

14 TYPING UNIT
REQUIREMENTS AND ADJUSTMENTS

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2. REQUIREMENTS AND ADJUSTMENTS

2.01 Main Shaft: When the main shaft is rotated, the selector cams on the selector cam sleeve shall line up with their respective selector levers.

To Adjust: Loosen the four screws that hold the main-shaft bearing brackets and position the main shaft.

2.02 Main-shaft Clutch Throw-out Lever: With the motor operating, open and close the signal line and then stop the motor. There shall be minimum 0.010, maximum 0.020-inch clearance between the teeth of the two clutch members. (See Figure 10.)

To Adjust: Reposition the clutch throw-out lever pilot screws making sure that the throw-out lever is free in its bearings, with some endplay, not more than 0.002 inch, when the pilot-screw locknuts are tightened.

2.03 Main-shaft Clutch Throw-out-lever Spring shall have a tension of minimum 2-1/2 ounces, maximum 4 ounces measured at right

angles to the throw-out lever, when the clutch teeth are fully engaged and the clutch throw-out lever is resting against the low part of the driven clutch member. (See Figure 1.)

2.04 Main-shaft-clutch Spring, TP6993 on units for 60-speed operation shall have a tension of minimum 24 ounces, maximum 30 ounces to separate the clutch teeth. Spring TP122059 (which has one full turn at one end painted yellow) on units for 75-speed operation shall have a tension of minimum 32 ounces, maximum 42 ounces to separate the clutch teeth. With the teeth of the driven clutch member resting against the teeth of the driving clutch member but not engaged, hook the scale over the throw-out cam on the driven clutch member and pull down as nearly in line with the shaft as possible. (See Figure 2.)

2.05 Driven Clutch Member: After being pulled manually to the position of extreme disengagement the driven clutch member shall move freely without bind on the main shaft.

To Gauge: Pull the driven member to its operated position with the tension specified in 2.04, gradually reduce the tension and permit the driven member to slide until it

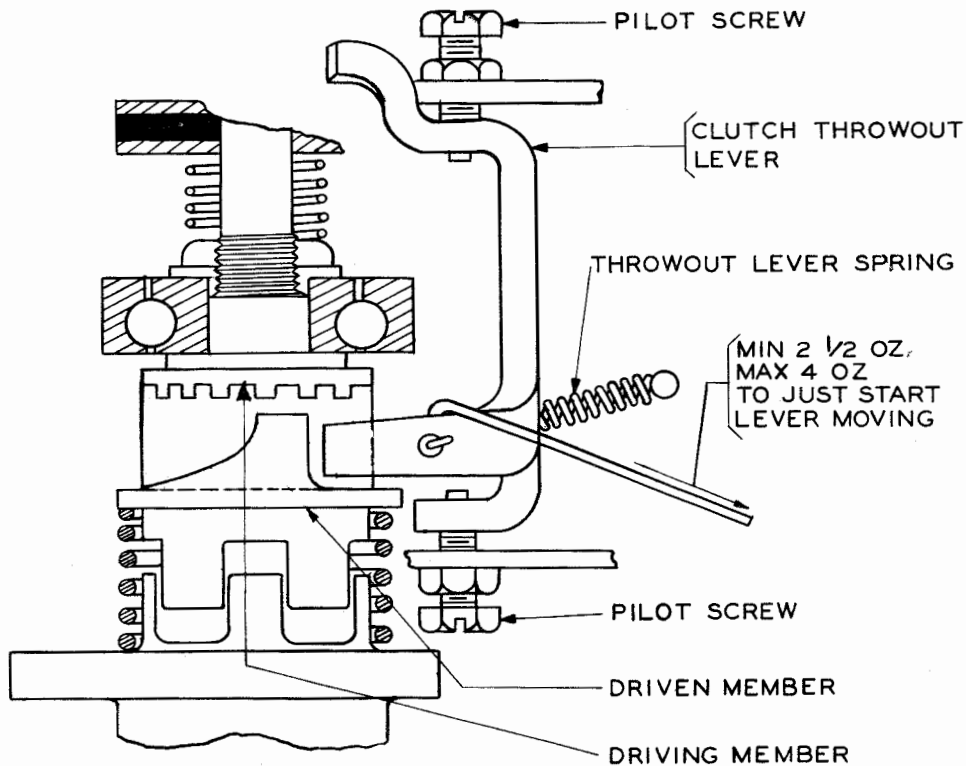
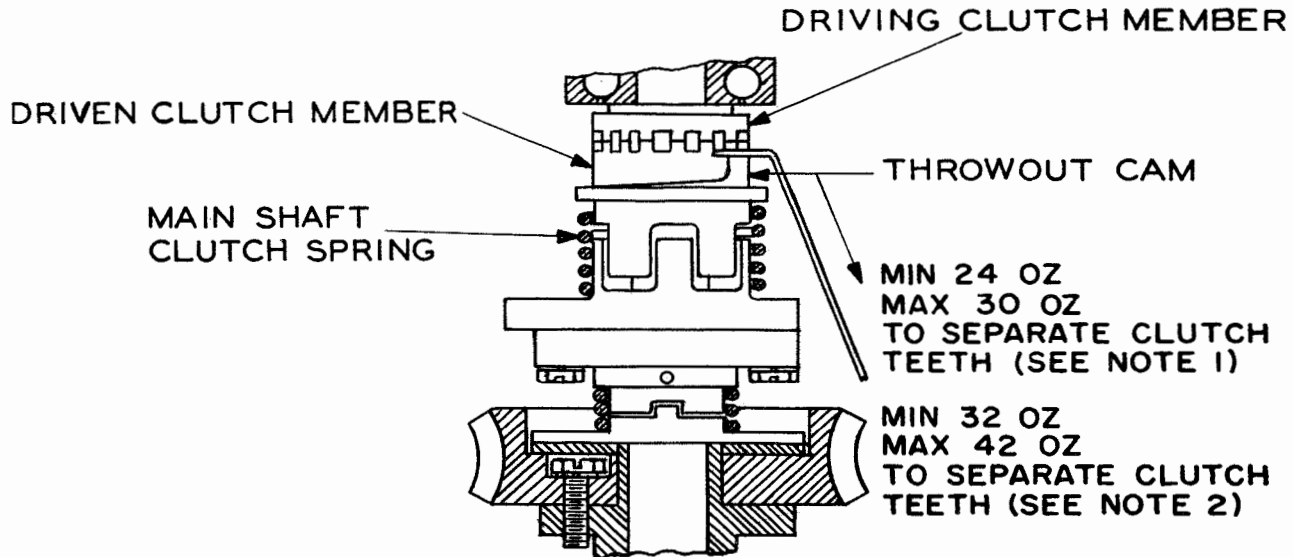


Figure 1

**NOTES:**

1. FOR UNITS USING CLUTCH SPRING TP6993 OPERATING AT 60 WPM.
2. FOR UNITS USING CLUTCH SPRING TPI22059 OPERATING AT 75 WPM. CLUTCH SPRING TPI22059 HAS ONE FULL TURN AT ONE END PAINTED YELLOW.

Figure 2

touches the driving member. The gauge reading should not go below 10 ounces.

To Adjust: Clean and lubricate the clutch. If the sliding surfaces of the driven member and the bushing on which it slides are not smooth and polished, replace these parts or return the typing unit to the shop for replacement.

Note: Failure to receive the first character after a period of idleness may be caused by sticking of the main-shaft clutch parts. Trouble of this nature may be checked by observing the typing of the first character received from the associated keyboard after the main shaft of the typing unit has been at rest for at least 10 minutes with the power disconnected.

2.06 **Motor Position:** Motors and governors shall conform to the requirements given in the section covering teletypewriter motors with the following additions:

- (a) **Governor Guard** shall clear the upper edge of the target by at least 0.062 inch.

- (b) **Motor Position:** 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 lock washers to prevent the screws from protruding beneath the plate.

- (c) **Gear Backlash:** 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 1: The gear play may be refined by pivoting the motor base plate about the left-hand screw and adjusting the eccentric stop.

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Note 2: For 2.09 to 2.16 inclusive, remove the codebar assembly, type basket, and the bell-and-break-signal mechanism.

2.07 To Remove the Codebar Assembly (1) unscrew the two screws at the rear of the pullbar guide, and (2) move the T-levers to the right by pushing the ends of the sword levers to the left. The screws should be replaced so as not to lose any shims which may be under the mounting plate.

2.08 Remove the Type Basket as follows to avoid stretching the springs and bending the levers.

- (1) Unhook the codebar locking lever spring.
- (2) Unhook the signal-bell-hammer spring.
- (3) Unhook the LTRS pullbar spring.
- (4) Unhook the space-release pullbar spring.
- (5) If the unit is equipped with a mechanism to prevent printing and spacing on lower-case Blank, unhook the locking bail spring.
- (6) Remove the right ribbon-spool-bracket front mounting screw.
- (7) Loosen the rear mounting screw and swing the basket so that the ribbon-spool cup will not interfere with the basket.
- (8) Remove the bell-and-break-signal mechanism.
- (9) Hold the pullbars out of engagement with the pullbar guide (as an aid use a piece of

wire or string around the upper end of the pullbars).

(10) Disengage the lower end of the function pullbars from the mechanism on the base, and slide the assembly upward. Care should be taken that the pullbar toes are not jammed against the spacer locking bail or the signal-bell hammer.

2.09 Spacer Feed Pawl shall clear the face of all teeth in the ratchet by minimum 0.002 inch, maximum 0.018 inch when the roller of the spacer operating lever is in the bottom of the indent of the main-bail plunger and when the detent roller is snugly bottoming between two teeth of the ratchet. Gauge by eye. (See Figures 3 and 4.)

To Adjust: Loosen the left front motor-plate mounting-screw and remove the two rear screws that hold the motor plate to the base. Remove the keyboard drive assembly and swing the motor out so as to gain access to the detent-lever-plate adjusting screws. Reposition the detent-lever plate on the main casting to meet the requirements. Check the gear backlash when the motor is put back.

Note: It is possible to set the spacer detent in a position one full tooth off. This error, however, will affect the detent spring tension. Check the spring tension.

2.10 Spacer Detent-lever Spring: With the detent roller resting in the hollow between two teeth, it shall require minimum 3-1/4, maximum 3-3/4 pounds to start the detent lever moving. (See Figure 3.)

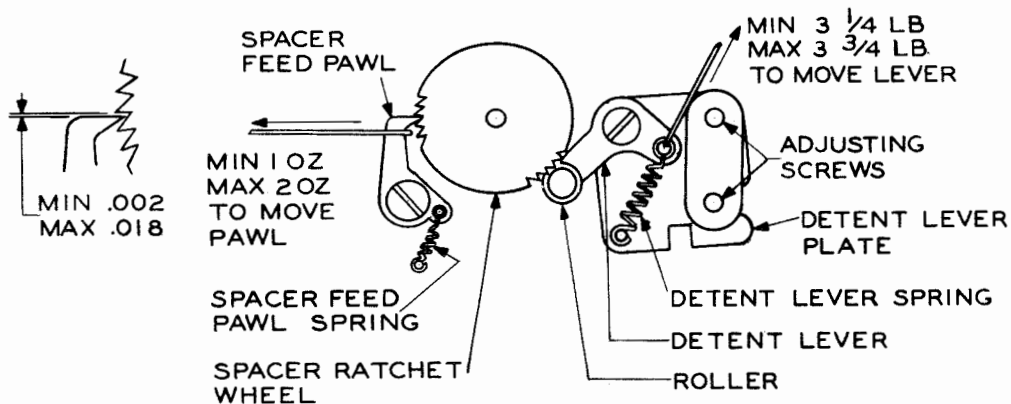


Figure 3

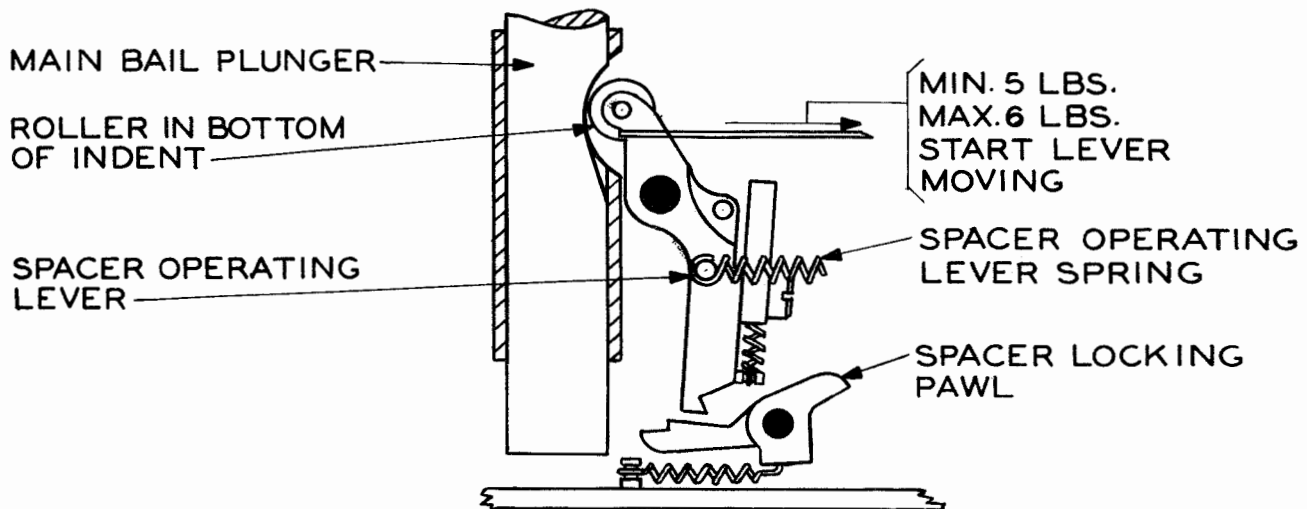


Figure 4

Note: Since the spacer feed pawl and the spacer detent-lever spring adjustments are interrelated, both should be rechecked if one of them is altered. Make sure that the feed pawl advances the ratchet only one tooth during one complete operating cycle.

2.11 Spacer Feed-pawl Spring tension shall be minimum 1 ounce, maximum 2 ounces. (See Figure 3.)

2.12 Spacer Operating Lever Spring tension shall be minimum 5 pounds, maximum 6 pounds for units equipped with a horizontal spring, or minimum 3 pounds, maximum 6 pounds for units equipped with a vertical spring, when the spacer operating lever roller is in the bottom of the indent of the main bail and the spacer locking pawl is not engaged with the spacer operating lever. The horizontal spring is illustrated in Figure 4. (See Figure 4.)

2.13 Ribbon Feed-lever Spring: Loosen the ribbon feed pawl and move it out of engagement with the ribbon feed ratchet. With the ribbon feed-lever roller in the plunger indent it shall require minimum 12 ounces, maximum 18 ounces to start the lever moving. Tighten the ribbon feed pawl. (See Figure 5.)

2.14 Spacer Locking Bail Spring tension shall be minimum 1-1/2 ounces, maximum 2 ounces when the spacer locking pawl is held away from the locking bail.

Note: For typing units equipped with the TP84641 mechanism for printing and spacing on upper-case Blank, see the section covering requirements and adjustments for 14 teletypewriter auxiliary features for the spacer locking bail spring tension requirement. (See Figure 6.)

2.15 Function-bar Spring Bracket: The two end pullbars supported by the function-bar spring brackets shall have an equal amount of play in the segment. Gauge by eye. (See Figure 7.)

Note: This need be checked only when the plates are moved.

To Adjust: Rotate the function-bar spring brackets on their mounting screws.

2.16 Pullbar Springs: The tension of character pullbar springs shall be minimum 3 ounces, maximum 4 ounces and the tension of function pullbar springs shall be minimum 5-1/2 ounces, maximum 6-3/4 ounces. (See Figure 8.)

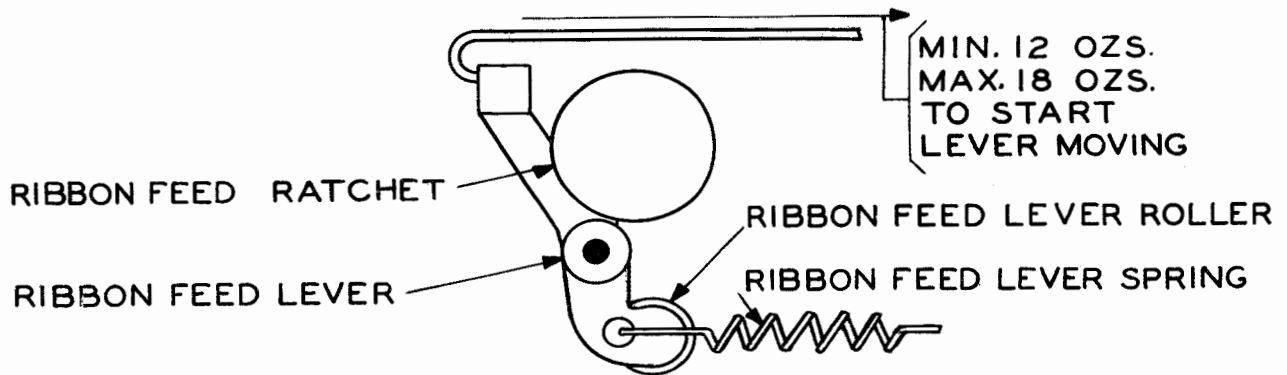


Figure 5

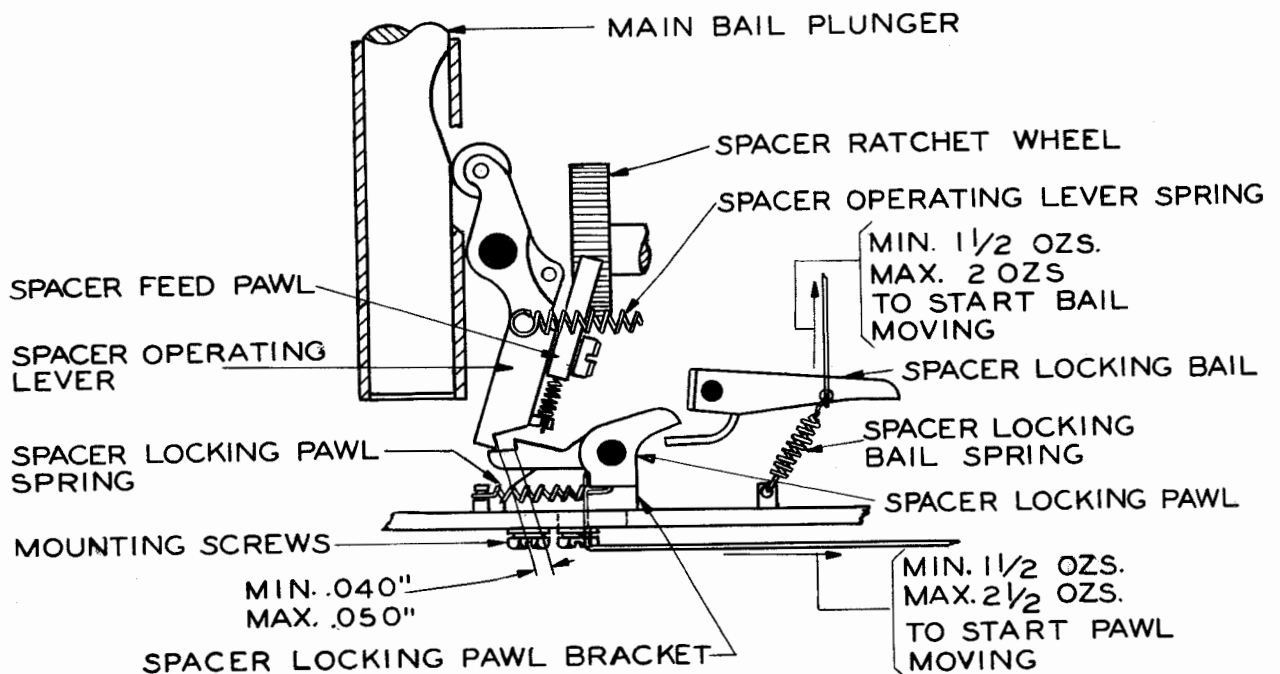


Figure 6

Note: Remount the type basket, the bell-and-break-signal mechanism, and the codebar assembly.

2.17 Remounting of Type Basket, Bell-and-break-signal Mechanism, and Codebar Assembly: The procedure for remounting is as follows:

- (1) Place the main bail in its highest position and remount the type basket with three screws through the base, making sure that all the pullbar springs are in place.

- (2) Reassemble the bell-and-break-signal mechanism.
- (3) Remove the ties from the tops of the pullbars.
- (4) Place the main bail in its lowest position, slip the slots in the pullbar guide over the proper pullbars, and when the codebar assembly is almost in place engage the T-levers in the notches in the codebars.

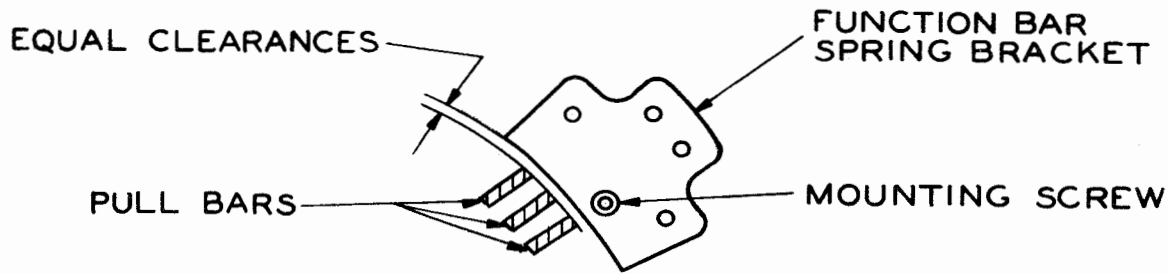


Figure 7

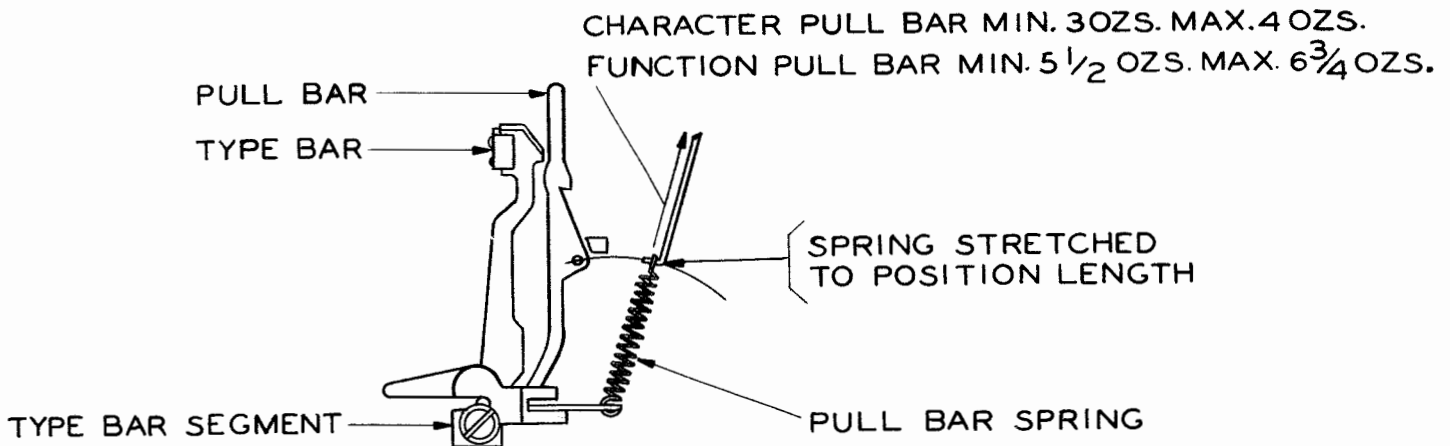


Figure 8

(5) Reassemble any shims which may have been removed from between pullbar guide and the frame casting.

CAUTION: IF CODEBARS ARE REMOVED FROM THE CODEBAR ASSEMBLY, CARE MUST BE USED IN REPLACING THEM, AS EXCESSIVE TIGHTENING OF THE CODEBAR-POST NUTS MAY CAUSE CODEBAR SEPARATOR COLLARS TO BECOME IMBEDDED IN THE NICKEL-SILVER SEPARATOR WASHERS ON UNITS SO EQUIPPED. TO PREVENT THIS, BACK OFF THE NUTS AND TURN THE LOWER NUT WITH THE FINGERS UNTIL THE LOCKWASHER IS PRESSED FLAT. THEN WITH A WRENCH HOLD THE LOWER NUT IN THIS POSITION AND TIGHTEN THE LOCKNUT.

2.18 Pullbar Guide shall be located so that:

- (1) It clears the oilcup on top of the main-bail plunger.

(2) The main bail clears the pullbar projections on unselected pullbars by minimum 0.008 inch, maximum 0.020 inch when Blank and LTRS combinations are set up in turn and the main-bail play is taken up so as to make the clearance a minimum.

(3) There is minimum 0.004-inch, maximum 0.080-inch clearance between the end of the No. 1 T-lever and the bottom of the slot in the codebar, measured at the point of closest approach.

Also check to see that there is clearance between the ends of the No. 2, 3, 4, and 5 T-levers and their respective codebars. Gauge by eye. (See Figure 9.)

To Adjust: Reposition the pullbar guide. If it is necessary to adjust, check 2.19.

2.19 Pullbars, except the selected one, shall clear the inner edge of the codebars by minimum 0.010 inch, maximum 0.050 inch when

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Blank and LTRS combinations are set up in turn, the main-bail roller is on the high part of the main-bail cam and the play in the main bail and the pullbars is taken up to make the clearance a minimum. (See Figure 10.)

Note: Before making any readjustment to meet this requirement check 2.18.

To Adjust: Reposition the main-bail adjusting screw.

Note: If codebars and pullbars are not concentric it may be necessary to shift the typebar segment and main bracket on the base plate.

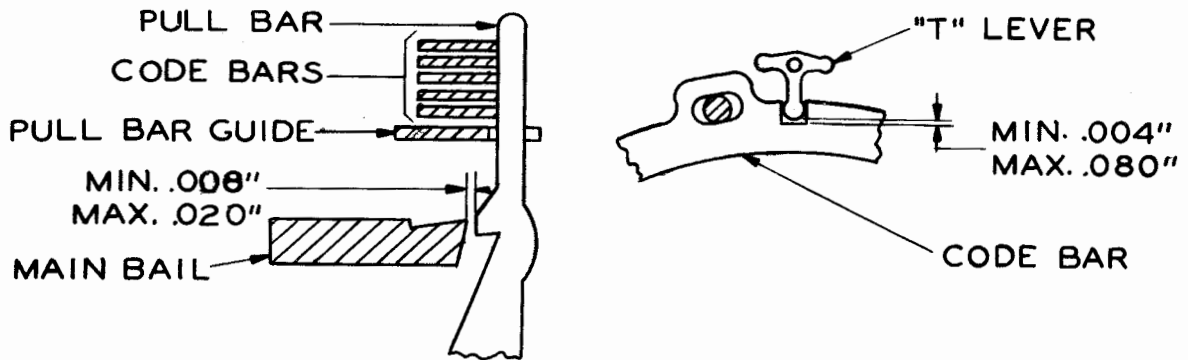


Figure 9

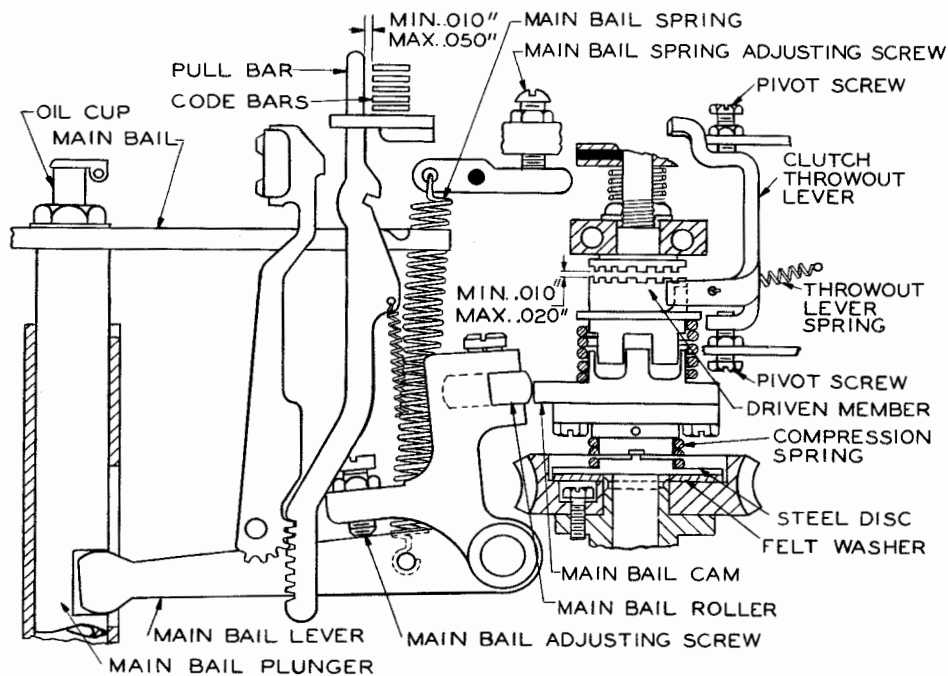


Figure 10

2.20 Main-bail Freedom of Movement: The main-bail shall be free from bind throughout its movement.

To Check:

- (1) Rotate the main shaft until the main bail is opposite the humps of the pull-bars.
- (2) Swing the motor out of the way and remove the ribbon feed-lever spring and the main-bail spring, allowing the bail to drop.
- (3) Block all the pullbars out of the path of the main bail. (A convenient way to do this is to place a length of rosin-core wire solder between the pullbars and the codebars.)
- (4) Then with a finger under the main bail raise the main bail slowly to its highest position and release it. There shall be no evidence of bind on the upward travel and the bail shall fall freely of its own weight to its lowest position when released.
- (5) Restore the springs.

2.21 Equalizing Pullbar Clearance:

- (a) Pullbar-main Bail Clearance: With the Blank combination set up and the main bail opposite the unselected pullbar humps (Figure 11) the clearance between the LTRS pullbar and the main bail and the clearance between the FIGS pullbar and the main bail shall be approximately the same.
- (b) Pullbar Codebar Clearance: With the main bail in its lowest position (Figure 12) the clearance between the LTRS pullbar and the

codebars and the clearance between the FIGS pullbar and the codebars shall be approximately the same.

To Adjust:

For Units With Main-bail Roller Guides

- (1) Loosen the mounting screws of both roller guides, leaving those of the right roller guide friction tight.
- (2) Move the right roller guide until both clearance requirements are met.
- (3) Tighten the right-roller-guide mounting screws.
- (4) Move the left roller guide so that there is no bind on the main bail.
- (5) Tighten the left-roller-guide mounting screws.

For Units with Adjustable Guide Post

- (1) With the guide post away from the bottom of the bail slot, position the eccentric bushing to meet the requirements.
- (2) To meet the requirements, it may be necessary to relocate either the eccentric bushing, the typebar basket, or the pullbar guide.

Recheck: The movement of the main bail shall be free from bind throughout its movement.

Note: If this adjustment is made, check 2.18, 2.19, and 2.42.

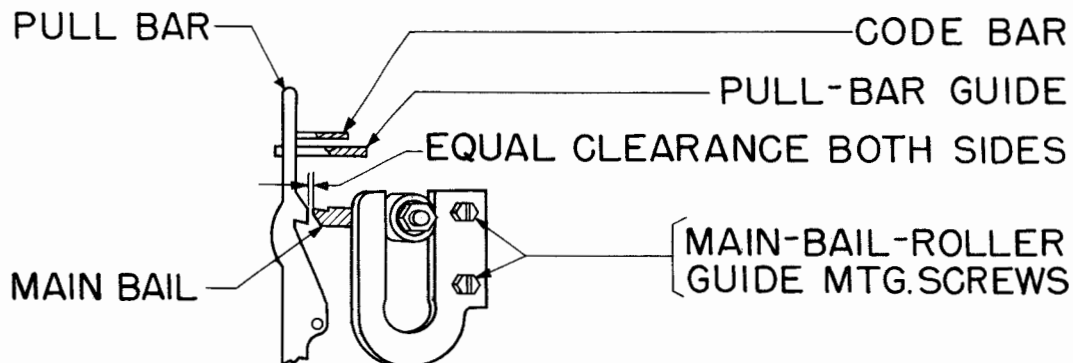


Figure 11

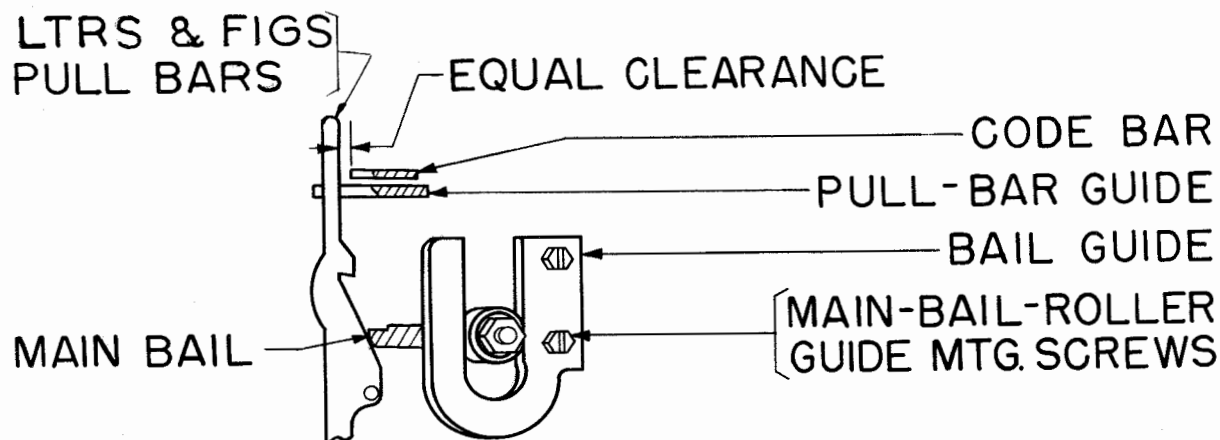


Figure 12

2.22 Spacer Locking Pawl Bracket: With the FIGS combination selected and the main shaft rotated until the space operating lever roller is on the high part of the main-ball plunger, the shoulder on the spacer locking pawl shall clear the notched part of the spacer operating lever by minimum 0.040 inch, maximum 0.050 inch. (See Figure 6.)

To Adjust: Reposition the spacer locking pawl bracket on the base.

2.23 Spacer Locking Bail Finger: With the E combination set up and the main shaft rotated until the two edges are in line, there shall be minimum 0.015 inch, maximum 0.025 inch clearance between the latching edge of the spacer operating lever and the latching edge of the spacer locking pawl. (See Figure 13.)

To Adjust: Hold the spacer locking bail by means of the TP72574 holding tool inserted under the typebar segment alongside the carriage-shaft gear and bend the spacer locking bail finger with the TP72575 bending tool. The bending tool should be inserted horizontally between the motor and the main casting (on the left side of the unit).

2.24 Spacer Locking Pawl Spring tension shall be minimum 1-1/2 ounces, maximum 2-1/2 ounces when the Blank combination is set up and the main shaft is rotated until the main bail is in its extreme upper position. (See Figure 6.)

Note: Place the typing unit so it rests on the motor for this adjustment.

2.25 Carriage shall shift freely, without bind, back and forth between the LTRS and FIGS positions at all positions of the spacing gear when the carriage locking pawl is operated and the carriage is moved slowly by hand. Gauge by feel.

To Adjust: Reposition the platen-shaft front bearing bracket and if necessary free or replace the shift rocker, shift-rocker lever, and lockout bearings. For identification of parts see Figure 14.

Note: After this adjustment, position the carriage-bracket locating plate so that the three projections make contact with the bracket. The carriage bracket can then be removed and reassembled without further adjustment.

2.26 Shift Rocker shall be parallel to the platen-shaft. Gauge by eye. (See Figure 14.)

To Adjust: Reposition the shift-rocker post.

2.27 Shift-rocker-lever Post shall be located so that its front surface is approximately parallel to the front edge of the baseplate (gauge by eye), and on typing units equipped with a non-adjustable shift rocker, so that the shift-rocker lever clears the LTRS pullbar toe by minimum 0.002 inch, maximum 0.006 inch when the carriage is in the FIGS position and the LTRS pullbar is just selected and about to move upward. (See Figure 15.) To obtain clearance, raise or lower the shift-rocker-lever post by means of shims TP8896 (0.004 inch) under the post.

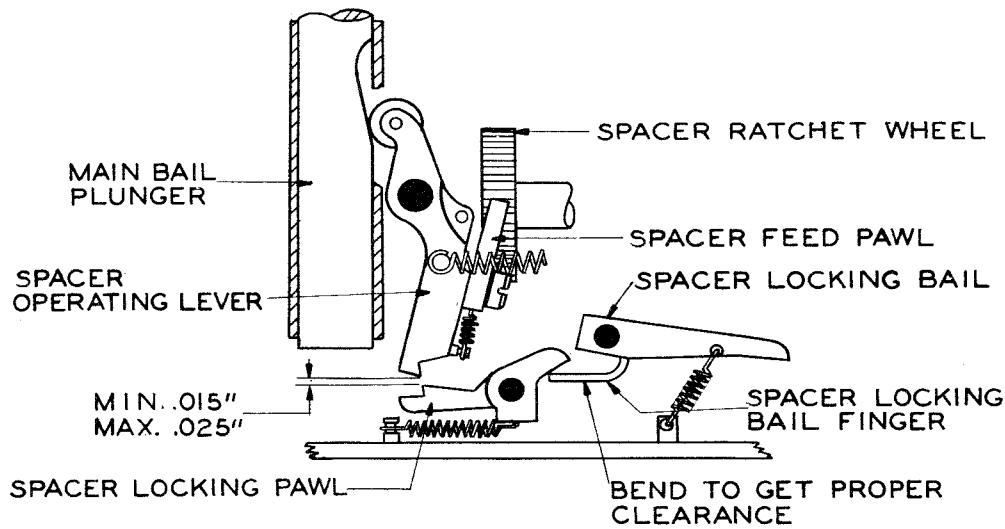


Figure 13

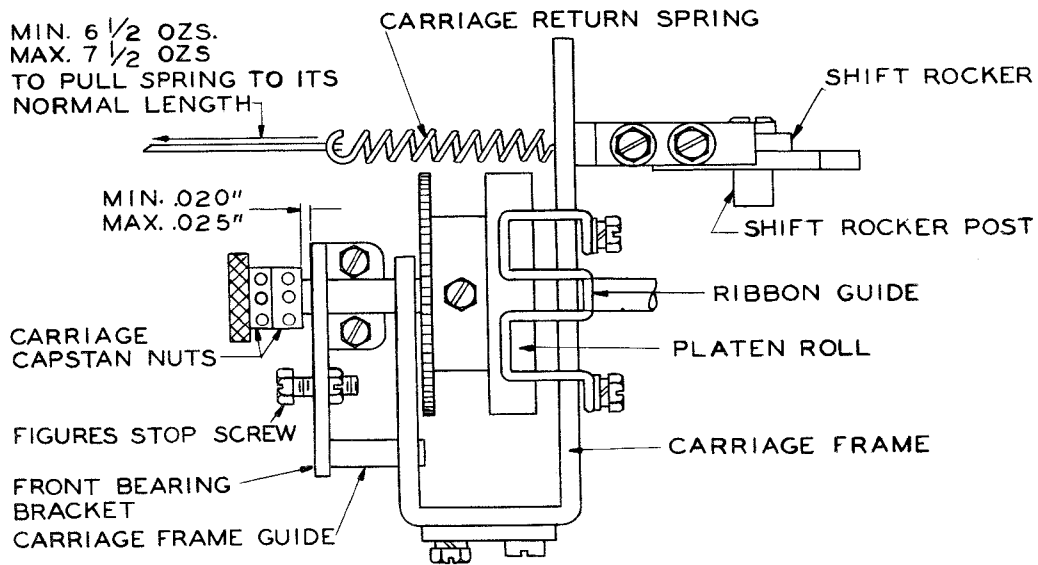


Figure 14

2.28 Shift-rocker Spring tension shall be adequate to cause the lever to stay in contact with the rocker when the platen is in the LTRS position.

2.29 Carriage Locking Pawl shall set fully on the carriage locking toe when the carriage is in the LTRS position and the play of the pawl is taken up in either direction.

To Adjust: Position the locking pawl post by means of its locknut. (See Figure 16.)

2.30 Carriage Stops:

- (1) With the carriage in the FIGS position, the Figure 2 shall print in the middle of the platen roll. Gauge by eye.

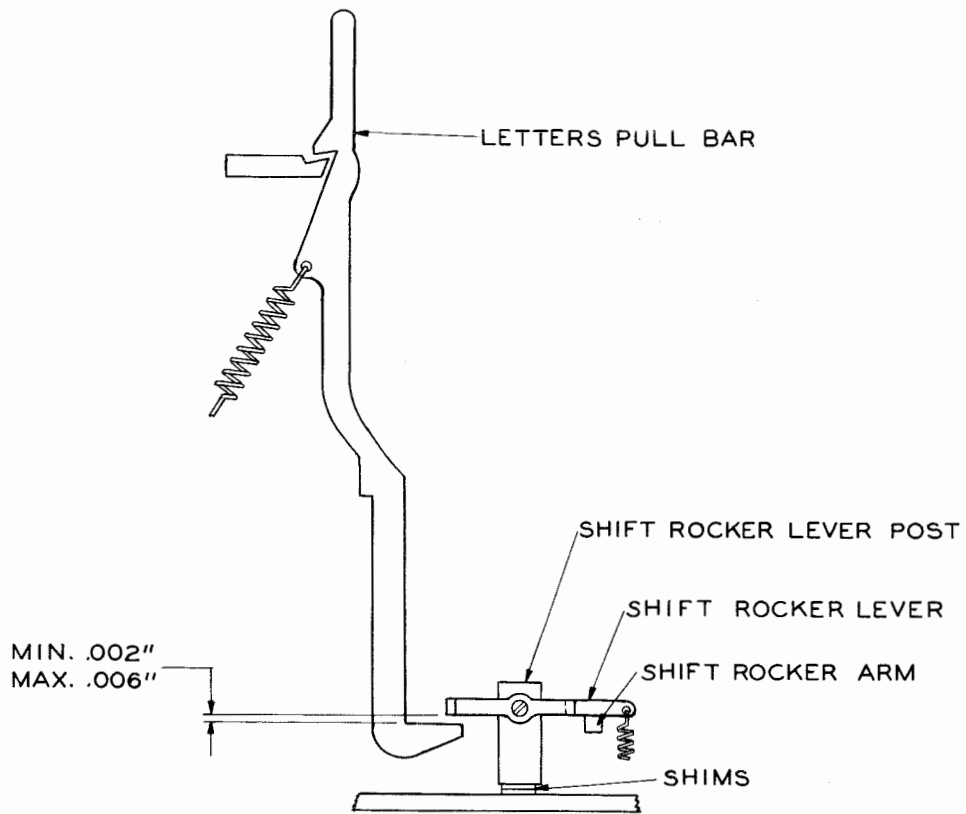


Figure 15

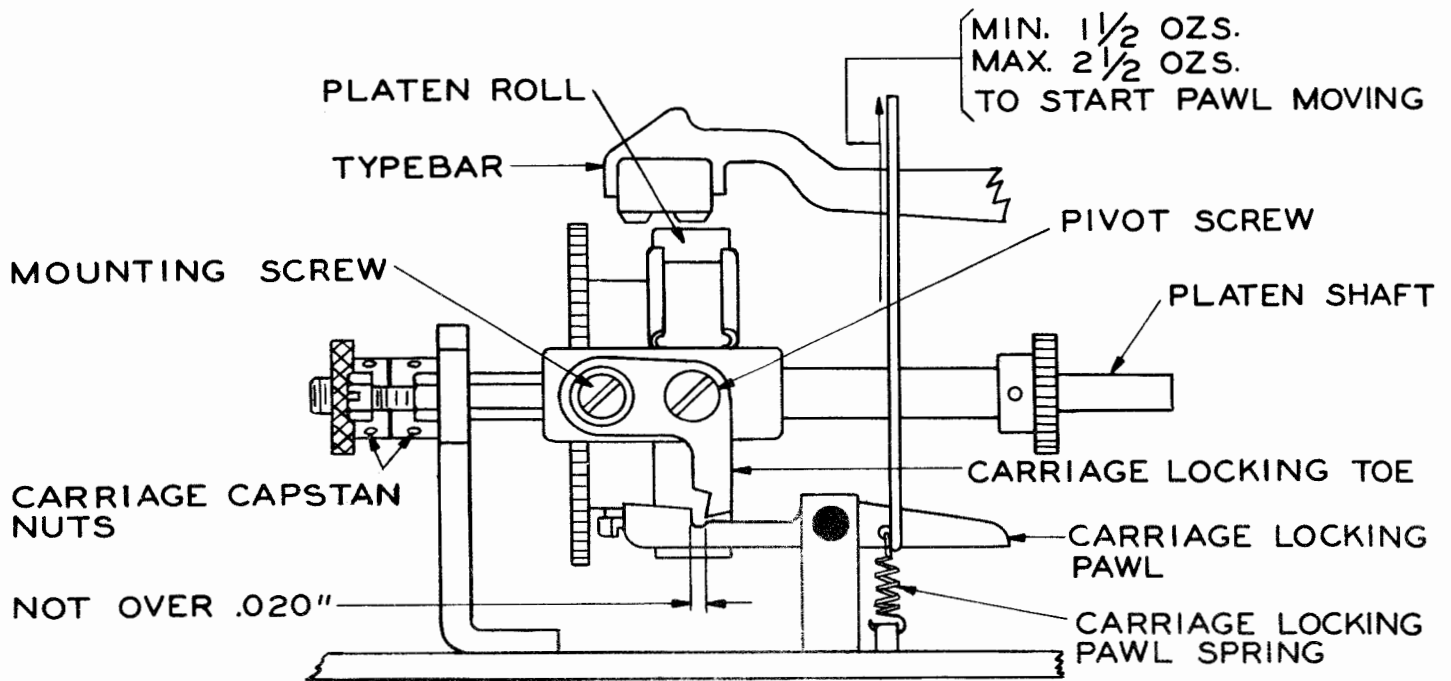


Figure 16

To Adjust: Position the FIGS stop screw.
(See Figure 14.)

- (2) With the carriage in the LTRS position, the letter W shall print in the middle of the platen roll. Gauge by eye.

To Adjust: Loosen the carriage-locking toe mounting screw and position the carriage locking toe (See Figure 16.)

- 2.31 Rear Capstan Nut shall clear the carriage front-bearing bracket by minimum 0.020 inch, maximum 0.025 inch when the carriage is latched in the LTRS position. (See Figure 14.)

To Adjust: Reposition the capstan nuts, using the TP6617 tommy wrench.

- 2.32 Carriage Travel: On units equipped with an adjustable shift rocker, the carriage locking toe shall overtravel the locking-pawl notch by not more than 0.020 inch when the LTRS combination is set up and the main bail is in its highest position. (Pull upward on the bail to insure this.) Gauge by eye. (See Figure 16.)

Note: If the unit is to unshift on Space, it should meet the same requirement when the Space combination is set up.

To Adjust: Loosen the shift-rocker hexagon screw and readjust the shift rocker.

- 2.33 Carriage-spring-bracket Toe shall travel an equal distance on either side of a vertical line passing through the shift-rocker-bearing screw when the carriage is moved from

the LTRS to the FIGS position. Gauge by eye. (See Figure 17.)

To Adjust: Reposition the carriage spring-bracket toe.

- 2.34 Carriage-return Spring tension shall be minimum 6-1/2 ounces, maximum 7-1/2 ounces measured when the carriage is in the LTRS position. (See Figure 14.)

Note: Where a 14 typing unit is mounted on a sloping shelf, such as a No. 2 serviceboard, the unit should be equipped with a TP91096 carriage-return spring which is heavier than the standard TP80365 carriage-return spring usually in the platen-shift mechanism. The tension of the heavier spring TP91096 shall be minimum 8 ounces, maximum 9 ounces measured when the carriage is in the LTRS position. The tension of the standard TP80365 shall be as specified in 2.34.

- 2.35 Carriage Locking Pawl Spring tension shall be minimum 1-1/2 ounces, maximum 2-1/2 ounces measured when the carriage is held back far enough to have clearance between the carriage locking pawl and the carriage locking toe. (See Figure 16.)

- 2.36 Tape Guides shall be in line with each other and be so located that the printing is in the middle of the tape, the tape guide on the left side of the platen clears the platen by minimum 0.004 inch, maximum 0.010 inch, and the tape guide on the right side of the platen

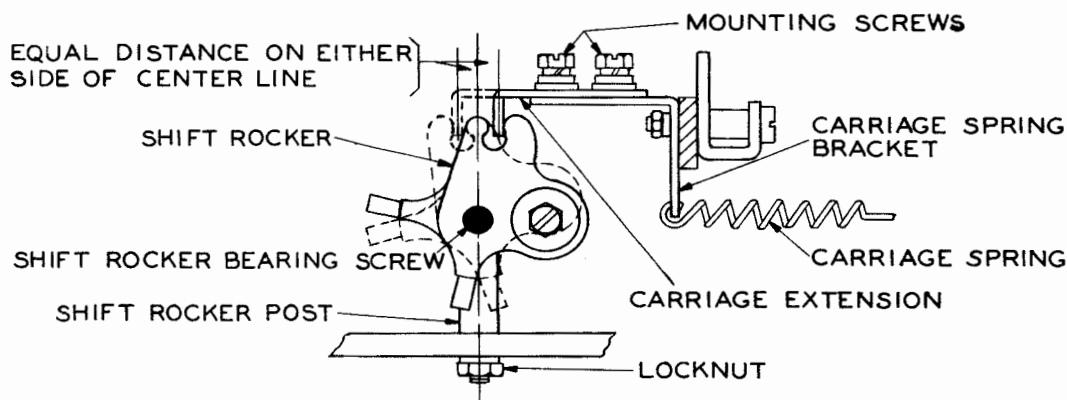


Figure 17

clears the platen by minimum 0.010 inch, maximum 0.020 inch. Gauge by eye. This adjustment applies to both types of tape feed. (See Figure 18.)

To Adjust: Shift or bend the guides.

2.37 Exit Tape Chute, except swivel tape chutes, shall be in alignment with the left-hand tape guide.

Adjust: By means of the chute mounting screws. There shall be minimum 0.015-inch to maximum 0.040-inch clearance between the under surface of the left-hand tape-guide and the top surface of the exit-chute channel when the platen assembly is in either the LTRS or FIGS position.

Adjust: By bending the chute mounting bracket.

2.38 Swivel Tape Chute shall clear the platen by minimum 0.010 inch, maximum 0.020 inch and the chute center line shall coincide with that of the platen surface when the platen is held at the midpoint of its travel. Gauge by eye.

To Adjust: The clearance, reposition the right chute bracket; to adjust the alignment, reposition the left chute bracket.

2.39 Tape-feed Roll shall be located so that both knurls rest against the platen and the roller gear engages the carriage gear so as to drive reliably with minimum backlash. Gauge by eye.

To Adjust: Check the platen for swelling and replace it if necessary.

Note: For the push-tape-feed mechanism see the section covering requirements and adjustments for 14 teletypewriter (auxiliary features).

2.40 Tape-feed-roll Spring tension shall be minimum 7 ounces, maximum 11 ounces on pull-tape-feed typing units, and minimum 10 ounces, maximum 14 ounces on push-tape-feed typing units, measured at the feed-roll shaft as the feed roll leaves the platen. (See Figure 18.)

2.41 Typebars and Pullbars shall be free in their segment slots with a minimum amount of side play. Gauge by feel.

To Check: The freeness of a typebar, move it down so that the pallet rests lightly on the platen roll. Then, when the typebar is released, it should return to its normal position against the typebar backstop. If necessary, the sides of the typebar may be lapped on a fine stone to prevent binding in the segment slot.

To Remove: A typebar, remove the carriage spring, the ribbon from the guide, and the two screws from the carriage front bracket. Lift off the carriage assembly. Move the typebar forward and downward until the teeth on the typebar are disengaged from those on the pullbar. The typebar may then be unhooked from the fulcrum rod and removed.

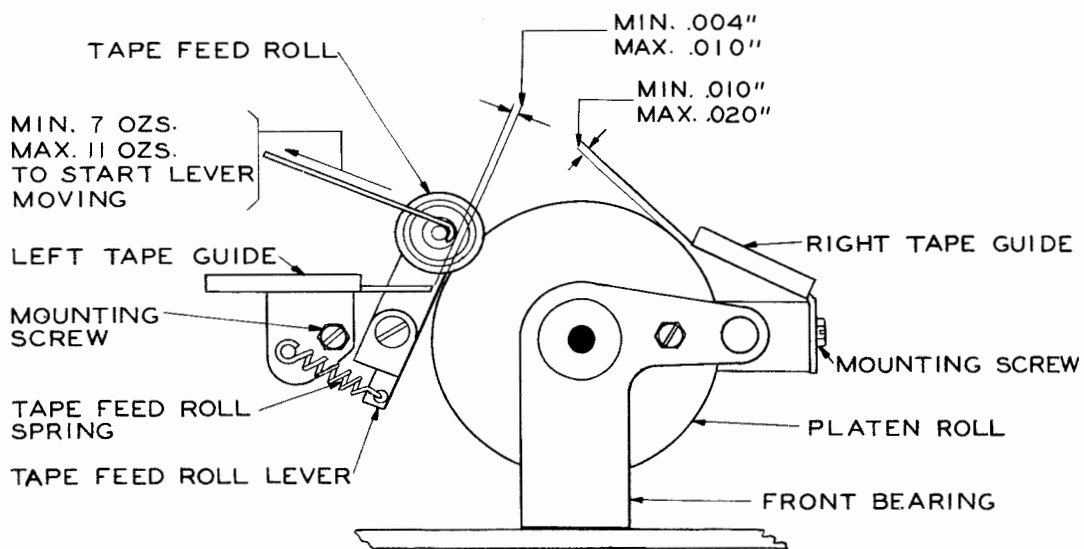


Figure 18

To Replace: A typebar, hook it over the fulcrum rod. If the teeth are meshed properly, the typebar will rest against the typebar backstop when the top of its pullbar is in line with the other pullbars. If the typebar does not rest against the typebar backstop, move the typebar downward again until the teeth are out of mesh and then raise the pullbar as many teeth as is necessary to permit the typebar to resume its correct position. Replace the carriage, making sure that the bracket is against the positioning plate, and tighten the bracket mounting screws.

Note: If this adjustment needs refining, check 2.18 and 2.19.

2.42 Pullbar-lockout Lever shall meet the following requirements.

- (a) With the platen in the FIGS position, select the Blank combination and rotate the main shaft until the main bail is in its uppermost position. Adjust the pullbar-lockout lever so that the S pullbar clears the codebars by minimum 0.004 inch, maximum 0.040 inch. With the platen in the LTRS position there shall be minimum 0.004 inch, maximum 0.040 inch between the BELL pullbar and the codebars. Reposition the pullbar lockout lever if necessary. [See Figures 19(C) and 19(D).]

Note: Substitute J for S on units arranged to ring the bell on upper case J instead of S.

- (b) With the platen in the FIGS position, select the BELL combination and rotate the main shaft until the main bail is approximately 0.010 inch from the BELL pullbar notch [Figure 20(A)]. There shall be at least 0.010 inch clearance between the BELL pullbar and the

lockout-lever roller [Figure 20(B)], with the play of the platen shaft, shift rocker, and lockout lever taken up in a direction to make this clearance a minimum. Gauge by eye. See Figures 20(A) and 20(B).

Note: As an increase in pullbar clearance also increases the load on the platen-shift spring, the platen-shift mechanism shall be checked (manually) for correct operation.

2.43 Ribbon Guide shall meet the following requirements.

- (1) Clear the top of the platen by minimum 0.040 inch, maximum 0.050 inch.

To Adjust: Position the ribbon guide by means of its mounting screws.

- (2) Clear the side of the platen by minimum 3/16 inch, maximum 7/32 inch as gauged by eye.

To Adjust: Bend the guide. Recheck the previous adjustment.

2.44 Ribbon-spool Cups: The centers of the ribbon-spool-cup rollers shall be minimum 4-11/16 inches, maximum 4-13/16 inches from the base plate. (See Figure 21.)

To Adjust: Reposition the ribbon-spool cups.

2.45 Ribbon-spool Bracket shall be parallel with the edges of the base plate and there shall be a minimum amount of backlash between the bevel gears of the ribbon-feed shaft throughout a complete revolution of the ribbon-spool shafts when the ribbon-feed shaft is in its extreme left and right positions, respectively. Gauge by eye and feel.

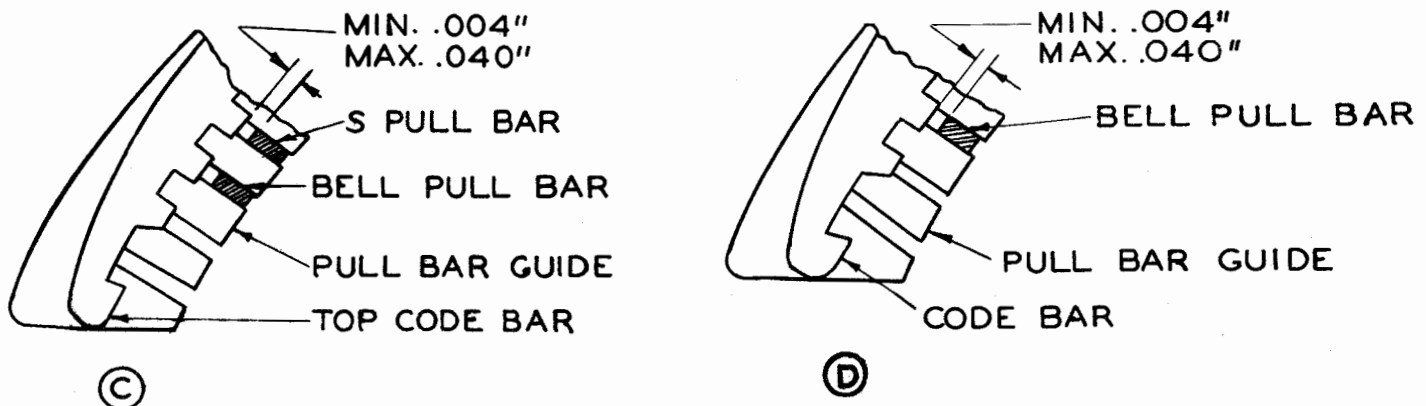


Figure 19

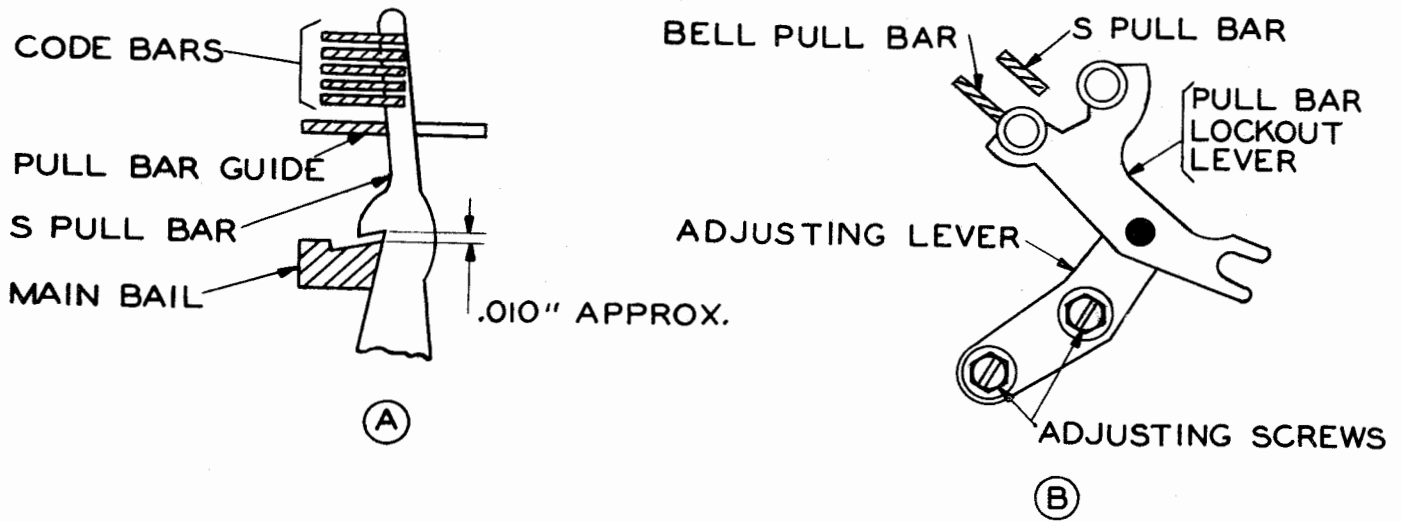


Figure 20

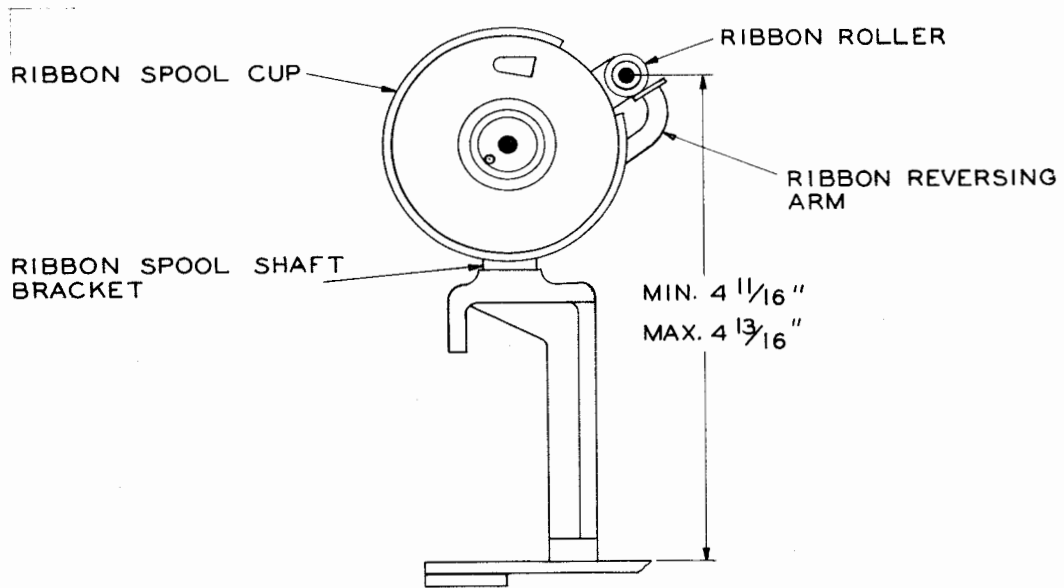


Figure 21

To Adjust: Position the ribbon-spool brackets.

Note: If the unit is equipped with an end-of-line indicator mechanism, the right bracket should be so positioned that the front edge of its ribbon-spool cup is approximately in line with the front edge of the left ribbon-spool cup and the gear backlash obtained by positioning the gear on right ribbon-spool shaft.

2.46 Ribbon-spool Shafts shall have perceptible end play, but not more than 0.004 inch. Gauge by eye and feel.

To Adjust: Reposition spool-shaft gears. (See Figure 22.)

2.47 Ribbon-spool-shaft Springs: The resistance to turning caused by the ribbon-spool-shaft springs shall be minimum 2-1/2 ounces, maximum 5 ounces, measured by pulling on the pin, with

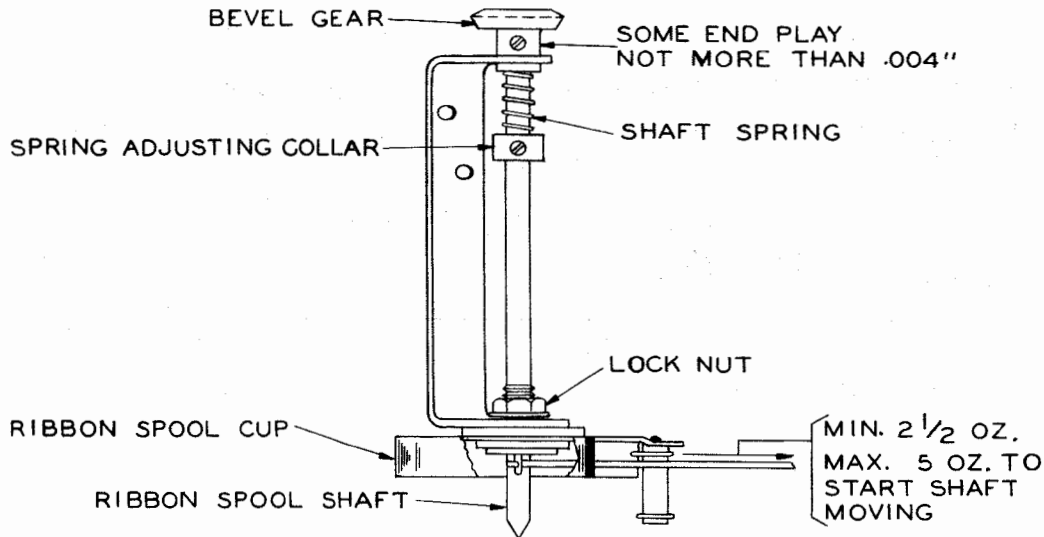


Figure 22

the ribbon-feed shaft disengaged from the ribbon-spool shaft. (See Figure 22.)

To Adjust: Move the spring adjusting collar lengthwise on the shaft.

2.48 Ribbon-reverse-arm Shafts shall (1) clear their respective ribbon-spool cups by minimum 0.005 inch, maximum 0.025 inch when the reverse arms are held against the ribbon-spool-shaft bracket so as to make the clearance a minimum and (2) have not more than 0.004 inch endplay as gauged by eye and feel.

To Adjust the clearance, reposition the ribbon-reverse arms; to adjust endplay, reposition the collar at the rear bearing of the bracket.

Note: If the clearance is changed, check 2.50.

2.49 Ribbon-reverse-pawl Links shall not bind on their shoulder screws.

To Adjust: Reposition the ribbon-reverse levers at the rear end of the reverse shafts and check 2.50.

2.50 Ribbon-reverse Pawls shall clear the ribbon-reverse bail by minimum 0.015 inch, maximum 0.040 inch when the associated ribbon-reversing arm is against its ribbon-spool cup. (See Figure 23.)

To Adjust: Reposition the reversing arms on their shafts and recheck 2.48.

2.51 Ribbon-feed-shaft Safety Springs shall exert a pressure of minimum 3 pounds, maximum 5 pounds measured on the ribbon-reverse pawls when the feed shaft is held in engagement with the opposite spool-shaft gear and the main bail is in its uppermost position. (See Figure 24.)

2.52 Ribbon-feed-shaft Detent Plunger shall press against the detent so that it requires a force of minimum 1-1/2 pound, maximum 3-1/2 pound to push the detent over the plunger when the ribbon-feed and check pawls are held clear of the ratchet. (See Figure 25.)

2.53 Ribbon Check Pawl (top end) shall clear the lower surface of the pullbar guide by minimum 3/64 inch, maximum 5/64 inch. Gauge by eye. (See Figure 26.)

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

2.54 Ribbon-feed-pawl and Ribbon-check-pawl Spring tension shall be minimum 6 ounces, maximum 8 ounces.

To Gauge: With the ribbon-feed shaft pushed to the right, and the main shaft in its stop position, hook the scale over the extreme lower end of the pawl and pull at right angles to the pawl, as in Figure 26. Minimum 6 ounces, maximum 8 ounces should just start the pawl moving away from the ratchet. Make sure that the pawl does not bind against a tooth on the ratchet when tension is being measured.

To Adjust: Bend the pawl.

Note: Pull the R type bar down to the platen to get at the check pawl.

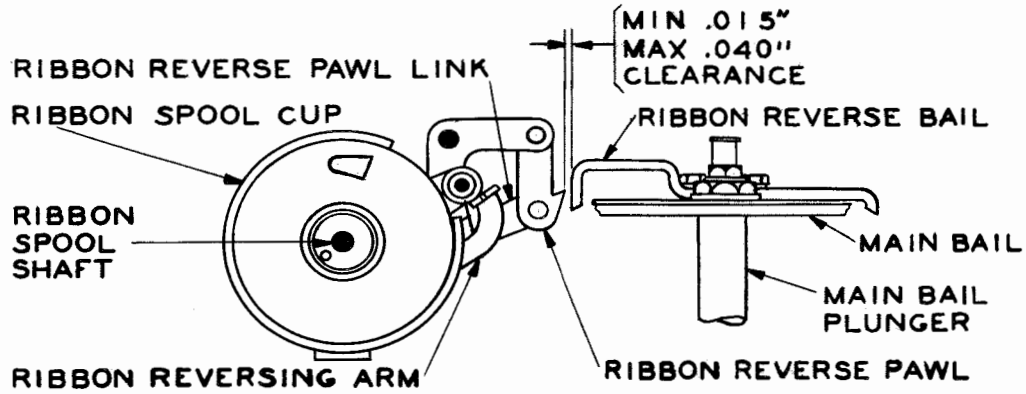


Figure 23

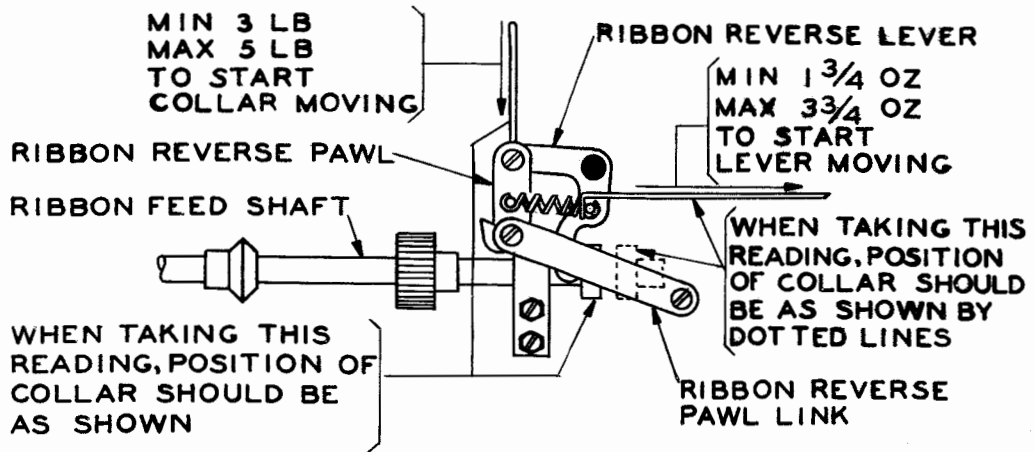


Figure 24

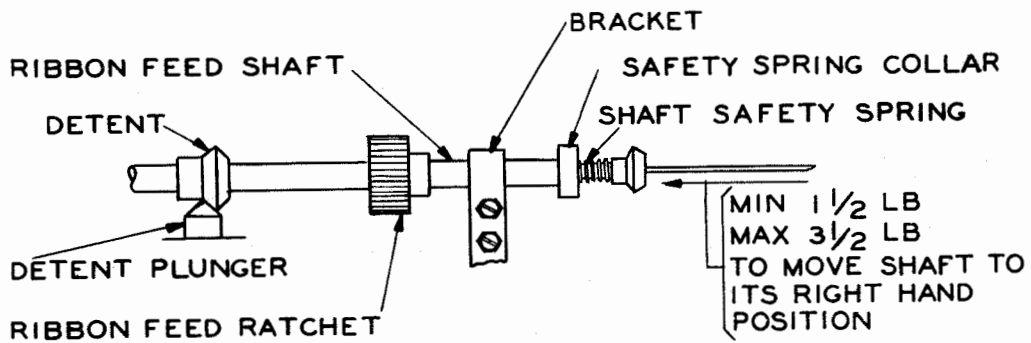


Figure 25

2.55 Ribbon-feed-pawl Position shall be such that the ratchet will be moved one or two teeth for each operation of the main bail.

To Adjust: Position the ribbon feed pawl by means of its mounting screw.

2.56 Ribbon-reverse-pawl Spring tension shall be minimum 1-3/4 ounces, maximum 3-3/4 ounces with the ribbon-feed-shaft collar moved away from the ribbon-reverse lever as shown dotted in Figure 24.

2.57 Ribbon Spools shall be tight on their shafts so as not to slide off.

To Adjust: Spread the slot in the end of the shaft.

2.58 LTRS Pullbar Spring tension shall be minimum 1 ounce, maximum 1-1/2 ounces, measured when the main bail is in the down position. (See Figure 27.)

To Adjust: Reposition spring bracket.

2.59 Codebar Locking Lever Spring tension shall be minimum 3-1/2 ounces, maximum 5 ounces measured when the main bail is in the extreme upward position. (See Figure 28.)

To Adjust: Reposition the right spring bracket.

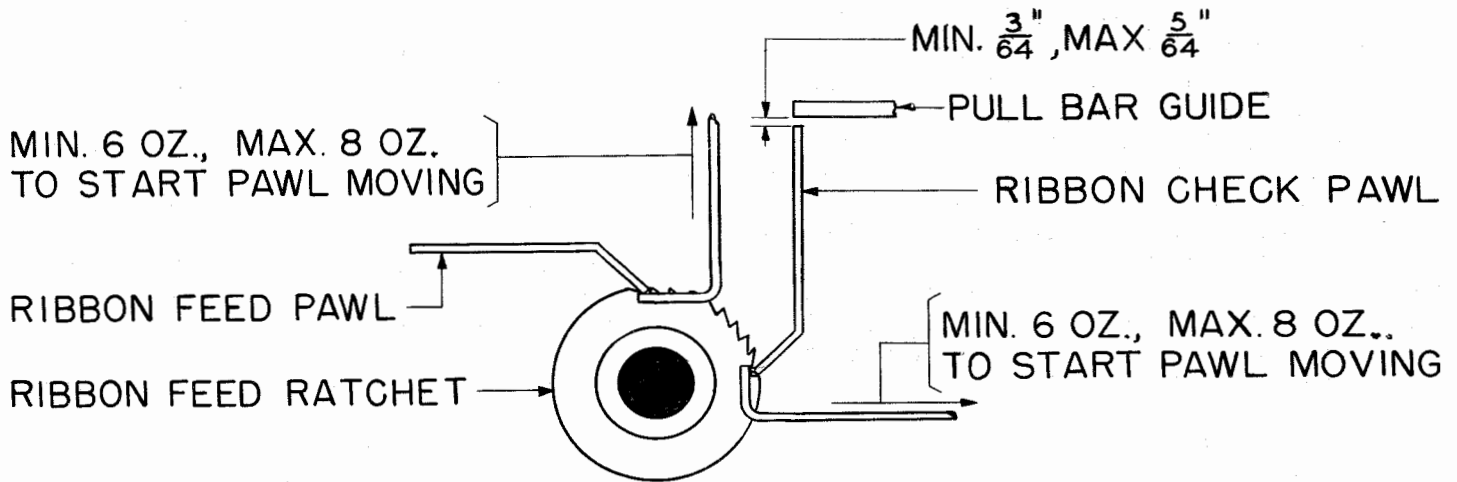


Figure 26

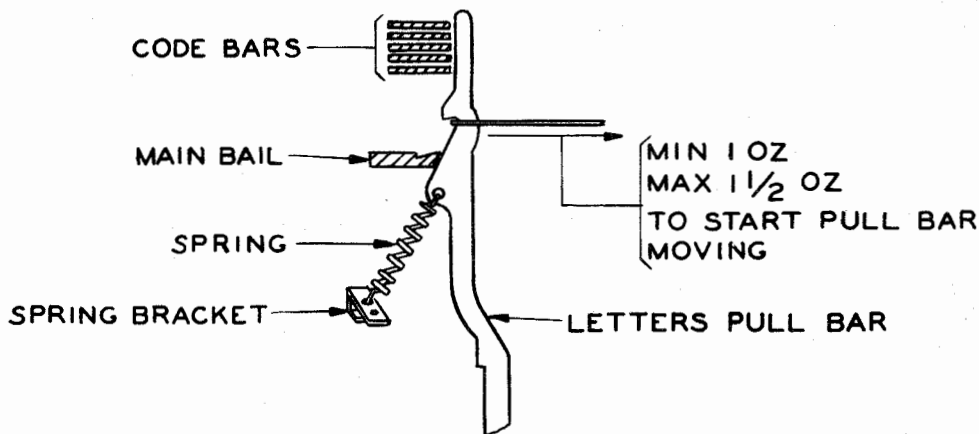


Figure 27

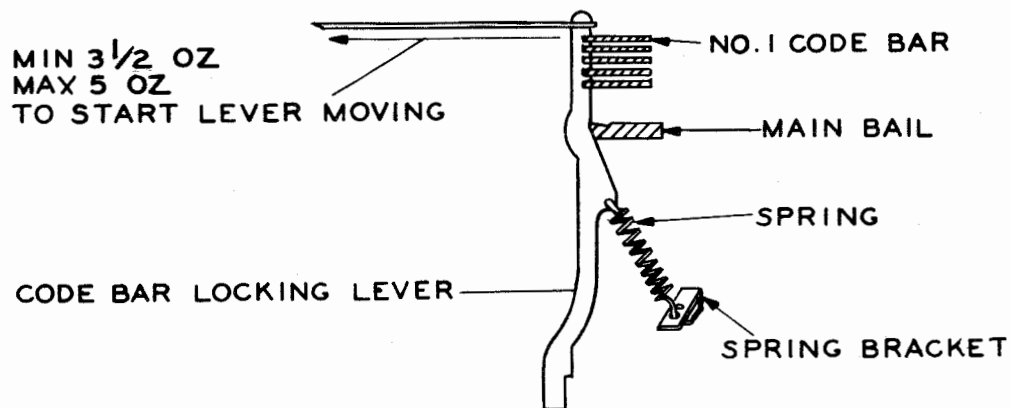


Figure 28

2.60 Signal-bell-hammer Lip shall clear the bell-hammer post by minimum 0.045 inch, maximum 0.075 inch for units which do not print on BELL selection (see Figure 29); and minimum 0.020 inch, maximum 0.040 inch for units which print on BELL selection. This clearance shall be gauged by eye when the platen is in the FIGS position, the BELL selection has been set up, the motor rotated by hand, and the bail lifted until the bell pullbar has reached its uppermost position. The pullbar toe shall fully engage the bell-hammer eccentric screw, ie, its end shall be approximately in line with the outer side of the eccentric screw.

To Adjust the Clearance: Reposition the eccentric screw.

To Adjust the Alignment: Reposition the bell-hammer post.

2.61 Signal Bell shall be positioned so as to obtain the most satisfactory tone. It shall also be positioned to provide at least 0.010 inch clearance between the bell and all brackets and screws, and at least 0.004 inch between the bell and the tape chute or platform.

Adjust: By means of its mounting screw.

2.62 Main-shaft Friction-clutch Torque: After the motor has been run at least 10 minutes, a pull of minimum 10 ounces, maximum 24 ounces applied to the mainbail cam, perpendicular to the radius, shall move the cam in a direction opposite to normal rotation. The tension shall be gauged with the motor running, the selector-magnet operated, and the mainbail roller held away from its cam. (See Figure 30.)

Note 1: This measurement requires considerable care, and need be checked only when it is thought that the cam is not being brought up to speed as the clutch engages.

To Check: Remove the tape reel and the gear guard, hold the main-bail roller away from the cam by pressing upon the lid of the oilcup at the top of the main-bail plunger, block the magnet armature in its operated position so that the main clutch will not engage, hook the scale into a screw hole and pull in a direction opposite to normal rotation until the cam just starts to move. (See Figure 30.)

Note 2: Since pulling too far will tend to make the main clutch engage and give a greater reading, only a slight backward motion of the cam should be given.

CAUTION: IT IS IMPORTANT TO KEEP THE CLUTCH STOPARM AGAINST THE DRIVEN JAW TO PREVENT THE MAIN CLUTCH FROM ENGAGING AND WINDING THE SCALE AROUND THE MAIN SHAFT. EITHER KEEP THE ARMATURE OPERATED TO AVOID TRIPPING THE CLUTCH STOPARM, OR BLOCK OR CLAMP THE CLUTCH STOPARM SO THAT THE MAIN CLUTCH CANNOT ENGAGE.

To Adjust: Replace the compression spring, steel disc, and felt washer of the clutch. If the torque is too high, lubricate the clutch and recheck before replacing parts.

2.63 Main-bail Spring: Typing units shall type characters without embossing the back of the copy of single-copy work or the last copy of

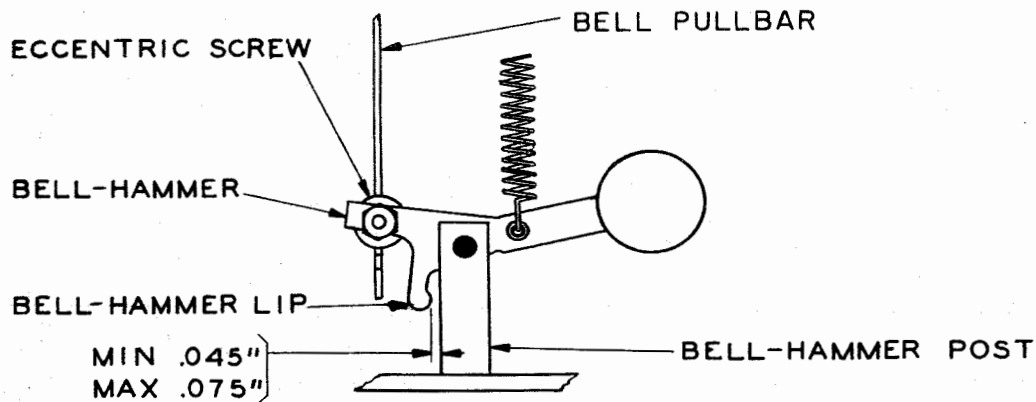


Figure 29

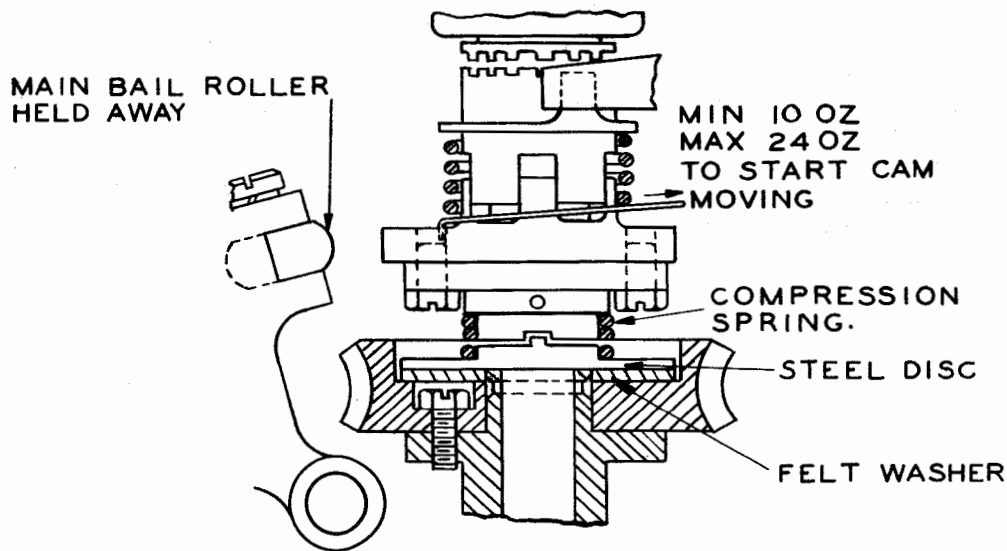


Figure 30

multiple-copy work, except that embossing of punctuation marks is permissible.

To Adjust: Back off the main-bail-spring adjusting screw counterclockwise, with the typing unit running, until the machine fails to type, then turn the adjusting screw clockwise until satisfactory copy is obtained. (See Figure 10.)

Note: On typing units operated at 75 speed it may be necessary to increase this tension to minimize irregular spacing. On some machines it will not be possible to get even spacing at this speed.

2.64 Platens which are cracked, broken, or badly pitted by type shall be replaced by new or repaired platens.

2.65 Alignment of Type: Characters (upper and lower case) shall type evenly on all sides and appear vertical, centrally spaced, and not noticeably out of line horizontally with respect to the letter N.

Note: The N typebar and pallet on each typing unit are aligned at the factory to serve as a master for aligning other typebars and pallets.

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To Check: Type a series of characters between the letter N as NANBNCN, etc. In case of doubt on any character, type the character at least 6 times between two N's.

To Adjust: Proceed as described below. If many require adjusting, check the position of the N type-pallet and reposition the N so as to make minimum readjustment of the other pallets.

(a) If the type requires raising or lowering an appreciable amount (more than a few thousandths of an inch) the type pallet should be unsoldered. To do this pull the typebar forward slightly and place a small block behind it to hold it forward from the other bars. Then heat the type pallet with an electric soldering copper until the solder just begins to melt. Take the soldering copper away and move the pallet up or down slightly as required. After solder has reset, remove the block and let the typebar return to its normal position, but do not use it for printing until the solder is thoroughly set. For very small vertical adjustments a peener TP78586 may be used to squeeze the typebar slightly in the crook just below the type pallet. Peening the inside of the crook lowers characters and peening the outside raises them.

(b) To straighten type so that the sides of a letter will be vertical and the upper-case character will print properly hold the typebar at the top of its straight shank with parallel-jaw pliers TP78590 and grasping the top of the bar with short-nose pliers, correct the bend in the bar to right or left as required. If any typeprints with improper spacing from N, and if one side of the character prints heavier than the other side, hold the typebar as above and twist the top of the bar slightly in a direction to correct the fault. Three-pronged pliers TP78589 may be used to bend typebars where twisting will not answer or where some bending is required to make the typebars lie properly spaced against the leather stop. If any part of a character still prints faintly, use double cutter TP78587 to cut into the type pallet just back of the low part of the type to raise the low portion.

(c) After the type alignment, a piece of cardboard should be placed on the platen and the pallets which were unsoldered should be moved down against the cardboard and their slots refilled with solder where required. Use a small brush to remove excess solder.

Note: While these adjustments may be made with standard repairman's tools, the tools referred to are better. These tools are not usually included in the repairman's kit.