

BELL SYSTEM PRACTICES

**Teletypewriter and Manual
 Telegraph Station and P.B.X.
 Installation and Maintenance**

SECTION P35.610

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AT&T Co Standard

14 TYPE TYPING UNIT

REQUIREMENTS AND PROCEDURES

Table of Contents

Paragraphs

1. General	1.01 to 1.03
2. Lubrication	2.01
3. Requirements and Procedures	3.01 to 3.70
Alignment of Type	3.69
Carriage and Shift Mechanism	3.02 to 3.03
Carriage	3.20 to 3.22
Carriage Locking-Toe	3.37
Carriage Locking-Pawl Spring	3.34
Carriage-Return Spring	3.33
Carriage Spring-Bracket Toe	3.36
Positive Carriage-Shift	3.23 to 3.26
Rear Capstan-Nut	3.39
Shift-Rocker	3.32
Shift-Rocker-Lever Post	3.35
Governor	3.06
Main-Shaft Mechanism	3.07
Clutch-Throw-out-Lever Spring	3.03
Main-Bail	3.70
Main-Bail-Cam Friction-Clutch	3.61
Main-Bail Spring	3.67
Main-Shaft-Clutch Teeth and Spring	3.02, 3.04 & 3.05
Selector-Cams	3.01
Selector-Clutch Torque	3.62
Motor	3.05

Table of Contents**Paragraphs**

Orientation Range and Distortion Tolerances	See Section P30.002
Ribbon Mechanism	
Ribbon-Check-Pawl and Spring	3.51 & 3.52
Ribbon-Feed-Lever Spring	3.11
Ribbon-Feed-Pawl and Spring	3.53 & 3.54
Ribbon-Feed-Shaft Safety-Spring	3.49
Ribbon-Feed-Shaft Detent-Plunger	3.50
Ribbon-Guide	3.41
Ribbon-Reverse-Pawl Link	3.47
Ribbon-Reverse Pawls and Spring	3.48 & 3.55
Ribbon-Reverse Shaft	3.46
Ribbon-Spools	3.56
Ribbon-Spool Brackets	3.43
Ribbon-Spool Cups	3.42
Ribbon-Spool Shafts and Springs	3.44 & 3.45
Selecting Mechanisms	See Section P32.001
Spacer Mechanism	
Spacer Detent-Lever Spring	3.08
Spacer Feed-Pawl and Spring	3.07 & 3.09
Spacer Locking-Pawl and Spring	3.17 to 3.19
Spacer Locking-Bail Spring	3.12
Spacer Operating-Lever Spring	3.10
Tape Mechanism	
Exit and Swivel Tape-Chute	3.28 & 3.29
Tape Feed-Roll and Spring	3.30 & 3.31
Tape Guides	3.27
Push Tape Feed	See Section P35.701
Type-Bars, Pull-Bars and Springs	
Pull-Bar Guide	3.15
Pull-Bar Lockout-Lever	3.40
Pull-Bar Springs	3.14 & 3.57
Type-Bars and Pull-Bars	3.38 & 3.16
Miscellaneous	
Bell and Break-Signal	3.64
Code-Bar Lock-Lever Spring	3.58

Function-Bar Spring-Bracket	3.13
Mechanical End-of-Line Indicator	3.66
Mechanical Motor Control	See Section P35.701
Mechanism for Preventing Printing and Spacing	See Section P35.701
Monitoring Range Scale	See Section P35.613
Platen	3.68
Remote Signal-Bell Contacts	3.63
Signal-Bell and Hammer	3.60 & 3.59
Upper Case Blank Contacts	3.65

1. GENERAL

1.01 This section contains the apparatus requirements and adjusting procedures for the maintenance of teletypewriter typing units of the 14 type.

1.02 This section is reissued to eliminate the paragraphs dealing with the selector mechanism (covered in Section P32.001), to eliminate the general instructions and cleaning procedure previously contained in the P sections giving requirements and procedures and now contained in Section P30.012, and to make other revisions.

1.03 In addition to requirements listed herein the 14 Typing Unit shall meet requirements of the following sections.
 P30.002—Orientation Test and Distortion Tolerance
 P30.012—Teletypewriter—General Requirements
 P82.001—Selecting Mechanisms

2. LUBRICATION

2.01 Typing units shall be lubricated in accordance with Section P35.601 covering Lubrication of 14 Type Teletypewriters.

3. REQUIREMENTS AND PROCEDURES

3.01 Selector-cams shall line up with their respective selector-levers. Gauge by eye.

(a) To adjust, loosen main-shaft bearings and raise or lower main-shaft.

Note: New typing units are equipped with a 117387M retainer on the lower bearing-cap to prevent shifting of the main-shaft.

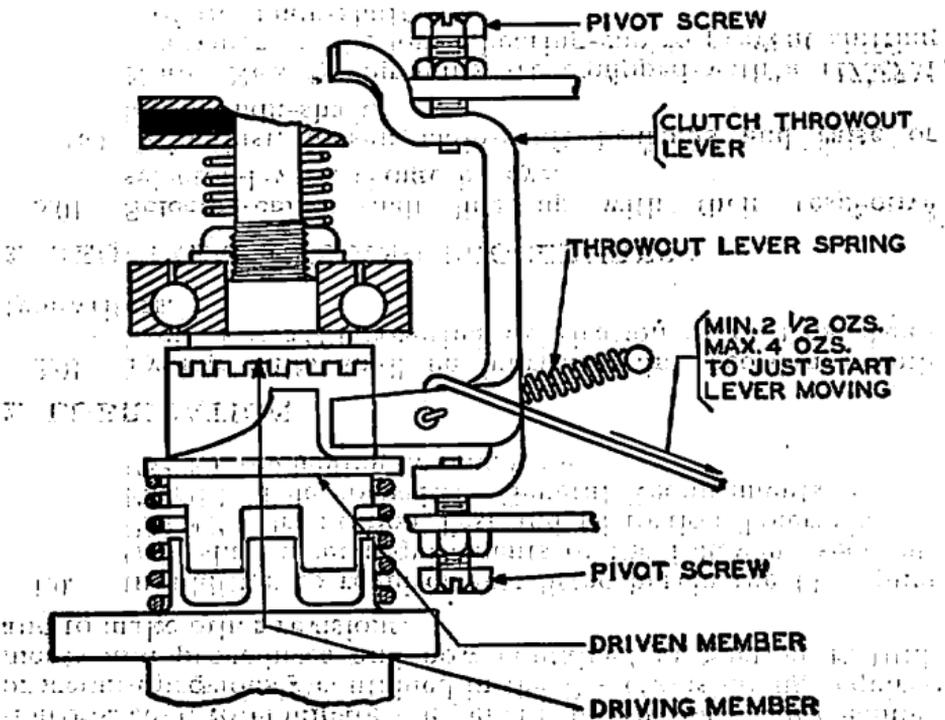


Fig. 1

3.02: **Main-shaft clutch teeth** shall clear each other by Min. .010", Max. .020" when clutch is fully cammed out of engagement. **Fig. 10**

(a) To adjust, reposition clutch-throw-out lever pivot-screws making sure that the throw-out lever is free in its bearings, without perceptible end play when pivot-screw lock-nuts are tightened.

3.03 **Clutch-throw-out-lever spring** shall have a tension of Min. 2-1/2 oz., Max. 4 oz. 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. **Fig. 1**

3.04 **Main-shaft-clutch spring** shall have a tension of Min. 24 oz., Max. 30 oz. to separate the clutch-teeth on 60 speed operation. 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

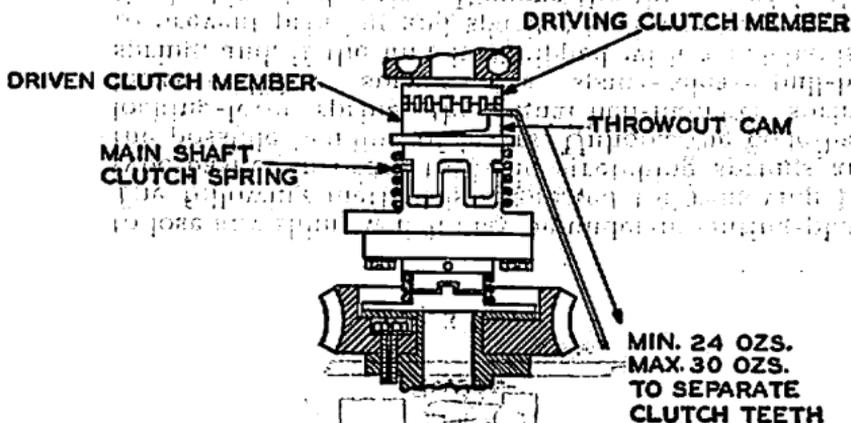


Fig. 2

clutch-member and pull down as nearly in line with the shaft as possible. On some units operated at 75 speed a heavy tension spring is used. When this heavy spring is in a unit the tension shall be Min. 34 oz., Max. 44 oz. Fig. 2

3.05 Clutch driven-member, after being pulled manually to position of extreme disengagement, shall start and slide until it engages with or touches the driving-member teeth when the clutch-spring is opposed by a force of not less than 10 ozs.

(a) To gauge, pull driven member to operated position with tension specified in 3.04, gradually reduce tension and permit driven-member to slide until it touches driving-member. The gauge reading should not go below 10 ozs.

(b) To adjust, clean and lubricate clutch. If sliding surfaces of driven-member and bushing on which it slides are not smooth and polished, replace these parts or return typing unit to shop for replacement.

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

3.06 Motors and governors shall conform to requirements of Section P32.004 covering Teletypewriter Motor-Units and the adjustment of governor contacts, except those with

regard to the speed and position of the motor which shall be as specified below.

(a) Motor-pinion and main-shaft-gears shall engage with minimum backlash without bind throughout a complete revolution of the main-shaft. Gauge by eye and feel.

(1) To adjust, reposition motor on mounting-plate.

(b) There should be clearance between motor and ribbon feed-lever when main-bail is up and motor and motor-plate are moved forward to their normal operating position. Gauge by eye.

(c) **Motor speed:** See Section P30.020. For synchronous motors no speed check is required unless it is suspected that the power frequency is off.

Note: For adjustments 3.07 to 3.14 inclusive, bell break-signal-mechanism, code-bar assembly and type-basket should be removed to make the parts accessible. Code-bar assembly is removed by unscrewing the two screws at rear of pull-bar-guide and moving "T" levers to the right by pushing ends of sword-levers to the left. The screws should be replaced so as not

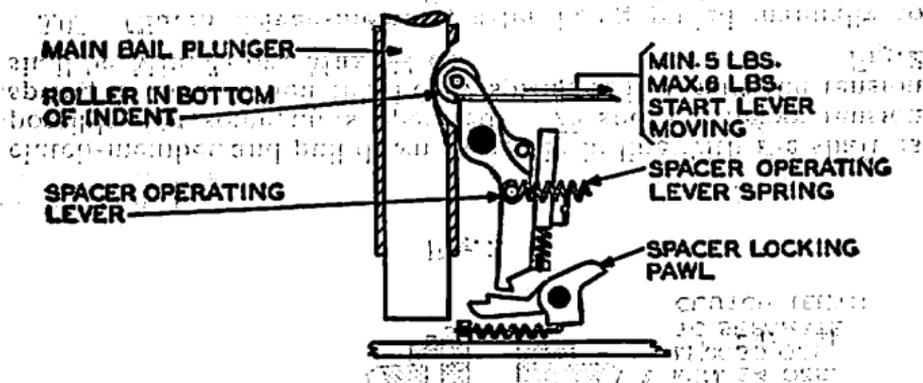


Fig. 3

to lose any shims which may be under mounting-plate. The following method is suggested for removing the type-basket in order to avoid stretching springs and the possible bending of levers. Unhook the code-bar-locking-lever spring, the signal-bell-hammer spring, letters-pull-bar spring, the space-release-pull-bar spring, and, if the unit is equipped with a mechanism to prevent printing and spacing on lower case blank, the locking-bail spring. Remove the three type-basket

assembly mounting-screws. Remove the right ribbon-spool-bracket front mounting-screw, loosen the rear mounting-screw, and swing the basket so that the ribbon-spool-cup will not interfere with the basket. Remove the bell-and-break signal mechanism. Hold the pull-bars out of engagement with the pull-bar-guide (as an aid in holding the pull-bars out of engagement with the pull-bar-guide, use a piece of wire or string around the upper ends of the pull-bars). Disengage lower end of function pull-bars from mechanism on base, and slide the assembly upward. Care should be taken that the pull-bar toes are not jammed against the spacer locking-ball or the signal-bell-hammer.

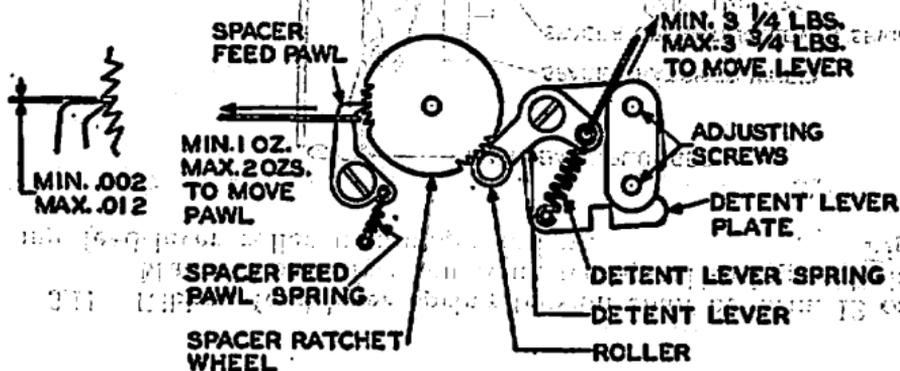


Fig. 4

3.07 **Spacer feed-pawl** shall clear face of all teeth in ratchet by Min. .002", Max. .012" when roller of spacer operating-layer is in bottom of indent of main-bail plunger and when detent-roller is snugly bottoming between two teeth of ratchet. Gauge by eye.

Fig. 4

(a) 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 detent-lever-plate on main-casting to meet requirements.

3.08 **Spacer detent-lever spring** tension shall be Min. 3-1/4 lbs., Max. 3-3/4 lbs.

Fig. 4

3.09 **Spacer feed-pawl spring** tension shall be Min. 1 oz., Max. 2 ozs.

Fig. 4

3.10 **Spacer operating-lever spring tension** shall be Min. 5 lbs., Max. 6 lbs. for units equipped with a horizontal spring, or Min. 3 lbs., Max. 6 lbs. 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. Horizontal spring illustrated in Fig. 3.

Fig. 3

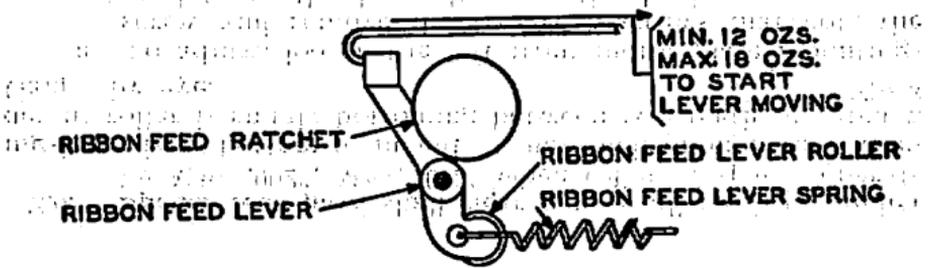


Fig. 5

3.11 **Ribbon feed-lever spring tension** shall be Min. 12 ozs., Max. 18 ozs. after removing feed-pawl spring and placing feed-lever roller in plunger indent.

Fig. 5

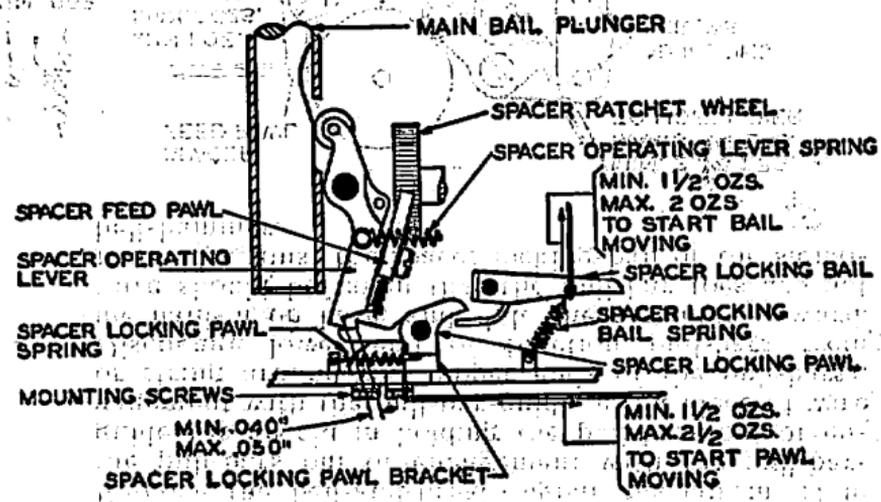


Fig. 6

3.12 **Spacer locking-bail spring tension** shall be Min. 1-1/2 ozs., Max. 2 ozs. when spacer locking-pawl is held away from locking-bail. (See Fig. 6) On typing units equipped with an 84641M mechanism, the spring tension shall be Min. 7-1/2 ozs., Max. 8-1/2 ozs. measured in the upper loop of the spring by pulling vertically upward to position length. This mechanism provides for printing and spacing on upper-case blank and prevents printing and spacing on lower-case blanks (see Section P35.612).

Fig. 6

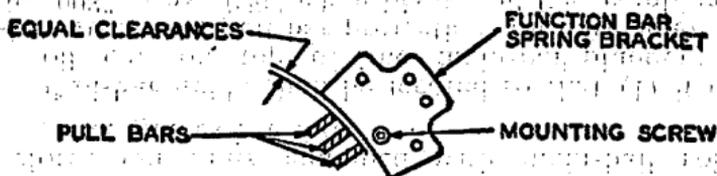


Fig. 7

3.13 **Function-Bar Spring-Bracket:** Two end pull-bars supported by function-bar bracket-plates shall have an equal amount of play in the segment. Gauge by eye. Fig. 7

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

(a) To adjust, reposition function-bar bracket-plates by rotating them on their mounting-screws.

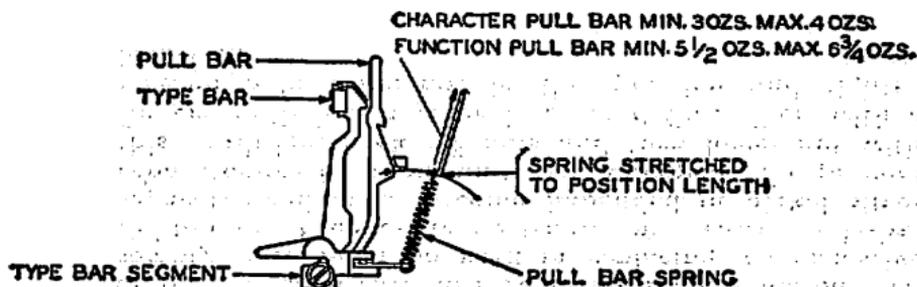


Fig. 8

3.14 **Pull-Bar Springs:** Tension of character pull-bar springs shall be Min. 3 ozs., Max. 4 ozs. and tension of function pull-bar springs shall be Min. 5-1/2 ozs., Max. 6-3/4 ozs. Fig. 8

Note: Place main-bail in its highest position and remount type-basket with three screws through base, making

sure that all pull-bar springs are in place. Reassemble springs which were removed for removal of type-basket. Reassemble the bell-and-break signal mechanism, and remove tie from tops of pull-bars. Place main-bail in its lowest position, slip slots in pull-bar-guide over proper pull-bars and when the assembly is almost in place engage "T" levers in notches of code-bars. Reassemble any shims which may have been removed from between pull-bar-guide and frame casting.

Caution: If code-bars are removed from code-bar assembly, care must be used in replacing, as excessive tightening of code-bar post-nuts may cause code-bar separator-collars to become imbedded in nickel silver separator-washers on units so equipped. To prevent this condition, back off nuts and turn lower-nut with fingers until lock-washer is pressed flat. Then with a wrench hold lower-nut in this position and tighten lock-nut.

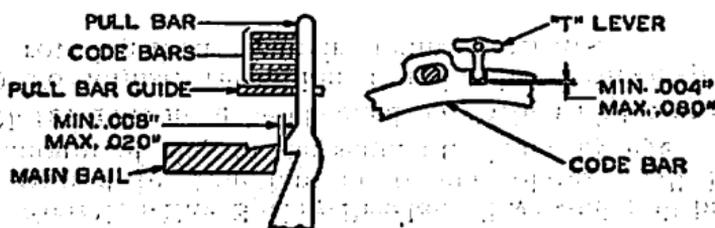


Fig. 9

Note: On units equipped with main-bail rollers and roller guides see 3.70.

3.15 Pull-bar guide shall be located so that (1) it clears the oil cup on top of the main-bail-plunger; (2) the main-bail clears the pull-bar projections on unselected pull-bars, by Min. .008", Max. .020" when blank and ltrs. combinations are set up in turn and main-bail play is taken up so as to make the clearance a minimum; (3) there is Min. .004", Max. .080", clearance 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. Also check to see that there is clearance between the ends of the Nos. 2, 3, 4 and 5 T levers and their respective code-bars. Gauge by eye.

Fig. 9

(a) To adjust, reposition pull-bar guide. If necessary to adjust check 3.16.

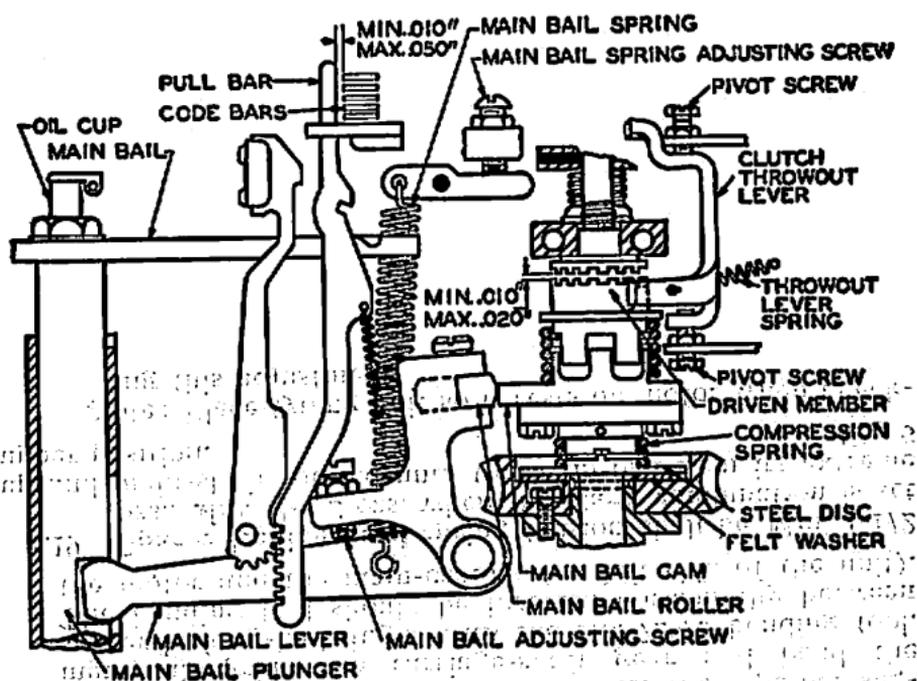


Fig. 10

3.16 **Pull-bars**, except the selected one, shall clear inner edge of code-bars by Min. .010", Max. .050" when blank and letters combinations are set up in turn, main-bail-roller is on high part of main-bail-cam and play in the main-bail and the pull-bars is taken up to make clearance minimum.

Note: Before making any readjustment to meet this requirement check 3.15.

(a) To adjust, reposition main-bail adjusting-screw.

Note: If code-bars and pull-bars are not concentric it may be necessary to shift the type-bar segment and main-bracket on the base-plate.

3.17 **Spacer locking-pawl** shall clear the operating-lever by Min. .040", Max. .050", when Fig. 6 is selected and spacer operating-lever roller is on high part of main-bail-plunger.

Fig. 6

(a) To adjust, reposition locking-pawl block on base.

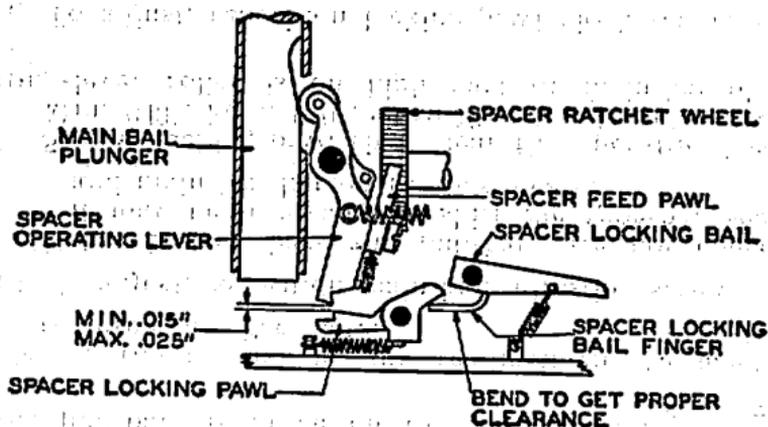


Fig. 11

3.18 **Spacer locking-pawl** shall clear spacer operating-lever by Min. .015", Max. .025" when the locking-pawl is in its unoperated position (so as not to prevent spacing). **Fig. 11**

(a) To adjust, hold the spacer locking-bail by means of the No. 72574 holding tool inserted under the type-bar segment, alongside the carriage-shaft gear and bend the spacer-locking-bail-finger with the No. 72575 bending tool. The bending tool should be inserted horizontally between the motor and the main-casting (on left side of the unit).

3.19 **Spacer locking-pawl spring tension** shall be Min. 1-1/2 ozs., Max. 2-1/2 ozs. when the blank combination is set up and main-shaft rotated until the main-bail is in its extreme upper position. **Fig. 6**

Note: Place typing unit so it rests on motor when checking this adjustment.



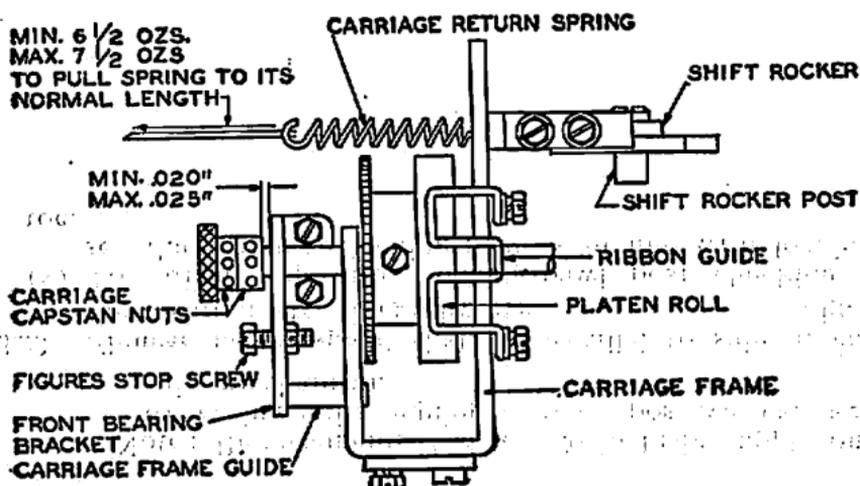


Fig. 12

3.20. Carriage shall shift freely without bind from the Ltrs. to the Figs. position at all positions of the spacing-gear when the carriage-locking-pawl is operated and carriage is moved slowly by hand. Gauge by feel.

(a) To adjust, reposition platen-shaft front-bearing-bracket and if necessary free or replace shift-rocker, shift-rocker-lever and lockout-bearings. For identification of part see Fig. 12.

Fig. 12

Note: After making 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.

3.21. Carriage locking-pawl should set fully on the carriage locking toe when carriage is in the Ltrs. position and the play of the pawl is taken up in either direction.

(a) To adjust, position the locking-pawl post by means of its lock-nut.

3.22 Carriage-Stops Adjustment

(1) With the carriage in the Figs. position, the figure 2 should print in the middle of the platen-roll. Gauge by eye.

(a) To adjust, position figures stop-screw.

(2) With the carriage in the **Ltrs.** position the letter **W** should print in the middle of the platen-roll. Gauge by eye.

(a) To adjust, loosen the carriage locking-toe mounting-screw and position the carriage locking-toe.

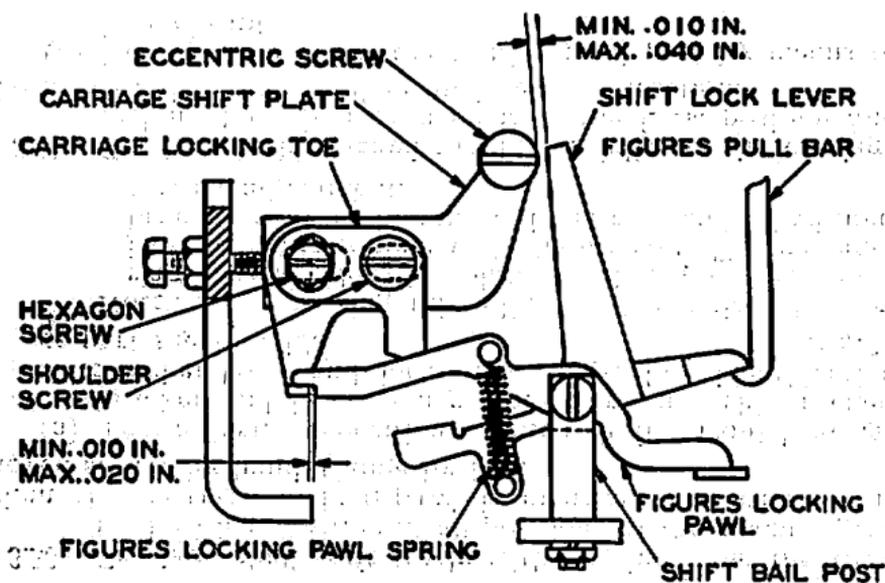


Fig. 13

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Note: Requirements 3.23 to 3.26 inclusive apply only to typing-units equipped with positive carriage-shift mechanism.

3.23 Figures locking-pawl shall be parallel to side of carriage shift-plate. Gauge by eye. **Fig. 13**

(a) To adjust, reposition locking-pawl post checking to see that carriage locking-pawl is in line with locking-toe.

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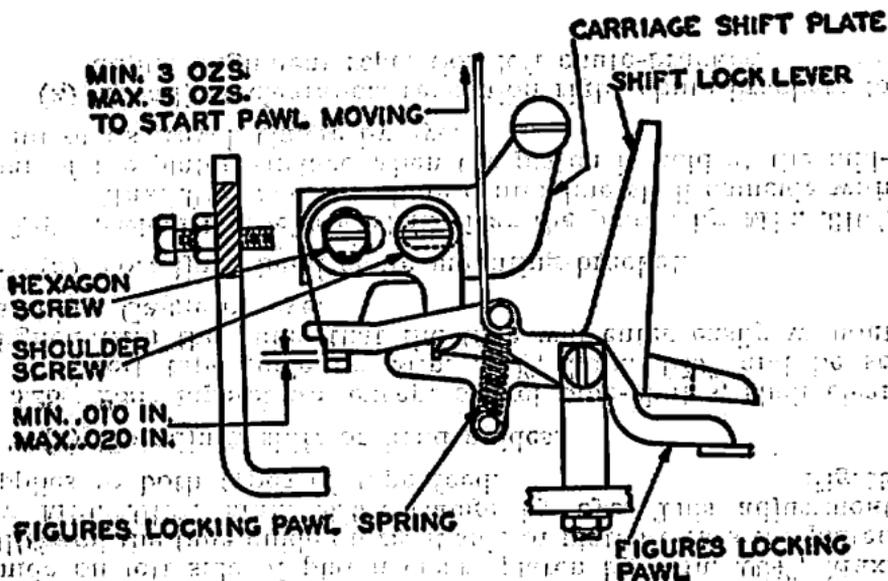


Fig. 14

3.24 Carriage shift-plate projection shall clear (1) shoulder of the figures locking-pawl by Min. .010", Max. .020" when the carriage is in the Figs. position and the locking-pawl is held down against the shift-plate projection; (2) lower edge of the figures locking-pawl by Min. .010", Max. .020" when the carriage is moved from Figs. to Ltrs. position. Figs. 13 and 14

(1) To adjust, loosen (slightly) hexagon and shoulder-screws which clamp carriage shift-plate and locking-toe, reposition shift-plate first horizontally and then vertically, tighten shoulder-screw and recheck horizontal adjustment. Check carriage locking-toe position 3.22 and tighten hexagon screw.

3.25 Carriage shift-plate eccentric-screw shall clear the shift lock-lever by Min. .010", Max. .040" when the carriage is in the Figs. position, Figs. combination set up and the main-shaft rotated until main-bail is in its highest position (pull upward on bail to insure it has reached highest position).

Fig. 13

(1) To adjust, reposition eccentric-screw.

3.26 Figures locking-pawl spring tension shall be Min. 3 ozs., Max. 5 ozs., when the carriage is in the Ltrs. position and the Figs. pull bar is in its operated position. Fig. 14

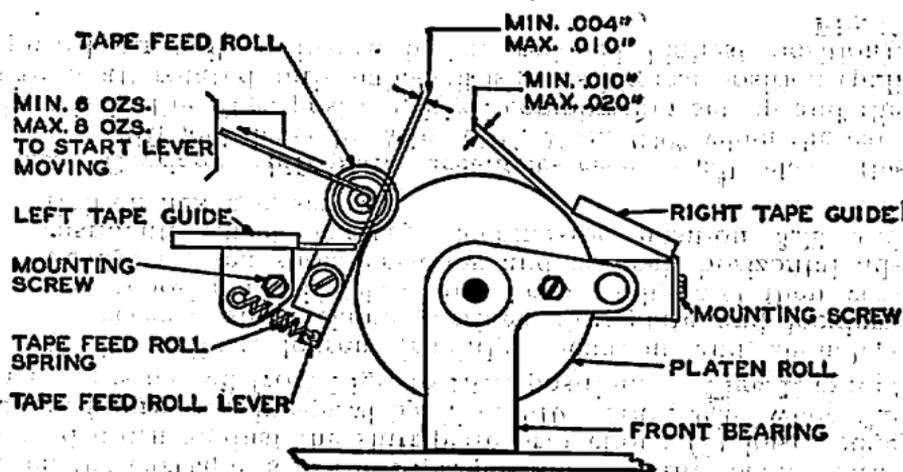


Fig. 15

3.27 Tape-guides shall be in line with each other and be so located that printing is in middle of tape, the tape-guide on left side of platen clears platen by Min. .004", Max. .010" and the tape guide on right side of platen clears the platen by Min. .010", Max. .020". Gauge by eye. This adjustment applies to both types of tape feed. Fig. 15

(a) To adjust, shift or bend guides.

3.28 Exit tape-chute, except swivel tape-chutes, shall clear left tape-guide by Min. .010", Max. .020" and be so aligned with the guide that the tape will enter easily without catching. Gauge by eye.

(a) To adjust, bend chute mounting-bracket.

3.29 Swivel tape-chute, shall clear the platen by Min. .010", Max. .020" and the chute center line shall coincide with that of the platen surface when the platen is held at the mid-point of its travel. Gauge by eye.

(a) To adjust clearance, reposition right chute-bracket; to adjust alignment reposition left chute-bracket.

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

(a) To adjust, check platen for swelling and replace if necessary.

3.31 **Tape feed-roll spring tension** shall be Min. 6 ozs., Max. 8 ozs., on pull-tape-feed typing-units, and Min. 10 ozs., Max. 14 ozs. on push-tape-feed typing units, measured at the feed-roll-shaft as the feed-roll leaves the platen. **Fig. 15**

3.32 **Shift-rocker** shall be parallel to platen-shaft. Gauge by eye. **Fig. 12**

(a) To adjust, reposition shift-rocker post.

3.33 **Carriage-return spring tension** shall be Min. 6-1/2 ozs., Max. 7-1/2 ozs. measured when the carriage is in Ltrs. position. **Fig. 12**

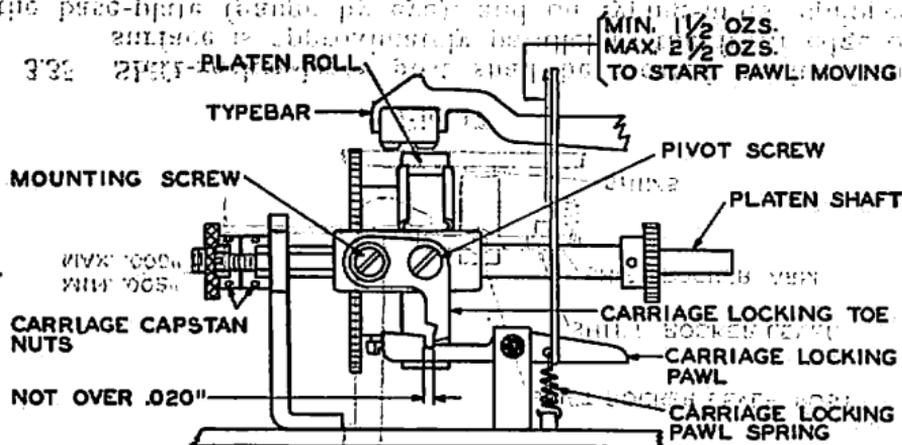


Fig. 16

3.34 **Carriage locking-pawl spring tension** shall be Min. 1-1/2 ozs., Max. 2-1/2 ozs. measured when the carriage is held back far enough to have clearance between the carriage locking-pawl and the carriage locking-toe. **Fig. 16**

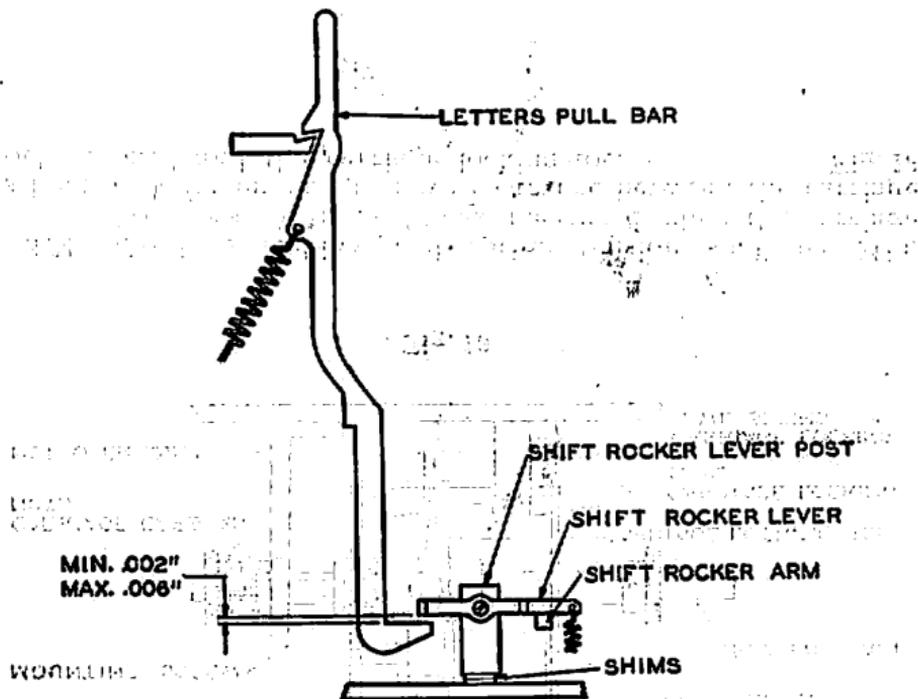


Fig. 17

3.35 **Shift-rocker-lever post** shall be located so its front surface is approximately parallel to the front edge of the base-plate (gauge by eye), and on typing-units equipped with a nonadjustable shift-rocker, so that the shift-rocker-lever clears Ltrs. pull-bar-toe by Min. .002", Max. .006", when the carriage is in the Figs. position and the Ltrs. pull-bar is just selected and about to move upward.

Fig. 17

(a) To obtain clearance, raise or lower shift-rocker-lever post by means of shims 8896M (.004") under post.

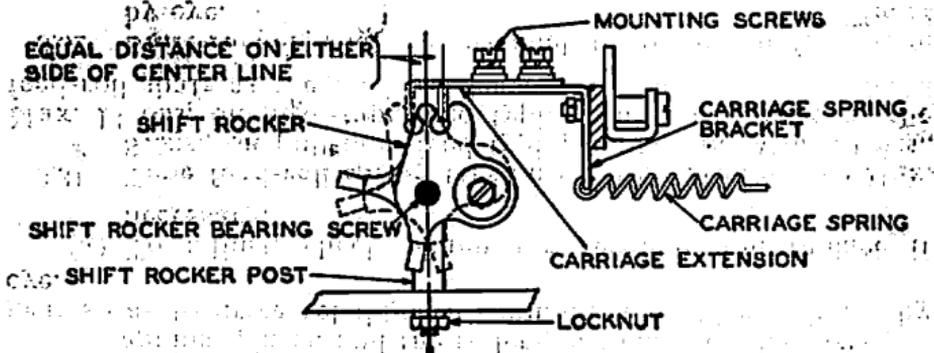


Fig. 18

3.36 **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 **Ltrs.** to **Figs.** position. Gauge by eye. **Fig. 18**

(a) To adjust, reposition carriage spring-bracket-toe.

3.37 **Carriage travel adjustment.** On units equipped with an adjustable shift-rocker, the carriage locking-toe shall overtravel the locking-pawl notch by not more than .020" when **Ltrs.** combination is set up and the main-bail is in its highest position. (Pull upward on bail to insure this.) Gauge by eye. **Fig. 16**

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

(a) To adjust, loosen shift-rocker hexagon-screw and readjust shift-rocker.

3.38 **Type-bars, and pull-bars** shall be free in their segment slots with a minimum amount of side play. Gauge by feel.

(a) To check freeness of a type-bar, move it down so that the pallet rests lightly on the platen-roll. Then, when the type-bar is released, it should return to its normal position against the type-bar back-stop. If necessary, the sides of the type-bar may be lapped on a fine stone to prevent binding in the segment slot.

(b) To remove a type-bar, 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 type-bar forward and downward until the teeth on the type-bar are disengaged from those on the pull-bar. The type-bar may then be unhooked from the fulcrum-rod and removed.

(c) To replace a type-bar, hook it over the fulcrum-rod. If the teeth are meshed properly, the type-bar will rest against the type-bar-backstop when the top of its pull-bar is in line with the other pull-bars. If the type-bar does not rest against the type-bar-backstop, move the type-bar downward again until the teeth are out of mesh and then raise the pull-bar as many teeth as is necessary to permit the type-bar to resume its correct position. Replace the carriage making sure that the bracket is against the positioning-plate, and tighten the bracket mounting-screws.

3.39 Rear capstan-nut shall clear the carriage front bearing-bracket by Min. .020", Max. .025" when the carriage is latched in the Ltrs. position. Fig. 12

(a) To adjust, reposition capstan-nuts using the 6617M tommy.

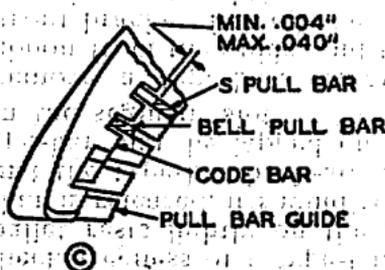
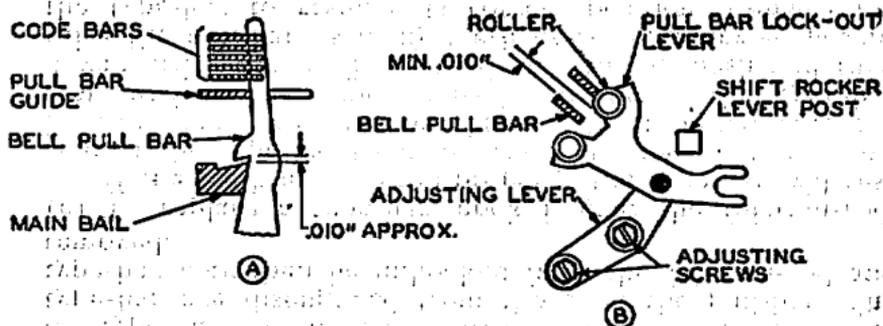


Fig. 19

3.40 Pull-bar lockout-lever shall meet the following requirements:

(a) With the platen in the Figs. position, select the Blank combinations and rotate the main-shaft until the main-bail is in its uppermost position. Adjust the pull-bar lockout-lever so that the S pull-bar clears the code-bars by Min. .004" Max. .040". With the platen in the Ltrs. position there should be Min. .004" Max. .040" between the Bell pull-bar and the code-bars. Reposition the pull-bar lockout-lever if necessary. Figs. 19C and 20C

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

(c) With the platen in the Figs. position select the Bell combination and rotate the main-shaft until the main-bail is moved to within approximately .010" from the Bell

pull-bar notch. There should be at least .010" clearance between the Bell pull-bar and the lock-out-lever roller 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.

Figs. 19A and 19B

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

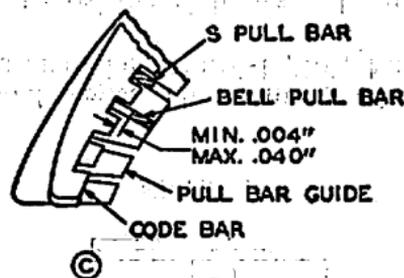
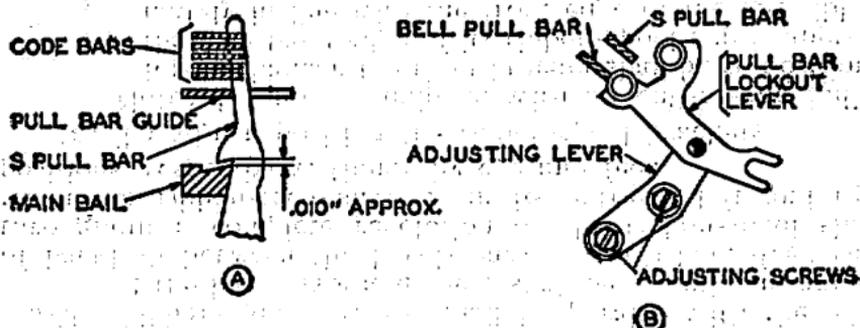


Fig. 20

3.41 Ribbon-guide shall meet the following requirements.

(1) Clear the top of platen by Min. .040", Max. .050".

(a) To adjust, position the ribbon-guide by means of its mounting-screws.

(2) Clear the side of platen by Min. 3/16", Max. 7/32" as gauged by eye.

(a) To adjust, bend the guide.

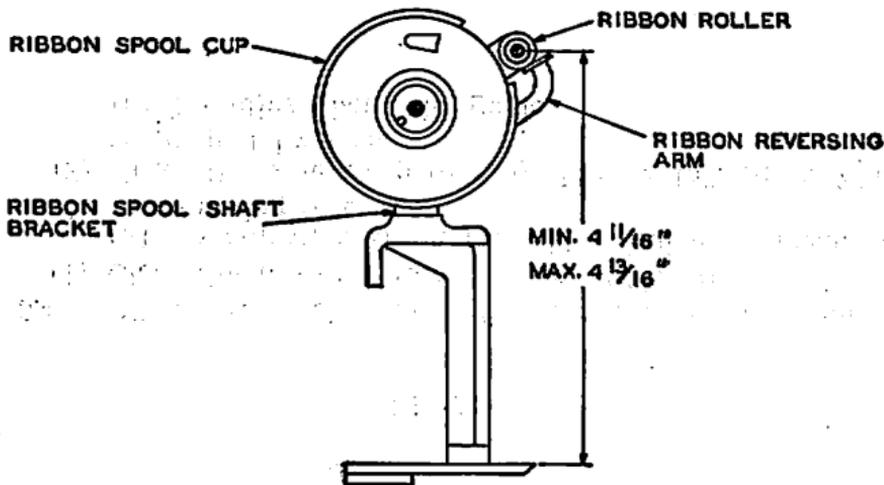


Fig. 21

3.42 Ribbon-spool cups. The centers of the ribbon-spool cup rollers shall be Min. 4-11/16", Max. 4-13/16" from the base-plate. **Fig. 21**

(a) To adjust, reposition ribbon-spool cups.

3.43 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 on 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.

(a) To adjust, position the ribbon-spool brackets.

Note: If unit is equipped with an end-of-line indicator mechanism the right bracket shall 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.

3.44 Ribbon-spool shafts shall have perceptible end play, but not more than .004". Gauge by eye and feel.

(a) To adjust, reposition spool-shaft gears.

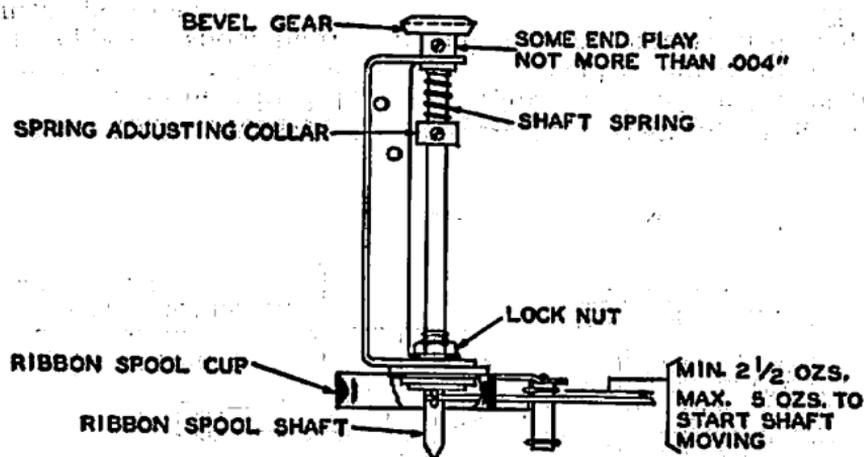


Fig. 22

3.45 **Ribbon-spool shaft springs.** The resistance to turning caused by the ribbon-spool-shaft springs shall be Min. 2-1/2 ozs., Max. 5 ozs. measured by pulling on the pin, with ribbon-feed shaft disengaged from ribbon-spool shaft. Fig. 22

(a) To adjust, move spring collar longitudinally on shaft.

3.46 **Ribbon-reverse shafts** shall (1) clear their respective ribbon-spool cups by Min. .005", Max. .025" 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 .004" end play as gauged by eye and feel.

(a) To adjust clearance, reposition ribbon-reverse-arms; to adjust end play, reposition collar at rear bearing of bracket.

Note: If clearance is changed check 3.48.

3.47 **Ribbon-reverse pawl links** shall not bind on their shoulder-screws.

(a) To adjust, reposition ribbon-reverse-levers at rear end of reverse-shafts and check 3.48.

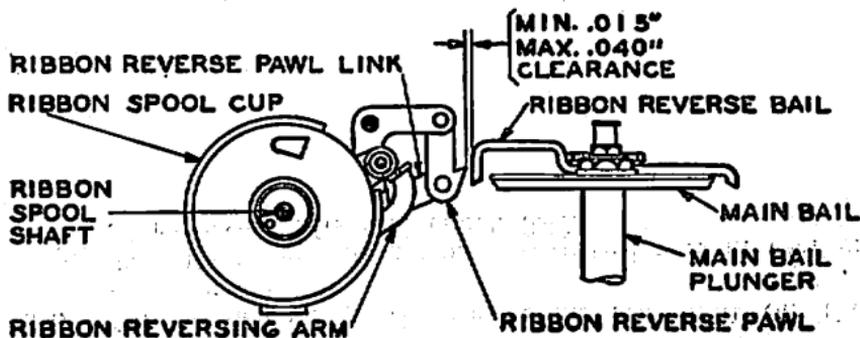


Fig. 23

3.48 Ribbon-reverse pawls shall clear the ribbon-reverse bail by Min. .015", Max. .040" when the associated ribbon-reversing arm is against its ribbon-spool cup. Fig. 23

(a) To adjust, reposition reversing-arms on their shafts and recheck 3.46.

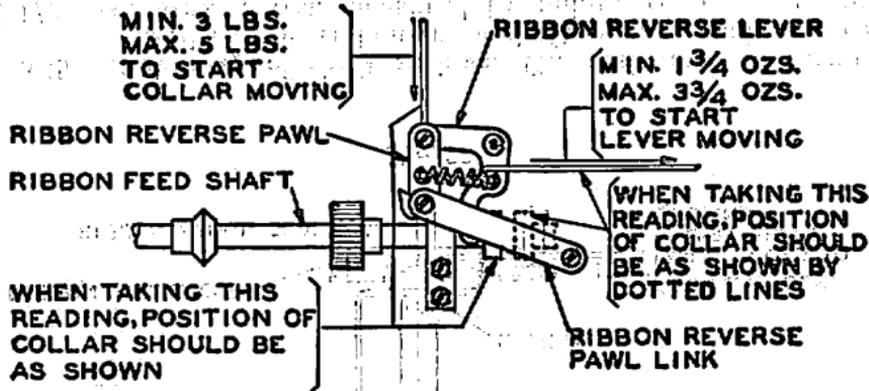


Fig. 24

3.49 Ribbon-feed-shaft safety-springs shall exert a pressure of Min. 3 lbs., Max. 5 lbs. 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. Fig. 24

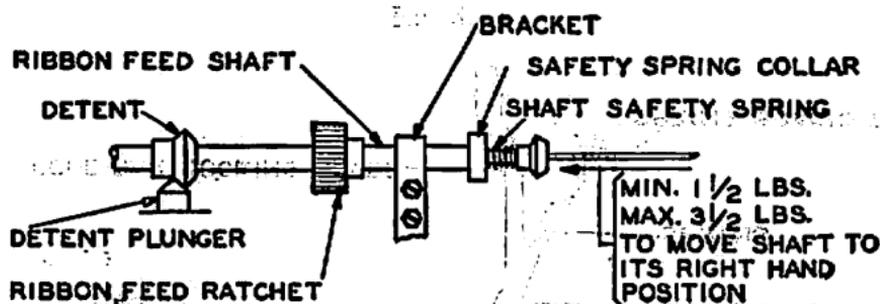


Fig. 25

3.50 Ribbon-feed-shaft detent-plunger shall press against the detent so that it requires a force of Min. 1-1/2 lbs., Max. 3-1/2 lbs. to push the detent over the plunger when the ribbon-feed and check-pawls are held clear of the ratchet.

Fig. 25

3.51 Ribbon-check-pawl (top end) shall clear the pull-bar guide by Min. 3/64", Max. 5/64" gauged by eye.

(a) To adjust, reposition check-pawl.

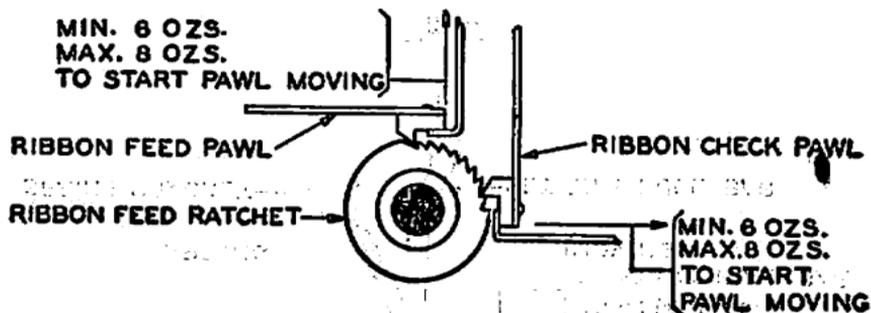


Fig. 26

3.52 Ribbon-check-pawl spring tension shall be Min. 6 ozs., Max. 8 ozs.

Fig. 26

(a) To adjust, bend spring.

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

(a) To adjust, position the ribbon-feed-pawl by means of its mounting-screw.

3.54 Ribbon-feed-pawl spring tension shall be Min. 6 ozs., Max. 8 ozs.

Fig. 26

(a) To adjust, bend spring.

3.55 Ribbon-reverse-pawl spring tension shall be Min. 1-3/4 ozs., Max. 3-3/4 ozs., with ribbon-feed-shaft-collar moved away from ribbon-reverse-lever as shown dotted. Fig. 24

3.56 Ribbon-spools shall be tight on their shaft so as not to slide off.

(a) To adjust, spread slot in end of shaft.

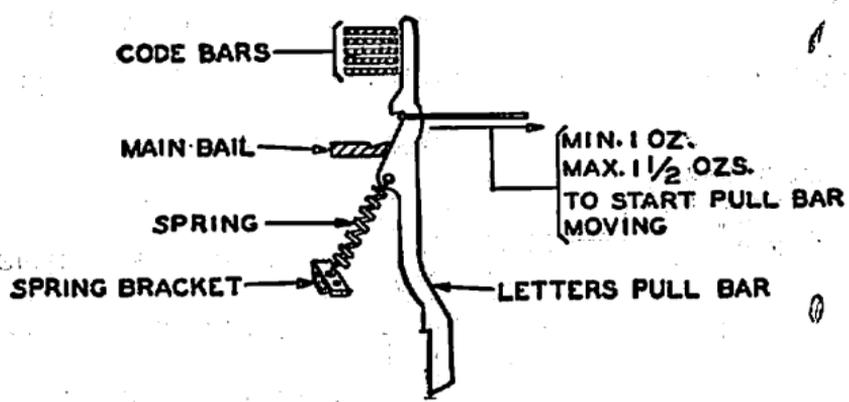


Fig. 27

3.57 "Ltrs" pull-bar spring tension shall be Min. 1 oz., Max. 1-1/2 ozs., measured when the main-bail is in the "down" position. Fig. 27

(a) To adjust, reposition spring-bracket.

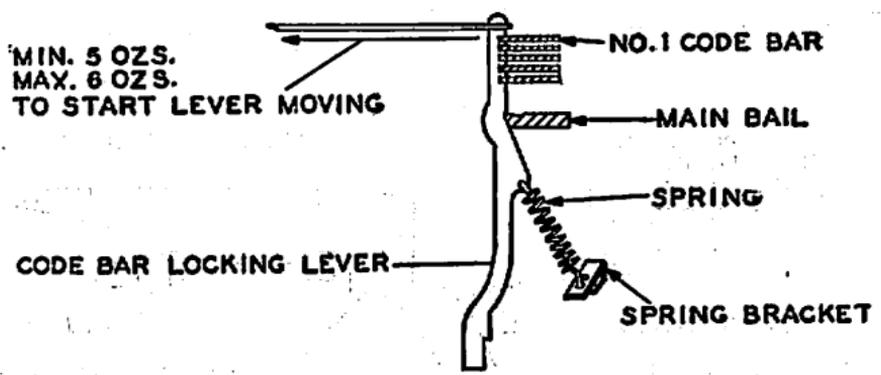


Fig. 28

3.58 **Code-bar lock-lever spring tension** shall be Min. 5 ozs., Max. 6 ozs., measured when main-bail is in the extreme upward position. **Fig. 28**

(a) To adjust, reposition spring-bracket.

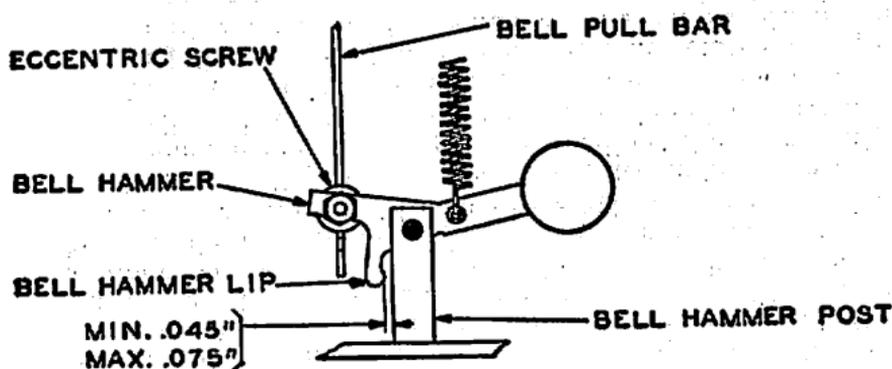


Fig. 29

3.59 **Signal-bell hammer lip** shall clear bell-hammer post by Min. .045", Max. .075", when the platen is in **Figs.** position and the bell selection has been set up and motor rotated by hand and bail lifted by hand until bell pull-bar has reached its uppermost position. End of bell pull-bar-toe shall be in alignment with outer side of eccentric on bell-hammer. Gauge **Fig. 29** by eye.

(a) To adjust clearance, reposition eccentric-screw. To adjust alignment, reposition bell-hammer post.

3.60 **Signal-bell** should be positioned so as to obtain the most satisfactory tone. It should also be positioned to provide at least .010" clearance between the bell and all brackets and screws, and at least .004" between the bell and the tape-chute or platform.

(a) Adjust by means of its mounting-screw.

MAIN BAIL ROLLER
 HELD AWAY

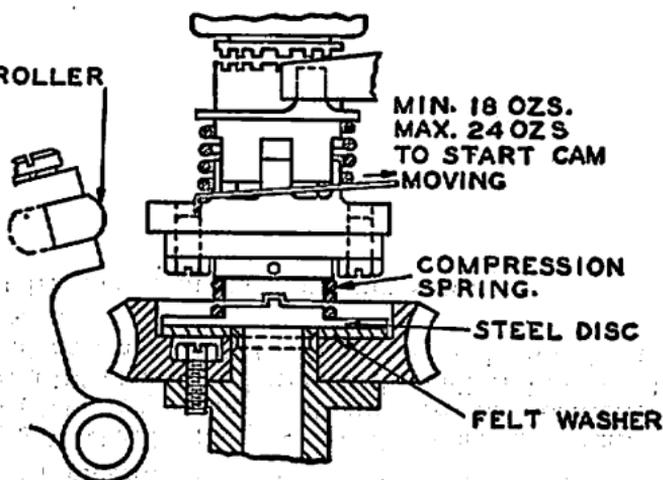


Fig. 30

3.61 **Main-Bail-Cam Friction-Clutch Torque:** After motor has been run for at least 10 minutes a pull of Min. 18 ozs., Max. 24 ozs. applied to main-bail-cam, perpendicular to radius, shall move cam in a direction opposite normal rotation when motor is running, selector-magnet is operated and main-bail-roller is held away from its cam. **Fig. 30**

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

(a) To check, remove tape-reel and gear-guard, hold main-bail-roller away from cam by pressing upon lid of oil cup at top of the main-bail-plunger, block magnet-armature in operated position so that main-clutch will not engage; hook scale into screw hole and pull in direction reverse to normal rotation until cam just starts to move. **Fig. 30**

Note: Pulling too far will tend to make main-clutch engage and give a greater reading, therefore only a slight backward motion of cam should be given.

Caution: It is important to keep clutch stop-arm against driven-jaw to prevent main-clutch engaging and winding scale around main-shaft so either keep armature operated to avoid tripping clutch stop-arm, or block or clamp clutch stop-arm so that main-clutch cannot engage.

(b) To adjust, replace compression-spring, steel-disc and felt-washer of clutch. If torque is too high, lubricate clutch and recheck before replacing parts.

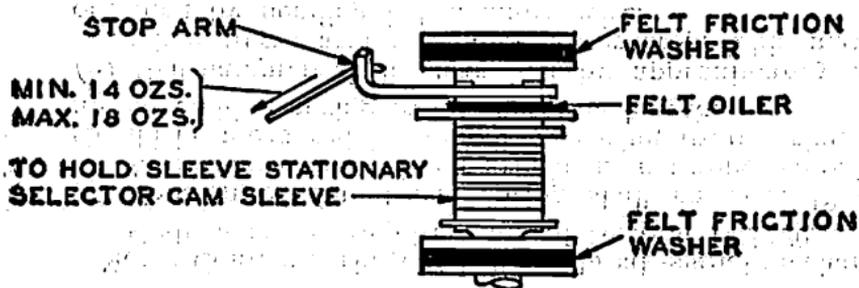


Fig. 31

3.62 Selector-Clutch Torque: After clutch has been freshly lubricated and motor has been run for at least 10 minutes a pull of Min. 14 ozs., Max. 18 ozs. applied tangentially to the selector stop-arm, when the motor is running, shall hold the selector cam-sleeve from rotating when the selector stop-arm is held just clear of its stop.

Fig. 31

(a) To adjust, replace felt friction-washers, add spring adjusting-washers, replace spring or, on units equipped with 119541M adjustable capstan-nut, readjust nut.

Note: Replacing the felt washers will usually be satisfactory since the spring holds its adjustment over long periods. Before replacing spring, consideration should be given to the addition of washer-shims 96763M (.012"), 96764M (.016") or 96765M (.020") around the shoulder of the 72515M nut at the end of the spring nearest the bearing.

(1) To replace felt washers; remove range-finder assembly, detach locking-lever spring and remove retaining-disc noting that it has a left-hand thread and unscrews to right (clockwise); remove outer felt-washer, cam-sleeve assembly, cam-sleeve disc, and inner felt-washer, holding selector-levers away from shaft and rotating cam-sleeve disc until notch in its edge registers with points of selector-levers. Replace the felt washers with new washers that have been lubricated with oil.

(2) To remove friction-clutch spring on holding-magnet units proceed as in (1), then loosen top and bottom shaft bearing-brackets and position main-shaft downward and remove clutch driving-disc and spring. After replacement of parts recheck 3.01 and 3.02.

Caution: The following adjustment should not be made without first attempting to meet clutch torque requirements by replacing clutch-washers as directed in (1).

(3) On units equipped with adjustable clutch-spring parts (119541M) the tension may be adjusted to compensate for variations in spring tension. This can be done by turning the capstan-nut with the blade of a 3" screwdriver. Turning the nut in a counter-clockwise direction, as viewed from the top end of shaft, increases the tension.

3.63 Remote signal-bell contacts on typing units so equipped shall meet the following requirements:

(a) Contact-lever shall fully engage the heel of the bell pull-bar and clear its side by at least .010" when the Bell combination is set up and the motor has been rotated by hand until the pull-bar bail is in its extreme upper position. Gauge by eye.

(1) To adjust, reposition contact-bracket.

(b) Contact-lever shall clear the insulator on the upper contact-spring by not more than .006" when the contact-lever is held against the bell pull-bar after the motor has been rotated by hand until the pull-bar bail is in its extreme lower position.

(1) To adjust, bend upper contact-spring.

(c) Contact-gap shall be Min. .025", Max. .030" when contact-lever is held clear of the upper contact-spring, and it shall require Min. 1-1/2 ozs., Max. 2 ozs. pressure at the end of the lower contact-spring to move the spring from its stiffener.

(1) Gauge gap by eye and tension by feel.

(2) To adjust gap, bend stiffener; to adjust tension bend spring.

Note: It may be necessary to remove contact assembly to make this adjustment, in which case contact adjustments may be checked before reassembling in typing-unit.

3.64 Bell and break signal mechanism on units so equipped shall meet the following requirements:

Note: Contact springs of bell and break-signal mechanism shall meet the requirements of Section P35.620.

(a) Tension of detent-arm spring shall be Min. 18 ozs., Max. 22 ozs. when finger-arm is against upper stop. This should be measured by unhooking spring from spring-post and stretching spring to its operating length.

(b) Bell-hammer shall clear bell by approximately .010" when finger-arm is against lower stop. This may be obtained by bending bell-hammer wire.

(c) When assembled on a standard 14 teletypewriter base the contact-arm shall clear ends of contact-spring covers by at least .020" with play in contact-arm taken up in a direction to make this clearance minimum.

(1) Gauge clearances by eye.

3.65 **Upper case blank contact mechanism 86563M** on typing-units so equipped shall meet the following requirements:

(a) Bracket assembly and contacts shall be adjusted in accordance with 3.63.

(b) Blank-pull-bar projection shall clear all edges of blank-pull-bar lever by at least .030" when the carriage is in the **Ltrs. position**. Gauge by eye.

(1) To adjust, bend blank-pull-bar lever.

3.66 **Mechanical end-of-line indicator 87593M** on typing-units so equipped shall meet the following requirements:

(a) Worm-shaft shall not bind but shall have just perceptible end play. Gauge by eye and feel.

(1) To adjust, unfasten shaft-spring from contact-bracket, loosen collar set-screw and reposition collar.

(b) Worm-shaft spring shall have sufficient drag to eliminate back-lash of the worm-shaft.

(c) Front lamp contact-spring shall press against its stiffener with a pressure of Min. 3 ozs., Max. 4 ozs. measured by pushing perpendicular to the spring at the contact-point when the contacts are in the unoperated position.

(1) To adjust, remove spring from pileup and bend it.

(d) Rear lamp contact-spring shall clear the front spring-contact by Min. .015", Max. .025" when the front spring is resting against its stiffener.

(1) To adjust, bend rear spring.

(e) Front lamp contact-spring shall clear the lower edge of its stiffener by Min. .010", Max. .020" when the worm-follower rests in the groove at the end of the worm.

(1) To adjust, reposition contact-bracket.

(f) Worm-follower bail shall not bind, shall have just perceptible end play and shall close the lamp contacts when Min. 62 characters, Max. 66 characters have been received.

(1) To adjust, reposition collar and recheck (e).

- (g) Worm-follower spring tension shall be Min. 1-1/2 ozs., Max. 3-1/2 ozs., measured by pulling parallel to the spring at the end of the worm-follower as the follower comes in contact with the rear contact-spring, holding the bail so that the follower-pin clears the worm.
- (h) Release-bail spring tension shall be Min. 7 ozs., Max. 11 ozs., measured by pulling vertically upward at the edge of the release-bail near the spring-hole as the bail starts to move from its unoperated position.
- (i) Feed-pawl spring tension shall be Min. 3 ozs., Max. 5-1/2 ozs., measured by pulling in line with the spring at the spring-hole near the end of the feed-pawl as the pawl starts to move, when the feed-lever roller is on the high part of its cam.
- (j) Cam-lever spring tension shall be Min. 28 ozs., Max. 38 ozs., measured on the feed-lever at the spring-hole as the lever starts to move when the feed-lever roller is on the low part of its cam.

3.67 Mail-Bail Spring: Typing-units shall type characters without embossing the back of the copy of single copy work or the last copy of multiple copy work except that embossing of punctuation marks is permissible.

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.

(a) To adjust, back off main-bail spring adjusting-screw counterclockwise, with typing-unit running, until machine fails to type, then turn adjusting-screw clockwise until satisfactory copy is obtained.

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

3.69 Alignment of Type: Character (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 letter "N".

Note: The "N" type-bar and pallet on each typing-unit is aligned at the factory to serve as a master for use in aligning other type-bars and pallets.

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

(b) To adjust proceed as described below. If many require adjusting check position of "N" type-pallet with other type and reposition "N" so as to make minimum readjustment of other pallets.

(c) If type requires raising or lowering an appreciable amount (more than a few thousands of an inch) type-pallet should be unsoldered. To do this, pull type-bar forward slightly and place a small block behind it to hold it forward from other bars. Then heat type-pallet with an electric soldering copper until solder just begins to melt. Take soldering copper away and move pallet up or down slightly as required. After solder has reset, remove block and let type-bar return to normal position, but do not use it for printing until solder is thoroughly set. For very small vertical adjustments a peener (78586M) may be used to squeeze type-bar slightly in the crook just below type-pallet. Peening inside of crook lowers characters and peening outside raises them.

(d) To straighten type so sides of letter will be vertical and upper case character will print properly when compared with lower case character, hold type-bar at top of its straight shank with parallel jaw pliers (78590M) and grasping top of bar with short nose pliers, correct bend in bar to right or left as required. If any type prints with improper spacing from "N", and if one side of character prints heavier than other side, hold type-bar as above and twist top of bar slightly in a direction to correct fault. Three-pronged pliers (78589M) may be used to bend type-bar to secure this adjustment where twisting will not answer or where some bending is required to make type-bars lie properly spaced when against leather stop. If any part of a character prints faintly after above alignment has been completed use double cutter (78587M) to cut into type-pallet just back of low part of type so as to raise low portion.

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

Note: While these adjustments may be made with standard repairman's tools, the adjustments can be more readily accomplished using tools referred to. These tools are not usually included in the repairman's tool kit.

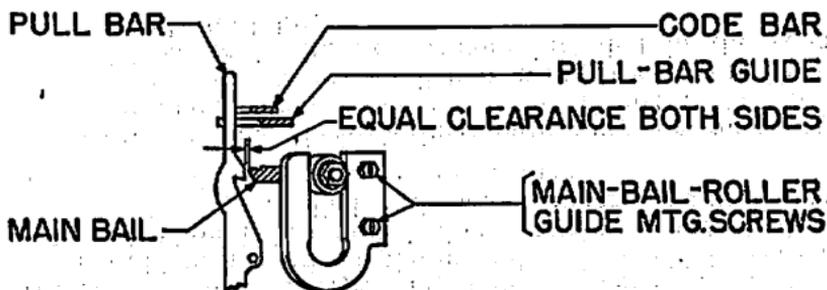


Fig. 32

3.70 Main-bail on units equipped with roller-guides shall not bind throughout its entire travel.

(a) To check, rotate main-shaft until the main-bail is in its highest position. Swing motor out of the way and remove ribbon-feed-lever spring and main-bail spring allowing bail to drop. Block all pull-bars 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 pull-bars and code-bars.) Then with a finger under the main-bail lever raise the main-bail slowly to its highest position and release. There should be no evidence of bind on the upward travel and the bail should fall freely of its own weight to its lowest position when released.

(b) To adjust, restore spring and so position the pull-bar-guide that its mounting-screws are in the middle of the elongated-slots, then loosen the mounting-screws of both main-bail roller-guides. (1) With the blank combination set up and the main-bail opposite the unselected pull-bar-humps, shift the right roller-guide to obtain the same clearance between the main-bail and the Ltrs. and Figs. pull-bar-humps. Tighten the right roller-guide mounting-screw friction tight. (2) With the main-bail in its lowest position, adjust the main-bail adjusting-screw to give some clearance between pull-bars and code-bars. Shift the right roller-guide around its friction tight top mounting-screw to obtain approximately the same clearance between the code-bars and Ltrs. and Figs. pull-bars. Tighten the right roller-guide bottom mounting-screw friction tight and recheck (1). Then fully tighten both right roller-guide mounting-screws after making any necessary readjustments. Position

left roller-guide so that check conditions covered in (a) are met and then tighten both of its mounting-screws.

Figs. 32 and 33

Note: If this adjustment is made check 3.15, 3.16 and 3.40.

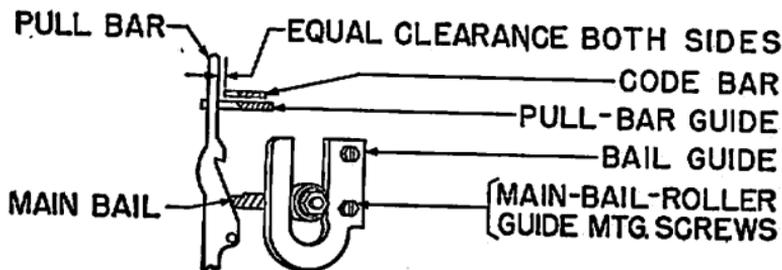


Fig. 33