SECTION 1

ADJUSTMENTS

1. GENERAL

a. The following requirements and adjusting procedures for the maintenance of the Teletype Model 15 Printer are arranged in a sequence that would be followed if a complete readjustment of a unit were undertaken. In following such a procedure, parts or assemblies which are removed to facilitate adjustment should not be replaced until all other adjustments are made which would be facilitated by the removal of these parts. If any adjustment is changed, related adjustments should be checked.

b. The spring tension values indicated in this bulletin are scale readings which should be obtained when Teletype scales are used as specified. Springs which do not meet the requirements specified and for which no adjusting procedure is given, should be replaced by new springs. Ordering information may be obtained from the Teletype Model 15 Printer parts bulletin.

c. Before proceeding with any adjustment, read the applicable portion of the adjusting text carefully. After the adjustment is completed, be sure to tighten any screws or nuts which may have been loosened. If a part that is mounted on shims is to be dismantled, the number of shims used at each of its mounting screws should be noted so that the same shim pile-ups can be replaced when the part is remounted.

d. In addition to the standard adjustments, a number of variable features appear toward the rear of Section 1. Where adjustments of these variable features affect the adjusting sequence, cross reference information has been included in the standard adjustments. Variable features which do not affect the adjusting sequence may be done at any time.

NOTE

In all the figures of this bulletin, fixed pivot points are designated by solid black circles.

2. MISCELLANEOUS INSTRUCTIONS

a. MANUAL SELECTION OF CHARACTERS OR FUNCTIONS

When the text of any adjustment in this bulletin specifies the setting up of a certain character or function, the following method should be used. Rotate the main shaft until the printing bail is in its extreme rear position. Hold down the front edges of those vanes which correspond to the marking impulses of the combination to be set up (see Figure 1 for code combination chart). Then rotate the main shaft in accordance with the instructions outlined in the applicable adjustment text.

b. ADJUSTING MOTOR SPEED

(1) When AC or DC governed motor units are used, a tuning fork (speed indicator) is supplied for the purpose of checking the motor speed. The tuning fork is equipped with shutters attached to the ends of the tines. The governor of the motor is equipped with a speed target of alternate black and white spots.

(2) With the motor running and the target well illuminated, tap the tuning fork lightly to start it vibrating. Hold the fork close to the eye and view the spots on the target through the vibrating shutters. If the motor is running at the correct speed, the spots will appear to be stationary. If the motor is running too fast, the spots will appear to be moving in the direction in which the motor is rotating; if too slow, in the opposite direction. The speed may be increased or decreased by momentarily pressing against the speed adjusting lever or the governor adjusting bracket respectively.

NOTE

There is a possibility of setting the speed incorrectly, due to getting a speed multiple; i.e., the speed could be half the desired speed, or two thirds the speed, or some other multiple, even though the spots appeared to be stationary when viewed through the tuning fork shutters. This should be kept in mind if trouble is experienced in the operation of the printer.

(3) No speed setting is required on printers equipped with synchronous motors since they are constant speed motors.

c. ORIENTATION

(1) The range finder assembly, which is used for the purpose of orienting the selector to

the incoming signals, is mounted at the left end of the main shaft. Before measuring the receiving range of a printer equipped with a pulling magnet selector, the armature spring tension should be set as follows:

(a) When a distortion test set is available for measuring the receiving margins of a printer, the armature spring tension should measure from 6 to 7 ounces in order to obtain the specified margins. This tension should be checked with the armature in the marking position and the spring stretched to its position length.

(b) When no distortion test set is available, but the printer is equipped with a line relay, the armature spring tension should measure from 6 to 6-3/8 ounces under the same conditions as in (a) above.

(c) When no distortion test set is available and the printer is not equipped with a line relay, turn the armature spring adjusting screw in a clockwise direction while receiving a test message until errors appear in the copy. Then, from this point, count the number of turns that the adjusting screw can be turned in a counter-clockwise direction before errors again appear in the copy. Turn the adjusting screw backward (clockwise) half this number of turns to a point midway between the two failing points (the middle of the armature spring range) and lock the adjusting screw with its lock nut.

NOTE

To insure reliable clutch release, the armature spring tension should be checked to ascertain that it is not below 4-1/2 ounces.

If no errors appear in the copy throughout the entire range of the spring, set the spring tension at 6 to 6-3/8 ounces and lock the adjusting screw.

(2) Transmit RY (the letters R and Y sent alternately) to the printer continually while the receiving range is being determined as described in the following paragraphs.

(a) While RY is being received, loosen the index arm thumb screw and shift the index arm of the range finder toward 0 until errors appear in the copy. Then move the arm back slowly until errors no longer appear; at least 72 characters should be received without error. This position indicates one limit of the orientation range. Note the position of the index arm on the scale.

(b) Determine the opposite end of the receiving range by repeating the foregoing procedure with the index arm near the opposite end of the scale. After the two limits of the receiving range have been found, set the index arm of the range scale midway between these two points.

(3) To measure the receiving range of printers equipped with a holding magnet selector, set the armature spring tension as prescribed in paragraph 82, "ARMATURE LEVER SPRING". Then proceed by transmitting RY as described in paragraph c.(2) above.

d. REMOVAL OF TYPE BAR CARRIAGE FROM TYPING UNIT

Operate the carriage return lock bar, and move the carriage to the extreme right. Operate the dashpot lever, locking the carriage in this position. Hold the carriage return spring drum so that the spring cannot unwind. Then unhook the draw strap from the carriage and hook the eyelet of the strap onto the margin bell hammer spring post. Move the right margin adjusting screw arm to the rear. Operate the carriage return lock bar again and remove the carriage by sliding it off to the right.

e. REMOVAL OF TYPE BAR SEGMENT FROM TYPE BAR CARRIAGE

Remove the type bar backstop, unhook the ribbon carrier from the ribbon oscillator lever, and remove the type bar segment mounting screws. Hold the pull bars out of engagement with the code bar mounting plate (as an aid, use a piece of string or wire under the pull bars), and slide the assembly forward.

f. REMOVAL AND REPLACEMENT OF TYPE BARS

CAUTION

The type bar guide adapter plate, located between the type bar guide and the type bar segment, is positioned at the factory for type alignment and should not be disturbed as it may seriously affect the alignment.

Remove the type bar carriage, the ribbon, the two screws and lock washers mounting the type bar guide to the adapter plate, and the

ribbon carrier after disengaging it from the hook on the ribbon oscillator lever, and then lift the type bar guide off its dowels; raise the type bar in question until it passes the ribbon oscillator lever, then raise the selected pull bar until it is disengaged from the type bar and remove the type bar from its slot in the type bar segment. Insert the new type bar in the slot just vacated engaging the teeth on the pull bar so the top of the pull bar is even with that of the other pull bars when the type bar is resting against its back-stop. (New type bars are usually oversize and the section that fits in the segment will probably have to be stoned down to permit it to operate freely. Do not remove more metal than is necessary for freedom of movement.) Reassemble the type bar guide on the adapter plate using the two screws and lock washers previously removed, and the ribbon carrier on the type bar guide by engaging its lower end in the ribbon oscillator lever hook.

g. REMOVAL AND REPLACEMENT OF CODE BARS

If it becomes necessary to remove one or more code bars from the code bar assembly, the following instructions should be followed carefully. Hold the inner nut on the code bar stop with a wrench and remove the outer nut. The inner nut may then be removed. In replacing the nuts, care must be used, as excessive tightening of the nuts may cause the code bar separator collars to become embedded in the separator washers. Such a condition might prevent the code bars from moving freely. To prevent this, tighten the inner nut slightly, just enough to flatten the lock washer. Then, with a wrench, hold the inner nut in this position while tightening the outer nut.

h. MOUNTING THE BELL CRANK ASSEMBLY

Place the bell cranks in their lowest position, with respect to the code bars, by means of their eccentric bushings (see Figure 17). Then mount the bell crank assembly as follows:

First, mount the right end of the bell crank assembly with one of its mounting screws so that it is friction tight. Then rotate the assembly clockwise and engage the five bell cranks with their respective code bars. Replace the left mounting screw and tighten both screws. (See paragraph 153 for CODE BAR BELL CRANKS adjustment.)

i. REPLACING THE TYPE BAR CARRIAGE

Shift the platen to the FIGURES position and rotate the main shaft until the printing bail is in its rear position. Then move the right margin adjusting screw arm on the carriage to the rear so that it is approximately 45 degrees from the vertical. Hold the carriage in the right hand and rest the left front carriage support roller on the right end of the front carriage track, making sure that the carriage guide screw engages the slot in the carriage track. Position the upper gear of the spacing shaft so that the first full tooth on the carriage gear rack engages the hollow directly above the numeral "1" of the part number stamped on the upper spacing gear. Move the carriage slowly to the left until the rear carriage support roller rests on the upper track. Operate the carriage return lock bar and move the pull bar bail to its rearmost position by pushing on the right pull bar bail roller with the right thumb. Move the carriage further to the left, making sure that the bell cranks engage their respective vanes, that the right front carriage support roller and guide screw properly engage the front carriage track, and the pull bar bail roller is between the printing bail baldes. When the carriage has been moved far enough to the left to permit the right margin adjusting screw to clear the spacing stop lever, restore the right margin adjusting screw arm to its normal vertical position, and then shift the carriage to its extreme right position and lock it in place by operating the dashpot lever. Hold the carriage return spring drum so that the spring cannot unwind. Then unhook the eyelet of the draw strap from the margin bell hammer spring post, and hook it over its mounting post on the carriage. Operate the carriage return lock bar to permit the carriage to return to its extreme left position.

NOTES

References are made to the following notes in the applicable adjustments.

(A) These requirements should be checked with the type bar carriage removed.

(B) These requirements should be checked with the type bar segment assembly removed from the type bar carriage.

(C) Pertains only to printers equipped with the yield mechanism shown in figure 10B.

(D) Pertains only to printers not equipped with a yield mechanism as shown in figure 10B.

(E) These requirements should be checked with the range finder assembly removed.

(F) Pertains only to friction feed printers.

(G) Pertains only to printers equipped with a send-receive mechanism.

(H) These requirements should be checked with the governor adjusting bracket, the brush spring plate, and the governor cover removed.

TYPING UNIT

3. PLUNGER GUIDE ROLLER BRACKET PRELIMINARY (Figure 2) See Note (A) On Page 1-3

There should be not more than .010" clearance between either the right or left end of the pull bar bail and stripper plate when the bail is moved to its extreme forward position. To adjust the position of the pull bar bail with relation to the stripper plate, loosen the plunger guide roller bracket mounting screws and move the bracket to the right or left.

4. FLANGED GUIDE ROLLER (Figure 2) See Note (A) on Page 1-3

The flanged guide roller should be parallel, or within .002" of being parallel, to the surface of the plunger, and both guide rollers should rotate freely. To adjust the flanged roller with relation to the plunger, move the roller end of the bracket up or down with the mounting screws friction tight. Tighten the mounting screws.

5. PLUNGER GUIDE ROLLER BRACKET FINAL (Figure 2) See Note (A) on Page 1-3

Operate the pull bar slowly and see that all pull bars start to move away from the code bars simultaneously, within .020". If necessary, relocate the plunger guide roller bracket to the left or right to meet this requirement. Check to see that the flange roller is parallel to the surface of the plunger within .002" and that both guide rollers rotate freely.

6. PLUNGER ROLLER ECCENTRIC MOUNTING STUD (Figure 2) See Note (A) on Page 1-3

There should be some play, not more than .004", between the pull bar bail plunger and the rollers. Check for this play throughout the entire travel of the plunger. Adjust the position of the eccentric mounting stud to obtain this requirement.

7. PULL BAR SPRING TENSION (Figure 3) See Notes (A) and (B) on Page 1-3

With any spring unhooked from its pull bar, hook an 8 oz. scale in the spring eye and pull vertically. It should require 2-1/2 to 3-1/2 ozs. to pull the spring to its position length. Replace the spring.

8. RIBBON FEED PAWL SPRING TENSION (Figure 4) See Notes (A) and (B) on Page 1-3

With the pull bar bail in its extreme rear position and the carriage held in its normal position, unhook the ribbon feed pawl spring from its post. With an 8 oz. scale held in a horizontal position and hooked in the spring eye, it should require 2-1/4 to 3-1/4 ozs. to pull the spring to its position length. Replace spring.

REPLACE THE TYPE BAR SEGMENT ASSEMBLY, THE TYPE BAR BACKSTOP, AND THE RIBBON CARRIER - SEE PARAGRAPH 2.d.

NOTE

Care should be taken to locate the ribbon lockout bar and detent spring, and the ribbon oscillator lever in their respective slots.

9. CODE BAR MOUNTING PLATE (PULL BAR GUIDE (Figure 5)

With the pull bar bail in its extreme rear position, move the code bars to the right. Then move the pull bar bail opposite the pull bar humps. There should be .008" to .020" clearance between the humps on all pull bars (except the blank pull bar) and the pull bar bail. With the code bars moved to the left position, there should be a like clearance between the blank pull bar hump and the pull bar bail.

NOTE

When checking this adjustment all the play of the pull bar bail should be taken up in a direction to make the clearance a minimum.

To adjust remove the bell crank mounting plate assembly from the type bar carriage, being careful not to bend the bell crank retainers.

Position the code bar mounting plate by means of its elongated mounting holes to secure the specified clearance.

10. RIBBON FEED SHAFT BEARING PLATES (Figures 6 and 7) See Note (A) on Page 1-3

The left end of the ribon feed shaft should be flush with or extend not more than .015" over the inner end of the left vertical feed shaft bevel gear teeth, when the ribbon feed shaft is in its left position and the left vertical feed shaft bevel gear is held in engagement with the ribbon shaft gear.

A like condition should exist when the ribbon feed shaft is in its right position and the right vertical feed shaft bevel gear is held in engagement with it. To adjust, loosen the mounting screws of both right and left ribbon spool brackets and move the brackets up as far as the elongated mounting holes will permit. Tighten the mounting screws with the brackets vertical. Adjust the right bearing plate by means of its clamping nuts to meet the first requirement. Adjust the left bearing plate in a like manner with the ribbon feed shaft in its right position to meet the latter requirement.

NOTE

Check the lateral movement of the ribbon feed shaft (movement from one detented position to the other); it should measure at least 3/16 inch. If necessary, refine the RIBBON FEED SHAFT BEARING PLATES adjustment.

11. RIBBON FEED SHAFT DETENT SPRING (Figure 6) - See Note (A) On Page 1-3

The center of the ribbon feed shaft detent roller should be at the same height as the center of the ribbon feed shaft, and the shaft detent should travel equally on either side of the detent roller when the shaft is moved from its extreme left to its extreme right position or vice versa. To adjust, loosen the mounting screws of the ribbon feed shaft detent spring, and position the spring.

12. RIBBON FEED SHAFT DETENT SPRING PRESSURE (Figure 6) - See Note (A) On Page 1-3

Move the ribbon feed shaft to its extreme left position. Hook a 32 oz. scale over the detent roller hub and pull horizontally toward the rear of the type bar carriage. It should require 18 to 26 ozs. to start the roller moving away from the detent. Then move the ribbon feed shaft to its extreme right position and check the pressure of the detent spring in the same manner. To increase or decrease the spring pressure, remove the spring and bend it. To equalize the pressure, position the spring to right or left.

13. VERTICAL RIBBON FEED SHAFTS (Figure 7) - See Note (A) On Page 1-3

The lower ends of the right and left vertical ribbon feed shafts should be flush with the outside edges of their respective bevel gears. Adjust by means of the bevel gear set screws, being sure that when the set screws are tightened they bear against the flat faces on the shafts.

14. RIBBON SPOOL BRACKETS (Figure 7)

With the ribbon feed shaft in its left position, the left vertical ribbon feed shaft should have some end play, not more than .015", during one revolution of the vertical ribbon feed shaft bevel gear. The right vertical ribbon feed shaft should have a like amount of end play, when the ribbon feed shaft is in the right position.

NOTE

When checking the vertical feed shaft for end play, take up the bearing play of the ribbon feed shaft in a direction to make the end play of the vertical feed shaft a maximum.

Adjust both right and left ribbon spool brackets by means of their elongated mounting holes to meet this requirement, being sure that the brackets are vertical.

15. RIBBON SPOOL SHAFT SPUR GEARS (Figure 8)

The ribbon spool shafts should have some end play not more than .006". To adjust, loosen the set screws of the vertical ribbon feed shaft spur gears and move the gears out of engagement with their respective ribbon spool shaft spur gears. Then position the ribbon spool shaft spur gears by means of their set screws. When tightening the set screws make certain that they bear against the flat faces on the shafts.

16. VERTICAL RIBBON FEED SHAFT SPUR GEARS (Figure 8)

Both right and left vertical ribbon feed shaft spur gears should line up with their respective

ribbon spool shaft spur gears. To adjust, position the vertical ribbon feed shaft spur gears by means of their set screws making sure that the set screws bear against the flat faces on the shafts.

17. RIBBON SPOOL CUPS (Figure 9) - See Note (D) On Page 1-3

The centers of the ribbon rollers should be 3/4" to 7/8" in front of a line through the centers of the ribbon spool shafts. There should be no bind between the ribbon spool shaft spur gears and the vertical ribbon feed shaft spur gears at any point in their engagement. To adjust, position each ribbon spool cup by means of the nut on its ribbon spool cup bushing. When tightening the nut, take up the play between the ribbon spool cup bushing and the bracket in a direction to make the play between the spur gears a maximum. (See Figure 8 for location of parts).

18. VERTICAL RIBBON FEED SHAFT SPRING TENSION (Figure 9)

Move the ribbon feed shaft to the right, thus disengaging its gear from the gear on the left vertical feed shaft. Hook an 8 oz. scale onto the pin on the left ribbon spool shaft and pull in a horizontal direction. It should require 2-1/2 to 3-1/2 ozs. (1-1/2 to 2-1/2 ozs. for 100 wpm) to start the shaft turning. Move the ribbon feed shaft to the left and in the same manner check the spring tension of the right vertical ribbon feed shaft. To adjust, position the collars on the vertical feed shafts (Figure 8), by means of their set screws to obtain the proper tension.

19. RIBBON REVERSE ARMS RIBBON GUIDE SLOT (Figure 10)

The ribbon guide slot should be .025" to .035" wide and the straight upright piece should clear the angled arm by .010" to .020". To adjust, bend the upright ends of the ribbon reverse arms.

20. RIBBON REVERSE SHAFTS (Figure 10) See Note (A) on Page 1-3

There should be .040" to .060" clearance between the bottoms of the ribbon spool cups and the upper ends of the ribbon reverse shafts when the ribbon reverse arms are held up against the ribbon spool brackets.

a. See Note (C) on Page 1-3 . To adjust typing units so equipped, loosen the set screw of the left ribbon reverse arm, and if necessary, the set screws of the collars and the link of the left ribbon reverse shaft. Position the shaft while holding the ribbon reverse arm up against the ribbon spool bracket and then tighten the ribbon reverse arm set screw. Adjust the right ribbon reverse shaft in the same manner.

b. See Note (D) on Page 1-3 . To adjust typing units so equipped, loosen the set screw of the spring block on the left ribbon reverse shaft, and, if necessary, the set screws of the ribbon reverse shaft collar and link. Position the shaft while holding the ribbon reverse arm against the ribbon spool bracket and the spring block up against the reverse arm. Then tighten the spring block set screw. Adjust the right ribbon reverse shaft in the same manner.

21. RIBBON REVERSE SHAFTS COLLARS (Figure 10) See Note (D) On Page 1-3

The ribbon reverse shafts should have from .002" to .010" end play. To adjust, position the collars by means of their set screws, while holding both ribbon reverse arms forward against their stops. Rotate the collars simultaneously so that the set screws are approximately centrally located between the ribbon spool brackets and the casting; gage by eye. Check to see that there is sufficient clearance between the set screws and both the ribbon spool brackets and the casting, when the ribbon reverse arms are against their extreme stops.

22. RIBBON REVERSE SHAFTS LINKS (Figure 11) See Note (A) On Page 1-3

The ribbon reverse bail should clear both left and right ribbon reverse pawls by .015" to .050" when the pull bar bail is in its extreme rear position and both the left and right ribbon reverse arms are held forward against their stops. When checking the .015" clearance between either ribbon reverse pawl and the ribbon reverse bail, the play in the ribbon reverse bail should be taken up in a direction to make the clearance a minimum. When checking for the .050" clearance, the play in the ribbon reverse bail should be taken up in a direction to make the clearance a maximum. To adjust, position the ribbon reverse shafts links by means of their set screws. At the same time, make certain that the ribbon reverse pawl links do not bind at their shoulder screws and that the right ribbon reverse shaft link clamping screw does not interfere with the screw which anchors the ribbon feed ratchet friction spring to the carriage casting.

23. RIBBON SPOOL CUPS AND RIBBON REVERSE ARM BACKSTOP (Figure 10B) - See Note (C) On Page 1-3

The centers of the ribbon rollers should be 3/4" to 7/8" in front of a line through the centers of the ribbon spool shafts (Figure 9). With the ribbon reverse arms held against their backstops (Figure 10B), approximately 3/4 of the tooth on each ribbon reverse pawl should be in a position to be engaged by the ribbon reverse bail. There should be no bind between the ribbon spool shaft spur gears and the vertical ribbon feed shaft spur gears at any point in their engagement. To adjust, position the ribbon spool cups and ribbon reverse arm backstops by means of the nuts on the ribbon spool cup bushings. When tightening the nuts, take up the play between the ribbon spool cup bushings and the ribbon spool brackets in a direction to make the play between the spur gears a maximum.

24. RIBBON REVERSE ARM YIELD SPRING TENSION (Figure 10B) - See Note (C) On Page 1-3

Position the ribbon reverse bail so that it will block the full travel of the ribbon reverse arm, and with the ribbon reverse pawl resting against the ribbon reverse bail, apply the push end of an 8 oz. scale, held at a right angle to the ribbon reverse arm at the center where the ribbon is threaded. It should require 1-1/2 to 4-1/2 ozs. to start the ribbon reverse arm moving. To increase or decrease the tension, remove the spring and adjust by bending.

25. RIBBON REVERSE PAWL SPRING TENSION (Figure 11) - See Note (A) On Page 1-3

With the ribbon feed shaft in its left position and the pull bar bail in its extreme forward position, hold the carriage so that the ribbon spool cups are lowermost. Then hook an 8 oz. scale in the notch of the left reverse pawl and pull horizontally toward the rear of the carriage. It should require 1 to 2 ozs. to start the pawl moving. Move the ribbon feed shaft to its right position and, in the same manner, check the tension of the right ribbon reverse pawl spring.

26. RIBBON REVERSE BAIL SPRING COMPRESSION (Figure 11) - See Note (A) On Page 1-3

With the type bar carriage held so that the ribbon spool cups are lowermost, and the pull bar bail plunger is in its extreme forward position, hook a 4 lb. scale in the corner at the left end of the ribbon reverse bail and pull horizontally toward the front of the carriage. It should require 2 to 4 lbs. to just start the ribbon reverse bail moving. Measure the right spring compression at the right end of the ribbon reverse bail moving. Measure the right spring compression at the right end of the ribbon reverse bail for this requirement in the same manner.

27. TYPE BAR BACKSTOP (RIGID TYPE) (Figure 12A) - See Note (A) On Page 1-3

With the pull bar bail in its extreme rear position, there should be not less than .010" clearance between the type bar backstop and the pull bars when the type bars are held in the type bar guide. Make this check on the two end pull bars and the middle pull bar. To adjust, set the up and down position of the type bar backstop by means of its elongated mounting holes to meet this requirement.

NOTE

When meeting the clearance requirement between the backstop and the pull bars, the backstop should be positioned low enough to eliminate any interference between adjacent type bar assemblies at the pallet ends which would be likely to cause "light" printing. It is preferable that the end type bars rest against the backstop buffer strip along its entire width. It is permissible, however, to allow a clearance of not more than .010" between the front edge of the buffer strip and the type bars.

28. TYPE BAR BACKSTOP (FLOATING TYPE) (Figure 12B) - See Note (A) On Page 1-3

With the play of the backstop taken up toward the left, the right end of the backstop should overlap the outside end of the formed projection of the supporting spring by 1/64" to 1/16" as gauged by eye. If necessary, form the right hand spring by bending, keeping the projection in a horizontal plane. Check and adjust the left hand bracket in a similar manner with the play of the backstop taken up toward the right.

With the pull bar bail in its extreme rear position and with the backstop located at the approximate center, with regard to its side play, position the type bar backstop brackets upward or downward by means of the elongated holes, so that the following requirements are met.

Preliminary: The end type bars should rest against the backstop along its entire width within .010".

Preliminary: With the type bars held in the guide against the platen, there should be at least .015" clearance between the backstop and the pull bars.

NOTE

This clearance should be kept towards the minimum side to prevent interference between adjacent type pallets.

With the play of the backstop taken up to the left, raise the type bars and hold them against the platen. There should be at least .010" clearance between the undersurface of the backstop and the closest pull bar. Make this check with the left end type bar and with the center type bar. Repeat this check with the right end and center type bars when the play in the backstop is taken up to the right.

29. RIBBON SHIFT LEVER BRACKET (Figures 13 and 14) - See Note (A) On Page 1-3

The ribbon oscillator lever should move freely in its slot when its spring is unhooked and the ribbon carrier is approximately centrally located with respect to the type bar guide. To adjust, position the ribbon shift lever bracket by means of its enlarged mounting holes. Replace the ribbon oscillator lever spring.

30. RIBBON OSCILLATOR LEVER SPRING TORSION (Figure 13) - See Note (A) On Page 1-3

With the ribbon shift lever spring removed, hook an 8 oz. scale over the lower end of the ribbon oscillator lever and pull horizontally toward the rear of the type bar carriage. It should require 2-1/2 to 3-1/2 ozs. to start the oscillator lever moving. Replace the ribbon shift lever spring.

31. RIBBON SHIFT LEVER SPRING TENSION (Figure 13) - See Note (A) On Page 1-3

With the ribbon oscillator lever spring unhooked from the oscillator lever, apply the push end of a 12 lb. scale, held in a vertical position, to the ribbon shift lever at the place where the ribbon oscillator lever spring is mounted. It should require 1 to 1-3/4 lbs. to start the shift lever moving. Replace the ribbon oscillator lever spring.

32. MARGIN BELL PAWL SPRING TENSION (Figure 14) - See Note (A) On Page 1-3

Hook an 8 oz. scale, held in a horizontal position, over the margin bell pawl, just above the stop, and pull in line with the spring. It should require 1/2 to 1-1/2 ozs. to start the pawl moving.

33. RIBBON LOCKOUT BAR DETENT SPRING PRESSURE (Figure 15)

NOTE

This adjustment applies only to those printers equipped with the standard (non-adjustable) ribbon lockout bar.

With the ribbon oscillator extension held clear of the ribbon lockout bar and the lockout bar pushed inward, hook a 32 oz. scale over the end of the lockout bar and pull directly in line with the bar. It should require 16 to 32 ozs. to pull the lockout bar out to its unoperated position.

34. RIBBON LOCKOUT BAR DETENT SPRING PRESSURE (Figure 16)

NOTE

This adjustment applies only to those printers equipped with the adjustable ribbon lockout bar.

With the ribbon lockout bar in its unoperated position (extreme right) and with the push end of a 12 lb. scale bearing against the ribbon lockout bar and pushing directly in line with the bar, it should require 1-1/4 to 6-1/2 lbs. to disengage the ribbon lockout bar detent spring from its notch in the lockout bar.

REPLACE THE BELL CRANK ASSEMBLY - SEE PARAGRAPH 2.h.

NOTE

The following two adjustments apply only to those printers equipped with a three-section pull bar spring bracket.

35. RIGHT PULL BAR SPRING BRACKET (Figure 18) - See Note (A) On Page 1-3

With the pull bar bail in its extreme rear position, the right end pull bar and the fourth pull bar from the right end should have some play, not more than .004", between the right spring bracket and the type bar when the type bar is in its guide. To adjust, loosen the mounting

screw of the right pull bar spring bracket and position the bracket. Tighten the screw.

NOTE

If the second or third pull bar from the end binds against the spring bracket when their respective type bars are moved to the type bar guide by hand, readjust the spring bracket so that all four pull bars are free and so that the end pull bar and at least one of the other three pull bars have some play, not more than .004", between the type bars and the spring bracket when their respective type bars are in the type bar guide.

36. LEFT PULL BAR SPRING BRACKET (Figure 18) - See Note (A) On Page 1-3

With the pull bar bail in its extreme rear position, the left end pull bar and the third pull bar from the left end should have some plays not more than .004", between the left spring bracket and the type bar when thetype bar is in the type bar guide. To adjust, loosen the mounting screw of the left pull bar spring bracket and position the bracket. Tighten the screw.

NOTE

If the second pull bar from the left end binds against the bracket, readjust the spring bracket so that the end pull bar and the second pull bar from the left end have some play, not more than .004", between the left spring bracket and the type bar when the type bar is in the type bar guide.

37. MARGIN ADJUSTING SCREW ARM SPRING PRESSURE (Figure 19) - See Note (A) On Page 1-3

With the notch in the right margin adjusting screw arm engaged with the detent spring, hook a 4-lb. scale over the adjusting screw and pull at right angles to the arm toward the rear of the type bar carriage. It should require 2 to 7 lbs. to disengage the arm from the detent spring.

38. CARRIAGE SUPPORT AND PULL BAR BAIL PLUNGER ROLLERS - See Note (A) On Page 1-3

The three carriage support rollers and the pull bar bail plunger roller should turn freely with a barely perceptible amount of end play. To adjust, loosen the lock nuts and position the cone nuts. The rollers should turn freely with a barely perceptible amount of end play after the lock nuts are tightened. (See Figure 22 for location of parts).

REST THE TYPING UNIT ON ITS RIGHT SIDE

39. MAIN SHAFT

When the main shaft is rotated, the selector cams on the selector cam sleeve should line up with their respective selector levers. To adjust, loosen the four screws which hold the main shaft bearing caps and position the main shaft. Then tighten the bearing caps mounting screws.

40. MAIN SHAFT JAW CLUTCH THROWOUT LEVER (Figure 20)

With the motor operating, open and close the signal line and then stop the motor. There should be from .010" to .020" clearance between the teeth of the two clutch members. Adjust the clutch throw-out lever by means of its pilot screws to obtain this clearance. After adjusting, the lever should be free, with not more than .002" end play.

41. MAIN SHAFT JAW CLUTCH THROWOUT LEVER SPRING TENSION

Place the typing unit on its left side and rotate the main shaft until the clutch teeth are fully engaged. Hook an 8 oz. scale, held in a horizontal position, over the clutch throwout lever at the spring hole, and pull at right angles to the throwout lever. It should require 2-1/2 to 4 ozs. to start the lever moving. (See Figure 20 for location of parts.)

42. MAIN SHAFT JAW CLUTCH SPRING TENSION (Figure 21)

Place the typing unit on its right side. Rotate the main shaft until the low part of the printing bail cam is toward the bottom of the printer. With the teeth of the clutch driven member resting against the teeth of the driving member, but not engaged, hook a 32 or 64 oz. scale on the driven member in line with the low part of the printing bail cam and pull vertically downward. The tension required to separate the clutch teeth is as follows:

22 to 30 ounces for 60 wpm operation
32 to 42 ounces for 75 wpm operation
46 to 58 ounces for 100 wpm operation

NOTE

After checking the 22 to 30 ounce pull and with the clutch teeth still separated, gradually reduce the tension exerted by the scale on the driven clutch member. The clutch teeth should come to rest against each other, but not engaged, before the scale reading drops to 10 ounces.

43. SPACING SHAFT LOWER BEARING BRACKET (Figure 22)

There should be a minimum amount of play without binding at any point of engagement between the spacing shaft gear and the main shaft spacing gear during one complete revolution of the spacing shaft gear. To adjust, place the typing unit in its normal upright position; unhook the carriage return operating lever spring from the spring post; move the eccentric away from the bearing bracket and position the bracket by means of its elongated mounting holes. Replace the carriage return operating lever spring and reposition the eccentric against the bearing bracket.

44. PRINTING BAIL SHAFT RIGHT BEARING

With the printing bail held toward the right, there should be some, not more than .015", clearance between the end of the printing bail casting and the left bearing of the printing bail shaft. To adjust, remove the printing bail spring and position the right bearing by utilizing its elongated mounting holes. Replace the printing bail springs.

REPLACE THE TYPE BAR CARRIAGE - SEE PARAGRAPH 2.i.

45. PRINTING BAIL (Figure 23)

The pull bars should clear the code bars .010" to .050" when the main shaft is rotated until the printing bail is in its extreme rear position.

Check this adjustment with the type bar carriage in both its extreme right and left positions and with the play in the pull bars taken up in a direction to make the clearance a minimum. To adjust, position the printing bail by means of its adjusting screw and lock nut, located on the printing bail operating arm.

NOTE

If the clearance at one side is so unequal to the clearance at the other side that the .010" to .050" clearance cannot be obtained, it will be necessary to refine the PULL BAR GUIDE paragraph 9 (Figure 4) in such a way that the clearance between the pull bar bail and the pull bar humps, at the side that had the least clearance, is reduced to a minimum and, at the side that had the most clearance, is increased to a maximum for the PRINTING BAIL.

On units equipped with floating backstops, the clearance between the code bars and any pull bars should be at least .010" when the printing bail is in its rearmost (stop) position and when the play in the type bar backstop is taken up towards the left and towards the right. If necessary, refine, the TYPE BAR BACKSTOP requirements paragraph 28. Check this requirement with the type bar carriage in its extreme right and left positions and with the play of the pull bars taken up in a direction to minimize the clearance.

NOTE

The following two adjustments apply only to printers equipped with a two-piece function lever bail assembly.

46. FUNCTION LEVER BAIL (Figures 24 and 25) - See Note (A) on Page 1-3

There should be .040" to .060" clearance between the rear edge of the No. 1 vane and the front edges of the function levers, except the universal function lever, when the main shaft is rotated until the printing bail is in its rearmost position and the No. 1 vane is held midway between its marking and spacing positions. To adjust, position the function lever bail by means of its elongated mounting holes.

47. BLOCKING PLATE (Figure 24) - See Note (A) On Page 1-3

The position of the blocking plate should be as follows:

a. With the CARRIAGE RETURN combination selected, the line feed push bar (Figure 51B) removed, and the main shaft rotated until the carriage return function lever is drawn completely into selection with the vanes, the travel of the function lever bail should be blocked by

the selected function lever and the front edge of the right projection of the function lever bail should be flush (within .005") with the top front edge of the rear prong of the carriage return function lever. (See Figure 25 for location of parts.)

b. With the LINE FEED combination selected, the line feed push bar (Figure 51B) removed, and the main shaft rotated until the line feed function lever is drawn completely into selection with the vanes, the travel of the function lever bail should be blocked by the selected function lever and the front edge of the left projection of the function lever bail should be flush (within .005") with the top front edge of the rear prong of the line feed function lever. (See Figure 25 for location of parts.)

To adjust, position the blocking plate by means of its slotted holes. Replace the line feed push bar.

48. FUNCTION LEVER BAIL - ONE PIECE (Figure 25) - See Note (A) On Page 1-3

On typing units equipped with the one piece function lever bail, the position of the bail should be as follows:

a. With the CARRIAGE RETURN combination selected, the line feed push bar (Figure 51B) removed, and the main shaft rotated until the carriage return function lever is drawn completely into selection with the vanes, the travel of the function lever bail should be blocked by the selected function lever and the front edge of the right projection of the function lever bail should be flush (within .005") with the top front edge of the rear prong of the carriage return function lever.

b. With the LINE FEED combination selected, the line feed push bar (Figure 51B) removed, the main shaft rotated until the line feed function lever is drawn completely into selection with the vanes, the travel of the function lever bail should be blocked by the selected function lever and the front edge of the left projection of the function lever bail should be flush (within .005") with the top front edge of the rear prong of the line feed function lever.

c. There should be .040" to .060" clearance between the rear edge of No. 1 vane and the front edge of the function levers, except the universal function lever, when, with the line feed push bar (Figure 51B) removed, the main shaft is rotated until the printing bail is in its extreme rear position and the No. 1 vane is held midway between its MARKING and SPACING positions.

To adjust, loosen the function lever bail mounting screw nuts. Move the function lever bail to its rearmost position and tighten the mounting screw nuts. Then select the CARRIAGE RETURN combination and reposition the right end of the function lever bail to meet the requirements specified in paragraph a. Next select the LINE FEED combination and adjust the left end of the function lever bail to meet the requirements specified in paragraph b. Finally, rotate the main shaft until the printing bail is in its extreme rear position and check for the requirements specified in paragraph c. If this latter requirement is not met, it will be necessary to add or remove shims between the function lever bail and its mounting brackets and readjust both ends of the bail. Replace the line feed push bar.

49. SIXTH VANE EXTENSION SPRING COMPRESSION (Figure 26) - See Note (A) On Page 1-3

On typing units equipped with the new style sixth vane extension, (a formed piece of steel mounted on the sixth vane by means of shoulder screws and compression springs), measure the compression of the springs as follows:

Back off the left pilot screw (Figure 25) and remove the sixth vane from the typing unit. With the vane held in a horizontal position and with the vane extension extending upward, hook an 8 oz. scale over the upper end of the extension. Pulling at right angles and toward the front of the vane, it should require 3/4 to 1-1/4 ozs. to start the extension moving away from the vane. Check this spring compression in the opposite direction by hooking the scale over the end of the extension and pulling toward the rear edge of the vane. Replace the sixth vane.

50. SIXTH VANE (Figure 25) - See Note (A) On Page 1-3

With the platen in the LETTERS position, there should be .008" to .030" clearance between the right edge of the sixth vane extension and the right end of the slot in the unshift push bar. The vane should have some end play, not more than .004". To adjust, loosen the vane clamping screws and position the sixth vane by means of its pilot screws. Tighten the clamping screws.

NOTE

When checking the .008" to .030" clearance, the forward edge of the sixth vane should be held in its lowermost position but not with sufficient pressure to spring or bend the parts involved.

51. SELECTOR VANES (Figure 25) - See Note (A) On Page 1-3

The forked arms of the Nos. 1, 2, 3, 4, and 5 vanes should line up with their respective T levers. When the printing bail is in its extreme rear position, each vane should have some end play, not more than .004". To adjust, loosen the vane clamping screws and position the vanes by means of their pilot screws. Tighten the clamping screws.

52. FUNCTION BAIL SPRING TENSION (Figure 27) - See Note (A) On Page 1-3

With the function bail in its extreme rear position, unhook the function bail spring from the front spring post and hook a 4 lb. scale in the spring eye. It should require 2 to 3 lbs. to extend the spring to its position length.

53. PRINTING BAIL SPRING TENSION (Figure 28) - See Note (A) On Page 1-3

Rotate the main shaft until the printing bail is in its extreme rear position. Hook a 12 lb. scale over the left end of the adjusting lever, directly behind the spring notch in the lever, and pull in line with the spring. It should require 6-1/2 to 8-1/2 lbs. for 60 or 75 wpm operation, and 4 to 6 lbs. for 100 wpm operation, to start the lever moving. To adjust, position the spring adjusting lever screw.

REPLACE THE TYPE BAR CARRIAGE - SEE PARAGRAPH 2.i.

NOTE

The following sixteen adjustments apply only to printers equipped with pulling magnet selectors.

PLACE THE TYPING UNIT ON ITS RIGHT SIDE

54. SELECTOR ARMATURE BRACKET LINK FRICTION (Figure 29)

Remove the selector armature bracket link screw. With an 8 oz. scale hooked in the link screw hole and pulled at right angles to the link, it should require some tension, not over 8 ozs., to start the link moving. If necessary, remove the link and adjust the slotted end to obtain this friction. Replace the link and screw.

55. SELECTOR LEVER SPRING (Figure 29)

With the code bars in the MARKING position and the main bail in its extreme forward position, move the swords manually to the SPACING position. Hook a 32 oz. scale over the end of each selector lever at the selector cam sleeve and pull radially to the main shaft. It should require 6 to 10 ozs. to start each selector lever moving.

NOTE

When checking the tension of the selector lever springs, make sure that the selector levers are free and without bind.

56. SELECTOR SEPARATOR PLATE (Figure 30)

NOTE

The separator plate leaf springs are adjusted during the initial assembly of the unit and should require attention only if the selector has been damaged or dismantled. If it is found necessary to check the adjustment, extreme care should be exercised in the removal and replacement of the selector lever springs to guard against distorting them. The subsequent selector adjustments will be facilitated if the swords and selector levers are replaced in the identical location they formerly occupied.

The leaf springs should exert a light pressure against the swords. To adjust, bend the leaf springs at the narrow portions so that the ends of the springs are .050" to .060" below the under surface of the straight portions.

57. SELECTOR ARMATURE (Figure 31)

The armature should be free on its pivot screws, with barely perceptible end play. There should be some clearance, not more than .008", between the lower surface of the armature locking wedge and the No. 1 sword under the following conditions:

a. No. 1 selector lever resting on the peak of its cam.

b. No. 1 sword held against the upper separator plate without bending the latter.

c. Armature end play taken up in a direction to reduce the specified clearance to a minimum.

To adjust, proceed as follows: If there is no clearance between the armature locking wedge and the No. 1 sword, loosen the lock nut on the upper pivot screw and adjust to obtain clearance, noting that a quarter-turn of the screw is equivalent to approximately .006". Remove the armature bracket and adjust the lower pivot screw to obtain the proper armature end play. Replace the armature bracket.

If there is more than .008" clearance, remove the armature bracket and adjust the lower pivot screw. Replace the bracket and adjust the armature end play by means of the upper pivot screw.

58. SELECTOR ARMATURE BRACKET LINK (Figure 32 and 33) - See Note (E) On Page 1-4

The position of the armature bracket should be such that a line through the center of the No. 1 sword extends approximately through the centers of the armature pivot screws when the swords are held midway between the stop posts by means of the No. 72581 gauge pins. To adjust, proceed as follows:

a. Unhook the locking lever spring; loosen the magnet bracket mounting screws, and move the bracket to its rearmost position. Loosen the armature bracket mounting screws, the link screw, and back off the armature stops. Move the bracket eccentric out of the way so that it will not interfere with the adjustment. Rotate the main shaft until the No. 1 selector lever rests on the peak of its cam.

b. Hold the swords in a position midway between the two stop posts by means of the gauge pins inserted between the stop posts and the swords. Be sure that both the armature extension arms are between the arms of the swords. With the swords held in this position, place the No. 73370 locating gauge over the end of the No. 1 sword, so that the two legs of the gauge are against the ends of the sword arms. Move the bracket to a position where both armature extension arms are against the flat surface between the legs of the gauge.

c. Hold the bracket in this position and tighten the link screw only. Remove the locating gauge and the two gauge pins.

59. SELECTOR ARMATURE BRACKET (Figure 33) - See Note (E) On Page 1-4

a. The position of the armature bracket should be such as to provide some clearance, not more than .040", between each sword and either stop post under the following conditions:

(1) Rotate the main shaft until the No. 1 selector lever is resting on the peak of its cam. With the armature in its unoperated (SPACING) position, move the spacing arm of the No. 1 sword against the armature extension.

(2) Place a .040" wire gauge against the spacing stop post and rotate the armature slowly toward the MARKING position. The blade of the sword should strike the .040" gauge before the armature leaves the spacing arm of the sword. Under these conditions, the armature will move the sword to not more than .040" of the stop post. Remove the .040" gauge and repeat the above procedure. The armature should leave the spacing arm of the sword before the blade of the sword strikes the spacing stop post. Under these conditions, there will be some clearance between the sword and the stop post.

b. Unhook the armature spring at its adjusting screw and with the selector armature in its operated (MARKING) position, move the marking arm of the No. 1 sword against the selector armature extension. Then rotate the armature slowly toward the SPACING position until the armature just leaves the marking arm of the No. 1 sword. Check the clearance between the No. 1 sword and the marking stop post in the same manner as described in the foregoing.

c. With each selector lever on the peak of its cam, each associated sword should be tried for the foregoing requirement of some clearance, not more than .040", between each sword and the stop posts. To adjust, tighten the armature bracket mounting screws just enough so that the bracket may be moved by tapping it lightly. By rotating the bracket on its pivot, the clearance between the sword and the stop posts may be regulated. If this clearance is more than .040", move the bracket in a direction to bring the armature toward the sword. If there is no clearance, move the bracket in the opposite direction to bring the armature away from the sword.

d. If the clearance between the sword and one stop post is close to zero and the clearance

between the sword and the other stop post is more than .040", it will be necessary to refine the "SELECTOR ARMATURE BRACKET LINK" as follows:

(1) Loosen the armature bracket mounting screws and the armature bracket link screw and move the armature bracket to the right or left so that the rear end of the link will move in the direction corresponding to the post at which a greater clearance is desired; i.e., if the clearance between the sword and the right stop post is less than that between the sword and the left stop post, move the bracket to the right. Tighten the bracket link screw and proceed to adjust the armature bracket according to the preceding paragraph.

e. After the bracket is set and both screws are tightened, move the bracket eccentric against the bracket and tighten the screw. The eccentric and bracket link will, therefore, determine the position of the bracket. The bracket may be removed by simply removing the two bracket screws. In replacing, the bracket should be held against the eccentric stop, while the two bracket screws are tightened.

60. ARMATURE STOPS (Figure 34) - See Note (E) On Page 1-4

The No. 1 sword arms (right and left) should clear the associated arms of the selector armature extension .035" to .037" when the front edge of the opposite sword arm is against its armature extension arm and the No. 1 selector lever is on the high part of its cam. To adjust the clearance of the right arm, remove the locking lever spring and reposition the unoperated stop screw with the armature in its unoperated position. (See Figure 33). To adjust the clearance of the left arm, reposition the operated stop nut with the armature in its operated position. If necessary, pinch the nut to make it tight on its screw. Recheck the right arm and replace the locking lever spring.

NOTE

The upper limit may be increased up to .042" only if necessary to meet the requirements given under "ARMATURE TRIP-OFF ECCENTRIC SCREW".

61. ARMATURE LOCKING WEDGE Figure 35) - See Note (E) On Page 1-4

There should be .006" to .012" clearance between the point of the armature locking wedge and the point of the locking lever when the locking lever is on the long high part of the locking cam and the two points are in line. To adjust, position the locking wedge forward or backward in its slot in the armature extension by means of the locking wedge lock nut.

NOTE

When making this adjustment on typing units equipped with a mechanical motor stop mechanism, set the motor stop pawl latch so that the shoulder of the latch is against the front face of the armature extension. (See Figure 30).

62. ARMATURE LOCKING LEVER SPRING TENSION (Figure 35) - See Note (E) On Page 1-4

With the locking lever on the high part of the locking cam, hook a 32 oz. scale in the spring hole of the locking lever and pull in line with the spring. It should require 10 to 14 ozs. to start the lever moving.

NOTE

On units equipped with a mechanical motor stop mechanism, perform the following adjustments at this time.

(1) Motor Stop Lever Bracket - Paragraph 240.
(2) Motor Stop Lever Eccentric - Paragraph 241.
(3) Motor Stop Lever Backstop Screw - Paragraph 242.
(4) Motor Stop Pawl Backstop - Paragraph 243.
(5) Motor Stop Release Lever Eccentric - Paragraph 244.
(6) Motor Stop Pawl Spring Compression - Paragraph 245.
(7) Motor Stop Lever Spring Tension - Paragraph 246.
(8) Motor Stop Contact Lever Spring Tension - Paragraph 247.
(9) Motor Stop Function Lever Spring Tension - Paragraph 248.

63. STOP LEVER ECCENTRIC SCREW (Figure 36) - See Note (E) On Page 1-4

The stop lever on the range finder assembly should overtravel the latching surface of the trip latch by some clearance, not more than .006". To adjust, position the stop lever eccentric screw by means of its lock nut, making certain

that, when tightening the nut, the adjustment is not disturbed.

64. STOP LEVER SPRING TENSION (Figure 37) - See Note (E) On Page 1-4

NOTE

Be sure that the STOP LEVER ECCENTRIC SCREW has been adjusted before checking this requirement.

With the trip latch plunger held operated, hook an 8 oz. scale at the end of the stop lever on the range finder assembly. It should require 3/4 to 1-1/4 ozs. to start the lever moving.

65. TRIP LATCH SPRING COMPRESSION (Figure 36) - See Note (E) On Page 1-4

When measuring this requirement, the range finder assembly should be held in a horizontal position. Apply the push end of an 8 oz. scale, held in a vertical position, to the trip latch as near to the stop lever as possible and push upward. It should require 1 to 1-1/2 ozs. to start the trip latch moving. Replace the range finder assembly, taking care to avoid jamming the trip latch plunger against the armature trip-off screw when remounting. (See Figure 38).

66. SELECTOR STOP ARM AND STOP LEVER ENGAGEMENT (Figure 38)

With the selector magnet armature in the spacing position, rotate the selector cam sleeve until the stop arm moves the stop lever to its maximum travel beyond the step of the trip latch. Loosen the range finder assembly mounting screws and the positioning link mounting screw just enough to make them friction tight. Position the range finder assembly so that the overtravel of the step lever beyond the trip latch is at least half but not more than the width of the stop lever. This should be checked with the range indicator set at 0, 60, and 120 on the range scale. Tighten the mounting screws and the positioning link screws.

REPLACE THE RANGE FINDER ASSEMBLY

67. ARMATURE TRIP-OFF ECCENTRIC SCREW (Figure 39)

a. There should be some clearance, not more than .004" between the stop lever and the trip latch when the armature is in the unoperated position and the selector cam sleeve is rotated until the stopping edge of the stop lever is directly below the latching surface of the trip latch. While checking the above clearance, take up the play in the stop lever with a screwdriver applied axially adjacent to the spring hole as close to the bearing as possible with thrust in the direction of the trip latch. This clearance should be held to a minimum to favor the "at least .002" end play of the trip plunger.

b. The trip latch plunger should have at least .002" end play when the armature is held in the attracted position and when the stop lever is resting against its eccentric stop post. To adjust, loosen the trip-off eccentric screw lock nut and position the eccentric screw to meet the first requirement. The latter requirement serves as a check on the TRIP-OFF ECCENTRIC SCREW and on the ARMATURE STOPS.

68. SELECTOR MAGNET COIL

The left edge of the core of the left magnet coil should align within 1/64" of the left edge of the armature. Adjust by means of the magnet coil mounting screws. (See Figure 33 for location of parts.)

69. MAGNET BRACKET (Figure 33).

There should be .002" to .007" clearance (.003" to .010" for chromium plated armatures) between each magnet core and the armature anti-freeze strip when the magnet coils are energized and the armature is against the marking stop nut. The faces of the cores should be parallel to the face of the armature. To adjust, position the bracket by means of its enlarged mounting holes.

NOTE

The following twenty adjustments apply only to printers equipped with holding magnet selectors.

70. SELECTOR SEPARATOR PLATE (See paragraph 56)

71. ARMATURE PIVOT SCREW (Figure 40) - See Note (E) On Page 1-4

With the armature lever spring and the selector arm spring unhooked, the armature lever should be free on its pivots with barely perceptible end play. Adjust by means of the upper pivot screw.

72. SELECTOR CORE AND ARMATURE ALIGNMENT (Figure 41) - See Note (E) On Page 1-4

a. PRELIMINARY

When the armature is in its operated position, it should touch both magnet pole faces approximately at their centers, and the cores should be located equi-distant, with respect to the outer edge of the armature as gauged by eye when a light reflector such as a piece of white paper is held behind the magnet. To adjust, remove the selector magnet bracket from the typing unit and reposition the magnet core assembly with its mounting screws loosened while holding the assembly so that the cores are vertical and the armature, by its own weight, rests against the pole faces. Tighten the magnet core assembly mounting screws and replace the selector magnet bracket.

b. FINAL

With the armature lever spring and the selector arm spring in position (hooked), manually rotate the shaft and selector cam sleeve so that the armature lever slowly moves the armature toward the magnet core. Observe that the armature touches both core ends simultaneously and approximately in the center of curvature; gauge by eye, holding a light reflector such as a piece of white paper behind the magnet and armature assembly. Adjust by repositioning the magnet core by means of its elongated mounting holes and mounting screws. Tighten the screws.

NOTE 1

When the cores are in proper adjustment, it should require at least 3-1/2 pounds pull, with a 64 ounce scale applied at right angle to the armature edge in line with the armature lever, to separate the armature from the cores when a current of .020 amperes is flowing through the magnet coils (coils in series shunted by a 5000 ohm resistor).

NOTE 2

The adjustment may have to be modified in order to obtain the required receiving margins and to prevent slow release of the armature due to oil-seal. The margin requirement and the minimum magnetic pull requirement of 3-1/2 pounds should be considered as "Final Check" for the armature and core alignment.

73. SELECTOR ARM PIVOT SCREW (Figure 42) - See Note (E) On Page 1-4

With the armature lever spring, the selector arm spring, and selector arm stop detent spring unhooked, the selector arm should be free on its pivots with barely perceptible end play, and the locking lever should overtravel the top and bottom edges of the locking wedge. There should also be a minimum clearance of .008" between the selector arm and the armature lever and a minimum clearance of .010" between the selector arm and the selector arm stop detent when the play in the detent is taken up in a direction to make this clearance a minimum. The end play may be adjusted by means of the left pivot screw. If the minimum clearance requirements are not met, it will be necessary to remove the selector magnet bracket and the selector arm bracket and adjust both pivot screws of the selector arm.

74. SELECTOR ARM BRACKET (Figure 40) - See Note (E) On Page 1-4

a. The position of the selector arm bracket should be such as to provide some clearance, not more than .040", between each sword and either stop post, under the following conditions:

(1) Remove the locking lever spring, the armature lever spring, and the selector arm spring. Rotate the main shaft until the No. 1 selector lever is resting on the peak of its cam. With the selector arm in its unoperated (SPACING) position, move the SPACING arm of the No. 1 sword against the selector arm extension. Then rotate the selector arm slowly toward the MARKING position until the selector arm just leaves the SPACING arm of the No. 1 sword. There should be some clearance, not more than .040", between the No. 1 sword and the SPACING stop post.

(2) With the selector arm in its operated (MARKING) position, move the MARKING arm of the No. 1 sword against the selector arm extension. Then rotate the selector arm slowly toward the SPACING position until the selector arm just leaves the MARKING arm of the No. 1 sword. There should be some clearance, not more than .040", between the No. 1 sword and the MARKING stop post.

b. With each selector lever on the peak of its cam, each associated sword should be tried for the foregoing requirement of some clearance, not more than .040". To adjust, loosen the selector arm bracket mounting screws just

enough to make the bracket friction tight. Then, to equalize the clearance between the swords and the stop posts, loosen the centralizing eccentric screw lock nut and turn the eccentric screw clockwise to provide more clearance on the SPACING side or counterclockwise to provide more clearance on the MARKING side.

NOTE

Be sure that the selector arm stop detent does not interfere with the adjustment.

c. The centralizing eccentric screw should always be located so that its indicating line is adjacent to the marked scale that has been provided on the bracket to aid in gauging the amount the screw must be turned. Tighten the lock nut when the selector arm has been centralized. To obtain the "some clearance, not more than .040"," requirement between the swords and the stop posts, insert the 90783 adjusting wrench in one of the two holes provided and turn the wrench to move the bracket closer to or farther from the swords as required. Then tighten the selector arm bracket mounting screws. Replace the locking lever spring, selector arm spring, and armature lever spring.

75. LOCKING WEDGE (Figure 43) - See Note (E) On Page 1-4

With the locking lever on a high part of its cam, the front end of the locking wedge should clear the locking lever by .005" to .012" when the end of the wedge is held in line with the locking lever. To adjust, loosen the locking wedge mounting screw and position the locking wedge in its guide; then tighten the mounting screw.

76. LOCKING LEVER SPRING TENSION (Figure 43) - See Note (E) On Page 1-4

With the locking lever on the high part of its cam, hook an 8 oz. scale on the end of the locking lever at the spring hole and pull in line with the spring. It should require 4 to 5-1/2 ozs. for 60 and 75 wpm operation or 7 to 10 ozs. for 100 wpm operation to start the lever moving away from the cam.

77. SELECTOR ARM STOP DETENT (Figure 44) - See Note (E) On Page 1-4

a. With the locking lever on the low part of its cam, there should be an equal amount of clearance, within .003", between the sides of the locking wedge and the locking lever when the selector arm is in the MARKING or SPACING position.

NOTE

When checking the MARKING position, be sure that the selector arm operating screw does not interfere with the movement of the selector arm.

b. To adjust, loosen the screw that mounts the selector arm stop detent eccentric post just enough to make the post friction tight. Position the stop detent by turning the post. Tighten the post mounting screw.

78. SELECTOR ARM STOP DETENT SPRING TENSION (Figure 44) - See Note (E) On Page 1-4

Unhook the stop detent spring from the locking lever guide and hook an 8 oz. scale in the spring eye. It should require 4 to 5 ozs. for 60 and 75 wpm operation or 6-3/4 to 7-3/4 ozs. for 100 wpm operation to pull the spring to its position length.

79. SELECTOR LEVER SPRING TENSION (Figure 43) - See Note (E) On Page 1-4

With the code bars in the MARKING position and the main bail in its extreme forward position, move the swords manually to the SPACING position. Hook a 32 oz. scale over the end of each selector lever at the selector cam sleeve and pull radially to the main shaft. It should require 6 to 10 ozs. to start each selector lever moving.

NOTE

When checking the tension of the selector lever springs, make sure that the selector levers are free and without bind.

80. SELECTOR MAGNET BRACKET POSITION (Figure 45) - See Note (E) On Page 1-4

With the main shaft in the STOP position, rotate the selector cam sleeve until the locking lever just drops off the high part of its cam; then rotate the cam sleeve backward until the rotation is stopped by the locking lever. With the selector arm locked in its MARKING position, there should be a clearance of .060" to .065" between the armature lever and the face of a tooth on the armature lever cam. To adjust, loosen the selector magnet bracket mounting screws and the selector magnet bracket adjusting arm mounting screws just enough to make the bracket and adjusting arm friction tight. Then position the selector magnet bracket by means of the

adjusting arm, using the 90783 adjusting wrench. To do this, insert the adjusting wrench in the hole above the end of the adjusting arm and rotate the wrench. Tighten the bracket and adjusting arm mounting screws.

81. SELECTOR MAGNET BRACKET (Figure 41A and B) - See Note (E) On Page 1-4

NOTE

When making this adjustment the selector arm should be kept in the marking position.

a. With the selector magnet energized, the clearance between the selector arm operating screw and the selector arm should be .004" to .006" greater when the armature lever is on a peak of its cam than when the armature lever is opposite an indent on the cam.

b. To adjust, de-energize the magnet and rotate the selector cam sleeve until the armature lever is resting on a peak of the armature lever cam. Holding the cam sleeve in this position, turn the main shaft to a point where it moves the armature lever the greatest distance.

c. With the selector magnet still de-energized, loosen the selector magnet bracket mounting screws and, by means of its adjusting screw, rotate the selector magnet bracket so that the armature just touches the pole-faces; then turn the adjusting screw an additional one-tenth of a turn counter-clockwise. This will press the armature firmly against the magnet cores. (While making the one-tenth of a turn adjustment, be careful to avoid lost motion due to loose fitting screw threads.)

d. With the selector magnet energized, measure the clearance between the selector arm operating screw and the selector arm and if there is no clearance, back off the selector arm operating screw to provide at least .006" clearance. Then rotate the selector cam sleeve so that the armature lever is opposite an indent of its cam and again measure the clearance between the selector arm operating screw and the selector arm. If the difference in the two clearances exceeds .006", the selector magnet bracket adjusting screw should be turned clockwise. If the difference in the clearance is less than .004", turn the screw counterclockwise. Tighten the selector magnet bracket mounting screws.

82. ARMATURE LEVER SPRING TENSION (Figure 41) - See Note (E) On Page 1-4

a. Unhook the armature lever spring from its spring arm and rotate the main shaft until the armature lever is on a high part of its cam. With a 32 oz. scale hooked in its spring eye, pull the spring to its position length. It should require the following tensions:

(1) If a distortion test set is available, the spring tension should be set at the optimum value within the limits of 13 to 24 ozs.

(2) If no distortion test set is available the spring tension should be 17 to 19 ozs. for 60 and 75 wpm operation or 22 to 26 ozs. for 100 wpm operation. When the coils are connected in parallel without a 1000 ohm shunt, the tension should be 13 to 15 ozs.

b. To adjust, loosen the spring arm mounting nut and position the spring arm. Tighten the mounting nut and rehook the armature lever spring.

83. SELECTOR ARM OPERATING SCREW (Figure 46) - See Note (E) On Page 1-4

With the selector magnet energized and the selector cam sleeve rotated so that the armature lever is opposite an indent of its cam, there should be a clearance of .003" to .006" between the selector arm operating screw and the selector arm. To adjust, loosen the selector arm operating screw lock nut and position the screw; then tighten the lock nut.

84. SELECTOR ARM SPRING TENSION (Figure 47) - See Note (E) On Page 1-4

Unhook the selector arm stop detent spring. With the armature lever on a high part of its cam, and the locking lever held away from the locking wedge, hook an 8 oz. scale over the end of the locking wedge and pull parallel to the selector arm spring. It should require 1-1/4 to 1-3/4 ozs. for 60 and 75 wpm operation or 1-3/4 to 2-1/4 ozs. for 100 wpm operation to start the selector arm moving. Reform the outer loop of the selector arm spring, if necessary, to meet this requirement. Rehook the selector arm stop detent spring.

CAUTION

Care should be taken not to nick, crimp, or otherwise deform the spring, or spring wire when reforming the loops.

85. STOP LEVER ECCENTRIC SCREW (Figure 48) - See Note (E) On Page 1-4

The stop lever on the range finder assembly should overtravel the latching face of the trip latch by not more than .006". To adjust, loosen the stop lever eccentric screw lock nut and position the screw; then tighten the nut, making certain that the tightening of the nut does not disturb the adjustment.

86. TRIP LATCH SPRING COMPRESSION (Figure 48) - See Note (E) On Page 1-4

When measuring this requirement, the range finder assembly should be held in a horizontal position. Apply the push end of an 8 oz. scale, held in a vertical position, to the trip latch, as near to the stop lever as possible. It should require 1 to 1-1/2 ozs. for 60 and 75 wpm operation or 2-3/4 to 3-1/4 ozs. for 100 wpm operation, when pushing upward, to start the trip latch moving.

87. STOP LEVER SPRING TENSION (Figure 37) - See Note (E) On Page 1-4

NOTE

Be sure that the stop lever eccentric has been adjusted before checking this requirement.

With the trip latch plunger held operated, hook an 8 oz. scale on the end of the stop lever of the range finder assembly and pull horizontally at right angles to the stop lever. It should require 3/4 to 1-1/4 ozs. to start the lever moving.

REPLACE THE RANGE FINDER ASSEMBLY

88. SELECTOR STOP ARM AND STOP LEVER ENGAGEMENT (Figure 38)

With the selector magnet armature in the spacing position, rotate the selector cam sleeve until the stop arm moves the stop lever to its maximum travel beyond the step of the trip latch. Loosen the range scale assembly mounting screws and the positioning link mounting screw just enough to make them friction tight. Position the range scale assembly so that the overtravel of the stop lever beyond the trip latch is at least half but not more than the width of the stop lever. This should be checked with the range indicator set at 0, 60, and 120 on the range scale. Tighten the mounting screws and the positioning link screw.

89. TRIP-OFF SCREW (Figure 49)

a. There should be some clearance, not more than .004", between the stop lever and the trip latch when the armature is in the unoperated position and the selector cam sleeve is rotated until the stopping edge of the stop lever is directly below the latching surface of the trip latch. While checking the above clearance, take up the play in the lock lever with a screwdriver applied axially adjacent to the spring hole as close to the bearing as possible with thrust in the direction of the trip latch. This clearance should be held to a minimum to favor the "at least .002" end play of the trip plunger.

b. The trip latch plunger should have at least .002" end play when the armature is held in the attracted position and when the stop lever is resting against its eccentric stop post.

c. To adjust, loosen the trip-off screw lock nut and position the screw to meet the first requirement. The latter requirement serves as a check on the TRIP-OFF SCREW and on the SELECTOR MAGNET BRACKET.

90. PLATEN UNIT PILOT SCREWS See Note (A) On Page 1-3

The platen unit should be midway between the side frames and should be free on its bearings without end play. To adjust, place the typing unit in its normal upright position. Disconnect the line feed and shift-unshift vertical link at the upper shoulder screws. (See Figures 49 and 52) Unhook the platen balance spring and the shift-unshift detent spring. Then position the platen unit by means of its pilot screws to meet the first requirement. Then back off one pilot screw until the platen unit has some end play. Turn the pilot screw in just enough to take up the end play. Replace the platen balance spring and shift-unshift detent spring and reconnect the line feed and shift-unshift vertical link. (Care should be taken not to tighten the pilot screws to the extent that they cause a strain on the side frames.)

91. PLATEN SHIFT-UNSHIFT STOP POST - See Note (A) On Page 1-3

The top and bottom surfaces of the platen shift-unshift stop post should be parallel to a line through the center of the platen detent roller screw and the platen pilot screw. To adjust, loosen the platen shift-unshift stop post nut and rotate the post. (See Figure 50 for location of parts.)

REPLACE THE TYPE BAR CARRIAGE - SEE PARAGRAPH 2.i.

92. UNSHIFT (LETTERS) STOP SCREW

With the platen in the UNSHIFT position and the letter N type bar held lightly against the platen, the face of the letter N should conform to the curvature of the platen when viewed along the axis of the platen. A further check may be made by inserting a sheet of paper with a carbon in the printer and pressing the letter N firmly against the platen. The impression made on the paper should be of uniform shade. To adjust, raise the UNSHIFT stop screw if the shading is lighter at the bottom of the character and lower it if the shading is lighter at the top. (See Figure 50 for location of parts.)

93. SHIFT (FIGURES) STOP SCREW

With the platen in the UNSHIFT position (down), print the letter W on the platen. Then, with the platen in the SHIFT position (up), the figure 2 should be in direct alignment with the letter W when the figure 2 is printed directly on the platen. Adjust by means of the SHIFT stop screw. (See Figure 50 for location of parts.)

94. SHIFT (FIGURES), UNSHIFT (LETTERS), AND LINE FEED FUNCTION LEVER SPRING TENSIONS (Figure 51) - See Note (A) On Page 1-3

Place the typing unit on its right side. Select the BLANK combination and rotate the main shaft until the printing bail is in its extreme forward position. Hook a 32 oz. scale over the rear extension of the SHIFT, UNSHIFT, and line feed function levers just in front of the lobes which engage the push bars and pull horizontally at right angles to the rear extension. It should require 15 to 19 ozs. to start each of these function levers moving. When checking these tensions, the push bars should be held away from the function levers.

95. SPACE FUNCTION LEVER SPRING TENSION (Figure 51)

With the space function lever resting against the vanes, but not selected, hook a 32 oz. scale over the rear extension of the lever, just in front of the lobe, and pull horizontally at right angles to the rear extension. It should require 12 to 16 ozs. to start the space function lever moving. When checking this tension, the UNSHIFT push bar should be held away from the function lever.

96. BLANK PRINTING AND SPACING CUTOUT FUNCTION LEVER SPRING TENSION

NOTE

The following spring tension applies only to printers equipped with a special function lever located in slot 7 in the vane frame to prevent printing and spacing when the BLANK combination is selected.

Rotate the main shaft until the printing bail is in its extreme rear position. Then unhook the blank printing and spacing cutout function lever spring from the spring plate. Hook a 32 oz. scale in the spring eye. It should require 22 to 30 ozs. to extend the spring to its position length.

97. FUNCTION BAIL BLADE (Figure 52)

NOTE

If the SHIFT-UNSHIFT mechanism has not been adjusted, it will be necessary to loosen the mounting screws of the shift bell crank operating lever bracket and move the bracket to its extreme rear position before proceeding with the "FUNCTION BAIL BLADE" adjustment.

a. With the SHIFT, LINE FEED, AND UNSHIFT function levers (Figure 50) alternately selected and the main shaft rotated until the travel of the function lever bail is blocked by the selected function lever, there should be .004" to .015" clearance between the rear edge of No. 1 vane and the bottom of a notch in the selected function lever. With the unshift on space cutout lever (Figure 50) released from the lower extension of the SPACE function lever, place the platen in the SHIFT position, select the SPACE combination, and rotate the main shaft until the function lever bail roller just leaves the cam surface of the SPACE function lever. Under this condition, there should be .004" to .015" clearance between the rear edge of the No. 1 vane and the bottom of a notch in the SPACE function lever.

b. To adjust, select the SHIFT function lever and adjust the right end of the function bail blade by raising or lowering it by means of its elongated mounting holes to secure the specified clearance between the rear edge of the No. 1 vane and the bottom of a notch in the SHIFT function lever. Then select the LINE FEED function lever and adjust the left end of the function bail blade by raising or lowering it to secure the

specified clearance between the rear edge of the No. 1 vane and the bottom of a notch in the LINE FEED function lever. If like requirements are not met when the UNSHIFT and SPACE function levers are selected, it may be necessary to readjust both ends of the function bail blade.

98. UNSHIFT ON SPACE CUTOUT LEVER

a. If it is desired that the platen return to the UNSHIFT position when the SPACE combination is received, the UNSHIFT on space cutout lever should be rotated counterclockwise (as viewed from the bottom of the printer) against its stop. The lock nut should be tightened to hold the cutout lever in this position. (See Figure 97 for location of parts.)

b. If it is desired that the platen should not return to the UNSHIFT position when the SPACE combination is received, the UNSHIFT on space cutout lever should be rotated clockwise (as viewed from the bottom of the printer), so that the hooked end of the cutout lever is to the rear of the SPACE function lever extension and the cutout lever touches the side of the SPACE function lever extension. There should be some clearance, not more than .006" between the rear surface of the SPACE function lever extension and the cutout lever. (See Figure 97.)

c. To adjust, first remove the T lever and attached mechanism (See Figure 98) from its mounting post and loosen the cutout lever eccentric screw nut. Position the cutout lever and the eccentric screw and then tighten the nut. Replace the T lever and attached mechanism.

99. SHIFT (FIGURES) AND UNSHIFT (LETTERS)

a. With the SHIFT-UNSHIFT detent and platen balance springs removed and the UNSHIFT and SHIFT combinations alternately selected, the SHIFT-UNSHIFT stop post should move to within .010" to .025" of the UNSHIFT stop screw and the SHIFT stop screw respectively, when the main shaft is rotated and the selected push bar is moved to its rearmost position when operated by the function bail blade. The platen should be placed in the SHIFT position (up) before selecting the UNSHIFT combination and in the UNSHIFT position (down) before selecting the SHIFT combination.

b. To adjust, place the shift-unshift link bracket in the middle of the adjustment provided by the elongated mounting holes and tighten the mounting screws. Place the typing unit on its right side and rotate the main shaft until the function bail is in its extreme forward position. Adjust the turnbuckle on the shift-unshift link so as to equalize (within .010") the clearance between the function bail blade and the shoulder on the UNSHIFT push bar when the platen is in the FIGURES position, with the clearance between the function bail blade and the shoulder on the SHIFT push bar when the platen is in the LETTERS position. Then select the UNSHIFT and SHIFT combinations alternately and check for the specified clearances between the shift-unshift stop post and the UNSHIFT and SHIFT stop screws. If either of these clearances is greater than .025", move the shift-unshift link bracket toward the front of the unit; if less than .010", move it toward the rear, after which a slight readjustment of the shift-unshift link turnbuckle may be necessary to bring both clearances within the specified limits. Replace the shift-unshift detent spring and platen balance spring. (See Figures 50 and 51 for location of parts.)

100. PLATEN BALANCE SPRING TENSION (Figure 53)

With the platen in the UNSHIFT position, unhook the platen balance spring from the platen unit bracket and hook a 12 lb. scale in the spring eye. It should require 3-1/2 to 5 lbs. to pull the spring to position length on units equipped with cast iron platen brackets, and 1-1/4 to 2 lbs. on units equipped with aluminum platen brackets.

101. SHIFT-UNSHIFT DETENT

When the platen is shifted to the SHIFT and UNSHIFT positions, the platen detent roller should ride equally on either side of the detent. To adjust, position the shift-unshift detent by means of its eccentric shoulder screw. (See Figure 50 for location of parts.)

102. SHIFT-UNSHIFT DETENT SPRING TENSION (Figure 50)

Hook a 25 lb. scale over the extension on the shift-unshift detent and pull in line with the spring. It should require from 10 to 14 lbs. to start the detent moving.

103. SIXTH VANE EXTENSION

NOTE

This adjustment applies only to printers equipped with the old style sixth vane extension (a flat spring formed from spring steel).

Unhook the sixth vane detent spring from the spring plate. When the platen is shifted to the SHIFT and UNSHIFT positions, the sixth vane should travel equally on either side of the detent in the W notch of the locking function lever. Adjust by bending the sixth vane extension. After bending the extension, the UNSHIFT push bar should not bind on the extension in either the UNSHIFT or SHIFT positions. (See Figure 25 for location of parts.)

104. UNSHIFT (LETTERS) AND SHIFT (FIGURES) PUSH BARS SPRING TENSIONS (Figure 51A)

Select any character and rotate the main shaft until the printing bail is in its extreme forward position. Place the push end of an 8 oz. scale directly beneath the notch on the push bar and push horizontally at right angles to the bar. It should require 3 to 5 ozs. to start the LETTERS and FIGURES push bars moving.

105. PLATEN SHAFT

The platen shaft should have some end play, not more than .004". To adjust, position the friction assembly on the platen shaft by means of its set screws. (See Figure 64B for location of parts.)

106. SINGLE-DOUBLE LINE FEED DETENT

When the single-double line feed lever is shifted to the SINGLE and DOUBLE line feed positions, the hump on the detent spring should travel equally on either side of the detent. (See Figure 50 for location of parts.) To adjust, position the detent by means of its mounting screw.

107. SINGLE-DOUBLE LINE FEED DETENT SPRING PRESSURE (Figure 50)

With the single-double line feed lever in the SINGLE line feed position (up), hook a 4 lb. scale, held in a horizontal position, over the extension of the lever and pull toward the front. It should require 1-1/4 to 4 lbs. to move the lever to the DOUBLE line feed position.

108. LINE FEED DETENT LEVER

With the single-double line feed lever in the SINGLE line feed position (up), and the line feed bail operated by hand, the line feed pawl, when sliding off the rear edge of the single-double line feed lever, should just miss the edge of a tooth on the ratchet. (See Figure 50 for location of parts.) To adjust, loosen the detent lever eccentric screw nut (Figure 53) and turn the eccentric screw so as to rotate the platen by means of the detent lever. Tighten the detent lever eccentric screw nut and check the adjustment for all the teeth on the line feed ratchet. For line feed ratchets and detents marked with an "X", see that the holes adjacent to the "X" line up.

NOTE

There are two positions of the detent lever eccentric screw which will provide correct adjustment. Use the position which applies the least tension to the detent lever spring and be sure that the detent roller rests in the bottom of a notch on the detent ratchet.

109. LINE FEED LINK TURNBUCKLE (Figure 50)

a. With the single-double line feed lever in the SINGLE line feed position, select the LINE FEED combination and rotate the main shaft as follows:

(1) Until the line feed push bar is being stripped from the function bail blade on printers not equipped with the automatic carriage return and line feed.

(2) Until the function bail is in its extreme rear position on printers equipped with the automatic carriage return and line feed.

b. Under this condition, the turnbuckle should be adjusted so that the platen has rotated one line-space, that the detent roller rests in the hollow between two ratchet teeth and that the feed pawl is still in engagement with a ratchet tooth to such an extent that there is no clearance or not more than .002" clearance between the detent roller and the detenting face of the tooth just above the roller. Check for this condition at 4 positions on the ratchet approximately 90° apart.

110. LINE FEED PUSH BAR SPRING TENSION

With the typing unit on its right side and the printing bail in its extreme rear position, apply the push end of an 8 oz. scale to the line feed push bar just to the rear of the function lever extension and push horizontally at right angles to the bar (See Figure 51A). It should require 1-1/2 to 2-1/2 ozs. to start the push bar moving.

111. LINE FEED DETENT LEVER SPRING TENSION (Figure 53)

With the typing unit in its normal upright position, hook a 12 lb. scale over the head of the line feed lever detent roller mounting screw and pull at right angles to the detent lever. It should require 5 to 6 lbs. to start the detent lever moving.

112. LINE FEED PAWL SPRING TENSION (Figure 50)

With the single-double line feed lever in the DOUBLE line feed position and the line feed pawl in its unoperated position, hook an 8 oz. scale under the line feed pawl just to the rear of the notch and pull up vertically. It should require 2 to 4 ozs. to start the pawl moving.

113. LINE FEED CHECK SCREW (Figure 53)

The line feed check screw should drop in the twelfth notch from the detent roller when line feed ratchets having 33 teeth are used, and in the fourteenth notch when ratchets having 37 teeth are used. (When counting the notches, start with the notch just above the detent roller.) There should be some clearance, not more than .020", between the front face of the screw and the face of the tooth at the point of minimum clearance, when the check screw is held in the bottom of a notch on the ratchet. To adjust, loosen the line feed check screw lock nut and position the check screw to meet the foregoing requirements. Tighten the lock nut. Rotate the platen roll and check the clearance in each notch of the ratchet. If necessary, loosen the clamping nut of the line feed check post stop screw and back off the stop screw before making this adjustment.

114. LINE FEED CHECK POST STOP SCREW (Figure 53)

With the line feed check post stop screw held down against the casting, there should be .015" to .030" clearance between the line feed check screw and each tooth on the detent ratchet, when the platen is rotated. To adjust, loosen the check post clamping nut and position the stop screw. Before tightening the clamping nut, make sure that the line feed check post is against the inner side of the casting and that the end of the line feed check lever shaft (Figure 50) is flush with the outer surface of the casting. Tighten the clamping nut.

115. LINE FEED CHECK LEVER (Figure 53)

With the LINE FEED combination selected and the main shaft rotated until the line feed pawl has reached its farthest travel in rotating the platen, the line feed pawl lever should be in contact with the check lever, and there should be some clearance, not more than .015", between the lower edge of the line feed check screw and the bottom of any notch in the detent ratchet. To adjust, loosen the check lever set screw and position the check lever. (See Figure 50 for location of parts.) Before tightening the set screw see that the shaft has some end play, not more than .008".

NOTE

When checking the clearance between the check screw and the ratchet, the play of the line feed check lever shaft in its right bearing should be taken up to make this clearance a maximum.

116. LINE FEED CHECK LEVER SPRING TENSION (Figure 50)

With the line feed pawl in the forward position, hook an 8 oz. scale under the head of the check lever set screw and pull at right angles to the set screw. It should require 2 to 3 ozs. to start the lever moving.

117. PRESSURE ROLLER RELEASE SHAFT COLLARS (Figure 54) - See Note (F) On Page 1-4

The pressure roller release shaft should have some end play, not more than .004". With the right collar against the casting, there should be 5/32" to 7/32" clearance between the boss just to the rear of the platen shaft boss and the pressure roller release shaft arm when the arm is opposite the boss. Adjust the clearance of the release shaft arm by means of the right locating collar and adjust the end play by means of the left locating collar.

118. PRESSURE ROLLER RELEASE CAMS (Figure 55) - See Note (F) On Page 1-4

a. On units equipped with six pressure rollers, the following applies. With the pressure roller release shaft arm in its rear position, the camming surfaces should line up with the release levers. With all the travel of the front pressure rollers taken up manually in a downward direction, (so that the rear pressure rollers are resting against the platen), there should be at least

.060" between the front pressure rollers and the platen. With all the travel of the rear pressure rollers taken up manually in a downward direction, (so that the front pressure rollers are resing against the platen), there should be at least .060" between the rear pressure rollers and the platen. To adjust, position the cams on the release shaft by means of their set screws.

b. On units equipped with one pressure roller, the following applies. With the pressure roller release shaft arm in its rear position, the pressure roller should be from .015" to .050" away from the platen. To adjust position the cams on the release shaft by means of their set screws.

119. PRESSURE ROLLER SPRING TENSION (Figure 55) - See Note (F) On Page 1-4

With the release shaft arm in its forward position, hook a 12 lb. scale over the lower end of the spring adjusting lever, just above the spring, and pull in line with the spring. It should require 5 to 6 lbs. to start the adjusting lever moving. Adjust by means of the spring adjusting lever screw.

120. PRESSURE ROLLER RELEASE LEVER SHAFTS

With the inner surfaces of the two paper chute mounting extensions touching the outer bosses of the two release lever shafts, the left end of the left release lever shaft (viewed from the rear of the printer) should project beyond the outer surfaces of the left paper chute mounting extension and butt against the platen bracket. The outer end of the right release lever shaft should project beyond the outer surface of the right paper chute extension by not more than 3/64" to 3/32". To adjust, position the release shafts by means of their set screws. (See Figure 54 for location of parts.)

121. PAPER CHUTE SPRING TENSION (Figure 56B) - See Note (F) On Page 1-4

With the pressure roller release shaft arm in its rear position, hook an 8 oz. scale over the rear edge of the paper chute, midway between the side frames, and pull at right angles to the rear flat surface. It should require 2 to 7 ozs. to start the paper chute moving.

122. PAPER CHUTE (See Note (F) On Page 1-4

With one side of the paper chute touching its associated end boss on the platen cross bar, the other side of the chute should touch or be within .004" of touching its associated end boss; also, when one or both sides of the paper chute are touching their associated end bosses on the platen cross bar, there should be some clearance, not more than .020", between the front edge of the paper chute and the surface of the platen. To adjust, bend the chute manually to meet the above requirements. (Rotate the platen shaft to see that the paper chute does not bind the platen.)

123. PAPER FINGERS (Figure 56B) - See Note (F) On Page 1-4

The paper finger shaft stop arm should clear its stop post .004" to .020" with both paper fingers resting against the platen. When paper 8-1/2" wide is used, the outer edge of the lower portion of each finger should be within 3/32" of the end of the rubber portion of the platen and should not extend beyond the end of the rubber portion. When paper narrower than 8-1/2" is used, the left finger should be moved inward correspondingly. To adjust, first set the lateral position of the right paper finger and secure it to the shaft by means of its set screw with the specified clearance between the stop arm and the stop post. Then set the left paper finger to correspond to the width of the paper.

124. PAPER FINGERS SHAFT SPRING TENSION (Figure 56B) - See Note (F) On Page 1-4

Hook a 32 oz. scale over the paper finger shaft stop arm, just above the stop post, and pull in line with the spring. It should require 16 to 22 ozs. to start the stop arm moving.

125. PAPER STRAIGHTENER ROD STOPS (Figure 56B) - See Note (F) On Page 1-4

When the paper straightener rod is in its extreme upward position, there should be a clearance of .030" to .050" between the straightener rod and the blocking edge of the stops. To adjust, position the stops by means of their elongated holes.

126. PAPER STRAIGHTENER ROD SPRING TENSION (Figure 56B) - See Note (F) On Page 1-4

Hook a 32 oz. scale over the ends of the paper straightener rod levers, where the springs are hooked, and pull in line with the springs. It should require 8 to 12 ozs. to start the levers moving.

127. PAPER GUIDES (Figure 56A) - See Note (F) On Page 1-4

The outer sides of both paper guides should be .040" to .050" from the shoulder on their respective ends of the straightener rod. To adjust, position the guides on the shaft by means of their set screws.

128. SPACING ESCAPEMENT PAWL OPERATING ARM (Figure 57)

With the LINE FEED combination selected and the main shaft rotated until the function lever bail rests on the line feed function lever, there should be .020" to .040" clearance between the rear spacing escapement pawl and the low part of the spacing escapement ratchet. To adjust, loosen the spacing escapement pawl operating arm mounting screws and position the arm. Tighten the mounting screws.

NOTE

On units equipped with a horizontal tabulator mechanism having the adjustable front spacing escapement pawl, perform the following adjustment at this time. (1) Front Spacing Escapement Pawl - Paragraph 278.

129. SPACING ESCAPEMENT PAWL SPRING TENSION (Figure 57)

Rotate the main shaft until the printing bail is in its extreme rear position. Hook a 32 oz. scale under the front spacing escapement pawl at the place where it rests against the escapement pawl operating arm, and pull vertically upward. It should require 10 to 14 ozs. to start the pawl moving.

130. MARGIN BELL HAMMER (Figure 58)

With the bell hammer arm resting against the stop post, there should be .020" to .060" clearance between the bell and the bell hammer. To adjust, loosen the margin bell hammer bracket mounting screws and shift the bracket; if this does not give the required clearance, then bend the bell hammer arm along its entire length, avoiding a sharp bend at any point.

131. MARGIN BELL HAMMER SPRING TENSION (Figure 58)

Hook a 32 oz. scale over the bell hammer arm, directly below the spring, and pull in line with the spring. It should require 10-1/2 to 13-1/2 ozs. to start the arm moving.

132. SIGNAL BELL HAMMER SPRING TENSION (Figure 59A)

With the bell latch bar in its latched position, hook an 8 oz. scale over the upper end of the bell hammer arm extension and pull at right angles to the inner straight edge of the extension. It should require 3 to 5 ozs. to start the bell hammer moving.

133. SIGNAL BELL LATCH BAR LATCH SHIMS (Figure 59A)

a. Set the typing unit on its right side. With the platen in the UNSHIFT position (down), the BELL combination selected and the main shaft rotated until the printing bail is in its extreme forward position, there should be .004" to .010" clearance between the bell latch bar and the lobe on the rear extension of the bell function lever. When checking this clearance, the front shoulder of the bell latch bar should be fully latched on its latch.

NOTE

On typing units which ring the bell on BLANK, set up the letter T combination and rotate the main shaft until the printing bail is in its extreme forward position.

b. To adjust, add or remove shims between the latch and the function lever comb.

134. SIGNAL BELL LATCH BAR LATCH (Figure 59A)

With the main shaft rotated until the function bail is in its extreme rear position, there should be a clearance of .010" to .020" between the front shoulder of the bell latch bar and its latch. When checking this clearance, the shoulder on the bell reset bar should be fully engaged with the function bail blade. To adjust, position the bell latch bar latch toward the front or rear by means of its elongated mounting holes.

135. SIGNAL BELL HAMMER BACKSTOP (Figure 59A)

With the bell latch bar in its latched position, there should be .020" to .040" clearance between the bell hammer arm extension and the bell operating lever. To adjust, position the bell hammer backstop by means of its elongated mounting holes.

136. SIGNAL BELL OPERATING LEVER SPRING TENSION (Figure 59A)

Remove the bell reset bar spring. With the rear shoulder of the bell latch bar resting against the bell latch bar latch, hook a 4 lb. scale under the head of the bell operating lever screw and pull parallel to the latch bar. It should require 1-1/4 to 2-1/4 lbs. to start the lever moving. Replace the bell reset bar spring.

137. SIGNAL BELL RESET BAR SPRING TENSION (Figure 59B)

Rotate the main shaft until the function bail is in its extreme forward position. With the front shoulder of the bell latch bar resting against the latch, hook an 8 oz. scale over the bell reset bar just in front of the shoulder and pull at right angles to the reset bar. It should require 3 to 5 ozs. to start the reset bar moving.

138. BELL FUNCTION LEVER SPRING TENSION (Figure 59A)

Select any character and rotate the main shaft until the bell function lever rests against the vanes but is not selected. Hook a 4 lb. scale over the rear extension of the bell function lever just in front of the lobe that engaged the bell latch bar, and pull at right angles to the lever. It should require 1-3/4 to 2-1/4 lbs. to start the lever moving.

139. CARRIAGE RETURN LATCH BAR LATCH SHIMS

With the letter O combination selected and the main shaft rotated until the printing bail is in its extreme forward position, there should be .004" to .010" clearance between the carriage return latch bar and the lobe on the rear extension of the carriage return function lever. When checking this clearance, the shoulder on the carriage return latch bar should be fully latched on the latch. (Similar to "Bell Latch Bar Latch Shims Adjustment" Figure 59A.) To adjust, add or remove shims between the carriage return latch bar latch and the function lever comb. (See figure 60 for location of parts.)

140. CARRIAGE RETURN LATCH BAR LATCH

With the main shaft rotated until the function bail is in its extreme rear position, there should be .010" to .020" clearance between the shoulder on the carriage return latch bar and the latch. When checking this clearance, the shoulder on the carriage return reset bar should be fully engaged with the function bail blade. (Similar to "Bell Latch Bar Latch Adjustment" Figure 59A.) To adjust, position the latch to the front or rear by means of its elongated mounting holes. (See Figure 60 for location of parts.)

141. CARRIAGE RETURN LOCK BAR LATCH ECCENTRIC SCREW (Figure 60B)

With the front end of the dashpot lever held in its extreme left position, there should be .006" to .020" clearance between the lower edge of the lock bar. When checking this clearance, all the play between the lock bar and the shoulder stud should be taken up in a direction to make this clearance a minimum. Adjust by means of the lock bar latch eccentric screw.

NOTE

There are two positions of the eccentric screw at which the proper adjustment can be obtained. Use the position which gives the greater tension to the latch spring.

142. CARRIAGE RETURN LOCK BAR LATCH SPRING TENSION (Figure 60B)

With the carriage return lock bar latch unlatched (resting on the upper part of the carriage return lock bar), hook a 32 oz. scale over the latch just below the spring and pull parallel to the lock bar. It should require 7 to 10 ozs. to start the latch moving.

143. CARRIAGE RETURN LOCK BAR (Figure 60A)

With the carriage return lock bar in its latched position and the shoulder of the lock bar held against the edge of the latch, there should be a clearance of .010" to .020" between the teeth of the carriage return clutch members. Adjust the length of the lock bar by means of its sliding joint to obtain this clearance.

NOTE

Before making the foregoing adjustment, place the typing unit on its back. Rotate the spacing shaft until the mounting screw of the carriage return clutch driven member is accessible. Operate the dashpot lever to engage the clutch teeth. Loosen the mounting screw and rotate the spacing gear in a clockwise direction (as viewed from the lower end of the shaft) until all the play between the clutch driven member and its mounting screw has been taken up. Tighten the mounting screw.

144. CARRIAGE RETURN OPERATING LEVER STOP SCREW (Figure 60B)

With the typing unit in its normal upright position, select the "CARRIAGE RETURN" combination and rotate the main shaft until the carriage return function lever just trips the carriage return latch bar off its latch. There should be from .002" to .020" clearance between the lock bar shoulder and the inner edge of the lock bar latching lever. When making this adjustment all the play in the mechanism should be taken up in a direction to make the clearance a minimum. This can best be done by applying the hook end of an 8 oz. scale on the lock bar and by pulling and holding the lock bar outward with a tension of 6 ounces. To adjust, set the height of the carriage return operating lever stop screw.

145. CARRIAGE RETURN RESET BAR SPRING TENSION (Figure 60A)

With the typing unit resting on its right side, the function bail in its extreme forward position, and the carriage return latch bar tripped off its latch, hook an 8 oz. scale over the reset bar just in front of the shoulder and pull horizontally at right angles to the reset bar. It should require 3 to 5 ozs. to start the reset bar moving.

146. CARRIAGE RETURN FUNCTION LEVER SPRING TENSION (Figure 60A)

With any character selected and the main shaft rotated until the carriage return function lever is resting against the vanes but not selected, hook a 4 lb. scale over the rear extension of the function lever just in front of the lobe that engages the latch bar, and pull at right angles to the lever. It should require 1-3/4 to 2-1/4 lbs. to start the lever moving.

147. CARRIAGE RETURN OPERATING LEVER SPRING TENSION (Figure 60A)

With the shoulder of the carriage return latch bar against its latch, and the carriage return operating lever spring unhooked from the spring post, hook a 12 lb. scale in the spring eye. It should require 5 to 7 lbs. to extend the spring to position length.

148. CARRIAGE RETURN CLUTCH SPRING COMPRESSION

With the shoulder of the carriage return latch bar resting against its latch and the carriage return lock bar latch held away from the lock bar, apply a 12 lb. push scale to the end of the carriage return clutch fork to which the latch link is assembled and push downward as nearly in line with the latch link as possible. It should require 1-1/2 to 2-1/2 lbs. to start the driving clutch member moving away from the driven member. (See Figure 60 for location of parts.)

NOTE

On units equipped with the automatic carriage return and line feed mechanism, perform the following adjustments at this time.

(1) Carriage Return Latch Bar Latch Shims - Paragraph 291.
(2) Carriage Return Function Lever Eccentric Screw - Paragraph 292.
(3) Operating Bail Line Feed Extension - Paragraph 293.
(4) Automatic Carriage Return and Line Feed Function Lever Eccentric Screw - Paragraph 294.
(5) Mounting Bracket - Paragraph 295.
(6) Trigger Guide - Paragraph 296.
(7) Trigger Adjustable Screw - Paragraph 297.
(8) Carriage Return and Automatic Carriage Return and Line Feed Function Levers Spring Tensions - Paragraph 298.
(9) Trigger Spring Tension - Paragraph 299.
(10) Bell Crank Retainer Yield Lever Spring Tension - Paragraph 300.

149. DASHPOT LEVER SPRING TENSION

Unhook the dashpot lever spring from the spring post in the dashpot lever and hook a 32 oz. scale in the spring eye. With the front end of the dashpot lever in its extreme right position, it should require 16 to 22 ozs. to extend the spring to its position length.

150. SPACING STOP LEVER BRACKET (Figure 61)

The lower end of the spacing stop lever should clear the driving disc of the main shaft .060" to .080". With the spacing stop lever held against the stop on the bracket by means of its spring, there should be a clearance of .040" to .080" between the lower left edge of the stop lever and the right side of a tooth on the spacing stop sleeve whtn the tooth is opposite the lever. Adjust the spacing stop lever bracket vertically by means of its enlarged mounting holes to meet the first requirement and adjust it horizontally to meet the latter requirement.

PLACE THE TYPING UNIT IN AN UPRIGHT POSITION

151. SPACING STOP LEVER SPRING TENSION (Figure 61)

With a 32 oz. scale held in a horizontal position and hooked over the upper end of the spacing stop lever, pull toward the right. It should require 8 to 12 ozs. to start the lever moving.

REPLACE THE TYPE BAR CARRIAGE

152. CARRIAGE GUIDE SCREWS (Figure 23)

With the type bar carriage in position on the typing unit and the printing bail in its extreme rear position, there should be some clearance, not more than .008", between the upper surface of the guide screw heads and the upper surface of the groove in the front carriage track. Check for this clearance over the entire travel of the carriage. Adjust by means of the guide screws and lock nuts.

153. CODE BAR BELL CRANKS

a. The code bars should be carried firmly against their stops in both the MARKING and SPACING positions when the UNSHIFT and BLANK combinations are alternately selected and the main shaft is rotated until the function levers are lifted free from the rear edges of the vanes. With the UNSHIFT combination selected, move the vanes, one by one, from the marking position to the spacing position and allow them to return to the marking position slowly. Note any of the code bars which are not carried firmly against their stops. (See Figure 62 for location of parts.)

b. Set up the BLANK combination on the selector and repeat the foregoing procedure. Again note any of the code bars which are not carried firmly against their spacing stops. If it is found that all the code bars are carried against their stops in the spacing position and not in the marking position, or vice versa, it will be necessary to loosen the mounting screws and adjust the position of the bell crank mounting plate (up and down). If the plate is moved upward, the code bars may be caused to move farther toward the left, which is their marking position. If, however, it is found that only one or two of the code bars fail to be carried firmly against their stops in both the marking and spacing positions, the travel of the code bars may be adjusted by means of the bell crank eccentric bushings.

c. When the bell crank assembly is finally adjusted, all five code bars should rest firmly against the marking and spacing stops when the vanes are in their respective marking and spacing positions. Make sure that the upper ends of the bell cranks do not engage the code bars deeply enough to bind.

154. SPACING RACK (Figure 63)

There should be some backlash, not more than .006" between the spacing gear and the spacing rack along the entire travel of the rack. To adjust, remove the type bar carriage draw strap, loosen the spacing rack mounting screws and position the rack toward the front or rear. Adjust for this backlash with the carriage in its extreme left and right hand positions and also in its center position. Tighten the mounting screws and replace the draw strap.

155. LOCKING FUNCTION LEVER SPRING TENSION (Figure 27)

Rotate the main shaft until the printing bail is in its extreme rear position. Unhook the locking function lever spring from the spring plate and hold the locking function lever against its pivoting shaft. With a 64 oz. scale hooked in the locking function lever spring eye, it should require 40 to 50 ozs. to pull the spring to position length.

156. SIXTH VANE DETENT SPRING TENSION (Figure 25)

Hook an 8 oz. scale in the sixth vane detent spring hole and pull in line with the spring toward the rear of the typing unit. It should require 6 to 8 ozs. to start the roller moving away from the sixth vane.

157. CARRIAGE RETURN SPRING DRUM

Rotate the main shaft until the printing bail is in its extreme rear position. Hook a 12 lb. scale over the lower part of the right ribbon spool bracket and pull in a line parallel to the carriage track. It should require 3-3/4 to 4-1/4 lbs. to start the carriage moving away from the extreme left position. When measuring this tension, the carriage return lock bar should be held in approximately its latched position so as to disengage the clutch teeth, and the dashpot lever should be held in its operated position. To

adjust, wind up the carriage return spring by rotating the center shaft of the drum to increase the tension, and operate the carriage return drum escapement lever to decrease the tension.

158. PAPER SPINDLE DRAG SPRING (Figure 64A) - See Note (F) On Page 1-4

Insert a paper spindle (without paper) in its bearing slots, and lock it in place with the retaining plates. With both ends of the spindle shaft at the bottom of their slots, apply the push end of a 12 lb. scale to the left end of the spindle shaft and push toward the right side of the typing unit. It should require 5 to 8 lbs. to start the spindle moving. This pressure may be adjusted by bending the spindle drag spring.

159. PLATEN FRICTION ASSEMBLY (Figure 64B) - See Note (F) On Page 1-4

Move the pressure roller release shaft arm (Figure 55) to its extreme rear position. Unhook the line feed detent lever spring (Figure 53) and place the platen crank vertically upward. Hook an 8 oz. scale at the end of the crank handle and pull horizontally toward the front of the typing unit. It should require 5 to 9 ozs. to start the platen rotating. Replace the detent lever spring. This tension may be regulated by means of the adjusting nuts on the friction assembly.

NOTE

On units equipped with a handwheel in place of the platen crank, position the handwheel so that the 1/8 inch diameter hole is located vertically above the platen shaft. Hook the spring scale in the hole and pull horizontally toward the front of the typing unit. Under these conditions the above requirements must be met.

160. SEND-RECEIVE T LEVER FRICTION WASHER (Figure 65A) - See Note (G) On Page 1-4

With the printing bail in its extreme rear position, move the T lever so as to provide .040" to .060" clearance between the T lever and the universal function lever extension. Hook an 8 oz. scale under the right extension of the T lever, just to the left of the universal function lever extension, and pull vertically upward. It should require 5 to 6-1/2 ozs. to start the lever moving. To adjust, replace the friction washer with a new one.

NOTE

On units equipped with the send-receive break mechanism operating on a double blank signal, the friction requirement of 5 to 6-1/2 ozs. may be obtained by adjusting the position of the stop nut when the send-receive "T" lever is equipped with the 119925 elastic stop nut and 71047 shim in place of the 3598 nut and 2191 lockwasher previously furnished.

161. UNIVERSAL FUNCTION LEVER SPRING TENSION (Figure 65A) - See Note (G) On Page 1-4

With the printing bail in the extreme rear position, hook a 32 oz. scale under the extreme front end of the universal function lever extension and pull vertically upward. It should require 14 to 17 ozs. to start the lever moving.

162. BLANK FUNCTION LEVER SPRING TENSION (Figure 65A) - See Note (G) On Page 1-4

With the printing bail in its extreme rear position, hook a 12 lb. scale under the extreme front end of the blank function lever extension and pull vertically upward. It should require 4-1/2 to 6 lbs. to start the lever moving.

163. SEND-RECEIVE MECHANISM PLATE (Figure 66)

With the left arm of the T lever in contact with the blank function lever extension, there should be some clearance, not more than .008", between the right arm of the T lever and the universal function lever extension when the BLANK combination is selected and the main shaft rotated until the blank function lever is completely selected, stopping rotation at the point where the function lever bail roller just leaves the cam surface of the blank function lever. (On typing units equipped with blank printing-spacing cutout function lever, it will be necessary to stop rotation of the main shaft at the point where the function lever bail comes to rest on top of the blank printing-spacing cutout function lever.) To adjust, position the send-receive mechanism plate by means of its elongated mounting holes. When making this adjustment, the intermediate lever should be clear of the blank function lever extension.

NOTE

On typing units where the blank and universal function levers are omitted, the send-receive mechanism plate should be adjusted so as to provide .020" to .030" vertical clearance between both bends of the function lever spring plate and the send-receive mechanism plate.

NOTE

On units equipped with a mechanical motor stop mechanism, perform the following adjustments at this time.
(1) Right Motor Stop Contact - Paragraph 249.
(2) Left Motor Stop Contact - Paragraph 250.

NOTE

On units equipped with a mechanical motor stop mechanism to operate on SHIFT-BLANK-STOP, perform the following adjustments at the times indicated.
(1) Adapter Plate - Paragraph 253 - at this time.
(2) Trigger Guide - Paragraph 254 - at this time.
(3) Blocking Lever Spring - Paragraph 255 - after Send-Receive Reset Lever Upper Adjusting Screw - Paragraph 167.

164. INTERMEDIATE LEVER STOP BRACKET (Figure 66) - See Note (G) On Page 1-4

First select the BLANK combination and rotate the main shaft until the intermediate lever toe is under the blank function lever extension. Make sure that the intermediate lever is approximately vertical. Then select the T combination and rotate the main shaft until the printing bail is in its extreme forward position. During this latter operation the left end of the intermediate lever toe should move to a point at least 1/16" to the right of the blank function lever extension. To adjust, position the intermediate lever stop bracket by means of its elongated mounting holes.

165. INTERMEDIATE LEVER SPRING TENSION (Figure 65A) - See Note (G) On Page 1-4

With the printing bail in its extreme rear position, move the T lever so that its right end is in contact with the universal function lever extension and hold the reset lever so that its upper edge is horizontal. Then hook an 8 oz. scale over the intermediate lever just above the spring arm and pull horizontally toward the left of the typing unit. It should require 3/4 to 1-1/2 ozs. to start the lever moving.

166. MOTOR PLATE

a. There should be a barely perceptible amount of backlash between the motor pinion and the highest point of the main shaft gear. The lateral alignment of the motor pinion and the main shaft gear should be such that the center line of the gear coincides with a vertical line through the center of the hole in the motor pinion.

b. To check for the lateral alignment, place the typing unit on an adjusted base with a motor assembly and tighten the three typing unit thumb screws. With the keyboard removed from the base, face the front of the unit and make a visual check of the alignment. To adjust, remove the typing unit from the base and loosen the four motor mounting screws. Replace the typing unit on the base and shift the motor by taking up the play in its mounting holes until the two lines previously mentioned coincide.

(1) On printers equipped with motors not having elongated mounting holes, there might be insufficient play in the mounting holes to permit proper alignment. In this case, shift the motor as far as the mounting holes will allow in order to obtain the best possible alignment.

(2) On printers equipped with motors having elongated mounting holes, shift the motor until the lines coincide as nearly as it is possible to determine by eye.

See that the edges of the motor base are parallel to the respective edges of the motor plate. Remove the typing unit and tighten the four motor mounting screws.

c. To adjust for the backlash, loosen the rear motor plate mounting screw and the lock nut on the motor plate adjusting screw. Slightly loosen the two front motor plate mounting screws. Place the typing unit on the base and tighten the three thumb screws. Position the motor plate adjusting screw to obtain the specified backlash. Start the motor and carefully reposition the adjusting screw until the gear noise is reduced to a minimum. Tighten the three motor plate mounting screws and the adjusting screw lock nut. Recheck the backlash.

CAUTION

Care should be exercised in adjusting the vertical position of the motor pinion while the motor is running in order to avoid damaging the main shaft gear or reducing the speed of the motor as a result of too close a mesh between the pinion and the gear.

NOTE

On units equipped with a mechanical motor stop mechanism, perform the following adjustments at this time.
(1) Reset Lever Lower Adjusting Screw - Paragraph 251.
(2) Reset Lever Downstop Screw - Paragraph 252.

167. SEND-RECEIVE RESET LEVER UPPER ADJUSTING SCREW (Figure 65B) - See Note (G) On Page 1-4

With the printing bail in its extreme rear position and the send-receive lever in the SEND position (up), move the toe of the intermediate lever under the blank function lever extension. Then select the T combination and rotate the motor until the intermediate lever is moved to a position where the blank function lever extension overlaps the toe of the intermediate lever by one half the thickness of the blank function lever extension. Under these conditions, there should be .004" to .006" clearance between the upper edge of the intermediate lever toe and the bottom of the blank function lever extension. To adjust, position the reset lever upper adjusting screw.

168. LEFT MARTIN ADJUSTING SCREW (Figure 60B) - See Note (F) On Page 1-4

The left edge of the letter M should print 7/8" (plus or minus 1/16") from the left edge of the platen when used as the first character in lines of 72 character length. When lines of 76 character length are required, or when adjusting typing units that print six characters to the inch instead of the standard ten, the left edge of the letter M should print 11/16" (Plus or minus 1/16") from the left edge of the platen. To adjust, turn the left margin adjusting screw inward and lock the carriage in place by operating the dashpot lever so that the carriage will be in a position to print the letter M the required distance from the left edge of the platen as specified in the foregoing. Make sure that the carriage clutch members are fully engaged. Then reposition the adjusting screw so that, when the lock nut is slightly tightened so as to take up the end play in the threads and a horizontal pull of 8 lbs. is exerted on the dashpot lever applied with a 12 lb. scale at right angles to the curved surface 1/32" behind the margin and adjusting screw, there is a slight clearance (not more than .002") between the end of the screw and the dashpot lever. Turn the left margin adjusting screw 1/6th turn in a direction to eliminate this clearance and tighten the lock nut.

NOTE

On sprocket feed printers, perform the following adjustments at this time.
(1) Platen Roller Sprocket Rings - Paragraph 232.
(2) Paper Guide Posts - Paragraph 233.

169. RIGHT MARGIN ADJUSTING SCREW (Figure 61)

The printer should normally print seventy-two characters on a line (forty-four characters for typing units that print six characters to the inch instead of the standard ten) before spacing is blocked by the spacing stop pawl. To adjust, return the carriage to the left end of the line and back off the right margin adjusting screw. Then, with the right margin adjusting screw arm in engagement with its detent, space the carriage one less space than the number of characters desired per line: that is, seventy-one spaces for normal lines of seventy-two characters. (The carriage should then be in position to print the last character for desired length of line.) Adjust the stop screw so that the spacing stop lever is moved within .015" to .030" from a projection on the spacing stop sleeve.

NOTE

When printing seventy-two, seventy-six or forty-four characters per line, pile-ups should occur on the seventy-third, seventy-seventh and forty-fifth characters respectively.

170. RIBBON OSCILLATOR LEVER

With the ribbon lockout bar in its unoperated position (pulled outward toward the right), the ribbon should fully cover any character as it is being printed and the top edge of the ribbon should not be above the bottom edge of the printed character when the printing has been completed and the main shaft clutch has disengaged. To adjust, shift the platen to the SHIFT

position (up) and loosen the ribbon oscillator lever clamping screw and nut. Position the ribbon oscillator lever and tighten the clamping screw and nut. Check this adjustment with the platen in the UNSHIFT position (down). See Figure 67.

171. RIBBON LOCKOUT BAR (Figure 68)

NOTE

This adjustment applies only to those printers equipped with the adjustable ribbon lockout bar.

a. Hold the ribbon carrier down and move the ribbon lockout bar to the left against its stop. The ribbon should be locked sufficiently below the printing line to prevent printing of any portion of the characters. To adjust, position the lockout bar extension by means of its adjusting screws so that the ribbon oscillator just fails to operate when the lockout bar is in its operated (extreme left) position and the platen is in the UNSHIFT position.

b. With the ribbon lockout bar in its operated position and with a 12 lb. scale hooked over the end of the ribbon lockout bar and pulling directly in line with the bar, it should not require more than 5 lbs. to move the lockout bar to its unoperated position.

172. SPACING CLUTCH TORQUE (Figure 69)

After the motor has run for at least ten minutes, tie the carriage return lock bar in its latched position and hook a 32 oz. scale over a tooth on the spacing escapement ratchet. With the main shaft rotating, hold off the rear escapement pawl and pull horizontally toward the rear of the unit. It should require from 18 to 24 ozs. to hold the spacing escapement ratchet stationary.

173. MARGIN SIGNAL BELL

The bell should ring on the sixty-sixth printed character for lines of seventy-two character length, on the seventieth for lines of seventy-six character length, and on the thirty-ninth for lines of forty-four character length. To adjust, return the carriage to the left end of the line. Then space the carriage sixty-six, seventy or thirty-nine spaces to the right, depending on the length of line being printed. Loosen the margin bell cam thumb screw and adjust the cam so that its right side is in contact with the margin bell pawl and tighten the thumb screw. (See Figure 58 for location of parts.)

174. SELECTOR CLUTCH TORQUE (Figure 70)

a. The torque should be measured after the motor has been running at least ten minutes. With a 32 oz. scale hooked over the selector cam sleeve stop arm, it should require a pull of 14 to 18 ozs. for 60 or 75 wpm operation and 16 to 22 ozs. for 100 wpm operation to hold the cam sleeve stationary. This clutch torque depends on the condition of the felt washers and the clutch spring.

b. On units equipped with the 72515 nut and 72517 keyed nut, the clutch torque may be adjusted by the use of shims which may be placed between the clutch spring and the 72515 nut. The selector clutch spring must be removed from the shaft in order to insert the shims. Shims are available under the following numbers.

96763 Shim (.012" thick)
96764 Shim (.016" thick)
96765 Shim (.020" thick)

c. On units equipped with a 119540 keyed nut, a 122974 capstan nut, and a 122838 spacer in place of the 72515 nut and 72517 keyed nut, the torque may be regulated by positioning the capstan nut in the proper direction with a screwdriver.

NOTE

The 122974 capstan nut is split and the open ends are offset to insure a tight fit on the 119540 slotted nut. When installing the new parts in the field, the offset ends of the capstan nut must be held approximately in line by using a pair of pliers or a clamp in order to thread the capstan nut onto the slotted nut. The slotted nut can then be screwed into place on the main shaft. To prevent the capstan nut from being turned downward against the bearing, the 122838 spacer should be installed between the slotted nut and the bearing.

175. BAIL CAM UNIT FRICTION CLUTCH TORQUE (Figure 70)

Remove the function bail spring and hold the printing bail away from its adjusting screw. With the printer running on a closed line, hook a 32 oz. scale over the screw head on the cam unit and pull horizontally at right angles to the main shaft. It should require 20 to 24 ozs. to move the cam in a direction opposite to its normal direction of rotation.