

14 REPERFORATOR-TRANSMITTER
REQUIREMENTS AND ADJUSTMENTS

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1. GENERAL

1.01 This section contains the specific requirements and adjustments for 14F and 14G reperforator-transmitter units designed for operation at speeds of 60 or 75 wpm. The material in this section, together with that in the section giving the general requirements for teletypewriter apparatus, provides the complete adjusting information for the maintenance of these units.

1.02 This section is reissued to include the timing requirements shown in 3. of this section.

1.03 The information given in this section is arranged so that the adjustments are in the sequence that should be followed if a complete readjustment of a unit were being made,

and applies to both the 14F and 14G reperforator-transmitter units unless otherwise indicated. The 14F transmitter-distributor unit differs from the 14G only in that the 14F unit is equipped with control contacts operated by special pull-bars.

1.04 References to left or right, front or rear, and top or bottom refer to the unit, or its component mechanisms, in its normal operating position with the punching and printing mechanisms directly in front of the viewer.

1.05 To Prevent Lost or Garbled First Characters After a Period of Shutdown: It is particularly important that the specified method of readjusting the mainbail adjusting screw be strictly followed.

1.06 Selecting a Character or Function: When the instructions for making an adjustment specify the setting-up of a certain character or function, the following method should be used: rotate the motor fan counterclockwise, as viewed from the fan, until the selector-armature locking lever is about to drop off the long, high part of the locking cam. Hold or release the selector armature as necessary to move the selector-arm extension to the operated (Marking) or unoperated (Spacing) side in accordance with the first selecting impulse of the code combination to be set up. With the selector arm in this position, rotate the motor fan until the top (No. 1) selector sword has been positioned and the locking lever is on the peak of the locking cam. Position the selector arm in accordance with the second impulse of the code combination to be set up and repeat the procedure followed in positioning the top selector sword. Position all of the selector swords in accordance with the foregoing procedure. When all swords have been positioned and the main-shaft clutch has been engaged, further rotation of the motor fan will cause the unit to select the character to perform the functions which have been set up.

1.07 To Provide Unshift on LTRS Only: Standard 14F and 14G reperforator-transmitter units are equipped to unshift on either LTRS or Space. In order to provide for unshift on LTRS only, it is necessary to transfer the Space pullbar from its slot in the pullbar guide to the notch adjacent to the slot.

Note 1: All units manufactured since 1930 are equipped with pullbar guides having these notches.

Note 2: On 14 reperforator-transmitter units equipped with pullbar guards and short spring brackets, it will be necessary to loosen (but not to remove) the pullbar guard and the spring bracket associated with the Space pullbar in order to transfer the Space pullbar from its slot to the adjacent notch without damaging the parts involved.

1.08 To Move the Motor Unit: To facilitate some adjustments, the motor unit should be moved in the following manner: remove the gear guard; remove the right and the rear, left mounting screws from the motor unit baseplate; loosen the left, front mounting screw; and swing the motor unit to the left.

Note: After all adjustments which are facilitated by moving the motor have been completed, the motor should be swung back into position and the gear guard reinstalled. Before tightening the motor base-plate mounting screws, make certain that the motor pinion meshes with the gear on the main shaft and make sure that the baseplate is resting against the eccentric stop on the right side.

2. REQUIREMENTS AND ADJUSTMENTS

2.01 Selector Cams shall line up with their respective selector levers.

Gauge by eye while the selector cam sleeve is rotated through at least one complete revolution.

To Adjust: Loosen the upper and lower main-shaft bearing-cap mounting screws, and raise or lower the shaft. Tighten the upper bearing-cap mounting screws and position the bearing retainer on the lower bearing cap so that the bridge of the retainer rests against the upper face of the ball bearing, and clears the lower bearing-cap mounting screws. See Figure 1.

2.02 Main-shaft-clutch Throwout-lever: There shall be a clearance as indicated in Figure 1 between the clutch teeth when the driven-clutch member is fully cammed out of engagement.

To Gauge: Open and close the signal line with the motor running, then stop the motor.

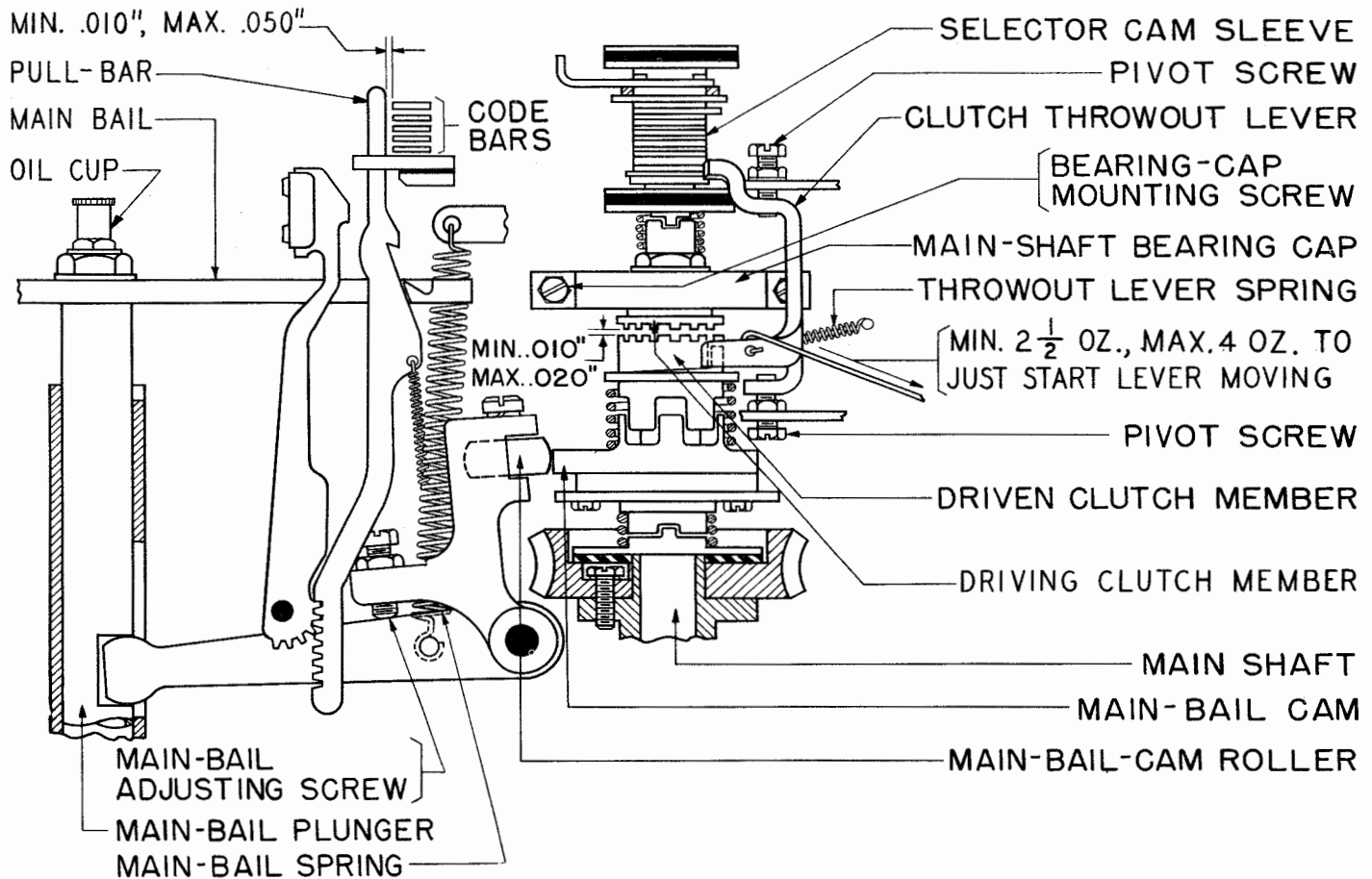


Figure 1

To Adjust: Position the clutch throwout-lever pivot screws to meet the requirement. The throwout lever should be free on its bearings with some endplay, not more than 0.002 inch, when the pivot-screw locknuts are tightened.

2.03 Main-shaft-clutch Throwout-lever Spring: It shall require a pull as indicated in Figure 1 to start the clutch-throwout lever moving.

To Gauge:

- (1) Position the main shaft so that the throwout lever is resting against the low part of the driven-clutch member.
- (2) Hook the pull end of the scale over the throwout lever at the spring hole and pull at a right angle to the lever.

2.04 Main-shaft-clutch Spring: With the teeth of the driven-clutch member resting against the teeth of the driving member, but not engaged, hook a scale over the throwout cam on the driven-clutch member and pull as nearly in line with the shaft as possible. It shall require a pull as indicated in Figure 2 to separate the clutch teeth.

Note: The 75-wpm spring, which has the higher spring compression, can be identified by an end turn that is painted yellow.

To Gauge:

- (1) Turn the main shaft until the throwout lever is resting against the low part of the driven-clutch member.
- (2) With the base plate removed, insert the pull end of the scale through the cable hole in the base and hook it over the throwout cam on the driven-clutch member, then pull as shown in Figure 2. Remount the base plate.

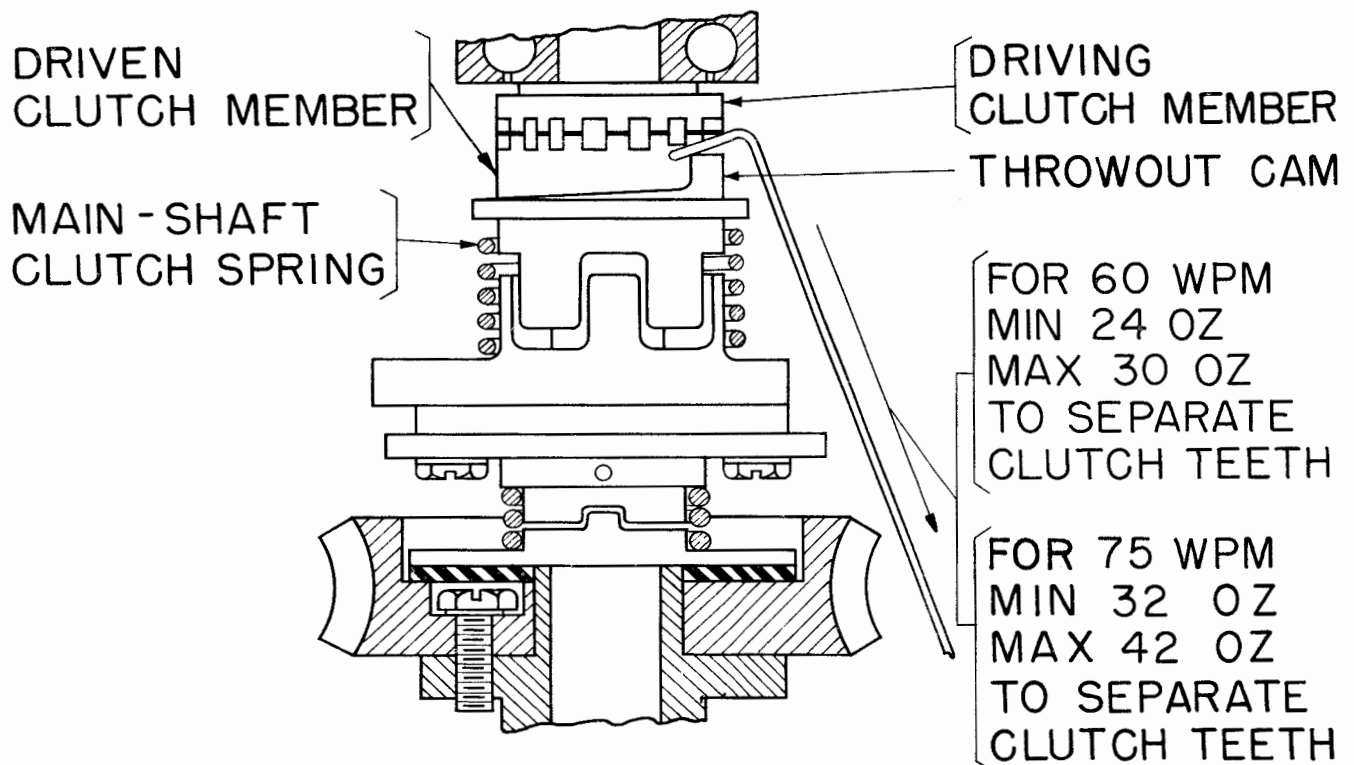


Figure 2

2.05 Motor Position and Gear Mesh:

(a) With the motor base-plate eccentric-stop approximately in the center of its adjustment and the base plate resting against the stop, a horizontal center line through the main-shaft gear shall coincide approximately with a horizontal line through the center of the pinion.

To Adjust: Add or remove shims between the motor feet and the base plate, using the same number of shims under each motor foot. Shims not used should be retained beneath their respective mounting-screw lockwashers to prevent the screws from protruding beneath the base plate.

(b) There shall be a barely perceptible amount of backlash between the motor pinion and the main-shaft gear throughout one complete revolution of the gear.

To Adjust: Loosen the motor mounting-screws and align the motor on the base plate.

Note: The gear play may be refined by pivoting the motor base-plate about the left-hand screw and adjusting the eccentric stop.

2.06 Tape-out Mechanism (Manual): The round tip of the clutch-release lever shall be approximately midway between the triplatch plunger and the bracket. The clutch-release lever shall not limit the upper range movement of the indicator arm on the range-finder scale. See Figure 3.

To Adjust: Loosen the setscrews in the collar under the clutch-release lever and raise or lower the lever by means of the collar.

2.07 Clutch-release Rod shall slide freely on its mounting screws. See Figure 3.

Gauge by eye and feel.

To Adjust: Loosen the front mounting-screw and raise the screw.

2.08 Clutch-release-rod Spring: It shall require a push as indicated in Figure 3 to start the clutch-release rod moving.

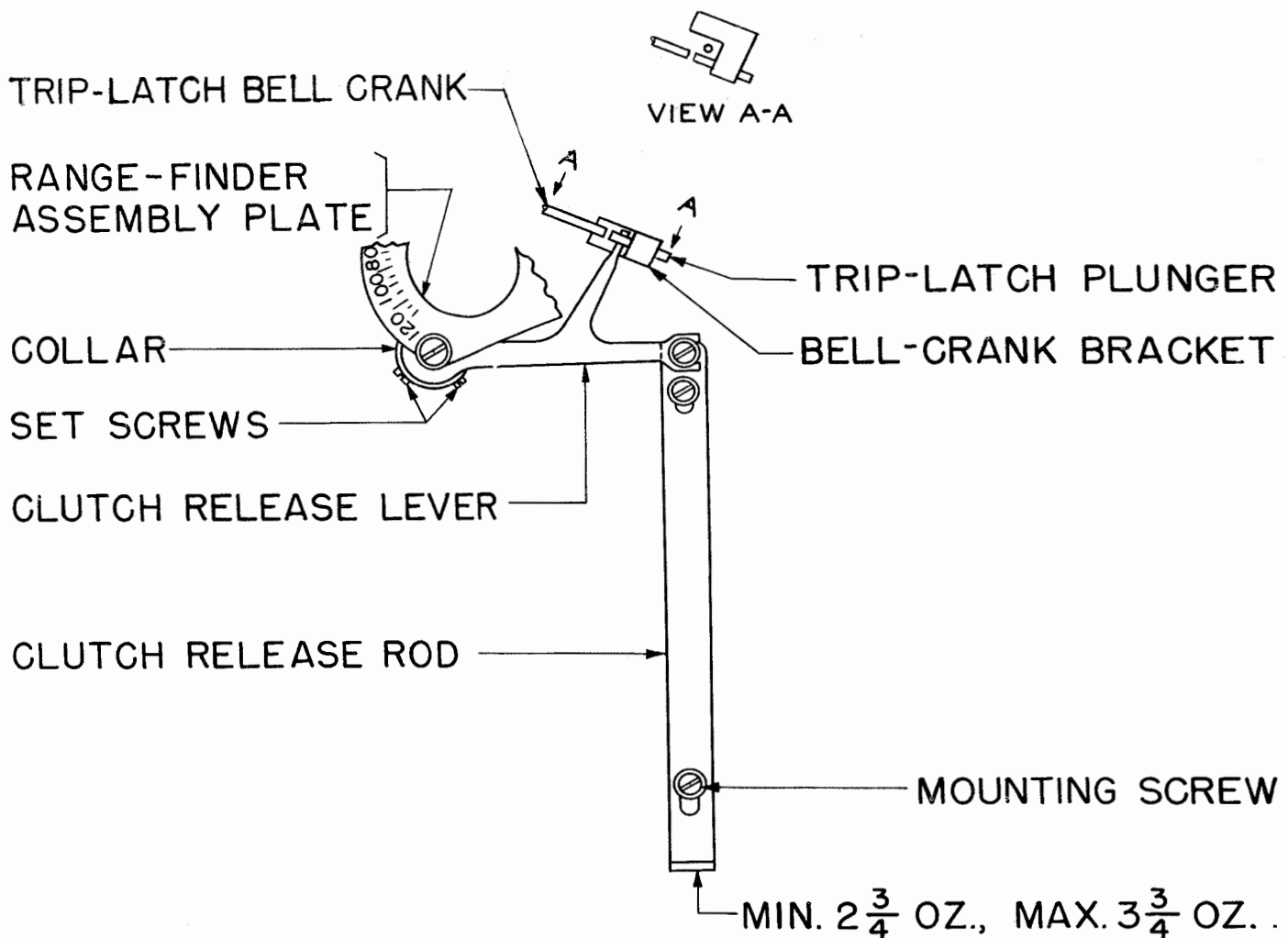


Figure 3

To Gauge: Apply the push end of the scale to the end of the clutch-release rod and push parallel to the rod.

2.09 Pullbars Supported by Function-bar-spring Brackets shall be free, without bind, and shall have approximately equal clearance between the corresponding edges of the function-bar-spring brackets. See Figure 4.

To Gauge: Remove the type basket as follows:

- (1) Remove the pullbar mounting-plate assembly (14F reperforator-transmitter unit only).
- (2) Unhook the codebar locking-lever spring and the space-pullbar spring. Set the

unit on its back supports and remove the base plate.

- (3) Remove the three code-punch-bracket mounting screws.
- (4) Remove the sensing and distributor clutch detent-lever-bracket assembly by removing its two mounting screws.
- (5) Remove the three type basket assembly mounting screws.
- (6) Unhook the punch-bail-arm spring located behind the punch-arm link.
- (7) Remove the ribbon spools and the ribbon.

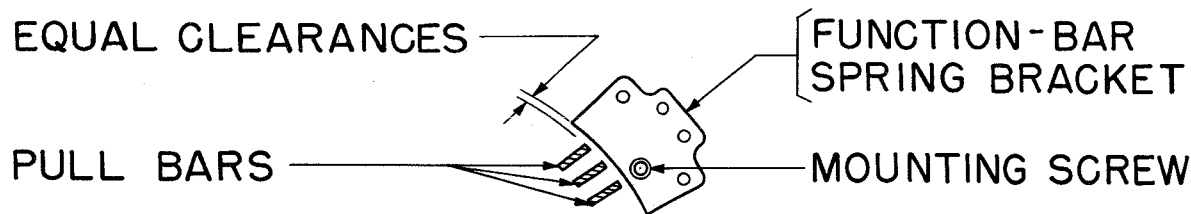


Figure 4

- (8) Remove the code-punch-block assembly rear mounting screw.
- (9) Remove the front mounting-screw of the right ribbon-spool bracket. Loosen the rear mounting-screw and swing the bracket so that the ribbon-spool cup will not interfere with the removal of the type basket.
- (10) Lift the code-punch-bracket assembly and the punch-block assembly out of the unit.
- (11) With the pullbars out of engagement with the pullbar guide, loop a piece of string or wire around the top of the pullbars and lift the assembly upward and out of the unit.

To Adjust: Align both the right and left brackets by rotating them on their mounting-screws.

2.10 Pullbar Springs: (Type basket removed per 2.09) It shall require a pull as indicated in Figure 5 to stretch the pullbar springs to position length. If trouble is experienced due to contact bounce, it may be necessary to select other springs of the same code number with tensions toward the high limit, not to exceed the applicable limit specified in Figure 5.

To Gauge: Unhook the pullbar springs from the pullbars, hook the pull end of the scale through the spring eye, and pull vertically.

To Adjust the function-pullbar springs located to the right and left side, see 2.37 and 2.38.

Note: Remount the type basket by reversing the procedure under 2.09, To Gauge.

2.11 Mainbail: (Motor moved out of the way)
The mainbail shall not bind throughout its entire travel. See Figures 6 and 7.

To Gauge:

- (1) Rotate the main shaft until the mainbail is in its highest position. Allow the bail to drop by removing the mainbail spring and holding the ribbon-feed-lever roller away from the mainbail plunger.
- (2) Block all pullbars out of the path of the mainbail. (A convenient way to do this is to place a length of solder wire between the pullbars and the codebars.)
- (3) Place a finger under the mainbail lever and slowly raise the mainbail to its highest position and release.
- (4) There should be no evidence of bind on the upward travel, and the bail should fall freely to its lowest position when released. The universal contacts may prevent the bail from falling to its lowest position, in which case, the contacts should be removed.
- (5) Rehook the mainbail spring.

To Adjust:

- (1) Position the pullbar guide so that its mounting screws are in the middle of the elongated slots and loosen the mounting screws of both mainbail roller-guides.
- (2) With the BLANK combination set up and the mainbail opposite the unselected-pullbar humps, shift the right roller-guide to obtain the same clearance between the mainbail and the LTRS and FIGS pullbar humps. Tighten the right roller-guide top mounting-screw frictiontight.

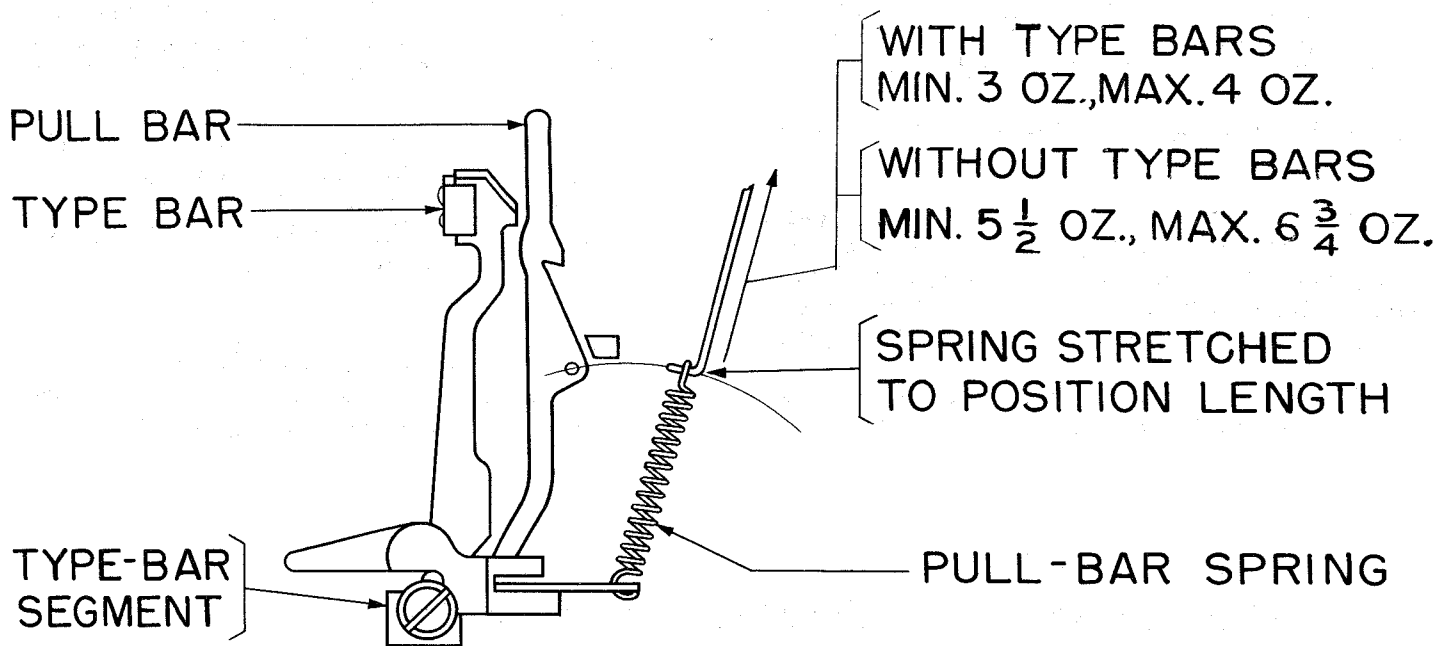


Figure 5

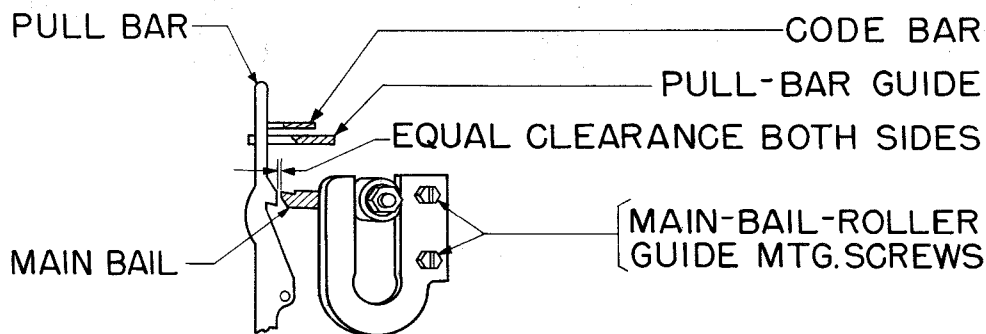


Figure 6

(3) With the mainbail cam-roller on the high part of its cam, adjust the mainbail adjusting-screw to give some clearance between the pullbars and the codebars. Shift the right roller-guide around its friction tight top mounting-screw to obtain approximately the same clearance between the codebars and the LTRS and FIGS pull-bars. Tighten the right roller-guide bottom mounting-screw friction tight and recheck adjusting Step (2). Tighten both right roller-guide mounting-screws after adjustments.

(4) Remove the mainbail spring and hold the ribbon-feed-lever roller away from the mainbail plunger. Position the left roller-guide so that the mainbail is free throughout its travel and tighten the left roller-guide mounting-screws. Check the freeness of the mainbail by raising it to its uppermost position manually and releasing it. It should fall of its own weight to its lowest position. Rehook the mainbail spring. Remount the universal contacts.

(5) If it has been necessary to make the preceding adjustment, check the requirements in 2.12, 2.13, and 2.43.

2.12 Pullbar Guide: (Motor moved out of the way)

- (a) There shall be a clearance as indicated in Figure 8 between the mainbail and the projections on the unselected pullbars. Where the mainbail plunger is equipped with an oilcup, the oilcup shall clear the pullbar guide.
- (b) There shall be a clearance as indicated in Figure 8 between the end of the No. 1

T-lever and the bottom of the slot in the code-bar measured at the point of closest approach. All other levers shall have some clearance.

To Gauge requirement (a), set up the BLANK and LTRS combinations in turn, position the mainbail opposite the pullbar hump, and take up the play of the mainbail in a direction to make the clearance a minimum.

To Adjust to meet the requirements in (a) and (b), align the pullbar guide by loosening its mounting-screws and moving the bar within its enlarged mounting holes.

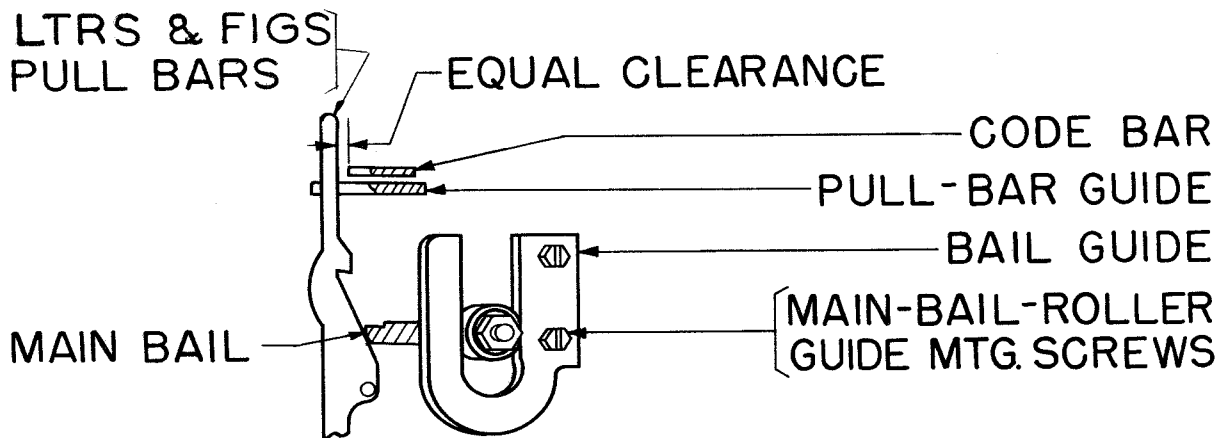


Figure 7

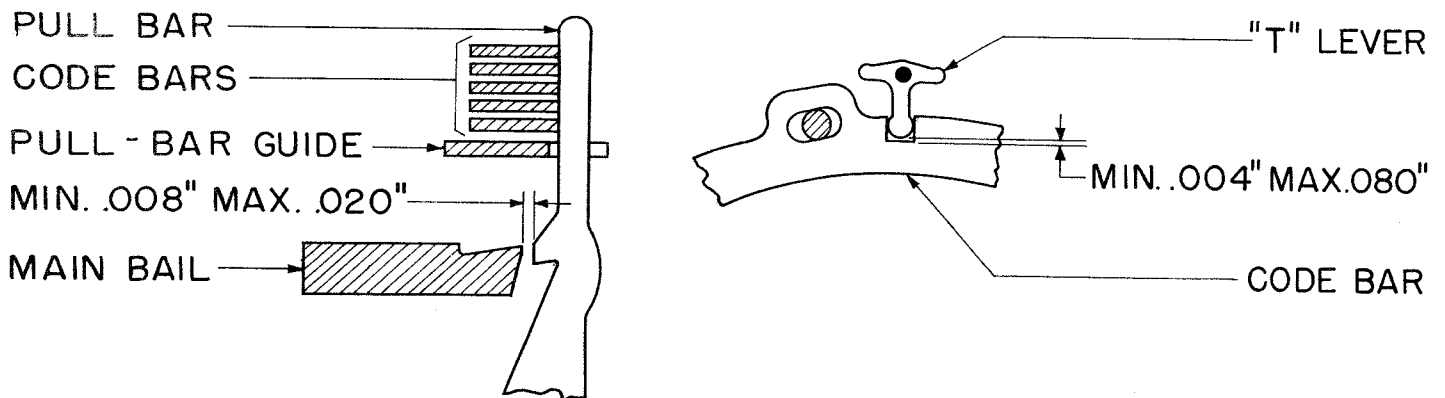


Figure 8

Note: When preceding requirements cannot be met, it may be necessary to readjust the mainbail roller-guides in accordance with 2.11.

2.13 Mainbail Adjusting-screw (Preliminary Adjustment): (Motor moved out of the way)

There shall be a clearance as shown in Figure 1 between the unselected pullbars and the projections on the codebars.

To Gauge: Set up BLANK and LTRS combinations in turn, have the mainbail roller on the high part of its cam, and the play in the mainbail and pullbars taken up to make the clearance a minimum.

To Adjust: Loosen the mainbail adjusting-screw locknut and position the screw. See Figure 1.

2.14 Codebar Bellcranks:

(a) The codebars shall move freely between the codebar-bellcrank separator-plates. See Figure 9.

To Adjust: Make certain that the vertical-link bracket is mounted approximately in a vertical position and align the codebar bellcranks with the codebars by shifting the vertical-link bracket up or down. When necessary, add or remove shims between the lower separator-plate and the shoulder on the pivot post.

(b) There shall be a clearance as indicated in Figure 10 between the right ends of the codebars and the adjacent edges of the associated codebar bellcranks when the codebars

are positioned for BLANK selection and the main shaft is rotated until the right ends of the codebars and the adjacent edges of the associated codebar bellcranks are at the point of closest approach.

To Adjust: Loosen the pivot-post locknut and move the pivot post horizontally in the elongated mounting holes in the vertical-link bracket. See Figure 9.

Note: When making the preceding adjustments, make certain that the extension of each codebar bellcrank fully engages the vertical link and at the same time does not overlap sufficiently to interfere with the adjacent vertical link. In addition, each codebar bellcrank should fully engage the end of the associated vertical link (vertically), but the upper end of any vertical link should not interfere with the free movement of the codebar bellcrank immediately above the one with which that vertical link operates.

2.15 Vertical-link Pivot Screw should be positioned to meet the following requirements:

Note: The codebar locking-lever shall not bind against the codebar bellcranks, with the mainbail in the lowermost position. If binding is encountered and cannot be removed by adjustment, it may be necessary to replace the selector fingers with TP117257 selector fingers which are slightly longer and have a notch on the flared-out portion mounting the retaining spring.

(a) The left end surfaces of the punch selector-fingers shall be in approximate alignment

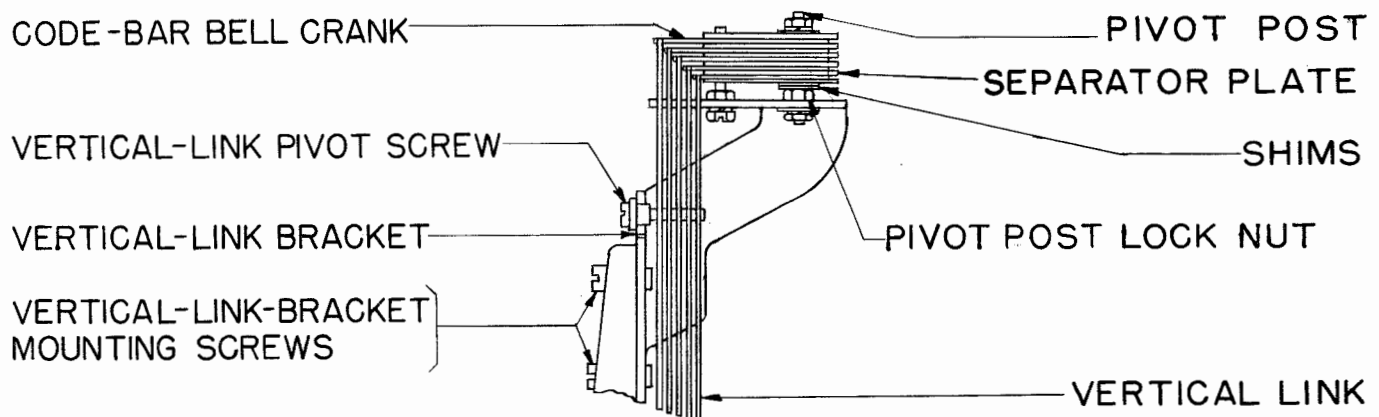


Figure 9

with the left vertical edge of the punches, when the codebars are positioned to the right (LTRS combination) and the codebar bellcranks are resting against the codebars. Fingers and punches shall meet squarely and at full surface when in operation. See Figure 11.

To Adjust: Position the vertical-link pivot screw in its elongated mounting hole. See Figure 9.

(b) The left end surface of each of the punch selector-fingers shall be approximately in line and at a right angle to the front surface of the code-punch bracket when the codebars are positioned to the right. See Figure 11.

To Adjust: With the TP103534 bending tool, twist that portion of the vertical-link bracket which mounts the vertical-link pivot screw. Hold the adjusting tool parallel to the base while twisting. Recheck (a). See Figure 9.

Note 1: Care should be exercised when bending the vertical-link bracket to avoid disturbing other parts of the bracket.

Note 2: After the foregoing requirements have been met, the checks given in (c) and (d) should be made.

(c) With alternate combinations for R (2-4) and Y (1-3-5) set up on the codebars and

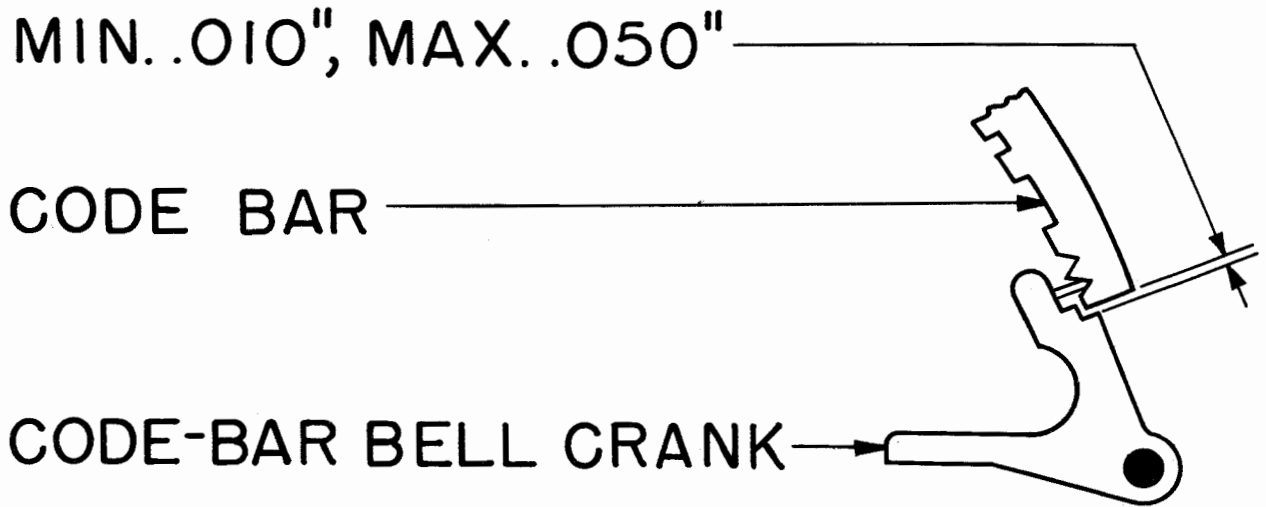


Figure 10

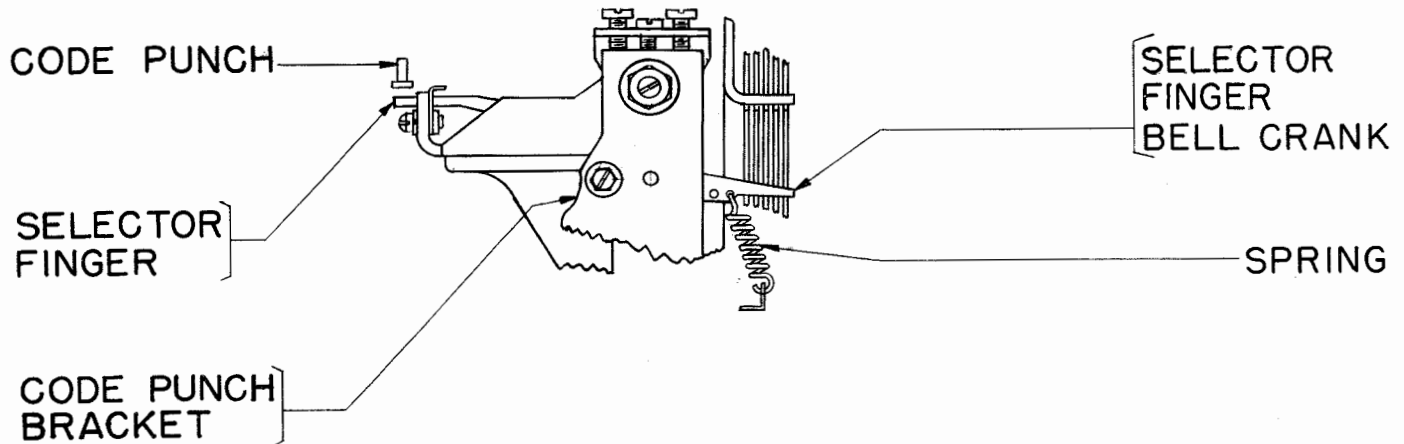


Figure 11

the punch-arm roller on the high part of its cam, there shall be a clearance of at least 0.020 inch between the left-end surface of the unselected punch-selector-fingers and the right end of the punches.

(d) With the codebars in the BLANK combination selection and the codebar locking-lever against the codebars, the left end of the punch selector-fingers shall be drawn not more than halfway through their guide slots in the punch bail. When these checks cannot be met, readjust (a) or (b), or both, as necessary.

2.16 Lower Vertical-link Bellcrank Separator Plates shall meet the following requirements with the mainbail in its lowermost position. See Figure 12.

(a) Separator plates without extension shall be approximately in line with each other horizontally.

(b) Separator plate with extension shall have minimum 0.005 inch, maximum 0.020 inch clearance between the top edge of the No. 1 bellcrank and the bottom of the extension at the closest point, and there shall be some clearance between the bottom side of the extension and the top edge of the other four bellcranks.

(c) Vertical parts of the bellcranks shall be retained by at least 1/3 their width within their guide slots when the horizontal end is held against the separator-plate extension.

To Adjust: Loosen the locknut on the bellcrank stud while holding the stud to prevent its loosening. Position the separator plates. If necessary, bend the plate extension to meet the requirements. Do not loosen the stud.

Note: Make certain that the locking pullbar does not bind against the codebar bellcranks when the mainbail is in its lowermost position.

2.17 Ribbon-spool Cups:

(a) The center of the left ribbon-spool-cup roller shall be positioned within the limits shown in Figure 13 from the surface of the boss on which the pivoted sensing-unit is mounted.

(b) The center of the right ribbon-spool-cup shall be positioned within the limits shown in Figure 13 from the surface of the boss on which the code-punch assembly is mounted.

To Adjust: Loosen the ribbon-spool-cup locknut and rotate the cup.

2.18 Ribbon-spool Brackets: Both left and right ribbon-spool cups shall be in line, and the right and left ribbon-drive-shaft bevel-gears shall have a minimum amount of endplay without binding when they are in mesh with their respective ribbon-feed-shaft bevel-gears. See Figures 14 and 15.

To Adjust: Loosen the right and left ribbon-spool-bracket locknuts and mounting screws and align the brackets.

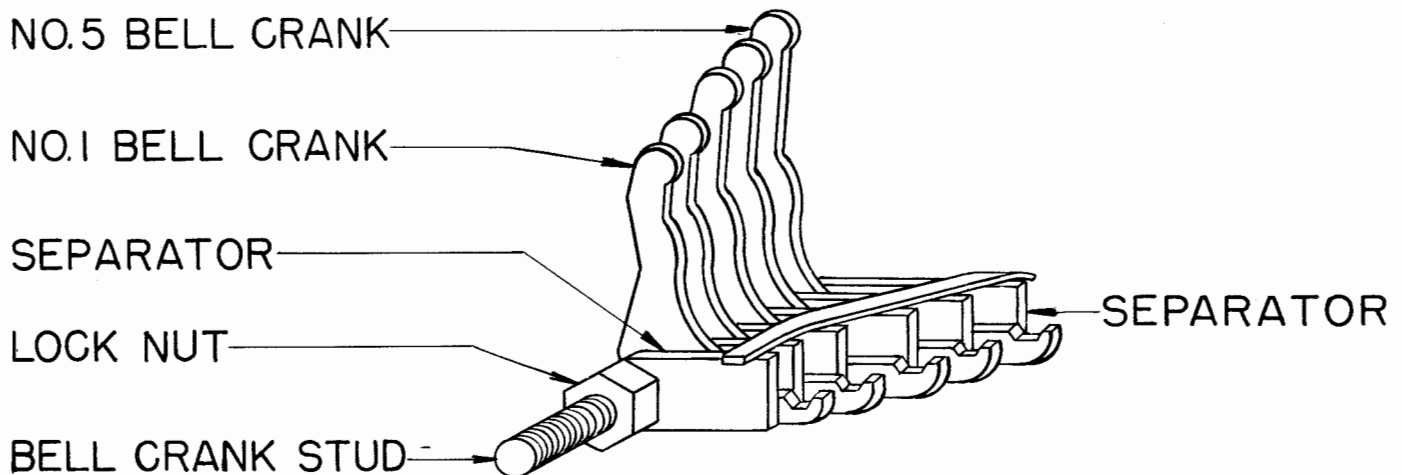


Figure 12

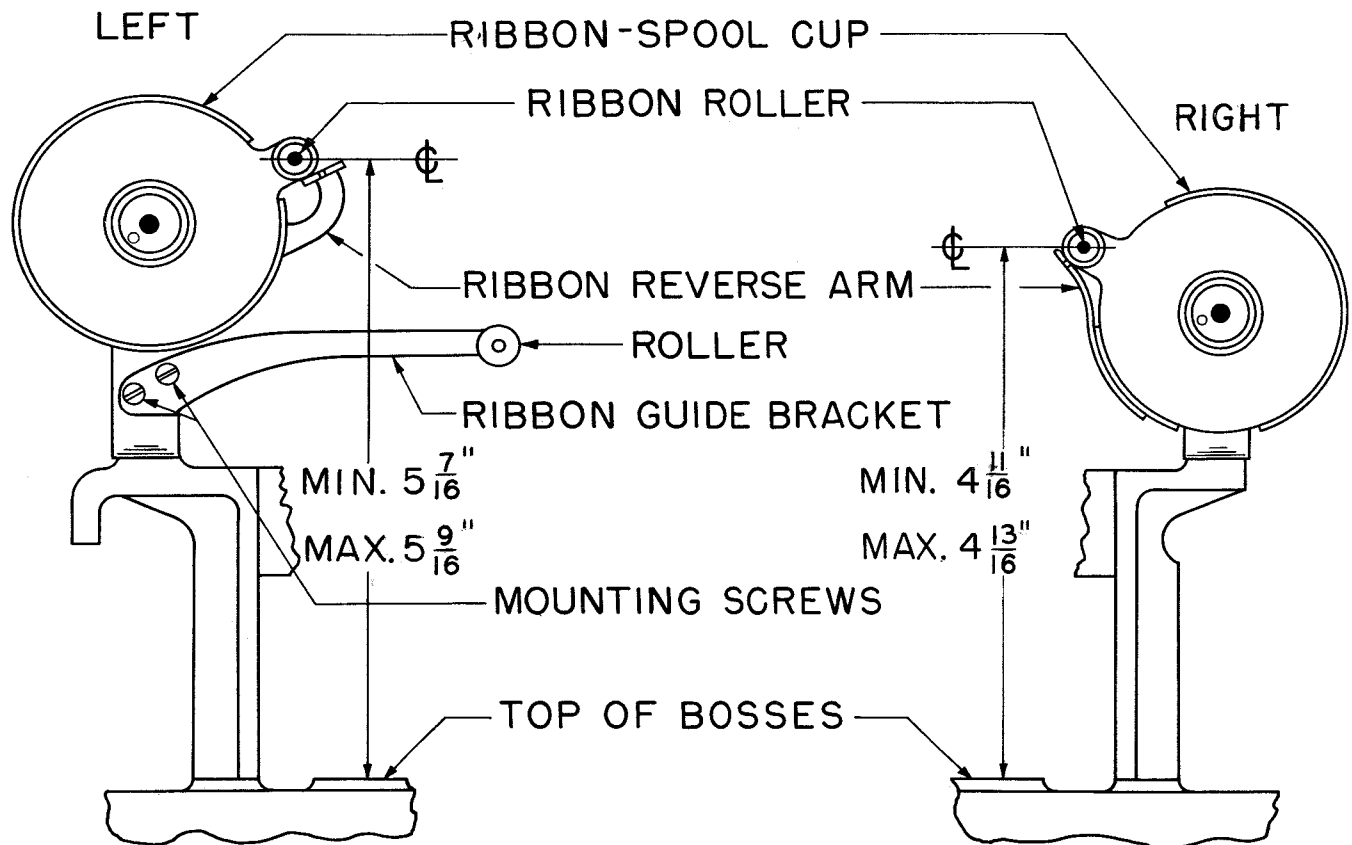


Figure 13

2.19 Left and Right Ribbon-spool Shafts shall have some endplay, not more than shown in Figures 14 and 15.

To Adjust: Loosen the ribbon-spool-shaft-gear setscrew and position the gears.

Note: Make sure that the ribbon-spool-shaft-gear setscrews rest upon the flat surface of the shafts after being tightened.

2.20 Left Ribbon-spool Drive-shaft shall extend approximately the same distance through the bevel gear as it does through the front of the ribbon-spool bracket. See Figure 14.

To Adjust: Loosen the ribbon-spool drive-shaft bevel-gear setscrew and position the gear.

2.21 Left Ribbon-spool Drive-shaft Drive-gear shall mesh fully with the intermediate gear. See Figure 14.

To Adjust: Loosen the drive-gear setscrew and position the gear.

Note: The intermediate gear should have some endplay and should run freely in mesh with the drive gear and the ribbon-spool-shaft gear.

2.22 Left and Right Ribbon-spool-shaft Compression-springs: It shall require a pull as indicated in Figure 16 to just start the ribbon-spool shafts turning. See Figure 14 for location of parts and Figure 17 for method of checking.

To Gauge: With the ribbon-feed shaft in its left-hand position, hook the scale over the pin in the right ribbon-spool shaft and pull horizontally at a right angle to a line through the center of the pin and the center of the ribbon-spool shaft. Move the ribbon-feed shaft to its right-hand position and check the left-hand compression spring in the same manner.

To Adjust: Loosen the setscrew on the spring adjusting-collar and position the collar.

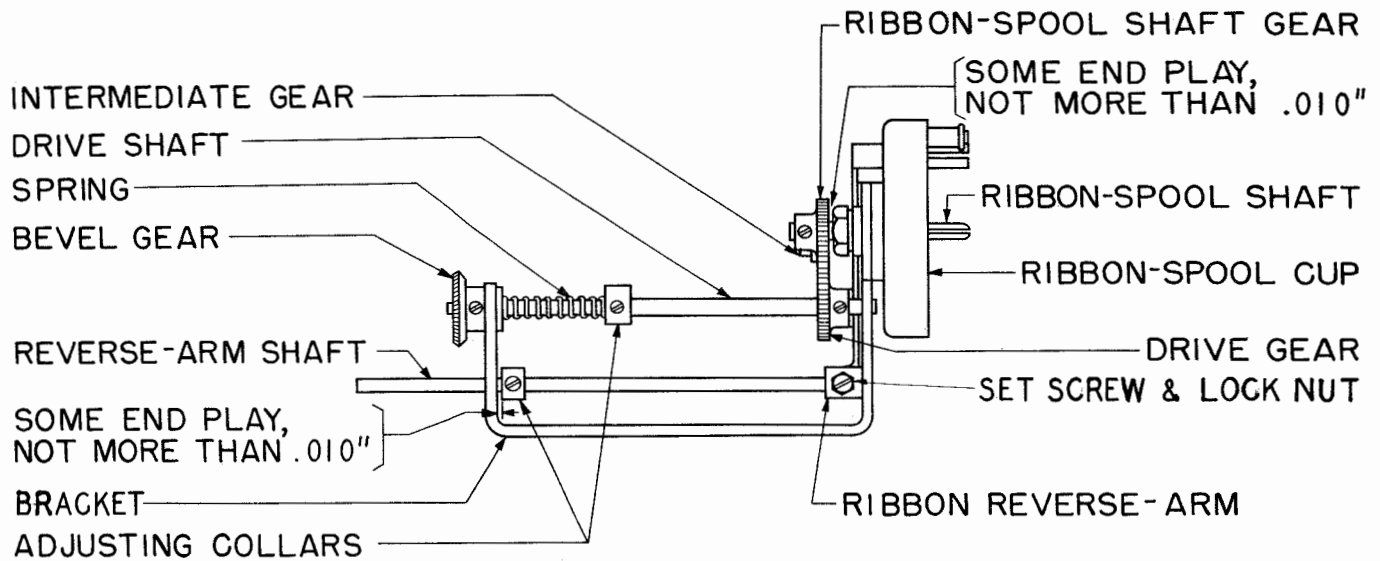


Figure 14

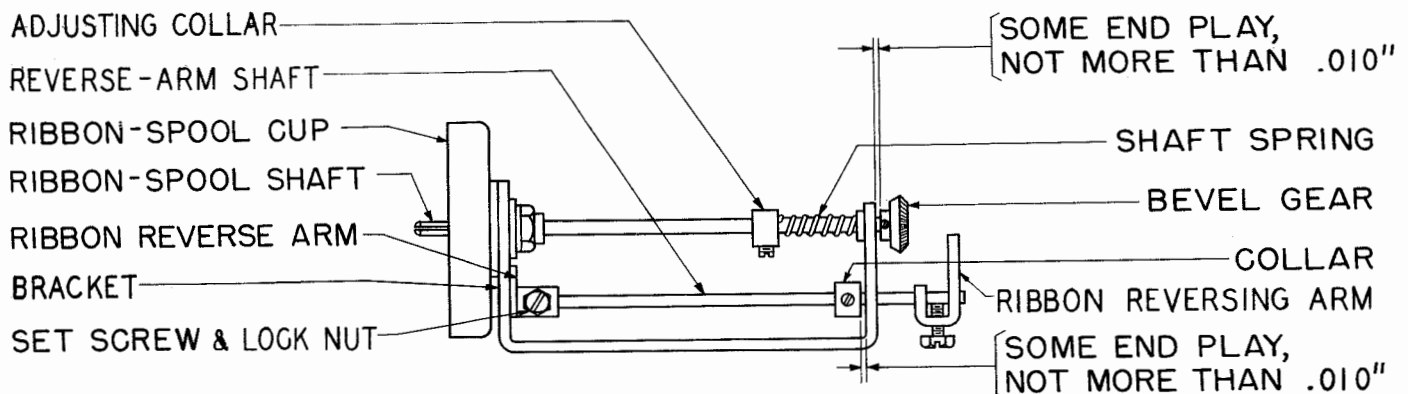


Figure 15

2.23 Left and Right Ribbon-reverse-arm Shafts:

(a) On units where the left ribbon-reverse arm is provided with a left ribbon-reverse arm locknut and setscrew instead of a ribbon-reverse-arm yield-spring, the left and right ribbon-reverse-arm shafts shall be set flush with the front of the bracket when the associated ribbon-reverse arm is held against the bracket. See Figures 14 and 15.

To Adjust: Loosen the associated ribbon-reverse-arm locknut and setscrew and position the shaft.

(b) On units equipped with a ribbon-reverse-arm yield-spring, the left ribbon-reverse-arm shaft shall be set flush with the front of the ribbon-spool bracket. The right ribbon-reverse arm shall be positioned as specified in (a). See Figures 15 and 17.

To Adjust (1) The left ribbon-reverse-arm shaft, loosen the setscrew of the spring block, and if necessary, the setscrews of the left ribbon-reverse-shaft collar and link. Position the shaft while holding the

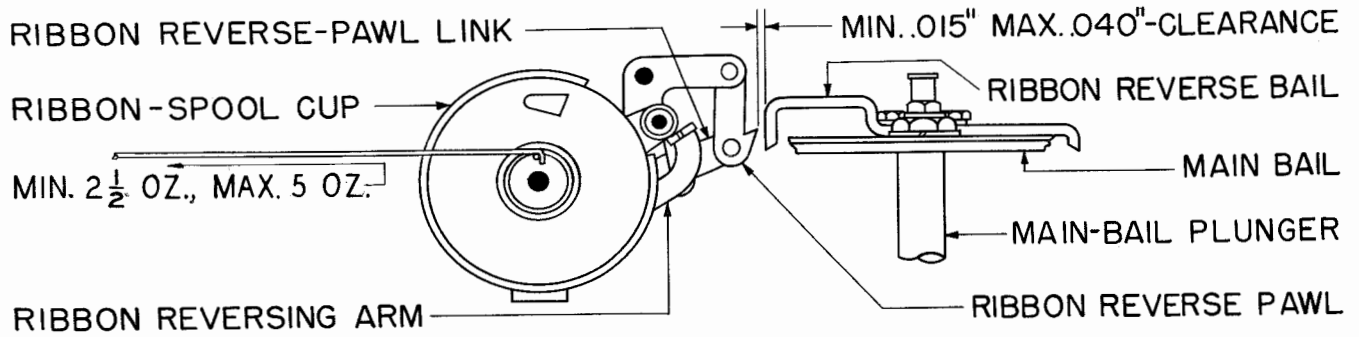


Figure 16

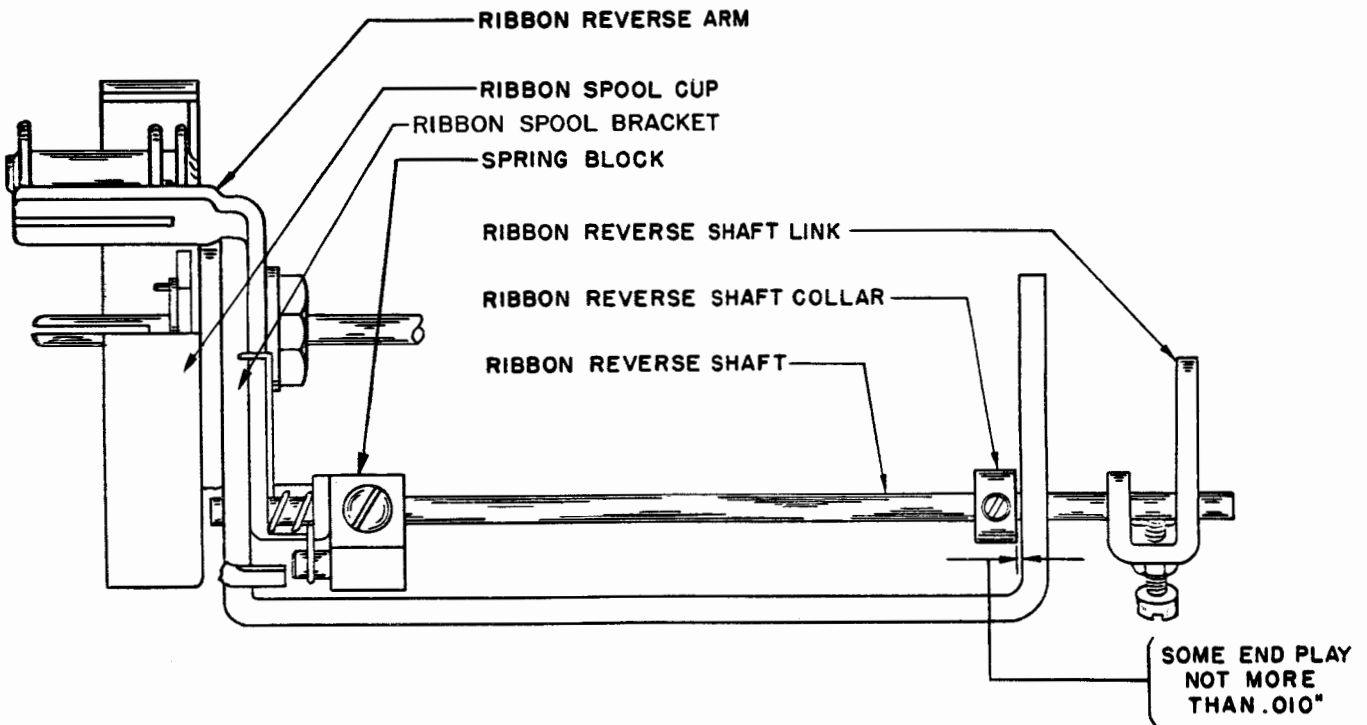


Figure 17

ribbon-reverse arm against the ribbon-spool bracket and the spring block against the ribbon-reverse arm.

To Adjust (2) the right ribbon-reverse-arm shaft, proceed in accordance with (a), To Adjust.

2.24 Left and Right Ribbon-reverse-arm-shaft Endplay:

- (a) On units where the left ribbon-reverse arm is provided with a left ribbon-reverse-arm locknut and setscrew instead of a ribbon-reverse-arm yield-spring, the left and right ribbon-reverse-arm shafts shall have some

endplay, not more than that indicated in Figures 14 and 15.

To Adjust: Loosen the setscrew in each adjusting collar and position the collars. Locate the setscrews so that they are easily accessible.

(b) On units equipped with a ribbon-reverse-arm yield-spring, the left and right ribbon-reverse-arm shafts shall have some endplay, not more than that indicated in Figure 17.

To Adjust: Loosen the setscrew in each adjusting collar and position the collars. Locate the setscrews so that they are easily accessible when the ribbon-reverse arms are held up against the ribbon-spool cups.

2.25 Ribbon Spools shall be sufficiently tight on their shafts to insure that they will not slide off in service. See Figures 14 and 15.

To Adjust: Spread the prongs of the ribbon-spool shafts.

2.26 Ribbon-reverse Pawls:

(a) On units where the left ribbon-reverse arm is provided with a left ribbon-reverse-arm locknut and setscrew instead of a ribbon-

reverse-arm yield-spring, there shall be a clearance as indicated in Figure 16 between both the right and left ribbon-reverse pawls and the ribbon-reverse bail when the ribbon-reverse arms are resting against the ribbon-spool cups (unoperated position) and the ribbon-reverse bail is opposite the ribbon-reverse pawls.

To Adjust: Loosen the associated ribbon-reverse arm setscrew and position the arm.

(b) On units equipped with a ribbon-reverse-arm yield-spring, there shall be a clearance as indicated in Figure 18 between both right and left ribbon-reverse pawls and the ribbon-reverse bail when the ribbon-reverse arms are resting against the ribbon-spool cups (unoperated position) and the ribbon-reverse bail is opposite the ribbon-reverse pawls.

Note: When checking the minimum clearance, the play in the ribbon-reverse bail should be taken up in a direction to make the clearance a minimum. When checking the maximum clearance, the play in the ribbon-reverse bail should be taken up in a direction to make the clearance a maximum.

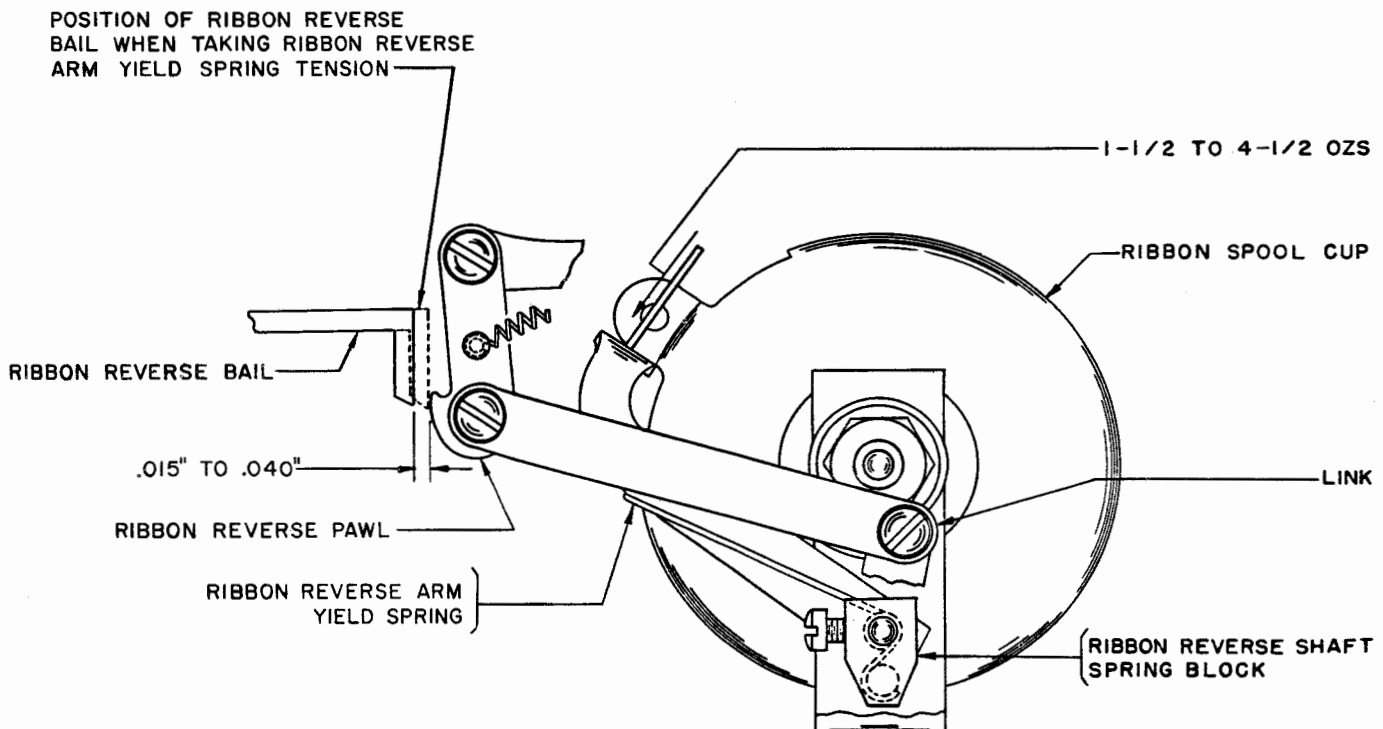


Figure 18

To Adjust: Position the spring block on the left ribbon-reverse shaft and the sleeve on the right ribbon-reverse shaft.

2.27 Ribbon-reverse-pawl Links shall not bind on their shoulder screws. See Figures 15 and 19.

To Adjust: Loosen the locknuts and set-screws on the ribbon-reverse arms located at the rear end of the ribbon-reverse-arm shafts and position the arms back and forth. After tightening the screws and locknuts, recheck 2.26.

2.28 Ribbon-reverse-arm Yield-spring (If So Equipped): With the ribbon-reverse bail positioned so that it will block the full travel of the ribbon-reverse arm, and with the ribbon-reverse pawl resting against the ribbon-reverse bail, it shall require a push as indicated in Figure 18 to start the ribbon-reverse arm moving.

To Gauge: Apply the push end of the scale at a right angle to the ribbon-reverse arm at the center where the ribbon is threaded.

To Adjust: Remove and bend the spring.

2.29 Left and Right Ribbon-feed-shaft Safety-springs: With the mainbail in its uppermost position and the ribbon-feed shaft held in its left-hand position, it shall require a push as indicated in Figure 19 to just start the right spring-collar moving.

To Gauge: Apply the push end of the scale to the upper end of the right-hand ribbon-reverse pawl and push vertically downward. Check the left safety-spring with the ribbon-feed shaft in its right-hand position and the scale applied to the left-hand ribbon-reverse pawl. See Figure 20 for location of spring.

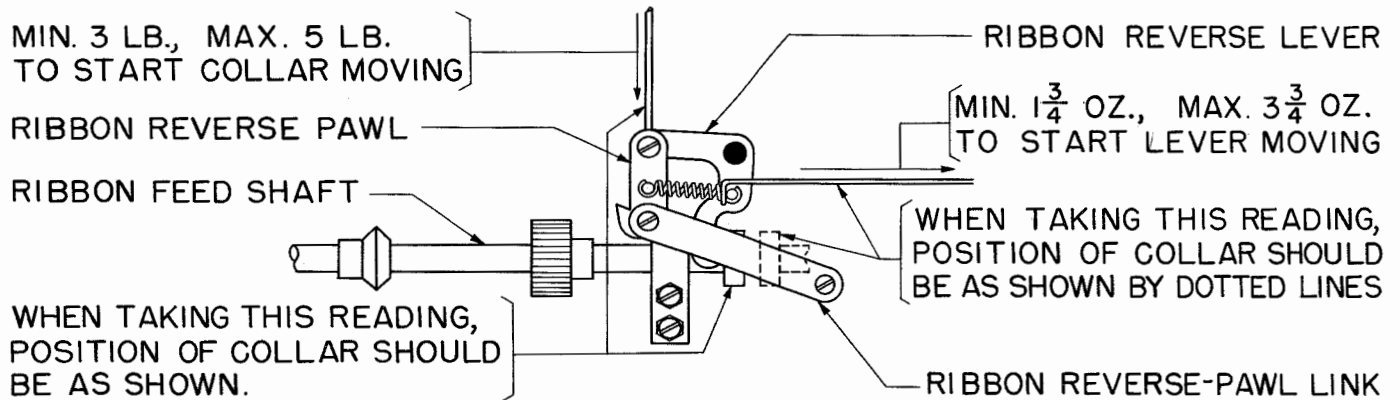


Figure 19

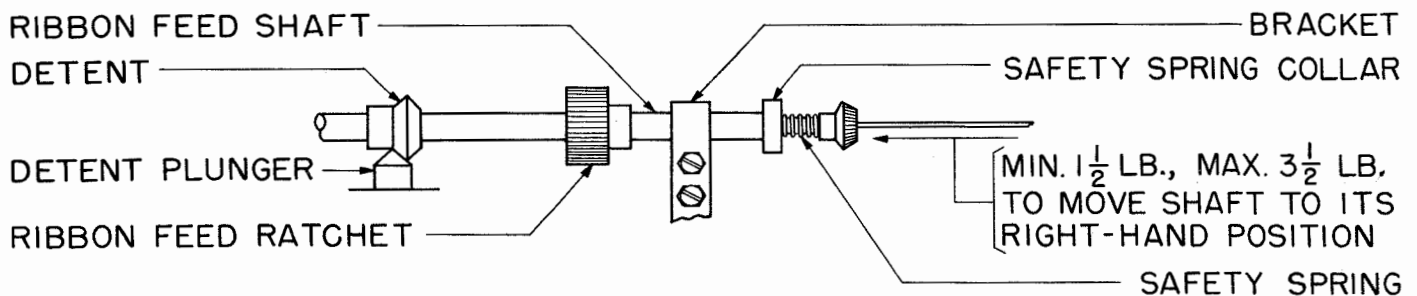


Figure 20

2.30 Left and Right Ribbon-reverse-pawl Springs: With the ribbon-feed shaft in its left-hand position, it shall require a pull as indicated in Figure 19 to start the left ribbon-reverse lever moving.

To Gauge: Hook the pull end of the scale over the spring post of the left ribbon-reverse lever and pull in line with the spring. Check the right ribbon-reverse-pawl spring with the ribbon-feed shaft in its right-hand position and the scale applied to the spring post of the right ribbon-reverse lever.

2.31 Ribbon-feed-shaft Detent-plunger Spring: (Remove the ribbon-feed pawl and check pawl.) With the ribbon-feed shaft in its left-hand position, it shall require a push as indicated in Figure 20 to move the ribbon-feed shaft to its right-hand position.

To Gauge: Apply the push end of the scale to the ribbon-feed shaft and push in line with the shaft.

Note: If it is not necessary at this time to check the tension of the ribbon-feed-lever spring, remount the ribbon-feed pawl and check pawl; otherwise proceed in accordance with 2.32.

2.32 Ribbon-feed-lever Spring: (If the ribbon-feed pawl was not previously removed from the unit as specified in 2.31, remove it.) It shall require a pull as indicated in Figure 21 to start the lever moving when the ribbon-feed-lever roller is in the plunger indent.

To Gauge: Hook the scale over the top of the ribbon-feed lever and pull horizontally toward the front of the unit.

Note: Remount the ribbon-feed pawl, and the check pawl if previously removed.

2.33 Ribbon-check Pawl (top end) shall clear the lower surface of the pullbar guide as indicated in Figure 22. Gauge by eye.

To Adjust: Loosen the check-pawl mounting-screw and position the check pawl.

2.34 Ribbon-check-pawl Spring: It shall require a pull as indicated in Figure 22 to just pull the check pawl away from the ribbon-feed ratchet when the ratchet is positioned so that its tooth does not prevent free movement of the pawl.

To Gauge: Hook the pull end of the scale under the engaging end of the ribbon-check pawl and pull horizontally toward the front of the unit.

To Adjust: Change the curvature of the ribbon-check pawl. Do not crimp.

2.35 Ribbon-feed Pawl shall be positioned so that the ribbon-feed ratchet will be moved one or two teeth for each revolution of the main shaft. See Figure 22.

To Adjust: Loosen the feed-pawl mounting-screw and position the pawl.

2.36 Ribbon-feed-pawl Spring: With the ribbon-feed shaft pushed to the right and the main shaft in its stop position, it shall require a pull as indicated in Figure 22 to just pull the ribbon-feed pawl away from the ribbon-feed ratchet.

To Gauge: Make certain that the ratchet is positioned so that the tooth engaged by the pawl does not prevent free movement of the pawl, then hook the pull end of the scale under the engaging edge of the ribbon-feed pawl adjacent to the feed ratchet. Pull vertically at a right angle to the spring.

To Adjust: Change the curvature of the ribbon-feed pawl. Do not crimp.

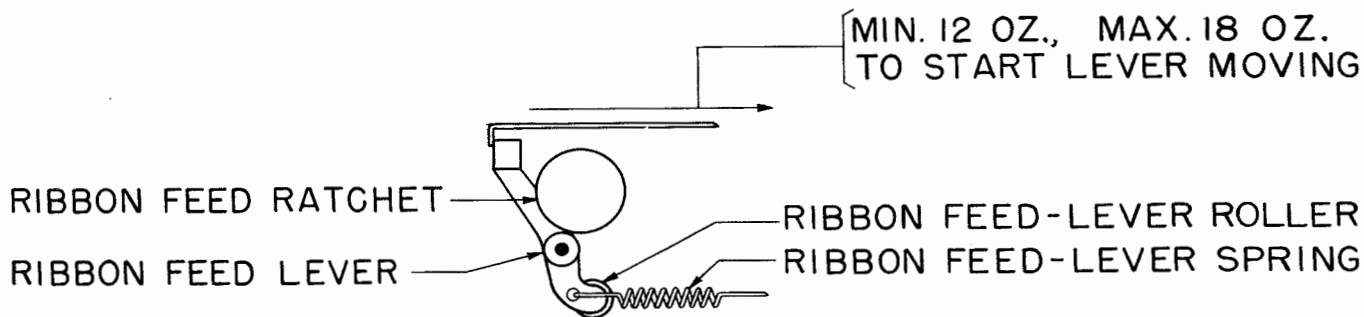


Figure 21

2.37 Left Function Pullbar Spring: It shall require a pull as indicated in Figure 23 to just start the pullbar moving when the main-bail is in its lowest position.

To Gauge: Hook the pull end of the scale over the Space pullbar just below the lobe and pull horizontally at a right angle to the bar.

To Adjust: Loosen the left function-pullbar spring-bracket locknut and position the bracket.

2.38 Codebar Locking-lever Spring: It shall require a pull as indicated in Figure 24 to just start the locking lever moving when the mainbail is in its uppermost position and the codebar bellcranks are held away from the locking lever.

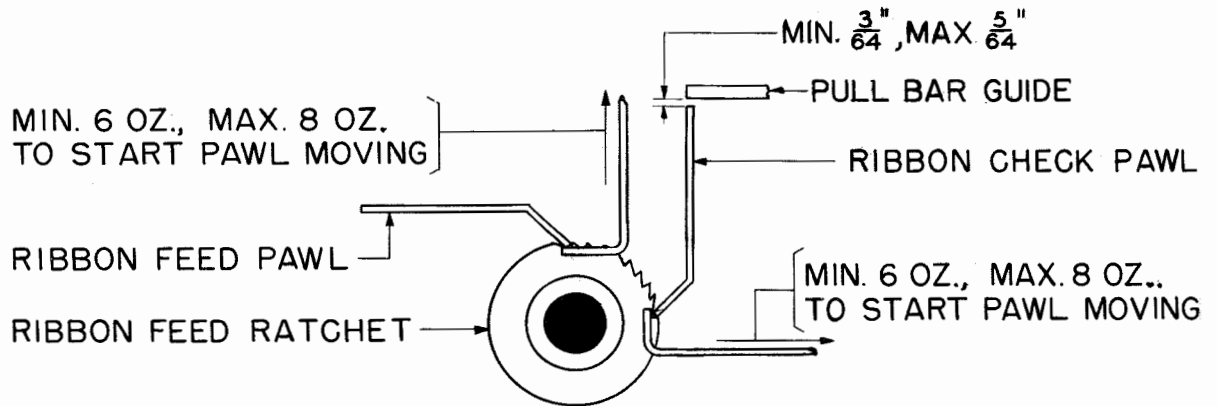


Figure 22

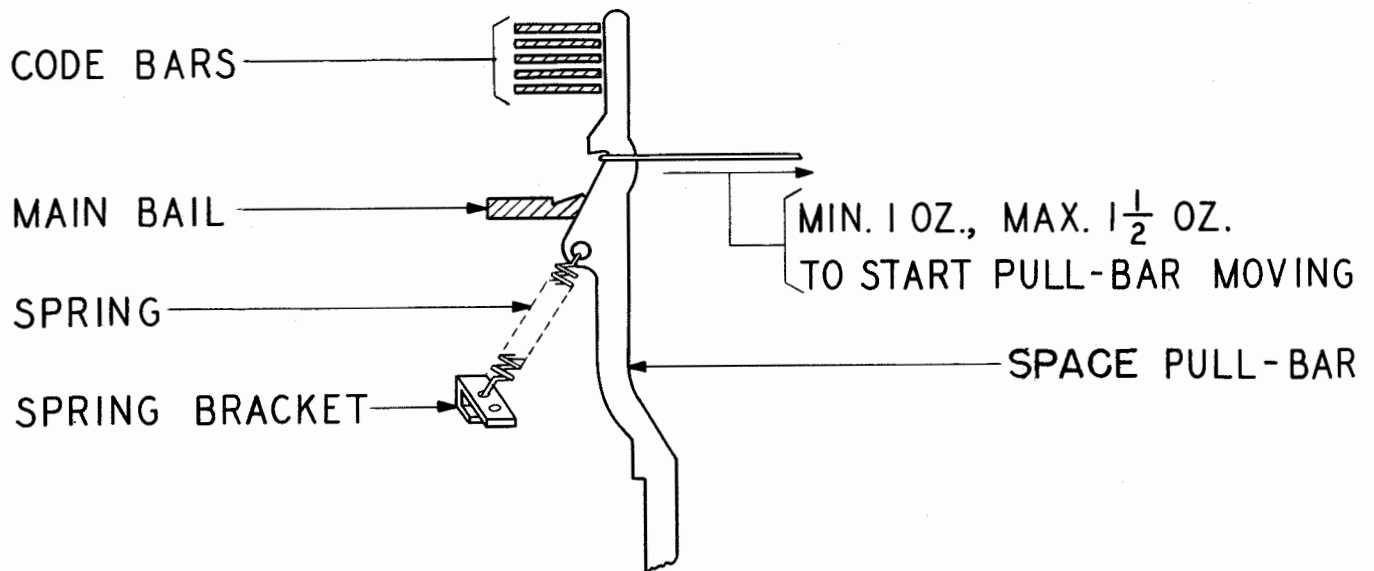


Figure 23

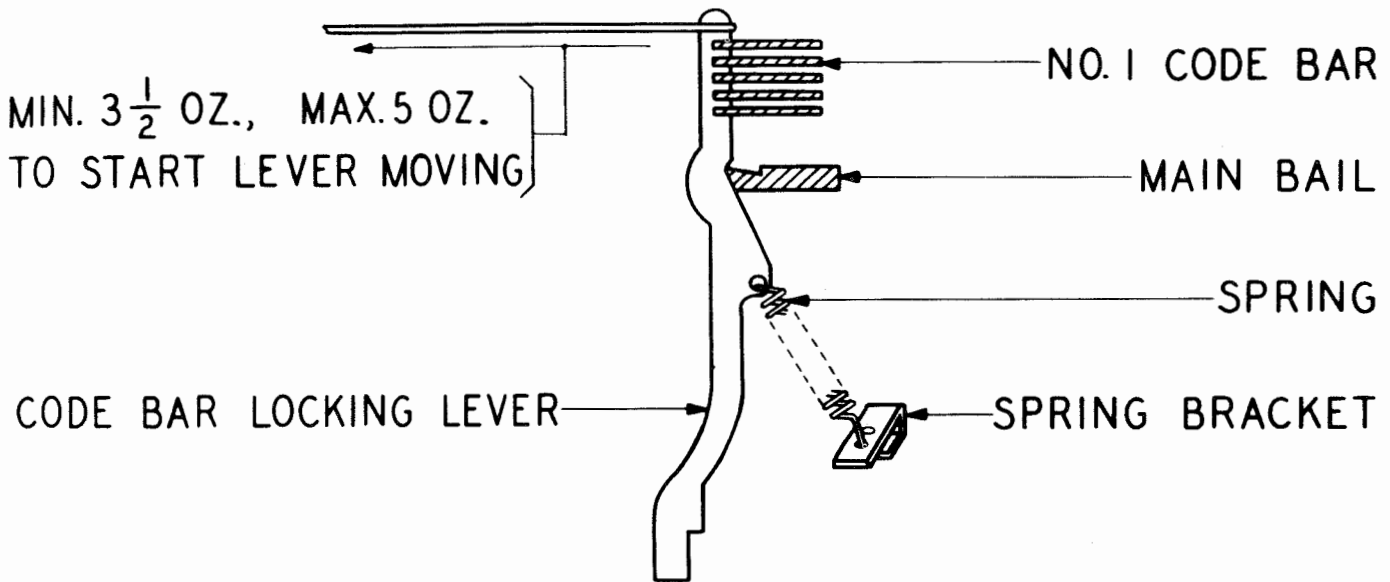


Figure 24

To Gauge: Hook the pull end of the scale over the locking lever just above the No. 1 codebar and pull horizontally at a right angle to the locking lever.

To Adjust: Loosen the codebar locking-lever spring-bracket locknut and position the bracket.

2.39 Pullbar Guard shall meet the following requirements with the mainbail in its lowest position. See Figure 25.

- (a) With the typebars resting against the back-stop, it shall not be possible to manually disengage the pullbars from their guide slots.
- (b) With the typebars held against the platen, there shall be some clearance between the pullbars and the pullbar guard.
- (c) The same clearance shall be obtained for pullbars not having associated typebars.

To Check this adjustment, raise the pullbar by hand to a point where there is a minimum clearance between the pullbar and the pullbar guard when the pullbar is in contact with the mainbail. (Shift the platen to permit raising of the pullbar.)

To Adjust (1): When the guard does not meet the preceding requirements for the

end pullbars, add or remove washers or shims located between the guard and the frame on the side not meeting the requirement. (The correct washers and shims measure 0.028 inch and 0.004 inch in thickness, respectively.)

To Adjust (2): When the guard does not meet the preceding requirements for the middle pullbars, loosen one guard mounting-screw and push or pull the guard until the requirement is met.

2.40 Pullbar-contact Mounting-plate (14F Reperforator-Transmitter Units Only): The following requirements shall be met with the pullbars resting against the codebars, but not selected.

- (a) The clearance between the toes of the pullbar hooks and the top of the contact mounting-plate shall be as close as possible to that shown in Figure 26.

Gauge with the TP99391 gauge.

To Adjust: Add or remove shims between the pullbar-contact mounting-plate and the mounting posts.

- (b) The clearance between the toes of the two end and one middle pullbar-hooks and the front of the contact mounting-plate shall be as close as possible to that shown in Figure 25.

PULL-BAR IN BLOCKED POSITION

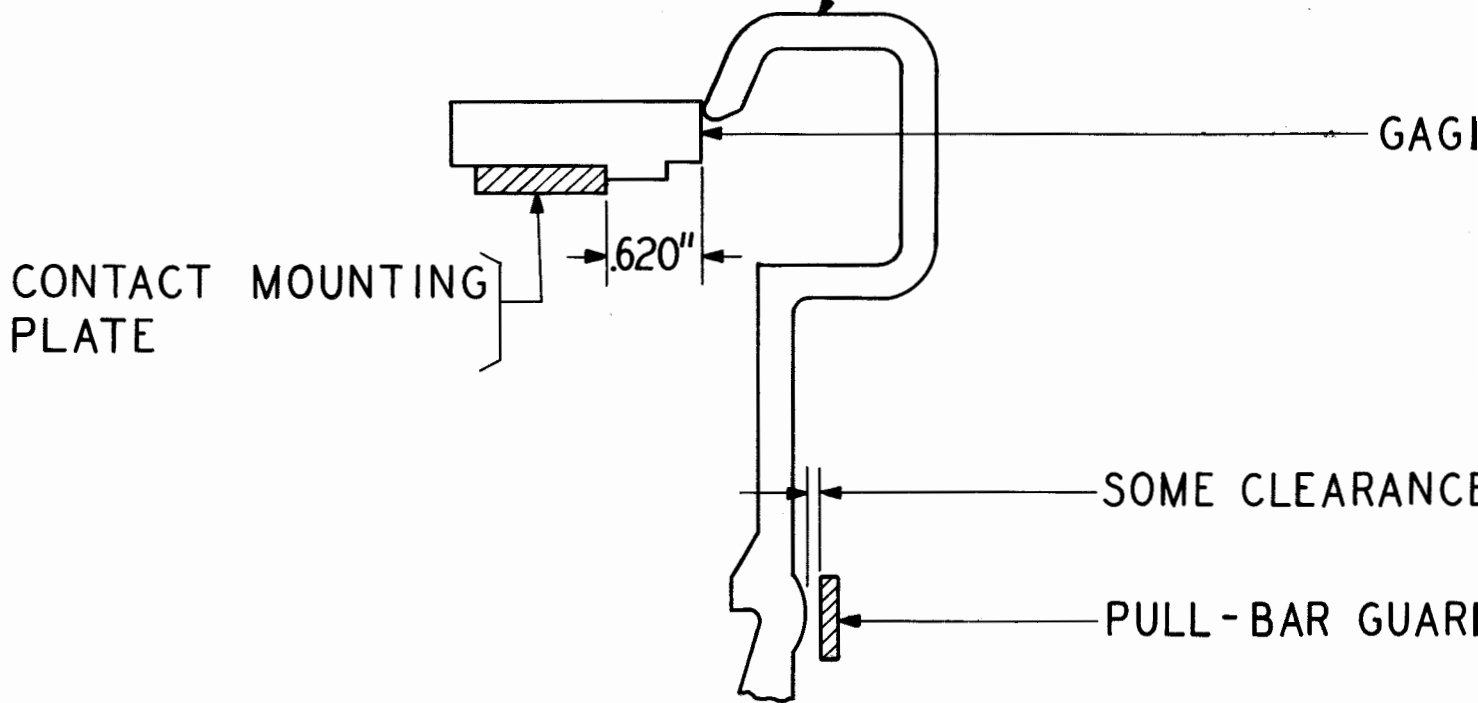


Figure 25

PULL BAR IN BLOCKED POSITION

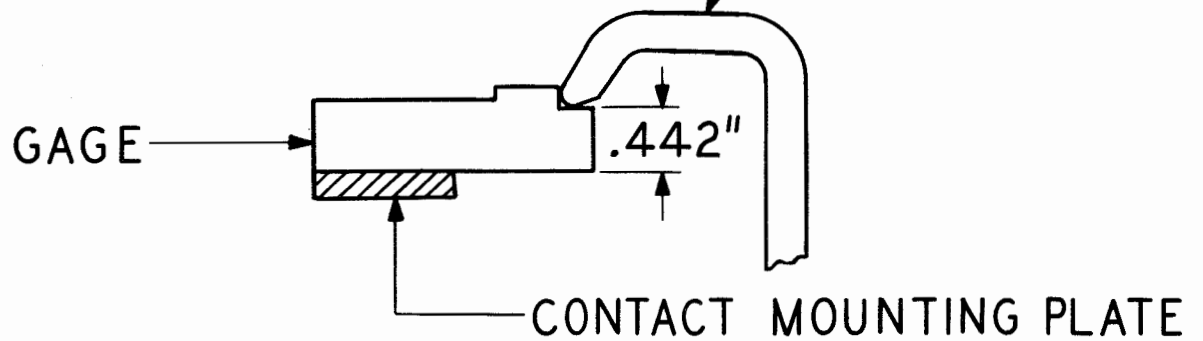


Figure 26

Gauge with the TP99391 gauge.

To Adjust: Loosen the nuts securing the mounting plate and position the plate.

2.41 Pullbar-contact Assembly (14F Repeater-Transmitter Units Only):

Note 1: To insure uniformity in checking the adjustments, the pullbars should be blocked out of selection by the No. 1 codebar only. To do this, select the pullbar, and by manually holding it out of selection, move the No. 1 codebar into the path of the pullbar. The contact pressure should be measured with the scale held in a vertical position. The scale should engage the spring directly in front of the contact point.

(a) There shall be approximately a clearance (preliminary) as indicated in Figure 27 between the tip of the pullbar hook and the low, flat surface of the long-contact-spring insulator.

Note 2: This clearance may be affected by subsequent adjustments in this paragraph. There is no fixed requirement for the final clearance.

To Gauge: The pullbar should be in the selected position with some clearance between it and the mainbail.

To Adjust: Bend the long contact-spring for minimum clearance at this point and then obtain the clearance indicated in Figure 27 by bending the upper contact-spring.

(b) There shall be a clearance as indicated in Figure 27 between the lower sloping surface of the long-contact-spring insulator and the adjacent surface of the pullbar hook. The insulator should be aligned centrally with the pullbar.

To Gauge: The pullbar should be in the selected position with play taken up by pressing lightly downward on the pullbar to make this clearance a maximum.

To Adjust: Loosen the contact-assembly mounting-screws and reposition the contact assemblies, making sure that there is adequate clearance between adjacent assemblies. When the above requirements cannot be met, adjust the pullbar-contact mounting-plate per 2.40.

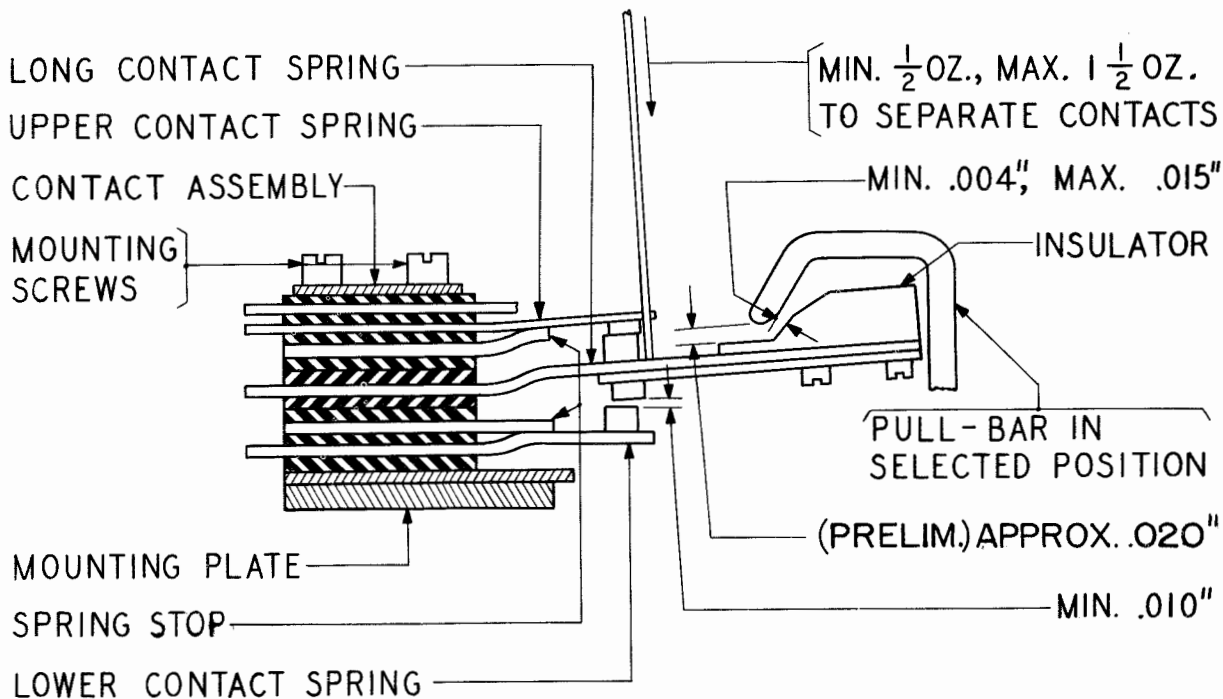


Figure 27

Note: Restore the pullbar to its nonselected position.

(c) There shall be a clearance as indicated in Figure 28 between the long-spring contact and the upper-spring contact.

To Gauge: The pullbar should be resting against the No. 1 codebar in the nonselected position and the upper contact-spring should be against its stop.

To Adjust: Bend the upper contact-spring stop. To reduce bounce or chatter of the H pullbar contact, adjust toward the maximum clearance.

(d) It shall require a pull as indicated in Figure 28 to separate the upper contact-spring from its stop.

To Gauge: The pullbar should be in its non-selected position and resting against the No. 1 codebar. Hook the scale under the upper spring at the contact and pull vertically.

To Adjust: Bend the upper contact-spring. To reduce bounce or chatter of the H pullbar contact, adjust toward the maximum tension. Recheck requirement (b).

(e) It shall require a push as indicated in Figure 27 to separate the long-spring contact from the upper-spring contact.

To Gauge: The pullbar should be in the selected position. Apply the push end of the scale to the long contact-spring at the contact and exert pressure downward.

To Adjust: Bend the long contact-spring and recheck requirement (c).

(f) There shall be a clearance as indicated in Figure 28 between the lower contact-spring and its stop.

To Gauge: The pullbar should be in its non-selected position and resting against the No. 1 codebar.

To Adjust: Bend the lower-contact-spring stop.

(g) It shall require a push as indicated in Figure 28 to separate the lower-spring contact from the long-spring contact.

To Gauge: The pullbar should be in the non-selected position. Apply the push end of the scale to the lower contact-spring at the contact and exert a downward pressure.

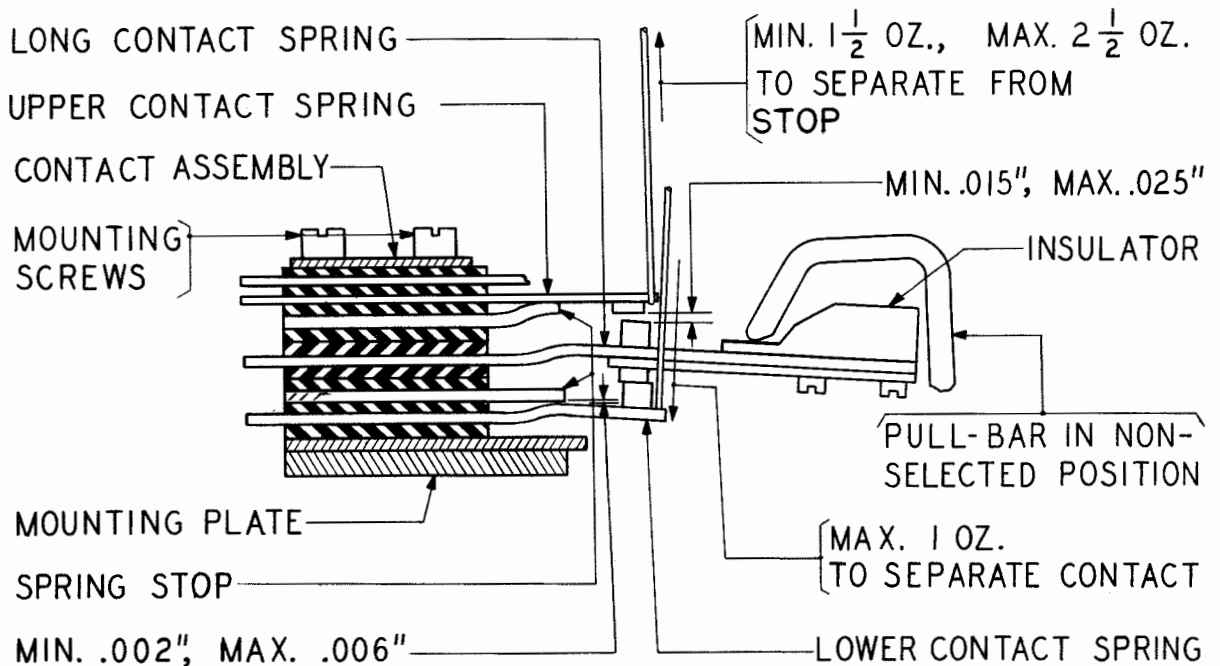


Figure 28

To Adjust: Bend the lower contact-spring and recheck requirement (f).

(h) With the pullbar in its selected position, there shall be a clearance as shown in Figure 27 between the lower-spring contact and the long-spring contact. Gauge by eye.

Note: The bending of springs and stops sets up stresses which tend to cause changes in permanent adjustments. To stabilize the adjustments, each pile-up of springs should be operated either manually or under power at least 20 times and then rechecked and re-adjusted as required.

2.42 Mainbail Spring (Preliminary Adjustment):

It shall require a pull as indicated in Figure 29 to start the adjustment lever moving.

To Gauge: The main shaft should be in its stop position (mainbail down). Hook the

scale under the adjusting lever at the spring hole and pull vertically upward.

To Adjust: Loosen the locknut and position the mainbail-spring adjusting-screw.

2.43 Mainbail Adjusting-screw (Final Adjustment): (Motor moved out of the way) There shall be a clearance as shown in Figure 30 between the front edges of the codebars and the adjacent edges of the codebar bellcranks.

To Gauge: The codebars should be positioned for LTRS selection with the mainbail roller on the high part of its cam (mainbail down).

Note: To prevent lost or garbled first characters after a period of shutdown, it is most important that before changing this adjustment or any related adjustment that the following adjustments be checked, and remade if necessary in the order given:

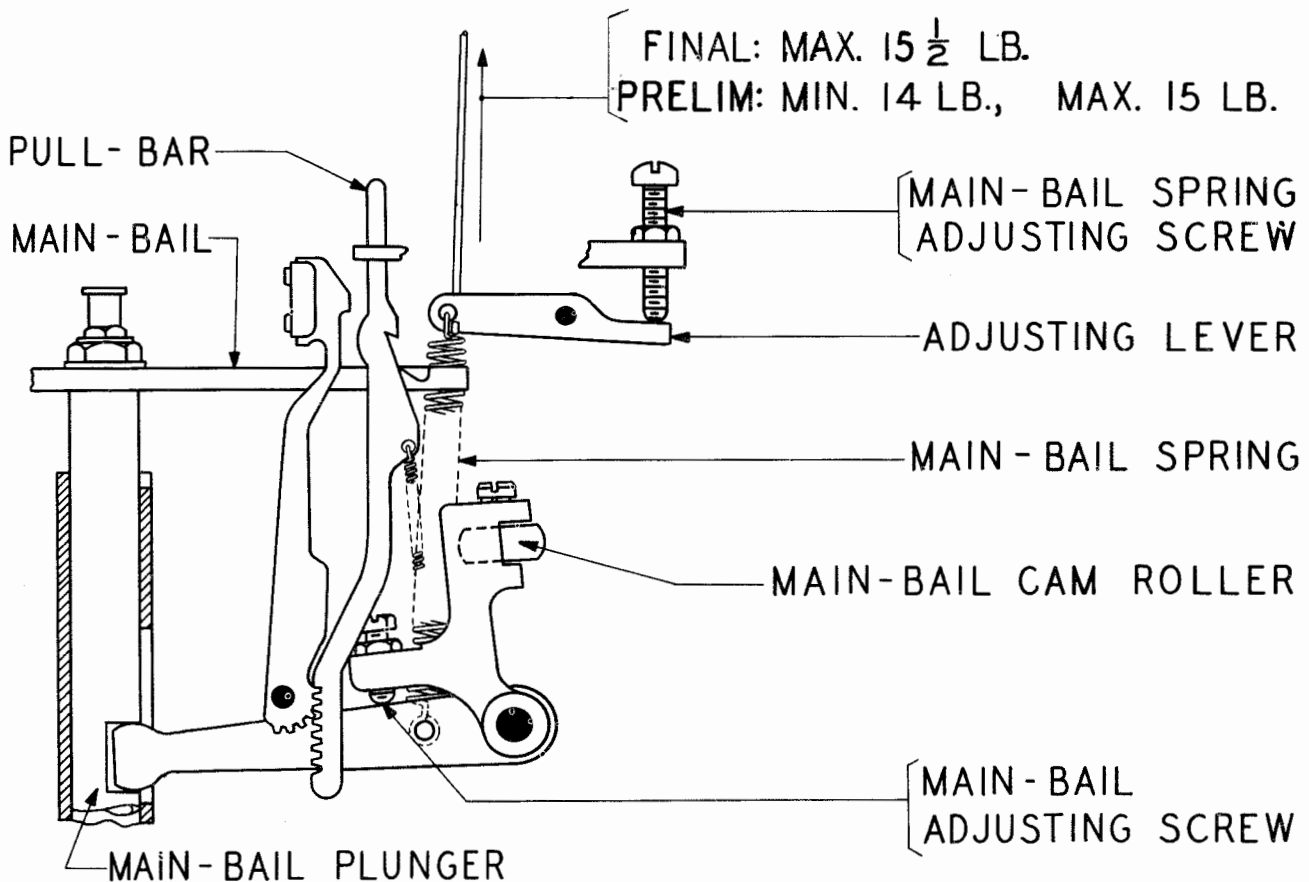


Figure 29

<u>Adjustment</u>	<u>Paragraph</u>
Mainbail	2.11
Pullbar Guide	2.12
Mainbail Adjusting-screw (Preliminary Adjustment)	2.13
Codebar Bellcranks	2.14
Vertical-link Pivot-screw	2.15
Lower Vertical-link Bellcrank Separator-plates	2.16
Codebar Locking-lever Spring	2.38
Mainbail Spring	2.42
Mainbail Adjusting-screw (Final Adjustment)	2.43

To Adjust: Keeping the clearance between the pullbars and the codebars within the limits specified in 2.13 and Figure 1, re-adjust the mainbail adjusting-screw to obtain the clearance required in 2.43. Move the motor into position and recheck 2.05(b).

2.44 Shift Lever: The letter T shall print centrally on the platen, when the platen is latched in the LTRS (rear) position. See Figure 31. If adjustment is required, and it is necessary to remove the code-punch and prepunch assemblies to make the adjustment, remove these assemblies as follows:

- (1) Place the main shaft in its stop position and place the unit so that it is resting on its rear supports.

- (2) Unhook the punch-bail spring from its spring post.
- (3) Remove the punch-arm-link shoulder-screw, disengage the link from the punch-bail arm, and remove the link from the unit.
- (4) Remove the prepunch mechanism by means of its two mounting screws. Be careful not to damage the cable.
- (5) Remove the three punch-assembly mounting-screws and the rear code-punch-block mounting screw. Lift out the code-punch assembly, taking care not to damage or distort the bellcranks, separator plates, or codebars.

To Adjust: Loosen the shift-lever-stud locknut and position the stud.

Note: If it is not necessary to verify the requirements in 2.45 to 2.58, inclusive, remount the code-punch and prepunch assemblies in the reverse order of their removal. Otherwise make all associated adjustments before remounting these assemblies.

2.45 Platen-frame Spring: It shall require a push as indicated in Figure 31 to just start the platen frame moving with the main shaft in its stop position and the platen latched in the LTRS (rear) position.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

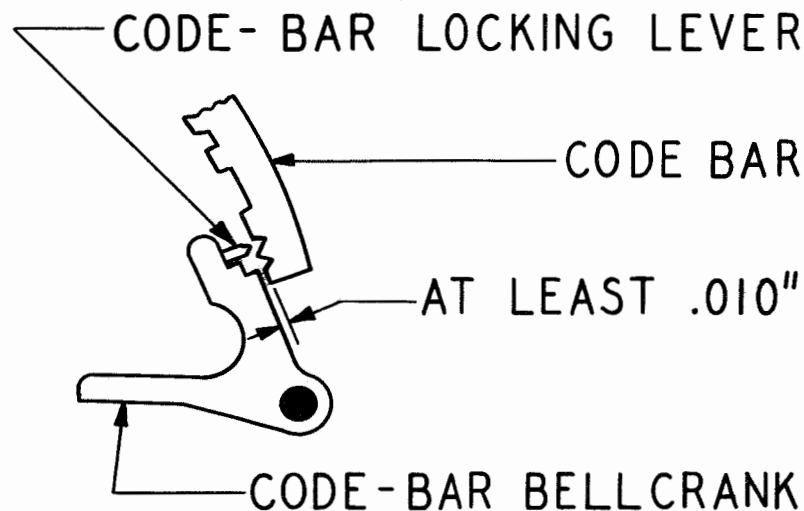


Figure 30

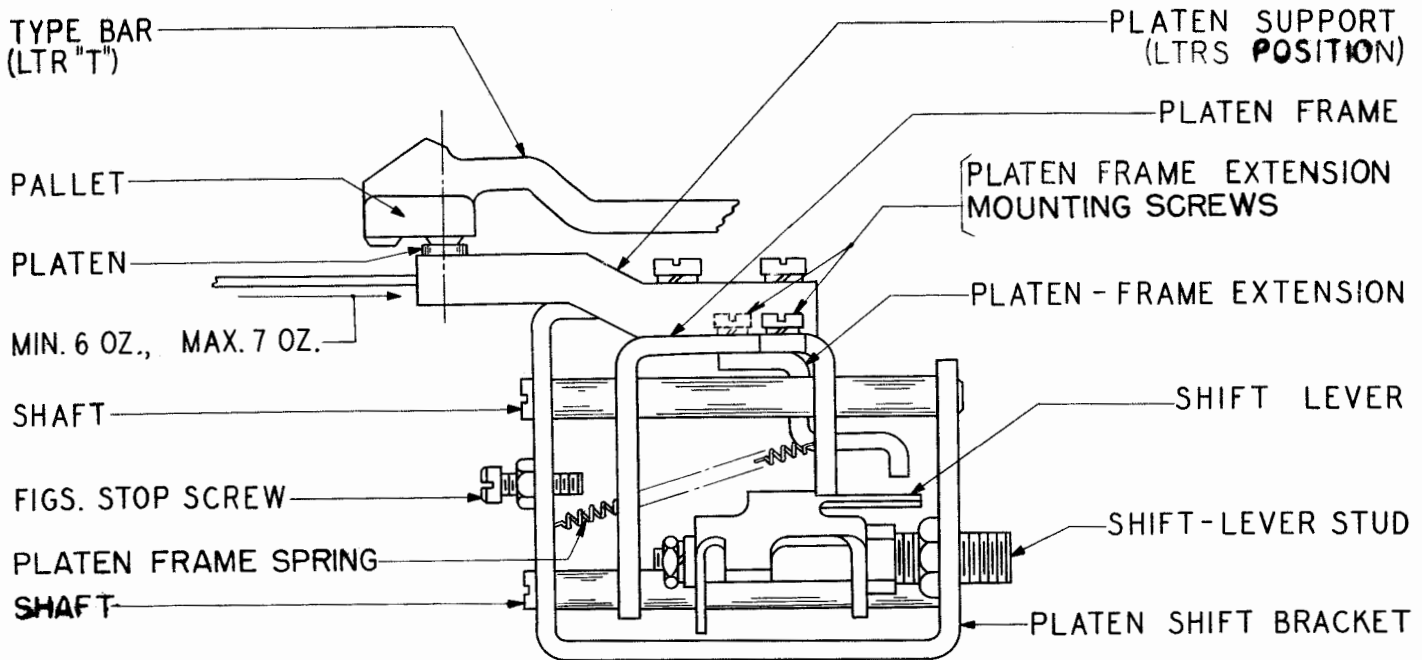


Figure 31

To Gauge: Apply the push end of the scale to the front end of the platen support and push horizontally toward the rear of the unit.

2.46 FIGS Stop-screw: The figure 5 shall print directly in front of and in line with the letter T (printed in 2.44) when the platen frame is unlatched and resting against the FIGS stop-screw (forward position). See Figure 32.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the FIGS stop-screw locknut and position the screw.

2.47 Shift-bail Bracket: The front surface shall be parallel to the front edge of the recessed portion of the base. See Figure 33.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the shift-bail-bracket mounting-screws and position the bracket.

2.48 Intermediate-bail Alignment: The forward extension of the intermediate bail shall engage the center of the ear on the shift bail. See Figure 33.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the intermediate-bail-bracket mounting-screws and position the bail.

2.49 Mainbail-plunger Extension-bracket: The left edge of the operating surface on the mainbail-plunger extension shall clear the side of the intermediate bail as indicated in Figure 33.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the mainbail-plunger extension-bracket locknut and reposition the bracket. See Figure 34.

2.50 Intermediate-bail Adjusting-screw: The shift bail shall overtravel the shift latch as indicated in Figure 34 with the main shaft in its stop position and the play in the shift latch taken up in a direction to make the clearance a minimum.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the intermediate-bail adjusting-screw locknut and position the screw. See Figure 34.

Note: If difficulty is experienced in meeting the specified clearance, add shims (0.004 inch thick) under the head of the intermediate-bail

shoulder-screw, shift-bail shoulder-screw, and shift-latch shoulder-screw.

2.51 Shift-bail Spring: It shall require a pull as indicated in Figure 34 to pull the spring to position length with the main shaft in its stop position and the platen latched in the LTRS position.

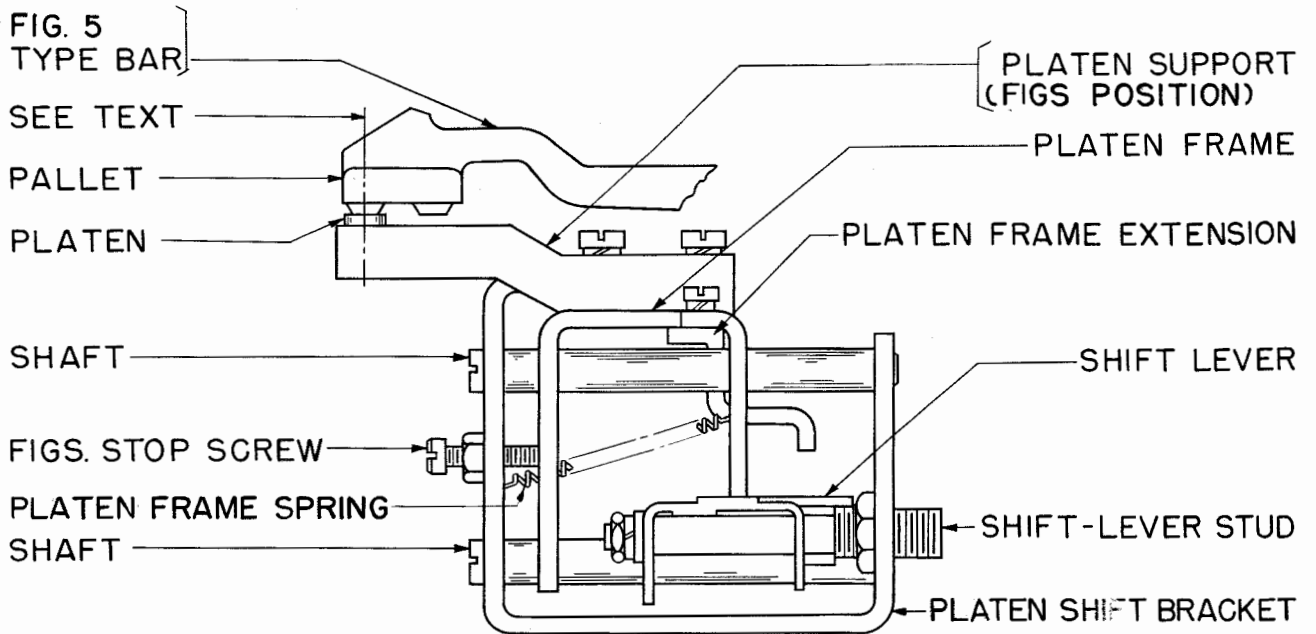


Figure 32

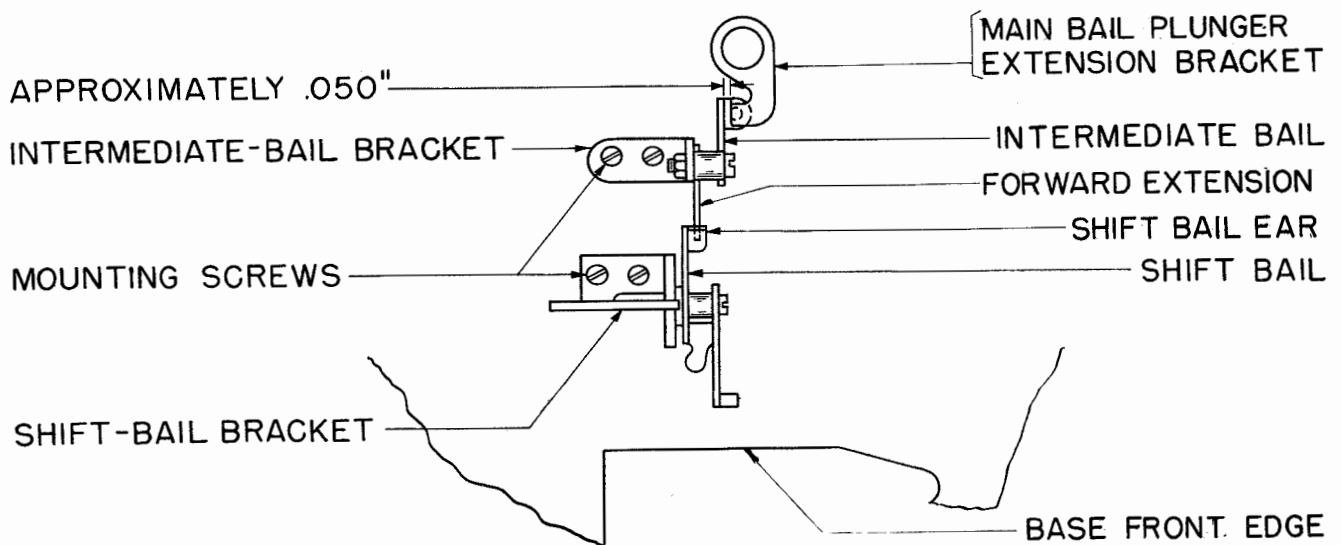


Figure 33

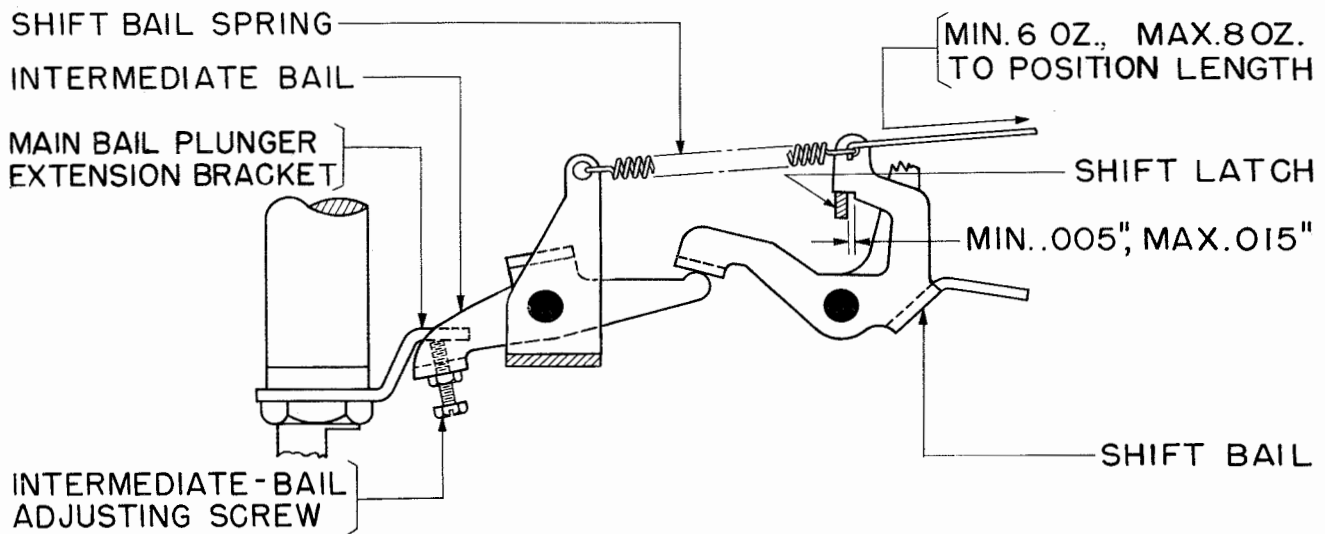


Figure 34

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Gauge: Unhook the shift-bail spring from the shift bail, hook the scale through the spring eye, and pull horizontally until the spring eye is opposite its hole in the shift bail.

2.52 Platen-frame Extension: There shall be a clearance as indicated in Figure 35A between the shift bail and the vertical surface of the platen-frame extension with the mainbail in its uppermost position, the platen in the FIGS position, and the shift bail latched on the shift latch.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the platen-frame-extension mounting-screws and reposition the extension by means of its elongated left mounting hole. See Figure 31.

2.53 Shift-bail Upstop-screw: There shall be a clearance as indicated in Figure 35B between the vertical surface of the platen-frame extension and the shift bail, with the mainbail in its uppermost position, the platen in the LTRS position, and the shift latch unlatched.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the shift-bail unstop-screw locknut and position the screw.

2.54 Shift-lever Spring: It shall require a pull as indicated in Figure 36 to just start the lever moving with the platen frame held clear of the lever.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Gauge: Hook the pull end of the scale around the shift lever at the spring hole and pull horizontally in line with the spring.

2.55 Shift-latch Spring: It shall require a pull as indicated in Figure 37 to start the shift latch moving with the main shaft in the stop position.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Gauge: Hook the pull end of the scale under the end of the shift latch, just above the space pullbar toe, and pull vertically upward.

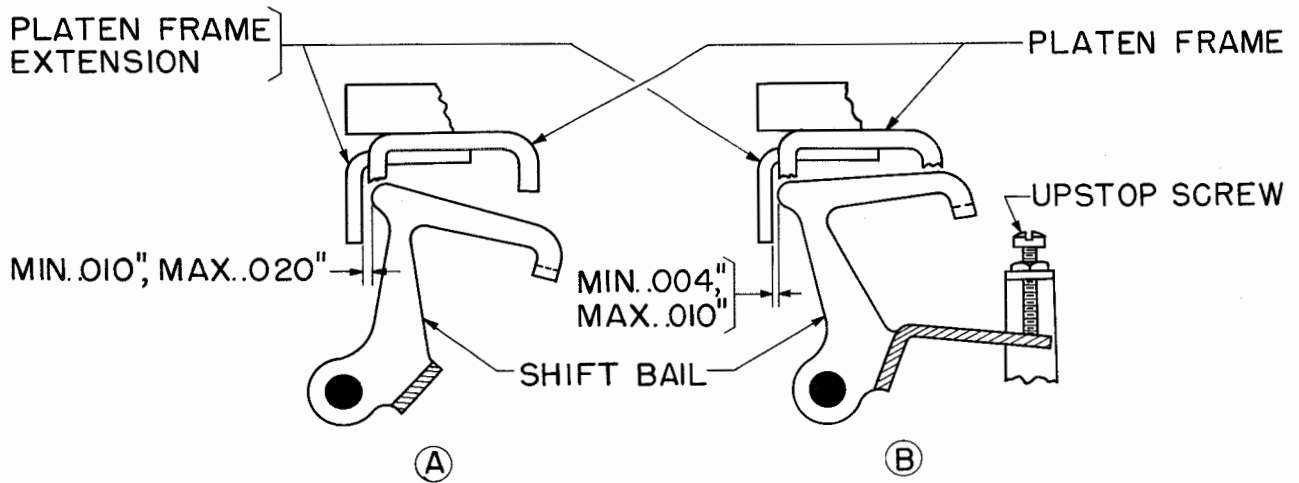


Figure 35

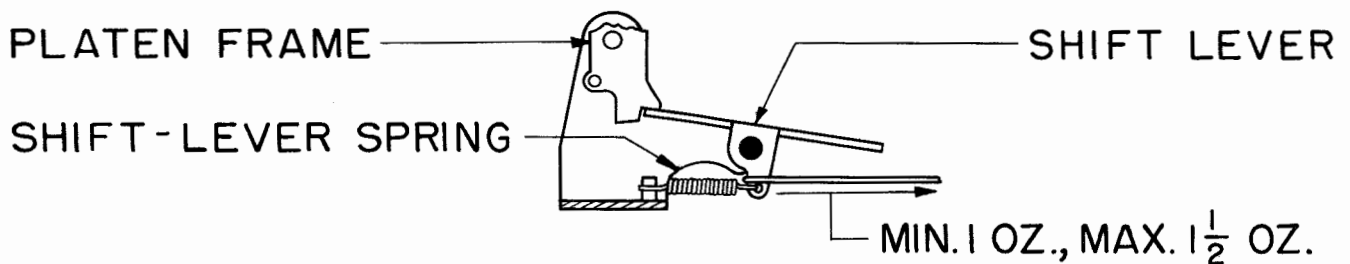


Figure 36

2.56 Code-punch-bail Pivot-bracket (Preliminary Adjustment): The lower surface of the punch-bail pivot-bracket shall be minimum 0.080 inch, maximum 0.090 inch above and parallel to the surface of the code-punch bracket on which it mounts, as shown in Figure 38.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the front punch-bail pivot-screw locknut and the punch-bail pivot-bracket clamp-screw, and position the bracket by means of the right and left tilt-screws.

2.57 Code-punch Bail shall meet the following requirements:

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

(a) The No. 1 and No. 5 code-punch selector-fingers shall be centered with respect to the No. 1 and No. 5 code punches and the code-punch bail shall have some endplay, but not more than 0.004 inch. See Figure 39.

To Adjust: Position the code-punch-bail pivot-screws.

(b) The punch retractor shall float freely within the bail with the punch-retractor springs removed. See Figure 39.

To Adjust: Bend both legs of the punch retractor near the cross-brace and parallel to it.

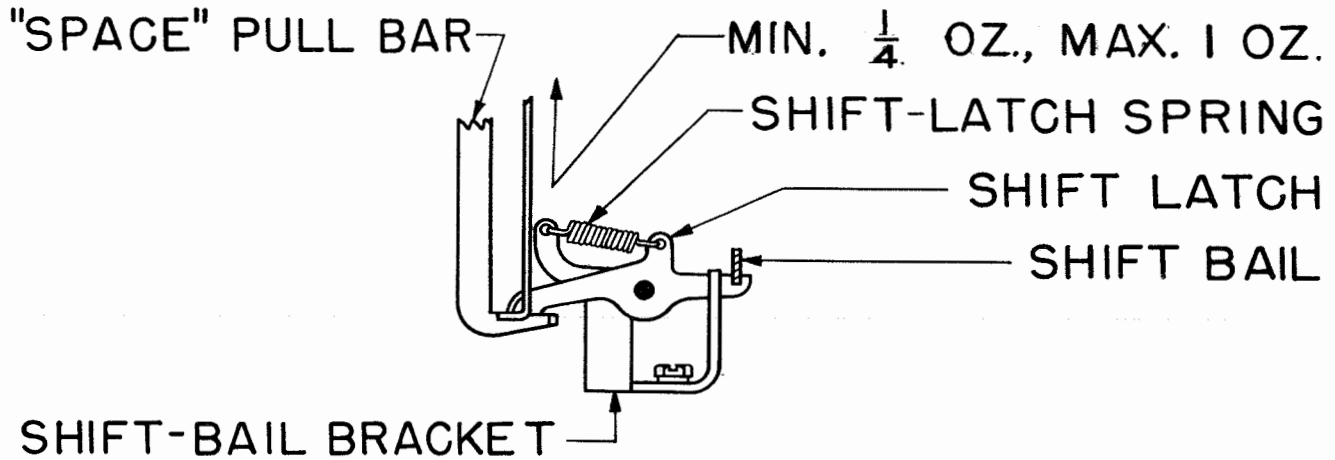


Figure 37

2.58 Selector-fingers Retaining-bracket: The code-punch selector-fingers shall have minimum 0.006 inch, maximum 0.015 inch up and down play in their slots in the retaining bracket. See Figure 38.

Note: If necessary, remove the code-punch and prepunch assemblies in accordance with 2.44.

To Adjust: Loosen the selector-finger retaining-bracket mounting-screws and position the bracket.

Note: If the code-punch and prepunch assemblies were previously removed from the unit, remount them by reversing the procedure for their removal given in 2.44.

2.59 Code-punch-bail Pivot-bracket (Final Adjustment): A line across the top of the code-punch selector-fingers shall be parallel to a line across the bottom of the code punches. See Figure 39.

To Gauge: Insert a piece of tape into the punch block and back off the punch-bail-arm stud until the punch pins, when presented against the tape, barely emboss the tape. Punches No. 1 and 5 should emboss the tape equally.

To Adjust: Loosen the front punch-bail pivot-screw locknut and the punch-bail pivot-bracket clamp-screw, and position

the bracket by raising or lowering the right and left tilt-screws equally until the position is reached where the punch-bail pivot-bracket is parallel and the No. 1 and 5 punches emboss the tape equally.

2.60 Code-punch-bail-arm Stud (Preliminary Adjustment): All code punches shall just perforate the tape when the LTRS combination is set up and the motor is rotated manually.

Note: Do not disassemble defective punches; If satisfactory punching cannot be obtained, replace the entire punch-block assembly.

To Adjust: Loosen the punch-bail-arm-stud locknut and turn the stud in or out of the punch-bail arm.

2.61 Code-punch Die-plate Alignment:

CAUTION: THE TWO TOP SCREWS THAT HOLD THE SPRING-ARM BRACKET AND DIE PLATE TO THE CODE-PUNCH-BLOCK ASSEMBLY SHOULD NOT BE DISTURBED.

Note: The loosening of the screws that hold the spring-arm bracket and die plate to the code-punch-block assembly permits shifting of the die plate with respect to the punch-block casting and results in sticking code-punches. If after thoroughly cleaning the code-punch-block assembly, it is noted that the code punches stick, the die-plate position is probably out of alignment. The following procedure to realign the dieplate should be followed.

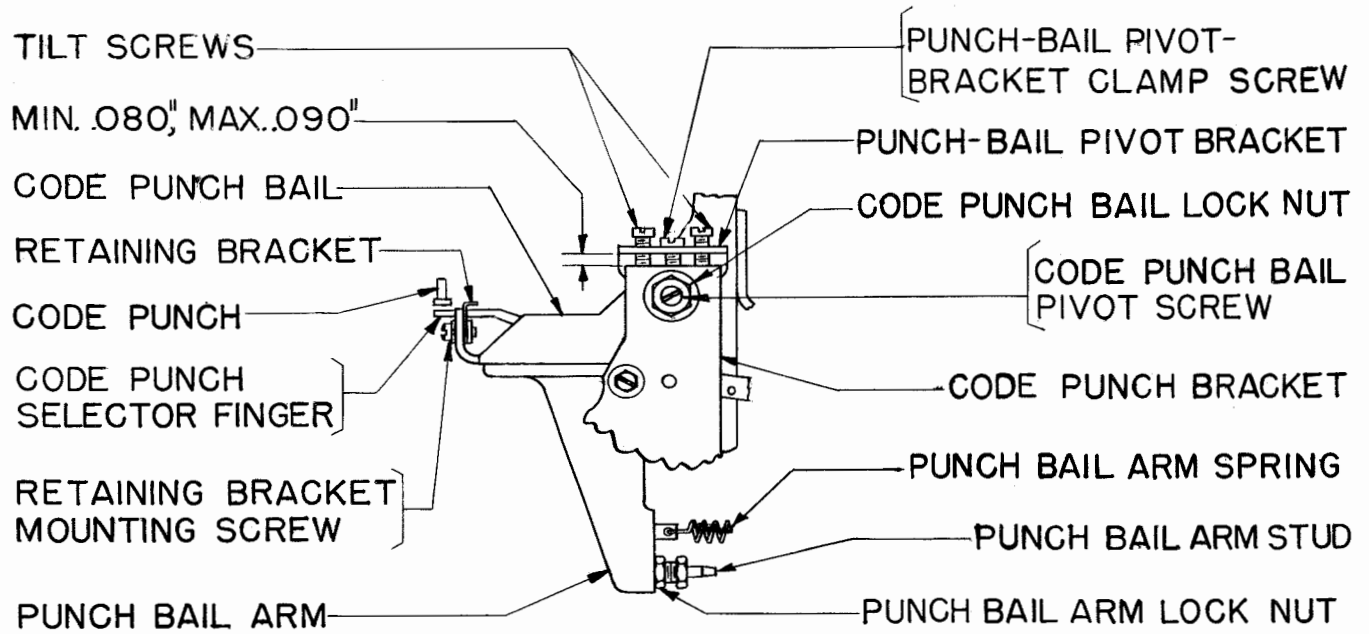


Figure 38

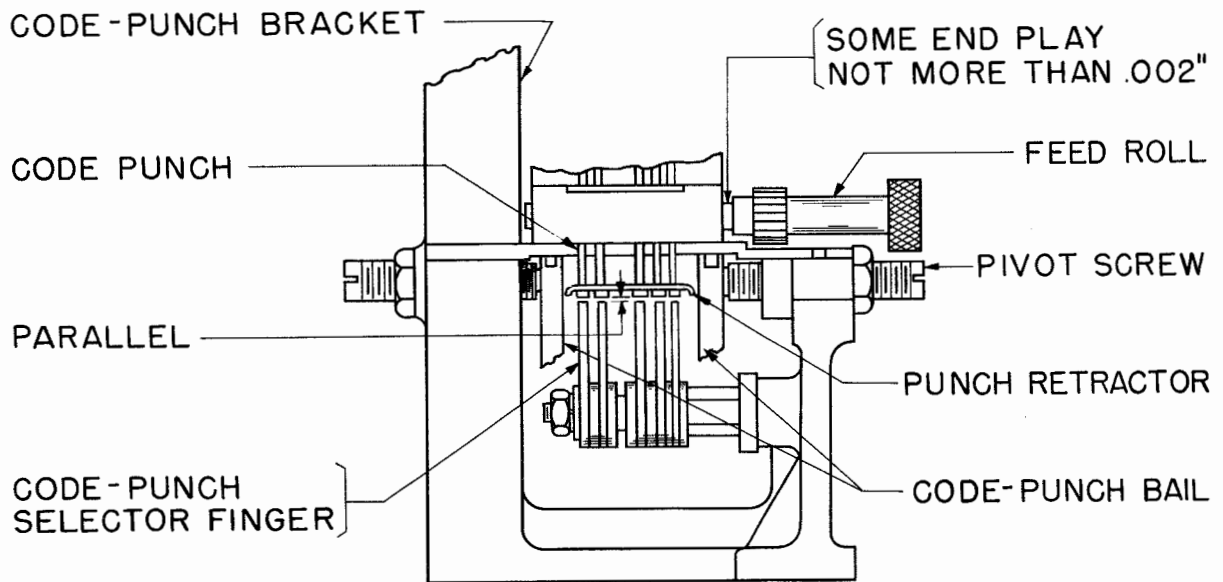


Figure 39

- (a) Operate all code punches manually to engage the punches in the die plate.
- (b) Loosen and retighten (frictiontight) the two screws in the spring-arm and die plate.
- (c) Release the code punches and observe that they are free and return to their lowermost position without hesitation.
- (d) When the punches do not move freely, lightly tap the die plate to effect shifting of the plate to relieve the binding condition.

Note: Do not disassemble defective punches. If satisfactory punching cannot be obtained, replace the entire punch-block assembly.

- (e) With all punches engaged in the die plate, tighten the screws and recheck (c).

2.62 Code-punch-stripper Spring: It shall require at least 4 ounces to start the punch stripper-pins moving, with the punch block removed from the unit.

To Gauge: Remove the punch block in accordance with 2.63, hook the scale under the shoulder of the stripper pins, and pull in a horizontal direction to start the pins moving by compressing the springs.

2.63 Code-punch Feed-roll shall rotate freely and shall have some endplay, not more than as indicated in Figure 39, when the tape-tension lever and the code-punch detent-lever are held clear of the feed roll. The feed hole shall be centrally located between the No. 2 and 3 code holes. See Figure 39.

To Gauge the feed-hole requirement, place a length of tape, in which the feed holes have been perforated, into the die block and engage the feed holes on the pins on the feed wheel. Select the letter I and perforate the tape. Remove the tape from the die block and gauge by eye.

Note: The preceding is a factory adjustment and should not require readjustment unless the shim pile-up has been disturbed or a new feed role is to be installed. If it is necessary to readjust, proceed as follows:

- (1) Unhook the feed-roll detent-lever spring.
- (2) Remove the two code-punch-block-assembly mounting-screws.

- (3) With the BLANK combination selected and the punch arm on the high part of its cam, hold the feed pawl clear and remove the code-punch-block assembly from the punch mechanism. Avoid damaging the punch pins when removing them from the punch retractor.

- (4) Hold the punch-block assembly so that the support plate is upward and remove the two shoulder screws and the two support-plate mounting-screws. Remove the support plate, being careful not to pull out the punch pins.

- (5) Place the proper number of shims on each side of the feed roll to meet the endplay specified in Figure 39. The shims should be slipped on the shaft by means of the slot. Avoid bending or kinking the shims.

- (6) Place the feed roll with the shims in the die block with the wide ends toward the die pins and the straight side toward the bottom of the die block.

- (7) Remount the support plate and the two mounting screws. After tightening the screws, recheck the location of the feed hole in relation to the code holes as specified, when the No. 2 and 3 code punches are operated manually. If the feed hole is not centered between the No. 2 and 3 code-punch holes, shift one or more shims from one side to the other.

- (8) The tape should be held in the die block so that the edges of the tape are parallel with the sides of the block. If the feed roll is rotated so that the left edge of the die plate is midway between two feed-hole perforations, the No. 2 and 3 punch pins will perforate their holes in line with the feed holes. This will aid in gauging the position of the feed roll.

- (9) With the BLANK combination selected, manually rotate the shaft until the punch-arm roller is on the high part of its cam. Place the punches of the code-punch assembly in their lowermost position, move the detent roller clear of the feed-roll ratchet, and hold the feed pawl so that it passes through its slot in the block assembly.

- (10) Engage the punches and the guide shoulder-screws of the punch-block assembly in the retractor slots and replace the front punch-block mounting-screw frictiontight.

- (11) Hold the pivoted transmitter against the punch block and locate the block, within

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the limits of its mounting holes, parallel to the edge of the pivoted-transmitter guide-plate. (It may be necessary to move the ribbon guide out of the way.) Replace the rear screw before tightening both mounting screws.

- (12) Rehook the feed-roll detent-lever spring. Check the following adjustments:

<u>Adjustment</u>	<u>Paragraph</u>
Code-punch Feed-pawl	2.65
Code-punch Feed-roll Detent (Final Adjustment)	2.92
Code-punch Tape-guide	2.97
Ribbon Guide	2.98
Pivoted-transmitter Bracket	2.100
Pivoted-transmitter Pilot-screws	2.101
Tape-feed-pin-oscillator Backstop-screw	2.102
Pivoted-transmitter Tape-guide Plate	2.103
Tape-depressing Bail	2.104

2.64 Code-punch Feed-roll Detent (Preliminary Adjustment): When a length of tape containing ten feed holes to the inch (check with the TP95960 tape gauge) is placed in the code-punch die-block and the code-punch feed-roll detent is resting in an indent between two teeth on the ratchet, the left edge of a feed hole shall be visible at the left edge of the die block when the feed holes in the tape are engaged with the pins on the feed roll. See Figure 40.

To Adjust: Loosen the detent-lever mounting-plate clamping-screws and position the plate.

2.65 Code-punch Feed-pawl (Preliminary Adjustment): The feed pawl shall rest on the bottom of the first notch below the horizontal center line of the feed roll with the punch-arm roller on the lowest part of its cam. See Figure 40.

To Adjust: Loosen the code-feed-pawl adjustable-mounting-plate clamping-screws and position the plate by means of the elongated left-hand mounting hole.

2.66 Sensing and Distributing Clutch-magnet Mechanism should meet the following requirements:

Note: Adjustments (a) and (b) need not be made unless the shims or magnet have been disturbed.

(a) The clutch armature-levers shall have some endplay, not to exceed 0.006 inch. See Figure 41B.

To Adjust: Add or remove shims between the armature levers and the bracket in which the shaft is mounted.

(b) The armatures when operated shall rest against the magnet cores evenly. See Figure 41A.

To Gauge: Hold a light background behind the armature cores.

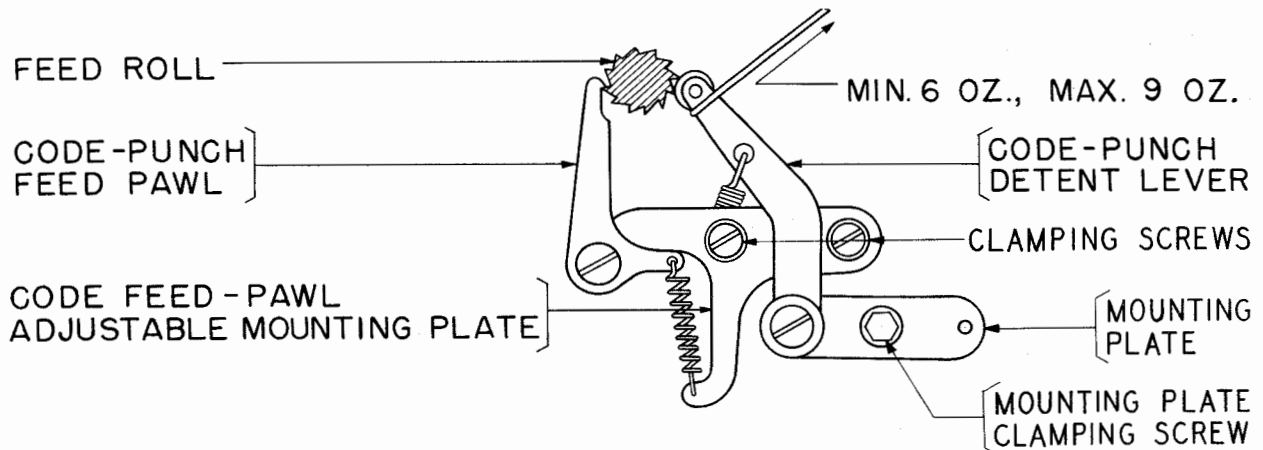


Figure 40

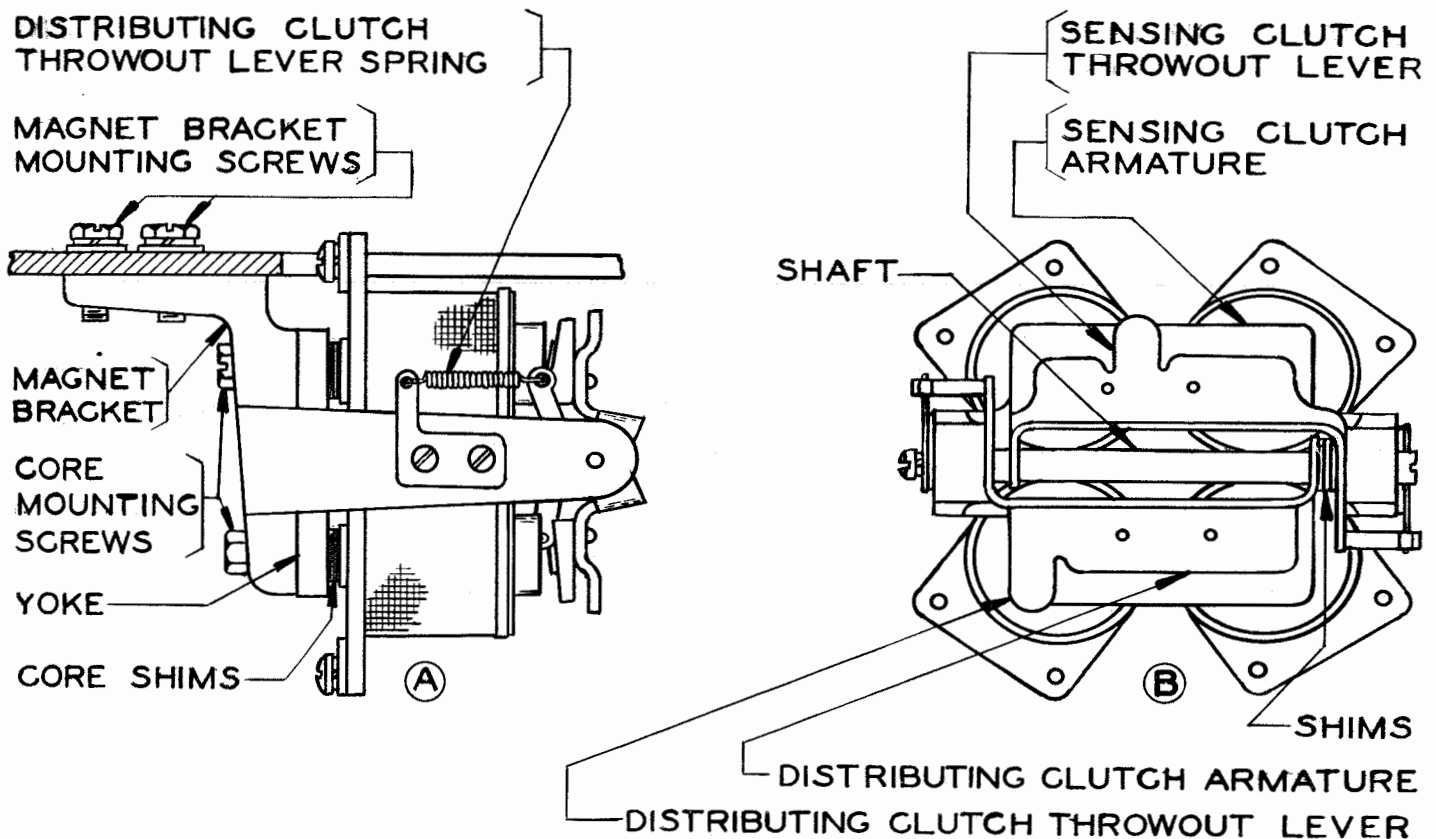


Figure 41

To Adjust: Add or remove shims between the magnet cores and the magnet yoke.

(c) With the driving-clutch members positioned in the center of their elongated holes (preliminary) and the armatures held in the operated position, there shall be a clearance as indicated in Figure 42 between the high part of the driven clutches and their respective clutch-throwout levers. The armatures shall be parallel to the shafts, and with the armatures in the unoperated positions, the clutch-throwout levers shall disengage their clutches with approximately 0.005-inch clearance between the clutch teeth. See Figure 42.

To Adjust: Loosen the clutch-magnet-bracket mounting-screws and position the bracket. (It may be necessary to loosen the clutch-driving-members mounting-screws and position the members by means of their elongated mounting holes.) See Figures 41A and 42.

2.67 Sensing and Distributing Clutch-magnet Release-springs:

(a) When a clutch-magnet release-spring (TP120682) has been installed on each clutch-magnet, the spring shall rest against the top insulators of each set of magnet coils.

To Adjust: Bend the legs of the release spring.

(b) With the throwout-lever springs removed, and an armature held lightly against the center leaf of the release spring but not compressing the release spring while the other armature is held in the unoperated position, there shall be minimum 0.006 inch, maximum 0.015 inch between the magnet core and the armature at the closest point.

To Adjust: Bend the center leaf-spring.

Note: Check that the operating edges of the leaf extensions are parallel to their respective armatures, as gauged by eye.

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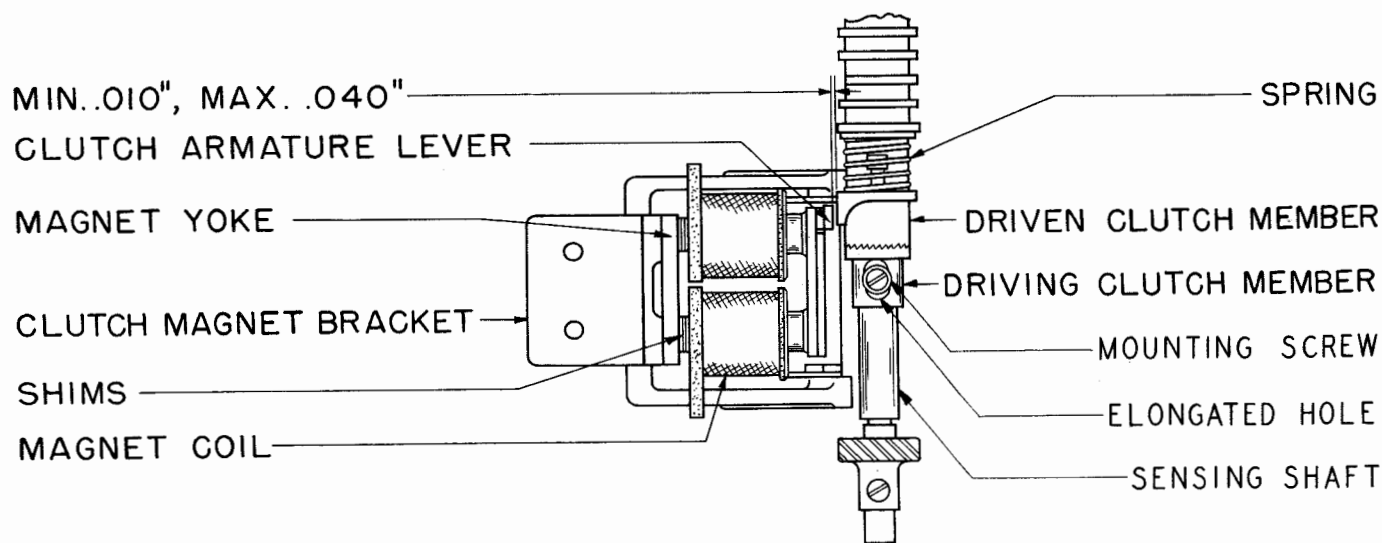


Figure 42

- (c) It shall require at least 12 ounces to push the armature until it just touches the core.

To Gauge: Apply the push end of the scale in a horizontal direction to the outer edge of the armature, approximately in the middle. Replace the throwout-lever springs.

- 2.68 Subshaft-bearing Brackets: The subshaft shall be free on its bearing with a minimum amount of endplay. The gears at both ends shall have a minimum amount of backlash throughout a complete revolution of the subshaft.

To Adjust: Loosen the mounting-screws of the subshaft mounting-brackets and position the brackets. To adjust gear play between gears at left end of shaft, add or remove shims located between bearing brackets and base casting.

- 2.69 Sensing and Distributing Driving-clutch shall meet the following requirements: There shall be a clearance as indicated in Figure 43 between the teeth of the driving and driven clutch members.

CAUTION: TO AVOID DAMAGE TO THE MECHANISM, CHECK THAT THERE IS CLEARANCE BETWEEN THE CLUTCH MEMBERS BEFORE APPLYING POWER.

To Gauge: Operate the unit under power, stop the cam assemblies by releasing the clutch-throwout levers, and then stop the motor.

To Adjust: Loosen the driving-clutch mounting-screw and reposition the driving member by means of its elongated mounting hole.

- 2.70 Punch-arm-shaft Oiler: The lid on the oilcup on the upper end of the punch-arm shaft shall open to the left.

To Adjust: Loosen the punch-arm-shaft setscrew and reposition the shaft.

- 2.71 Sensing-shaft Rear-bearing Oilcup: The oilcup on the rear bearing of the sensing shaft shall be positioned so that the hinge is toward the rear of the unit, and the clearance between the hexagonal portion of the oilcup and the locknut shall not exceed 1/16 inch.

To Adjust: Loosen the hexagonal locknut on the oilcup and position the cup.

- 2.72 Sensing and Distributing Clutch Spring: It shall require a pull as indicated in Figure 43 to just separate the teeth of either clutch,

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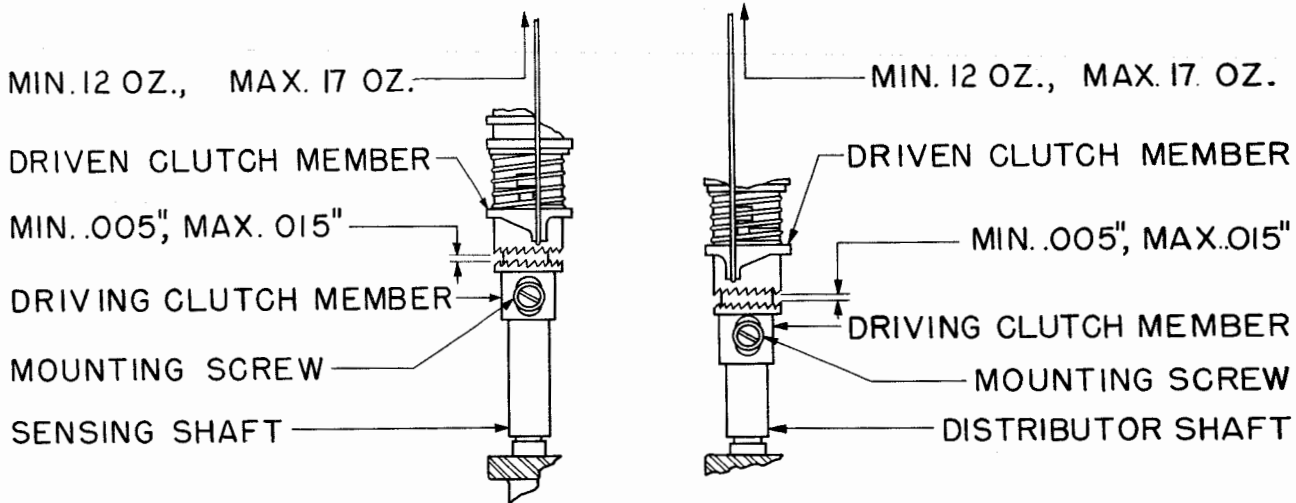


Figure 43

with the unit resting on its rear supports and the teeth on the driven-clutch member resting on the teeth of the driving-clutch member, but not engaged. The springs can be identified as follows:

Spring	Identification
Sensing-clutch spring TP102252	End-turns painted green
Distributing-clutch spring TP120599	End-turns painted gray

To Gauge: Hook the pull end of the scale over the raised portion of the clutch-driven members and pull in line with the shafts.

2.73 Prepunch Tape-guide shall be positioned so that the punch-block cleaning tool when threaded through the tape guide, will not snag at the entrance to the die block. The rear of the guide shall line up with the rear of the slot in the die block. (The punch-block cleaning tool should never be used while the punch mechanism is moving.)

To Adjust: Loosen the tape-guide mounting-screws and align the guide.

2.74 Prepunch Tape-guide Spring shall be positioned so that its curved tip is centered on the tape at a point opposite the cutout portion of the tape guide. The tension of the spring shall hold the tape firmly toward the rear wall of the die-block slot without buckling.

To Adjust for center alignment, loosen the spring mounting-screws and position the spring. To adjust the tension, bend the spring.

2.75 Prepunch Retaining-bracket:

(a) There shall be some clearance, not more than as indicated in Figure 44, between the top of the feed-hole punch and the prepunch arm, when the feed-hole punch is at its highest point of travel.

To Adjust: Loosen the prepunch retaining-bracket mounting-screws and reposition the bracket.

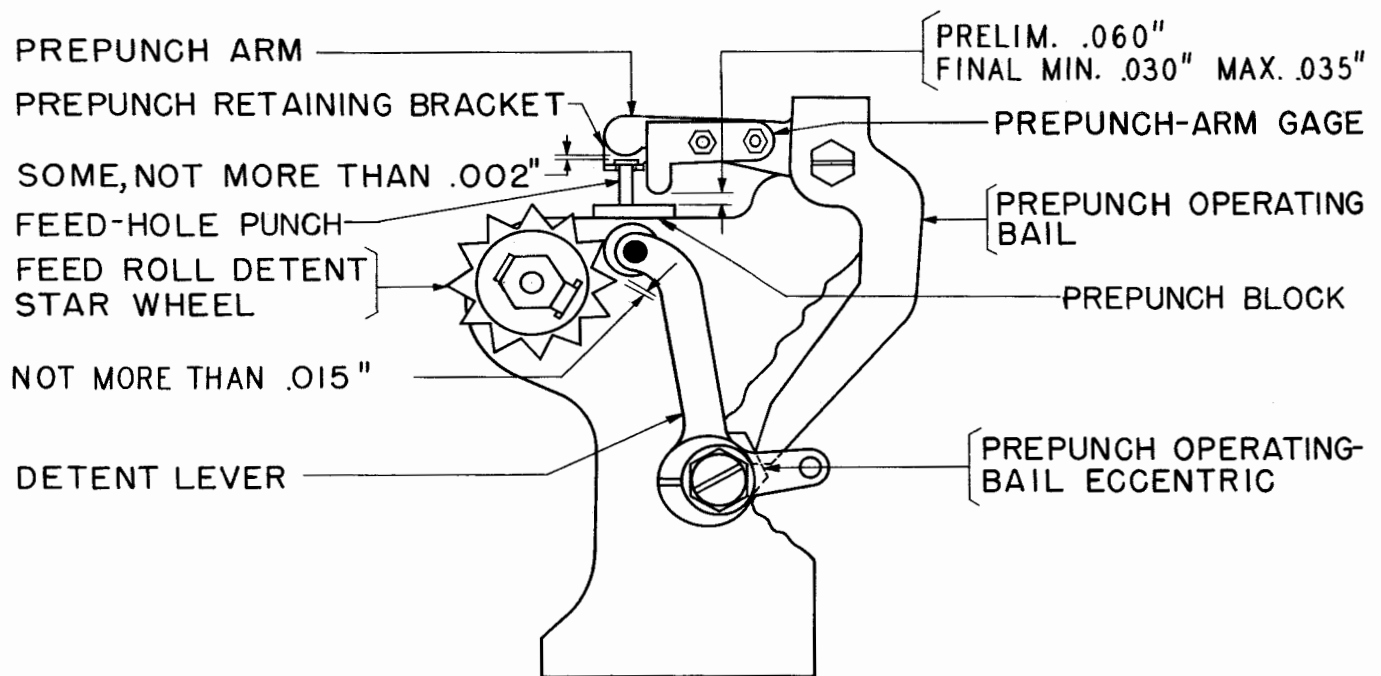


Figure 44

- (b) There shall be no bind in the entire length of travel of the feed-hole punch.

To Check: Remove the prepunch operating-bail spring and feel for bind.

To Adjust: Align the guide and die-plate assembly as required.

2.76 Prepunch Feed-roll Bearings: The feed roll shall be free in its bearings with some endplay, not more than indicated in Figure 45, with the feed-roll detent, the feed pawl, and the tape-tension lever held clear of the feed roll.

To Adjust for freeness, loosen the rear-bearing-bracket mounting-screws and reposition the bracket. To adjust for endplay, loosen the rear-bearing-bushing locknut and reposition the bearing.

2.77 Prepunch Tape-tension-lever Stud: The tape-tension lever shall be centrally located with respect to the feed-roll pins. This requirement should be measured as follows:

(1) Take up the feed-roll endplay toward the star wheel and the tension-lever endplay toward its adjusting nut. The edge of the lever slot may touch the feed-roll pins on the side of the pins nearest the ratchet, but there must be clearance on the other side.

(2) Take up the feed-roll endplay away from the star wheel and the tension-lever endplay away from the tension-lever adjusting-nut. The edge of the lever slot may touch the feed-roll pins on the side farthest away from the ratchet, but there must be clearance on the other side.

To Adjust: Add or remove shims between the shoulder on the tape-tension-lever stud and its mounting bracket.

2.78 Prepunch Tape-tension-lever Spring: It shall require a pull as indicated in Figure 46 to just pull the lever away from the feed roll.

To Gauge: Hook the pull end of the scale under the tension lever at the right-hand end of the slot and pull at a right angle to the lever.

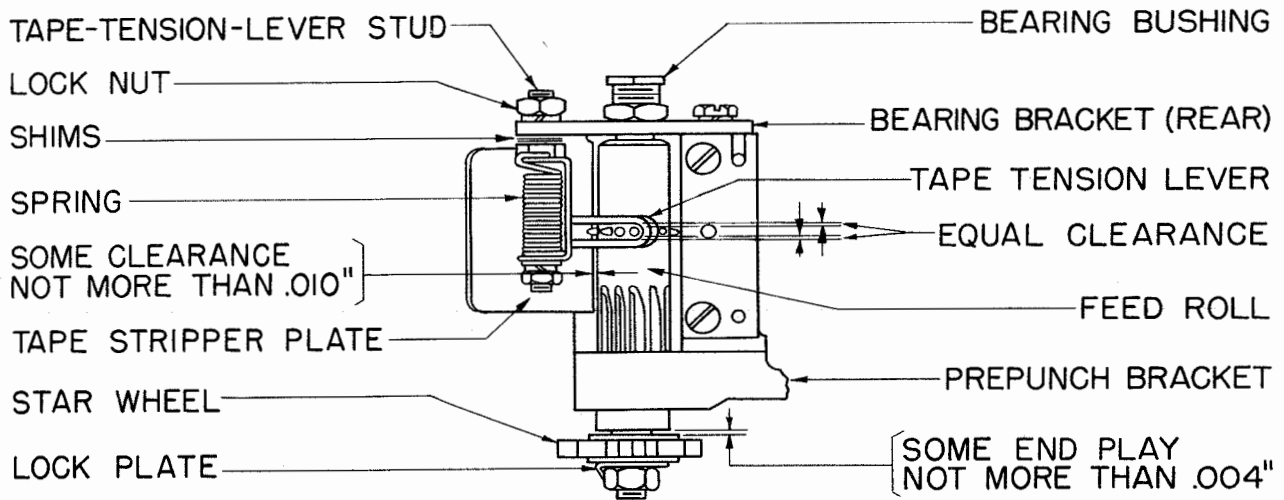


Figure 45

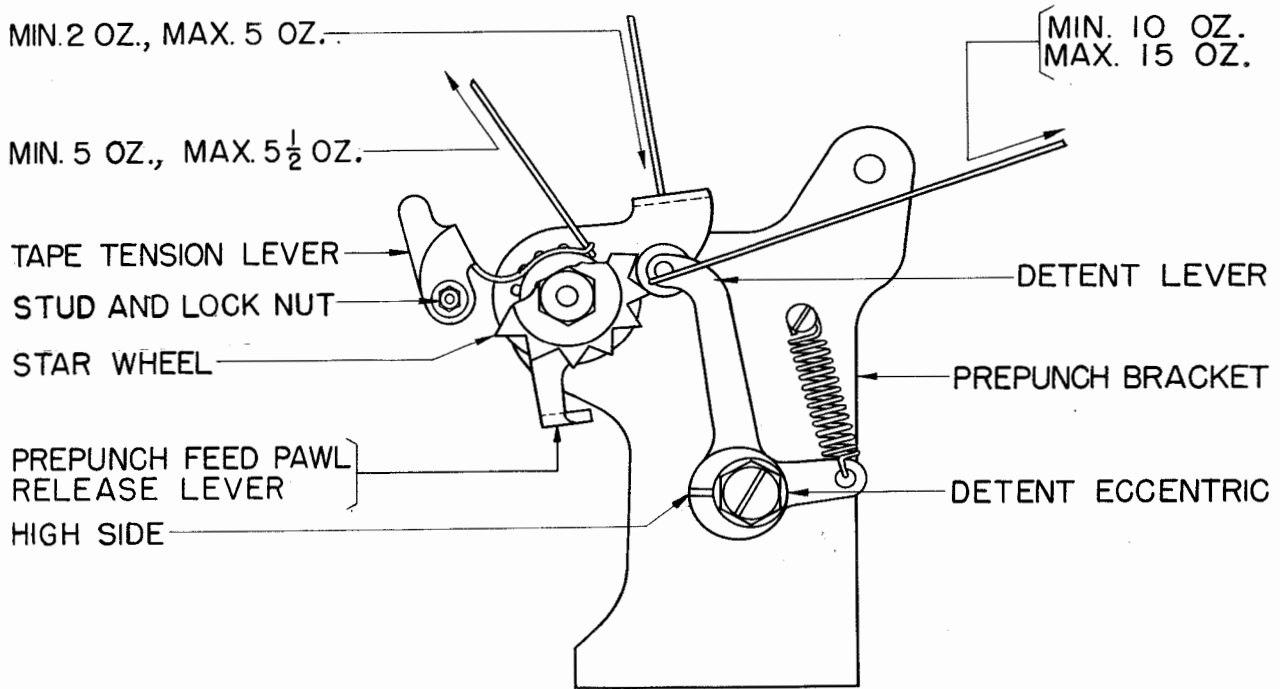


Figure 46

To Adjust: Hold the tape-tension-lever stud with a wrench and loosen the locknut. Rotate the stud in either direction as required. When tightening the locknut, hold the stud to prevent it from slipping.

2.79 Prepunch Feed-roll Detent (Preliminary Adjustment): The high side of the detent eccentric shall be positioned toward the left with the slot horizontal. See Figure 46.

To Adjust: Loosen the detent-eccentric mounting-screw and rotate the eccentric.

2.80 Prepunch Feed-pawl Eccentric (Preliminary Adjustment): The feed pawl shall rest in the bottom of the first notch below the horizontal center line of the feed roll with the punch-arm roller on the low part of its cam. See Figure 47.

To Adjust: Loosen the feed-pawl-eccentric mounting-screw and rotate the eccentric. Make certain the high side of the eccentric is to the left.

2.81 Prepunch Operating-bail Eccentric (Preliminary Adjustment):

(a) A piece of unperforated tape shall be held friction-tight in the prepunch block by means of the feed-hole punch when the punch-arm roller is on the high part of its cam.

To Adjust: Loosen the prepunch operating-bail-eccentric mounting-screw and rotate the eccentric.

(b) There should be approximately a preliminary clearance as indicated in Figure 44 between the end of the prepunch-arm gauge and the prepunch block.

To Adjust: Loosen the prepunch-arm-gauge mounting-nuts and position the gauge.

(c) With the tape removed, there shall be a clearance as indicated in Figure 44 between the end of the prepunch-arm gauge and the prepunch block with the punch-arm roller on high part of cam.

To Adjust: Loosen the prepunch operating-bail-eccentric mounting-screw and reposition the eccentric. The high part of the eccentric should be positioned above the center of a horizontal line through the eccentric.

2.82 Prepunch Feed-roll Detent (Final Adjustment): There shall be ten feed holes to the inch of tape ± 0.007 inch in a 4-inch length of tape when the tape has been perforated under power.

Gauge with the TP95960 tape gauge.

To Adjust: Loosen the feed-roll-detent-eccentric mounting-screw and rotate the eccentric, keeping the high side toward the left. See Figure 46.

2.83 Prepunch Feed-pawl Eccentric (Final Adjustment): Check the following requirements with the tape-tension lever held away

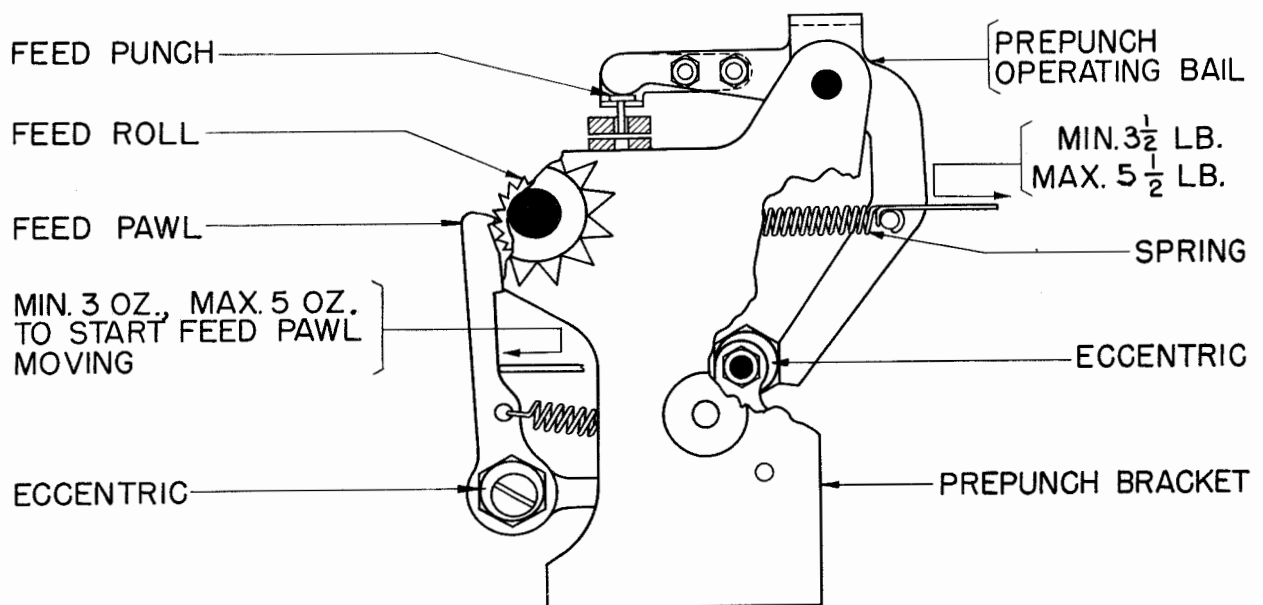


Figure 47

from the feed roll. With the detent roller in engagement with the feed-roll star-wheel, rotate the receiving shaft until the feed pawl is in its uppermost position. Hold the detent roller away from the star wheel and continue to rotate the receiving shaft until the feed pawl is in its lowermost position. The feed roll shall have rotated one full step. See Figure 47.

To Check: Allow the feed-roll detent-lever roller to come in engagement with the feed-roll star-wheel. The star wheel should not rotate in a clockwise direction, and the clearance between the detent-lever roller and the face of the tooth directly below the roller should be as indicated in Figure 44. Check these requirements at four points on the star wheel approximately 90 degrees apart.

To Adjust: Position the feed-pawl eccentric.

2.84 Prepunch Operating-bail Eccentric (Final Adjustment): Rotate the receiving shaft from its stop position until the prepunch feed-pawl starts its downward movement. Place a 0.006-inch flat gauge in the tape slot of the prepunch block and continue to rotate the receiving shaft until the gauge just slides under the prepunch pin. In this position there shall be some clearance between the face of the feed pawl and the face of a tooth on the feed roll. Check for clearance of each tooth on the feed roll by rotating the feed roll in a counterclockwise direction.

To Adjust: Rotate the receiving shaft until the feed pawl just engages a tooth on the feed roll. Then, readjust the prepunch-bail eccentric until a 0.006-inch flat gauge just slides under the punch pin.

2.85 Prepunch-pin Travel shall meet the following requirement after the prepunch operating-bail eccentric adjustment has been made. With the receiving shaft in its stop position, place a piece of unperforated tape in the prepunch block and rotate the receiving shaft until the feed-punch pin just touches the tape. Measure the clearance between the prepunch gauge and the top of the prepunch block. Continue to rotate the receiving shaft until the prepunch reaches the lowermost point of its travel. Again measure the clearance between the prepunch gauge and the top of the prepunch block. The difference between the two gauge readings shall not be less than 0.020 inch.

2.86 Tape-stripper Plate: There shall be some clearance, not more than as indicated in Figure 45, between the upper edge of the tape-stripper plate and the feed roll. Check throughout one complete revolution of the feed roll.

To Adjust: Loosen the stripper-plate mounting-screws and position the plate.

2.87 Prepunch Operating-bail Spring: It shall require a pull as indicated in Figure 47 to start the prepunch arm moving with the punch-arm roller on the low part of its cam and the prepunch operating-bail lower-extension held against the operating-bail eccentric.

To Gauge: Hook the pull end of the scale over the spring post on the bail and pull horizontally in line with the spring. See Figure 47.

2.88 Prepunch Feed-roll Detent-lever Spring: It shall require a pull as indicated in Figure 46 to just start the detent roller moving away from the star wheel.

To Gauge: Hook the pull end of the scale over the detent lever at the roller and pull at a right angle to the spring.

2.89 Prepunch Feed-pawl Spring: It shall require a pull as indicated in Figure 47 to start the feed pawl moving away from the feed-roll ratchet with the main shaft in the stop position.

To Gauge: Apply the push end of the scale to the feed pawl just above the curved portion at the spring hole and push horizontally to the left.

2.90 Prepunch Feed-pawl Release-lever Spring: It shall require a push as indicated in Figure 46 to just start the prepunch feed-pawl release-lever moving.

To Gauge: Apply the push end of the scale to the top of the release lever and push downward.

2.91 Code-punch-bail-arm Stud (Final Adjustment): The code punches shall punch a full lid with a minimum amount of tear.

To Gauge: Energize the selector magnet and run out a length of tape under power by operating the clutch-release lever.

Note: Do not disassemble defective punches. If satisfactory punching cannot be obtained, replace the entire punch-block assembly.

To Adjust: Loosen the locknut on the punch-bail-arm stud located under the base and position the stud. See Figure 38.

2.92 Code-punch Feed-roll Detent (Final Adjustment) and Code-punch Feed Pawl (Final Adjustment): The centers of the punch holes and the center of the feed hole shall lie in a straight line when a length of tape has been run out in accordance with 2.91.

To Adjust: Loosen the feed-roll-detent mounting-plate clamping-screw and reposition the mounting plate by moving it up or down. Recheck the code-punch feed-pawl adjustment given in 2.65. See Figure 40.

2.93 Code-punch Feed-roll-detent Spring: It shall require a pull as indicated in Figure 40 to start the code-punch detent-lever roller moving away from the feed-roll ratchet.

To Gauge: Hook the pull end of the scale over the detent lever at the roller and pull at a right angle to the upper portion of the lever.

2.94 Code-punch Feed-pawl Spring: It shall require a pull as indicated in Figure 48 to start the pawl moving away from the feed-roll ratchet-wheel.

To Gauge: With the unit in its stop position and the feed-roll-detent lever held away, hook the scale over the feed pawl at the spring hole and pull in line with the spring.

2.95 Tape-depressing-bail Spring: It shall require a pull as indicated in Figure 48 to extend the spring to position length with the tape-depressing bail resting against the transmitter plate.

To Gauge: Unhook the spring from the bail, hook the pull end of the scale through the spring eye, and pull vertically upward.

2.96 Selector-finger Bellcrank-springs: It shall require minimum 2-1/4 ounces, maximum 3-1/4 ounces to start each bellcrank moving, when the code-punch tape-guide has been removed and the main shaft is in the stop position. See Figure 11.

To Gauge: Hook the pull end of the scale under the bellcrank at the spring hole and pull vertically upward. Replace the tape guide.

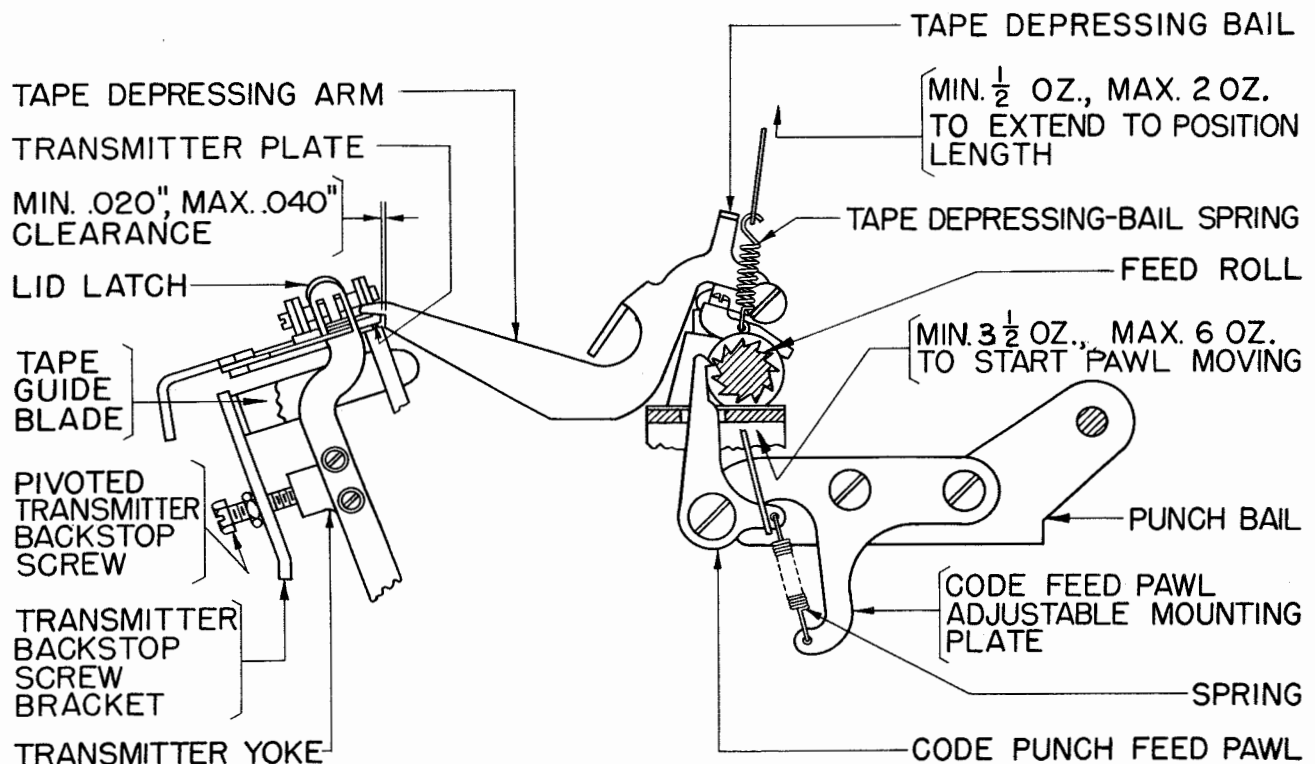


Figure 48

2.97 Code-punch Tape-guide: The tape shall enter the code-punch block without buckling, and a center line through the tape-code holes of the LTRS combination shall be at a right angle to the edges of the tape. See Figure 49.

To Gauge: Perforate a series of LTRS combinations in a length of tape. Open all flaps in the tape on two LTRS perforations spaced approximately 2 inches apart and fold the tape back between the holes, with the edges of the tape in line. Check that the two trailing edges of the two LTRS combinations are in line as gauged by eye.

To Adjust: Loosen the code-punch tape-guide mounting-screws and position the guide.

Note 1: If the tape does not move freely, insert the punch-block cleaning-tool between the guide plate and the die plate of the punch block and move the tool forward and backward a few times to remove any line or paper scraps. The punch-block cleaning tool should never be used while the punch mechanism is moving.

Note 2: Do not take apart defective punches. If satisfactory punching cannot be obtained, replace the entire punch-block assembly.

2.98 Platen Height: With tape inserted in the unit (from the prepunch block through the tape guide into the code punch) the platen height shall be such that the clearance between the platen and the tape is a minimum, and the platen

does not hang up on the rear edge of the tape when the platen-shift mechanism returns from its rearmost position, to which it may be moved by disengaging the shift lever and the platen frame.

To Adjust: Add or remove shims under the platen as necessary.

2.99 Ribbon Guide shall meet the following requirements:

(a) The ribbon shall clear the platen as indicated in Figure 49 when the platen is in either the FIGS or the LTRS position. The guide shall be centered over the platen. See Figure 49.

To Adjust: Loosen the ribbon-guide mounting-screws and position the guide. Before tightening the screws, check (b).

(b) When fraction-type pallets are used it may be necessary to reposition the ribbon guide to insure printing the entire character.

To Adjust: Add or remove washers between the ribbon guide and the tape guide.

2.100 Code-punch-retractor Springs: It shall require a pull as indicated in Figure 50 to start the retractor moving away from the downstops when the punch-arm roller is on the low part of its cam and the selector fingers are in the spacing (extreme right) position.

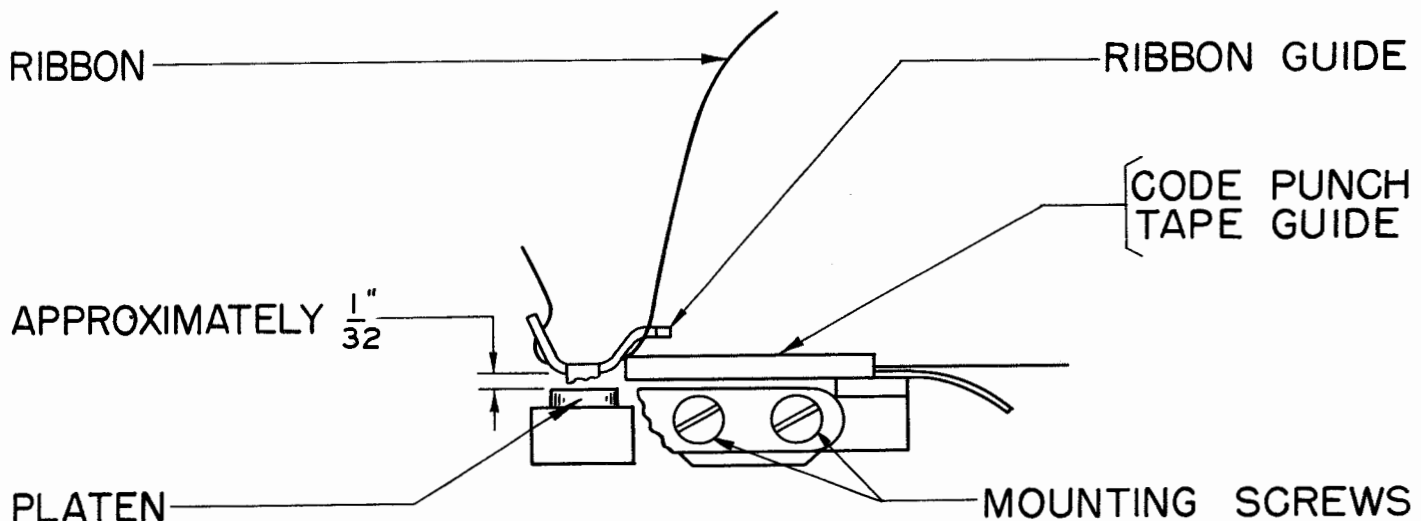


Figure 49

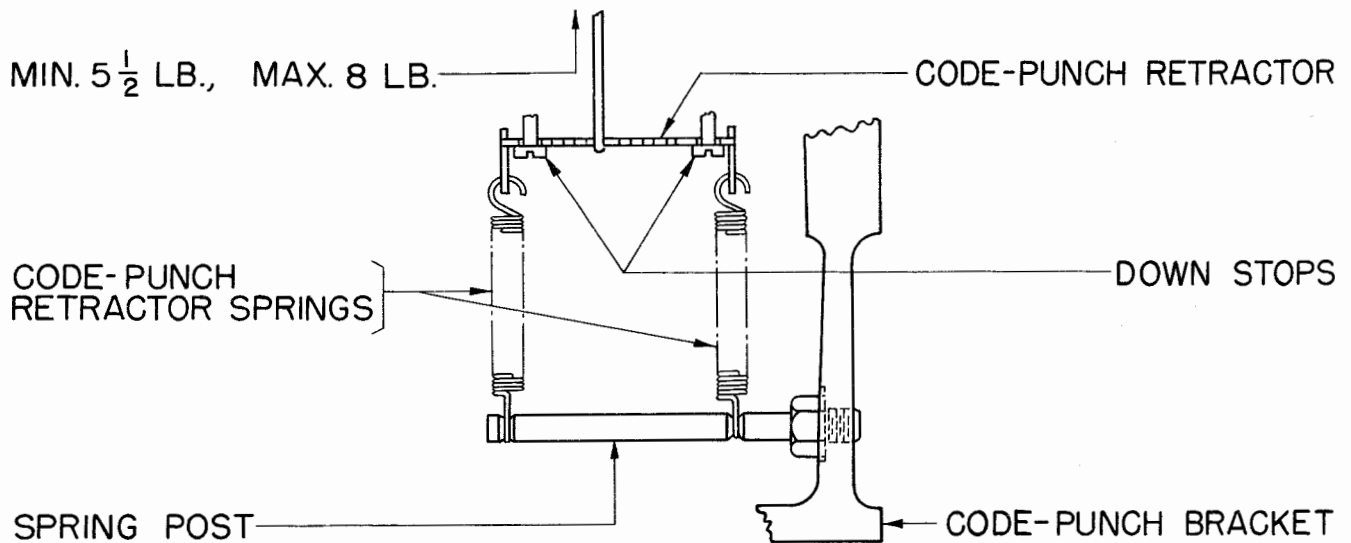


Figure 50

To Gauge: Hook the pull end of the scale under the center of the retractor and position the scale until both sides of the retractor leave their stops simultaneously. (This may require placing the scale under the No. 3 pin.) Pull vertically upward.

2.101 Pivoted-transmitter Bracket: When the pivoted transmitter is held against the code-punch block, the channel on the pivoted transmitter shall be approximately in the same horizontal plane as the tape channel in the code-punch block. Gauge by eye.

Note: To avoid damaging the tape pins while following the procedures outlined herein and in 2.102 to 2.108, inclusive, do not raise or lower the transmitter lid unless the sensing shaft is in its stop position.

To Adjust: Increase or decrease the number of shims between the pivoted-transmitter bracket and the base casting.

2.102 Pivoted-transmitter Pilot-screws: (See 2.101, Note.) With the sensing shaft in its stop position, the pins in the feed-pin oscillator shall be in line with the feed holes in the tape at the point where the tape emerges from the code-punch block. The pivoted transmitter shall have a minimum amount of endplay without bind. See Figure 51.

To Adjust: Loosen the locknuts on the pilot screws and position the screws.

2.103 Tape-feed-pin-oscillator Backstop-screw: (See 2.101, Note.) With the sensing cam-sleeve in the stop position, place a length of tape, which has ten holes to the inch, in the pivoted transmitter. Operate the sensing cam-sleeve slowly until the tape-feed pins leave and are just about to re-enter the tape-feed holes. Under this condition the feed pins shall be centered directly beneath the feed holes in the tape.

To Adjust: Loosen the tape-feed-pin-oscillator backstop-screw locknut and position the screw. See Figure 52.

2.104 Pivoted-transmitter Tape-guide Plate: (See 2.101, Note.) With a length of tape, perforated with the LTRS code combination, emerging from the code-punch block and with the pivoted-sensing-unit tape-guide touching the punch block, the transmitter tape-guide plate should be adjusted on the pivoted frame to meet the following requirements:

- (a) With the sensing-cam assembly in the stop position and the tape-feed holes engaged with the tape-feed pins, the tape shall not buckle against either the front or the rear edges of the tape-guide channel. See Figure 51.

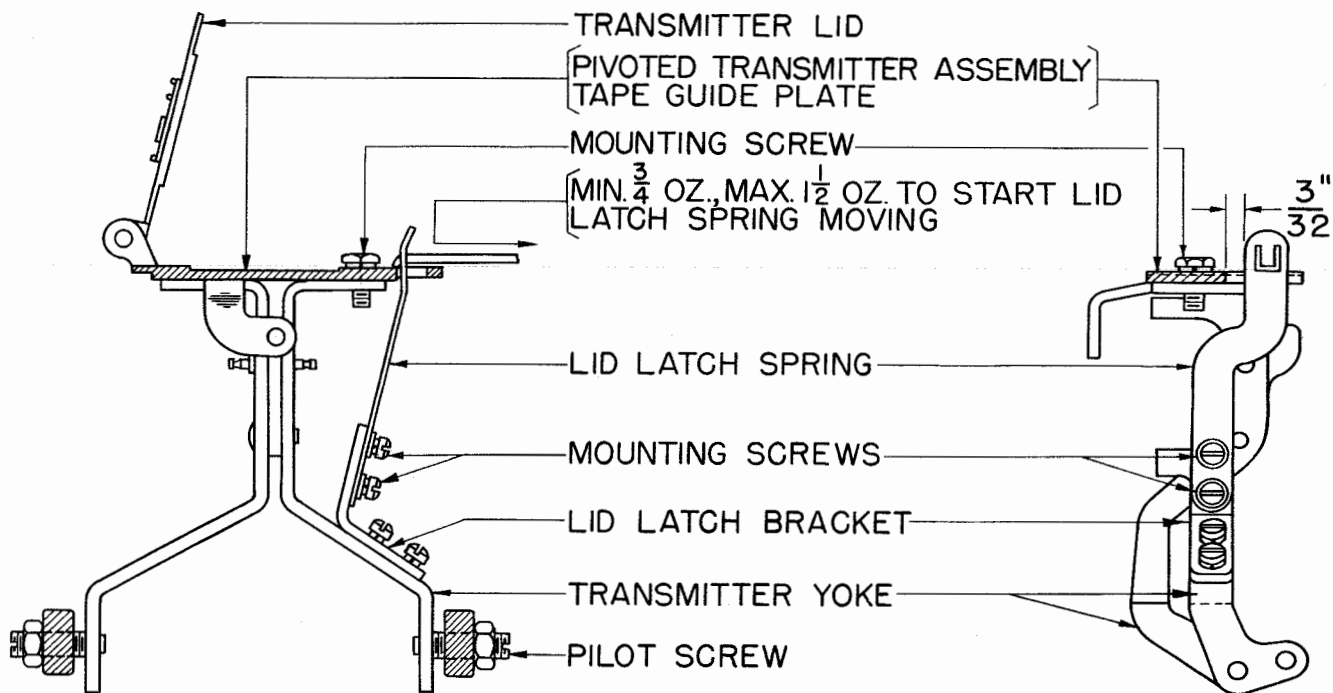


Figure 51

(b) The five sensing pins shall line up approximately in the center of the code holes in the LTRS perforated tape, between the hinged edge and the trailing edge and from front to rear.

To Gauge: First move the pivoted transmitter to its midway position (between its extreme left-hand and right-hand positions), raise the tape-retaining lid, and raise the lids of the perforations over the pins. Then block down the tape-out sensing-pin (rear) and tape-holding-pin (front) by inserting a 0.065-inch or 0.070-inch gauge between the upper prong of their associated Y-levers and the end of the slot in the guide comb. Finally, release the sensing-shaft clutch-lever and turn the motor by hand until the Y-levers of the five sensing pins are about ready to drop off their cams. In this position, the five sensing pins will have raised slightly above the surface of the tape-guide plate and permit checking the requirement.

To Adjust: Loosen the pivoted-transmitter-assembly-tape-guide-plate-mounting-screws and move the plate from left to right or from front to rear as required while rechecking the foregoing requirements. Check to see that the sensing pins do not touch the edges

of their code holes when the pivoted transmitter is: first, one space away from the die block, then in its midway position, and finally in the extreme left-hand position. Gauge by rotating the motor slowly by hand and observing the sensing pins when they are lifting up the flaps in the tape. Remove the 0.065-inch and 0.070-inch gauges. See Figure 51.

2.105 Tape-depressing Bail: (See 2.101, Note.)

With the transmitter lid closed and latched, the tape-depressing arm, which rides on the pivoted transmitter when the transmitter is not in its left-hand (latched) position, shall pass midway between the lid-latch spring and the locating stud of the transmitter lid. See Figure 48.

To Adjust: Bend the blade of the tape-depressing bail.

2.106 Pivoted-transmitter Lid-latch Spring:

(See 2.101, Note.) With the transmitter lid up, it shall require a pull as indicated in Figure 51 to start the flat surface of the latch spring moving away from the tape-guide plate.

To Gauge: Hook the pull end of the scale through the latch spring adjacent to, and just above, the tape-guide plate and pull at a right angle to the spring.

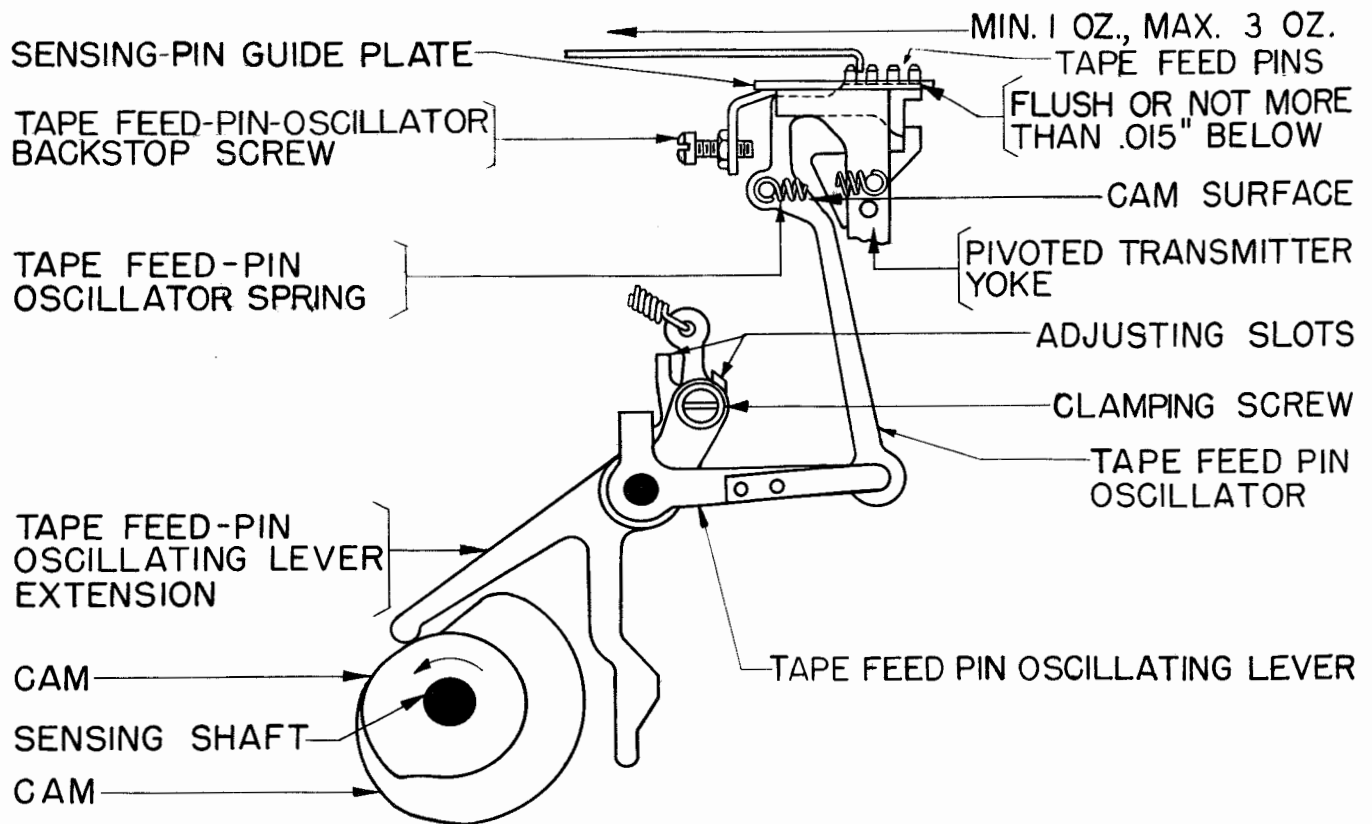


Figure 52

To Adjust: Bend the lid-latch-spring bracket. Care should be exercised to prevent bending the pivoted-transmitter frame.

2.107 Pivoted-transmitter Lid-latch shall be latched by the latch spring with no appreciable play between the lid and the guide plate. (See 2.101, Note.) There shall be a clearance of approximately $3/32$ inch between the left edge of the latch spring and the edge of the slot in the tape-guide plate. See Figure 51

To Adjust: Loosen the lid-latch-spring mounting-screws and reposition the spring by means of its enlarged mounting holes.

2.108 Tape-holding-lever Spring: (See 2.101, Note.) It shall require minimum 2 ounces, maximum 4 ounces to just start the tape-holding lever moving.

To Gauge: Unlatch and raise the transmitter lid. Rotate the sensing cam-sleeve until the tape-holding lever is in the indent of its cam. Hold the pivoted transmitter in a vertical position and apply the push end of the scale to the pin in the tape-holding lever at the sending-unit guide-plate and push vertically downward.

2.109 Y-Lever Pivot-shaft: With the camfollower tip on each Y-lever resting firmly on the high part of its associated cam, the tip of the sensing finger which is withdrawn the least distance into the sensing-mechanism guide-plate shall be just flush with or not more than 0.005 inch below the surface of the tape channel in the guide plate. Gauge by eye with the pivoted transmitter first against the die block, then in the center, and finally against the left stop. See Figure 53.

To Adjust: Loosen the Y-lever pivot-shaft adjusting-cams clamping-screws located at each end of the shaft and reposition the adjustable cams.

2.110 Y-Lever Guide-plate:

(a) With the camfollower tips of the Y-levers resting on the high part of their associated cams, there shall be some clearance between the top edge of the lower arm of the Y-lever and the top of the associated slot. See Figure 53.

To Adjust: Position the Y-lever guide-plate on its mounting screws in the transfer-assembly casting.

(b) The following requirements should be met after the above adjustment has been made:

(1) With the camfollower tips of the Y-levers opposite the low part of their associated cams and the Y-lever springs unhooked, the Y-levers and the sensing pins shall move freely in their guides. Rehook the Y-lever springs.

(2) With the camfollower tips of the Y-levers opposite the low part of their associated cams, the lower edge of the upper arm of the Y-lever shall rest firmly in the bottom of the associated guide slot in the guide plate. See Figure 54.

(3) When the clearance between the top edge of the lower arm of the Y-levers and the top edge of the associated slot is reduced to zero by hand, the sensing pins shall not become disengaged from the sensing-pin guide-plate.

Note: If any of the foregoing requirements cannot be met, the Y-lever guide-plate should be readjusted.

2.111 Y-Lever Spring: With the upper arm of the Y-lever resting firmly in the bottom of its slot, it shall require a pull as indicated in Figure 54 to start the Y-lever moving upward.

To Gauge: Hook the pull end of the scale under the Y-lever adjacent to the left side of the lever guide and pull upward.

2.112 Tape-feed-pin Oscillator:

(a) The top surface of the tape-feed-pin oscillator in which the tape-feed pins mount shall rise to a point flush with, or not more than 0.015 inch below, the lower surface of the tape-guide channel in the sensing-pin guide-plate at any point during the feeding motion from right to left, when the camfollower tip of the tape-feed-pin oscillating-lever extension is riding firmly on the lower part of its cam. See Figure 52.

(b) The tips of the tape-feed pins shall clear the tape as the oscillator moves from left to right on the return portion of the tape-feeding cycle when the camfollower tip on the tape-feed-pin oscillating-lever extension is on the high part of its cam.

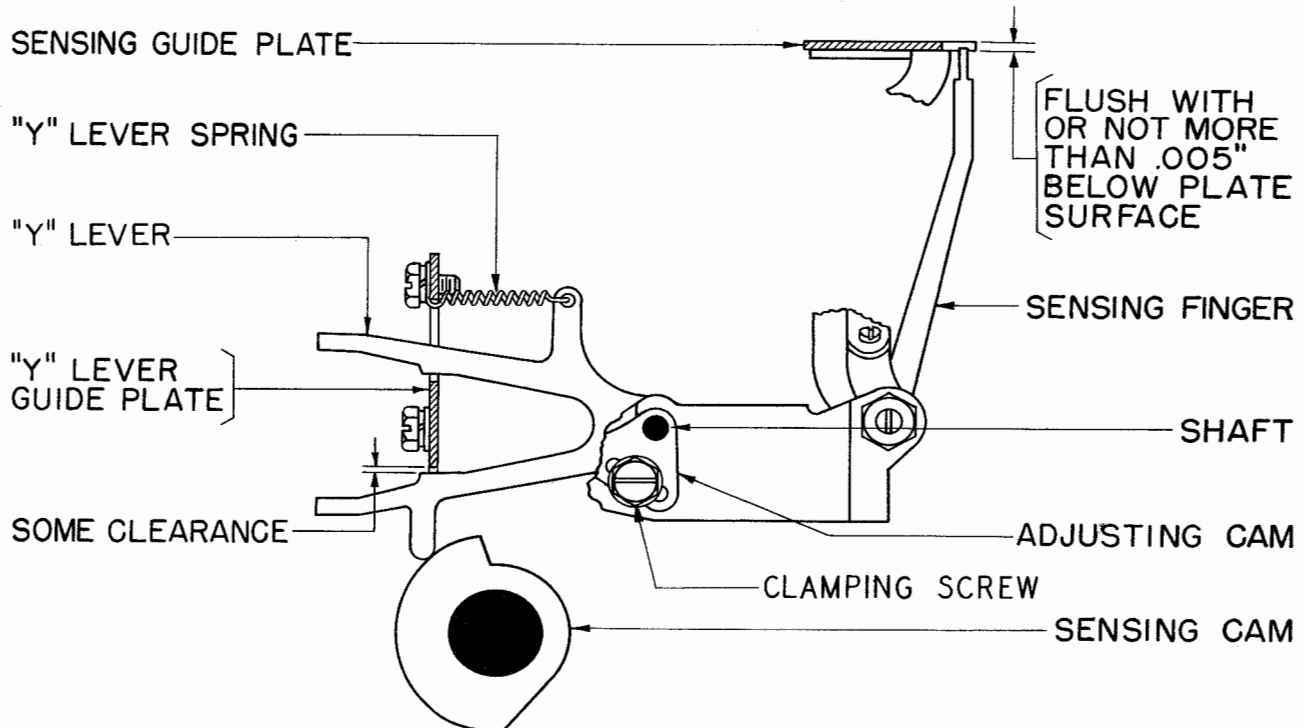


Figure 53

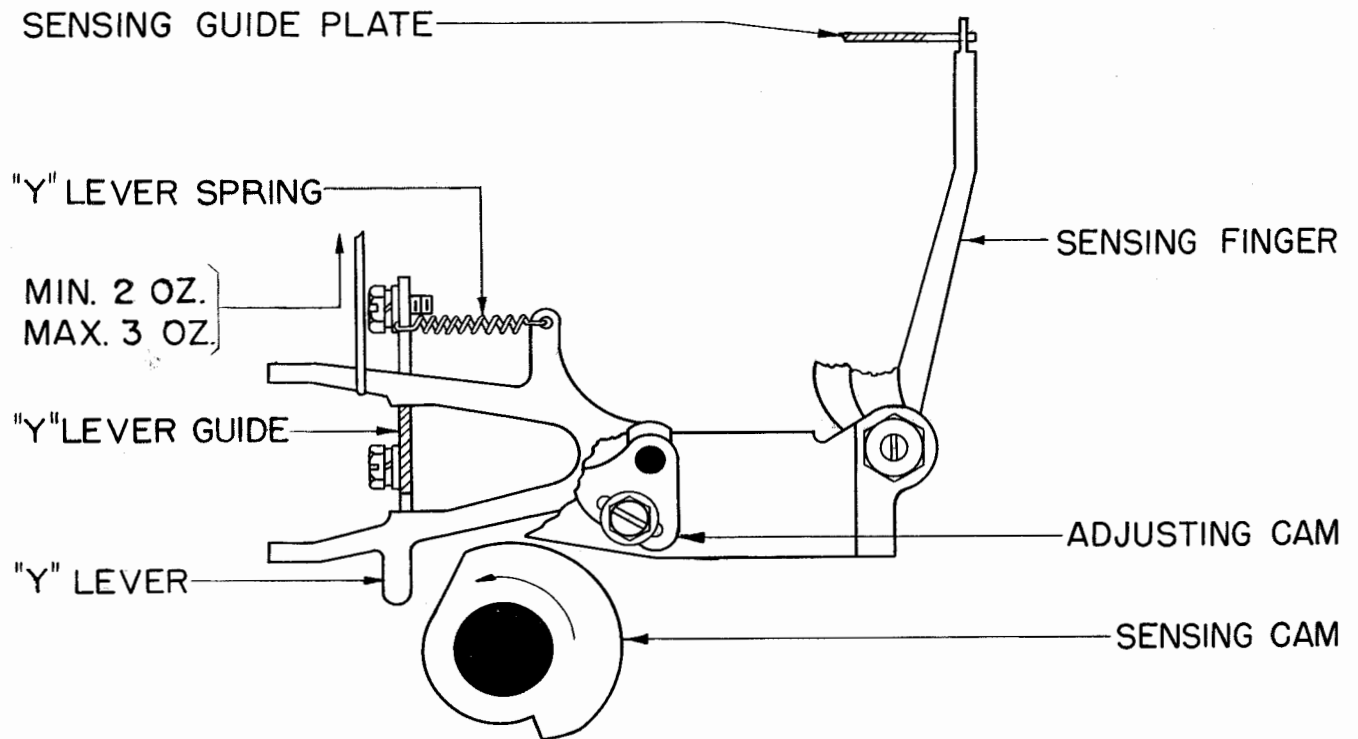


Figure 54

To Adjust: Loosen the tape-feed-pin oscillating-lever extension clamping-screw and position the lever by means of the adjusting slots.

2.113 Tape-feed-pin-oscillator Spring: It shall require a pull as indicated in Figure 52 to start the tape-feed-pin oscillator moving.

To Gauge: With the sensing shaft in its stop position, hook the pull end of the scale over the left tape-feed pin in the oscillator and pull horizontally to the left.

2.114 Tape-feed Lever: The tape-feed-pin oscillator shall start moving to the left immediately after the tape-pin feed-lever-extension roller starts to ride from the high to the low part of its cam. See Figure 55.

To Adjust: Engage the sensing-shaft clutch and rotate the motor by hand until the tape-feed-lever extension just starts to move. Change the angular relation between the tape-feed lever and the tape-feed-lever extension by loosening the clamping screw and moving the lever in its adjusting slot until the tape-feed lever just starts to move

to the left. After tightening the screw, re-check the requirement, and readjust if necessary.

2.115 Tape-feed-lever-extension Spring: It shall require a pull as indicated in Figure 55 to extend the spring to position length with the sensing-cam sleeve in its stop position and the tape-feed-lever-extension cam-roller resting on its cam.

To Gauge: Unhook the upper end of the tape-feed-lever-extension spring, hook the pull end of the scale through the spring eye, and pull upward to position length.

2.116 Tape-feed-pin Oscillating-lever-extension Spring: It shall require a push as indicated in Figure 56 to just start the oscillating-lever extension moving when the camfollower tip of the extension is resting firmly on the high part of its cam.

To Gauge: Apply the push end of the scale to the extension at the spring hole and push to the right as nearly in line with the spring as possible.

2.117 Pivoted-transmitter Backstop-screw:

There shall be a clearance as indicated in Figure 48 between the latch on the tape-depressing arm and the adjacent latching edge on the transmitter plate with the pivoted transmitter positioned against its backstop screw and the latch on the tape-depressing bail engaged with the transmitter.

To Adjust: Loosen the backstop-screw locknut and position the screw. It may be necessary to bend the backstop-screw bracket to obtain this clearance.

2.118 Tape-guide Blades shall pass between the tape-out and the No. 1 sensing fingers and between the No. 4 and 5 sensing fingers without touching the sensing fingers or the underside of the transmitter frame, as the transmitter pivots from right to left. See Figure 48.

To Adjust: Loosen the tape-guide-blade mounting-screws and position the blades by means of their enlarged mounting holes and by bending the blades as required.

2.119 Transfer Bail and Slide Assembly Components: The method of adjusting the components of the transfer bail and slide assembly depends on the style of the transfer slide-bar mounting-bracket with which the reperforator-transmitter unit is equipped. There are two styles of brackets, old style and new style. The old style consists of three sheet-metal parts, while the new-style bracket consists of a single metal casting.

(a) Where a unit is equipped with the old-style bracket, the adjustments given in 2.120 to 2.123, inclusive, apply.

(b) Where a unit is equipped with the new-style bracket, the adjustments given in 2.124 to 2.128, inclusive, apply.

Note: To check or adjust any of the transfer bail and slide assembly components per 2.120 to 2.128, inclusive, the transfer bail and slide assembly should be removed from the base casting.

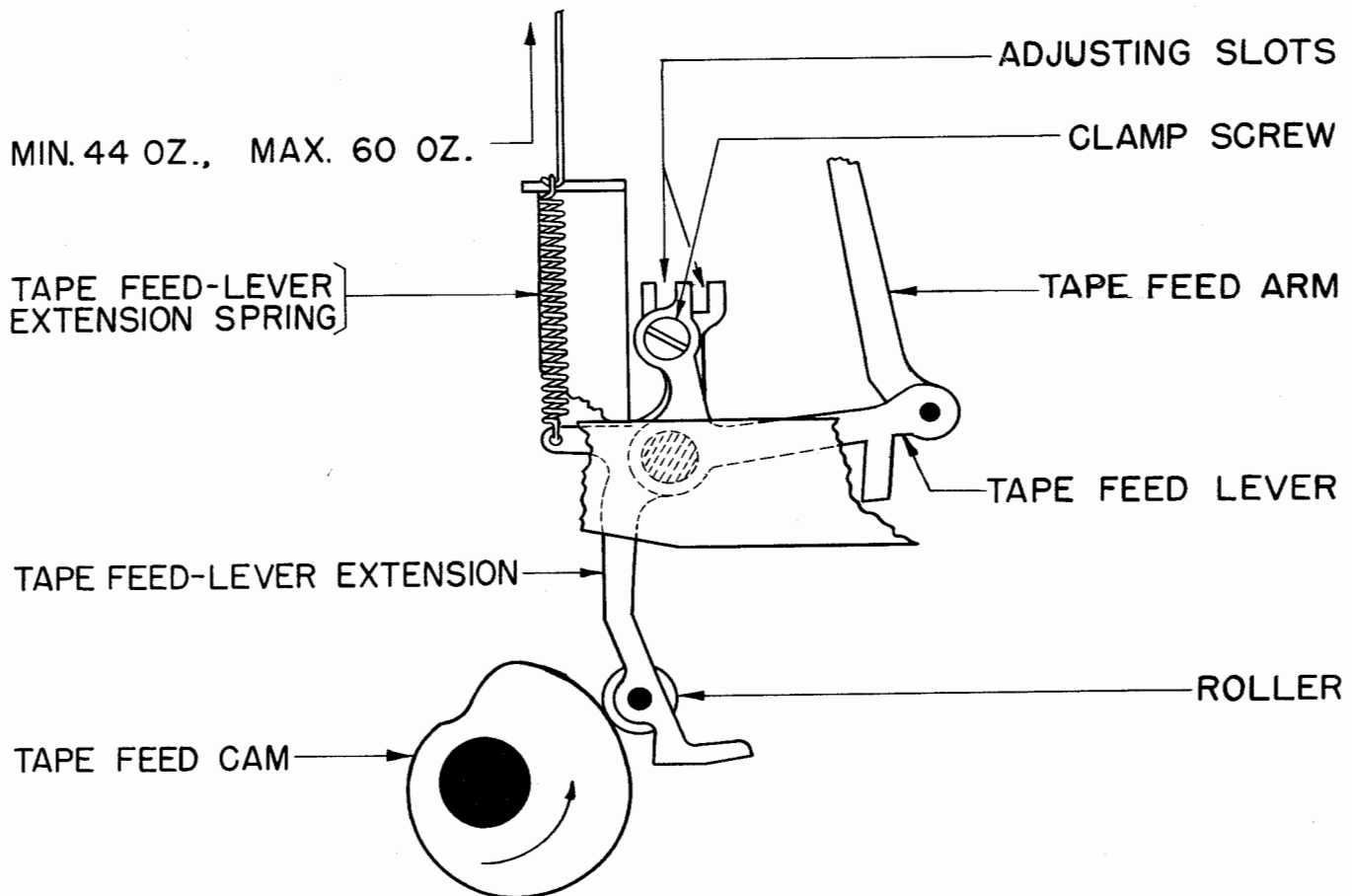


Figure 55

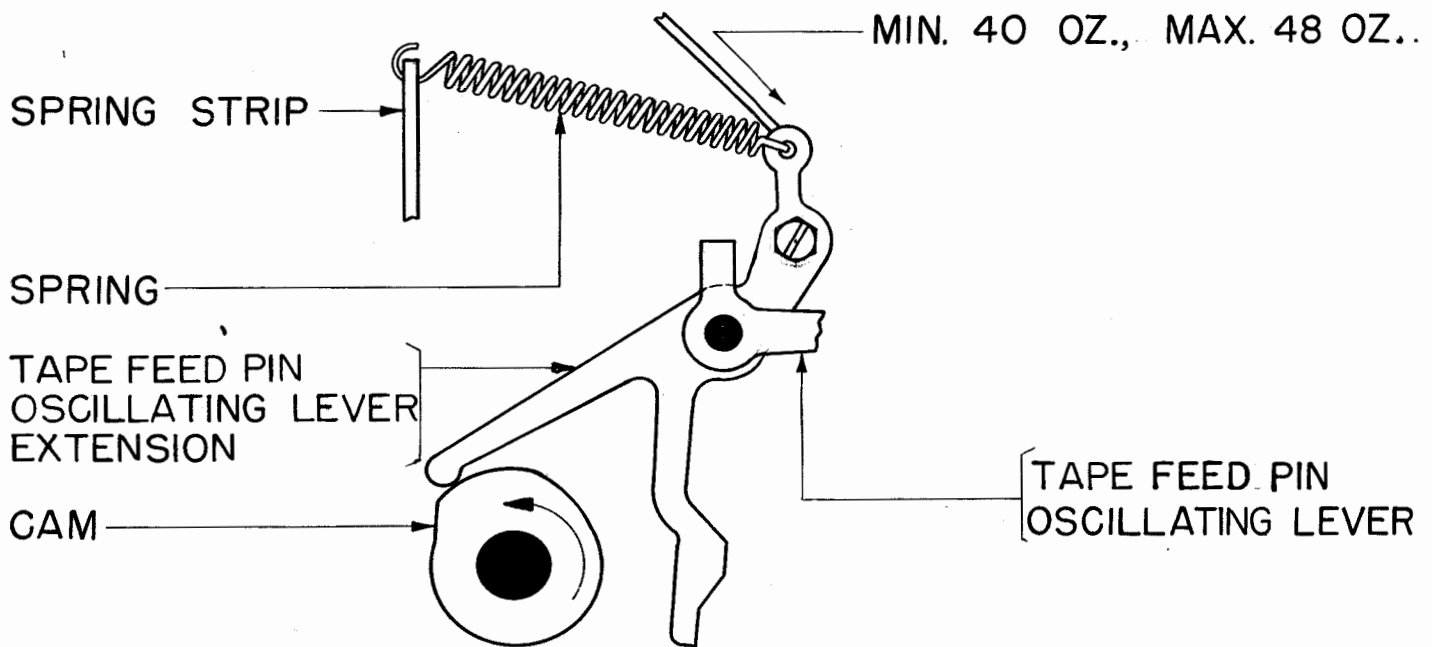


Figure 56

2.120 Lower Transfer-slide-bar Eccentric-shaft (Old-style Bracket): (See also 2.119.) The high part of the eccentric shaft shall extend downward. See Figure 57.

To Adjust: Loosen the eccentric-shaft locknut located on the rear of the shaft and reposition the shaft in the transfer-slide mounting-brackets.

2.121 Lower Transfer-slide-bar Eccentric-shaft Collar (Old-style Bracket): (See also 2.119.) The transfer slide bars shall be perpendicular to their shafts, and move freely in their guides. There shall be some endplay, not more than that indicated in Figure 57, between the set-collar on the lower eccentric-shaft and the adjacent slide bar when the play is taken up in a direction away from the collar.

To Adjust: Loosen the set-collar setscrews and position the collar.

2.122 Transfer-lever Bail (Old-style Bracket): (See also 2.119.) With the bail spring unhooked, the transfer levers shall line up centrally with their associated transfer-slide bars, and the bail shall rotate freely on its bearing screws with some endplay, not more than that indicated in Figure 57.

To Adjust: Loosen the locknuts on the pilot screws and position the screws.

2.123 Sensing-contact Operating-bails (Old-style Bracket): (See also 2.119.) The sensing-contact operating-bails shall line up centrally with the associated camming projections on the transfer-slide bars. The bails shall rotate freely on their shaft with some endplay, not more than that indicated in Figure 58.

To Adjust: Loosen the setscrew in one of the set-collars and position the collar against the aligned sensing-contact operating-bail. Tighten the setscrew. Loosen the setscrew in the other set-collar and position the collar for specified clearance when the play of the levers is taken up against the first collar. After tightening the setscrew, rehook the transfer-lever-bail spring.

2.124 Sensing-contact Operating-bails (New-style Bracket): (See also 2.119.) The sensing-contact operating-bails shall be centrally located between the casting supports and the bails shall rotate freely on their shaft with some endplay, not more than that indicated in Figure 59.

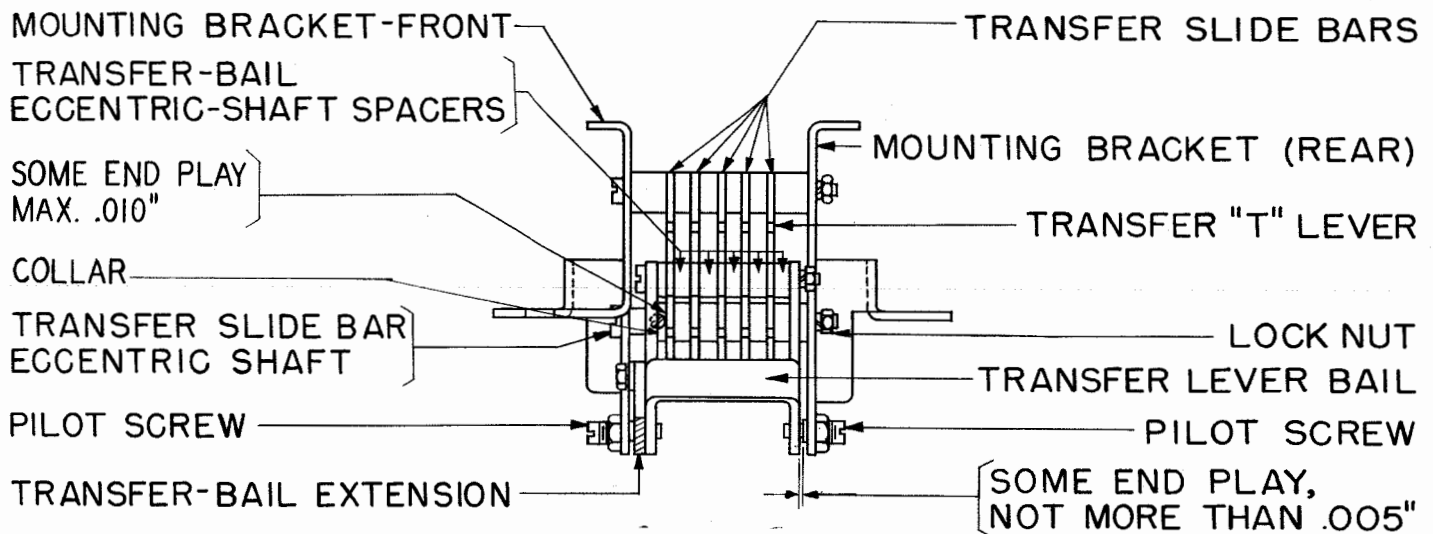


Figure 57

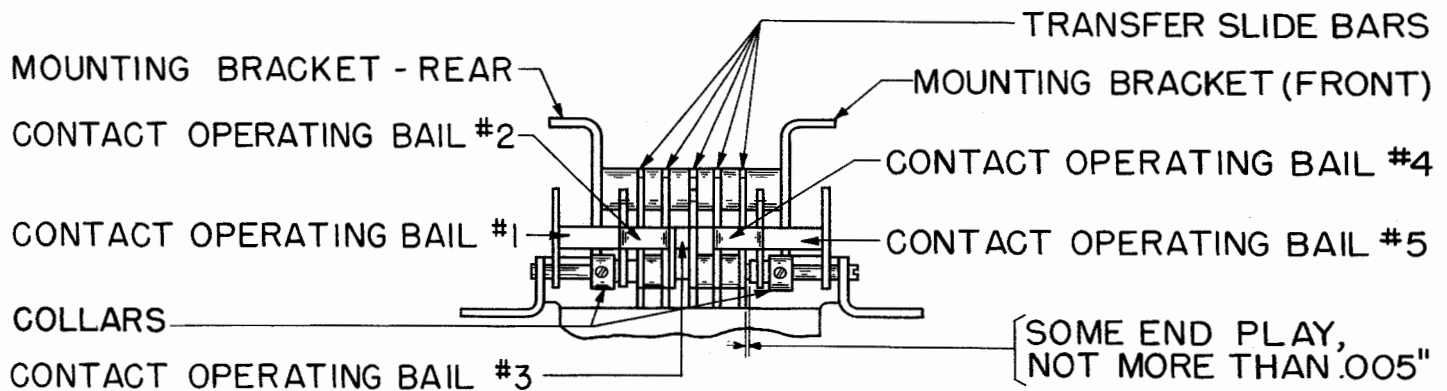


Figure 58

To Adjust: Loosen the setscrews of both set-collars and centrally locate the entire assembly along its shaft. Tighten the setscrew on one set-collar. Position the other collar for the specified clearance when the play in the bails is taken up in a direction toward the previously adjusted collar. Tighten the setscrew in the adjusted set-collar.

2.125 Lower Transfer-slide-bar Eccentric-shaft (New-style Bracket): (See also 2.119.) With the transfer-bail spring unhooked and the lower slide-bar eccentric-shaft collars loose

on the shaft, the high part of the lower transfer-slide-bar eccentric-shaft shall extend downward. See Figure 60.

To Adjust: Loosen the setscrews on each of the lower slide-bar eccentric-shaft collars and the locknut located on the rear of the shaft. Position the shaft in the transfer-slide mounting-brackets.

2.126 Upper Transfer-slide-bar-shaft Collars (New-style Bracket): (See also 2.119.) The transfer slides shall line up with their associated sensing-contact operating-bails, and there shall be some side play, not more than that indicated in Figure 60.

CONTACT OPERATING BAILS

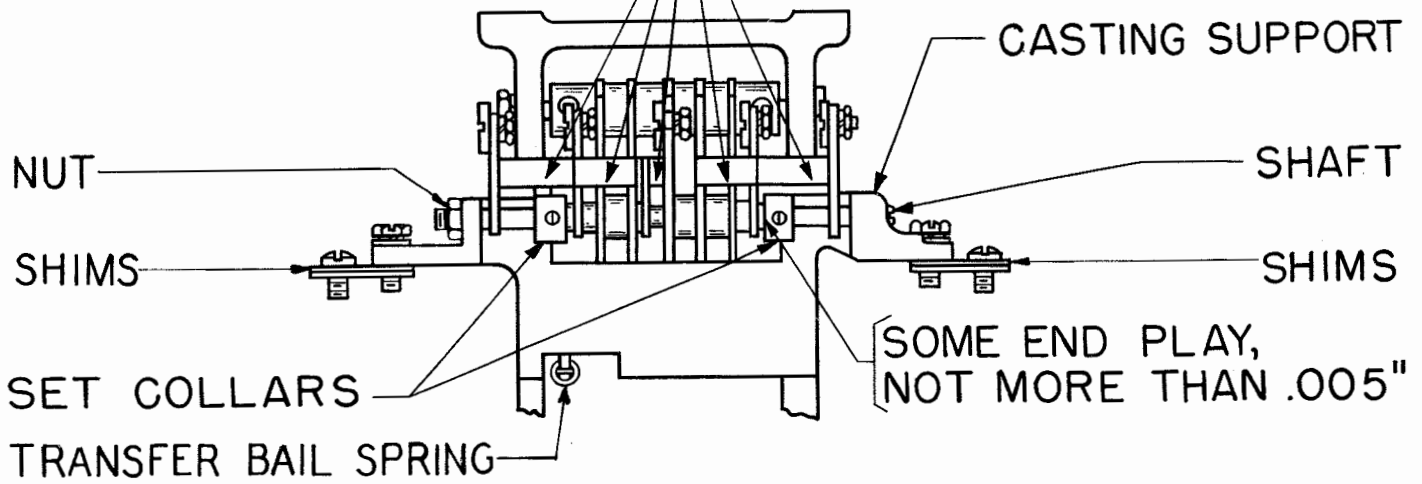


Figure 59

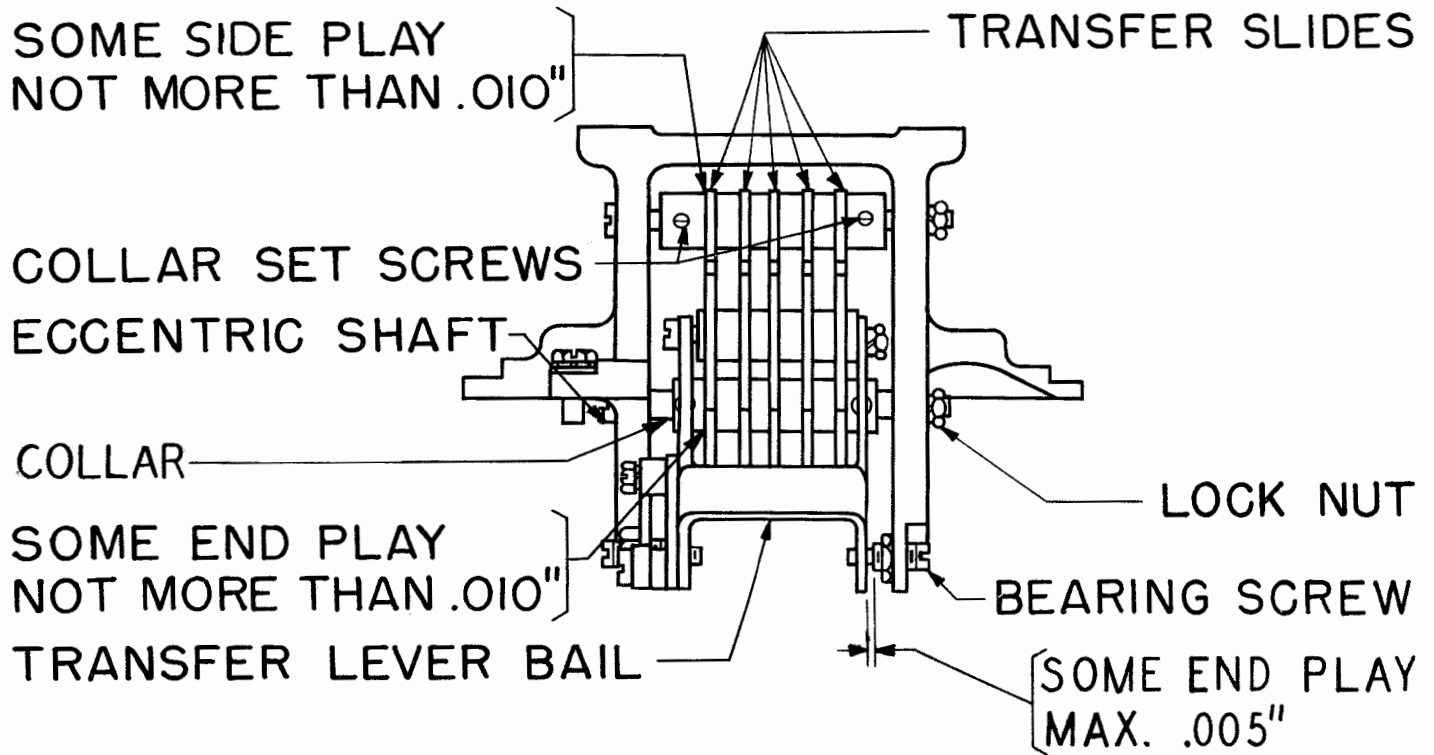


Figure 60

To Adjust: Loosen the setscrews of both collars and reposition one collar so that each transfer slide lines up with its associated contact-operating bail when all the slides are held against this collar. Tighten its setscrew. Reposition the other collar so that the slide bars move freely and have the specified side play. Tighten its setscrew.

2.127 Lower Transfer-slide-bar Eccentric-shaft Collar (New-style Bracket): (See also 2.119.) The transfer-slide bars shall be perpendicular to their shafts and move freely in their guides, and there shall be some endplay, not more than that indicated in Figure 60, between the set-collar on the lower eccentric-shaft and the adjacent slide bar when the play is taken up in a direction away from the collar.

To Adjust: Loosen the set-collar setscrews and position the collar.

2.128 Transfer-lever Bail (New-style Bracket): (See also 2.119.) With the transfer-lever-bail spring unhooked, the transfer levers shall line up centrally with their associated slide bars and the bail shall rotate freely on its bearing screws with some endplay, not more than that indicated in Figure 60.

To Adjust: Loosen the bearing-screw locknuts and position the screws. After tightening the nuts, rehook the spring.

2.129 Transfer Bail and Slide Assembly (Preliminary Adjustment): Rotate the sensing shaft to its stop position and mount the transfer bail and slide assembly (previously removed) on the base casting. Position the assembly so that the T-levers line up centrally with the Y-levers and so that there is approximately equal distance between the T-levers and Y-levers on the No. 1 (rear) and 5 (front) sets of levers. See Figure 61.

2.130 Transfer T-Lever Eccentric-shaft (Preliminary Adjustment): Loosen the transfer-bail-extension adjusting clamp-screw. With a piece of tape perforated with the Y-code combination inserted in the transmitter so that the Y character will be selected, trip the sensing-shaft clutch and rotate the motor by hand until the transfer-bail-extension roller is on the high part of its cam. Hold the roller against the cam and press the transfer bail to the right, manually, until the transfer slides move against their stops. Do not jam. Under this condition, at least one transfer slide shall be moved upward against its stop and at least one which is moved downward shall also be against its stop. Tighten the transfer-bail-extension clamp-screw. See Figure 62.

To Adjust: Loosen the transfer T-lever eccentric-shaft locknut and position the shaft, keeping the high part of the eccentric shaft to the right.

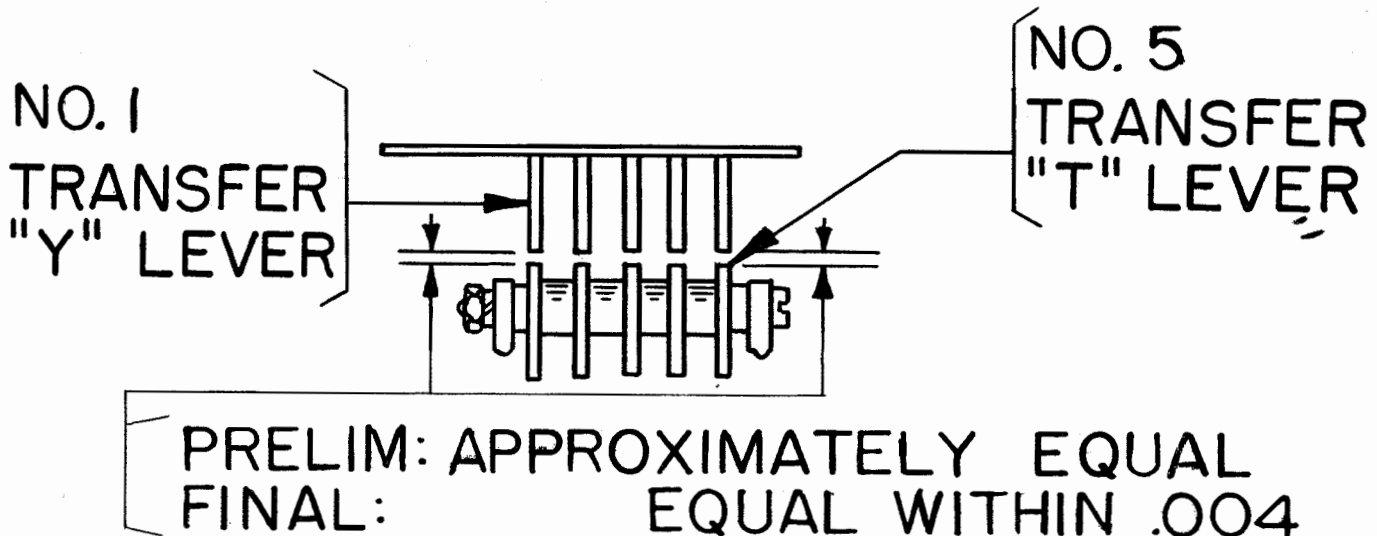


Figure 61

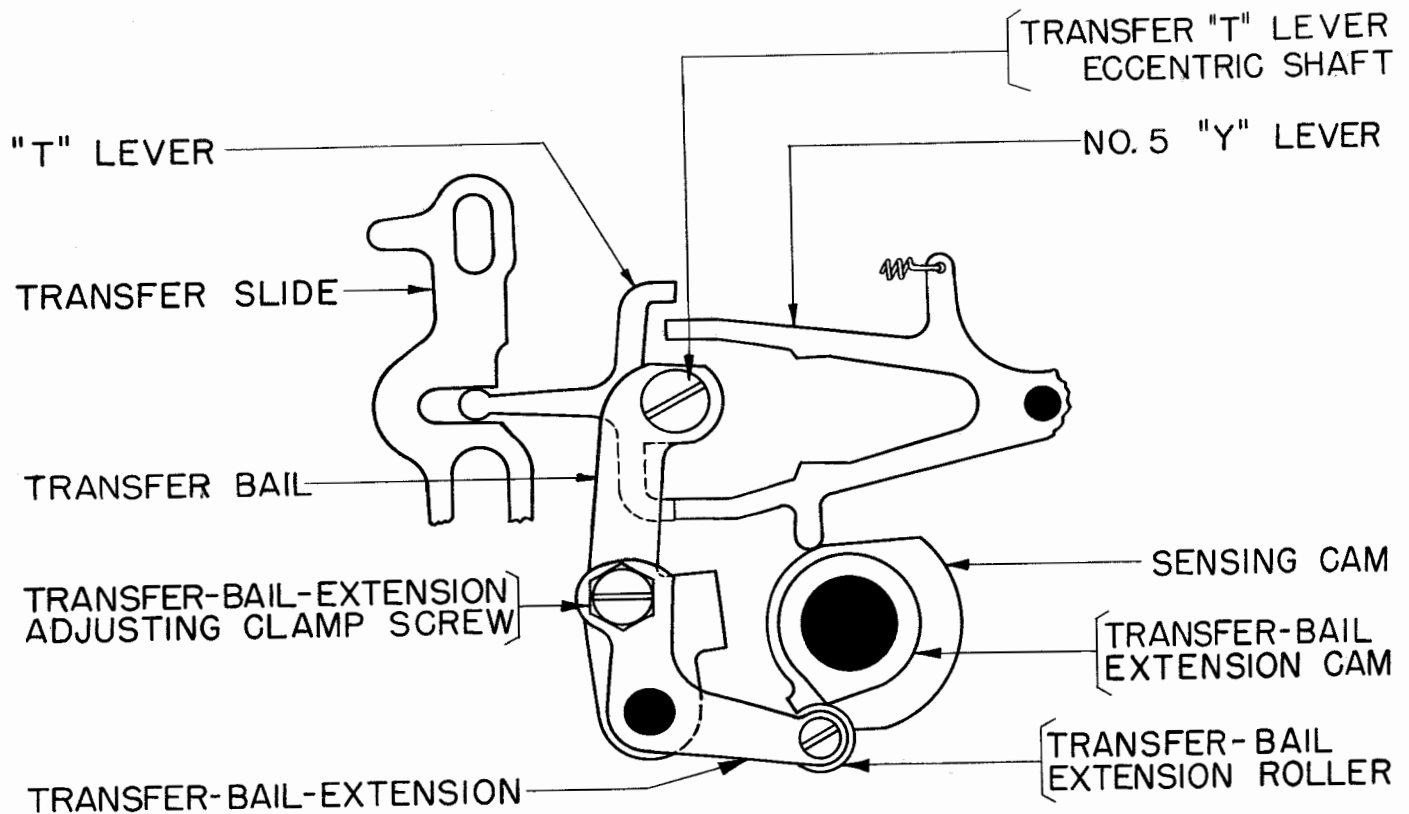


Figure 62

2.131 Transfer Bail and Slide Assembly (Final Adjustment):

- (a) With the R code combination set up on the Y transfer levers and the transfer-bail-extension roller on the high part of its cam, there shall be a clearance, as indicated in Figure 63, between the T-levers and the Y-levers when measured between the top prongs of the No. 4 (second) set of levers and the bottom prongs of the No. 5 (front) set of levers.

To Adjust: Add or remove shims under the three legs of the transfer-bail-assembly bracket.

- (b) There shall be a clearance as indicated in Figure 61 between the T-levers and the Y-levers when measured between the bottom prongs of the No. 1 (rear) and 5 (front) sets of levers.

To Adjust: Loosen the transfer-bail-bracket mounting-screws and position the bracket.

2.132 Transfer-bail Extension and Transfer T-Lever Eccentric-shaft (Final Adjustment):

- (a) Insert a length of tape perforated with the Y-code combination in the pivoted transmitter, trip the sensing clutch, and rotate the motor by hand until the transfer-bail-extension roller is on the high part of its cam and the Y combination is set up on the Y-levers. There shall be some clearance, not more than 0.006 inch, between the lower prongs of the No. 1 (rear) and the No. 5 (front) T-levers and Y-levers when the play in the transfer slides is taken up in a direction to make this clearance a maximum. See Figure 62.

To Adjust: Loosen the transfer-bail-extension clamp-screw and position the extension by means of its elongated hole.

- (b) Insert a length of tape perforated with the Blank code combination in the pivoted transmitter, trip the sensing clutch, and rotate the motor by hand until the transfer-bail-extension roller is on the high part of its cam.

With the play in the transfer slides taken up in a direction to make the clearance a maximum, there shall be some clearance, not more than 0.010 inch, between the closest set of T-levers and Y-levers. If necessary, loosen the locknut and refine the transfer T-lever eccentric-shaft adjustment given in 2.130, keeping the high part of the eccentric to the right. After tightening the locknut, recheck (a).

2.133 Transfer-bail Spring: It shall require minimum 9 ounces, maximum 11 ounces to just start the bail moving when the sensing shaft is in the stop position.

To Gauge: Rotate the sensing-contact levers out of the way and apply the push end of the scale to one of the spacers on the transfer T-lever eccentric-shaft and push horizontally to the right. See Figure 62.

2.134 Distributor Contacts shall meet the following requirements:

(a) Contact points must be centrally aligned with each other and square, as gauged by eye, when the distributor contact levers are on the low part of their respective cams and the adjusting screws are set to permit the contacts to remain in closed position.

To Adjust: Bend the long and short contact springs as necessary, using a TP124134 spring bending tool or other satisfactory bending tool.

(b) It shall require a push as indicated in Figure 64 to just start the short contact-springs moving away from the distributor-contact levers when the levers are on the high part of their cams.

To Gauge: Apply the push end of the scale to the lower end of each short contact-spring and push horizontally at a right angle to the spring.

To Adjust: Bend the short contact-springs.

(c) There shall be minimum 0.015 inch, maximum 0.020 inch gap between the contact points when the distributor-contact levers are on the high part of their cams. See Figure 64.

To Adjust: Position the adjusting screws.

To Check the contact gap with a 1A teletypewriter test set, if available, proceed in accordance with Steps 1 and 2.

Step 1: With the light image of the STOP impulse lined up with the zero mark on the stop segment of the stroboscopic test scale,

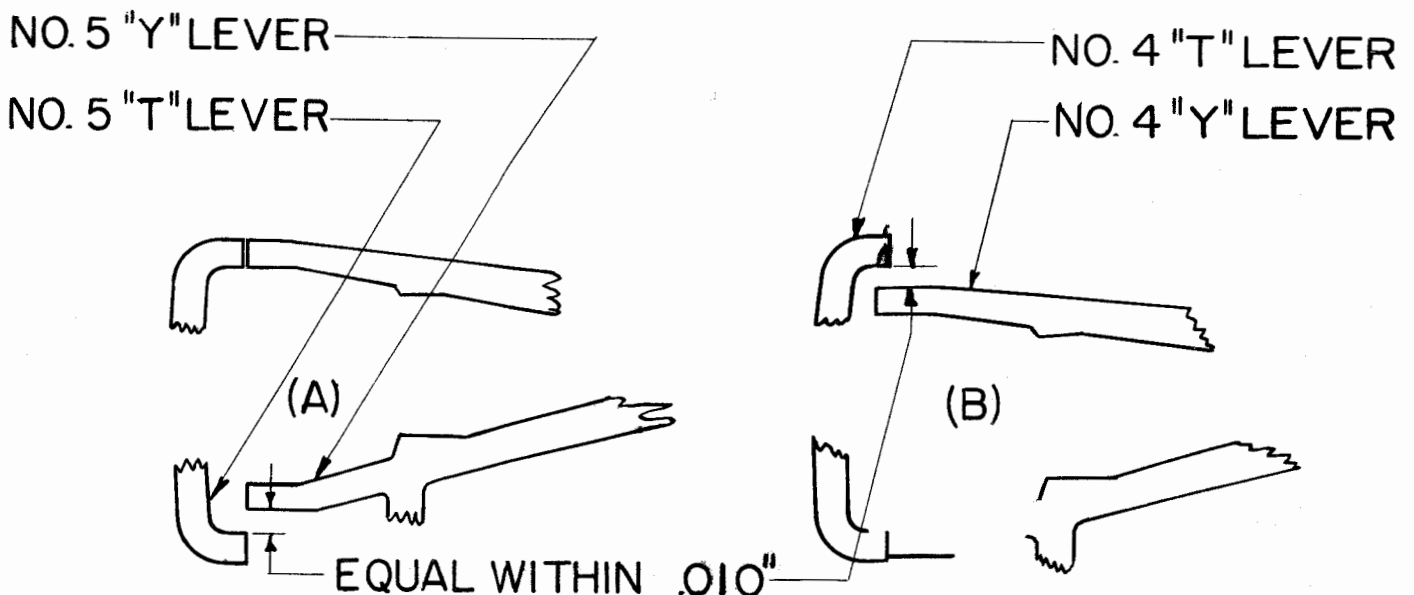


Figure 63

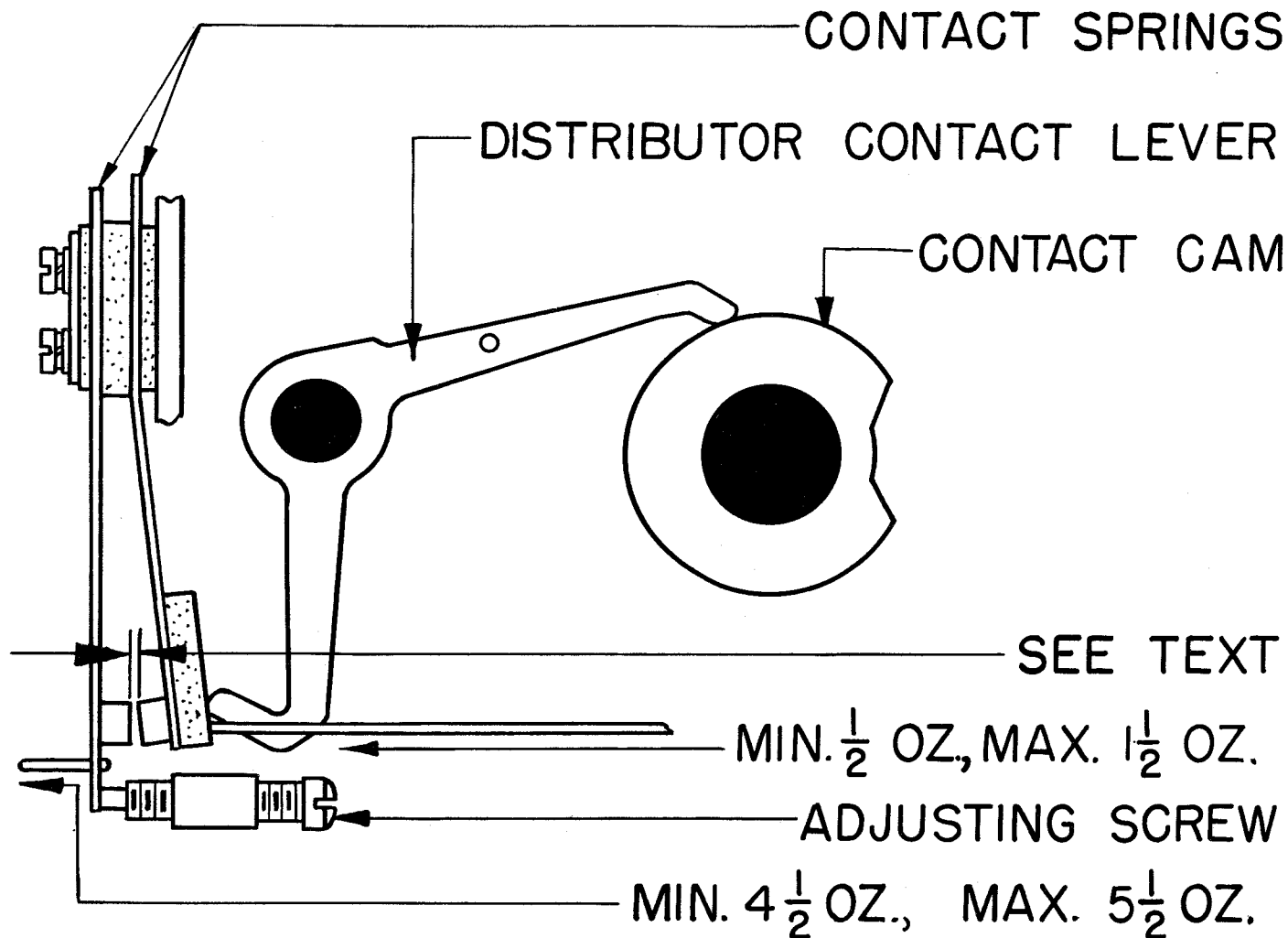


Figure 64

adjust the stop-contact gap of the unit by means of its adjusting screw so that the end of the light image lines up with the 142 mark (plus or minus one division) on the stop segment scale. Adjust the line transmitting contacts gap by means of the adjusting screws until their light images are equal within plus or minus one division of the length of their respective segments on the stroboscopic scale.

Step 2: With the START-pulse zero indication on the stroboscopic scale in line with the end of the STOP-impulse light image, see that the beginning and ends of the light images of all five transmitting contact images are within five divisions of their segment length on their respective stroboscopic scale lengths. If the signals do not

meet these requirements, refine the contact gap adjustment.

Note: In order to meet the requirements specified in Steps 1 and 2, the contact gap may be reduced to a minimum of 0.010 inch, if necessary, or increased to exceed the 0.020 inch maximum limit of adjustment.

(d) With the pull end of the scale hooked over the end of the long contact-springs and pulled horizontally to the left, it shall require a pull as indicated in Figure 64 to start the contact springs moving away from the adjusting screws.

To Adjust: Bend the long contact-springs and recheck requirement (c) of 2.134.

(e) It shall require a pull as indicated in Figure 65 to start a lever moving with the short contact-spring held clear of the lever.

To Gauge: Hook the pull end of the scale over the contact lever just above its lower hooked portion and pull away from the contact spring.

To Adjust: Loosen the nut holding the spring bracket to the casting and position the bracket.

2.135 Transmitter Auxiliary-contact shall meet the following requirements:

Note: Bakelite tips shall be centrally aligned with their respective operating levers, and the contact points on opposing contact springs shall be centrally aligned with each other.

(a) It shall require a pull as indicated in Figure 66 to just separate the short-spring contact from the long-spring contact when the bakelite tip of the long contact-spring is resting against the transmitter auxiliary-contact lever and the lever is resting against the high part of its cam.

To Gauge: Trip the sensing clutch and rotate the motor by hand until the contact lever operates the long contact-spring. Hook the pull end of the scale behind the short contact-spring at the contact and pull horizontally to the right.

To Adjust: Bend either or both sides of the short contact-spring, making sure to maintain a slight clearance between the springs and their stops. See Figure 67.

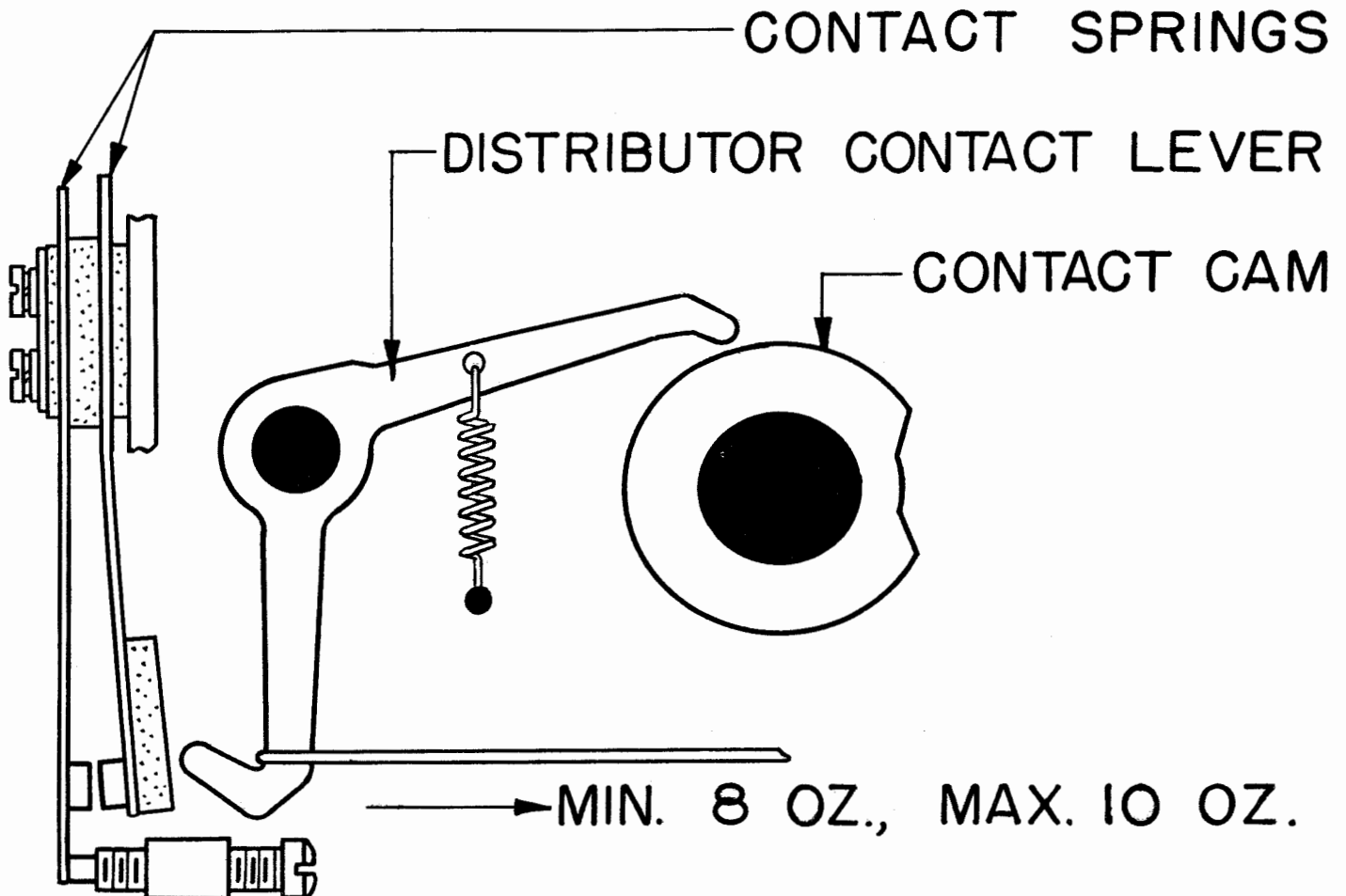


Figure 65

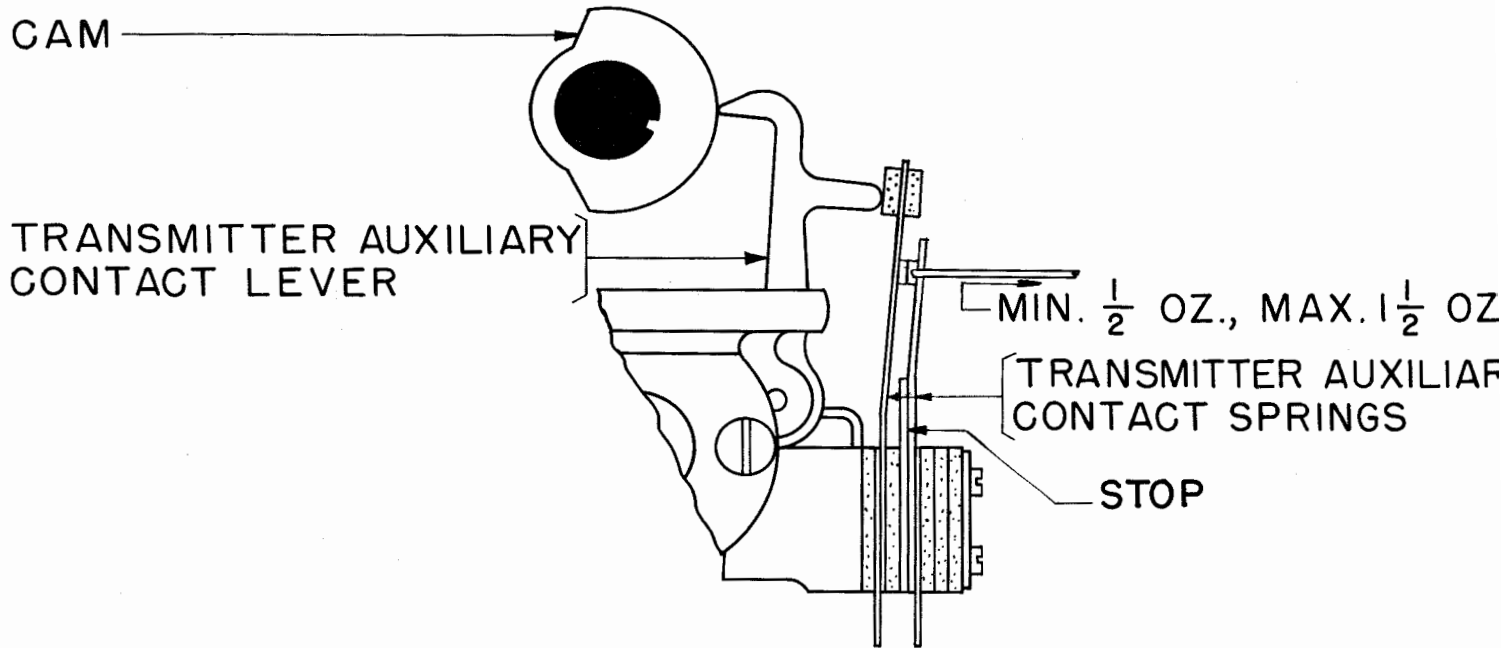


Figure 66

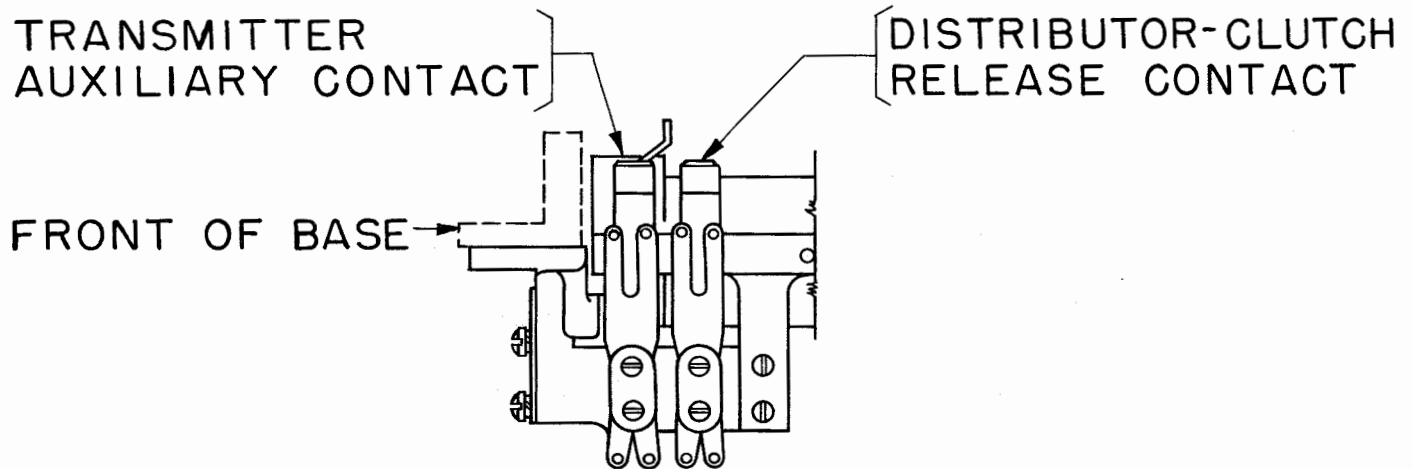


Figure 67

(b) With the bakelite tip of the long contact-spring resting against the transmitter auxiliary-contact lever and the lever resting on the low part of its cam, it shall require a pull as indicated in Figure 68 to move the bakelite tip away from the auxiliary lever.

To Gauge: Hook the pull end of the scale behind the long contact-spring at the contact point and pull horizontally to the right.

To Adjust: Bend the long contact-spring.

(c) With the bakelite tip of the long contact-spring resting against the transmitter auxiliary-contact lever and the lever resting against the low part of its cam, there shall be a gap as indicated in Figure 68 between the two sets of contacts.

To Adjust: Bend the short-contact-spring stop. Recheck (a).

2.136 Distributor-clutch-release-contact-lever

Spring: With the sensing shaft in the stop position, and the bakelite tip on the long contact-spring resting against its contact lever, it shall require a pull as indicated in Figure 69 to pull the spring to position length.

To Gauge: With the distributor-clutch-release-contact lever resting on the high part of its cam, unhook the spring from the spring strip, hook the pull end of the scale through the spring eye, and pull toward the spring mounting hole.

2.137 Distributor-clutch-release Contact shall meet the following requirements with the sensing shaft in the stop position and bakelite tip of the long contact-spring resting against the contact lever:

Note: Bakelite tips shall be centrally aligned with their respective operating levers, and opposing contacts shall be centrally aligned with each other.

(a) It shall require a pull as indicated in Figure 69 to start the bakelite tip of the long contact-spring moving away from the contact lever.

To Gauge: Hook the pull end of the scale behind the long contact-spring at the contact and pull to the right.

To Adjust: Bend the long contact-spring.

(b) There shall be a gap as indicated in Figure 69 between the contact points.

To Adjust: Bend the stop adjacent to the short contact-springs.

(c) It shall require a pull as indicated in Figure 69 to just start each short contact-spring moving away from its stop.

To Gauge: Hook the pull end of the scale behind the short contact-springs at the contact and pull to the right.

To Adjust: Bend the short contact-springs. Recheck (b).

(d) There shall be some clearance between the short contact-springs and their stops when the contact levers are opposite the low part of the cam and the contacts are closed. See Figure 69. If there is no clearance, refine (a).

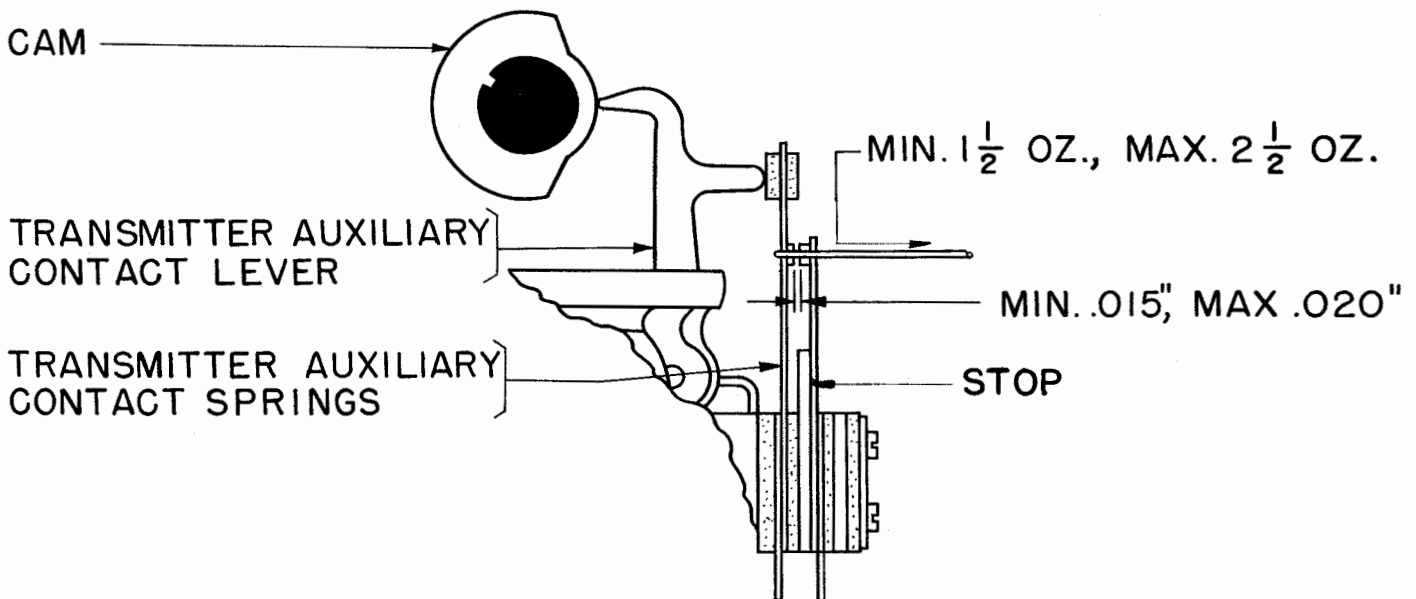


Figure 68

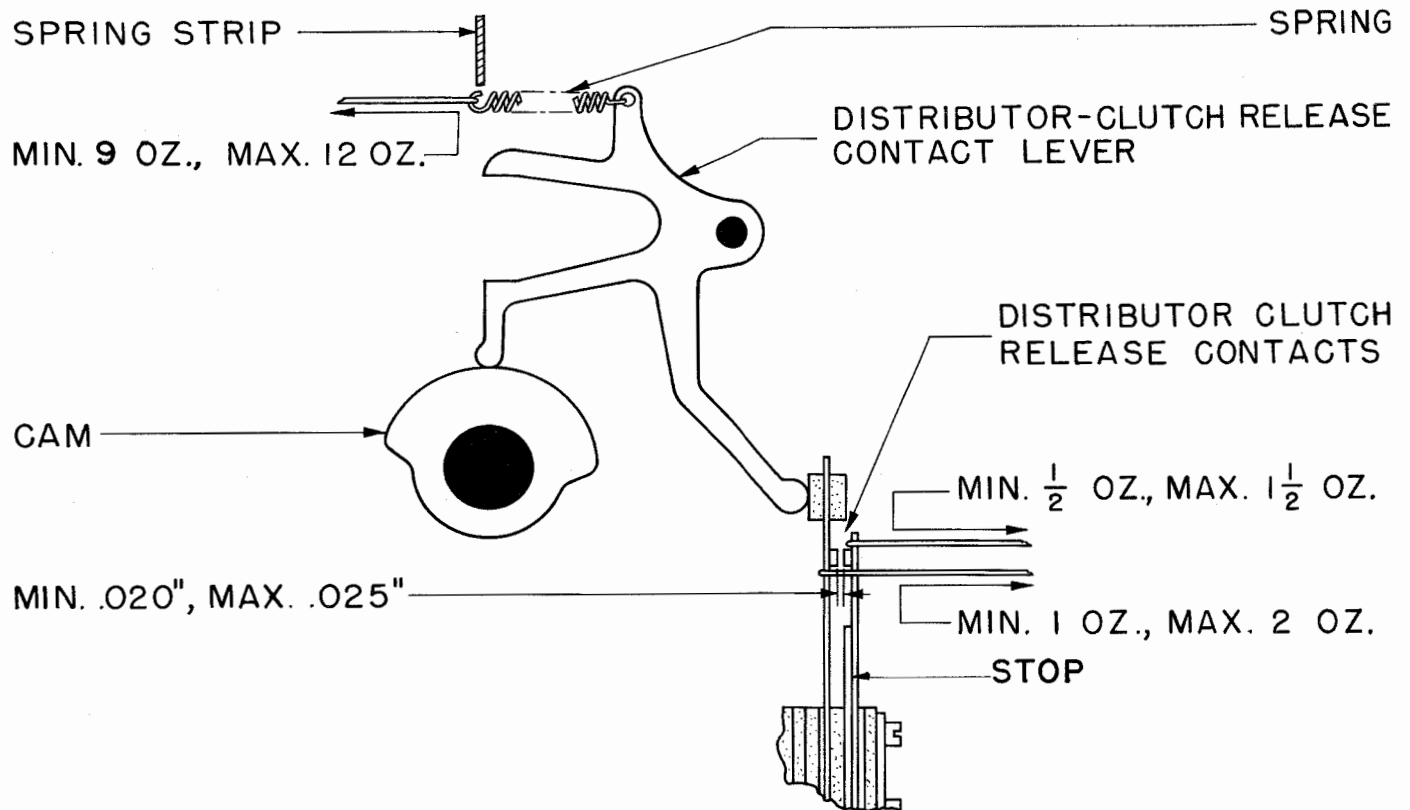


Figure 69

2.138 Tape-out Sensing-lever Spring: It shall require a push as indicated in Figure 70 to start the tape-out sensing-lever moving when the lever is in its uppermost position, the tape-out-contact swinger held away from the extension, and the pivoted transmitter held in its vertical position.

Note: In order to eliminate friction between the tape-feed lever and the tape-out lever, the tape-feed lever should be positioned toward the rear of the unit when measuring the spring tension.

To Gauge: Apply the push end of the scale to the tape-out sensing-pin. (The tension may be easily determined by observing the tape-out sensing-lever spring.)

2.139 Tape-out Contacts:

(a) Remove the tape chute.

Note 1: Bakelite tips shall be centrally aligned with their operating levers and opposing contacts shall be centrally aligned with each other.

Note 2: The tape-out-contact assembly, together with its mounting bracket, may be removed to make adjustments (b) and (c).

(b) The short contact-spring shall rest lightly against its stop. See Figure 70.

To Adjust: Bend the spring.

(c) The long and short contact-springs shall be approximately parallel and at approximately right angles to their mounting bracket. There shall be a clearance as indicated in Figure 70 between the contacts of the opposing springs.

To Adjust: Lightly tension the shorter contact-springs against their backstop.

Note: Remount the tape-out contact assembly and mounting bracket if previously removed.

(d) With a piece of tape perforated with the LTRS combination inserted into the pivoted transmitter, and the sensing shaft rotated until the tape-out lever is opposite the low part of

its cam, there shall be a clearance as indicated in Figure 71 between the insulator on the long contact-spring and the tip of the tape-out lever.

To Adjust: Loosen the contact-mounting-bracket screws and position the bracket as required. After tightening the screws, re-install the tape chute. Check that with the tape removed from the transmitter, the contacts are closed and that none of the short springs is resting against its stop.

2.140 Transmitter-stop Contact shall meet the following requirements:

Note 1: Bakelite tips shall be centrally aligned with their operating levers and opposing contacts shall be centrally aligned with each other.

Note 2: The transmitter-stop contact assembly, together with its mounting bracket, may be removed to make adjustments (a) and (b).

(a) With the short-contact spring tensioned against its backstop and aligned so that it is parallel to its mounting bracket, it shall require a pull as indicated in Figure 72 to just open the contacts.

To Gauge: Hook the pull end of the scale over the end of the long contact-spring and pull at a right angle to the spring mounting.

To Adjust: Bend the long contact-spring.

(b) With a length of perforated tape emerging from the code-punch mechanism and engaged in the pivoted transmitter, the contact

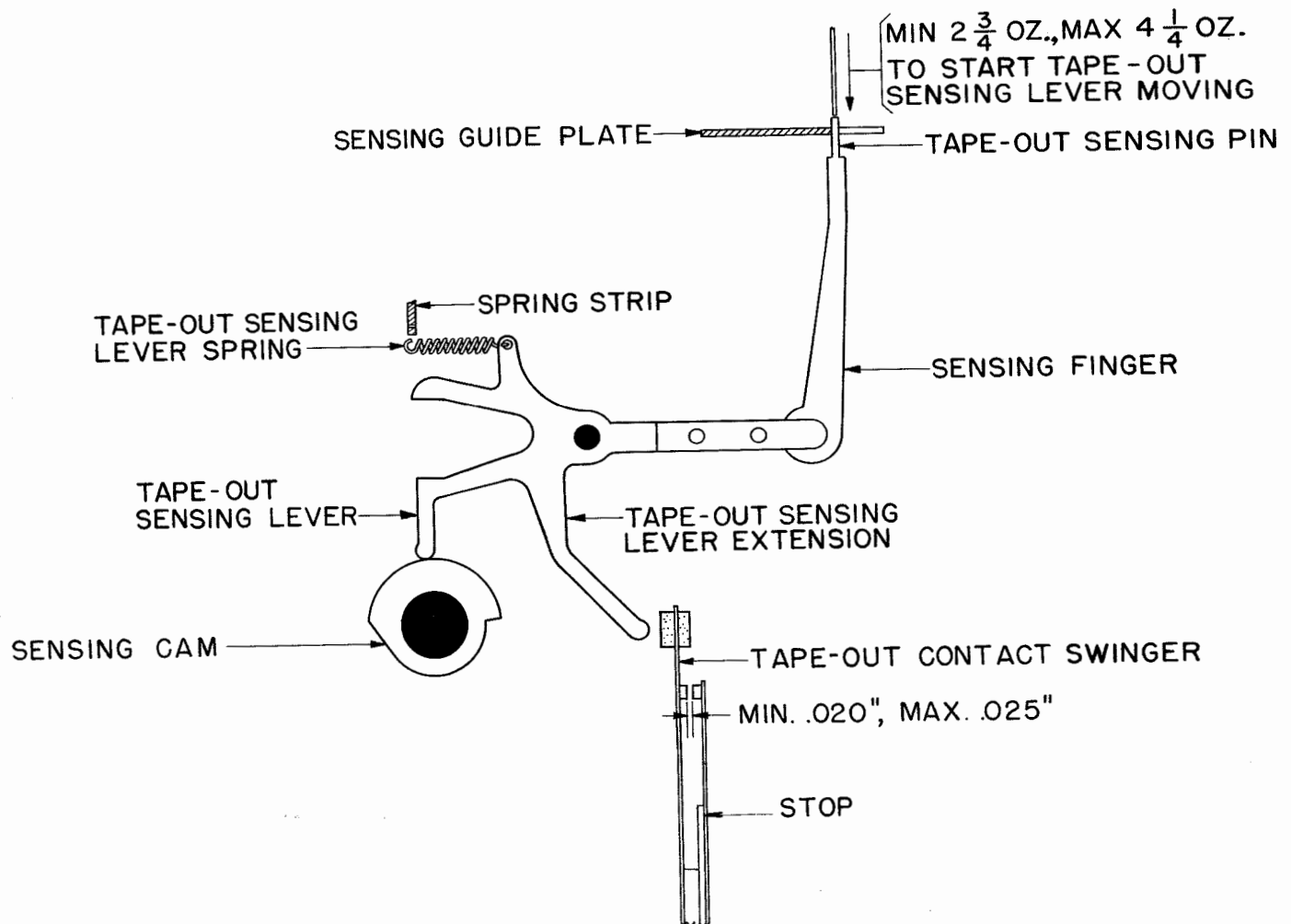


Figure 70

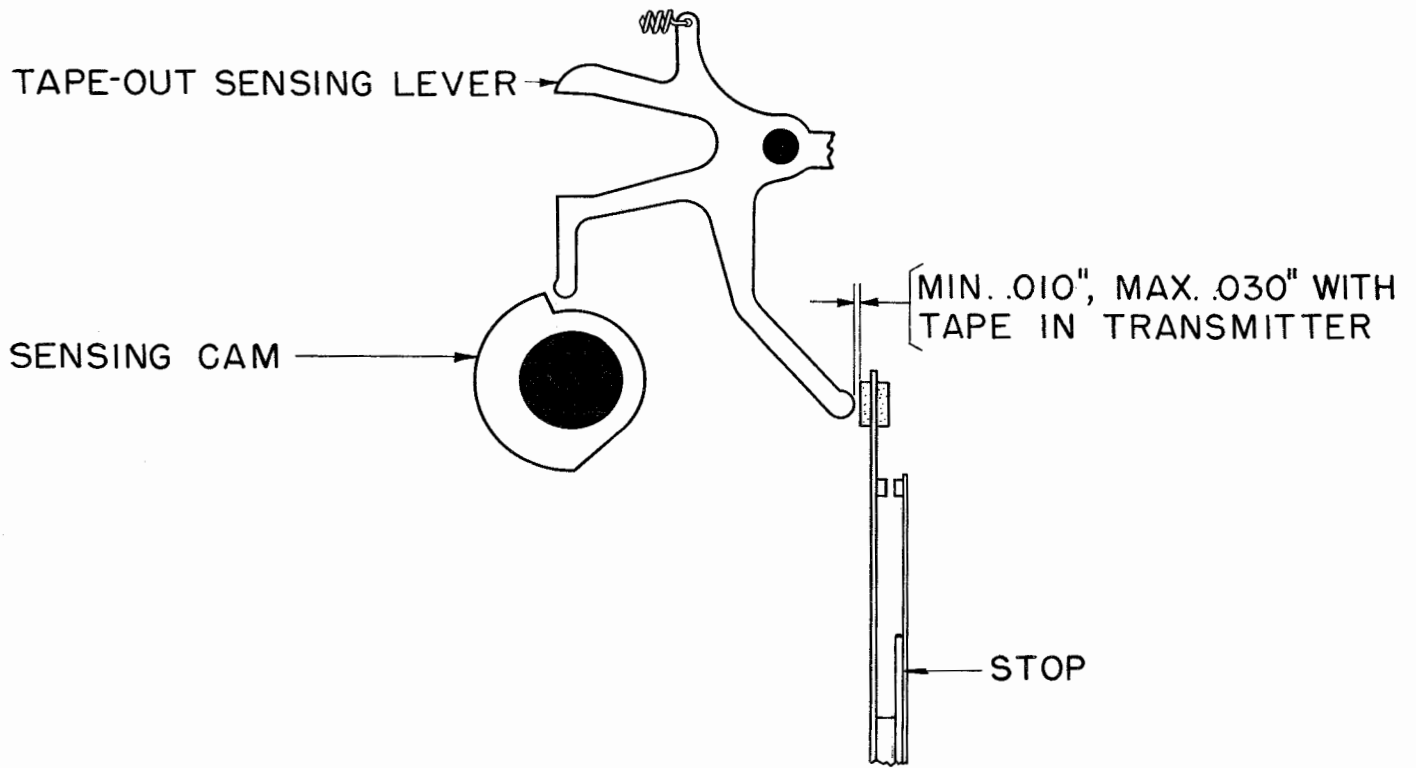


Figure 71

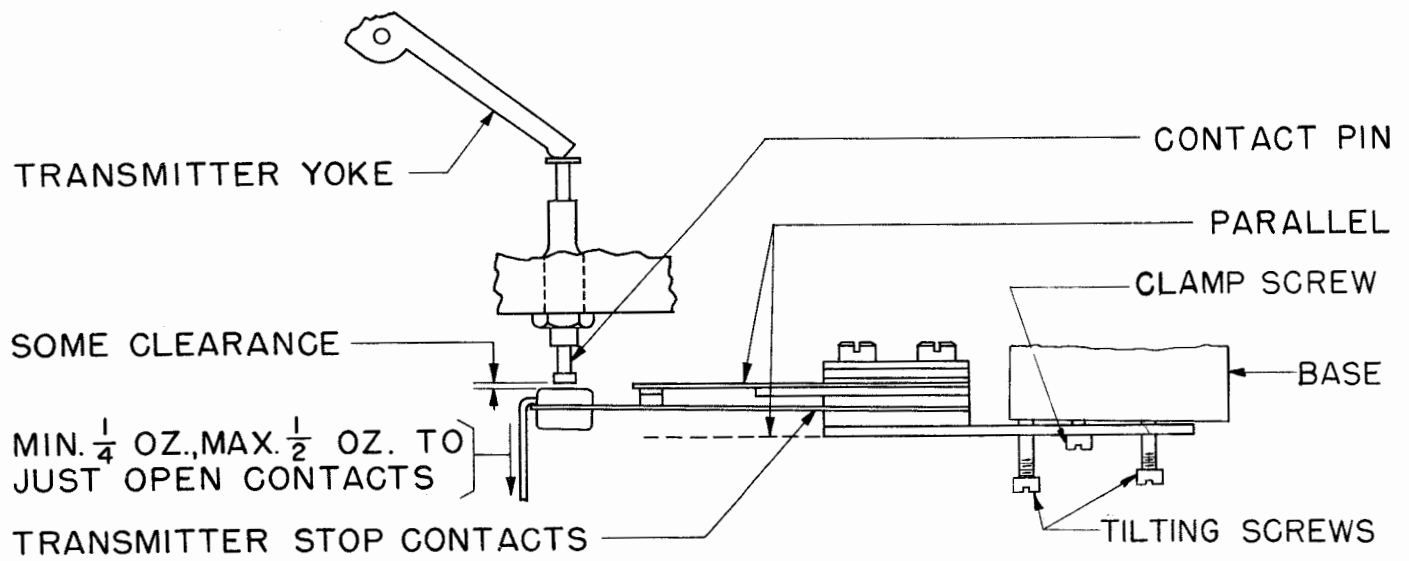


Figure 72

shall be closed with some clearance between the insulated tip on the long contact-spring and the lower end of the contact pin when the next to the last character on the tape is being sensed by the selector pins. With the last character in the tape being sensed, the contacts shall be open and there shall be minimum 0.010 inch clearance between the contacts. See Figure 72.

To Adjust: Loosen the contact-assembly-bracket clamp-screw and position the bracket by means of the two tilting screws.

Note: Remount the transmitter-stop contact assembly and mounting bracket if previously removed.

2.141 Universal Contacts shall meet the following requirements:

Note 1: Bakelite tips shall be centrally aligned with their operating levers and opposing contacts shall be centrally aligned with each other.

Note 2: When measuring the tension values in the following requirements, the scale should be applied beside the spring contact and at a right angle to the spring. These springs are bifurcated and the requirements apply to each side of the spring.

Note 3: To facilitate adjustment, the universal-contact assembly and its bracket may be removed from the base casting.

(a) No. 4 Contact Spring: With its stop parallel to the mounting surface and the No. 5 contact spring held away from the No. 4 contact spring, it shall require minimum 1-1/2 ounces, maximum 2-1/2 ounces to separate each section of the No. 4 contact spring from its stop. See Figure 73.

To Adjust: Increase or decrease the tension against the stop by bending the spring near the pile-up.

(b) No. 5 Contact Spring: With the insulator tip of the No. 2 contact spring held away from the insulator tip of the No. 5 contact spring, it shall require minimum 2 ounces, maximum 3 ounces to separate the contact of the No. 5 spring from the No. 4 spring contact. See Figure 73.

To Adjust: Bend the No. 5 contact spring near the pile-up.

(c) No. 1 Contact Spring: With its stop parallel to the mounting surface and the No. 2 contact held away from the No. 1 contact, it shall require minimum 1-1/2 ounces, maximum 2-1/2 ounces to separate the No. 1 contact spring from its stop. See Figure 73.

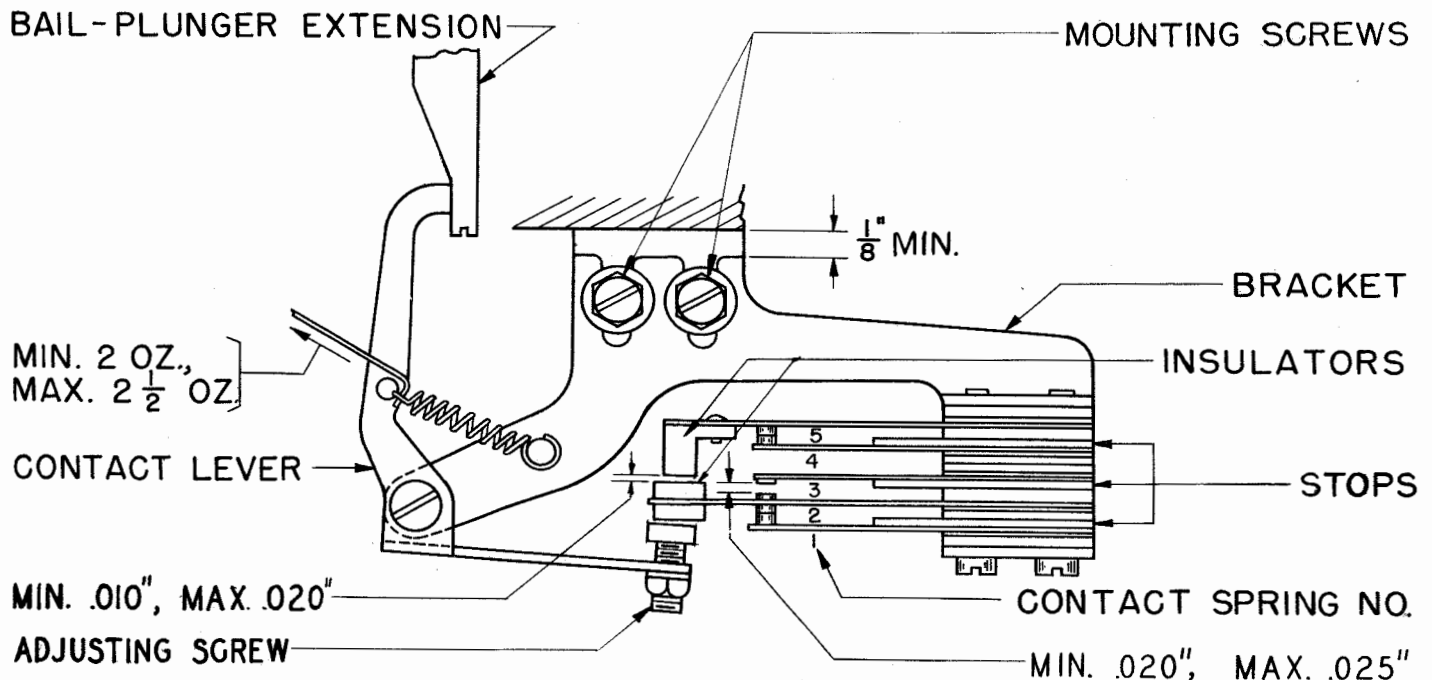


Figure 73

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To Adjust: Increase or decrease the tension against the stop by bending the spring near the pile-up.

(d) No. 2 Contact Spring:

(1) With the No. 5 contact-spring tip insulator blocked away from the No. 2 contact-spring tip insulator and, if necessary, the No. 3 spring contact held away, it shall require minimum 2 ounces, maximum 3 ounces to separate the No. 2 and No. 1 contacts. See Figure 73.

To Adjust: Bend the No. 2 spring.

(2) With the No. 5 spring returned to its unoperated position, there shall be a clearance of minimum 0.010 inch, maximum 0.020 inch between the No. 5 and No. 2 contact-spring tip insulators. See Figure 73.

To Adjust: Bend the No. 2 contact spring between the contact and the tip insulator.

(e) No. 3 Contact Spring:

(1) It shall require minimum 1 ounce, maximum 2 ounces to separate the No. 3 contact spring from its stop. See Figure 73.

To Adjust: Increase or decrease the tension against the stop by bending the spring near the pile-up.

(2) When the No. 2 and No. 1 spring contacts are making, there shall be a clearance of minimum 0.020 inch, maximum 0.025 inch between the No. 3 and No. 2 spring contacts.

To Adjust: Increase or decrease the clearance by simultaneously bending the No. 3 contact spring and its stop. Recheck (e)(1).

Note: Remount the universal-contact assembly on the base bracket. There shall be at least 1/8 inch clearance between the top edge of the universal-contact bracket and the milled section on the base casting. See Figure 73.

(f) No. 5 Spring-contact Clearance (Operated Position): With the contact lever of the universal-contact assembly on the high camming surface of the bail-plunger extension, there shall be a clearance of minimum 0.020

inch, maximum 0.025 inch between the No. 5 and No. 4 spring contacts. See Figure 73.

To Adjust: Reposition the universal-contact adjusting-screw.

(g) Contact Bracket: Rotate the motor by hand until the bail rises to within 0.020 inch to 0.080 inch of the notch in the pullbars. The No. 4 and No. 5 spring contacts shall just make at this point.

To Adjust: Raise or lower the universal-contact bracket in its slotted mounting holes. [Determine with a test lamp, and recheck (f).]

2.142 Universal Contact-lever Spring: It shall require minimum 2 ounces, maximum 2-1/2 ounces to pull the spring to position length when the universal-contact lever is resting on the high camming surface of the bail-plunger extension. See Figure 73.

To Gauge: Unhook the universal-contact-lever spring from the contact lever and hook the pull end of the scale through the spring eye and pull in line with the spring hole to position length. Rehook the spring.

2.143 Punch-bail-arm Spring: It shall require minimum 6 pounds, maximum 7 pounds to start the punch-bail-arm roller moving away from its cam when the roller is resting on the low part of the cam. See Figure 74.

To Gauge: Hook the pull end of the scale over the punch-bail arm at the roller and pull at a right angle to the arm.

2.144 Distributor and Sensing Clutch Throwout-lever Springs shall meet the following requirements with the throwout levers on the low part of the clutch cam and the clutch teeth engaged. See Figure 41.

(a) It shall require minimum 3 ounces, maximum 5 ounces to just start the distributor-clutch (lower) throwout lever moving.

To Gauge: Apply the push end of the scale to the bottom edge of the lower armature and push as nearly horizontal as possible.

(b) It shall require minimum 5 ounces, maximum 7 ounces to just start the sensing-clutch (upper) throwout lever moving.

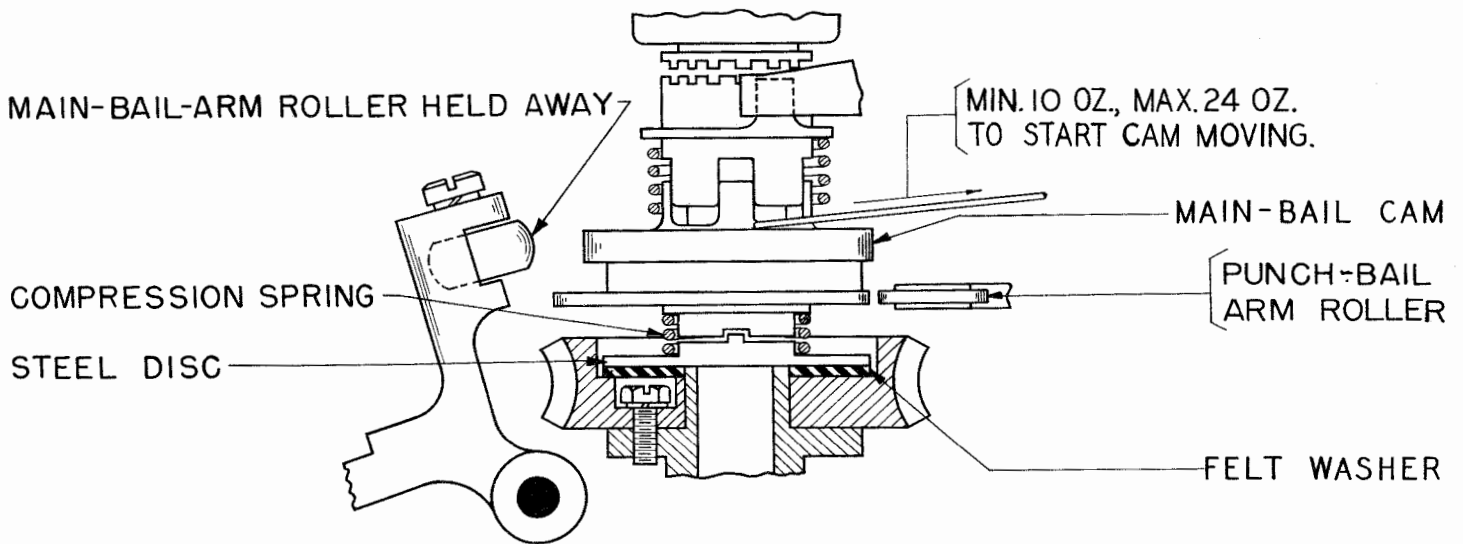


Figure 74

To Gauge: Hook the pull end of the scale over the upper throwout-lever-spring arm at the spring and pull as nearly horizontal as possible.

2.145 Detent Levers (Applies Only on Units Having TP115778 Adjustable Detent Mechanism): The detent levers shall engage their respective cams by at least $\frac{2}{3}$ the width of the cams when the play in the detent levers is taken up to make this engagement a minimum. See Figure 75.

To Adjust: Position the detent bracket.

2.146 Detent-lever Plate (Applies Only on Units Having TP115778 Adjustable Detent Mechanism): With both clutches in their fully disengaged positions there shall be a maximum and approximately equal amount of engagement (for both levers) between the detent levers and their respective cams. See Figure 75.

To Adjust: Position the detent-lever plate on its bracket by means of the elongated mounting holes. Make certain that both spring tensions are approximately equal by extending the springs an equal amount. Gauge by eye. If the detent bracket has been repositioned for alignment of the detent levers with their cams, the tape-out contact adjustment must be rechecked, and if necessary, remade.

2.147 Detent-lever Spring (Applies Only on Units Having TP115778 Adjustable Detent Mechanism): With the detent levers resting on the high part of their cams, hook a scale over the cam end of the lever and pull at a right angle as nearly as possible to the levers. It shall require a pull as indicated in Figure 75 to start the levers moving away from their cams.

2.148 Distributor and Sensing Clutch Detent-lever Springs: It shall require minimum $1\text{-}\frac{3}{4}$ ounces, maximum 3 ounces to just start each detent lever moving.

To Gauge: Hook the pull end of the scale over the detent levers at the rollers and pull at right angles to the levers.

2.149 Mainbail Spring (Final Adjustment):

Note: The force with which the typebars strike the platen is regulated by the mainbail-spring adjusting-screw.

(a) With the motor running, send alternate LTRS and FIGS signals to the reperforator-transmitter unit. Loosen the mainbail-spring adjusting-screw locknut and back off the mainbail-spring adjusting-screw until the platen fails to return to the LTRS position. Then, turn the adjusting screw in a clockwise direction until the platen just changes from the LTRS and FIGS positions without failure. Turn the adjusting screw an additional $1\text{-}\frac{1}{2}$ turns clockwise and tighten the locknut. See Figure 29.

(b) With the main-shaft clutch disengaged, hook the scale under the mainbail-spring tension-adjusting lever at the spring hole and pull in line with the spring. It shall require a pull as indicated in Figure 29 (final) to start the lever moving.

2.150 Mainbail-cam Clutch-torque should be measured as follows after the motor has been running at least 10 minutes with the mainbail cam remaining stationary. It shall require a pull as indicated in Figure 74 to start the mainbail cam moving opposite to its normal direction of rotation.

To Gauge: Press downward on the mainbail so as to move the mainbail roller away from its cam. At the same time, hold the cam-lever roller and the punch-bail-arm roller away from their cams. Hook the scale in the screw hole on top of the mainbail cam and pull at a right angle to the radius.

2.151 Sensing-contact Mechanism shall meet the requirements specified in 2.151 to 2.157, inclusive. To facilitate checking these requirements, the entire sensing-contact assembly may be removed from the base to the extent of the slack in the cable connected to the contact terminals.

Note 1: The sensing-contact-assembly clamping screws are tightened under pressure at the factory. If for any reason the screws become loosened, they should be tightened with a torque of 20 inch-pounds. This can be accomplished by applying a 5-pound pull at the end of a 4-inch offset screwdriver.

Note 2: The 505A and 507A adjusting tools should be used for bending the sensing-contact springs. The 68B or 70D gram gauge should be used for checking the spring tensions of sensing-contact springs.

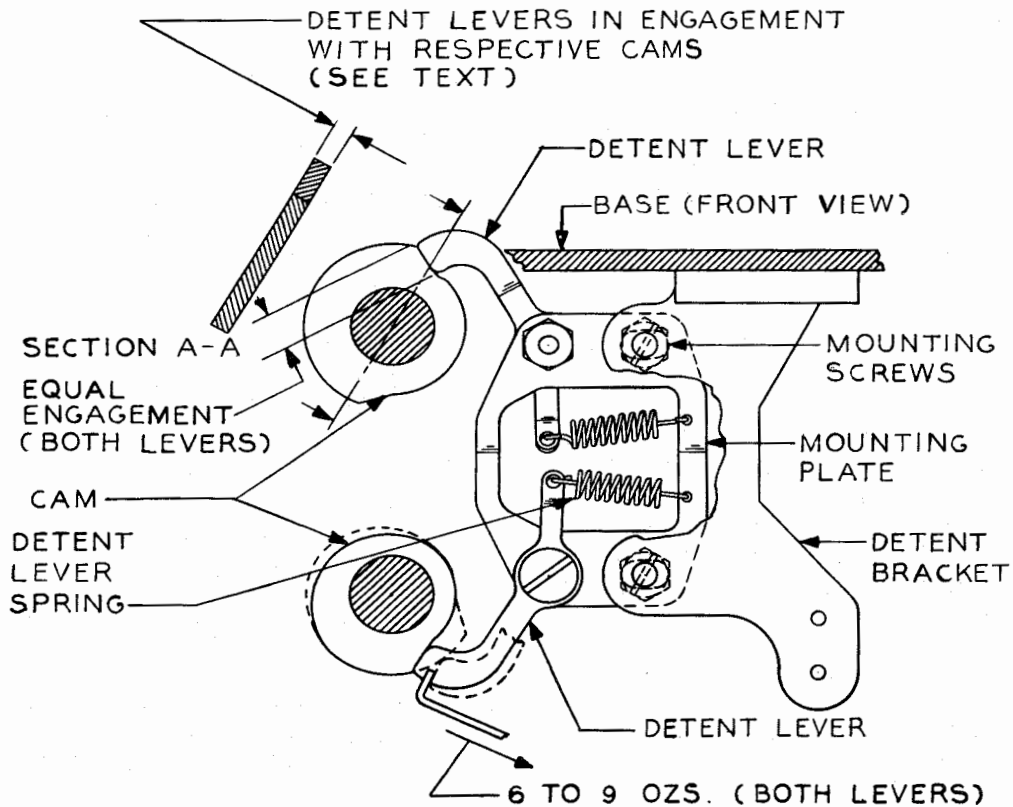


Figure 75

2.152 Sensing-contact and Spring-tang Alignment: (See also 2.151.)

- (a) The alignment of all contacts shall be within the limits indicated in Figure 76 as gauged by eye.
- (b) The width of each spring tang shall lie entirely within the slots in the comb as gauged by eye. See Figure 77.
- (c) The spring studs shall clear the springs through which they pass in all positions of stud travel. See Figure 78.

2.153 Sensing-contact-assembly Comb Alignment: (See also 2.151.) The spring tangs shall rest in the slots of the comb so that there is approximately equal clearance from the free end of the tang to the bottom of the slot as gauged on the two end springs with tangs. See Figure 77.

To Adjust: Loosen the comb mounting-screws and position the comb by means of its enlarged mounting holes.

2.154 Sensing-contact Springs (General Requirements): (Detailed Requirements in 2.155.)

Note: See also 2.151.

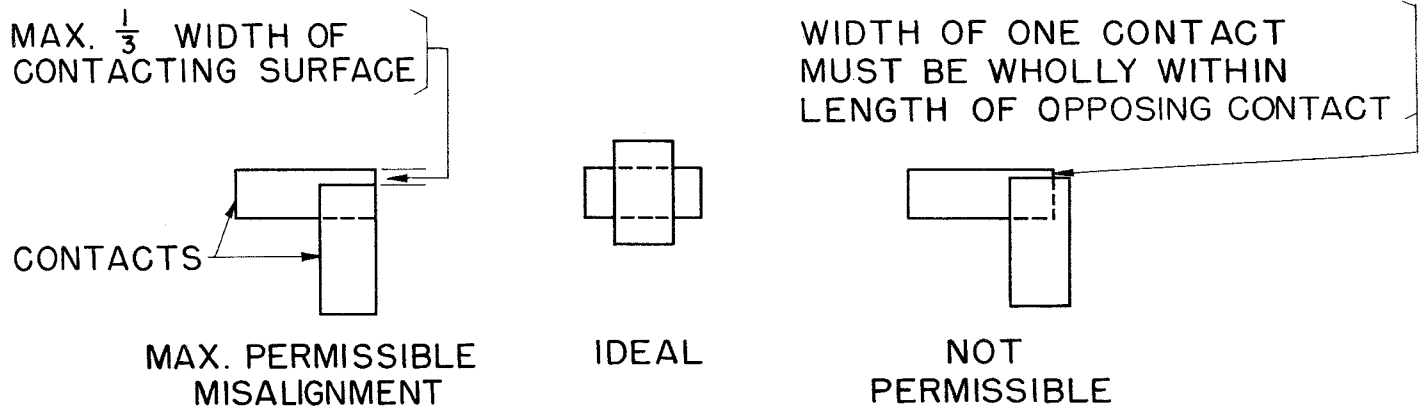


Figure 76

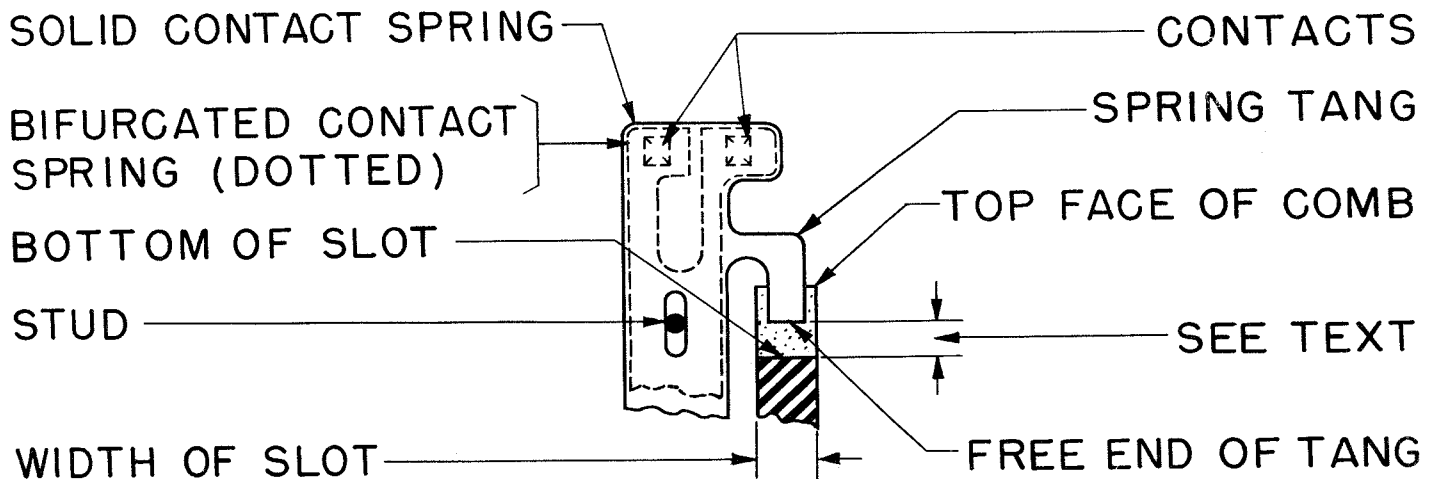


Figure 77

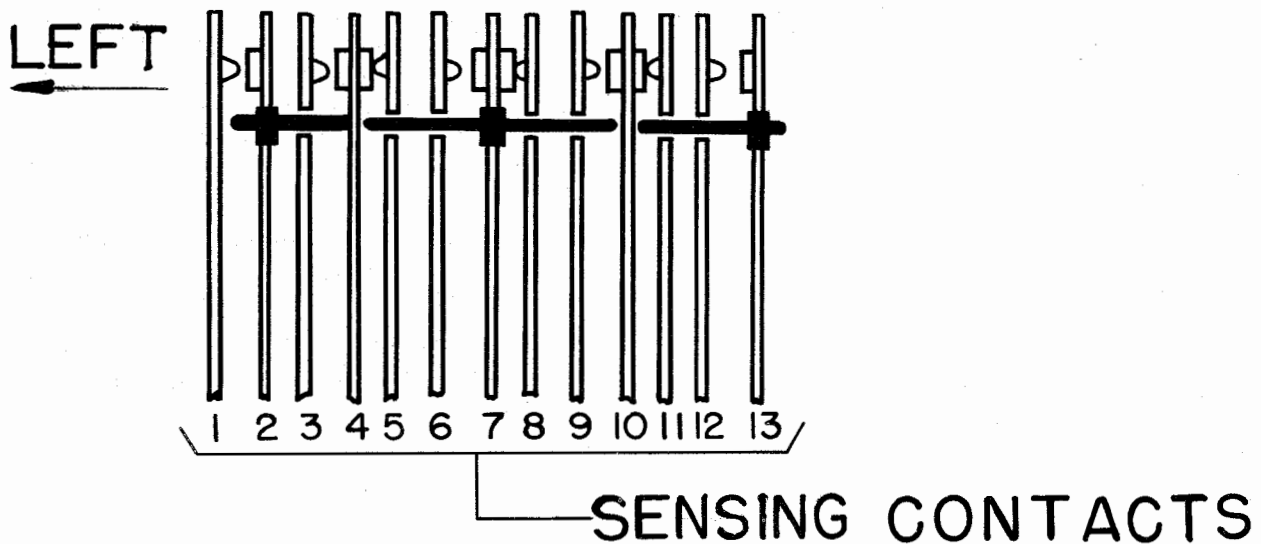


Figure 78

(a) All contact springs shall be tensioned toward the narrow end of the comb so that they exert some tension against the adjacent contact spring, comb, etc.

(b) Unless otherwise specified, the tension shall be measured with the springs in the normal unoperated position.

(c) Both sections of the bifurcated springs shall be in alignment with each other so that the contacts on the bifurcated springs make or break with their opposing contacts at approximately the same time.

(d) A spring which is tensioned against the comb, or an opposing spring or a stud, shall register the required tension just as the tang leaves the comb, just as the contacts break, or just as it leaves the stud.

(e) When gauging tensions on solid springs, the gauge shall be applied near the end of the springs just in front of the contacts.

(f) When checking tension on swingers, the gauge shall be applied at the end of both parts of the bifurcated springs just above the contacts.

(g) There shall be a clearance between adjacent springs, whether in operated or unoperated position, of at least 0.008 inch as gauged by eye.

2.155 Sensing-contact Springs (Detailed Requirements): (General Requirements 2.154.) Refer to Figure 78 for the position and number of contacts which apply in the following adjustments. See also 2.151.

(a) The tangs of the heavy contact springs (No. 1, 3, 5, 6, 8, 9, 11, and 12) shall be in alignment with the main body of the springs before starting adjustments.

To Adjust: Bend the tangs.

(b) It shall require minimum 30 grams, maximum 50 grams to just move the tang away from the comb. On springs 5, 8, and 11, the opposing springs shall be held clear by pressing the right-hand stud to the left.

To Adjust: Bend the contact springs.

(c) Contact Spring No. 2 shall be tensioned toward the right so that its stud is in contact with the No. 4 spring, and it shall require minimum 6 grams, maximum 12 grams to move the spring to a point where its stud just leaves the No. 4 spring.

To Adjust: Bend the No. 2 spring.

(d) It shall require minimum 18 grams, maximum 25 grams to just move the No. 4 spring contact clear of its opposing contact with the stud of the No. 2 spring resting against the No. 4 spring.

To Adjust: Bend the No. 4 spring.

(e) It shall require minimum 18 grams, maximum 25 grams to just move the No. 7 spring contact clear of its opposing contact (No. 8) and there shall be some clearance, not more than 0.003 inch, between the stud of the No. 7 spring and the No. 4 spring.

To Adjust: Bend and bow the No. 7 spring. If further refinements are necessary, the tang on the No. 8 spring may be bent slightly and the tension rechecked.

Note: When making the foregoing adjustment, some clearance shall be maintained between the No. 10 spring and the stud on the No. 7 spring. Hold the No. 10 spring away by hand.

(f) It shall require minimum 18 grams, maximum 25 grams to just move the No. 10 spring contact clear of its opposing contact (No. 11), and there shall be some clearance, not more than 0.003 inch, between the stud of the No. 7 spring and the No. 10 spring.

To Adjust: Bend and bow the No. 10 spring. If further refinements are necessary, the tang on the No. 11 spring may be bent slightly.

Note: If the sensing-contact assembly was removed from the base, remount it. (See also 2.151.)

2.156 Sensing-contact Spring-pile-up Alignment:

Note: See also 2.151.

(a) (Preliminary) There shall be minimum 0.010 inch, maximum 0.015 inch gap between the stud on the No. 13 spring and the No. 10 spring, on the No. 1 and No. 5 contact-pile-up assemblies, with the transfer-slides in the Spacing (lower) position and the slots in all the contact-operating-bail eccentrics in a vertical position (high side up or down, whichever gives the fullest engagement between the end of the plunger and the curvature of the eccentric).

To Adjust: Loosen the two eccentric-stop mounting-screws and rotate the eccentrics away from the brackets. Loosen the contact-bracket mounting-screws and shift the bracket. After tightening the mounting-screws, rotate the eccentrics so that they touch the bracket and then tighten the eccentric mounting-screws. This is a preliminary adjustment.

(b) The right-hand stud on each pile-up shall be centrally aligned with its associated contact-bail eccentric.

To Adjust: Align each contact pile-up by means of its mounting-screws and enlarged holes in the mounting plate.

(c) There shall be minimum 0.005 inch, maximum 0.015 inch clearance between the stud of the No. 13 contact spring and the No. 10 contact spring on each of pile-ups 2, 3, and 4.

To Adjust: Reposition the contact-bail eccentrics.

(d) With the transfer slides in their Spacing (lower) position, spring No. 13 in each pile-up shall require minimum 18 grams, maximum 25 grams to move, just as the stud leaves the slide-lever eccentric.

To Adjust: Bend and bow the No. 13 spring.

(e) With the slide levers in their Spacing (lower) position, adjacent spring contacts No. 1 and 2, 3 and 4, 6 and 7, 9 and 10, 12 and 13 shall make contact when a 0.035-inch gauge is inserted between the transfer-slide eccentrics and their respective studs. The same spring contacts shall not make contact when a 0.025-inch gauge is inserted between the transfer-slide eccentrics and their respective studs. See Figure 78.

To Adjust: Bend the tangs on springs No. 1, 3, 6, 9, and 12 and recheck the requirements specified in 2.155.

(f) With the slide levers in their Spacing (lower) position, there shall be at least 0.008 inch clearance between the contacts of the light-contact springs and the contacts of the associated left-hand heavy springs. With the slide levers in the Marking (upper) position, there shall be at least 0.008 inch clearance between the contacts of the light springs and the contacts of their associated right-hand heavy springs.

(g) With the slide levers in the Marking (upper) position, move the heavy left-hand contact springs away from their stops or from the light springs, and note that there is some follow of the light-contact springs.

2.157 Tape-feed-indicator-contact Assembly:

(a) The formed portion of the tape-contact lever which follows the tape loop, between

the prepunch and the code-punch mechanisms, shall be slightly to the front of the tape-feed holes or approximately in the center of the tape as gauged by eye. See Figure 79A.

(b) With the tape held against the tape guides, there shall be clearance as indicated in Figure 79B between the tape and the formed part of the tape-contact lever at the bottom of the loop.

To Adjust for requirements (a) and (b), position the collar on the tape-contact lever between the ears of the contact bracket. The setscrew post in the collar acts as a backstop against the ribbon-spool bracket for controlling the clearance between the lever and the tape, and also to clamp the tape-contact lever in the collar. The collar also acts as a front stop against the inside of the bracket front ear to control the central position of the tape-contact lever on the tape. (When necessary, bend the tape-contact lever for proper clearance between the tape and the lever.)

(c) With the tape-lever arm in its central position on the tape and the contact-spring-operating lever opposite the center of the low

part of the insulator on the long contact-spring, there shall be a clearance as indicated in Figure 79B between the contact-spring-operating lever and the insulator.

To Adjust: Loosen the rear-collar-setscrew post so that the collar will be frictiontight on the tape-contact lever. The collar holding the contact-spring-operating lever can then be positioned to give proper clearance between the operating lever and the insulator.

(d) When the tape-contact lever is pushed to its rearmost position and the contact-spring-operating lever is on the high part of the insulator on the long-contact spring, there shall be at least 0.015 inch gap between the contacts of the long and short springs.

To Adjust: Bend the short heavy-contact spring. Recheck (c).

(e) It shall require minimum 2 ounces, maximum 3 ounces to just separate the contacts with the tape-contact lever in the center of the tape and the contacts closed.

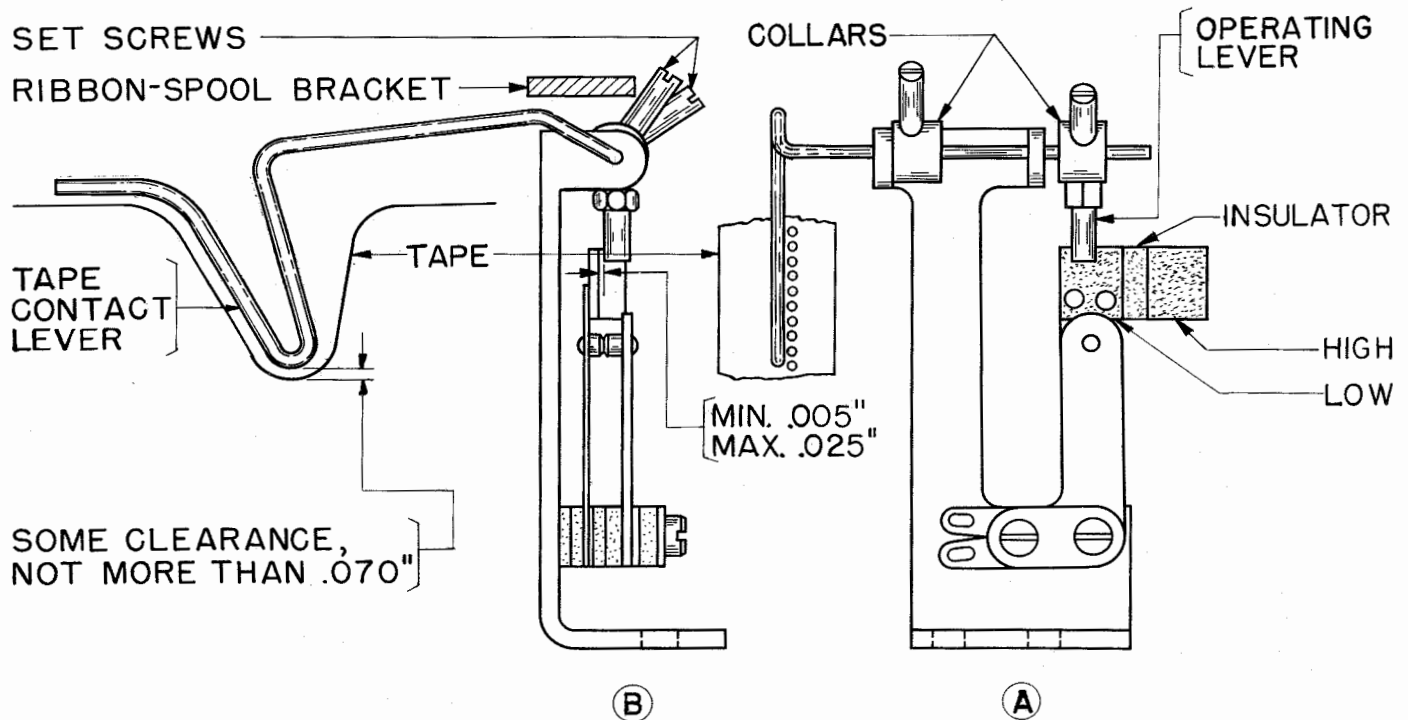


Figure 79

To Gauge: Apply the push end of the scale to the insulator on the long-contact spring at a point between the rivets and push horizontally at a right angle to the spring.

To Adjust: Bend the long-contact spring.

3. TIMING REQUIREMENTS

3.01 The timing of the 14 reperforator-transmitter is shown on the graphs in Figures 80 and 81. Figure 82 shows the sensing cam sleeve and the distributor cam sleeve associated with the timing graph in Figure 81.

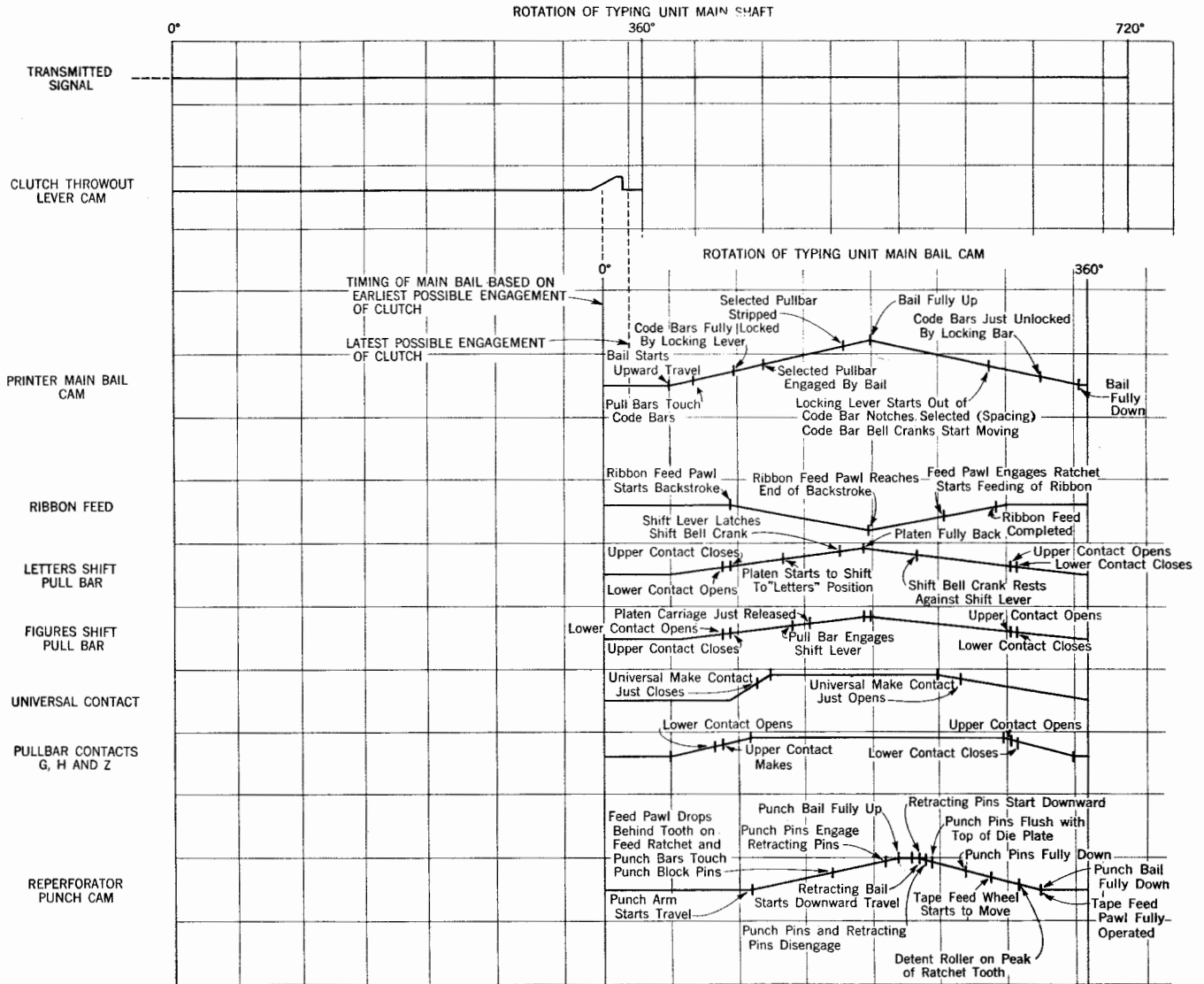


Figure 80 — 14 Reperforator-Transmitter Timing Graph (Receive Side)

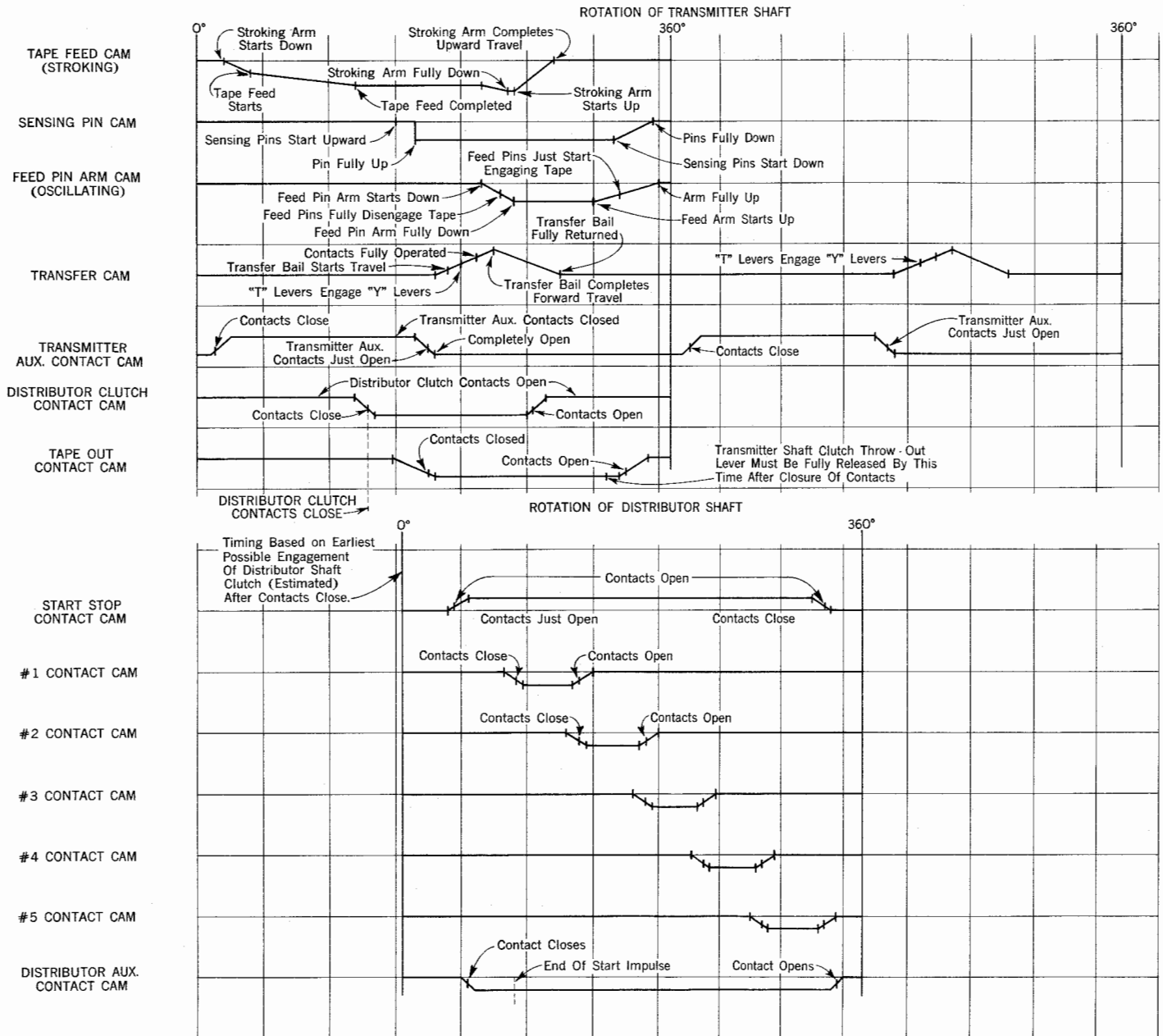


Figure 81 — 14 Reperforator-Transmitter Timing Graph (Send Side)

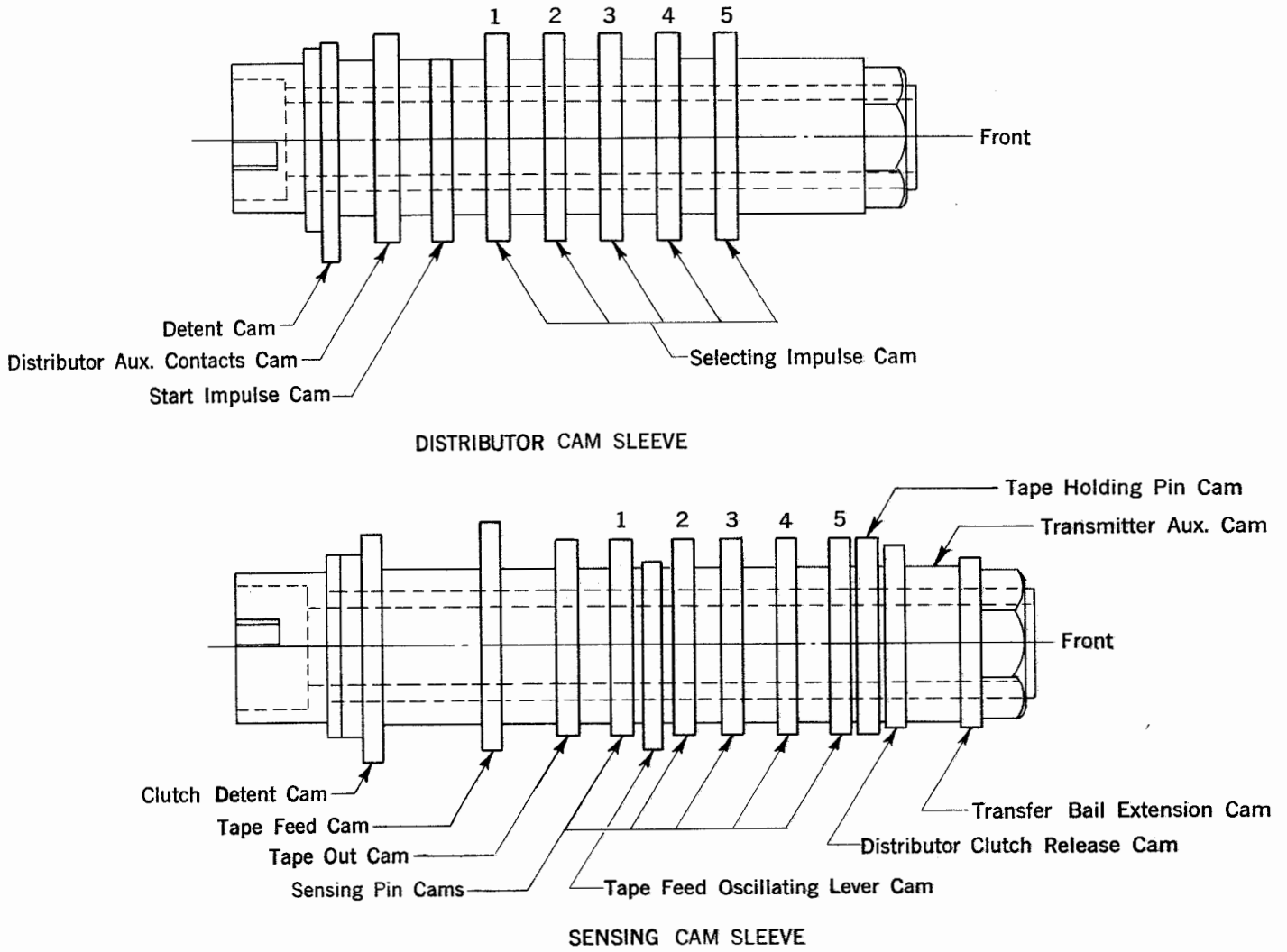


Figure 82 — 14 Reperforator-Transmitter Sensing Cam Sleeve and Distributor Cam Sleeve