INTRODUCTION

This manual contains three (3) volumes of literature for the 28 Automatic Send-Receive Teletypewriter Sets as follows:

Volume 1, NAVSHIPS 0967-173-6010, provides cross reference material, description and principles of operation, installation, operating test, disassembly and reassembly of the set, and component wiring diagrams.

Volume 2, NAVSHIPS 0967-173-6020, provides adjusting information, lubrication, and disassembly and reassembly of components.

Volume 3, NAVSHIPS 0967-173-6030, provides parts ordering information.

Each volume is made up of a group of appropriate independent sections. The sections are complete within themselves; they are separately identified by title and section number and the pages of each section are numbered consecutively, independent of other sections.

The identifying number of a section, a 9-digit number, appears at the top of each page of the section, in the left corner of left-hand pages and the right corner of right-hand pages.

To locate specific information, refer to the table of contents. The name of the involved component, the title of the section, and the 9-digit section number may then be found. The sections are arranged in the order shown in the table of contents. Turn to page one of the section indicated where the contents of the section will be found (except where a section is small and does not require a listing of contents).
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28 CABINET FOR AUTOMATIC SEND-RECEIVE
TELETYPEWRITER SETS

ADJUSTMENTS

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1. GENERAL

1.01 This section has been revised to include recent engineering changes and additions, and to rearrange the text so as to bring the section generally up-to-date. Since this is an extensive revision, marginal arrows ordinarily used to indicate changes have been omitted.

1.02 This section contains the specific requirements and adjustments for the 28 cabinet for automatic send-receive teletypewriter sets.

1.03 Maintenance procedures apply only to mechanisms of a particular design, or to certain models of 28 cabinets for automatic send-receive teletypewriter sets.

1.04 The adjustments of each unit are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken. The tools and spring scales required to perform these adjustments are listed in the applicable section. After an adjustment is completed, be sure to tighten any nuts or screws that are loosened. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions and the angles at which scales should be applied when measuring spring tensions. If a part mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same number is replaced when the part is remounted.

1.05 References made to left or right, up or down, front or rear, etc apply to the unit in its normal operating position as viewed from the front.

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Figure 1 - Model 20 Transmission and Receive Set
2. BASIC UNIT

2.01 Cabinet

REQUIRED

THE DOME SHOULD BE CENTERED ON THE CABINET FROM RIGHT TO LEFT AND PLACED APPROXIMATELY 0.050 INCH FROM THE FRONT EDGE OF CABINET OR SO THE EXTRUDED PORTIONS OF THE LEFT FRONT DOOR AND RIGHT FRONT CROSS BAR LINE UP.

TO ADJUST

1. DISCONNECT THE UPSTOP LATCH ARM ON RIGHT SIDE OF DOME. THEN PIVOTING DOME REARWARDLY OVER THE BACK, PRY END OF TORSION BARS OUT OF HOLE AND SLIP OUT FROM REAR BRACKET IN DOME.

NOTE: IF NECESSARY TO CHECK REQUIREMENT, REMOVE BLANK CONTROL PANEL.

TO ADJUST
POSITION THE LATCH TOWARD THE OUTSIDE SURFACE OF DOME WITH MOUNTING SCREWS LOOSENED. PIVOT DOME OPEN REARWARDLY OVER BACK OF CABINET. REPLACE ENDS OF TORSION RODS BY SLIDING THE STRAIGHT PORTION OF RODS UNDER BRACKET ON THE GUSSET IN CORNERS OF THE DOME, UNTIL BENT END OF ROD SLIPS INTO RETAINING HOLE IN FRONT OF BRACKET. PIVOT DOME FORWARD, AND REPLACE UPSTOP LATCH ARM ON RIGHT SIDE OF DOME AND SECURE IN PLACE WITH SCREW AS BEFORE.
2.03 Cabinet (continued)

TORSION BAR

(1) REQUIREMENT—WHEN THE CLOSED DOME IS RELEASED FROM ITS LATCHES THE TORSION BARS SHOULD LIFT THE DOME ABOVE THE FRONT EDGE OF CABINET MIN. 7 INCHES—MAX. 9 INCHES

(2) REQUIREMENT—WHEN DOME IS STARTED DOWN BY SLIGHT PUSH FROM ITS FULLY OPENED POSITION IT SHOULD NOT CLOSE OR LATCH. NOTE: READJUST DOME IF MORE APPARATUS IS ADDED.

TO ADJUST

TURN THE SHOULDER NUTS ON THE EYE BOLTS CLOCKWISE TO INCREASE THE SPRING TORQUE, AND COUNTERCLOCKWISE TO DECREASE THE SPRING TORQUE.
2.04 Cabinet (continued)

TOP DOORS (RIGHT AND LEFT)

REQUIREMENT
THE DOORS SHOULD SET SQUARELY AND UNIFORMLY ON THE CONTOUR OF THE DOME.

TO ADJUST
POSITION EACH DOOR WITH ITS HINGE MOUNTING SCREWS LOOSENED.

TOP MIDDLE DOOR

REQUIREMENT
THE DOOR SHOULD REST FLAT AND SQUARELY ON THE DOME. THE REINFORCEMENT CHANNEL SHOULD FIT OVER ITS GUIDE BRACKET IN THE DOME.

TO ADJUST
REMOVE THE SPRING DETENT FROM CENTER OF DOME AND POSITION THE DOOR WITH ITS HINGE MOUNTING SCREWS AND BRACKET MOUNTING SCREWS LOOSENED.

RIGHT FRONT DOOR

REQUIREMENT
THE RIGHT AND LEFT EDGES OF THE RIGHT FRONT DOOR SHOULD BE EVEN WITH THE RIGHT TOP DOOR. WITH THE DOOR CLOSED IT SHOULD REST FLAT ON THE HORIZONTAL SURFACE OF THE DOME.

TO ADJUST
REMOVE THE THUMB SCREWS, LATCHES, AND SPRINGS FROM THE DOOR, AND POSITION THE DOOR WITH ITS MOUNTING SCREWS LOOSENED.
2.05 Cabinet (continued)

LATCH THUMB SCREW

(MOUNTING SCREWS

LEFT FRONT DOOR

ADJUSTING BRACKET

LEFT FRONT DOOR

TORSION SPRING

DOME

STOP GUIDE

TO ADJUST

REMOVE LATCH THUMB SCREW AND LATCH. REMOVE TORSION SPRING ANCHOR POST. POSITION THE DOOR WITH ITS HINGE MOUNTING SCREWS LOOSENED.

(1) REQUIREMENT

THE DOOR SHOULD SET SQUARELY ON ITS OPENING IN THE DOME AND FLAT ON THE DOME.

TO ADJUST

REMOVE LATCH THUMB SCREW AND LATCH. REMOVE TORSION SPRING ANCHOR POST. POSITION THE DOOR WITH ITS HINGE MOUNTING SCREWS LOOSENED.

(2) REQUIREMENT

THE TORSION SPRING SHOULD RAISE THE DOOR UPWARD UNTIL STOPPED BY ITS STOP GUIDE BEFORE IT REACHES A VERTICAL POSITION.

TO ADJUST

ROTATE THE TORSION SPRING POST TO ACQUIRE SUFFICIENT LIFTING POWER. POSITION THE GUIDE STOP WITH ITS MOUNTING SCREW LOOSENED.

(3) REQUIREMENT

THE DOOR LATCH SHOULD HAVE SUFFICIENT LATCHING SURFACE ON ITS BRACKET AND SHOULD HOLD THE DOOR CLOSED REASONABLY TIGHT.

TO ADJUST

POSITION ITS ADJUSTING BRACKET HORIZONTALLY WITH ITS MOUNTING SCREWS LOOSENED. MODIFY UP OR DOWN POSITION OF BRACKET IF NECESSARY.
NOTE: THE REQUIREMENTS FOR PAPER GUIDE AND WINDOW GIVEN HEREIN ALSO APPLY WHERE THE CABINET IS EQUIPPED WITH A FORM GUIDE INSTEAD OF A PAPER GUIDE.

WINDOW REQUIREMENT
AS THE RIGHT FRONT DOOR IS BEING OPENED OR CLOSED, THE PAPER GUIDE SHOULD CLEAR THE WINDOW BY 1/16 INCH.

TO ADJUST POSITION THE WINDOW WITH ITS RETAINER MOUNTING SCREWS LOOSENED.

PAPER GUIDE REQUIREMENT
WITH THE RIGHT TOP DOOR CLOSED, THE BOTTOM EDGE OF THE PAPER GUIDE SHOULD BE MIN. 7/64 INCH --- MAX. 9/64 INCH BELOW THE BOTTOM EDGE OF THE SURFACE OF THE WINDOW IN THE RIGHT FRONT DOOR. TO ADJUST POSITION THE PAPER GUIDE WITH ITS MOUNTING SCREWS LOOSENED.

LAMP POSITION REQUIREMENT
CLEARANCE BETWEEN EACH LAMP AND ITS LENS OR THE DOME MIN. 1/16 INCH.
TO ADJUST POSITION LAMP HOLDER ON ITS BRACKET WITH MOUNTING SCREWS LOOSENED.
2.07  Cabinet (continued)

(1) REQUIREMENT
Understanding normal load, the top of the cradle railing should be 2 inches ± 1/32 inch from the shelf on the cabinet.

TO ADJUST
Loosen the lock nuts on vibration dampener No. 1, 2, and 3 on top of the left and right rails. Loosen the nut on the lower end of stud in mount No. 4. Rotate the adjusting studs until the rails have reached the desired height. Tighten all nuts previously loosened.

(2) REQUIREMENT
The front rail should be positioned approximately 3-11/32 inch ± 1/32 inch from and parallel to the front of the cabinet.

TO ADJUST
Position the base rail assembly with its four mounting screws and two locating eccentrics loosened after positioning the rail assembly to desired position, rotate the eccentrics against the rear rail and lock in position.
2.08 Cabinet (continued)

**LEFT FRONT CROSS BAR**

**NOTE:**
The front cross bar brackets are located at the factory and should not be disturbed unless it is necessary to remove for replacement. Should they however be removed replace as follows:

**REQUIREMENT**
The adjustable cross bar brackets should be positioned 0.050 from the front edge of the cabinet body cross bar.

- **TRANSMITTER HOUSING**
  - **REQUIREMENT**
  - The housing mounting bracket on the left front cross bar should be positioned to provide a minimum of 0.020 inch between the housing and the transmitter unit.

- **COPYHOLDER**
  - **REQUIREMENT**
  - There should be sufficient tension on the line guide to prevent it from slipping down its shaft. It should also hold the copy in place.

- **TO ADJUST**
  - Remove the mounting screws or nuts from the shaft and turn the shaft so as to increase the spring tension. Replace the shaft mounting post.
2.09 Cabinet (continued)

- **ARMATURE SPRING TENSION**
  - **REQUIREMENT**
  - MIN. 1/2 OZ. ---- MAX. 1 OZ.
  - TO PUSH THE ARMATURE AGAINST THE CORE (VERTICALLY)

- **REMOTE SIGNAL BELL**
  - **REQUIREMENT**
  - ARMATURE HELD AGAINST THE MAGNET CORE. CLEARANCE BETWEEN THE ARMATURE BALL AND THE BELL
  - MIN. 0.020 INCH
  - MAX. 0.035 INCH
  - TO ADJUST
  - BEND THE ARMATURE EXTENSION, BELOW THE ARMATURE SPRING

- **CHAD CHUTE AND CHAD BIN ASSEMBLIES**
  - (AUTOMATIC SEND-RECEIVE SET)
  - **REQUIREMENT**
  - WHEN CHAD BIN IS INSERTED ON SLIDE PLATES, THE CABINET DOOR SHOULD CLOSE WITHOUT INTERFERING WITH CHAD BIN.
  - TO ADJUST
  - USING THE SLACK IN THE MOUNTING SCREW BODY HOLES, POSITION THE CHAD CHUTE AND THE CHAD BIN LEFT AND RIGHT SIDE PLATES.
MESSAGE TRAY POSITION REQUIREMENT

The three-shelf message tray should be positioned so as not to interfere with the cabinet dome torsion bars.

To adjust position the shelves with their mounting screws loosened.
# 28 ELECTRICAL SERVICE UNITS

## ADJUSTMENTS

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## 1. GENERAL

1.01 This section provides mechanical adjusting information for the 28 electrical service units and most of the various components that may be assembled onto it. It is reissued to include a signal bell assembly and to arrange the material in a standardized format.

Note: Remove power from units, before making adjustments.

1.02 Since this is a general revision, marginal arrows normally used to indicate changes and additions have been omitted.
2. REQUIREMENTS AND ADJUSTMENTS

2.01 28G and 28G-1 Electrical Service Unit

SLOW RELEASE RELAY

Requirement
The relay should not de-energize while receiving a series of BLANK code combinations. The time required to stop an associated transmitter after receipt of line break signal should not exceed
Max 800 milliseconds.

To Adjust
Insert a 5-foot strip of BLANK tape into the transmitter. Turn the keyboard control knob to the K-T position. Turn the line-test key to the TEST position. Depress the SEND key. Loosen the residual screw locknut on the armature of the slow release relay and turn the screw counterclockwise until no gap exists between the armature and pole piece. Press the slow release relay test button and turn on the transmitter. With the tape running through the transmitter turn the residual screw clockwise until the slow release relay armature begins to vibrate. Then turn the residual screw counterclockwise slowly until the armature stops vibrating. Tighten the locknut. Rerun the entire 5-foot strip of tape through the transmitter, while the slow release relay test key is held depressed; the slow release relay armature must not drop out.

Insert a 5-foot strip of LETTERS tape into the transmitter. Plainly mark a row of perforations approximately three inches back from the sensing pins on the transmitter. Hold the slow release relay test button depressed, and start the transmitter. When the previously marked row of perforations reach the sensing pins, depress the line-break key and hold depressed until the transmitter stops. Mark the row of perforations immediately over the sensing pins, remove the tape from the transmitter and count the number of perforations between the two marked lines. The number of perforations between these lines should be no greater than,

1. Eight for 100 wpm operation.
2. Six for 75 wpm operation.
3. Five for 60 wpm operation.

Should the number of perforations be greater than that specified above, turn the residual screw clockwise approximately 1/8 turn and repeat the above test. The number of perforations may be fewer than that specified above provided the requirement is met.
2.02 Electrical Motor-Control Mechanism (if Equipped)

(A) STOP ARMATURE SPRING

Requirement
Stop armature latched on start armature. Stop armature spring unhooked.
Min 4-1/2 oz --- Max 6 oz
to pull spring to installed length.

(B) INTERMEDIATE LEVER SPRING

Requirement
With the stop and start armatures held against their cores, apply a gram scale to the under side of the intermediate lever just to the right of its downward extension and push upward.
Min 10 grams
Max 20 grams
to start the lever moving upward.

(C) START ARMATURE SPRING

Requirement
Stop armature in unattracted position. Clearance between the start magnet core and anti-freeze rivet on the start armature
Armature TP151409 TP152849
Min 0.003 inch 0.010 inch
Max 0.010 inch 0.015 inch

To Adjust
Advance or retard the start magnet cores with screwdriver (locknut loosened).

(D) START MAGNET CORE

Requirement
Stop armature in attracted position. Intermediate lever held upward. 8 oz scale applied to start armature at right of intermediate lever lower extension
Min 2-1/2 oz
Max 4 oz
to hold start armature against cores.
2.03 Relay Motor-Control Mechanism (if Equipped)

**SWITCH POSITION (IF UNIT IS SO EQUIPPED)**

**Requirement**
When the solenoid plunger is depressed slowly, the switch should operate when the plunger is within
Max 0.005 inch from the end of its travel (gauge by eye).
Check by the audible click or by test lamp.

To Adjust
Loosen the switch mounting screws.
Hold the plunger downward and move the switch toward the plunger until it operates. Tighten the screws.

**EARLIER DESIGN**
(CONTACT PILE-UP TYPE)

(A) **MIDDLE CONTACT SPRING**

**Requirement**
With solenoid plunger unoperated
Min 2 oz --- Max 3 oz
to break contact with inner contact.

To Adjust
Form middle contact spring with suitable spring bender.

(B) **OUTER CONTACT SPRING**

**Requirement**
Hold solenoid plunger operated.
Min 12 oz --- Max 16 oz
to break contact with the middle contact spring.

To Adjust
Form outer contact spring with suitable spring bender.

(C) **INNER CONTACT SPRING GAP**

**Requirement**
Hold solenoid plunger operated.
Clearance between inner and middle contact spring contact surface
Min 0.025 inch --- Max 0.030 inch

To Adjust
Form inner contact spring with suitable spring bender.
2.04 Signal Bell

(A) ARMATURE SPRING TENSION

Requirement
Min 1/2 oz—Max 1 oz
to push the armature against the core (vertically).

(B) REMOTE SIGNAL BELL

Requirement
Armature held against the magnet core. Clearance between the armature ball and the bell
Min 0.020 inch—Max 0.035 inch

To Adjust
Bend the armature extension just below the armature spring.

2.05 Line Test Key Assembly (if Equipped)

LINE TEST KEY

Note: This key is carefully adjusted at the factory and should not need readjusting unless it has been disassembled or mutilated.

Requirement
When knob is moved to downward position contacts 9-10 should close before contacts 8-10 and 5-6 open.

To Adjust (if necessary)
Form contact leaf springs with a suitable spring bender to meet requirements.
2.06 28 LB Electrical Service Unit

(A) Requirement for circuit assurance detector: The circuit assurance detector should accept incoming spacing signals from a receive set without setting off an alarm. If the spacing signals fall within the limits of 32.6 to 73.0 ms in length, and are received at least once each 500 ms, the alarm does not operate. The alarm contacts in the dry-reed relay pack (a part of the circuit assurance detector) close to initiate an alarm if the signal to the send set does not comply.

(B) To adjust: The timers on the circuit assurance card are adjusted with off-line signals by using the TP146439 adapter. The character T or V (32.6 ms marking pulse and 73.0 ms marking pulse respectively) is sent from the 28 LA or 28 LB transmitter distributor to the MLR relay. Using the TP146439 adapter, a 32.6 ms spacing pulse, and a 73.0 ms spacing pulse are taken from the normally closed contacts of the MLR relay and fed into the card. The operating point of the lower limit timer is set by using the 32.6 ms spacing pulse and the operating point of the upper limit timer is set by using the 73.0 ms spacing pulse.

(C) Preliminary preparation:

1. Prepare four test tapes as follows:
   a. Three feet punched with BLANKS only.
   b. Three feet punched with T only.
   c. Three feet punched with M only.
   d. Three feet punched with V only.

2. Lower the message processing panel of the send set.
   a. Block relay CFR operated.
   b. Block relay PBRR operated.
   c. Set the timer disable switch to its NORMAL position.
(3) Lower the alarm panel of the send set.
   (a) Block relay TCFR in the unoperated position.
(4) Remove the following from their sockets in the electrical service unit.
   (a) Relay REC.
   (b) Relay LFR.
   (c) Relay MLR.
   (d) Wave shaping assembly (TP-146652).
(5) Plug relay MLR into the socket provided in the adapter.
(6) Plug the adapter, with the MLR relay, into the MLR socket of the electrical service unit.
(7) Plug the adapter test plug into the REC socket of the electrical service unit.
(D) Upper limit timer adjustment (73 ms):
   (1) Set the switch on the adapter to its ADJUST position.
   (2) Place the beginning of the V test tape in the reading head of the TD.
   (3) Set the TD STOP-RUN lever in the STOP position.
   (4) Press the RESET key on the key and lamp assembly to clear all alarms.
   (5) Set the TRANSMITTER selector switch on the key and lamp assembly to its NORMAL position.
   (6) Start the test tape through the TD by setting the STOP-RUN lever to RUN.
   (7) With the TD reading the V test tape, rotate the adjusting screw of the 100K potentiometer (forward potentiometer) on the card clockwise until the CONNECTION LOST alarm operates. Then rotate the screw counterclockwise until the alarm fails to operate.
   Note: Every time the alarm operates, the circuit must be reset by pressing the RESET key with the TD lever in the STOP position.
   (8) Very slowly rotate the adjusting screw counterclockwise until the CONNECTION LOST alarm just operates as V test tape is read by TD.
(E) Lower limit timer adjustment (32.6 ms):
   (1) Set the switch on the adapter to ADJUST position.
   (2) Place the beginning of the T test tape in the reading head of the TD.
   (3) Set the TD STOP-RUN lever in the STOP position.
   (4) Press the RESET key on the key and lamp assembly to clear all alarms.
   (5) Set the TRANSMITTER selector switch on the key and lamp assembly to its NORMAL position.
   (6) Start the test tape through the TD by setting the STOP-RUN lever on RUN.
   (7) With the TD reading the T test tape, rotate the adjusting screw of the 200K potentiometer (rear potentiometer) on the card counterclockwise until CONNECTION LOST alarm operates. Then rotate the adjusting screw clockwise until the CONNECTION LOST alarm fails to operate.
   Note: Every time the alarm operates, the circuit must be reset by pressing the RESET key with the TD lever in the STOP position.
   (8) Very slowly rotate the adjusting screw clockwise until the CONNECTION LOST alarm just operates as T test tape is read by TD.
(F) Final tests:
   (1) Set the adapter switch in its TEST position. Press the RESET key on the key and lamp assembly with the TD lever in the STOP position to clear any alarms.
   (2) Place the beginning of the BLANK test tape in the reading head of the TD and start the TD reading. CONNECTION LOST alarm should operate. If not, readjust the upper limit timer. To clear an alarm condition depress the RESET key on the key and lamp assembly with the TD lever in the STOP position.

Note: Every time the alarm operates, the circuit must be reset by pressing the RESET key with the TD lever in the STOP position.
(3) Replace the BLANK test tape with the T test tape and start the TD. The CONNECTION LOST alarm should fail to operate. If the alarm operates, readjust the upper limit timer as described in (D).

(4) Replace the T test tape with the M test tape and start the TD. The CONNECTION LOST alarm should fail to operate. If the alarm operates, readjust the lower limit timer as described in (E).

(5) Replace the M test tape with the V test tape and start the TD. The CONNECTION LOST alarm should operate. If the alarm fails to operate, readjust the lower limit timer as described in (E). Clear the alarm as previously described.

(6) Restore the equipment to normal by reversing the order of (C), Preliminary preparation. The timer disable switch should be in NORMAL position.
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## 1. GENERAL

1.01 This section has been revised to include recent engineering changes and additions, and to rearrange the text, so as to bring the section generally up-to-date. Since this is an extensive revision, marginal arrows ordinarily used to indicate changes have been omitted.

1.02 This section contains the specific requirements and adjustments for the 28 perforator-transmitter base.

1.03 Maintenance procedures which apply only to mechanisms of a particular design, or to certain models of 28 perforator-transmitter bases are so indicated in the titles of the paragraphs which contain these particular adjustment requirements.
1.04 The adjustments of each unit are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken. The tools and spring scales required to perform these adjustments are listed in the applicable section. After an adjustment is completed, be sure to tighten any nuts or screws that are loosened. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions and the angles at which scales should be applied when measuring spring tensions. If a part mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same number is replaced when the part is remounted.

1.05 References made to left or right, up or down, front or rear, etc apply to the unit in its normal operating position as viewed from the front.

1.06 The letters K (Keyboard), K-T (Keyboard - Tape), and T (Tape) are used in this section to refer to corresponding positions of the keyboard-control knob. Unless otherwise specified adjustments should be made in the K-T position.

1.07 When a requirement calls for a clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latch-lever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

Note: When the signal generator shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve drag and permit the main shaft to rotate freely, apply pressure on the lug of the clutch disc with a screwdriver to cause it to engage its latchlever and fully disengage the clutch.

1.08 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 per cent of the contact diameter. Check contacts for pitting and corrosion and clean or buff-nish them before making specified adjustment or tolerance measurement. Avoid sharp kinks or bends in the contact springs.

CAUTION: KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.
2. BASIC UNIT

2.01 Code Bar Assembly

NOTE: REMOVE PERFORATOR TRANSMITTER FROM CABINET BEFORE ADJUSTING CODE BARS.

(B) CODE LEVER UNIVERSAL BAIL SPRING TENSION REQUIREMENT

GENERATOR CLUTCH DISENGAGED, UNIVERSAL BAIL LATCH IS HELD OUT OF CONTACT WITH THE BAIL.

MIN. 1 OZ.
MAX. 2 OZS.
TO START BAIL MOVING.

CODE BAR GUIDE

CLUTCH TRIP BAR

KEYBOARD LOCK BAR

UNIVERSAL BAIL SPRING

CODE LEVER UNIVERSAL BAIL

FRONT BLADE

REAR BLADE

CODE BAR GUIDE MOUNTING SCREWS

FRAME

SPACE BAR BRACKET

PILOT SCREW

PILOT SCREW

CODE BAR GUIDE CLEARANCE REQUIREMENT

ALL CODE BARS SHOULD MOVE FREELY WITHOUT BINDING INCLUDING THE CLUTCH TRIP BAR AND KEYBOARD LOCK BAR.

MIN. SOME
MAX. 0.010 INCH
TO ADJUST LOOSEN MOUNTING SCREWS AND POSITION CODE BAR GUIDES.

(C) SPACE BAR BAIL PIVOT REQUIREMENT

MIN. SOME END PLAY.
MAX. 0.010 INCH.
SPACE BAR FREE FROM BIND.
TO ADJUST POSITION SPACE BAR WITH PILOT SCREWS LOOSENED.

NOTE: THE BAIL SHOULD BE SO ADJUSTED THAT THE SPACE BAR CAN BE OPERATED WITHOUT BINDING IN THE HOLES IN THE GUIDE PLATE AND THE FRAME.

NOTE: KEYLEVER COVER MUST BE REMOVED. SEE DISASSEMBLY AND REASSEMBLY.
2.02 Signal Generator Mechanism

ADJUSTING DISK CLAMP SCREWS

CLUTCH SHOE LEVER

(TOP VIEW)

CLUTCH CAM DISK

ADJUSTING DISK

CLUTCH DISK STOP LUG

GEAR SLEEVE

(A) CLUTCH SHOE LEVER

REQUIREMENT

CLEARANCE WHEN CLUTCH IS DISENGAGED SHOULD BE 0.055 INCH TO 0.085 INCH LESS THAN WHEN CLUTCH IS ENGAGED.

TO CHECK

LATCH CLUTCH IN DISENGAGED POSITION AND MEASURE CLEARANCE. ROTATE GEAR UNTIL OIL HOLE IS UPWARD. ENGAGE CLUTCH AND MEASURE CLEARANCE.

TO ADJUST

LOOSEN THE TWO ADJUSTING DISK CLAMP SCREWS TO POSITION DISK.

(CLUTCH SHOE LEVER)

CLUTCH DRUM

(B) CLUTCH STOP LEVER

REQUIREMENT

SHOULD FULLY ENGAGED CLUTCH SHOE LEVER.

DURING ROTATION, THE LEVER SHOULD NOT TOUCH THE CLUTCH DRUM AT ANY POINT.

TO ADJUST

POSITION STOP LEVER WITH ITS CLAMP SCREW LOOSENED.

(CLUTCH STOP LEVER)

CLUTCH STOP LEVER SPRING

CLUTCH TRIP BAIL EXTENSION

(C) CLUTCH STOP LEVER SPRING TENSION

REQUIREMENT

CLUTCH ENGAGED AND ROTATED 1/4 TURN.

MIN. 2 OZS.

MAX. 3 OZS.

TO START LEVER MOVING.

(CLUTCH LATCH LEVER)

CLUTCH LATCH LEVER SPRING

(CLUTCH LATCH LEVER)

MIN. 2 OZS.

MAX. 3 OZS.

TO START LATCH LEVER MOVING.
2.03 Signal Generator Mechanism continued

(A) **CLUTCH SHOE LEVER SPRING TENSION**

**REQUIREMENT**
- CLUTCH ENGAGED.
- CAM DISK HELD TO PREVENT TURNING.
- MIN. 15 OZS.
- MAX. 20 OZS.
- TO MOVE SHOE LEVER IN CONTACT WITH STOP LUG.

(B) **CLUTCH SHOE SPRING TENSION**

**NOTE**
In order to check this spring tension, it is necessary to remove the clutch from the main signal generator drive shaft. Therefore, it should not be checked unless there is good reason to believe that it does not meet its requirement.

**REQUIREMENT**
- CLUTCH DRUM REMOVED.
- MIN. 3 OZS.
- MAX. 5 OZS.
- TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.
2.04 Signal Generator Mechanism continued

(B) TRANSFER BAIL DETENT LATCH SPRING
REQUIREMENT
MIN 2-3/4 OZS.
MAX 4-1/4 OZS.
TO START LATCH MOVING.
HOLD TRANSFER BAIL TO LEFT.

(A) TRANSFER BAIL DETENT PLATE
REQUIREMENT
EQUAL L. H. AND R. H. CLEARANCE WITHIN
0.002 INCH WHEN TRANSFER BAIL IS AT
EXTREME L.H. OR R.H. POSITION AS THESE
OCUR IN A CHARACTER BETWEEN START
AND NO. 1 PULES ONLY.

(C) SIGNAL CONTACT CLEARANCE
REQUIREMENT
MARKING AND SPACING GAPS SHOULD BE EQUAL WITHIN 0.001 INCH.
TO CHECK
DEPRESS Y KEYLEVER AND ROTATE SIGNAL GENERATOR CAM SLEEVE UNTIL EACH CONTACT
HAS FULLY OPENED.
TO ADJUST
LOSEN MOUNTING SCREWS AND MOVE CONTACT BOX BY MEANS OF ECCENTRIC.
NOTE: CHECK BY MEANS OF SIGNAL CHECKING DEVICE WHERE POSSIBLE, AND CAREFULLY RE-
FINE THE ADJUSTMENT TO ELIMINATE ALL BIAS FROM THE SIGNALS BY EQUALIZING THE
CURRENT-ON AND CURRENT-OFF INTERVALS

(D) SIGNAL CONTACT DRIVE LINK
REQUIREMENT
WITH MAINSHAFT IN STOP POSITION AND TRANSFER BAIL DETENT LATCH SPRING UN HOOKED
SEE FIG ABOVE), MOVE LATCHES AWAY FROM TRANSFER BAIL EXTENSION. HOLD
THE TOGGLE FIRMLY AGAINST CONTACTS.
MIN 6 OZS --- MAX 9 OZS
TO START TRANSFER BAIL EXTENSION MOVING.

(E) SIGNAL CONTACT SPRING
REQUIREMENT
REMOVE DRIVE LINK SPRING
TRANSFER BAIL HELD CLEAR OF
DRIVE LINK.
MIN 2 OZS --- MAX 3 OZS
TO START LINK MOVING.

CAUTION: ON UNITS SO EQUIPPED -
CLEAN GOLD CONTACTS BY PASSING
BOND PAPER BETWEEN THEM.
USE NO OTHER CLEANING OR
BURNISHING METHODS. AVOID
PITTING OR CHIPPING THE CONTACTS.

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SECTION 573-117-700

2.05 Codebar Assembly continued

NOTE: IF NECESSARY REMOVE CHARACTER COUNTER ASSEMBLY. SEE DISASSEMBLY AND REASSEMBLY.

(A) CODE BAR AND CODE LEVER CLEARANCE
REQUIREMENT
CARRIAGE RETURN KEY DEPRESSED BUT NOT ENOUGH TO TRIP OFF UNIVERSAL BAIL LATCH OR CLUTCH BAR.
MIN. 0.006 INCH --- MAX. 0.017 INCH
MEASURE AT CODE BAR #3
TO ADJUST
POSITION GUIDE BY ADJUSTING SLOT WITH FOUR MOUNTING SCREWS LOOSENED.

(B) CLUTCH TRIP BAR SPRING TENSION
REQUIREMENT
BLANK KEY DEPRESSED TO ALLOW THE CLUTCH TRIP BAR TO FALL TO RIGHT.
SPRING UNHOOKED FROM BRACKET
MIN. 8 OZS. --- MAX. 12 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
NOTE: SEE FOLLOWING PAGE FOR ADJUSTMENTS (C),(D),(E) AND (F).
NOTE: ADJUSTMENTS CONTINUED FROM PRECEDING PAGE.

(C) CLUTCH TRIP BAR (USED FOR SYNCHRONOUS PULSED TRANSMISSION)

REQUIREMENT

WITH THE CLUTCH DISENGAGED AND LATCHED, POWER OFF AND ARMATURE OF THE MAGNET ASSEMBLY HELD AWAY FROM THE CLUTCH TRIP BAR. PUSH AT THE RIGHT HAND END OF CLUTCH TRIP BAR.

MIN. 9 OZS. --- MAX. 12 OZS.

TO START CLUTCH TRIP BAR MOVING.

NOTE: HOLD THE SWINGER OF THE CONTACT ASSEMBLY AWAY FROM THE UNIVERSAL CODE BAR WHEN MEASURING THE CLUTCH TRIP SPRING TENSION.

(D) UNIVERSAL CODE BAR (USED FOR SYNCHRONOUS PULSED TRANSMISSION)

REQUIREMENT

WITH THE CLUTCH DISENGAGED AND LATCHED, DEPRESS THE BLANK KEY TO ALLOW THE UNIVERSAL CODE BAR TO FALL TO THE RIGHT. SPRING UNHOOKED FROM THE BRACKET.

MIN. 8 OZS. --- MAX. 12 OZS.

TO PULL SPRING TO INSTALLED LENGTH.

(E) CODE BAR SPRING TENSION

REQUIREMENT

KEYBOARD IN K POSITION, LETTERS KEYLEVER DEPRESSED (POWER OFF) HOLD TRANSFER LEVERS (REF. FIGURE 1-15) TO THE RIGHT SO THEY DO NOT AFFECT THE CODE BARS.

MIN. 3 OZS. --- MAX. 5 OZS.

TO START CODE BAR MOVING.

(F) LOCK BAR SPRING TENSION

REQUIREMENT

CLUTCH DISENGAGED, KEYBOARD LOCK KEYLEVER DEPRESSED, APPLY PUSH END OF SCALE AGAINST R.H. END OF LOCK BAR.

MIN. 2-1/2 OZS. --- MAX. 6 OZS.

TO START LOCK BAR MOVING.
2.06 Codebar Assembly continued

(A) FUNCTION BAIL AND CODE LEVER CLEARANCE REQUIREMENT
MIN. 0.015 INCH BETWEEN ANY FUNCTION BAIL AND ITS ADJACENT CODE LEVER.
TO ADJUST POSITION FUNCTION BAIL ASSEMBLY WITH MOUNTING SCREWS AND TYPING UNIT LOCATING STUDS LOOSENED.

NOTE: THIS ADJUSTMENT SHOULD NOT BE MADE UNLESS THE LOCK BALL CHANNEL HAS BEEN DISASSEMBLED.

2.07 Keyboard Mechanism

(B) LOCK BALL CHANNEL REQUIREMENT
THERE SHOULD BE SOME TO 0.006 INCH CLEARANCE BETWEEN END OF LOCK BALL CHANNEL AND ADJUSTING SCREW WHEN MOST OF THE CODE LEVERS ARE CENTRALLY LOCATED IN THE LOCK BALL CHANNEL SLOTS.
TO CHECK REMOVE THE LOCK BALL RETAINER. REMOVE A WEDGE FROM EACH END AND ONE FROM THE CENTER IN ORDER TO VIEW THE POSITION OF THE CODE LEVER.

TO ADJUST LOOSEN THE LOCK BALL CHANNEL MOUNTING SCREWS. BACK OFF LATERAL ADJUSTING SCREWS AND POSITION CHANNEL. TURN ONE ADJUSTING SCREW IN AGAINST THE END OF THE CHANNEL AND LOCK IT. TURN THE OTHER ADJUSTING SCREW IN TO THE END OF THE CHANNEL AND BACK IT OFF 1/4 TURN. LOCK THE SCREW. REPLACE THE WEDGES AND CHECK THEIR POSITION WITH RESPECT TO THE BALLS. PULL CHANNEL ASSEMBLY DOWNWARD UNTIL ALL CODE LEVERS STRIKE THEIR UPSTOP WITHOUT WEDGES JUMPING OUT OF POSITION. REPLACE LOCK BALL RETAINER. BACK OFF BALL ENDPPLAY ADJUSTING SCREW.
2.08 Code Bar Assembly continued

(A) Code Bar Bail Latch Spring Tension Requirement
- Min. 1/2 ozs.
- Max. 1 1/2 ozs.
To start Code Bar Bail Latch moving

(B) Code Bar Bail Requirement
- Cam eccentric and arm which hold the bail in extreme reset position to the left.
  - Min. some
  - Max. 0.006 inch
- Between Code Bar Bail Roller and Code Bar Bail Latch
To adjust
- With lock nut loosened,
- Adjust eccentric stud so that high point is in upper half of arc.

(C) Non-Repeat Lever Spring Tension Requirement
- Any key lever depressed
  - Min. 2 ozs.
  - Max. 3 1/4 ozs.
To start Non-Repeat Lever moving downward.

(D) Code Bar Bail and Non-Repeat Lever Clearance Requirement
- Mechanism in initial trip-off position, any key depressed, no power.
  - Min. 0.010 inch
  - Max. 0.020 inch
- Between roller of code bar bail and non-repeat lever pick-up step.
To adjust
- Loosen lock nut and shoulder screw and move mechanism left or right.
2.09 Keyboard Mechanism continued

(A) BALL WEDGELOCK AND BALL TRACK CLEARANCE
REQUIREMENT (PRELIMINARY)
ADJUSTMENT SCREW BACKED OUT TO PERMIT MAXIMUM
BALL MOVEMENT WITHOUT THE BALLS ROLLING OUT
OF TRACK. (FROM PREVIOUS LATERAL ADJUSTMENT)
APPLY 32 OZS. OF PRESSURE TO THE "Q" OR THE "P" KEYLEVER
MIN. 0.005 INCH
MAX. 0.015 INCH
EQUAL WITHIN 0.005 INCH BETWEEN THE TIP OF THE WEDGE-
LOCK AND THE BALL TRACK.
TO ADJUST
LOosen MOUNTING SCREWS AT EACH END OF THE BALL
TRACK AND ADJUST TRACK UP OR DOWN.
NOTE: REMOVE KEYBOARD HOOD IN ORDER TO MAKE THIS ADJUSTMENT.
SEE DISASSEMBLY AND REASSEMBLY
NOTE: WHEN GAUGING THESE CLEARANCES MAKE SURE THERE IS NO
CLEARANCE BETWEEN THE LOWER EDGE OF CODE LEVER EX-
TENSIONS AND THE BOTTOM OF THE SLOTS IN THE WEDGES.
A TOTAL OF 43 BALLS ARE REQUIRED IN THE BALL TRACK ASSEMBLY.

(B) LOCK BALL-END PLAY
REQUIREMENT (PRELIMINARY)
WITH A 32 OZS. PRESSURE APPLIED TO THE CAR.
RET. KEY, THE BALLS SHALL HAVE A
MIN. CLEARANCE
TO ADJUST
TURN IN BALL END-PLAY ADJUSTMENT SCREW
WITH FINGERS UNTIL A RESISTANCE IS FELT,
TIGHTEN THE NUT.
2.10 Codebar Assembly continued

**UNIVERSAL BAIL LATCH SPRING TENSION REQUIREMENT**

**(B)**

CLUTCH DISENGAGED, UNIVERSAL BAIL HELD AWAY FROM LATCH LEVER. NON-REPEAT LEVER BELL CRANK HELD DOWN AGAINST ITS STOP POST.

MIN. 7 1/2 OZS.
MAX. 11 OZS.
TO START LATCH LEVER MOVING.

**UNIVERSAL BAIL LATCH LEVER (PRELIMINARY)**

NOTE: ON KEYBOARDS EQUIPPED FOR REPEAT SPACE OPERATION, UNHOOK THE SPRING FROM THE PLATE WITH STUD—SEE PARAGRAPH 3.09.

**(C)**

UNIVERSAL BAIL EXTENSION REQUIREMENT (POWER OFF)

UNIVERSAL BAIL EXTENSION ROLLER RESTING AGAINST END OF UNIVERSAL BAIL LATCH LEVER

MIN. 0.060 INCH
MAX. 0.080 INCH
BETWEEN EXTENSION AND NON-REPEAT LEVER

TO CHECK: DEPRESS LETTERS KEYLEVER AND RELEASE IT. CHECK CLEARANCE.

TO ADJUST: POSITION THE EXTENSION WITH ITS CLAMP SCREW LOOSENED.
2.11 Keyboard Mechanism continued

BALL WEDGELOCK, BALL END-PLAY AND UNIVERSAL BAIL LATCH ADJUSTMENTS - (FINAL)

CHECK UNDER POWER

1) REQUIREMENT

MIN. 2 OZS.
MAX. 5 OZS.
TO TRIP ANY CENTER ROW KEY.

2) REQUIREMENT

WITH 5-1/2 OZS. PRESSURE APPLIED PERPENDICULAR TO THE "A" KEY, DEPRESS EACH KEY IN THE THIRD ROW. THE "A" KEY SHALL TRIP EACH TIME A KEY IS RELEASED. REPEAT THIS CHECK WITH THE 5-1/2 OZS. PRESSURE ON THE "CAR. RET." KEY.

3) REQUIREMENT

THE CLUTCH SHALL NOT TRIP WHEN ANY TWO KEYS ARE DEPRESSED SIMULTANEOUSLY.

4) REQUIREMENT

WITH 4-1/4 + 1/4 OZ. APPLIED TO THE "SPACE BAR," DEPRESS "CAR. RET." KEY. THE "SPACE BAR" SHALL TRIP EACH TIME THE "CAR. RET." KEY IS RELEASED BY MOVING THE FINGER OFF THE KEY IN A HORIZONTAL DIRECTION.

NOTE

DISREGARD MULTIPLE SPACE OPERATION IF UNIT IS EQUIPPED WITH 163775 MODIFICATION KIT FOR REPEAT-SPACE OPERATION.

TO ADJUST

IF NECESSARY, REFINISH PRELIMINARY BALL WEDGELOCK, PRELIMINARY BALL END-PLAY, PRELIMINARY UNIVERSAL BAIL LATCH, AND UNIVERSAL BAIL EXTENSION ADJUSTMENTS.
2. 12  Signal Generator Mechanism continued

**SIGNAL CONTACT CLEARANCE (USING SIGNAL TEST SET --- SUCH AS DXD/LSS)**

Preliminary --- With electrical noise suppressor disconnected from circuit, connect signal contacts so as to interrupt (key) current to "strobe" lamp of DXD or LSS. Test set and key-board must operate at same speed. (See Table 1-1).

Requirements

1. With blanks combination selected, orient scale of test set to align zero mark of stop segment with beginning of stop pulse image. Length of trace shall be from the zero mark (Note 1) to (min. 141-1/2 divisions) - (max. 142-1/2 divisions).

To adjust, if variations occur, position scale so that variations extend equally on right & left of 142 mark.

2. Nominal length of pulses No. 1, 2, 3, 4, & 5 is 100 divisions. To adjust, recheck contact clearance requirement Fig. 1-4. Refine clearance, where necessary, to favor pulses 1 thru 5 by orienting beginning of stop pulse trace up to ± 5 divs. From zero mark of segment (refer to requirements "A" and "B" below).

3. Each pulse trace (See "C" below) to be free of undesirable breaks. To adjust, recheck transfer bail detent plate requirement. (Fig. 1-4) and where necessary, refine adjustment. Note --- Detent plate may be rotated either left or right as long as detent toggle latch continues to cam off projection of transfer bail.

A. Beginning of each trace should fall between
   1. Zero mark and 5th div. of scale segment
   2. 95th div. (previous segment) and zero mark.

B. End of each trace (except stop pulse)
   1. 95th div. (previous segment) & zero mark
   2. Zero mark and 5th div. of scale segment.

C. Each trace of the marking code pulses may have a break within tolerance limits --- The break should not occur prior to 95th division of observed pulse (1 through 5) or 137th division of stop pulse. See Table 1-1 for permissible width of break at speed of operation.

**TABLE 1-1 SIGNALING PULSE SPEED AND PERMISSIBLE WIDTH OF BREAK**

<table>
<thead>
<tr>
<th>SPEED</th>
<th>OPERATIONS PER MINUTE</th>
<th>WIDTH OF BREAK NOT TO EXCEED</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 W.P.M.</td>
<td>368.182</td>
<td>1 DIVISION</td>
<td>MARKING PULSES (1 THROUGH 5 &amp; STOP)</td>
</tr>
<tr>
<td>75 W.P.M.</td>
<td>460.00</td>
<td>1-1/2 DIVISION</td>
<td>MARKING PULSES (1 THROUGH 5 &amp; STOP)</td>
</tr>
<tr>
<td>100 W.P.M.</td>
<td>600.00</td>
<td>2 DIVISION</td>
<td>MARKING PULSES (1 THROUGH 5 &amp; STOP)</td>
</tr>
</tbody>
</table>
2.13 Signal Generator Mechanism continued

"R" AND "Y" COMBINATION

FOR UNITS WITH SPACING CONTACTS OF SIGNAL GENERATOR WIRING FOR POLAR OPERATION

REQUIREMENTS ---

(1) SPACING PULSES SHALL START NO EARLIER THAN 94TH DIV. OF PREVIOUS SEGMENT AND NO LATER THAN 6TH DIV. OF PULSE UNDER OBSERVATION.

(2) TRACE OF SPACING PULSE SHALL END NO EARLIER THAN 94TH DIV. OF PULSE UNDER OBSERVATION AND END NO LATER THAN 6TH DIV. OF FOLLOWING PULSE.

(3) TRACE OF START PULSE SHALL BEGIN NO EARLIER THAN 136TH DIV. OF STOP SEGMENT AND NO LATER THAN 6TH DIV. OF START SEGMENT. START PULSE SHALL END NO EARLIER THAN 94TH DIV. OF START SEGMENT AND END NO LATER THAN 6TH DIV. OF NO. 1. SEGMENT.

(4) SPACING PULSE MAY HAVE A BREAK PROVIDED THE BREAK IS NOT OVER ONE DIVISION WIDE AND IT DOES NOT OCCUR PRIOR TO 95TH DIV. OF PULSE UNDER OBSERVATION.

SEE TABLE 1-1 FOR PERMISSIBLE WIDTH OF BREAK AT SPEED OF OPERATION.

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2.14 Keyboard Mechanism continued

- Local Line Feed Trip Link
- Local Line Feed Trip Link Spring
- Plunger Lock Spring (Flat Spring)
- Plunger Spring Tension Requirement
  - With Plunger Operating Keylever Depressed:
  - Min. 2 OZs.
  - Max. 5 OZs.
  - To Start Plunger Moving Downward.

- Local Line Feed Trip Link Spring Tension Requirement
  - Min. 4 OZs.
  - Max. 10 OZs.
  - To Start Link Moving.
2.15 Keyboard Mechanism continued

(A) CODE LEVER SPRING TENSION
(1) REQUIREMENT
  MIN. 1 OZ.
  MAX. 2 OZS.
  TO START CODE LEVER MOVING DOWNWARD.
(2) REQUIREMENT
  POWER ON.
  GENERATOR CLUTCH DISENGAGED.
  MIN. 3 OZS.
  MAX. 5 OZS.
  TO OPERATE KEYLEVER OR SPACE BAR.

(B) LOCAL CARRIAGE RETURN FUNCTION BAIL SPRING TENSION
(COMBINED CODE LEVER AND BAIL SPRING)
REQUIREMENT
  MIN. 1 OZ.
  MAX. 3 OZS.
  TO MOVE KEY LEVER DOWNWARD.
2.16 Codebar Assembly and Signal Generator Mechanism continued

(B) TRANSFER LEVER LOCKING BAIL SPRING TENSION
REQUIREMENT
SPRING UNHOOKED FROM POST, CLUTCH DISENGAGED,
MIN. 5 OZS.,
MAX. 6 OZS.,
TO PULL TO INSTALLED LENGTH.

(A) TRANSFER LEVER SPRING TENSION
REQUIREMENT
CLUTCH DISENGAGED,
MIN. 1 1/2 OZS.
MAX. 2 1/2 OZS.,
TO START EACH OF SEVEN LEVERS MOVING.

2.17 Interrelated Features

(C) CODE BAR EXTENSION SPRING
REQUIREMENT
MIN. 5 OZS.
MAX. 7 OZS.,
TO START EACH EXTENSION MOVING.

(D) MARGIN INDICATOR SPRING TENSION
REQUIREMENT
MIN. 7 OZS.
MAX. 11 OZS.,
TO START LEVER MOVING.
SECTION 573-117-700

Note: Paragraph 2.18 through 2.23 apply to both typing and non-typing perforators.

2.18  Interrelated Features continued

(1) REQUIREMENT
PUNCH SLIDE LATCHES SHOULD ALIGN WITH CODE BAR EXTENSIONS
MIN. 0.010 -- MAX. 0.020 INCH TO RIGHT OF CODE BAR EXTENSION.

(2) REQUIREMENT
RESET CAM SHOULD ALIGN WITH ITS CAM FOLLOWER ROLLER
APPROXIMATELY 0.030 INCH FORWARD OF THE REAR EDGE OF THE ROLLER.

CONTINUED ON FOLLOWING PAGE.
CONTINUED FROM PRECEDING PAGE.

TO ADJUST

LOosen Setscrews and DIsengAge FLEXiBLE COUPLiNGS. LOOSEN Two ALlIGNMENT BRACKET SCREWS AND THREE PERFORATOR MOUNT­ING SCREWS. SET EXTENSION GUIDE PIN IN MIDDLE OF GUIDE BRA­CKET SLOT AND ALIGN PERFORATOR AND RESET CAM. TIGHTEN PER­FORATOR MOUNTING SCREWS. POSITION ALIGNMENT BRACKET SO THAT IT CONTACTS PERFORATOR CASTING FOR ITS FULL LENGTH, AND TIGHTEN SCREWS. POSITION REAR BEARING BRACKET UNTIL PERFORATOR DRIVE SHAFT LINES UP WITH BEARING BRACKET SHAFT. A STRAIGHT-EDGE RULE APPLIED TO THE CENTER OF THE BEARING BRACKET SHAFT SHOULD ALSO EXTEND THROUGH THE CENTER OF THE PERFORATOR DRIVE SHAFT. TIGHTEN SCREWS, AND ENGAGE THE COUPLING, IF NECESSARY, REFINe LINE UP OF PUNCH SLIDE LATCHES AND CODE BAR EXTENSIONS BY ADJUSTiNG THE CODE BAR EXTENSION GUIDE BRACKET IN ITS MOUNTING HOLES.

2.19 Interrelated Features continued

![Diagram showing the components and adjustments for the perforator.]

- **FOLLOWER LEVER SPRING**
  - **PERFORATOR CLUTCH DISENGAGED**
    - **MIN.** 12 OZS.
    - **MAX.** 18 OZS.
  - **TO START ROLLER AWAY FROM RESET CAM.**

- **CODE BAR BAIL LATCH**
  - **CONTROL KNOB IN T POSITION. CODE BAR BAIL AT EXTREME LEFT. CLEARANCE BETWEEN CODE BAR BAIL LATCH LEVER AND ROLLER.**
    - **MIN.** SOME --- **MAX.** 0.006 INCH

- **PUNCH SLIDE LATCHES AND CODE BAR EXTENSIONS**
  - **BY ADJUSTING THE CODE BAR EXTENSION GUIDE BRACKET IN ITS MOUNTING HOLES.**

**TO CHECK**

WITH ALL CLUTCHES LATCHED, DEPRESS LTRS KEY. AFTER CODE BARS HAVE MOVED TO RIGHT, THERE MUST BE SOME CLEARANCE BETWEEN FOLLOWER RESET LEVER AND CLUTCH TRIP BAR PIN.
2.20 Interrelated Features continued

(A) **PUNCH SLIDE LATCH SPRING**

Requirement
- **MIN.** 1 OZ.
- **MAX.** 3 OZS.

To start latch moving.

---

(B) **CODE BAR EXTENSION AND PUNCH SLIDE LATCH**

1. **REQUIREMENT**
   - Control knob in T position, blank keylever depressed. Punch slide latched.
   - Play between code bar extensions and code bars taken up by moving and holding extensions at engagement with code bars. Clearance should be
     - **MIN.** SOME
     - **MAX.** 0.010 INCH
   - Between code bar extensions and closest punch slide latch.

2. **REQUIREMENT**
   - LTRS keylever depressed. Code bar extensions should rotate punch slide latches to release all punch slides. Check dynamic operation by depressing the "Repeat" and "Blank" key simultaneously.

3. **ON KEYBOARD PERFORATORS NOT HAVING THE "BLANK" KEY, OPERATE THE "BLANK" CODE BAR LEVER BY LIFTING WITH A SPRING HOOK.**
   - To adjust
   - Position guide vertically with guide lock nut loosened to obtain required clearance. Tighten lock nut.
PERFORATOR CLUTCH RELEASE TRIP REQUIREMENT

PERFORATOR CLUTCH SHOULD TRIP CONSISTENTLY IN K-T POSITIONS WHEN BLANK AND REPEAT KEY LEVERS ARE DEPRESSED SIMULTANEOUSLY. WHEN THE CONTROL KNOB IS TURNED FROM K POSITION TO K-T POSITION, THE PERFORATOR CLUTCH SHOULD TRIP WHEN THE FIRST KEY LEVER IS DEPRESSED. CLEARANCE BETWEEN MAIN TRIP LEVER AND CLUTCH RELEASE MIN. 0.015 INCH MAX. 0.025 INCH

TO ADJUST

PLACE CONTROL KNOB IN T POSITION. LOOSEN MAIN TRIP LEVER LATCH CLAMP SCREWS AND MOVE LATCH TO EXTREME LEFT. STRIKE BLANK KEY LEVER. MOVE THE STOP BRACKET TO THE RIGHT UNTIL IT IS OUT OF ENGAGEMENT WITH THE LATCH. MOVE THE CLUTCH TRIP BAR EXTENSION TO THE RIGHT UNTIL IT LATCHES. POSITION MAIN TRIP LEVER LATCH TO RIGHT TO OBTAIN REQUIRED CLEARANCE. TIGHTEN SCREWS.

NOTE: CHECK FOR CLEARANCE BETWEEN RESET BAIL AND SLIDES WHEN THE RESET LEVER IS TRIPPED. REFINE ADJUSTMENT IF NECESSARY TO OBTAIN OPERATIONAL CLEARANCE.

TO CHECK

WITH THE STOP BRACKET SCREWS FRICTION TIGHT, MOVE THE STOP BRACKET SLOWLY TO THE LEFT UNTIL THE LATCH JUST TRIPS. TIGHTEN CLAMP SCREWS. TURN ON MOTOR. DEPRESS BLANK AND REPEAT KEY LEVERS SIMULTANEOUSLY. IF OPERATION IS SATISFACTORY, TURN TO K-T POSITION AND REPEAT. TURN TO K POSITION AND BACK TO K-T POSITION. DEPRESS A KEY LEVER. PERFORATOR CLUTCH SHOULD TRIP. IF IT DOES NOT, MOVE STOP BRACKET SLIGHTLY TO THE RIGHT AND REPEAT THE ABOVE ADJUSTMENT.

NOTE: IF KEYBOARD DOES NOT HAVE BLANK KEY LEVER USE ‘T’ KEY LEVER INSTEAD OF BLANK.

CLUTCH TRIP BAR LINK RETURN SPRING REQUIREMENT

CLUTCH DISENGAGED AND IN K-T POSITION. MIN. 4 OZS. MAX. 6 OZS.

TO START MAIN TRIP LEVER LATCH MOVING.
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2.22 Interrelated Features continued

CODE BAR EXTENSION BLOCKING ASSEMBLY

SELECTOR SWITCH IN K POSITION. CODE BAR EXTENSIONS AND CHARACTER COUNTER BARS
SHOULD NOT OPERATE.

(1) CLEARANCE BETWEEN RIGHT END AT CODE BAR EXTENSIONS AND CODE BARS.
MIN. SOME
MAX. 0.015 INCH

(2) CLEARANCE BETWEEN BLOCKING LEVER AND SIDE OF NOTCH IN CHARACTER COUNTER CODE
BARS. BAR WITH CLOSEST GAP
MIN. SOME
MAX. 0.010 INCH

TO ADJUST
WITH CLUTCH LATCHED, TURN CONTROL KNOB TO THE K POSITION. STRIKE LTRS KEYLEVER AND
ROTATE SIGNAL GENERATOR SHAFT TO RETURN CODE BARS TO EXTREME LEFT. WITH ADJUSTING
SCREW FRiction TIGHT, POSITION EXTENSION BAIL TO OBTAIN REQUIREMENT (1) AND
POSITION BLOCKING LEVER TO OBTAIN REQUIREMENT (2) MAKE CERTAIN THAT THE CODE BAR
EXTENSION BAIL IS FREE ON ITS GUIDE POST. TEST OPERATION IN K, K-T AND T POSITIONS.
2.23 Interrelated Features continued

- **RESET CAM FOLLOWER**
- **CAM FOLLOWER SPRING**
- **RESET LEVER SPRING**
- **RESET LEVER**
- **CONTROL CAM**
- **KEYBOARD CONTROL SELECTION LEVER**
- **KEYBOARD CONTROL SWITCH**
- **SWINGER**

**Requirements:**

1. **(A) KEYBOARD CONTROL SWITCH**
   - **Requirement**
   - **(1)** In T position, the normally open contact gap must be at least 0.015 inches.
   - **(2)** In K-T position, the normally closed contact gap must be at least 0.015 inches.
   - **(3)** All contacts should close with some overtravel and be adjustable by bending the contact springs.

2. **(B) RESET LEVER SPRING**
   - **Requirement**
   - **(1)** In T position, the control knob must be at least 10 ounces.
   - **(2)** In K-T position, the control knob must be at least 14 ounces.

3. **(C) CAM FOLLOWER SPRING**
   - **Requirement**
   - **(1)** At least 3 ounces.
   - **(2)** No more than 5 ounces.

**To Start:**

- **CAM FOLLOWER MOVING**
- **LEVER MOVING**
- **CONTACTS CLOSING**
CAUTION

IF THE MOTOR SHOULD BECOME BLOCKED FOR SEVERAL SECONDS, THE THERMAL CUT-OUT SWITCH WILL BREAK THE CIRCUIT. SHOULD THIS HAPPEN, ALLOW THE MOTOR TO COOL AT LEAST 5 MINUTES BEFORE MANUALLY DEPRESSING THE RED BUTTON. AVOID REPEATED DEPRESSION.

SYNCHRONOUS MOTOR POSITIONING REQUIREMENT
TWO OILERS SHOULD BE UPWARD AND APPROXIMATELY EQUIDISTANT FROM A VERTICAL LINE THROUGH THE MOTOR SHAFT.

TO ADJUST
POSITION THE MOTOR WITH BOTH CLAMP SCREWS LOOSENED.
2.25 Interrelated Features continued

---

(2) REQUIREMENT
BARELY PERCEPTIBLE BACKLASH BETWEEN THE INTERMEDIATE DRIVING GEAR AND THE INTERMEDIATE DRIVEN GEAR AT THE CLOSEST POINT.

TO ADJUST RAISE OR LOWER THE FRONT END OF THE INTERMEDIATE GEAR BRACKET BY MEANS OF THE FILLISTER HEAD ADJUSTING AND CLAMPING SCREWS LOCATED AT THE FRONT END OF THE BRACKET, REFINE REQUIREMENTS IF NECESSARY.

---

INTERMEDIATE GEAR BRACKET
(1) REQUIREMENT
BARELY PERCEPTIBLE BACKLASH BETWEEN THE TYPING UNIT DRIVEN GEAR AND THE TYPING UNIT DRIVING GEAR AT THE CLOSEST POINT.

TO ADJUST POSITION THE COMPLETE INTERMEDIATE GEAR MECHANISM BRACKET BY UTILIZING THE ADJUSTING SLOTS WITH THE THREE HEXAGON HEAD SCREWS LOOSENED, ALIGN THE GEARS AT THIS TIME.

---

INTERMEDIATE DRIVEN GEAR
INTERMEDIATE DRIVING GEAR
KEYBOARD DRIVING GEAR
MOTOR CRADLE
MOTOR MOUNTING SCREW
MOUNTING SCREW
NUT PLATE SCREW
ADJUSTING SCREW

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2.26 Interrelated Features continued

(A) MOUNTING TYPING UNIT ON KEYBOARD

(B) SIGNAL GENERATOR FRAME

REQUIREMENT

WHEN PLACING THE TYPING UNIT ON THE BASE HOLD IT TILTED SLIGHTLY TO THE RIGHT AND LOWER THE RIGHT END INTO ENGAGEMENT WITH THE RIGHT LOCATING STUD. WHILE EASING THE LEFT END DOWNWARD ROTATE THE MOTOR BY HAND TO PROPERLY MESH THE GEARS. SECURE BY FOUR MOUNTING SCREWS.

TO ADJUST

REMOVE THE SIGNAL GENERATOR FRAME REAR MOUNTING SCREW AND LOOSEN THE SHIM SCREW. ADD OR SUBTRACT SHIMS AS REQUIRED.
3. VARIABLE FEATURES

3.01 Electrical Line Break Mechanism

![Diagram of Electrical Line Break Mechanism]

LINE BREAK LEVER SPRING TENSION
REQUIREMENT
(COMBINED CODE LEVER AND BREAK LEVER SPRING)
MIN. 3 OZS.
MAX. 4 OZS.
TO MOVE SWITCH BREAK LEVER IN CONTACT
WITH SWITCH PLUNGER.

3.02 Local Paper Feed-Out Mechanism

![Diagram of Local Paper Feed-Out Mechanism]

SWITCH LEVER SPRING TENSION
REQUIREMENT
MIN. 11 OZS.
MAX. 14 OZS.
TO PULL SWITCH LEVER FREE OF
SWITCH ACTUATING PIN.
3.03 Tape Out Switch Mechanism

(A) LOW TAPE SWITCH
REQUIREMENT
SWITCH SHOULD OPERATE WHEN DIAMETER OF TAPE ROLL IS BETWEEN 2-3/4 INCHES AND 2-3/8 INCHES.
TO ADJUST
POSITION SWITCH ASSEMBLY WITH MOUNTING SCREWS LOOSENED, CHECK WITH TEST LAMP.

(B) TAPE-OUT LEVER SPRING
REQUIREMENT
MIN. 6 OZS. --- MAX. 8 OZS.
TO PULL SPRING TO LENGTH OF 1-1/4 INCHES

(C) SWITCH LEVER SPRING
REQUIREMENT
MIN. 6 OZS. --- MAX. 7 OZS.
TO PULL SPRING TO LENGTH OF 1-1/4 INCHES

3.04 Keyboard Lockbar Switch Mechanism

(D) KEYBOARD LOCK BAR SWITCH
SPRING
REQUIREMENT
LOCK BAR LATCHED (SEND KEY LEVER DEPRESSED IF EQUIPPED WITH ELECTRICAL LOCK-OUT)
MIN. 8 OZS.
MAX. 15 OZS.
TO START SWITCH SPRING MOVING.

(E) KEYBOARD LOCK-BAR SWITCH
(1) REQUIREMENT
WITH THE RECEIVE KEY DEPRESSED THE CONTACT GAP OF THE NORMALLY OPEN CONTACT (NO'S 1, 2, 3) SHOULD BE MIN. 0.008 INCH

(2) REQUIREMENT
WITH THE SEND KEY DEPRESSED CONTACT GAP OF THE NORMALLY CLOSED CONTACT NO. 4 SHOULD BE MIN. 0.008 INCH

(3) REQUIREMENT
ALL CONTACTS SHOULD CLOSE WITH SOME OVER-TRAVEL
TO ADJUST BEND CONTACT SPRINGS
3.05 Character Counter Mechanism

CORD ASSEMBLY
REQUIREMENT
ROTATE PULLEY UNTIL INDICATOR POINTS TO 75 ON THE SCALE.
TO ADJUST
VIEW THE END OF PULLEY AND ADJUST AS SHOWN.
3.06 Character Counter Mechanism continued

**Requirement**

**(1)**

When indicator is at extreme left of scale, it should point to zero.

To adjust:

Set indicator to left, loosen lock screws and position scale.

**(2)**

Point of indicator should not touch throughout its entire travel.

To adjust:

Form the indicator.

**Requirement**

With the counter ratchet fully returned and resting against its stop lever, the clearance between the latch lever and the face of the 4th ratchet tooth should be

- **Min.** 0.002 inch
- **Max.** 0.010 inch

**Requirement**

The anti-bounce latch should not interfere with the rotation of the ratchet.

To adjust:

Hold the drive lever out of engagement with the ratchet and rotate the stop lever eccentric.
3.07 Character Counter Mechanism continued

**RATCHET DRUM ASSEMBLY RETURN SPRING**

**REQUIREMENT**
1/2 TO 1 1/2 OZS. WHEN INDICATOR POINTS TO 35 ON THE SCALE.
1 1/2 TO 2 1/2 OZS. WHEN INDICATOR POINTS TO 70 ON THE SCALE.

**CHARACTER COUNTER END-OF-LINE SWITCH**

(1) **REQUIREMENT**

THE SWITCH SHOULD CLOSE AT A PRESET NUMBER OF CHARACTERS.

(2) **REQUIREMENT**

BEFORE INSTALLING THE COUNTER ON THE KEYBOARD PERFORATOR, TIGHTEN THE CLAMP SCREWS AND SWITCH BRACKET MOUNTING SCREWS FRICTION TIGHT. WITH THE SWITCH LEAF SPRINGS APPROXIMATELY PARALLEL TO THE SWITCH MOUNTING BRACKET (GAGE BY EYE) AND WITH

MIN. 0.005 INCH --- MAX. 0.020 INCH

CLEARANCE BETWEEN THE LEAF SPRING SWITCH CONTACTS (BEND LOWER LEAF SPRING).

TO ADJUST

POSITION SWITCH BRACKET UNTIL THE UPPER SWITCH LEAF SPRING CLEARS THE LOW OF THE CAM

MIN. SOME --- MAX. 0.025 INCH

CHECK CLOSEST POINT AND TIGHTEN BRACKET SCREWS. SET INDICATOR TO COUNT DESIRED AND ADJUST CAM UNTIL THE SWITCH JUST CLOSES. TIGHTEN CLAMP SCREWS.

TO CHECK OPERATION

MOVE RATCHET DRUM UNTIL THE INDICATOR TRAVERSES THE ENTIRE SCALE. THE SWITCH SHOULD CLOSE ON THE DESIRED COUNT, WITH A SMALL AMOUNT OF OVER-TRAVEL OF BOTH BLADES. IT MAY BE NECESSARY TO REFINE THE ABOVE ADJUSTMENTS WHEN OPERATING ON THE EXTREME ENDS OF THE 65 TO 80 CHARACTER RANGE.
Character Counter Stroke

Requirement:
When character and repeat keys are depressed, the counter should operate consistently in T or K-T position. When carriage return key is depressed, the counter should reset without binding. The mechanism should count the first character on a restart after reset condition.

Min. 0.006—Max. 0.015 inch

Between drive lever and ratchet tooth, when counter is set near mid-point of its range.

To adjust:
Loosen mounting screws, with keyboard in T position, start motor and strike carriage return key, and then E key. Turn off motor. Depress E key. Position character counter frame for clearance. Turn control knob to K-T position and recheck. Refine if necessary.

Reset Latch Lever and Drive Lever Spring

Requirement:
Min. 1/2 oz.
Max. 1 oz.
To move either lever.

Drive Lever
Latch Lever
Ratchet Teeth
Reset Lever Extension Spring

Requirement:
With the code bars latched
Min. 1/2 oz.
Max. 1-1/4 oz.
To start lever moving.

Ratchet Drum
Mounting Screws
3.09 Repeat On Space Mechanism

(C) SPACE-REPEAT LEVER SPRING REQUIREMENT
WITH SPRING UNHOOLED
MIN. 13-1/2 CZS. --- MAX. 16-1/2 CZS. TO POSITION LENGTH.

STOP SCREW
STOP SCREW LOCK NUT

RESET BAIL ROLLER
NON-REPEAT LEVER
TRAVEL SCREW
TRAVEL SCREW LOCK NUT

(A) TRAVEL SCREW REQUIREMENT
WITH SPACE BAR FULLY DEPRESSED:
MIN. 0.035 INCH --- MAX. 0.080 INCH
BETWEEN RESET BAIL ROLLER AND NON-REPEAT LEVER.

TO ADJUST
WITH SPACE BAR FULLY DEPRESSED,
POSITION TRAVEL SCREW WITH ITS LOCK NUT LOOSENED.
RECHECK CLEARANCE AFTER TIGHTENING LOCK NUT.

(B) STOP REQUIREMENT
MIN. 0.002 INCH --- MAX. 0.020 INCH
BETWEEN TRAVEL SCREW AND NON-REPEAT LEVER.
TO ADJUST
DEPRESS G KEYLEVER TO TRIP KEYBOARD CLUTCH.
POSITION STOP SCREW WITH ITS LOCK NUT LOOSENED.
RECHECK GAP AFTER TIGHTENING LOCK NUT.

NOTE: SPACE BAR TOUCH TO OBTAIN A
REPEAT IS AFFECTED BY THIS ADJUSTMENT.
TO GET A LIGHTER TOUCH, ADJUST TO MAXIMUM LIMIT.
TO OBTAIN A HEAVIER TOUCH ADJUST TO THE MINIMUM LIMIT.

(D) SPACE BAR
(1) REQUIREMENT (SINGLE SPACE)
NORMAL KEY TOP PRESSURE
TO TRANSMIT SINGLE SPACE
(2) REQUIREMENT (REPEAT SPACE)
SPACE BAR FULLY DEPRESSED AND
HELD DOWN TO EFFECT CONTINUOUS SPACE TRANSMISSION.
3.10 Time Delay Mechanism

**TIME DELAY RATCHET WHEEL TENSION**

**REQUIREMENT**
- Hold off all pawls.
- Min. 2 ozs.
- Max. 8 ozs.
- To move ratchet wheel.
- To adjust
  - Remove and bend the friction springs.

**TIME DELAY SWITCH POSITION**

**REQUIREMENT**
- Contact pawl not blocked by latch lever and on high part of the ratchet wheel. Some clearance between contact pawl and switch plunger when play in ratchet wheels is taken up in downward direction.
- Max. 0.010 inch
- To adjust
  - Position the switch with the two switch mounting screws loosened.
3.11 Time Delay Mechanism continued

**CONTACT PAWL SPRING TENSION REQUIREMENT**

CONTACT PAWL LATCHED ON END OF LATCH LEVER.

MIN.  8 OZS.
MAX.  12 OZS.
TO START THE PAWL MOVING.

---

**CONTACT LATCH PAWL SPRING TENSION REQUIREMENT**

LATCH PAWL SPRING UNHOOKED AT ANCHOR

MIN.  12 OZS.
MAX.  15 OZS.
TO STRETCH SPRING TO INSTALLED LENGTH AS SHOWN.
3. 12 Time Delay Mechanism continued

3.13 Time Delay Mechanism continued

**ECCENTRIC FOLLOWER PAWL SPRING**

**REQUIREMENT**

ECCENTRIC FOLLOWER PAWL IN EXTREME FORWARD POSITION. 8 OZ. SCALE APPLIED TO PAWL NEAR RATCHET WHEEL AND PULLED UPWARD

MIN. 1-1/2 OZS.

MAX. 4 OZS.

TO START PAWL MOVING.

**TIME DELAY ECCENTRIC FOLLOWER PAWL**

**ADJUSTING LEVER**

**MOUNTING SCREW**

**ECCENTRIC FOLLOWER PAWL SPRING**

**RATCHET WHEEL**

**TIME DELAY DISABLING DEVICE**

**REQUIREMENT**

DISABLE THE TIME DELAY MECHANISM WHEN NOT REQUIRED.

TO ADJUST

LOosen THE ADJUSTING LEVER MOUNTING SCREW AND PRESS DOWNWARD ON THE LEVER TO RAISE ECCENTRIC FOLLOWER OUT OF ENGAGEMENT WITH ITS RATCHET WHEEL.
3.14 Synchronous Pulse Mechanism

**Mounting Bracket (A)**

To check with magnet not attracted and clutch trip bar in furthest left position.

**Requirement**

Min. 0.005 inch --- Max. 0.015 inch between clutch trip bar and armature lever.

To adjust position mounting bracket with three mounting screws loose by means of pry point.

Note: tighten rear left mounting screw and make mounting bracket adjustment (B).

**Magnet Armature (D)**

To check clutch trip bar in extreme left position.

Hook 32 oz. scale to armature lever as shown. Measure at right angle to armature lever as indicated.

**Requirement**

Min. 3 ozs. --- Max. 5 ozs.

To pull armature lever from clutch trip bar.

**Mounting Bracket (B)**

To check with armature lever held against magnet pole face and clutch trip bar in furthest right position.

**Requirement**

Min. 0.005 inch --- Max. 0.015 inch between clutch trip bar and armature lever.

To adjust with right rear and left front mounting bracket screws loose position mounting bracket by means of pry point.
3.15 Synchronous Pulse Mechanism continued

CONTACT BRACKET

CONTACT MOUNTING SCREWS

CONTACT GAP

REQUIREMENT

WITH UNIVERSAL CODE BAR IN STOP POSITION
(TO RIGHT AS VIEWED FROM REAR) CONTACT GAP SHOULD BE
MIN. 0.020 INCH — MAX. 0.035 INCH

TO ADJUST POSITION CONTACT MOUNTING BRACKET
WITH MOUNTING SCREWS LOOSE.

UNIVERSAL CODE BAR CONTACT

REQUIREMENT

WITH UNIVERSAL CODE BAR IN OPERATED POSITION (TO THE LEFT AS VIEWED FROM REAR)
MIN. 3-1/2 OZS. — MAX. 4-1/2 OZS.

TO OPEN CONTACTS,

TO ADJUST BEND CONTACT SWINGER.
NOTE: TO MAKE KEYBOARD OPERABLE WITHOUT ELECTRICAL PULSE TO OPERATE STEPPING MAGNET LOOSEN CLAMP MOUNTING SCREW AND ROTATE CLAMP COUNTERCLOCKWISE TO HOLD THE ARMATURE IN THE OPERATING POSITION. MAINTAIN 0.005 INCH TO 0.015 INCH CLEARANCE BETWEEN CLUTCH TRIP BAR AND ARMATURE LEVER.

WITH ARMATURE OPERATED, CLEARANCE BETWEEN ARMATURE CLAMP AND ARMATURE APPROX. 3/8 INCH TO ADJUST POSITION CLAMP WITH ITS MOUNTING SCREW LOOSENED.
3.17 Power Backspace Switch

**POWER BACKSPACE SWITCH POSITION**

**NOTE**

THIS IS NOT A ROUTINE ADJUSTMENT AND SHOULD BE CHECKED AND MADE ONLY IF TROUBLE IN ITS OPERATION IS ENCOUNTERED OR PARTS ARE DISASSEMBLED AND REPLACED.

(1) **REQUIREMENT**

WITH SWITCH OPERATING LEVER HELD PARALLEL TO THE TOP OF ITS MOUNTING BRACKET AND DEPRESSED TO LIMIT OF ITS TRAVEL, THE SWITCH SHALL BE OPERATED.

(2) **REQUIREMENT**

WITH SWITCH IN UNOPERATED CONDITION AND OPERATING LEVER HELD PARALLEL TO TOP OF ITS MOUNTING BRACKET, THERE SHOULD BE SOME CLEARANCE BETWEEN THE OPERATING LEVER AND TOP OF THE CURVED SLOT IN THE BRACKET.

TO ADJUST POSITION SWITCH BRACKET WITH ITS MOUNTING SCREWS LOOSENED.
3.18 Remote Control Gear Shift Mechanism

GEAR SHIFT MECHANISM

REQUIREMENT

The backlash between the motor pinion and its driven gear and between the typing unit driven gear and its driving gear should be some --- Max. 0.005 inch

To adjust

Loosen the four screws which mount the assembly bracket to base. Loosen the nut-plate mounting screw at front of assembly bracket. Loosen lock nuts on adjusting bushings. Position gear shift bracket assembly front to rear. Raise or lower rear of assembly by rotating adjusting bushing nearest the motor. Position other bushing against base plate and tighten all screws and lock nut.

GEAR SHIFT MAGNET ARMATURE SPRING

REQUIREMENT

Magnet de-energized

Min. 2-1/2 ozs.

Max. 8 ozs.

To start armature moving
3.19 Remote Control Gear Shift Mechanism continued

**ARMATURE STOP**

**Requirement**

With armature in its open position and the armature stop against the casting, clearance between gear shift lever and stud on sleeve

- Min. 0.010 inch
- Max. 0.020 inch

To adjust: hold gear shift lever in position and position armature stop with its clamp screw loosened until requirement is met.

**GEAR SHIFT MAGNET**

**Requirement**

The pole face of the armature should meet the pole face of the magnet squarely.

To adjust: position armature with gear shift lever clamp screw loosened and position magnet bracket with its mounting screws loosened.

**CLUTCH STOP LEVER**

**Requirement**

Armature resting against magnet pole face, clearance between gear shift lever and the sleeve

- Min. 0.002 inch
- Max. 0.010 inch

To adjust: position gear shift lever with its clamp screw loosened.
3.20 Perforator Motor

**Perforator Motor Pinion and Driven Gear Mesh Requirement**

- **MIN. 0.004 INCH**
- **MAX. 0.008 INCH**

Backlash between motor pinion and driven gear at point of minimum backlash.

**To Check**

1. Loosen the four motor mounting screws.
2. Loosen the two nuts which lock the adjusting bushings at the right end of the motor (rear view).

**To Adjust**

1. Back off a few turns on the rear adjusting bushing to provide enough clearance to make the adjustment.
2. By means of the front adjusting bushing, adjust the motor height to meet requirement at the pinion and driven gears. Tighten the lock nut.
3. Turn the rear adjusting bushing until it touches the mounting plate. Tighten the lock nut.
3.21 Universal Keyboard Switch

(A) KEYBOARD UNIVERSAL SWITCH
PRELIMINARY REQUIREMENT
CENTERLINE OF INSULATED PORTION OF UNIVERSAL SWITCH ASSEMBLY SHOULD ALIGN WITH CENTERLINE OF CODE BAR LEVER.
TO ADJUST POSITION UNIVERSAL SWITCH ASSEMBLY LATERALLY ON RETAINER BAR WITH ITS MOUNTING SCREW LOOSENED.

(B) KEYBOARD UNIVERSAL SWITCH - HORIZONTAL REQUIREMENT
CENTERLINE OF INSULATED PORTION OF UNIVERSAL SWITCH ASSEMBLY SHOULD ALIGN WITH CENTERLINE OF LOWERMOST PORTION OF CODE BAR LEVER.
TO ADJUST POSITION RETAINER BAR FORWARD OR REARWARD ON ITS BRACKETS WITH ITS MOUNTING SCREWS LOOSENED.

(C) KEYBOARD UNIVERSAL SWITCH - VERTICAL REQUIREMENT
1. CLEARANCE BETWEEN CENTER AND LOWER CONTACT POINTS SHOULD BE MIN. 0.015 INCH --- MAX. 0.025 INCH
TO CHECK PULL CONTACT FUNCTION LEVER DOWN AGAINST CODE BAR BASKET AT REAR OF BASKET AND FRONT OF CONTACT LEVER TOUCHING CENTER OF CONTACT INSULATOR
TO ADJUST BEND UPPER CONTACT SPRING

2. CLEARANCE BETWEEN CENTER AND LOWER CONTACT POINTS SHOULD BE AT LEAST 0.010 INCH
TO CHECK DEPRESS CONTACT OPERATING KEY WITH 16 OZS. PRESSURE.

3. CENTER AND LOWER CONTACTS SHOULD CLOSE WITH SOME OVER-TRAVEL
TO CHECK FULLY DEPRESS CONTACT OPERATING KEY
TO ADJUST POSITION COMPLETE ASSEMBLY WITH RIGHT AND LEFT BRACKET MOUNTING SCREWS LOOSENED.
NOTE 1: ADJUSTMENTS ON THIS PAGE SHOULD BE MADE WITH THE ANSWER-BACK MECHANISM REMOVED FROM THE KEYBOARD.

NOTE 2: FOR "HERE IS" KEYLEVER SWITCH REQUIREMENTS SEE UNIVERSAL KEYBOARD SWITCH ADJUSTMENTS, PAGE 47.

Figure 2-28 — Answer-Back Mechanism
3.23 Answer-Back Mechanism continued

STOP LEVER LATCH

(1) REQUIREMENT

CLEARANCE BETWEEN STOP LEVER AND STOP LEVER LATCH SHOULD BE
MIN. 0.002 INCH
MAX. 0.007 INCH

TO CHECK

HOLD ARMATURE AGAINST THE MAGNET CORE AND THE STOP LEVER IN ITS MAXIMUM
COUNTER-CLOCKWISE POSITION.

(2) REQUIREMENT

CLEARANCE BETWEEN STOP LEVER AND STOP LEVER LATCH THROUGHOUT A COMPLETE
TRAVEL OF THE STOP LEVER
MIN. 0.002 INCH

TO CHECK

HOLD ARMATURE AGAINST MAGNET CORE.

TO ADJUST

POSITION STOP LEVER LATCH WITH ITS TWO MOUNTING SCREWS LOOSENED.
3.24 Answer-Back Mechanism continued

NOTE: TO FACILITATE MAKING THIS ADJUSTMENT, REMOVE MESSAGE DRUM AND DRIVE PLATE ASSEMBLY FROM MECHANISM.

(B) SENSING LEVER SPRINGS
REQUIREMENT
WITH THE SIGNAL GENERATOR CLUTCH IN STOP POSITION AND THE MESSAGE DRUM REMOVED IT SHOULD REQUIRE
MIN. 1/4 OUNCE
MAX. 1-1/4 OUNCES
TO START EACH SENSING LEVER MOVING.

(C) DETENT LEVER SPRING
REQUIREMENT
WITH THE SIGNAL GENERATOR CLUTCH IN STOP POSITION AND THE MESSAGE DRUM REMOVED, IT SHOULD REQUIRE
MIN. 22 OUNCES
MAX. 26 OUNCES
TO START THE DETENT LEVER MOVING.

(A) CHARACTER GENERATOR MOUNTING PLATE
(1) REQUIREMENT
SENSING LEVERS SHOULD BE CENTERED ON THE FULL WIDTH OF THEIR ASSOCIATED CODE BAR.

(2) REQUIREMENT
CLEARANCE BETWEEN SHOULDERS OF CODE BARS #1 AND #5 AND THEIR ASSOCIATED SENSING LEVERS SHOULD BE
MIN. 0.002 INCH
MAX. 0.012 INCH
TO ADJUST POSITION THE MOUNTING PLATE WITH THE THREE MOUNTING SCREWS LOOSENED.
3.25 Answer-Back Mechanism continued

Perform this adjustment before final installation of message drum and drive plate assembly.

Drive link spring requirement
With the signal generator clutch in stop position, it should require
Min. 10 ounces
Max. 15 ounces
to pull spring to installed length.

Eccentric stud
Drive link

Drive link adjusting screws

Drive link requirement
Clearance between drive plate extension and blocking lever should be
Min. 0.002 inch
Max. 0.007 inch
to check
Signal generator cam eccentric and arm holding code bar bail in extreme reset position to the left.
to adjust
Loosen the two adjusting screws and position the two drive links by means of the adjusting slots.

Note: The standard keyboard adjustments listed below should be checked during installation of the answer-back mechanism.
B. Code bar bail, page 11.
C. Code bar bail and non-repeat lever clearance, page 11.
SECTION 573-117-700

3.26 Answer-Back Mechanism continued

THE FOLLOWING FINAL ADJUSTMENTS FOR THE ANSWER-BACK MECHANISM SHOULD BE MADE AFTER INSTALLATION OF THE MECHANISM ON THE KEYBOARD.

STEPPING PAWL

REQUIREMENT

CLEARANCE BETWEEN STEPPING PAWL AND ANY CODE BLADE SHOULD BE MIN. 0.018 INCH MAX. 0.030 INCH

TO CHECK

MESSAGE DRUM IN FULLY DETENTED POSITION.

SIGNAL GENERATOR CAM AND ARM HOLDING CODE BAR BAIL IN EXTREME RESET POSITION TO THE LEFT.

TO ADJUST

LOOSEN LOCK NUT AND POSITION ECCENTRIC STUD SO THAT ITS HIGH POINT IS TOWARD THE TOP.
Answer-Back Mechanism continued

**Stepping Pawl Spring Requirement**
- With Signal Generator Clutch in stop position.
  - Min. 2-1/2 ounces
  - Max. 3-1/2 ounces
  - To start pawl moving.

**Latch Operating Lever Spring Requirement**
- With Signal Generator Clutch in stop position.
  - Min. 5 ounces
  - Max. 6 ounces
  - To start lever moving.

**Latch Operating Lever Adjusting Screw Requirement**
- Clearance between extension on Latch Operating Lever and Code Bar Bail Latch should be:
  - Min. 0.005 inch
  - Max. 0.015 inch
- To check:
  - Signal Generator Clutch fully disengaged, stop lever latched on magnet armature latch.
- To adjust:
  - With lock nut loosened, position latch operating adjusting screw.

Page 53
3.28 Answer-Back Mechanism continued

(A) **Blocking Lever Spring Requirement**

With Signal Generator Clutch in Stop Position, unhook blocking lever spring from stop lever.

- Min. 1 ounce
- Max. 2 ounces

To pull spring to installed length.

(B) **Armature Latch Spring Requirement**

With Signal Generator Clutch in Stop Position, unhook armature latch spring from spring post on Magnet Yoke.

- Min. 2 ounces
- Max. 4 ounces

To pull spring to installed length.

(C) **Motor Control Relay Switch Requirement**

The switch should be in its operated position when the armature is held against the magnet core.

To adjust position switch with its mounting screws loosened.
3.29 Answer-Back Mechanism continued

CODING THE MESSAGE DRUM

1. REMOVE MESSAGE DRUM FROM ANSWER BACK ASSEMBLY AND TAKE OUT CODE BLADES AS FOLLOWS:
   REMOVE DRIVE LINK SPRING ALLOWING DRIVE LINK TO DROP OUT OF ENGAGEMENT WITH STUD ON DRIVE PLATE. LIFT MESSAGE DRUM FROM NOTCHES. DEPRESS STEPPING PAWL EXTENSION AND PULL DRUM OFF SHAFT. REMOVE "O" RING FROM ONE END OF DRUM AND TAKE OUT TWENTY CODE BLADES. IT IS NOT NECESSARY TO TAKE OUT STOP BLADE.

2. CODE A BLADE BY BREAKING OFF UNWANTED TINES AT SCORED LINE AT BASE OF EACH TINE. THE FIGURE BELOW INDICATES TINES TO BE REMOVED FOR A PARTICULAR CHARACTER. HOLD EACH BLADE SECURELY NEAR SCORE MARK OF TINE TO BE REMOVED. IN STANDARD 5 LEVEL OPERATION, THE "O" CODE LEVEL TINE IS DISREGARDED.

3. CODE THE DRUM IN A COUNTER-CLOCKWISE DIRECTION STARTING WITH NO. 2 CODE BLADE (ADJACENT TO STOP BLADE). BEGIN MESSAGE WITH "LETTERS" (STOP BLADE) FOLLOWED BY "CARRIAGE RETURN" AND "LINE FEED". END MESSAGE WITH "CARRIAGE RETURN" AND "LINE FEED". THIS LEAVES 16 CHARACTERS AVAILABLE FOR MESSAGE PROPER. CODE ANY UNUSED CHARACTERS WITH "LETTERS" OR "BLANKS", SINCE EACH SLOT POSITION IN DRUM MUST BE OCCUPIED BY A CODE BLADE.

4. INSTALL CODED BLADES IN PROPER SLOTS IN DRUM - INSERT END OF BLADE UNDER REMAINING "O" RING AND ROTATE THE BLADE TOWARD CENTER OF DRUM UNTIL IT IS FULLY SEATED. WHEN ALL THE SLOTS ARE FILLED REPLACE "O" RING REMOVED IN 1. ABOVE

5. APPLY GREASE TO SHAFT OF MESSAGE DRUM. REASSEMBLE MECHANISM REVERSING PROCEDURE OF STEP 1. BE SURE PARTS ARE PROPERLY SEATED. LUBRICATE PER INSTRUCTION IN SECTION 3.

---

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CARRIAGE RETURN
LINE FEED

LETTERS | SHIFT FIGURES | SHIFT SPACE | BLANK
---------|--------------|-------------|--------
0         |             |             |        }

SCORED LINES

CODE BLADE

\[\text{ISS 4, SECTION 573-117-700}\]
3.30 Answer-Back Mechanism ("Figs D")

**NOTE**

ADJUSTMENT REQUIREMENTS FOR "FIGS D" ANSWER-BACK OPERATION ARE IDENTICAL TO REQUIREMENTS FOR "FIGS C" OPERATION (SEE PAGES 48 THROUGH 55) EXCEPT FOR THE ADDITIONAL REQUIREMENT GIVEN BELOW.

**KEYBOARD LOCK BAIL ECCENTRIC REQUIREMENT**

CLEARANCE BETWEEN KEYBOARD LOCK LEVER W/HUB AND KEYBOARD LOCK FUNCTION LEVER SHOULD BE MIN. SOME ---- MAX. 0.006 INCH

TO CHECK

FULLY DEPRESS BOTH "KYBD LOCK" AND "HERE IS" KEYS (HOLD LIGHTLY).

TO ADJUST

LOOSEN LOCK NUT AND POSITION ECCENTRIC WITH ITS HIGH POINT TOWARD FRONT OF KEYBOARD.
3.31 Clutch Trip Delay Mechanism

**CLUTCH TRIP DELAY REQUIREMENT**

Place keyboard in K-T position. With keyboard in its tripped position and signal generator shaft rotated so that clutch is approximately 180 degrees from its latched position, depress LTRS key lever. Slowly continue rotation of signal generator shaft in clockwise direction noting gap between nearest edge of clutch shoe lever and clutch stop lever. Codebar bail shall not trip until gap measures

- **MIN.** 3/8 Inch
- **MAX.** 1/2 Inch

To adjust position blocking lever with clamping screw friction tight, utilizing pry points provided.

**NOTE:** If signal distortion test set is available, minimum gap requirement shall be considered met if 100 WPM signal generator strobe requirements can be met.

**Trip Delay Torsion Spring Requirement**

With keyboard clutch disengaged, apply push end of 8 oz. scale vertically to edge of formed end of blocking lever.

- **MIN.** 4-1/2 ozs.
- **MAX.** 8 ozs.

To start blocking lever moving.

---

**Diagram:**

- Clutch Shoe Lever
- Blocking Lever
- Clamping Screw
- Code Bar Bail Latch
- Eccentric Follower
3. 32  Auxiliary Contacts

**AUXILIARY CONTACTS**

- **Requirement 1:** Clutch disengaged and latched, cam follower off its cam. Clearance between contact points min. 0.015 inch max. 0.025 inch to adjust position set screw with lock nut loosened.

- **Requirement 2:** Clutch disengaged, clearance between cam follower and cam min. some max. 0.005 to adjust position mounting bracket with its mounting screws loosened. This adjustment is to be refined when strobing is done.

- **Requirement 3:** Cam follower on high part of cam min. 3-1/2 ozs. max. 4-1/2 ozs. to separate the contacts to adjust bend upper contact spring.

- **Requirement 4:** Min. 0.010 inch between the contact guard and the contact springs.

- **Requirement 5:** With the clutch disengaged and latched clearance between the lower extension of the cam follower and the inside surface of the clutch disk min. some to adjust position the contact springs contact guard and cam follower hinge with their mounting screws loosened.
3.33 Letters and Figures Contacts

**LETTERS-FIGURES CONTACT REQUIREMENT**

- **CLUTCH DISENGAGED AND LATCHED THEN LETTERS OR FIGURES KEYLEVER DEPRESSED, LEFT HAND CONTACT GAP**
  - MIN. 0.012 INCH
  - MAX. 0.018 INCH

  TO ADJUST:
  - BEND CONTACT STIFFENER. CHECK BOTH CONTACT ASSEMBLIES.

**LETTERS OR FIGURES CONTACT ASSEMBLY**

**RIGHT HAND CONTACT POINTS**

**MOUNTING SCREWS**

**CODE BAR EXTENSIONS**

**LETTERS-FIGURES CONTACT REQUIREMENT**

- **CLUTCH DISENGAGED AND LATCHED, THEN LETTERS OR FIGURES KEYLEVER DEPRESSED**
  - MIN. 4-1/2 OZS.
  - MAX. 5-1/2 OZS.

  TO ADJUST:
  - BEND SWINGER. RECHECK CONTACT GAPS.

**LEFT CONTACT SPRING**

**LEFT SIDE CONTACT POINTS**

**BRACKET**

**LETTERS-FIGURES CONTACT REQUIREMENT**

- **CLUTCH DISENGAGED AND LATCHED, THEN ANY KEYLEVER OTHER THAN LETTERS OR FIGURES DEPRESSED, RIGHT CONTACT GAP**
  - MIN. 0.012 INCH
  - MAX. 0.018 INCH

  CHECK BOTH LETTERS OR FIGURES CONTACTS TO ADJUST:
  - POSITION CONTACT ASSEMBLY WITH ITS BRACKET MOUNTING SCREWS LOOSENED.

**LEFT CONTACT SPRING**

**LEFT SIDE CONTACT POINTS**

**BRACKET**

**LETTERS-FIGURES CONTACT REQUIREMENT**

- **CLUTCH DISENGAGED AND LATCHED, THEN ANY KEYLEVER OTHER THAN LETTERS OR FIGURES DEPRESSED**
  - MIN. 4-1/2 OZS.
  - MAX. 5-1/2 OZS.

  TO ADJUST:
  - BEND LEFT CONTACT SPRING. CHECK BOTH CONTACT ASSEMBLIES. RECHECK CONTACT GAP.

**LEFT CONTACT SPRING**

**LEFT SIDE CONTACT POINTS**

**BRACKET**

**LETTERS-FIGURES CONTACT REQUIREMENT**

- **CLUTCH DISENGAGED AND LATCHED, THEN ANY KEYLEVER OTHER THAN LETTERS OR FIGURES DEPRESSED, CLEARANCE BETWEEN LEFT CONTACT SPRING AND ITS STIFFENER**
  - MIN. 0.003 INCH

  TO ADJUST:
  - REFINISH POSITION OF CONTACT ASSEMBLY BRACKET.
3.34 Code Reading Contacts (Transmitting)

NOTE: REFER TO SECTION 573-139-700 FOR OTHER ADJUSTMENTS OF CODE READING CONTACTS.

(1) REQUIREMENT
   CLUTCH DISENGAGED AND LATCHED. CLEARANCE BETWEEN LEFT SIDE CONTACT POINTS
   MIN. 0.030 INCH
   MAX. 0.035 INCH

(2) REQUIREMENT
   CLEARANCE BETWEEN THE LOWER SURFACE OF BELLCRANK AND THE CODE BAR (CHECK NO. 1 AND NO. 5 ONLY)
   MIN. 0.050 INCH
   MAX. 0.065 INCH

(3) REQUIREMENT
   LOWER SURFACE OF BELLCRANK SHOULD BE PARALLEL TO THE CODE BAR
   TO ADJUST POSITION THE MOUNTING BRACKET WITH ITS MOUNTING NUTS LOOSENED.
# 28 Typing Unit Adjustments

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1. GENERAL

1.01 This section is reissued: to incorporate adjusting information for the Selector Armature Downstop, and the Selector Armature Vertical Adjustment; to rearrange the text matter and assembly grouping to conform to the new...
standard format. Since this is a general revision, marginal arrows are omitted.

1.02 The adjustments in this section are divided into basic units, variable features, and earlier design mechanisms. The basic units consist of the friction feed and sprocket feed typing units; the adjustments are sub-divided into major mechanisms most of which are common to both units. All other mechanisms which are of an optional nature to create variations of the 28 typing unit, appear under variable features. When applicable, earlier design mechanisms for the basic units and variable features are cross referenced in their adjustment text.

Note: Remove power from unit before making adjustments.

1.03 The adjustments for the basic units are arranged in a sequence that would be followed if a complete readjustment were undertaken. After an adjustment has been completed, be sure to tighten any nuts or screws that may have been loosened to facilitate the adjustment. If a part that is mounted on shims is to be removed, the number of shims used at each mounting screw should be noted so that the same shim pile up can be replaced when the part is re-mounted.

1.04 The spring tensions given in this section are indicated values and should be checked with proper spring scales in the position indicated. The adjusting illustrations, in addition to indicating the adjusting tolerances, positions of moving parts, and spring tensions, also show the angle at which the scale should be applied when measuring spring tensions.

1.05 Tools and spring scales required to perform the adjustments are not basic units as part of the equipment but are listed separately in Teletype Bulletin 1124B.

1.06 References made to left or right, up or down, and front or rear apply to the typing unit in its normal operating position as viewed by the operator facing the unit.

1.07 Where instructions call for the removal of parts or subassemblies, refer to appropriate section, covering Disassembly and Re-assembly.

UNMOUNTED POSITIONS OF TYPING UNIT

1.08 The typing unit may be safely placed in any one of three positions for servicing:

1. In an upright position, and resting on all four feet.
2. Tilted backward, and resting on the two rear feet and rear points of side frames.
3. Bottom upwards, and resting on two upper points on each side frame.

In addition, the typing unit may be placed on either end by using the TP159358 modification kit (not supplied with the unit).

OPERATING CONDITIONS OF CLUTCHES

1.09 When a requirement calls for a clutch to be disengaged, the clutch shoe lever must be fully latched so that the clutch shoes are disengaged from the clutch drum. To become fully latched the trip lever must engage the clutch shoe lever, and the clutch disc must rotate far enough to permit the latch lever to fall into the notch on the clutch disc. The disengaged condition is illustrated in the upper figure of Par. 2.21. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged against the clutch drum.

Note: When rotating the main shaft of the typing unit by hand, the clutches do not fully disengage upon reaching their stop positions. In order to relieve the drag on the clutches and permit the main shaft to rotate freely, apply pressure to the stop lug on each clutch disc with a screwdriver until each latch lever falls into its notch on its clutch disc. Thus each internal expansion clutch becomes fully disengaged. This procedure should be followed before placing the typing unit on the base and switching on the power.

MANUAL SELECTION OF CHARACTERS OR FUNCTIONS

1.10 To manually operate the typing unit while removed from the keyboard or base, hold the selector magnet armature (Par. 2.01) against the pole pieces with an armature clip. Rotate the main shaft in a counterclockwise direction (handwheel listed in Bulletin 1124B) to bring all clutches to their disengaged position.

Note: The armature clip is attached to the armature by carefully inserting the flat formed end of the clip over the top of the armature and between the pole pieces, and hooking the extruded projection under the edge of the armature. The top end of the clip
should then be hooked over the top of the selector coil terminal (bakelite) guard. The spring tension of the clip will hold the armature in the marking (attracted) position.

1.11 Fully disengage all clutches as described in the note following Par. 1.09. Release the armature momentarily to permit the selector clutch to engage. Turn the main shaft slowly until the no. 5 selector lever has just moved to the peak of its cam. Strip from the selector levers all push levers which are spacing in the code combination that is being selected. It should be noted that selector levers (Par. 2.12) move in succession, starting with the inner (no. 1). Continue to rotate the main shaft until all operations initiated by the selector mechanism clear the typing unit.

VARIABLE FEATURES

1.12 In addition to the basic unit adjustments, covered in Part 2, adjustments for a number of variable features appear in Part 3. Where adjustments of these variable features affect the adjustment sequence, cross reference information has been included in Part 2. Variable feature adjustments which do not affect the adjusting sequence, may be done at any time during the adjusting procedure.

EARLIER DESIGN MECHANISMS

1.13 Parts 2 and 3 contain illustrations and adjusting procedures for mechanisms currently being manufactured. Illustrations and adjusting procedures for mechanisms of earlier design are located in Part 4. Where a new mechanism has replaced a mechanism of earlier design, reference has been made in Parts 2 and 3 to the corresponding mechanism in Part 4.

COMPLETE ADJUSTMENT OF TYPING UNIT

1.14 When making a complete adjustment of the typing unit, the following conditioning operations should be performed to prevent damage:

(a) Loosen the clamp screw on the code bar shift lever drive arm (Par. 2.15).

(b) Move the right and left vertical positioning lever eccentric studs (Par. 2.28 and 2.29) in the rocker shaft brackets to their lowest position.

(c) Loosen the two bearing stud mounting screws and two connecting strip clamp screws in the horizontal positioning drive linkage (Par. 2.35).

(d) Loosen the clamp screws and move the reversing slide brackets to their uppermost position (Par. 2.34).

(e) Loosen the function reset bail blade mounting screws (Par. 2.32).

(f) For units equipped with two-stop function clutches: Loosen the shoulder bushings on each function stripper blade arm and move stripper blade and arms to their lowest positions (Par. 4.18).

(g) Loosen the carriage return lever clamp screw (Par. 2.40).

(h) Loosen the clamp screws in the oscillating rail slide (Par. 2.30).

(i) Loosen the reversing slide adjusting stud (Par. 2.34).

(j) Loosen the clamp nuts on the shift code bar guide plates (Par. 2.33).
NOTE
TO FACILITATE MAKING THE FOLLOWING ADJUSTMENTS, REMOVE THE RANGE FINDER AND SELECTOR MAGNET ASSEMBLIES. TO INSURE BETTER OPERATION, PULL A PIECE OF KS BOND PAPER BETWEEN THE ARMATURE AND THE POLE PIECES TO REMOVE ANY OIL OR FOREIGN MATTER THAT MAY BE PRESENT. MAKE CERTAIN THAT NO LINT OR PIECES OF PAPER REMAIN BETWEEN THE POLE PIECES AND ARMATURE.

**NOTE**

**SELECTOR ARMATURE**

**NOTE**

THIS REQUIREMENT NEED NOT BE MADE NOR CHECKED IF THE SELECTOR MAGNET BRACKET AND RECEIVING MARGIN REQUIREMENTS ARE MET.

(1) **REQUIREMENT (ARMATURE CLAMP STRIP)**
CLEARANCE BETWEEN ARMATURE CLAMP STRIP AND CASTING.
MIN. 0.025 INCH
MAX. 0.045 INCH

(2) **REQUIREMENT (ARMATURE ALIGNMENT)**
OUTER EDGE OF ARMATURE SHOULD BE FLUSH WITHIN 0.015 INCH WITH OUTER EDGE OF POLE PIECES.
NOTE
THE APPROPRIATE PRELIMINARY SELECTOR ARMATURE SPRING TENSION ADJUSTMENT MUST BE MADE PRIOR TO THE SELECTOR MAGNET BRACKET ADJUSTMENT.

SELECTOR MAGNET BRACKET (MAGNETS ENERGIZED)

(1) REQUIREMENT---SPACING LOCK LEVER ON EACH HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SHOULDER ON SPACING LOCK LEVER.
MIN. 0.020 INCH ------------------------------- MAX. 0.035 INCH
TO ADJUST --- LOOSEN TWO MAGNET BRACKET MOUNTING SCREWS AND ADJUSTING LINK CLAMP SCREW. POSITION MAGNET BRACKET BY MEANS OF ADJUSTING LINK AND TIGHTEN LINK CLAMP SCREW ONLY.

(2) REQUIREMENT --- SPACING LOCK LEVER ON EACH HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. SOME CLEARANCE BETWEEN UPPER SURFACE OF ARMATURE EXTENSION AND LOWER SURFACE OF SPACING LOCK LEVER WHEN LOCK LEVER IS HELD DOWNWARD.
MAX. 0.003 INCH
TO ADJUST --- POSITION UPPER END OF MAGNET BRACKET. TIGHTEN TWO MAGNET BRACKET MOUNTING SCREWS. RECHECK REQUIREMENT (1).
CAUTION

BEFORE PROCEEDING WITH THE SELECTOR ARMATURE SPRING ADJUSTMENT, THE TYPE OF ARMATURE (ONE ANTIFREEZE BUTTON OR TWO ANTIFREEZE BUTTONS) MUST BE KNOWN. EXCESSIVE TENSION ON, OR THE MISMANAGEMENT OF A TWO BUTTON ARMATURE CAN DAMAGE THE THIN LEAF SPRING ATTACHED TO THE PIVOT END. IF REMOVAL FOR EXAMINATION IS NECESSARY, DISASSEMBLE AS
FOLLOWS:

(1) DISCONNECT ARMATURE SPRING,
(2) REMOVE ARMATURE MOUNTING SCREWS,
(3) WITHDRAW ARMATURE FROM SELECTOR.

REASSEMBLE AND RECHECK THE FOLLOWING ADJUSTMENTS:
SELECTOR ARMATURE
SELECTOR ARMATURE DOWNSTOP BRACKET
SELECTOR MAGNET BRACKET

SELECTOR MAGNET BRACKET - VERTICAL ADJUSTMENT

(3) REQUIREMENT
MARKING LOCK LEVER ON LOW PART OF CAM. ARMATURE IN CONTACT WITH FRONT POLE PIECE (MAGNET ENERGIZED). THERE SHOULD BE SOME CLEARANCE BETWEEN LOWER SURFACE OF ARMATURE EXTENSION AND UPPER SURFACE OF MARKING LOCK LEVER, GAUGE BY EYE.

TO ADJUST WITH MOUNTING SCREW LOOSENED POSITION UPPER END OF MAGNET BRACKET BY MEANS OF PRY POINT.
RECHECK REQUIREMENTS (1) AND (2).
2.04 Selector Mechanism (Cont.)

SELECTOR ARMATURE SPRING (500 MA SELECTOR COILS)
REFER TO PAR. 2.05 USING THE FOLLOWING:

SINGLE BUTTON ARMATURE
500 MA; MIN 4-1/2 OZS --- MAX 5-1/2 OZS

DOUBLE BUTTON ARMATURE
500 MA; APPROXIMATELY --- 1-1/8 OZ
TO PULL REAR BUTTON AGAINST ITS POLE PIECE
SECTION 573-115-700

2.05 Selector Mechanism (Cont.)

SELECTOR ARMATURE SPRING (FOR UNITS WITH SINGLE ANTI-FREEZE BUTTON ON SELECTOR ARMATURE)

REQUIREMENT —- (PRELIMINARY) WITH START LEVER, MARKING AND SPACING LOCK LEVERS ON HIGH PART OF THEIR CAMS, HOOK SCALE UNDER END OF ARMATURE EXTENSION (HOLD AS NEARLY VERTICAL AS POSSIBLE). IT SHOULD REQUIRE

(a) MIN. 1-1/2 OZS. --------------------- MAX. 2 OZS. FOR 20 MA OPERATION.
(b) MIN. 2-1/2 OZS. --------------------- MAX. 3 OZS. FOR 60 MA OPERATION.

TO PULL ARMATURE TO MARKING POSITION.
TO ADJUST --- POSITION ADJUSTING NUT.

REQUIREMENT —- (FINAL) REFER TO SELECTOR RECEIVING MARGIN PAR. 2.11

NOTE
SPRING TENSIONS SHOWN ON THIS PAGE PERMIT OPERATION OF PRINTER PRIOR TO MEASUREMENT OF RECEIVING MARGINS. REFINED SPRING TENSION FOR MAXIMUM SELECTOR PERFORMANCE WITH UNIT CONNECTED TO SPECIFIC CIRCUIT IN WHICH IT IS TO FUNCTION (OPERATING AT DESIRED SPEED AND LINE CURRENT). SEE PAR. 2.11.

SELECTOR ARMATURE SPRING (FOR UNITS WITH TWO ANTI-FREEZE BUTTONS ON SELECTOR ARMATURE)

REQUIREMENT —- (PRELIMINARY) WITH START LEVER, MARKING AND SPACING LOCK LEVERS ON HIGH PART OF THEIR CAMS, HOOK SCALE UNDER END OF ARMATURE EXTENSION (HOLD AS NEARLY VERTICAL AS POSSIBLE). IT SHOULD REQUIRE

0.020 AMPERES 0.030 AMPERES 0.060 AMPERES
14 GRAMS 18 GRAMS 21 GRAMS

TO PULL REAR BUTTON AGAINST ITS POLE PIECE
TO ADJUST --- POSITION ADJUSTING NUT.

REQUIREMENT —- (FINAL) WHEN A DISTORTION TEST SET IS AVAILABLE, REFINED SELECTOR ARMATURE SPRING ADJUSTMENT TO MEET SELECTOR RECEIVING MARGIN PAR. 2.11. NOTE --- WITH SELECTOR MAGNETS ENERGIZED, FRONT ANTI-FREEZE BUTTON MUST BE IN CONTACT WITH ITS MAGNET CORE.
To facilitate making the following adjustments, remove the range finder assembly and selector magnet assembly. To insure better operation, pull a piece of bond paper between the armature and the pole pieces to remove any oil or foreign matter that may be present. Make certain that no lint or pieces of paper remain between the pole pieces and the armature.

**NOTE**

To insure better operation, pull a piece of bond paper between the armature and the pole pieces to remove any oil or foreign matter that may be present.

**SELECTOR ARMATURE**

These requirements need not be made nor checked if the selector magnet bracket and receiving margin requirements are met.

1. **REQUIREMENT**
   - **CLEARANCE**
     - **MIN.** 0.025 inch
     - **MAX.** 0.045 inch
   - Between armature clamp strip and magnet bracket casting.

2. **REQUIREMENT**
   - Outer edge of armature should be flush within 0.015 inch with outer edge of pole pieces.

3. **REQUIREMENT**
   - Start lever shall drop freely into armature extension slot.

To adjust:

- Position armature spring adjusting nut to hold armature firmly against pivot edge of casting. Position armature with mounting screws loosened.

**SELECTOR ARMATURE DOWNSTOP BRACKET**

**REQUIREMENT**

Remove oil shield. With magnet de-energized, lock levers on high part of their cam, and armature resting against its downstop, clearance between end of armature and left edge of left pole piece

- **MIN.** 0.025 inch
- **MAX.** 0.030 inch

To adjust:

- Position downstop bracket with mounting screw loosened. Replace oil shield and check oil shield adjustment.
SECTION 573-115-700

2.07 Selector Mechanism (Cont.)

MARKING LOCK LEVER SPRING

REQUIREMENT --- LETTERS COMBINATION SELECTED, ROTATE
MAIN SHAFT UNTIL SELECTOR CLUTCH IS DISENGAGED.
SCALE APPLIED TO LOWER EXTENSION OF LOCK LEVER
MIN. 1-1/2 OZS. ------- MAX. 3 OZS.
TO START MARKING LOCK LEVER MOVING.

NOTE FOR BELL SERVICE ONLY
WHEN CHECKING UNITS WITH SINGLE
BUTTON ARMATURE, SIGNAL LINE SHALL BE
SHUNTED BY A TWX SWITCHBOARD
SIMULATOR. SIMULATOR SHALL NOT BE
USED WITH UNITS EMPLOYING THE TWO
BUTTON ARMATURE

START LEVER SPRING

REQUIREMENT --- WITH LATCH LEVER SPRING
UNHOOKED, STOP ARM BAIL IN THE INDEXT
OF ITS CAM AND RANGE SCALE SET AT 60,
IT SHOULD REQUIRE
MIN. 2-1/2 OZS. ------- MAX. 4-1/2 OZS.
TO START STOP ARM MOVING.

NOTE
FOR EARLIER DESIGN
SEE PAR. 4.01
2.08 Selector Mechanism (Cont.)

**SELECTOR LEVER SPRING REQUIREMENT**

PUSH LEVER IN SPACING POSITION
- MIN. 3/4 OZ.
- MAX. 1-1/2 OZs.

TO MOVE PUSH LEVER FROM SELECTOR LEVER. CHECK FIVE SPRINGS.

**SELECTOR LEVER SPRING REQUIREMENT**

PLACE UNIT UPSIDE DOWN.
RESET BAIL ON PEAK OF ITS CAM.
- MIN. 1-1/4 OZS.
- MAX. 2-1/2 OZS.

TO START EACH LEVER MOVING.
CHECK FIVE SPRINGS. IF NECESSARY, UNHOOK START LEVER SPRING TO CHECK NO. 4 SELECTOR LEVER SPRING.

**SELECTOR CLUTCH DRUM REQUIREMENT**

CLUTCH LATCHED IN STOP POSITION. CAM-CLUTCH ASSEMBLY SHOULD HAVE SOME END PLAY
- MAX. 0.010 INCH

TO ADJUST POSITION CLUTCH DRUM WITH MOUNTING SCREW LOOSENED.
2.09 Selector Mechanism (Cont.)

(A) PUSH LEVER RESET BAIL SPRING
REQUIREMENT
PUSH LEVER RESET BAIL ON LOW PART OF CAM
AND 32 OZ. SCALE APPLIED TO RESET BAIL.
MIN. 4 OZS. --- MAX. 8 OZS.
TO MOVE BAIL FROM CAM.

(B) SELECTOR CLUTCH LATCH LEVER SPRING
REQUIREMENT
LATCH RESTING ON LOW PART OF ITS CAM DISK.
MIN. 2 OZS. --- MAX. 3-1/2 OZS.
TO START LATCH MOVING.

(C) SPACING LOCK LEVER SPRING
REQUIREMENT
SELECTOR ARMATURE RELEASED AND SPACING LOCK LEVER ON LOW PART
OF ITS CAM. SPRING SCALE APPLIED TO LOWER END OF SPACING LOCK LEVER.
MIN. 3 OZS. --- MAX. 6 OZS.
TO MOVE SPACING LOCK LEVER FROM ITS PIVOT SHAFT.
2.10 Selector Mechanism (Cont.)

NOTE: REPLACE RANGE FINDER AND SELECTOR MAGNET ASSEMBLY

(A) RANGE FINDER KNOB PHASING REQUIREMENT

WITH RANGE FINDER KNOB TURNED TO EITHER END OF RACK, ZERO MARK ON SCALE SHOULD BE WITHIN 3 POINTS OF SCRIBED LINE ON RANGE FINDER PLATE.

TO ADJUST

REMOVE MOUNTING NUT, DISENGAGE KNOB FROM RACK AND POSITION KNOB. RE-ENGAGE KNOB WITH RACK AND REPLACE MOUNTING NUT.

(B) SELECTOR CLUTCH STOP ARM REQUIREMENT

RANGE SCALE SET AT 60, SELECTOR CLUTCH DISENGAGED. ARMATURE IN MARKING POSITION. CLUTCH STOP ARM SHOULD ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF SHOE LEVER.

TO ADJUST

POSITION STOP ARM ON STOP ARM BAIL WITH CLAMP SCREW LOOSENED.
SECTION 573-115-700

2.11 Selector Mechanism (Cont.)

NOTE

ARMATURE WITH TWO ANTI-FREEZE BUTTONS, FRONT BUTTON MUST CONTACT ITS CORE WHEN MAGNETS ARE ENERGIZED.

SELECTOR RECEIVING MARGIN

REQUIREMENT (FOR UNITS EMPLOYING ARMATURE WITH ONE ANTI-FREEZE BUTTON) WHEN A SIGNAL DISTORTION TEST SET IS USED FOR DETERMINING THE RECEIVING MARGINS OF THE SELECTOR, AND WHERE THE CONDITION OF THE COMPONENTS IS EQUIVALENT TO THAT OF NEW EQUIPMENT, THE RANGE AND DISTORTION TOLERANCES BELOW SHOULD BE MET.

REQUIREMENT (FOR UNITS EMPLOYING ARMATURE WITH TWO ANTI-FREEZE BUTTONS) WHEN A DISTORTION TEST SET IS AVAILABLE, THE SELECTOR ARMATURE SPRING TENSION SHOULD BE REFINED, IF NECESSARY, TO MEET THE SELECTOR RECEIVING MARGINS. THE FRONT ANTI-FREEZE BUTTON MUST CONTACT THE MAGNET CORE WHEN THE MAGNET COILS ARE ENERGIZED.

SELECTOR RECEIVING MARGIN MINIMUM REQUIREMENTS

<table>
<thead>
<tr>
<th>CURRENT (WINDINGS)</th>
<th>SPEED POINTS RANGE (ZERO DISTORTION)</th>
<th>PERCENT MARKING AND SPACING BIAS TOLERATED</th>
<th>END DISTORTION TOLERATED (SCALE SET AT BIAS OPTIMUM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.060 AMP. (PARALLEL)</td>
<td>60 75 100</td>
<td>72 40</td>
<td>35</td>
</tr>
<tr>
<td>0.020 AMP. (SERIES)</td>
<td>60 75</td>
<td>72 40</td>
<td>35</td>
</tr>
</tbody>
</table>

TO ADJUST: REFINŒ THE SELECTOR ARMATURE SPRING. (SEE PAR. 2.04 AND 2.05).

RECEIVING MARGIN FOR DUAL SPEED OPERATION (60 AND 100 WPM)

REQUIREMENT

WITH RANGE SCALE SET AT COMMON OPTIMUM SETTING FOR DUAL SPEED OPERATION, THE PAGE PRINTER SHOULD ACCEPT SIGNALS WITH 35% BIAS AND END DISTORTION WHEN OPERATED AT 60 OR 100 WPM.

TO ADJUST

1. BIAS SELECTOR BETWEEN LIMITS OF 0% TO -7% INTERNAL BIAS AT 100 WPM. (DO NOT READJUST FOR 60 WPM).

2. OBTAIN RECEIVING MARGINS AT 60 AND 100 WPM.

3. CALCULATE COMMON OPTIMUM BIAS SETTING AS FOLLOWS: 

   \[ O_c = \frac{UMB_{100} + LSB_{60}}{2} \]

   WHERE

   \[ O_c = \text{COMMON OPTIMUM BIAS SETTING} \]

   \[ UMB_{100} = \text{UPPER ORIENT LIMIT MARKING BIAS AT 100 WPM} \]

   \[ LSB_{60} = \text{LOWER ORIENT LIMIT SPACING BIAS AT 60 WPM} \]
2.12 Codebar Mechanism

REAR CODE BAR SHIFT LEVER

COMMON TRANSFER LEVER SPRING
REQUIREMENT
TRANSFER LEVER IN SPACING POSITION
SCALE APPLIED NEAR UPPER END OF
COMMON TRANSFER LEVER.
MIN. 1/2 OZ.
MAX. 1-1/4 OZS.
TO START LEVER MOVING

TRANSFER LEVER OUTER STEP

TRANSFER LEVER ECCENTRIC
REQUIREMENT
PUSH LEVERS POSITION FOR E OR
LF OR LETTERS. SELECTOR CLUTCH
DIENGAGED. CODE BAR SHIFT LEVER
LINK IN UPPERMOST POSITION,
CLEARANCE BETWEEN REAR CODE BAR
SHIFT LEVER AND CODE BAR SHIFT
BAR FARDEST FROM REAR CODE BAR
SHIFT LEVER
MIN. 0.010 INCH
MAX. 0.025 INCH
WHEN PLAY OF SHIFT BAR IS
TAKEN UP FOR MAXIMUM CLEARANCE.

TO ADJUST
ROTATE ECCENTRIC BUSHING WITH
CLAMP SCREW LOOSENED.
HIGH PART OF ECCENTRIC SHOULD
BE ABOVE HORIZONTAL CENTER LINE
NOTE
ONE OR MORE CODEBAR SHIFT
BARS CAN TOUCH CODE BAR
SHIFT LEVERS.

TRANSFER LEVER ECCENTRIC BUSHING

BUSHING CLAMP SCREW

ECCENTRIC BUSHING

COMMON TRANSFER LEVER SPRING

SELECTOR LEVER

PUSH LEVER (SELECTED)

INTERMEDIATE ARM

TRANSFER LEVER SPRING
REQUIREMENT
TRANSFER LEVER HELD IN SPACING POSITION
MIN. 1-1/2 OZ.
MAX. 2-1/2 OZS.
TO START INTERMEDIATE ARM MOVING.
SECTION 573-115-700

2.13 Codebar Mechanism (Cont.)

SELECTOR CAM LUBRICATOR

REQUIREMENT
THE LUBRICATOR TUBE SHOULD CLEAR THE HIGH PART OF THE LOCK LEVER CAM
MIN. 0.020 INCH
THE HIGH PART OF THE SELECTOR LEVER CAMS SHOULD TOUCH THE LUBRICATOR WICK, BUT SHOULD NOT RAISE IT MORE THAN 1/32 INCH.
NOTE: THERE SHOULD BE SOME CLEARANCE BETWEEN THE MARKING LOCK LEVER SPRING AND THE RESERVOIR.

TO ADJUST
POSITION THE LUBRICATOR BRACKET WITH ITS MOUNTING SCREWS LOOSENSED.

Page 20
TRANSFER LEVERS

2.15 Codebar Mechanism (Cont.)

CODE BAR SHIFT LEVER

ROLLER

CODE BAR SHIFT LEVER DRIVE ARM

REQUIREMENT

CODE BAR SHIFT LEVER LINK IN THE UPPERMOST POSITION. THERE SHOULD BE SOME CLEARANCE BETWEEN THE TOP OF THE ROLLERS AND THE TOP OF THE CAM SLOTS IN THE CODE BAR SHIFT LEVERS MAX. 0.025 INCH ON THE CLOSEST LEVER.

TO ADJUST

LOosen THE CLAMP SCREW. POSITION THE CODE BAR SHIFT LEVER DRIVE ARM ON ITS SHAFT TO MEET THE REQUIREMENT AND TO PROVIDE SOME END PLAY, NOT MORE THAN 0.006 INCH.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.03

CODE BAR SHIFT LEVER LINK BRACKET

CODE BAR SHIFT LEVER LINK

CODE BAR SHIFT LEVER DRIVE ARM

CLAMP SCREW

(FRONT VIEW)

(RIGHT SIDE VIEW)
2.16 Codebar Mechanism (Cont.)

CODE BAR SHIFT LEVER LINK BRACKET

REQUIREMENT

MOTION OF FRONT AND REAR CODE BAR SHIFT LEVERS SHOULD BE EQUALIZED WITH RESPECT TO CODE BAR TRAVEL.

TO CHECK (FRONT)

SELECT BLANK COMBINATION AND ROTATE MAINSHAFT UNTIL CODE BAR SHIFT LEVER LINK REACHES HIGHEST TRAVEL. TAKE UP PLAY FOR MAXIMUM CLEARANCE. CLEARANCE BETWEEN FRONT CODE BAR SHIFT LEVER AND SHOULDER ON NEAREST CODE BAR SHIFT BAR

MIN. 0.002 INCH
MAX. 0.025 INCH

TO CHECK (REAR)

SELECT LETTERS COMBINATION. CHECK CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND SHOULDER ON NEAREST CODE BAR SHIFT BAR IN SAME WAY.

MIN. 0.002 INCH
MAX. 0.025 INCH

TO ADJUST

POSITION ADJUSTING PLATES (FRONT AND REAR) WITH CLAMP SCREWS LOOSENED.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.04
2.17 Main Shaft and Trip Shaft Mechanisms

**CLUTCH LATCH LEVER SPRING (EXCEPT SELECTOR)**

**REQUIREMENT**
Clutch turned to stop position but with latch lever not latched.

- **MIN.** 5 OZS.
- **MAX.** 7-1/4 OZS.

To move latch lever from lug. This requirement applies to code bar clutch, function clutch, spacing clutch, line feed clutch, and type box clutch.

**SELECTOR CLUTCH CAM**

**CODE BAR CLUTCH LATCH LEVER SPRING**

**STOP LUG**

**CODE BAR CLUTCH LATCH LEVER (REAR VIEW)**

**CLUTCH LATCH LEVER**

**TRIP SHAFT**

**CLAMP SCREW**

**CODE BAR CLUTCH**

**TRIP LEVER**

**CODE BAR CLUTCH TRIP LEVER**

**REQUIREMENT**
Selector clutch and code bar clutch disengaged. Code bar clutch trip lever should engage clutch shoe lever by full thickness of shoe lever and have some end play.

- **MAX.** 0.006 Inch

To adjust position trip lever on its shaft with clamp screw loosened.

**TRIP SHAFT LEVER SPRING**

**REQUIREMENT**
Trip shaft lever on low part of cam. Code bar clutch engaged. Rotate 1/4 turn.

- **MIN.** 1 OZ
- **MAX.** 2 OZ

To start lever moving.

**TRIP SHAFT LEVER**

**TRIP SHAFT LEVER SPRING (RIGHT SIDE VIEW)**

**CLUTCH SHOE LEVER**

**CODE BAR CLUTCH TRIP LEVER (LEFT SIDE VIEW)**
SECTION 573-115-700

2. 18 Main Shaft and Trip Shaft Mechanisms (Cont.)

- CLUTCH TRIP LEVER
- CLUTCH SHOE LEVER
- FUNCTION CLUTCH

**REQUIREMENT**

- CODE BAR CLUTCH AND FUNCTION CLUTCH DISENGAGED. FUNCTION CLUTCH TRIP LEVER SHOULD ENGAGE CLUTCH SHOE LEVER BY FULL THICKNESS OF SHOE LEVER. (CHECK AT LUG WITH LEAST BITE ON TWO STOP CLUTCHES)

**TO ADJUST**

POSITION TRIP LEVER ON ITS SHAFT WITH CLAMP SCREW LOOSENED, LETTING SHAFT HAVE END PLAY

- MIN. 20 OZS.
- MAX. 24 OZS.

**TO PULL SPRING TO INSTALLED LENGTH,**

- MIN. 20 OZS.
- MAX. 24 OZS.
2.19 Main Shaft and Trip Shaft Mechanisms (Cont.)

(A) CLUTCH TRIP SHAFT SET COLLARS

(1) Requirement
Spacing cut-out lever should have side play
Min. SOME
Max. 0.008 INCH

To adjust
Position spacing cut-out lever
Set collar

Note: For earlier design see Par. 4.05.

(2) Requirement
Approximate alignment of right end of stop extensions on trip lever and shoe lever.

To adjust
Position line feed clutch
Trip lever set collar.

(3) Requirement
Line feed clutch latch lever should have side play.

Min. SOME
Max. 0.008 INCH

To adjust
Position line feed clutch
Latch lever set collar.
SECTION 573-115-700

2. 20 Main Shaft and Trip Shaft Mechanisms (Cont.)

**SPACING CLUTCH TRIP LEVER**

**REQUIREMENT**

CLEARANCE BETWEEN TRIP LEVER AND CLUTCH DRUM SHOULD BE 0.018 TO 0.035 INCH LESS THAN CLEARANCE BETWEEN SHOE LEVER AND DRUM AT STOP SHOWING GREATEST CLEARANCE. THERE SHOULD BE SOME OVERBITE ON ALL STOP LUGS. GAUGE BY EYE.

**TO CHECK**

DISENGAGE THE CLUTCH. TRIP CLUTCH TRIP LEVER AND ROTATE MAIN SHAFT UNTIL TRIP LEVER IS OVER THE SHOE LEVER. TAKE UP PLAY OF SHOE LEVER INWARD BY SNAPPING THE TRIP LEVER OVER THE SHOE LEVER. CHECK CLEARANCE BETWEEN SHOE LEVER AND DRUM AT EACH STOP POSITION. WITH THE TRIP LEVER AT THE STOP POSITION WHICH YIELDS GREATEST CLEARANCE, ROTATE MAIN SHAFT SLOWLY UNTIL THE TRIP LEVER JUST FALLS OFF THE STOP LUG. CHECK CLEARANCE BETWEEN TRIP LEVER AND DRUM.

**TO ADJUST**

POSITION THE TRIP LEVER BY MEANS OF ITS CLAMP SCREW.

**NOTE:** FOR EARLIER DESIGN SEE PAR. 4.06.

**CLUTCH TRIP LEVER SPRING**

**REQUIREMENT**

CLUTCH ENGAGED AND ROTATED UNTIL TRIP LEVER RESTS ON STOP LUG

<table>
<thead>
<tr>
<th>SPACING</th>
<th>MIN.</th>
<th>MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLUTCH</td>
<td>11 OZS.</td>
<td>16 OZS.</td>
</tr>
<tr>
<td>LINE FEED</td>
<td>9 OZS.</td>
<td>12 OZS.</td>
</tr>
<tr>
<td>TYPE BOX</td>
<td>5 OZS.</td>
<td>7-1/4 OZS.</td>
</tr>
</tbody>
</table>

TO MOVE LEVER AWAY FROM STOP LUG.
2.21 Main Shaft and Trip Shaft Mechanisms (Cont.)

(A) TYPE BOX CLUTCH TRIP LEVER ECCENTRIC POST

**Requirement**

Type box clutch disengaged, trip lever should engage the clutch shoe lever by the full thickness of the shoe lever.

To adjust position, the trip lever eccentric post.

(C) LINE FEED CLUTCH TRIP LEVER ADJUSTING SCREW

**Requirement**

Line feed function slide arm in rear position, clutch trip lever against its eccentric post.

Trip arm held against its function slide arm, some clearance between the end of the trip lever adjusting screw and the trip arm.

Max. 0.006 inch

To adjust position the adjusting screw.

(B) LINE FEED CLUTCH TRIP LEVER ECCENTRIC POST

**Requirement**

Clearance between trip lever and clutch drum should be 0.018 to 0.035 inch less than clearance between shoe lever and drum at stop which shows greatest clearance. There should be some overbite on all three stop lugs as gauged by eye.

To check:

Dismount the clutch, trip clutch trip lever, and rotate main shaft until trip lever is over the shoe lever. Take up play of shoe lever inward by snapping the trip lever over the shoe lever. Check clearance between shoe lever and drum at each stop position. With trip lever at the stop position which yields greatest clearance, rotate main shaft slowly until the trip lever just falls off the stop lug, check clearance between trip lever and drum.

To adjust:

Back off trip lever adjusting screw and position trip lever eccentric stop post.
SECTION 573-115-700

2.22 Main Shaft and Trip Shaft Mechanisms (Cont.)

**CLUTCH TRIP ARM**

**TRIP LEVER**

**CLUTCH DRUM**

**DRUM MOUNTING SCREW**

**CLUTCH SHOE LEVER**

**CLUTCH DISK STOP LUG**

**ADJUSTING DISK**

**CLAMP SCREWS**

**LATCH LEVER**

**TYPE BOX CLUTCH TRIP LEVER**

(1) REQUIREMENT

CLUTCH TRIP SHAFT CAM FOLLOWER ROLLER (SEE PAR. 2.18) ON LOWEST SURFACE OF CAM (LOCATED ON CODE BAR CLUTCH).

CLEARANCE BETWEEN INNER FACE OF TYPE BOX CLUTCH TRIP LEVER AND THE CLUTCH DISK STOP LUG.

MIN. 0.025
MAX. 0.045

TO ADJUST

LOosen CLAMP SCREW AND POSITION STOP.

(2) REQUIREMENT

WHEN POSITIONING THE TRIP ARM DETERMINE THAT THE LATCH LEVER HAS SOME SIDE PLAY

MAX. 0.008 INCH

TO ADJUST

POSITION THE CLUTCH TRIP ARM ON ITS SHAFT WITH THE CLAMP SCREW LOOSEnED.

**TYPE BOX CLUTCH DISK**

**CLUTCH SHOE LEVER**

**CLUTCH DISK STOP LUG**

**ADJUSTING DISK**

**CLAMP SCREWS**

**TRIP LEVER ECCENTRIC POST**

CLUTCH SHOE LEVER REQUIREMENT

GAP BETWEEN CLUTCH SHOE LEVER AND ITS STOP LUG SHOULD BE 0.055 INCH TO 0.085 INCH GREATER WHEN CLUTCH IS ENGAGED THAN WHEN THE CLUTCH IS DISENGAGED.

TO CHECK


NOTE

ON MULTIPLE STOP CLUTCHES CHECK THE CLEARANCE AT THE STOP LUG THAT IS ADJACENT TO THE FORM IN THE CLUTCH ADJUSTING DISK.

TO ADJUST

LOosen THE TWO CLAMP SCREWS ON THE CLUTCH DISK. ENGAGE A WRENCH OR SCREWDRIVER ON THE LUG OF THE ADJUSTING DISK AND ROTATE THE DISK.
2.23 Main Shaft and Trip Shaft Mechanisms (Cont.)

**CLUTCH SHOE LEVER SPRING REQUIREMENT**

CLUTCH ENGAGED, HOLD CAM DISK TO PREVENT TURNING. SPRING SCALE PULLED AT TANGENT TO CLUTCH.

- **MIN.** 15 OZS.
- **MAX.** 20 OZS.

**ONE-STOP CLUTCHES**

- **MIN.** 16 OZS.
- **MAX.** 22 OZS.

TO MOVE THE SHOE LEVER IN CONTACT WITH THE STOP LUG.

**CLUTCH DRUM POSITION (EXCEPT SELECTOR) REQUIREMENT**

CLUTCH SHOE LEVER HELD DIENGAGED, CLUTCH SHOULD HAVE SOME END PLAY MAX. 0.015 INCH

TO ADJUST POSITION EACH DRUM AND SPACING CLUTCH SET COLLAR WITH MOUNTING SCREWS LOOSENED.

**CLUTCH SHOE SPRING NOTE**

IN ORDER TO CHECK THIS SPRING TENSION, IT IT NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT. THEREFORE, IT SHOULD NOT BE CHECKED UNLESS THERE IS GOOD REASON TO BELIEVE THAT IT DOES NOT MEET ITS REQUIREMENT.

**REQUIREMENT**

CLUTCH DRUM REMOVED, SPRING SCALE APPLIED TO PRIMARY SHOE AT A TANGENT TO THE FRICTION SURFACE.

- **MIN.** 3 OZS.
- **MAX.** 5 OZS.

TO START THE PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

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2.24 Spacing Mechanism

**SECTION 573-115-700**

**2.24 Spacing Mechanism**

**(B) SPACING GEAR PHASING REQUIREMENT**

spacing clutch disengaged. Index line on the spacing pawl should be as near as possible to the center of the two lines on the pawl retaining washer.

To adjust:

- Remove the mounting screw from the spacing shaft gear.
- Hold the pawls in alignment and engage the spacing shaft gear with the clutch gear at a point where the spacing shaft gear mounting screw hole is in line with the tapped hole in the spacing shaft and insert the mounting screw.

**(A) SPACING GEAR CLEARANCE REQUIREMENT**

Carriage fully returned. Minimum backlash of spacing gears without bind.

To adjust:

- Insert shims between the spacing shaft bearing and front plate at upper mounting screw to increase clearance and at lower mounting screw to decrease backlash.
2.25 Line Feed and Platen Mechanism

**Line Feed Clutch Phasing Requirement**
- Line Feed Clutch Disengaged.
- Both line-feed Bars Should Engage Teeth of Line Feed Spur Gear.

To adjust:
- Loosen Assembly Bearing Post.
- Re-mesh line feed Eccentric Spur Gear with Clutch Gear.

**Positioning Mechanism**

INNER BEARING RACE

**Mounting Screws**

ROCKER SHAFT LEFT BRACKET

ROCKER SHAFT

BALL BEARING

LEFT SIDE FRAME

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SECTION 573-115-700
2.27 Positioning Mechanism (Cont.)

ROCKER SHAFT BRACKET ECCENTRIC STUD

1. REQUIREMENT --- WITH TYPE BOX CLUTCH DIENGAGED AND PLAY IN LOCKING ARM TAKEN UP TOWARD FRONT, GAP BETWEEN LOWER SIDE OF LOCK LEVER ROLLER AND TOP EDGE OF SHOULDER ON HORIZONTAL POSITIONING LOCK LEVER SHOULD BE:
   MIN. 0.055 INCH --- MAX. 0.090 INCH

2. REQUIREMENT --- MAKE SURE THAT ROCKER SHAFT DRIVE LINK IS FREE IN ITS BEARINGS (NOT UNDER LOAD) WHEN CLUTCH IS IN (a) ITS STOP POSITION; (b) WHEN IT IS ROTATED 180 DEGREES FROM STOP POSITION.

TO ADJUST --- (1) POSITION ECCENTRIC STUD IN LOWER END OF ROCKER-SHAFT LEFT BRACKET. KEEP HIGH PART OF ECCENTRIC (MARKED WITH DOT) BELOW CENTER LINE OF DRIVE LINK. (2) MAKE SURE THAT STUD IS FREE IN TYPE BOX CLUTCH BEARING AT POSITIONS (a) AND (b) ABOVE (NO PUSHING OR PULLING FORCE ON DRIVE LINK). CHECK MANUALLY BY MOVING LINK TOWARD LEFT SIDE FRAME AND THEN IN REVERSE DIRECTION.

NOTE --- ANY CHANGE IN THIS ADJUSTMENT WILL REQUIRE THAT THE FOLLOWING RELATED ADJUSTMENTS BE RECHECKED: HORIZONTAL POSITIONING DRIVE LINKAGE (PAR. 2.35) RIGHT VERTICAL POSITIONING LEVER ECCENTRIC STUD (PAR. 2.28), LEFT VERTICAL POSITIONING LEVER ECCENTRIC STUD (PAR. 2.29) VERTICAL POSITIONING LOCK LEVER (PAR. 2.36), RIBBON FEED LEVER BRACKET (PAR. 2.53), FUNCTION STRIPPER BLADE ARMS (PAR. 4.18), SPACING TRIP LEVER BAIL CAM PLATE (PAR. 2.31), REVERSING SLIDE BRACKETS (PAR. 2.34) AND RIBBON REVERSE SPUR GEAR (PAR. 2.52) PRINTING TRACK (PAR. 2.49) AND PRINTING ARM (PAR. 2.50).
SUPPRESSION BAR

#1 CODE BAR

#2 CODE BAR

COMMON CODE BAR

VERTICAL POSITIONING LEVER TOE

RIGHT VERTICAL POSITIONING LEVER

(A) RIGHT VERTICAL POSITIONING LEVER

ECCENTRIC STUD

REQUIREMENT

TYPE BOX CLUTCH DISENGAGED, COMMON
CODE BAR IN SPACING POSITION. PLAY TAKEN
UP BY PRESSING DOWNWARD ON
COMMON CODE BAR AT GUIDE
BLOCK.

MIN. 0.030 INCH
MAX. 0.050 INCH

CLEARANCE BETWEEN THE TOE OF VERTICAL
POSITIONING LEVER AND THE BOTTOM
OF THE COMMON CODE BAR WHEN PLAY IS
TAKEN UP TO MAKE CLEARANCE A MINIMUM

TO ADJUST

POSITION THE ECCENTRIC STUD IN THE
RIGHT ROCKER SHAFT BRACKET. POSITION
HIGH PART OF ECCENTRIC (MARKED WITH DOT
ECCENTRIC CAN ALSO BE IDENTIFIED BY THE
EXPOSED PORTION OF THE FLAT SURFACE OF
THE VERTICAL POSITIONING LINK.

RIGHT VERTICAL POSITIONING LEVER

(B) VERTICAL POSITIONING LEVER SPRING

REQUIREMENT

VERTICAL POSITIONING LEVER TOES (RIGHT AND
LEFT) IN CONTACT WITH THE SUPPRESSION
CODE BAR, LEVERS NOT BUCKLED.

MIN. 4 OZS.
MAX. 12 OZS.

TO MOVE THE LINK EXTENSION AWAY
FROM THE VERTICAL POSITIONING
LEVER.
CHECK BOTH RIGHT AND LEFT SPRINGS.
VERTICAL POSITIONING LOCK LEVER REQUIREMENT
TYPE BOX CLUTCH DISENGAGED MIN. 5 OZS.
MAX. 8 OZS. TO START LOCK LEVER MOVING.
CHECK RIGHT AND LEFT SPRINGS.

LEFT VERTICAL POSITIONING LOCK LEVER

LEFT VERTICAL POSITIONING LEVER

RIGHT VERTICAL POSITIONING LEVER

COMMON CODE BAR

VERTICAL POSITIONING LEVER TOE

LEFT VERTICAL POSITIONING LEVER ECCENTRIC STUD

REQUIREMENT
RIGHT AND LEFT VERTICAL POSITIONING LEVERS SHOULD BUCKLE EQUALLY WITHIN 0.006 INCH

TO CHECK
COMMON CODE BAR IN SPACING POSITION, TRIP TYPE BOX CLUTCH. ROTATE MAIN SHAFT UNTIL RIGHT VERTICAL POSITIONING LEVER TOE TOUCHES COMMON CODE BAR, BUCKLING ITS LOWER LINK 0.008 INCH (MAXIMUM)

LEFT VERTICAL POSITIONING LEVER TOE SHOULD TOUCH COMMON CODE BAR, BUCKLING ITS LOWER LINK EQUALLY WITHIN 0.006 INCH

TO ADJUST
POSITION ECCENTRIC STUD ON ROCKER SHAFT LEFT BRACKET INNER ARM. POSITION HIGH PART OF CAM (MARKED WITH DOT) TOWARD REAR.
2.30 Spacing Mechanism (Cont.)

NOTE: CHECK RELATED ADJUSTMENTS, PARs. 2.43, 2.44, AND 2.47, IF THE FOLLOWING ADJUSTMENTS ARE REMADE.

OSCILLATING RAIL SLIDE POSITION REQUIREMENT
CARRIAGE RETURN RING AND AUTOMATIC CARRIAGE RETURN-LINE FEED RING FREE TO ROTATE ON SPACING DRUM (FIVE MOUNTING SCREWS LOOSENED). SPACING CLUTCH DISENGAGED. FEED PAWL, WHICH IS FARthest ADVANCED, ENGAGING TOOTH IMMEDIATELY ABOVE CUT-AWAY SECTION OF RATCHET. CLEARANCE BETWEEN SLIDE AND PULLEY MIN. 0.025 INCH—MAX. 0.050 INCH TO ADJUST POSITION SLIDE ON WIRE ROPE WITH CLAMP SCREWS LOOSENED.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.07.

OSCILLATING RAIL SLIDE
CLAMP SCREW
PULLEY WIRE ROPE

RATCHET
MOUNTING SCREWS
CARRIAGE RETURN RING
SPACING DRUM
AUTOMATIC CARRIAGE RETURN-LINE FEED RING (AND SPACE SUPPRESSION RING)

SPACING FEED PAWL SPRING REQUIREMENT
EACH SPACING PAWL IN LEAST ADVANCED POSITION RESTING AGAINST RATCHET WHEEL. EACH SPRING UNHOOKED FROM BRACKET MIN. 2-1/2 OZS., MAX. 4 OZS., TO PULL SPRINGS TO INSTALLED LENGTH.
NOTE: ON UNITS EQUIPPED FOR 6 SPACES PER INCH THIS TENSION SHOULD BE MIN. 8 OZS., MAX. 10 OZS., TO PULL SPRINGS TO INSTALLED LENGTH.
SECTION 573-115-700

2.31 Spacing Mechanism (Cont.)

(A) SPACING TRIP LEVER BAIL CAM PLATE REQUIREMENT
SPACING TRIP LEVER ARM IN UPWARD POSITION. TYPE BOX CLUTCH
ROTATED THROUGH APPROXIMATELY ONE-HALF OF ITS CYCLE. ALL
FUNCTION PAWLS DISENGAGED FROM FUNCTION BAR. CLEARANCE
BETWEEN TOP SURFACE OF TRIP LEVER ARM EXTENSION AND
SPACING TRIP LEVER SHOULDER.
MIN. 0.010 INCH
MAX. 0.040 INCH
TO ADJUST
POSITION CAM PLATE ON ROCKER SHAFT WITH MOUNTING SCREWS
LOOSENED, POSITION FORWARD EDGE OF CAM PLATE PARALLEL TO
SHAFT.

(B) SPACING TRIP LEVER SPRING REQUIREMENT
TYPE BOX CLUTCH DISENGAGED.
MIN. 2-1/2 OZS.
MAX. 5 OZS.
TO START LEVER MOVING.

(C) SPACING TRIP LEVER BAIL SPRING REQUIREMENT
SPACING TRIP LEVER BAIL AGAINST STOP,
SPACING TRIP LEVER BAIL SPRING UNHOOKED.
MIN. 8 OZS.
MAX. 12 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
2.32 Function Mechanism

(B) FUNCTION RESET BAIL SPRING --- WITH TYPING UNIT INVERTED, HOLD #1 CODE BAR IN ITS MARKING POSITION SO THAT NO FUNCTION BAR IS SELECTED. ROTATE MAIN SHAFT UNTIL FUNCTION RESET BAIL SPRINGS ARE IN THEIR MINIMUM LENGTH POSITION. HOOK A 32 OZ. SCALE (BETWEEN CLUTCH TRIP SHAFT AND SPACE SUPPRESSOR BAIL) ON FRONT EDGE OF RESET BAIL (AT MIDDLE OF BAIL) AND PULL REARWARD. MIN. 10 OZS. ----------------- MAX. 22 OZS. (TO START BAIL MOVING).

(A) FUNCTION RESET BAIL BLADE (FOR UNITS WITH 2-STOP FUNCTION CLUTCH SEE PAR. 4.09)

(1) REQUIREMENT --- WITH ALL CLUTCHES DISENGAGED, TRIP CODE BAR CLUTCH AND TURN MAIN SHAFT UNTIL CODE-BAR CLUTCH SHOE-RELEASE LEVER JUST TOUCHES ITS STOP LEVER. UN-LATCH ALL FUNCTION PAWLS FROM THEIR FUNCTION BARS. HOLD RESPECTIVE FUNCTION BAR IN ITS EXTREME REARWARD POSITION WITH SPRING HOOK; CLEARANCE BETWEEN FUNCTION BAR AND RESET BAIL BLADE SHOULD BE MIN. 0.018 INCH ------------------ MAX. 0.035 INCH

TO CHECK --- MEASURE CLEARANCE AT BARS IN STUNT BOX SLOTS, NO'S 1, 4, 11, 18, 23, 33, 38 AND 41. IF A DESIGNATED SLOT IS VACANT, USE NEAREST BAR OR SELECT BAR WITH HIGHEST NUMBERED SLOT WHEN A BAR IS LOCATED ON BOTH SIDES OF VACANT SLOT. (VIEW SLOTS FROM REAR, NUMBERING FROM LEFT TO RIGHT). TO ADJUST --- POSITION BLADE ON RESET BAIL WITH ITS MOUNTING SCREWS FRICITION TIGHT.

(2) REQUIREMENT --- EACH FUNCTION PAWL SHOULD OVER TRAVEL ITS FUNCTION BAR BY AT LEAST 0.002 INCH WITH INDICATED TENSIONS APPLIED. CHECK PAWLS ONE AT-A-TIME AT SLOT NO'S. USED ABOVE.

TO CHECK --- IF CARRIAGE RETURN LEVER ADJUSTMENT HAS NOT BEEN MADE, LOOSEN ITS CLAMP SCREW, LATCH FUNCTION PAWLS BY LOWERING STRIPPER BLADE; TRIP CODE BAR CLUTCH AND POSITION ITS RELEASE LEVER AS IN (1) ABOVE. STRIP OFF ANY FUNCTIONS WHICH MAY HAVE BEEN SELECTED.

TO ADJUST --- REFINES REQUIREMENT (1) ABOVE, HOLDING THE READJUSTMENT WITHIN LIMITS MIN. 0.018 INCH ------------------ MAX. 0.035 INCH

NOTE: IF THE FUNCTION RESET BAIL BLADE IS REPOSITIONED, CHECK THE ADJUSTMENT OF THE FIGS-LTRS SHIFT CODE BAR OPERATING MECHANISM FOLLOWING.
SECTION 573-115-700

2.33 Function Mechanism (Cont.)

NOTE 1. FOR UNITS WITH ADJUSTABLE GUIDE PLATES AND ONE-STOP FUNCTION CLUTCHES, PROCEED AS SPECIFIED.

NOTE 2. FOR UNITS WITH ADJUSTABLE GUIDE PLATES AND TWO-STOP FUNCTION CLUTCHES, CHANGE FIRST SENTENCE IN REQUIREMENT (1) TO "DISENGAGE FUNCTION CLUTCH AT STOP GIVING LEAST CLEARANCE." THEN PROCEED AS SPECIFIED.

FIGS - LTRS SHIFT CODE BAR OPERATING MECHANISM

(1) REQUIREMENT
WITH FUNCTION CLUTCH ROTATED UNTIL CLUTCH DISK STOP LUG IS TOWARD BOTTOM OF UNIT, HOOK FIGURES FUNCTION PAWL OVER THE END OF THE FUNCTION BAR. CLEARANCE BETWEEN UPPER GUIDE PLATE EXTENSION AND SHIFT SLIDE.
MAX. 0.020 WHEN PLAY IS TAKEN UP FOR MAXIMUM.

(2) REQUIREMENT
WITH 32 OZ. PULL APPLIED TO FUNCTION PAWL THERE SHOULD BE MIN. 0.002 INCH BETWEEN SHOULDER OF FIGURES FUNCTION PAWL AND FACE OF FUNCTION BAR.

(3) REQUIREMENT
REPEAT REQUIREMENT (1) & (2) FOR THE LETTERS FUNCTION PAWL. CHECK MAX. CLEARANCE BETWEEN LOWER GUIDE PLATE EXTENSION AND SHIFT SLIDE. CHECK MIN. CLEARANCE BETWEEN SHOULDER OF LETTER FUNCTION PAWL AND FACE OF FUNCTION BAR.
NOTE: THERE SHOULD BE SOME CLEARANCE BETWEEN THE UNOPERATED SHIFT SLIDE AND ITS GUIDE PLATE, WHEN THE SHIFT SLIDE HAS REACHED ITS POSITION OF MAXIMUM TRAVEL.

TO ADJUST
POSITION UPPER AND/OR LOWER GUIDE PLATE BY THE ADJUSTING SLOT WITH THE CLAMP NUTS LOOSENED.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.08
2.34 Positioning Mechanism (Cont.)

(A) REVERSING SLIDE DETENT SPRING
   REQUIREMENT
   SLIDE IN LEFT HAND POSITION, SCALE HOOKED IN UPPER RIGHT HAND DETENT NOTCH
   MIN. 2 OZS.
   MAX. 4-1/2 OZS.
   TO START DETENT MOVING

(B) REVERSING SLIDE ADJUSTING STUD
   REQUIREMENT
   TYPE BOX CLUTCH DISENGAGED.
   WITH NO. 3 CODE BAR IN SPACING POSITION (RIGHT), THE REVERSING SLIDE DETENT ROLLERS SHOULD BE FULLY SEATED IN THE RIGHT-HAND NOTCHES OF THE DETENT LEVER.
   WITH NO. 3 CODE BAR IN MARKING POSITION (LEFT), THE REVERSING SLIDE DETENT ROLLERS SHOULD BE FULLY SEATED IN THE LEFT-HAND NOTCHES OF THE DETENT LEVER.
   TO ADJUST POSITION THE REVERSING SLIDE STUD IN ITS ELONGATED HOLE WITH ITS MOUNTING NUT LOOSENED.

(C) REVERSING SLIDE BRACKETS
   REQUIREMENT
   TYPE BOX CLUTCH, CODE BAR CLUTCH, AND FUNCTION CLUTCH DISENGAGED.
   REVERSING SLIDE MOVED TO RIGHT AND LEFT THROUGH ITS FULL TRAVEL RIGHT MOTION SHOULD BUCKLE LEFT HORIZONTAL POSITIONING DRIVE LINKAGE AND LEFT MOTION SHOULD BUCKLE RIGHT HORIZONTAL POSITIONING DRIVE LINKAGE. THE AMOUNT OF BUCKLING IN EACH CASE SHOULD BE:
   MIN. 0.030 INCH
   MAX. 0.050 INCH
   MEASURED AT POINT OF MAXIMUM CLEARANCE

LEFT HORIZONTAL POSITIONING DRIVE LINK

TO ADJUST POSITION EACH REVERSING SLIDE BRACKET WITH THEIR CLAMP SCREWS LOOSENED.

RIGHT HORIZONTAL POSITIONING DRIVE LINKAGE
NOTE: THESE ADJUSTMENTS APPLY ONLY TO HORIZONTAL POSITIONING DRIVE MECHANISMS EQUIPPED WITH TORSION SPRINGS.

HORIZONTAL POSITIONING DRIVE LINKAGE REQUIREMENT

- TYPE BOX CLUTCH DISENGAGED.
- CODE BARS 4 AND 5 TO SPACING (RIGHT).
- CLEARANCE BETWEEN EACH SIDE OF CENTER HORIZONTAL STOP SLIDE AND DECELERATING SLIDES, ON SIDE WHERE KNEE LINK IS STRAIGHT SHOULD BE EQUAL (WITHIN 0.008 INCH)

| MIN.   | 0.090 INCH |
| MAX.   | 0.110 INCH |

TO ADJUST

- LOOSEN BEARING STUD MOUNTING SCREWS AND CONNECTING STRIP MOUNTING SCREWS FRICITION TIGHT.
- POSITION ONE OF BOTH BEARING STUDS ON THE CONNECTING STRIP TO PROVIDE 0.095 INCH TO 0.105 INCH BETWEEN THE CENTER HORIZONTAL SLIDE AND THE DECELERATING SLIDE ON THE SIDE WHERE THE LINKAGE IS NOT BUCKLED.
- TIGHTEN THE TWO INNER MOUNTING SCREWS.
- CHANGE POSITION OF REVERSING SLIDE AND CHECK OPPOSITE CLEARANCE.
- EQUALIZE BY SHIFTING BOTH STUDS AND CONNECTING STRIP AS A UNIT.
- HOLD THE DRIVE LINKAGE HUB AGAINST THE LOWER VERTICAL LINK OF THE DRIVE LINKAGE.
- TIGHTEN THE TWO OUTER BEARING STUD MOUNTING SCREWS.
- CHECK THE LINKAGE FOR FREENESS THROUGHOUT A COMPLETE CYCLE.
- THE TYPE BOX CLUTCH DISK SHOULD HAVE SOME MOVEMENT IN THE NORMAL DIRECTION OF ROTATION IN THE STOP POSITION.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.10
2. 36  Positioning Mechanism (Cont.)

VERTICAL POSITIONING LOCK LEVER

(1) REQUIREMENT
LETTERS COMBINATION SET UP ON
CODE BARS. MAIN SIDE OPERATING
LEVERS AT UPPER END OF TRAVEL.
UPPER NOTCH OF VERTICAL POSI-
TIONING LOCK LEVER FULLY ENGAGED
(MANUALLY IF NECESSARY) WITH
VERTICAL SLIDE PROJECTION.
UPPER SURFACE OF FOLLOWER ARM
REAR EXTENSION SHOULD BE
MIN. IN CONTACT WITH
MAX. 0.004 Inch AWAY FROM
INNER EXTENSION OF MAIN
SIDE LEVER.

(2) REQUIREMENT
WITH PLAY TAKEN UP BY
PULLING UPWARD WITH
8 0ZS. TENSION ON TYPE
BCX CARRIAGE TRACK,
VERTICAL SURFACES
MIN. IN CONTACT WITH
MAX. 0.012 Inch AWAY
FROM EACH OTHER

TO ADJUST
POSITION RIGHT AND LEFT
VERTICAL POSITIONING
LOCK LEVERS WITH CLAMP
SCREWS LOOSENED.
2.37 Spacing Mechanism (cont.)

**Lower Draw-Wire Rope Pulley Bail Spring Requirement**

Spring unhooked from pulley bail, bail extension resting on opening in front plate.
- Min. 18 ozs.
- Max. 22 ozs.
To pull spring to position length.

**Carriage Draw-Wire Rope Requirement**

Clearance between lower draw-wire rope and carriage return latch bail post should be at least 0.006 inch, with the horizontal positioning mechanism in its lowest position, clearance between the lower draw-wire rope and the left horizontal positioning drive linkage should be min. 0.030 inch.

To adjust:
- Advance printing carriage to extreme right hand position.
- Rotate type box clutch 1/2 revolution.
- Loosen rope clamp screw one turn only.
- Position pulley bearing studs, with their mounting screws loosened, to meet requirement.
- Check that cable has moved around its equalizing clamp so that rear cable has slightly greater tension than front cable, gauged by feel.
- Tighten the clamp screw.
2.38 Spacing Mechanism (Cont.)

CARTRIDGE RETURN SPRING REQUIREMENT
PULL REQUIRED TO START SPRING DRUM MOVING
MIN. 3-1/2 LBS.
MAX. 4 LBS.

TO CHECK
SPACING DRUM IN ITS RETURNED POSITION. PRINTING TRACK IN LOWER POSITION. REMOVE LOWER CABLE ROLLER SPRING. HOLD SPACING PAWL, BUFFER SLIDE AND CARRIAGE RETURN LATCH TO PREVENT INTERFERENCE WITH SPACING DRUM.

TO ADJUST
SPRING DRUM NUT LOOSENED. ROTATE SPRING DRUM RATCHET WHEEL TO INCREASE TENSION, OPERATE ESCAPEMENT LEVER TO DECREASE TENSION.

SPACING FEED PAWL RELEASE LINK SPRING REQUIREMENT
MIN. 1/2 OZ.
MAX. 2-1/2 OZS.
TO START SPRING STRETCHING.
2.39 Spacing Mechanism (Cont.)

(A) CARRIAGE RETURN LATCH BAIL
REQUIREMENT
CARRIAGE FULLY RETURNED (SEE PAR. 2.43)
PLAY IN CARRIAGE RETURN BAIL TAKEN UP
TO RIGHT BY HOLDING RIGHT SIDE OF BAIL
AGAINST ITS RETAINER. CLEARANCE BETWEEN
CARRIAGE RETURN LATCH BAIL AND CARRIAGE
RETURN LEVER.
MIN. 0.004 INCH
MAX. 0.040 INCH
TO ADJUST
POSITION LATCH BAIL PLATE WITH CLAMP
SCREW LOOSENED.

(B) CARRIAGE RETURN LATCH
BAIL SPRING
REQUIREMENT
SPACING DRUM FULLY RETURNED
MIN. 3 OZS.
MAX. 4-1/2 OZS.
TO START LATCH BAIL MOVING
2.40 Spacing Mechanism (Cont.)

CARRIAGE RETURN LEVER
REQUIREMENT (UNITS EQUIPPED WITH ONE-STOP FUNCTION CLUTCH)
CARRIAGE RETURN FUNCTION SET UP ON SELECTOR. MAIN SHAFT ROTATED UNTIL FUNCTION CLUTCH STOP LUG IS TOWARD BOTTOM OF UNIT. CARRIAGE RETURN FUNCTION PAWL HOOKED OVER ITS FUNCTION BAR. SPACING DRUM HELD SO THAT CARRIAGE RETURN LATCH BAIL IS LATCHED.
CLEARANCE BETWEEN LATCH BAIL AND CARRIAGE RETURN LEVER.
MIN. 0.006 INCH — MAX. 0.035 INCH

CARRIAGE RETURN LEVER
REQUIREMENT (UNITS EQUIPPED WITH TWO-STOP FUNCTION CLUTCH)
SAME EXCEPT MAIN SHAFT SHOULD BE ROTATED UNTIL FUNCTION CLUTCH IS DISENGAGED IN STOP POSITION THAT RESULTS IN LEAST CLEARANCE.

TO ADJUST POSITION CARRIAGE RETURN LEVER ON CARRIAGE RETURN BAIL WITH CLAMP SCREW LOOSENED.
2.41 Spacing Mechanism (Cont.)

**TRANSFER SLIDE SPRING REQUIREMENT**

TRANSFER SLIDE IN EXTREME LEFT POSITION.
SPRING UNHOOKE
MIN. 3-1/2 OZS.
MAX. 4-1/2 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

**DASH POT VENT SCREW REQUIREMENT**

TYPE BOX CARRIAGE SHOULD RETURN FROM ANY LENGTH OF LINE WITHOUT BOUNCING.
TO CHECK PRINTER OPERATED AT ANY SPEED FROM AUTOMATIC TRANSMISSION WITH ONE CR AND ONE LF SIGNAL BETWEEN LINES, FIRST CHARACTER OF EACH LINE SHOULD BE PRINTED IN SAME LOCATION AS IF UNIT WAS MANUALLY OPERATED SLOWLY.
TO ADJUST TURN DOWN VENT SCREW UNTIL SLIGHT PNEUMATIC BOUNCE IS PERCEPTIBLE, BACK OFF SCREW UNTIL EFFECT DISAPPEARS.
FOR DASHPOTS WITH ONE VENT HOLE; THEN BACK SCREW OFF ONE FULL TURN, TIGHTEN NUT.
FOR DASHPOTS WITH TWO VENT HOLES; THEN BACK SCREW OFF 1/4 TURN, TIGHTEN NUT.

2.42 Function Mechanism (Cont.)

**KEYBOARD LOCK LEVER SPRING (IF UNIT IS EQUIPPED) REQUIREMENT (UNIT UPSIDE DOWN) SCALE APPLIED TO BELL CRANK**
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START KEYBOARD LOCK LEVER MOVING
2.43 Spacing Mechanism (Cont.)

NOTES
1. WHEN ADJUSTMENTS ON THIS PAGE ARE MADE
   CHECK RELATED REQUIREMENTS IN PARAS. 2.30,
   2.44, AND 2.47.
2. FOR SPROCKET FEED PRINTER REQUIREMENTS REFER
   TO ADJUSTMENTS IN PARAS. 2.71 THROUGH 2.75.
3. LEFT MARGIN MAY BE VARIED AS REQUIRED FROM
   ZERO TO ONE INCH. MAXIMUM RANGE OF
   ADJUSTMENT FOR MECHANISMS WITH STANDARD
   (10 CHARACTERS-PER-INCH) SPACING IS AS
   FOLLOWS:
   (a) FRICTION FEED PLATEN - 85 CHARACTERS
   (b) SPROCKET FEED PLATEN - 74 CHARACTERS
4. PRINTING CARRIAGE POSITION REQUIREMENT
   REFER TO STANDARD ADJUSTMENT --- PAR. 2.47
5. FOR EARLY DESIGN REFER TO PAR. 4.12.

LEFT MARGIN
REQUIREMENTS --- (72 CHARACTER TYPICAL LINE).
(1) WITH TYPE BOX CLUTCH DIENGAGED, SPACING
DRUM IN ITS RETURN POSITION AND TYPE BOX
SHIFTED TO LETTERS POSITION; CLEARANCE
BETWEEN LEFT EDGE OF PLATEN AND LETTERS
PRINT INDICATOR. (SEE NOTE 3).
MIN. 15/16 INCH --- MAX. 1-1/16 INCH.
TO ADJUST --- POSITION STOP ARM OF SPACING
DRUM* WITH ITS CLAMP SCREWS LOOSENED.
(2) WITH SPACING CLUTCH DIENGAGED, FRONT
SPACING FEED PAWL FARTEST ADVANCED,
SPACING DRUM FULLY RETURNED (DASH POT
PLUNGER DEPRESSED FULLY) PLAY IN SPACING
SHAFT GEAR (PAR. 2.24) TAKEN UP IN CLOCK-
WISE DIRECTION; CLEARANCE BETWEEN PAWL
AND SHOULDER OF RATCHET WHEEL TOOTH
IMMEDIATELY AHEAD.
MIN. SOME --- MAX. 0.008 INCH.
(3) THE REAR PAWL, WHEN FARTEST ADVANCED,
SHOULD DROP INTO INDENTATION BETWEEN
RATCHET WHEEL TEETH AND SHOULD BOTTOM
FIRMLY IN NOTCH.
TO ADJUST --- REFINE REQUIREMENT (1) ABOVE.

*SHIFT TYPE BOX TO LTRS. POSITION, RETURN
PRINT CARRIAGE TO ITS LEFT POSITION AND
LOOSEN CARRIAGE RETURN RING MOUNTING
SCREWS (4). HOLD CARRIAGE RETURN RING IN
ITS COUNTER-CLOCKWISE POSITION, AND
POSITION TYPE BOX SO THAT ITS LTRS.
INDICATOR ALIGNS WITH REQUIRED MARGIN.
TIGHTEN MOUNTING SCREWS.
NOTE: CHECK RELATED ADJUSTMENTS, PARS. 2.30, 2.43 AND 2.47 IF THE FOLLOWING ADJUSTMENTS ARE REMADE.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.13
2.45 Positioning Mechanism (Cont.)

DECELERATING SLIDE SPRING

REQUIREMENT

PRINTING BAIL IN DOWNWARD POSITION. PRINTING CARRIAGE AND DECELERATING SLIDE ASSEMBLY IN RIGHT HAND POSITION.
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START THE SLIDE MOVING.
WITH THE PRINTING CARRIAGE AND DECELERATING SLIDE IN THEIR LEFT HAND POSITION
CHECK THE LEFT HAND DECELERATING SLIDE SPRING

NOTE: FOR EARLIER DESIGN SEE PAR. 4.13
2.46 Printing Mechanism

**Printing Carriage Lower Roller Requirements**
- Carriage wire rope clamp screws loosened. Play of carriage on track—min., without bind, throughout track's full length.
- To adjust (eccentric bushing) position lower roller with screw nut loosened, keep high part of eccentric (chamfered corner) toward the right.
- To adjust (sliding screw) position lower roller with mounting screw loosened.

**Type Box Carriage Roller Arm Spring Requirements**
- Min. 28 ozs.
- Max. 36 ozs.
- To start upper roller, nearest type box latch, moving away from carriage track.

*Note: For earlier design see PAR. 4.14*
2.47 Printing Mechanism (Cont.)


**PRINTING CARRIAGE POSITION REQUIREMENT**

TYPE BOX IN LETTERS POSITION. M TYPE PALLET selected. CARRIAGE AT APPROXIMATE MIDPOINT OF PLATEN. TYPE BOX IN PRINTING POSITION. M TYPE PALLET SHOULD BE APPROXIMATELY IN CENTER OF PRINTING HAMMER WHEN HAMMER IS JUST TOUCHING M TYPE PALLET. TAKE UP PLAY IN TYPE BOX CARRIAGE IN EACH DIRECTION AND SET HAMMER IN CENTER OF PLAY.

TO ADJUST POSITION PRINTING CARRIAGE ON WIRE ROPE WITH CLAMP SCREWS LOOSENED.

**PRINTING HAMMER BEARING STUD REQUIREMENT**

TYPE BOX AT MIDPOINT OF PLATEN AND IN POSITION TO PRINT PERIOD. PRINTING HAMMER IN CONTACT WITH TYPE PALLET AND PRESSED DOWNWARD AT BEARING POST. FACE OF HAMMER SHOULD BE FULLY ON END OF TYPE PALLET.

TO ADJUST

ADD OR REMOVE SHIMS BETWEEN SHOULDER ON BEARING POST AND STOP BRACKET.
2.48 Positioning Mechanism (Cont.)

(A) **SHIFT LINKAGE REQUIREMENT**

Carriage near midpoint of platen. Type box in position to print letter "0". Manually buckle right shift linkage. Shift type box to left. Figure "9" type pallet should be approximately in center of print hammer when hammer is just touching "9" type pallet.

**TO ADJUST**

Position left shift linkage on oscillator rail with two clamp screws loosened.

**TO RECHECK**

Shift alternately from "W" to "2". Take up play in each direction. Refine adjustment if necessary.

(B) **SHIFT LINKAGE SPRING REQUIREMENT**

Link in straight position min. 6 ozs. max. 14 ozs. To start each link moving.

NOTE: FOR SHIFT MECHANISMS WITH TORSION SPRINGS SEE PAR. 4.15
2.49 Printing Mechanism (Cont.)

(A) PRINTING TRACK

REQUIREMENT

- Printing track in its extreme downward position. Blank selection in figures.
- Printing hammer operating bail latching extension held with left face in line with the latch shoulder. Printing arm slide positioned alternately over each track mounting screw. Printing bail reset each time. Clearance between latching extension and operating bail latch should be
  - Min. 0.015 inch
  - Max. 0.040 inch

To adjust
- Position the printing track up or down with its mounting screws loosened. Hold clearance to maximum.

(B) PRINTING HAMMER OPERATING BAIL

PRINTING HAMMER PLUNGER SPRING

REQUIREMENT

- Min. 3 ozs.
- Max. 5-3/4 ozs.
- To start plunger moving.

(C) PRINTING HAMMER OPERATING BAIL

PRINTING HAMMER YIELD SPRING

REQUIREMENT

- Spring adjusting bracket in left-hand notch. Hammer yield spring unhooked.
  - Min. 10 ozs.
  - Max. 13 ozs.
- To start bail moving.

(D) PRINTING HAMMER YIELD SPRING

REQUIREMENT

- Printing hammer operating bail against its stop.
  - Min. 1 oz.
  - Max. 2-1/2 ozs.
- To start hammer bail moving (horizontal position).

(E) PRINTING HAMMER OPERATING BAIL LATCH SPRING

REQUIREMENT

- Printing track in its extreme upward position.
  - Min. 3 ozs.
  - Max. 4-1/2 ozs.
- To start latch moving.
2.50 Printing Mechanism (Cont.)

PRINTING HAMMER STOP BRACKET

REQUIREMENT — WITH TYPE BOX IN POSITION TO PRINT CHARACTER "M", PRINTING TRACK IN ITS MAXIMUM DOWNWARD POSITION, AND PRINTING HAMMER STOP BRACKET HELD TOWARD THE PLATEN WITH PRESSURE OF 8 OZS; CLEARANCE BETWEEN PRINTING HAMMER AND "M" TYPE PALLET.

MIN. 0.005 INCH
MAX. 0.035 INCH
AT ANY POINT ALONG THE ENTIRE LENGTH OF THE PLATEN.

TO ADJUST — POSITION STOP BRACKET BY MEANS OF ITS TWO MOUNTING SCREWS.

TYPE PALLET SPRING

REQUIREMENT

TYPE BOX REMOVED FROM THE UNIT. 8 OZS. SCALE APPLIED VERTICALLY TO THE END OF THE PALLET SHANK.
MIN. 1/4 OZS.
MAX. 3/4 OZS.
TO START PALLET MOVING.

TYPE PALLET

TYPE BOX ASSEMBLY

PRINTING TRACK IN MAXIMUM DOWNWARD POSITION.
PRINTING HAMMER OPERATING BAIL AGAINST ITS STOP.
SOME CLEARANCE BETWEEN SECONDARY PRINTING ARM AND FORWARD EXTENSION OF HAMMER OPERATING BAIL.
MAX. 0.015 INCH
WHEN PRINTING ARM SLIDE IS HELD DOWNWARD OVER EACH PRINTING TRACK MOUNTING SCREW FOR MAXIMUM CLEARANCE.

NOTE 1
THE PRINTING ARM ADJUSTMENT SHOULD ALWAYS BE MADE WITH THE PRINTING HAMMER OPERATING BAIL SPRING BRACKET IN THE NO. 1 POSITION. POSITIONS NO. 2 AND 3 ARE TO BE USED ONLY FOR MAKING MULTIPLE COPIES.

PRINTING TRACK IN UPPERMOST POSITION. LATCHING EXTENSION OF PRINTING HAMMER OPERATING BAIL SHOULD OVERTRAVEL LATCHING SURFACE OF OPERATING BAIL LATCH BY MIN. 0.006 INCH CHECK RIGHT AND LEFT POSITIONS TO ADJUST

SECONDARY PRINTING ARM

PRINTING ARM
CLAMP SCREWS

(FRONT VIEW)

NOTE 2
FOR EARLIER DESIGN SEE PAR. 4.16
2.51 Printing Mechanism (Cont.)

NOTE: THIS ADJUSTMENT APPLIES ONLY TO UNITS SO EQUIPPED AND SHOULD BE MADE WITH THE TYPEBOX IN ITS UPPER POSITION.

NOTE: RECHECK PRINTING STOP BRACKET ADJUSTMENT PAR. 2.50, AND READJUST IF NECESSARY.

TYPE BOX ALIGNMENT REQUIREMENT
PRINTED IMPRESSION OF CHARACTERS AT TOP AND AT BOTTOM SHOULD BE EQUAL. (GAUGE VISUALLY)

TO ADJUST
LOosen NUT. OPERATE PRINTER UNDER POWER, REPEAT CHARACTERS E AND Z, TURN ADJUSTING SCREW IN OR OUT (IN STEPS OF 1/4 TURN) TO MEET REQUIREMENT. TIGHTEN NUT.

NOTE: SOME TYPING UNITS ARE EQUIPPED WITH A RIBBON GUIDE WHICH HAS A TYPE BOX RETAINING CLIP WITH A LIMITED YIELD. IN CASES WHERE IT IS NECESSARY TO BACK THE ADJUSTING SCREW OUT TO PROVIDE HEAVIER PRINTING AT THE TOP OF A CHARACTER, IT MAY BE NECESSARY TO BEND THE SPRING CLIP ON THE RIBBON GUIDE TOWARD THE FRONT SO THAT THE TAB AT THE BOTTOM OF THE TYPE BOX IS HELD AGAINST THE HEAD OF THE ADJUSTING SCREW.
CHECK THE TWO COLOR RIBBON REQUIREMENTS PARs. 3.44 AND 3.45 ON UNITS SO EQUIPPED.

(A) RIBBON REVERSE SPUR GEAR REQUIREMENT

WHEN RIGHT REVERSING LEVER IS IN MAXIMUM DOWNWARD POSITION, THE LEFT REVERSING LEVER SHOULD BE IN ITS MAXIMUM UPWARD POSITION.

TO ADJUST

LOOSEN THE SET SCREWS IN THE DETENT CAM. LOOSEN THE LEFT SPUR GEAR NUT. SECURELY TIGHTEN THE RIGHT SPUR GEAR NUT. MOVE THE RIGHT REVERSING LEVER TO ITS MAXIMUM DOWNWARD POSITION AND HOLD LEFT REVERSING LEVER IN ITS MAXIMUM UPWARD POSITION. THEN TIGHTEN THE LEFT SPUR GEAR NUT.

NOTE: ROTATE TYPE BOX CLUTCH 1/2 TURN AND MOVE RIGHT REVERSING LEVER UNDER THE SEGMENT. THERE SHOULD BE SOME CLEARANCE BETWEEN SEGMENT AND THE LEVER. REFINE ADJ. IF NECESSARY.

(B) RIBBON REVERSE DETENT REQUIREMENT

RIBBON REVERSE DETENT LINK BUCKLED IN ITS DOWNWARD POSITION, CLEARANCE BETWEEN DETENT LINK AND DETENT LEVER.

MIN. SOME --- MAX. 0.055 INCH

WHEN PLAY IN THE LEVER IS TAKEN UP LIGHTLY TOWARD THE RIGHT SIDE OF THE PRINTER.

TO ADJUST

HOLD LEFT RIBBON REVERSING LEVER IN ITS DOWNWARD POSITION, POSITION DETENT LINK, AND TIGHTEN THE UPPER SET SCREW IN THE HUB OF THE DETENT LINK. BUCKLE THE DETENT LINK UPWARD AND TIGHTEN LOWER SET SCREW.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.17

(C) RIBBON REVERSE DETENT LEVER SPRING (IF UNIT IS EQUIPPED)

REQUIREMENT

DETENT LINK BUCKLED IN UPWARD POSITION

MIN. 10 OZS.
MAX. 18 OZS.

TO START DETENT LEVER MOVING TOWARD REAR.
2.53 Printing Mechanism (Cont.)

RIBBON FEED LEVER BRACKET

(1) REQUIREMENT (LEFT-HAND MECHANISM)
LEFT REVERSING LEVER IN UPWARD POSITION.
RIBBON MECHANISM IN UPPER POSITION.
RATCHET WHEEL HELD AGAINST THE DETENT LEVER.
CLEARANCE BETWEEN THE FRONT FACE OF THE
FEED LEVER AND THE SHOULDER OF A TOOTH
ON THE RATCHET WHEEL.
MIN. 0.015 INCH
MAX. 0.035 INCH
TO ADJUST
POSITION THE FEED LEVER BRACKET WITH ITS
MOUNTING SCREWS LOOSENED.

RIBBON REVERSING LEVER - LEFT

FEED LEVER BRACKET

LONG FEED LEVER SPRING

RIBBON FEED LEVER SPRING

REQUIREMENT
RIBBON FEED LEVERS IN UPPERMOST POSITION.
FOR LONG LEVER: PUSH DOWNWARD NEAR ITS SPRING.
FOR SHORT LEVER: PUSH DOWNWARD AT POINT
NEAR LONG LEVER SPRING.
MIN. 3/4 OZ.
MAX. 2 OZS.
TO START FEED LEVERS MOVING,
MEASURE ALL FOUR PAWLS.

NOTE: IF MINIMUM REQUIREMENT OF SHORT LEVER IS NOT MET, PULL LOWER END OF TORSION
SPRING TO REAR.

(2) REQUIREMENT (RIGHT-HAND MECHANISM)
RIGHT REVERSING LEVER AND RIBBON
MECHANISM IN UPWARD POSITION.
ADJUST FEED LEVER BRACKET IN THE
SAME MANNER

NOTE
ROTATE THE MAIN SHAFT. THE
RATCHET WHEEL SHOULD STEP ONE
TOOTH ONLY WITH EACH OPERATION.

RIBBON RATCHET WHEEL FRICTION SPRING

REQUIREMENT
FEED LEVERS DISENGAGED.
MIN. 3 OZS.
MAX. 7-1/2 OZS.
TO START THE RATCHET WHEEL MOVING.

*TWO COLOR RIBBON REQUIREMENT
MIN. 3 OZS.--MAX. 4 OZS.
TO START RATCHET WHEEL MOVING.

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2.54 Printing Mechanism (Cont.)

RIBBON LEVER SPRING

REQUIREMENT
MIN. 1-1/2 OZS.
MAX. 3 OZS.
TO START THE LEVER MOVING. CHECK BOTH RIGHT AND LEFT SPRINGS.

RIBBON LEVER SPRING

RIBBON LEVER

SPOOL SHAFT

RIBBON TENSION SPRING

REQUIREMENT
RIBBON RATCHET WHEEL POSITIONED SO THAT EACH DRIVING PIN IS TOWARD THE OUTSIDE OF THE SPOOL SHAFT.
MIN. 3 OZS.
MAX. 5-1/2 OZS.
TO START SPOOL SHAFT MOVING.
2.55 Function Mechanism (Cont.)

NOTE: REFER TO BULLETIN 11498 FOR INSTRUCTIONS ON CODING THE UNCODED FUNCTION BAR.

(A) Function Lever Spring

NOTE: IF A FUNCTION LEVER OPERATES A CONTACT OR A SLIDE, HOLD OFF THE CONTACT OR SLIDE WHEN CHECKING THE SPRING TENSION

REQUIREMENT

FUNCTION LEVER IN UNOPERATED POSITION.
SUPPRESSION BAIL HELD FORWARD.

STANDARD LEVER WITH STUD THAT OPERATES TWO CONTACTS

MIN. 1/2 OZS.
MAX. 2-3/4 OZS.

TO START FUNCTION LEVER MOVING, CHECK EACH SPRING.

FUNCTION PAWL SPRING

FUNCTION PAWL

FUNCTION BAR SPRING

FUNCTION BAR

FUNCTION LEVER

FUNCTION LEVER SPRING

SUPPRESSION BAIL

(B) Function Pawl Spring

REQUIREMENT

REAR END OF FUNCTION PAWL RESTING ON FUNCTION BAR
ONE STOP FUNCTION CLUTCH UNITS:
MIN. 3 OZS.
MAX. 5 OZS.
TWO STOP FUNCTION CLUTCH UNITS:
MIN. 7 OZS.
MAX. 10-1/2 OZS.
TO START PAWL MOVING, CHECK EACH SPRING.

(C) Function Bar Spring

REQUIREMENT

FUNCTION CLUTCH DISENGAGED
FUNCTION PAWL HELD AWAY.
MIN. 2-1/2 OZS.
MAX. 3-1/2 OZS.
TO START FUNCTION BAR MOVING.

CAUTION: SEVERE WEAR TO THE POINT OF OPERATIONAL FAILURE WILL RESULT IF THE TELETYPEWRITER IS OPERATED WITHOUT EACH FUNCTION PAWL HAVING EITHER A RELATED FUNCTION BAR OR, WHERE A FUNCTION BAR IS MISSING, A RELATED FUNCTION PAWL CLIP TO HOLD THE FUNCTION PAWL AWAY FROM THE STRIPPER BLADE.
SECTION 573-115-700

2.56 Function Mechanism (Cont.)

LEFT-HAND POSITION

CENTER POSITION

RIGHT-HAND POSITION

FUNCTION LEVER

CLIP

FUNCTION PAWL

STUNT BOX CLIP (FOR UNITS EQUIPPED WITH CLIPS ONLY)

(1) REQUIREMENT (RIGHT-HAND POSITION)
THE CLIP SHOULD NOT PREVENT THE ASSOCIATED FUNCTION PAWL FROM ENGAGING ITS FUNCTION BAR.
TO ADJUST
POSITION THE CLIP TO ITS EXTREME RIGHT-HAND POSITION

(2) REQUIREMENT (CENTER POSITION)
THE CLIP SHOULD HOLD THE FUNCTION PAWL OUT OF ENGAGEMENT WITH ITS FUNCTION BAR BUT SHOULD NOT INTERFERE WITH THE FUNCTION LEVER.
TO ADJUST
POSITION THE CLIP WITH ITS MOUNTING SCREW LOOSENED.

(3) REQUIREMENT (LEFT-HAND POSITION)
THE CLIP SHOULD HOLD THE FUNCTION PAWL UPWARD OUT OF ENGAGEMENT WITH ITS FUNCTION BAR. IT SHOULD ALSO HOLD THE TOP END OF THE FUNCTION LEVER IN ITS REAR POSITION.
TO ADJUST
POSITION THE CLIP TO ITS EXTREME LEFT-HAND POSITION.
2.57 Line Feed and Platen Mechanism (Cont.)

**B. PLATEN DETENT BAIL SPRING**

Requirement
- Detent seated between two teeth on line feed spur gear.
- Min. 16 ozs.
- Max. 32 ozs.
- To start detent bail moving.

**C. LINE FEED BAR RELEASE LEVER SPRING**

Requirement
- Min. 3 ozs.
- Max. 8 ozs.
- To start lever moving.
- On LP68
- Min. 8 ozs.
- Max. 12 ozs.

**A. LINE FEED SPUR GEAR**

Requirement
- Line feed clutch disengaged.
- Platen rotated until detent stud is seated between two teeth on line feed spur gear.
- When hand wheel is released, manually set the teeth on the feed bars into engagement with the teeth on the line feed spur gear.
- The detent stud should contact one gear tooth and be not more than 0.010 inch from other tooth.
- To adjust:
  - Rotate the detent eccentric with its mounting screw loosened.
  - Keep high part of eccentric upward.

**D. LINE FEED BAR BELL CRANK SPRING**

Requirement
- Left-hand line feed bar in rear position.
- Friction feed
  - Min. 19 ozs.
  - Max. 24 ozs.
- Sprocket feed
  - Min. 28 ozs.
  - Max. 38 ozs.
- To start bar moving.
SECTION 573-115-700

2.58 Function Mechanism (Cont.)

STRIPPER BLADE DRIVE CAM POSITION

REQUIREMENT

STRIPPER BLADE DRIVE CAM SHOULD MOVE EACH STRIPPER BLADE CAM ARM AN EQUAL DISTANCE ABOVE AND BELOW CENTER LINE OF ITS PIVOT (GAUGE BY EYE)

A. UPWARD DIRECTION
B. DOWNWARD DIRECTION

TO CHECK

WITH FUNCTION CLUTCH DISEN GAGED OBSERVE ENGAGEMENT OF STRIPPER BLADE DRIVE CAM (UPPER PEAK) WITH STRIPPER BLADE CAM ARM. THEN ROTATE CLUTCH TO TURN CAM TO ITS EXTREME DOWNWARD POSITION AND OBSERVE ENGAGEMENT OF LOWER CAM PEAK.

TO ADJUST

WITH STRIPPER BLADE DRIVE ARM MOUNTING SCREWS LOOSENED, EQUALIZE THE OVERTRAVEL OF EACH CAM PEAK.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.18
2.59 Spacing Mechanism (Cont.)

SUPPRESSION BAIL SPRING

REQUIREMENT
SPACING SUPPRESSION BAIL IN REAR POSITION. SCALE APPLIED NEAR CENTER OF HORIZONTAL PORTION OF BAIL.
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START BAIL MOVING.

---

2.60 Line Feed and Platen Mechanism (Cont.)

LINE FEED STRIPPER BAIL SPRING

REQUIREMENT
LINE FEED CLUTCH DISENGAGED. SCALE HOOKED UNDER LINE FEED STRIPPER BAIL.
MIN. 1/2 OZ.
MAX. 2 OZS.
TO START STRIPPER BAIL MOVING UPWARD.

EARLY DESIGN
REFER TO PAR. 2.61 FOR LATER DESIGN
2.61 Line Feed and Platen Mechanism (Cont.)

SINGLE-DOUBLE LINE FEED LEVER

FUNCTION BAR

STRIPPER BLADE

SINGLE - DOUBLE LINE FEED LEVER IN SINGLE LINE FEED POSITION.
MIN. 1/2 OZ.
MAX. 2 OZS.
TO START STRIPPER BAIL ARM MOVING UPWARD.

(2) REQUIREMENT
LINE FEED CLUTCH DISENGAGED AND SINGLE - DOUBLE LINE FEED LEVER IN SINGLE LINE FEED POSITION
MIN. 1/2 OZ.
MAX. 2 OZS.
TO START STRIPPER BAIL ARM MOVING TO LEFT AS SHOWN.

NOTE: FOR EARLIER DESIGN SEE PAR. 4.20

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2.62 Spacing Mechanism (Cont.)

RIGHT MARGIN WITH AUTOMATIC CARRIAGE RETURN - LINE FEED RING REQUIREMENT (ON UNITS SO EQUIPPED)
TYPE BOX CLUTCH DISENGAGED. CARRIAGE POSITIONED TWO SPACES BEFORE CHARACTER ON WHICH AUTOMATIC CARRIAGE RETURN-LINE FEED IS TO OCCUR. FRONT FEED PAWL FARTHEST ADVANCED.
CLEARANCE BETWEEN EXTENSION ON RING AND AUTOMATIC CARRIAGE RETURN-LINE FEED BELL CRANK.
MIN. 0.040 INCH --- MAX. 0.055 INCH
TO ADJUST POSITION RING WITH FOUR INDICATED MOUNTING SCREWS LOOSENED.

SPACING CUT-OUT TRANSFER BAIL SPRING
SEE PAR. 2.44.

NOTE: FOR ADJUSTMENT ON EARLIER MODELS SEE PAR. 4.19
2.63 Positioning Mechanism (Cont.)

**HORIZONTAL STOP SLIDE SPRING**

(FRONT TOP VIEW)

HORIZONTAL STOP SLIDE SPRING

**REQUIREMENT**

- CODE BARS IN MARKING POSITION (LEFT)
- TYPE BOX CLUTCH ROTATED 1/4 TURN FROM ITS STOP POSITION
- HORIZONTAL MOTION DECELERATING SLIDES (PAR. 2.35) HELD AWAY FROM HORIZONTAL STOP SLIDES
- MIN. 1/2 OZ., MAX. 1-1/2 OZS. FOR UPPER AND LOWER SLIDES
- MIN. 1-3/4 OZS., MAX. 3 OZS. FOR MIDDLE SLIDE

TO START SLIDE MOVING.

NOTE: WHEN CHECKING UPPER AND LOWER SLIDES, HOLD MIDDLE SLIDE 1/32 INCH FORWARD.

2.64 Line Feed and Platen Mechanism (Cont.)

**PAPER STRAIGHTENER COLLAR - LEFT**

**PAPER STRAIGHTENER COLLAR - RIGHT**

**PAPER STRAIGHTENER SHAFT**

**PAPER STRAIGHTENER LEVER SPRING**

**REQUIREMENT**

- MIN. 1-1/2 OZS.
- MAX. 4 OZS.

TO START THE LEVER MOVING.

**PAPER STRAIGHTENER COLLAR**

**REQUIREMENT**

- LEFT COLLAR SPACE
  - MIN. 9/32 INCH
  - MAX. 21/64 INCH
  - FROM THE LEFT SHOULDER ON THE PAPER STRAIGHTENER SHAFT.
- RIGHT COLLAR SPACED.
  - MIN. 1/16 INCH
  - MAX. 5/64 INCH
  - FROM THE RIGHT SHOULDER.

TO ADJUST POSITION OF COLLARS ON SHAFT WITH SET SCREWS LOOSENED.

NOTE: FOR SPROCKET FEED MECHANISM SEE PAR. 2.75
2.65 Line Feed and Platen Mechanism (Cont.)

**PAPER FINGER SHAFT**

**PAPER FINGER**

**PAPER**

**PLATEN**

**PAPER FINGER - RIGHT**

**PAPER FINGER SPRING**

**PAPER FINGER REQUIREMENT**

The pressure end of the paper fingers should overlap the paper from 3/8 inch to 1/2 inch.

To adjust position the paper fingers by sliding them on their shaft.

**PAPER FINGER SPRING REQUIREMENT**

Pull upward on right paper finger to start left paper finger moving from platen.

Min. 3 OZS.

Max. 6 OZS.

**NOTE: FOR SPROCKET FEED MECHANISM SEE PAR. 2.73**

**PRESSURE ROLLER**

**PRESSURE ROLLER LEVER**

**COMPRESSION SPRING**

**PRESSURE ROLLER LEVER SPRING REQUIREMENT**

Min. 28 OZS.

Max. 36 OZS.

To start each center lever moving alternately.

**PAPER PRESSURE BAIL SPRING REQUIREMENT**

Scale hooked over pressure bail at each end of platen.

Min. 7 OZS.

Max. 20 OZS.

To move pressure bail from platen.
SECTION 573-115-700

2.66 Function Mechanism (Cont.)

NOTE: FOR EARLIER DESIGN SEE PAR. 4.21 AND 4.22

NOTE: IF THE SWITCHES ARE REMOVED FROM THE STUNT BOX, THE FOLLOWING REQUIREMENTS APPLY:

1) PROVIDE AT LEAST 0.006 INCH CLEARANCE BETWEEN THE CONTACT ARM AND THE VERTICAL PORTION OF THE CONTACT CLIP. IF THE SWITCH HAS CONTACTS FRONT AND REAR, THIS CLEARANCE APPLIES TO BOTH FRONT AND REAR. TO OBTAIN THIS CLEARANCE, POSITION THE CONTACT PLATE BEFORE TIGHTENING THE CONTACT PLATE SCREWS. THE CONTACT MUST BE MADE BEFORE THE FUNCTION LEVER TOUCHES THE TOP PLATE.

2) ON SWITCHES WITH CONTACTS FRONT AND REAR, CHECK TO SEE THAT THERE IS A GAP OF 0.008 TO 0.028 INCH BETWEEN THE FORMED-OVER END OF THE FRONT CONTACT CLIP AND THE BOTTOM OF THE CONTACT ARM WHEN THE REAR CONTACT IS CLOSED.
2.67 Function Mechanism (Cont.)

(1) REQUIREMENT

To prevent unshift-on-space function, provide clearance between the lower edge of the unshift-on-space function pawl and its function bar.

MIN. 0.015 INCH
MAX. 0.060 INCH

To adjust, loosen the lock nut and turn the disabling screw in.

(2) REQUIREMENT

To restore the unshift-on-space function, back off the screw so that pawl fully engages the function bar. Then continue to turn the screw out one to three turns.
SECTION 573-115-700

2.98 Codebar Mechanism (Cont.)

**CODE BAR DETENT**

**REQUIREMENT**

- FRONT PLATE REMOVED. ALL CLUTCHES DISENGAGED.
- SUPPRESSION AND SHIFT CODE BARS SHOULD DETENT EQUALLY (GAUGED BY EYE)

**TO ADJUST**

- EQUALIZE THE DETENTING OF THE CODE BARS BY ADDING OR REMOVING SHIMS BETWEEN THE CASTING AND THE CODE BAR BRACKET.

**NOTE**

- UNLESS THERE IS REASON TO BELIEVE THAT THESE SPRINGS ARE CAUSING OPERATING FAILURE DO NOT CHECK THIS REQUIREMENT.

**REQUIREMENT**

- CODE BAR DETENT BRACKET CAREFULLY REMOVED AND CODE BARS REMOVED FROM DETENT BRACKET. SCALE APPLIED TO DETENT BALL AND PULLED IN DIRECTION OF BALL TRAVEL

- MIN. 1-1/2 OZS.
- MAX. 3-1/2 OZS.

TO START BALL MOVING AGAINST COMPRESSION OF SPRING. CHECK EACH BALL

**CODE BAR GUIDE BRACKET**

**CODE BAR YIELD SPRING (IF SO EQUIPPED)**

**REQUIREMENT**

- SELECTOR CLUTCH, CODE BAR CLUTCH, AND TYPE BOX CLUTCH DISENGAGED. NO. 1 CODE BAR IN SPACING POSITION

- MIN. 14 OZS.
- MAX. 23 OZS.

TO START CODE BAR SHIFT BAR PIVOT MOVING AWAY FROM CODE BAR. CHECK NO. 2 AND COMMON CODE BAR SHIFT BAR IN THE SAME MANNER.
2.69 Spacing Mechanism (Cont.)

NOTE: FOR EARLIER DESIGN SEE PAR. 4.23

MARGIN INDICATOR LAMP

REQUIREMENT
OPERATING UNDER POWER, THE LAMP SHOULD LIGHT ON THE DESIRED CHARACTER.

TO ADJUST
SET THE TYPE BOX CARRIAGE TO PRINT THE DESIRED CHARACTER AND POSITION THE CAM DISK COUNTERCLOCKWISE ON THE SPRING DRUM WITH ITS THREE MOUNTING SCREWS LOOSENED SO THAT THE SWITCH JUST OPENS. IF A LINE SHORTER THAN 72 CHARACTERS IS REQUIRED, IT MAY BE NECESSARY TO REMOVE THE CAM DISK SCREWS AND INSERT THEM IN ADJACENT SLOTS IN THE DISK, IF THE RANGE OF ROTATION IN ONE SLOT IS NOT ENOUGH.
2.70 Positioning Mechanism (Cont.)

TYPE BOX POSITION

**REQUIREMENT**

TYPE BOX AND SPACING CLUTCHES DISENGAGED. TYPE BOX SHIFTED TO LETTERS POSITION. FOUR MOUNTING SCREWS LOOSENED SO THAT SPACE SUPPRESSION RING, OR AUTOMATIC CARRIAGE RETURN LINE FEED RING, IS FREE TO ROTATE ON DRUM.

(UNITS EQUIPPED WITH LIMITED ADJUSTMENT SPACING DRUM: SPACING CUT OUT AND AUTOMATIC CARRIAGE RETURN LINE FEED ARMS IN MAXIMUM COUNTER-CLOCKWISE POSITION. SEE PAR. 4.07) CLEARANCE BETWEEN LETTERS PRINT INDICATOR AND CENTER LINE OF SPROCKET PINS IN RIGHT HUB:

- **MIN.** 5/16 INCH
- **MAX.** 7/16 INCH

**TO ADJUST**

LOOSEN TWO TYPE BOX CLAMP SCREWS AND TWO PRINTING CARRIAGE CLAMP SCREWS. POSITION TYPE BOX. TIGHTEN TYPE BOX CLAMP SCREWS. DO NOT TIGHTEN PRINTING CARRIAGE CLAMP SCREWS UNTIL PRINTING CARRIAGE POSITION ADJUSTMENT IS MADE.
2.71 Line Feed and Platen Mechanism (Con't)

(A) LEFT MARGIN REQUIREMENT

(1) TYPE BOX CLUTCH DISENGAGED, SPACING DRUM FULLY RETURNED, AND TYPE BOX SHIFTED TO LETTERS POSITION; CLEARANCE BETWEEN CENTER OF LETTERS PRINT INDICATOR ON TYPE BOX AND CENTER LINE OF SPROCKET PINS AT LEFT HUB SHOULD BE:
MIN. 5/16 INCH --- MAX. 7/16 INCH
TO ADJUST --- POSITION CARRIAGE RETURN RING WITH ITS MOUNTING SCREWS LOOSENED.

(2) SPACING CLUTCH DISENGAGED, FRONT SPACING FEED PAWL IN ITS FARTHEST ADVANCED POSITION, SPACING DRUM FULLY RETURNED, AND PLAY IN SPACING GEAR (PAR. 2.24) TAKEN UP-CLOCKWISE; CLEARANCE BETWEEN PAWL AND SHOULDERS OF RATCHET WHEEL TOOTH IMMEDIATELY AHEAD:
MIN. SOME --- MAX. 0.008 INCH

(3) THE REAR PAWL WHEN FARTHEST ADVANCED SHOULD DROP INTO THE INDENTATION BETWEEN RATCHET WHEEL TEETH AND SHOULD BOTTOM FIRMLY IN NOTCH.

TO ADJUST --- REFINE REQUIREMENT (1) ABOVE

(B) PRINTING HAMMER STOP BRACKET

(1) FOR UNITS WITH THICK TYPEBOX AND DUMMY TYPE PALLETs USE CORRESPONDING STANDARD ADJUSTMENT EXCEPT CLEARANCE BETWEEN PRINTING HAMMER AND DUMMY TYPE PALLET SHOULD BE:
MIN. SOME --- MAX. 0.020 INCH

(2) FOR UNITS WITH THIN TYPEBOX - NO DUMMY TYPE PALLETs, USE CORRESPONDING STANDARD ADJUSTMENT.

(3) CERTAIN MULTIPLE FORM UNITS WILL REQUIRE A REFINEMENT OF STANDARD ADJUSTMENT FOR THE STOP BRACKET TO:
MIN. 0.005 INCH --- MAX. 0.015 INCH

(C) RIGHT MARGIN

(1) FOR UNITS WITH LIMITED ADJUSTMENT SPACING DRUM, USE CORRESPONDING STANDARD ADJUSTMENT.

(2) FOR UNITS WITH UNIVERSAL SPACING DRUM, USE CORRESPONDING STANDARD ADJUSTMENT.

(D) PRINTING CARRIAGE POSITION

USE PAR. 2.47

(E) TYPE BOX ALIGNMENT

USE PAR. 2.51

FOLLOWING THIS ADJUSTMENT, ALL SCREWS SHOULD BE TIGHTENED.
2.72 Line Feed and Platen Mechanism (Con't)

(A) LINE FEED SPUR GEAR DETENT ECCENTRIC
USE PAR. 2.57

(B) PRINTED LINE
REQUIREMENT
THE BOTTOM OF THE PRINTED LINE
SHOULD BE 1/32 INCH ± 1/64 INCH
(PLUS A MULTIPLE OF 1/6 INCH IF REQUIRED) ABOVE A HORIZON
TAL LINE DRAWN EVEN WITH THE
BOTTOM EDGE OF ANY SPROCKET HOLE.
TO ADJUST
LOOSEN SCREWS AND POSITION
LEFT SPROCKET. IF OTHER THAN
STANDARD PAPER IS USED, IT MAY BE
NECESSARY TO MAKE A VARIATION IN THIS
ADJUSTMENT.
NOTE: SPUR GEAR AND LEFT PLATEN RETAINER
MUST BE REMOVED TO MAKE PRINTED
LINE ADJUSTMENT.

(C) PLATEN END PLAY
REQUIREMENT
LINE FEED PAWLS DISENGAGED,
PLATEN SHAFT SHOULD HAVE SOME
END PLAY
MAX. 0.010 INCH
TO ADJUST
POSITION PLATEN SPUR GEAR WITH
CLAMP SCREW LOOSENED.

(D) SPROCKET PIN SEPARATION
(1) REQUIREMENT
WITH SINGLE SHEET OF SPROCKET FEED
PAPER PLACED ON THE PLATEN THE
SPROCKET PINS SHOULD BE CENTRALLY
LOCATED IN THE FEED HOLES OF THE PAPER
(2) REQUIREMENT
PRINTED LINE SHOULD BE PARALLEL
TO A LINE DRAWN PERPENDICULAR TO
EDGE OF PAPER WITHIN PLUS OR MINUS
1/32 INCH
TO ADJUST
POSITION RIGHT SPROCKET WITH CLAMP
SCREW LOOSENED.
2.73 Line Feed and Platen Mechanism (Con't)

PAPER FINGER OR GUIDE BRACKET

(1) REQUIREMENT
SPROCKET PIN SHOULD BE CENTRALLY LOCATED IN THE PAPER FINGER OR GUIDE BRACKET SLOT.

(2) REQUIREMENT *
THE GAP BETWEEN THE PLATEN AND THE PAPER FINGER OR GUIDE BRACKET SHOULD BE

<table>
<thead>
<tr>
<th>Stapled</th>
<th>Unstapled Multiple Copy</th>
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<tbody>
<tr>
<td>Min. 0.050 INCH</td>
<td>0.020 INCH</td>
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<tr>
<td>Max. 0.105 INCH</td>
<td>0.060 INCH</td>
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TO ADJUST
WITH PAPER FINGER OR GUIDE BRACKET ASSEMBLY IN LATCHED POSITION, LOOSEN BOTH CLAMP SCREWS, POSITION ASSEMBLY HORIZONTALLY TO MEET REQUIREMENT (1). ROTATE ASSEMBLY TO MEET REQUIREMENT (2).

(3) REQUIREMENT (NOT ILLUSTRATED)
MIN. 0.035 INCH
BETWEEN LEADING EDGE OF PAPER FINGER OR GUIDE BRACKET AND RIBBON GUIDE. BOTH RIGHT AND LEFT PAPER FINGERS MUST BE PARALLEL TO THE SAME PRINTED LINE AS GAUGED BY EYE.

TO ADJUST
SELECT LETTERS COMBINATION AND ROTATE TYPE BOX CLUTCH 1/2 REVOLUTION. POSITION PAPER FINGERS BY MEANS OF ELONGATED MOUNTING HOLES. AFTER TIGHTENING THE SCREWS RECHECK THESE REQUIREMENTS.

*NOTE --- A MINIMUM CLEARANCE THAT WILL PASS STATIONERY FREELY IS DESIRED. THIS MINIMUM VALUE IS DEPENDENT UPON TYPE OF PAPER, NUMBER OF COPIES, STAPLING ETC.
SECTION 573-115-700

2. 74 Line Feed and Platen Mechanism (Cont.)

- SPROCKET PIN SPRING
  - REQUIREMENT
    - MIN. 6 OZS.
    - MAX. 8 OZS.
    - TO START DEPRESSING THE PIN.

- PAPER GUIDE
  - REQUIREMENT
      - STAPLED SINGLE COPY OR UNSTAPLED
      - MULTIPLE COPY MULTIPLE COPY
    - MIN. 0.050 INCH 0.020 INCH
    - MAX. 0.105 INCH 0.060 INCH
    - TO ADJUST POSITION THE GUIDE WITH ITS REAR MOUNTING SCREWS LOOSENED.

*NOTE --- A MINIMUM CLEARANCE THAT WILL PASS STATIONERY FREELY IS DESIRED. THIS MINIMUM VALUE IS DEPENDENT UPON TYPE OF PAPER, NUMBER OF COPIES, STAPLING ETC.

(C) RIBBON REVERSE SPUR GEAR
  USE PAR. 2.52

(D) RIBBON REVERSE DETENT
  USE PAR. 2.52

(E) LINE FEED BAR BELL CRANK SPRING
  USE PAR. 2.57 EXCEPT
  - MIN. 28 OZS.
  - MAX. 38 OZS.
  - TO START BAR MOVING.
2.75 Line Feed and Platen Mechanism (Con't)

(A) **Paper Finger or Guide Bracket Shaft Spring**

**Requirement**
- Min. 6 OZS.
- Max. 10 OZS.
- To move paper finger or guide bracket against the platen.

(B) **Paper Finger or Guide Bracket Latch Spring**

**Requirement**
- Paper finger or guide bracket against platen
- Min. 8 OZS.
- Max. 12 OZS.
- To start latch moving.

**Note**

*Spray Feed Mechanism with Retractable Pins*

**Paper Finger Locking Arm Spring**

**Requirement**
- It shall require
  - Min. 1 OZ
  - Max. 1-1/2 OZS
- To move arm away from platen

**Platen Detent Bail Spring**

*Use Par. 2.57*
SECTION 573-115-700

3. VARIABLE FEATURES
3.01 Horizontal Tabulator Mechanism

NOTE: FOR EARLIER DESIGN SEE PARS. 4.24 THROUGH 4.29.

3.01 Horizontal Tabulator Mechanism

TRIP LEVER ARM

NOTE: FOR EARLIER DESIGN SEE PARS. 4.24 THROUGH 4.29.

SPACING CLUTCH TRIP LEVER

REQUIREMENT
SPACING CLUTCH DISENGAGED. TRIP LEVER ARM AND INTERMEDIATE BAIL IN THEIR UPWARD POSITION. THE OUTER SURFACE OF THE TRIP LEVER SHOULD BE FLUSH WITH THE OUTER SURFACE OF THE SHOE LEVER OR UNDER FLUSH TO .010 INCH. CHECK AT STOP LUG WITH LEAST BITE.

TO ADJUST
USE ADJUSTING SCREW TO POSITION SPACING CLUTCH TRIP LEVER.

NOTE
IF THIS ADJUSTMENT IS CHANGED, CHECK THE LATCH BAIL ADJUSTING PLATE - PAR. 3.03

CLUTCH TRIP LEVER SPRING

REQUIREMENT
SPACING CLUTCH ENGAGED. ROTATE CLUTCH UNTIL TRIP LEVER RESTS ON STOP LUG.
MIN. 11 OZS.
MAX., 16 OZS.
TO MOVE TRIP LEVER AWAY FROM STOP LUG.
3.02 Horizontal Tabulator Mechanism (Con't)

**OPERATING LEVER SLIDE ARM**

**NOTE**
Prior to this adjustment check the function reset bail blade adjustment.

**REQUIREMENT**
On units with two-stop function clutches, function clutch disengaged, type box clutch rotated 1/2 revolution past stop position. On units with one-stop function clutch, rotate function clutch until function pawl stripper blade is in its lower position and the function reset bail roller is on the high part of its cam. Horizontal tabulator function pawl pulled to rear until latched on its function bar. Clearance between front end of operating lever slide arm and blocking surface of blocking lever min. 0.015 inch---max. 0.035 inch

To adjust position slide arm on operating lever with mounting stud friction tight.

Note when pulling function pawl to the rear, if the operating lever cam arm should be stripped off the tabulator slide arm before the function pawl is latched on the function bar, temporarily disable the stripper bail arm by loosening its adjusting screw.

(LEFT VIEW)

**OPERATING LEVER SLIDE ARM SPRING**

**REQUIREMENT**
Trip lever arm latch bail spring unhooked. Operating lever in operated position with slide arm against blocking lever.

Min. 8-3/4 ozs.---max. 10-3/4 ozs.

To start link moving.

Note on units equipped with transmitter control contact, hold contact spring away from stud when measuring tension.

**OPERATING LEVER ADJUSTING PLATE**

**REQUIREMENT**
Operating lever in unoperated position, take up play in slide arm and blocking lever to minimize clearance. Clearance between front end of slide arm and lower projection of blocking lever min. 0.020 inch---max. 0.045 inch

To adjust position adjusting plate on bracket with mounting screws loosened.

**NOTE**
If operating lever slide arm or operating lever adjusting plate adjustment is changed on units equipped with transmitter control contact, check control contact gap and remake if necessary.
3.03 Horizontal Tabulator Mechanism (Con't)

**TRIP LEVER ARM LATCH BAIL**

**REQUIREMENT**
- OPERATING LEVER UNOPERATED, TRIP LEVER ARM UP. CLEARANCE BETWEEN THE TRIP LEVER ARM AND THE TRIP LEVER ARM LATCH BAIL
  - MIN. 0.020 INCH --- MAX. 0.040 INCH
- TO ADJUST POSITION LATCH BAIL ADJUSTING SCREW WITH ITS LOCK NUT LOOSENED.

**LATCH BAIL SPRING**

**INTERMEDIATE BAIL SPRING**

**REQUIREMENT**
- TRIP LEVER ARM AND INTERMEDIATE BAIL IN UNOPERATED POSITION.
  - MIN. 1-1/2 OZS. --- MAX. 3-1/2 OZS.
- TO PULL SPRING TO INSTALLED LENGTH.

**SPACE SUPPRESSION BAIL**

**INTERMEDIATE BAIL**

*(LEFT VIEW)*

**CLUTCH SHOE LEVER**

**CLUTCH TRIP LEVER**

**LATCH BAIL ADJUSTING PLATE**

**REQUIREMENT**
- OPERATING LEVER SLIDE ARM POSITIONED TO REAR AND LATCHED ON BLOCKING LEVER, TRIP LEVER ARM LATCH BAIL IN FULLY LATCHED POSITION, SPACING TRIP LEVER DISENGAGED FROM INTERMEDIATE BAIL BY PUSHING FORWARD ON SPACE SUPPRESSION BAIL. CLEARANCE BETWEEN CLUTCH TRIP LEVER AND CLUTCH SHOE LEVER
  - MIN. SOME --- MAX. 0.008 INCH
- TO ADJUST POSITION LATCH BAIL ADJUSTING PLATE WITH MOUNTING SCREWS LOOSENED.
- CHECK AT THE CLUTCH SHOE LEVER WITH THE LEAST CLEARANCE.
3.04 Horizontal Tabulator Mechanism (Cont.)

**Horizontal Tabulator Slide Arm Spring Requirement**
- Operating lever in operated position, slide arm in unoperated position.
- Min. 1 oz.
- Max. 4 ozs.
- To start slide arm moving.

**Operating Lever Cam Arm Spring Requirement**
- Operating lever in unoperated position, horizontal tabulator function pawl unlatched.
- Min. 4 ozs.
- Max. 9 ozs.
- To start stripper bail moving.

**Cam Arm Stripper Bail Requirement**
- Operating lever and tabulator slide arm in unoperated positions spacing clutch rotated until high part of spacing cam is opposite stripper bail. Clearance between spacing cam and stripper bail.
- Min. 0.010 inch
- Max. 0.025 inch
- To adjust position stripper bail arm on stripper bail with stripper bail arm screw friction tight.

**Set Collar Adjusting Screw Requirement**
- Transfer bail should have some end play.
- Max. 0.008 inch
- To adjust position set collar with adjusting screw loosened.
3.05 Horizontal Tabulator Mechanism (Cont.)

**Requirement**

Clearance between spacing cut-out lever on spacing drum and bail extension arm

- **MIN.** 0.006 inch
- **MAX.** 0.025 inch

To check:

Place type box in position to print character on which spacing cut-out is desired. Pull forward on part of transfer bail extending below mounting shaft until bail is in fully operated position. Gage clearance.

To adjust:

Position cut-out lever with clamp screw loosened.

Note:

Four screws must be loosened to adjust circular cut-out levers. Do not loosen hex. head screw that clamps front ring.

**Space Suppression By-Pass Spring Requirement**

Min. 20 ozs.
Max. 26 ozs.
To start bail extension moving.

**Spacing Cut-Out Transfer Bail**

**Bail Extension Arm**

**Spacing Cut-Out Lever on Spacing Drum**

**(Right Side View)**
3.05 Horizontal Tabulator Mechanism (Con't)

**TABULATOR PAWL (PRELIMINARY)**

**NOTE:**
Before making this adjustment, check left margin and spacing gear phasing adjustments.

**PURPOSE**
To select tabulator stop to be used as reference in making final tabulator pawl horizontal and vertical adjustments.

**PROCEDURE**
1. Beginning with 15th slot counterclockwise from roller on tabulator ring, place tabulator stops approximately an equal number of slots apart around remaining slotted periphery of ring corresponding to length of printed line.
2. To move stops, hook small spring hook in hole and pull out radially from drum. Holding stop away from drum, slide it on garter spring to desired location and insert in slot. Spacing drum may have to be rotated to make some slots accessible. Caution: Make sure all stops are firmly seated and not turned sideways. Do not use pliers to move stops.
3. Disengage all clutches so front spacing feed pawl is in lower position. Place pawl adjusting plate at center of horizontal and vertical adjustment. To adjust vertically, loosen both mounting screws; to adjust horizontally, loosen only left screw. Horizontal adjustment should be made after vertical. Disengage spacing feed pawls and allow drum to rotate to extreme counterclockwise position. Keeping spacing clutch disengaged, manually advance drum until first stop is immediately to left of pawl. Position adjusting plate horizontally so that stop is aligned with left edge of pawl shoulder.
4. Place blocking lever and operating lever slide arm in unblocked position. Disengage feed pawls and let drum rotate two spaces counterclockwise. Both feed pawls should be fully engaged. Block slide arm with blocking lever. Gage and note clearance between stop and slope on pawl.
5. Rotate drum clockwise until next stop is just to left of pawl. Repeat procedure described in paragraph (4) for this stop. Repeat procedure for remaining stops, noting each clearance.
6. Stop with maximum clearance should be used as reference in making final horizontal and vertical pawl adjustments.
3.07 Horizontal Tabulator Mechanism (Cont.)

**TABULATOR PAWL - VERTICAL (Final)**

To check:
- Position spacing drum such that reference tabulator stop, as determined by preliminary tabulator pawl adjustment (Par. 3.06), is opposite shoulder on pawl. Block operating lever slide arm with blocking lever.

**Requirement**
- Clearance between pawl and stop: min. 0.055 inch max. 0.075 inch

To adjust:
- Position pawl adjusting plate with both mounting screws loosened. Tighten right screw only, using wrench to prevent bushing from turning.

**Pawl Adjusting Plate**

**Operating Lever Slide Arm**

**Blocking Lever**

**(Front View)**

**Tabulator Pawl Spring**

**Blocking Lever Spring**

**Tabulator Pawl**

**Reference Tabulator Stop**

**Requirement**
- Min. 3 ozs. max. 5 ozs. to start pawl moving.

**Blocking Lever Spring**

**Requirement**
- Min. 2 1/2 ozs. max. 4 1/2 ozs. to start blocking lever moving.
**Horizontal Tabulator Mechanism (Cont.)**

To Check:

1. Disengage all clutches so that front spacing feed pawl is in lower position (as shown in Par. 3.06). Position spacing drum so that reference tabulator stop, as determined in preliminary tabulator pawl adjustment (Par. 3.06), is immediately to left of pawl. Operating lever slide arm should be forward in unblocked position. Disengage feed pawls and allow drum to rotate one space counterclockwise. Both feed pawls should be fully engaged. Move slide arm to rear to blocked position.

2. Trip spacing clutch stop lever and slowly rotate main shaft until blocking lever is just tripped. Take up play in spacing shaft toward rear.

**Requirement**

Some portion of clutch disk stop lug should be aligned with rear surface of spacing shaft gear.

To Adjust:

Repeat procedure set forth in paragraph (1) above. Trip spacing clutch and rotate shaft until middle of stop lug is in line with rear surface of gear. If blocking lever tripped too soon, with left mounting screw loosened, position pawl adjusting plate to left until slide arm can be blocked. Slowly move plate to right until blocking lever just trips. When adjusting trip-off point, care should be taken that blocking lever is cammed down by stop and not manually moved out of blocked position by accident. Recheck requirement.

**Note:**

After obtaining trip-off point, continue rotating main shaft until spacing clutch is disengaged. Pawl should be to right of stop. When slide arm is moved to rear, blocking lever should move to blocked position. If tip of pawl should rest on end of stop, readjust plate to right so that clearance between pawl and stop is:

Min. 0.003  Max. 0.008
3.09 Horizontal Tabulator Mechanism (Cont.)

**TABULATOR STOP SETTINGS**

**NOTE:**
FOR INSTRUCTIONS ON HOW TO MOVE TABULATOR STOPS, SEE TABULATOR PAWL PRELIMINARY ADJUSTMENT. PAR. 3.06 (2)

(1) ***COLUMNAR TABULATOR STOPS***
PLACE CARRIAGE IN POSITION TO PRINT FIRST CHARACTER IN COLUMN, PLACE STOP IN SLOT IMMEDIATELY TO LEFT OF PAWL. TO FACILITATE INSERTING STOPS, MARK DESIRED SLOT AND ROTATE DRUM TO MORE ACCESSIBLE POSITION. FOR SETTINGS NEAR LEFT MARGIN, COUNT NUMBER OF SPACING OPERATIONS FROM LEFT MARGIN AND PLACE STOP CORRESPONDING NUMBER OF SLOTS COUNTERCLOCKWISE FROM ROLLER.

NOTE: WHEN PRINTING FORMS, CHECK STOP SETTINGS IN RELATION TO COLUMNS. CORRESPONDING STOPS ON ALL MACHINES ON A CIRCUIT MUST BE THE SAME NUMBER OF SLOTS FROM LEFT MARGIN.

(2) ***RIGHT MARGIN TABULATOR STOP (WITH WIDE SHELF)***
NOTE: BEFORE MAKING THIS ADJUSTMENT, CHECK RIGHT MARGIN AND TABULATOR PAWL ADJUSTMENTS.

POSITION PRINTING CARRIAGE AT RIGHT MARGIN (SPACING CUTOUT OPERATED). INSERT STOP WITH WIDE SHELF IN SLOT IMMEDIATELY TO LEFT OF PAWL. SHELF SHOULD EXTEND TO RIGHT SO THAT PAWL RESTS ON IT.
NOTE
THE FOLLOWING TWO HORIZONTAL TABULATOR MECHANISM ADJUSTMENTS SHOULD BE CHECKED BEFORE MAKING THE TRANSMITTER CONTROL ADJUSTMENTS SHOWN BELOW.

1. OPERATING LEVER SLIDE ARM (PAR. 3.02)
2. OPERATING LEVER ADJUSTING PLATE (PAR. 3.02)

IF EITHER OF THE ABOVE ADJUSTMENTS ARE CHANGED, THE TRANSMITTER CONTROL ADJUSTMENTS SHOULD BE RECHECKED.

TRANSMITTER CONTROL CONTACT SPRING
REQUIREMENT
OPERATING LEVER IN UNOPERATED POSITION.
MIN. 3-1/2 OZS.
MAX. 4-1/2 OZS.
TO JUST OPEN CONTACTS.

TO ADJUST
BEND THE LONG CONTACT SPRING

TRANSMITTER CONTROL CONTACT GAP
REQUIREMENT
OPERATING LEVER SLIDE ARM PULLED TO REAR UNTIL BLOCKED BY BLOCKING LEVER. CLEARANCE BETWEEN CONTACTS MIN. 0.010 INCH MAX. 0.020 INCH

TO ADJUST
POSITION THE CONTACT ASSEMBLY BRACKET WITH THE MOUNTING SCREW LOOSENED, THE BRACKET PIVOTS ABOUT A PIN AT THE UPPER END OF THE BRACKET.
3.11  Page Feed-Out Mechanism

(A) **PAGE FEED-OUT GEAR PLAY**

**REQUIREMENT**
- Barely perceptible backlash.

**TO ADJUST**
- Position gear pivot post with nut loosened.

(B) **MOUNTING BRACKET**

**REQUIREMENT**
- Clearance between blocking arm and page feed-out slide.
  - MIN. 0.002 inch
  - MAX. 0.015 inch

**TO CHECK**
- Select feed-out sequence code bar clutch disengaged. Take up play in blocking arm and feed-out slide to make clearance minimum.

**TO ADJUST**
- Position lower portion of mounting bracket with mounting screws loosened.

(C) **BLOCKING ARM**

**SEE PAR. 3.12**

SWITCH OPERATING ARM

(D) **INDEXING DISK**

**REQUIREMENT**
- Clearance between highest numbered index plate and bail
  - MIN. 0.020 inch
  - MAX. 0.040 inch

**TO CHECK**
- Line feed clutch disengaged, index plate adjacent to bail, take up play between gears to make clearance minimum.

**TO ADJUST**
- Disengage gear from idler, turn handwheel clockwise until index plate just operates bail, engage first tooth on idler. Position indexing disk with three mounting screws loosened.

**NOTE:** If page feed-out gear has uneven number of teeth, rotate platen until head of screw in platen spur gear is up and platen is detented, then proceed with adjustment.

(E) **SWITCH OPERATING ARM (USED ONLY WITH TRANSMITTER CONTROL)**

**REQUIREMENT**
- Blocking arm in position to block slide, clearance
  - MIN. SOME
  - MAX. 0.005 inch

**TO ADJUST**
- Position switch with two mounting screws loosened.
3.12 Page Feed-Out Mechanism (Cont.)

(F) **POINTER**
**REQUIREMENT**
LINE FEED CLUTCH DISENGAGED,
INDEX PLATE ADJACENT TO BAIL
AS SHOWN IN PAR. 3.11. POINTER
SHOULD LINE UP WITH NOTCH IN
INDEXING DISK AND CLEAR DISK BY
APPROXIMATELY 1/16 INCH.
TO ADJUST
POSITION POINTER WITH MOUNTING
SCREWS LOOSENED.

(C) **BLOCKING ARM**
**REQUIREMENT**
BAIL ON PEAK OF INDEX
PLATE. CLEARANCE
MIN. 0.005 INCH
MAX. 0.045 INCH
TO ADJUST
POSITION ADJUSTABLE ARM
WITH MOUNTING SCREWS
LOOSENED.
NOTE
IF REQUIREMENT CANNOT
BE MET FOR EACH PLATE,
REPOSITION PLATE WITH
MOUNTING SCREW LOOSENED.

(H) **BLOCKING ARM SPRING**
**REQUIREMENT**
BLOCKING ARM IN UNBLOCKED
POSITION.
MIN. 3 OZS.
MAX. 5 OZS.
TO PULL SPRING TO OPERATING
LENGTH.
3.13 Selective Calling Mechanism

**TYPE BOX CLUTCH TRIP LEVER**
(SELECTIVE - CALLING UNITS WITH OR WITHOUT
OFF-LINE SHIFT SOLENOID)

CLEARANCE BETWEEN TYPE BOX CLUTCH TRIP
LEVER AND CLUTCH DISK STOP LUG SHOULD BE
MIN. 0.040 INCH --- MAX. 0.055 INCH
SEE PAR. 2.22.

PRINT SUPPRESSOR CODE BAR SPRING
REQUIREMENT
SUPPRESSOR CODE BAR TO LEFT,
MIN. 4-1/2 OZS. --- MAX. 7-1/2 OZS.
TO START CODE BAR MOVING. CODE
BAR SHOULD BE FREE OF BINDS.

**NOTE:** TO CHECK REQUIREMENTS (A, B, AND D), SET
FUNCTION CLUTCH IN STOP POSITION AND
ALL CODE BARS TO THE RIGHT.

(A) **CODE BAR SHIFT MECHANISM**
REQUIREMENTS

1. WITH FUNCTION CLUTCH IN STOP POSITION, LATCH FUNCTION LEVER (SHIFT MECH.)
   ON ITS LOWER RELEASING LATCH. NOTCH IN SUPP. CODE BAR SHOULD ALIGN WITH
   NOTCHES IN OTHER CODE BARS WHEN ALL CODE BARS ARE SHIFTED TO THE RIGHT.
   TO ADJUST
   POSITION UPPER OR LOWER GUIDE PLATE (PAR. 2.33) WITH ITS CLAMP NUTS LOOSENED.

2. REPEAT FOR EACH STUNT CASE CODE BAR SHIFT MECHANISM.
   NOTE --- POSITION THE ASSOCIATED GUIDE PLATE SO THAT THE MOVEMENT OF THE
   FORK IS NOT RESTRICTED WITHIN THE RANGE OF ADJUSTMENT.

(D) **OFF LINE SHIFT SOLENOID BRACKET ASSEMBLY** (OFF LINE ONLY)
REQUIREMENT
NOTCH IN SUPPRESSION CODE BAR SHOULD ALIGN
WITH NOTCHES IN OTHER CODE BARS WHEN ALL
CODE BARS ARE SHIFTED TO THE RIGHT.
TO ADJUST
POSITION THE SOLENOID BRACKET ASSEMBLY WITH
ITS MOUNTING SCREWS LOOSENED.

(C) **TYPE BOX CLUTCH SUPPRESSION ARM**
SEE PAR. 3.14

(B) **CONDITION CODE (ZERO) CODE BAR SHIFT MECHANISM**
REQUIREMENT
WITH FUNCTION CLUTCH IN STOP POSITION, LATCH FUNCTION LEVER (SHIFT
MECH.), THE NOTCH IN CONDITION CODE (ZERO) CODE BAR SHOULD ALIGN
WITH NOTCHES IN OTHER CODE BARS WHEN ALL CODE BARS ARE SHIFTED TO THE
RIGHT.
TO ADJUST
POSITION THE UPPER OR LOWER GUIDE PLATE (PAR. 2.33) WITH ITS CLAMP NUTS
LOOSENED.

NOTE --- POSITION THE ASSOCIATED GUIDE PLATE SO THAT THE MOVEMENT OF THE
FORK IS NOT RESTRICTED.

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3.14 Selective Calling Mechanism (Con’t)

(C) TYPE BOX CLUTCH SUPPRESSION ARM (WITH OR WITHOUT SOLENOID SHIFT)

REQUIREMENT

SUPPRESSION ARM IN BLOCKING POSITION. SHAFT ROTATED UNTIL
THE FUNCTION CLUTCH SHOE LEVER IS OPPOSITE THE FUNCTION
CLUTCH TRIP LEVER.

1. AT LEAST 0.003 INCH CLEARANCE BETWEEN TRIP ARM EXTENSION
AND CLUTCH TRIP LEVER.

2. AT LEAST 0.006 INCH CLEARANCE BETWEEN THE FUNCTION CLUTCH
SHOE LEVER AND FUNCTION CLUTCH TRIP LEVER.

TO ADJUST
POSITION SUPPRESSION ARM WITH ITS MOUNTING SCREWS LOOSENED.

1. LATCH FUNCTION LEVER OF ANY STUNT CASE CODE BAR SHIFT MECHANISM
AND ROTATE MAIN SHAFT UNTIL LOWER SURFACE OF THE SUPPRESSION ARM IS
ALIGNED (APPROX) WITH BOTTOM SURFACE OF BLOCKING BAIL EXTENSION,
CLEARANCE BETWEEN SUPPRESSION ARM AND BLOCKING BAIL EXTENSION, WITH
PLAY TAKEN UP TO PRODUCE MINIMUM CLEARANCE.
MIN. 0.008 INCH __________ MAX. 0.055 INCH

TO ADJUST
POSITION EXTENSION WITH ITS MOUNTING SCREW LOOSENED, REFINE THE ADJUST-
MENT IF NECESSARY, AND RECHECK EACH SHIFT MECHANISM.

2. REFINE THE STUNT CASE CODE BAR SHIFT MECHANISM ADJUSTMENT OF ANY
SHIFT MECHANISM THAT DOES NOT MEET THE ABOVE REQUIREMENT.
3.15 Selective Calling Mechanism (Cont.)

**LINE FEED (Stunt Case) FUNCTION BAR**

**AUTOMATIC CARRIAGE RETURN - LINE FEED BLOCKING SLIDE**

**CONDITION CODE SHIFT FORK SPRING**

REQUIREMENT

WITH CONDITION CODE SHIFT IN ITS UNOPERATED POSITION.

MIN. 1 OZ.
MAX. 3 OZS.
TO PULL SPRING TO ITS INSTALLED POSITION.

**BLOCKING SLIDE SPRING**

**GUIDE PLATE**

**LOWER GUIDE PLATE**

**CONDITION CODE SHIFT FORK**

**AUTOMATIC CARRIAGE RETURN - LINE FEED BLOCKING SLIDE SPRING**

REQUIREMENT

WITH CONDITION CODE SHIFT FORK IN ITS UNOPERATED POSITION.

MIN. 1 OZ.
MAX. 3 OZS.
TO PULL SPRING TO ITS INSTALLED POSITION
3.16 Local Back Space Mechanism

**CAMMING BAIL STOP ARM**

**REQUIREMENT**

- Spacing clutch disengaged, front feed pawl in lower position, back space bail held operated, clutch tripped and main shaft rotated until the front feed pawl tooth is opposite the peak of the first spacing drum tooth that moves down past the pawl tooth.
- Clearance between pawl tooth and the tooth on the spacing drum ratchet wheel.
  - MIN. 0.020 inch
  - MAX. 0.035 inch

To adjust:

- Position the adjusting plate on the intermediate arm in the center of its adjusting range. Then position the camming bail stop arm with its mounting screw friction tight to meet the requirement.

**CAMMING BAIL SPRING**

**REQUIREMENT**

- MIN. 1 oz.
- MAX. 2-1/4 ozs.

To start bail moving.
3.17 Reverse Line Feed Mechanism

Reverse Line Feed Slide Link Spring Requirement
- Slide Link resting on its stop bracket, line feed clutch disengaged.
- Min. 1-1/2 OZs.
- Max. 3-1/2 OZs.
- To pull spring to installed length.

Reverse Line Feed Slide Link Stop Bracket Requirement
- When the line feed bar is nearest the slide link stop bracket during a forward line feed operation, there should be a minimum of 0.045 inch clearance between top surface of slide link and lower edge of closest line feed bar.

To adjust position the slide link stop bracket with its mounting screws loosened.
3.18 Reverse Line Feed Mechanism (Cont.)

LINE FEED CLUTCH SPUR GEAR

REQUIREMENT
LINE FEED CLUTCH DISENGAGED. SLIDE LINK RAISED UPWARD SO AS TO FULLY ENGAGE THE END OF THE LOWER LINE FEED BAR, SLIDE HELD FORWARD BY ITS SPRING CLEARANCE BETWEEN SLIDE LINK AND LOWER LINE FEED BAR.

MIN. 0.005 INCH
MAX. 0.040 INCH

TO ADJUST
SET LINE FEED CLUTCH SPUR GEAR AT CENTER OF ADJUSTING RANGE DISENGAGE LINE FEED CLUTCH, LOOSEN ECCENTRIC ASSEMBLY BEARING POST. MESH THE TWO GEARS SO THAT THE FORWARD EDGES OF THE LOWER ENDS OF THE LINE FEED BARS ARE IN LINE WITH EACH OTHER WITHIN 0.040 INCH. ROTATE THE LINE FEED CLUTCH SPUR GEAR RELATIVE TO ITS MOUNTING PLATE WITH THE GEAR MOUNTING SCREWS LOOSENED. CHECK BOTH BARS FOR THE REQUIRED CLEARANCE AT EACH STOP POSITION OF THE CLUTCH.
3.19 Reverse Line Feed Mechanism (Cont.)

(B) PLATE DETENT BAIL SPRING

REQUIREMENT

DETENT SEATED BETWEEN TWO TEETH ON
LINE FEED SPUR GEAR.
MIN. 16 OZS.
MAX. 32 OZS.
TO START DETENT BAIL MOVING.

(C) LINE FEED BAR RELEASE LEVER SPRING

REQUIREMENT

MIN. 3 OZS.
MAX. 8 OZS.
TO START LEVER MOVING.

(A) LINE FEED SPUR GEAR DETENT ECCENTRIC

REQUIREMENT

LINE FEED CLUTCH DISENGAGED. PLATE
ROTATED UNTIL DETENT STUD IS SEATED
BETWEEN TWO TEETH ON LINE FEED SPUR
GEAR. WHEN HAND WHEEL IS RELEASED,
MANUALLY SET THE TEETH ON THE FEED
BARS INTO ENGAGEMENT WITH THE TEETH
ON THE LINE FEED SPUR GEAR. THE DE­
TENT STUD SHOULD CONTACT ONE GEAR
TOOTH AND BE NOT MORE THAN 0.006
INCH FROM THE OTHER TOOTH

TO ADJUST

ROTATE THE DETENT ECCENTRIC WITH ITS
MOUNTING SCREWS LOOSENED. KEEP
HIGH PART OF ECCENTRIC UPWARD.
3.20 Reverse Line Feed Mechanism (Cont.)

LINE FEED BAR SPRINGS

REQUIREMENT

LINE FEED BAR ENGAGED
WITH PLATEN GEAR.
MIN. 2-1/2 OZS.
MAX. 5 OZS.
TO PULL EACH SPRING
TO INSTALLED LENGTH.
SECTION 573-115-700

3.21 Reverse Line Feed Mechanism (Cont.)

LINE FEED BAR BELL CRANK SPRING

REQUIREMENT
LINE FEED BAR IN REAR POSITION
SLIDE LINK UNOPERATED. LINE FEED
BAR SPRINGS IN PLACE.
MIN. 19 OZS.
MAX. 24 OZS.
TO START LINE FEED BAR MOVING.

BAR BELL CRANK SPRING
BAR BELL CRANK

LINE FEED BAR SPRING
LINE FEED BAR

3.22 Answer-Back Mechanism (Switched Circuit Network)

"FIGURES" STUNT BOX CONTACT
(STUNT BOX SLOT 32)

REQUIREMENT
CLEARANCE BETWEEN CONTACT INSULATOR
AND FUNCTION LEVER SHOULD BE
MIN. SOME --- MAX. 0.010 INCH

TO CHECK
STUNT BOX MOUNTED ON TYPING UNIT AND
"LETTERS" COMBINATION MANUALLY SET UP
ON TYPING UNIT SELECTOR. ROTATE TYPING
UNIT MAIN SHAFT UNTIL FUNCTION LEVER IS
IN EXTREME FORWARD POSITION TOWARD
CONTACT INSULATOR.

TO ADJUST
WITH CONTACT MOUNTING SCREWS LOOSENED;
ADD OR REMOVE SHIMS AS REQUIRED.
3.23  Print Suppression Mechanism

**FUNCTION CLUTCH ROTATED UNTIL FUNCTION BARS ARE IN EXTREME REAR POSITION.**

LINE FEED FUNCTION PAWL HOOKED OVER ITS FUNCTION BAR AND THEN STRIPPED. THE NOTCH IN THE ZERO CODE BAR SHOULD LINE UP VERTICALLY WITH THE NOTCHES IN THE 4, 1, 5, 2, 3 CODE BARS BUT MAY BE OUT OF ALIGNMENT MAX. 0.010 INCH IN THE MARKING DIRECTION.

**REQUIREMENT**

MAX. 0.002 INCH CLEARANCE BETWEEN GUIDE PLATE EXTENSION AND SLIDE.

**TO ADJUST**

POSITION THE GUIDE PLATE BY ITS LOWER ADJUSTING SLOT WITH ITS CLAMP NUTS LOOSENED.

**SUPPRESSION CODE BAR MECHANISM**

**FUNCTION BARS IN REAR POSITION.** CALL DIRECTING FUNCTION PAWL HOOKED OVER ITS FUNCTION BAR AND STRIPPED.

NOTCH IN SUPPRESSION CODE BAR SHOULD LINE UP VERTICALLY WITH NOTCHES IN 4, 1, 5, 2, 3 CODE BARS BUT MAY BE OUT OF ALIGNMENT MAX. 0.010 INCH IN THE MARKING DIRECTION

**REQUIREMENT**

MAX. 0.002 INCH CLEARANCE BETWEEN GUIDE PLATE EXTENSION AND SLIDE.

**TO ADJUST**

POSITION THE GUIDE PLATE BY ITS LOWER ADJUSTING SLOT WITH ITS CLAMP NUTS LOOSENED.

**3 REQUIREMENT**

THERE SHOULD BE SOME CLEARANCE BETWEEN THE REAR END OF THE FUNCTION BAR AND THE FACE OF THE NOTCH ON THE FUNCTION PAWL WHEN THE LINE FEED FUNCTION PAWL AND CALL DIRECTING FUNCTION PAWL ARE ALTERNATELY HOOKED OVER THEIR RESPECTIVE FUNCTION BAR.

REFINE THE TWO ADJUSTMENTS ABOVE IF NECESSARY.
3.24 Continuous Spacing Mechanism

**SOLENOID PLUNGER SPRING REQUIREMENT**

Solenoid De-Energized, Spring Unhooked
Min. 1-1/2 OZS.
Max. 3 OZS.
To pull spring to position length.

**FUNCTION CLUTCH TRIP LEVER REQUIREMENT**

With the solenoid de-energized and the function clutch disengaged, the function clutch trip lever should engage the clutch shoe lever by the full thickness of the shoe lever (check at lug with least bite on two stop clutches).

To adjust position the solenoid mounting plate with its mounting screws loosened. In positioning the plate move each end equally to avoid binds in the solenoid plunger and function clutch trip lever.
3.25 Continuous Spacing Mechanism (Cont.)

**SUPPRESSION BAIL ADJUSTING BRACKET REQUIREMENT**

- Function clutch rotated until suppression bail is in extreme forward position. CR and LF function slide arms manually pushed forward until the CR and LF levers are tripped. Slide arms resting back against their slide arm brackets. Clearance between projection on CR slide arm and guide bar:
  - Min. 0.070 inch --- Max. 0.095 inch

To adjust:
- Position the connecting link on the adjusting bracket with its clamp screw loosened.
- Recheck after tightening screw. On two-stop clutches, check with clutch in each position.

**NOTE**

Before making the following adjustment check the carriage return lever adjustment. With the stunt box removed, the standard adjusting procedure cannot be followed. Refer to Par. 2.40 and use the following procedure.

**CARRIAGE RETURN LEVER REQUIREMENT**

- Clearance between carriage return latch bail and carriage return lever (Par. 2.40) should be:
  - Min. 0.006 inch --- Max. 0.040 inch

To check:
- Printing carriage in returned position. Trip function clutch and rotate main shaft until suppression bail is in extreme forward position. Locate spacing drum so that carriage return latch bail resets against carriage return lever extension.

To adjust:
- Position CR lever on CR latch bail with clamp screw loosened.
3.26 Paper-Out Alarm Mechanism

(A) SWITCH POSITION

Requirement --- Horizontal axis of switch shall lie in a plane parallel to the switch bracket when the switch is moved toward upper limit of its travel in the mounting holes.

To adjust --- with its mounting screws (2) loosened, position and align the switch.

(C) SWITCH BRACKET SPRING

Requirement --- With spring scale applied at the top switch bracket operating lever near spring hook, it shall require min. 11 ozs. --- max. 18 ozs.

To move switch bracket clear of switch plunger (gauge by eye)

(B) SWITCH OPERATING LEVER

Requirement --- With paper roll removed, upper surface of switch bracket operating lever shall lie in a plane that is parallel with under side of hexagonal paper spindle and rest approximately 1/4 inch from the spindle.

To adjust --- loosen screw that secure the switch assembly mounting bracket and position the assembly upward or downward.
3.27 Vertical Tabulation and Transmitter Distributor Control Mechanism

(C) **PAGE FEED-OUT GEAR PLAY**
- **REQUIREMENT**
  - Barely perceptible backlash between idler gear and feed-out gear
- **TO ADJUST**
  - Position gear pivot post with nut loosened.
- **NOTE:** Gears should mesh accurately when checked at 3 equal distances around circumference of gear.

(D) **BLOCKING LEVER**
- **SEE PAR. 3.28**

(E) **INDEXING DISK**
- **REQUIREMENT**
  - Clearance between index plate and pawl should be
    - Min. 0.015 inch --- Max. 0.040 inch
- **TO CHECK**
  - Line feed clutch disengaged. Index plate adjacent to pawl. Slack in gears taken up to make gap a minimum.
- **TO ADJUST**
  - Pull feed-out gear out of engagement with idler gear. Turn feed-out gear hand wheel clockwise until index plate just operates the pawl, then engage first tooth on idler.
  - Position indexing disk with three mounting screws loosened.

(B) **MOUNTING BRACKET**
- **REQUIREMENT**
  1. Clearance between feed-out blocking lever (inner lever) and feed-out slide
    - Min. Some --- Max. 0.020 inch
    - **TO CHECK**
      - Select upper case "Z" and rotate main shaft until page feed-out slide is in its most forward position. Take up play in page feed-out blocking lever to make clearance a minimum.
  2. Clearance between vertical tab slide and vertical tab blocking lever (outer lever)
    - Min. 0.002 inch
    - **TO CHECK**
      - Select upper case "J" and rotate main shaft until vertical tab slide is in its most forward position. Take up play in vertical tab blocking lever to make clearance a minimum.
    - **TO ADJUST**
      - Position lower portion of mounting bracket with mounting screws loosened.
SECTION 573-115-700

3.28 Vertical Tabulation and Transmitter Distributor Control Mechanism (Cont.)

(H) **POINTER**

**REQUIREMENT**

LINE FEED CLUTCH DISENGAGED. INDEX PLATE ADJACENT TO PAWL. POINTER SHOULD LINE UP WITH NOTCH IN INDEXING DISK AND CLEAR ANY INDEX PLATE BY APPROXIMATELY 1/16 INCH.

TO ADJUST

POSITION POINTER ON SIDE FRAME WITH ITS MOUNTING SCREW LOOSENED.

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(I) **PAGE FEED-OUT INDEX PLATE POSITION**

SEE PAR. 3.31

(J) **TABULATION INDEX PLATE POSITION**

SEE PAR. 3.30

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(F) **SWITCH CONTACT PRESSURE**

(TRANSMITTER CONTROL ONLY)

**REQUIREMENT**

CONTACTS CLOSED

MIN. 2 OZS. --- MAX. 3 OZS.

TO MOVE CONTACT SWINGER AWAY FROM ITS MATING CONTACT.

TO ADJUST --- BEND SWINGER

---

(D) **BLOCKING LEVER**

**REQUIREMENT**

CLEARANCE BETWEEN BOTTOM OF BLOCKING LEVER AND TOP OF SLIDE WHEN PAWL IS ON PEAK OF INDEX PLATE SHOULD BE

MIN. 0.005 INCH --- MAX. 0.045 INCH

TO ADJUST

TRIP LINE FEED CLUTCH. ROTATE MAIN SHAFT UNTIL PAWL IS ON PEAK OF INDEX PLATE. POSITION ADJUSTABLE ARM WITH MOUNTING SCREWS LOOSENED. MAKE ADJUSTMENT FOR EACH BLOCKING LEVER.

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* TRANSFER TYPE CONTACTS SEE PARs. 3.29 AND 3.30

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3.29 Vertical Tabulation and Transmitter Distributor Control Mechanism (Cont.)

TRANSMITTER CONTROL SWITCH (TRANSFER TYPE)

TRANSMITTER CONTROL SWITCH (TRANSMITTER CONTROL ONLY)

REQUIREMENTS --- FOR TRANSFER TYPE CONTACTS
1. WITH NORMALLY CLOSED (LOWER) CONTACTS CLOSED, CLEARANCE BETWEEN INSULATED EXTENSION OF SWINGER AND LOBES OF FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVER SHALL BE MIN. SOME CLEARANCE ____________________ MAX 0.005 INCH

TO CHECK --- ROTATE MAINSHAFT UNTIL FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVERS ARE UNOPERATED (BLOCKING LEVERS RESTING ON SLIDES).

TO ADJUST --- WITH TRANSMITTER CONTROL SWITCH MOUNTING SCREWS LOOSENED, POSITION THE CONTACT ASSEMBLY.

2. WITH THE NORMALLY OPEN (UPPER) CONTACTS CLOSED
   (a). LOBE OF FEED-OUT BLOCKING LEVER (INNER LEVER) SHALL FULLY ENGAGE INSULATED EXTENSION OF CONTACT SWINGER.
   (b). THE FEED-OUT BLOCKING LEVER SHALL REST FIRMLY ON THE FUNCTION ARM GUIDE BAR (INTERNAL --- CHECK BY LIFTING LEVER LIGHTLY AT CONTACT END) AND ALSO SEPARATE THE NORMALLY OPEN CONTACT SPRING FROM ITS STIFFENER AS THE UPPER CONTACT CLOSES.

TO CHECK --- SELECT FEED-OUT CODE COMBINATION, ROTATE MAIN SHAFT UNTIL FEED-OUT SLIDE IS IN ITS EXTREME FORWARD POSITION AND FEED-OUT BLOCKING LEVER DROPS BEHIND ITS SLIDE TO CLOSE NORMALLY OPENED CONTACTS.

TO ADJUST --- WITH CONTACT PILE-UP MOUNTING SCREWS LOOSENED, POSITION THE ASSEMBLY.

3. WITH THE NORMALLY OPEN (UPPER) CONTACTS CLOSED
   (a). LOBE OF VERTICAL TABULATOR BLOCKING LEVER (OUTER) SHALL FULLY ENGAGE THE INSULATED EXTENSION OF THE SWINGER.
   (b). THE VERTICAL TABULATOR BLOCKING LEVER SHALL REST FIRMLY ON THE FUNCTION ARM GUIDE BAR (INTERNAL --- CHECK BY LIFTING LEVER LIGHTLY AT CONTACT END,) AND ALSO SEPARATE NORMALLY OPEN CONTACT SPRING FROM ITS STIFFENER AS UPPER CONTACT CLOSES.

TO CHECK --- SELECT VERTICAL TABULATOR COMBINATION AND PROCEED AS IN ITEM TO CHECK OF REQUIREMENT 2 ABOVE.
SECTION 573-115-700

3. 30 Vertical Tabulation and Transmitter Distributor Control Mechanism (Cont.)

(J) TABULATION INDEX PLATE POSITION
REQUIREMENT --- WITH REQUIREMENT (I)
MET, LINE FEED PLATEN TO DESIRED
FIRST LINE OF PRINTING IN THAT FORM.
TO POSITION --- PLACE TABULATION INDEX
PLATE TO ALIGN WITH POINTER ON
SIDE OF PRINTER. INSTALL ADDITIONAL
TAB INDEX PLATES AT SUCCEEDING
DESIRED PRINTING LINES WITHIN THE FORM.
WHEN TABULATION AT A GIVEN POINT IS
NOT NEEDED, ROTATE TAB INDEX PLATES
(1/4 TURN) ON THEIR SIDES.

(K) BLOCKING LEVER SPRING *
REQUIREMENT --- WITH SPRING UNHOOKED
AND BLOCKING LEVER ON TOP OF SLIDE.
MIN. 7 OZS. --- MAX. 11 OZS.
TO PULL RESPECTIVE SPRING TO POSITION
LENGTH.

*BLOCKING LEVER SPRINGS USED WITH
TRANSFER TYPE SWITCH (PAR. 3.31)
MIN 12 OZS --- MAX 13-1/2 OZS

(G) TRANSMITTER CONTROL SWITCH (TRANSMITTER CONTROL ONLY)
REQUIREMENTS --- FOR SINGLE-CONTACT TYPE CONTROL
1. WITH TRANSMITTER CONTROL CONTACTS CLOSED, THERE SHOULD BE SOME CLEARANCE BETWEEN
INSULATED EXTENSION OF SWINGER AND LOBE OF FEED-OUT AND VERTICAL TABULATOR
BLOCKING LEVERS.
TO CHECK - ROTATE MAIN SHAFT UNTIL FEED-OUT AND VERTICAL TABULATOR BLOCKING LEVERS
ARE UNOPERATED (RESTING ON TOP OF SLIDES).
TO ADJUST - POSITION THE CONTACT ASSEMBLY WITH ITS MOUNTING SCREWS LOOSENED.
2. WITH TRANSMITTER CONTROL CONTACTS OPENED BY FEED-OUT BLOCKING LEVER, CLEARANCE
BETWEEN SWITCH CONTACTS SHALL BE
MIN 0.010 INCH ----------------------------- MAX 0.020 INCH
TO CHECK - SELECT FEED-OUT CODE COMBINATION, ROTATE MAIN SHAFT UNTIL FEED-OUT SLIDE
IS IN ITS EXTREME FORWARD POSITION AND FEED-OUT BLOCKING LEVER DROPS BEHIND ITS SLIDE
TO OPEN CONTACTS
TO ADJUST - REFINE REQUIREMENT NO. 1 ABOVE.
3. WITH CONTROL CONTACTS OPENED BY VERTICAL TABULATOR BLOCKING LEVER, CLEARANCE
BETWEEN SWITCH CONTACTS SHOULD BE
MIN 0.010 INCH ----------------------------- MAX 0.020 INCH
TO CHECK - SELECT VERTICAL TABULATOR CODE COMBINATION, ROTATE MAIN SHAFT UNTIL
VERTICAL TAB SLIDE IS IN ITS EXTREME FORWARD POSITION AND VERTICAL TABULATOR BLOCKING
LEVER DROPS BEHIND ITS SLIDE
TO ADJUST - REFINE REQUIREMENT NO. 1 ABOVE.
3.31 Vertical Tabulation and Transmitter Distributor Control Mechanism (Cont.)

(I) PAGE FEED-OUT INDEX PLATE POSITION

REQUIREMENT --- PLACE AN INDEX PLATE IN THE NUMBERED SLOTS ON DISK CORRESPONDING TO LENGTH OF PAGE FORM TO BE USED. SYNCHRONIZE PAGE FEED-OUT WITH A FORM BY POSITIONING FORM SO THAT TYPING UNIT WILL PRINT IN FIRST TYPING LINE OF THE FORM. WHEN TYPING UNIT IS IN STOP POSITION, TOP OF RIBBON GUIDE SHOULD ALIGN WITH BOTTOM OF PRINTING LINE.

TO POSITION --- WITH PAGE FORM IN DESIRED POSITION, DISENGAGE PAGE FEED-OUT GEAR FROM ITS IDLER GEAR. ROTATE FEED-OUT GEAR UNTIL NOTCH IN INDEXING DISK ALIGNS WITH POINTER ON SIDE OF PRINTER, RE-ENGAGE GEARS.

SWITCH CONTACTS (TRANSMITTER CONTROL ONLY)

REQUIREMENTS --- FOR TRANSFER TYPE CONTROL SWITCH

1. WITH NORMALLY CLOSED (LOWER) CONTACTS CLOSED, LIFT SWINGER FREE OF MATING CONTACT. IT SHALL REQUIRE A MINIMUM OF 30 GRAMS TO MOVE LOWER CONTACT SPRING AWAY FROM ITS STIFFENER.

TO ADJUST - FORM THE LOWER CONTACT SPRING BY BENDING,

2. WITH LOWER CONTACT CLOSED

MIN 30 GRAMS ------------------------------- MAX 45 GRAMS.

TO MOVE SWINGER FROM ITS MATING CONTACTS.

TO ADJUST - FORM THE SWINGER BY BENDING.

3. WITH LOWER CONTACT CLOSED

(a) GAP BETWEEN UPPER CONTACT AND MATING CONTACT OF SWINGER

MIN 0.008 INCH ------------------------------- MAX 0.015 INCH

TO ADJUST - POSITION STIFFENER OF NORMALLY CLOSED CONTACT.

(b) WITH A GAP OF 0.008 TO 0.015 INCH, IT SHALL REQUIRE

MIN 25 GRAMS ------------------------------- MAX 35 GRAMS

TO PULL UPPER CONTACT AWAY FROM ITS STIFFENER.

TO ADJUST - FORM THE UPPER CONTACT SPRING BY BENDING.

RECHECK REQUIREMENT (a).
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3. 32 Vertical Tabulation and Transmitter Distributor Control Mechanism (Cont.)

(L) **LINE FEED CLUTCH TRIP LEVER SPRING**
SEE PAR. 2.20

(M) **TABULATOR BAIL SPRING REQUIREMENT**
MIN. 3 OZS.
MAX. 8 OZS.
TO PULL BAIL AWAY FROM ITS BACKSTOP LEVER.

(O) **STUNT BOX SWITCH SPRING**
SEE PAR. 2.66

(N) **FORM-OUT PAWL SPRING REQUIREMENT**
MIN. 3 OZS.
MAX. 8 OZS.
TO PULL THE PAWL AWAY FROM ITS BACKSTOP LEVER.
3.33 Universal Contact (Selector) Mechanism

(A) CONTACT MOUNTING BRACKET

REQUIREMENT

THE DRIVE ARM LINKAGE SHOULD BE VERTICALLY ALIGNED TO PREVENT BINDS.

TO ADJUST

POSITION THE CONTACT MOUNTING BRACKET WITH ITS MOUNTING SCREWS LOOSE.

(B) CONTACT BLOCK

REQUIREMENT

THE CONTACT FACES SHOULD BE IN A VERTICAL STRAIGHT LINE TO ADJUST

LOOSEN THE TWO CONTACT MOUNTING SCREWS. PRESS THE CONTACT BLOCK TOWARD THE REAR OF THE TYPING UNIT FIRMLY AGAINST THE SCREWS AND TIGHTEN THE SCREWS.

(C) CONTACT DRIVE ARM POSITION

REQUIREMENT

THE CONTACTS SHOULD OPEN EQUALLY WITHIN 0.010 INCH TO CHECK

ROTATE CODE BAR CLUTCH UNTIL IT IS DISENGAGED AND LATCHED IN STOP POSITION. MEASURE GAP BETWEEN UPPER CONTACTS. TRIP CODE BAR CLUTCH AND ROTATE 180 DEGREES OR UNTIL LOWER CONTACT GAP REACHES ITS MAXIMUM OPENING. MEASURE THE GAP.

TO ADJUST

POSITION CONTACT DRIVE ARM WITH ITS CLAMP SCREW LOOSE.

(D) CONTACT ARM SPRING

REQUIREMENT

WITH SHOULDER SCREW WHICH CONNECTS CONTACT ARM TO DRIVE LINK REMOVED AND SPRING SCALE APPLIED VERTICALLY UPWARD OR DOWNWARD MIN. 2 OZS. --- MAX. 5 OZS. TO OPEN EITHER CONTACT.
SECTION 573-115-700

3. 34 Universal Contact (Stunt Box) Mechanism

NOTE: 1. THESE ADJUSTMENTS SHOULD BE MADE WITH THE CONTACT BRACKET ASSEMBLY REMOVED
NOTE: 2. IF CONTACT SCREWS ARE DISTURBED TO OBTAIN A REQUIREMENT, THEY MUST BE RETIGHTENED
AND ALL PRECEDING REQUIREMENTS RECHECKED.

CAUTION: IF IT IS NECESSARY TO INCREASE THE CONTACT SPRING TENSIONS, IT IS ADVISABLE TO
REMOVE THE CONTACT SPRING TO INCREASE ITS CURVATURE. AVOID DAMAGE TO CONTACT
SPRINGS WHEN ADJUSTING THE STIFFENERS IN THE ASSEMBLY.

(A) CONTACT
1. REQUIREMENT
   CONTACT SPRINGS AND STIFFENERS MOUNTED VERTICALLY AND CONTACT POINTS IN
   ALIGNMENT (GAUGE BY EYE).
   TO ADJUST
   POSITION THE CONTACT SPRINGS AND STIFFENERS WITH ASSEMBLY SCREWS LOOSENED.
2. REQUIREMENT
   STIFFENERS SHOULD BE PARALLEL WITH THE CONTACT BRACKETS.
   TO ADJUST
   FORM THE STIFFENER
3. REQUIREMENT
   CONTACT SPRINGS SHOULD REST AGAINST THEIR STIFFENERS THROUGHOUT THEIR WIDTH.
   TO ADJUST
   BEND TOP FORMED SECTION OF STIFFENER. IF NECESSARY, BEND CONTACT SPRINGS.

(B) NORMALLY OPEN CONTACT GAP
   REQUIREMENT
   WITH THE NORMALLY CLOSED CONTACTS CLOSED, THE NORMALLY OPEN CONTACT SHOULD BE OPEN
   MIN 0.020 INCH
   MAX 0.025 INCH
   TO ADJUST
   BEND STIFFENER

(C) CONTACT SPRING (TWO SPRINGS)
   REQUIREMENT
   MIN 2 OZ
   MAX 3 OZ
   TO MOVE EACH CONTACT SPRING AWAY FROM ITS STIFFENER, WITH THE SWINGER HELD AWAY
   TO ADJUST
   REMOVE AND FORM THE SPRING.

(D) SWINGER SPRING
   REQUIREMENT
   MIN 4 OZ
   MAX 6 OZ
   TO MOVE SWINGER FROM NORMALLY CLOSED CONTACT.
   TO ADJUST
   BEND SWINGER
3. 35 Universal Contact (Stunt Box) Mechanism (continued)

TRIP CAM
REQUIREMENT
WITH STRIPPER BAIL SHAFT DRIVE LINK
AT ITS LOWEST POINT, THE CLEARANCE
BETWEEN THE LATCH LEVER AND THE LATCH
CAM SHOULD BE
MIN 0.003 INCH
TO ADJUST
ROTATE THE TRIP CAM WITH ITS MOUNTING
SCREW LOOSENED.
NOTE: AS A CHECK TO SEE THAT THE TRIP CAM IS
NOT INSTALLED 180° OUT OF PLACE, THE MAIN
SHAFT SHOULD BE ROTATED SO THAT THE STRIPPER
SHAFT DRIVE LINK MOVES DOWNWARD.

LATCH LEVER SPRING
REQUIREMENT
WITH LATCH LEVER RESTING ON HIGH PART
OF TRIP CAM
MIN 1/2 OZ
MAX 2 OZ
TO MOVE LATCH LEVER AWAY FROM TRIP CAM.
SECTION 573-115-700

3.36 Universal Contact (Stunt Box) Mechanism (continued)

NOTE: THE FOLLOWING ADJUSTMENTS ARE TO BE MADE WITH THE CONTACT ASSEMBLY INSTALLED ON THE STUNT BOX

CONTACT BRACKET AND DRIVE CAM

1. REQUIREMENT
   WITH DRIVE LINK IN ITS UPPERMOST POSITION, CLEARANCE BETWEEN TOP OF LATCH LEVER AND LATCH CAM
   MIN 0.003 INCH
   MAX 0.008 INCH

2. REQUIREMENT
   WITH THE MAIN SHAFT ROTATED ON UNTIL THE CLEARANCE IN REQUIREMENT 1. IS CLOSED AND THE LATCH CAM RESTS FIRMLY ON THE LATCH LEVER.
   CLEARANCE BETWEEN THE NORMALLY OPEN CONTACT SPRING AND THE UPPER END OF ITS STIFFENER
   MIN 0.005 INCH
   MAX 0.010 INCH

TO ADJUST REPOSITION THE CONTACT BRACKET, AND, IF NECESSARY, THE DRIVE CAM.

Page 112
GENERAL APPLICATION TIMING - FINAL (USING DXD OR SIMILAR EQUIPMENT)

CONTACT BRACKET AND DRIVE CAM POSITION

REQUIREMENT
- The normally open universal contacts should close within ±5 milliseconds of the closure of the normally open stunt box contact.

TO ADJUST
- Refine the drive cam (and, if necessary, the bracket) adjustment by rotating the drive cam within the specified limits.

TRIP CAM

REQUIREMENT
- The normally open universal contacts should open within -5 +0 milliseconds of the opening of the normally open stunt box contact.

TO ADJUST
- Refine the trip cam adjustment by rotating the trip cam on its shaft within the specified limits.

SPECIAL ADJUSTMENTS (FOR 100 WPM)

NOTE: To prevent excessive flexing of the swinger, the normally open contact spring stiffener must be bent to hold the spring away from the swinger with the drive link in its uppermost position.

NORMALLY OPEN CONTACT GAP (100 WPM)

REQUIREMENT
- With the swinger resting against the normally closed contact the gap should be
  - MIN 0.075 inch
  - MAX 0.085 inch

TO ADJUST
- Bend the contact spring stiffener.

CONTACT BRACKET AND DRIVE CAM POSITION (100 WPM)

REQUIREMENT
- With the latch cam in its fully latched position
  - MIN 0.015 inch
  - MAX 0.025 inch

TO ADJUST
- Position the drive cam and/or, if necessary, the contact bracket.

SPECIAL APPLICATION TIMING (USING DXD OR SIMILAR EQUIPMENT)

A. NORMALLY CLOSED CONTACTS (100 WPM FOR 83B2 SWITCHING SYSTEM)

1. The normally closed contacts should close within 50 to 80 divisions after the start of the stop pulse.
2. The normally open contact should close prior to the end of No. 3 pulse.
3. The normally open contacts should remain closed for at least 238 divisions (100 WPM DXD with 742 scale divisions).

NOTE: The relation between the normally closed universal contact marking pulse and the stop impulse of the received signal varies with the range scale setting of the unit.
SECTION 573-115-700

3. 38 Universal Contact (Stunt Box) Mechanism (continued)

B. **NORMALLY CLOSED CONTACTS** (100 WPM USED IN DELTA AND UNITED AIRLINES SYSTEM)

When the normally open contacts are not used, the normally closed contacts should remain open for 53.88 milliseconds or 400 + 15 DXD divisions.

To adjust, refine the drive cam, trip cam and, if necessary, the bracket positions to meet the timing requirements.

**NOTE 1:**
The normal 0.003 to 0.008 inch overtravel of the latch cam over the latch lever with the drive link in its uppermost position must be increased in order to decrease normally closed contact gap in the latched position of the latch cam. This prevents the contact from bouncing when the latch lever is released.

**NOTE 2:**
With the latch cam in its latched position, there should be 0.015 inch minimum contact gap between the normally closed contacts.

**GENERAL REQUIREMENTS AFTER TIMING ADJUSTMENTS**

**NOTE:** It is very important that the following requirements be met

A. **With the drive link in its uppermost position:**

1. The latch cam shall not overtravel or hang up on the swinger insulator.

2. There shall be at least 0.003 inch clearance between the latching surface of the latch cam and the latching surface of the latch lever.

3. The clearance between the normally open contact spring and its stiffener shall not exceed 0.025 inch.

B. **With the drive link in its lowermost position:**

1. The top of the swinger insulator must clear the cut-out section of the latch cam.

2. There shall be at least 0.003 inch clearance between the front edge of the latch lever latching surface and the high part of the latch cam.

C. **With the latch cam in its latched position,** there shall be at least 0.005 inch clearance between the normally open contact spring and the upper end of its stiffener.

D. The latching surface of the latch lever shall cover the width of the trip cam and latch cam.
3.39 Form Alignment Switch Mechanism

(A) FORM FEED-OUT ADJUSTMENT
SEE PARS. 3.11 AND 3.12

(B) FORM ALIGNMENT SWITCH
(REMOVE POWER FROM SWITCH)
REQUIREMENT
SWITCH SHOULD BE OPERATED WHEN SWITCH LEVER IS WITHIN 0.010 INCH OF BOTTOM OF NOTCH IN FORM-OUT DISK AND SHOULD NOT BE OPERATED WHEN LEVER IS ON OUTER EDGE OF DISK.

TO CHECK
1. ROTATE DISK UNTIL LEVER FALLS INTO NOTCH. PLACE 0.010 INCH FEELER GAGE BENEATH LEVER. LIFT LEVER AND ALLOW IT TO COME TO REST ON GAGE. SWITCH SHOULD BE OPERATED.
2. ROTATE DISK UNTIL LEVER RESTS ON OUTER EDGE. SWITCH SHOULD NOT BE OPERATED.

TO ADJUST
POSITION SWITCH, AT PRY POINTS, WITH ITS MOUNTING SCREWS LOOSENED.

(C) FORM ALIGNMENT SWITCH SPRING
REQUIREMENT
MIN. 6 OZS.
MAX. 8 OZS.
TO MOVE THE LEVER FROM OUTER-EDGE OF DISK.
TO CHECK
SWITCH OPERATING LEVER ON OUTER EDGE OF DISK (NOT IN NOTCH AS SHOWN)
DC Magnet Operated Print Suppression Mechanism

3.40

(D) ARMATURE EXTENSION OVERTRAVEL REQUIREMENT

1. OVERTRAVEL OF ARMATURE EXTENSION SHOULD BE
   MIN. 0.010 INCH -- MAX. 0.015 INCH

2. THERE SHOULD BE NO CLEARANCE BETWEEN BLOCKING SURFACE OF ARMATURE EXTENSION AND BOTTOM SURFACE OF SUPPRESSION ARM.
   TO CHECK (REQUIREMENTS 1 AND 2.)
   SUPPRESSION ARM BLOCKED BY BLOCKING BAIL EXTENSION. HOLD ARMATURE AGAINST POLE FACE OF MAGNET.

3. ROTATE BLOCKING BAIL EXTENSION. IT SHOULD SLIDE UNDER THE SUPPRESSION ARM WITH NO PERCEPTIBLE CLEARANCE.
   TO CHECK (REQUIREMENT 3.)
   SUPPRESSION ARM BLOCKED BY ARMATURE EXTENSION

TO ADJUST
  PIVOT MAGNET BRACKET, UP OR DOWN AND TO THE FRONT OR REAR, WITH ITS MOUNTING SCREWS LOOSENED, USING AN ECCENTRIC ADJUSTING TOOL. PRESS ARMATURE EXTENSION FIRMLY AGAINST BOTTOM OF SUPPRESSION ARM. IF NECESSARY, ADD OR REMOVE SHIMS BETWEEN SUPPRESSION ARM AND TYPE BOX CLUTCH TRIP ARM. RECHECK (B) AND (C).

(A) TYPE BOX CLUTCH TRIP LEVER
   SEE PAR. 2.22 AND REFINE REQUIREMENT TO
   MIN. 0.040 INCH -- MAX. 0.055 INCH

(B) TYPE BOX CLUTCH SUPPRESSION ARM
   SEE PAR. 3.14

(C) BLOCKING BAIL
   SEE PAR. 3.14

(E) ARMATURE EXTENSION CLEARANCE REQUIREMENT
   CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SUPPRESSION ARM SHOULD BE
   MIN. 0.012 INCH -- MAX. 0.030 INCH

   TO CHECK
   ARMATURE RELEASED
   TO ADJUST
   POSITION ARMATURE WITH ARMATURE STOP SCREW. RECHECK (D).

NOTE: KEEP POLE FACE FREE OF OIL AND GREASE.

CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SUPPRESSION ARM SHOULD BE
MIN. 0.012 INCH -- MAX. 0.030 INCH
TO CHECK
ARMATURE RELEASED
TO ADJUST
POSITION ARMATURE WITH ARMATURE STOP SCREW. RECHECK (D).
3.41 Print Suppression and Offline Stunt Shift Control Mechanism

(A) SUPPRESSION CODE BAR POSITION
REQUIREMENT
NOTCHES IN SUPPRESSION CODE BAR SHOULD ALIGN WITH NOTCHES IN OTHER CODE BARS. VIEW FROM REAR OF UNIT ABOVE STUNT BOX. GAGE BY EYE.
TO CHECK
ENERGIZE THE PRINT SUPPRESSION MAGNET AND PLACE ALL CODE BARS IN SPACING POSITION.
TO ADJUST
OPERATE MAGNET ARMATURE MANUALLY OR ELECTRICALLY. PLACE ALL CODE BARS IN SPACING POSITION. PIVOT THE ARMATURE EXTENSION IN ITS ELONGATED MOUNTING HOLE WITH THE MOUNTING SCREWS LOOSENED.

(B) TYPE BOX CLUTCH TRIP LEVER
SEE PAR. 2.22 AND REFINE REQUIREMENT TO MIN. 0.040 INCH MAX. 0.055 INCH

(C) TYPE BOX CLUTCH SUPPRESSION ARM
SEE PAR. 3.14

(D) BLOCKING BAIL
SEE PAR. 3.14

(E) PRINT SUPPRESSION MAGNET ARMATURE RETURN SPRING
REQUIREMENT
MIN. 7 OZS.
MAX. 10-1/2 OZS.
TO START MAGNET ARMATURE MOVING TOWARD CORE
TO CHECK
PRINT SUPPRESSION MAGNET UNOPERATED

NOTE: KEEP POLE FACE FREE OF OIL AND GREASE.
SECTION 573-115-700

3.42 Letters - Figures Codebar Shift Magnet Mechanism

(A) SHIFT MAGNET YOKE

**Requirement**
- Clearance between armature and end of heelpiece should be min. some --- max. 0.003 inch

**To check**
- Magnet armature held against core. Check clearance across end of heelpiece

**To adjust**
- Position yoke with its clamp screw loosened.

**Note:** Keep pole face free of oil and grease.

---

(B) SHIFT MAGNET ARMATURE

**Requirement**
1. Clearance between armature and transfer lever should be min. some --- max. 0.005 inch

**To check**
- Magnet armature attracted. Shift code bar in full marking position.

**To adjust**
- Position magnet forward or backward with bracket mounting screws loosened.

2. Clearance between armature and transfer lever should be min. some --- max. 0.010 inch

**To check**
- Magnet armature unoperated. Shift code bar in full spacing position.

**To adjust**
- Position armature backstop screw with lock nut loosened.

---

(C) SHIFT MAGNET ARMATURE RETURN SPRING

**Requirement**
- Min. 1 oz. --- Max. 3 ozs.

**To pull spring to installed length**

---

(D) SHIFT CODE BAR RETURN SPRING

**Requirement**
- Min. 3 ozs. --- Max. 7 ozs.

**To start code bar moving**
- To check trip type box clutch, rotate main shaft until printing track is in lowest position

LTRS - FIGS SHIFT CODE BAR EXTENSION POST
3.43 Form Feed-Out Mechanism

**Form Feed-Out Torsion Spring Requirement** *

- **MIN.** 1/8 OZ.
- **MAX.** 1-1/4 OZ.

To start bail moving towards rear of unit.
To check disengage line feed clutch trip lever.

*Receive only units
- **MIN.** 2 OZS
- **MAX.** 6 OZS
SECTION 573-115-700

3.44 Two Color Ribbon Mechanism

SEE NOTES 1 THROUGH 5 ON FOLLOWING PAGE

(A) RIBBON MAGNET HINGE BRACKET (LEFT AND RIGHT) (PRELIMINARY)
REQUIREMENT: --- MAGNET ENERGIZED OR IN ATTRACTION POSITION, ARMATURE ON POLE PIECE.
CLEARANCE BETWEEN ARMATURE AND POLE PIECE SHOULD BE NOT MORE THAN .005 INCH.
TO ADJUST --- POSITION HINGE BRACKET WITH MOUNTING SCREWS LOOSENED.

(B) RIBBON MAGNET BRACKET (LEFT AND RIGHT) (PRELIMINARY)
REQUIREMENT --- ADJUSTING SCREW IN LOWEST POSITION, ALL CLUTCHES DISENGAGED,
POSITION RIBBON MAGNET BRACKET AS FOLLOWS:
1. HOLD MAGNET ARMATURE STOP LEVER AGAINST MAGNET CORE. LEVER SHOULD BE PARALLEL
   TO OSCILLATING LEVER TOP SURFACE AND ENGAGE THE OSCILLATING LEVER BY AT LEAST
   1/2 OF THE STOP LEVER THICKNESS. GAUGE BY EYE.
2. STOP LEVER HELD AGAINST MAGNET CORE. CLEARANCE BETWEEN STOP LEVER AND
   OSCILLATING LEVER SHOULD BE: MIN. 0.005 INCH --- MAX. 0.020 INCH WITH PLAY
   TAKEN UP TOWARD FRONT OF UNIT.
TO ADJUST---LOOSEN AND POSITION RIBBON MAGNET BRACKET TO MEET ABOVE REQUIREMENTS.

(C) RIBBON MAGNET HINGE BRACKET (LEFT AND RIGHT) (FINAL)
REQUIREMENT --- MAGNET DE-ENERGIZED OR IN RELEASED POSITION, ROTATE MAIN SHAFT UNTIL
OSCILLATING LEVER IS FULLY UNDER STOP LEVER. CLEARANCE BETWEEN OSCILLATING LEVER
AND STOP LEVER SHOULD BE: MIN. 0.020 INCH --- MAX. 0.040 INCH.
TO ADJUST --- POSITION STOP LEVER ADJUSTING SCREW WITH LOCK NUT LOOSENED.

---OSCILLATING LEVER
3.45 Two Color Ribbon Mechanism

OPERATIONAL REQUIREMENT - RIBBON MAGNET BRACKET (FINAL) (SEE PRECEDING FIGURE)
PRINTER OPERATING AT 60, 75, OR 100 WPM, TEST BEING PRINTED.
REQUIREMENT
PRINTS RED WHEN RIBBON MAGNETS ARE ENERGIZED.
TO ADJUST
TURN LEFT AND RIGHT RIBBON BRACKET ROLLER BAIL ADJUSTING SCREWS
1/2 TURN UP. REFINE RIBBON AND RIBBON HINGE BRACKET ADJUSTMENTS.
REPEAT ABOVE PROCEDURE IF BLACK IS PRINTED.

RIBBON ROLLER BAIL SPRING (LEFT AND RIGHT) (SEE PRECEDING FIGURE)
REQUIREMENT
ALL CLUTCHES DISENGAGED, ADJUSTING SCREW IN LOWEST POSITION
MIN. 4 OZS. --- MAX. 6 OZS.
TO START LIFTER BAIL MOVING.

NOTES
REFER TO RELATED REQUIREMENTS
1. VERTICAL POSITION LOCK LEVER EXTENSION - PAR. 2.36
2. RIBBON REVERSE SPUR GEAR - PAR. 2.52
3. RIBBON REVERSE DETENT - PAR. 2.52
4. RIBBON FEED LEVER BRACKET - PAR. 2.53
5. RIBBON RATCHET WHEEL FRICTION SPRING - PAR. 2.53
(MIN 3-1/3 OZS --- MAX 4-1/2 OZS).

RIBBON REVERSING LEVER SPRING (LEFT AND RIGHT)
REQUIREMENT
MIN. 1/2 OZ --- MAX. 1-1/2 OZS.
TO START LEVER MOVING.

RIBBON GUIDE LEVER SPRING (LEFT AND RIGHT)
REQUIREMENT
MIN. 1 OZ --- MAX. 2 OZS
TO START LEVER MOVING.
SECTION 573-115-700

4. EARLIER DESIGN MECHANISMS
   BASIC UNITS

4.01 SELECTOR MECHANISM

NOTE: BAIL LEVER GUIDE ADJUSTMENT APPLIES ONLY TO UNITS EQUIPPED WITH ADJUSTABLE GUIDES

SELECTOR MAGNET

MOUNTING NUT

RANGE FINDER PLATE

START LEVER (EXTENSION)

START LEVER SPRING

LATCH LEVER SPRING

START LEVER SPRING UNHOOKED. STOP ARM BAIL IN INDENT OF ITS CAM. RANGE SCALE SET AT 60
MIN. 2-1/2 OZS.
MAX. 4-1/2 OZS.
TO START THE STOP ARM MOVING.

BAIL LEVER GUIDE

REQUIREMENT

SOME CLEARANCE BETWEEN EACH SIDE OF GUIDE FORK AND EXTENSION OF START LEVER THROUGHOUT ITS TRAVEL.

TO ADJUST POSITION BAIL LEVER GUIDE WITH MOUNTING NUT LOOSENED.

(RIGHT SIDE VIEW)
4.02 Selector Mechanism

**SELECTOR ARMATURE**

FOR REQUIREMENTS (1) AND (2) SEE PAR. 2.01 UNDER BASIC UNITS

**ARMATURE BACKSTOP**

**ARMATURE EXTENSION**

(BOTTOM VIEW)

**MOUNTING SCREWS**

(3) REQUIREMENT (ARMATURE BACKSTOP ALIGNMENT)

CLEARANCE BETWEEN SIDES OF BACKSTOP AND SIDES OF ARMATURE EXTENSION.

MIN. 0.010 INCH

TO ADJUST

1. POSITION ARMATURE SPRING ADJUSTING NUT TO HOLD ARMATURE FIRMLY AGAINST PIVOT EDGE OF CASTING.

2. POSITION ARMATURE AND BACKSTOP WITH MOUNTING SCREWS LOOSENED.
SECTION 573-115-700

4.03 Codebar Mechanism

TRANSFER LEVERS

CODE BAR SHIFT LEVER

CODE BAR SHIFT LEVER DRIVE ARM

REQUIREMENT

CODE BAR SHIFT LEVER LINK IN THE UPPERMOST POSITION. THERE SHOULD BE SOME CLEARANCE BETWEEN THE TOP OF THE ROLLERS AND THE TOP OF THE CAM SLOTS IN THE CODE BAR SHIFT LEVERS MAX. 0.025 INCH ON THE CLOSEST LEVER.

TO ADJUST LOOSEN THE CLAMP SCREW. POSITION THE CODE BAR SHIFT LEVER DRIVE ARM ON ITS SHAFT TO MEET THE REQUIREMENT AND TO PROVIDE SOME END PLAY, NOT MORE THAN 0.006 INCH.

CLAMP SCREW

(FRONT VIEW)

CODE BAR SHIFT LEVER DRIVE ARM

(RIGHT SIDE VIEW)
CODE BAR SHIFT LEVER LINK GUIDE BRACKET

REQUIREMENT
MOTION OF FRONT AND REAR CODE BAR SHIFT LEVERS SHOULD BE EQUALIZED WITH RESPECT TO CODE BAR TRAVEL.

TO CHECK (FRONT)
SELECT BLANK COMBINATION AND ROTATE MAIN SHAFT UNTIL CODE BAR SHIFT LEVER LINK REACHES HIGHEST TRAVEL. TAKE UP PLAY FOR MAXIMUM CLEARANCE.
CLEARANCE BETWEEN FRONT CODE BAR SHIFT LEVER AND SHOULDER ON NEAREST CODE BAR SHIFT BAR
MIN. 0.002 INCH—MAX. 0.025 INCH

TO CHECK (REAR)
SELECT LETTERS COMBINATION. CHECK CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND SHOULDER OF CODE BAR SHIFT BAR IN SAME WAY.
MIN. 0.002 INCH—MAX. 0.025 INCH

TO ADJUST
POSITION CODE BAR SHIFT LEVER LINK GUIDE BRACKET BY MEANS OF MOUNTING SCREWS (3).
SECTION 573-115-700
4.05 Main Shaft and Trip Shaft Mechanisms

(A) CLUTCH TRIP SHAFT SET COLLARS
(1) REQUIREMENT
SPACING CLUTCH LATCH LEVER SHOULD HAVE SIDE PLAY
MIN. SOME
MAX. 0.008 INCH
TO ADJUST POSITION SPACING CLUTCH LATCH LEVER SET COLLAR.

(2) REQUIREMENT
APPROXIMATE ALIGNMENT OF RIGHT END OF STOP EXTENSIONS ON TRIP LEVER AND SHOE LEVER TO ADJUST POSITION LINE FEED CLUTCH TRIP LEVER SET COLLAR.

(3) REQUIREMENT
LINE FEED CLUTCH LATCH LEVER SHOULD HAVE SIDE PLAY
MIN. SOME
MAX. 0.008 INCH
TO ADJUST POSITION LINE FEED CLUTCH LATCH LEVER SET COLLAR.

NOTE: ANTI-DEFLECTION PLATE ADJUSTMENT APPLIES ONLY TO UNITS SO EQUIPPED.

(b) ANTI-DEFLECTION PLATE REQUIREMENT
WITH TYPING UNIT UPSIDE DOWN AND FUNCTION, SPACING, LINE FEED, AND TYPE BOX CLUTCHES LATCHED DISENGAGED.
MIN. 1 LB.
MAX. 5 LBS.
TO PULL TRIP SHAFT AWAY FROM ANTIDEFLECTION PLATE.
TO ADJUST POSITION PLATE WITH MOUNTING SCREWS LOOSENED.
4.06 Main Shaft and Trip Shaft Mechanisms (Cont.)

SPACING CLUTCH TRIP LEVER

REQUIREMENT
SPACING AND TYPE BOX CLUTCHES DISENGAGED
TRIP LEVER ARM IN UPWARD POSITION.

FOR UNITS WITHOUT U-SHAPED LINE
FEED CLUTCH TRIP LEVER:
SPACING CLUTCH TRIP LEVER SHOULD
BE FLUSH OR UNDERFLUSH BY 1/2
THICKNESS OF SHOE LEVER WITH
OUTER SURFACE OF SHOE LEVER.

FOR UNITS WITH U-SHAPED LINE
FEED CLUTCH TRIP LEVER:
SPACING CLUTCH TRIP LEVER SHOULD
ENGAGE SHOE LEVER BY FULL
THICKNESS OF SHOE LEVER
CHECK AT STOP LUG WITH LEAST BITE.

TO ADJUST
USE ADJUSTING SCREW TO POSITION
SPACING CLUTCH TRIP ARM.

SPACING CLUTCH TRIP LEVER SPRING

REQUIREMENT
CLUTCH ENGAGED AND ROTATED UNTIL
TRIP LEVER RESTS ON STOP LUG.

CLUTCH Trip Lever Spring Requirement

<table>
<thead>
<tr>
<th>CLUTCH</th>
<th>MIN.</th>
<th>MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPACING</td>
<td>11 OZS.</td>
<td>16 OZS.</td>
</tr>
<tr>
<td>LINE FEED</td>
<td>9 OZS.</td>
<td>12 OZS.</td>
</tr>
<tr>
<td>TYPE BOX</td>
<td>5 OZS.</td>
<td>7-1/4 OZS.</td>
</tr>
</tbody>
</table>

TO MOVE LEVER AWAY FROM
STOP LUG.
4.07 Spacing Mechanism

NOTE: CHECK RELATED ADJUSTMENTS, PARS. 4.12, 4.13, 2.47, IF THE FOLLOWING ADJUSTMENTS ARE REMADE.

OSCILLATING RAIL SLIDE

WIRE ROPE CLAMP SCREW

WIRE ROPE

OSCILLATING RAIL SLIDE POSITION REQUIREMENT

SPACING CUTOUT LEVER AND AUTOMATIC CR-LF ARM IN MAXIMUM COUNTERCLOCKWISE POSITION ON SPACING DRUM. SPACING CLUTCH DISENGAGED. FARthest ADVANCED SPACING PAWL ENGAGED WITH TOOTH JUST ABOVE CUT-AWAY SECTION IN RATCHET WHEEL. RIGHT END OF OSCILLATING RAIL SLIDE SHOULD CLEAR PULLEY.

MIN. 0.025 INCH --- MAX. 0.050 INCH TO ADJUST POSITION SLIDE ON WIRE ROPE WITH CLAMP SCREWS LOOSENED.

PULLEY

AUTOMATIC CARRIAGE RETURN ARM

SPACING PAWL

RATCHET WHEEL

SPACING CUTOUT LEVER

STOP ARM

SPACING FEED PAWL SPRING REQUIREMENT

EACH SPACING PAWL IN LEAST ADVANCED POSITION, RESTING AGAINST RATCHET WHEEL. EACH SPRING UNHOOKED FROM BRACKET

MIN. 2-1/2 OZS. --- MAX. 4 OZS.

TO PULL SPRINGS TO INSTALLED LENGTH.

SPACING FEED PAWL SPRING BRACKET

NOTE:

ON UNITS EQUIPPED FOR 6 SPACES PER INCH, THIS TENSION SHOULD BE

MIN. 8 OZS. --- MAX. 10 OZS.

TO PULL SPRINGS TO INSTALLED LENGTH.
4.08 Function Mechanism

NOTE: 1. THIS ADJUSTMENT APPLIES ONLY TO UNITS WITH NON-ADJUSTABLE GUIDE PLATES
2. FOR UNITS WITH ADJUSTABLE GUIDE PLATES SEE PAR. 2.32.

GUIDE PLATE EXTENSION

GUIDE PLATE

MOUNTING NUTS

LETTERS FUNCTION SLIDE

SHIFT FORK

SHIFT CODE BAR

FIGURES FUNCTION SLIDE

FUNCTION LEVER

FUNCTION PAWL

FUNCTION BAR

REQUIREMENT: (FOR TWO STOP FUNCTION CLUTCH)
DISENGAGE FUNCTION CLUTCH AT POSITION GIVING LEAST CLEARANCE. ROTATE TYPE BOX CLUTCH
1/2 REVOLUTION. HOLD FIGURES FUNCTION LEVER IN REARWARD POSITION WITH TENSION OF 32
OZS. CLEARANCE BETWEEN THE FUNCTION PAWL SHOULDER AND FACE OF FUNCTION BAR
MIN. 0.002 INCH
MAX. 0.015 INCH
WHEN PLAY IN PAWL IS TAKEN FOR MAXIMUM CLEARANCE.
DISENGAGE FIGURES FUNCTION PAWL. CHECK LETTERS FUNCTION PAWL IN SAME MANNER.

TO ADJUST
POSITION SHIFT ASSEMBLY WITH CLAMP SCREWS LOOSENED. TAKE UP PLAY IN
MOUNTING HOLES TO REAR.

CAUTION: MANUALLY OPERATE LETTERS AND FIGURES FUNCTION LEVER ALTERNATELY
LEVERS SHOULD BE FREE OF BINDS.
4.09  Function Mechanism (Cont.)

NOTE:  1.  THIS ADJUSTMENT APPLIES ONLY TO UNITS WITH A TWO STOP FUNCTION CLUTCH.
       2.  FOR UNITS WITH A ONE STOP FUNCTION CLUTCH SEE PAR. 2.33.

FUNCTION RESET BAIL BLADE
(1) REQUIREMENT

FUNCTION CLUTCH DISENGAGED AT STOP POSITION GIVING LEAST CLEARANCE. TYPE BOX CLUTCH DISENGAGED. ALL FUNCTION PAWS UNLATCHED FROM THEIR FUNCTION BARS. FUNCTION BAR HELD IN MAXIMUM REARWARD POSITION. CLEARANCE BETWEEN FUNCTION BAR AND RESET BAIL BLADE

MIN. 0.018 INCH---MAX. 0.035 INCH

TO CHECK

MEASURE CLEARANCE AT BARS LOCATED IN STUNT BOX SLOTS, 1, 4, 11, 18, 23, 33, 38, AND 41. IF THERE IS NO BAR IN A DESIGNATED SLOT, USE NEAREST BAR. IF THERE IS A BAR ON EACH SIDE OF A DESIGNATED VACANT SLOT, USE BAR IN HIGHEST NUMBERED SLOT. (NOTE: FACING REAR OF UNIT, SLOTS ARE NUMBERED FROM LEFT TO RIGHT)

TO ADJUST

POSITION BLADE ON RESET BAIL WITH BLADE MOUNTING SCREWS FRICITION TIGHT.

(2) REQUIREMENT

TYPE BOX CLUTCH ROTATED 1/2 REVOLUTION, FUNCTION LEVER HELD IN REARMOST POSITION WITH 2 LBS. MAXIMUM TENSION. LATCH ASSOCIATED PAWL ONLY ONE AT A TIME. WITH 32 OZS. TENSION APPLIED TO FUNCTION PAWL, IT SHOULD OVERTRAVEL ITS BAR

MIN. 0.002 INCH

TO ADJUST

REFINE REQUIREMENT (1).
4.10 Positioning Mechanism

NOTE: THESE ADJUSTMENTS APPLY ONLY TO HORIZONTAL POSITIONING DRIVE MECHANISMS EQUIPPED WITH TENSION SPRINGS.

NOTE: THE LOOPS OF THIS SPRING ARE OFF-SET FROM CENTER IN THE SAME DIRECTION. THE SPRING MUST BE HOOKED ON ITS ANCHORS SO THAT THE SIDE OF THE SPRING ON WHICH THE LOOPS ARE LOCATED, IS TOWARD THE REAR OF THE MACHINE. WHEN REMOVING EITHER SPRING EXERCISE CARE TO AVOID KINKS IN LOOPS.

HORIZONTAL POSITIONING DRIVE LINKAGE SPRING REQUIREMENT

SPRING UNHOOKED FROM ITS POST.
LINKAGE IN ITS UNBUCKLED POSITION.
MIN. 14 OZS. --- MAX. 18 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

HORIZONTAL POSITIONING DRIVE LINKAGE - VERTICAL LINK

REVERSING SLIDE

BEARING STUD

DRIVE LINKAGE HUB

HORIZONTAL STOP SLIDES

DECELERATING SLIDE

CONNECTING STRIP

CONNECTING STRIP MOUNTING SCREWS

BEARING STUD MOUNTING SCREWS

HORIZONTAL POSITIONING DRIVE LINKAGE REQUIREMENT

TYPE BOX CLUTCH DISENGAGED, CODE BARS 4 AND 5 TO SPACING (RIGHT).
CLEARANCE BETWEEN EACH SIDE OF CENTER HORIZONTAL STOP SLIDE AND DECELERATING SLIDES ON SIDE WHERE KNEE LINK IS STRAIGHT, SHOULD BE EQUAL (WITHIN 0.005 INCH)
MIN. 0.020 INCH --- MAX. 0.040 INCH

TO ADJUST

LOosen BEARING STUD MOUNTING SCREWS AND CONNECTING STRIP MOUNTING SCREWS
FRICtion TIGHT. POSITION ONE OR BOTH BEARING STUDS ON THE CONNECTING STRIP TO PROVIDe 0.025 INCH TO 0.035 INCH BETWEEN THE CENTER HORIZONTAL SLIDE AND THE DECELERATING SLIDE ON THE SIDE WHERE THE LINKAGE IS NOT BUCKLED. TIGHTEN THE TWO INNER MOUNTING SCREWS. CHANGE POSITION OF REVERSING SLIDE AND CHECK OPPOSITE CLEARANCE. EQUALIZE BY SHIFTING BOTH STUDS AND CONNECTING STRIP AS A UNIT. HOLD THE DRIVE LINKAGE HUB AGAINST THE LOWER VERTICAL LINK OF THE DRIVE LINKAGE. TIGHTEN THE TWO OUTER BEARING STUD MOUNTING SCREWS. CHECK THE LINKAGE FOR FREEmNESS THROUGHOUT A COMPLETE CYCLE. THE TYPE BOX CLUTCH DISK SHOULD HAVE SOME MOVEMENT IN THE NORMAL DIRECTION OF ROTATION IN THE STOP POSITION.
NOTE: THESE ADJUSTMENTS APPLY ONLY TO HORIZONTAL POSITIONING DRIVE MECHANISMS EQUIPPED WITH TORSION SPRINGS.

HORIZONTAL POSITIONING DRIVE LINKAGE REQUIREMENT

- TYPE BOX CLUTCH DISENGAGED.
- CODE BARRS 4 AND 5 TO SPACING (RIGHT).
- CLEARANCE BETWEEN EACH SIDE OF CENTER HORIZONTAL STOP SLIDE AND DECELERATING SLIDES, ON SIDE WHERE KNEE LINK IS STRAIGHT SHOULD BE EQUAL (WITHIN 0.008 INCH)
  - MIN. 0.015 INCH
  - MAX. 0.040 INCH

TO ADJUST

LOOSEN BEARING STUD MOUNTING SCREWS AND CONNECTING STRIP MOUNTING SCREWS FRICITION TIGHT. POSITION ONE OR BOTH BEARING STUDS ON THE CONNECTING STRIP TO PROVIDE 0.025 INCH TO 0.035 INCH BETWEEN THE CENTER HORIZONTAL SLIDE AND THE DECELERATING SLIDE ON THE SIDE WHERE THE LINKAGE IS NOT BUCKLED. TIGHTEN THE TWO INNER MOUNTING SCREWS. CHANGE POSITION OF REVERSING SLIDE AND CHECK OPPOSITE CLEARANCE. EQUALIZE BY SHIFTING BOTH STUDS AND CONNECTING STRIP AS A UNIT. HOLD THE DRIVE LINKAGE HUB AGAINST THE LOWER VERTICAL LINK OF THE DRIVE LINKAGE. TIGHTEN THE TWO OUTER BEARING STUD MOUNTING SCREWS. CHECK THE LINKAGE FOR FREENESS THROUGHOUT A COMPLETE CYCLE. THE TYPE BOX CLUTCH DISK SHOULD HAVE SOME MOVEMENT IN THE NORMAL DIRECTION OF ROTATION IN THE STOP POSITION.
4.12 Spacing Mechanism (Cont.)

NOTE: CHECK RELATED ADJUSTMENTS, PARS. 4.07, 4.13 AND 2.47 IF THE FOLLOWING ADJUSTMENTS ARE REMADE.

(A) PRINTING CARRIAGE POSITION
(USE STANDARD ADJUSTMENT PAR. 2.47)

(B) LEFT MARGIN
(FOR SPROCKET FEED UNITS SEE PAR. 2.71)

TYPE BOX CLUTCH DISSENGAGED. SPACING DRUM IN RETURNED POSITION. TYPE BOX SHIFTED TO THE LETTERS POSITION. CENTER OF THE LETTERS PRINT INDICATOR ON THE TYPE BOX SHOULD BE MIN. 15/16 INCH---MAX. 1-1/16 INCH FROM THE LEFT EDGE OF THE PLATEN.

(C) AUTOMATIC CR-LF BELL CRANK SPRING
REQUIREMENT
FUNCTION CLUTCH DISSENGAGED.
MIN. 6-1/2 OZS. --- MAX. 11 OZS.
TO MOVE THE BELL CRANK.

NOTE:
FOR OTHER LENGTHS OF LINE, RANGING FROM 65 TO 85 CHARACTERS THE MARGIN CAN BE VARIED AS REQUIRED.

NOTE
THIS VIEW SHOWS THE SPACING DRUM FULLY RETURNED.
4.13 Spacing Mechanism (Cont.)

NOTE: CHECK RELATED ADJUSTMENTS, PARS. 4.07, 2.38 AND 2.47, IF THE FOLLOWING ADJUSTMENT ARE REMADE.

- **SPACING CUTOUT LEVER**
- **SPACING CUTOUT TRANSFER BAIL SPRING**
  - REQUIREMENT: MIN. 1 OZ. --- MAX. 3-1/2 OZS. TO START BAIL MOVING.
- **SPACING DRUM**
- **CLAMP SCREW**
- **RIGHT MARGIN REQUIREMENT (OPERATING ON BASE)**
  - TYPE BOX CARRIAGE IN POSITION TO PRINT CHARACTER ON WHICH SPACING CUTOUT IS DESIRED.
  - FRONT SPACING PAWL FARTHEST ADVANCED. CLEARANCE BETWEEN UPPER EDGE OF SPACING CUTOUT LEVER AND CUTOUT TRANSFER BAIL WHEN SPACING CUTOUT TRANSFER BAIL IS HELD IN ITS EXTREME UPPER POSITION
  - MIN. 0.006 INCH --- MAX. 0.025 INCH
  - TO ADJUST POSITION THE CUTOUT LEVER WITH ITS CLAMP SCREW LOOSENED.
- **DECELERATING SLIDE BELL CRANK**
  - (PART OF DECELERATING SLIDE)
  - **DECELERATING SLIDE BELL CRANK SPRING**
  - REQUIREMENT: MIN. 3/4 OZ. --- MAX. 1-3/4 OZS. TO START BELL CRANK MOVING.
  - CHECK RIGHT AND LEFT SPRINGS.
4.14 Printing Mechanism

**Type Box Carriage Roller Requirement**

Minimum vertical play without bind in Type Box Carriage to check.

Move carriage to right end of track. Place in upper position. Remove drive link. Check throughout entire travel of carriage.

To adjust position lower roller arm with clamp screw loosened.

---

4.15 Positioning Mechanism (Cont.)

*Note: For shift mechanisms with torsion springs*

Oscillator rail

Clamp screws

Left shift linkage

Shift linkage spring

Right shift linkage

Shift linkage spring requirement:

Link in straight position.

Min. 7 ozs.

Max. 16 ozs.

To start each link moving.
SECTION 573-115-700

4.16 Printing Mechanism (Cont.)

(A) PRINTING HAMMER STOP BRACKET

(FOR THICK TYPE BOX WITH DUMMY PALLETS)

REQUIREMENT

TYPE BOX IN BLANK, OR CR POSITION (WHICHEVER DOES NOT PRINT) AND NEAR CENTER OF PLATEN. PRINTING TRACK IN ITS DOWNWARD POSITION, PRINTING HAMMER HELD AGAINST ITS STOP WITH 8 OZS. OF PRESSURE, CLEARANCE BETWEEN PRINTING HAMMER AND DUMMY TYPE PALLETS.

FRICITION FEED
MIN. 0.008 INCH
MAX. 0.020 INCH

TO ADJUST
POSITION THE STOP BRACKET WITH ITS MOUNTING SCREW AND THE PRINTING HAMMER BAIL PIVOT STUD LOOSENED.

(FOR SPROCKET FEED UNITS, SEE PAR. 2.71)

(C)

TYPE PALLET SPRING

REQUIREMENT

TYPE BOX REMOVED FROM THE UNIT, 8 OZ. SCALE APPLIED VERTICALLY TO THE END OF THE PALLET SHANK.

MIN. 1/4 OZ.
MAX. 3/4 OZ.
TO START PALLET MOVING

(B) PRINTING ARM

(1) REQUIREMENT

PRINTING TRACK IN MAXIMUM DOWNWARD POSITION. PRINTING HAMMER OPERATING BAIL AGAINST ITS STOP. SOME CLEARANCE BETWEEN SECONDARY PRINTING ARM AND FORWARD EXTENSION OF HAMMER OPERATING BAIL.

MAX. 0.015 INCH

WHEN PRINTING ARM SLIDE IS HELD DOWNWARD OVER EACH PRINTING TRACK MOUNTING SCREW FOR MAXIMUM CLEARANCE.

(2) REQUIREMENT

PRINTING TRACK IN UPPERMOST POSITION. LATCHING EXTENSION OF PRINTING HAMMER OPERATING BAIL SHOULD OVER-TRAVEL LATCHING SURFACE OF OPERATING BAIL LATCH BY MIN. 0.006 INCH

CHECK RIGHT AND LEFT POSITION TO ADJUST POSITION SECONDARY PRINTING ARM WITH CLAMP SCREWS LOOSENED.

NOTE

THE PRINTING ARM ADJUSTMENT SHOULD ALWAYS BE MADE WITH THE PRINTING HAMMER OPERATING BAIL SPRING BRACKET (PAR. 2.38) IN THE NO. 1 POSITION. POSITIONS NO. 2 AND NO. 3 ARE TO BE USED ONLY FOR MAKING MULTIPLE COPIES.
4.17 Printing Mechanism (Cont.)

RIBBON REVERSING LEVER - RIGHT

RIBBON REVERSING LEVER - LEFT

(A) RIBBON REVERSE SPUR GEAR
REQUIREMENT

WHEN RIGHT REVERSING LEVER IS IN
MAXIMUM DOWNWARD POSITION, THE
LEFT REVERSING LEVER SHOULD BE
IN ITS MAXIMUM UPWARD POSITION.
TO ADJUST

LOOSEN THE SET SCREWS IN THE
DETENT CAM. LOOSEN THE LEFT SPUR
GEAR NUT. SECURELY TIGHTEN THE
RIGHT SPUR GEAR NUT. MOVE THE RIGHT
REVERSING LEVER TO ITS MAXIMUM
DOWNWARD POSITION AND HOLD
LEFT REVERSING LEVER IN ITS
MAXIMUM UPWARD POSITION. THEN
TIGHTEN THE LEFT SPUR GEAR NUT.

(RIGHT SIDE FRAME
DETENT CAM

LEFT END
SET SCREW
DETENT LEVER
RIBBON REVERSE SPUR GEAR
SPUR GEAR NUT

(C) RIBBON REVERSE DETENT LEVER SPRING
REQUIREMENT

DETENT SEATED IN NOTCH OF CAM.
RIGHT RIBBON REVERSING LEVER
HELD DOWNWARD.
MIN. 6-1/2 OZS. -- MAX. 9 OZS.
TO START THE DETENT LEVER MOVING.

(B) RIBBON REVERSE DETENT
REQUIREMENT

DETENT SEATED APPROXIMATELY EQUAL
IN UPPER AND LOWER POSITIONS OF
DETENT CAM
TO ADJUST

POSITION CAM ON SHAFT WITH SET
SCREWS LOOSENED. LET LEFT END
OF DETENT STUD BE APPROXIMATELY
FLUSH WITH LEFT FACE OF CAM (PLAY
IN DETENT TAKEN TO RIGHT OF PRINTER)
4.18 Function Mechanism (Cont.)

FUNCTION PAWL

FUNCTION BAR

STRIPPER BLADE

FUNCTION STRIPPER BLADE ARMS

REQUIREMENT

TYPE BOX CLUTCH AND FUNCTION CLUTCH DISENGAGED. LEFT LINE FEED FUNCTION PAWL HELD IN ITS REAR POSITION AND RESTING ON THE UPPER EDGE OF THE STRIPPER BLADE. CLEARANCE BETWEEN UPPER EDGE OF FUNCTION BAR AND LOWER SURFACE OF NOTCHED SECTION OF FUNCTION PAWL.

MIN. 0.055 INCH
MAX. 0.065 INCH

THE LETTERS FUNCTION PAWL NEAR THE OPPOSITE END OF THE STRIPPER BLADE SHOULD HAVE THE SAME CLEARANCE.

TO ADJUST

POSITION THE SHOULDER BUSHING AT THE LOWER END OF THE RIGHT AND LEFT STRIPPER BLADE ARM WITH THE LOCK NUT LOOSENED.

NOTE

WHEN CHECKING THIS ADJUSTMENT SINGLE-DOUBLE LINE FEED LEVER MUST BE IN DOUBLE LINE FEED POSITION.

4.19 Spacing Mechanism (Cont.)

AUTOMATIC CARRIAGE RETURN AND LINE FEED ARM

REQUIREMENT (OPERATING ON BASE)

CARRIAGE IN POSITION TO PRINT TWO SPACES BEFORE THE LAST DESIRED CHARACTERS, AND FRONT SPACING PAWL FARthest ADVANCED. CLEARANCE BETWEEN LEADING END OF AUTOMATIC CARRIAGE RETURN ARM AND BELL CRANK.

MIN. 0.040 INCH
MAX. 0.055 INCH

TO ADJUST

POSITION AUTOMATIC CARRIAGE RETURN ARM WITH MOUNTING SCREWS LOOSENED.

NOTE

RANGE OF ADJUSTMENT IS FROM 65TH TO 85TH CHARACTERS.

NOTE

FOR UNITS EQUIPPED WITH UNIVERSAL SPACING DRUM, SEE PAR. 2.62.
4.20 Line Feed Mechanism and Platen Mechanism

NOTE: THIS ADJUSTMENT APPLIES ONLY TO UNITS WITH A TWO-STOP FUNCTION CLUTCH

SINGLE-DOUBLE LINE FEED LEVER

REQUIREMENT

SINGLE-DOUBLE LINE FEED LEVER IN SINGLE LINE FEED POSITION. LINE FEED COMBINATION SET UP. MAIN SHAFT ROTATED UNTIL THE LINE FEED FUNCTION PAWL STRIPPER IS IN CONTACT WITH THE LINE FEED FUNCTION PAWL, THE PAWL SHOULD OVERLAP THE STRIPPER BY MIN. 1/2 THE PAWL THICKNESS WHEN THE PLAY IN THE PAWL IS TAKEN UP IN A DIRECTION TO MAKE THE OVERLAP MINIMUM.

TO ADJUST
POSITION THE LEVER ADJUSTING SCREW
4.21 Function Mechanism (Cont.)

**FUNCTION LEVER**

**LOWER ELECTRICAL CONTACT**

**FUNCTION LEVER**---;

**FUNCTION LEVER**------.....J

**FUNCTION LEVER**

**BELL OR MOTOR STOP FUNCTION CONTACT**

(1) REQUIREMENT
FUNCTION LEVER AS SHOWN
CONTACT GAP
MIN. 0.010 INCH
MAX. 0.020 INCH
TO ADJUST
BEND THE LOWER ELECTRICAL CONTACT.

(2) REQUIREMENT
FUNCTION LEVER AS SHOWN
MIN. 1-1/4 OZS.
MAX. 1-3/4 OZS.
TO ADJUST
BEND THE UPPER ELECTRICAL CONTACT.

(3) REQUIREMENT
RECHECK REQUIREMENT (1)
4.22 Function Mechanism (Cont.)

CONTACT ASSEMBLY

FUNCTION CONTACT SPRING REQUIREMENT
CONTACT CLOSED
MIN. 1 OZ.
MAX. 2 OZS.
TO OPEN SWITCH CONTACT

FUNCTION LEVER (UNOPERATED)

CAUTION: CARE SHOULD BE EXERCISED IN SOLDERING TO CONTACT SPRINGS SINCE EXCESSIVE HEAT WILL ANNEAL THE SPRINGS.

FUNCTION CONTACT SPRING REQUIREMENT
CONTACT CLOSED
MIN. 1 OZ.
MAX. 2 OZS.
TO OPEN SWITCH CONTACT

FUNCTION LEVER (OPERATED)
MARGIN INDICATOR LAMP

REQUIREMENT
OPERATING UNDER POWER, THE LAMP SHOULD LIGHT ON THE DESIRED CHARACTER.

TO ADJUST
SET THE TYPE BOX CARRIAGE TO PRINT THE DESIRED Character AND POSITION THE CAM DISK COUNTERCLOCKWISE ON THE SPRING DRUM WITH ITS THREE MOUNTING SCREWS LOOSENED SO THAT THE SWITCH JUST OPENS. IF A LINE SHORTER THAN 72 CHARACTERS IS REQUIRED, IT MAY BE NECESSARY TO REMOVE THE CAM DISK SCREWS AND INSERT THEM IN ADJACENT SLOTS OF THE DISK, IF THE RANGE OF ROTATION IN ONE SLOT IS NOT ENOUGH.
VARIABLE FEATURES

4.24 Horizontal Tabulator Mechanism

(A) OPERATING LEVER SLIDE ARM

NOTE
PRIOR TO THIS ADJUSTMENT CHECK FUNCTION
RESET BAIL BLADE ADJUSTMENT (PAR. 4.09)

REQUIREMENT
ON UNITS WITH TWO-STOP FUNCTION CLUTCHES.
FUNCTION CLUTCH DISENGAGED. TYPE BOX CLUTCH
ROTATED 1/2 REVOLUTION PAST STOP POSITION. ON UNITS
WITH ONE-STOP FUNCTION CLUTCH, ROTATE CLUTCH
UNTIL FUNCTION PAWL STRIPPER BLADE IS IN ITS
LOWER POSITION AND THE FUNCTION RESET BAIL ROLLER
IS ON THE HIGH PART OF CAM. HORIZONTAL TABULATOR
FUNCTION PAWL PULLED TO REAR AND LATCHED OVER
FUNCTION BAR. CLEARANCE
MIN. 0.020 INCH
MAX. 0.030 INCH

TO ADJUST
POSITION SLIDE ARM ON OPERATING LEVER WITH
MOUNTING STUD FRICTION TIGHT

(C) OPERATING LEVER EXTENSION
LINK SPRING

REQUIREMENT
TRIP ARM LATCH BAIL SPRING UNHOOKED. OPERATING LEVER
IN OPERATED POSITION.
SLIDE ARM AGAINST BLOCKING LINK.
MIN. 8-3/4 OZS.
MAX. 10-3/4 OZS.
TO START LINK MOVING.

(B) OPERATING LEVER ADJUSTING PLATE

REQUIREMENT
OPERATING LEVER IN UNOPERATED
POSITION. CLEARANCE
MIN. 0.070 INCH
MAX. 0.085 INCH

TO ADJUST
POSITION ADJUSTING PLATE ON
BRACKET WITH MOUNTING SCREWS LOOSE.

(D) TABULATOR SHAFT SPRING
(TORSION)

NOTE
FOR LOCATION OF SPRING
SEE PAR. 4.27

REQUIREMENT
OPERATING LEVER IN UNOPERATED POSITION.
(AS IN LOWER FIGURE)
MIN. 1-1/2 OZS.
MAX. 3-1/2 OZS.
TO START SLIDE ARM MOVING.
SECTION 573-115-700

4.25 Horizontal Tabulator Mechanism (Cont.)

TRIP ARM LATCH BAIL

OPERATING LEVER UNOPERATED.
SPACING TRIP ARM UP. CLEARANCE
MIN. 0.025 INCH
MAX. 0.035 INCH
TO ADJUST
POSITION LATCH BAIL ADJUSTING
SCREW. TIGHTEN LOCK NUT.

TRIP ARM LATCH BAIL ADJUSTING PLATE

SPACING CLUTCH AND TYPE BOX
CLUTCH DISENGAGED. OPERATING
LEVER SLIDE ARM TO REAR AND
LATCHED ON BLOCKING ARM. LATCH
BAIL IN FULLY LATCHED POSITION.
SPACING TRIP ARM DOWN AND
BEARING UP AGAINST LATCHING
SURFACE OF LATCH BAIL. CLEARANCE
MIN. SOME
MAX. 0.008 INCH
TO ADJUST
POSITION LATCH BAIL ADJUSTING
PLATE WITH MOUNTING SCREW
FRICITION TIGHT.
4.26  Horizontal Tabulator Mechanism (Cont.)

(C) HORIZONTAL TABULATOR SLIDE ARM SPRING
REQUIREMENT
OPERATING LEVER IN OPERATED POSITION, SLIDE ARM IN UNOPERATED POSITION.
MIN. 1 OZ.
MAX. 4 OZS.
TO START SLIDE ARM MOVING.

(D) OPERATING LEVER CAM PLATE SPRING
REQUIREMENT
OPERATING LEVER IN UNOPERATED POSITION, HORIZONTAL TABULATOR FUNCTION PAWL UNLATCHED,
MIN. 4 OZS.
MAX. 9 OZS.
TO START STRIPPER BAIL ARM MOVING.

(A) CAM PLATE STRIPPER BAIL
REQUIREMENT
OPERATING LEVER AND TABULATOR SLIDE ARM IN UNOPERATED POSITIONS. SPACING CLUTCH ROTATED UNTIL HIGH PART OF SPACING CAM IS OPPOSITE CAM ARM FOLLOWER BAIL. CLEARANCE
MIN. 0.010 INCH
MAX. 0.025 INCH
TO ADJUST POSITION STRIPPER BAIL ARM ON CAM ARM FOLLOWER BAIL WITH STRIPPER BAIL ARM SCREW FRICITION TIGHT.

(B) SPACING CUTOUT TRANSFER BAIL
SET COLLAR
REQUIREMENT
TRANSFER BAIL SHOULD HAVE SOME END PLAY.
MAX. 0.008 INCH.
TO ADJUST POSITION SET COLLAR WITH ADJUSTING SCREW LOOSENED.
SECTION 573-115-700

4.27 Horizontal Tabulator Mechanism (Cont.)

(A) RIGHT MARGIN

**REQUIREMENT**

CLEARANCE

MIN. 0.006 INCH—MAX. 0.025 INCH

**TO CHECK**

PLACE TYPE BOX IN POSITION TO PRINT CHARACTER ON WHICH SPACING CUTOUT IS DESIRED. PULL FORWARD ON PART OF TRANSFER BAIL EXTENDING BELOW MOUNTING SHAFT UNTIL BAIL IS IN FULLY OPERATED POSITION. GAUGE CLEARANCE.

**TO ADJUST**

POSITION CUTOUT LEVER WITH CLAMP SCREW LOOSENED. (FOR LOCATION OF CLAMP SCREW SEE PAR. 4.13)

**NOTE:** FOUR SCREWS MUST BE LOOSENED TO ADJUST CIRCULAR CUTOUT LEVERS.

(B) SPACE SUPPRESSION BY-PASS SPRING

**REQUIREMENT**

MIN. 20 OZS.
MAX. 26 OZS.
TO START ARM MOVING.

(C) TABULATOR SHAFT MOUNTING BRACKETS

**REQUIREMENT**

LEVER SLIDE ARM TO REAR SO THAT BLOCKING ARM AND TABULATOR STOP ARE IN EXTREME UPPER POSITION.
CLEARANCE
MIN. 0.050 INCH—MAX. 0.065 INCH CLEARANCE MEASURED NEAR LEFT AND RIGHT END OF SHAFT EQUAL WITHIN 0.007 INCH.

**TO ADJUST**

POSITION MOUNTING BRACKETS WITH MOUNTING SCREWS LOOSENED.
**NOTE:** MAKE SURE SHAFT IS FREE OF BINDS.

(D) TABULATOR PAWL SPRING

**REQUIREMENT**

MIN. 1-3/4 OZS.
MAX. 3 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
4.28 Horizontal Tabulator Mechanism (Cont.)

**ECCENTRIC**

**LOWER ROLLER MOUNTING SCREW**

**PAWL MOUNTING ARM**

**TABULATOR PAWL**

**FIXED TABULATOR STOP NEAR RIGHT END OF SHAFT**

**SPACING PAWL**

**RATCHET**

PAWL MOUNTING ARM OPERATING RANGE (PRELIMINARY)

NOTE --- PRIOR TO THIS ADJUSTMENT, CHECK THE FOLLOWING: OSCILLATING RAIL SLIDE (PAR. 2.30), PRINTING CARRIAGE POSITION (PAR. 2.47) AND PRINTING CARRIAGE LOWER ROLLER (PAR. 2.46).

REQUIREMENT (UNITS WITH FRICTION FEED PLATENS)

SPACING CLUTCH DISENGAGED. SPACING PAWL, WHICH IS FARthest ADVANCED, ENGAGING TOOTH IMMEDIATELY ABOVE CUTAWAY SECTION OF RATCHET. TABULATOR PAWL RIDING UP ON FIXED STOP. HIGH PART OF ECCENTRIC TOWARD FORK OF MOUNTING ARM. CLEARANCE MIN. 0.070 INCH MAX. 0.090 INCH

REQUIREMENT (UNITS WITH SPROCKET FEED PLATENS)

HIGH PART OF ECCENTRIC TOWARD LOWER ROLLER MOUNTING SCREW.

TO ADJUST

POSITION ECCENTRIC.
SECTION 573-115-700
4.29 Horizontal Tabulator Mechanism (Cont.)

**ECCENTRIC**

**PAWL MOUNTING ARM**

**TABULATOR SHAFT**

**TABULATOR STOP NO. 2**

**TABULATOR STOP NO. 3.**

**TABULATOR STOP NO. 1.**

**TABULATOR STOP NO. 5.**

**TABULATOR STOP NO. 4.**

**TABULATOR SHAFT**

**FOUR SLOTS APART**

**FOUR SLOTS APART**

**TABULATOR STOP SETTING (NOT ILLUSTRATED)**

- **RIGHT MARGIN TABULATOR STOP (WITH WIDE SHELF)**
  - **NOTE:** Prior to this adjustment, check the following: Right Margin (Par. 4.27) and Pawl Mounting Arm Operating Range (Par. 4.28 and 4.29).
  - Position printing carriage at right margin (spacing cutout operated). Insert stop with wide shelf in slot immediately to left of tabulator pawl.

- **COLUMNAR TABULATOR STOPS**
  - Place carriage in position to print first character in column. Insert stop in slot immediately to left of tabulator pawl. Store extra stops in slots beyond printing line at either end of shaft.
  - **NOTE:** When printing forms, check stop settings with relation to columns. Corresponding stops on all machines connected in a circuit must be the same number of spacing operations from left margin.

**CLEARANCE MIDWAY BETWEEN MINIMUM AND MAXIMUM LIMITS OF OPERATING RANGE.**

**TO CHECK**

To determine maximum limit... (A) Set five tabulator stops as shown in figure. (B) Position pawl immediately to right of stop no. 1. (C) Position eccentric to set clearance approximately 0.030 inch. (Note... measure all clearances at stop no. 1, with play taken up in carriage to reduce gap to minimum.) (D) Mark column location by printing a character on paper. (E) Position pawl immediately to right of stop no. 2, and mark column location as in step (D). (F) Repeat step (E) for other three stops. (G) Gradually increase clearance until carriage stops one space before any column while receiving figures G letters X from transmitter distributor. (Note... if unit is not equipped with XG control, put fill-in characters of letters or figures in tape to delay printing until carriage completes travel.) (H) Decrease clearance until ten lines of tabular operation can be made without error. (1) Gauge and record values of clearance. (2) Gage all clearances with front feed pawl farthest advanced.

To determine minimum limits... (A) Repeat steps (B) and (C) above. (B) Gradually decrease clearance until carriage stops one space after any column. (C) Increase clearance until ten lines of tabular operation can be made without error. (1) Gauge and record value of clearance.

**TO ADJUST**

If minimum limit is positive, add it to maximum limit and divide the sum by two. Set resultant amount as midpoint of range. If minimum limit is zero or less, divide maximum limit by two and set this amount as midpoint of range. The differences between limits normally is not less than 0.045 inch.

**TABULATOR STOP SETTING (NOT ILLUSTRATED)**

- **RIGHT MARGIN TABULATOR STOP (WITH WIDE SHELF)**
  - **NOTE:** Prior to this adjustment, check the following: Right Margin (Par. 4.27) and Pawl Mounting Arm Operating Range (Par. 4.28 and 4.29).
  - Position printing carriage at right margin (spacing cutout operated). Insert stop with wide shelf in slot immediately to left of tabulator pawl.

**COLUMNAR TABULATOR STOPS**

- Place carriage in position to print first character in column. Insert stop in slot immediately to left of tabulator pawl. Store extra stops in slots beyond printing line at either end of shaft.
  - **NOTE:** When printing forms, check stop settings with relation to columns. Corresponding stops on all machines connected in a circuit must be the same number of spacing operations from left margin.
4.30 Paper-Out Alarm Mechanism

**Bell Crank Follower Spring Requirement**

Spring scale applied to bell crank follower where it makes contact with paper roll.
- Min. 2 ozs.
- Max. 3 ozs.

To start bell crank moving.

**Bell Crank Follower Requirement**

The bell crank follower should be approximately 1/4 inch from a flat side of the paper spindle.

To adjust position the switch with its mounting screws loosened.
REPLACING PAGE ADDENDUM

Filing Instructions

1. Remove from the section the pages numbered the same as those attached to this sheet.

2. Insert the attached pages into the section in their place.

3. Place this sheet ahead of Page 1 of the section.

28 TYPING AND NONTYPING PERFORATORS

ADJUSTMENTS

1. GENERAL

1.001 This addendum supplements Section 573-139-700TC, Issue 1, and is issued to incorporate engineering changes to the backspace mechanism, and to change the requirement tolerance for the LATCH LEVER CLEARANCE adjustment of the punch mechanism. Arrows in the margins indicate changes.

1.002 Insert the attached pages in accordance with the filing instructions above.

Attached:
Page 1 dated May 1966, reissued; April 1968, reissued
Page 2 dated May 1966, revised; April 1968, reissued
Page 17 dated April 1968, revised
Page 18 dated April 1968, reissued
Page 57 dated May 1966, revised; April 1968, reissued
Page 58 dated May 1966, revised; April 1968, reissued
Page 61 dated May 1966, reissued; April 1968, reissued
Page 62 dated May 1966, revised; April 1968, reissued
# 28 Typing and Nontyping Perforators

## Adjustments

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1. GENERAL

1.01 This section has been revised to include
recent engineering changes and additions,
and to rearrange the text, so as to bring the sec-
tion generally up-to-date. Since this is an ex-
tensive revision, marginal arrows ordinarily
used to indicate changes have been omitted.

1.02 This section contains the specific re-
quirements and adjustments for the 28
typing and non-typing perforators.

1.03 Maintenance procedures which apply only
to mechanisms of a particular design, or
to certain models of 28 typing or non-typing per-
forators are so indicated in the titles of the para-
graphs which contain these particular adjust-
ment requirements.

1.04 The adjustments of each unit are ar-
ranged in a sequence that should be fol-
lowed if a complete readjustment of the unit
were undertaken. The tools and spring scales
required to perform these adjustments are lis-
ted in the applicable section. After an adjust-
ment is completed, be sure to tighten any nuts
or screws that are loosened. The adjusting il-
lustrations indicate tolerances, positions of
moving parts, spring tensions and the angles at
which scales should be applied when measuring
spring tensions. If a part mounted on shims is
removed, the number of shims used at each of
its mounting screws should be noted so that the
same number is replaced when the part is re-
mounted.

1.05 Reference made to left or right, up or
down, front or rear, etc apply to the
unit in its normal operating position as viewed
from the front.

1.06 When a requirement calls for a clutch to
be disengaged, the clutch shoe lever
must be fully latched between its trip lever and
latch lever so that the clutch shoes release their
tension on the clutch drum. When engaged, the
clutch shoe lever is unlatched and the clutch
shoes are wedged firmly against the clutch drum.

Note: When the signal generator shaft is ro-
tated by hand, the clutch does not fully disen-
gage upon reaching its stop position. In order
to relieve drag and permit the main shaft to
rotate freely, apply pressure on the lug of the
clutch disc with a screwdriver to cause it to
engage its latch lever and fully disengage the
clutch.

1.07 All electrical contact points should meet
squarely. Contacts with the same diam-
eter should not be out of alignment more than 25
per cent of the contact diameter. Check contacts
for pitting and corrosion and clean or burnish
them before making specified adjustments or
tolerance measurement. Avoid sharp kinks or
bends in the contact springs.

CAUTION: KEEP ALL, ELECTRICAL CON-
TACTS FREE OF OIL AND GREASE.
Figure 1 - 28 Non-Typing Perforator - Chadless Tape (With Code Reading Contacts, Timing Contacts and Backspace Mechanism)

Figure 2 - 28 Typing Perforator - Chadless Tape (With Backspace Mechanism)
2. BASIC UNIT

2.01 Function Mechanism

NOTE: UNLESS OTHERWISE SPECIFIED, THESE ADJUSTMENTS APPLY TO BOTH TYPING AND NON-TYPING PERFORATORS.

(A) FUNCTION CLUTCH SHOE LEVER TO CHECK

(1) DISENGAGE CLUTCH. MEASURE CLEARANCE.

(2) ALIGN HEAD OF CLUTCH DRUM MOUNTING SCREW WITH STOP LUG, ENGAGE CLUTCH. MANUALLY PRESS SHOE LEVER AND STOP LUG TOGETHER AND ALLOW TO SNAP APART. MEASURE CLEARANCE.

REQUIREMENT CLEARANCE BETWEEN SHOE LEVER AND STOP LUG.

MIN. 0.055 INCH --- MAX. 0.085 INCH

GREATER WHEN CLUTCH IS ENGAGED (2) THAN WHEN DISENGAGED (1).

TO ADJUST ENGAGE WRENCH OR SCREWDRIVER WITH LUG ON ADJUSTING DISK. ROTATE DISK WITH CLAMP SCREWS LOOSENED.

(B) FUNCTION CLUTCH DRUM END PLAY REQUIREMENT WITH FUNCTION CLUTCH DISENGAGED.

MIN. SOME --- MAX. 0.015 INCH

BETWEEN CAM SLEEVE AND COLLAR WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MAXIMUM.

TO ADJUST POSITION COLLAR WITH MOUNTING SCREW LOOSENED.
2.02 Function Mechanism continued

(A) CLUTCH SHOE LEVER SPRING
TO CHECK
ENGAGE CLUTCH. HOLD CAM
DISK TO PREVENT ITS TURNING.

REQUIREMENT
FOR TYPING PERFORATOR ONLY
MIN. 15 OZS ----- MAX. 20 OZS
FOR NON-TYPING PERFORATOR ONLY
MIN. 16 OZS ----- MAX. 22 OZS
CHECK BOTH SHOE LEVERS.

STOP LUG

(B) CLUTCH SHOE SPRING
NOTE:
IN ORDER TO CHECK THIS SPRING
TENSION, IT IS NECESSARY TO
REMOVE THE CLUTCH FROM THE
MAIN SHAFT. THEREFORE, IT SHOULD
NOT BE CHECKED UNLESS THERE IS
REASON TO BELIEVE IT WILL NOT
MEET ITS REQUIREMENT.

TO CHECK
REMOVE CLUTCH FROM DRUM.
REQUIREMENT
MIN. 3 OZS. ------ MAX. 5 OZS.
TO START PRIMARY SHOE MOVING.
2.03 Function Mechanism continued

WITH ROCKER BAIL POSITIONED TO ITS EXTREME LEFT AND UPPER ROLLER IN CONTACT WITH FUNCTION CAM:

MIN. SOME —— MAX. 0.004 INCH CLEARANCE BETWEEN CAM AND LOWER ROLLER AT POINT OF LEAST CLEARANCE.

TO ADJUST POSITION LOWER ROLLER MOUNTING SCREW IN ELONGATED SLOT WITH LOCK NUT LOOSENED. CHECK THROUGHOUT A COMPLETE REVOLUTION FOR BINDS.
 SECTION 573-139-700

2.04 Function Mechanism continued

ROCKER BAIL GUIDE BRACKET
(TYPING PERFORATOR ONLY)
REQUIREMENT
1. ROCK BAIL ROLLERS SHOULD ENGAGE FULL THICKNESS OF FUNCTION CAM.
2. LIFTER ROLLER IN FULL ENGAGEMENT WITH ROCK BAIL CAMMING SURFACE. SEE PARAGRAPH 2.36.

TO ADJUST POSITION ROCK BAIL AND GUIDE BRACKET WITH GUIDE BRACKET MOUNTING SCREWS LOOSENED.

ROCKER BAIL GUIDE BRACKET
(NON-TYPING PERFORATOR ONLY)
REQUIREMENT
CLEARANCE BETWEEN UPPER ROLLER AND RESET PINS; BETWEEN LOWER ROLLER SCREW HEAD AND FRONT CAM; BETWEEN ROCK BAIL AND REAR ROCKER CAM. MIN. 0.010 INCH

TO ADJUST POSITION ROCK BAIL WITH GUIDE MOUNTING SCREWS LOOSENED.
(A) FUNCTION CLUTCH TRIP LEVER

REQUIREMENT

1. WITH RELEASE RESTING ON MAIN TRIP LEVER (SEE BELOW), FUNCTION CLUTCH TRIP LEVER SHOULD ENGAGE FULL THICKNESS OF SHOE LEVER AT THE STOP WHERE BITE IS LEAST.

2. TRIP LEVER END PLAY:
   MIN. SOME — MAX. 0.010 INCH

TO ADJUST POSITION TRIP LEVER ON ITS SHAFT WITH CLAMP SCREW LOOSENED.

(RELEASE)

MAIN TRIP LEVER

RESET ARM CLAMP SCREW

RESET ARM

LATCH LEVER

MAIN SHAFT

CAM

FUNCTION CLUTCH TRIP LEVER

CLAMP SCREW

LATCH LEVER

SHOE LEVER

SHAFT

FUNCTION CLUTCH TRIP LEVER

(RIGHT SIDE VIEW)

REQUIREMENT

1. CLEARANCE BETWEEN RELEASE AND MAIN TRIP LEVER:
   NON-TYPING PERFORATOR
   MIN. 0.005 INCH 0.005 INCH
   MAX. 0.030 INCH 0.030 INCH

2. LATCH LEVER END PLAY:
   MIN. SOME
   MAX. 0.010 INCH

TO ADJUST POSITION RESET ARM ON ITS SHAFT WITH ITS CLAMP SCREW LOOSENED.
2.06 Function Mechanism continued

(A) **MAIN TRIP LEVER REQUIREMENT**
- Clutch latched, punch reset bail must be in its uppermost position when the trip lever is flush with the end of the release.
- To adjust position main trip lever with its clamp screw loosened.

(B) **FUNCTION CLUTCH RELEASE SPRING REQUIREMENT**
- Perforator clutch disengaged.
  - Min. 5 ozs.
  - Max. 8 ozs.
- To start release moving.

(C) **MAIN TRIP LEVER SPRING REQUIREMENT**
- With the reset bail trip lever extension tripped.
  - Min. 1 oz.
  - Max. 4 ozs.
- To start main trip lever moving.

*NOTE: On units equipped with ribbon feed it will be necessary to remove the ribbon feed mechanism.*
2.07 Punch Mechanism

PERFORATOR POSITION - PRELIMINARY - (FOR NON-TYPING PERFORATOR ONLY)

REQUIREMENT

THE PERFORATOR MECHANISM MOUNTING SCREW BENEATH PUNCH BLOCK AND MOUNTING SCREW AT LOWER EDGE OF PERFORATOR MECHANISM BACKPLATE SHALL BE LOCATED CENTRALLY WITHIN THEIR RESPECTIVE MOUNTING HOLES.

NOTE: THE MOUNTING HOLES ARE OVERSIZE TO FACILITATE USE OF PERFORATOR MECHANISM ON THE TYPING REPERRFORATOR.

TO ADJUST

REMOVE MOUNTING SCREW AT THE LOWER EDGE OF PERFORATOR MECHANISM BACKPLATE, WITH THE TWO REMAINING BACKPLATE MOUNTING SCREWS AND MOUNTING BRACKET SCREW FRICITION TIGHT, POSITION PERFORATOR MECHANISM SO THAT THE TAPPED HOLE OF THE FRAME IS CENTRALLY LOCATED (AS GAUGED BY EYE) WITHIN LARGE BODY HOLE OF PUNCH MECHANISM BACKPLATE. TIGHTEN THE TWO BACKPLATE MOUNTING SCREWS AND RECHECK TO SEE THAT REQUIREMENT IS MET. REPLACE AND TIGHTEN THE LOWER BACKPLATE MOUNTING SCREW. TIGHTEN THE BRACKET MOUNTING SCREW.

PERFORATOR POSITION - FINAL - (FOR NON-TYPING PERFORATOR ONLY)

REQUIREMENT

WITH LETTERS COMBINATION SELECTED AND FUNCTION CLUTCH JUST TRIpped.

MIN. 0.015 INCH --- MAX. 0.045 INCH

CLEARANCE BETWEEN THE CLOSEST LATCH LEVER AND ASSOCIATED PUNCH SLIDE.

TO ADJUST

LOosen (FRicTION TIGHT) REAR FRAME MOUNTING SCREws (AND PIVOT LOCATING PLATE CLAMP SCREW IF THE TYPING UNIT IS USED ON THE PUNCH), THE FRONT MOUNTING BRACKET SCREws, PLACE TIP OF SCREWDRIVER BETWEEN HEX HEAD SCREW AND ITS CLEARANCE HOLE RIM AND PRY UP OR DOWN. TIGHTEN SCREws. (IF THE TYPING UNIT IS BEING USED, TIGHTEN PIVOT LOCATING PLATE CLAMP SCREW ONLY, AS THE NEXT ADJUSTMENT WILL BE TO OBTAIN CLEARANCE BETWEEN TYPEWHEEL AND PUNCH.)
PERFORATOR POSITION (FOR TYPING PERFORATOR ONLY)

(1) REQUIREMENT - (FOR TYPING PERFORATOR WITH SPRING RETRACTED PUNCH UNIT)
WITH UNIT IN STOP POSITION AND TYPEWHEEL IN THE LETTERS FIELD. CLEARANCE BETWEEN
THE LETTER "Z" ON THE TYPEWHEEL AND THE TOP OF THE STRIPPER PLATFORM.
MIN. 0.090 INCH --- MAX. 0.110 INCH

(2) REQUIREMENT - (FOR TYPING PERFORATOR WITH POWER RETRACTED PUNCH UNIT)
WITH UNIT IN STOP POSITION AND TYPEWHEEL IN THE FIGURES FIELD. CLEARANCE BETWEEN
THE FIGURE "5" ON THE TYPEWHEEL AND THE TOP OF THE STRIPPER PLATFORM.
MIN. 0.075 INCH --- MAX. 0.095 INCH

TO ADJUST
REMOVE RIBBON FROM CARRIER. POSITION PERFORATOR WITH TWO MOUNTING SCREWS,
ADJUSTING CLAMP PIVOT SCREW AND ANCHOR BRACKET SCREW LOOSENED. CHECK RESET
BAIL TRIP LEVER REQUIREMENT FOR SOME CLEARANCE AND ADJUST IF NECESSARY.
NOTE: BEFORE PROCEEDING WITH THE PUNCH MECHANISM ADJUSTMENTS, CHECK THE ROCKER BAIL CAM FOLLOWER ROLLER ADJUSTMENT AND LOOSEN THE PUNCH SLIDE DOWNSTOP MOUNTING NUT AND GUIDE MOUNTING STUD.

(A) TOGGLE BAIL ECCENTRIC (PRELIMINARY) REQUIREMENT
THE INDENT (HIGH SIDE OF ECCENTRIC) SHALL BE IN ITS UPPERMOST POSITION.
TO ADJUST WITH THE TOGGLE ECCENTRIC SHAFT LOCK NUT FRICTION TIGHT POSITION ECCENTRIC.

(B) TOGGLE OPERATING ARM
* (1) REQUIREMENT
TRIP FUNCTION CLUTCH AND ROTATE MAIN SHAFT UNTIL THE UPPER ROCKER BAIL ROLLER IS ON HIGH PART OF ITS CAM.
MIN. SOME --- MAX. 0.009 INCH CLEARANCE BETWEEN FEED PAWL STUD AND THE TP 159926 GAUGE.
(2) CLEARANCE BETWEEN ARM AND OSCILLATING SHAFT BEARING HUB.
MIN. 0.002 INCH --- MAX. 0.015 INCH WITH PLAY TAKEN UP IN DIRECTION TO MAKE CLEARANCE MAXIMUM.
TO ADJUST WITH LOCKSCREW FRICTION TIGHT, POSITION TOGGLE BAIL AND OPERATING ARM.

*AFTER FEED PAWL ADJUSTMENT HAS BEEN MADE, IF PUNCH PIN PENETRATION AND FEED PAWL REQUIREMENTS ARE MET, THIS REQUIREMENT SHOULD BE CONSIDERED FULFILLED.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

**2.10 Punch Mechanism continued**

---

**Punch Slide Downstop Position**

**Requirement**

- Function Clutch Disengaged. Up and down play at left end of punch slides taken up toward top, clearance between front and rear punch slides and their downstop plate.

- Min. some --- max. 0.008 inch

- All other punches should have some clearance.

---

**To Adjust**

- Remove punch slide guide, loosen downstop plate mounting studs and position the downstop plate. Tighten studs and replace guide so that punch slides align with punch pins (as gauged by eye).

---

**NOTE:** To check for some clearance place unit in the stop position, trip function trip mechanism and latches, the punch slides shall move freely to their operated position.

---

**Punch Pin Penetration**

**Requirement**

- Letters manually selected, clutch engaged and rotated until punch pins have traveled maximum distance into the die plate, clearance between lower edge of punch retractor bail and upper side of guide plate (measured at left edge of punch pins where clearance is least). The code punches should punch a full lid with a minimum amount of tear. (Refine adjustment).

- Min. 0.060 inch --- max. 0.075 inch

---

**To Adjust**

- Rotate the toggle bail eccentric shaft with its lock nut loosened. Keep the indentation in the eccentric shaft to the left of a vertical center line through the shaft.

---

**Punch Slide Guide Position**

**Requirement**

- Letters selected, function clutch engaged and rotated until the punch slides just touch the punch pins. The punch slides should align centrally with their respective punch pins (gauged by eye).

---

**To Adjust**

- Position the punch slide guide with its mounting nuts loosened.
2.11 Punch Mechanism continued

(A) PUNCH PIN PENETRATION

REQUIREMENT

(1) WITH THE LETTERS COMBINATION SELECTED, FUNCTION CLUTCH ENGAGED, ROTATE MAIN SHAFT UNTIL ALL PUNCH PINS ARE INTO OR ABOVE THE TAPE APERTURE IN PUNCH BLOCK.

WITH THE TP159926 GAUGE IN POSITION

MIN. 0.050 INCH

CLEARANCE BETWEEN FEED PAWL STUD AND THE GAUGE.

(2) WITH LETTERS COMBINATION SELECTED, FUNCTION CLUTCH ENGAGED, ROTATE MAIN SHAFT UNTIL ALL PUNCH PINS HAVE CLEARED THE PUNCH BLOCK. WITH THE TP159926 GAUGE IN POSITION

MAX. 0.080 INCH

CLEARANCE BETWEEN FEED PAWL STUD AND GAUGE.

TO ADJUST REFINE THE TOGGLE BAIL ECCENTRIC ADJUSTMENT KEEPING THE INDENT TO THE RIGHT OF A VERTICAL CENTERLINE THROUGH THE SHAFT.

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO FULLY PERFORATED TAPE MECHANISM.

(B) PUNCH SLIDE GUIDE

REQUIREMENT

THE PUNCH SLIDES SHOULD ALIGN WITH THEIR CORRESPONDING PUNCH PINS AND BE FREE OF BINDS AFTER TIGHTENING THE GUIDE MOUNTING STUDS. EACH PUNCH SLIDE SHOULD RETURN FREELY AFTER BEING PUSHED IN NOT MORE THAN 1/16 INCH.

TO ADJUST POSITION THE GUIDE WITH ITS MOUNTING STUDS FRICTION TIGHT.

(C) PUNCH SLIDE DOWNSSTOP POSITION

REQUIREMENT

WITH FUNCTION CLUTCH DISENGAGED AND LATCHED, PLAY TAKEN UP TOWARD THE TOP CLEARANCE BETWEEN BOTH THE FRONT AND REAR PUNCH SLIDES AND THE DOWNSSTOP PLATE

MIN. SOME --- MAX. 0.008 INCH

ALL OTHER PUNCH SLIDES SHALL HAVE SOME CLEARANCE.

NOTE: TO CHECK FOR SOME CLEARANCE, PLACE UNIT IN STOP POSITION, TRIP FUNCTION TRIP MECHANISM AND LATCHES, THE PUNCH SLIDES SHALL MOVE FULLY TO THEIR OPERATED POSITION.

TO ADJUST WITH UNIT IN STOP POSITION, LOOSEN THE TWO DOWNSSTOP PLATE MOUNTING LOCK NUTS AND LOCATE THE DOWNSSTOP PLATE TO MEET THE REQUIREMENT.
2.12 Punch Mechanism continued

RESET BAIL TRIP LEVER

Requirement

(1) Manually select blank combination. Manually rotate reset bail trip lever. The punch slide reset bail shall trip before the function clutch is tripped.

(2) With function and selector clutches disengaged and latched, the punch slide reset bail shall fully engage the punch slide latching surface when play in parts is taken up in direction to make the engagement the least.

To Adjust

(1) With trip lever extension lock screw friction tight and letters' combination selected, position reset bail against punch slides. Take up play between reset bail and trip lever in a counter clockwise direction. Position trip lever by means of its pry point.

(2) Recheck requirement (1) above and refine adjustment if necessary.
2.13 Punch Mechanism continued

LATCH LEVER CLEARANCE REQUIREMENT (FOR BOTH TYPING AND NON-TYPING PERFORATORS)

WITH "BLANK" COMBINATION SELECTED, THE FUNCTION CLUTCH DISENGAGED AND LATCHED.
CLEARANCE BETWEEN THE PUNCH SLIDE AND ITS ASSOCIATED LATCH LEVER.

MIN. 0.008 INCH
MAX. 0.020 INCH

FOR THE SLIDE HAVING THE LEAST CLEARANCE.

TO ADJUST

LOOSEN THE LOCK NUT ON THE RESET BAIL ECCENTRIC SHAFT AND POSITION THE RESET BAIL BY
ROTATING THE ECCENTRIC SHAFT TO MEET THE REQUIREMENT: THE INDENT SHALL BE KEPT ABOVE
THE HORIZONTAL CENTER LINE OF THE ECCENTRIC.

NOTE: ON KEYBOARD PERFORATORS NOT HAVING A "BLANK" KEY, SUBSTITUTE USE OF THE "T" KEY
WHENEVER USE OF THE "BLANK" KEY IS REQUIRED.

NOTE: THIS ADJUSTMENT IS RELATED TO FEED HOLE SPACING AND THE TWO ADJUSTMENTS MUST BE
MADE AT THE SAME TIME.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

FEED HOLE SPACING (PRELIMINARY)

REQUIREMENT

THE INDENT OF DIE WHEEL ECCENTRIC STUD SHALL BE POINTING DOWNWARD.

TO ADJUST

POSITION DIE WHEEL ECCENTRIC STUD WITH LOCK NUT LOOSENED.

NOTE

BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENTS, CHECK BOTH TAPE GUIDE SPRING TENSIONS.

FEED HOLE SPACING (FINAL)

REQUIREMENT


(2) PERFORATE SIX SERIES OF (9) "BLANK" COMBINATIONS FOLLOWED BY (1) "LETTERS" COMBINATION. OPEN CHADS SO CODE HOLES ARE VISIBLE. PLACE TAPE OVER SMOOTH SIDE OF THE TP156011 TAPE GAUGE SO CIRCULAR PORTION OF THE FIRST NUMBER TWO CODE HOLE IN TAPE IS CONCENTRIC WITH THE FIRST (0.072) HOLE OF TAPE GAUGE, (SEE NOTE). THE NEXT FOUR 0.072 HOLES IN TAPE GAUGE SHALL BE VISIBLE THROUGH THE NUMBER TWO CODE HOLES IN TAPE AND CIRCULAR PORTION OF THE LAST (SIXTH) NUMBER TWO CODE HOLE IN TAPE SHALL BE ENTIRELY WITHIN THE 0.086 DIA. HOLE OF TAPE GAUGE.

NOTE: THE FIRST FIVE HOLES IN GAUGE ARE THE SAME SIZE AS CODE HOLES IN TAPE (0.072 INCH DIAMETER) BUT THE SIXTH HOLE IN GAUGE IS LARGER THAN THE FIRST FIVE (0.086 INCH DIAMETER). THIS ARRANGEMENT ALLOWS + 0.007 INCH VARIATION IN FIVE (5) INCHES.

TO ADJUST

(1) WITH TAPE REMOVED FROM PUNCH MECHANISM, LOOSEN DIE WHEEL ECCENTRIC STUD LOCK NUT AND ADJUST DIE WHEEL SO THAT IT JUST BINDS ON FEED WHEEL, BACK OFF ECCENTRIC SO DIE WHEEL IS JUST FREE (CHECK FREENESS THROUGH 3 OR 4 ROTATIONS). KEEP INDENT OF ECCENTRIC STUD BELOW THE HORIZONTAL CENTER LINE OF STUD.

(2) CHECK TEN CHARACTERS PER INCH REQUIREMENT AND REFINE FEED WHEEL DIE WHEEL CLEARANCE ADJUSTMENT TO MEET THE REQUIREMENT BY MOVING INDENT OF DIE WHEEL ECCENTRIC STUD TOWARD FEED WHEEL TO DECREASE CHARACTER SPACING AND AWAY FROM FEED WHEEL TO INCREASE THE CHARACTER SPACING.

CAUTION: WITH THE TAPE REMOVED FROM THE PUNCH MECHANISM, BE SURE THE DIE WHEEL DOES NOT BIND.

(3) WITH THE TAPE SHOE AWAY FROM THE FEED WHEEL, THE FEED PAWL AND DETENT DISENGAGED, AND THE TAPE REMOVED FROM THE PUNCH MECHANISM, THE FEED WHEEL SHALL ROTATE FREELY. FAILURE TO MEET THIS REQUIREMENT INDICATES THE DIE WHEEL ECCENTRIC HAS BEEN OVER-ADJUSTED. TO MEET THIS REQUIREMENT, REFINE THE ADJUSTMENT.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

**REQUIREMENT**

A PIECE OF TAPE CONTAINING NINE FEED HOLES FOLLOWED BY A LETTERS COMBINATION PERFORATED ON THE PERFORATOR MUST CONFORM TO THE TP156011 TAPE GAUGE. THE LATERAL CENTERLINE THROUGH THE CODE HOLES IN THE TAPE SHOULD COINCIDE WITH A LATERAL CENTERLINE THROUGH THE HOLES IN THE GAUGE.

**TO ADJUST**

ROTATE THE DETENT ECCENTRIC CLOCKWISE TO MOVE THE FEED HOLES TOWARD THE HINGED EDGE OF THE CODE HOLES AND COUNTERCLOCKWISE TO MOVE THE FEED HOLES TOWARD THE TRAILING EDGE OF THE CODE HOLES. TIGHTEN THE ECCENTRIC LOCK NUT AND REFINISH THE FEED PAWL ADJUSTMENT.

RECHECK FEED PAWL ADJUSTMENT.
2.16 Punch Mechanism continued

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

WITH MACHINE OPERATING UNDER POWER, OBTAIN A TAPE CONSISTING OF A SERIES OF NINE "BLANKS" FOLLOWED BY A "LETTERS" COMBINATION. OPEN CHADS SO CODE HOLES ARE VISIBLE AND PLACE TAPE OVER THE TP156011 TAPE GAUGE WITH "LETTERS" COMBINATION FEED HOLES ENGAGING FEED PINS. THE LARGE HOLES IN GAUGE ARE THE SAME DIAMETER AS THE CIRCULAR PORTION OF CODE HOLES IN TAPE. THE SMALL HOLES IN GAUGE SERVE AS A GUIDE FOR GAUGING. THE CIRCULAR PORTION OF CODE HOLES IN TAPE SHALL BE CONCENTRIC WITH HOLES IN TAPE GAUGE.

TO ADJUST

LOosen ADJUSTING SCREW LOCK NUT AND POSITION ADJUSTING SCREW. TO MOVE HOLES OF GAUGE AWAY FROM REFERENCE EDGE OF TAPE, MOVE FEED WHEEL TOWARDS FRONT PLATE OF PUNCH MECHANISM BY ROTATING ADJUSTING SCREW COUNTER CLOCKWISE. TO MOVE HOLES OF GAUGE TOWARDS THE REFERENCE EDGE OF TAPE, MOVE FEED WHEEL TOWARD BACKPLATE OF PUNCH MECHANISM BY ROTATING ADJUSTING SCREW CLOCKWISE. TIGHTEN THE LOCK NUT.

REFINE DETENT ADJUSTMENT TO ALIGN LATERAL CENTER LINES OF CODE HOLES AND FEED HOLE IF REQUIRED.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO PERFORATOR MECHANISM FOR FULLY PERFORATED TAPE WITH INDENTATIONS OF THE FEED WHEEL FULLY PUNCHED OUT.

NOTE: BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENT CHECK BOTH TAPE GUIDE SPRING TENSIONS

FEED HOLE SPACING

(1) REQUIREMENT


(2) REQUIREMENT

WITH TAPE SHOE HELD AWAY FROM FEED WHEEL, FEED PAWL AND DETENT DIS-ENGAGED AND TAPE REMOVED, FEED WHEEL SHOULD ROTATE FREELY.

TO ADJUST

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2. 18 Punch Mechanism continued

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO PERFORATOR MECHANISM FOR FULLY PERFORATED TAPE WITH INDENTATIONS OF THE FEED WHEEL FULLY Punched OUT.

FEED WHEEL INDENTATION ALIGNMENT

(1) REQUIREMENT

WHEN A PIECE OF TAPE IS PERFORATED WITH A SERIES OF BLANK CODE COMBINATIONS THE INDENTATIONS OF THE FEED WHEEL SHALL BE FULLY PUNCHED OUT.

TO ADJUST

RIGHT OR LEFT, ROTATE THE DETENT LEVER ECCENTRIC STUD CLOCKWISE TO MOVE THE FEED PERFORATION TOWARD THE LEADING EDGE OF THE CODE HOLES, AND COUNTER CLOCKWISE TO MOVE THE FEED WHEEL PERFORATIONS TOWARD THE TRAILING EDGE OF THE CODE HOLES. REFINED THE FEED PAWL ADJUSTMENT.

FRONT TO REAR, LOOSEN THE LOCK NUT ON THE ADJUSTING SCREW AND TURN THE SCREW CLOCKWISE TO MOVE TAPE TOWARD REFERENCE EDGE (REAR), AND COUNTER CLOCKWISE TO MOVE THE TAPE AWAY FROM REFERENCE EDGE (FRONT).

References: TAPE GAUGE, REFERENCE EDGE, ADJUSTING SCREW, LOCK NUT, ECCENTRIC STUD, DETENT LEVER, RATCHET WHEEL, FEED PAWL.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO PERFORATOR MECHANISM FOR FULLY PERFORATED TAPE WITH INDENTATIONS OF THE FEED WHEEL BETWEEN THE FEED HOLES.

NOTE: BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENTS, CHECK BOTH TAPE GUIDE SPRING TENSIONS.

FEED HOLE SPACING (FINAL) REQUIREMENT

(2) PERFORATE SIX SERIES OF "BLANK" COMBINATIONS FOLLOWED BY (1) "LETTERS" COMBINATION, PLACE TAPE OVER SMOOTH SIDE OF THE TP156011 TAPE GAUGE SO CIRCULAR PORTION OF THE FIRST NUMBER TWO CODE HOLE IN TAPE IS CONCENTRIC WITH THE FIRST (0.072) HOLE OF TAPE GAUGE. (SEE NOTE). THE NEXT FOUR 0.072 HOLES IN TAPE GAUGE SHALL BE VISIBLE THROUGH THE NUMBER TWO CODE HOLES IN TAPE AND CIRCULAR PORTION OF THE LAST (SIXTH) NUMBER TWO CODE HOLE IN TAPE SHALL BE ENTIRELY WITHIN THE 0.086 DIA. HOLE OF TAPE GAUGE.

NOTE: THE FIRST FIVE HOLES IN GAUGE ARE THE SAME SIZE AS CODE HOLES IN TAPE (0.072 INCH DIAMETER) BUT THE SIXTH HOLE IN GAUGE IS LARGER THAN THE FIRST FIVE (0.086 INCH DIAMETER). THIS ARRANGEMENT ALLOWS ± 0.007 INCH VARIATION IN FIVE (5) INCHES.

TO ADJUST
(1) WITH TAPE REMOVED FROM PUNCH MECHANISM, LOOSE DIE WHEEL ECCENTRIC STUD LOCK NUT AND ADJUST DIE WHEEL SO THAT IT JUST BINDS ON FEED WHEEL, BACK OFF ECCENTRIC SO DIE WHEEL IS JUST FREE (CHECK FREENESS THROUGH 3 OR 4 ROTATIONS). KEEP INDENT OFF ECCENTRIC STUD BELOW THE HORIZONTAL CENTER LINE OF STUD.

(2) CHECK TEN CHARACTERS PER INCH REQUIREMENT AND REFINE FEED WHEEL DIE WHEEL CLEARANCE ADJUSTMENT TO MEET THE REQUIREMENT BY MOVING INDENT OF DIE WHEEL ECCENTRIC STUD TOWARD FEED WHEEL TO DECREASE CHARACTER SPACING AND AWAY FROM FEED WHEEL TO INCREASE THE CHARACTER SPACING.

CAUTION: WITH THE TAPE REMOVED FROM THE PUNCH MECHANISM, BE SURE THE DIE WHEEL DOES NOT BIND.


FAILURE TO MEET THIS REQUIREMENT INDICATES THE DIE WHEEL ECCENTRIC HAS BEEN OVER-ADJUSTED. TO MEET THIS REQUIREMENT, REFINE THE ADJUSTMENT.
2.20 Punch Mechanism continued

DETENT (FOR FULLY PERFORATED TAPE WITH INDENTATION OF FEED WHEEL BETWEEN THE FEED HOLES)

WITH THE UNIT OPERATING UNDER POWER, THE INDENTATIONS OF THE FEED WHEEL SHALL BE CENTRALLY LOCATED BETWEEN TWO FULLY PERFORATED FEED HOLES, AS GAUGED BY EYE.

TO ADJUST

LOOSEN THE DETENT LEVER ECCENTRIC STUD LOCK NUT AND TURN THE ECCENTRIC STUD CLOCKWISE TO MOVE THE INDENTATION TOWARD THE LEADING EDGE OF THE FEED HOLE AND COUNTERCLOCKWISE TO MOVE THE INDENTATION TOWARD THE TRAILING EDGE. TIGHTEN THE LOCK NUT AND RE-CHECK THE FEED PAWL ADJUSTMENT.

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO PERFORATOR MECHANISM FOR FULLY PERFORATED TAPE WITH INDENTATIONS OF THE FEED WHEEL BETWEEN THE FEED HOLES.

FEED HOLE LATERAL ALIGNMENT

WITH THE UNIT OPERATING UNDER POWER, THE INDENTATIONS OF THE FEED WHEEL SHOULD BE ON A CENTERLINE BETWEEN THE FULLY PERFORATED FEED HOLES, AS GAUGED BY EYE.

TO ADJUST

WITH THE ADJUSTING SCREW LOCK NUT LOOSE TURN THE ADJUSTING SCREW CLOCKWISE TO MOVE THE INDENTATION TOWARD THE REAR AND COUNTERCLOCKWISE TO MOVE THE INDENTATIONS TOWARD THE FRONT.
2.21 Punch Mechanism continued

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

(A) PUNCH SLIDE SPRING

LETTERS COMBINATION SET UP, FUNCTION CLUTCH TRIPPED AND PUNCH SLIDES IN SELECTED POSITION UNDER THE PUNCH PINS.

MIN. 2-1/4 OZS.
MAX. 3-1/4 OZS.
TO START EACH SLIDE MOVING.

(B) RETRACTOR BAIL SPRINGS

(1) REQUIREMENT (COMPRESSION SPRINGS ONLY)
WITH FUNCTION CLUTCH DISENGAGED AND TENSION SPRINGS UNHOOKED:
MIN. 15 OZS.
MAX. 32 OZS.
TO LIFT RETRACTOR BAIL AWAY FROM LOWER GUIDE OF PUNCH BLOCK.

(2) REQUIREMENT (COMBINED COMPRESSION AND TENSION SPRINGS)
UNDER THE SAME CONDITIONS AS REQUIREMENT (1) ABOVE, EXCEPT WITH TENSION SPRINGS HOOKED*
MIN. 4 LBS.
MAX. 5 LBS.
TO LIFT THE RETRACTOR BAIL AWAY FROM THE LOWER GUIDE OF THE PUNCH BLOCK.

*TO FACILITATE REHOOKING TENSION SPRINGS, PLACE PUNCH PINS IN UPPERMOST POSITION.
2.22 Punch Mechanism continued

(B) TAPE GUIDE ASSEMBLY SPRING

Requirement
The tape guide assembly should be free to return to rest against the tape guide block after a min. 16 ozs. is used to pull the tape guide assembly away from the block.

To adjust
Replace spring if requirement is not met.
If the tape guide assembly is not free to return, reposition the tape guide assembly mounting post to free the tape guide assembly.

(C) TAPE GUIDE SPRING PUNCH BLOCK (FOR CHADLESS TAPE MECHANISM)

(1) Requirement
With the tape removed from the punch block the tape guide spring should rest against the clearance slot in the block in a symmetrical manner.

(2) Requirement
With tape in the punch block and the perforator operating under power, the spring should not distort the edge of the tape.

To adjust
Bend the spring and position it with its mounting screw loosened.

(A) TAPE GUIDE SPRING (TAPE CHUTE)

Requirement
Clutch disengaged and tape threaded through the punch assembly, it should require min. 1-1/4 ozs., max. 2-1/4 ozs.

To adjust
Move the spring away from the tape.

To adjust
Bend the spring.

Note: In order to check this spring tension on units equipped with backspace mechanism, it is necessary to remove several parts. It should not be checked unless there is reason to believe that requirements cannot be met.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO FULLY PERFORATED TAPE MECHANISM.

PUNCH SLIDE SPRING

LETTERS COMBINATION SET UP AND PUNCH SLIDES IN SELECTED POSITION.
MIN. 2-1/4 OZS.
MAX. 3-1/4 OZS.
TO START EACH SLIDE MOVING.

TAPE GUIDE SPRING (PUNCH BLOCK)
(1) REQUIREMENT
WITH TAPE REMOVED FROM THE PUNCH BLOCK THE TAPE GUIDE SPRING SHOULD REST AGAINST THE CLEARANCE SLOT IN THE BLOCK IN A SYMETRICAL MANNER.

(2) REQUIREMENT
WITH TAPE IN THE PUNCH BLOCK AND THE REPERFORATOR OPERATING UNDER POWER, THE SPRING SHOULD NOT DISTORT THE EDGE OF THE TAPE.
TO ADJUST
BEND THE SPRING AND POSITION IT WITH ITS MOUNTING SCREW LOOSENED.
2.24 Punch Mechanism continued

**Tape Shoe Torsion Spring**

**Requirement**
- Min. 13 ozs. ---- Max. 18 ozs.
- To move tape shoe from feed wheel

**Tape Guide**

To check:
- Rotate feed wheel until oil hole is upward.
- Center tape shoe and tape guide. Hold tape guide downward.

**Requirement**
- Clearance between adjusting plate and backstop post
  - Min. 0.002 inch
  - Max. 0.008 inch

To adjust:
- Position adjusting plate with its clamp screw loosened.

**Tape Depressor Slide Spring**

**Requirement**
- Rocker bail in its extreme left position
  - Min. 1 1/2 ozs. -- Max. 2 1/2 ozs.
  - To start depressor slide moving.
2.25 Punch Mechanism continued

**TAPE GUIDE (EARLY DESIGN)**

**Requirement**

With tape guide under and in contact with V-shaped projection of die plate*

- Min. 0.008 inch -- Max. 0.015 inch
- Clearance between guide and tape platform.

**TO ADJUST**

With mounting screw friction tight, place 0.010 inch flat gauge between guide and tape platform. Press guide down and to left. Tighten mounting screw while holding feed wheel adjusting screw stationary by means of an Allen wrench.

*Guide is considered "in contact" with projection when 0.0015 inch gauge cannot be inserted between them.

**TAPE GUIDE SPRING (ON UNITS NOT EQUIPPED WITH TAPE GUIDE ADJUSTING PLATE)**

**Requirement**

Min. 8 ozs. to start tape guide bail moving upward.

**TAPE GUIDE (LATEST DESIGN)**

**Requirement**

Clearance under the tape guide:

- Min. 0.008 inch
- Max. 0.015 inch

**TO ADJUST**

With mounting screw friction tight, position the tape guide. Keeping the guide against the front plate of the punch.
2.26 Punch Mechanism continued

(A) FEED PAWL SPRING

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. DETENT SPRING UNHOOKED FROM TOGGLE BAIL
MIN. 3 OZS.
MAX. 4-1/2 OZS.
TO START THE DETENT LEVER MOVING.

(B) DETENT LEVER SPRING

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. FEED PAWL SPRING UNHOOKED.
MIN. 7 OZS.
MAX. 10 OZS.
TO START THE DETENT LEVER MOVING.
### Function Mechanism continued

**Release Downstop Bracket Requirement**

With Function Clutch Tripped, rotate shaft until clearance between Function Clutch Disk Stop Lug and Clutch Stop Lever is at a minimum. Release resting against Downstop Bracket. Clearance between Function Clutch Disk Stop Lug and Stop Lever:

- **Min.** 0.002 inch
- **Max.** 0.045 inch

**To Adjust**

Remove tape guard. With Downstop Bracket mounting screws friction tight position bracket. Recheck for some clearance between Trip Lever Extension and left end of slot in release lever Downstop Bracket.

**Note:** On non-typing perforators with 2-stop Function Clutch, gauge at stop having least clearance.
SECTION 573-139-700

2.28 Typing Mechanism

**PUSH BAR OPERATING BLADE (PRELIMINARY)**

**TO CHECK**

Manually select letters code combination (12345). Rotate main shaft until function clutch trips. Hold No. 2 and 3 bell cranks against stop post.

**REQUIREMENT**

Operating blade parallel to (not necessarily flush) to top of No. 2 and 3 push bar latching surfaces.

**TO ADJUST**

With its mounting screws friction tight, pry transfer mounting bracket all the way to the right. Add or remove shims under the rear leg of the operating blade. Place extra shims on rear mounting screw between blade and flat washer.

**BELLS CRANK SPRING (S)**

To check

Select letters code combination (12345). Rotate main shaft until function clutch trips.

**REQUIREMENT**

Min. 1 oz. -- Max. 3 ozs.

To start push bar moving

**NOTE:**

Check all five springs.

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2.29 Typing Mechanism continued

PUSH BAR OPERATING BLADE (FINAL)

(1) TO CHECK
MANUALLY SELECT LETTERS CODE COMBINATION
(12345). ROTATE MAIN SHAFT UNTIL FUNCTION
CLUTCH TRIPS. MANUALLY SEAT PUSH BARS IN
DETENTED POSITION. IN BAR WHICH IS NEAREST
LEFT EDGE OF BLADE, TAKE UP PLAY TO LEFT
AND REAR, AND THEN RELEASE.

REQUIREMENT
CLEARANCE BETWEEN BAR AND LEFT EDGE OF
BLADE:
MIN. 0.015 INCH --- MAX. 0.030 INCH

(2) REQUIREMENT
SOME CLEARANCE BETWEEN RIGHT EDGE OF
BLADE AND PUSH BARS WHEN PLAY IN BARS
HAS BEEN TAKEN UP TO RIGHT AND RELEASED.

(3) REQUIREMENT
WITH UNIT IN STOP POSITION, SOME CLEAR-
ANCE BETWEEN RIGHT EDGE OF BLADE AND
BARS WHEN PLAY IN BARS HAS BEEN TAKEN
UP TO RIGHT AND RELEASED.

TO ADJUST
WITH MOUNTING SCREWS LOOSENED, POSITION
OPERATING BLADE IN ELONGATED HOLES.

NOTE:
IT MAY BE NECESSARY
TO REFINE THIS AD-
JUSTMENT AFTER ROCK-
ER BAIL PILOT STUD AD-
JUSTMENT.

NO. 2 PUSH BAR
NO. 1 PUSH BAR
NO. 4 PUSH BAR
NO. 5 PUSH BAR
LETTERS PUSH BAR
FIGURES PUSH BAR
NO. 3 PUSH BAR
PUSH BAR OPERATING BLADE

MOUNTING SCREWS

(TOP VIEW)
SECTION 573-139-700

2. 30  Typing Mechanism continued

(A)  ROCKE R BAIL PILOT STUD  
REQUIREMENT  
SELECT BLANK COMBINATION AND THE TRIP FUNCTION CLUTCH. POSITION ROCK E R BAIL  
THROUGH A COMPLETE CYCLE, TAKING UP PLAY BETWEEN ROCK E R BAIL AND FUNCTION BOX  
REAR PLATE FOR MINIMUM CLEARANCE.  
REQUIREMENT  
CLEARANCE BETWEEN FUNCTION BOX REAR PLATE AND REAR EDGE OF PUSH BAR OPERATING  
BLADE.  
MIN. 0.005 INCH  
MAX. 0.020 INCH  
AT POINT IN THE CYCLE WHERE CLEARANCE IS MINIMUM.  
TO ADJUST  
POSITION ROCK E R BAIL PILOT STUD  
IN ELONGATED HOLE WITH LOCK NUT LOOSE NED.

(B)  FUNCTION CLUTCH LATCH LEVER SPRING  
REQUIREMENT  
WITH FUNCTION CLUTCH TURNED TO STOP POSITION AND LATCH LEVER UNLATCHED:  
MIN. 12 OZS. --- MAX. 15 OZS.  
TO START LATCH LEVER MOVING.
2.32 Typing Mechanism continued

**FUNCTION BOX REQUIREMENT**

Manually select letters code combination (12345). Rotate main shaft until function clutch trips, and punch slides are disengaged from latches. The top of the operating blade shall be:

- FLUSH --- MAX. 0.020 INCH

Below the tops of the No. 2 and 3 push bars. Take up play in pushbars in a downward direction then release.

**NOTE:** When unit is mounted as part of the keyboard perforator transmitter, it may be necessary to refine the adjustment within its limits to increase operating margins of the unit.

To adjust with three mounting screws in rear plate and one mounting screw in front plate loosened, position function box by means of pry point. Check position of bell crank spring bracket.

**NOTE:** On units equipped with two-piece trip bracket, set above adjustment in center of its range and tighten screws. Loosen two screws which mount guide to bracket and position guide to meet above requirement.
2. 33 Typing Mechanism continued

TRANSFER MOUNTING BRACKET
TO CHECK
MANUALLY SELECT BLANK CODE COMBINATION. ROTATE MAIN SHAFT
UNTIL FUNCTION CLUTCH TRIPS.
REQUIREMENT
WITH PUNCH SLIDES LATCHED, CLEARANCE BETWEEN BELL CRANK AND STOP
POST:
MA. 0.018 INCH*
AT BELL CRANK WHERE CLEARANCE IS MAXIMUM, WHEN BELL CRANK WITH
MINIMUM CLEARANCE IS TOUCHING POST.
TO ADJUST
WITH MOUNTING SCREWS FRICITION TIGHT, PAY TRANSFER MOUNTING
BRACKET TO LEFT UNTIL CLOSEST BELL CRANK TOUCHES POST. TIGHTEN
MOUNTING SCREWS AND CHECK REQUIREMENT,
CAUTION: BELL CRANK THAT YIELDS MOST SHOULD NOT YIELD MORE
THAN 0.007 INCH MEASURED AT POST.

*NOTE: REMOVAL OF FUNCTION BLADES WILL FACILITATE MEASURING
CLEARANCE.
2.34 Typing Mechanism continued

(A) LETTERS AND FIGURES YIELD ARMS

(1) To check trip function clutch and rotate main shaft until rocker bail is to extreme left. Manually place arm assemblies in letters position. Hold letters—figures bell crank against left edge of stop post.

Requirement

Min. some—max. 0.006 inch clearance between bell crank and letters extension arm.

(Continued on following page)

(B) FIGURES ARM ASSEMBLY SPRING

Requirement with arm assemblies in letters position:

Min. 1-1/2 ozs.—max. 3-1/2 ozs. to pull spring to installed length.

(C) FIGURES EXTENSION ARM SPRING

Requirement with arm assemblies in letters position and letters extension arm manually held in position.

Min. 5 ozs.—max. 8 ozs. to pull spring to installed length.

*NOTE

Removal of function blades will facilitate measuring clearance.
2.35 Typing Mechanism continued

(B) LETTERS ARM ASSEMBLY SPRING

REQUIREMENT
WITH ARM ASSEMBLIES IN FIGURES POSITION:
MIN. 1-1/2 OZS. ---- MAX. 3-1/2 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(A) LETTERS AND FIGURES YIELD ARMS
(CONTINUED FROM PRECEDING PAGE)
(2) TO CHECK
MANUALLY PLACE ARM ASSEMBLIES IN
FIGURES POSITION.
REQUIREMENT
MIN. SOME ---- MAX. 0.006 INCH *
CLEARANCE BETWEEN BELL CRANK
AND FIGURES EXTENSION ARM.

*NOTE: REMOVAL OF FUNCTION
BLADES WILL FACILITATE
MEASURING CLEARANCE.

TO ADJUST
LOosen CLAMP SCREWS IN BOTH LETTERS AND FIGURES YIELD ARMS.
PLACE ARM ASSEMBLIES IN LETTERS POSITION HOLD LETTERS-FIGURES
BELL CRANK AGAINST LEFT SIDE OF STOP POST, AND BY MEANS OF
PRY POINT, POSITION LETTERS YIELD ARM TO MEET CLEARANCE RE-
QUIREMENT UNDER (A)(1) ON PREVIOUS PAGE. TIGHTEN LETTERS
YIELD ARM CLAMP SCREW. PLACE ARM ASSEMBLIES IN FIGURES
POSITION, HOLD LETTERS-FIGURES BELL CRANK AGAINST RIGHT
SIDE OF STOP POST, AND BY MEANS OF PRY POINT POSITION FIGURES
YIELD ARM TO MEET REQUIREMENT UNDER (2) ABOVE. TIGHTEN
FIGURES YIELD ARM CLAMP SCREW. CAUTION: ARM ASSEMBLIES MAY
CHANGE POSITION DURING ADJUSTMENT. AS TIGHTENING OF SCREWS
MAY AFFECT ADJUSTMENT, RECHECK REQUIREMENTS.
2.36 Typing Mechanism continued

**ECCENTRIC SCREW**  
(LOCK NUT ON OTHER END)

---

**LIFTER ARM**

---

**LIFTER ROLLER**

---

**LEFT DWELL SURFACE**

---

**RIGHT DWELL SURFACE**

---

**LOCK PLATE SCREW**

---

**ROCKER BAIL**

---

(A) **LIFTER ARM**

**TO CHECK**

TRIP FUNCTION CLUTCH, MOVE ROCKER BAIL TO EXTREME LEFT POSITION AND OBSERVE TRAVEL OF LIFTER ROLLER ON RIGHT DWELL SURFACE. MOVE ROCKER BAIL TO EXTREME RIGHT POSITION AND OBSERVE TRAVEL OF ROLLER ON LEFT DWELL SURFACE.

**REQUIREMENT**

APPROXIMATELY EQUAL TRAVEL ON EACH DWELL SURFACE.

**TO ADJUST**

LOosen LOCK PLATE SCREW UNTIL FRICtion TIGHT. WITH ECCENTRIC SCREW LOCK NUT FRICtion TIGHT, POSITION LIFTER ARM ON LIFTER. TIGHTEN LOCK PLATE SCREW. DO NOT TIGHTEN LOCK NUT.

*NOTE: REMOVE TIMING CONTACTS IF UNIT IS SO EQUIPPED.*

(B) **LIFTER ARM ECCENTRIC SCREW**

**REQUIREMENT**

WITH FUNCTION CLUTCH DISENGAGED:

1. CLEARANCE BETWEEN CLOSEST PROJECTION OF BELL CRANKS AND ASSOCIATED LETTERS OR FIGURES FUNCTION BLADE PROJECTION:
   
   - MIN. 0.008 INCH
   - MAX. 0.026 INCH

2. MIN. 0.005 INCH CLEARANCE
   FOR FUNCTION BLADES OTHER THAN LETTERS AND FIGURES IF UNIT IS SO EQUIPPED.

**TO ADJUST**

POSITION LIFTER ARM ECCENTRIC SCREW WITH LOCK NUT LOOSENED.
2.37 Typing Mechanism continued

(A) **LOCK LEVER**

**REQUIREMENT**

1. With letters code combination (12345) selected and rocker bail to extreme left, toggle linkage should move through point where toggle link and lock lever are in straight line without raising lifter.

2. With toggle link and lock lever in straight line, clearance between toggle link and lifter pin:
   - Min. some
   - Max. 0.015 inch

To adjust position lock lever on lock arm assembly with clamp screw friction tight.

**NOTE:**

To avoid interference with lock lever, it may be necessary to move high part of correcting drive link eccentric bushing above horizontal center line.

(B) **NO. 5 PULSE BEAM SPRING**

**REQUIREMENT**

- Min. 10 ozs.
- Max. 15 ozs.

To pull spring to length of 7/16 inch.
2.38 Typing Mechanism continued

LOCK LEVER TRIP POST
REQUIREMENT
AS ROCKER BAIL APPROACHES EXTREME RIGHT
POSITION, LOCK LEVER TOGGLE LINKAGE
SHOULD BREAK AND LIFTER ROLLER SHOULD
DROP ONTO RIGHT DWELL SURFACE.
TO ADJUST
BY MEANS OF PRY POINTS, POSITION LOCK
LEVER TRIP POST WITH CLAMP SCREW LOOSENED.

LIFTER ROLLER

RIGHT DWELL
SURFACE

ROCKER BAIL

LOCK LEVER TRIP POST

LOCK LEVER
TOGGLE LINKAGE

CLAMP SCREW

(REAR VIEW)

PRY POINTS
2.39 Typing Mechanism continued

(A) CORRECTOR DRIVE LINK SPRING (NON-YIELDING)
REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 3 OZS. --- MAX. 9 OZS.
TO START DRIVE LINK MOVING. (FOR CORRECTOR DRIVE LINK SPRING YIELDING SEE PARAGRAPH 2.44)

(B) FUNCTION BLADE SPRINGS (2 OR MORE)
REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 7 OZS. --- MAX. 10 OZS.
TO START FUNCTION BLADE MOVING.

(C) LIFTER SPRING
REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 7 OZS. --- MAX. 9 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(D) LIFTER TOGGLE LINK SPRING
REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 1 1/2 OZS. --- MAX. 2 1/4 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
2.40 Typing Mechanism continued

**OSCIllATING BAIL DRIVE LINK**
- To check position rocker bail to its extreme left.
- Requirement: sector mounting stud, toggle pivot screw and oscillating drive bail mounting screw should approximately line up.
- To adjust: position oscillating drive link by means of its eccentric bushing.

**AXIAL SECTOR**

**OSCILLATING DRIVE BAIL**

**OSCILLATING DRIVE BAIL MOUNTING SCREW**

**TOGGLE PIVOT SCREW**

**SECTOR MOUNTING STUD**

**ROCKER BAIL**

**AXIAL CORRECTING PLATE**

**ECCENTRIC BUSHING**

**CORRECTING DRIVE LINK**

**OSCILLATING BAIL PIVOT**

**Requirement:** With "BLANK" combination selected, rotate main shaft, taking up axial play in type wheel shaft toward front of unit, the axial corrector roller shall enter the first notch of the sector centrally.

**To adjust:** Loosen oscillating bail adjusting screw. Select "BLANK" combination. Position oscillating bail by means of its elongated mounting hole so corrector roller enters first notch of sector when rocker bail moves to its extreme left position. Hold corrector roller firmly in first notch and take up play in oscillating bail linkage by applying a force to oscillating bail toward rear of unit. Tighten the oscillating bail adjusting screw.
2.41 Typing Mechanism continued

(A) **AXIAL SECTOR ALIGNMENT**

**REQUIREMENT**

1. Teeth of axial sector and axial output rack should engage by their full thickness.
2. Guide roller free to rotate.

**TO ADJUST**

Loosen lock nut, disengage rack. Remove retaining ring and guide roller. Add or remove shims. Place extra shims on top of shim used to retain felt washer.

*NOTE:* On units with larger 0.594 inch diameter roller, no adjustment is necessary.

---

(B) **ECCENTRIC SHAFT**

**DETENT LEVER SPRINGS**

*MIN. 7 OZS. — MAX. 10 OZS.*

To start detent lever moving.

*NOTE:*

Check all six springs. There are two on the axial positioning mechanism and four on the rotary positioning mechanism.
2. 42 Typing Mechanism continued

(A) AXIAL OUTPUT RACK GUIDE ROLLER
TO CHECK
SELECT LINE FEED CODE COMBINATION
(\(-2---\)). ROTATE MAIN SHAFT UNTIL
ECCENTRIC HAS ROTATED 90 DEGREES.
TAKE UP PLAY TO MAKE CLEARANCE BE-
TWEEN OUTPUT RACK AND GUIDE ROLLER
MAXIMUM.
REQUIREMENT
MIN. SOME--------MAX. 0.008 INCH
TO ADJUST
POSITION GUIDE ROLLER MOUNTING
STUD IN ELONGATED HOLE WITH LOCK
NUT LOOSENED.

MOUNTING STUD
90°
(TOP VIEW)

(B) PUSH BAR GUIDE BRACKET
TO CHECK
MANUALLY SELECT CARRIAGE RETURN CODE COMBINATION
(---4---). ROTATE MAIN SHAFT SO THAT NO. 4 PUSH BAR
MOVES THROUGH COMPLETE RANGE OF TRAVEL.
REQUIREMENT
WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE
MAXIMUM:
MIN. SOME---MAX. 0.008 INCH
BETWEEN NO. 4 PUSH BAR AND GUIDE BRACKET
THROUGHOUT COMPLETE TRAVEL OF BAR.
TO ADJUST
POSITION GUIDE BRACKET WITH MOUNTING SCREWS
LOOSENED.
SECTION 573-139-700

2.43 Typing Mechanism continued

AXIAL CORRECTOR (NON-YIELDING)

(1) TO CHECK
SELECT BLANK CODE COMBINATION. TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.
REQUIREMENT
ROLLER ON AXIAL CORRECTING PLATE FIRMLY SEATED IN FIRST NOTCH OF AXIAL SECTOR.

(2) TO CHECK
SELECT LETTERS CODE COMBINATION (12345). TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.
REQUIREMENT
ROLLER ON AXIAL CORRECTING PLATE FIRMLY SEATED IN FOURTH NOTCH OF AXIAL SECTOR.

TO ADJUST
(1) LOOSEN THE TWO DRIVE LINK ADJUSTING SCREWS. FIRMLY SEAT THE AXIAL CORRECTOR ROLLER INTO THE FIRST NOTCH OF THE SECTOR BY MANUALLY APPLYING AND HOLDING THIS POSITION FOR THE NEXT PART OF THE ADJUSTMENT.
(2) APPLY A MANUAL PRESSURE ON THE DRIVE LINK SUCH THAT THE SLOT IN THE LINK WILL BOTTOM AGAINST THE BUSHING OF THE ROCKER BAIL.
(3) MAINTAINING PRESSURE AT THESE TWO PLACES. TIGHTEN ADJUSTING SCREWS.

IDLER GEAR ECCENTRIC SHAFT
REQUIREMENT
WITH UNIT IN LETTERS CONDITION AND FUNCTION CLUTCH disengaged;
MIN. SOME --- MAX. 0.015 INCH CLEARANCE BETWEEN TYPEWHEEL RACK TOOTH AND IDLER GEAR TOOTH.

TO ADJUST
WITH MOUNTING SCREW LOOSENED, POSITION IDLER GEAR ECCENTRIC SHAFT BY MEANS OF THREE ADJUSTING HOLES. CHECK RACK THROUGHOUT ITS TRAVEL FOR BINDS.

Page 46
CORRECTOR DRIVE LINK (YIELDING)
EXTENSION SPRING TENSION

REQUIREMENT
WITH ALL SPACING CODE COMBINATION
SELECTED, THE FUNCTION CLUTCH
TRIPPED, AND THE ROCKER BAIL IN ITS
EXTREME LEFT POSITION, PLACE A 32 OZS.
SPRING HOOK ON THE END OF THE COR-
RECTOR AXIAL PLATE. IT SHOULD TAKE
MIN. 16 OZS. ---MAX. 32 OZS.
TO MOVE THE ROLLER FROM THE NOTCH
IN THE SECTOR.

SECTOR

AXIAL CORRECTOR

AXIAL CORRECTOR (YIELDING)

REQUIREMENT
WITH ALL SPACING CODE COMBINATION SELECTED, FUNCTION
CLUTCH TRIPPED AND ROCKER BAIL IN ITS EXTREME LEFT POSITION,
THE AXIAL CORRECTOR ROLLER SHOULD SEAT IN THE FIRST SECTOR
NOTCH AND THERE SHOULD BE
MIN. 0.005 INCH
BETWEEN THE ENDS OF THE SLOT AND THE SPRING POST. CHECK
BOTH SIDES AND CHECK SEATING IN FOURTH NOTCH (LETTERS
SELECTION), TURN THE TRU ARC FASTENING THE DRIVE LINK
EXTENSION TO THE CORRECTOR PLATE TO CHECK THE MINIMUM
REQUIREMENT.

TO ADJUST
LOosen TWO DRIVE LINK ADJUSTING SCREWS, POSITION DRIVE LINK
TO MEET THE REQUIREMENT AND RETIGHTEN THE SCREWS.
2.45 Typing Mechanism continued

ROTARY CORRECTING LEVER

(1) TO CHECK

LOOSEN CORRECTING CLAMP ADJUSTING SCREW. WITH UNIT IN FIGURES CONDITION, SELECT NO. 9 CODE COMBINATION (---45). TRIP FUNCTION CLUTCH AND POSITION ROCKING BAIL TO EXTREME LEFT. MANUALLY SEAT ROTARY CORRECTING LEVER IN TYPE WHEEL RACK.

REQUIREMENT
SECOND TOOTH FROM TOP OF RACK SEATED BETWEEN LOBES OF CORRECTING LEVER.

TO ADJUST
LOOSEN ECCENTRIC BUSHING LOCK NUT. WITH CLAMP ADJUSTING SCREW LOOSENED AND CORRECTING LEVER PIVOT TO RIGHT OF CENTER LINE, POSITION CORRECTING LEVER. TIGHTEN BUSHING LOCK NUT. DO NOT TIGHTEN CLAMP ADJUSTING SCREW AT THIS TIME.

(2) TO CHECK

IN A MANNER SIMILAR TO THAT DESCRIBED ABOVE CHECK ENGAGEMENT OF FIFTH TOOTH (---345 CODE COMBINATION SELECTED IN FIGURES CONDITION), NINTH TOOTH (---45 CODE COMBINATION SELECTED IN LETTERS CONDITION) AND SIXTEENTH TOOTH (---35 CODE COMBINATION SELECTED IN LETTERS CONDITION).

TO ADJUST
REFINE ADJUSTMENT UNDER (1) ABOVE.

ADJUSTMENT CONTINUED ON FOLLOWING PAGE.
2.46 Typing Mechanism continued

ADJUSTING SCREW

ECCENTRIC BUSHING

ROTARY CORRECTING LEVER

(TOP VIEW)

AXIAL SECTOR

TYPEWHEEL RACK

CORRECTING CLAMP

(RIGHT SIDE VIEW)

Axial Correcting Plate

To adjust

With correcting clamp adjusting screw loosened, trip function clutch and rotate main shaft until roller on axial correcting plate approaches seated position in notch of axial sector. When clearance between roller and sector is

\[ \text{MIN. SOME} \quad \text{MAX. 0.005 INCH} \]

Position correcting lever finger-tight against rack. Tighten correcting clamp adjusting screw.

With unit in letters condition, select letters code combination (12345). Position rocker bail to extreme left. Manually seat correcting lever in rack.

Requirement

A. Lobes of rotary correcting lever firmly seated in typewheel rack.

B. End play between correcting clamp and eccentric bushing:

\[ \text{MIN. SOME} \quad \text{MAX. 0.006 INCH} \]
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

RIBBON CARRIER
REQUIREMENT
WITH FUNCTION CLUTCH DISENGAGED:
(1) RIBBON SHOULD OVERLAP TAPE BY A SMALL AMOUNT.
(2) LAST PRINTED CHARACTER SHOULD BE VISIBLE, NOT INCLUDING FRACTIONS.
TO ADJUST WITH LOCK SCREW LOOSENED, POSITION RIBBON OSCILLATING LEVER BY MEANS OF ADJUSTING SLOT.

NOTE: THERE SHOULD BE SOME END PLAY BETWEEN CARRIER AND REAR GUIDE POST WHEN UNIT IS IN STOP POSITION.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO FULLY PERFORATED TAPE MECHANISM.

RIBBON CARRIER

(TOP VIEW)

NOTE: THERE SHOULD BE SOME END PLAY BETWEEN CARRIER AND REAR GUIDE POST WHEN UNIT IS IN STOP POSITION.
2.49 Typing Mechanism continued

PRINTING TRIP LINK

TO CHECK
TRIP FUNCTION CLUTCH AND POSITION ROCKER BAIL TO EXTREME LEFT. MANUALLY LIFT ACCELERATOR SO THAT LATCHING SURFACES OF PRINTING LATCH AND ACCELERATOR ARE EVEN.

REQUIREMENT
MIN. SOME --- MAX. 0.015 INCH CLEARANCE BETWEEN ACCELERATOR AND LATCH.

TO ADJUST
WITH LOCK NUT LOOSENED, POSITION PRINTING TRIP LINK BY MEANS OF ECCENTRIC MOUNTING SCREW. KEEP HIGH PART OF SCREW TO LEFT OF CENTER LINE.

ACCELERATOR SPRING
REQUIREMENT
WITH UNIT IN IDLE CONDITION:
MIN. 26 OZS. --- MAX. 32 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

PRINTING TRIP LINK SPRING
REQUIREMENT
MIN. 4 OZS. --- MAX. 7 OZS.
TO PULL SPRING TO POSITION LENGTH.

PRINT HAMMER SPRING
REQUIREMENT
WITH UNIT IN IDLE CONDITION:
MIN. 1 OZ. --- MAX. 3 OZS.
PUSH PRINT HAMMER LEVER UNTIL TOP OF HAMMER HEAD IS LEVEL WITH TYPE WHEEL.
2.50 Typing Mechanism continued

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO CHADLESS TAPE MECHANISM.

(A) TYPEWHEEL:
TO CHECK
SELECT "M" CODE COMBINATION (--345). PLACE ROCKER BAIL TO EXTREME LEFT. CORRECTING LEVER SHOULD BE FIRMLY SEATED IN TYPEWHEEL RACK.
REQUIREMENT
TYPEWHEEL ALIGNED SO THAT FULL CHARACTER IS PRINTED UNIFORMLY AND 6 1/4 CODE HOLE SPACES BEHIND ITS PERFORATED CODE HOLES.
TO ADJUST
POSITION TYPEWHEEL WITH LOCK NUT LOOSENED. CHECK PRINTING BY MANUALLY LIFTING ACCELERATOR TO LATCHED POSITION AND RELEASING IT.

NOTE:
FOR BEST RESULTS IT MAY BE NECESSARY TO MAKE PRINT HAMMER ADJUSTMENT (BELOW) AND THEN REFINE THIS ADJUSTMENT.

(B) PRINT HAMMER
REQUIREMENT
WHEN OPERATING UNDER POWER, PRINT HAMMER AND TYPEWHEEL ALIGNED SO AS TO OBTAIN BEST QUALITY OF PRINTING.
TO ADJUST
POSITION PRINT HAMMER SHAFT WITH LOCK NUT LOOSENED.

NOTE:
IT MAY BE NECESSARY TO REMAKE TYPEWHEEL ADJUSTMENT (ABOVE) AND THEN REFINE THIS ADJUSTMENT.
NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY ONLY TO FULLY PERFORATED TAPE MECHANISM.

PRINT HAMMER (PRELIMINARY)

REQUIREMENT
POSITION PRINT HAMMER
MIN. 0.030 INCH --- MAX. 0.040 INCH
FROM THE PIN POINTS ON THE FEED WHEEL.

TO ADJUST
WITH THE PRINT HAMMER SHAFT LOCK NUT LOOSE
POSITION THE PRINT HAMMER BY TURNING THE
SHAFT CLOCKWISE TO MOVE PRINT HAMMER
TOWARD THE FEED WHEEL AND COUNTER CLOCK-
WISE TO MOVE THE PRINT HAMMER AWAY FROM
THE FEED WHEEL.

TYPE WHEEL POSITIONING AND PRINT HAMMER
(FINAL)

REQUIREMENT
WITH "M" CODE COMBINATION (---345) SELECTED,
AND ROCKER BAIL IN ITS EXTREME LEFT POSITION
CHECK THAT THE ROTARY CORRECTOR IS FIRMLY
SEATED IN THE TYPE WHEEL RACK. THE TYPE
WHEEL AND PRINT HAMMER ALIGNMENT COULD
BE SUCH THAT A FULL CHARACTER IS PRINTED
UNIFORMLY BETWEEN THE FEED HOLES.

TO ADJUST
WITH TYPEWHEEL LOCK NUT LOOSE POSITION
THE TYPE WHEEL. IF NECESSARY, REFINE THE
PRINT HAMMER ADJUSTMENT MAKING CERTAIN
THE PRINT HAMMER HEAD DOES NOT COME IN
CONTACT WITH THE FEED WHEEL.
2.52 Ribbon Mechanism

**FEED PAWL SPRING REQUIREMENT**

WITH ROCKER BAIL TO EXTREME RIGHT:
MIN. 4 OZS. --- MAX. 6 OZS.
TO PULL FEED PAWL SPRING TO INSTALLED LENGTH.

**RATCHET WHEEL TORQUE SPRING REQUIREMENT**

MIN. 1 OZS. --- MAX. 3 OZS.
APPLIED TANGENTIALLY TO THE RATCHET WHEEL TO START IT TO ROTATE.

---

DRIVE ARM TO CHECK
POSITION ROCKER BAIL TO EXTREME LEFT.
HOLD THE RIBBON REVERSING ARM UNDER LOWER REVERSING EXTENSION OF FEED PAWL.

**REQUIREMENT**

1. CLEARANCE BETWEEN BLOCKING EDGE OF RIBBON REVERSE ARM AND REVERSING EXTENSION OF FEED PAWL:
MIN. SOME

2. CLEARANCE SHALL NOT BE SO GREAT AS TO ALLOW FEED PAWL TO FEED MORE THAN TWO TEETH AT A TIME.

3. FEED PAWL DETENTED IN BOTH ITS RIGHT AND LEFT POSITION.

TO ADJUST
POSITION DRIVE ARM ADJUSTABLE EXTENSION LEVER WITH ITS MOUNTING SCREW LOOSENED.
2.53 Ribbon Mechanism continued

**DRIVE ARM SPRING**

**REQUIREMENT**

WITH ROCK BAIL TO EXTREME RIGHT:

MIN. 9 OZS. --- MAX. 14 OZS. ---
TO PULL DRIVE ARM SPRING TO INSTALLED LENGTH.

**DETENT SPRING**

**REQUIREMENT**

WITH REVERSING ARM IN ITS EXTREME RIGHT OR LEFT POSITION:

MIN. 2 OZS. --- MAX. 4 OZS.---
TO PULL DETENT SPRING TO ITS INSTALLED LENGTH.
3. VARIABLE FEATURES

NOTE: UNLESS OTHERWISE SPECIFIED, THE FOLLOWING BACKSPACE ADJUSTMENTS APPLY TO BOTH THE CHADLESS AND FULLY PERFORATED TAPE MECHANISMS.

3.01 Manual and Power Drive Backspace Mechanism (For Chadless Tape)

RAKE (A)

(1) REQUIREMENT

WITH ROTATIONAL PLAY IN RAKE TAKEN UP TO LEFT, BOTTOM SURFACE OF RAKE TEETH SHOULD BE WITHIN 0.040 INCH OF THE SAME VERTICAL PLANE AS LEFT SIDE OF PUNCH BLOCK OR SLIGHTLY TO THE RIGHT.

TO ADJUST

REMOVE TWO MOUNTING SCREWS FROM REAR PLATE. POSITION RAKE SHAFT GEAR IN RELATION TO GEAR SEGMENT, REPLACE MOUNTING SCREWS.

(2) REQUIREMENT

WITH BELL CRANK SPRING UNHOOKED AND RAKE IN OPERATED POSITION, CLEARANCE BETWEEN BOTTOM OF RAKE TEETH AND LOWER SURFACE OF TAPE SLOT:

MIN. 0.007 INCH—MAX. 0.011 INCH (CHECK AT NO. 1 & 5 PINS.)

TO ADJUST

LOosen THE FOUR PUNCH BLOCK MOUNTING SCREWS FRICTION TIGHT, POSITION THE RAKE MOUNTING PLATE AND BELL CRANK MOUNTING PLATE SO THAT THE FRONT EDGE OF BOTH PLATES IS APPROXIMATELY IN LINE WITH THE VERTICAL PLANE OF THE PUNCH BLOCK. WITH THE RAKE IN THE OPERATED POSITION (BELL CRANK IN MAXIMUM DOWNWARD POSITION) MOVE THE RAKE UP OR DOWN TO MEET CLEARANCE REQUIREMENT, TIGHTEN SCREWS AND REPLACE THE BELL CRANK SPRING.

FEED PAWL ADJUSTING PLATE

(1) PRELIMINARY: WITH BELL CRANK ROTATED CLOCKWISE, FEED PAWL SHALL MISS FIRST TOOTH AT POINT OF LEAST CLEARANCE BY

MIN. 0.006 INCH—MAX. 0.040 INCH

(2) FINAL: FEED PAWL SHALL MISS FIRST TOOTH AND ENGAGE SECOND TOOTH BY AT LEAST 1/2 OF RIGHT ENGAGING SURFACE OF FEED PAWL (AS GAUGED BY EYE WHEN FEED PAWL FIRST CONTACTS RATCHET TOOTH).

TO ADJUST

POSITION ADJUSTING PLATE WITH MOUNTING SCREW FRICTION TIGHT.
3.02 Manual and Power Drive Backspace Mechanism (For Chadless Tape) continued

(A) RETURN LATCH REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION. CLEARANCE BETWEEN RETURN LATCH AND FEED PAWL EXTENSION
MIN. 0.004 INCH
MAX. 0.020 INCH
TO ADJUST
ADJUST ECCENTRIC WITH MOUNTING SCREW FRICITION TIGHT.

(B) FEED PAWL ECCENTRIC MANUAL BACKSPACE (PRELIMINARY) REQUIREMENT
WITH THE BACKSPACE BELL CRANK IN ITS OPERATED POSITION AND THE FEED WHEEL DETENTED BACK ONE SPACE:
MIN. SOME --- MAX. 0.003 INCH
CLEARANCE BETWEEN THE FEED WHEEL RATCHET TOOTH AND THE BACKSPACE FEED PAWL.
POWER DRIVE BACKSPACE
WITH THE BACKSPACE BELL CRANK IN ITS OPERATED POSITION, THE HIGH SIDE OF THE ECCENTRIC SHOULD BE IN ITS UPPERMOST POSITION.
TO ADJUST
LOosen THE NUT POST (FRICITION TIGHT) AND ROTATE ECCENTRIC WITH AN ALLEN WRENCH, TIGHTEN THE NUT POST.
3.03 Manual and Power Drive Backspace Mechanism (For Fully Perforated Tape)

(A) BACKSPACE RATCHET
REQUIREMENT
TEETH OF BACKSPACE AND FEED WHEEL RATCHETS TO LINE UP (VISUAL ALIGNMENT) FEED WHEEL RATCHET TO BE IN DETENTED POSITION.
TO ADJUST
WITH ADJUSTING CLAMP MOUNTING SCREW FRICITION TIGHT, ROTATE BACKSPACE RATCHET TO MEET THE REQUIREMENT.

(B) BACKSPACE PAWL CLEARANCE
(1) REQUIREMENT --- PRELIMINALY
WITH BACKSPACE BELL CRANK ROTATED CLOCKWISE, THE BACKSPACE PAWL SHALL MISS THE FIRST TOOTH BY A CLEARANCE OF:
MIN. 0.003 INCH
MAX. 0.010 INCH
AT POINT OF LEAST CLEARANCE.

(2) REQUIREMENT --- FINAL
THE BACKSPACE PAWL SHALL MISS THE FIRST TOOTH AND ENGAGE THE SECOND TOOTH BY AT LEAST 1/2 OF THE RIGHT ENGAGING SURFACE OF THE BACKSPACE PAWL (AS GAUGED BY EYE) WHEN BACKSPACE PAWL FIRST CONTACTS THE RATCHET TOOTH.
TO ADJUST
TAKE UP ALL ROTATIONAL PLAY OF BACKSPACE RATCHET IN RELATION TO FEED RATCHET BY ROTATING IT CLOCKWISE AT SAME TIME ROTATE BELL CRANK CLOCKWISE, WITH MOUNTING SCREW FRICITION TIGHT ROTATE ECCENTRIC POST TO MEET THE REQUIREMENTS.

FINAL MINIMUM ENGAGEMENT:
1/2 OF SURFACE WITH SECOND RATCHET TOOTH AT FIRST POINT OF CONTACT.
3.04 Manual and Power Drive Backspace Mechanism (For Fully Perforated Tape) continued

(A) **FEED PAWL DISABLING REQUEREIMENT**

WHEN BELL CRANK IS IN OPERATED POSITION HIGH SIDE OF FEED PAWL DISABLING ECCENTRIC SHOULD BE IN UPPERMOST POSITION.

TO ADJUST WITH NUT POST FRICITION TIGHT, ROTATE ECCENTRIC WITH A 0.060'' ALLEN WRENCH.

3.05 Power Drive Backspace Mechanism (For Fully Perforated Tape) (Early Design)

(B) **DRIVE LINK REQUIREMENT**

WITH HIGH PART OF ECCENTRIC ARM IN LEFT HAND POSITION, ARMATURE AGAINST POLE FACE TO ALLOW DRIVE ARM LATCH LEVER TO REST AGAINST ECCENTRIC ARM. CLEARANCE BETWEEN STEP ON ECCENTRIC ARM AND LATCH MIN. 0.040 INCH MAX. 0.045 INCH

TO ADJUST WITH DRIVE LINK SCREW FRICITION TIGHT POSITION ADJUSTING LINK.
3.06 Power Drive Backspace Mechanism (Early Design) continued

(A) ARMATURE HINGE

REQUIREMENT
ARMATURE BAIL SPRING REMOVED, WITH ARMATURE
HELD AGAINST POLE FACE AND PLAY TAKEN UP AT
HINGE IN DOWNWARD DIRECTION, CLEARANCE
BETWEEN ARMATURE AND MAGNET BRACKET
MIN. SOME --- MAX. 0.004 INCH
TO ADJUST
WITH HINGE MOUNTING SCREWS LOOSENED
POSITION ARMATURE.

NOTE: THE FOLLOWING ADJUSTMENTS ARE FOR
USE WITH THE EARLY DESIGN BACKSPACE
MAGNET ASSEMBLY. LATER DESIGN USE
A NON-ADJUSTABLE BACKSPACE MAGNET
ASSEMBLY.

NOTE:
FOR "DC" OPERATION, THE BACKSPACE
MAGNET ARMATURE SHALL BE POSITIONED
SO THAT THE SIDE MARKED "C" SHALL FACE
THE POLE FACE OF THE MAGNET CORE.
FOR "AC" OPERATION, THE UNMARKED
SIDE OF THE MAGNET ARMATURE SHALL
FACE THE POLE FACE OF THE MAGNET CORE.

(B) ARMATURE UP-STOP

REQUIREMENT
ARMATURE IN UNOPERATED POSITION.
GAP BETWEEN ARMATURE AND POLE
FACE
MIN. 0.025 INCH.
MAX. 0.030 INCH.
AT CLOSEST POINT.
TO ADJUST
ROTATE ECCENTRIC WITH MOUNTING
NUT LOOSENED. KEEP HIGH PART OF
ECCENTRIC TO LEFT.
- 3.07 Power Drive Backspace Mechanism (For Chadless Tape) (Early Design) continued

(A) DRIVE ARM

REQUIREMENT

WITH DRIVE ARM LATCH LEVER ENGAGED WITH ECCENTRIC LINK, MAIN SHAFT
ROTATED TO PLACE ECCENTRIC IN ITS EXTREME RIGHT HAND POSITION AND
FEED WHEEL DETENTED BACK ONE SPACE;

MIN. 0.003 MAX. 0.003 INCH

CLEARANCE BETWEEN THE BACKSPACE FEED PAWL AND THE RATCHET TOOTH. CHECK
WITH FEED WHEEL SHAFT OIL HOLE IN THE UPPERMOST POSITION AND RECHECK EACH
90 DEGREES ABOUT THE PERIPHERY OF THE FEED WHEEL.

TO ADJUST

LOosen DRIVE ARM SCREW (FRiction TIGHT) AND POSITION ADJUSTING PLATE.

3.08 Power Drive Backspace Mechanism
(Early Design) continued

NOTE:

THIS ADJUSTMENT IS MADE AT
FACTORY AND SHOULD NOT BE
DISTURBED UNLESS A REASSEMBLY
OF THE UNIT IS UNDERTAKEN. IF
NECESSARY TO MAKE THIS ADJ-
JUSTMENT, PUNCH SHOULD BE
REMOVED. SEE DISASSEMBLY AND
REASSEMBLY. REMAKE PUNCH
POSITION ADJUSTMENT.

(b) LATCH EXTENSION

REQUIREMENT

BACKSPACE MECHANISM IN UNOPERATED POSITION. HIGH PART OF ECCENTRIC TO LEFT. ARMATURE
AGAINST POLE FACE. LATCH RESTING ON ECCENTRIC ARM NOTCH. CLEARANCE BETWEEN TOP OF
ARMATURE BAIL EXTENSION AND LATCH EXTENSION

MIN. 0.005 INCH
MAX. 0.020 INCH

TO ADJUST

SWING MAGNET CLOCKWISE OR COUNTERCLOCKWISE, AS NECESSARY, WITH MOUNTING SCREWS
FRiction TIGHT.
3.09 Power Drive Backspace Mechanism (Early Design) continued

(A) LATCH

REQUIREMENT

BACKSPACE MECHANISM IN UNOPERATED POSITION. ARMATURE OFF POLE FACE (DE-ENERGIZED). LATCH EXTENSION AGAINST END OF ARMATURE BAIL EXTENSION. ECCENTRIC ARM AT ITS CLOSEST POINT TO UNDERSIDE OF LATCH. CLEARANCE BETWEEN LATCH AND ECCENTRIC ARM.

MIN. 0.005 INCH
MAX. 0.025 INCH

TO ADJUST POSITION LATCH WITH LATCH EXTENSION SCREW LOOSENED.

NOTE 1:
ON UNITS EQUIPPED WITH ONE PIECE NON-ADJUSTABLE LATCH LEVER THE REQUIREMENTS IN THE "FINAL POWER OR MANUAL" MUST BE MET.

(B) NON-REPEAT ARM

REQUIREMENT

BACKSPACE MECHANISM IN UNOPERATED POSITION. CLEARANCE BETWEEN TOP SURFACE OF NON-REPEAT ARM AND LOWEST POINT OF LATCH EXTENSION

MIN. 0.002 INCH
MAX. 0.010 INCH

TO ADJUST POSITION ADJUSTING ARM WITH ARM SCREW LOOSENED FRICTION TIGHT.

NOTE 2:
MUST NOT BE OPERATED WITH LATCH AGAINST ARMATURE EXTENSION.
3.10 Manual and Power Drive Backspace Mechanism (For Chadless Tape) (Early Design) continued

(A) LATCH SPRING

REQUIREMENT

BACKSPACE MECHANISM IN UNOPERATED POSITION.

MIN. 14 OZS. --- MAX. 26 OZS.

TO START LATCH MOVING.

(B) FEED PAWL SPRING

REQUIREMENT

BACKSPACE MECHANISM IN UNOPERATED POSITION.

MIN. 8 OZS. --- MAX. 15 OZS.

TO START FEED PAWL MOVING.

(C) BELL CRANK SPRING

REQUIREMENT

SPRING UNHOOKED FROM PLATE EXTENSION.

MIN. 19 OZS. --- MAX. 23 OZS.

TO PULL TO INSTALLED LENGTH.

(D) GEAR SEGMENT SPRING

REQUIREMENT

SPRING UNHOOKED FROM BELL CRANK SPRING POST.

MIN. 22 OZS.
MAX. 26 OZS.

TO PULL TO INSTALLED LENGTH.

(E) ARMATURE BAIL SPRING

REQUIREMENT

ARMATURE LATCH SPRING UNHOOKED

MIN. 3-1/2 OZS.
MAX. 6-1/2 OZS.

TO START ARMATURE BAIL MOVING.

(F) LATCH EXTENSION SPRING (POWER DRIVE ONLY)

REQUIREMENT

SPRING UNHOOKED FROM LATCH EXTENSION.

MIN. 1 OZ. --- MAX. 2-1/4 OZS.

TO PULL TO INSTALLED LENGTH.
3.11 Manual and Power Drive Backspace Mechanism (For Fully Perforated Tape) (Early Design) continued

(A) FEED PAWL SPRING
REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION.
MIN. 4 OZS.
MAX. 6 OZS.
TO START FEED PAWL MOVING.

(B) BELL CRANK SPRING
REQUIREMENT
MIN. 9 OZS.
MAX. 12 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(C) ARMATURE LATCH SPRING
REQUIREMENT
MIN. 1 OZS.
MAX. 2-1/4 OZS.
TO PULL ARMATURE LATCH SPRING TO INSTALLED LENGTH.

(D) ARMATURE BAIL SPRING
REQUIREMENT
WITH ARMATURE LATCH SPRING UNHOOKED:
MIN. 3-1/2 OZS.
MAX. 6-1/2 OZS.
TO START ARMATURE MOVING.
3. 12 Power Drive Backspace Mechanism (Latest Design)
(Non-Adjustable Backspace Magnet Assembly)

(A) ARMATURE SPRING
REQUIREMENT
MIN 15 OZS
MAX 20 OZS
TO PULL SPRING TO INSTALLED LENGTH.

(C) MAGNET POSITION
REQUIREMENT
THE ARMATURE EXTENSION SHALL ENGAGE THE LATCH BY APPROXIMATELY ITS FULL THICKNESS
WHEN THE MAGNET IS DE-ENERGIZED.
TO ADJUST
POSITION THE MAGNET ASSEMBLY BY MEANS OF ITS MOUNTING SCREWS.

(B) LATCH EXTENSION SPRING
REQUIREMENT
MIN 1 OZ
MAX 2-1/4 OZS
TO START LATCH MOVING.

3. 13 Manual and Power Drive Backspace Mechanism (Chadless and Fully Perforated Tape)

(D) FINAL MANUAL OR POWER
REQUIREMENT
UNIT OPERATING UNDER POWER AND TAPE IN THE PUNCH UNIT. PLACE THE FEED WHEEL SHAFT
OIL HOLE IN ITS UPPERMOST POSITION AND OPERATE THE BACKSPACE MECHANISM ONCE.
THE BACKSPACE RATCHET WHEEL SHALL BE BACKED ONE SPACE AND THE FEED WHEEL RATCHET TO A
FULLY DETENTED POSITION. RECHECK EVERY 90° FOR ONE FULL REVOLUTION OF THE BACKSPACE
RATCHET WHEEL.

NOTE 1: A FULLY DETENTED POSITION IS DEFINED AS: WITH THE DETENT ROLLER IN CONTACT WITH THE
RATCHET WHEEL THE PUNCH UNIT FEED PAWL SHALL ENGAGE THE FIRST TOOTH BELOW THE
HORIZONTAL CENTER LINE OF THE RATCHET FEED WHEEL WITH NO PERCEPTIBLE CLEARANCE.

TO ADJUST
(FOR CHADLESS TAPE MECHANISM) REFINISH FEED PAWL ADJUSTMENTS.
(FOR FULLY PERFORATED TAPE MECHANISM) LOOSEN ARM ADJUSTING SCREW AND
MOVE ADJUSTING PLATE.
NOTE 1: UNLESS SPECIFICALLY STATED OTHERWISE, THE FOLLOWING CODE READING CONTACT ADJUSTMENTS APPLY TO BOTH THE TRANSFER (BREAK BEFORE MAKE) TYPE AND MAKE TYPE CONTACTS. WHEN AN ADJUSTMENT IS APPLICABLE TO BOTH TYPES, THE TRANSFER TYPE CONTACTS ARE USED IN THE ILLUSTRATIONS. WHEN TESTING THESE CONTACTS ON ASR SETS THE CONTROL KNOB SHOULD BE IN THE K-T POSITION.

NOTE 2: IT IS RECOMMENDED THAT THE FOLLOWING ADJUSTMENTS BE MADE WITH THE CODE READING CONTACT ASSEMBLY REMOVED FROM THE UNIT.

NOTE 3: WHEN USING THE CONTACT SPRING BENDER, START WITH THE CONTACT PILE-UP FARDEST FROM THE HANDLE OF THE TOOL AND WORK TOWARD THE HANDLE SO AS NOT TO DISTURB ADJUSTMENTS ALREADY MADE.

(A) MARKING CONTACT BACKSTOPs

REQUIREMENT
AS GAUGED BY EYE, FIVE MARKING CONTACT SPRINGS SHOULD ALIGN WITH EACH OTHER AND BE PARALLEL WITH MOUNTING PLATE.

TO ADJUST BEND MARKING CONTACT BACKSTOPs.

MARKING CONTACT BACKSTOP

(B) MARKING CONTACT SPRINGs-PRELIMINARY

REQUIREMENT
WITH SWINGER CONTACT SPRING HELD AWAY:
MIN. 2 OZS.
MAX. 6 OZS.

TO MOVE EACH SPRING AWAY FROM BACKSTOP.

TO ADJUST BEND MARKING CONTACT SPRINGS.

NOTE 4:
TO INCREASE TENSION OF MARKING CONTACT SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM SPRING, BEND SPRING AND THEN RE-BEND BACKSTOP TO MEET REQUIREMENT OF MARKING CONTACT BACKSTOPs ADJUSTMENT (ABOVE).
3.15  Code Reading Contacts continued

(A) **SWINGER CONTACT SPRINGS-PRELIMINARY**

**REQUIREMENT**
- MIN. 30 GRAMS
- MAX. 40 GRAMS

**TO OPEN MARKING CONTACTS.**
**TO ADJUST**
**BEND SWINGER CONTACT SPRINGS.**

**NOTE 1:** SPACING CONTACTS (ON TRANSFER TYPE CONTACT ASSEMBLIES ONLY) ARE NORMALLY OPEN WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT.

(B) **SPACING CONTACT BACKSTOPS - PRELIMINARY**

(APPLIES TO TRANSFER TYPE CONTACTS ONLY)

**REQUIREMENT**
- GAP BETWEEN SPACING CONTACTS
  - MIN. 0.018 INCH
  - MAX. 0.025 INCH

**TO ADJUST**
**BEND SPACING CONTACT BACKSTOPS.**

(C) **SPACING CONTACT SPRINGS-PRELIMINARY**

(APPLIES TO TRANSFER TYPE CONTACTS ONLY)

**REQUIREMENT**
- MIN. 35 GRAMS
- MAX. 50 GRAMS

**TO MOVE EACH CONTACT SPRING AWAY FROM BACKSTOP.**
**TO ADJUST**
**BEND SPACING CONTACT SPRINGS.**

**NOTE 2:** TO INCREASE TENSION OF SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM SPRING, BEND SPRING, AND THEN RE-BEND BACKSTOP TO MEET REQUIREMENT OF SPACING CONTACT BACKSTOPS ADJUSTMENT ABOVE.
3.16 Code Reading Contacts continued

NOTE 1: THE FOLLOWING CODE READING CONTACT ADJUSTMENTS SHOULD BE MADE WITH THE CONTACT ASSEMBLIES MOUNTED ON THE UNIT.

(A) CONTACT MOUNTING BRACKET
REQUIREMENT
(1) WITH FUNCTION CLUTCH DISENGAGED AND LATCHED, THERE SHALL BE Min. 0.015 INCH CLEARANCE BETWEEN THE CLOSEST NORMALLY CLOSED CONTACT SPRING (MARKING CONTACT) AND PUNCH SLIDE INSULATOR.
(2) WITH LETTERS COMBINATION SELECTED AND PUNCH PINS IN THEIR UPPERMOST POSITION, THE SWINGER SHALL BE PARALLEL TO RIGHT END OF PUNCH SLIDE AND EXTEND BELOW ITS CENTER, AS GAGED BY EYE.
TO ADJUST POSITION CONTACT MOUNTING BRACKET WITH MOUNTING SCREWS LOOSENED.

(B) CONTACT MOUNTING PLATE
REQUIREMENT
EACH SWINGER CONTACT SPRING SHOULD BE ALIGNED WITH ITS ASSOCIATED PUNCH SLIDE INSULATOR AS GAUGED BY EYE.
TO ADJUST POSITION CONTACT MOUNTING PLATE WITH MOUNTING SCREWS LOOSENED.
SECTION 573-139-700

3.17 Code Reading Contacts continued

CONTACT BRACKET—PRELIMINARY (APPLIES TO TRANSFER TYPE CONTACTS ONLY)

(1) REQUIREMENT
MANUALLY SELECT BLANK CODE COMBINATION.
ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS.
SOME CLEARANCE BETWEEN SPACING CONTACT SPRING AND ITS BACKSTOP.
MIN. SOME
MAX. 0.008 INCH

(2) REQUIREMENT
WITH SELECTOR AND FUNCTION CLUTCHES DISENGAGED AND LATCHED, MANUALLY SELECT LETTERS CODE COMBINATION. ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS. CLEARANCE BETWEEN PUNCH SLIDE INSULATOR AND SWINGER CONTACT SPRING.
MIN. 0.028 INCH

TO ADJUST POSITION CONTACT BRACKET WITH ITS MOUNTING SCREWS. LOOSENED TO MEET REQUIREMENT (1). TO PRY BRACKET TO LEFT, INSERT SCREWDRIVER BETWEEN BRACKET AND LEFT EDGE OF MOUNTING SCREWS; TO PRY BRACKET TO RIGHT, INSERT SCREWDRIVER BETWEEN BRACKET AND RIGHT EDGE OF MOUNTING SCREWS. CHECK REQUIREMENT (2). IF NOT MET, REFINE ADJUSTMENT.
3.18 Code Reading Contacts continued

CONTACT BRACKET-PRELIMINARY (APPLIES TO MAKE TYPE CONTACTS ONLY)

(1) REQUIREMENT
MANUALLY SELECT BLANK CODE COMBINATION.
ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS
AND PUNCH SLIDES ARE AGAINST THEIR RESPECTIVE LATCHES.
GAP BETWEEN CONTACTS.
MIN. 0.020 INCH
MAX. 0.025 INCH

(2) REQUIREMENT
WITH SELECTOR AND FUNCTION CLUTCHES DIENGAGED AND LATCHED, MANUALLY SELECT LETTERS CODE COMBINATION.
ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS. CLEARANCE BETWEEN PUNCH SLIDE INSULATOR AND SWINGER CONTACT SPRING.
MIN. 0.028 INCH

TO ADJUST
POSITION CONTACT BRACKET WITH MOUNTING SCREWS
FRICITION TIGHT. TO PRY BRACKET TO LEFT,
INSERT SCREW DRIVER BETWEEN BRACKET AND
LEFT EDGE OF MOUNTING SCREW; TO PRY BRACKET TO RIGHT,
INSERT SCREW DRIVER BETWEEN BRACKET
AND RIGHT EDGE OF MOUNTING SCREW.
3. 19 Timing Contacts

NOTE 1: THERE ARE TWO TYPES OF TIMING CONTACT ASSEMBLIES, SINGLE AND DOUBLE./single contact assemblies have a front contact only, no rear contact. If unit is equipped with a double contact assembly, the following adjustments apply to both front and rear contacts.

NOTE 2: IN CASE OF SINGLE-CONTACT ASSEMBLY, make certain contact bracket mounting screws are centrally located in elongated slots, and proceed to next adjustment.

CONTACT MOUNTING SCREWS

CONTACT SPRINGS

CONTACT BACKSTOP (DOUBLE CONTACT ASSEMBLY)

REQUIREMENT
Swinger of each contact held against its backstop by its operating bail and spring, and contact bracket mounting screws centrally located in elongated slots, clearance between operating bails min. 0.040 inch on units equipped with max. 0.045 inch one-cycle cams, min. 0.035 inch on units equipped with max. 0.040 inch two-cycle cams at point of least clearance.

TO ADJUST
Bend front backstop leg.

CONTACT BRACKET MOUNTING SCREWS

FRONT BACKSTOP LEG

FRONT OPERATING BAIL

REAR OPERATING BAIL

CONTACT Bracket

SWINGER

CONTACT BACKSTOP

CONTACT ALIGNMENT

REQUIREMENT
When parts are in engagement:
(1) operating bail centrally located with respect to swinger.
(2) mating contact points aligned.
To adjust
Position contact springs with contact mounting screws loosened.
3.20 Timing Contacts continued

NOTE 1: IT IS RECOMMENDED THAT THE FOLLOWING TIMING CONTACT ADJUSTMENTS BE MADE WITH CONTACT ASSEMBLIES REMOVED FROM THE UNIT.

(A) RIGHT CONTACT GAP (NORMALLY CLOSED WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT)

REQUIREMENT

SWINGER HELD AGAINST ITS BACKSTOP.
GAP BETWEEN CONTACTS

MIN. 0.020 INCH
MAX. 0.025 INCH

TO ADJUST
BEND RIGHT CONTACT SPRING.

(B) SWINGER CONTACT SPRING - PRELIMINARY

REQUIREMENT

OPERATING BAIL HELD AWAY FROM SWINGER

MIN. 4 1/2 OZS.
MAX. 5 1/2 OZS.

TO OPEN RIGHT SIDE OF CONTACT

TO ADJUST
BEND SWINGER CONTACT SPRING, RECHECK RIGHT CONTACT GAP AND READJUST IF NECESSARY.

(C) LEFT CONTACT GAP (NORMALLY OPEN WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT)

REQUIREMENT

OPERATING BAIL HELD AWAY FROM SWINGER, GAP BETWEEN CONTACTS

MIN. 0.020 INCH
MAX. 0.025 INCH

TO ADJUST
BEND STIFFENER.

(D) LEFT CONTACT SPRING - PRELIMINARY

REQUIREMENT

SWINGER HELD AGAINST BACKSTOP BY ITS OPERATING BAIL AND SPRING.

MIN. 4 1/2 OZS.
MAX. 5 1/2 OZS.

TO OPEN LEFT SIDE OF CONTACT.

TO ADJUST
BEND LEFT CONTACT SPRING. RECHECK RIGHT CONTACT GAP AND LEFT CONTACT GAP, AND READJUST IF NECESSARY.
3.21 Timing Contacts continued

NOTE 1: THE FOLLOWING TIMING CONTACT ADJUSTMENTS SHOULD BE MADE WITH CONTACT ASSEMBLY MOUNTED ON UNIT.

(B) OPERATING BAIL SPRINGS REQUIREMENT
OPERATING BAIL HELD SO THAT SWINGER IS AGAINST BACKSTOP.
MIN. 7 OZS.
MAX. 12 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(A) CONTACT BRACKET-PRELIMINARY (FOR UNITS EQUIPPED WITH ONE-CYCLE CAMS)
LOOSEN LOCKING SCREW. POSITION CAM FOLLOWER ARM, BY MEANS OF ITS ELONGATED MOUNTING HOLE, TO ITS MINIMUM LENGTH ON OPERATING BAIL. TIGHTEN LOCKING SCREW.

REQUIREMENT
SELECTOR AND FUNCTION CLUTCHES DIENGAGED AND LATCHED. CLEARANCE BETWEEN CAM FOLLOWER ROLLER AND FUNCTION CAM.
MIN. 0.050 INCH
MAX. 0.055 INCH
TO ADJUST
POSITION CONTACT BRACKET WITH MOUNTING SCREWS LOOSENED.

NOTE 2: ON UNITS EQUIPPED WITH DOUBLE CONTACT ASSEMBLIES, RECHECK CONTACT BACKSTOP ADJUSTMENT. IF REQUIREMENT IS NOT MET, REFINE CONTACT BRACKET ADJUSTMENT.
CONTACT BRACKET-PRELIMINARY (FOR UNITS EQUIPPED WITH TWO-CYCLE CAMS)

Loosen locking screw. Position cam follower arm, by means of its elongated mounting holes, to its maximum length on operating bail. Tighten locking screw.

Requirement

Selector and function clutches disengaged and latched. Clearance between bail and swinger insulator of pile-up having least clearance should be 0.118 inch minus clearance "X" between backstop and swinger insulator.

To adjust

Position contact bracket with its mounting screws loosened.

Note 1: The range of this adjustment is 0.005 inch. For example; if clearance "X" is 0.080 inch, the normal adjustment is 0.038 inch and the range of adjustment is 0.035 inch to 0.040 inch.
3.23 Code Reading Contacts Strobing (Using Signal Distortion Test Set)

The following tests require the use of a teletype signal distortion test set. They should be made after the contact assemblies have been adjusted as instructed on the preceding pages. Where requirements are not met, designated adjustments must be refined, and/or related lengths may have to be changed to meet timing requirements.

All tests should be made with the control knob of the Model 28 ASR in the K-T position and with the unit and test set operating at 600 o.p.m.

Observations are to be made of a neon trace on the graduated disc of a test set. Trace will have tendency to "jump"; that is, it will not be steady enough to be accurately measured. Variation may be as high as ten divisions on scale. Minimum signal length is measured between latest start and earliest end of all traces. Maximum signal length is measured between earliest start and latest end of all traces.

To zero test set
Connect neon trace to No. 1 code reading contact (rearmost). With unit receiving letters code combinations, observe and note point at which trace ends. Traces will jump as described above; note earliest end of traces. Repeat for remaining contacts. Of all traces observed, choose one that starts the latest. Set "start-zero" mark of scale at latest start of chosen trace. Record earliest end of chosen trace for future adjustment references.
3.24 Code Reading Contacts Strobing continued

NOTE 1: TEST PROCEDURES ON THIS PAGE APPLY TO A UNIT WITH 2-CYCLE CLUTCH

CODE READING CONTACTS
(1) ZERO TEST SET AS PREVIOUSLY INSTRUCTED.
(2) CONNECT NEON TRACE TO MARKING SIDE OF CODE READING CONTACT. (NORMALLY OPEN WHEN UNIT IS IN IDLE CONDITION). WITH UNIT RECEIVING LETTERS CODE COMBINATIONS, OBSERVE TRACE.

REQUIREMENTS
A. SIGNAL LENGTH
   MIN. 245 DIVISIONS
   MAX. 425 DIVISIONS
B. BOUNCE SHOULD END WITHIN MAX. OF 20 DIVISIONS OF EARLIEST START AND EARLIEST END OF TRACE.
(3) TO ADJUST
A. IF REQUIREMENTS UNDER (2)A. ARE NOT MET, REFINE CONTACT BRACKET ADJUSTMENT. IF NECESSARY, REFINE CONTACT GAP TO MEET STROBE REQUIREMENTS. RECHECK CONTACT SPRING TENSIONS.
B. IF BOUNCE REQUIREMENTS UNDER (2)B. ARE NOT MET, REFINE MARKING CONTACT SPRING AND SWINGER CONTROL SPRING TENSIONS.
C. IF ANY REFINEMENTS ARE NECESSARY, REPEAT COMPLETE TEST PROCEDURE.
3.25 Timing Contacts Strobing

NOTE 1: TEST PROCEDURES ON THIS PAGE APPLY TO A UNIT WITH 2-CYCLE CLUTCH

TIMING CONTACTS

(1) ZERO TEST SET AS PREVIOUSLY DESCRIBED.
(2) CONNECT NEON TRACE TO RIGHT SIDE OF FRONT CONTACT (NORMALLY OPEN WHEN UNIT IS IN IDLE CONDITION). WITH UNIT RECEIVING LETTERS CODE COMBINATIONS FROM KEYBOARD TRANSMISSION, OBSERVE TRACE.

REQUIREMENTS
A. EARLIEST START MIN. 22 DIVISIONS AFTER START-ZERO MARK.
B. LATEST END MIN. 22 DIVISIONS BEFORE EARLIEST END OF CODE READING CONTACT TRACES.
C. TRACE LENGTH
   MIN. 163 DIVISIONS
   MAX. 200 DIVISIONS
D. BOUNCE SHOULD END WITHIN MAX. OF 5 DIVISIONS OF EARLIEST START OR LATEST END OF TRACE.

(3) TO ADJUST
A. IF REQUIREMENTS UNDER (2)A., B., AND C. ARE NOT MET, REFINE RIGHT CONTACT GAP, LEFT CONTACT GAP, SWINGER CONTACT SPRING, AND LEFT CONTACT SPRING.
B. IF BOUNCE REQUIREMENTS UNDER (2)D. ARE NOT MET, REFINE SWINGER CONTACT SPRING AND LEFT CONTACT SPRING.
C. IF ANY REFINEMENTS ARE NECESSARY, REPEAT COMPLETE TEST PROCEDURE.
3.26 Unshift-On-Space Mechanism

(A) **UNSHIFT-ON-SPACE FUNCTION BLADE**

(1) **TO CHECK**

- Remove signal bell contact assembly with bracket and signal bell function blade.
- Select figures code combination (12-45). Rotate main shaft until lifter roller is on low part of rocker bail's camming surface and unshift-on-space function blade rests on bell cranks.
- Requirement: Min. some...max. 0.015 inch between stripper blade and letters extension arm.

(2) **TO CHECK**
- Select space code combination (--3--). Rotate main shaft until stripper blade touches letters extension arm.
- Requirement: When play is taken up in either direction, stripper blade should engage an equal thickness of letters extension arm.

To adjust position stripper blade on function blade with two mounting screws loosened, reinstall signal bell contact assembly with bracket and signal bell function blade.

Make signal bell contact mounting bracket adjustment.

(B) **UNSHIFT-ON-SPACE FUNCTION BLADE SPRING**

Requirement: With unit in stop position and long slot in blocking sleeve engaging function blade:
- Min. 10 ozs., max. 13 ozs.
- To start blade moving.
3.27 Chad Chute Assembly (Keyboard Perforator Typing or Non-Typing)

CHAD CHUTE ASSEMBLY (KEYBOARD PERFORATOR "TYPING OR NON-TYPING"
AUTOMATIC SEND-RECEIVE SET)

REQUIREMENT
CLEARANCE BETWEEN EACH CHAD CHUTE AND
ADJACENT UNITS SHOULD BE EQUAL IN ALL
DIRECTIONS.

TO ADJUST
WITH MOUNTING SCREWS FRICITON TIGHT POSITION
EACH CHUTE BY MEANS OF THEIR ELONGATED
SLOTS.

CHAD CHUTE

CHAD CHUTE W/BRACKET

KEYBOARD BASE

TYPING OR NON-TYPING
PERFORATOR UNIT
## 28 TYPING REPERFORATOR AND TAPE PRINTER ADJUSTMENTS

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## 1. GENERAL

1.01 This section contains the specific requirements and adjustments for the 28 typing reperforators and tape printers.

1.02 This section has been revised to include recent engineering changes and additions, and to rearrange the text, so as to bring the section generally up-to-date. Since this is an extensive revision, marginal arrows ordinarily used to indicate changes have been omitted.

Note: Remove power from set or unit before making adjustment.

1.03 Maintenance procedures which apply only to mechanisms of a particular design, or to certain models of 28 typing reperforators and tape printers are so indicated in the titles of the paragraphs which contain these particular adjustment requirements.

1.04 The adjustments are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken. The tools and spring scales required to perform these adjustments are listed in the applicable section. After an adjustment is completed, be sure to tighten any nuts or screws that are loosened. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions and the angles at which scales should be applied when measuring spring tensions. If a part mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same number is replaced when the part is remounted.

1.05 Reference made to left or right, up or down, front or rear, etc apply to the unit in its normal operating position as viewed from the front.

1.06 When a requirement calls for a clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latch lever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

Note: When the main shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve drag and permit the main shaft to rotate freely, apply pressure on the lug of the clutch disc with a screwdriver to cause it to engage its latch lever and fully disengage the clutch.

1.07 To manually operate the typing reperforator or tape printer proceed as follows:

1. Attach the TP312709 armature clip to the selector magnet armature by carefully placing the spring loop over the magnet terminal insulator and pressing down to engage the hook of the clip on the underside of the armature and releasing. The spring tension of the armature clip will hold the selector armature in the marking (attracted) position.

2. While holding the selector magnet armature operated by means of the armature clip, use the handwheel, included with the special tools for servicing 28 teletypewriter apparatus, to manually rotate the main shaft in a counterclockwise direction until all the clutches are brought to their disengaged position.

3. Fully disengage all clutches in accordance with 1.06, Note.

4. Release the selector magnet armature momentarily to permit the selector clutch to engage.
(5) Rotate the main shaft slowly until all the pushlevers have fallen to the left of their selecting levers.

(6) Strip the pushlevers from their selector levers, which are spacing in the code combination of the character function that is being selected, and allow the pushlevers to move to the right.

(7) The pushlevers and the selector levers move in succession starting with the inner lever No. 1 to the outer lever No. 5.

(8) Continue to rotate the main shaft until all operations initiated by the selector action clear through the unit.

1.08 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 per cent of the contact diameter. Check contacts for pitting and corrosion and clean or burnish them before making specified adjustments or tolerance measurement. Avoid sharp kinks or bends in the contact springs.

CAUTION: KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.

1.09 Where a typing reperforator is used as a component of the 28 reperforator-transmitter unit or the 28 perforator-transmitter base or the multiple reperforator base, refer to the applicable sections for the additional adjustments.

Figure 1 - 28 Typing Reperforator Unit
(Fully Perforated Tape)
Figure 2 - 28 Tape Printer Unit With Manual Interfering LTRS Tape Feed-Out Mechanism
Figure 3 - 28 Typing Reperforator Unit With Remote Control BLANK Tape Feed-Out Mechanism (Fully Perforated Tape)
Figure 4 - 28 Typing Reperforator Unit With Remote Control LTRS Tape Feed-Out Mechanism (Rear View)
2. BASIC UNITS

2.01 Selector and Function Clutch Mechanisms.

Note: To facilitate adjustments, remove typing perforator from base as follows:
(1) For typing perforator equipped with one-shaft mechanism, refer to section containing the disassembly and reassembly routines for the 28 typing perforator.
(2) For typing perforator equipped with two-shaft mechanism, refer to section containing the disassembly and reassembly routines for the 28 perforator-transmitter base.

(A) CLUTCH SHOE LEVER

NOTE: THIS ADJUSTMENT SHALL BE MADE FOR BOTH SELECTOR AND FUNCTION CLUTCHES.

TO CHECK

(1) DISENGAGE CLUTCH. MEASURE CLEARANCE.
(2) ALIGN HEAD OF CLUTCH DRUM MOUNTING SCREW WITH STOP LUG. ENGAGE CLUTCH. MANUALLY PRESS SHOE LEVER AND STOP LUG TOGETHER AND ALLOW TO SNAP APART. MEASURE CLEARANCE.

REQUIREMENT
CLEARANCE BETWEEN SHOE LEVER AND STOP LUG
MIN. 0.055 INCH --- MAX. 0.085 INCH
GREATER WHEN CLUTCH ENGAGED (2) THAN WHEN DISENGAGED (1).

TO ADJUST
ENGAGE WRENCH OR SCREWDRIVER WITH LUG ON ADJUSTING DISC. ROTATE DISC WITH CLAMP SCREWS LOOSENED.

NOTE: AFTER MAKING ADJUSTMENT, DISENGAGE CLUTCH. REMOVE DRUM MOUNTING SCREW, ROTATE DRUM IN NORMAL DIRECTION AND CHECK TO SEE IF IT DRAGS ON SHOE. IF IT DOES, REFINISH ADJUSTMENT.

(B) FUNCTION CLUTCH DRUM END PLAY

FOR ONE-SHAFT UNIT

REQUIREMENT
WITH CLUTCH SHOE LEVER HELD IN DISENGAGED POSITION:
MIN. SOME --- MAX. 0.015 INCH
WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MAX.

TO ADJUST
MOVE DRUM TO EXTREME FRONT POSITION. TIGHTEN DRUM MOUNTING SCREW. POSITION COLLAR WITH MOUNTING SCREW LOOSENED.

(C) FUNCTION CLUTCH DRUM END PLAY

FOR TWO-SHAFT UNIT

REQUIREMENT
WITH FUNCTION CLUTCH DISENGAGED:
MIN. SOME --- MAX. 0.015 INCH
BETWEEN CAM SLEEVE AND COLLAR WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MAXIMUM.

TO ADJUST
POSITION COLLAR WITH MOUNTING SCREW LOOSENED.
NOTE:
THESE SPRING TENSIONS APPLY TO BOTH CLUTCHES.

(A) CLUTCH SHOE LEVER SPRING
TO CHECK ENGAGE CLUTCH. HOLD CAM DISC TO PREVENT ITS TURNING.
REQUIREMENT
MIN. 15 OZS. --- MAX. 20 OZS.
TO PULL SHOE LEVER IN CONTACT WITH STOP LUG.

(b) CLUTCH SHOE SPRING
NOTE:
IN ORDER TO CHECK THIS SPRING TENSION, IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT. THEREFORE, IT SHOULD NOT BE CHECKED UNLESS THERE IS REASON TO BELIEVE IT WILL NOT MEET ITS REQUIREMENT.

TO CHECK REMOVE CLUTCH FROM DRUM.
REQUIREMENT
MIN. 3 OZS. --- MAX. 5 OZS.
TO START PRIMARY SHOE MOVING.
2.03 Selector Mechanism

NOTE: TO FACILITATE MAKING THE FOLLOWING ADJUSTMENTS, REMOVE THE RANGE FINDER AND SELECTOR MAGNET ASSEMBLIES. TO INSURE BETTER OPERATION, PULL A PIECE OF BOND PAPER BETWEEN THE ARMATURE AND THE POLE PIECES TO REMOVE ANY OIL OR FOREIGN MATTER THAT MAY BE PRESENT. MAKE CERTAIN THAT NO LINT OR PIECES OR PAPER REMAIN BETWEEN THE POLE PIECES AND ARMATURE.

NOTE: THESE REQUIREMENTS NEED NOT BE MADE NOR CHECKED IF THE SELECTOR MAGNET BRACKET AND RECEIVING MARGIN REQUIREMENTS ARE MET.

(1) REQUIREMENT
CLEARANCE
MIN. 0.025 INCH
MAX. 0.045 INCH
BETWEEN ARMATURE CLAMP STRIP AND MAGNET BRACKET CASTING.

(2) REQUIREMENT
OUTER EDGE OF ARMATURE SHOULD BE FLUSH WITHIN 0.015 INCH WITH OUTER EDGE OF POLE PIECES.

(3) REQUIREMENT
START LEVER SHALL DROP FREELY INTO ARMATURE EXTENSION SLOT.

TO ADJUST
POSITION ARMATURE SPRING ADJUSTING NUT TO HOLD ARMATURE FIRMLY AGAINST PIVOT EDGE OF CASTING. POSITION ARMATURE WITH MOUNTING SCREWS LOOSENED.

SELECTOR ARMATURE DOWNSSTOP BRACKET
REQUIREMENT
REMOVE OIL SHIELD. WITH MAGNET DE-ENERGIZED, LOCK LEVER ON HIGH PART OF THEIR CAM, AND ARMATURE RESTING AGAINST ITS DOWNSSTOP, CLEARANCE BETWEEN END OF ARMATURE AND LEFT EDGE OF LEFT POLE PIECE.
MIN. 0.025 INCH
MAX. 0.030 INCH

TO ADJUST
POSITION DOWNSSTOP BRACKET WITH MOUNTING SCREW LOOSENED.
SECTION 573-118-700

2.04 Selector Mechanism continued

SELECTOR ARMATURE SPRING (PRELIMINARY)
(For units employing selector armature with single anti-freeze button only).
REQUIREMENT

With locking levers and start lever on high part of their cams, scale applied as near vertically as possible under end of armature extension. It shall require the following tensions to move armature to marking position:

- 0.060 AMPERES
- 0.020 AMPERES and 0.035 AMPERES

MIN. 2-1/2 OZS. --- MAX. 3 OZS. MIN. 1-1/2 OZS. --- MAX. 2 OZS.

NOTE:
This spring can be adjusted for maximum selector performance only when printer is connected to the specific circuit over which it is to operate under service conditions. Since there are several operating speeds and since circuits vary widely, it is impossible to adjust spring for maximum performance at the factory. The foregoing spring tension requirement is given to permit operation prior to measurement of receiving margins. Readjustment made to obtain satisfactory receiving margin should not be disturbed in order to meet requirements of this adjustment.

To adjust position adjusting nut.

SELECTOR ARMATURE SPRING (FINAL)
REQUIREMENT

(See selector receiving margin adjustment)
2.05 Selector Mechanism continued

**Selector Armature Spring (Preliminary)**

(for units employing selector armature with two anti-freeze buttons only).

Requirement

With locking levers and start lever on high part of their cams, scale applied as nearly vertical as possible under end of armature extension. It shall require approximately the following tensions to move the rear anti-freeze button against the magnet core:

- 0.020 Ampere (14 grams)
- 0.030 Ampere (18 grams)
- 0.060 Ampere (21 grams)

To adjust position adjusting nut.

**Selector Armature Spring (Final)**

Requirement

When a distortion test set is available, the selector armature spring tension should be refined, if necessary, to obtain satisfactory receiving margins. The front anti-freeze button must contact the magnet core when the magnet coils are energized.

(See selector receiving margin adjustment.)
2.06 Selector Mechanism continued

**NOTE:**

**THE APPROPRIATE PRELIMINARY SELECTOR ARMATURE SPRING TENSION ADJUSTMENT MUST BE MADE PRIOR TO THIS ADJUSTMENT.**

**1. REQUIREMENT**

SPACING LOCK LEVER ON HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SHOULDER ON SPACING LOCK LEVER.

- **MIN.** 0.020 INCH
- **MAX.** 0.035 INCH

**TO ADJUST**

- LOOSEN TWO MAGNET BRACKET MOUNTING SCREWS AND ADJUSTING LINK CLAMP SCREW. POSITION MAGNET BRACKET BY MEANS OF ADJUSTING LINK AND TIGHTEN LINK CLAMP SCREW ONLY.

**2. REQUIREMENT**

SPACING LOCK LEVER ON HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. SOME CLEARANCE BETWEEN UPPER SURFACE OF ARMATURE EXTENSION AND LOWER SURFACE OF SPACING LOCK LEVER WHEN LOCK LEVER IS HELD DOWNWARD.

- **MAX.** 0.003 INCH

**TO ADJUST**

- POSITION UPPER END OF MAGNET BRACKET. TIGHTEN TWO MAGNET BRACKET MOUNTING SCREWS. RECHECK REQUIREMENT (1).
2.07 Selector Mechanism continued

MARKING LOCK LEVER SPRING REQUIREMENT

LETTERS COMBINATION SELECTED, MAIN SHAFT ROTATED UNTIL SELECTOR CLUTCH IS DISENGAGED. PUSH SCALE APPLIED TO LOWER EXTENSION OF LOCK LEVER.

MIN. 1-1/2 OZS.
MAX. 3 OZS.
TO START LEVER MOVING.
2.08 Selector Mechanism continued

**Selector Push Lever Spring Requirement**
- Push lever in spacing position
  - Min. 3/4 oz.
  - Max. 1-1/2 ozs.
- To move push lever from selector lever, check five springs.

**Selector Lever Spring Requirement**
- Typing unit upside down.
- Reset bail on peak of its cam.
  - Min. 1-1/4 ozs.
  - Max. 2-1/2 ozs.
- To start each lever moving, check five springs. If necessary, unhook start lever spring to check No. 4 selector lever spring.

**Selector Clutch Drum End Play Requirement**
- Clutch latched in stop position, clutch drum should be against shoulder on main shaft.
- To adjust position clutch drum with mounting screw loosened.

**Main Shaft**

**Mounting Screw**

**Cam-Clutch Assembly**

**Selector Clutch Drum**
2.09 Selector Mechanism continued

(A) **PUSH LEVER RESET BAIL SPRING REQUIREMENT**

PUSH LEVER RESET BAIL ON LOW PART OF CAM. 32 OZ. SCALE APPLIED TO RESET BAIL.
MIN. 4 OZS.
MAX. 8 OZS.
TO MOVE BAIL FROM CAM.

(B) **SELECTOR CLUTCH LATCH LEVER SPRING REQUIREMENT**

LATCH RESTING ON LOW PART OF ITS CAM DISC.
MIN. 2 OZS.
MAX. 3-1/2 OZS.
TO START LATCH MOVING.

(C) **SPACING LOCK LEVER SPRING REQUIREMENT**

SELECTOR ARMATURE RELEASED. SPACING LOCK LEVER ON LOW PART OF ITS CAM.
SPRING SCALE APPLIED TO LOWER END OF SPACING LOCK LEVER.
MIN. 3 OZS.
MAX. 6 OZS.
TO MOVE SPACING LOCK LEVER FROM ITS PIVOT SHAFT.
2.10 Selector Mechanism continued

(A) RANGE SCALE KNOB

REQUIREMENT

With range scale knob turned to either end of rack, zero mark on scale should be within 3 points of scribed line on range scale plate and the inner teeth of the knob and sector assembly are engaged.

To adjust

Loosen range scale mounting nut, disengage range scale gear from rack teeth reposition range scale and tighten mounting nut.

---

(B) SELECTOR CLUTCH STOP ARM

REQUIREMENT

Range scale set at 60. Selector clutch disengaged. Armature in marking position. Clutch stop arm shall engage clutch shoe lever by approximately full thickness of shoe lever.

To adjust

Position stop arm on stop arm bail with clamp screw loosened.
2.11 Selector Mechanism continued

START LEVER SPRING
REQUIREMENT:
LATCH LEVER SPRING UNHOOKED. STOP
ARM BAIL IN INDENT OF ITS CAM. RANGE
SCALE SET AT 60.
MIN. 2-1/2 OZS.
MAX. 4-1/2 OZS.
TO START STOP ARM MOVING.

NOTE:
TYPING REPERFORATORS OPERATING WITH
30 MILLIAMPERE SELECTOR COIL CURRENT
WITH COILS IN SERIES SHALL HAVE RECEIVING MARGIN TESTS RUN AT, AND MEET
THE REQUIREMENTS FOR 100 WPM SPEED,
60 MILLIAMPERE SELECTOR COILS IN PARALLEL. TESTING AT 30 MILLIAMPERE IS NOT
REQUIRED.

START LEVER SPRING
REQUIREMENT (FOR UNITS EMPLOYING ARMATURE WITH ONE ANTI-FREEZE BUTTON)
WHEN A SIGNAL DISTORTION TEST SET IS USED FOR DETERMINING THE RECEIVING MARGINS
OF THE SELECTOR, AND WHERE THE CONDITION OF THE COMPONENTS IS EQUIVALENT TO
THAT OF NEW EQUIPMENT, THE RANGE AND DISTORTION TOLERANCES BELOW SHOULD BE MET.

REQUIREMENT (FOR UNITS EMPLOYING ARMATURE WITH TWO ANTI-FREEZE BUTTONS)
WHEN A DISTORTION TEST SET IS AVAILABLE, THE SELECTOR ARMATURE SPRING TENSION SHOULD
BE REFINED, IF NECESSARY, TO OBTAIN SATISFACTORY RECEIVING MARGINS. THE FRONT ANTI-FREEZE
BUTTON MUST CONTACT THE MAGNET CORE WHEN THE MAGNET COILS ARE ENERGIZED.

TO ADJUST: REFINISH THE SELECTOR ARMATURE SPRING.

### SELECTOR RECEIVING MARGIN
MUNIMUM REQUIREMENTS

<table>
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<tr>
<th>CURRENT</th>
<th>SPEED IN W.P.M.</th>
<th>POINTS RANGE WITH ZERO DISTORTION</th>
<th>PERCENTAGE OF MARKING AND SPACING BIAS TOLERATED</th>
<th>END DISTORTION TOLERATED WITH SCALE AT BIAS OPTIMUM SETTING</th>
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<tr>
<td>0.060 AMP.</td>
<td>60</td>
<td>72</td>
<td>40</td>
<td>35</td>
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<tr>
<td>(WINDINGS PARALLEL)</td>
<td>75</td>
<td>72</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>0.020 AMP.</td>
<td>60</td>
<td>72</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>(WINDINGS SERIES)</td>
<td>75</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>0.035 AMP.</td>
<td>65 (45.5 BAUD)</td>
<td>72</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>(WINDINGS SERIES)</td>
<td>106 (75.0 BAUD)</td>
<td>72</td>
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2.12 Selector and Function Mechanisms

(A) Selector Cam Lubricator Requirement

- Lubricator tube shall clear high part of lock lever cam
  - Min. 0.020 inch
- High part of selector lever cams shall touch lubricator wick, but shall not raise it more than 1/32 inch.
- There shall be some clearance between marking lock lever spring and reservoir.

To adjust position lubricator with mounting screws loosened.

(B) Function Clutch Trip Lever Requirement

- (1) With release lever resting on main trip lever (see below), function clutch trip lever shall engage full thickness of shoe lever.
- (2) Min. some — Max. 0.010 inch

To adjust position trip lever on its shaft with clamp screw loosened.

(C) Reset Arm To Check

Trip function clutch and position main shaft so that reset arm is held in its highest position by cam pin.

Requirement

- (1) Clearance between release lever and main trip lever
  - Min. 0.005 inch — Max. 0.030 inch
- (2) Latch lever end play
  - Min. some
- (3) Clearance between reset arm and function cam
  - Min. some

To adjust position reset arm with clamp screw loosened.
2.13 Function Mechanisms

(A) FOLLOWER LEVER REQUIREMENT

With follower lever on high part of cam
(1) Clearance between release lever and main trip lever
   Min. 0.010 inch --- Max. 0.030 inch
(2) Some clearance between main trip lever and downstop bracket.

To adjust by means of pry point, position adjusting arm of follower lever with lock nut loosened.

(C2) MAIN TRIP LEVER SPRING (LATER DESIGN) REQUIREMENT

With function clutch tripped
   Min. 1 oz. --- Max. 4 ozs.

To start main trip lever moving.

Note: It may be necessary to remove ribbon-feed mechanism when checking this tension.

(C1) MAIN TRIP LEVER SPRING (EARLIER DESIGN) REQUIREMENT

With follower lever on high part of trip cam
   Min. 2-1/2 ozs. --- Max. 4-1/2 ozs.

To start trip lever moving.

(B1) ADJUSTING ARM SPRING (EARLIER DESIGN) REQUIREMENT

With follower lever on high part of trip cam and main trip lever held away from adjusting arm
   Min. 2-1/2 ozs. --- Max. 4 ozs.

To start adjusting arm moving.

(B2) ADJUSTING ARM TORSION SPRING (LATER DESIGN) REQUIREMENT

With follower lever on low part of trip cam and main trip lever held away from adjusting arm
   Min. 1 oz. --- Max. 4 ozs.

To start adjusting arm moving.
2.14 Function Mechanisms continued

(A) **ROCKER BAIL REQUIREMENT**

- With rocker bail positioned to its extreme left and upper roller in contact with function cam, the minimum clearance between cam and lower roller at point of least clearance is 0.004 inch.
- To adjust, position lower roller mounting screw in elongated slot with lock nut loosened. Check throughout a complete revolution for binds.

(B) **ROCKER BAIL GUIDE BRACKET REQUIREMENT**

1. Rocker bail rollers should engage full thickness of function cam.
2. Lifter roller in full engagement with rocker bail camming surface.
- To adjust, position rocker bail and guide bracket with guide bracket mounting screws loosened.
2.15 Selector Mechanisms

PUNCH SLIDE LATCH SPRINGS
TO CHECK
SELECT LETTERS CODE COMBINATION (12345). POSITION ROCKER BAIL TO EXTREME LEFT. STRIP PUSH LEVERS FROM SELECTING LEVERS.

REQUIREMENT
FOR ONE-SHAFT UNIT
MIN. 1 OZS. --- MAX. 3 OZS.
TO START LATCH MOVING.
FOR TWO-SHAFT UNIT
MIN. 3/4 OZS. --- MAX. 2 OZS.
TO START LATCH MOVING.
2.16 Punch Mechanisms

Perforator Position Requirement

With letters combination selected and function clutch just tripped,
min. 0.015 inch --- max. 0.045 inch clearance between the closest latch lever and associated punch slide.

To adjust
loosen (friction tight) rear frame mounting screws (and pivot locating plate clamp screw if the typing unit is used on the punch), the anchor bracket mounting screws, place tip of screwdriver between hex head screw and its clearance hole rim and pry up or down. Tighten screws. Tighten pivot locating plate clamp screw only, as the next adjustment will be to obtain clearance between typewheel and punch.
2.17 Punch Mechanisms continued

PERFORATOR POSITION

(1) REQUIREMENT - (FOR TYPING REPERFORATOR WITH SPRING RETRACTED PUNCH UNIT)
WITH UNIT IN STOP POSITION AND TYPEWHEEL IN THE LETTERS FIELD. CLEARANCE BETWEEN
THE LETTER "Z" ON THE TYPEWHEEL AND THE TOP OF THE STRIPPER PLATFORM.
MIN. 0.090 INCH --- MAX. 0.110 INCH

(2) REQUIREMENT - (FOR TYPING REPERFORATOR WITH POWER RETRACTED PUNCH UNIT)
WITH UNIT IN STOP POSITION AND TYPEWHEEL IN THE FIGURES FIELD. CLEARANCE BETWEEN
THE FIGURE "5" ON THE TYPEWHEEL AND THE TOP OF THE STRIPPER PLATFORM.
MIN. 0.075 INCH --- MAX. 0.095 INCH

TO ADJUST
REMOVE RIBBON FROM CARRIER. POSITION PERFORATOR WITH TWO MOUNTING SCREWS,
ADJUSTING CLAMP PIVOT SCREW AND ANCHOR BRACKET SCREW LOOSENED. CHECK RESET
BAIL TRIP LEVER REQUIREMENT FOR SOME CLEARANCE AND ADJUST IF NECESSARY.
2.18 Punch Mechanisms continued

NOTE: BEFORE PROCEEDING WITH THE PUNCH MECHANISM ADJUSTMENTS, CHECK THE ROCKER BAIL CAM FOLLOWER ROLLER ADJUSTMENT AND LOOSEN THE PUNCH SLIDE DOWNSTOP MOUNTING NUT AND GUIDE MOUNTING STUD.

TOGGLE BAIL ECCENTRIC (PRELIMINARY) REQUIREMENT
THE INDENT (HIGH SIDE OF ECCENTRIC) SHALL BE IN ITS UPPERMOST POSITION.

TO ADJUST
WITH THE TOGGLE ECCENTRIC SHAFT LOCK NUT FRICTION TIGHT POSITION ECCENTRIC.

PERFORATOR DRIVE LINK SPRING REQUIREMENT
MIN. 3-1/2 OZS.
MAX. 8 OZS.
TO PULL SPRINGS TO INSTALLED LENGTH.

TOGGLE OPERATING ARM
(1) REQUIREMENT
TRIP FUNCTION CLUTCH AND ROTATE MAIN SHAFT UNTIL THE UPPER ROCKER BAIL ROLLER IS ON HIGH PART OF ITS CAM.
MIN. SOME---MAX. 0.009 INCH
CLEARANCE BETWEEN FEED PAWL STUD AND THE TP159926 GAUGE.

(2) CLEARANCE BETWEEN ARM AND OSCILLATING SHAFT BEARING HUB.
MIN. 0.002 INCH---MAX. 0.015 INCH
WITH PLAY TAKEN UP IN DIRECTION TO MAKE CLEARANCE MAXIMUM.

* AFTER FEED PAWL ADJUSTMENT HAS BEEN MADE, IF PUNCH PIN PENETRATION AND FEED PAWL REQUIREMENTS ARE MET, THIS REQUIREMENT SHOULD BE CONSIDERED FULFILLED.
2.19 Punch Mechanisms for Chadless Tape

(B) PUNCH SLIDE DOWNSTOP PLATE POSITION

TO CHECK

WITH LTRS COMBINATION SELECTED AND UNIT IN STOP
POSITION (CLUTCHES DISENGAGED), TRIP FUNCTION RESET
TRIP MECHANISM FOR SOME CLEARANCE,
THE PUNCH SLIDES SHALL MOVE FREELY TO THEIR
OPERATED POSITION.

REQUIREMENT

MIN. SOME---MAX. 0.008 INCH
BETWEEN FRONT AND REAR PUNCH SLIDES AND
DOWNSTOP PLATE. ALL OTHER PUNCH SLIDES
SHALL HAVE SOME CLEARANCE.

NOTE: ADJUSTMENTS
ON THIS PAGE DO
NOT APPLY TO TAPE
PRINTER.

TO ADJUST
REMOVE PUNCH SLIDE GUIDE, LOOSEN DOWN­­
STOP PLATE MOUNTING STUDS, AND POSITION
THE DOWNSTOP PLATE. TIGHTEN STUDS AND
REPLACE GUIDE SO THAT PUNCH SLIDES ALIGN
WITH PUNCH PINS (AS GAUGED BY EYE).

(A) PUNCH PIN PENETRATION

REQUIREMENT

LTRS SELECTED, FUNCTION CLUTCH ENGAG­ED AND ROTATED UNTIL PUNCH PINS HAVE
TRAVELED MAXIMUM DISTANCE INTO THE DIE
PLATE, CLEARANCE BETWEEN LOWER EDGE OF
PUNCH RETRACTOR BAIL AND UPPER SIDE OF
GUIDE PLATE (MEASURED ADJACENT TO NO. 1
AND NO. 5 PUNCH PINS WHERE CLEARANCE
IS LEAST).

MIN. 0.060 INCH
MAX. 0.075 INCH

TO ADJUST
ROTATE THE TOGGLE BAIL ECCENTRIC SHAFT
WITH ITS LOCK NUT LOOSENED. KEEP THE IN­
DENTATION IN THE ECCENTRIC SHAFT TO THE
LEFT OF A VERTICAL CENTERLINE THROUGH THE
SHAFT.

NOTE:
The code punches shall punch a
full tape lid with slight amount
of tear. The tear shall be re­
stricted to a minimum. Refine
punch pin penetration adjustment,
if necessary.

(C) PUNCH SLIDE GUIDE

REQUIREMENT

LTRS SELECTED, FUNCTION CLUTCH ENGAG­ED AND ROTATED UNTIL THE PUNCH SLIDES
JUST TOUCH THE PUNCH PINS. THE PUNCH
SLIDES SHALL ALIGN CENTRALLY WITH THEIR
RESPECTIVE PUNCH PINS (GAUGED BY EYE).

TO ADJUST
POSITION THE PUNCH SLIDE GUIDE WITH ITS
MOUNTING NUTS LOOSENED.
2.20 Punch Mechanisms for Fully Perforated Tape

(A) PUNCH PIN PENETRATION REQUIREMENT

1. WITH THE LETTERS COMBINATION SELECTED, FUNCTION CLUTCH ENGAGED. ROTATE MAIN SHAFT UNTIL ALL PUNCH PINS ARE INTO OR ABOVE THE TAPE APERTURE IN PUNCH BLOCK. WITH THE TP159926 GAUGE IN POSITION
   MIN. 0.050 INCH CLEARANCE BETWEEN FEED PAWL STUD AND THE GAUGE.

2. WITH LETTERS COMBINATION SELECTED, FUNCTION CLUTCH ENGAGED. ROTATE MAIN SHAFT UNTIL ALL PUNCH PINS HAVE CLEARED THE PUNCH BLOCK. WITH THE TP159926 GAUGE IN POSITION
   MAX. 0.080 INCH CLEARANCE BETWEEN FEED PAWL STUD AND GAUGE.

TO ADJUST

REFINE THE TOGGLE BAIL ECCENTRIC ADJUSTMENT KEEPING THE INDENT TO THE RIGHT OF A VERTICAL CENTERLINE THROUGH THE SHAFT.

(B) PUNCH SLIDE GUIDE REQUIREMENT

THE PUNCH SLIDES SHOULD ALIGN WITH THEIR CORRESPONDING PUNCH PINS AND BE FREE OF BINDS AFTER TIGHTENING THE GUIDE MOUNTING STUDS. EACH PUNCH SLIDE SHOULD RETURN FREELY AFTER BEING PUSHED IN NOT MORE THAN 1/16 INCH.

TO ADJUST

POSITION THE GUIDE WITH ITS MOUNTING STUDS FRICTION TIGHT.

(C) PUNCH SLIDE DOWNSTOP POSITION REQUIREMENT

WITH FUNCTION CLUTCH DISENGAGED AND LATCHED. PLAY TAKEN UP TOWARD THE TOP CLEARANCE BETWEEN BOTH THE FRONT AND REAR PUNCH SLIDES AND THE DOWNSTOP PLATE
   MIN. SOME---MAX. 0.008 INCH

ALL OTHER PUNCH SLIDES SHALL HAVE SOME CLEARANCE.

NOTE: TO CHECK FOR SOME CLEARANCE, PLACE UNIT IN STOP POSITION, TRIP FUNCTION TRIP MECHANISM AND LATCHES. THE PUNCH SLIDES SHALL MOVE FULLY TO THEIR OPERATED POSITION.

TO ADJUST

WITH UNIT IN STOP POSITION, LOCSEN THE TWO DOWNSTCP PLATE MOUNTING LOCK NUTS AND LOCATE THE DOWNSTCP PLATE TO MEET THE REQUIREMENT.

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.
2.21 Function Mechanism continued

RESET BAIL TRIP LEVER

REQUIREMENT

(1) MANUALLY SELECT BLANK COMBINATION, MANUALLY ROTATE RESET BAIL TRIP LEVER. THE PUNCH SLIDE RESET BAIL SHALL TRIP BEFORE THE FUNCTION CLUTCH IS TRIPPED.

(2) WITH FUNCTION AND SELECTOR CLUTCHES DIS- ENGAGED AND LATCHED, THE PUNCH SLIDE RESET BAIL SHALL FULLY ENGAGE THE PUNCH SLIDE LATCHING SURFACE WHEN PLAY IN PARTS IS TAKEN UP IN DIRECTION TO MAKE THE ENGAGEMENT THE LEAST.

TO ADJUST

(1) WITH TRIP LEVER EXTENSION LOCK SCREW FRICITION TIGHT AND LETTERS COMBINATION SELECTED, POSITION RESET BAIL AGAINST PUNCH SLIDES. TAKE UP PLAY BETWEEN RESET BAIL AND TRIP LEVER IN A COUNTER CLOCKWISE DIRECTION. POSITION TRIP LEVER BY MEANS OF ITS PRY POINT.

(2) RECHECK REQUIREMENT (1) ABOVE AND REFINE ADJUSTMENT IF NECESSARY.
2.22 Punch Mechanism continued

(A) LATCH LEVER CLEARANCE

TO CHECK
PUNCH SLIDES SHALL BE IN SPACING POSITION.

REQUIREMENT
WITH FUNCTION CLUTCH DISENGAGED AND LATCHED, CLEARANCE BETWEEN PUNCH SLIDE AND PUNCH SLIDE LATCH
MIN. 0.008 INCH — MAX. 0.020 INCH
FOR SLIDE HAVING THE LEAST CLEARANCE.

TO ADJUST
ROTATE THE RESET BAIL ECCENTRIC SHAFT WITH ITS LOCK NUT LOOSENED,
KEEP INDENTATION IN ECCENTRIC ABOVE HORIZONTAL CENTER OF SHAFT.

(B) FEED PAWL (PRELIMINARY)

TO CHECK
FEED WHEEL OIL HOLE SHALL BE IN UP POSITION.

REQUIREMENT
FUNCTION CLUTCH DISENGAGED, INDENTATION IN DETENT LEVER ECCENTRIC AT RIGHT ANGLE TO LEVER, DETENT ROLLER IN CONTACT WITH RATCHET WHEEL,
HIGH PART OF FEED PAWL ECCENTRIC TO THE RIGHT OF ITS LOCK SCREW. THE FEED PAWL SHALL ENGAGE THE FIRST TOOTH BELOW A HORIZONTAL CENTERLINE THROUGH THE RATCHET WHEEL WITH NO PERCEPTIBLE CLEARANCE.

TO ADJUST
ROTATE THE FEED PAWL ECCENTRIC WITH LOCK SCREW LOOSENED.

NOTE:
THIS ADJUSTMENT IS RELATED TO FEED HOLE SPACING AND TWO ADJUSTMENTS SHALL BE MADE AT THE SAME TIME.
2.23 Punch Mechanism for Chadless Tape continued

**FEED HOLE SPACING (PRELIMINARY)**

**NOTE:** ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.

TO ADJUST:

1. **INDENT OF DIE WHEEL ECCENTRIC STUD POINTING DOWNWARD.**
2. **POSITION DIE WHEEL ECCENTRIC STUD WITH LOCK NUT LOOSENED.**

**NOTE:** BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENTS, CHECK BOTH TAPE GUIDE SPRING ADJUSTMENTS.

**FEED HOLE SPACING (FINAL)**

(1) **REQUIREMENT**

WITH TAPE SHOE BLOCKED AWAY FROM THE FEED WHEEL, FEED PAWL AND DETENT DISENGAGED, AND TAPE REMOVED FROM THE PUNCH MECHANISM, THE FEED WHEEL SHALL ROTATE FREELY. (CHECK THROUGH 3 OR 4 ROTATIONS).

(2) **REQUIREMENT**

PERFORATE SIX SERIES OF NINE BLANK CODE COMBINATIONS FOLLOWED BY A LTS COMBINATION. OPEN CHADS SO THAT CODE HOLES ARE VISIBLE. PLACE TAPE OVER SMOOTH SIDE OF TP156011 TAPE GAUGE SO THAT CIRCULAR PORTION OF FIRST NO. 2 CODE HOLE IS CONCENTRIC WITH FIRST (0.072 INCH) HOLE OF TAPE GAUGE. (SEE NOTE BELOW.) SECOND THROUGH FIFTH HOLES IN TAPE GAUGE SHALL BE VISIBLE THROUGH NO. 2 CODE HOLES IN TAPE. CIRCULAR PORTION OF SIXTH NO. 2 CODE HOLE IN TAPE SHALL BE ENTIRELY WITHIN (0.086 INCH) HOLE OF TAPE GAUGE.

**TO ADJUST**

1. **WITH TAPE REMOVED FROM PUNCH MECHANISM, LOOSEN DIE WHEEL ECCENTRIC STUD LOCK-NUT. ADJUST DIE WHEEL SO THAT IT JUST BINDS ON FEED WHEEL. BACK OFF ECCENTRIC SO DIE WHEEL IS JUST FREE (CHECK FREENESS THROUGH 3 OR 4 REVOLUTIONS). KEEP INDENT OF ECCENTRIC STUD BELOW HORIZONTAL CENTERLINE OF STUD.**

2. **REFINE ABOVE ADJUSTMENT TO MEET REQUIREMENT (2). IF NECESSARY, MOVE INDENT OF DIE WHEEL ECCENTRIC STUD TOWARD FEED WHEEL TO DECREASE CHARACTER SPACING AND AWAY FROM FEED WHEEL TO INCREASE CHARACTER SPACING. CAUTION: WITH TAPE REMOVED FROM PUNCH MECHANISM, MAKE SURE DIE WHEEL DOES NOT BIND.**

3. **RECHECK REQUIREMENT (1). IF IT IS NOT MET, DIE WHEEL ECCENTRIC HAS BEEN OVER ADJUSTED.**

**NOTE:**

FIRST THROUGH FIFTH HOLES IN GAUGE ARE SAME SIZE AS CODE IN TAPE (0.072 INCH DIAMETER). BUT SIXTH HOLE IN GAUGE IS LARGER (0.086 INCH). THIS ARRANGEMENT ALLOWS ± 0.007 INCH VARIATION IN 5 INCHES.
2.24 Punch Mechanism for Chadless Tape continued

DETENT LEVER

REQUIREMENT
A piece of tape containing nine feed holes followed by a letters combination perforated on the perforator must conform to the TP156011 tape gauge.
The lateral centerline through the code holes in the tape should coincide with a lateral centerline through the holes in the gauge.

TO ADJUST
Rotate the detent eccentric clockwise to move the feed holes toward the hinged edge of the code holes and counterclockwise to move the feed holes toward the trailing edge of the code holes. Tighten the eccentric lock nut and refine the feed pawl adjustment.

RECHECK FEED PAWL ADJUSTMENT.

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.
NOTE: IF UNIT IS EQUIPPED WITH TAPE GUIDE (EARLIER DESIGN), LOCKNUT MUST BE LOOSENED BEFORE FEED HOLE LATERAL ALIGNMENT ADJUSTMENT IS MADE.

FEED HOLE LATERAL ALIGNMENT

REQUIREMENT

WITH REPERFORATOR OPERATING UNDER POWER, OBTAIN A PIECE OF TAPE CONTAINING A SERIES OF NINE BLANK CODE COMBINATIONS FOLLOWED BY A LTRS COMBINATION. OPEN CHADS SO CODE HOLES ARE VISIBLE AND PLACE TAPE OVER TP156011 TAPE GAUGE WITH LTRS COMBINATION FEED HOLES ENGAGING FEED PINS. LARGE HOLES IN GAUGE ARE SAME DIAMETER AS CIRCULAR PORTION OF CODE HOLES IN TAPE. SMALL HOLES IN GAUGE SERVE AS GUIDE FOR GAUGING. CIRCULAR PORTION OF CODE HOLES IN TAPE SHALL BE CONCENTRIC WITH HOLES IN TAPE GAUGE.

TO ADJUST

LOOSEN ADJUSTING SCREW LOCKNUT AND POSITION ADJUSTING SCREW. TO MOVE HOLES OF GAUGE AWAY FROM REFERENCE EDGE OF TAPE, MOVE FEED WHEEL TOWARD FRONT PLATE OF PUNCH MECHANISM BY ROTATING ADJUSTING SCREW COUNTERCLOCKWISE. TO MOVE HOLES OF GAUGE TOWARD REFERENCE EDGE OF TAPE, MOVE FEED WHEEL TOWARDS BACKPLATE OF PUNCH MECHANISM BY ROTATING ADJUSTING SCREW CLOCKWISE. TIGHTEN LOCKNUT. REFINE DETENT LEVER ADJUSTMENT TO ALIGN LATERAL CENTERLINES OF CODE HOLES AND FEED HOLES, IF REQUIRED.
2.26 Punch Mechanism for Chadless Tape continued

(A) PUNCH SLIDE SPRING

REQUIREMENT
LETTERS COMBINATION SET UP, FUNCTION CLUTCH TRIPPED, PUNCH SLIDES IN SELECTED POSITION UNDER PUNCH PINS.
MIN. 2 1/4 OZS.
MAX. 3 1/4 OZS.
TO START EACH SLIDE MOVING,

(B) RETRACTOR BAIL SPRINGS

(1) REQUIREMENT (COMPRESSION SPRINGS ONLY) WITH FUNCTION CLUTCH DISENGAGED AND TENSION SPRINGS UNHOOKED:
MIN. 15 OZS.
MAX. 32 OZS.
TO LIFT RETRACTOR BAIL AWAY FROM LOWER GUIDE OR PUNCH BLOCK.

(2) REQUIREMENT (COMBINED COMPRESSION AND TENSION SPRINGS)
UNDER THE SAME CONDITIONS AS REQUIREMENT (1) ABOVE, EXCEPT WITH TENSION SPRINGS HOOKED:
MIN. 4 LBS. -- MAX. 5 LBS.

*TO FACILITATE REHOOKING TENSION SPRINGS, PLACE PUNCH PINS IN UPPER-MOST POSITION.
2.27 Punch Mechanism for Chadless Tape continued

(B) TAPE GUIDE ASSEMBLY SPRING

REQUIREMENT
THE TAPE GUIDE ASSEMBLY SHOULD BE FREE TO RETURN TO REST AGAINST THE TAPE GUIDE BLOCK AFTER A MIN. 16 OZS.
IS USED TO PULL THE TAPE GUIDE ASSEMBLY AWAY FROM THE BLOCK.
TO ADJUST REPLACE SPRING IF REQUIREMENT IS NOT MET.
IF THE TAPE GUIDE ASSEMBLY IS NOT FREE TO RETURN, REPOSITION THE TAPE GUIDE ASSEMBLY MOUNTING POST TO FREE THE TAPE GUIDE ASSEMBLY.

(A) TAPE GUIDE SPRING (TAPE GUIDE)

REQUIREMENT
CLUTCH DISENGAGED AND TAPE THREADED THROUGH THE PUNCH ASSEMBLY, IT SHOULD REQUIRE MIN. 1-1/4 OZS.
MAX. 2-1/4 OZS.
TO JUST MOVE THE SPRING AWAY FROM THE TAPE.
TO ADJUST BEND THE SPRING.

NOTE: IN ORDER TO CHECK THIS SPRING TENSION ON UNITS EQUIPPED WITH BACKSPACE MECHANISM, IT IS NECESSARY TO REMOVE SEVERAL PARTS. IT SHOULD NOT BE CHECKED UNLESS THERE IS REASON TO BELIEVE THAT REQUIREMENTS CANNOT BE MET.

(C) TAPE GUIDE SPRING (PUNCH BLOCK)

(1) REQUIREMENT
WITH THE TAPE REMOVED FROM THE PUNCH BLOCK THE TAPE GUIDE SPRING SHOULD REST AGAINST THE CLEARANCE SLOT IN THE BLOCK IN A SYMMETRICAL MANNER.

(2) REQUIREMENT
WITH TAPE IN THE PUNCH BLOCK AND THE PERFORATOR OPERATING UNDER POWER, THE SPRING SHOULD NOT DISTORT THE EDGE OF THE TAPE.
TO ADJUST BEND THE SPRING AND POSITION IT WITH ITS MOUNTING SCREW LOOSENED.

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.
2.28 Punch Mechanism for Fully Perforated Tape continued

NOTE: INDENTATIONS OF THE FEED WHEEL FULLY PUNCHED OUT BY THE FEED PUNCH

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.

NOTE: BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENTS, CHECK BOTH TAPE GUIDE SPRING
ADJUSTMENTS.

FEED HOLE SPACING
(1) REQUIREMENT
WITH TAPE SHOE BLOCKED AWAY FROM FEED WHEEL, FEED PAWL AND DETENT DISENGAGED, AND TAPE REMOVED FROM THE PUNCH MECHANISM, FEED WHEEL SHALL ROTATE FREELY. (SHALL BE CHECKED THROUGH 3 OR 4 REVOLUTIONS.)

(2) REQUIREMENT
PERFORATE SIX SERIES OF NINE BLANK CODE COMBINATIONS FOLLOWED BY A LTRS COMBINATION. PLACE TAPE OVER SMOOTH SIDE OF TP156011 TAPE GAUGE SO THAT CIRCULAR PORTION OF FIRST NO. 2 CODE HOLE IS CONCENTRIC WITH FIRST (0.072 INCH) HOLE OF TAPE GAUGE. (SEE NOTE BELOW.) SECOND THROUGH FIFTH HOLES IN TAPE GAUGE SHALL BE VISIBLE THROUGH NO. 2 CODE HOLES IN TAPE. CIRCULAR PORTION OF SIXTH NO. 2 CODE HOLE IN TAPE SHALL BE ENTIRELY WITHIN (0.086 INCH) HOLE OF TAPE GAUGE.

TO ADJUST
(1) WITH TAPE REMOVED FROM PUNCH MECHANISM, LOOSEN DIE WHEEL ECCENTRIC STUD LOCKNUT. ADJUST DIE WHEEL SO THAT IT JUST BINDS ON FEED WHEEL. BACK OFF ECCENTRIC SO DIE WHEEL IS JUST FREE (CHECK FREENESS THROUGH 3 OR 4 REVOLUTIONS). KEEP INDENT OF ECCENTRIC STUD BELOW HORIZONTAL CENTERLINE OF STUD.

(2) REFINE ABOVE ADJUSTMENT TO MEET REQUIREMENT (2). IF NECESSARY, MOVE INDENT OF DIE WHEEL ECCENTRIC STUD TOWARD FEED WHEEL TO DECREASE CHARACTER SPACING AND AWAY FROM FEED WHEEL TO INCREASE CHARACTER SPACING. CAUTION: WITH TAPE REMOVED FROM PUNCH MECHANISM, MAKE SURE DIE WHEEL DOES NOT BIND.

(3) RECHECK REQUIREMENT (1). IF IT IS NOT MET, DIE WHEEL ECCENTRIC HAS BEEN OVERADJUSTED.

REFINE.

NOTE: FIRST THROUGH FIFTH HOLES IN GAUGE ARE SAME SIZE AS CODE IN TAPE (0.072 INCH DIAMETER). BUT SIXTH HOLE IN GAUGE IS LARGER (0.086 INCH). THIS ARRANGEMENT ALLOWS±0.007 INCH VARIATION IN 5 INCHES.
2.29 Punch Mechanism for Fully Perforated Tape continued

NOTE: (INDENTATION OF THE FEED WHEEL FULLY PUNCHED OUT BY THE FEED PUNCH)

NOTE: IF UNIT IS EQUIPPED WITH TAPE GUIDE (EARLIER DESIGN), LOCKNUT MUST BE LOOSENED BEFORE FEED HOLE LATERAL ALIGNMENT ADJUSTMENT IS MADE.

FEED WHEEL INDENTATION ALIGNMENT

(1) REQUIREMENT

WHEN A PIECE OF TAPE IS PERFORATED WITH A SERIES OF BLANK CODE COMBINATIONS, THE INDENTATIONS OF THE FEED WHEEL SHALL BE FULLY PUNCHED OUT.

TO ADJUST

RIGHT OR LEFT, ROTATE THE DETENT LEVER ECCENTRIC STUD CLOCKWISE TO MOVE THE FEED WHEEL PERFORATIONS TOWARD THE LEADING EDGE OF THE CODE HOLES, AND COUNTERCLOCKWISE TO MOVE THE FEED WHEEL PERFORATIONS TOWARD THE TRAILING EDGE OF THE CODE HOLES. REFINE THE FEED PAWL ADJUSTMENT.

FRONT TO REAR, LOOSEN THE LOCK NUT ON THE ADJUSTING SCREW AND TURN THE SCREW CLOCKWISE TO MOVE TAPE TOWARD REFERENCE EDGE (REAR), AND COUNTERCLOCKWISE TO MOVE THE TAPE AWAY FROM REFERENCE EDGE (FRONT).

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.
2.30 Punch Mechanism for Fully Perforated Tape continued

(Indentations of the Feed Wheel Between Feed Holes.)

**NOTE:** Before proceeding with the following adjustments, check both tape guide spring tensions.

**Feed Hole Spacing (Final) ***(see note below)**

(1) With tape shoe blocked away from the feed wheel, the feed pawl and detent disengaged, and tape removed from the punch mechanism, the feed wheel shall rotate freely. (Check through 3 or 4 rotations).

(2) Perforate six series of (9) "Blank" combinations followed by (1) "Letters" combination. Place tape over smooth side of the TP156011 tape gauge so circular portion of the first number two code hole in tape is concentric with the first (0.072 hole of tape gauge. (See note). The next four 0.072 holes in tape gauge shall be visible through the number two code holes in tape and circular portion of the last (sixth) number two code hole in tape shall be entirely within the 0.086 dia. hole of tape gauge.

**NOTE:** The first five holes in gauge are the same size as code holes in tape (0.072 inch diameter) but the sixth hole in gauge is larger than the first five (0.086 inch diameter). This arrangement allows ± 0.007 inch variation in five (5) inches.

*To adjust*

(1) With tape removed from punch mechanism, loosen die wheel eccentric stud lock nut and adjust die wheel so that it just binds on feed wheel, back off eccentric so die wheel is just free (check freeness through 3 or 4 rotations), keep indent off eccentric stud below the horizontal center line of stud.

(2) Check ten characters per inch requirement and refine feed wheel die wheel clearance adjustment to meet the requirement by moving indent of die wheel eccentric stud toward feed wheel to decrease character spacing and away from feed wheel to increase the character spacing.

**CAUTION:** With the tape removed from the punch mechanism, be sure the die wheel does not bind.

(3) With the tape shoe away from the feed wheel, the feed pawl and detent disengaged, and the tape removed from the punch mechanism, the feed wheel shall rotate freely. Failure to meet this requirement indicates the die wheel eccentric has been over-adjusted. To meet this requirement, refine the adjustment.

*NOTE:* The adjustments on this page are for five level fully perforated tapes, with indentation of feed wheel between feed holes.

(1) 11/16 inch wide tape with printing between feed holes.

(2) 7/8 inch wide tape having a margin for printing at top of tape.

(3) 7/8 inch wide tape having a margin for printing at bottom of tape.

*(See figure on following page)*
2.31 Punch Mechanism For Fully Perforated Tape continued
(Indentation of Feed Wheel Between The Feed Holes)

DETENT REQUIREMENT *(SEE NOTE BELOW)

WITH THE UNIT OPERATING UNDER POWER, THE INDENTATIONS OF THE FEED WHEEL SHALL BE CENTRALLY LOCATED BETWEEN TWO FULLY PERFORATED FEED HOLES, AS GAUGED BY EYE.

TO ADJUST

LOOSEN THE DETENT LEVER ECCENTRIC STUD LOCK NUT AND TURN THE ECCENTRIC STUD CLOCKWISE TO MOVE THE INDENTATION TOWARD THE LEADING EDGE OF THE FEED HOLE AND COUNTERCLOCKWISE TO MOVE THE INDENTATION TOWARD THE TRAILING EDGE. TIGHTEN THE LOCK NUT AND RE-CHECK THE FEED PAWL ADJUSTMENT.

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.

MARGIN FOR PRINTING

7/8" TAPE

TP156011 TAPE GAUGE

FEED WHEEL INDENTATION

11/16" TAPE MARGIN FOR PRINTING

7/8" TAPE

FEED HOLE LATERAL ALIGNMENT REQUIREMENT

WITH THE UNIT OPERATING UNDER POWER, THE INDENTATIONS OF THE FEED WHEEL SHOULD BE ON A CENTERLINE BETWEEN THE FULLY PERFORATED FEED HOLES, AS GAUGED BY EYE.

TO ADJUST

WITH THE ADJUSTING SCREW LOCK NUT LOOSE, TURN THE ADJUSTING SCREW CLOCKWISE TO MOVE THE INDENTATION TOWARD THE REAR AND COUNTERCLOCKWISE TO MOVE THE INDENTATIONS TOWARD THE FRONT.

* NOTE:

THE ADJUSTMENTS ON THIS PAGE ARE FOR FIVE-LEVEL FULLY PERFORATED TAPES, WITH INDENTATION OF FEED WHEEL BETWEEN FEED HOLES.

(1) 11/16 INCH WIDE TAPE WITH PRINTING BETWEEN FEED HOLES.
(2) 7/8 INCH WIDE TAPE HAVING A MARGIN FOR PRINTING AT TOP OF TAPE.
(3) 7/8 INCH WIDE TAPE HAVING A MARGIN FOR PRINTING AT BOTTOM OF TAPE.
2.32 Punch Mechanism For Fully Perforated Tape continued

(A) PUNCH SLIDE SPRING

REQUIREMENT:
- LETTERS COMBINATION SET UP AND PUNCH SLIDES IN SELECTED POSITION.
- MIN. 2-1/4 OZS.
- MAX. 3-1/4 OZS.
- TO START EACH SLIDE MOVING.

NOTE: ON UNITS EQUIPPED WITH BACKSPACE MECHANISM, IT IS NECESSARY TO REMOVE SEVERAL PARTS IN ORDER TO CHECK THIS SPRING TENSION. IT SHOULD NOT BE CHECKED UNLESS THERE IS GOOD REASON TO BELIEVE THAT IT DOES NOT MEET ITS REQUIREMENTS.

(B) TAPE GUIDE ASSEMBLY SPRING

REQUIREMENT:
- THE TAPE GUIDE ASSEMBLY SHALL BE FREE TO RETURN TO REST AGAINST THE TAPE GUIDE BLOCK.
- MIN. 16 OZS.
- TO PULL THE TAPE GUIDE ASSEMBLY AWAY FROM THE BLOCK.
- TO ADJUST IF THE SPRING DOES NOT MEET THE REQUIREMENT, REPLACE THE SPRING. IF THE TAPE GUIDE ASSEMBLY IS NOT FREE TO RETURN, REPOSITION THE TAPE GUIDE ASSEMBLY MOUNTING POST TO FREE THE TAPE GUIDE ASSEMBLY.

(C) TAPE GUIDE SPRING (TAPE GUIDE)

REQUIREMENT:
- CLUTCH DISENGAGED AND TAPE THREADED THROUGH THE PUNCH ASSEMBLY, IT SHOULD REQUIRE
- MIN. 1-1/4 OZS. --- MAX. 2-1/4 OZS.
- TO JUST MOVE THE SPRING AWAY FROM THE TAPE.
- TO ADJUST BEND THE SPRING.

(D) TAPE GUIDE SPRING (PUNCH BLOCK)

(1) REQUIREMENT
- WITH TAPE REMOVED FROM THE PUNCH BLOCK THE TAPE GUIDE SPRING SHOULD REST AGAINST THE CLEARANCE SLOT IN THE BLOCK IN A SYMMETRICAL MANNER.

(2) REQUIREMENT
- TO ADJUST BEND THE SPRING AND POSITION IT WITH ITS MOUNTING SCREW LOOSENED.
2.33  Punch Mechanism continued

(A) FEED PAWL SPRING

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. DETENT SPRING UNHOOKED FROM TOGGLE BAIL
MIN. 3 OIZS.
MAX. 4-1/2 OIZS.
TO START THE DETENT LEVER MOVING.

(B) DETENT LEVER SPRING

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. FEED PAWL SPRING UNHOOKED.
MIN. 7 OIZS.
MAX. 10 OIZS.
TO START THE DETENT LEVER MOVING.
2.34 Punch Mechanism continued

(A) TAPE SHOE TORSION SPRING

REQUIREMENT
MIN. 13 OZS., MAX. 18 OZS.
TO MOVE TAPE FROM FEED WHEEL.

NOTE: ADJUSTMENTS
ON THIS PAGE DO
NOT APPLY TO TAPE
PRINTER.

(B) TAPE GUIDE

TO CHECK
ROTATE FEED WHEEL UNTIL OIL HOLE IS UPWARD.
CENTER TAPE SHOE AND TAPE GUIDE. HOLD TAPE
GUIDE DOWNWARD.

REQUIREMENT
CLEARANCE BETWEEN ADJUSTING PLATE AND
BACKSTOP POST
MIN. 0.002 INCH
MAX. 0.008 INCH

TO ADJUST
POSITION ADJUSTING PLATE WITH ITS
CLAMP SCREW LOOSENEd.

(C) TAPE DEPRESSOR SLIDE SPRING

REQUIREMENT
ROCKER BAIL IN ITS EXTREME LEFT POSITION
MIN. 1-1/2 OZS., MAX. 2-1/2 OZS.
TO START DEPRESSOR SLIDE MOVING.
2.35 Punch Mechanism continued

NOTE: ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.

TAPE GUIDE (EARLY DESIGN)

REQUIREMENT

WITH TAPE GUIDE UNDER AND IN CONTACT WITH V SHAPED PROJECTION OF DIE PLATE*

MIN. 0.008 INCH -- MAX. 0.015 INCH

CLEARANCE BETWEEN GUIDE AND TAPE PLATFORM.

MOUNTING SCREW

TO ADJUST

WITH MOUNTING SCREW FRICITION TIGHT, PLACE 0.010 INCH FLAT GAUGE BETWEEN GUIDE AND TAPE PLATFORM. PRESS GUIDE DOWN AND TO LEFT. TIGHTEN MOUNTING SCREW WHILE HOLDING FEED WHEEL ADJUSTING SCREW STATIONARY BY MEANS OF AN ALLEN WRENCH.

*GUIDE IS CONSIDERED "IN CONTACT" WITH PROJECTION WHEN 0.0015 INCH GAUGE CANNOT BE INSERTED BETWEEN THEM.

TAPE GUIDE SPRING (ON UNITS NOT EQUIPPED WITH TAPE GUIDE ADJUSTING PLATE)

REQUIREMENT

MIN. 8 OZS. TO START TAPE GUIDE BAIL MOVING UPWARD.

TAPE GUIDE

PUNCH BLOCK

TAPE GUIDE (LATEST DESIGN)

REQUIREMENT

CLEARANCE UNDER THE TAPE GUIDE.

MIN. 0.008 INCH

MAX. 0.015 INCH

TO ADJUST

WITH MOUNTING SCREW FRICITION TIGHT, POSITION THE TAPE GUIDE. KEEP THE GUIDE AGAINST THE FRONT PLATE OF THE PUNCH.
2.36 Function Mechanism

(A) Function Clutch Release Lever Spring Requirement
Trip Function Clutch. Rotate main shaft until release lever is reset on main trip lever. Min. 5 ozs. -- Max. 8 ozs. To start release lever moving.

(B) Release Lever Downstop Bracket Requirement
With function clutch tripped, rotate shaft until clearance between function clutch disc stop lug and clutch trip lever is at a minimum. Release lever resting against downstop bracket. Clearance between function clutch disc stop lug and trip lever Min. 0.002 inch -- Max. 0.045 inch.

To adjust:
Remove tape guard. With downstop bracket mounting screws friction tight, position bracket. Recheck for some clearance between trip lever extension and left end of slot in release lever downstop bracket.
2.37 Typing Mechanism

(A) PUSH BAR OPERATING BLADE (PRELIMINARY)

TO CHECK
MANUALLY SELECT LTRS CODE COMBINATION (12345) ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS. HOLE NO. 2 AND 3 BELL CRANKS AGAINST STOP POST.

REQUIREMENT
OPERATING BLADE PARALLEL TO (NOT NECESSARILY FLUSH) TO TOP OF NO. 2 AND 3 PUSH BAR LATCHING SURFACES.

TO ADJUST
WITH ITS MOUNTING SCREWS FRICITION TIGHT PRY TRANSFER MOUNTING BRACKET ALL THE WAY TO THE RIGHT.
ADD OR REMOVE SHIMS UNDER THE REAR LEG OF THE OPERATING BLADE. PLACE EXTRA SHIMS ON REAR MOUNTING SCREW BETWEEN BLADE AND FLAT WASHER.

(B) PUSH BAR OPERATING BLADE (FINAL)

(1) TO CHECK
MANUALLY SELECT LTRS CODE COMBINATION (12345). ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS. MANUALLY SEAT PUSH BARS IN DETENTED POSITION. IN BAR WHICH IS NEAREST LEFT EDGE OF BLADE, TAKE UP PLAY TO LEFT AND REAR, AND THEN RELEASE.

REQUIREMENT
CLEARANCE BETWEEN BAR AND LEFT EDGE OF BLADE.
MIN. 0.015 INCH --- MAX. 0.030 INCH

(2) REQUIREMENT
SOME CLEARANCE BETWEEN RIGHT EDGE OF BLADE AND PUSH BARS WHEN PLAY IN BARS HAS BEEN TAKEN UP TO RIGHT AND RELEASED.

(3) REQUIREMENT
WITH UNIT IN STOP POSITION, SOME CLEARANCE BETWEEN RIGHT EDGE OF BLADE AND BARS WHEN PLAY IN BARS HAS BEEN TAKEN UP TO RIGHT AND RELEASED.

TO ADJUST
WITH MOUNTING SCREWS LOOSENED, POSITION OPERATING BLADE IN ELONGATED HOLES.

NOTE:
IT MAY BE NECESSARY TO REFINE THIS ADJUSTMENT AFTER ROCKER BAIL PILOT STUD ADJUSTMENT.
2.38 Typing Mechanism continued

(A) ROCKE R BAIL PILOT STUD
TO CHECK
SELECT BLANK COMBINATION, POSITION
ROCKER BAIL THROUGH A COMPLETE CYCLE
TO INSURE THE CLEARANCE IS A MINIMUM.
REQUIREMENT
CLEARANCE BETWEEN FUNCTION BOX REAR
PLATE AND PUSH BAR OPERATING BLADE
MIN. 0.005 INCH—MAX. 0.020 INCH
AT A POINT IN THE CYCLE AND WHEN PLAY IS
TAKEN UP TO MAKE CLEARANCE MINIMUM.
TO ADJUST
POSITION ROCKER BAIL PILOT STUD IN
ELONGATED HOLE WITH LOCK NUT
LOOSENED.

(B) FUNCTION CLUTCH LATCH LEVER SPRING
REQUIREMENT
WITH FUNCTION CLUTCH TURNED TO STOP
POSITION AND LATCH LEVER UNLATCHED
MIN. 12 OZS.—MAX. 15 OZS.
TO START LATCH LEVER MOVING.
2.39 Typing Mechanism continued

**FUNCTION BOX**

**REQUIREMENT**

MANUALLY SELECT LETTERS CODE COMBINATION (12345). ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS, AND PUNCH SLIDES ARE DISENGAGED FROM LATCHES. THE TOP OF THE OPERATING BLADE SHALL BE FLUSH --- MAX. 0.020 INCH.

[Diagram showing operating blade and push bars]

BELOW THE TOPS OF THE NO. 2 AND 3 PUSHBARS. TAKE UP PLAY IN PUSHBARS IN A DOWNWARD DIRECTION THEN RELEASE.

**NOTE:**

WHEN UNIT IS MOUNTED AS PART OF THE KEYBOARD PERFORATOR TRANSMITTER, IT MAY BE NECESSARY TO REFINE THE ADJUSTMENT WITHIN ITS LIMITS TO INCREASE OPERATING MARGINS OF THE UNIT.

TO ADJUST

WITH THREE MOUNTING SCREWS IN REAR PLATE AND ONE MOUNTING SCREW IN FRONT PLATE LOOSENED, POSITION FUNCTION BOX BY MEANS OF PRY POINT. CHECK POSITION OF BELL CRANK.

**NOTE:**

ON UNITS EQUIPPED WITH TWO-PIECE TRIP BRACKET, SET ABOVE ADJUSTMENT IN CENTER OF ITS RANGE AND TIGHTEN SCREWS. LOOSEN TWO SCREWS WHICH MOUNT GUIDE TO BRACKET AND POSITION GUIDE TO MEET ABOVE REQUIREMENT.
2.40 Typing Mechanism continued

TRANSFER MOUNTING BRACKET
TO CHECK
MANUALLY SELECT BLANK CODE
COMBINATION, ROTATE MAIN SHAFT
UNTIL FUNCTION CLUTCH TRIPS.

REQUIREMENT
WITH PUNCH SLIDES LATCHED, CLEARANCE BETWEEN
BELL CRANK AND STOP POST
MAX. 0.018 INCH*
AT BELL CRANK WHERE CLEARANCE IS MAXIMUM WHEN
BELL CRANK WITH MINIMUM CLEARANCE IS TOUCHING
POST.

TO ADJUST

WITH MOUNTING SCREWS FRICTION TIGHT, PRY
TRANSFER MOUNTING BRACKET TO LEFT UNTIL
CLOSEST BELL CRANK TOUCHES POST. TIGHTEN
MOUNTING SCREWS AND CHECK REQUIREMENT.

CAUTION: BELL CRANK THAT YIELDS MOST SHALL
NOT YIELD MORE THAN 0.007 INCH
MEASURED AT POST.

TRANSFER MOUNTING BRACKET
MOUNTING SCREWS
APPROXIMATELY VERTICAL
WITHOUT BINDING

*NOTE: REMOVAL OF FUNCTION BLADES WILL FACILITATE MEASURING CLEARANCE.
2.41 Typing Mechanism continued

(B) FIGS ARM ASSEMBLY SPRING
REQUIREMENT
WITH ARM ASSEMBLIES IN LTRS
POSITION
MIN. 1-1/2 OZS. --- MAX. 3-1/2 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(C) FIGS EXTENSION ARM SPRING
REQUIREMENT
WITH ARM ASSEMBLIES IN LTRS
POSITION AND LTRS EXTENSION ARM
MANUALLY HELD IN POSITION
MIN. 5 OZS. --- MAX. 8 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(A) LTRS - FIGS YIELD ARMS
(1) TO CHECK
TRIP FUNCTION CLUTCH AND ROTATE MAIN
SHAFT UNTIL ROCKER BAIL IS TO EXTREME
LEFT. MANUALLY PLACE ARM ASSEMBLIES
IN LTRS POSITION. HOLD
LTRS-FIGS BELL CRANK AGAINST LEFT EDGE
OF STOP POST.

REQUIREMENT
MIN. SOME --- MAX. 0.006 INCH*
CLEARANCE BETWEEN BELL CRANK AND
LTRS EXTENSION ARM.

(ADJUSTMENT IS CONTINUED ON
THE FOLLOWING PAGE)

*NOTE:
REMOVAL OF FUNCTION BLADES
WILL FACILITATE MEASURING CLEARANCE.
2.42 Typing Mechanism continued

(B) LTRS ARM ASSEMBLY SPRING
REQUIREMENT
WITH ARM ASSEMBLIES IN FIGS POSITION
MIN. 1-1/2 OZS. --- MAX. 3-1/2 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(A) LTRS - FIGS YIELD ARMS (CONTINUED FROM PREVIOUS PAGE)
(2) TO CHECK
MANUALLY PLACE ARM ASSEMBLIES IN FIGS POSITION;
HOLD LTRS - FIGS BELL CRANK AGAINST RIGHT EDGE OF STOP POST.
REQUIREMENT
MIN. SOME --- MAX. 0.006 INCH *
CLEARANCE BETWEEN BELL CRANK AND FIGS EXTENSION ARM.

(C) LTRS EXTENSION ARM SPRING
REQUIREMENT
WITH ARM ASSEMBLIES IN FIGS POSITION AND LTRS EXTENSION ARM MANUALLY HELD IN POSITION
MIN. 5 OZS. --- MAX. 8 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

*NOTE:
REMOVAL OF FUNCTION BLADES WILL FACILITATE MEASURING CLEARANCE.

TO ADJUST
LOosen CLAMP SCREWS IN BOTH LTRS-FIGS YIELD ARMS.
PLACE ARM ASSEMBLIES IN LTRS POSITION, HOLD LTRS-FIGS BELL CRANK AGAINST LEFT SIDE OF STOP POST, AND BY MEANS OF PRY POINT, POSITION LTRS YIELD ARM TO MEET CLEARANCE REQUIREMENT UNDER (A) (1) FIG. ON PREVIOUS PAGE. TIGHTEN LTRS YIELD ARM CLAMP SCREW.
PLACE ARM ASSEMBLIES IN FIGS POSITION AND BY MEANS OF PRY POINT, POSITION FIGS YIELD ARM TO MEET REQUIREMENT UNDER (2) ABOVE. TIGHTEN FIGS YIELD ARM CLAMP SCREW.
CAUTION: ARM ASSEMBLIES MAY CHANGE POSITION DURING ADJUSTMENT. AS TIGHTENING OF SCREWS MAY AFFECT ADJUSTMENT, RECHECK REQUIREMENTS.
2.43 Typing Mechanism continued

(A) LIFTER ARM
TO CHECK
TRIP FUNCTION CLUTCH, MOVE ROCKER BAIL TO EXTREME LEFT POSITION AND OBSERVE TRAVEL OF LIFTER ROLLER ON RIGHT DWELL SURFACE. MOVE ROCKER BAIL TO EXTREME RIGHT POSITION AND OBSERVE TRAVEL OF ROLLER ON LEFT DWELL SURFACE.

REQUIREMENT
APPROXIMATELY EQUAL TRAVEL ON EACH DWELL SURFACE.

TO ADJUST*
LOosen LOCK PLATE SCREW UNTIL FRICTION TIGHT, WITH ECCENTRIC SCREW LOCK NUT-FRICTION TIGHT, POSITION LIFTER ARM ON LIFTER, TIGHTEN LOCK PLATE SCREW. DO NOT TIGHTEN LOCK NUT.

(B) LIFTER ARM ECCENTRIC SCREW
REQUIREMENT
WITH FUNCTION CLUTCH DISENGAGED
(1) CLEARANCE BETWEEN CLOSEST PROJECTION OF BELL CRANKS AND ASSOCIATED LTRS-FIGS FUNCTION BLADE PROJECTION
MIN. 0.008 INCH—MAX. 0.020 INCH
(2) MIN. 0.005 INCH CLEARANCE FOR FUNCTION BLADES OTHER THAN LTRS-FIGS IF UNIT IS SO EQUIPPED

TO ADJUST
POSITION LIFTER ARM ECCENTRIC SCREW WITH LOCK NUT LOOSENED.

*NOTE:
REMOVE TIMING CONTACTS IF UNIT IS SO EQUIPPED.
2.44 Typing Mechanism continued

LOCK LEVER REQUIREMENT

(1) WITH LETTERS CODE COMBINATION (12345) SELECTED AND ROCKER BAIL TO EXTREME LEFT, TOGGLE LINKAGE SHOULD MOVE THROUGH POINT WHERE TOGGLE LINK AND LOCK LEVER ARE IN STRAIGHT LINE WITHOUT RAISING LIFTER.

(2) WITH TOGGLE LINK AND LOCK LEVER IN STRAIGHT LINE, CLEARANCE BETWEEN TOGGLE LINK AND LIFTER PIN (WITH RETAINING RING REMOVED)
MIN. SOME—MAX. 0.015 INCH.

TO ADJUST POSITION LOCK LEVER ON LOCK ARM ASSEMBLY WITH CLAMP SCREW FRICITION TIGHT.

NOTE:
TO AVOID INTERFERENCE WITH LOCK LEVER, IT MAY BE NECESSARY TO MOVE HIGH PART OF CORRECTING DRIVE LINK ECENTRIC BUSHING ABOVE HORIZONTAL CENTERLINE.

NO. 5 PULSE BEAM SPRING REQUIREMENT
MIN. 10 OZS.——MAX. 15 OZS. TO PULL SPRING TO LENGTH OF 7/16 INCH.
2.45 Typing Mechanism continued

LOCK LEVER TRIP POST
REQUIREMENT
AS ROCKER BAIL APPROACHES EXTREME RIGHT
POSITION, LOCK LEVER TOGGLE LINKAGE
SHOULD BREAK AND LIFTER ROLLER SHOULD
DROP ONTO RIGHT DWELL SURFACE.
TO ADJUST
BY MEANS OF PRY POINTS, POSITION LOCK
LEVER TRIP POST WITH CLAMP SCREW LOOSENED.

LIFTER ROLLER
RIGHT DWELL
SURFACE
ROCKER BAIL
LOCK LEVER TRIP POST
CLAMP SCREW

(REAL VIEW)
2.46 Typing Mechanism continued

(A) LIFTER TOGGLE LINK SPRING

 REQUIREMENT
 WITH UNIT IN STOP POSITION
 MIN. 1-1/2 OZS. --- MAX. 2-1/4 OZS.
 TO PULL SPRING TO INSTALLED LENGTH.

(B) FUNCTION BLADE SPRINGS

 REQUIREMENT
 WITH UNIT IN STOP POSITION.
 LETTERS AND FIGURES: FUNCTION BLADES.
 MIN. 10 OZS. --- MAX. 13 OZS.
 OTHER FUNCTION BLADES
 MIN. 7 OZS. --- MAX. 10 OZS.
 TO START FUNCTION BLADE MOVING.

(C) LIFTER SPRING

 REQUIREMENT
 WITH UNIT IN STOP POSITION
 MIN. 7 OZS. --- MAX. 9 OZS.
 TO PULL SPRING TO INSTALLED LENGTH.

(D) CORRECTOR DRIVE LINK SPRING (NON-YIELDING)

 REQUIREMENT
 WITH UNIT IN STOP POSITION
 MIN. 5 OZS. --- MAX. 9 OZS.
 TO START DRIVE LINK MOVING.
 (FOR CORRECTOR DRIVE LINK SPRING YIELDING SEE PAR. 2.51)

CORRECTOR DRIVE LINK SPRING

CORRECTOR DRIVE LINK

(TOP VIEW)
2.47 Typing Mechanism continued

(A) OSCILLATING DRIVE LINK

TO CHECK
POSITION ROCKER BAIL TO ITS EXTREME LEFT.

REQUIREMENT
SECTOR MOUNTING STUD, TOGGLE PIVOT SCREW AND OSCILLATING DRIVE BAIL MOUNTING SCREW SHOULD APPROXIMATELY LINE UP.

TO ADJUST
POSITION OSCILLATING DRIVE LINK BY MEANS OF ITS ECCENTRIC BUSHING.

(B) OSCILLATING DRIVE BAIL

REQUIREMENT

WITH "BLANK" COMBINATION SELECTED, ROTATE MAIN SHAFT, TAKING UP AXIAL PLAY IN TYPE WHEEL SHAFT TOWARD FRONT OF UNIT, THE AXIAL CORRECTOR ROLLER SHALL ENTER THE FIRST NOTCH OF THE SECTOR CENTRALLY.

TO ADJUST
LOosen OSCILLATING BAIL ADJUSTING SCREW. SELECT "BLANK" COMBINATION. POSITION OSCILLATING BAIL BY MEANS OF ITS ELONGATED MOUNTING HOLE SO CORRECTOR ROLLER ENTERS FIRST NOTCH OF SECTOR WHEN ROCKER BAIL MOVES TO ITS EXTREME LEFT Position. HOLD CORRECTOR ROLLER FIRMLY IN FIRST NOTCH AND TAKE UP PLAY IN OSCILLATING BAIL LINKAGE BY APPLYING A FORCE TO OSCILLATING BAIL TOWARD REAR OF UNIT. TIGHTEN THE OSCILLATING BAIL ADJUSTING SCREW.
2.48 Typing Mechanism continued

(A) AXIAL SECTOR ALIGNMENT REQUIREMENT
(1) TEETH OF AXIAL SECTOR AND AXIAL OUTPUT RACK SHALL ENGAGE BY THEIR FULL THICKNESS
(2) AXIAL OUTPUT RACK GUIDE ROLLER FREE TO ROTATE.

TO ADJUST
LOosen LOCK NUT. DISENgAGE AXIAL OUTPUT RACK. REMOVE RETAINING RING AND GUIDE ROLLER, ADD OR REMOVE SHIMS. PLACE EXTRA SHIMS ON TOP OF SHIM USED TO RETAIN FELT WASHER.

NOTE:
THE ABOVE ADJUSTMENT APPLIES ONLY TO AXIAL OUTPUT RACK GUIDE ROLLERS FURNISHED WITH SHIMS. ON UNITS WITH LARGER 0.594 INCH DIAMETER ROLLER, NO ADJUSTMENT IS NECESSARY.

(B) ECCENTRIC SHAFT
DETENT LEVER SPRINGS (6)
MIN. 7 OZS. — MAX. 10 OZS.
TO START DETENT LEVER MOVING.
NOTE:
CHECK ALL 6 SPRINGS. THERE ARE TWO ON THE AXIAL POSITIONING MECHANISM AND FOUR ON THE ROTARY POSITIONING MECHANISM.
2.49 Typing Mechanism continued

(A) AXIAL OUTPUT RACK GUIDE ROLLER

TO CHECK
SELECT LINE FEED CODE COMBINATION
(-2---). ROTATE MAIN SHAFT UNTIL
ECCENTRIC HAS ROTATED 90 DEGREES.
TAKE UP PLAY TO MAKE CLEARANCE BE-
TWEEN OUTPUT RACK AND GUIDE ROLLER
MAXIMUM.

REQUIREMENT
MIN. SOME --- MAX. 0.008 INCH
TO ADJUST
POSITION GUIDE ROLLER MOUNTING
STUD IN ELONGATED HOLE WITH LOCK
NUT LOOSENED.

(TOP VIEW)

(B) PUSH BAR GUIDE BRACKET

TO CHECK
MANUALLY SELECT CARRIAGE RETURN CODE COMBINATION
(---4-). ROTATE MAIN SHAFT SO THAT NO. 4 PUSH BAR
MOVES THROUGH COMPLETE RANGE OF TRAVEL.

REQUIREMENT
WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE
MAXIMUM:
MIN. SOME --- MAX. 0.008 INCH
BETWEEN NO. 4 PUSH BAR AND GUIDE BRACKET
THROUGHOUT COMPLETE TRAVEL OF BAR.

TO ADJUST
POSITION GUIDE BRACKET WITH MOUNTING SCREWS
LOOSENED.
### Typing Mechanism continued

**SECTION 573-118-700**

2.50 **AXIAL CORRECTOR (NON-YIELDING)**

1. **TO CHECK**
   - SELECT BLANK CODE COMBINATION, TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.
   - REQUIREMENT
     - ROLLER ON AXIAL CORRECTING PLATE FIRMLY SEATED IN FIRST NOTCH OF AXIAL SECTOR.

2. **TO CHECK**
   - SELECT LETTERS CODE COMBINATION (12345), TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.
   - REQUIREMENT
     - ROLLER ON AXIAL CORRECTING PLATE FIRMLY SEATED IN FOURTH NOTCH OF AXIAL SECTOR.

**TO ADJUST**


2. APPLY A MANUAL PRESSURE ON THE DRIVE LINK SUCH THAT THE SLOT IN THE LINK WILL BOTTOM AGAINST THE BUSHING OF THE ROCKER BAIL.

3. MAINTAINING PRESSURE AT THESE TWO PLACES, TIGHTEN ADJUSTING SCREWS.

**TYPEWHEEL RACK CLEARANCE REQUIREMENT**

- **WITH UNIT IN LETTERS FIELD, FUNCTION CLUTCH DISENGAGED.**
  - **MAX. 0.015 INCH**
  - CLEARANCE BETWEEN IDLER GEAR AND RACK AT THE CLOSEST POINT WITH ALL THE PLAY TAKEN UP IN A DIRECTION TO MAKE THE CLEARANCE MAXIMUM. THERE SHALL BE SOME CLEARANCE THROUGHOUT THE TRAVEL OF THE RACK.

**TO ADJUST**

- WITH MOUNTING SCREW LOOSEND, POSITION IDLER GEAR ECCENTRIC SHAFT BY MEANS OF THREE ADJUSTING HOLES. CHECK RACK THROUGHOUT ITS TRAVEL FOR BINDS.
2.51 Typing Mechanism continued

**CORRECTOR DRIVE LINK (YIELDING)**

**EXTENSION SPRING TENSION**

**REQUIREMENT**

With all spacing code combination selected, the function clutch tripped, and the rocker bail in its extreme left position, place a 32 ozs. spring hook on the end of the corrector axial plate. It should take min. 16 ozs. -- max. 32 ozs. to move the roller from the notch in the sector.

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**OSCILLATING BAIL**

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**CORRECTOR DRIVE LINK (YIELDING)**

**AXIAL CORRECTOR**

**AXIAL CORRECTOR (YIELDING)**

**REQUIREMENT**

With blank code combination selected, function clutch tripped and rocker bail in its extreme left position, the axial corrector roller should seat in the first sector notch and there should be min. 0.005 inch between the ends of the slot and the spring post. Check both sides and check seating in fourth notch (letters selection). Turn the retaining ring fastening the drive link extension to the corrector plate to check the minimum requirement.

To adjust loosen two drive link adjusting screws, position drive link to meet the requirement and retighten the screws.
2.52 Typing Mechanism continued

ROTARY CORRECTOR MESH

(1) TO CHECK

WITH CLAMP ARM LOOSENED, "FIGURE 9" COMBINATION SELECTED (NO. 4 AND NO. 5 PULSE MARKING IN THE FIGURES POSITION) AND THE ROCKER BAIL IN ITS EXTREME LEFT POSITION.

REQUIREMENT

THE SECOND TOOTH FROM THE TOP OF THE ROTARY OUTPUT RACK (WITH THE PUSH BARS MANUALLY DETENTED) SHOULD SEAT FIRMLY BETWEEN THE LOBES OF THE ROTARY CORRECTOR ARM.

TO ADJUST

LOOSEN CLAMP ARM SCREW AND ECCENTRIC BUSHING LOCK NUT. WITH THE PIVOT OF THE CORRECTOR ARM TO THE RIGHT OF THE CENTER OF THE BUSHING, POSITION THE ROTARY CORRECTOR. TIGHTEN BUSHING LOCK NUT. DO NOT TIGHTEN CLAMP ARM SCREW AT THIS POINT.

(2) TO CHECK

CHECK ENGAGEMENT IN A SIMILAR MANNER AS IN (1) ABOVE WITH THE FIFTH TOOTH (NO. 3 AND NO. 4 MARKING IN FIGURES POSITION), NINTH TOOTH (NO. 4 PULSE MARKING IN THE LETTERS POSITION), SIXTEENTH TOOTH (NO. 3 AND NO. 5 PULSE MARKING IN THE LETTERS FIELD).

TO ADJUST

REFINE ADJUSTMENT UNDER (1) ABOVE.
2.53 Typing Mechanism continued

CORRECTING CLAMP ARM SCREW
ECCENTRIC BUSHING

(LEFT SIDE VIEW)
CORRECTING CLAMP ARM

(REAR VIEW)

ROTARY CORRECTOR ARM TO CHECK
WITH THE LETTERS COMBINATION SELECTED IN THE LETTERS FIELD AND THE ROCKER BAIL IN ITS EXTREME LEFT POSITION.

REQUIREMENT
THE ROTARY CORRECTOR ARM SHALL SEAT FIRMLY IN THE TYPEWHEEL RACK.
MIN. SOME-----MAX. 0.006 INCH END PLAY BETWEEN CLAMP ARM AND BUSHING, WITH UNIT IN THE STOP POSITION.

TO ADJUST
(UNITS EQUIPPED WITH NON-YIELDING AXIAL CORRECTOR)
AS THE ROCKER BAIL APPROACHES THE EXTREME LEFT, MEASURE CLEARANCE BETWEEN THE AXIAL CORRECTOR ROLLER AND THE SECTOR NOTCH. WHEN CLEARANCE IS MIN. SOME-----MAX. 0.005 INCH POSITION ROTARY CORRECTOR ARM FINGER TIGHT AGAINST TYPEWHEEL RACK, AND TIGHTEN CORRECTING CLAMP ARM SCREW.

(UNITS EQUIPPED WITH A YIELDING AXIAL CORRECTOR)
AS THE ROCKER BAIL APPROACHES THE EXTREME LEFT AND THE SPRING POST OF THE AXIAL CORRECTOR STARTS TO LEAVE THE END OF ITS SLOT, POSITION THE ROTARY CORRECTOR ARM FINGER TIGHT AGAINST TYPEWHEEL RACK AND TIGHTEN CORRECTING CLAMP ARM SCREW.
2.54 Typing Mechanism for Chadless Tape continued

RIBBON CARRIER

REAR GUIDE POST

ADJUSTING SLOT

LOCK SCREW

RIBBON OSCILLATING LEVER

RIBBON CARRIER

REQUIREMENT

WITH FUNCTION CLUTCH DISENGAGED:

1. RIBBON SHOULD OVERLAP TAPE BY A SMALL AMOUNT.

2. LAST PRINTED CHARACTER SHOULD BE VISIBLE, NOT INCLUDING FRACTIONS.

TO ADJUST

WITH LOCK SCREW LOOSENED, POSITION RIBBON OSCILLATING LEVER BY MEANS OF ADJUSTING SLOT.

NOTE:

THERE SHOULD BE SOME END PLAY BETWEEN CARRIER AND REAR GUIDE POST WHEN UNIT IS IN STOP POSITION.

(TOP VIEW)
### Typing Mechanism for Chadless Tape continued

(A) **Typewheel (Preliminary)**

**To Check**
- Select "H" code combination (---3-5). Place rocker bail to extreme left. The rotary corrector arm firmly engaged.

**Requirement**
- Typewheel aligned so that full character is printed uniformly and 6 ± 1/4 code hole spaces behind its perforated code holes.

**To Adjust**
- Position typewheel with lock nut loosened. Check printing by manually lifting accelerator to latched position and releasing it.

**Note:**
- For best results it may be necessary to proceed to the next adjustment then come back and refine the above.

(B) **Typewheel (Final)**

**Requirement**
- All characters shall be legible and 6 ± 1/4 code hole spaces behind the perforated code holes with unit operating under power.

**To Adjust**
- Refine the typewheel position with its lock nut loosened.

**Note:**
- For best results it may be necessary to make the print hammer adjustment and then refine this adjustment.

(C) **Print Hammer**

**Requirement**
- When operating under power, print hammer and typewheel aligned so as to obtain best quality of printing.

**To Adjust**
- Position print hammer shaft with lock nut loosened.

**Note:**
- It may be necessary to remake typewheel adjustment (above) and then refine this adjustment.
2.56 Typing Mechanism for Fully Perforated Tape continued

RIBBON CARRIER

REAR GUIDE POST

LOCK SCREW

RIBBON OSCILLATING LEVER

ADJUSTING SLOT

RIBBON CARRIER REQUIREMENT

WITH FUNCTION CLUTCH DISENGAGED:
(1) RIBBON SHOULD OVERLAP TAPE.
(2) LAST PRINTED CHARACTER SHOULD BE VISIBLE.

TO ADJUST WITH LOCK SCREW LOOSENED, POSITION RIBBON OSCILLATING LEVER BY MEANS OF ADJUSTING SLOT.

NOTE:
THERE SHOULD BE SOME END PLAY BETWEEN CARRIER AND REAR GUIDE POST WHEN UNIT IS IN STOP POSITION.

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Reissued, April 1967
2.57 Typing Mechanism continued

(A) PRINTING LATCH (FOR UNITS WITH ADJUSTABLE PRINTING LATCH MOUNTING BRACKETS)

NOTE: FOR UNITS WITH NON-ADJUSTABLE PRINTING LATCH MOUNTING BRACKET REFER TO REQUIREMENT (1) AND TO ADJUST (3) BELOW ONLY.

REQUIREMENTS

1. ROCKER BAIL IN EXTREME LEFT POSITION. MANUALLY LIFT PRINT HAMMER ACCELERATOR SO THAT LATCHING SURFACES OF PRINTING LATCH AND ACCELERATOR ARE AT THE CLOSEST POINT. MIN. SOME---MAX. 0.015 INCH CLEARANCE BETWEEN ACCELERATOR AND LATCH.

2. ROCKER BAIL IN ITS EXTREME RIGHT POSITION. THERE SHOULD BE SOME OVERTRAVEL OF THE PRINT HAMMER ACCELERATOR WITH RESPECT TO THE LATCHING SURFACE OF THE PRINTING LATCH AND SOME CLEARANCE BETWEEN THE PRINT HAMMER ACCELERATOR AND THE RIBBON CARRIER.

TO ADJUST

1. POSITION THE ROCKER BAIL TO THE EXTREME RIGHT. ADJUST THE ECCENTRIC SO THAT THERE IS APPROXIMATELY 0.065 INCH CLEARANCE BETWEEN THE PRINT HAMMER ACCELERATOR AND THE RIBBON CARRIER, KEEPING THE HIGH PART OF THE ECCENTRIC TO THE LEFT. LOOSEN THE TWO SCREWS WHICH FASTEN THE PRINTING LATCH MOUNTING BRACKET UNTIL THEY ARE JUST FRICTION TIGHT, AND MOVE THE BRACKET TO ITS EXTREME REAR POSITION.

2. POSITION THE ROCKER BAIL TO THE EXTREME LEFT. MOVE THE PRINTING LATCH MOUNTING BRACKET TOWARD THE FRONT UNTIL THE PRINT HAMMER ACCELERATOR JUST TRIPS. TIGHTEN THE TWO SCREWS WHICH FASTEN THE PRINTING LATCH MOUNTING BRACKET.

3. WITH THE ROCKER BAIL TO THE EXTREME LEFT, POSITION THE PRINTING TRIP LINK BY ADJUSTING THE ECCENTRIC UNTIL THERE IS:

MIN. SOME---MAX. 0.015 INCH CLEARANCE BETWEEN THE PRINTING LATCH AND THE PRINT HAMMER ACCELERATOR. THE HIGH PART OF THE ECCENTRIC SHOULD BE TO THE LEFT.

(B) ACCELERATOR SPRING

REQUIREMENT WITH UNIT IN IDLE CONDITION.

MIN. 26 OZS.
MAX. 32 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(D) PRINTING LATCH SPRING

REQUIREMENT WITH UNIT IN IDLE CONDITION:

MIN. 5 OZS. --- MAX. 7 OZS.
TO PULL SPRING TO POSITION LENGTH.

(E) PRINTING TRIP LINK SPRING

REQUIREMENT

MIN. 4 OZS. --- MAX. 7 OZS.
TO PULL SPRING TO POSITION LENGTH.
NOTE:
ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO TAPE PRINTER.

(A) TYPEWHEEL (PRELIMINARY)
TO CHECK
SELECT "H" CODE COMBINATION (--3--5). PLACE ROCKEBAIL TO EXTREME LEFT, THE
ROTARY CORRECTOR FIRMLY ENGAGED.
REQUIREMENT
TYPEWHEEL ALIGNED SO THAT FULL CHARACTER IS PRINTED UNIFORMLY AND 6-1/2 CODE HOLE
SPACES BEHIND ITS PERFORATED CODE HOLES.
TO ADJUST
POSITION TYPEWHEEL WITH LOCK NUT LOOSENED. CHECK PRINTING BY MANUALLY LIFTING
ACCELERATOR TO LATCHED POSITION AND RELEASING IT.
NOTE:
FOR BEST RESULTS IT MAY BE NECESSARY TO PROCEED TO THE NEXT ADJUSTMENT
THEN COME BACK AND REFINEx THE ABOVE.

(B) TYPEWHEEL (FINAL)
REQUIREMENT
ALL CHARACTERS SHALL BE LEGIBLE AND 6-1/2 CODE HOLE SPACES BEHIND THE PERFORATED CODE HOLES
WITH UNIT OPERATING UNDER POWER.
TO ADJUST
REFINE THE TYPEWHEEL POSITION WITH ITS LOCK NUT
LOOSENED.
NOTE:
FOR BEST RESULTS IT MAY BE NECESSARY TO MAKE
THE PRINT HAMMER ADJUSTMENT AND THEN REFINx
THIS ADJUSTMENT.

(C) PRINT HAMMER
REQUIREMENT
WHEN OPERATING UNDER POWER, PRINT HAMMER AND TYPEWHEEL ALIGNED
SO AS TO OBTAIN BEST QUALITY OF PRINTING.
TO ADJUST
POSITION PRINT HAMMER SHAFT WITH LOCK NUT LOOSENED.
NOTE:
IT MAY BE NECESSARY TO REMAKE TYPEWHEEL ADJUSTMENT (ABOVE) AND
THEN REFINx THIS ADJUSTMENT.
2.59 Ribbon Mechanism (Later Design)

(For Earlier Design see Par. 4.01 through 4.03)

**FEED PAWL SPRING**

**REQUIREMENT**
- WITH ROCKER BAIL TO EXTREME RIGHT:
  - MIN. 4 OZS. --- MAX. 6 OZS.
  - TO PULL FEED PAWL SPRING TO INSTALLED LENGTH.

**RATCHET WHEEL TORQUE SPRING**

**REQUIREMENT**
- MIN. 1 OZS. --- MAX. 3 OZS.
  - APPLIED TANGENTIALLY TO THE RATCHET WHEEL TO START IT TO ROTATE.

**CHECK PAWL**

**ADJUSTABLE EXTENSION ARM**

**DRIVE ARM**

**DRIVE ARM ADJUSTMENT SCREW**

TO CHECK
- POSITION ROCKER BAIL TO EXTREME LEFT.
- HOLD THE RIBBON REVERSING ARM UNDER LOWER REVERSING EXTENSION OF FEED PAWL.

**REQUIREMENT**

(1) CLEARANCE BETWEEN BLOCKING EDGE OF RIBBON REVERSE ARM AND REVERSING EXTENSION OF FEED PAWL:
- MIN. SOME

(2) CLEARANCE SHALL NOT BE SO GREAT AS TO ALLOW FEED PAWL TO FEED MORE THAN TWO TEETH AT A TIME.

(3) FEED PAWL DETENTED IN BOTH ITS RIGHT AND LEFT POSITION.

**TO ADJUST**
- POSITION DRIVE ARM ADJUSTABLE EXTENSION LEVER WITH ITS MOUNTING SCREW LOOSENED.
2.60 Ribbon Mechanism (Later Design) continued
(For Earlier Design see Par. 4.01 through 4.03)

DRIVE ARM SPRING
REQUIREMENT
WITH ROCKER BAIL TO EXTREME RIGHT:
MIN. 9 OZS. — MAX. 14 OZS.
TO PULL DRIVE ARM SPRING TO INSTALLED LENGTH.

DETENT SPRING
REQUIREMENT
WITH REVERSING ARM IN ITS EXTREME RIGHT OR LEFT POSITION:
MIN. 2 OZS. — MAX. 4 OZS.
TO PULL DETENT SPRING TO ITS INSTALLED LENGTH.
2.61 Slack Tape Mechanism

**TAPE PLATFORM REQUIREMENT**
Top surface of tape platform should be flush with top surface of tape guide.

**TO ADJUST**
With tape platform mounting screws loosened, position tape platform.

**CLAMP PLATE SPRING REQUIREMENT**
Function clutch disengaged and latched. Clamp plate spring bowed to the right.

- **MIN. 18 OZS.**
- **MAX. 24 OZS.**

To move clamp plate from bottom of slot in tape depressor.
2.62 Model 28 Tape Printer Unit

NOTE:
THESE ADJUSTMENTS, PLUS APPLICABLE MODEL 28 TYPING REPERFORATOR ADJUSTMENTS, ARE REQUIRED TO ADJUST THE MODEL 28 TAPE PRINTER.

FEED WHEEL REQUIREMENT (PRELIMINARY)
(1) CLEARANCE BETWEEN FEED WHEEL RATCHET AND FRONT PLATE:
MIN. 0.085 --- MAX. 0.095 INCH

(2) (FINAL)
PRINTING CENTRALLY LOCATED ON TAPE
TO ADJUST
TURN ADJUSTING SCREW WITH LOCK NUT LOOSENED.

TAPE GUIDE REQUIREMENT
THE TAPE SHALL "RUN" IN THE CENTER OF TAPE GUIDE (GAGE BY EYE).
TO ADJUST
WITH MOUNTING NUTS FRICITION TIGHT,
POSITION TAPE GUIDE WITH ROLLER UP OR DOWN TO MEET REQUIREMENT.

SPECIAL REQUIREMENT
IF THE MODEL 28 TAPE PRINTER IS USED ON A MODEL 28 TYPING REPERFORATOR SINGLE OR DOUBLE PLATE BASE, A TAPE REEL WILL HAVE TO BE USED TO ACCOMMODATE THE 3/8 INCH TAPE. THIS TAPE REEL CONSISTS OF A DISC W/HUB AND A DISC W/NUT.
2.63 Chad Chute Assembly for Self-contained Typing Reperforator Set for Fully Perforated Tape

CHAD CHUTE (SELF CONTAINED TYPING REPERFORATOR SET)
REQUIREMENT
CHAD CHUTE SHOULD BE FLUSH WITH TOP OF PUNCH BLOCK.

TO ADJUST
WITH MOUNTING SCREWS FRICTION TIGHT POSITION CHAD CHUTE.

MOUNTING SCREWS

TYPING REPERFORATOR UNIT

CHAD CHUTE
Chad Chute Assembly for Multiple Typing Reperforator Set for Fully Perforated Tape

CHAD CHUTE ASSEMBLY (MULTIPLE REPERFORATOR SET)
REQUIREMENT
(1) CHAD CHUTE SHOULD BE FLUSH WITH TOP OF PUNCH BLOCK.
(2) CHAD CHUTE ASSEMBLY SHOULD BE ADJUSTED SO CLEARANCE IS MAXIMUM IN ALL DIRECTIONS BETWEEN EACH CHAD CHUTE AND REPERFORATOR CASTING.
(3) POSITION TAPE GUIDE IN ITS MOUNTING SLOTS SO THAT TOP OF ROLLER IS PARALLEL TO AND ABOVE THE TAPE EXIT OF THE PUNCH BLOCK.

TO ADJUST WITH MOUNTING SCREWS FRICTION TIGHT POSITION CHAD CHUTE AND CHAD CHUTE ASSEMBLY BY MEANS OF ELONGATED SLOTS.
2.65 Chad Chute Assembly for Keyboard Typing Reperforator on Automatic Send-Receive for Fully Perforated Tape

CHAD CHUTE ASSEMBLY (KEYBOARD REPERFORATOR - AUTOMATIC SEND-RECEIVE SET)

REQUIREMENT
CLEARANCE BETWEEN EACH CHAD CHUTE AND ADJACENT UNITS SHOULD BE EQUAL IN ALL DIRECTIONS.

TO ADJUST WITH MOUNTING SCREWS FRICTION TIGHT POSITION EACH CHUTE BY MEANS OF THEIR ELONGATED SLOTS.

CHAD CHUTE

CHAD CHUTE W/BRACKET

KEYBOARD BASE

TYPING REPERFORATOR UNIT
2.66 Chad Chute Assembly for Auxiliary Typing Reperforator on Automatic Send-Receive for Fully Perforated Tape

CHAD CHUTE

MOUNTING SCREWS

CHAD CHUTE W/BRACKET

MOUNTING SCREWS

BASE PLATE

NUT PLATE

CHAD CHUTE ASSEMBLY (FOR AUXILIARY REPERFORATOR - AUTOMATIC SEND-RECEIVE SET)

REQUIREMENT

CLEARANCE BETWEEN EACH CHAD CHUTE AND ADJACENT UNITS SHOULD BE EQUAL IN ALL DIRECTIONS.

TO ADJUST

WITH MOUNTING SCREWS FRICTION TIGHT POSITION CHAD CHUTE AND CHAD CHUTE W/BRACKET BY MEANS OF THEIR ELONGATED SLOTS.
2.67 Tape Guide Chute Mechanism for Auxiliary Typing Reperforator on Automatic Send-Receive

**TAPE GUIDE CHUTE (AUXILIARY TYPING REPERFORATOR) (AUTOMATIC SEND-RECEIVE SET)**

**REQUIREMENT**

With left-top and middle dome doors open, front and rear ends of chute align with punch block tape aperture and with hole in auxiliary control panel.

**TO ADJUST**

Position mounting bracket with mounting screws friction tight until chute is positioned horizontally. With upper adjusting screw friction tight in its nut plate, position chute vertically.

**NOTE:** Tape guide chute should not touch typing reperforator or cabinet. Tape should feed without binding or twisting.
3. VARIABLE FEATURES

3.01 Unshift-on-Space Mechanism

(A) UNSHIFT-ON-SPACE FUNCTION BLADE

(1) To check

- Remove signal bell contact assembly with bracket and signal bell function blade.
- Select figures code combination (12-45). Rotate main shaft until lifter roller is on low part of rocker bail's camming surface and unshift-on-space function blade rests on bell cranks.

Requirement

Min. Some --- Max. 0.015 inch between stripper blade and letters extension arm.

(2) To check

- Select space code combination (3--3--).
- Rotate main shaft until stripper blade touches letters extension arm.

Requirement

When play is taken up in either direction, stripper blade should engage an equal thickness of letters extension arm.

To adjust

Position stripper blade on function blade with two mounting screws loosened, reinstall signal bell contact assembly with bracket and signal bell function blade.

Note:

Make signal bell contact mounting bracket adjustment

(B) UNSHIFT-ON-SPACE FUNCTION BLADE SPRING

Requirement

With unit in stop position and long slot in blocking sleeve engaging function blade

Min. 10 ozs. --- Max. 13 ozs.

To start blade moving.
3.02 Signal-bell Contact Mechanism (Later Design)
(For Earlier Design see Par. 4.04)

**CONTACT BRACKET ASSEMBLY**

1. **Requirement**
   The contact assembly shall be centrally located over the bell function blade insulator.

2. **Requirement**
   With letters code combination (12345) selected, rotate main shaft until bell function blade is in its lowest position (resting on bell cranks). Gap between contacts.
   - Min. 0.015 inch
   - Max. 0.025 inch

3. **Requirement**
   With bell function blade in its selected position, the contacts shall be closed.

   To adjust with mounting screws loosened, position contact bracket assembly.

**SIGNAL BELL CONTACT**

*Note:*
Complete the following adjustments with the signal bell contact assembly removed from the function box front plate.

1. **Requirement**
   Contact springs shall be approximately parallel to top of bracket.

   To adjust bend contact spring.

2. **Requirement**
   Min. 1-1/2 ozs.
   Max. 2-1/2 ozs.

   With pull applied at contact point to open contacts.

   To adjust bend upper contact spring.
3.03 Tape Absence Contact Assembly

(A) TAPE ABSENCE LONG CONTACT SPRING

REQUIREMENT
TAPE SENSING FINGER IN ITS EXTREME COUNTERCLOCKWISE POSITION.
MIN. 35 GRAMS
MAX. 45 GRAMS
TO ADJUST
REMOVE GUARD. BEND LONG CONTACT SPRING.

(D) TAPE ABSENCE CONTACT ASSEMBLY
GUARD POSITION
REQUIREMENT
THE GUARD SHOULD NOT INTERFERE WITH MOVEMENT OF SENSING FINGER.
TO ADJUST
WITH MOUNTING NUT LOOSENED, POSITION THE GUARD.

(C) TAPE ABSENCE SHORT CONTACT SPRING

REQUIREMENT
TAPE SENSING FINGER IN ITS EXTREME COUNTER-CLOCKWISE POSITION.
MIN. 0.010 INCH
MAX. 0.020 INCH
CLEARANCE BETWEEN SENSING FINGER EXTENSION AND CLOSEST POINT ON BAKELITE INSULATOR OF LONG CONTACT SPRING.
TO ADJUST
WITH GUARD REMOVED, BEND THE SHORT CONTACT SPRING.

(B) TAPE ABSENCE CONTACT ASSEMBLY

POSITION
REQUIREMENT
CONTACT POINTS ALIGNED, INSULATOR ON LONG CONTACT SPRING CENTRALLY LOCATED WITH SENSING FINGER EXTENSION.
TO ADJUST
WITH CONTACT ASSEMBLY GUARD REMOVED, MOUNTING SCREWS LOOSENED, POSITION CONTACT SPRINGS.

(F) TAPE ABSENCE CONTACTS CABLE ASSEMBLY

POSITION
REQUIREMENT
THE CABLE ASSEMBLY FOR THE TAPE ABSENCE CONTACTS SHOULD BE ROUTED TOGETHER WITH THE SELECTOR MAGNET CABLE ASSEMBLY AND, IF PRESENT, THE CODE READING CONTACTS CABLE ASSEMBLY. FORM THE CABLES SO THAT THEY DO NOT INTERFERE WITH THE MOVEMENT OF THE TAPE SENSING FINGER.
TO ADJUST:
SECURE THE POSITION OF THE CABLE ASSEMBLIES BY MEANS OF AN APPROPRIATE CABLE CLAMP LOCATED BEHIND THE SELECTOR MAGNETS.

(E) TAPE ABSENCE CONTACTS SENSING FINGER END PLAY

REQUIREMENT
THE END PLAY BETWEEN TAPE SENSING FINGER AND TAPE GUARD SHOULD BE:
MIN. 0.006 INCH
MAX. 0.035 INCH
TO ADJUST
BEND THE TAPE SENSING FINGER.
3.04 Code-reading Contact Mechanisms (Make-only and Transfer Types)

NOTE 1:
UNLESS SPECIFICALLY STATED OTHERWISE, THE FOLLOWING CODE READING CONTACT ADJUSTMENTS APPLY TO BOTH THE TRANSFER (BREAK BEFORE MAKE) TYPE AND MAKE TYPE CONTACTS. WHEN AN ADJUSTMENT IS APPLICABLE TO BOTH TYPES, THE TRANSFER TYPE CONTACTS ARE USED IN THE ILLUSTRATIONS. WHEN TESTING THESE CONTACTS ON ASR SETS THE CONTROL KNOB SHOULD BE IN THE K-T POSITION.

NOTE 2:
IT IS RECOMMENDED THAT THE FOLLOWING ADJUSTMENTS BE MADE WITH THE CODE READING CONTACT ASSEMBLY REMOVED FROM THE UNIT.

(A) MARKING CONTACT BACKSTOPS
REQUIREMENT
AS GAUGED BY EYE, FIVE MARKING CONTACT SPRINGS SHOULD ALIGN WITH EACH OTHER AND BE PARALLEL WITH MOUNTING PLATE.
TO ADJUST
BEND MARKING CONTACT BACKSTOPS.

(MARKING CONTACT BACKSTOP)

(B) MARKING CONTACT SPRINGS-PRELIMINARY
REQUIREMENT
WITH SWINGER CONTACT SPRING HELD AWAY:
MIN. 2 OZS.
MAX. 6 OZS.
TO MOVE EACH SPRING AWAY FROM BACKSTOP.
TO ADJUST
BEND MARKING CONTACT SPRINGS.
NOTE:
TO INCREASE TENSION OF MARKING CONTACT SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM SPRING, BEND SPRING AND THEN RE-BEND BACKSTOP TO MEET REQUIREMENT OF MARKING CONTACT BACKSTOPS ADJUSTMENT (ABOVE).
3.05 Code-reading Contact Mechanisms (Make-only and Transfer Types) continued

(A) SWINGER CONTACT SPRINGS - PRELIMINARY

REQUIREMENT

MIN. 30 GRAMS
MAX. 40 GRAMS

TO OPEN MARKING CONTACTS.

TO ADJUST

BEND SWINGER CONTACT SPRINGS.

NOTE:

SPACING CONTACTS (ON TRANSFER TYPE CONTACT ASSEMBLIES ONLY)
ARE NORMALLY OPEN WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT.

(B) SPACING CONTACT BACKSTOPS - PRELIMINARY

(APPLIES TO TRANSFER TYPE CONTACTS ONLY)

REQUIREMENT

GAP BETWEEN SPACING CONTACTS

MIN. 0.018 INCH
MAX. 0.025 INCH

TO ADJUST

BEND SPACING CONTACT BACKSTOPS.

(C) SPACING CONTACT SPRINGS - PRELIMINARY

(APPLIES TO TRANSFER TYPE CONTACTS ONLY)

REQUIREMENT

MIN. 35 GRAMS
MAX. 50 GRAMS

TO MOVE EACH CONTACT SPRING AWAY FROM BACKSTOP.

TO ADJUST

BEND SPACING CONTACT SPRINGS.

NOTE:

TO INCREASE TENSION OF SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP
AWAY FROM SPRING, BEND SPRING, AND THEN RE-BEND BACKSTOP TO MEET
REQUIREMENT OF SPACING CONTACT BACKSTOPS ADJUSTMENT ABOVE.
NOTE:
The following code reading contact adjustments should be made with the contact assemblies mounted on the unit.

(A) CONTACT MOUNTING BRACKET
REQUIREMENT
(1) With function clutch disengaged and latched, there shall be minimum 0.015 inch clearance between the closest normally closed contact spring (marking contact) and punch slide insulator.
(2) With letters combination selected and punch pins in their uppermost position, the swinger shall be parallel to right end of punch slide and extend below its center, as gauged by eye.

TO ADJUST
POSITION CONTACT MOUNTING BRACKET WITH MOUNTING SCREWS LOOSENEO.

(b) CONTACT MOUNTING PLATE
REQUIREMENT
Each swinger contact spring should be aligned with its associated punch slide insulator as gauged by eye.

TO ADJUST
POSITION CONTACT MOUNTING PLATE WITH MOUNTING SCREWS LOOSENEO.
3.07 Code-reading Contact Mechanism (Transfer Type)

**CONTACT BRACKET—PRELIMINARY (APPLIES TO TRANSFER-TYPE CONTACTS ONLY)**

### (1) REQUIREMENT
- Manually select blank code combination.
- Rotate main shaft until function clutch trips.
- Some clearance between spacing contact spring and its backstop.
- Max. 0.008 inch

![Diagram of code-reading contact mechanism](image)

### (2) REQUIREMENT
- With the selector and function clutches disengaged and latched, manually select the LTRS code combinations and trip the function clutch.
- Clearance between punch slide insulator and swinger contact spring
  - Min. 0.028 inch

**TO ADJUST**
- Position contact bracket with its mounting screws loosened to meet requirement (1). To pry bracket to left, insert screwdriver between bracket and left edge of mounting screws; to pry bracket to right, insert screwdriver between bracket and right edge of mounting screws. Check requirement (2). If not met, refine adjustment.
3.08 Code-reading Contact Mechanism (Make-only Type)

CONTACT BRACKET (APPLIES TO MAKE-TYPE CONTACTS ONLY)---PRELIMINARY

(1) REQUIREMENT

MANUALLY SELECT BLANK CODE COMBINATION.

ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS

AND PUNCH SLIDES ARE AGAINST THEIR RESPECTIVE LATCHES.

GAP BETWEEN CONTACTS.

MIN. 0.010 INCH

MAX. 0.015 INCH (SEE NOTE)

PUNCH SLIDE

PUNCH SLIDE LATCH

NOTE:
WHERE A TYPING REPERFORATOR IS PART OF A
28 PERFORATOR-TRANSMITTER-BASE, CONTACT GAP
SHALL BE

MIN. 0.020 INCH

MAX. 0.025 INCH

SWINGER CONTACT SPRING

PUNCH SLIDE INSULATOR

CONTACT MOUNTING PLATE

MOUNTING SCREWS

CONTACT BRACKET

CONTACT MOUNTING BRACKET

(2) TO CHECK

WITH THE SELECTOR AND FUNCTION CLUTCHES

DISENGAGED AND LATCHED, MANUALLY SELECT

THE LTRS CODE COMBINATION AND TRIP THE

FUNCTION CLUTCH.

REQUIREMENT

CLEARANCE BETWEEN PUNCH SLIDE INSULATOR

AND SWINGER CONTACT SPRING

MIN. 0.028 INCH

TO ADJUST

POSITION CONTACT BRACKET WITH MOUNTING SCREWS

FRICITION TIGHT. TO PRY BRACKET TO LEFT,

INSERT SCREWDRIVER BETWEEN BRACKET AND

LEFT EDGE OF MOUNTING SCREW; TO PRY BRACKET TO

RIGHT, INSERT SCREWDRIVER BETWEEN BRACKET

AND RIGHT EDGE OF MOUNTING SCREW.
3.09 Auxiliary Timing Contact Mechanisms (Single-contact and Double-contact Types)

NOTE 1:
THERE ARE TWO TYPES OF TIMING CONTACT ASSEMBLIES, SINGLE AND DOUBLE. SINGLE CONTACT ASSEMBLIES HAVE A FRONT CONTACT ONLY, NO REAR CONTACT. IF UNIT IS EQUIPPED WITH A DOUBLE CONTACT ASSEMBLY, THE FOLLOWING ADJUSTMENTS APPLY TO BOTH FRONT AND REAR CONTACTS.

NOTE 2:
IN CASE OF SINGLE-CONTACT ASSEMBLY, MAKE CERTAIN CONTACT BRACKET MOUNTING SCREWS ARE CENTRALLY LOCATED IN ELONGATED SLOTS, AND PROCEED TO NEXT ADJUSTMENT.

CONTACT MOUNTING SCREWS

CONTACT SPRINGS

CONTACT BRACKET

CONTACT BACKSTOP

SWINGER

REAR OPERATING BAIL

FRONT OPERATING BAIL

CONTACT BRACKET MOUNTING SCREWS

FRONT BACKSTOP LEG

CONTACT BACKSTOP (DOUBLE CONTACT ASSEMBLY)

requirement
SWINGER OF EACH CONTACT HELD AGAINST ITS BACKSTOP BY ITS OPERATING BAIL AND SPRING, AND CONTACT BRACKET MOUNTING SCREWS CENTRALLY LOCATED IN ELONGATED SLOTS, CLEARANCE BETWEEN OPERATING BAILS MIN. 0.040 INCH MAX. 0.045 INCH (ON UNITS EQUIPPED WITH ONE-CYCLE CAMS) AT POINT OF LEAST CLEARANCE.

TO ADJUST BEND FRONT BACKSTOP LEG.

CONTACT ALIGNMENT REQUIREMENT
WHEN PARTS ARE IN ENGAGEMENT:
(1) OPERATING BAIL CENTRALLY LOCATED WITH RESPECT TO SWINGER.
(2) MATING CONTACT POINTS ALIGNED.
TO ADJUST POSITION CONTACT SPRINGS WITH CONTACT MOUNTING SCREWS LOOSENED.
3.10 Auxiliary Timing Contact Mechanisms (Single-contact and Double-contact Types) continued

(A) RIGHT CONTACT GAP (NORMALLY CLOSED WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT).

REQUIREMENT:
SWINGER HELD AGAINST ITS BACKSTOP.
GAP BETWEEN CONTACTS:
MIN. 0.020 INCH
MAX. 0.025 INCH
TO ADJUST
BEND RIGHT CONTACT SPRING.

(B) SWINGER CONTACT SPRING—PRELIMINARY

REQUIREMENT:
OPERATING BAIL HELD AWAY FROM SWINGER
MIN. 4-1/2 OZS.
MAX. 5-1/2 OZS.
TO OPEN RIGHT SIDE OF CONTACT
TO ADJUST
BEND SWINGER CONTACT SPRING. RECHECK
RIGHT CONTACT GAP AND READJUST IF NECESSARY.

(C) LEFT CONTACT GAP (NORMALLY OPEN WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT)

REQUIREMENT:
OPERATING BAIL HELD AWAY FROM SWINGER, GAP BETWEEN CONTACTS:
MIN. 0.020 INCH
MAX. 0.025 INCH
TO ADJUST
BEND STIFFENER.

(D) LEFT CONTACT SPRING—PRELIMINARY

REQUIREMENT:
SWINGER HELD AGAINST BACKSTOP BY ITS OPERATING BAIL AND SPRING.
MIN. 4-1/2 OZS.
MAX. 5-1/2 OZS.
TO OPEN LEFT SIDE OF CONTACT.
TO ADJUST
BEND LEFT CONTACT SPRING. RECHECK
RIGHT CONTACT GAP AND LEFT CONTACT GAP, AND READJUST IF NECESSARY.
NOTE:
THE FOLLOWING TIMING CONTACT ADJUSTMENTS SHOULD BE MADE WITH CONTACT ASSEMBLY MOUNTED ON UNIT.

(A) OPERATING BAIL SPRINGS

REQUIREMENT
OPERATING BAIL HELD SO THAT SWINGER IS AGAINST BACKSTOP.
MIN. 7 OZS.
MAX. 12 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(B) CONTACT BRACKET—PRELIMINARY (FOR UNITS EQUIPPED WITH ONE-CYCLE CAMS)

LOOSEN LOCKING SCREW. POSITION CAM FOLLOWER ARM, BY MEANS OF ITS ELONGATED MOUNTING HOLE, TO ITS MINIMUM LENGTH ON OPERATING BAIL.
TIGHTEN LOCKING SCREW.

REQUIREMENT
SELECTOR AND FUNCTION CLUTCHES DIENGAGED AND LATCHED. CLEARANCE BETWEEN CAM FOLLOWER ROLLER AND FUNCTION CAM.
MIN. 0.050 INCH
MAX. 0.055 INCH

TO ADJUST
POSITION CONTACT BRACKET WITH MOUNTING SCREWS LOOSENED.

NOTE:
ON UNITS EQUIPPED WITH DOUBLE CONTACT ASSEMBLIES, RECHECK CONTACT BACKSTOP ADJUSTMENT. IF REQUIREMENT IS NOT MET, REFINE CONTACT BRACKET ADJUSTMENT.
3.12 LTRS-FIGS Contact Mechanism (Later Design)
(For Earlier Design see Par. 4.05)

NOTE:
TO FACILITATE CONTACT SPRING ADJUSTMENT,
REMOVE CONTACT ASSEMBLY FROM UNIT.

(A) MIDDLE CONTACT SPRING
REQUIREMENT
MIN. 25 GRAMS—MAX. 40 GRAMS
TO OPEN UPPER SIDE OF CONTACT.
TO ADJUST
BEND MIDDLE CONTACT SPRING.

MIDDLE CONTACT SPRING
UPPER CONTACT SPRING
MOUNTING BRACKET
OPERATING LEVER
LOWER CONTACT SPRING

(B) LOWER CONTACT SPRING
REQUIREMENT
WITH UPPER SIDE OF CONTACT
CLOSED:
MIN. 0.012 INCH—MAX. 0.020 INCH
GAP AT LOWER SIDE OF CONTACT.
TO ADJUST
BEND LOWER CONTACT SPRING.

(C) OPERATING LEVER SPRING
REQUIREMENT
MIN. 1 OZ.—MAX. 2 OZS.
TO START OPERATING LEVER MOVING.

OPERATING LEVER
LETTERS
PUSH BAR
OPERATING LEVER SPRING

(D) MOUNTING BRACKET
NOTE: CONTACT ASSEMBLY SHOULD BE MOUNTED ON UNIT BEFORE THIS ADJUSTMENT IS MADE.
REQUIREMENT
WITH UNIT IN LETTERS CONDITION AND FUNCTION CLUTCH DISENGAGED:
MIN. 0.005 INCH—MAX. 0.015 INCH BETWEEN OPERATING LEVER AND INSULATOR ON MIDDLE CONTACT SPRING.
TO ADJUST
WITH MOUNTING NUT AND UPPER MOUNTING SCREW LOOSE, POSITION MOUNTING BRACKET.
3.13 Contact Timing Measurements (To Zero Test Set)

THE FOLLOWING TESTS REQUIRE THE USE OF A TELETYPED SIGNAL DISTORTION TEST SET. THEY SHOULD BE MADE AFTER THE CONTACT ASSEMBLIES HAVE BEEN ADJUSTED AS INSTRUCTED ON THE PRECEDING PAGES. WHERE REQUIREMENTS ARE NOT MET, DESIGNATED ADJUSTMENTS MUST BE REFINED, AND/OR RELATED LENGTHS MAY HAVE TO BE CHANGED TO MEET TIMING REQUIREMENTS.

TESTS ON 600 OPERATION PER MINUTE UNITS OR LOWER SHOULD BE MADE WITH THE PERFORATOR OR REPERFORATOR AND THE TEST SET OPERATING AT 600 O.P.M. TESTS ON 900 O.P.M. UNITS USED ON THE AUTOMATIC SEND-RECEIVE (ASR) SET SHOULD BE MADE WITH THE TEST SET OPERATING AT 600 O.P.M. AND USING KEYBOARD TRANSMISSION. TESTS ON 1200 O.P.M. UNITS SHOULD BE MADE WITH THE REPERFORATOR OPERATING AT 1200 O.P.M. AND THE TEST SET EQUIPPED WITH A TWO CYCLE SCALE AND OPERATING AT 600 O.P.M.

OBSERVATIONS ARE TO BE MADE OF A NEON TRACE ON THE GRADUATED DISC OF A TEST SET. TRACE WILL HAVE TENDENCY TO "JUMP"; THAT IS, IT WILL NOT BE STEADY ENOUGH TO BE ACCURATELY MEASURED. VARIATION MAY BE AS HIGH AS TEN DIVISIONS ON SCALE. MINIMUM SIGNAL LENGTH IS MEASURED BETWEEN LATEST START AND EARIEST END OF ALL TRACES. MAXIMUM SIGNAL LENGTH IS MEASURED BETWEEN EARIEST START AND LATEST END OF ALL TRACES.

TO ZERO TEST SET
CONNECT NEON TRACE TO NO. 1 CODE READING CONTACT (REARMOST). WITH UNIT RECEIVING LETTERS CODE COMBINATIONS, OBSERVE AND NOTE POINT AT WHICH TRACE ENDS. TRACES WILL JUMP AS DESCRIBED ABOVE, NOTE EARLIEST END OF TRACES. REPEAT FOR REMAINING CONTACTS. OF ALL TRACES OBSERVED, CHOOSE ONE THAT STARTS THE LATEST. SET "START-ZERO" MARK OF SCALE AT LATEST START OF CHOSEN TRACE. RECORD EARLIEST END OF CHOSEN TRACE FOR FUTURE ADJUSTMENT REFERENCES.
3.14 Contact-timing Measurements for Code-reading Contacts

NOTE:
TEST PROCEDURES ON THIS PAGE APPLY TO 600 O.P.M. UNITS OR LOWER ONLY.

CODE READING CONTACTS

(1) ZERO TEST SET AS PREVIOUSLY INSTRUCTED.
(2) CONNECT NEON TRACE TO MARKING SIDE OF A CODE READING CONTACT (NORMALLY OPEN WHEN UNIT IS IN IDLE CONDITION). WITH UNIT RECEIVING CONTINUOUS LETTERS CODE COMBINATIONS, OBSERVE TRACE. REPEAT FOR ALL FIVE CONTACTS.
REQUIREMENTS
A. SIGNAL LENGTH FOR EACH CONTACT TRACE AND COMBINED CONTACT TRACES.
   - MIN. 450 DIVISIONS
   - MAX. 594 DIVISIONS
B. BOUNCE SHOULD END WITHIN MAX. OF 20 DIVISIONS OF Earliest Start AND Latest End OF ALL TRACES.
(3) (APPLIES TO TRANSFER TYPE CONTACTS ONLY) CONNECT NEON TRACE TO BOTH SIDES OF CONTACT. WITH UNIT RECEIVING LETTERS CODE COMBINATIONS, OBSERVE TRACE.
REQUIREMENTS
A. BREAK IN TRACE INDICATING BREAK BEFORE MAKE.
   - MIN. 3 DIVISIONS
B. SIGNAL LENGTH OF SPACING SIDE OF CONTACT
   - MIN. 100 DIVISIONS
C. BOUNCE SHOULD END WITHIN 30 DIVISIONS OF Earliest Start AND Latest End OF TRACE.
(4) TO ADJUST
A. IF REQUIREMENTS UNDER (2) A., (3) A., OR (3) B. ARE NOT MET, REFINE CONTACT BRACKET ADJUSTMENT. WHEN REFINING (2) A., ATTEMPT TO ADJUST TOWARD MAXIMUM SIGNAL LENGTH.
B. IF BOUNCE REQUIREMENTS UNDER (2) B. AND (3) C. ARE NOT MET, REFINE MARKING AND SWINGER CONTACT SPRING AND SPACING CONTACT SPRING TENSIONS.
C. IF ANY REFINEMENTS ARE NECESSARY, REPEAT COMPLETE TEST PROCEDURE.
3.15 Contact-timing Measurements for Auxiliary Timing Contacts

TEST PROCEDURES ON THIS PAGE APPLY ONLY TO 600 O.P.M. UNITS (BELL 8281 SYSTEM) USING ONE-CYCLE CAMS.

**TIMING CONTACTS**

(1) ZERO TEST SET AS PREVIOUSLY DESCRIBED.

(2) REAR CONTACT

A. CONNECT NEON TRACE TO RIGHT SIDE OF REAR CONTACT (NORMALLY OPEN WHEN UNIT IS IN IDLE CONDITION). WITH UNIT RECEIVING LETTERS CODE COMBINATIONS, OBSERVE TRACE.

REQUIREMENTS

1. **EARLIEST START** MIN. OF 35 DIVISIONS AFTER START ZERO MARK.
2. **LATEST END** MIN. OF 35 DIVISIONS BEFORE EARLIEST END OF CODE READING CONTACT TRACES RECORDED WHEN ZEROING TEST SET.
3. **MIN. TRACE LENGTH** 225 DIVISIONS.
4. **BOUNCE SHOULD END WITHIN MAX.** 5 DIVISIONS OF START AND END OF ANY TRACE.

(3) FRONT CONTACT

A. CONNECT NEON TRACE TO BOTH SIDES OF FRONT CONTACT. WITH UNIT RECEIVING LETTERS CODE COMBINATIONS, OBSERVE TRACE.

REQUIREMENTS

1. **BREAK IN TRACE TO INDICATE BREAK BEFORE MAKE.** MIN. 10 DIVISIONS
2. **BETWEEN EARLIEST STARTS OF TRACES OF RIGHT AND LEFT (NORMALLY OPEN AND NORMALLY CLOSED) SIDES OF CONTACT.** MIN. 325 DIVISIONS—MAX. 420 DIVISIONS
3. **BOUNCE SHOULD END WITHIN MAX.** 5 DIVISIONS OF EARLIEST START AND LATEST END OF ANY TRACE.

(4) TO ADJUST

A. IF TIMING REQUIREMENTS UNDER (2) A. 1., 2., 3., AND (3) A. 1. AND 2. ARE NOT MET, REFINE CONTACT BRACKET ADJUSTMENT AND/OR RIGHT CONTACT GAP, LEFT CONTACT GAP, SWINGER CONTACT SPRING, AND LEFT CONTACT SPRING ADJUSTMENTS.

B. IF BOUNCE REQUIREMENTS UNDER (2) A. 4. AND (3) A. 3. ARE NOT MET, REFINE SWINGER CONTACT SPRING AND LEFT CONTACT SPRING TENSIONS.

C. IF ANY REFINEMENTS ARE NECESSARY, REPEAT COMPLETE TEST PROCEDURE.
3.16 Contact-timing Measurements for LTRS-FIGS Contacts (Later Design)
(For Earlier Design see Par. 4.05)

NOTE:
IF UNIT IS EQUIPPED WITH CODE READING AND/OR TIMING CONTACTS, TEST IS TO BE MADE AFTER INSTALLATION AND ADJUSTMENT OF THESE CONTACTS.

LETTERS-FIGURES CONTACT TEST
TO CHECK
CONNECT CABLE LEADS OF LETTERS-FIGURES CONTACT TO NEON TRACE LAMP OF SIGNAL DISTORTION TEST SET. SET CONTROL SWITCHES OF TEST SET TO FOLLOWING POSITIONS: (1) VIEW-TRANSMIT SWITCH TO VIEW; (2) LINE-DIST. SWITCH TO LINE; AND MOTOR SWITCH TO ON. ALTERNATELY SELECT LETTERS (12345) AND FIGURES (12-45). SET START-ZERO MARK OF TEST-SET SCALE AT START OF CONTACT TRACE. CONNECT RIGHT SIDE OF FRONT TIMING CONTACT (PROBE) TO NEON TRACE LAMP; RECORD START AND END OF TRACE. RECONNECT LETTERS-FIGURES CONTACT TO TRACE LAMP AND ALTERNATELY SELECT LETTERS AND FIGURES.

REQUIREMENT
(1) NO CHATTER OR BOUNCE OF LETTERS-FIGURES CONTACT DURING TIME WHEN TIMING CONTACT IS CLOSED.
(2) TRACE OF LETTERS-FIGURES CONTACT START MIN. OF 40 DIVISIONS BEFORE START OF TRACE OF TIMING CONTACT AND END MIN. OF 5 DIVISIONS AFTER END OF TIMING CONTACT.

TO ADJUST
(1) IF (1) OF REQUIREMENT IS NOT MET, REFINE MIDDLE AND LOWER CONTACT SPRING ADJUSTMENTS.
(2) IF (2) OF REQUIREMENT IS NOT MET, REFINE MOUNTING BRACKET ADJUSTMENT.
(3) IF TEST REQUIREMENTS ARE NOT MET, REFINE LTRS-FIGS CONTACT MECHANISM ADJUSTMENTS.
3.17 Contact Timing Measurements (To Zero Test Set)

**NOTE:**
TEST PROCEDURES ON THIS PAGE AND THE FOLLOWING PAGE APPLY ONLY TO 600 O.P.M. UNITS (WESTERN UNION PLAN 55 SYSTEM) USING ONE-CYCLE CAMS.

**TIMING CONTACTS**

(1) ZERO TEST SET AS PREVIOUSLY DESCRIBED.

(2) FRONT CONTACT
   A. CONNECT NEON TRACE TO RIGHT SIDE OF FRONT CONTACT (NORMALLY OPEN WHEN UNIT IS IN IDLE CONDITION). WITH UNIT RECEIVING CONTINUOUS LETTERS CODE COMBINATIONS, OBSERVE TRACE.
   REQUIREMENTS
   1. LATEST END MIN. OF 35 DIVISIONS BEFORE EARLIEST END OF CODE READING CONTACT TRACES.
   2. EARLIEST START MIN. OF 35 DIVISIONS AFTER LATEST START OF CODE READING CONTACT TRACES.
   3. MIN. TRACE LENGTH 200 DIVISIONS.
   4. BOUNCE SHOULD END WITHIN MAX. 5 DIVISIONS OF EARLIEST START AND LATEST END OF ANY TRACE.
   B. RECORD LATEST START AND EARLIEST END OF TRACE.
   C. (APPLIES ONLY IF COMPLETE TRANSFER CONTACT IS USED). CONNECT NEON TRACE TO BOTH SIDES OF FRONT CONTACT. OBSERVE TRACE.
   REQUIREMENT
   1. BREAK IN TRACE AT TWO PLACES TO INDICATE BREAK BEFORE MAKE.
   MIN. 10 DIVISIONS

TEST CONTINUED ON NEXT PAGE
3.18 Contact Timing Measurements (To Zero Test Set) continued

(3) REAR CONTACT

A. CONNECT NEON TRACE TO RIGHT SIDE OF REAR CONTACT (NORMALLY OPEN WHEN UNIT IS IN IDLE CONDITION). WITH UNIT RECEIVING LETTERS CODE COMBINATIONS, OBSERVE TRACE.

REQUIREMENTS
1. LATEST END OF TRACE MIN. OF 35 DIVISIONS BEFORE EARLIEST END OF TRACE OF RIGHT SIDE OF FRONT CONTACTRecorded in (2) B.
2. MIN. TRACE LENGTH 111 DIVISIONS.
3. EARLIEST START OF TRACE MIN. OF 35 DIVISIONS AFTER LATEST START OF TRACE OF RIGHT SIDE OF FRONT CONTACTRecorded in (2) B.
4. BOUNCE SHOULD END WITHIN MAX. 5 DIVISIONS OF EARLIEST START AND LATEST END OF ANY TRACE.

B. (APPLIES ONLY IF COMPLETE TRANSFER CONTACT IS USED). CONNECT NEON TRACE TO BOTH SIDES OF REAR CONTACT. OBSERVE TRACE.

REQUIREMENTS
1. BREAK IN TRACE AT TWO PLACES TO INDICATE BREAK BEFORE MAKE.

MIN. 10 DIVISIONS

(4) TO ADJUST

A. IF TRACE LENGTHS UNDER (2) A, 3, AND (3) A, 2. ARE BOTH SHORT, REFINE CONTACT BRACKET ADJUSTMENT. IF ONLY ONE TRACE IS SHORT, REFINE CONTACT BACKSTOP ADJUSTMENT AND CHECK RIGHT CONTACT GAP, LEFT CONTACT GAP, SWINGER CONTACT SPRING, AND LEFT CONTACT SPRING ADJUSTMENTS.

B. IF BREAK BEFORE MAKE REQUIREMENTS UNDER (2) C, 1, AND (3) B, 1, ARE NOT MET, REFINE RIGHT CONTACT GAP, LEFT CONTACT GAP, SWINGER CONTACT SPRING, AND LEFT CONTACT SPRING ADJUSTMENTS.

C. IF ANY REFINEMENTS ARE NECESSARY, REPEAT COMPLETE TEST PROCEDURE.
3.19 Print Suppression on Function Mechanism

(A) PRINT HAMMER STOP — PRELIMINARY

REQUIREMENT
WITH HEAD OF PRINT HAMMER AGAINST
CHARACTER ON TYPEWHEEL
MIN. SOME — MAX. 0.010 INCH
CLEARANCE BETWEEN PRINT HAMMER
LEVER AND PRINT HAMMER STOP.
TO ADJUST
WITH MOUNTING SCREWS LOOSENED POSITION
PRINT HAMMER STOP BY MEANS OF ITS
ELONGATED UPPER HOLE.

(B) PRINT HAMMER STOP — FINAL

REQUIREMENT
WITH UNIT OPERATING UNDER POWER, THE
AMOUNT OF SMUDGE SHALL BE HELD TO
A MINIMUM WHERE PRINT SUPPRESSION IS
REQUIRED.
TO ADJUST
REFINE PRINT HAMMER STOP (PRELIMINARY)
ADJUSTMENT.
NOTE: UNLESS OTHERWISE SPECIFIED, THE FOLLOWING BACKSPACE ADJUSTMENTS APPLY TO BOTH THE CHADLESS AND FULLY PERFORATED TAPE MECHANISMS.

3.20 Manual and Power Drive Backspace Mechanism (For Chadless Tape)

RAKE (A)

(1) REQUIREMENT

WITH ROTATIONAL PLAY IN RAKE TAKEN UP TO LEFT, BOTTOM SURFACE OF RAKE TEETH SHOULD BE WITHIN 0.040 INCH OF THE SAME VERTICAL PLANE AS LEFT SIDE OF PUNCH BLOCK OR SLIGHTLY TO THE RIGHT.

TO ADJUST

REMOVE TWO MOUNTING SCREWS FROM REAR PLATE. POSITION RAKE SHAFT GEAR IN RELATION TO GEAR SEGMENT. REPLACE MOUNTING SCREWS.

(2) REQUIREMENT

WITH BELLCRANK SPRING UNHOOKED AND RAKE IN OPERATED POSITION, CLEARANCE BETWEEN BOTTOM OF RAKE TEETH AND LOWER SURFACE OF TAPE SLOT:

MIN. 0.007 INCH
MAX. 0.011 INCH

(CHECK AT NO. 1 & 5 PINS.)

TO ADJUST

LOosen THREE MOUNTING SCREWS AND ECCENTRIC MOUNT SCREW UNTIL FRICTION TIGHT. POSITION FRONT AND REAR PLATES, WITH BELL CRANK HANDLE FULLY DEPRESSED, UNTIL LEFT EDGES OF BOTH PLATES ARE APPROXIMATELY IN LINE WITH VERTICAL PLANE OF PUNCH BLOCK AND CLEARANCE MEETS THE REQUIREMENT. TIGHTEN MOUNTING SCREWS AND REPLACE BELL CRANK SPRING.

FEED PAWL ADJUSTING PLATE

REQUIREMENT

(1) PRELIMINARY: WITH BELL CRANK ROTATED CLOCKWISE, FEED PAWL SHALL MISS FIRST TOOTH AT POINT OF LEAST CLEARANCE BY

MIN. 0.006 INCH --- MAX. 0.040 INCH

(2) FINAL: FEED PAWL SHALL MISS FIRST TOOTH AND ENGAGE SECOND TOOTH BY AT LEAST 1/2 OF RIGHT ENGAGING SURFACE OF FEED PAWL (AS GAUGED BY EYE WHEN FEED PAWL FIRST CONTACTS RATCHET TOOTH)

TO ADJUST

POSITION ADJUSTING PLATE WITH MOUNTING SCREW FRICTION TIGHT.
3.21 Manual and Power Drive Backspace Mechanism (For Chadless Tape) continued

(A) RETURN LATCH REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION. CLEARANCE BETWEEN RETURN LATCH AND FEED PAWL EXTENSION
MIN. 0.004 INCH
MAX. 0.020 INCH
TO ADJUST
ADJUST ECCENTRIC WITH MOUNTING SCREW FRICITION TIGHT.

(B) FEED PAWL ECCENTRIC
MANUAL BACKSPACE (PRELIMINARY) REQUIREMENT
WITH THE BACKSPACE BELL CRANK IN ITS OPERATED POSITION AND THE FEED WHEEL DETENTED BACK ONE SPACE.
MIN. SOME---MAX. 0.003 INCH CLEARANCE BETWEEN THE FEED WHEEL RATCHET TOOTH AND THE BACKSPACE FEED PAWL.
POWER DRIVE BACKSPACE
WITH THE BACKSPACE BELL CRANK IN ITS OPERATED POSITION, THE HIGH SIDE OF THE ECCENTRIC SHOULD BE IN ITS UPPERMOST POSITION.
TO ADJUST
LOOSEN THE NUT POST (FRICITION TIGHT) AND ROTATE ECCENTRIC WITH AN ALLEN WRENCH. TIGHTEN THE NUT POST.
3.22 Manual and Power Drive Backspace Mechanism (For Fully Perforated Tape)

(A) **BACKSPACE RATCHET REQUIREMENT**
Teeth of backspace and feed wheel ratchets to line up (visual alignment). Feed wheel ratchet to be in detented position.

To adjust with adjusting clamp mounting screw friction tight, rotate backspace ratchet to meet the requirement.

---

(B) **BACKSPACE PAWL CLEARANCE**

(1) **REQUIREMENT --- PRELIMINARY**
With backspace bell crank rotated clockwise, the backspace pawl shall miss the first tooth by a clearance of:

- **MIN. 0.003 INCH**
- **MAX. 0.010 INCH**

At point of least clearance.

---

(2) **REQUIREMENT (FINAL)**
The backspace pawl shall miss the first tooth and engage the second tooth by at least 1/2 of the right engaging surface of the backspace pawl (as gauged by eye) when backspace pawl first contacts the ratchet tooth.

To adjust take up all rotational play of backspace ratchet in relation to feed ratchet by rotating it clockwise, at same time rotate bell crank clockwise. With mounting screw friction tight, rotate eccentric post to meet the requirements.

---

**FINAL MINIMUM ENGAGEMENT:**
1/2 of surface with second ratchet tooth at first point of contact.
3.23 Manual and Power Drive Backspace Mechanism (For Fully Perforated Tape) continued

FEED PAWL ECCENTRIC
MANUAL BACKSPACE (PRELIMINARY)
REQUIREMENT
WITH THE BACKSPACE BELL CRANK ASSEMBLY IN ITS OPERATED POSITION AND THE FEED WHEEL
DETENTED BACK ONE SPACE.
MIN. SOME ---- MAX. 0.003 INCH
CLEARANCE BETWEEN THE BACKSPACE RATCHET TOOTH AND THE BACKSPACE FEED PAWL WITH ALL
THE ROTATIONAL PLAY OF THE BACKSPACE RATCHET TAKEN UP IN A DIRECTION TO MAKE THE
CLEARANCE MAXIMUM.
POWER DRIVE BACKSPACE
REQUIREMENT
WITH THE BACKSPACE BELL CRANK ASSEMBLY IN ITS OPERATED POSITION, THE HIGH SIDE OF THE
ECCENTRIC SHOULD BE IN ITS UPPERMOST POSITION.
TO ADJUST
LOOSEN THE NUT POST (FRICTION TIGHT) AND ROTATE THE ECCENTRIC WITH AN ALLEN WRENCH,
TIGHTEN THE NUT POST.
3.24 Power Drive Backspace Mechanism (Early Design)

(A) ARMATURE HINGE
REQUIREMENT
ARMATURE BAIL SPRING REMOVED, WITH ARMATURE HELD AGAINST POLE FACE AND PLAY TAKEN UP AT HINGE IN DOWNWARD DIRECTION, CLEARANCE BETWEEN ARMATURE AND MAGNET BRACKET MIN. SOME --- MAX. 0.004 INCH
TO ADJUST
WITH HINGE MOUNTING SCREWS LOOSENED, POSITION ARMATURE. THE ARMATURE SHOULD TOUCH FRONT AND REAR OF MAGNET CORE. TIGHTEN SCREWS AND RECHECK ADJUSTMENT.

NOTE 1:
THE FOLLOWING ADJUSTMENTS ARE FOR USE WITH THE EARLY DESIGN BACKSPACE MAGNET ASSEMBLY. LATER DESIGN USE A NON-ADJUSTABLE BACKSPACE MAGNET ASSEMBLY.

NOTE 2:

NOTE 3:
THIS ADJUSTMENT IS MADE AT FACTORY AND SHOULD NOT BE DISTURBED UNLESS A REASSEMBLY OF THE UNIT IS UNDERTAKEN. IF NECESSARY TO MAKE THIS ADJUSTMENT, THE PUNCH UNIT SHOULD BE REMOVED. SEE DISASSEMBLY AND REASSEMBLY. REMAKE PUNCH UNIT POSITION ADJUSTMENT.

(B) ARMATURE UP-STOP
REQUIREMENT
ARMATURE IN UNOPERATED POSITION. GAP BETWEEN ARMATURE AND POLE FACE MIN. 0.025 INCH. MAX. 0.030 INCH. AT CLOSEST POINT.
TO ADJUST
ROTATE ECCENTRIC WITH MOUNTING NUT LOOSENED. KEEP HIGH PART OF ECCENTRIC TO LEFT.
3.25 Power Drive Backspace Mechanism (For Fully Perforated Tape) (Early Design) continued

DRIVE ARM
REQUIREMENT (PRELIMINARY)

WITH HIGH PART OF ECCENTRIC LINK IN LEFT
HAND POSITION, ARMATURE AGAINST POLE
FACE TO ALLOW DRIVE ARM LATCH LEVER TO
REST AGAINST ECCENTRIC LINK. CLEARANCE
BETWEEN STEP ON ECCENTRIC LINK AND
LATCH LEVER WITH PLAY TAKEN UP TO MAKE
GAP MINIMUM.

MIN. 0.040 INCH
MAX. 0.045 INCH
3.26 Manual and Power Drive Backspace Mechanism (For Chadless Tape) (Early Design) continued

DRIVE ARM
REQUIREMENT (PRELIMINARY)
WITH DRIVE-ARM LATCH LEVER ENGAGED WITH ECCENTRIC LINK, MAIN SHAFT ROTATED TO PLACE ECCENTRIC IN ITS EXTREME RIGHT HAND POSITION AND FEED WHEEL DETENTED BACK ONE SPACE.
MIN. SOME --- MAX. 0.003 INCH
CLEARANCE BETWEEN THE BACKSPACE FEED PAWL AND THE RATCHET TOOTH. CHECK WITH FEED WHEEL SHAFT OIL HOLE IN THE UPPERMOST POSITION AND RECHECK EACH 90 DEGREES ABOUT THE PERIPHERY OF THE FEED WHEEL.
TO ADJUST
LOOSEN DRIVE ARM SCREW (FRICITION TIGHT) AND MOVE ADJUSTING PLATE.
3.27 Power Drive Backspace Mechanism (Early Design) continued

NOTE:
THIS ADJUSTMENT IS MADE AT FACTORY AND SHOULD NOT BE DISTURBED UNLESS A REASSEMBLY OF THE UNIT IS UNDERTAKEN. IF NECESSARY TO MAKE THIS ADJUSTMENT, PUNCH SHOULD BE REMOVED. SEE DISASSEMBLY AND REASSEMBLY, REMAKE PUNCH POSITION ADJUSTMENT.

LATCH EXTENSION REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION, HIGH PART OF ECCENTRIC TO LEFT, ARMATURE AGAINST POLE FACE, LATCH RESTING ON ECCENTRIC LINK NOTCH. CLEARANCE BETWEEN TOP OF ARMATURE EXTENSION AND LATCH EXTENSION
MIN. 0.005 INCH
MAX. 0.020 INCH
TO ADJUST SWING MAGNET CLOCKWISE OR COUNTERCLOCKWISE, AS NECESSARY, WITH MOUNTING SCREWS FRICTION TIGHT.
3.28 Power Drive Backspace Mechanism (Early Design) continued

(A) LATCH
REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION. ARMATURE OFF POLE FACE (DE-ENERGIZED). LATCH EXTENSION AGAINST END OF ARMATURE. ECCENTRIC LINK AT ITS CLOSEST POINT TO UNDERSIDE OF LATCH. CLEARANCE BETWEEN LATCH AND ECCENTRIC LINK.
MIN. 0.005 INCH
MAX. 0.025 INCH

TO ADJUST POSITION LATCH WITH LATCH EXTENSION SCREW LOOSENED.

NOTE 1:
ON UNITS EQUIPPED WITH ONE PIECE NON-ADJUSTABLE LATCH LEVER THE REQUIREMENTS IN THE "FINAL POWER OR MANUAL" MUST BE MET.

(B) NON-REPEAT LATCH
REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION. CLEARANCE BETWEEN TOP SURFACE OF NON-REPEAT LATCH AND LOWEST POINT OF LATCH EXTENSION
MIN. 0.002 INCH
MAX. 0.010 INCH

TO ADJUST POSITION ADJUSTING PLATE WITH LATCH SCREW LOOSENED FRICITION TIGHT.

NOTE 2:
MUST NOT BE OPERATED WITH LATCH AGAINST ARMATURE EXTENSION.
3.29 Manual and Power Drive Backspace Mechanism (For Chadiess Tape (Early Design) continued

(A) LATCH SPRING REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION.
MIN. 14 OZS. --- MAX. 26 OZS.
TO START LATCH MOVING.

(B) FEED PAWL SPRING REQUIREMENT
BACKSPACE MECHANISM IN UNOPERATED POSITION.
MIN. 8 OZS. --- MAX. 15 OZS.
TO START FEED PAWL MOVING.

(C) BELL CRANK SPRING REQUIREMENT
SPRING UNHOOKED FROM PLATE EXTENSION.
MIN. 19 OZS. --- MAX. 23 OZS.
TO PULL TO INSTALLED LENGTH.

(D) GEAR SEGMENT SPRING REQUIREMENT
SPRING UNHOOKED FROM BELL CRANK SPRING POST.
MIN. 22 OZS.
MAX. 26 OZS.
TO PULL TO INSTALLED LENGTH.

(E) ARMATURE BAIL SPRING REQUIREMENT
ARMATURE LATCH SPRING UNHOOKED
MIN. 3-1/2 OZS.
MAX. 6-1/2 OZS.
TO START ARMATURE BAIL MOVING.

(F) LATCH EXTENSION SPRING (POWER DRIVE ONLY) REQUIREMENT
SPRING UNHOOKED FROM LATCH EXTENSION.
MIN. 1 OZ. --- MAX. 2-1/4 OZS.
TO PULL TO INSTALLED LENGTH.
3.30 Power Drive Backspace Mechanism (For Fully Perforated Tape) (Early Design) continued

(A) Feed Pawl Spring
Requirements
Backspace Mechanism in Unoperated Position.
- Min. 4 ozs.
- Max. 6 ozs.
To start Feed Pawl moving.

(B) Bell Crank Spring
Requirements
- Min. 9 ozs.
- Max. 12 ozs.
To pull Spring to installed length.

(C) Armature Latch Spring
Requirements
- Min. 1 ozs.
- Max. 2-1/4 ozs.
To pull Armature Latch Spring to installed length.

(D) Armature Bail Spring
Requirements
With Armature Latch Spring unhooked:
- Min. 3-1/2 ozs.
- Max. 6-1/2 ozs.
To start Armature moving.
3.31 Power Drive Backspace Mechanism (Latest Design)  
(Non-Adjustable Backspace Magnet Assembly)

(A) ARMATURE SPRING
REQUIREMENT
MIN. 18 OZS
MAX. 23 OZS
TO PULL SPRING TO INSTALLED LENGTH.

(B) LATCH EXTENSION SPRING
REQUIREMENT
MIN 1 OZ
MAX 2-1/4 OZS
TO START LATCH MOVING.

(C) MAGNET POSITION
REQUIREMENT
THE ARMATURE EXTENSION SHALL ENGAGE THE LATCH BY APPROXIMATELY ITS FULL THICKNESS
WHEN THE MAGNET IS DE-ENERGIZED.
TO ADJUST
POSITION THE MAGNET ASSEMBLY BY MEANS OF ITS MOUNTING SCREWS.

3.32 Manual and Power Drive Backspace Mechanism (Chadless and Fully Perforated Tape)

NOTE: THE FINAL ADJUSTMENT REQUIREMENT FOR ALL BACKSPACE MECHANISMS, MANUAL OR
POWER DRIVE, REGARDLESS OF THE TYPE OF UNIT WILL READ AS FOLLOWS:

FINAL POWER OR MANUAL
REQUIREMENT
(1) WITH TAPE IN THE UNIT, PLACE THE FEED WHEEL SHAFT OIL HOLE IN ITS UPPERMOST
POSITION, OPERATE THE BACKSPACE MECHANISM ONCE. THE RATCHET WHEEL SHALL
BE BACKED ONE SPACE INTO A FULLY DETENTED POSITION.

NOTE: A FULLY DETENTED POSITION IS DEFINED AS: WITH THE DETENT ROLLER IN
CONTACT WITH THE RATCHET WHEEL THE PUNCH UNIT FEED PAWL SHALL
ENGAGE THE FIRST TOOTH BELOW THE HORIZONTAL CENTERLINE OF THE
FEED WHEEL RATCHET WITH NO PERCEPTIBLE CLEARANCE.

REQUIREMENT
(2) WITH THE UNIT OPERATING UNDER POWER, PERFORATE APPROXIMATELY TWO (2)
INCHES OF TAPE WITH THE "LETTERS" COMBINATION SELECTED. BACKSPACE TWELVE
(12) CHARACTERS IN SUCCESION WITH THE UNIT STILL UNDER POWER. AGAIN
PERFORATE APPROXIMATELY TWO (2) INCHES OF TAPE WITH THE "LETTERS" COM-
BINATION SELECTED. CLIPPING OF THE CODE HOLES SHALL BE HELD TO A
MINIMUM AND SHALL NOT EXCEED MORE THAN 0.005 INCH AS GAUGED BY EYE.

TO ADJUST
ON MANUAL OPERATED BACKSPACE MECHANISMS REFINE THE FEED PAWL
PRELIMINARY ADJUSTMENT. ON BACKSPACE MECHANISMS EQUIPPED WITH POWER
DRIVE, LOOSEN THE ARM ADJUSTING SCREW AND POSITION THE ADJUSTING
PLATE. TIGHTEN THE ARM ADJUSTING SCREW.
3.33 Automatic Noninterfering LTRS and Blank Tape Feed-out Mechanisms

**C** Release Lever Spring

**To Check:**
- Trip Selector Clutch. Rotate main shaft until reset cam follower is on peak of reset bail cam. With spring hook, hold front ratchet check pawl away from release lever.
- Requirement:
  - Min. 5 ozs. --- Max. 7 ozs.
  - To start release lever moving.

**B** Safety Latch

**(1)** To Check:
- Trip function clutch by pivoting main trip lever counterclockwise. Rotate main shaft until drive link is to extreme left. Trip selector clutch and rotate main shaft until reset cam follower is on peak of cam. Trip lever is in line.
- Requirement:
  - Max. of 0.030 inch of safety latch not engaged by latch lever.

**To Adjust:**
- Refine (1) above and latch lever adjustment.

**(2)** To Check:
- Trip selector clutch. Rotate main shaft until right edge of safety latch contacting edge of latch lever are in line.
- Requirement:
  - Max. of 0.030 inch of safety latch not engaged by latch lever.

**To Adjust:**
- Position latch lever with clamp screw on reset cam follower loosened.

**E** Safety Latch Spring

**To Check:**
- Trip function clutch by pivoting main trip lever counterclockwise. Rotate main shaft until drive link is to extreme left. Trip selector clutch and rotate main shaft until reset cam follower is on peak of cam. Requirement:
  - Min. 1-1/2 ozs. --- Max. 3 ozs.
  - To pull spring to installed length.

**D** Latch Lever Spring

**To Check:**
- Trip selector clutch. Rotate main shaft until reset cam follower is on peak of reset bail cam. Requirement (for automatic noninterfering LTRS tape feed-out mechanism)
  - Min. 2 ozs. --- Max. 4 ozs.
- Requirement (for automatic noninterfering blank tape feed-out mechanism)
  - Min. 7 ozs. --- Max. 10 ozs.
- To pull spring to installed length.
3.34 Automatic Noninterfering LTRS and Blank Tape Feed-out Mechanisms continued

(A) RELEASE ARM
TO CHECK
PLACE UNIT IN FEED OUT CYCLE BY POSITIONING RELEASE LEVER ON LOWER STEP OF LATCH LEVER. ADVANCE RATCHETS BEYOND TIME DELAY (HIGH PART OF TIME DELAY CAM BEYOND TIME DELAY LEVER). POSITION FEED OUT CAM AS SHOWN.

REQUIREMENT
(1) MIN. 0.010 INCH—MAX. 0.030 INCH BETWEEN DRIVE ARM AND RELEASE ARM.
(2) WITH UNIT IN THE STOP POSITION
MAX. 0.015 INCH
OF THE DRIVE BAIL UNENGAGED BY THE RELEASE ARM.
TO ADJUST
WITH CLAMP NUT LOOSENED, POSITION RELEASE ARM BY MEANS OF ECCENTRIC SCREW ON TIME DELAY LEVER.

(b) RELEASE ARM SPRING
REQUIREMENT
WITH CLUTCHES DISENGAGED AND DRIVE ARM LATCHED BY RELEASE ARM:
MIN. 2 OZS. — MAX. 5 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
3.35 Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms
(For Earlier Design Noninterfering BLANK Tape Feed-Out Mechanism see Par. 4.06)

(A) ARMATURE HINGE
REQUIREMENT
WITH ARMATURE MANUALLY OPERATED, IT SHALL BE FLUSH AGAINST POLE FACE AND MAGNET BRACKET EXTENSION.
TO ADJUST LOOSEN ARMATURE-HINGE BRACKET MOUNTING SCREWS, POSITION ARMATURE AND TIGHTEN SCREWS.

(B) DRIVE BAIL SPRING
REQUIREMENT
ROTATE MAIN SHAFT UNTIL DRIVE BAIL IS ON HIGH PART OF ITS CAM.
MIN. 20 OZS. --- MAX. 28 OZS.
TO START THE DRIVE BAIL MOVING.

(C) MOUNTING PLATE
REQUIREMENT
WITH ARMATURE IN UNOPERATED POSITION.
ROTATE MAIN SHAFT UNTIL DRIVE BAIL IS ON HIGH PART OF ITS CAM. CLEARANCE BETWEEN THE BLOCKING BAIL AND DRIVE BAIL SURFACE.
MIN. 0.006 INCH
MAX. 0.015 INCH
TO ADJUST POSITION BLOCKING BAIL WITH MOUNTING PLATE CLAMP SCREW AND SPRING POST FRICTION TIGHT.

(D) MAGNET ASSEMBLY
REQUIREMENT
WITH ARMATURE HELD IN OPERATED POSITION.
ROTATE MAIN SHAFT UNTIL DRIVE BAIL ROLLER IS ON HIGH PART OF ITS CAM. CLEARANCE BETWEEN BLOCKING BAIL AND RIGHT EDGE OF DRIVE BAIL.
MIN. 0.005 INCH
MAX. 0.015 INCH
TO ADJUST POSITION MAGNET ASSEMBLY, ARMATURE HELD AGAINST MAGNET POLE PIECE WITH MAGNET BRACKET MOUNTING SCREWS FRICTION TIGHT.
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3.36 Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms continued

(A) BLOCKING LATCH TORSION SPRING
Requirement

With armature in unoperated position and
Drive bail roller on high part of its cam.
Min. 15 grams --- Max. 40 grams
to start blocking latch moving.

Pry point
Clamp screws

(B) ARMATURE BACKSTOP
To check

With armature in unoperated position,
rotate main shaft until drive bail
roller is on high part of its cam.

Requirement

Min. some --- Max. 0.005 inch
Clearance between the blocking
latch and non-repeat latch. The drive
bail should engage the blocking bail
by at least 2/3 of its thickness.

To adjust
Loosen the armature backstop
mounting screws and position
by means of pry point.

(C) NON-REPEAT LEVER SPRING
Requirement

With armature in unoperated position and
Drive bail roller on high part of its cam
Min. 6 ozs. --- Max. 9 ozs.
to pull spring to installed length.

(D) BLOCKING BAIL SPRING
Requirement

With armature in unoperated position and
Drive bail roller on high part of its cam.
Min. 3 ozs. --- Max. 5 ozs.
to pull spring to installed length.

(E) RELEASE LEVER
Requirement

With armature in operated position, rotate
main shaft until drive bail roller is in indent
of its cam. Clearance between release
lever and latch lever.

Min. 0.010 inch
Max. 0.025 inch

To adjust
With clamp screw friction tight position release lever.
3.37 Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms continued

**Release Lever Spring**

To check trip selector clutch. Rotate main shaft until stripper cam follower is on peak of cam, with spring hook, hold front ratchet check pawl away from release lever.

**Requirement**

- Min. 5 ozs. --- Max. 7 ozs.
- To start release lever moving.

**Latch Lever**

To check trip selector clutch. Rotate main shaft until stripper cam follower is on peak of cam. With spring hook, hold front ratchet check pawl away from release lever.

**Requirement**

- Min. 5 ozs. --- Max. 7 ozs.
- To pull spring to installed length.

**Latch Lever Spring**

To check trip selector clutch. Rotate main shaft until stripper cam follower is on peak of cam.

**Requirement**

- (For remote control non-interfering LTRS tape feed-out mechanism) Min. 2 ozs. --- Max. 4 ozs.
- (For remote control non-interfering blank tape feed-out mechanism) Min. 9 ozs. --- Max. 12 ozs.
- To pull spring to installed length.

**Latch Lever**

To adjust position latch lever with clamp screw on stripper cam follower loosened.

**Latch Lever Spring**

To check trip selector clutch. Rotate main shaft until stripper cam follower is on peak of cam.

**Requirement**

- Min. 2 ozs. --- Max. 4 ozs.
- (For remote control non-interfering LTRS tape feed-out mechanism) Min. 9 ozs. --- Max. 12 ozs.
- To pull spring to installed length.
3.38 Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms continued

(A) RELEASE ARM

(1) REQUIREMENT
WITH UNIT IN THE FEED-OUT CYCLE, RATCHETS ADVANCED BEYOND THE TIME DELAY. CLEARANCE BETWEEN THE DRIVE ARM AND UPPER SURFACE OF RELEASE ARM:
MIN. 0.010 INCH
MAX. 0.030 INCH
POSITION CAM SO SURFACES ARE IN LINE.

(2) REQUIREMENT
WITH UNIT IN STOP POSITION THE SURFACE OF THE DRIVE BAIL THAT DOES NOT ENGAGE THE RELEASE ARM SHALL NOT EXCEED:
MAX. 0.015 INCH
TO ADJUST WITH CLAMP NUT FRICITION TIGHT, POSITION RELEASE ARM BY MEANS OF ECCENTRIC SCREW ON TIME DELAY LEVER.

(8) RELEASE ARM SPRING
REQUIREMENT
WITH CLUTCHES DISENGAGED AND DRIVE ARM LATCHED BY RELEASE ARM:
MIN. 2 OZS. --- MAX. 5 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
3.39 Automatic and Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms

(C) FEED PAWL AND FRONT CHECK PAWL SPRINGS

REQUIREMENT
WITH UNIT IN FEED OUT CYCLE (SEE "TO CHECK"
OF REAR CHECK PAWL ADJUSTMENT BELOW):

MIN. 1 OZ. --- MAX. 3 OZS.
TO PULL EACH SPRING
TO INSTALLED LENGTH.

FRONT CHECK PAWL SPRING

REAR CHECK PAWL SPRING

MIN. 28 GRAMS --- MAX. 56 GRAMS
TO START REAR CHECK PAWL MOVING.

FRONT RATCHET STOP BLOCK

TO CHECK
WITH UNIT IN STOP POSITION, PLACE
RELEASE LEVER ON LOWER STEP OF LATCH LEVER. PERMIT STOP ON FRONT
RATCHET TO REST AGAINST STOP BLOCK.
ROTATE MAIN SHAFT UNTIL FEED PAWL
IS IN EXTREME RIGHT POSITION.

MIN. 0.002 INCH --- MAX. 0.015 INCH
BETWEEN FRONT CHECK PAWL AND
FRONT RATCHET TOOTH.

TO ADJUST
WITH TWO CLAMP SCREWS LOOSENEO
POSITION STOP BLOCK BY MEANS OF
PRY POINT.
3.40 Automatic and Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms continued

**B) TIME DELAY LEVER SPRING**

**REQUIREMENT**

**WITH UNIT IN STOP POSITION:**

MIN. 2 OZS. --- MAX. 3 OZS.

TO PULL SPRING TO INSTALLED LENGTH.

**C) RATCHET RETURN SPRING**

**REQUIREMENT**

**WITH UNIT IN STOP POSITION:**

MIN. 5 OZS. --- MAX. 7 OZS.

TO PULL SPRING TO INSTALLED LENGTH.

---

**A) TIME DELAY LEVER**

1) TO CHECK

TRIP SELECTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL STRIPPER CAM FOLLOWER IS ON HIGH PART OF ITS CAM.

**REQUIREMENT**

MIN. 0.040 INCH --- MAX. 0.060 INCH

CLEARANCE BETWEEN TIME DELAY LEVER AND HIGH PART OF TIME DELAY CAM.

2) **REQUIREMENT**

**WITH UNIT IN STOP POSITION:**

MIN. SOME

CLEARANCE BETWEEN TIME DELAY LEVER AND HIGH PART OF TIME DELAY CAM.

**TO ADJUST**

WITH CLAMP SCREW LOOSENED, POSITION ECCENTRIC BUSHING.
3.41 Automatic and Remote-control Noninterfering LTRS
and Blank Tape Feed-out Mechanisms continued

**DRIVE ARM SPRING REQUIREMENT**
WITH UNIT IN FEED-OUT CYCLE AND DRIVE ARM ROLLER HELD FIRMLY AGAINST ITS CAM INDENT, IT SHALL REQUIRE
MIN. 42 OZS. --- MAX. 50 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

---

3.42 Automatic and Remote Control Noninterfering LTRS
Tape Feed-out Mechanisms continued

**PUNCH SLIDE LATCH**
TO CHECK
SET UP BLANK CODE COMBINATION (-----) IN SELECTOR. PLACE UNIT IN FEED-OUT CYCLE, THE RATCHETS ADVANCED BEYOND THE TIME DELAY AND THE DRIVE ARM ON THE LOW PART OF ITS CAM.

**REQUIREMENT**
MIN. 0.010 INCH——MAX. 0.030 INCH
BETWEEN PUNCH SLIDE AND PUNCH SLIDE LATCH AT SLIDE WHERE CLEARANCE IS LEAST.

**NOTE:** SEE THAT RESET BAIL IS TRIPPED.

**TO ADJUST**
WITH CLAMP SCREW LOOSENEO, POSITION DRIVE ARM ADJUSTING PLATE BY MEANS OF PRY POINT.
3.43 Automatic and Remote-control Noninterfering LTRS and Blank Tape Feed-out Mechanisms continued

(B) ADJUSTING LEVER
TO CHECK
PLACE UNIT IN FEED-OUT CYCLE, THE RATCHETS ADVANCED BEYOND THE TIME DELAY AND THE DRIVE ARM ON THE LOW PART OF FEED-OUT CAM.

REQUIREMENT
(1) MIN. 0.010 INCH—MAX. 0.030 INCH CLEARANCE BETWEEN THE TRIP LEVER AND CLUTCH RELEASE LEVER.
(2) MIN. SOME CLEARANCE BETWEEN TRIP LEVER AND LEFT END OF SLOT IN RELEASE LEVER DOWNSTOP BRACKET.

TO ADJUST WITH CLAMP SCREW LOOSENED, POSITION ADJUSTING LEVER MAKING SURE IT RIDES FULLY ON THE SLIDE TRIP LEVER.

(A) FOLLOWER LEVER
REQUIREMENT
WITH FOLLOWER LEVER ON HIGH PART OF TRIP CAM:
(1) MIN. 0.010 INCH—MAX. 0.030 INCH BETWEEN RELEASE AND MAIN TRIP LEVER.
(2) SOME CLEARANCE BETWEEN MAIN TRIP LEVER AND DOWNSTOP BRACKET.

TO ADJUST WITH LOCK NUT LOOSENED, POSITION ADJUSTING ARM BY MEANS OF PRY POINT.
3.44 Automatic and Remote Control Noninterfering LTRS and BLANK Tape Feed-Out
Mechanisms continued

Note: After making this adjustment recheck (B) on the preceding page.

(RESET BAIL TRIP LEVER)

TO CHECK

LETTERS COMBINATION SELECTED, FUNCTION CLUTCH TRIPPED, TRIP CAM FOLLOWER RESTING ON THE HIGH PART OF CAM, PUNCH SLIDES AGAINST THEIR DOWNSTOP.

(1) REQUIREMENT

MIN. 0.008 INCH—MAX. 0.020 INCH
CLEARANCE BETWEEN LOWER EDGE OF SLIDE AND UPPER EDGE OF RESET BAIL.

(2) REQUIREMENT

WITH CLUTCHES FULLY DISENGAGED, RESET BAIL SHOULD FULLY ENGAGE NOTCHES IN PUNCH SLIDES.

TO ADJUST

WITH CLAMP SCREW LOOSENED, POSITION RESET BAIL TRIP LEVER BY MEANS OF ADJUSTING SLOT.
3.45 Automatic and Remote Control Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms continued

TAPE LENGTH ADJUSTING PLATE

**NOTE:** CAN BE SET TO FEED OUT TAPE OF ANY LENGTH UP TO 18 INCHES.

(1) **REQUIREMENT**
PLACE UNIT IN FEED OUT CYCLE BY POSITIONING RELEASE LEVER ON LOWER STEP OF LATCH LEVER. MANUALLY ADVANCE RATCHETS SO THAT FRONT RATCHET IS IN TOOTH PRECEDING TRIP OFF. ROTATE MAIN SHAFT UNTIL FEED PAWL IS IN EXTREME LEFT POSITION.

CLEARANCE BETWEEN ADJUSTING PLATE AND LATCH LEVER PROJECTION
MIN. 0.002 INCH --- MAX. 0.020 INCH

(2) **REQUIREMENT**
WHEN OPERATING UNDER POWER, UNIT SHOULD FEED OUT CORRECT LENGTH OF TAPE.

TO ADJUST WITH SPRING POST LOOSENE, POSITION ADJUSTING PLATE.
3.46 Automatic and Remote Control Noninterfering BLANK Tape Feed-Out Mechanisms continued

**BLOCKING LINK TORSION SPRING**

**REQUIREMENT**

WITH UNIT IN STOP POSITION AND RELEASE LEVER ON LOWER STEP OF LATCH LEVER

MIN. 25 GRAMS—MAX. 45 GRAMS

TO START THE BLOCK LINK MOVING.

---

**BLOCKING LINK**

TO CHECK (HORIZONTAL CLEARANCE) WITH UNIT IN STOP POSITION AND RELEASE LEVER IN UPPER STEP OF LATCH LEVER, MANUALLY TRIP FUNCTION CLUTCH.

**REQUIREMENT**

(1) MIN. 0.005 INCH—MAX. 0.018 INCH BETWEEN THE RIGHT EDGE OF PUNCH SLIDE RESET BAIL AND BLOCKING LINK.

(2) WITH SELECTOR RANGE SCALE SET AT 120 THE BLOCKING LINK SHOULD BE CENTERED BETWEEN THE CLUTCH DISC MOUNTING SCREWS AND THE SELECTOR STOP ARM BAIL.

TO ADJUST LOOSEN CLAMP SCREW ON ADJUSTING LEVER AND POSITION BLOCKING LINK TO MEET REQUIREMENT.
3.47 Automatic and Remote Control
Noninterfering LTRS and BLANK
Tape Feed-Out Mechanisms continued

(A) RESET BAIL LATCH

(1) TO CHECK (VERTICAL CLEARANCE)
SELECT LETTERS CODE COMBINATION (12345). ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS AND PUNCH SLIDES ARE TO EXTREME LEFT. SET UP BLANK CODE COMBINATION (-----) IN SELECTOR BY STRIPPING ALL PUSH LEVERS FROM SELECTING LEVERS. ROTATE MAIN SHAFT UNTIL PUNCH SLIDES ARE JUST LATCHED.

REQUIREMENT
MIN. 0.008 INCH --- MAX. 0.020 INCH BETWEEN RESET BAIL AND RESET BAIL LATCH.
TO ADJUST
WITH MOUNTING SCREWS LOOSENED, POSITION MOUNTING PLATE BY MEANS OF PRY POINTS.

(2) REQUIREMENT (HORIZONTAL CLEARANCE)
WITH CLUTCHES DISENGAGED,
MIN. 0.005 INCH --- MAX. 0.020 INCH BETWEEN RESET BAIL AND RESET BAIL LATCH.
TO ADJUST
POSITION RESET BAIL SO THAT APPROX. Half ITS THICKNESS IS BELOW TOP SURFACE OF ITS LATCH. WITH CLAMP SCREW LOOSENED, POSITION RESET BAIL LATCH BY MEANS OF PRY POINT.

(3) TO CHECK
SELECT LETTERS CODE COMBINATION (12345). ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS. SET UP BLANK CODE COMBINATION (-----) IN SELECTOR BY STRIPPING ALL PUSH LEVERS FROM SELECTING LEVERS. ROTATE MAIN SHAFT TO STOP POSITION.

REQUIREMENT
PUNCH SLIDES LATCHED BY PUNCH SLIDE LATCHES.
TO ADJUST
REFINE (1) AND (2) ABOVE.

(B) RESET BAIL LATCH SPRING

REQUIREMENT
WITH UNIT IN STOP CONDITION
MIN. 1 OZ. --- MAX. 3 OZS.
TO START RESET BAIL LATCH MOVING.

(C) TRIP LEVER EXTENSION SPRING

TO CHECK
DISENGAGE BOTH CLUTCHES. TRIP FUNCTION CLUTCH BY PIVOTING MAIN TRIP LEVER COUNTERCLOCKWISE. HOLD TRIP LEVER EXTENSION UP AGAINST RESET BAIL.
REQUIREMENT
MIN. 18 OZS. --- MAX. 24 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
3.48 End of Feed-Out Timing Contacts for Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms

(A) CONTACT SWINGER --- PRELIMINARY 
REQUIREMENT
MIN. 1-1/2 OZS. --- MAX. 2-1/2 OZS. 
TO OPEN NORMALLY CLOSED CONTACT. 
TO ADJUST BEND SWINGER.

(B) CONTACT SPRING GAP --- PRELIMINARY 
REQUIREMENT
NORMALLY OPEN CONTACT GAP
MIN. 0.012 INCH --- MAX. 0.020 INCH
TO ADJUST BEND CONTACT SPRING.

(C) CONTACT ASSEMBLY 
REQUIREMENT
INSULATOR BUTTON ON SWINGER SHOULD BE 
CENTRALLY LOCATED IN BAIL EXTENSION YOKE.
TO ADJUST WITH MOUNTING SCREWS LOOSENED 
POSITION CONTACT ASSEMBLY.

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3.49 End of Feed-Out Timing Contacts for Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms continued

**Diagram:**

- **Contact Assembly Mounting Bracket**
- **Contact Bracket Mounting Screws**
- **Swinger Contact**
- **NORMALLY Closed Contact**
- **Bail**
- **Normaly Open Contact Insulator Button**
- **Spring Post**
- **Adjusting Plate**
- **Latch Lever Extension**

**E) Tape Length Adjusting Plate Requirement**

With Unit in stop position, Blank Combination selected and the release lever positioned on lower step of latch lever manually advance ratchets so that the feed pawl is in the front ratchet tooth preceding trip off. Turn main shaft until feed pawl is in extreme left position, hold bail against adjusting plate lightly.

- **(1) Requirement**
  - Min. 0.030 inch — Max. 0.040 inch clearance between bail and latch lever extension.

- **(2) Requirement**
  - When operating under power, unit should feedout correct length of tape.

To adjust with spring post loosened, position adjusting plate.

**D) Contact Assembly Mounting Bracket Requirement**

With unit in stop position and release lever positioned on lower step of latch lever.

- **(1) Requirement**
  - Min. 0.030 — Max. 0.040 inch clearance between latch lever extension and bail when bail is positioned so clearance is a minimum.

To adjust with mounting screws loosened position contact bracket.
3.50 Manual- and Solenoid-Operated Interfering LTRS Tape Feed-Out Mechanisms

DRIVE SHAFT REAR BEARING

REAR BEARING

MOUNTING SCREWS

(REA5 VIEW)

DRIVE SHAFT REAR BEARING

REQUIREMENT

DRIVE SHAFT SHOULD MOVE FREELY IN ITS BEARINGS.

TO ADJUST

POSITION REAR BEARING WITH MOUNTING SCREWS LOOSENED.
3.51 Manual- and Solenoid-Operated Interfering LTRS Tape Feed-Out Mechanisms continued

- **Section 573-118-700**

**SOLENOID PLUNGER**

**CLAMP SCREW**

**STOP LEVER CASTING**

- **TRIP LEVER - MANUALLY OPERATED TO CHECK**
  
  With unit in stop position, trip selector clutch by positioning hand lever to left until stop lever rests against casting.
  
  Requirement:
  
  (1) Min. some---max. 0.015 inch between start lever and armature at point of min. clearance.
  
  (2) Start lever engaging approx. center of trip lever's operating surface.

  To adjust:
  
  With clamp screw loosened, position trip lever on shaft.

**TRIP LEVER - SOLENOID OPERATED TO CHECK**

With unit in stop position, trip selector clutch by energizing solenoid. Take up play in stop lever to right (i.e., play between stop lever and plunger).

Requirement:

(1) Min. some---max. 0.008 inch between start lever and armature at point of min. clearance.

(2) Start lever engaging approx. center of trip lever's operating surface.

To adjust:

With clamp screw loosened, position trip lever on shaft.

**TRIP LEVER SPRING REQUIREMENT**

Min. 3.4 ozs.

Max. 2 oz.

To pull spring to its installed length.
3.52 External Manual Interfering LTRS Tape Feed-Out Mechanism

(A) LEVER REQUIREMENT
LEVER SHOULD NOT TOUCH SIDES OF GUIDE.
TO ADJUST
BEND LEVER.

NOTE 1:
RECHECK MANUALLY OPERATED TRIPLEVER AND TRIPLEVER SPRING ADJUSTMENTS.

(B) ARM REQUIREMENT
WITH COVER PROPERLY POSITIONED AS SPECIFIED IN SECTION CONTAINING REQUIREMENTS AND ADJUSTMENTS FOR TYING REPERFORATOR COVER, AND ARM JUST TOUCHING LEVER, THE HANDLE SHOULD BE APPROXIMATELY HORIZONTAL.
TO ADJUST
WITH ARM ADJUSTING NUT FRICTION TIGHT, POSITION ARM.

NOTE 2:
REMOVE COVER TO SIMPLIFY TIGHTENING AND LOOSENING THE ADJUSTING NUT.
3.53 Timing Contact Mechanism (Operated by Selector)

**NOTE**

Parts should be well aligned and free of sharp bends. Contact points misalignment shall not exceed 1/4 the diameter of points.

**(A) "M" CONTACT SPRINGS**

Requirement
- Min. 4 OZS.
- To move contact spring away from its stiffener.
- To adjust bend contact spring.

**(B) "B" CONTACT SPRINGS**

Requirement
- Min. 4 OZS.
- To move contact spring away from its stiffener.
- To adjust bend contact spring.

**(C) "S" - "B" CONTACT SPRINGS**

Requirement
- Min. 3-1/2 OZS.
- Max. 4-1/4 OZS.
- To move swinger contact away from normally break contact.
- To adjust bend swinger contact spring.

**(D) TWIN "B" CONTACT SPRINGS**

1. Requirement
   - Both contacts should open at the same time.

2. Requirement
   - The insertion of an 0.008 inch gauge between one pair of points should not cause the other pair to separate.
   - To adjust bend springs or slightly twist stiffener.
   - Recheck contact pressure.

**(E) "S" - "M" CONTACT GAP**

Requirement
- Min. 0.012 inch
- Max. 0.020 inch
- To adjust bend stiffener.

**CONTACT MOUNTING BRACKET**

**(F) TWIN SPRINGS ("M" CONTACTS)**

Requirement
- Both break and swinger contacts should make approximately the same time.
- To adjust bend break contact springs or slightly twist stiffener.

---

**NOTE 1:**

In this text, the letters S, B and M are used to denote respectively the "swinger", "break" (normally closed with lever riding cam depression) and "make" (normally open; closed only with lever riding cam peak) contact springs.

**NOTE 2:**

When making adjustments (F) through (H) make certain the "S" spring insulator is clear of the operating lever.
3.54 Timing Contact Mechanism (Operated by Selector) continued

(H) CONTACT ASSEMBLY POSITION

1. REQUIREMENT
   SET RANGE SCALE AT 50 (IMPORTANT).
   ROTATE SHAFT SO OPERATING LEVER IS ON LOWEST PART OF CAM.
   TO ADJUST
   WITH MOUNTING SCREWS LOOSENED POSITION CONTACT ASSEMBLY BY MEANS OF ITS OVERSIZE MOUNTING HOLES SO LEVER CAN BE MOVED
   MIN. 0.002 INCH
   MAX. 0.006 INCH
   BEFORE IT TOUCHES THE SWINGER SPRING,
   AND SO FIRST TOUCH IS ON LOWER HALF OF SPRING STUD WEARING PLATE.

2. REQUIREMENT
   (AT HIGHER SETTINGS, MOVEMENT WILL BE LARGER; DISREGARD). TIGHTEN SCREWS AND RECHECK. ROTATE SHAFT AND NOTE THE HIGH PART OF CAM CAUSES BOTH "M" CONTACTS TO MOVE AT LEAST,
   MIN. 0.012 INCH
   IF THIS CONTACT MOVEMENT IS NOT MET AT SETTINGS 60 AND 90, CHECK FOR INSECURE PARTS AND REFINE CONTACT GAP BETWEEN SWINGER AND MAKE CONTACT. IF STILL NOT MET, REPLACE RANGE SCALE SELECTOR RACK.

(I) OPERATING LEVER SPRING

 REQUIREMENT
   THE SPRING SHOULD HOLD OPERATING LEVER AGAINST CAM WITH LIGHT PRESSURE. WITH SPRING REMOVED.
   MIN. 2 OZS.
   MAX. 3 OZS.
   TO STRETCH SPRING 5/8 INCH LENGTH.

(G) ALIGNMENT OF OPERATING LEVER WITH CAM

1. REQUIREMENT
   OPERATING LEVER'S FULL THICKNESS SHOULD RIDE CAM.
   TO CHECK
   TAKE UP ALL CAM END PLAY TOWARD SELECTOR CLUTCH DRUM, ALL OPERATING LEVER END PLAY (AT ITS BEARING) IN OPPOSITE DIRECTION. OBSERVE LEVER AND CAM FOR FULL ENGAGEMENT.

2. REQUIREMENT
   LEVER SHOULD NOT EXERT PRESSURE AGAINST FACE OF CLUTCH DISC.
   TO ADJUST
   REFINE CLUTCH DRUM END PLAY.
3.55 Auxiliary Contact Assembly

NOTE:
The following adjustments should be made prior to installation of contact bracket assembly on the unit.

(A) Normally Open Contact Spring Requirement

- Min. 4-1/2 ozs.
- Max. 5-1/2 ozs.

To move contact spring away from its stiffener.

To adjust bend contact spring. Recheck contact gap.

(B) Normally Open Contact Gap Requirement

- Min. 0.020 inch
- Max. 0.025 inch

To adjust bend stiffener.

(C) Normally Closed Contact Requirement

- Min. 3 ozs.
- Max. 4 ozs.

To move swinger contact away from normally closed contact.

To adjust bend swinger contact.

(D) Auxiliary Contact Assembly Requirement

- Trip function clutch and rotate until clearance between pad and actuator is maximum.
- Min. some
- Max. 0.008 inch

Clearance between swinger pad and actuating lever when play is taken up to make clearance a minimum.

To adjust loosen mounting screws and position contact bracket assembly on mounting bracket. It may be necessary to reposition mounting bracket to meet requirement.
3. 56 Multiple Mounted Function Blade Contact Mechanism

Note: For early design see par 4.21.

NOTE 1:
THE FOLLOWING ADJUSTMENTS SHOULD BE MADE PRIOR TO INSTALLING THE CONTACT BRACKET ASSEMBLY ON UNIT.

(A) NORMALLY OPEN CONTACT GAP
REQUIREMENT
MIN. 0.008 INCH
MAX. 0.015 INCH
TO ADJUST BEND NORMALLY OPEN CONTACT SPRING.

(B) NORMALLY CLOSED CONTACT
REQUIREMENT
MIN. 8 GRAMS
MAX. 15 GRAMS
TO MOVE THE SWINGER CONTACT AWAY FROM THE NORMALLY CLOSED CONTACT.
TO ADJUST BEND NORMALLY CLOSED CONTACT SPRING.

NOTE 2:
THE FOLLOWING ADJUSTMENTS SHOULD BE MADE AFTER THE CONTACT BRACKET ASSEMBLY IS MOUNTED TO THE UNIT.

(C) NORMALLY OPEN CONTACT GAP
(1) REQUIREMENT
WITH THE FUNCTION BLADE IN ITS LOWEST POSITION IN THE NON-SELECTED CONDITION.
CLEARANCE BETWEEN THE CONTACT SWINGER INSULATOR BUTTON AND THE FUNCTION BLADE:
MIN. SOME
(2) REQUIREMENT
CONTACT GAP
MIN. 0.008 INCH
MAX. 0.015 INCH
TO ADJUST BEND NORMALLY CLOSED CONTACT SPRING.
(3) REQUIREMENT
WITH THE FUNCTION BLADE IN ITS LOWEST POSITION IN THE SELECTED CONDITION.
GAP BETWEEN THE SWINGER CONTACT AND NORMALLY CLOSED (NOW OPEN) CONTACT
MIN. 0.015 INCH
AND SOME OVERTRAVEL OF THE NORMALLY OPEN CONTACT.
TO ADJUST BEND NORMALLY CLOSED CONTACT SPRING.
REFINE PREVIOUS ADJUSTMENTS TO MAINTAIN REQUIREMENTS.
3. 57 Blank Delete Mechanism

(8) FUNCTION BLADE TORSION SPRING
REQUIREMENT

MIN. 2 OZS.
MAX. 5 OZS.

TO START LIFTING THE BLANK FUNCTION BLADE FROM BLANK SENSING POSITION WITHOUT BLANK FUNCTION BLADE CONTACT INTERFERENCE.

NOTE
TAKE UP PLAY IN LETTERS FUNCTION BLADE TO MAKE THE GAP MAXIMUM.

(A) BLANK FUNCTION BLADE
REQUIREMENT

WITH BLANK CODE COMBINATION SELECTED AND BLANK FUNCTION BLADE IN ITS SELECTED POSITION, CLEARANCE BETWEEN BLANK FUNCTION BLADE AND LETTERS FUNCTION BLADE

MIN. SOME
MAX. 0.020 INCH

TO ADJUST
WITH FUNCTION BLADE MOUNTING SCREW FRIC-TION TIGHT, ADJUST ECCENTRIC BUSHING KEEP-ING HIGH PART OF ECCENTRIC TOWARDS THE TOP OF UNIT.
FEED PAWL READJUSTMENT

REQUIREMENT
WITH FEED WHEEL RATCHET IN ITS FULLY DETENTED POSITION, THE FEED PAWL IN ITS UPPERMOST POSITION MUST JUST TOUCH THE LOWER PART OF A TOOTH ON THE RATCHET.

TO ADJUST
WITH LOCK SCREW FRICTION TIGHT, ROTATE THE FEED PAWL ECCENTRIC, KEEPING HIGH PART OF ECCENTRIC TO RIGHT OF LOCK SCREW.

NOTE:
THE ECCENTRIC STUD SHOULD BE BACKED OFF TO ELIMINATE ANY INTERFERENCE WITH THIS ADJUSTMENT.
SECTION 573-118-700

3.59 Blank Delete Mechanism continued

BLOCKING LEVER WITH SHAFT MOUNTING PLATE
REQUIREMENT
WITH THE UNIT IN THE STOP POSITION, (ALL
CLUTCHES LATCHED)
MIN. 0.015 INCH -- MAX. 0.030 INCH
CLEARANCE BETWEEN THE BLOCKING LEVER AND
THE LATCH LEVER.

TO ADJUST
LOosen MOUNTING SCREWS AND POSITION
THE BLOCKING LEVER WITH SHAFT MOUNTING
PLATE.

NOTE: CHECK THAT THE HUB ON THE
STUD WITH BUSHING
DOES NOT RUB AGAINST THE REAR
PUNCH PLATE CAUSING THE BLOCKING
LEVER SHAFT TO BIND.

ADJUSTING SCREW
ARMATURE BAIL

ROD

LOCK NUT
ARMATURE STOP SCREW
AMATURE BAIL SPRING

LATCH LEVER
SHAFT MOUNTING PLATE
MOUNTING SCREWS
POST
3.60 Blank Delete Mechanism continued

(A) ARMATURE HINGE
REQUIREMENT
THE ARMATURE SHOULD BE FLUSH WITH THE MAGNET POLE FACE AND MAGNET BRACKET EXTENSION.
TO ADJUST
WITH MAGNET BRACKET ADJUSTING SCREW AND SPRING POST FRICTION TIGHT, POSITION HINGE.

(B) MAGNET ASSEMBLY
REQUIREMENT
WITH FUNCTION BLADES IN SENSING POSITION AND ARMATURE MANUALLY HELD OPERATED,
THE ROD SHOULD FULLY CONTACT THE ADJUSTING SCREW.
TO ADJUST
WITH MOUNTING SCREWS FRICTION TIGHT, POSITION MAGNET ASSEMBLY TO MEET REQUIREMENT.
3.61 Blank Delete Mechanism continued

**LATCH LEVER TORSION SPRING**

**REQUIREMENT**

- MIN. 2 OZS.
- MAX. 5 OZS.

TO LIFT LATCH LEVER FROM BLOCKING LEVER.

**BLOCKING LEVER**

**REQUIREMENT**

WITH FUNCTION BLADES IN SENSING POSITION AND MAGNET ARMATURE MANUALLY HELD OPERATED,
CLEARANCE BETWEEN BLOCKING LEVER AND LATCH LEVER
MIN. SOME
MAX. 0.005 INCH

TO ADJUST
WITH MAGNET ARMATURE MANUALLY HELD OPERATED
AND LOCKNUT ON ADJUSTING SCREW LOOSENED,
ROTATE ADJUSTING SCREW TO MEET THE REQUIREMENT.
RECHECK
TIGHTEN LOCK NUT ON ADJUSTING SCREW AND RECHECK ADJUSTMENT.

**NOTE:** IF UNIT IS EQUIPPED WITH FEED SUPPRESSION,
THE LEVER ON TAPE SHOE ARM SHOULD BE PIVOTED OUT OF POSITION WHEN MAKING THIS ADJUSTMENT.
3.62 Blank Delete Mechanism continued

ARMATURE STOP
WITH FUNCTION BLADES IN SENSING POSITION AND BLOCKING LEVER UNLATCHED
CLEARANCE BETWEEN END OF ROD AND ADJUSTING SCREW
MIN. 0.010 INCH—MAX. 0.020 INCH
TO ADJUST
WITH LOCKNUT LOOSENED, ADJUST ARMATURE STOP SCREW.

ARMATURE BAIL SPRING
WITH ROD MOVED OUT OF INTERFERING POSITION
MIN. 1 OZ.
MAX. 3 OZS.
TO START ARMATURE BAIL MOVING

ADJUSTING SCREW

ARMATURE BAIL

LOCK NUT

ARMATURE STOP SCREW

ARMATURE BAIL SPRING

TRANSFER SHAFT SPRING
WITH UNIT IN STOP POSITION, AND FEED PAWL EXTENSION HELD AWAY FROM INTERFERING, IT SHOULD REQUIRE
MIN. 20 GRAMS
MAX. 50 GRAMS
TO START SHAFT MOVING.
3.63 Blank Delete Mechanism continued

**ECCENTRIC STUD REQUIREMENT**

With Latch lever and blocking lever in latched position and feed pawl in its upward travel, clearance between tip of engaging feed wheel ratchet tooth and feed pawl tooth at its closest point

Min. 0.010 inch  
Max. 0.020 inch

To adjust with lock nut on eccentric stud friction tight, adjust eccentric stud on blocking lever to meet requirement.

Recheck tighten lock nut on eccentric stud and recheck adjustment.

**NOTE:**

The eccentric should be towards the top of unit in its fully adjusted position.
3.64 Blank Delete Mechanism continued

(A) PRINT SUPPRESSOR BLOCKING ARM REQUIREMENT

With function blades in sensing position, blocking lever latched, at the closest point there shall be
min. 0.003 inch---max. 0.015 inch clearance between the left side of the print hammer lever and blocking arm
when all the play in the print hammer lever is taken up in a direction to make the clearance minimum.

To adjust
loosen nut friction tight and adjust eccentric shoulder screw to meet requirement.

NOTE: It may be necessary to favor the position of the eccentric shoulder screw in its mounting hole to meet
the requirement.

(B) PRINT SUPPRESSOR STOP REQUIREMENT

With blocking lever in unlatched position

clearance between blocking arm and print hammer
min. some
max. 0.015 inch

when play in print hammer is taken up in a direction
to make the clearance a minimum.

To adjust
with lock nut friction tight, position stop to meet
requirement.

Recheck
print suppressor blocking arm adjustment.

(C) BLOCKING ARM SPRING REQUIREMENT

With unit in stop position
min. 10 grams
max. 50 grams

to start moving the blocking arm away from stop.
3.65 Blank Delete Mechanism continued

**CONTACT SPRING TENSION**

**REQUIREMENT**
- MIN. 4-1/2 OZS.
- MAX. 5-1/2 OZS.

TO MOVE THE CONTACT SPRING AWAY FROM ITS STIFFENER.

TO ADJUST
BEND CONTACT SPRING TO MEET REQUIREMENT.

RECHECK
OPEN CONTACT GAP ADJUSTMENT.

**SWINGER CONTACT SPRING TENSION**

**REQUIREMENT**
- MIN. 2 OZS.
- MAX. 3 OZS.

TO JUST MOVE THE SWINGER CONTACT SPRING AWAY FROM THE NORMALLY CLOSED CONTACT.

TO ADJUST
BEND CONTACT SPRING TO MEET REQUIREMENT.

**STIFFENER**

**OPEN CONTACT GAP**

**REQUIREMENT**
- MIN. 0.010 INCH
- MAX. 0.015 INCH

BEND STIFFENER TO MEET REQUIREMENT.

**NORMAL CONTACT SPRING**

**NOTE:**
The following adjustments should be made after contact bracket assembly is mounted on unit.

**CONTACT ASSEMBLY (EARLIER DESIGN)**

**REQUIREMENT**
- CONTACT ASSEMBLY SHOULD LINE UP CENTRALLY WITH INSULATOR ON BLANK FUNCTION BLADE.

TO ADJUST
WITH MOUNTING SCREWS LOOSENED LINE UP THE CONTACT ASSEMBLY TO MEET REQUIREMENT.

**INSULATOR**

**CONTACT GAP**

**REQUIREMENT**
- SELECT SPACING COMBINATION (3) AND ROTATE MAIN SHAFT UNTIL BLANK FUNCTION BLADE DROPS INTO SENSING POSITION. CLEARANCE BETWEEN CONTACT SPRINGS.
  - MIN. 0.010 INCH
  - MAX. 0.015 INCH

TO ADJUST
WITH MOUNTING SCREWS LOOSENED, POSITION CONTACT MOUNTING BRACKET.

**CONTACT ASSEMBLY (LATER DESIGN)**

THIS CONTACT ASSEMBLY SHOULD BE EQUIPPED WITH A GUARD LOCATED UNDER THE PLATE TO ELIMINATE A SHOCK HAZARD.
**MANUAL PRINT SUPPRESSION MECHANISM**

The manual print suppression mechanism consists of a blocking arm which can be locked in a print or non-print condition at the time of unit installation.

**Requirement**

1. Blocking arm to be adjusted in non-print condition to assure that print hammer arm is blocked by blocking arm.
2. The blocking arm should be readjusted to the print condition and locked in place.

To adjust:

- With mounting screw friction tight, rotate eccentric bushing and manually position blocking arm to non-print or print condition.
3. 67  Time Delay Motor Stop Mechanism

(A) TIME DELAY RATCHET WHEEL TENSION
REQUIREMENT
HOLD ALL PAWLS OFF RATCHET WHEELS.
MIN. 2 OZS.
MAX. 8 OZS.
TO MOVE EACH RATCHET WHEEL.
TO ADJUST
REMOVE AND BEND FRICTION SPRINGS
OF RATCHET WHEEL.
3.68 Time Delay Motor Stop Mechanism continued

(B) TIME DELAY CLAMP ARM

(1) REQUIREMENT
SELECTOR RESET BAIL ON HIGH PART OF ITS CAM; LATCH PAWL RESTING ON HIGH PART OF BOTH RATCHET WHEEL FLANGES.
MIN. 0.010 INCH
MAX. 0.020 INCH
CLEARANCE BETWEEN LATCHING SURFACES OF CONTACT OPERATING PAWL AND LATCH LEVER

CLAMP ARM

(2) REQUIREMENT
END PLAY BETWEEN CLAMP ARM AND ITS ADJACENT BUSHING.
MIN. .006 INCH
MAX. 0.006 INCH
TO ADJUST WITH MOUNTING SCREW LOOSENED POSITION CLAMP ARM.
3.69 Time Delay Motor Stop Mechanism continued

(C) TIME DELAY CONTACT ASSEMBLY
REQUIREMENT
CONTACT POINTS CENTRALLY ALIGNED, INSULATOR ON LONG CONTACT SPRING CENTRALLY LOCATED WITH RESPECT TO CONTACT OPERATING PAWL EXTENSION.
TO ADJUST WITH MOUNTING SCREWS LOOSENED, POSITION CONTACT SPRINGS.

(D) TIME DELAY LONG CONTACT SPRING
REQUIREMENT
SELECTOR RESET BAIL ON HIGH PART OF ITS
CAM.
MIN. 1 OZ.
MAX. 1-1/2 OZS.
TO JUST START INSULATOR ON LONG CONTACT SPRING MOVING AWAY FROM CONTACT OPERATING PAWL EXTENSION.
TO ADJUST BEND LONG CONTACT SPRING.
3.70 Time Delay Motor Stop Mechanism continued

(F) Time Delay Short Contact Spring

**Requirement**

- Selector and function clutches disengaged and latched; contact operating pawl in indentations of both ratchet wheel flanges.
- Min. 2 ozs.
- Max. 3 ozs.
- To just separate contact points of long and short contact springs.
- To adjust bend short contact spring.

(E) Time Delay Contact Gap

**Requirement**

- Selector and function clutches disengaged and latched; contact operating pawl resting on high part of both ratchet wheel flanges.
- Min. 0.010 inch
- Max. 0.015 inch
- Clearance between contact points of long and short contact springs.
- To adjust bend short contact spring stiffener.
3.71 Time Delay Motor Stop Mechanism continued

(G) TIME DELAY LATCH PAWL SPRING
REQUIREMENT
LATCH PAWL SPRING UNHOOKED FROM PAWL;
LATCH PAWL HELD ON HIGH PART OF BOTH
RATCHET WHEEL FLANGES.
MIN. 12 OZS.
MAX. 15 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(H) TIME DELAY CONTACT OPERATING PAWL SPRING
REQUIREMENT
CONTACT OPERATING PAWL SPRING UNHOOKED
FROM LATCH LEVER; CONTACT OPERATING
PAWL HELD BLOCKED BY LATCH LEVER.
MIN. 2-1/4 OZS.
MAX. 3-1/4 OZS.
TO PULL SPRING TO INSTALLED LENGTH.
3.72 Time Delay Motor Stop Mechanism continued

(i) **TIME DELAY DRIVE PAWL**

**REQUIREMENT**

ROTATE BOTH RATCHET WHEELS UNTIL LATCH PAWL DROPS INTO INDENTATIONS OF BOTH RATCHET WHEEL FLANGES. DEPRESS DRIVE PAWL DOWNWARD OUT OF ENGAGEMENT WITH RATCHET TEETH AND TAKE UP PLAY BETWEEN LATCH PAWL AND RATCHET WHEELS BY MOVING RATCHET WHEELS BACKWARD (COUNTER-CLOCKWISE). WITH ECCENTRIC FOLLOWER DRIVE ARM AT END OF ITS EXTREME LEFT TRAVEL, POSITION DRIVE PAWL ON DRIVE ARM SO POINT OF UPPER BEVELED EDGE OF PAWL RESTS ON PEAK OF FIRST RATCHET WHEEL TOOTH TO RIGHT OF VERTICAL CENTERLINE THROUGH RATCHET WHEELS OR OVERTRAVELS PEAK.

**MIN. SOME**

**MAX., 0.010 INCH**

**TO ADJUST**

WITH MOUNTING SCREWS LOOSENED, POSITION DRIVE PAWL ON ITS DRIVE ARM.
3.73 Time Delay Motor Stop Mechanism continued

**Requirement**

Eccentric follower drive arm at end of its extreme right travel.
- Min. 3 OZS.
- Max. 4 OZS.
To just start drive pawl moving downward away from ratchet wheels.

**Requirement**

Disable the time delay motor stop contact mechanism when not required.
To adjust
- Remove pilot screw from its upper mounting hole in ratchet wheel bracket and reinstall it in its lower mounting hole so that it holds drive pawl out of engagement with ratchet wheels.
3.74 Vacuum Chad Removal (Send-Receive Typing Reperforator Set)

**VACUUM CHAD REMOVAL (SEND-RECEIVE TYPING REPERFORATOR SET)**

**REQUIREMENTS**

1. **DIRECTS THE PUNCHED CHAD TO A CONVENIENT DISPOSAL OUTSIDE THE SET.**
2. **SYNCHRONOUS MOTOR WITH OPEN TINES OF THE FAN WHEEL FACING AWAY FROM THE MOTOR PROVIDES POWER FOR CHAD DISPOSAL.**
3. **A NYLON BAG OR A NYLON CHUTE ATTACHED TO EXHAUST END OF FAN WHEEL ASSEMBLY FURNISHED AS ALTERNATE MEANS OF CHAD DISPOSAL OUTSIDE OF CABINET.**

**TO ADJUST**

WITH MOUNTING HARDWARE FRICTION TIGHT POSITION CHAD CHUTE ASSEMBLY, TUBING, AND FAN WHEEL CASING ASSEMBLY SO THERE IS NO INTERFERENCE WITH ADJACENT UNITS.
4. EARLIER DESIGN MECHANISMS ADJUSTMENTS

4.01 Ribbon Feed Mechanism for Chadless Tape and Fully Perforated Tape
(For Later Design see Par. 2.59 and 2.60)

(A) RIBBON FEED PAWL SPRING
REQUIREMENT
WITH ROCKER BAIL TO EXTREME LEFT
MIN. 10 OZS. --- MAX. 14 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(B) RIBBON FEED ECCENTRIC STUD
REQUIREMENT
(1) WITH ROCKER BAIL TO EXTREME LEFT, THERE
SHOULD BE
MIN. 0.012 INCH --- MAX. 0.028 INCH
BETWEEN RETAINING PAWL AND RATCHET
TOOTH ON SIDE WHERE CLEARANCE IS
LEAST.

TO ADJUST:
(1) UNITS EQUIPPED WITH ECCENTRIC
STUD: POSITION STUD WITH LOCK
NUT LOOSENED.
(2) UNITS EQUIPPED WITH ADJUSTABLE
ARM: BY MEANS OF PRY POINT,
POSITION ADJUSTABLE ARM WITH
MOUNTING SCREWS FRICITION TIGHT.

NOTE: UNITS IN WHICH THE OLD
STYLE ROCKER BAIL IS PRESENT, POSITION
THE ECCENTRIC IN ITS NEUTRAL POSITION
AND MAKE THE ADJUSTMENT WITH THE
ADJUSTABLE DRIVE ARM.
4.02 Ribbon Feed Mechanism for Chadless Tape and Fully Perforated Tape continued

(A) RIBBON FEED DRIVE ARM SPRING
REQUIREMENT
WITH UNIT IN STOP POSITION
MIN. 3 OZS. -- MAX. 5 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(B) RIBBON FEED PAWL DOWNSTOP ECCENTRIC
TO CHECK
DISENGAGE FUNCTION CLUTCH. TAKE UP BACKLASH IN
RATCHET WHEEL SO THAT CLEARANCE BETWEEN FEED PAWL
AND RATCHET TOOTH IS AT MINIMUM. MEASURE CLEARANCE.
REPEAT FOR OTHER RATCHET WHEEL.
REQUIREMENT
(1) CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH
MIN. 0.020 INCH -- MAX. 0.040 INCH
ON SIDE WHERE CLEARANCE IS LEAST.
(2) PAWL SHOULD FEED ONE TOOTH AT A TIME.
TO ADJUST
POSITION DOWNSTOP ECCENTRIC WITH LOCK NUT LOOSENED.

(C) RIBBON RATCHET WHEEL SPRING WASHERS
REQUIREMENT
WITH FEED PAWL AND RETAINING PAWL SHIFTED TO OPPOSITE RATCHET WHEEL.
MIN. 1 OZ. -- MAX. 2-1/2 OZS.
TO START WHEEL TURNING.
TO ADJUST
REMOVE RETAINING RING AND BEND SPRING WASHER.
NOTE:
MAKE THIS ADJUSTMENT FOR BOTH RATCHET WHEELS.
4.03 Ribbon Feed Mechanism for Chadless Tape and Fully Perforated Tape continued

(A) RIBBON REVERSING PLATE
TO CHECK
POSITION ROCKER BAIL TO EXTREME LEFT. HOLD REVERSING ARM UNDER REVERSING PLATE AND MEASURE CLEARANCE. WITH FEED PAWL AGAINST OTHER RATCHET, REPEAT PROCEDURE FOR OTHER REVERSING ARM.
REQUIREMENT
CLEARANCE BETWEEN REVERSING ARM AND REVERSING PLATE
MIN. 0.010 INCH --- MAX. 0.020 INCH
AT REVERSING ARM WHERE CLEARANCE IS LEAST.
TO ADJUST
POSITION REVERSING PLATE WITH CLAMP SCREW LOOSESED.

(B) RIBBON FEED REVERSING ARM SPRING
REQUIREMENT
WITH FEED PAWL IN HIGHEST POSITION
MIN. 10 GRAMS TO 30 GRAMS
TO START REVERSING ARM MOVING.
4.04 Signal Bell Contact Mechanism (For Later Design see Par. 3.02)

(A) CONTACT MOUNTING BRACKET

(1) TO CHECK

Disconnect contact. Select letters code combination (12345). Rotate main shaft until bell function blade is in lowest position (resting on bell cranks).

Requirement

Normally open contact open.

(2) TO CHECK

Select bell code combination and rotate main shaft until bell function blade is in lowest position.

Requirement

Bell function blade in slots of bell cranks and normally open contact closed.

To adjust with mounting screws loosened, position contact mounting bracket.

CAUTION: There should be some clearance between ribbon feed drive roller and contact mounting bracket when unit is in stop position. If necessary, refine above adjustment.

(B) FUNCTION BLADE SPRING REQUIREMENT --- REFER TO
4.05 Letters - Figures Contact Mechanism  
(For Later Design see Par. 3.12 and 3.16)

Mounting Bracket Requirement
With unit in letters condition and function clutch disengaged, left side of contact should be closed.

To adjust
With mounting nuts loosened, rotate mounting bracket until left side of contact just closes and note position of actuating blade. Rotate bracket further until actuating blade is approximately 0.020 inch beyond noted position.

Position of Blade at Initial Closure

Start of left side of letters-figures contact (may vary 5 divisions)

Start of right side of front timing contact
Min. of 40 divisions

Letters-figures contact test operation of letters-figures contact can be check by means of teletype signal distortion test set.

End of right side of front timing contact

End of left side of letters-figures contact

To check
Record start and end of trace of right side of front timing contact. Connect neon trace lamp across left side of letters-figures contact. Alternately select letters (12345) and figures (12-45) code combinations and observe trace. Set start-zero mark of test set scale at start of trace.

Requirement

1) Left side of letters-figures contact should close before right side of timing contacts close and should open after right side of timing contacts open.
2) No bounce or chatter of letters-figures contact during part of function cycle when right side of timing contacts are closed.
4.06 Noninterfering BLANK Tape Feed-Out Mechanism (Earlier Design)
(For Later Design see Par. 3.36)

(A) FEED OUT BRACKET
REQUIREMENT
OUTER RATCHET CHECK PAWL RIDING FULLY ON RATCHET WHEN PLAY IS TAKEN UP IN EITHER DIRECTION.
TO ADJUST POSITION FEED OUT BRACKET WITH MOUNTING SCREWS LOOSENED.

(MOUNTING SCREWS)

FEED OUT BRACKET (RIGHT SIDE VIEW)

(B) DRIVE ARM SHAFT REAR BEARING
REQUIREMENT
DRIVE ARM SHAFT FINGER FREE IN ITS BEARINGS.
TO ADJUST POSITION REAR BEARING WITH MOUNTING SCREWS LOOSENED.

(DRIVE ARM SHAFT)

MOUNTING SCREWS

(REAR VIEW)

(C) DRIVE ARM
REQUIREMENT
(1) WHEN PLAY IS TAKEN UP TO MAKE IT MINIMUM, AT LEAST SOME CLEARANCE BETWEEN DRIVE ARM AND FUNCTION CAM.
(2) DRIVE ARM SHOULD ENGAGE FULL THICKNESS OF RELEASE ARM.
TO ADJUST POSITION DRIVE ARM ON SHAFT WITH CLAMP SCREW LOOSENED.

(RELEASE ARM)

(MOUNTING SCREWS)

(CLAMP SCREW)

(DRIVE ARM SHAFT)

(FUNCTION CAM)

(TOP VIEW)
4.07 Noninterfering BLANK Tape Feed-Out Mechanism continued

**RELEASE ARM**

REQUIREMENT

WITH DRIVE ARM ON HIGH PART OF ECCENTRIC COLLAR, CLEARANCE BETWEEN DRIVE ARM AND RELEASE ARM

MIN. 0.003 ---- MAX. 0.010 INCH.

TO ADJUST POSITION RELEASE ARM PIVOT SHAFT IN ELONGATED MOUNTING HOLE WITH CLAMP NUT LOOSENED.

**NOTE:** FEED PAWL MUST BE DISENGAGED FROM FEED WHEEL RATCHET.
(A) FEED OUT PAWL
TO CHECK
WITH UNIT OPERATING UNDER POWER, ALLOW FEED OUT OPERATION TO BE INTERRUPTED BY AN INCOMING MESSAGE.

REQUIREMENT
FEED HOLE AND CODE HOLES OF FIRST CHARACTER ON SAME CENTER LINE.

TO ADJUST
WITH POWER OFF, CHECK DETENT ROLLER FOR FULL ENGAGEMENT WITH RATCHET. LATCH FEED OUT MECHANISM IN OPERATED POSITION.

POSITION MAIN SHAFT SO THAT DRIVE ARM IS ON HIGH PART OF ECCENTRIC COLLAR. WITH CLAMP SCREW LOOSENED, POSITION FEED OUT PAWL AGAINST FIRST RATCHET TOOTH TO LEFT OF VERTICAL CENTER LINE. TIGHTEN CLAMP SCREW FRICTION TIGHT. ROTATE MAIN SHAFT UNTIL FEED OUT PAWL HAS RETRACTED

MIN. 0.020 INCH---MAX. 0.030 INCH

REPOSITION PAWL AGAINST TOOTH. TIGHTEN CLAMP SCREW. RECHECK REQUIREMENT.

(B) FEED OUT PAWL SPRING
REQUIREMENT
MIN. 1/2 OZ.---MAX. 2 OZS.
TO START PAWL MOVING.

NOTE: AFTER COMPLETION OF A MESSAGE (FEED OUT MECHANISM UNLATCHED) THE FEED OUT PAWL SHOULD REST ON THE UPPER PORTION OF A FEED WHEEL RATCHET TOOTH AND SHOULD NOT ENGAGE THE VERTICAL FACE OF ANY TOOTH. REFINE ADJUSTMENT IF NECESSARY.
4.09 Noninterfering BLANK Tape Feed-Out Mechanism continued

(A) ARMATURE HINGE

REQUIREMENT
WITH ARMATURE HELD AGAINST MAGNET CORE
MAX. 0.003 INCH
BETWEEN ARMATURE AND MAGNET MOUNTING BRACKET.

TO ADJUST
WITH MOUNTING SCREW AND ARMATURE SPRING POST LOOSENED, POSITION ARMATURE HINGE.

(B) MAGNET MOUNTING BRACKET
TO CHECK
PLACE TAPE-OUT MECHANISM IN UNOPERATED CONDITION (MAGNET DE-ENERGIZED AND DRIVE ARM LATCHED BY RELEASE ARM). TAKE UP ALL CLEARANCE BETWEEN LOCK LEVER ROLLER AND ARMATURE BAIL.

REQUIREMENT
CLEARANCE BETWEEN MAGNET CORE AND ARMATURE ANTI-FREEZE BUTTON
MIN. 0.020 INCH——MAX. 0.025 INCH

TO ADJUST
BY MEANS OF PRY POINT, POSITION MAGNET MOUNTING BRACKET WITH MOUNTING SCREWS LOOSENED.

(C) ARMATURE SPRING
REQUIREMENT
MIN. 7 OZS. —— MAX. 8 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

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4.10 Noninterfering BLANK Tape Feed-Out Mechanism continued

(A) RELEASE ARM LATCH

REQUIREMENT

(1) WITH KICK-OUT ROLLER POSITIONED AWAY FROM LOCK LEVER AND MAGNET ENERGIZED, CLEARANCE BETWEEN RELEASE ARM AND RELEASE ARM LATCH

MIN. SOME—MAX. 0.005 INCH

(2) WHEN FEED OUT PAWL IS TOO EXTREME RIGHT, IT SHOULD FULLY ENGAGE A RATCHET TOOTH WHEN MAGNET IS ENERGIZED.

TO ADJUST POSITION LATCH SHAFT IN ELONGATED HOLE WITH LOCK NUT LOOSENED.

(B) RELEASE ARM LATCH SPRING

REQUIREMENT

MIN. 1-1/2 OZS.—MAX. 2-1/2 OZS.

TO PULL SPRING TO INSTALLED LENGTH.
4.11 Noninterfering BLANK Tape Feed-Out Mechanism continued

(B) METERING FEED PAWL SPRING REQUIREMENT
WITH DRIVE ARM LATCHED BY RELEASE ARM
MIN. 2-1/2 OZS. --- MAX. 4-1/2 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(C) OUTER RATCHET CHECK PAWL SPRING REQUIREMENT
MIN. 2-1/2 OZS. --- MAX. 4-1/2 OZS.
TO PULL SPRING TO MAX. INSTALLED LENGTH.

(A) LIFTER LEVER REQUIREMENT
WITH FEED-OUT MECHANISM IN OPERATED CONDITION (RELEASE ARM LATCHED)
PRELIMINARY
(1) METERING FEED PAWL SHOULD FULLY SEAT IN DEEP NOTCHES OF INNER METERING RATCHET.
(2) SOME CLEARANCE BETWEEN RELEASE ARM AND LIFTER LEVER WHEN PLAY IN LIFTER LEVER IS TAKEN UP TO MAKE CLEARANCE MAX.
(3) WITH RELEASE ARM UNLATCHED, FEED PAWL SHOULD CLEAR ALL RATCHET TEETH.

TO ADJUST
WITH LOCK NUT LOOSENED, POSITION LIFTER LEVER BY MEANS OF ITS ECCENTRIC SHAFT.
4.12 Noninterfering BLANK Tape Feed-Out Mechanism continued

(A) INNER RATCHET CHECK PAWL
TO CHECK
WITH FEED-OUT MECHANISM IN OPERATED CONDITION (DRIVE ARM
UNLATCHED), PRESENT A DEEP NOTCH OF BOTH RATCHETS TO
METERING FEED PAWL AND POSITION PAWL TO EXTREME LEFT.
REQUIREMENT
CLEARANCE BETWEEN INNER RATCHET CHECK PAWL AND RATCHET
TOOTH
MIN. 0.005 INCH --- MAX. 0.015 INCH
TO ADJUST
POSITION CHECK PAWL MOUNTING PLATE WITH MOUNTING SCREWS LOOSENED.

(B) INNER RATCHET CHECK PAWL SPRING
REQUIREMENT
MIN. 1/2 OZ. --- MAX. 1-1/2 OZS.
TO PULL CHECK PAWL AWAY FROM RATCHET.
TO ADJUST
POSITION SPRING WITH LOCK NUT LOOSENED. ROTATING SPRING
CLOCKWISE INCREASES TENSION; ROTATING SPRING COUNTERCLOCK-
WISE DECREASES TENSION.
4.13 Noninterfering BLANK Tape Feed-Out Mechanism continued

NOTE
LOOSEN THE STRIPPER BAIL CLAMP SCREW AND TAKE UP THE PLAY BETWEEN THE STRIPPER BAIL AND THE SHAFT IN A CLOCKWISE DIRECTION BEFORE MAKING THE FOLLOWING ADJUSTMENT. TIGHTEN THE STRIPPER BAIL CLAMP SCREW.

SELECTOR RESET BAIL

RELEASE ARM

NONINTERFERING ARM

RESET BAIL CAM

MOUNTING SCREW

INTERMEDIATE ARM

NONINTERFERING CLAMP ARM

CLAMP SCREW

RELEASE ARM

BUSHING (RIGHT SIDE VIEW)

REQUIREMENT
MIN. 0.002 INCH—MAX. 0.015 INCH BETWEEN RELEASE ARM AND RELEASE ARM LATCH.

(1) TO CHECK
WITH ITS MOUNTING SCREW LOOSENED, TAKE UP PLAY IN NONINTERFERING ARM IN CLOCKWISE DIRECTION. TIGHTEN MOUNTING SCREW. POSITION RESET BAIL ON HIGH PART OF ITS CAM.

(2) REQUIREMENT
MIN. SOME—MAX. 0.006 INCH END PLAY BETWEEN CLAMP ARM AND BUSHING. TO ADJUST WITH CLAMP SCREW LOOSENED, POSITION CLAMP ARM.

OUTER RATCHET RETURN SPRING

REQUIREMENT
WITH DRIVE ARM LATCHED BY RELEASE ARM—MIN. 2 OZS.—MAX. 3 OZS. TO PULL SPRING TO INSTALLED LENGTH.
4.14 Noninterfering BLANK Tape Feed-Out Mechanism continued

(A) KICK-OUT ARM

(1) REQUIREMENT
WITH SELECTOR RESET BAIL ON HIGH PART OF CAM AND MAGNET DE-ENERGIZED
MIN. SOME
CLEARANCE BETWEEN KICK-OUT ROLLER AND ARMATURE LOCK LEVER.

(B) LATCH ARM SPRING
REQUIREMENT
MIN. 1-1/2 OZS., -- MAX. 2-1/2 OZS.,
TO PULL SPRING TO INSTALLED LENGTH.

(2) REQUIREMENT
WITH MAGNET ENERGIZED, LOCK LEVER ROLLER SHOULD DISENGAGE FROM ARMATURE BAIL AS RESET BAIL APPROACHES
HIGH PART OF CAM.
TO ADJUST
POSITION KICK-OUT ARM WITH CLAMP SCREW LOOSENED.

(C) ARMATURE LOCK LEVER SPRING
REQUIREMENT
MIN. 1 OZS., -- MAX. 2-1/2 OZS.,
TO PULL SPRING TO INSTALLED LENGTH.
4.15 Noninterfering BLANK Tape Feed-Out Mechanism continued

**NOTE:**

AMOUNT OF TAPE FED OUT CAN BE SET FOR ANY LENGTH UP TO 17 INCHES.

**REQUIREMENT**

1. WHEN UNIT IS OPERATING UNDER POWER AND FEED-OUT MAGNET IS ENERGIZED, CORRECT LENGTH OF TAPE SHOULD BE FED OUT.
2. WHEN UNIT IS NOT OPERATING UNDER POWER AND THE FEED-OUT MECHANISM IN ITS LATCHED POSITION, MANUALLY POSITION RATCHET SO THE NEXT FEED-OUT CYCLE WILL CAUSE FEED-OUT MECHANISM TO STOP. MANUALLY HOLDING FEED PAWL AGAINST THE RATCHET, ROTATE MAIN SHAFT UNTIL RELEASE ARM LATCH RELEASES RELEASE ARM AND FEED PAWL IS IN ITS EXTREME LEFT POSITION. CLEARANCE BETWEEN RELEASE ARM AND THE RELEASE ARM LATCH MIN. SOME—MAX. 0.080 INCH

TO ADJUST

WITH SPRING POST LOOSENED, POSITION TAPE LENGTH ADJUSTING PLATE.
4.16 Noninterfering BLANK Tape Feed-Out Mechanism continued

(A) **DRIVE ARM SPRING**

REQUIREMENT
WITH DRIVE ARM ON LOW
PART OF ECCENTRIC COLLAR:
MIN. 3 OZS. ---- MAX. 5 OZS.
TO START ARM MOVING.

(B) **RELEASE ARM SPRING**

REQUIREMENT
WITH DRIVE ARM LATCHED BY
RELEASE ARM:
MIN. 12 OZS. ---- MAX. 15 OZS.
TO PULL SPRING TO INSTALLED
LENGTH.
NOTE:
(1) FOR UNITS EQUIPPED WITH SWITCH IN PLACE OF CONTACTS (SEE PAR. 4.19).
(2) IN THIS FIGURE, REFERENCES TO LEFT OR RIGHT INDICATE THE VIEWER'S LEFT OR RIGHT AS HE FACES THE REAR OF THE EQUIPMENT.

CONTACT SPRINGS
(1) REQUIREMENT
ALL SPRINGS PARALLEL TO REAR EDGE OF MOUNTING BRACKET AND CONTACT ACTUATING LEVER ENGAGE CONTACT BUTTON BY A MINIMUM OF 75% OF THE CONTACT BUTTON.
TO ADJUST POSITION SPRINGS WITH MOUNTING SCREWS LOOSENED.

(2) REQUIREMENT
LEFT CONTACT SPRING APPROXIMATELY PARALLEL TO FACE OF MOUNTING BRACKET.
TO ADJUST BEND LEFT CONTACT SPRING.

(3) REQUIREMENT
WITH CONTACT LEVER FREE OF CENTER CONTACT SPRING
MIN. 20 GRAMS—MAX. 40 GRAMS TO JUST OPEN LEFT SIDE OF CONTACT.
TO ADJUST BEND CENTER CONTACT SPRING.

(4) REQUIREMENT
WITH CONTACT LEVER AWAY FROM CENTER CONTACT SPRING
MIN. 0.010 INCH—MAX. 0.018 INCH GAP AT RIGHT SIDE OF CONTACT.
TO ADJUST BEND CONTACT SPRING.
4. 18 Noninterfering BLANK Tape-Feed-Out Mechanism continued

(A) CONTACT LEVER
TO CHECK
FULLY LATCH RELEASE ARM ON
RELEASE ARM LATCH. HOLD
CENTER CONTACT SPRING
AWAY FROM CONTACT LEVER.
ALLOW CONTACT LEVER'S EXTEN-
SION TO REST AGAINST LATCH.
MEASURE CLEARANCE BETWEEN
FEED-OUT BRACKET AND CON-
TACT LEVER AT TOP OF LEVER.
REQUIREMENT
MIN. SOME-----MAX. 0.020 INCH
TO ADJUST
POSITION CONTACT LEVER WITH
CLAMP SCREW LOOSENED. (FOR
POSITION OF CLAMP SCREW SEE
ILLUSTRATION BELOW.)

(B) CONTACTING MOUNTING BRACKET
REQUIREMENT
WITH RELEASE ARM UNLATCHED
MIN. 0.010 INCH-----MAX. 0.040 INCH
BETWEEN CONTACT LEVER AND CENTER
CONTACT SPRING.
TO ADJUST
POSITION MOUNTING BRACKET WITH
MOUNTING SCREW AND NUT
LOOSENED.

(C) CONTACT LEVER SPRING
REQUIREMENT
MIN. 3 OZS.-----MAX. 6 OZS.
TO PULL TO INSTALLED LENGTH.

(D) CONTACT PULSE CLOSURE
NOTE: PRECEDING ADJUSTMENTS SHOULD BE MADE
PRIOR TO THIS ADJUSTMENT.
EXTERNAL CIRCUITRY MAY REQUIRE A PULSE AT
END OF FEED-OUT OPERATION. TO OBTAIN THIS
CONDITION, REMOVE CLAMP SCREW AND AD-
JUSTING BRACKET AND HOOK CONTACT LEVER
SPRING IN TAPPED HOLE. CONTACTS WILL THEN
BE OPEN OR CLOSED, DEPENDING ON CHOICE OF
CONTACT, EXCEPT FOR SHORT PERIOD AT END OF
FEED-OUT OPERATION.
4.19 Noninterfering BLANK Tape Feed-Out Mechanism continued

(For Units Equipped with Contacts in Place of Switch see Par. 4.17)

(A) FEED-OUT SWITCH MOUNTING FRAME

TO CHECK
PLACE 0.045 INCH FEELER GAUGE BETWEEN MOUNTING FRAME AND SWITCH LEVER AND DETERMINE IF SWITCH OPERATES. THIS CAN BE DONE BY MEANS OF TEST LAMP OR LISTENING FOR BARELY AUDIBLE CLICK. REPEAT PROCEDURE WITH 0.020 INCH GAUGE BETWEEN FRAME AND LEVER.

REQUIREMENT
SWITCH SHOULD NOT OPERATE WHEN 0.045 INCH GAUGE IS BETWEEN FRAME AND LEVER, AND SHOULD OPERATE WHEN 0.020 INCH GAUGE IS IN THE SAME POSITION.

TO ADJUST POSITION SWITCH WITH MOUNTING SCREWS LOOSENED.

(B) SWITCH LEVER SPRING

REQUIREMENT
MIN. 3 OZS., ---MAX. 6 OZS.--- TO PULL SPRING TO INSTALLED LENGTH.
4.20 Noninterfering BLANK Tape Feed-Out Mechanism continued

(A) SWITCH LEVER ADJUSTING BRACKET

REQUIREMENT
WITH CLUTCHES DIENGAGED AND FEED OUT MECHANISM IN UNOPERATED CONDITION
(DRIVE ARM LATCHED BY RELEASE ARM
MIN. SOME---MAX. 0.010 INCH
CLEARANCE BETWEEN SWITCH LEVER AND
SWITCH ACTUATOR.

TO ADJUST
POSITION ADJUSTING BRACKET ON SWITCH LEVER WITH CLAMP SCREW LOOSENED.

(B) FEED OUT SWITCH (WITH PULSE CLOSURE)

NOTE: EXTERNAL CIRCUITRY MAY REQUIRE A PULSE AT END OF FEED-OUT OPERATION: TO OBTAIN THIS CONDITION, REMOVE ADJUSTING BRACKET AND HOOK SPRING IN TAPPED HOLE IN SWITCH LEVER. SWITCH WILL THEN BE CLOSED EXCEPT FOR SHORT PERIOD AT END OF FEED-OUT OPERATION. FOR REVERSE CONDITION---I.E. SWITCH OPEN EXCEPT FOR SHORT PERIOD AT END OF OPERATION---REMOVE WHITE AND BLUE LEAD AND SOLDER TO SPARE TERMINAL.

TO CHECK
SAME AS FEED OUT SWITCH EXCEPT 0.040 INCH GAUGE SHOULD BE SUBSTITUTED FOR 0.045 INCH GAUGE.

REQUIREMENT
SWITCH SHOULD NOT OPERATE WHEN 0.040 INCH GAUGE IS BETWEEN FRAME AND LEVER, AND SHOULD OPERATE WHEN 0.020 INCH GAUGE IS IN SAME POSITION.

TO ADJUST
SAME AS FEED OUT SWITCH.
4.21 Multiple Mounted Function Blade Contacts
(For later design see par 3.56)

**NOTE 1:**
THE FOLLOWING ADJUSTMENTS SHOULD BE MADE PRIOR TO INSTALLING THE CONTACT BRACKET ASSEMBLY ON UNIT.

(A) NORMALLY OPEN CONTACT GAP
REQUIREMENT
MIN. 0.010 INCH
MAX. 0.020 INCH
TO ADJUST
BEND STIFFENER.

(C) NORMALLY CLOSED CONTACT SPRING
REQUIREMENT
MIN. 2-1/2 OZS.
MAX. 3-1/2 OZS.
TO MOVE THE SWINGER CONTACT AWAY FROM THE NORMALLY CLOSED CONTACT.
TO ADJUST
BEND SWINGER CONTACT SPRING.

NOTE 2:
THE FOLLOWING ADJUSTMENTS SHOULD BE MADE AFTER THE CONTACT BRACKET ASSEMBLY IS MOUNTED ON THE UNIT.

(B) NORMALLY OPEN CONTACT SPRING
REQUIREMENT
MIN. 3 OZS.--MAX. 4-1/2 OZS.
TO MOVE THE CONTACT SPRING AWAY FROM ITS STIFFENER.
TO ADJUST
BEND CONTACT SPRING. RECHECK CONTACT GAP.

(D) NORMALLY CLOSED Contact GAP
REQUIREMENT
WITH FUNCTION BLADE IN THE NONSELECT POSITION AND THE FUNCTION BLADE LIFTER IN ITS LOWEST POSITION
MIN. 0.010 INCH--MAX. 0.020 INCH
TO ADJUST
BEND LOWER CONTACT SPRING.

**NOTE 3:**
SELECT EACH FUNCTION BLADE IN TURN AND DETERMINE THAT THERE IS A DEFINITE TRANSFER FROM MAKE TO BREAK CONTACTS. REFINE ABOVE ADJUSTMENT.
# 28 Reperforator and Tape Printer Bases

## Adjustments

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SECTION 573-121-700

(a) Receive-only base
(b) Multiple receive-only base
(c) Auxiliary receive-only base
(d) Receive-only miniaturized tape printer base
(e) Receive-only miniaturized typing re­
    perforator base
(f) Sliding subbase

Note: Remove power from set (or unit) before making adjustment.

1.02 This section has been revised to include recent engineering changes and additions, and to rearrange the text so as to bring the section generally up-to-date. Since this is an extensive revision, marginal arrows ordinarily used to indicate changes have been omitted.

1.03 Maintenance procedures which apply only to mechanisms of a particular design, or to certain models of 28 bases, are so indicated in the titles of the paragraphs which contain these particular adjustment requirements.

1.04 The adjustments are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken. The tools and spring scales required to perform these adjustments are listed in the applicable section. After an adjustment is completed, be sure to tighten any nuts or screws that are loosened. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions and the angles at which scales should be applied when measuring spring tension. If a part mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same number is replaced when the part is remounted.

1.05 References made to left or right, up or down, front or rear, etc apply to the unit as viewed from the front (Figures 1, 2, 3 and 4).

1.06 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 per cent of the contact diameter. Check contacts for pitting and corrosion and clean or burnish them before making specified adjustment or tolerance measurement. Avoid sharp kinks or bends in the contact springs.

CAUTION: KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.

Figure 1 - 28 Receive-Only Reperforator Base (Rear View)
2. RECEIVE-ONLY BASES

2.01 Tape-Out Mechanism

(A) TAPE-OUT LEVER REQUIREMENT
TAPE-OUT LEVER SHOULD BE ABLE TO PUSH BOTH SWITCH LEVERS AWAY FROM SWITCH ACTUATORS BUT SHOULD NOT BE ABLE TO LIFT WOOD FILLER WITH DEPLETED TAPE ROLL OUT OF SLOTS IN TAPE CONTAINER.

TO ADJUST IF REQUIREMENT IS NOT MET, CHECK TAPE-OUT LEVER AND SWITCH LEVER SPRING TENSIONS (BELOW).

(B) TAPE-OUT LEVER SPRING REQUIREMENT
MIN. 6 OZS. ---- MAX. 8 OZS.
TO PULL SPRING TO LENGTH OF 1-17/32 INCHES.

(C) SWITCH LEVER SPRINGS (2)
REQUIREMENT
MIN. 1-3/4 OZS. ---- MAX. 2-1/4 OZS.
TO PULL SPRING TO LENGTH OF 1-5/16 INCHES.
2.02 Tape-Out Mechanism continued

NOTE 1:
The inner elements are those nearer the mounting plate; the outer elements, those farther from the mounting plate.

(A) SWITCH LEVER

REQUIREMENT
(1) Outer switch should operate before inner switch.
(2) Both switches should operate within limits of motion of tape-out lever and when diameter of tape roll is reduced to:
   - First 1-5/16 inches diameter, then to 1-3/16 inches diameter (when using a 1 inch diameter core)
   - First 2-7/16 inches diameter, then to 2-5/16 inches diameter (when using a 2 inch diameter core)

TO ADJUST:
   Bend outer switch lever toward switch assembly.

NOTE 2:
Adjustment can be facilitated by removing switch mechanism from tape container.

(B) SWITCH MECHANISM MOUNTING PLATE

REQUIREMENT
Outer switch should just operate when diameter of tape roll is reduced to:
   - 1-5/16 inches when using a 1 inch diameter core.
   - 2-3/8 inches when using a 2 inch diameter core.

TO ADJUST:
Position mounting plate with mounting screws loosened.

Page 4
2.03 Intermediate Drive Mechanism

(A) **Timing Belt**

**Requirement**
- Slight pressure (8 ± 1 oz.) at center of span should deflect belt:
  - Min. 3/32 inch --- Max. 5/32 inch
- **Caution:** Belt should not be tight.

**To adjust**
- Position intermediate drive assembly with mounting screws loosened.

(B) **Gear Mesh**

**Requirement**
- Motor drive gear and intermediate shaft driven gear should mesh at right angles.

**To adjust**
- Position drive assembly with mounting screws loosened. Re-check timing belt adjustment (above).

(C) **Wire Tape Guide**

**Requirement**
- Tape should pass freely through wire guide and be aligned with perforator guide assembly.

**To adjust**
- Bend or position wire guide
GEAR SHIFT GUIDE PLATE

REQUIREMENT----WITH SPEED SELECTOR LEVER DETENTED IN CENTER POSITION, 100 W.P.M.
DRIVING AND DRIVEN GEAR SHOULD MESH FULLY AND EDGE OF EACH GEAR SHOULD
BE APPROXIMATELY IN LINE. (SEE NOTES 1 & 2)
TO ADJUST----WITH MOUNTING SCREWS FRICTION TIGHT, POSITION
GUIDE PLATE TO LEFT OR RIGHT.

100 W.P.M.
POSITION

SPEED SELECTOR LEVER

60 W.P.M.

75 W.P.M.

GEAR SHIFT GUIDE PLATE
MOUNTING SCREWS

NOTE 1:
SPEED SELECTOR LEVER
(LIFT UPWARD AND MOVE LATERALLY WHILE
ORIENTATING GEARS)

NOTE 2:
MOVABLE GEAR CLUSTER
(SLIDING SURFACES AND SHAFT
SHOULD BE FREE OF BINDS)

GEAR ASSEMBLY
MOUNTING SCREWS
2.05 Variable Speed Drive Mechanism continued

(A) GEAR ASSEMBLY
REQUIREMENT----CENTER LINE OF MOTOR SHAFT SHOULD BE IN A PLANE PERPENDICULAR TO CENTER LINE OF GEAR SHAFT (GAUGED BY EYE).
TO ADJUST----WITH MOUNTING SCREWS (3) FRICITION TIGHT, POSITION GEAR ASSEMBLY.

NOTE: -----CHECK REQUIREMENTS B & C

(B) MOTOR ADJUSTING STUD
(SEE PAR. 3.04)
CAUTION: DO NOT ATTEMPT TO SHIFT GEARS WHILE SET IS OPERATING UNDER POWER.

(C) TIMING BELT
REQUIREMENT
(SEE PAR. 2.03)
TO ADJUST
POSITION GEAR ASSEMBLY WITH MOUNTING SCREWS LOOSENED.

(D) GREASE RETAINER PLATE
REQUIREMENT
GREASE RETAINER PLATE SHOULD ALIGN WITH GEAR SHIFT GUIDE PLATE.
TO ADJUST----POSITION PLATE WITH ITS MOUNTING SCREWS LOOSENED.
Figure 2 - 28 Multiple Reperforator Receive-Only Base (Front View)
3. MULTIPLE RECEIVE-ONLY BASES

3.01 Drive Mechanism

NOTE: THIS ADJUSTMENT SHOULD BE MADE FOR EACH TYPING REPERFORATOR UNIT.

TIMING BELT

REQUIREMENT
SLIGHT PRESSURE AT CENTER OF SPAN (8 ± 1 OZ.) SHOULD DEFLECT BELT.
MIN. 3/32 INCH --- MAX. 5/32 INCH
CAUTION: BELT SHOULD NOT BE TIGHT.

TO ADJUST:
WITH TWO ANCHOR BRACKET SCREWS AND THREE MOUNTING SCREWS LOOSENED, POSITION TYPING REPERFORATOR UNIT. TIGHTEN THREE MOUNTING SCREWS. PRESS ANCHOR BRACKET AGAINST BASE PLATE AND TIGHTEN SCREW HOLDING BRACKET TO REPERFORATOR. TIGHTEN SCREW HOLDING BRACKET TO BASE.
3.02 Tape-Out Mechanism

**TAPE-OUT LEVER SPRING**

*Requirement*

TAPE-OUT LEVER CAPABLE OF PUSHING SWITCH LEVER AWAY FROM SWITCH ACTUATOR BUT INCAPABLE OF LIFTING DISC WITH HUB WITH DEPLETED CARDBOARD TAPE ROLL OUT OF SLOTS IN CONTAINER.

**NOTE:** IF NECESSARY, HAND FORM RIGHT STOP TAB ON SPROCKET GUARD SO THAT IT WILL STOP ON TOP OF BEARING MOUNTING PLATE.

**TAPE-OUT SWITCH ASSEMBLY**

*Requirement*

SWITCH SHOULD OPERATE WHEN DIAMETER OF TAPE ROLL IS MIN. 2-3/8 INCH---MAX. 2-5/8 INCH (CHECK WITH TEST LAMP.)

TO ADJUST WITH TWO MOUNTING SCREWS LOOSESED, POSITION SWITCH ASSEMBLY ON TAPE CONTAINER.
3.03 Motor Adjusting Stud

**MOTOR ADJUSTING STUD**

**REQUIREMENT**

BARELY PERCEPTIBLE BACKLASH BETWEEN DRIVE GEAR AND DRIVEN GEAR AT THEIR CLOSEST POINT.

**TO ADJUST**

WITH LOCK NUT LOOSENED, POSITION ADJUSTING STUD. TIGHTEN NUT WHILE HOLDING STUD IN POSITION.

---

**CAUTION:**

IF MOTOR BECOMES BLOCKED FOR SEVERAL SECONDS, THERMAL CUT-OUT SWITCH WILL BREAK CIRCUIT. SHOULD THIS HAPPEN, ALLOW MOTOR TO COOL AT LEAST 5 MINUTES BEFORE DEPRESSING RED RESET BUTTON. CHECK UNIT TO SEE WHY MOTOR WAS BLOCKED.
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4. AUXILIARY RECEIVE-ONLY BASE

4.01 Tape-Out Mechanism

**TAPE-OUT SWITCH ASSEMBLY REQUIREMENT**
- Switch just closed when tape roll is reduced to 2-3/8 inch
- To adjust position switch assembly with mounting screws loosened.

**TAPE-OUT LEVER REQUIREMENT**
- Switch lever out of engagement with switch actuator when tape roll removed.
- To adjust check tape-out lever and switch lever spring tensions. Replace springs which do not meet requirements.

**SWITCH LEVER SPRING REQUIREMENT**
- Min. 8-1/2 ozs. -- Max. 10 ozs.
  - To pull spring to 1-1/4 inches.

**TAPE-OUT LEVER SPRING REQUIREMENT**
- Min. 6 ozs. -- Max. 8 ozs.
  - To pull spring to 1-17/32 inches.
4.02 Drive Mechanism

(A) **INTERMEDIATE DRIVE ASSEMBLY**

**REQUIREMENT**

BARELY PERCEPTIBLE BACKLASH BETWEEN MOTOR DRIVE GEAR AND DRIVEN GEAR AT THEIR CLOSEST POINT.

**TO ADJUST**

WITH THREE MOUNTING SCREWS LOOSENED, POSITION INTERMEDIATE DRIVE ASSEMBLY.

(B) **TIMING BELT**

**REQUIREMENT**

MINIMUM SLACK IN BELT.

**TO ADJUST**

WITH TWO ANCHOR BRACKET SCREWS AND THREE MOUNTING SCREWS LOOSENED, POSITION TYPING REPERFORATOR UNIT. TIGHTEN THREE MOUNTING SCREWS. PRESS ANCHOR BRACKET AGAINST BASE PLATE AND TIGHTEN SCREW HOLDING BRACKET TO REPERFORATOR. TIGHTEN SCREW HOLDING BRACKET TO BASE.

(C) **TAPE CONTAINER**

**REQUIREMENT**

POSSIBLE TO INSERT FULL ROLL OF TAPE INTO TAPE CONTAINER THROUGH ACCESS DOOR IN DOME.

**TO ADJUST**

POSITION TAPE CONTAINER WITH TWO MOUNTING SCREWS LOOSENED.
5. RECEIVE-ONLY MINIATURIZED TAPE PRINTER BASE

5.01 Pinion and Gear

PINION-GEAR (FOR RECEIVE-ONLY MINIATURIZED TAPE PRINTER SET)

REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN MOTOR PINION
AND DRIVEN GEAR MOUNTED IN SINGLE SPEED DRIVE ASSEMBLY.

TO ADJUST

LOOSEN FOUR MOUNTING SCREWS SECURING MOTOR
TO UPPER BASE PLATE. INCREASE OR DECREASE BACKLASH
BY ROTATING MIDDLE NUTS ON MOUNTING SCREWS
OPPOSITE PINION END. TO INSURE MOTOR IS
PROPERLY ALIGNED WITH DRIVEN GEAR, THE BOTTOM
EDGE OF THE MOTOR MOUNT BRACKET OPPOSITE THE
PINION END SHALL BE PARALLEL WITH UPPER BASE PLATE.
Figure 3 - 28 Receive-Only Miniaturized Base with Motor and Subbase (Front View)
6. RECEIVE-ONLY MINIATURIZED TYPING REPERFORATOR BASE

6.01 Tape Guide and Control Panel Bracket

**Tape Guide Requirement**
- Approximately 1/4 inch clearance between long segment of tape guide and the tape container.
- To adjust with the mounting screws holding tape guide to tape container mounting bracket friction tight, position tape guide.

**Control Panel Bracket Requirement**
- Min. some—Max. 0.094 inch between the angular face of the control panel bracket and switch identification plate mounted to cover plate.
- To adjust with the control panel bracket mounting screws friction tight, position the bracket.
6.02 Tape Container Assembly

**Requirement**

Clearance between the reperforator and the tape container assembly at any point min. 0.063 inch --- max. 0.125 inch.

To adjust with mounting screws friction tight, position tape container assembly.
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6.03 Tape Container Assembly continued

SWITCH BAIL SPRING
REQUIREMENT
MIN. 1-1/2 OZS. --- MAX. 2-1/2 OZS.
TO OPEN NORMALLY CLOSED SWITCH WHEN
SPRING SCALE IS HOOKED UNDER TIP OF SWITCH
BAIL AND ROTATED AWAY FROM SWITCH. TAPE
SENSING BAIL SHOULD NOT TOUCH THE SWITCH BAIL.

TAPE SENSING BAIL SPRING
SWITCH BAIL SPRING

TAPE SENSING BAIL

INSIDE DIAMETER
OF TAPE CONTAINER

SWITCH ACTUATORS

SWITCH

SWITCH BAIL

TAPE REEL

TAPE CONTAINER

TAPE ROLL CORE

LOW TAPE SWITCH
NOTE:
THIS SWITCH IS NOT SUPPLIED WITH THIS BASE,
HOWEVER, PROVISION IS MADE TO ACCEPT
THE LOW TAPE SWITCH. IF THE SWITCH IS PRO­
VIDED THE ADJUSTMENT IS AS FOLLOWS:
REQUIREMENT
THE SECOND OR TOP SWITCH LOCATED ON THE
TAPE CONTAINER ASSEMBLY SHOULD OPERATE
WHEN THE TAPE ROLL IN THE CONTAINER IS
REDUCED TO 2-7/16 INCHES.
TO ADJUST
BEND THE UPPER PRONG OF SWITCH BAIL.

TAPE-OUT SWITCH
REQUIREMENT
THE SWITCH SHOULD OPERATE WHEN THE
TAPE ROLL IN THE CONTAINER IS REDUCED
IN DIAMETER TO 2-5/16 INCHES.
TO ADJUST
BEND THE LOWER PRONG OF THE SWITCH
BAIL.

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6.04 Base Assembly and Variable Speed Mechanism

VIBRATION ISOLATOR IMMOBILIZATION

REQUIREMENT
NO CLEARANCE BETWEEN TOP OF RUBBER ISOLATOR AND BOTTOM OF METAL WASHER WITH NO COMPRESSION OF THE RUBBER.

TO ADJUST
TURN THE ELASTIC STOP NUT.

VARIABLE SPEED MECHANISM (SEE PAR. 2.04 AND 2.05)

(1) REQUIREMENT
THERE SHOULD BE A BARELY PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN THE MOTOR PINION AND THE DRIVEN GEAR AT THEIR CLOSEST POINT.

TO ADJUST
WITH THE FOUR MOUNTING SCREWS FASTENING THE VARIABLE SPEED DEVICE TO THE VIBRATION ISOLATORS FRICITION TIGHT, POSITION THE VARIABLE SPEED ASSEMBLY.

(2) REQUIREMENT
WITH SPEED SELECTOR LEVER DETENTED IN CENTER POSITION 100 W.P.M. THERE SHALL BE FULL MESH BETWEEN GEARS.

TO ADJUST
WITH THE GEAR SHIFT BRACKET MOUNTING SCREWS FRICITION TIGHT, POSITION GEAR SHIFT BRACKET.
Figure 4 - 28 Sliding Subbase Assembly For Miniaturized Receiving-Only Typing Reperforator Set (Extended - Front View)
7. SLIDING SUBBASE FOR MINIATURIZED RECEIVING-ONLY TYPING REPERFORATOR SET

7.01 Sliding Subbase

**Quick Disconnect Latch Requirement**

- With slide in the fully retracted position, the locking cylinder of the quick disconnect device shall be firmly seated against the stop surface of the bottom plate.
- Min. 0.002 inch --- Max. 0.012 inch
- End play between locking cylinder and the two mounting blocks.

**To Adjust**

- With the mounting screws of the two blocks friction tight and the slide fully depressed, position the two blocks.

**Mounting Screws (8)**

**Upper Base Plate**

**Lower Base Plate**

**Mounting Screws (8)**

**Adjustable Stabilizing Stop Plate (4)**

**Permanent Stabilizing Stop Segment (4)**

**Stabilizing Bracket Requirement**

- No clearance between the permanent stabilizing segment of lower base plate and the adjustable stabilizing stop plate of the upper base plate when the slide is in the fully retracted locked position.

**To Adjust**

- With mounting screws of each of the four stabilizing stop plates friction tight, position each stabilizing stop plate.

**Quick Disconnect Knob Requirement**

- With knobs in the open position:
  - Min. 0.093 inch --- Max. 0.140 inch
- Clearance between cover and locking device knobs.

**To Adjust**

- With the two set screws in each knob friction tight, position knobs.

**Note:**

The knob locking cylinder assembly must snap into the locked position when the knobs are released from an angular displacement of approximately 45° from the horizontal.
# 28 TRANSMITTER DISTRIBUTOR UNIT (LXD) ADJUSTMENTS

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1. GENERAL

1.01 This section provides specific adjustments for the single contact 28 transmitter distributor. It reflects 5- and 6-level operation for LXD unit.

1.02 The adjustments are arranged in a sequence that should be followed if a complete readjustment is undertaken. The tools and spring scales required to perform these adjustments are found in tool section 570-005-800TC. A complete adjusting procedure should be read before attempting to make the adjustment. After an adjustment is completed, be sure to tighten any nuts or screws that may have been loosened. Where an illustration shows interrelated parts, the sequence that should be followed in checking the requirements and making the adjustments is indicated by the letters, (A), (B), (C), etc.
1.03 The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions, and the angle at which scales should be applied. Coil springs which do not meet the requirements, and for which there are no adjusting procedures, should be discarded and replaced with new springs. If a part mounted on shims is removed, the number of shims used at each mounting screw should be noted so that the same number is replaced when the part is remounted.

Note: Remove power from unit before making adjustments.

1.04 When the requirement calls for the clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latchlever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum. When the main shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve the drag on the clutch and permit the main shaft to rotate freely, apply pressure on a lug of the clutch disc with a screwdriver to cause it to engage its latchlever and thus disengage the internal expansion clutch shoes from the clutch drum.

1.05 The covers may be removed for inspection and minor repair of the unit; however, when more extensive maintenance is to be undertaken, it is recommended that the unit be disconnected from its source of power as a safety precaution.

1.06 References made to left, right, up, down, front, or rear, apply to the set in its operating position, as viewed from the operator's position.

1.07 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 percent of the contact diameter. Check contacts for pitting and corrosion and clean or burnish them before making specified adjustment or tolerance measurement. Avoid sharp kinks or bends in the contact springs.

CAUTION: KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.

1.08 Units may have signal contacts made of either unplated or gold-plated tungsten. If in doubt as to the type of contacts, remove contact box cover and inspect contacts for gold plating. Do not use burnishers, files, etc which will remove gold plating.

1.09 Use twill jean cloth (KS2423) (TP107162) to clean gold-plated contacts. Open contacts. Allow contacts to close on surface of twill jean. Draw twill jean part way through. Open contacts and withdraw twill jean.

1.10 This procedure prevents small fibers at edges of twill jean strip from becoming lodged between contacts.

1.11 Clean unplated tungsten contacts in accordance with standard procedures (Paragraph 1.07).

Servicing For Certain Low-Voltage Applications

1.12 For standard applications, including those with data sets, observe standard maintenance procedures and intervals. Certain low-voltage applications are covered below.

1.13 For optimum reliable operation in these low-voltage applications, clean gold-plated contacts with twill jean, as instructed above, at intervals of approximately 50 hours of actual contact operation. Since maintenance interval and life expectancy of the contacts are dependent on the signal circuit, maintenance interval may be lengthened for specific applications.

Note 1: Applying operating voltage of standard Distortion Test Set directly to contacts may damage gold plating and impair low-voltage operation. When electrically adjusting or testing contacts (2.23), use an intermediate device, keyed by the contacts, to interrupt current to stroboscopic lamp of test set. This intermediate device must be capable of being keyed by a 3 to 20 volt change at maximum of 20 milliamperes.

Note 2: Normally for low-voltage applications, contacts should be used in circuits operating between 3 and 20 volts dc at a current level not to exceed 60 milliamperes. Between 20 and 70 volts dc the current should be adjusted so as not to exceed a 120 milliwatt power level. The contacts are not normally intended for use with voltages above 70 volts dc. Exceeding this level for an appreciable length of time may result in damage to the gold plating and make them unfit for low-voltage applications.
2. BASIC UNITS

2.01 Clutch Mechanism

Note 1: Remove the transmitter distributor from its base before making a complete readjustment or spring tension checks.

Note 2: Adjustments (A) and (B) are made at the factory and should not be disturbed unless good reasons exist that the requirements are not met.

(A) CLUTCH SHOE LEVER SPRING

To Check
Invert unit and rotate main shaft until clutch shoe lever and stop lug are up. With clutch engaged, hold cam disc to prevent turning.

Requirement
- Min 15 oz -- Max 20 oz to move shoe lever in contact with stop lug.

(Where set is equipped with tape slack mechanism)
- Min 9 oz -- Max 11 oz

(B) CLUTCH SHOE SPRING

To Check
Remove the clutch from the main shaft. With the clutch drum removed, hook spring scale as shown.

Requirement
- Min 3 oz -- Max 5 oz to start primary shoe moving away from secondary shoe at point of contact.
2.02 Clutch Mechanism (continued)

Note: Remove transmitter distributor from base before making adjustments.

(A) CLUTCH SHOE LEVER

To Check
Trip transmitter distributor clutch.
Pull shoe lever opposite the stop lug with a force of 32 oz. Release the force slowly to engage clutch shoes.
Note clearance between clutch shoe lever and stop lug. Disengage the clutch, and again pull the lever opposite the stop lug with a force of 32 oz. Release the force slowly. Note clearance between the shoe lever and the stop lug.

Requirement
Min 0.055 inch—Max 0.085 inch
greater clearance with clutch engaged than with clutch disengaged.

To Adjust
Loosen clutch disc clampscrews.
Place wrench over stop lug and move disc. Retighten screws.

Note: Drum must not drag on shoes when clutch is disengaged and rotated in its normal direction. Refine CLUTCH SHOE LEVER adjustment to correct shoe drag.
2.03 Clutch Mechanism (continued)

(D) **CLUTCH LATCHLEVER SPRING**

To Check
Trip clutch and rotate until latchlever is on low part of disc.

Requirement
Min 3 oz --- Max 5 oz to start clutch latchlever moving.

(B) **CLUTCH TRIP LEVER**

To Check
Trip transmitter distributor clutch. With main bail in highest position, rotate clutch until stop lug is opposite trip lever.

(1) Requirement
With trip bail play taken up to make clearance maximum.
Min 0.012 inch --- Max 0.025 inch between stop lug and trip lever.

(2) Requirement
With trip bail play taken up to make clearance minimum
some clearance between stop lug and trip lever.

To Adjust
Loosen clamp nut friction tight and rotate trip bail eccentric post. Check Requirement (1). Retighten clamp-screw.

(C) **CLUTCH TRIP LEVER SPRING**

Requirement
With clutch engaged
Min 7 oz --- Max 10-1/2 oz to start clutch trip lever moving.
(A) CLUTCH MAGNET ASSEMBLY

(1) To Check
Place armature in attracted (energized) position.

Requirement
Armature to contact core face of top magnet with
---Min some---Max 0.004 inch
between armature and core face of bottom magnet at point of least clearance. (Sets with Tape Shoe and Tape Feed Assurance Mechanisms
---Min 0.004 inch---Max 0.007 inch)

To Adjust
Remove magnet mounting bracket screws and lift clutch magnet assembly from the unit. Loosen mounting screws and position hinge.

(2) To Check
Place high part of backstop eccentric toward top of unit. Hold armature in attracted (energized) position.

Requirement
---Min 0.045 inch---Max 0.055 inch
between armature bail and backstop eccentric.

To Adjust
Loosen backstop clamp nut and position eccentric. Retighten backstop clamp nut.

(B) ARMATURE BAIL SPRING

To Check
Place armature in de-energized position and hold main bail latch lever away from armature bail extension.

Requirement
---Min 1 oz---Max 2 oz
(Sets with Tape Shoe and Tape Feed Assurance Mechanisms only
---Min 3-3/4 oz---Max 4-3/4 oz)
to start bail moving.

(C) MAIN BAIL LATCH SPRING

To Check
Invert unit. Release main bail latch.

Requirement
Min 3/4 oz---Max 2 oz
to start main bail latch moving.
2.05 Tape Lid

**TAPE LID**

To Check
Remove top plate and tape guideplate.
Lubricate before adjustment.

(1) Requirement
With tape lid held against notch in tape guideplate, feed wheel groove lined up with slot in tape guideplate, and tape-out pin holes lined up
Min some---Max 0.010 inch between tape lid and pivot shoulder.

To Adjust
Loosen bearing bracket mounting screws. While pressing tape lid against tape guideplate, position bearing bracket. Recheck Requirement (1).

Note 2: If Requirement (2) cannot be met, position bearing bracket so that its mounting screws are located in centers of holes in bracket. Repeat Requirements (1) and (2).

Note 3: When tape guideplate and top plate are assembled to reader, tape lid may touch top plate, and a different clearance from that specified in Requirement (2) can be expected. However, with tape lid closed, there must always be at least 0.002 inch clearance between tape guideplate and heel pad.

(2) Requirement
With front bearing surface of tape lid touching tape guideplate
Min 0.010 inch---Max 0.018 inch between fin indicated and tape guideplate.

To Adjust
Loosen locknut. Raise tape lid and rotate high part of eccentric towards bearing bracket. Close tape lid and continue rotating high part of eccentric towards bearing bracket until latch ball just falls under flat on post.
Recheck operation of latch bail by depressing release plunger with tape lid held down.

(3) Requirement
With tape lid latched against tape guideplate, release plunger must have some endplay.

To Adjust
Loosen locknut. Raise tape lid and rotate high part of eccentric towards bearing bracket. Close tape lid and continue rotating high part of eccentric towards bearing bracket until latch ball just falls under flat on post.
Recheck operation of latch bail by depressing release plunger with tape lid held down.
2.06 Tape Lid (continued)

**TAPE GUIDE**

To Check
Unlatch tape lid and position gauge as illustrated.

(1) Requirement
--- Min some--- Max 0.003 inch between gauge and each tape guide.

(2) Requirement
Edge of wear plate flush with edge of tape guideplate.

(3) Requirement
Tape must not ride up the sides of the tape guides.

To Adjust
Loosen mounting nuts. Position wear plate until it overhangs tape guideplate. Push gauge down until top two studs butt up against tape guideplate thus positioning edge of wear plate flush with edge of tape guideplate. Hold gauge and wear plate and position each tape guide to meet Requirement (1). Tighten mounting nuts.

Note: Tape guides may touch gauge, but they must not bind against gauge when it is removed.
SECTION 573-127-703TC

2.07 Tape Lid (continued)

(A) START-STOP DETENT BAIL SPRING

To Check
Place control lever in run position.

Requirement
Min 14 oz—Max 22 oz

to start detent bail moving away from control lever.

(B) TAPE LID RELEASE PLUNGER SPRING

To Check
Unlatch tape lid. Place tape guideplate in a horizontal position and hold it there.

Requirement
Min 28 oz—Max 48 oz

to start tape lid bail moving.

(C) TAPE LID SPRING

To Check
Hold release plunger fully depressed. Hold tape guideplate in horizontal position.

Requirement
Min 2-1/2 oz—Max 4-1/2 oz

to move open end of tape lid against tape guideplate.
Note 1: To prevent damage to the tape-out pin, position stop arm to its lowest position and hold control lever bail extension from feed wheel ratchet.

**TAPE GUIDEPLATE**

(1) Requirement
Feed wheel post is not to interfere with mounting brackets of top plate and tape guideplate.

To Adjust
Loosen clamp nut and rotate feed wheel post.

(2) Requirement
Tape guideplate to rest firmly against a minimum of three of the four projections on side plates.

To Adjust
Rotate unit clutch to its stop position.
Trip clutch to put sensing pins in their highest positions. Unlatch tape lid and place control lever to run position.
Loosen mounting screws and mounting nuts. Position tape guideplate on reader to meet Requirement (2). Position tape-out pin into hole in tape guideplate.
Tighten mounting screws.

Note 2: Mounting nuts loosened in Requirement (2) are tightened after performing Requirement (3) and **TOP PLATE** adjustment.

(3) Requirement
Edge of tape guideplate to project over side plates by equal amounts as gauged by eye.

To Adjust
Position type guideplate.

Note 3: Tight-tape bail extension must be under top plate.
SECTION 573-127-703TC

2.09 Top Plate

TOP PLATE

To Check
Remove cover plate and unlatch the tape lid.

(1) Requirement
Min flush---Max 0.003 inch below top surface of tape guideplate along width of tape lid when top plate is resting on a minimum of five of the six projections on side plates.

To Adjust
Loosen mounting screws and mounting nuts friction tight. Position top plate. Tighten mounting screws. Tighten tape guideplate mounting nuts left friction tight in TAPE GUIDEPLATE adjustment.

Note: Mounting nuts loosened in Requirement (1) above are tightened after performing Requirement (2) below.

(2) Requirement
Feed wheel slot to align with slot in tape guideplate so that feed wheel rotates freely with control lever in free position.

To Adjust
Position top plate toward one side plate or the other. Tighten mounting nuts left friction tight in Requirement (1) above.

(3) Requirement
With tape lid latched
Min 0.010 inch at end of extension covering feed wheel slot
Min 0.010 inch---Max 0.018 at tape guideplate adjacent to sensing pins
Min 0.010 inch---Max 0.025 at all other areas between tape lid projection and top plate with play taken up toward tape guideplate.

To Adjust
Loosen tape lid bearing bracket mounting screws. Position tape lid. Recheck TAPE LID adjustment, Requirements (1) and (2).
2.10 Cover Plate

(A) COVER PLATE

(1) Requirement
Right edge of cover plate holds flush against left edge of top plate by the cover plate detents.

(2) Requirement
Cover plate rests against at least three of the four projections (front and rear plate).

(3) Requirement
Front edge of cover plate and top plate align.

To Adjust
With detenting nut clampscrew (front and rear plate) friction tight, move clampscrews to their extreme lower right position, then tighten screws. Loosen detent bracket and spring plate mounting nuts. Place cover on unit and position horizontally to meet requirements. Retighten mounting nuts.

(B) COVER PLATE DETENT SPRING

Requirement
With spring scale applied to center of one detent
- Min 28 oz --- Max 48 oz
to start plunger moving.

Note: Outer edge of each mounting bracket should be approximately in line with shoulder of its mounting stud. Replace tape guideplate, tape-out tension spring, top plate, and cover plate.
2.11 Tape-Out Switch Assembly

(A) TAPE-OUT CONTACT ASSEMBLY

To Check
Loosen spring bracket and move downward until tape-out pin extension no longer touches insulation on contact swinger.

(1) Requirement
Min 6 grams - Max 15 grams to separate normally closed contacts.

(2) Requirement
Min 0.008 inch - Max 0.015 inch between normally open contacts.

To Adjust
Remove tape-out contact assembly from unit by unhooking tape-out pin spring and removing bracket mounting screws. Form contact swinger using TP11046 spring bender. Replace contact assembly with swinger over tape-out pin extension. Place spring bracket shoulder bushing on upper hole and the washer on lower mounting hole. Rehook tape-out pin spring.

(B) TAPE-OUT SENSING PIN SPRING

To Check
Place control lever in run position.

Requirement
Min 38 grams - Max 45 grams to move tape-out pin to a position flush with tape guideplate.

To Adjust
Loosen lower bracket mounting screw and position spring bracket to meet requirement. Retighten bracket mounting screw.

(C) TAPE-OUT CONTACT BRACKET

To Check
Insert tape under tape lid to hold tape-out pin down.

Requirement
Min 0.006 inch - Max 0.020 inch between tape-out pin upper extension and underside of insulation on swinger contact.

To Adjust
Loosen bracket mounting screws and adjust bracket. Retighten mounting bracket screws.
2.12 Tape-Out Switch Assembly (continued)

(B) DEPRESSOR BAIL TORSION SPRING

To Check
Place control lever in stop position.
Unhook one end of intermediate tape-out bail spring.

Requirement
Min 2-3/4 oz---Max 5-1/2 oz---to start tape-out bail moving away from tape-out pin depressor bail.

(C) INTERMEDIATE TAPE-OUT BAIL SPRING

To Check
Place control lever in run position.
Unhook intermediate tape-out bail spring at post end.

Requirement
Min 3 oz---Max 5 oz---
*Min 2 oz---Max 3 oz---to pull intermediate tape-out bail to its installed length.
*5-level only

(A) TAPE-OUT SENSING PIN

(1) To Check
Place control lever in stop position.

Requirement
Top of pin to be
Min flush---Max 0.010 inch below surface of tape guideplate.

To Adjust
Loosen stop arm clampscrew. Friction tight. Position stop arm to meet requirement. Retighten clampscrew.

(2) To Check
Place control lever in run position.

Requirement
Clearance as shown should be
Min 0.055 inch.

To Adjust
Loosen tape-out bail clampscrew. Position extension arm to meet requirement. Retighten clamp screw. Recheck requirement under (1) To Check.
2.13 Tape-Out Switch Assembly (continued)

**TAPE-OUT SENSING PIN** (For Units Equipped with Tape Lid Sensing Lever)

To Check
Hold tape-out pin manually against stop arm.

Requirement
Top of pin to be
Min flush—Max 0.010 inch below top surface of guideplate.

To Adjust
Loosen switch bracket mounting screws. Position switch bracket to meet requirement. Retighten mounting screws.
2.14 Start-Stop Switch Assembly

(A) START-STOP SWITCH BRACKET

To Check
Place control lever in run position.
Disengage clutch.

To Adjust
Loosen switch bracket mounting screws. Position switch bracket to meet requirement. Retighten bracket mounting screws.

(1) Requirement
Min 0.006 inch -- Max 0.015 inch between start-stop bail extension and insulator on start-stop switch swinger.

(2) Requirement
Start-stop bail extension and contact arm to fully engage insulated portion of start-stop switch swinger.

To Adjust
Loosen mounting screws and position start-stop switch swinger to meet requirement. Retighten mounting screw.

(B) TIGHT-TAPE START-STOP CONTACT SPRING

To Check
Place control lever in run position.

Requirement
Min 3 oz -- Max 4 oz to separate contacts.

To Adjust
Bend break contact spring with TP110445 bending tool. Recheck START-STOP SWITCH BRACKET adjustment.

CONTACT ARM
CONTACT PILE-UP
MOUNTING SCREWS
START-STOP BAIL
(Top View)

TIGHT-TAPE BAIL
START-STOP BAIL
(Top View)

TIGHT-TAPE INTERMEDIATE ARM
CLAMPSCREW
PRY POINT
(Rear View)

YIELD ARM
SECTION 573-127-703TC

2.15 Tight-Tape Mechanism

START-STOP SWITCH BRACKET (For Units Equipped with Tape Lid Sensing Lever)

To Check
Place intermediate tight-tape arm to center of its adjusting range with the contact arm.

(1) Requirement
Tight-tape start-stop contacts to:
(a) Remain closed when tight-tape bail is raised 0.045 inch
(b) Open as bail is raised to 0.075 inch.

To Adjust
(a) Loosen tight-tape intermediate arm clamp screw. Position pry point midway in contact operating arm adjusting slot. Retighten clamp screw.
(b) Loosen switch bracket screws friction tight. Position contact pile-up to meet requirement.

(2) Requirement
Contact arm to fully engage insulated part of switch swinger.

To Adjust
Loosen contact pile-up mounting screws. Position contact pile-up mounting bracket. Retighten mounting screws.
2.16  Tight-Tape Mechanism (continued)

(A) **TIGHT-TAPE INTERMEDIATE ARM**

To Check
Place control lever in **run** position.

Requirement
Start-stop contacts when tight-tape bail is raised away from tape guideplate:
(a) Remain closed when bail is raised 0.045 inch.
(b) Open as bail is raised to 0.075 inch.

To Adjust
Loosen clampscrew and position tight-tape intermediate arm using pry points.
Retighten clampscrew.

(B) **TIGHT-TAPE INTERMEDIATE ARM SPRING**

To Check
Place control lever in **run** position.

Requirement
Min. 20 grams (3/4 oz)---Max. 40 grams (1-1/2 oz)---to start yield arm moving.
2.17 Feed Wheel Mechanism

(D) MAIN BAIL

To Check
Place sensing pins in their lowest position.

Requirement
Highest sensing pin should be
Min 0.010---Max 0.020 inch below surface of tape guideplate.

To Adjust
Loosen nut on main bail eccentric.
Keeping high part towards right, adjust eccentric to meet this requirement.
Retighten nut on main bail eccentric.

(B) FEED RATCHET DETENT SPRING

To Check
Rotate clutch to stop position. Hold feed pawl away from feed wheel ratchet.

Requirement
Min 8 oz---Max 13 oz to start detent moving.

(A) MAIN BAIL SPRING

To Check
Remove top plate. Disengage clutch.
Unhook spring end from main bail.

Requirement
Min 6 oz---Max 10 oz to pull main bail to installed length.
2.18 Feed Wheel Mechanism (continued)

(A) SENSING PIN SPRING

To Check
Open tape lid, and disengage unit clutch. Then hold armature in the attracted position to unlatch main bail and place sensing pins in their uppermost position. Hold rub-out deleter bail (if present) away from the sensing pins.

Requirement
* Chaddless tape
  Min 3 oz – Max 5 oz

**Perforated tape
  Min 2 oz – Max 3 oz
to move each sensing pin flush with tape guide plate.

* For units using TP154349 spring – 5-level units
** For units using TP151103 spring – 6-level units

(B) FEED WHEEL DETENT

To Check
Open tape lid. Disengage the unit clutch to place sensing pins in their lowest position. Place high part of feed wheel ratchet detent eccentric toward the right. With an all marking code combination punched into a new piece of tape, place the tape on the feed wheel and over the sensing pins. Take up play in tape lightly toward the right.

Requirement
Tip of each sensing pin to be centrally located in its code hole.

To Adjust
Loosen feed wheel ratchet detent eccentric friction tight and hold feed pawl away from feed wheel ratchet. Rotate feed wheel ratchet detent eccentric, keeping high part of eccentric towards the right.

Note: When unit is used to read chaddless spliced tape, the sensing pins should be made to favor the trailing edge of the code hole.
2.19 Feed Wheel Mechanism (continued)

(A) **FEED PAWL**

To Check
Remove the top plate. With the high part of the feed pawl eccentric towards the right,* (viewed from rear plate) disengage the clutch to place the sensing pins in their lowest position.

*Left for units equipped with tape withhold mechanism.

**Requirement**
Min some -- Max 0.003 inch between feed pawl and ratchet tooth just engaged.

To Adjust
Loosen feed pawl eccentric locknut, and position feed pawl eccentric. Re-check requirement at four positions on feed wheel ratchet approximately 90 degrees apart.

---

(B) **FEED PAWL SPRING**

To Check
Rotate unit clutch to stop position.

**Requirement**
Min 2 oz -- Max 3-1/2 oz to start pawl moving.
2.20 Transfer Mechanism

(A) TRANSFER LEVER SPRING

To Check
Disengage unit clutch.

Requirement
Min 1/2 oz---Max 1-1/2 oz
to start each transfer lever spring moving.

(B) LOCKING BAIL SPRING

Requirement
Min 10 oz---Max 14 oz
to pull locking bail spring to its installed length.
2.21 Main Bail

(1) To Check
Hold armature in its attracted (energized) position and rotate clutch until main bail is on its lowest position.

Requirement
Min 0.005 inch --- Max 0.015 inch
between main bail and main bail trip lever.

(2) To Check
Hold armature in its attracted (energized) position and rotate clutch until main bail is in its highest position.

Requirement
Min 0.005 inch
between vertical surfaces of main bail and main bail trip lever.

To Adjust
Loosen nut on main bail and position main bail eccentric. Retighten nut. Check MAIN BAIL TRIP LEVER adjustment. Refine, if necessary.
2.22 Transfer Bail

(A) TRANSFER BAIL STABILIZER

(1) To Check
Select a LETTERS combination. Rotate main shaft until #3 transfer lever is on high part of its cam. Check clearance between side of transfer bail extension and marking latch.

(2) To Check
Select a BLANKS combination. Rotate main shaft until #3 transfer lever is on high part of its cam. Check clearance between side of transfer bail extension and spacing latch.

Requirement
Clearance in marking and spacing positions should be equal within 0.002 inch.

To Adjust
Loosen stabilizer assembly mounting screws friction tight, and position the assembly. Retighten assembly mounting screws.

(B) STABILIZER SPRING

To Check
Rotate clutch to stop position.

Requirement
Min 2-1/2 oz---Max 5 oz--- to start stabilizer latch moving.

Note: Latches should drop in place as other transfer levers cam the transfer bail.
2.23 Signal Contacts

(A) SIGNAL CONTACT CLEARANCE

To Check
Remove cover plate and signal contact box cover. Engage the unit clutch and rotate main shaft slowly until spacing contact is fully open. Measure the gap. Continue rotating the main shaft until marking contact is fully open. Measure the gap.

Requirement
Marking and spacing contact gaps measured in To Check to be equal within 0.001 inch.

To Adjust
Loosen mounting screws and position contact box using eccentric.

Note: Before operating, refine SIGNAL CONTACT CLEARANCE adjustment in accordance with Signal Contacts - Electrical.

CAUTION: IF CONTACTS ARE GOLD PLATED, CLEAN THEM BY PARTIALLY DRAWING A STRIP OF TP107162 TWILL JEAN BETWEEN THEM.

(B) DRIVE LINK SPRING

To Check
Trip clutch and rotate main shaft to stop position. Unhook stabilizer spring, and move latches away from transfer bail extension. Hold toggle firmly against spacing contact.

Requirement
Min 6 oz --- Max 12 oz to start transfer bail extension moving.

(C) SIGNAL CONTACT SPRING (TRANSMITTER DISTRIBUTOR SETS ONLY)

To Check
Place transmitter in stop position. Remove contact box cover, and toggle drive link spring from its link end. Move transfer bail towards the right (spacing) position, so that both toggle contacts are closed. Hook an 8-oz scale over the pivot screw and pull horizontally to the left.

Requirement
Min 2 oz --- Max 3-1/2 oz to open left-hand contact. Replace toggle drive link spring to its link.

(Top View - Right Side)
Signal Contacts — Electrical

2.24 The strobing adjustment procedure is used for checking and adjusting signal contacts electrically, and at the same time, refining the mechanical adjustments for the transmitter distributor. The same procedure is used for checking both the marking and spacing pulses for both 5 and 6 level, and all unit codes. Differences exist, however, in the number, width, and tolerance of pulses, and in the allowable break width. The data appropriate to each level and unit code is tabulated on the associated Pulse Data Table. By following the general procedures given in Paragraphs 2.25 and 2.26 following, and using data from the appropriate table, the marking and spacing pulse adjustment can be made for all units. To illustrate the procedure further, the data appropriate to a 5-level, 7.42 unit code is added parenthetically as an example in the general adjustment procedure following.

Note: Gold-plated signal contacts should not be electrically adjusted unless there is an intermediate device available which, when keyed by the signal contacts, will interrupt the current to the stroboscopic test set. The intermediate device must be capable of being keyed by a 3- to 20-volt change in voltage at a current not in excess of 20 milliamperes. The standard stroboscopic test set operating voltage must not be applied directly to the signal contacts because of the possibility of damaging the contacts' gold plating and thus impairing their operating efficiency in this low-energy level application. (Refer to Paragraphs 1.08 through 1.13.)

2.25 Marking Pulse Adjustments

(a) Plug a signal distortion test set having the appropriate scale (eg, 7.42) into the signal line so that the marking contacts of the transmitter-distributor unit under test will interrupt the current to the stroboscopic lamp within the DXD. Have the transmitter-distributor transmitting "Y" or "R" continuously and the test set and transmitter-distributor operating at the same speed (100 wpm). Rotate the test scale to align the 0-scale mark of the START segment (end of STOP segment) with the end of the stop pulse image indicated by the rotating strobe light.

Note: The end of the stop pulse image should not vary more than one division in either direction when the scale is positioned so that the variation is centered about the 0-scale mark of the START segment.

(b) Check the position of each of the pulses against the position tabulated. Each pulse should be in its designated segment on the test scale, within the specified tolerance figure (eg, 15 div).

Note: Each marking code pulse may have one break, provided the break is not longer than the allowable break width specified (eg, 1 div) and the break comes within the tolerance range (eg, 5 div) and the end of the pulse.

(c) To adjust, loosen the two contact box mounting screws until they are friction tight. Rotate the eccentric of the contact box mounting bracket toward the right or left until the requirements are met. Tighten the mounting screws and recheck the adjustment.

CONTACT BOX
ECCENTRIC SCREW
SIGNAL CONTACT BOX
CONTACT BOX
MOUNTING SCREW

(Front View)

Note: If these signal requirements cannot be met, refine the TRANSMITTER DISTRIBUTOR GEAR BACKLASH adjustment (See BASES) and the TRANSFER BAIL STABILIZER adjustment, viewing the signal on the test set.

2.26 Spacing Pulse Adjustments: The general procedure for adjusting the spacing pulse is identical to that outlined for marking pulses. The tolerances for spacing pulses may not be the same as for marking pulses however. Refer to the appropriate Pulse Data Table when making adjustments.
Note: On units equipped with signal regenerators, remove regenerator circuit card before applying test set probes to contact access terminals.

CAUTION: APPLYING OPERATING VOLTAGE OF DISTORTION TEST SET DIRECTLY TO GOLD-PLATED CONTACTS MAY MAKE THEM UNSUITABLE FOR LOW-VOLTAGE APPLICATIONS. REFER TO 1.12 FOR SERVICING INSTRUCTIONS.

2.27 Follow the general procedure outlined in Paragraphs 2.25 and 2.26 substituting the appropriate data from the following table.

### PULSE DATA TABLE

**FIVE-LEVEL UNITS, 7.00 UNIT CODE**

<table>
<thead>
<tr>
<th>PULSE</th>
<th>MARKING</th>
<th>SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RANGE</strong></td>
<td><strong>NOMINAL</strong></td>
<td><strong>TOLERANCE</strong></td>
</tr>
<tr>
<td><strong>STOP PULSE</strong></td>
<td>36 (STOP) TO 142 (STOP)</td>
<td>BEGIN ±5 DIV TO END ±1/2 DIV</td>
</tr>
<tr>
<td><strong>START PULSE</strong></td>
<td>142 (STOP) TO 6 (ONE)</td>
<td>BEGIN ±5 DIV TO END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 1</strong></td>
<td>6 (ONE) TO 12 (TWO)</td>
<td>BEGIN ±5 DIV TO END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 2</strong></td>
<td>12 (TWO) TO 18 (THREE)</td>
<td>BEGIN ±5 DIV TO END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 3</strong></td>
<td>18 (THREE) TO 24 (FOUR)</td>
<td>BEGIN ±5 DIV TO END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 4</strong></td>
<td>24 (FOUR) TO 30 (FIVE)</td>
<td>BEGIN ±5 DIV TO END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 5</strong></td>
<td>30 (FIVE) TO 36 (STOP)</td>
<td>BEGIN ±5 DIV TO END ±5 DIV</td>
</tr>
<tr>
<td><strong>ALLOWABLE BREAK WIDTH</strong></td>
<td>1 DIV</td>
<td>MUST FALL WITHIN PULSE TOLERANCE</td>
</tr>
</tbody>
</table>

*Ranges specified apply only for test sets (DXD) having a 7.42 unit code scale.*
2.28 Follow the general provisions outlined in Paragraphs 2.25 and 2.26 substituting the appropriate data from the following table.

### PULSE DATA TABLE
**FIVE-LEVEL UNITS, 7.42 UNIT CODE**

<table>
<thead>
<tr>
<th>PULSE</th>
<th>MARKING</th>
<th>SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RANGE</strong></td>
<td><strong>NOMINAL</strong></td>
<td><strong>TOLERANCE</strong></td>
</tr>
<tr>
<td><strong>STOP PULSE</strong></td>
<td>0 (STOP) TO 0 (START)</td>
<td>BEGIN ±5 DIV END ±1/2 DIV</td>
</tr>
<tr>
<td><strong>START PULSE</strong></td>
<td>0 (START) TO 0 (ONE)</td>
<td>BEGIN ±5 DIV END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 1</strong></td>
<td>0 (ONE) TO 0 (TWO)</td>
<td>BEGIN ±5 DIV END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 2</strong></td>
<td>0 (TWO) TO 0 (THREE)</td>
<td>BEGIN ±5 DIV END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 3</strong></td>
<td>0 (THREE) TO 0 (FOUR)</td>
<td>BEGIN ±5 DIV END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 4</strong></td>
<td>0 (FOUR) TO 0 (FIVE)</td>
<td>BEGIN ±5 DIV END ±5 DIV</td>
</tr>
<tr>
<td><strong>PULSE 5</strong></td>
<td>0 (FIVE) TO 0 (STOP)</td>
<td>BEGIN ±5 DIV END ±5 DIV</td>
</tr>
<tr>
<td><strong>ALLOWABLE BREAK WIDTH</strong></td>
<td>±1 DIV</td>
<td>MUST FALL WITHIN TOLERANCE LIMITS</td>
</tr>
</tbody>
</table>
2.29 Follow the general provisions outlined in Paragraphs 2.25 and 2.26 substituting the appropriate data from the following table.

### PULSE DATA TABLE
**SIX-LEVEL UNITS, 8.50 UNIT CODE**

<table>
<thead>
<tr>
<th>PULSE</th>
<th>NOMINAL</th>
<th>TOLERANCE</th>
<th>SPACING</th>
<th>TOLERANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RANGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOP PULSE</td>
<td>0 (STOP) TO 0 (START)</td>
<td>BEGIN ±7 DIV TO END ±1/2 DIV</td>
<td>0 (STOP) TO 0 (START)</td>
<td>BEGIN ±8 DIV TO END ±1/2 DIV</td>
</tr>
<tr>
<td>START PULSE</td>
<td>0 (START) TO 0 (ONE)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (START) TO 0 (ONE)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>PULSE 1</td>
<td>0 (ONE) TO 0 (TWO)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (ONE) TO 0 (TWO)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>PULSE 2</td>
<td>0 (TWO) TO 0 (THREE)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (TWO) TO 0 (THREE)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>PULSE 3</td>
<td>0 (THREE) TO 0 (FOUR)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (THREE) TO 0 (FOUR)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>PULSE 4</td>
<td>0 (FOUR) TO 0 (FIVE)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (FOUR) TO 0 (FIVE)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>PULSE 5</td>
<td>0 (FIVE) TO 0 (SIX)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (FIVE) TO 0 (SIX)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>PULSE 6</td>
<td>0 (SIX) TO 0 (STOP)</td>
<td>BEGIN ±7 DIV TO END ±7 DIV</td>
<td>0 (SIX) TO 0 (STOP)</td>
<td>BEGIN ±8 DIV TO END ±8 DIV</td>
</tr>
<tr>
<td>ALLOWABLE BREAK WIDTH</td>
<td>1 DIV</td>
<td>MUST LIE WITHIN TOLERANCE LIMITS</td>
<td>1 DIV</td>
<td>MUST LIE WITHIN TOLERANCE LIMITS</td>
</tr>
</tbody>
</table>
Basic Gear Adjustments

2.30

INTERMEDIATE GEAR — TRANSMITTER DISTRIBUTOR GEAR BACKLASH

To Check
With the MOTOR POSITION and TRANSMITTER DISTRIBUTOR POSITION adjustments completed, check the backlash between the gears.

(1) Requirement
Only a perceptible amount of backlash between the intermediate driving gear and the transmitter distributor gear.

To Adjust
Loosen three mounting screws that secure the transmitter distributor unit to its base. Position transmitter distributor to meet the requirement. Retighten the mounting screws.

(2) Requirement
Only a perceptible amount of backlash between the drive gear and the transmitter distributor gear.

To Adjust
Loosen three mounting screws that secure the transmitter distributor to its base. Position transmitter distributor to meet this requirement. Retighten the screws.
3. VARIABLE FEATURES

3.01 Tight-Tape and Tape Shoe Mechanism

(A) TIGHT-TAPE SWITCH

To Check
Place control lever in run position.

Requirement
Min 9/32 inch -- Max 13/32 inch
to open contacts when tight-tape arm
is raised.

To Adjust
Loosen clampscrew. Using adjusting
slot, position tight-tape intermediate
arm to meet this requirement. Re­
tighten clampscrew.

(B) TORSION SPRING

Requirement
Min 2-1/2 oz
to lift tape shoe.

(C) TAPE SHOE

To Check
Latch tape lid in position. Check
clearance between tape guideplate and
tape shoe.

Requirement
Min 0.005 inch -- Max 0.008 inch

To Adjust
Loosen locknut. Rotate adjusting screw
to meet the requirement. Retighten
locknut.
3.02 Tape Feed Assurance Mechanism

(A) TAPE SENSING FEED WHEEL PHASING

To Check
Place fresh, fully perforated tape (10 holes per inch) on tape guideplate across the feed wheel and tape feed assurance wheel. Set detent adjusting lever screw at midrange.

Requirement
Tape must lie flat on tape guideplate between feed wheel and tape feed assurance wheel.

To Adjust
Loosen bracket mounting screws friction tight. Position bracket to meet requirement. Retighten bracket mounting screws. Refine adjustment (if necessary) by rotating the detent lever adjusting screw.

Note: If tape is not available, use TPI65800 gauge.

(B) TAPE MOTION CONTACT GAP

To Check
Place detent lever in detented position.

Requirement
Min 0.005 inch—Max 0.010 inch gap between the normally closed contacts.

To Adjust
Bend contact leaf and stiffener to meet requirement.

(C) TAPE MOTION CONTACT SWINGER

To Check
Hold detent lever from contact swinger.

Requirement
Min 15 grams—Max 25 grams to separate contacts.

To Adjust
Bend swinger to meet requirement. Recheck TAPE MOTION CONTACT GAP.

(D) DETENT LEVER SPRING

To Check
Hold contact lever away from detent lever.

Requirement
Min 3 oz—Max 4 oz to move the roller from the ratchet.
3.03 Tape-Out Mechanism

(A) TAPE-OUT CONTACT

(1) To Check
Loosen contact bracket mounting screws. Pivot contact assembly until pad on tape-out pin extension is not touching the swinger pad. Check gap between normally open (top) contact points.

Requirement
Min 0.015 inch—Max 0.025 inch between normally open (top) contacts.

To Adjust
Bend upper contact spring to meet requirement.

(2) To Check
With assembly still in position, check force required to just separate normally closed (lower) contacts.

Requirement
Min 8 grams—Max 15 grams to just separate normally closed (lower) contacts.

To Adjust
Bend contact swinger. Recheck requirement under (1) To Check above.

(3) To Check
Hold tape-out pin down. With some clearance between tape-out pin extension and underside of contact swinger, without tape, tape lid closed, and unit in run position, check gap between normally closed contacts.

Requirement
Min 0.008 inch—Max 0.018 inch gap between normally closed contacts.

To Adjust
With contact bracket mounting screws loosened, adjust contact mounting bracket to meet requirement. Retighten contact bracket mounting screws.

(B) TAPE-OUT BAIL TORSION SPRING

Requirement
Min 8 oz—Max 12 oz to separate bail from tape-out pin.

Diagram:
- TAPE-OUT CONTACT
- EXTENSION ARM
- EXTENSION
- TAPE-OUT PIN SPRING
- MOUNTING SCREW
- BAIL
- FRONT PLATE
- SWINGER PAD
- TAPE-OUT PIN
- TAPE GUIDE-PLATE

(Front View)
3.04 Tape-Out Mechanism (continued)

(C) TAPE-OUT PIN SPRING

To Check
Remove tape and open tape lid.

Requirement
Min 38 grams—Max 45 grams—to press pin flush with tape guideplate.

To Adjust
Loosen tape-out spring bracket mounting screw and position bracket to meet requirement. Retighten bracket mounting screw.

(D) TAPE-OUT PIN

(1) To Check
Place control lever in free or stop position. Check position of tape-out pin in relation to tape guideplate.

Requirement
Tape-out pin should be
Min flush—Max 0.010 inch below surface of tape guideplate.

To Adjust
With control lever in stop position, loosen screw which secures the stop arm to the bracket with posts. Adjust stop arm to meet requirement. Tighten screw.

(2) To Check
Place control lever in run position. Check clearance between lower tape-out pin extension and tape-out bail extension.

Requirement
Min 0.055 inch—clearance between lower tape-out pin extension and tape-out bail extension.

To Adjust
With control lever in run position, loosen screw which secures the extension arm to the intermediate tape-out bail. Using a tommy wrench or suitable tool, change relative position of extension arm to bail to obtain required clearance. Tighten screw. Check requirement under (1) To Check and refine, if necessary.
3.06 Code Reading Contacts

Note 1: Remove code reading contact assembly from transmitter distributor unit before making initial adjustments.

Note 2: When using the contact spring bender, start with the contact pile-up farthest from the handle of the tool and work toward the handle so as not to disturb adjustments already made.

(A) NORMALLY CLOSED CONTACTS - BACKSTOP

Requirement
Lower contact leaves for all levels should be parallel with the mounting plate and in line with one another.

To Adjust
Bend backstop to meet the requirement.

(B) NORMALLY CLOSED CONTACTS - SPRING

(1) Requirement
With swinger held away
Min 2 oz — Max 6 oz
to move lower contact leaf from backstop.

To Adjust
Bend lower leaf.

(2) Requirement
Min 30 grams — Max 40 grams
to open normally closed contacts.

To Adjust
Bend swinger.

Note 3: If it is necessary to bend backstop to obtain required tension, reposition backstop to meet NORMALLY CLOSED CONTACTS - BACKSTOP requirement.

(C) NORMALLY OPEN CONTACTS - GAP

Requirement
Min 0.010 inch — Max 0.015 inch
gap between normally open contacts.

To Adjust
Bend associated backstop to meet requirement.

(D) NORMALLY OPEN CONTACTS - SPRING

Requirement
Min 30 grams — Max 40 grams
to move normally open contact away from backstop.

To Adjust
Bend upper contact leaf.

Note 4: If it is necessary to bend backstop to obtain required tension, reposition backstop to meet NORMALLY OPEN CONTACTS - GAP requirement.
3.06 Code Reading Contacts (continued)

Note: Secondary adjustments should be made with code reading contact assembly installed in the transmitter distributor and with the contact assembly bracket approximately centered in its adjustment range. (Remove contact box to facilitate adjustment.)

(A) CONTACT ASSEMBLY POSITIONING

To Check
Align each swinger with its associated sensing arm. (Gauge by eye.)

Requirement
Swinger to be aligned with its sensing arm.

To Adjust
Loosen screws which mount the contact assembly to the contact bracket. Position the assembly to meet the requirement.

(B) CONTACT SWINGER — SENSING ARM CLEARANCE

To Check
Place up-stop post out of the way and sensing arms in their uppermost positions. Select a BLANK combination.

Requirement
Min some—Max 0.010 inch gap between contact assembly swinger and insulator on contact sensing arm.

To Adjust
Loosen contact bracket mounting screws. Position bracket to meet the requirement. Tighten contact bracket mounting screws.
3.07  Code Reading Contacts (continued)

(A) CONTACT SENSING ARM — UP-STOP CLEARANCE

To Check
Rotate main shaft until sensing arms are in their highest positions. Engage clutch. Select a LETTERS combination.

Requirement
Min some—Max 0.008 inch clearance between upper contact leaf and its backstop.

To Adjust
Loosen nut that secures the eccentric up-stop to the front plate. Turn the eccentric to meet requirement. (High part of the eccentric should be toward the left.) Retighten eccentric nut.

(B) SENSING ARM — TRANSFER LEVER ALIGNMENT

To Check
Trip clutch. Select BLANK combination.

Requirement
Sensing arms must engage a minimum of 2/3 of their respective transfer levers.

To Adjust
Add TP8936 shims between plate assembly and the split bail spacer to meet requirement. (Store remaining shims under flat washer at end of split bail eccentric screw.)

(C) SENSING ARM SPRING

To Check
Disengage clutch.

Requirement
Min 2-1/2 oz—Max 3-1/2 oz to start sensing arm moving.

(D) SPLIT BAIL ECCENTRIC

To Check
Trip clutch. Select BLANK combination. Check clearance between closest transfer lever and its associated sensing arm.

Requirement
Min 0.005 inch—Max 0.010 inch

To Adjust
Loosen split bail eccentric locknut. Rotate split bail eccentric to meet requirement. Retighten locknut.
3.08 Code Reading Contacts (continued)

CONTACT SWINGER — SENSING ARM CLEARANCE (STROBING)

Note 1: When strobing the code reading contacts, use a DXD scale whose unit corresponds to that of the unit being checked. Refer to Contact Operating Requirements Table. The signal generator on the transmitter distributor must be synchronized with the DXD so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use a normal signal line direct current of 60 ma ±10% or 20 ma ±10% to strobe the contacts.

(1) Requirement
Contacts must open and close within the range specified on the Contact Operating Requirements Table.

(2) Requirement
Breaks in the pulses must be confined to the first and last 10 divisions of the trace.

CONTACT OPERATING REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>Levels</th>
<th>Unit Code</th>
<th>Beginning Pulse</th>
<th>End of Pulse</th>
<th>Max. Pulse Length Osc (Div)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Scale Segment</td>
<td>Scale Division</td>
<td>Tolerance (Div)</td>
</tr>
<tr>
<td>5</td>
<td>7.00</td>
<td>Pulse 1</td>
<td>25</td>
<td>±20</td>
</tr>
<tr>
<td>5</td>
<td>7.42</td>
<td>Pulse 1</td>
<td>30</td>
<td>±20</td>
</tr>
<tr>
<td>6</td>
<td>8.50</td>
<td>Pulse 0</td>
<td>45</td>
<td>±25</td>
</tr>
</tbody>
</table>

To Adjust
Loosen contact bracket mounting screws.
Position bracket to meet requirements.
Retighten contact bracket mounting screws.

Note 2: After making the adjustment, check clearance between contact swinger and insulator on the contact sensing arm when a BLANK combination has been selected and the main shaft rotated to place the sensing arms in their highest position. There must be some clearance. If the requirements cannot be met, recheck initial mechanical adjustments.
3.09 Auxiliary Contacts

Note: Make initial adjustments with the auxiliary contacts removed from the transmitter distributor unit.

(A) NORMALLY OPEN CONTACTS

1. Requirement
   Min 5-1/2 oz -- Max 6 oz
   to move normally open contact away from stiffener.

   To Adjust
   Bend normally open contact leaf to meet requirement.

2. Requirement
   Min 0.015 inch -- Max 0.020 inch
   gap between normally open contacts.

   To Adjust
   Bend contact stiffener to meet requirements.

(B) NORMALLY CLOSED CONTACTS

Requirement
   Min 4 oz -- Max 5 oz
   to open normally closed contact.

To Adjust
   Bend swinger contact to meet requirement.
3.10 Auxiliary Contacts (continued)

Note: Make secondary adjustments with the auxiliary contacts installed in the transmitter distributor.

(A) CONTACT SENSING ARM

(1) To Check
Disengage and latch clutch. Check clearance between insulator on swinger and bail.

Requirement
Swinger insulator should be centrally located with respect to its operating bail.

To Adjust
Loosen contact assembly screws. Position swinger and contact springs. Retighten contact assembly screws.

(2) To Check
Check position of swinger with respect to its bail.

Requirement
Min 0.040 inch — Max 0.050 inch between insulator on swinger and its bail.

To Adjust
Loosen contact bracket mounting screws. Position contact bracket to meet requirement. Retighten contact bracket mounting screws.

(B) AUXILIARY CONTACT OPERATING BAIL SPRING

To Check
Disengage clutch.

Requirement
Min 5 oz — Max 7 oz to pull spring to its installed length.
SECTION 573-127-703TC

3.11 Auxiliary Contacts (continued)

CONTACT SWINGER — OPERATING BAIL CLEARANCE

Note: When strobing the auxiliary contacts, use a DXD scale whose unit code corresponds to that of the unit being checked. (Refer to Contact Operating Requirements Table.) Synchronize the signal generator of the transmitter distributor with the DXD so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use normal direct current line signal of 60 mA ± 10% or 20 mA ± 10% to strobe the contacts.

Requirement
The contacts must open and close within the range specified in the Contact Operating Requirements Table.

To Adjust
Loosen the contact bracket mounting screws. Position the contacts to meet the requirements. Retighten contact bracket mounting screws.

CONTACT OPERATING REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>Levels</th>
<th>Unit Code</th>
<th>Start of Pulse</th>
<th>End of Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Scale Segment</td>
<td>Scale Division</td>
</tr>
<tr>
<td>5</td>
<td>7.00</td>
<td>Pulse 1</td>
<td>65</td>
</tr>
<tr>
<td>5</td>
<td>7.42</td>
<td>Pulse 1</td>
<td>75</td>
</tr>
<tr>
<td>6</td>
<td>8.50</td>
<td>Pulse 1</td>
<td>0</td>
</tr>
</tbody>
</table>
3.12 Tape Lid Sensing Lever

(A) SWITCH LEVER SPRING
To Check
Open tape lid.

Requirement
Min 20 grams -- Max 35 grams
to separate the switch lever from the contact swinger pad.

(B) SWITCH LEVER
To Check
Open tape lid. Depress the tape-out sensing pin.

Requirement
Min 0.005 inch -- Max 0.015 inch
between the normally closed tape-out switch contacts.

To Adjust
Loosen the adjustment screw. With the tape lid sensing lever seated firmly against the tape guideplate, rotate the switch lever clockwise or counterclockwise to meet requirement. Retighten adjustment screw.
3.13 Tape Deflector

(A) TAPE DEFLECTOR BRACKET

To Check
Check position of deflector tang in relation to its hole in top plate when the unit is in its operating position.

Requirement
Deflector tang should be located centrally in its hole in the top plate.

To Adjust
Remove rear screw which secures tape deflector spring to the cover plate. Loosen forward screw. Position tape deflector. Replace rear screw, and tighten both forward and rear screws.

(B) TAPE DEFLECTOR SPRING

Requirement
Min 1-1/2 oz—Max 4 oz to start the deflector moving from its operating position.

To Adjust
Loosen mounting screw. Position the spring using the enlarged mounting slot. Retighten mounting screw.
3.14 Start-Stop Pulse Contact

(A) CONTACT LEVER

To Check
Remove contact assembly from unit. Insure that no clearance exists between the contact lever and insulator.

Requirement
Min 20 grams - Max 30 grams to move insulator from contact operating lever.

To Adjust
Bend upper contact spring.

(B) CONTACT GAP (START AND STOP CONTACTS)

Requirement
Min 0.012 inch - Max 0.018 inch

To Adjust
Bend lower contact spring.

(C) CONTACT BRACKET

To Check
Place unit in stop position. Latch clutch. Check clearance between contact operating lever and transfer lever.

Requirement
Min 0.012 inch - Max 0.018 inch

To Adjust
Loosen mounting bracket screws. Position contact assembly to meet requirement. Retighten mounting bracket screws. Replace contact assembly in unit.
SECTION 573-127-703TC

3.15 Start-Stop Pulse Contact (continued)

CONTACT BRACKET (STROBING)

Note 1: When strobing auxiliary contacts, use a 7.42 unit DXD scale. Synchronize the signal generator of the transmitter distributor with the DXD so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use normal signal line direct current of 60 ma ± 10% or 20 ma ± 10% to strobe the contacts.

<table>
<thead>
<tr>
<th></th>
<th>MIN CLOSURE</th>
<th>CLOSURE RANGE</th>
</tr>
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<tbody>
<tr>
<td>STOP CONTACT</td>
<td>95 DIV</td>
<td>0 DIV OF STOP SEGMENT TO 142ND DIV OF STOP SEGMENT</td>
</tr>
<tr>
<td>START CONTACT</td>
<td>60 DIV</td>
<td>122ND DIV OF STOP SEGMENT TO 95TH DIV OF START SEGMENT</td>
</tr>
</tbody>
</table>

Requirement
Contacts must close within the following range.

Note 2: Breaks are permissible within 5 divisions of the beginning or end of a trace.

To Adjust
Loosen contact bracket mounting screws. Position the contact bracket to meet requirements. Retighten contact bracket mounting screws.
3.16 Rub-Out Deleter

(A) RUB-OUT DELETER BAIL GUIDE

To Check
Place sensing pins in their highest position. Check that deleter bail moves freely in its guide.

Requirement
When the rub-out permutation code is present, the rub-out deleter bail should rest against the lower projection of the sensing pin.

To Adjust

(B) SENSING PIN SPRING

To Check
Place sensing pin in its highest position. Hold rub-out deleter bail away from the pin.

Requirement
Min 3 oz --- Max 5 oz to move pin flush with tape guide.

(C) RUB-OUT DELETER BAIL SPRING

To Check
Place sensing pin in highest position.

Requirement
Min 1 oz --- Max 2-1/2 oz to move bail away from the sensing pin.
3.17 Tape Notch Sensing Mechanism

(A) TAPE NOTCH SENSING PIN SPRING

To Check
Place sensing pin in highest position.

Requirement
Min 1 oz --- Max 3 oz
to push sensing pin flush with surface of top plate.

(B) TAPE NOTCH SENSING CONTACT

(1) To Check
Check the location of the insulator with relation to the extension on sensing pin.

Requirement
Insulator on swinger should be centrally located with respect to the extension on sensing pin.

To Adjust
Loosen contact assembly mounting screws. Position contact assembly to meet requirement. Retighten mounting screws.

(2) To Check
Place sensing pin flush with top plate. Check clearance between sensing pin extension and insulator of contact swinger. Check gap between normally open contacts.

Requirement
Min 0.008 inch --- Max 0.015 inch

To Adjust
Bend swinger to meet requirement.

(3) To Check
Hold sensing pin extension away from swinger.

Requirement
Min 8 grams --- Max 15 grams
to just separate normally closed contacts.

To Adjust
Bend lower contact spring to meet requirement.
3.18 Tape Notch Sensing Mechanism (continued)

CONTACT BRACKET (STROBING)

Note: When using the tape notch sensing contacts, use a 7.42 unit DXD scale. Synchronize the transmitter distributor so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use a normal direct current line signal of 60 ma +10% or 20 ma +10% to strobe these contacts.

(FOR UNITS WITH TAPE SLACK ARM)

(1) Requirement
The contact should open no earlier than the 15 mark of the first pulse and open no later than the 55 mark of the first pulse.

(2) Requirement
The contact should close no earlier than the 15 mark of the fifth pulse and close no later than the 55 mark of the fifth pulse.

(3) Requirement
Contact breaks will be permitted between the 15 and 55 marks of the first pulse. The magnitude of the breaks must not extend beyond these limits.

To Adjust
Loosen bracket contact mounting screws. Position contact bracket to meet requirements. Retighten mounting screws.

(FOR UNITS WITHOUT TAPE SLACK ARM)

(1) Requirement
The contact should close no earlier than the 15 mark of the first pulse and close no later than the 55 mark of the first pulse.

(2) Requirement
The contact should open no earlier than the 15 mark of the fifth pulse and open no later than the 55 mark of the fifth pulse.

(3) Requirement
Contact breaks will be permitted between the 15 and 55 marks of the first pulse. The magnitude of the breaks must not extend beyond these limits.

To Adjust
Loosen bracket contact mounting screws. Position contact bracket to meet requirements. Retighten mounting screws.
3.19 Transmitter Stop Mechanism

(A) START-STOP CONTACT GAP (FOR TABULATOR CONTROL)

To Check
Place timing bail on lower part of its cam. Check start-stop contact gap.

Requirement
Min 0.018 inch --- Max 0.025 inch

To Adjust
Loosen clampscrew securing yield arm to timing arm friction tight.
Position timing arm to meet requirement. Retighten clampscrew.

(B) TIMING BAIL SPRING

Requirement
Min 5-1/2 oz --- Max 8 oz to start the bail moving.
3.20 Tape Slack Arm

**TAPE SLACK CONTACTS**

To Check
Close tape lid. Place control lever in run position. Check clearance between contacts when tape slack arm is raised to its maximum height.

Requirement
Min 0.010 inch --- Max 0.020 inch

To Adjust
Loosen clampscrew. Set contact gap by positioning pry points. Retighten clampscrew.

(Rear View)
3.21 Tape Withhold Mechanism

(A) MAGNET ARMATURE GAP

To Check
With the armature attracted, check the gap between the end of the armature adjusting screw and the plate.

Requirement
Min 0.020 inch---Max 0.025 inch

To Adjust
Loosen armature adjusting screw locknut friction tight. Rotate adjusting screw to meet requirement. Retighten locknut.

(B) BLOCKING BAIL ARM ECCENTRIC

To Check
Place sensing pins in their lowest position. Place high part of block bail arm eccentric pivot to right at approximately the same angular position as the feed pawl eccentric.

Requirement
some clearance between the extension on the blocking bail and the tail of the feed pawl.

To Adjust
Loosen arm eccentric clampscrew. Rotate arm eccentric to meet requirement. Retighten clampscrew.

(C) BLOCKING BAIL ECCENTRIC PIVOT

To Check
Trip clutch. Hold armature attracted. Hold main shaft latched in stop position. Check clearance between blocking bail extension and feed pawl at closest point.

Requirement
Min 0.002 inch---Max 0.035 inch

To Adjust
Loosen eccentric pivot clampscrew friction tight. Rotate eccentric pivot to meet requirement. Retighten clamp-screw.

Note 1: Check BLOCKING BAIL ARM ECCENTRIC adjustment, and refine if necessary.

Note 2: As a final check on this adjustment there should be some---to---0.015 inch clearance between the feed pawl and the feed ratchet at the closest point, as the feed pawl is cammed out of the ratchet during the blocking operation (magnet armature attracted). If necessary, refine BLOCKING BAIL ARM ECCENTRIC and BLOCKING BAIL ECCENTRIC PIVOT adjustments to meet this requirement.
4. EARLY MODELS

4.01 Tape Lid Mechanism

Note: Remove top and tape guideplate. Lubricate before adjustment.

TAPE LID

(1) To Check
Hold tape against notch in tape guideplate. Align feed wheel groove in tape lid with slot in plate. Align tape-out pin hole in plate tape lid with hole in plate. Check clearance between tape lid and pivot shoulder.

Requirement
Min some --- Max 0.010 inch clearance between tape lid and pivot shoulder.

To Adjust
Loosen tape lid mounting nuts friction tight. Insert tip of TP156743 gauge through slot and into groove of lid. Position tape lid bracket. Retighten nuts.

(2) To Check
Tape lid front bearing surface should rest squarely against tape guideplate. Check rear bearing surface clearance. Note: When both plates are assembled on unit, left edge of lid may touch top plate and some change in this clearance may be expected.

Requirement
Min some --- Max 0.003 inch clearance between rear bearing surface and tape guideplate.

To Adjust

(3) To Check
Latch tape lid against tape guideplate. Check release plunger for endplay.

Requirement
Some endplay when lid is latched against tape guideplate.

To Adjust
Loosen eccentric mounting post locknut friction tight. Raise tape lid. Rotate high part of eccentric toward tape guideplate. Close lid and rotate eccentric toward bracket until latch just falls under flat on post. Recheck by depressing plunger. With lid held down operate plunger. Tip of latch should clear post.
4.02 Tape Lid (continued)

**TAPE LID RELEASE PLUNGER SPRING** (For Units without Tape Lid Spring)

To Check
Hold tape guideplate horizontally. Unlatch tape lid.

Requirement
Min 28 oz — Max 48 oz
to start tape lid bail moving.

(Right Side View)
## Section 570-220-700TC
### MOTOR UNITS
#### ADJUSTMENTS

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1. **GENERAL**

1.01 This section is reissued to include adjustments formerly given in other sections, to include the latest engineering information, and to change the title. Since this revision is of a general nature, marginal arrows which indicate changes have been omitted.

1.02 The adjustment information given in this section and the section covering general teletypewriter requirements and adjustments provide the information necessary for maintenance of the motor unit.

1.03 The illustrations in this section show the adjusting tolerances, positions of moving parts, and spring tensions.
2. MINIATURIZED SYNCHRONOUS MOTOR UNITS

2.01 Motor Positioning

(A) MOTOR POSITIONING

Requirement
Position motor so that leads are approx. 30° from center line with oil holes up.

To Adjust
With mounting strap screws loosened, rotate motor.

Note: If necessary, position bracket with bracket screws loosened.

(B) MOTOR GEAR

Requirement
Barely perceptible amount of backlash between the motor driving gear and the main shaft driven gear at the point where backlash is least.

To Adjust
Raise or lower the gear end of the motor by means of the adjusting studs with their lock nuts loosened.

CAUTION: IF THE MOTOR SHOULD BECOME BLOCKED FOR SEVERAL SECONDS, THE THERMOSTATIC CUTOUT SWITCH WILL OPEN THE CIRCUIT. SHOULD THIS HAPPEN, ALLOW MOTOR TO COOL AT LEAST 5 MINUTES BEFORE MANUALLY RESETTING THE SWITCH BY DEPRESSING THE RED BUTTON. AVOID REPEATED RESETTING.
2.02 Motor Shield

(1) Requirement
Equal clearance between front and rear ends of motor and motor shield.

(2) Requirement
Clearance between motor shield and motor mounting bracket should be Min 0.062 inch

To Adjust
Position motor shield with its mounting screws loosened.

MOTOR SHIELD (IF SO EQUIPPED)
SECTION 570-220-700

2.03 Air Ducts and Capacitor Position

AIR DUCTS (2) (IF SO EQUIPPED)

Requirement
Equally spaced about exhaust ports.
Top edge of ducts to be parallel with motor bracket.

To Adjust
Loosen mounting screws and position ducts.

CAPACITOR POSITION

Requirement
Max 1/2 inch between motor bracket and end of capacitor.

To Adjust
Position relay and capacitor with motor removed from motor bracket and nut plate and clamp screws loosened.
3. STANDARD AND HEAVY DUTY SYNCHRONOUS MOTOR UNITS

3.01 Motor Positioning

MOTOR POSITIONING

(1) Requirement (Upright Mounted Motors)
Oilers should be upward and approximately equidistant from a vertical line through motor shaft.

(2) Requirement (Inverted Mounted Motors)
Oilers should be downward and approximately equidistant from a vertical line through motor shaft.

To Adjust
Position motor with clamp screws (2) loosened.

MOTOR ADJUSTING STUD (IF SO EQUIPPED)

Requirement
Barely perceptible backlash between drive gear and driven gear at point where backlash is least.

To Adjust
With lock nut loosened, position adjusting stud. Tighten nut while holding stud in position.

CAUTION: IF MOTOR BECOMES BLOCKED FOR SEVERAL SECONDS, THERMOSTATIC CUTOUT SWITCH (ON UNITS SO EQUIPPED) WILL BREAK CIRCUIT. SHOULD THIS HAPPEN, ALLOW MOTOR TO COOL AT LEAST 5 MINUTES BEFORE DEPRESSING RED RESET BUTTON. AVOID REPEATED RESETTING.
4. SERIES GOVERNED MOTOR UNITS

4.01 Motor Positioning and Governor

**MOTOR POSITIONING (NOT ILLUSTRATED)**

**Requirement**
Motor should be centrally positioned in its rubber mounts so as to provide at least 0.020 clearance between the motor housing and the cradle at the governor end. The cable should also clear the grommet in the screen by at least 0.030 inch.

**(A) GOVERNOR CONTACT BACKSTOP**

**Requirement**
Clearance between the movable contact arm and its eccentric backstop.

- Min 0.020 inch---Max 0.040 inch

To Adjust
- Rotate the eccentric backstop with clamping screw loosened.

**(B) GOVERNOR CONTACT**

**Requirement**
The contacts should meet squarely and not overlap more than 0.010 inch.

To Adjust
- Position the stationary contact and contact arm with the clamp screw and post loosened.

**CAUTION:** EXCESSIVE PRESSURE AGAINST GOVERNOR COVER ASSEMBLY DURING REMOVAL MAY DAMAGE SCREENED WINDOW.
4.02 Motor Governor

Note: Replace governor brushes that have worn to a length of approximately 15/32 inch (2/3 of original length).

BRUSH COVER

11/16"

BRUSH

BRUSH SPRING

(A) GOVERNOR BRUSH SPRING REQUIREMENT

Requirement
Governor fan removed.
Min 4 oz --- Max 6 oz
To move the spring flush with brush cover.

(B) MOTOR SPEED

Requirement
With target illuminated and viewed through the vibrating shutters of a 120 vps turning fork the spots on the 4-spot target should appear stationary while rotating. With target illuminated and viewed through the vibrating shutters of an 87.6 vps tuning fork the spots on the 6-spot target should appear stationary while rotating and with speed slightly increased the spots on the 35 spot target should appear stationary.

To Adjust
Stop the motor and turn the adjusting screw as indicated on governor cover. For units with screened governor covers, stop the motor, remove the TP152035 plug from cover. Turn adjusting screw as indicated on periphery of target.

Note: It is possible to adjust the motor at some multiple of the correct speed. To check motor speed when used with a page printer, return typebox carriage to left margin, set up any character in selector and manually trip typebox clutch trip lever. Printing should occur as follows:

<table>
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<tr>
<th>WPM</th>
<th>PRINTED CHARACTERS</th>
<th>REQUIRED TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>70</td>
<td>10 seconds</td>
</tr>
<tr>
<td>75</td>
<td>44</td>
<td>5 seconds</td>
</tr>
<tr>
<td>100</td>
<td>57</td>
<td>5 seconds</td>
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Page 7
7 Pages
1. **GENERAL**

1.01 The 28 Cabinet should be lubricated as directed in this section. The figures indicate the points to be lubricated and the quantity of lubricant to be used. Lubricate the assembly just prior to placing it in service.

1.02 The cabinet should be lubricated after each six months period of time or after each 1500 hours of service when the operating components of the set are serviced.

1.03 Use TP88970 oil at all points requiring oil and TP88973 grease at all points requiring grease.

1.04 The unit should be thoroughly lubricated, but over-lubrication which might allow oil or grease to be thrown to other parts, should be avoided. The following general instructions supplement the specific lubrication points indicated.

   a. Apply one drop of oil to all spring hooks.

   b. Apply oil to all pivot points.

   c. Apply oil to all sliding surfaces.

1.05 Specific lubrication requirements and the amount of lubricant are indicated at each lubrication point in accordance with the following code:

   O  Apply 1 drop of oil.
   O2  Apply 2 drops of oil.
   O3  Apply 3 drops of oil.
   G  Apply thin film of grease.

1.06 Remove any oil from finished surfaces with a soft clean cloth.
2. LUBRICATION

2.01 CABINET MECHANISM

- O3 SLIDING SURFACE - SPRING
- O BEARING SURFACES AND SPRING
- G LATCHING SURFACE (ALL LATCHES)
- G LATCHING SURFACE (2 PLACES)
- O BEARING SURFACE (2 PLACES)
- BEARING SURFACE (2 PLACES) DOME UPSTOP ARM
- TORSION SPRING UPSTOP
- RIGHT TOP DOOR UPSTOP ARM
- ALL DOORS DOME LATCH
- DOME LATCH
- DOME UPSTOP ARM
2.02 LINE GUIDE MECHANISM

2.03 DOME LATCH MECHANISM

2.04 LOW PAPER AND PAPER OUT SWITCH MECHANISM
1. GENERAL

1.01 This section provides specific lubrication procedures for the 28 electrical service units. It is being reissued to conform to more of a standard format. Since this is a general revision marginal arrows used to indicate changes and additions, have been omitted.

1.02 The figure indicates points to be lubricated and the kind and quantity of lubricant to be used. Lubricate the units prior to placing them in service. After that, lubricate as deemed necessary to provide smooth operation.

2. LUBRICATION DETAILS

2.01 Stop Magnet

1.03 The lubricating symbol in the text of the figure indicates lubrication directions as follows:

- O1 Apply one drop of oil
- O2 Apply two drops of oil
- O3 Apply three drops of oil
- G Apply thin coat of grease
- SAT Saturate (felt oilers, washers, wicks) with oil

1.04 Use TP88970 (KS7470) oil at all locations where the use of oil is indicated. Use TP88973 (KS7471) grease on all surfaces where grease is indicated.
28 PERFORATOR-TRANSMITTER BASE

LUBRICATION

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<td>11</td>
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<tr>
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<td>3</td>
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</tr>
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<td>11</td>
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<td>15</td>
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## OPERATING SPEEDS

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<td>IN WORDS PER MINUTE</td>
<td>3000 hr or 1 yr*</td>
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<tr>
<td>60</td>
<td>2400 hr or 9 mo*</td>
</tr>
<tr>
<td>75</td>
<td>1500 hr or 6 mo*</td>
</tr>
<tr>
<td>100</td>
<td>1000 hr or 6 mo*</td>
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*Whichever occurs first.
1.03 Use TP88970 oil at all locations where the use of oil is indicated. Use TP88973 grease on all surfaces where grease is indicated.

1.04 All spring wicks and felt oilers should be saturated. The friction surfaces of all moving parts should be thoroughly lubricated. Over-lubrication, however, which will permit oil or grease to drip or be thrown on other parts, should be avoided. Special care must be taken to prevent any oil or grease from getting between electrical contacts.

1.05 Apply a thick film of grease to all gears.

1.06 Apply oil to all cams, including the camming surfaces of each clutch disc.

1.07 The photographs show the paragraph numbers referring to particular line drawings of mechanisms and where these mechanisms are located on the unit. Parts in the line drawings are shown in an upright position unless otherwise specified.

1.08 The illustration symbols indicate the following lubrication directions:

- **O** Apply 1 drop of oil.
- **O2** Apply 2 drops of oil.
- **O3** Apply 3 drops of oil.
- **O20** Apply 20 drops of oil, etc.
- **G** Apply thin film of grease.
- **SAT** Saturate (felt oilers, washers, wicks) with oil.

Figure 1 - 28 Perforator-Transmitter Base
2. LUBRICATION

2.01 KEYBOARD
NOTE: REST PERFORATOR TRANSMITTER BOTTOM SIDE UP.

2.02 SPACE BAR MECHANISM

2.03 KEYLEVER MECHANISM
2.07 EXTENSION BASKET MECHANISM
NOTE: REST PERFORATOR TRANSMITTER BOTTOM SIDE UP.

2.08 DETENT LEVER MECHANISM

- CONTROL CAM
- BEARING SURFACES (FRONT AND REAR)
- DETENT LEVER
- BEARING SURFACE
- SPRING
- HOOKS-EACH END
- ROLLER
- BEARING SURFACE

2.09 SELECTOR LEVER MECHANISM

- SPRINGS
- HOOKS-EACH END (2 SPRINGS)
- RESET LEVER
- SLIDING SURFACE
- KEYBOARD CONTROL SELECTION LEVER
- BEARING SURFACE
- RESET CAM FOLLOWER AND RESET LEVER
- BEARING SURFACE
- CAMMING SURFACE
- RESET CAM FOLLOWER
2.13 CODE BAR AND LOCAL LINE FEED MECHANISM
NOTE: REST PERFORATOR IN UPRIGHT POSITION.

2.14 CODE BAR MECHANISM

HOOKS-EACH END (8 SPRINGS)

GUIDE SLOTS (LEFT AND RIGHT-TOP AND BOTTOM)

2.15 CODE LEVER UNIVERSAL BAIL MECHANISM

HOOKS-EACH END

BEARING SURFACE CODE LEVER UNIVERSAL BAIL
2.19 CLUTCH TRIP BAR MECHANISM

2.20 TRANSFER LEVER MECHANISM

2.21 CONTACT BOX

DISASSEMBLY: REMOVE NUT AND LOCK WASHER SECURING CONTACT BOX COVER AND REMOVE COVER.
2.26 LOCAL LINE FEED MECHANISM

- Guide slot
- Local line feed trip link
- Bearing surface
- Local line feed function lever
- Hooks - each end
- Spring
- Bearing surface
- Function bail
- Engaging surface
- Local line feed function lever

2.27 KEYBOARD SHAFT MECHANISM

- SAT - felt washer
- Signal generator shaft
- SAT - gear teeth
- Signal generator shaft
- G - oil hole
- Signal generator shaft
- Internal mechanism
- Keyboard clutch
- Sat - felt wick
- Signal generator cam
- 02 - oil hole
- Signal generator cam
- 02 - camming surface each cam
- Signal generator shaft
- SAT - felt washer

2.28 INTERMEDIATE GEAR MECHANISM

- 02 - oiler - each end (right and left)
- Motor shaft
- G - teeth (2 gears)
- Intermediate gear shaft
- 02 - ball bearing (2 bearings)
- Intermediate gears
2.31 CODE BAR BAIL MECHANISM

- SAT FELT WASHERS (TWO WASHERS) CODE BAR BAIL
- 0 BEARING SURFACE (2 PLACES) CODE BAR BAIL
- 0 HOOKS-EACH END (2 SPRINGS) SPRING
- SAT FELT WASHER CODE BAR BAIL LATCH
- 04 BEARING CODE BAR BAIL
- 02 BEARING SURFACE CODE BAR BAIL LATCH
- 02 ENGAGING SURFACE ECCENTRIC FOLLOWER

2.32 UNIVERSAL BAIL LATCH LEVER MECHANISM

- 0 HOOKS (EACH END) SPRING
- 02 GUIDE SLOT (EACH SIDE OF SLOT) UNIVERSAL BAIL LATCH LEVER
- ENGAGING SURFACE CODE BAR BAIL EXTENSION
- 0 ENGAGING SURFACE RESET BAIL LATCH
- SAT FELT WASHER UNIVERSAL BAIL LATCH LEVER

2.33 RESET CAM FOLLOWER MECHANISM

- SAT FELT WASHER ROLLER
- 0 BEARING SURFACE RETAINING RING
- SAT FELT WASHERS (FRONT & REAR) RESET CAM FOLLOWER SHAFT
- 05 OIL HOLE RESET CAM FOLLOWER SHAFT
- 0 HOOKS-EACH END SPRING
- 0 ENGAGING SURFACE RESET LEVER
2.36 CHARACTER COUNTER MECHANISM continued

CONTACT SURFACE
BEARING SURFACE
BEARING SURFACE
TEETH
ENGAGING SURFACES (2 PLACES)
HOOKS—EACH END (3 SPRINGS)
BEARING SURFACE
BEARING SURFACE
ENGAGING SURFACES (3 SURFACES)

ANTI-BOUNCE LATCH
ANTI-BOUNCE LATCH
RATCHET DRUM
RATCHET
RESET LEVER EXTENSION
SPRING
RESET BAIL
DRIVE LEVER FEED BAIL
DRIVE LEVER FEED BAIL & RESET BAIL

2.37 ELECTRICAL LINE BREAK MECHANISM

HOOKS—EACH END
CONTACT SURFACE
BEARING SURFACE

SPRING
SENSITIVE SWITCH
BREAK LEVER

2.38 LOCAL PAPER FEED-OUT MECHANISM

ENGAGING SURFACE
HOOKS—EACH END
BEARING SURFACE
ENGAGING SURFACE

LOCAL LINE FEED TRIP LINK
SPRING
LEVER
MAGNETIC BLOWOUT SWITCH
2.41 SYNCHRONOUS PULSE

2.42 CODE BAR GUIDE

2.43 SYNCHRONOUS PULSED MAGNET MECHANISM

2.44 CONTACT SWINGER
2.46 TIME DELAY MECHANISM

SAT  FELT WASHER  ECCENTRIC FOLLOWER PAWL
G  BEARING SURFACE  ECCENTRIC FOLLOWER PAWL
O2  GUIDE SLOT  ECCENTRIC FOLLOWER PAWL
SAT  FELT WASHER  LATCH PAWL
G  TEETH (2 WHEELS)  RATCHET WHEELS
O2  BEARING SURFACE  RATCHET WHEEL SHAFT EACH END
SAT  FELT WASHER  CONTACT PAWL

ENGAGING ECCENTRIC FOLLOWER PAWL SURFACE
SAT  FELT WASHER  LATCH LEVER
O  HOOKS - EACH END (3 SPRINGS)  SPRING
2.50 ANSWER-BACK — STOP LEVER

- CONTACTING SURFACE
- LATCHING SURFACE

LATCH AND STOP LEVER

CAMMING SURFACE

STOP LEVER

BEARING SURFACE (2 PLACES)

STOP LEVER AND LEVER PIVOT

(FRONT VIEW)
2.53 ANSWER-BACK — STEPPING PAWL

BEARING SURFACE

STEEPING PAWL AND ECCENTRIC STUD

CONTACTING SURFACES

STEEPING PAWL AND CODE BLADES

HOOK — EACH END

SPRING

CONTACTING SURFACE

ADJUSTING SCREW

CONTACTING SURFACE

LEVER AND LATCH

FRONT VIEW

2.54 ANSWER-BACK — KEYBOARD LOCK BAIL MECHANISM

ENGAGING SURFACES

ECCENTRIC AND LOCK LEVER

BEARING SURFACES

FUNCTION LEVER AND BAIL

(BOTTOM VIEW)

CONTACTING SURFACE

"HERE IS" LEVER AND BAIL
28 TYPING UNIT
LUBRICATION

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CAUTION: SPECIAL CARE MUST BE TAKEN TO PREVENT ANY OIL OR GREASE FROM GETTING BETWEEN THE SELE­CTOR ARMATURE AND ITS MAGNET POLE FACES. KEEP ALL ELECTRICAL CON­TACTS FREE OF OIL AND GREASE.

1.06 Apply a thick film of grease to all gears and the spacing clutch reset cam plate.

1.07 Apply oil to all cams, including the cam­ming surfaces of each clutch disc.

1.08 The photographs show the paragraph numbers referring to particular line drawings of mechanisms and where these mech­anisms are located on the unit. Parts in the line drawings are shown in an upright position unless otherwise specified.

Note: References made to left or right, top or bottom, and front or rear apply to the typ­ing unit in its normal operating position as viewed by the operator facing the unit.

1.09 The following list of symbols apply to the specific lubrication instructions given in each paragraph.

O Apply 1 drop of oil.
02 Apply 2 drops of oil.
03 Apply 3 drops of oil, etc.
G Apply thin film of grease.
SAT Saturate (felt oilers, washers, wicks) with oil.

1.10 During each lubrication period, check the following items. Requirements and adjustments are given in Section 573-115-700.

(1) Printing Carriage Position
(2) Printing Hammer Bearing Stud
(3) Printing Track
(4) Printing Hammer Stop Bracket (Also see Note 2, Par. 2.48, 573-115-700 which refers to Printing Hammer Operating Bail Spring Bracket Position.)
(5) Carriage Draw Wire Rope
(6) Dashpot Vent Screw (Check dashpot transfer slide for freeness.)
2.03 Printing Mechanism (Cont'd)

- **SAT FELT WASHERS** (3 WASHERS)
- **PRINTING CARRIAGE ROLLERS**
- **GUIDING SURFACE**
- **PRINTING ARM EXTENSION**
- **O10 TRACK SURFACE**
- **PRINTING TRACK**
- **SAT FELT WASHERS** (2 WASHERS)
- **PRINTING ARM**

2.04 Type Box Carriage Mechanism

- **BEARING SURFACE**
- **TYPE BOX CARRIAGE LATCH TOGGLE**
- **BEARINGS** (3 ROLLERS)
- **TYPE BOX CARRIAGE ROLLERS**
- **HOOK - EACH END**
- **SPRING**
- **FELT WICK**
- **TYPE BOX CARRIAGE LATCH**
- **BEARING SURFACE**
- **TYPE BOX CARRIAGE LINK**
- **BEARING SURFACE**
- **TYPE BOX CARRIAGE LINK**
2.07 Typing Unit - Left Front View

2.08 Codebar Detents

O2 BEARING BALLS (9 BALLS)  CODE BAR DETENT

2.09 Paper Feed Mechanism - Front View

02 BEARING SURFACE  (EACH END)
O2 BEARING SURFACE  (EACH END)
O2 BEARINGS  (EACH END)
O BEARING SURFACES-  (6 ROLLERS)
(LEFT SIDE)
O2 BEARING SURFACES  (EACH END)
O2 BEARING SURFACES  (RIGHT AND LEFT)
O HOOKS - EACH END
O2 BEARING SURFACE
O2 BEARING SURFACES  (EACH END)
(RIGHT SIDE)

0 HOOKS - EACH END  SPRING
O2 BEARING SURFACE  PLATEN DETENT BAIL
O2 BEARING SURFACE  PAPER FINGER SHAFT
O2 BEARINGS  (EACH END)
O BEARING SURFACES-  (6 ROLLERS)
02 BEARING SURFACES  (EACH END)
02 BEARING SURFACES  (RIGHT AND LEFT)
O HOOKS - EACH END
PAPER PRESSURE ROLLER SHAFTS  (WIPE OFF EXCESS OIL)
PAPER STRAIGHTENER SHAFT
PAPER STRAIGHTENER LEVERS
SPRING
RELEASE LEVER
RELEASE LEVER LINK
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2.14 Vertical Positioning Mechanism - Right Side
2.21 Selector Mechanism (Cont'd)

2.22 Typing Unit - Rear View

2.23 Typing Unit - Rear View
2.27 Shift Mechanism

- 0 ENGAGING SURFACES
- 0 ENGAGING SURFACE
- 02 GUIDING SURFACES (EACH SLIDE)

2.28 Function Rocker Shaft Mechanism

- SAT FELT WASHER
- SAT GUIDE SURFACE
- SAT FELT WASHERS (2 WASHERS)
- SAT FELT WASHERS (2 WASHERS)

- SPACE SUPPRESSION BAIL
- CARRIAGE RETURN SLIDE ARM
- FUNCTION ROCKER SHAFT
- FUNCTION BAIL TOGGLE LINK
- FUNCTION BAIL

2.29 Typing Unit - Front Bottom View

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- 2.31
- 2.32
- 2.33
- 2.34
2.32 Carriage Return Mechanism

SAT FELT OILER BETWEEN LAYERS SAT FELT OILER PRINTING TRACK GUIDE
O2 CAM DISK SURFACE CARRIAGE RETURN SPRING
G BEARING (OUTER MARGIN INDICATOR CAM DISK
AND INNER END) CARRIAGE RETURN SPRING
Felt WASHER DRUM SHAFT
SAT CARRIAGE RETURN SPRING
O2 SPRING WICK BETWEEN LAYERS SAT FELT WICK
SAT SPRING SPRING WICK O2 BEARING SURFACE TENSION PULLEY BAIL
O2 CARRIAGE RETURN SPRING SPRING WICK
CABLE GROOVES DRUM SHAFT

2.33 Spacing Drum Feed Mechanism

ENGAGING SURFACES AUTOMATIC CARRIAGE RETURN
(2 PLACES) BELL CRANK
O2 BEARING SURFACE AUTOMATIC CARRIAGE RETURN
O2 BEARING SURFACE BELL CRANK
O HOOKS - EACH END SPRING
O2 ENGAGING SURFACE SPACING DRUM FEED PAWL
O2 ENGAGING SURFACE RELEASE LINK
O2 BEARING SURFACES SPRING
(2 PLACES) SPACING DRUM FEED PAWL
O2 HOOKS - EACH END RELEASE LINK
O HOOKS - EACH END SPRING

2.34 Track Guide Mechanism

SAT FELT OILER PRINTING TRACK GUIDE
2.37 Horizontal Positioning Mechanism (Cont’d)

(TOP VIEW)

2.38 Horizontal Positioning Mechanism (Cont’d)

(FRONT VIEW)

2.39 Horizontal Positioning Mechanism (Cont’d)

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1. WITH SPRINGS LOCATED ON REAR SIDE OF SLIDE
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2.43 Oscillating Mechanism
2.46 Main Shaft - Clutches, Gears, Etc.

2.47 Main Shaft Mechanism

2.48 Selector Cam Clutch Assembly
2.51 Spacing Mechanism

![Diagram of Spacing Mechanism]

- ENGAGING SURFACES
- SPACING TRIP LEVER
- SPACING TRIP LEVER
- BAIL SHAFT
- TRIP RESET CAM
- SPRING PLATE

- FELT WASHERS (2 WASHERS)
- FELT WASHER
- SPACING SUPPRESSION SLIDE
- SPACING TRIP LEVER
- BAIL
- TRIP RESET CAM
- SPRING

2.52 Spacing Mechanism (Cont'd)

- OIL HOLE
- SPACING SHAFT

- G
- SPACING SHAFT GEAR

- TEETH

2.53 Spacing Mechanism (Cont'd)

- ENGAGING SURFACE
- SPACING CUT-OUT TRANSFER BAIL
- SPACING CUT-OUT TRANSFER BAIL
- SPACING CUT-OUT BAIL
- SPACING CUT-OUT BAIL
- CARRIAGE RETURN BAIL
- SHAFT
- SPRING

- FELT WASHERS (2 WASHERS)
- FELT WASHER
- HOOKS - EACH END
- SAT
- O
2.57 Typing Unit - Rear Top View

2.58 Line Feed Mechanism - Sprocket Feed

(RIGHT SIDE VIEW)
3. VARIABLE FEATURES
HORIZONTAL TABULATOR MECHANISM - EARLIER DESIGN

3.01 Typing Unit - Front View

3.02 Tabulator Shaft Mechanism

3.03 Space Suppression Mechanism
3.06 Spacing Clutch Mechanism

---

SELECTIVE CALLING MECHANISM

3.07 Typing Unit - Rear View
3.10 Typing Unit - Rear View - Stunt Box Removed

3.11 Single-Double Line Feed Mechanism

- O2 PIVOT
- O2 ENGAGING SURFACE
- O2 GUIDE SURFACES
- SAT FELT WASHER
- O2 ENGAGING SURFACES (4 SURFACES)
- O2 COILS
- O2 HOOKS - EACH END
- HOOKS - EACH END

(RIGHT SIDE VIEW)

SINGLE-DOUBLE LINE FEED LEVER
OPERATING ARM
OPERATING ARM
OPERATING ARM
STRIPPER BAIL
TORSION SPRING
SPRING
SPRING
3.14 Clutch Suppression Mechanism

BEARING SURFACES (2 PLACES)
HOOKS—EACH END
ENGAGING SURFACES (2 PLACES)
SAT FELT WASHERS (2 PLACES)

Solenoid Bell Crank Lever Spring Blocking Bail

(LEFT SIDE VIEW)

LOCAL BACKSPACE MECHANISM

3.15 Typing Unit - Front View
3.18 Trip Mechanism

[Diagram of Trip Mechanism]

Local Backspace Mechanism (Cont’d)

3.19 Trip Mechanism

[Diagram of Trip Mechanism]
PAGE FEED-OUT MECHANISM

3. 22 Typing Unit - Rear Left End View

3. 23 Drive Mechanism

[Diagram with labeled parts:
- G: Teeth
- O: Pivot
- O2: Bearing Surface
- IDLER GEAR
- ADJUSTABLE ARM
- HANDWHEEL
- GEAR
- BLOCKING ARM
- SPRING
- SLIDE]
3.26 Slide Arm Bracket

3.27 Compression Spring

3.28 Typing Unit - Rear View
3.31 Blocking Lever

- Engaging Surface Tabulator Stops
- Bearing Surface Tabulator Pawl
- Hooks - Each End Springs
- Bearing and Guide Surface Blocking Lever

3.32 Slide Arm

3.33 Operating Lever

- Engaging Surface with Blocking Lever and Bracket
- Operating Lever Slide Arm
- Hooks - Each End
- Operating Lever Slide Arm Bearing Surface
- Contacting Surface with Adjusting Plate
- Operating Lever Trip Lever Arm Latch Bail
- Operating Lever Bearing Surface
3.39 Oscillating Lever

3.40 Ribbon Operating Mechanism
VERTICAL TABULATION AND TRANSMITTER DISTRIBUTOR CONTROL MECHANISM

3. 43  Control Mechanism

3.43 Control Mechanism

(LEFT VIEW)
SEE PAR. 3.22

GEAR
GEAR
BEARING

PAGE FEED-OUT
IDLER
HANDWHEEL

ADJUSTABLE ARM

BEARING SURFACE
ADJUSTABLE ARM AND BLOCKING LEVER

SPRING (BOTH ENDS)
BLOCKING LEVER

PIVOT

PAGE FEED-OUT AND VERTICAL TAB

SLIDES (2)
DC MAGNET OPERATED PRINT SUPPRESSION MECHANISM

3.46 Suppression Mechanism

3.47 Shift Magnet Mechanism

Note: Keep oil and grease off of pole face.
# 28 Typing and Nontyping Perforators

## Lubrication

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### 1. GENERAL

1.01 This section contains the specific lubrication procedures for the 28 Typing and Nontyping Perforators. Included in the section are recent engineering changes and additions bringing it generally up-to-date.

1.02 The 28 Typing and Nontyping Perforators should be lubricated as directed in this section. The figures indicate points to be lubricated and the kind and quantity of lubricant to be used. Lubricate the perforators just prior to placing them in service. After a few weeks in service, relubricate to make certain that all points receive lubrication. The following lubrication schedule should be followed thereafter:
2. LUBRICATION

2.01 PERFORATOR MECHANISM RESET AND PERFORATOR MECHANISM IN UPRIGHT POSITION

2.02 PERFORATOR CLUTCH DRIVING SHAFT MECHANISM (NON-TYPING ONLY)

2.03 PERFORATOR CLUTCH AND RESET CAM MECHANISM

---

2.06
2.07 PERFORATOR MECHANISM (continued) REST PERFORATOR TRANSMITTER IN UPRIGHT POSITION

2.08 REAR BEARING BRACKET GEAR MECHANISM

2.09 PERFORATOR TRIP LEVER MECHANISM (NON-TYPING ONLY)
2.12 TAPE SHOE ARM MECHANISM

2.13 RETRACTOR BAIL MECHANISM

2.14 PUNCH PIN MECHANISM

2.15 PUNCH SLIDE MECHANISM
2.18 FEED WHEEL MECHANISM

- Bearing Surface
- Ratchet Teeth (2 Places)
- Sat Felt Washer
- Sat Felt Washer (2)
- Sat Felt Wicks (2)
- Sat Felt Washer

2.19 RESET BAIL MECHANISM

- Sat Felt Washer (2 Washers - Front & Rear)
- Sat Felt Washers (2 Washers - Front & Rear)
- Engaging Surface
- Sat Felt Washers (2 Washers - Front & Rear)

2.20 ROCKER ARM MECHANISM

- Sat Felt Washer
- Engaging Surface
- Hooks - Each End
- Sat Felt Wick
- Bearing Surface

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2.23 RIBBON FEED MECHANISM (LATE DESIGN)

- Hooks (2)
- TEETH
- SHAFT
- SHAFT, FELT WASHERS
- PIVOT
- CONTACTING SURFACES
- UPPER AND LOWER BUSHING
- PIVOT
- DETENT
- SPRINGS (2)
- RATCHET WHEEL
- ROLLERS (2)
- RATCHET WHEEL
- DETENT
- SLIDE LEVER
- DRIVE ARM

2.24 ROTARY POSITIONING MECHANISM (TYPING PERFORATOR ONLY)

- TEETH
- OIL HOLE
- SPECIAL TEETH
- PIVOT POINT
- PIVOT POINTS (2)
- PIVOT POINTS (FELT WASHERS)
- HOOKS - EACH END
- CONTACT POINTS
- SLIDING SURFACE
- PIVOT POINTS (3) (FELT WASHERS)
- CROSS LINKS
- ROTARY OUTPUT RACK
- TYPE WHEEL HOUSING
- ROTARY OUTPUT RACK
- ROTARY CORRECTING LEVER
- ROTARY CORRECTING LEVER SHAFT
- CONNECTING RODS
- DETENT LEVERS (8)
- SPRINGS (4)
- DETENT LEVERS (8)
2.25 TRANSFER MECHANISM (TYPING PERFORATOR ONLY)

- PIVOT POINTS (5)
- CONTACT SURFACES (5)
- CONTACT POINTS (5) (EACH END)
- HOOKS - EACH END
- PULSE BEAMS
- TRANSFER LEVERS
- PULSE BEAMS
- SPRING
- TRANSFER LEVERS
- GUIDE BRACKET

2.26 PUSH BARS (TYPING PERFORATOR ONLY)

- RACK TEETH (7)
- CONTACT SURFACES (7)
- CONTACT SURFACES (6)
2.27 TYPING PERFORATOR

NOTE: PLACE PERFORATOR IN UPRIGHT POSITION.

2.28 FUNCTION CAM - CLUTCH TRIP MECHANISM

- CONTACT POINTS (2)
- MAIN TRIP LEVER
- HOOKS - EACH END
- CLUTCH RELEASE SPRING
- CONTACT SURFACE
- RESET LEVER
- FELT WASHERS
- CLUTCH TRIP SHAFT
- HOOKS - EACH END
- LATCH LEVER SPRING
- CONTACT SURFACE
- CLUTCH STOP LUG
- PIVOT POINT
- MAIN TRIP LEVER
- PIVOT POINT
- MAIN TRIP LEVER
2.29 FUNCTION BOX (TYPING PERFORATOR ONLY)

- SLIDING SURFACES (EACH SIDE)
- HOOKS - EACH END (2)
- PIVOT POINTS
- FUNCTION BLADES
- EXTENSION ARMSPRINGS
- FIGURES ARM ASSEMBLY
- LETTERS AND FIGURES ARM ASSEMBLY SPRINGS
- FUNCTION BLADES
- FUNCTION BLADE SPRINGS (2)
- LIFTER ROLLER
- LIFTER ROLLER
- LIFTER TOGGLE
- LINK SPRING
- LIFTER SPRING
- FUNCTION BLADE LIFTER
- BELL CRANKS
- LETTERS ARM ASSEMBLY
- EXTENSION

2.30 AXIAL POSITIONING MECHANISM (TYPING PERFORATOR ONLY)

- SLIDING GUIDE SURFACES
- HOOKS - EACH END
- PIVOT POINT
- CORRECTING DRIVE LINK SPRING
- AXIAL OUTPUT RACK
- ROTARY CORRECTING CLAMP
- ROTARY CORRECTING LEVER SHAFT
- AXIAL CORRECTING PLATE
- AXIAL SECTOR TYPEWHEEL SHAFT
- AXIAL CORRECTING PLATE ROLLER
- OSCILLATING DRIVE BAIL
- AXIAL SECTOR
- GUIDE ROLLER
- AXIAL SECTOR AXIAL OUTPUT RACK
2.31 AXIAL POSITIONING MECHANISM (TYPING PERFORATOR ONLY)

2.32 DETENT ASSEMBLIES (TWO ON AXIAL POSITIONING MECHANISM)

2.33 SHAFT MECHANISMS (TYPING PERFORATOR ONLY)

*IF FUNCTION CAM NEEDLE BEARINGS ARE DISSASSEMBLED AT ANY TIME, REPACK BEARINGS WITH GREASE.*
2.34 PRINTING MECHANISM (TYPING PERFORATOR ONLY)

- G CONTACT SURFACE
- O2 SLIDING SURFACE
- O2 PIVOT POINT
- O2 PIVOT POINTS
- O HOOKS - EACH END
- O HOOKS - EACH END
- O HOOKS - EACH END
- O PIVOT POINT
- O HOOKS - EACH END
- O PIVOT POINTS (2)

- PRINTING LATCH
- PRINTING LATCH
- PRINT HAMMER
- PRINT HAMMER SPRING
- HAMMER ACCELERATOR SPRING
- PRINTING LATCH SPRING
- PRINTING DRIVE LINK
- PRINTING TRIP LINK SPRING
- PRINTING PIVOT ARM

(LEFT SIDE VIEW)

2.35 ROCKER BAIL MECHANISM (TYPING PERFORATOR ONLY)

- G CONTACT SURFACE
- SAT RIBBON FEED ECCENTRIC STUD
- O PIVOT POINTS
- SAT SLIDING SURFACE (FELT WASHER UNDER BLADE)
- O HOOKS - EACH END
- O HOOKS - EACH END
- O HOOKS - EACH END
- O PIVOT POINT
- O PIVOT POINT
- O ROLLER SURFACE
- O PIVOT POINTS
- O PIVOT POINT
- O PIVOT POINT (FELT STRIP)
- SAT PIVOT POINT

- PUSH BAR OPERATING BLADE
- PUSH BAR OPERATING BLADE
- CORRECTING DRIVE LINK
- OSCILLATING DRIVE LINK
- CAM FOLLOWER ROLLER (UPPER AND LOWER)
- CAM FOLLOWER ROLLERS
- PRINTING DRIVE LINK
- ROCKER BAIL
- ROLLER SURFACE
- CAM FOLLOWER ROLLER
- O CONTACT SURFACE

(REAR VIEW)

Page 16
2.36 MANUAL AND POWER DRIVE BACKSPACE MECHANISM FOR CHADLESS TAPE
NOTE: REST PERFORATOR TRANSMITTER IN UPRIGHT POSITION.

(FRONT VIEW)

2.37 MANUAL AND POWER DRIVE BACKSPACE MECHANISM FOR CHADLESS TAPE

02 BEARING SURFACE (REAR) RAKE SHAFT
G GEAR TEETH GEAR SEGMENT
0 HOOKS-EACH END PAWL SPRING
02 BEARING SURFACE FEED PAWL
G CONTACT SURFACE FEED PAWL
0 HOOKS-EACH END (3 SPRINGS) SPRING
02 BEARING SURFACE BELL CRANK
2.38 MANUAL AND POWER DRIVE BACKSPACE MECHANISM FOR FULLY PERFORATED TAPE

- Hooks - Each End
- Bearing Surface
- Feeding Surface
- Backspace Pawl Spring
- Backspace Pawl
- Bearing Surface
- Nut, Shoulder
- Bearing Surface
- Bell Crank
- Hooks - Each End
- Bell Crank Spring

2.39 POWER DRIVE BACKSPACE MECHANISM (EARLY DESIGN)

- Bearing Surface
- Rotating Surface
- Engaging Surface
- Sliding Surface
- Link
- Eccentric
- Latch
- Eccentric Drive Arm Fork
- Bearing Surface
- Arm
- Bearing Surface
- Armature Bail
- Hooks - Each End (2 Springs)
- Springs
2.40 POWER DRIVE BACKSPACE MECHANISM (LATEST DESIGN)

- BEARING SURFACE
- ENGAGING SURFACE
- ROTATING SURFACE
- SLIDING SURFACE
- ENGGAGING SURFACE
- HOOKS - EACH END (2 SPRINGS)
- SPRINGS
- LINK
- LATCH
- ECCENTRIC
- ECCENTRIC DRIVE ARM FORK

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2.41 SINGLE AUXILIARY TIMING CONTACTS MECHANISM

2.42 TAPE-OUT SWITCH MECHANISM

2.43 PERFORATOR GEAR AND MOTOR PINION
2.44 UNSHIFT ON SPACE MECHANISM

- HOOKS-EACH END
- SLOT
- GUIDE EXTENSION
- SPRING
- FUNCTION BOX REAR PLATE
- FUNCTION BOX FRONT PLATE
- FUNCTION BLADE

2.45 SIGNAL BELL CONTACT MECHANISM

- CONTACT SURFACE
- FUNCTION BLADE
- SPRING
- FUNCTION BLADE
- FUNCTION BLADE
- FUNCTION BLADE
- WING SPRING
- FUNCTION BLADE
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- GUIDE EXTENSION
- FUNCTION BLA
## 28 Typing Reperforator and Tape Printer

### Lubrication

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1. GENERAL  

1.01 This section contains the lubrication procedures for the 28 typing reperforator and tape printer units. The section has been revised to include recent engineering changes and additions and to rearrange the text, so as to bring the section generally up-to-date. Since this is an extensive revision, marginal arrows ordinarily used to indicate changes have been omitted.  

1.02 The figures indicate points to be lubricated and the kind and quantity of lubricant to be used. Lubricate the units just prior to placing them in service. After a few weeks in service, relubricate to make certain that all points receive lubrication. The following lubrication schedule should be followed thereafter:

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OPERATING SPEEDS
IN WORDS PER MINUTE

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<th>Speed</th>
<th>LUBRICATION INTERVAL</th>
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<tr>
<td>60</td>
<td>3000 hours or 1 year*</td>
</tr>
<tr>
<td>75</td>
<td>2400 hours or 9 months*</td>
</tr>
<tr>
<td>100</td>
<td>1500 hours or 6 months*</td>
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</table>

*Whichever occurs first.

1.03 Use TP88970 (KS7470) oil at all locations where the use of oil is indicated. Use TP88973 (KS7471) grease on all surfaces where grease is indicated. If the function cam needle bearings are disassembled at any time, repack the bearings with TP195298 grease (Beacon 325 grease or its equivalent).

1.04 All spring wicks and felt oilers should be saturated. The friction surfaces of all moving parts should be thoroughly lubricated. Over lubrication, however, which will permit oil or grease to drip or be thrown on other parts, should be avoided. Take special care to prevent oil or grease from getting between armatures and pole faces or between electrical contact points. Pull a piece of "BOND" paper between the armature and the pole pieces to remove any oil or foreign matter that may be present. Make certain that no lint or pieces of paper remain between the pole pieces and armature.

1.05 Apply a thick film of grease to all gears.

1.06 Apply oil to all cams, including the camming surfaces of each clutch disc.

1.07 The photographs show the paragraph numbers referring to particular line drawings of mechanisms and where these mechanisms are located on the unit. Parts in the line drawings are shown in an upright position unless otherwise specified.

1.08 The illustration symbols indicate the following lubrication directions:

- O1 Apply 1 drop of oil.
- O2 Apply 2 drops of oil.
- O3 Apply 3 drops of oil, etc.
- G Apply thin film of grease.
- SAT Saturate (felt oilers, washers, wicks) with oil.

2. BASIC UNITS

2.01 Typing Reperforator Unit
2.02 Ribbon Feed Mechanism (Later Design)
(For Earlier Design See Part 4.)

(FRONT VIEW)

(REAR VIEW)
2.03 Punch Mechanism for Chadless Tape
2.04 Punch Mechanism for Chadless Tape continued
2.05 Punch Mechanism for Fully Perforated Tape

SAT FELT WICK

O2 PIVOT POINTS (2)

O1 PIVOT POINT

TAPE SHOE

SAT FELT WICK

O2 PIVOT POINT

O2 PIVOT POINT

SAT PIVOT POINTS (4)
(FELT WASHERS)

SAT PIVOT POINTS (2)
(FELT WASHERS)

SAT PIVOT POINTS (2)
(FELT WASHERS)

SAT FELT STRIP

SAT PIVOT POINTS (2)
(FELT WASHERS)

O1 CONTACT SURFACES (6)

SAT FELT WICK

SAT FELT WICK

O1 PIVOT POINTS (2)

O2 PIVOT POINTS (2)

DRIVE LINK SPRING

PUNCH DRIVE LINK

RESET BAIL

DETENT LEVER

DETENT LEVER

FRONT AND REAR
TOGGLE LINK

TOGGLE BAIL

TOGGLE BAIL

TAPE SHOE ARM

O1 HOOKS - EACH END

SPRINGS

O1 PIVOT POINTS (6)

PUNCH SLIDES

SAT FELT STRIP

OSCILLATING SLIDE POST

RESET BAIL

SAT PIVOT POINTS (2)

PUNCH SLIDES

SAT FELT WICK

FEED PAWL SPRING

DETENT SPRING

FEED PAWL

ROCKER ARM
2.06 Punch Mechanism for Fully Perforated Tape continued

- 01 SLIDING SURFACE (6) (UPPER GUIDE)
- 01 SLIDING SURFACE (6) (LOWER GUIDE)
- 01 SLIDING SURFACE (6)
- 01 SLIDING SURFACE (6)
- 01 HOOKS-EACH END
- 01 SLIDING SURFACE (6)

- PUNCH PIN
- PUNCH PIN
- PUNCH PIN
- PUNCH SLIDE GUIDE
- SPRING

- G
- O2
- SAT
- SAT

- RATCHET TEETH
- OIL HOLE
- FEED WHEEL
- FEED WHEEL
- FEED WHEEL
- DIE WHEEL

- PIVOT POINT (FELT WASHER)
- PIVOT POINT (FELT WASHER)

- PIVOT POINTS (2)
- HANDWHEEL BEARING
2. 07 Typing Reperforator Unit
2.08 Rotary Positioning Mechanism

2.09 Selector Mechanism
2.10 Range Finder Mechanism

2.11 Main Shaft Mechanism

*IF FUNCTION CAM NEEDLE BEARINGS ARE DISASSEMBLED AT ANY TIME, REPACK BEARINGS WITH GREASE (BEACON 325) (TP195298) OR ITS EQUIVALENT.

MAIN SHAFT DRIVEN GEAR
(IF UNIT IS SO EQUIPPED)
2.12 Transfer Mechanism

- PIVOT POINTS (5)
- CONTACT SURFACES (5)
- CONTACT POINTS (5) (EACH END)
- HOOKS - EACH END
- PULSE BEAMS
- TRANSFER LEVERS
- PULSE BEAMS
- SPRING
- TRANSFER LEVERS
- GUIDE BRACKET

2.13 Push Bars

- RACK TEETH (7)
- CONTACT SURFACES (7)
- CONTACT SURFACES (6)
2.15 Function Box Mechanism

2.16 Axial Positioning Mechanism
2.17 Axial Positioning Mechanism continued (Left Side View)

- O1 PIVOT POINT
- O1 CONTACT SURFACES
- O1 PIVOT POINT
- (FELT WASHER)
- O1 CONTACT SURFACES
- O1 PIVOT POINT
- RIBBON CARRIER
- RIBBON OSCILLATING LEVER
- RIBBON OSCILLATING LEVER
- (FELT WASHERS)
- DRIVE LINK

2.18 Detent Assemblies (Bottom View)

NOTE: THERE ARE TWO DETENT ASSEMBLIES ON THE AXIAL POSITIONING MECHANISM.

- O1 DETENT POINTS
- O1 HOOKS - EACH END
- SAT PIVOT POINTS
- (FELT WASHERS)
- DETENT LEVERS (4)
- DETENT LEVER SPRINGS (2)
- DETENT LEVERS (4)
2.19 Printing Mechanism With Steel Print Hammer (Left Side View)

2.20 Printing Mechanism With Resilient Print Hammer (Left Side View): The printing mechanism with resilient print hammer (not illustrated) shall be lubricated in the same manner as the steel print hammer shown in 2.19 but in addition, the felt washer between the resilient print hammer accelerator and the frame shall be saturated with oil in accordance with general lubrication procedures. Where a mechanism is equipped with print suppression parts, a thin film of grease shall be applied on print hammer stop at the point of contact with the print hammer lever.
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2.21 Rocker Bail Mechanism (Rear View)

G CONTACT SURFACE
G RIBBON FEED ECCENTRIC STUD

O1 PIVOT POINTS
O1 PUSH BAR OPERATING BLADE

SAT SLIDING SURFACE (FELT WASHER UNDER BLADE)
SAT PUSH BAR OPERATING BLADE

G PIVOT POINT
CORRECTING DRIVE LINK
O1 PIVOT POINT
OSCILLATING DRIVE LINK
O1 ROLLER SURFACE
CAM FOLLOWER ROLLER (UPPER AND LOWER)
O1 PIVOT POINTS
CAM FOLLOWER ROLLERS
O1 PIVOT POINT
PRINTING DRIVE LINK
SAT PIVOT POINT (FELT STRIP)
ROCKER BAIL

O1 PIVOT POINT
CAM FOLLOWER ROLLER

O1 CONTACT SURFACE
FUNCTION CAM

O1 ROLLER SURFACE
2.22 Function Cam Clutch Trip Mechanism

- CONTACT POINTS (2)
- END OF LEVER
- HOOKS - EACH END
- MAIN TRIP LEVER
- CLUTCH TRIP SHAFT
- CLUTCH RELEASE SPRING
- RESET LEVER
- CLUTCH TRIP SHAFT
- LATCH LEVER SPRING
- CLUTCH STOP LUG
- BEARING
- CLUTCH TRIP SHAFT
- HOOKS - EACH END
- PIVOT POINT
- FOLLOWER LEVER SPRING
- TRIP CAM FOLLOWER LEVER
- TRIP CAM FOLLOWER LEVER
- MAIN TRIP LEVER
- MAIN TRIP LEVER
- MAIN TRIP LEVER SPRING
- MAIN TRIP LEVER

2.23 Slack Tape Mechanism

- PIVOT POINTS
- TAPE DEPRESSOR
- CONTACTING SURFACES - EACH END
- CLAMP PLATE SPRING
- ROLLER SURFACE
- DRIVE ROLLER
2.24 Main Shaft and Jack Shaft Mechanisms (Two Shaft Unit)

*IF FUNCTION CAM NEEDLE BEARINGS ARE DISASSEMBLED AT ANY TIME, REPACK BEARINGS WITH GREASE (BEACON 325) (TP195298) OR ITS EQUIVALENT.

TEETH

GEARS (2)

FUNCTION CAM

BOOTH ENDS OF SLEEVE AND OIL HOLE IN SLEEVE

MAIN SHAFT

CLUTCH CAM DISK

FUNCTION

CLUTCH DRUM

JACK SHAFT

GEARS (2)
2.25 Tape Mechanism for 28 Tape Printer Unit

(This lubrication instruction plus applicable 28 Typing Reperforator lubrication instructions are required to lubricate the 28 Tape Printer Unit)
3. VARIABLE FEATURES

3.01 Unshift-On-Space Mechanism

3.02 Signal Bell Contact Mechanism (Right Side View)
3.03 Manual and Solenoid Operated Interfering LTRS Tape Feed-Out Mechanism and Signal Bell Mechanism
3.04 Manual and Solenoid Operated Interfering LTRS Tape Feed-Out Mechanism
3.05 Automatic and Remote Control Noninterfering LTRS Tape Feed-Out Mechanisms
3.06 Automatic and Remote Control Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms

NOTE: PARTS ASSOCIATED ONLY WITH THE AUTOMATIC MECHANISMS.
3.07 Remote Control Noninterfering LTRS and BLANK Tape Feed-Out Mechanism

- PIVOT POINT
- ROLLER SURFACE
- PIVOT POINT
- PIVOT POINT
- CONTACT POINT
- CONTACT POINT
- CONTACT POINT
- BLOCKING BAIL
- DRIVE BAIL
- BLOCKING LATCH
- SPRING
- ARMATURE HINGE
- DRIVE BAIL ROLLER
- DRIVE BAIL ROLLER
- DRIVE BAIL
- BLOCKING BAIL
- DRIVE BAIL
- BLOCKING LATCH
- SPRING

- O2 PIVOT POINT
- O2 ROLLER SURFACE
- O2 PIVOT POINT
- O2 PIVOT POINT
- G CONTACT POINT
- G CONTACT POINT
- G CONTACT POINT
- G BLOCKING BAIL
- G DRIVE BAIL
- G BLOCKING LATCH
- G SPRING
- O1 HOOKS-EACH END (2)

- O2 PIVOT POINT
- O2 SLIDE SURFACE
- G CONTACT POINT
- G CONTACT POINT
- G HOOKS-EACH END
- O2 DRIVE LINK
- O2 DRIVE LINK
- G RELEASE LEVER
- G LATCH LEVER
- G SPRING
3.08 Automatic and Remote Control Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms continued

- **O1** HOOKS-EACH END
- **O2** BEARING SURFACE
- **O1** HOOKS-EACH END
- **O2** BEARING SURFACES (2)
- **O2** BEARING SURFACE
- **O1** HOOKS-EACH END
- **O1** CONTACT SURFACE
- **O2** BEARING SURFACE
- **O2** CAMMING SURFACE
- **O1** HOOKS-EACH END
- **O2** BEARING SURFACES
- **G** CAMMING SURFACE

- **SPRING**
- **RELEASE ARM**
- **LATCH LEVER**
- **TIME DELAY LEVER**
- **SPRING**
- **TIME DELAY CAM**
- **RELEASE ARM**
- **ROLLER**
- **DRIVE CAM**
- **SPRING**
- **BEARINGS (FRONT AND REAR)**
3.09 Automatic and Remote Control Noninterfering LTRS and BLANK Tape Feed-Out
Mechanisms continued

- SPRINGS (2)
- RATCHETS (2)
- RATCHETS (2)
- REAR CHECK PAWL
- SPRING
- RESET BAIL LATCH
- RESET BAIL LINK
- RESET BAIL TRIP LEVER
- RESET BAIL LINK
- SPRING
- SPRING
3.10 Automatic and Remote Control Noninterfering BLANK Tape Feed-Out Mechanisms

- O2 Pivot Point
- O1 Hooks-Each End
- Spring
- O2 Sliding Surfaces (2)
- Blocking Link
3.11 End of Tape Feed-Out Timing Contacts for Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms
3.12 Timing Contact Mechanism (Operated by Selector)

- Metal Face Toward Operating Arm
- Swinger Spring Insulator
- Felt Washers (3)
- Operating Lever
- Bearing—Each End
- Operating Lever
- Hooks—Each End
- Operating Lever
- Coiled Springs
- Operating Surface
- Cam
3.13  Print Suppression on Functions

G  ENGAGING SURFACE  PRINT HAMMER STOP
3.14 Blank Delete Mechanism
3.15 Blank Delete Mechanism continued

- **G** CONTACT SURFACE
- **01** FUNCTION BLADE
  - HOOKS - EACH END
  - SPRING
- **SAT** FELT WASHER
  - BLANK FUNCTION
  - BLADE

- **O2** ENGAGING SURFACE
  - PRINT HAMMER

- **O1** HOOKS - EACH END
  - SPRING

- **O2** SLIDING SURFACE
  - PRINT HAMMER
3.16 Letters-Figures Contact Mechanism (Later Design)

- 01 Pivot Point
- 01 Hooks-Each End
- Operating Lever
- Spring
3.17 Timing Contacts

3.18 Code Reading Contacts
3. 19 Manual and Power Drive Backspace Mechanisms (for Chadless Tape)
3.20 Backspace Mechanism for Chadless Tape (Manual)

- BEARING SURFACE (REAR)
- GEAR TEETH
- HOOKS-EACH END
- BEARING SURFACE
- CONTACT SURFACE
- HOOKS-EACH END (3 SPRINGS)
- BEARING SURFACE
- BEARING SURFACE
- BEARING SURFACE
- RAKE SHAFT
- GEAR SEGMENT
- Pawl spring
- Feed pawl
- Feed pawl
- Spring
- NUT, SHOULDER
- BELL CRANK

3.21 Backspace Mechanism for Chadless Tape (Power Drive)

- BEARING SURFACE
- ROTATING SURFACE
- SLIDING SURFACE
- BEARING SURFACE
- BEARING SURFACE
- HOOKS-EACH END (2 SPRINGS)
- LINK
- ECCENTRIC
- ECCENTRIC DRIVE ARM FORK
- ARM
- ARMATURE BAIL
- SPRINGS
3.22 Backspace Mechanism for Fully Perforated Tape (Power Drive)

- Hooks - Each End
- Bearing Surface
- Feeding Surface
- Backspace Pawl
- Spring
- Backspace Pawl
- Backspace Pawl
- Nut, Shoulder
- Bell Crank
- Bell Crank Spring
- Link
- Eccentric Drive
- Fork
- Latch
- Engaging Surface
- Rotating Surface
- Bearing Surface
- Hooks - Each End
- Armature Latch
- Spring
- Armature Bail
- Spring
- Armature Bail
3.23 Time Delay Motor Stop Mechanism

- HOOKS-EACH END
- ENGAGING SURFACE
- FELT WASHERS
- ENGAGING SURFACE
- HOOKS-EACH END
- FELT WASHERS
- BEARING SURFACE EACH END
- BEARING SURFACE EACH END
- TEETH AND FLANGES
- ENGAGING SURFACE
- FELT WASHERS
- BEARING SURFACE (2)
- BEARING SURFACE
- HOOKS-EACH END
- ENGAGING SURFACE
- ENGAGING SURFACE
- ENGAGING SURFACE
- SELECTOR RESET BAIL
- TIME DELAY RESET LEVER

- SPRING
- CONTACT OPERATING PAWL AND LATCH LEVER
- LATCH LEVER
- BELL CRANK AND CONTACT OPERATING PAWL
- LATCH PAWL AND LATCH LEVER
- SPRING
- LATCH PAWL
- RATCHET WHEEL SHAFT
- BELLCRANK AND SUPPORTING STUD
- RATCHET WHEELS
- CLAMP ARM AND BELLCRANK
- CONTACT PAWL
- TIME DELAY RESET SHAFT BUSHING
- ECCENTRIC FOLLOWER DRIVE ARM AND ECCENTRIC
- SPRING
- DRIVE ARM
- CONTACT OPERATING PAWL AND CONTACT INSULATOR
SECTION 573-118-701

4. EARLIER DESIGN MECHANISMS

4.01 Ribbon Feed Mechanism
(For Later Design See Par. 2.02.)

- PIVOT POINTS (2) - RIBBON ROLLER
- HOOKS - EACH END (2) - SPRINGS
- PIVOT POINT - FEED PAWL
- PIVOT POINTS (2) - REVERSING ARM
- PIVOT POINT - DRIVE ARM
- PIVOT POINTS (2) - RIBBON ROLLER
  REVERSING ARM
  REVERSING LEVER
  RETAINING PAWL
- PIVOT POINT - DRIVE ARM
- SAT PIVOT POINTS (2)
  (FELT WASHERS) - SHAFTS
- HOOKS - EACH END - SPRING
4.02 Remote Control Noninterfering BLANK Tape Feed-Out Mechanism

(For Later Design
See Part 3 Variable Features)
4.03 Remote Control Noninterfering BLANK Tape Feed-Out Mechanism continued
(For Later Design See Part 3 Variable Features)

- **G** CONTACT POINT
- **O2** GUIDE SURFACE
- **O2** PIVOT POINT
- **O1** HOOKS - EACH END
- **G** SLIDING SURFACE
- **O2** PIVOT POINTS (2)
- **O1** HOOKS - EACH END

**FEED-OUT PAWL**
**DRIVE LEVER SPRING**
**ECCENTRIC COLLAR**
**DRIVE LEVER SHAFT**
**FEED-OUT PAWL SPRING**

- **G** CONTACT POINT
- **G** SLIDING SURFACE
- **O1** HOOKS - EACH END

**RELEASE ARM**
**LOCK LEVER**
**SPRING**

- **SAT** PIVOT POINT (FELT WASHERS)
- **O2** PIVOT POINT
- **O1** HOOKS - EACH END

**RELEASE ARM**
**SPRINGS**
4.04 Remote Control Noninterfering BLANK Tape Feed-Out Mechanism continued
(For Later Design
See Part 3 Variable Features)

- O1 HOOKS - EACH END (2) SPRINGS
- O1 CONTACT POINT LIFTER LEVER
- O2 PIVOT POINT LIFTER LEVER
- O2 PIVOT POINT RATCHET SHAFT
- G ALL TEETH RATCHETS
- O2 POST LIFTER LEVER

- O1 HOOKS - EACH END SPRING
- O2 CONTACT POINT LATCH ARM
4.05 Remote Control Noninterfering BLANK Tape Feed-Out Mechanism continued
(For Later Design See Part 3 Variable Features)

- O2 ROLLER SURFACE
- KICK-OUT ARM
- G CONTACT POINT
- FEED-OUT LATCH
- O1 CONTACT SURFACE
- KICK-OUT ARM
- O2 PIVOT POINT
- LATCH ARM AND LATCH SHAFT
- O1 HOOKS - EACH END
- SPRING
- O2 PIVOT POINT
- ARMATURE BAIL
- O1 HOOKS - EACH END
- SPRING
- O2 PIVOT POINT
- NON-INTERFERING LEVER SHAFT
- O1 CONTACT POINT
- NON-INTERFERING LEVER
4.06 Remote Control Noninterfering BLANK Tape Feed-Out Mechanism continued
(For Later Design See Part 3 Variable Features)
4.07 Remote Control Noninterfering Tape Feed-Out Mechanism continued and Timing Contacts
1. GENERAL

1.01 This section provides lubrication information for the 5-level 28 transmitter-distributor unit (single contact).

CAUTION: THE UNIT IS SHIPPED WITH OIL RESERVOIR EMPTY. REMOVE COVER PLATE FOR ACCESS AND FILL OIL RESERVOIR AS INDICATED IN 2.07.

1.02 In this section, the general areas of the unit are shown by photographs. The specific points of lubrication are indicated by line drawings and descriptive text. The symbols in the text indicate the following directions:

- O1 Apply one drop of oil.
- O2 Apply two drops of oil, etc.
- G Apply thin coat of grease.
- SAT Saturate with oil (felt washers, oilers, etc).

1.03 Use KS7470 oil at all locations where the use of oil is indicated. Use KS7471 grease on all surfaces where grease is indicated.

1.04 The unit should be thoroughly lubricated, but over-lubrication which allows oil to drip or grease to be thrown on other parts, must be avoided. Exercise special care to prevent lubricant from getting between armature and pole faces. Keep all electrical contacts free from oil or grease.

1.05 The following general instructions supplement the specific lubricating points illustrated in this section.

1.06 The transmitter-distributor unit should be lubricated before being placed in service or prior to storage. After a few weeks of service, relubricate to make certain that all specified points have received lubricant. There-
after, the following schedule should be adhered to:

<table>
<thead>
<tr>
<th>OPERATING SPEED</th>
<th>LUBRICATION INTERVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 wpm</td>
<td>3000 hours or 1 year*</td>
</tr>
<tr>
<td>75 wpm</td>
<td>2400 hours or 9 months*</td>
</tr>
<tr>
<td>100 wpm</td>
<td>1500 hours or 6 months*</td>
</tr>
</tbody>
</table>

*Whichever occurs first.

1.07 For information pertaining to lubrication of associated parts - ie, motors, bases, etc, refer to the appropriate sections.

1.08 Instructions

(1) Removing Cover Plate: Lift left end of plate to release the detent fasteners then slide cover plate toward the left. Replace cover in the reverse order.

(2) Removing Top Plate: Loosen the front and rear mounting screws. Lift top plate upward.

(3) Remaining Tape Guideplate: Loosen the tape guideplate mounting screws. Lift the tape guideplate.

(4) Removing Transmitter-Distributor Assembly: Remove the screws which attach the unit to the base, and lift unit up to disengage the gears. Disconnect electrical plug.
2. BASIC UNIT

2.01 Transmitter Distributor
2.02 Tape Guideplate

(Right End - Top View)

(Right End - Bottom View)
2.03 Signal Contact Assembly

Note: The marking "DO NOT OIL" on the signal contact box should be interpreted literally. Portions of the mechanism should be greased as indicated, but no oil should be used.
2.04  Clutch Trip Assembly

(Front View)

(Right Side View)
2.05 Main Shaft, Oil Reservoir, and Center-Plate Assembly
2.06 Main Shaft

2.07 Oil Reservoir
Center-Plate Assembly

(Right Side View)

- SAT Felt Washer
- O1 Both Loops
- O1 Both Loops
- G Engaging Surface
- Ratchet Detent Bail
- Detent Bail Spring
- Tight Tape Arm Spring
- Start-Stop Bail Extension

(Rear View)

- G Engaging Surface
- G Engaging Surface
- O1 Bearing Surface
- O1 Bearing Surface
- Yield Arm
- Start-Stop Bail
2.09 Front Plate Assembly, Sensing and Feed Mechanism, and Transfer Mechanism
2.10 Front Plate Assembly

2.11 Sensing and Feed Assembly

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft</td>
<td></td>
</tr>
<tr>
<td>Felt Wicks</td>
<td>Feed Wheel</td>
</tr>
<tr>
<td>Felt Wicks</td>
<td>Feed Wheel Bearing</td>
</tr>
<tr>
<td>Sliding Surface</td>
<td>Sensing Pins</td>
</tr>
<tr>
<td>Sliding Surface</td>
<td>Sensing Pin Guide Post</td>
</tr>
<tr>
<td>Both Loops</td>
<td>Locking Bail</td>
</tr>
<tr>
<td></td>
<td>Locking Bail Spring</td>
</tr>
</tbody>
</table>

(Bottom View)
2.12 Transfer Mechanism

(Bottom View)

- Each Felt Washer
- Main Bail Pivots
- Sliding Surface
- Bail Drive Post
- Leather Pad
- Transfer Bail
- Sliding Surfaces
- Transfer Levers
- Each Loop
- Transfer Lever Springs
- Each Loop
- Locking Bail Spring

(Rear View)

- Teeth
- Feed Pawl and Ratchet Wheel
- Each Loop
- Transfer Lever Springs
- Each Loop
- Feed Pawl Spring
- Sliding Surface
- Feed Pawl Pivot
- Engaging Surface
- Locking Bail
- Felt Washer
- Locking Bail
- Sliding Surface
- Transfer Levers
3. VARIABLE FEATURES

3.01 Tape Feed Assurance Mechanism

3.02 Tape-Out Sensing Mechanism
3.03 Code Reading Contacts

(Front View)

- Bearing Surface
- Split Bail Roller
- Bearing Surfaces
- Split Bail

- Each Loop Spring
- Contact Insulator Surface
- Each Loop
- Insulator
- Spring
- Insulator
3.04 Tape Lid Sensing Lever

(Front View)

- O2 Protrusion Sensing Lever
- O2 Pivot Sensing Lever
- O2 Loops Sensing Lever (Each End)
- Spring

3.05 Tape Deflector

(Top View)

- O1 Bearing Surface Deflector (Each End)
- Thin Film Contact Surface Deflector Spring
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3.06  Start-Stop Pulse Contact

(Front Oblique View)

3.07  Rub-Out Deleter

(Front View)
3.08 Transmitter Stop Mechanism

(Rear View)

3.09 Tape-Withhold Mechanism

(Front View)
3.10 All Gears

[Diagram of gears labeled with "G" for Gears, "Teeth", and "All Gears"]
MOTOR UNITS

LUBRICATION

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<td>2. LUBRICATION</td>
<td>2</td>
</tr>
<tr>
<td>Motor bearings - standard motors</td>
<td>2</td>
</tr>
<tr>
<td>Motor bearings - miniature motors</td>
<td>2</td>
</tr>
</tbody>
</table>

1. GENERAL

1.01 This section has been revised to include additional information for lubricating miniature synchronous motors. Since this issue is a general revision, marginal arrows that indicate changes have been omitted.

1.02 For complete lubrication instructions refer also to the section covering teletypewriter apparatus general lubrication.

1.03 The motor should be lubricated initially, before being placed in service, as specified in the section covering the preparation of teletypewriter apparatus for installation. In the case of a new motor, the information supplied with it pertaining to the amount of lubricant should be used as a guide for further lubrication.

1.04 The suggested lubrication interval is indicated in the chart. However, because of varying conditions of application, the motor should be lubricated as often as specified by local instructions.

1.05 Before lubricating the motor, carefully and thoroughly clean the outer surfaces of the ball oilers with a clean cloth (KS2423) dampened with petroleum spirits (KS7860). Avoid depressing the ball oilers so that grit, dirty grease, or contaminated petroleum spirits do not get into the motor bearings (Par. 2.01).

1.06 Whenever the motor is disassembled the bearings should be repacked with Beacon 325 grease or equivalent.

1.07 The exposed motor shaft should be covered with a thin film of grease to prevent rust.

1.08 Use KS7470 oil where oil is specified.

1.09 The miniature synchronous motor does not contain ball oilers, as in the larger type motors, but has only a single oil hole in each end shield as shown in Par. 2.02.

CAUTION: DO NOT USE GREASE GUN ON 28, 32, 33 & 37 MOTOR UNITS.

LUBRICATION INTERVAL

<table>
<thead>
<tr>
<th>Motor Unit</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard and heavy</td>
<td>1500 consecutive operating hours or 6 months, whichever occurs first</td>
</tr>
<tr>
<td>duty units</td>
<td></td>
</tr>
<tr>
<td>Miniature units</td>
<td>750 consecutive operating hours or 3 months, whichever occurs first</td>
</tr>
</tbody>
</table>
SECTION 570-220-701TC

2. LUBRICATION

2.01 Motor Bearings - Standard Motors
Lubrication of motor bearings with ball type oilers.

Note: If motor is disassembled at any time, do not replace bearings until they have been repacked with (Teletype 195298) (Beacon 325 or its equivalent) grease.

2.02 Motor Bearings - Miniature Motors

Note: If motor is disassembled at any time, do not replace bearings until they have been repacked with (Teletype 195298) (Beacon 325 or its equivalent) grease.
TELETYPE CORPORATION  
Skokie, Illinois, U.S.A.  

SECTION 573-134-705TC  
Issue 1, September, 1964  

28 CABINET FOR AUTOMATIC SEND-RECEIVE 
TELETYPETWRITER SETS  
DISASSEMBLY AND REASSEMBLY 

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2. DISASSEMBLY AND REASSEMBLY 1 
   Front panel ........................ 1 
   Transmitter-distributor housing 
      (fixed head, multi-contact) 2 
   Transmitter-distributor housing 
      (fixed head, single contact) 2 
   Transmitter-distributor housing 
      (pivoted head, multi-contact) 1 
   Transmitter-distributor housing 
      (pivoted and fixed head, 
      multi-contact) ................ 1 

1. GENERAL  
1.01 This section contains specific routines for disassembling the 28 teletypewriter cabinet, and where necessary provides detailed reassembly information. 

1.02 The technician should refer to the exploded views found in appropriate parts literature for an illustration of the mechanism to be disassembled, for location and visual identification of parts and detailed disassembly and reassembly features. 

2. DISASSEMBLY AND REASSEMBLY  
2.01 In removing a subassembly from the cabinet, the procedure followed and the location from which parts are removed must be carefully noted so that reassembly can be done correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing it. 

2.02 To remove front panel, remove the typing unit in accordance with the section entitled "28 Typing Unit, Disassembly and Reassembly," Taking care not to damage the character counter, remove the front panel from the teletypewriter cabinet by removing the two screws, lockwashers, and washers at the left end of the panel and loosening the thumbscrew (inside of cabinet) at the right end of the panel. Slide the panel out to the left. 

2.03 To remove the transmitter-distributor housing (pivoted and fixed head, multi-contact) remove the two screws, lockwashers, and flat washers that mount it. 

(a) Remove the screw, lockwasher and flat washer (inside of teletypewriter cabinet) that secure the lower right-hand corner of the crossbar to the teletypewriter cabinet. 

CAUTION: DO NOT LOOSEN OR REMOVE THE SCREW, LOCKWASHER, AND FLAT WASHER THAT SECURE THE ADJUSTING PLATE, WHICH IS FACTORY POSITIONED. 

(b) Loosen the two screws, lockwashers, and flat washers that secure the left edge of the crossbar (with nut plate) to the left panel of the teletypewriter cabinet. 

(c) Remove the crossbar by sliding it out to the left. 

2.04 To remove the transmitter-distributor housing (pivoted head, multi-contact), remove the screw, lockwasher, and flat washer (inside of teletypewriter cabinet) that secure the lower right-hand corner of the crossbar to the teletypewriter cabinet. 

CAUTION: DO NOT LOOSEN OR REMOVE THE SCREW, LOCKWASHER, AND FLAT WASHERS, THAT SECURE THE ADJUSTING PLATE, WHICH IS FACTORY POSITIONED. 

(a) Loosen the two screws, lockwashers, and flat washers that secure the left edge of the crossbar (with nut plate) to the left panel of the teletypewriter cabinet. 

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(b) Remove the crossbar by sliding it out toward the left.

2.05 To remove the transmitter-distributor housing (fixed head, single contact or fixed head, multi-contact), slide it forward to release it from the detent springs that hold it in place.

(a) Remove the screw, lockwasher, and flat washer (inside of teletypewriter cabinet) that secure the lower right-hand corner of the crossbar to the teletypewriter cabinet.

CAUTION: DO NOT LOOSEN OR REMOVE THE SCREW, LOCKWASHER, AND FLAT WASHER THAT SECURE THE ADJUSTING PLATE, WHICH IS FACTORY POSITIONED.

(b) Loosen the two screws, lockwashers, and flat washers that secure the left edge of the crossbar (with nut plate), to the left panel of the teletypewriter cabinet.

(c) Remove the crossbar by sliding it toward the left and rear to disengage it from the slotted holes in the teletypewriter cabinet.
28 ELECTRICAL SERVICE UNITS

DISASSEMBLY AND REASSEMBLY

1. GENERAL

1.01 This section provides disassembly and reassembly instructions for 28 electrical service units used in teletypewriter sets. It is reissued to provide additional information in a standardized format. Since this is a general revision, marginal arrows ordinarily used to indicate changes and additions have been omitted.

1.02 When it is necessary to remove the various components from the electrical service unit, the appropriate wiring diagrams should be used as a reference.

1.03 After the disassembly procedure has been followed, reassembly procedure for most components is obviously a reversal of the disassembly procedure. Where necessary, reassembly information is given.

Note: Remove power from unit before starting disassembly procedure.

2. DISASSEMBLY AND REASSEMBLY

2.01 Removal of 28 Electrical Service Unit from 28 Teletypewriter Cabinet used with 28 Keyboard Send-Receive (28 KSR) or Receive-Only (28 RO) Teletypewriter.

(1) Raise dome of cabinet and disconnect all plugs and receptacles from the typing unit.
(2) Remove the typing unit in accordance with the section entitled "28 Typing Unit, Disassembly and Reassembly."
(3) Disconnect all plugs and receptacles from the keyboard and remove the keyboard.
(4) Remove the mounting studs from each end of the electrical service unit.

Note: The electrical service unit may now be turned upside down for servicing or unwiring components.

(5) The various components may be removed from the unit by removing their mounting screws on the top side of the unit and disconnecting cabling and wires.

(6) If it is desirable to remove the electrical service unit completely from the cabinet, disconnect the remaining wires and cables.

2.02 Removal of Electrical Service Unit from Skin-Tight KSR Sets (Located behind the typing unit cover):

(1) Unlatch electrical service unit cover at each end and lift cover off.
(2) Remove the mounting studs from each end of the electrical service unit and lift unit off base.
(3) Remove various components from the electrical service unit by removing their mounting screws and disconnecting wire or cable connections as necessary.

2.03 Removal of 28 Electrical Service Unit from 28 Automatic Send-Receive Sets (28 ASR):

(a) Without auxiliary equipment

(1) Raise the dome of the cabinet and disconnect all plugs and receptacles from the typing unit.
(2) Remove the typing unit in accordance with the section entitled "28 Typing Unit, Disassembly and Reassembly."
(3) Disconnect all plugs and receptacles from the perforator-transmitter base.
(4) Remove the mounting studs from each end of the electrical service unit.
(5) Remove the power control switch assembly bracket at the right end of the unit and the line-test-key control assembly at the left end.

(6) Remove various components from the electrical service unit by removing their mounting screws and disconnecting wire or cable connections as necessary.

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(?) If it is desirable to remove the electrical service unit completely from the cabinet, disconnect the remaining wires and cables.

Note: On some sets it may be necessary to remove the perforator transmitter in order to completely remove the electrical service unit. If necessary, refer to the appropriate section for removing the equipment from the cabinet.

(b) With auxiliary equipment

Note: When Automatic Send-Receive Sets include an auxiliary typing reperforator, an electrical service unit is used in the lower compartment of the ASR cabinet. To disassemble these units, open the bottom compartment.

(1) Disconnect all plugs and receptacle connections between the electrical service unit and other components and from the cabinet terminal boards.

(2) Remove the studs securing it to the relay rack and lift unit out.

(3) Remove various components from the electrical service unit by removing their mounting screws and disconnecting wire and cable connections as necessary.
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1. GENERAL

1.01 Disassembly, as outlined in this section, covers a procedure for removing the principle subassemblies which make up the unit.

1.02 The technician should refer to the exploded views found in the appropriate parts literature for an illustration of the mechanism to be disassembled, for location and visual identification of parts and detailed disassembly and reassembly features.

1.03 Most maintenance, lubrication and adjustments can be accomplished simply by removing the subject component from the cabinet. If possible, disassembly should be confined to subassemblies, which can, in some cases, be removed without disturbing adjustments. When reassembling the subassemblies, be sure to check all associated adjustments, clearances and spring tensions.

1.04 If a part that is mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same shim pile-up can be replaced when the part is remounted.

1.05 Retaining rings are made of spring steel and have a tendency to release suddenly when being removed. Loss of these retainers can be minimized as follows: Hold the retainer with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the retainer. Rotate the screwdriver in a direction to increase the diameter of the retainer for removal.

1.06 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs in removing them.

1.07 Raise cabinet lid or enclosure cover and remove the typing unit from its base by removing the four screws that secure it to its keyboard or base. Remove the cable plug connector from the side frame. Lift the typing unit off. Note: On sets equipped with a form supply container on the rear of the cabinet, rearward foot extensions should be in position to prevent the cabinet from tilting when any of the components are removed.

1.08 Remove the four TP151549 screws that secure the base to the cradle or subbase. Disconnect the cable plug from the connector at the rear of the keyboard base. Remove the base with the motor unit, typing or nontyping perforator still in position.

2. DISASSEMBLY AND REASSEMBLY

2.01 In removing a subassembly from the unit, the procedure followed and the location from which parts are removed must be carefully noted so that reassembly can be done correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing it.
Figure 1 - 28 Perforator-Transmitter Base
2.02 To remove the character counter assembly, remove the two screws that hold the TP179279 character counter bracket to the keyboard base. Raise the character counter and remove the two screws that hold the TP158050 switch to its TP158021 bracket. Remove the character counter assembly.

TAPE CONTAINER

2.03 To remove the tape container assembly, remove the four screws which hold the TP158233 panel mounting bracket to the base.

PERFORATOR (TYPING AND NONTYPING)

2.04 To remove the perforator assembly, loosen the two set screws on the TP193565 coupling located on the TP144982 rear shaft and slide the coupling to the rear to disengage it.

(a) Remove the three screws which hold the TP158169 nontyping or the TP159861 typing perforator frames to the base, and remove the screw which holds the TP156184 bracket to the base. Raise the perforator slightly from the base being careful not to injure the codebar extension or associated springs.

(b) If unit is equipped with power backspace, unscrew the leads from under the magnet assembly before entirely removing the perforator.

MARGIN INDICATOR

2.05 To remove the margin indicator assembly, remove the two screws which hold the TP158162 switch mounting bracket to the TP158160 reset cam follower lever assembly bracket.

RESET CAM FOLLOWER

2.06 To remove the reset cam follower lever assembly, remove the screws which hold the TP158160 reset cam follower lever assembly bracket to the TP158113 basket frame.

(a) Remove the screws that hold bracket to base.

(b) Disengage the follower lever assembly from the selector lever assembly.

AUXILIARY ELECTRICAL SWITCH

2.07 To remove the auxiliary electrical switch and housing assembly, disconnect the cable leads from the TP158250 terminal board located just to the right of the perforator drive shafting.

(a) Remove the three screws which hold the TP158202 auxiliary switch housing to the base.

(b) Slide the housing to the rear and disengage the TP158208 gear from the TP158210 shaft and lift the housing out.

(c) Disengage the drive shaft from the TP158114 extension basket control cam.

CODEBAR EXTENSION BASKET

2.08 To remove the codebar extension basket assembly, remove the screw which holds the left end of the TP158113 extension basket to the base.

Note: For reassembly purposes, observe how the TP158061 link guide pin and the TP158060 trip bar link latch spring which encases it are engaged between the TP158159 clutch trip bar link and the TP158103 trip bar link latch.

Slide the extension basket to the left and disengage the TP158116 reset lever from the TP158099 keyboard control selection lever assembly.

Note: When reassembling, be sure that the selection lever assembly straddles the clutch trip bar extension lever, and that the selection lever fork engages its mating pin.

SIGNAL GENERATOR

2.09 To remove the signal generator assembly, remove the typing unit, if it is present, the TP154131 contact box cover, and disconnect the signal line leads from the TP154042, TP154043 contact terminals.

(a) Remove the two screws at the front of the TP154200 signal generator frame and screw at the right rear of the frame.

(b) Lift the signal generator carefully, while holding the TP154179 universal bail back so that the TP154237 non-repeat lever clears and its spring will not be excessively stretched.
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CAUTION: IF THE NONREPEAT LEVER IS PULLED DOWN APPROXIMATELY 90 DEGREES FROM THE NORMAL POSITION, ITS SPRING MIGHT BE STRETCHED BEYOND ELASTIC LIMITS WHICH WILL RESULT IN ASSEMBLY MALFUNCTION. MAKE SURE THE LEVER IS IN ITS SLOT BEFORE SETTING IT DOWN.

KEYBOARD HOOD

2.10 To remove the plastic windows and labels, hood, seals and seal plates, remove the four screws which secure the TP154198 windows and labels.

(a) Remove the two screws underneath the TP154110 hood which hold the hood to the TP154203 hood mounting bracket; and remove the four screws on top of the hood which hold it to the TP154210, TP154211 left and right frame mounting brackets. Pull the hood forward to remove.

(b) Stretch the TP154020 rubber keyboard seal off its TP154057, TP154058 plates.

(c) Remove four screws and two TP154203 hood mounting brackets.

(d) Remove the TP154058 upper seal plate by removing the three screws at its rear.

(e) Remove the TP154057 lower seal plate by removing the screws at its front.

CONTACT BOX

2.11 To remove the contact box assembly, remove the TP154131 contact box cover and disconnect the signal line leads.

(a) Unhook the TP86304 drive link spring.

(b) Remove the two screws at the front of the TP154009 front plate which hold the contact box assembly.

(c) Disengage the TP156644 drive link from the transfer bail and lift off the assembly. It is more economical to replace the entire contact assembly if the contacts need replacement.

KEYBOARD

2.12 Remove the typing unit, signal generator assembly and keyboard hood assembly.

Note: It is easier to disassemble and reassemble the keyboard assembly with the base standing on its rear.

(a) Remove the four screws which hold the TP154210, 154211 front frames to the front of the TP158000 base.

(b) Remove the two screws which hold the TP154068, TP154069 right and left code-lever guide brackets at the top of the base, and the two screws at the extreme right and left of the TP154055 front bracket which hold it on the base.

(c) When these four screws in front and four on top of the base have been removed, tip up the front of the keyboard assembly and pull it forward, disengaging the function levers.

(d) Note that all function levers are under their corresponding function bails - except the keyboard lock function lever which fits on top of its function bail.

(e) When reassembling, depress the keyboard lock key lever so that the lock function lever will go in over its bail instead of under as the other function levers should.

TRANSFER LEVER LOCKING BAIL

2.13 Remove the signal generator assembly from the keyboard (see 2.09).

(a) Remove the contact assembly (see 2.11).

(b) Remove the TP70388 transfer lever locking bail spring.

(c) To remove the TP151140 locking bail, trip the clutch and rotate the shaft until the cam is positioned so that the bail can be unhooked and dropped from its guide post. Turn the locking bail clockwise until it is at right angles to the guide, and extract it from the bottom of the frame.

Note: It may be necessary to move the shaft back and forth to position the cam for maximum clearance.

SIGNAL GENERATOR SHAFT

2.14 Remove the transfer lever locking bail (see 2.13).
(a) Remove the two screws which mount the TP154101 clutch shaft rear mounting plate to the TP154200 signal generator frame, and remove the nut which locks the shaft to the front of the frame.

(b) Hold the TP154033 clutch latchleaver and the TP154034 clutch stop lever away and pull back on the shaft rear mounting plate to disengage the shaft from the front plate.

(c) Remove the entire cam, clutch, and shaft assembly by rotating it to clear the various transfer levers. The TP154019 code bar bail eccentric follower, the TP154138 felt washer and the TP154083 cam spacer will fall free. These must be repositioned before reassembly.

(d) To take the cam (with clutch assembly) off the shaft, disengage the clutch by holding the clutch shoe lever against the stop lug and slide the cam and clutch off.

KEYLEVER GUIDE PLATE

2.15 Remove the keyboard hood assembly (see 2.10).

(a) Remove the TP151045 space bar by un-screwing the two shoulder screws that fasten it to the TP154117 space bar bail.

(b) Remove the screw on the keylever guide plate under the space bar and the two screws in the upper corners of the plate which hold the plate to the frame.

(c) Work the guide plate off the keytops and let them fall free.

(d) To replace the guide plate over the key-levers, flop all levers to the rear. Place the front end of the guide plate down on the frame; push the keylevers into their respective holes starting with the bottom row and proceeding upward to the top row.
# 28 Typing Unit

## Disassembly and Reassembly

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### 1. General

1.01 This section is issued to describe the disassembly and reassembly procedures for the 28 typing unit. Disassembly covers a procedure for removing the principal sub-assemblies which make up the unit.

1.02 Reference should be made to the exploded views found in the appropriate parts literature for an illustration of the mechanism to be disassembled, for location and visual identification of parts, and detailed disassembly and reassembly features.

1.03 Disassembly should be confined to sub-assemblies, which can, in some cases, be removed without disturbing adjustments. When reassembling the sub-assemblies, be sure to check all associated adjustments, clearances, and spring tensions.

1.04 If a part that is mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same shim pile-up can be replaced when the part is remounted.

1.05 Retaining rings are made of spring steel and have a tendency to release suddenly when attempting to remove them. Loss of these retainers can be minimized as follows: Hold the retainer with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the retainer. Rotate the screwdriver in a direction to increase the diameter of the retainer for removal.

1.06 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs when removing them.

1.07 With cabinet lid raised or enclosure cover removed, loosen and remove the four screws that secure the typing unit to its base. Disconnect the cable plug connector from the side frame. Lift the typing unit off.
2. DISASSEMBLY AND REASSEMBLY

2.01 When removing a sub-assembly from the unit, the procedure followed and the location from which parts are removed must be carefully noted so that reassembly can be done correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing it.

TYPE BOX

2.02 To Remove: Trip the type box latch to the right. Lift the right end of the type box upward to an angle of approximately 45 degrees and pull toward the right to disengage it from the left hand bearing stud.

2.03 To disassemble the type box for replacing type pallet or spring, proceed as follows:

(a) Remove both screws and nuts that secure the front plate to the rear plate assembly. Separate the two plates.

(b) Remove the spring from the pallet by compressing it slightly and pulling the formed end out of the slot in the pallet.

Note: This spring should be discarded once it has been removed from its assembly.

(c) When installing the new spring, make certain that the formed end extends through the slot in the pallet.

(d) To reassemble the type box, line up the front plate with the rear plate assembly and draw the two plates together until the head of the pallet leaves the rear plate by approximately 1/16 inch. This may be accomplished by using two 6-40 screws (at least 11/32 inch long) and nuts in place of the two screws and nuts removed when disassembling, and tighten them only enough to hold the pallets as specified above. Do not clamp the plates together until all pallets have been moved into their correct position.

(e) Manipulate the pallets until they fall into their respective openings in the front plate. Press the plates together.

(f) Replace the screws and nuts used in step (d) with screws and nuts removed in step (a).

2.04 To Replace Type Box: reverse the procedure used in removing it.


PRINTING CARRIAGE

2.05 To Remove: Loosen the two screws in the printing carriage clamp plate and disengage the carriage from the upper draw-wire rope. Move the carriage to the left of its track and tilt the power part forward to disengage the rollers from the track.

2.06 To Replace: Make certain that the printing arm is correctly re-engaged with the printing track. Position the carriage clamp on the upper draw-wire rope for the correct printing carriage position as specified in the adjustment section.

TYPE BOX CARRIAGE

2.07 To Remove: Move the type box carriage to its extreme right hand position.

(a) Select any character in the bottom row of the type box and rotate the main shaft until the type box carriage is in the uppermost position.

(b) Remove the ribbon from the ribbon guide.

(c) Remove the retainer ring from the stud in the right hand end of the type box carriage link. Disengage the link from the carriage.

(d) Hold the ribbon guide forward and the right ribbon reverse lever back. Pull the carriage toward the right to disengage it from the carriage track.

FRONT PLATE

2.08 To Remove: Manually move the type box carriage to the extreme right. Select any character in the bottom row of the type box and rotate the main shaft until the type box carriage is in its uppermost position.
(a) Remove the retainer ring from the type box carriage link right hand stud and disengage the link from the carriage. (See instructions for removing the link retainer in 2.07(c).)

(b) Remove the three screws which secure the main bail drive bracket to the rocker shaft.

(c) Remove the spacing shaft gear.

(d) Remove the four screws which secure the front plate assembly to the typing unit side frames.

(e) Pull the front plate assembly forward to disengage it from its connecting parts in the typing unit.

2.09 To Replace Front Plate: Make certain that the TP150770 and TP150771 code bar bell cranks, the TP152596 letters-figures shift slide, the TP152532 reversing slide shift lever, the TP150438 automatic CR-LF bell crank, if so equipped, and the TP152545 carriage return lever extension are properly engaged with their mating parts before tightening the front plate mounting screws.

2.10 Replace the spacing shaft gear. See Section 573-115-706 for adjustment on phasing the spacing gears.

STUNT BOX

2.11 To Remove: The procedure for removing the stunt box is as follows:

(a) Remove the TP151627 rear tie bar from the typing unit side frames.

(b) Remove the line feed function pawl stripper from the stripper blade.

(c) Remove the single-double line feed lever screw and disengage the lever from the notch in the stripper blade.

(d) The stripper blade is either removed or disengaged from the typing unit, depending upon the design.

(1) For earlier design: Hold the stripper blade toward the right side of the typing unit and unhook the stripper blade left hand arm from the blade. Pull the stripper blade toward the left side of the typing unit to disengage the stripper blade from the right hand arm. Remove the stripper blade from the typing unit.

(2) For later design: Loosen the screw and remove the retainer ring from the TP153291 camshaft drive arm. Slide the drive arm out of engagement with the stripper blade drive arm.

(e) Remove the screws which secure the stunt box assembly in the typing unit.

(f) Lift the stunt box assembly upward to disengage it from its locating brackets and pull toward the rear to disengage all code bar forks from the code bars. Remove, if present, the contact assembly and cable clamp from the stunt box. Remove the stunt box.

Note: Proceed with 2.12 through 2.16 before replacing stunt box.

STUNT BOX SWITCH

2.12 To replace the contact arm in a stunt box switch, remove the two screws that hold the contact plate to the block.

(a) Carefully unsolder the wire from the TP157889 contact arm spring. (It is not necessary to unsolder the contact arm spring wire from switches having the TP172591 contact spring.)

(b) Remove the contact plate assembly from the contact block.

(c) Remove the contact arm(s) from the contact plate assembly.

(1) For earlier design: Slip the TP157889 contact arm spring from the contact plate.

(2) For later design: Slip the TP172591 contact arm spring out of engagement with the center lug of the section being replaced.

(d) Place the new spring in position on the contact plate.

(e) Before mounting the contact plate on the block, make sure the end of the spring rests on top of the formed-over portion of the contact clip. There should be some clearance between the low end of the spring (front) and the upper edge of the contact arm to avoid in-
terference with the normal movement of the contact arm.

(f) Replace the contact plate assembly, with the contact arms removed, into the contact block. Mount the contact block in the required location with the two screws friction tight.

(g) Carefully resolder any leads that may have been removed, being careful to avoid overheating.

(h) Insert the pointed end of the contact arm, notch downward, between the bent up end of the spring and the formed-over portion of the contact clip. Push the arm into its operating position in the contact block.

(i) Before tightening the contact plate screws, see Section 573-115-700 for adjusting information.

FUNCTION BAR

2.13 To remove a function bar, first unhook the function bar spring.

(a) Hold the function bar toward the rear of the stunt box and disengage its function pawl from the function bar.

(b) Pull the function bar toward the front to remove it from the stunt box.

FUNCTION PAWL

2.14 To remove a function pawl after the function bar has been removed:

(a) Remove the pawl spring.

(b) Hold associated function lever back.

(c) Remove the pawl from top of stunt box.

FUNCTION LEVER

2.15 To remove a function lever after the function bar and function pawl have been removed:

(a) Remove the TP152889 shaft retainer plate.

(b) Remove the TP150547 shaft nearest the front of the stunt box.

(c) Unhook the spring from the function lever and remove the lever through the top of the stunt box.

FUNCTION LEVER SPRING PLATE

2.16 To remove a function lever spring plate or latch after the function bar, function pawl, and function lever have been removed:

(a) Loosen the screws that fasten the three TP150689 guide blocks to the lower side of the guide bar.

(b) Remove the spring from the TP152660 spring plate or TP154613 latch.

(c) Pull downward on the function lever spring plate or latch to snap it out of engagement with the retainer shaft.

2.17 To replace the stunt box, push it forward in its guide rails to within 1/8 inch of its final position.

2.18 Manually disengage the function pawls from their function bars and push the stunt box assembly forward and downward until it is latched in place on its locating brackets.

2.19 Replace the stunt box mounting screws, receptacle, and selector magnet wires.

CODE BARS

2.20 To unblock the suppression code bar, loosen the TP151152 screw that mounts the TP154650 code bar clip and the retaining plate to the left hand code bar guide bracket, and rotate the code bar clip up out of engagement with the suppression code bar. Tighten the TP151152 screw.

2.21 To Remove the Code Bar Assembly: First, remove the stunt box assembly and the front plate assembly as previously described.

(a) Remove the screws and lock washers which secure the code bar assembly to the side frame.

(b) Remove the TP150301 code bar shift bar retainer plate from the right hand code bar guide bracket.

(c) Unblock the suppression code bar as instructed in 2.20. Remove the TP152548 and TP152255 code bar shift bars and springs.
from the code bars and pull the code bar assembly forward and to the left.

2.22 To Reinstall Code Bar Assembly: Reverse the procedure used in removing it, except do not tighten the mounting screws.

(a) Hook the short extension of the TP152257 spring in the spring hole of the code bar. The short extension of the spring should be hooked from the bottom of the code bar, and the long extension should be hooked over the top of the code bar shift bar.

(b) Loosen the TP151630 code bar assembly tie bar screws and hold the code bar guide brackets back and downward firmly against their locating surfaces on the side frame and tighten the four mounting screws.

(c) Tighten the two tie bar screws.

MAIN SHAFT

2.23 To Remove Main Shaft: The selector cam-clutch assembly must be removed. See 2.35.

(a) Set the typing unit upside down.

(b) Return the carriage to its left hand position.

(c) Remove the screw that secures the spacing shaft in the spacing collar.

(d) Remove the spacing shaft with gear.

(e) Remove the screw that secures the collar and the clamp to the right end of the main shaft.

(f) Remove the TP152573 main shaft right hand bearing retainer plate.

(g) Remove the TP150010 retainer plate at the TP150046 clutch bearing and remove the TP150244 link.

(h) Remove the two screws from the TP152537 main shaft left hand bearing clamp.

(i) Unhook the springs from the trip levers and latch levers associated with all clutches. Position the code bar clutch so that the low part of the clutch cam clears the spring arm on the cam follower. Unhook the code bar clutch cam follower spring.

(j) Remove the TP153300 function clutch arm by removing two screws and retainer ring if present.

(k) Unhook the spring from the TP153573 function bar reset ball.

(l) Move the main shaft assembly toward the left to disengage the code bar clutch and function clutch links from their connecting pins.

(m) Lift the left end of the shaft assembly out of the side frame. Position the shaft so that the function clutch link passes the suppression assembly bracket, then remove the shaft assembly from the typing unit.

Note: Disassembly of the main shaft and clutch assemblies can be accomplished by referring to the exploded views contained in the appropriate parts literature. It should be noted, that when assembling clutches having cams and discs marked "O" for identification, the marked side of the parts should face away from the clutch side of the assembly. Function and code bar clutches should have their driving links assembled so that the longer end of the hub faces away from the clutch side of the assembly.

2.24 To Reinstall Shaft Assembly: Reverse the procedure used in removing it. The line feed clutch spur gear should be positioned with its flat side toward the line feed clutch spacer and with the indentation in the gear toward the special washer between the gear and the main shaft ball bearing.

2.25 To phase the spacing gears, and remake the stripper blade drive cam position adjustment, refer to Section 573-115-700.

UPPER DRAW WIRE ROPE

2.26 To Remove Upper Draw Wire Rope: Return the carriage to the left hand position.

(a) Loosen the nut on the front end of the spring drum stud. Operate the ratchet escapement lever to unwind the carriage return spring.

(b) Remove the upper draw wire rope from the clamp plate on the printing carriage, and the clamp on the oscillator rail slide.
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(c) Loosen the clamp screw that secures the upper draw wire rope to the spring drum. Remove the wire rope from the drum.

(d) Remove the screw in the spacing drum that secures the ends of the wire rope. Remove the rope from the drum.

LOWER DRAW WIRE ROPE

2.27 To Remove Lower Draw Wire Rope: Remove the screw that secures the wire rope to the spacing drum. Remove the end of the rope from the drum.

(a) After loosening the screws that secure the TP150796 margin indicator cam disc on the spring drum, position the disc to expose the lower draw wire rope mounting screw.

(b) Remove the lower draw wire rope screw and rope from the spring drum.

(c) Loosen the screws in the pulley bearing studs that mount draw wire rope pulleys and move the studs toward the center of the typing unit.

2.28 To Replace Draw Wire Rope: Make certain that the lower draw wire rope is in front of the upper draw wire rope in the track around the drums.

2.29 Adjust the position of the type box, the printing carriage, and the wire rope tension as specified in Section 573-115-700.

PLATEN (SPROCKET FEED)

2.30 To Remove Platen: Remove the line feed spur gear.

(a) Remove the TP150719 and TP150720 platen bearing retainers.

(b) Remove the TP152832 paper straightener shaft.

(c) Hold off the detent and lift the platen out of the side frame.

2.31 When replacing each platen bearing retainer, put its upper screw in first. Leave the screw slightly loose. Press the lower end of the retainer downward and hook it into the elongated hole in the side frame. Replace the lower screw. Tighten both screws.

Note: These tools must be used when disassembling the TP153700 platen hub in order to hold the spring loaded pins in place when the feed cam is replaced.

PLATEN (FRICITION FEED)

2.32 To Remove Platen: Remove the paper fingers or guide bracket assembly.

(a) Remove the spur gear from the left end.

(b) Remove the TP150719 and TP150720 platen bearing retainers.

(c) Hold off the detent bail and remove the platen.

(d) Remove the sprocket hub assembly from the platen assembly.

(e) Insert the TP153673 shaft tool into the hub and fasten it with the TP151346 screw.

(f) Remove the TP157286 clamp and TP153699 cam from the assembly.

(g) Insert the hub into the TP153797 retaining tool.

CAUTION: WHILE ROTATING THE HUB, THE NOTCH MUST BE COVERED TO PREVENT THE PINS FROM BEING RELEASED. SINCE THE PINS ARE SPRING LOADED, THEY CAN EJECT WITH CONSIDERABLE FORCE.

2.33 To Replace a Pin: Rotate the hub assembly within the retaining tool, with a tommy wrench inserted in the shaft tool, until the desired pin is opposite the notch in the retaining tool. A pin may then be removed or replaced. Grease pin cylinder liberally before inserting new pin.

2.34 To Replace Platen: Reverse the procedure used in removing it. When replacing the TP153686 right sleeve bearing, the chamfer side or side marked "O" must face the end of the shaft and the wide part placed toward the front of the unit. When replacing each platen bearing retainer, put its upper screw in first. Leave the screw slightly loose. Press the lower end of the retainer downward, and hook it into the elongated hole in the side frame. Replace the lower screw. Tighten both screws.
SELECTOR CAM-CLUTCH

2.35 To Remove Selector-Cam Clutch: Facing the right end of the typing unit, lift the TP152410 push lever reset bail from its cam, and move the push lever reset bail to the rear, latching it in the raised position on the push lever guide. Push the marking lock lever (and the blocked selector levers) to the left until the selector magnet armature latches the marking lock lever.

(a) Remove the screw which secures the selector clutch drum to the main shaft. Position the clutch cam disc so that the stop lug is in the uppermost position.

(b) Hold the start lever and spacing lock lever away from the selector cam-clutch assembly; grasp the selector cam-clutch by the clutch cam disc (not by the drum) and pull forward by rotating the cam-clutch slowly.

CAUTION: THE CAM-CLUTCH SHOULD NOT COME OFF THE MAIN SHAFT EASILY. DO NOT FORCE IT.

2.36 To Replace Cam-Clutch Assembly: Reverse the procedure used in removing it except as the cam-clutch approaches its fully installed position, move the trip shaft lever and the clutch latch lever so that they ride on their respective cams. Restore the push lever reset bail and the armature to their operating positions.

SELECTOR MECHANISM

2.37 To Remove Selector Mechanism: The cam-clutch assembly must first be removed from the main shaft. See 2.35.

(a) Remove the TP151658 screw that secures the selector mechanism to the TP152546 intermediate bracket on the code bar positioning mechanism.

(b) Remove from the selector mechanism the spring which connects with the common transfer lever on the code bar positioning mechanism.

(c) Remove the remaining three selector mounting screws and lift the selector from the main shaft bearing housing.

CODE BAR POSITIONING MECHANISM

2.38 To Remove Code Bar Positioning Mechanism: Unhook from the selector the spring attached to the common transfer lever and restore any operating push levers to the spacing position by raising the TP152410 push lever reset bail.

(a) Loosen the clamp screw on the TP150447 shift lever drive arm, and remove the two screws which mount the mechanism - one to the side frame and one to the selector mounting plate.

(b) Manipulate the transfer levers and TP152548 or TP152255 code bar shift bars while gently twisting the mechanism off the code bar shift bars.

2.39 To Replace Code Bar Positioning Mechanism on the typing unit: Rotate the main shaft to the stop position; push the code bar shift bars to the marking position. Manipulate the code bar shift bars and transfer levers so that the shift bars line up with their respective slots in the TP150525 bracket, and slide the shift bars through the slots, one at a time, leaving the bottom slot vacant.

RANGE FINDER ASSEMBLY

2.40 To Remove Range Finder Assembly: Remove the two screws and the nut that secure the range finder plate to the selector mounting plate. Move the TP152438 stop arm bail forward so that it disengages from the TP161342 start lever and clears the selector clutch disc, while rocking the range finder assembly back and forth as it is removed.

2.41 To Replace Range Finder Assembly: Reverse the disassembly procedure.

Note: For units equipped with the TP152897 bail lever guide, do not tighten the nut until the bail lever guide adjustment has been checked. See earlier design mechanisms in 573-115-700.

SELECTOR MAGNET ASSEMBLY

2.42 To Remove Selector Magnet Assembly: Remove the two screws and nut which mount the range finder to the selector.

(a) Remove the selector magnet cable from the coil terminal screws.

(b) Remove the two magnet assembly mounting screws and lift the assembly out.
1. GENERAL

1.01 Disassembly as outlined in this section covers a procedure for removing the principal subassemblies which make up the unit.

1.02 The technician should refer to the exploded views found in the appropriate parts literature for an illustration of the mechanism to be disassembled, for location and visual identification of parts and detailed disassembly and reassembly features.

1.03 Most maintenance, lubrication and adjustments can be accomplished simply by removing the subject component from the cabinet. If possible, disassembly should be confined to subassemblies, which can, in some cases, be removed without disturbing adjustments. When reassembling the subassemblies, be sure to check all associated adjustments, clearances and spring tensions.

1.04 If a part that is mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same shim pile-up can be replaced when the part is remounted.

1.05 Retaining rings are made of spring steel and have a tendency to release suddenly when being removed. Loss of these retainers can be minimized as follows: Hold the retainer with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the retainer. Rotate the screwdriver in a direction to increase the diameter of the retainer for removal.

1.06 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs in removing them.

1.07 Raise cabinet lid or enclosure cover and remove the typing unit from its base by removing the four screws that secure it to its keyboard or base. Remove the cable plug connector from the side frame. Lift the typing unit off.

Note: On sets equipped with a form supply container on the rear of the cabinet, rearward foot extensions should be in position on the cabinet. This prevents the cabinet from tilting when the typing unit is removed.

1.08 Assuming that the typing unit and keyboard base have been removed from the cabinet, remove the perforator from the base as follows:

(a) Loosen the set screws on the TP193565 coupling located on the rear of the shaft, slide the coupling and/or short shaft so as to disengage it. Remove the screw which fas-
Figure 1 - 28 Non-Typing Perforator - Chadless Tape (With Code Reading Contacts, Timing Contacts and Backspace Mechanism)

Figure 2 - 28 Typing Perforator - Chadless Tape (With Backspace Mechanism)
tens the TP156184 anchor bracket to the base. Remove the three screws which secure the reperforator to the base. Carefully lift the reperforator upward and tilt to one side.

(b) Disconnect the wires from the backspace magnet, and remove the unit from the base.

2. DISASSEMBLY AND REASSEMBLY

2.01 In removing a subassembly from the unit, the procedure followed and the location from which parts are removed must be carefully noted so that reassembly can be done correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing it.

PUNCH AND MAGNET ASSEMBLIES AND BACKSPACE MECHANISM

2.02 To remove the punch and magnet assemblies and backspace mechanism unhook the TP90573 perforator drive link spring and disengage the TP192709 link. Remove three mounting screws that fasten the TP156024 rear plate to the TP159472 main plate.

(a) Remove the three screws which hold the TP159472 perforator main plate to either the TP158169, TP159861 nontyping or typing perforator frame, and one screw that anchors unit to base.

(b) Disengage the TP159961 eccentric arm and the assemblies will come free as a unit.

RIBBON FEED MECHANISM (TYPING PERFORATOR ONLY)

2.03 Remove the ribbon and then remove the two mounting screws that hold the ribbon mechanism.

TRANSFER MECHANISM (TYPING PERFORATOR ONLY)

2.04 Remove the TP150241 main trip lever spring and two mounting screws.

TYPING MECHANISM (TYPING PERFORATOR ONLY)

2.05 Remove the TP156872 operating blade from the rocker bail assembly by removing the two mounting screws, lockwashers, washers and shims that hold the mechanism.

Disconnect the TP159512 printing trip link by removing the retaining ring that secures it to the hammer accelerator. Remove the nut, lockwasher, washer and TP156936 eccentric on the rocker ball assembly and disconnect the TP159526 oscillating drive link. Remove the TP95378 spring from the TP156478 accelerator and the TP90606 spring from the TP156252 lifter.

2.06 Remove the screw and washer that fasten the TP159434 lifter plate to the TP162862 bar on the frame. Remove the screw and lockwasher that secure the TP159525 axial bracket to the TP159404 post on the frame. Remove the screw, lockwasher and flat washer that fasten the TP159487 function box front plate to the TP159472 main plate. Remove the TP119653 retaining ring from the TP159659 eccentric shaft; and remove the TP151629 nut, TP159536 idler gear, TP159659 shaft and lockwasher by removing the TP159658 mounting screw. Remove the three screws, lockwashers and flat washers that secure the TP159535 front plate to the frame. Remove the typing mechanism from the frame assembly. To remount the typing mechanism, reverse the procedure used to remove it.

2.07 To remove function box mechanism, remove the mounting screw, lockwasher and flat washer from the TP159535 front plate. Remove the function box from the typing mechanism.

2.08 To remove the axial plate assembly, remove the TP3870 correcting drive link spring. Remove the TP156413 correcting drive link by removing the TP119651 retaining ring. Remove the TP119649 retaining ring and disconnect the TP156869 ribbon guide from the TP156870 ribbon oscillating lever.

(a) Remove the three mounting screws and lockwashers from the axial plate assembly. Remove the axial plate assembly.

(b) To remount the axial plate assembly reverse the procedure used to remove it. The rearmost tooth of the rack on the TP156232 typewheel shaft must mesh with the rearmost tooth space in the TP156294 axial sector, and the forward tooth on the sector must mesh with the second tooth space on the shaft; there is an extra tooth space on the forward portion of the shaft's rack.
2.09 After the function box mechanism and axial plate assembly have been removed, the remainder of the typing mechanism is the front plate assembly.

2.10 After the typing mechanism has been removed, the following remain on the frame assembly: The function clutch trip assembly, the two shaft assemblies and the rocke bail assembly (typing perforator only).

2.11 To remove pushbars after removing the typing mechanism, remove the function box mechanism from the typing mechanism. Remove the pushbar by disengaging the pushbar rack from its associated pinion.

2.12 The correct gear tooth engagement of racks for pushbars 1 through 5 is as follows: In assembling the pushbars to the various eccentric assemblies, great care must be exercised to assure the correct rack-pinion gear mesh. The correct mesh is such that the first tooth on the pinion and the first tooth space on the rack are meshed. On later units this is identified by a mark on the pushbar and a mark on the eccentric. The last tooth on the pinion and the last tooth space on the rack should therefore also mesh.

CAUTION: MISALIGNMENT OF THE MESH BY AS LITTLE AS ONE TOOTH WILL PRODUCE A JAM IN THE MACHINE AND CAUSE PART BREAKAGE IF THE MACHINE IS PUT UNDER POWER WHILE THIS CONDITION EXISTS.

2.13 The assembly of the "Letters" and "Figures" pushbars to the left eccentric assembly must follow the assembly of the detents on the same eccentric. Starting with the left eccentric in the lower detented position, locate the gear tooth of the pinion which is at top dead center. (Using the oil hole in the eccentric housing as a reference may help since it is located at top dead center.) The first tooth space of the rack of the "Letters" pushbar must engage the tooth located directly below. This requirement is met when the indicating mark on the pushbar and eccentric shaft are in the line. Pull the "Letters" pushbar all the way on the pinion. The eccentric shaft should now be in the upper detent position. Now locate the tooth at bottom dead center. The first tooth space of the "Figures" pushbar should engage the tooth just located. The full travel of either pushbar should result in the eccentric shaft being rotated from one detented position to the other without jamming. As before, a misalignment of the mesh by one tooth will cause a jam and parts breakage if the machine is put under power while this condition exists.

ROCKER BAIL ASSEMBLY

2.14 Disconnect the TP156937 printing drive link by removing the retaining ring at its left end. Remove the nut, lockwasher, flat washer, felt washer, bushing and screw from the TP156871 operating blade mounting bail.

2.15 Remove the nut, lockwasher and remove the TP156366 rocker bail shaft. Remove the rocker bail.

MAIN SHAFT ASSEMBLY

2.16 Remove the spring from the TP158172 function clutch latchlever. Remove the retaining ring, spring washer and flat washers from the forward end of the TP154397 main shaft.

2.17 Remove the screw and lockwasher from the TP158184 function clutch drum. Remove the screw and lockwasher from the TP173340 collar. Remove the screw and lockwasher from the TP158745 bearing clamp.

2.18 Pull main shaft out of rear of unit, removing the cam-clutch and collar.

Note: When the main shaft is inserted in the cam-clutch, hold the latter firmly so that the drum is not pushed off the clutch. Compress the drum and cam disc together so that holes in the drum and clutch bearings are aligned.

POWER DRIVE BACKSPACE MECHANISM

2.19 To remove the power drive backspace mechanism, unhook the TP84575 spring from the TP159958 drive link latch.

(a) Loosen the screw on the TP159960 eccentric and pull the TP159961 eccentric arm off the TP159963 hub.

(b) Disengage the eccentric arm from its guide between the TP159958 latch and TP159955 drive link.

(c) Unscrew the TP159956 post from between the TP159954 adjusting link and the front punch frame, and remove the link and latch assembly.

(d) Remove the two screws on the front punch frame and extract the magnet assembly.

MANUAL BACKSPACE MECHANISM

2.20 To remove the manual backspace mechanism, unscrew the two screws which hold the TP159900 plate to the rear punch frame and remove the TP159902 rake shaft. Remove the two screws and TP159916 eccentric from the TP159987 bracket on the left side of the punch front plate. Remove the TP159903 crank assembly.
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1. GENERAL

1.01 This section provides disassembly and reassembly for the 28 typing reperforator and tape printer units. It is revised to include recent engineering changes, additions, and to rearrange the text. Since this is an extensive revision, marginal arrows ordinarily used to indicate changes have been omitted.

1.02 Disassembly as outlined in this section covers a procedure for removing the principle subassemblies which make up the unit.

1.03 Refer to the exploded views found in the appropriate parts literature for illustrations of the mechanisms to be disassembled, for location and visual identification of parts and detailed disassembly and reassembly features.

1.04 Most maintenance, lubrication and adjustments can be accomplished simply by removing the unit from the base. If possible, disassembly should be confined to subassemblies, which can, in some cases, be removed without disturbing adjustments. When reassembling the subassemblies, be sure to check all associated adjustments, clearances and spring tensions.

1.05 If a part that is mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same shim pile-up can be replaced when the part is remounted.

1.06 Retaining rings are made of spring steel and have a tendency to release suddenly when being removed. Loss of these retainers can be minimized as follows: Hold the retainer with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the retainer. Rotate the screwdriver in a direction to increase the diameter of the retainer for removal.

1.07 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs in removing them.

2. DISASSEMBLY AND REASSEMBLY

2.01 To remove the selector mechanism:

(a) Remove the screw, lockwasher, and nut from the TP150001 selector clutch drum. Place the TP152410 reset bail in its raised position. Holding the TP152432 stop arm and the TP152405 marking locklever to the left, grasp the cam-clutch by the cam disc (not by the drum) and pull forward rotating the cam-clutch slowly. The cam-clutch should come off easily.

CAUTION: DO NOT FORCE.

(b) Unhook the function clutch latchlever spring. Remove the TP156472 spring post by removing its nut and lockwasher. Remove the screw and lockwasher that pass through the TP156867 frame and the TP152400 selector mounting plate into the TP152402 selector lever guide. Remove the TP152457 oil wick, screw, lockwasher and TP159467 wick holder. Remove the selecting mechanism.
Figure 1 - 28 Typing Reperforator Unit with Remote Control Blank Tape Feed-Out Mechanism (Fully Perforated Tape)
Figure 2 - 28 Tape Printer Unit With Manual Letters Tape Feed-Out Mechanism
2.02 To remove ribbon feed mechanism:
Remove the ribbon, two mounting screws and lockwashers; remove the ribbon feed mechanism.

2.03 To remove perforator mechanism:
(a) Remove the TP90573 spring and disconnect the TP192709 perforator drive link from the TP156884 rocker arm.
(b) Remove the TP159621 shoulder screw with lockwasher from the TP159622 clamp. Remove the two mounting screws, lockwashers and flat washers, that fasten the TP156024 rear plate to the TP159472 main plate. Remove the perforator mechanism.

Note: When remounting the perforator mechanism, make certain that the TP156059 reset bail fits in the fork of the TP159430 reset bail trip lever and that the print hammer fits in its slot in the mechanism.

2.04 To remove transfer mechanism:
Remove the TP49084 main trip lever spring. Remove the mounting screws, lockwashers and flat washers from the TP159488 transfer mounting bracket. Remove the transfer mechanism.

2.05 To remove the typing mechanism:
(a) Remove the TP156872 operating blade from the rocker bail assembly by removing the two mounting screws, lockwashers, flat washers and shims. Remove the retaining ring and disconnect the TP159512 printing trip link. Remove the nut, lockwasher and flat washer from the TP156396 eccentric on the TP156368 rocker bail and disconnect the TP159526 oscillating drive link. Remove the spring from the TP156478 accelerator and the spring from the TP156252 function blade lifter.
(b) Remove the screw with lockwasher that fastens the TP159434 lifter plate to the TP156474 mounting bar on the frame. Remove the screw and lockwasher that secure the TP159525 axial bracket to the TP159404 post on the frame. Remove the TP156859 idler gear eccentric shaft, the TP159536 idler gear, the TP151629 special nut and lockwasher by removing the TP159658 mounting screw. Remove the three screws, lockwashers and flat washers that secure the TP159535 front plate to the frame. Remove the typing mechanism from the frame assembly.

2.06 To remove the function box mechanism:
Remove the mounting screw, lockwasher, and flat washer, that pass through the TP156316 function box rear plate and the TP159483 spring bracket into the TP159535 front plate. Remove the function box from the typing mechanism.

2.07 To remove the axial plate assembly:
(a) Remove the TP3870 correcting drive link spring. Remove the TP156413 correcting drive link by removing the retaining ring from the TP156378 axial correcting plate. Remove the retaining ring and disconnect the TP156889 ribbon guide from the TP156870 ribbon oscillating lever. Remove the screw and lockwasher that fastens the TP159525 axial plate to the TP160943 typewheel shaft housing.
(b) Remove the three mounting screws and lockwashers from the TP159525 axial plate. Remove the axial plate assembly.

Note: To remount the axial plate assembly, reverse the procedure used to remove it. The last tooth on the typewheel shaft shall mesh with the last full (there may be a partial space at the rear of the sector, if so, disregard it) tooth space of the TP156294 gear sector. Also, the first tooth of the gear sector shall mesh with the second tooth space on the typewheel shaft. There is an extra tooth space on the forward portion of the typewheel shaft. The correct axial output rack sector engagement is when the last tooth on the TP156313 axial output rack and the last tooth space of the TP156294 gear sector shall mesh. Also, the first tooth of the axial output rack and the first tooth space on the gear sector shall mesh.

2.08 To remove the rocker bail assembly:
(a) Disconnect the TP156937 printing drive-link by removing the retaining ring at its left end. Remove the nut, lockwasher, flat washer, felt washer, bushing, and screw from the TP156871 operating blade mounting ball.
2.09 To remove main shaft assembly:

(a) Remove the spring from the TP150355 clutch latch lever. Remove the retaining ring, spring washer and flat washers from the forward end of the TP154397 main shaft.

(b) Remove the screw and lockwasher (if present) from the TP150000 function clutch drum. Remove the screw and lockwasher from the TP173340 collar. Remove the screw and lockwasher from the TP158745 bearing clamp. Pull the main shaft out of rear of unit, removing the cam clutch and the collar.

(c) Note the location of the main shaft TP154398 needle bearings as shown in the parts section. Move the main shaft toward the rear of the unit a small amount at a time and exercise care not to drop or contaminate the 20 needle bearings in each race. A rubber band, string, or spring may be stretched around the shaft and needle bearings with the ends of the spring hooked together. The spring in conjunction with the grease will hold the needle bearings in place.

(d) To replace this type of main shaft assembly reverse the procedure used to remove it. Make sure the needle bearings are clean. Lubricate the race and bearings with TP195298 (Beacon 325) grease or its equivalent. Apply a liberal amount of KS7470 oil at each end of the bearing sleeve. When the main shaft is inserted into the cam clutch, hold the cam clutch firmly so that the drum is not pushed off the clutch, and compress the drum and cam disc together so that the holes in drum and clutch bearings are aligned.

2.10 To remove pushbars: Remove the typing mechanism. Remove the function box mechanism from the typing mechanism. Remove the pushbar by disengaging the pushbar rack from its associated pinion.

2.11 The correct gear tooth engagement of racks on pushbars is as follows:

(a) When assembling the pushbars (no. 1 to no. 5 inclusive) to the various eccentric assemblies, great care must be exercised to assure the correct rack-pinion gear mesh. The correct mesh is such that the first tooth space on the rack is meshed. On later units this is identified by a mark on the pushbar and a mark on the eccentric. The last tooth on the pinion and the last tooth space on the rack should therefore also mesh. Misalignment of the mesh by as little as one tooth will produce a jam in the machine and cause part breakage if the machine is put under power while this condition exists.

(b) The assembly of the letters and figures pushbars to the left eccentric assembly must follow the assembly of the detents on the same eccentric. Starting with the left eccentric in the lower detented position, locate the gear tooth of the pinion which is at top dead center. (Using the oil hole in the eccentric housing as a reference may help since it also is located at top dead center.) The first tooth space of the rack of the letters pushbar must engage the tooth directly below. This requirement is met when the indicating mark on the pushbar and eccentric shaft are in line. Pull the letters pushbar all the way on the pinion. The eccentric shaft should now be in the upper detented position. Now locate the tooth at bottom dead center. The first tooth space of the rack on the figures pushbar should engage the tooth just located. The full travel of either pushbar should result in the eccentric shaft being rotated from one detented position to the other without jamming. As before, a misalignment of the mesh by one tooth will cause a jam and parts breakage if the machine is put under power while this condition exists.
1. GENERAL

1.01 This section provides instructions for disassembly and reassembly of the 5- and 6-level, single contact, 28 transmitter distributor unit (Figure 1). These instructions outline a procedure for removing from the unit components or subassemblies, i.e., tape guideplate assembly, rear plate assembly, main shaft assembly, and center plate assembly.

1.02 Most maintenance, lubrication, and adjustments can be done by removing the transmitter distributor from its base. If possible disassembly should be confined to the components or subassemblies which can, in most cases, be removed without disturbing the adjustments. However, when reassembling the unit, check all associated adjustments, clearances, and spring tensions.

CAUTION: DISCONNECT EXTERNAL AC OR DC POWER SOURCE BEFORE WORKING ON TRANSMITTER DISTRIBUTOR UNIT.

2. DISASSEMBLY AND REASSEMBLY OF UNIT

2.01 To remove the coverplate assembly, lift the coverplate from its detented position.

1.03 To facilitate adjustments on earlier models, a generous length of cable is provided between the unit and its terminal block to allow rotation or inversion of the unit. The ac or dc potential must be disconnected from its power source. Later model units plug into position on their bases.

1.04 Exercise care when replacing the unit to keep the cable free of any moving parts. For a more detailed illustration of the units, refer to the appropriate 28 transmitter distributor parts section.

1.05 Retaining rings are of spring steel and have a tendency to release suddenly. The loss can be minimized by holding the ring with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the ring. Rotate the screwdriver in a direction to increase the diameter of the ring. The retaining rings should come off easily without flying.

1.06 If a shim mounted part is removed, note the number of shims used at each mounting point so that the same shim pile-up can be replaced when the part is reassembled.

1.07 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs while removing them.

1.08 Remove three screws that secure the transmitter distributor unit to the base and lift unit free. On earlier models remove cable connections from the terminal board and cable clamps from the base.
Figure 1 - Typical Transmitter Distributor (Cover Plate Removed)

Figure 2 - Plate Assemblies
2.02 To replace the coverplate assembly, align the ends of the coverplate and top plate, slide the tips of the plate spring under the edge of the top plate, and snap the cover plate down into its detented position.

**TOP PLATE**

2.03 To remove top plate, loosen the front and rear mounting screws (Figure 2) and lift the plate upward.

2.04 To replace the top plate, guide the mounting screws into the notch of the front and rear plates. Align the sensing pins and feed wheel with their respective slots. Refer to TOP PLATE adjusting procedure if the plates do not align.

**TAPE GUIDEPLATE**

2.05 To remove the tape guideplate, loosen the front and rear mounting screws and slide the plate upward (Figure 2).

2.06 To replace the tape guideplate, guide the mounting screws into the respective notch of the front and rear plates while guiding the tape-out pin into its notch and locating the sensing pins against the left edge of the tape guideplate. Refer to TAPE GUIDEPLATE adjusting procedure.

**OIL RESERVOIR**

2.07 To remove the oil reservoir, remove the screws that secure the casting and lift the assembly upward and toward the right.

2.08 To replace the oil reservoir, reverse the procedure.

**REAR PLATE ASSEMBLY**

2.09 To remove the rear plate assembly:

(a) Remove cable assembly leads from start-stop contact assembly and magnet assembly.

(b) Remove hex nuts and lockwashers from bottom posts.

(c) Remove main shaft retaining ring.

(d) Remove screws TP151630 securing plate to post TP156622.

(e) Remove the two screws which secure the clutch trip magnet assembly bracket to the rear plate and remove clutch trip magnet assembly.

(f) Remove rear plate assembly from the remainder of the unit.

2.10 To replace the rear plate assembly, reverse the procedured steps.

**MAIN SHAFT ASSEMBLY**

2.11 To remove the main shaft assembly:

(a) Remove the clamp TP156831 and plate TP156832 from the front plate assembly.

(b) Remove the main shaft assembly.

2.12 To replace the main shaft assembly, replace in the reverse order.

**CENTER PLATE ASSEMBLY**

2.13 To remove the center plate:

(a) Remove the post TP156622.

(b) Remove the two nuts which secure the center plate to the two guide posts.

(c) Remove the spring TP7603.

(d) Remove the center plate assembly.

2.14 To replace the center plate assembly, reverse the procedured steps.

2.15 When reinstalling the transmitter or transmitter distributor unit on the base, adjust the gear backlash as outlined in the section, 28 Transmitter Distributor Unit (LXD) — Adjustments.