

TELETYPE

PRINTING TELEGRAPH SYSTEMS

ADJUSTMENTS
TYPING REPERFORATOR

(FPR5H AND FPR26GS)

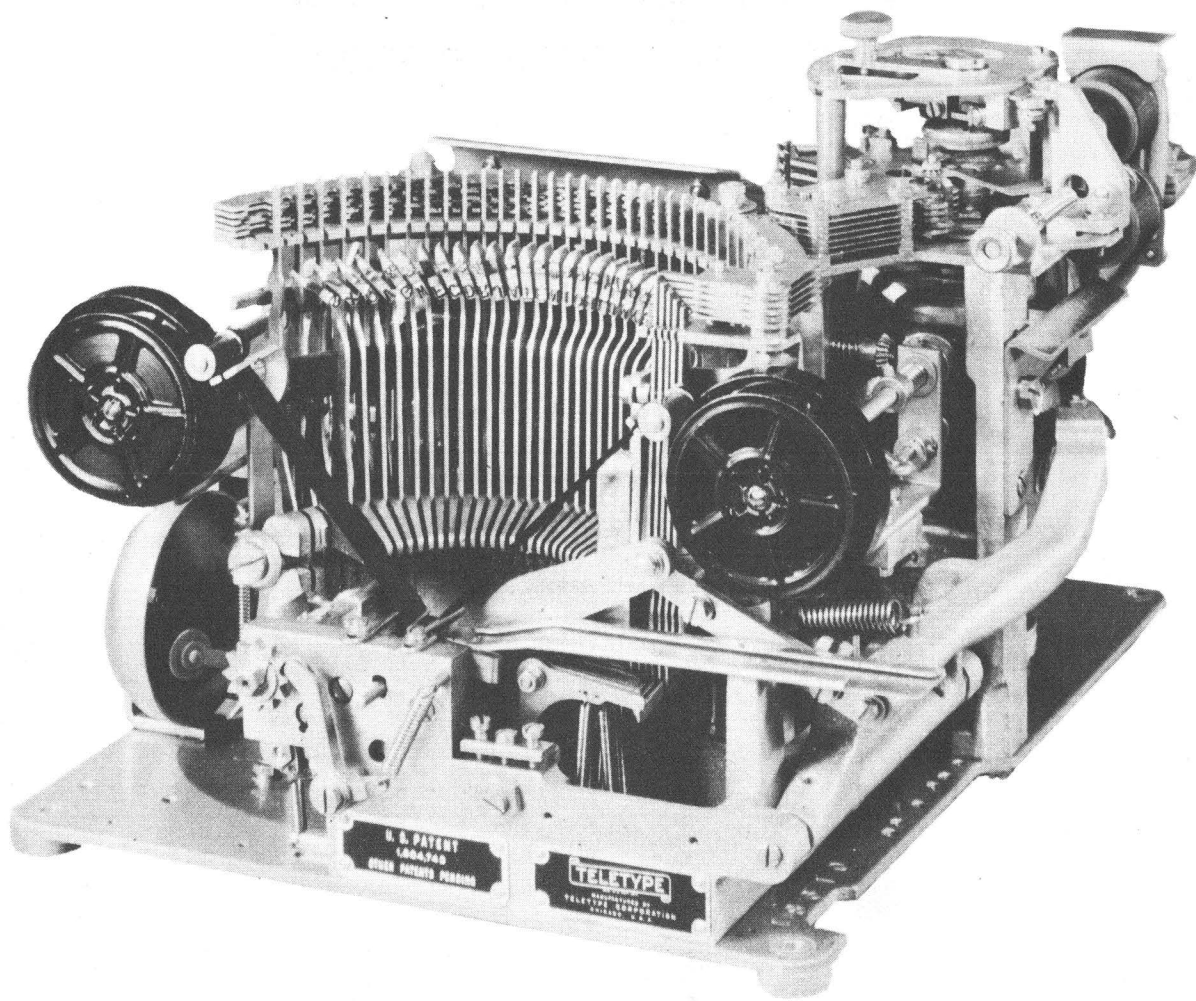


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C O N T E N T S

ADJUSTMENTS

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WIRING DIAGRAMS

WD-1978-A for FPR-5H
WD-2299-D for FPR26GS



ADJUSTMENTS

GENERAL

This bulletin contains requirements and adjusting procedures for the maintenance of typing reperforators. Adjustments 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 one adjustment is changed, related adjustments should be checked because a change in one adjustment may affect related adjustments. These facts should be kept in mind when a single adjustment is to be made.

The spring tension values given 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 parts bulletin.

Before proceeding to adjust any part, read the description of the adjustment 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.

Care should be exercised in removing or installing the cover to avoid damaging parts in close proximity. As a precaution, see that the platen is latched in the "letters" position, and raise or lower the cover slowly with a vertical movement. In handling the receiving unit, use the handles provided under the left-hand ribbon spool bracket and above the punch arm cam roller.

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

MISCELLANEOUS INSTRUCTIONS

(A) TO ADJUST MOTOR SPEED

Synchronous motors do not require governors because they are constant speed motors. The speed of a governed motor may be checked by viewing the target on the motor governor through the vibrating shutters of a speed indicator (tuning fork) provided for this purpose.

With the motor running and the target well illuminated, tap the speed indicator lightly to make it vibrate and hold it so that the shutters are close to the eye. If the motor is running at the correct speed, the target will appear stationary. If the motor speed is too fast, the target will appear to be moving in the direction of rotation; and if too slow, in the opposite direction.

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 speed indicator shutters. This should be kept in mind if trouble is experienced in the operation of the unit.

When increasing or decreasing the motor speed, the speed adjusting lever or the governor adjusting bracket respectively should be "momentarily" depressed. See Figure 46 for location of parts.

(B) TO MEASURE RECEIVING RANGE

Mounted above the main shaft of the typing reperforator is the range finder assembly which is used for the purpose of orientating the selector to the incoming signals.

Before proceeding to measure the receiving range, turn the selector armature spring adjusting screw to a position where it will require 6 to 6-1/2 ounces to stretch the armature spring to its position length. Then transmit "RY" (the letters "R" and "Y" sent alternately) to the printer continually while the receiving range is being determined. This procedure is described in the following paragraphs:

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.

NOTE: When determining the limits of orientation, operation is generally assumed to be correct when two 72 character lines are received with only one error.

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.

Turn the armature adjusting screw in a clockwise direction until errors appear in the copy. Then, from this point, count the number of turns the adjusting screw can be turned in a counterclockwise 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, or the middle of the armature spring range, and lock the adjusting screw with its lock nut. 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.

The orientation range should be rechecked after the armature spring range has been determined.

NOTE: If facilities for transmitting biased test signals to the receiving unit are available, the index arm should be set at the optimum setting for the reception of biased signals.

(C) TO SELECT A CHARACTER OR A FUNCTION

When the instructions for making an adjustment specify the "setting up" of a certain character or function, the following method should be used: Rotate the motor fan or governor counterclockwise, as viewed from the fan or governor end, until the locking lever (See Figure 10) is about to drop off the long high part of the locking cam. Move the armature extension to the operated (marking) or unoperated (spacing) side in accordance with the first selecting impulse of the code combination to be set up. Refer to the code chart, Figure 1. Hold the armature extension or the selector arm extension in this position, and again rotate the motor fan or governor until the top (No. 1) selector sword has been positioned and the locking lever is on a peak of the locking cam. Position the armature extension or the selector arm extension in accordance with the second impulse of the code combination to be set up and repeat the procedure followed in positioning the top (No. 1) selector sword. Position all of the selector swords following the foregoing procedure. When all swords have been positioned and the main clutch has been engaged, further rotation of the motor fan or governor will cause the unit to select the character or to perform the function which has been "set up."

(D) TO REMOVE A TYPE BAR

Remove the ribbon and ribbon guide. Remove the platen guide shaft from the platen block (Figure 30). Push the platen block toward the rear and rotate it clockwise out of the path of the type bars. To remove a type bar, pull it forward and downward as far as it will go and lift its pivoted end from the type bar segment. In case it cannot readily be disengaged from the bearing rod or if it is one of the type bars at the extreme left-hand end of the type bar segment, back off the retaining screw at the left end of the type bar bearing rod, not more than one full turn, in order to facilitate the removal of the type bar.

To replace a type bar, reverse the procedure followed in removing it, lifting the pull bar to engage the bottom tooth in the type bar with the bottom notch in the pull bar. When the pull bar is properly engaged with the type bar, the top of the pull bar will be in line with the other pull bars, when the type bar is resting against the type bar backstop. After replacing the type bars, tighten the bearing rod retaining screw moderately tight and replace the ribbon guide and ribbon.

MAIN SHAFT ADJUSTMENT

The cams on the selector cam sleeve (Figure 2) should line up with their associated selector levers. To check this alignment, rotate the selector cam sleeve at least one complete revolution. To adjust, loosen the four screws that hold the main shaft bearing caps and set the position of the main shaft. Then tighten the screws.

MAIN SHAFT CLUTCH THROWOUT LEVER ADJUSTMENT (Figure 2)

The clutch throwout lever should be free on its bearings with no perceptible end play and there should be .010" to .020" clearance between the

ends of the clutch teeth when the members are fully disengaged. To adjust, position the clutch throwout lever upper pivot screw and adjust the lower pivot screw so that the clutch throwout lever is free with no perceptible end play when the pivot screw lock nuts are tightened.

MAIN SHAFT CLUTCH THROWOUT LEVER SPRING TENSION (Figure 2)

With the clutch throwout lever resting against the lower surface of the driven clutch member, hook an 8 oz. scale over the clutch throwout lever at the spring hole and pull horizontally at right angles to the clutch throwout lever. It should require 2-1/2 to 4 ozs. to start the lever moving.

MAIN SHAFT CLUTCH SPRING TENSION (Figure 3)

With the teeth of the driven clutch member resting against the teeth of the driving member but not engaged, hook a 32 oz. scale over the throwout cam on the driven clutch member and pull as nearly in line with the shaft as possible. It should require 24 to 30 ozs. to separate the clutch teeth.

MOTOR POSITION ADJUSTMENT

There should be a barely perceptible amount of backlash between the motor pinion and the highest point on the main shaft gear. Check this backlash throughout a complete revolution of the main shaft. To adjust, position the motor by means of the motor mounting screws.

SELECTOR ARMATURE BRACKET LINK FRICTION ADJUSTMENT (Figure 4)

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.

SELECTOR LEVER SPRING TENSION (Figure 4)

With the code bars in the marking position and the main bail in its highest 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.

SELECTOR SEPARATOR PLATE ADJUSTMENT (Figure 5)

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 .045" to .055" below the under surface of the straight portions.

SELECTOR ARMATURE ADJUSTMENT (Figure 6)

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:

- (1) The No. 1 selector lever resting on the peak of its cam.
- (2) The No. 1 sword held against the upper separator plate without bending the latter.
- (3) The 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.

SELECTOR ARMATURE BRACKET LINK ADJUSTMENT (Figures 7 and 8)

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 72581 gauge pins. To adjust, proceed as follows: 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 armature bracket eccentric out of the way so that it will not interfere with the adjustment. Rotate the main shaft until No. 1 selector lever rests on the peak of its cam.

Hold the swords in a position midway between the two stop posts by means of the 72581 gauge pins inserted between the stop posts and the swords. Be sure that both the armature extension arms are between the sword arms. With the swords held in this position, place the 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. Hold the bracket in this position and tighten the link screw only. Remove the locating gauge and the two gauge pins.

SELECTOR ARMATURE BRACKET ADJUSTMENT (Figure 8)

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:

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.

Place a .040" wire gauge against the spacing stop post and move 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 within 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.

Unhook the armature spring at its adjusting screw, and with the armature in its operated (marking) position, move the marking arm of the No. 1 sword against the 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 paragraph.

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.

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 Adjustment as follows:

Loosen the armature bracket mounting screws and the armature 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 link screw and proceed to adjust the armature bracket according to the preceding paragraph.

After the bracket is set and both screws are tightened, move the bracket eccentric against the bracket and tighten the screw. The eccentric and link will, thereafter determine the position of the bracket. The bracket

may be removed by simply removing the two bracket mounting screws. In replacing, the bracket should be held against the eccentric stop, while the two bracket mounting screws are tightened.

ARMATURE STOPS ADJUSTMENT (Figure 9)

The No. 1 sword arms (right and left) should clear the associated arms of the armature extension by .040" to .042" 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, reposition the unoperated stop screw with the armature in its unoperated position. See Figure 8. To adjust the clearance of the left arm, reposition the operated stop nut with the armature in its operated position. If either clearance is changed, recheck the clearance of the other arm.

CAUTION: Be sure the stop nut is tight on its screw; pinch the hub if the nut is loose.

ARMATURE LOCKING WEDGE ADJUSTMENT (Figure 10)

There should be .008" to .012" clearance between the point of the armature locking wedge and the point of the locking lever when the two points are in line and the locking lever is on the high part of the locking cam. To adjust, position the locking wedge forward or backward in its slot in the armature extension by means of the locking wedge lock nut.

ARMATURE LOCKING LEVER SPRING TENSION (Figure 10)

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.

REMOVE THE RANGE FINDER ASSEMBLY

STOP LEVER ECCENTRIC SCREW ADJUSTMENT (Figure 11) See Note (A)

The stop lever on the range finder assembly should overtravel the latching surface of the trip latch by not more than .006". Adjust the stop lever eccentric screw to obtain this overtravel, making certain that the tightening of the eccentric screw nut does not disturb the adjustment.

STOP LEVER SPRING TENSION (Figure 12) See Note (A)

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. Make certain that the stop lever eccentric screw has been adjusted before checking this requirement.

TRIP LATCH SPRING COMPRESSION (Figure 11) See Note (A)

When measuring this requirement, the range finder assembly should be held in a horizontal position. An 8 oz. scale should be held in a vertical

* * *

NOTE (A) Check these requirements with the range finder assembly removed.

position and applied to the step of the trip latch. It should require 1 to 1 1/2 ozs. when pushing upward 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 ECCENTRIC SCREW WHEN REMOUNTING. See Figure 11.

ARMATURE TRIP-OFF ECCENTRIC SCREW ADJUSTMENT (Figure 13)

There should be some clearance, not more than .002", between the stop lever and the trip latch when the armature is in the unoperated position and the main shaft is rotated until the stopping edge of the stop lever is directly below the latching surface of the trip latch. Adjust by means of the armature trip-off eccentric screw.

NOTE: When the stop lever is against its eccentric screw and the armature is attracted, the trip latch plunger should have at least .002" end play, (see Figure 11). If the plunger does not have end play under these conditions, it may be taken as an indication that the trip-off screw or the selector magnet bracket is not properly adjusted.

SELECTOR MAGNET COIL ADJUSTMENT

The top edge of the core of the upper magnet coil should align (within 1/64") with the top edge of the armature. Adjust by means of the magnet coil mounting screws.

SELECTOR MAGNET BRACKET ADJUSTMENT (Figure 8)

There should be .002" to .007" clearance between each magnet core and the *armature antifreeze strip when the magnet coils are energized with approximately .060 amperes of current and the armature is against the operated stop nut, (marking stop). The sides of the cores should align with the edge of the armature and the ends of the cores should be parallel to the face of the armature. Adjust by means of the bracket mounting screws.

*NOTE: This clearance should be .003" to .010" when a chromium plated armature is used.

IN ORDER TO MEASURE THE "PULL BAR SPRING TENSION" OR ADJUST THE "FUNCTION BAR SPRING BRACKETS," IT IS NECESSARY TO REMOVE THE TYPE BASKET ASSEMBLY.

To do this, proceed as follows:

- (1) Unhook the code bar locking lever spring, the letters pull bar spring, and the letters-space pull bar spring.

* * *

NOTE (A) Check these requirements with the range finder assembly removed.

- (2) Remove the three type basket assembly mounting screws.
- (3) Remove the front mounting screw of the right ribbon spool bracket. Loosen the rear mounting screw and swing the bracket so that the ribbon spool cup will not interfere with the type basket.
- (4) Remove the mounting screws of the vertical lever bracket and remove the vertical lever assembly. (See Figure 33.)
- (5) Then, with the pull bars held out of engagement with the pull bar guide (use a piece of string or wire), slide the type basket assembly upward and out of the unit.

FUNCTION BAR SPRING BRACKETS ADJUSTMENT (Figure 14) See Note (B)

The pull bars supported by the function bar spring brackets should be free and without bind and they should have approximately equal clearance between the corresponding edges of the function bar spring brackets. Adjust both the right and the left function bar spring brackets by rotating them on their mounting screws.

PULL BAR SPRING TENSION (Figure 15) See Note (B)

Unhook the spring from each pull bar. With an 8 oz. scale held in a vertical position, hook the scale in the spring eye. It should require 3 to 4 ozs. to extend any pull bar spring (with associated type bar) to its position length and 5 1/2 to 6 3/4 ozs. to extend any pull bar spring (without associated type bar) to its position length.

NOTE: For adjustments of pull bar springs that are attached to either the right or left function pull bar bracket, see Letters or Code Bar Locking Lever Spring Tension Adjustments on page 13.

IF THE TYPE BASKET HAS BEEN REMOVED FOR CHECKING THE FOREGOING REQUIREMENTS, IT SHOULD NOW BE REPLACED BY REVERSING THE PROCEDURE FOLLOWED IN REMOVING IT.

PULL BAR GUIDE ADJUSTMENT (Figure 16)

With the BLANK combination set up, there should be .008" to .020" clearance between the unselected pull bars and the main bail, when the main bail is opposite the pull bar humps and the play of the main bail is taken up in a direction to make this clearance a minimum. With the LETTERS combination set up, there should be .008" to .020" clearance between the main bail and the BLANK pull bar when the main bail is opposite the pull bar humps and the play of the main bail is taken up in a direction to make this clearance a minimum.

* * *

NOTE (B) These requirements should be checked with the type basket assembly removed.

There should also be .004" to .080" clearance between the end of the No. 1 T lever and the bottom of the slot in the code bar, measured at the point of closest approach. Also see that there is some clearance between the ends of Nos. 2, 3, 4, and 5 T levers and their respective code bars measured at the point of closest approach.

To meet these requirements, adjust the position of the pull bar guide by means of its mounting screws.

MAIN BAIL ADJUSTING SCREW *PRELIMINARY ADJUSTMENT (Figure 2)

(* Main Bail Adjusting Screw Final Adjustment is on Page 15.

When the BLANK and LETTERS combinations are set up in turn and the main bail roller is on the high part of its cam, there should be .010" to .050" clearance between the unselected pull bars and the inner edges of the code bars when the play in the main bail and the pull bars is taken up in a direction to make this clearance a minimum. Adjust by means of the main bail adjusting screw.

RIBBON SPOOL CUPS ADJUSTMENT (Figure 17)

- (A) The center of the left-hand ribbon roller should be $4 \frac{11}{16}$ " to $4 \frac{13}{16}$ " from the printer base plate. To adjust, position the ribbon spool cup by means of its lock nut.
- (B) The center of the right-hand ribbon roller should be $2 \frac{3}{16}$ " to $2 \frac{5}{16}$ " from the top surface of the tape guide. To adjust, position the ribbon spool cup by means of its lock nut.

RIBBON SPOOL SHAFT GEARS ADJUSTMENT (Figure 18)

The left and right ribbon spool shafts should have some end play, not over .004". To check or change this adjustment, shift the ribbon feed shaft (Figure 22) if necessary, to avoid interference between the ribbon feed shaft gear and the ribbon spool shaft bevel gear, and push the ribbon spool shaft toward the rear of the unit. To adjust, position the ribbon spool shaft bevel gear, locating it so that the set screw engages the flat on the shaft.

RIBBON SPOOL BRACKETS ADJUSTMENT

The ribbon spool brackets should align with the edges of the base plate and there should be a minimum amount of backlash between the bevel gears on the ribbon spool shafts and the bevel gears on the ribbon feed shaft throughout a complete revolution of the ribbon spool shafts when the ribbon feed shaft is in its extreme left-hand and right-hand position, respectively. To adjust, position the ribbon spool brackets.

RIGHT RIBBON SPOOL SHAFT COLLAR ADJUSTMENT

The right ribbon spool shaft should have some end play not more than .004". To adjust, position the rear collar on the right ribbon spool shaft.

RIBBON SPOOL SHAFT COMPRESSION SPRING ADJUSTMENT (Figure 18)

Move the ribbon feed shaft to its left-hand position. Hook an 8 oz. scale over the pin in the right ribbon spool shaft and pull horizontally at right angles to a line through the center of the pin and the center of the ribbon spool shaft. It should require 2 1/2 to 5 ozs. to start the ribbon spool shaft moving. The proper compression of the ribbon spool shaft spring can be obtained by means of the spring adjusting collar. Move the ribbon feed shaft to its right-hand position and adjust the left-hand compression spring in the same manner.

RIBBON SPOOL SHAFTS SLOT ADJUSTMENT

The ribbon spools should be held firmly in place on the ribbon spool shafts. To adjust, spread the prongs at the end of the ribbon spool shafts. (See Figure 19).

LEFT RIBBON REVERSE ARM SHAFT ADJUSTMENT (Figure 19)

- (1) The front end of the left ribbon reverse arm shaft should clear the left ribbon spool cup by .005" to .025" when the ribbon reverse arm is held against the bracket to make the clearance a minimum. To adjust, position the ribbon reverse arm on the ribbon reverse arm shaft by means of its set screw.
- (2) With the left ribbon reverse arm in the normal position against the ribbon spool cup, the left ribbon reverse arm shaft should have some end play, not more than .004". To adjust, position the collar on the shaft by means of its set screw and locate the set screw so that it is easily accessible.

RIGHT RIBBON REVERSE ARM SHAFT ADJUSTMENT

- (1) There should be some clearance, not more than .004" between the front end of the right ribbon reverse arm shaft and the ribbon spool, when the ribbon reverse shaft collar is held against the bracket. To adjust, position the collar on its shaft by means of its set screw.
- (2) The rear of the slot in the right ribbon reverse arm should be in line with or slightly behind the rear flange of the ribbon spool cup roller. To adjust, position the right ribbon reverse arm on the ribbon reverse arm shaft by means of its set screw.

RIBBON REVERSE PAWL LINK ADJUSTMENT (Figure 20)

There should be .015" to .025" clearance between both right and left ribbon reverse pawls and the ribbon reverse bail, when the ribbon reversing arms are against the ribbon spool cups and the ribbon reverse bail is opposite each ribbon reverse pawl. The ribbon reverse pawl links should not bind on their shoulder screws. To adjust, position the ribbon reversing arms on their shafts by means of their set screws.

RIBBON FEED SHAFT SAFETY SPRING COMPRESSION (Figure 21)

With the main bail in its extreme upper position, slide the ribbon feed shaft to its left-hand position. Apply the push end of a 12 lb. scale to the upper end of the right ribbon reverse pawl, and push down vertically. It should require 3 to 5 lbs. to start the spring collar moving.

NOTE: When measuring this tension, hold the ribbon feed shaft to prevent it from moving. Slide the ribbon feed shaft to its right-hand position and check the ribbon feed shaft left safety spring in a similar manner.

REMOVE THE RIBBON FEED PAWL AND RIBBON CHECK PAWL (Figure 24)

RIBBON FEED SHAFT DETENT PLUNGER SPRING COMPRESSION (Figure 22)

With the ribbon feed shaft in its left-hand position, apply the push end of a 12 lb. scale to the left end of the shaft and push in line with the shaft. It should require 1 1/2 to 3 1/2 lbs. to move the shaft to its right-hand position.

RIBBON FEED LEVER SPRING TENSION (Figure 23)

With the ribbon feed lever roller in the plunger indent, hook a 32 oz. scale over the top of the ribbon feed lever and pull horizontally toward the front of the unit. It should require 12 to 18 ozs. to start the lever moving.

REPLACE THE RIBBON FEED PAWL AND THE RIBBON CHECK PAWL

RIBBON CHECK PAWL ADJUSTMENT

The upper end of the ribbon check pawl (figure 24) should be 3/64" to 5/64" from the top surface of the main bail bracket. To adjust, position the ribbon check pawl by means of its mounting screw.

RIBBON CHECK PAWL SPRING PRESSURE ADJUSTMENT (Figure 24)

With an 8 oz. scale hooked over the extreme lower end of the ribbon check pawl and pulled at right angles to the pawl, it should require 6 to 8 ozs. to start the pawl moving away from the ratchet. Make certain that the working edge of the pawl does not bind against a tooth on the ratchet when taking this pressure. To adjust, bend the ribbon check pawl.

RIBBON FEED PAWL ADJUSTMENT

The ribbon feed pawl (Figure 24) should be so positioned that the ribbon feed ratchet will be moved one or two teeth for every revolution of the main shaft. Make this check throughout a complete revolution of the ribbon feed shaft. To adjust, position the ribbon feed pawl by means of its mounting screw.

RIBBON FEED PAWL SPRING PRESSURE ADJUSTMENT (Figure 24)

With the main shaft in its stop position, rotate the shaft sufficiently to make certain that the feeding edge of the pawl does not bind against the face of a tooth on the ratchet, hook an 8 oz. scale over the extreme front edge of the ribbon feed pawl and pull at right angles to the pawl. It should require 6 to 8 ozs. to start the pawl moving away from the ribbon feed ratchet. To adjust, bend the ribbon feed pawl spring.

RIGHT AND LEFT RIBBON REVERSE PAWLS SPRING TENSION (Figure 21)

With the ribbon feed shaft in its left-hand position, hook an 8 oz. scale over the spring post on the left ribbon reverse lever and pull in line with the spring. It should require 2-1/2 to 3-1/2 ozs. to start the lever moving. Move the ribbon feed shaft to its right-hand position and check the right ribbon reverse pawl spring in the same manner.

LETTERS PULL BAR SPRING TENSION ADJUSTMENT (Figure 25)

With the main bail in its extreme downward position, hook an 8 oz. scale over the LETTERS pull bar, just below the hump, and pull horizontally at right angles to the pull bar. It should require 1 to 1-1/2 ozs. to start the pull bar moving. Adjust the position of the spring bracket by means of its lock nut to meet this requirement.

CODE BAR LOCKING LEVER SPRING TENSION ADJUSTMENT (Figure 26)

With the main bail in its extreme upward position and the code bar bell cranks (Figure 36) held away from the code bar locking lever, hook an 8 oz. scale over the code bar locking lever just above the No. 1 code bar and pull horizontally at right angles to the locking lever. It should require 3-1/2 to 5 ozs. to start the locking lever moving. Adjust the position of the spring bracket by means of its lock nut to meet this requirement.

PUNCH ARM ADJUSTMENT (Figure 27)

- (A) There should be approximately equal clearance between the ends of the punch arm and the lock nuts of the pilot screws.
- (B) The punch arm should have some end play on its pilot screws, not over .005".

Adjust both pilot screws to meet the first requirement. Adjust the front pilot screw only to meet the latter requirement. Tighten both lock nuts.

PUNCH BAIL FRONT PIVOT BEARING ADJUSTMENT

The punch selector fingers should be positioned to meet the following requirements:

- (A) As viewed from the left, with the punch selector fingers held against their respective punches, the rear edge of the rear finger and the front edge of the front finger should be within the outer edges of their respective punches. See Figures 28 and 29 for location of parts.

- (B) As viewed from the left, there should be some clearance, not more than .003", between the rear selector finger and its punch when the front selector finger just touches its associated punch.

To adjust, loosen the front pivot bearing screw lock nut and tilt the front pivot bearing plate to the left or right by means of the tilt and clamp screws, to meet the first requirement. To meet the latter requirement, operate the punch bail by hand until the punch selector fingers almost touch the punches and position the front pivot bearing plate vertically by means of the tilt and clamp screws so that, when the front selector finger just touches its punch there will be some clearance, not more than .003", between the rear selector finger and its associated punch. Recheck (a). Then tighten the front pivot bearing screw lock nut.

PUNCH BAIL END PLAY ADJUSTMENT

The punch bail should have some end play on its pivot bearing screws, not over .005". Adjust by means of the front pivot bearing screw. See Figures 28 and 29 for location of parts.

FEED ROLL BEARING BUSHING ADJUSTMENT (Figure 30)

With the feed roll detent, the feed pawl, and the tape tension lever held away from the feed roll, the feed roll should turn freely in its bearings and should have some end play, not over .004". To adjust, first position the rear bearing bracket on its mounting screws to provide freedom of rotation and then adjust the bearing bushing in this bracket to provide end play.

TAPE TENSION LEVER STUD ADJUSTMENT (Figure 31)

The tape tension lever should be centrally located with respect to the feed roll pins so that the tape tension lever does not touch the pins when play in both the feed roll and the tape tension lever is taken up in opposite directions. Adjust by adding or removing shims between the shoulder on the tape tension lever stud and its mounting bracket.

FEED ROLL DETENT PRELIMINARY ADJUSTMENT (Figure 32)

With the punch bail in its operated position, insert the 73517 feed roll positioning gauge in the punch block guide slot so that the projection on gauge stops against the feed hole punch. The position of the feed roll should be such that a pin on the feed roll lines up with the center hole of the gauge. To adjust, position the feed roll by means of the feed roll detent eccentric, (Figure 28) locating the eccentric so that the high part is toward the left.

FEED PAWL ECCENTRIC *PRELIMINARY ADJUSTMENT (Figure 33)

*NOTE: Feed Pawl Eccentric Final Adjustment is on Page 17.

With the punch arm cam roller on the low part of its cam, the feed pawl should rest in the bottom of the notch which is just below the horizontal center line of the feed roll. Adjust by means of the feed pawl eccentric, locating it so that the high part of the eccentric is toward the left.

FEED PAWL SPRING TENSION (Figure 33)

With the main bail cam in the stop position, hook an 8 oz. scale over the feed pawl just above the curved bearing portion shown in the figure and pull horizontally toward the left. It should require 2 to 4 ozs. to start the feed pawl moving away from the feed roll.

CODE BAR BELL CRANK ADJUSTMENTS (Figure 34)

- (A) The code bars should move freely between the code bar bell crank separator plates.
- (B) The code bar bell cranks illustrated in Figure 34-A should meet the following requirement: With the code bars positioned for BLANK selection, rotate the motor flywheel until the right ends of the code bars and the adjacent parallel edges of the code bar bell cranks are at the point of closest approach. Under this condition the clearance at this point should be .010" to .030".
- (C) The code bar bell cranks illustrated in Figure 34-C should meet the following requirement: With the code bars positioned for BLANK selection and the locking lever resting against the code bars, there should be .010" to .030" clearance between the right ends of the code bars and the adjacent edges of the associated code bar bell cranks.

To adjust, make certain that the vertical lever bracket is mounted approximately in a vertical position and align the code bar bell cranks with the code bars by adding or removing shims between the lower separator plate and the shoulder on the pivot post to meet the first requirement. The latter requirement may be met by loosening the pivot post lock nut and moving the pivot post horizontally in the elongated mounting hole in the vertical lever bracket. Tighten the pivot post lock nut.

NOTE: When making the foregoing adjustments, make certain that the extension on each code bar bell crank fully engages the vertical lever and at the same time does not overlap sufficiently to interfere with the adjacent vertical lever.

Likewise, each code bar bell crank should fully engage the end of the associated vertical lever (vertically) but the upper end of any vertical lever should not interfere with the free movement of the code bar bell crank immediately above the one with which that vertical lever cooperates.

MAIN BAIL ADJUSTING SCREW FINAL ADJUSTMENT (Figure 34-B or 34-D)

With the code bars positioned for LETTERS selection and the main bail roller on the high part of its cam, there should be at least .010" clearance between the front edges of the code bars and the adjacent edges of the code bar bell cranks. To obtain this clearance, readjust the main bail adjusting screw, (Figure 2) keeping within the previously specified limits of .010" to .050" between the pull bars and code bars.

VERTICAL LEVER PIVOT SCREW ADJUSTMENT (Figure 33)

With the code bars positioned to the right (letters combination), and the code bar bell cranks resting against the code bars, the right edge of the punch engaging projection on the punch selector fingers should be in approximate alignment with the right edges of the punches, when all play in the associated parts is taken up by pressing the punch selector fingers lightly toward the left. To adjust, position the vertical lever pivot screw in its mounting slot.

PUNCH SELECTOR FINGER BACKSTOP ADJUSTMENT

- (A) When the punch selector fingers are held to the right against the backstop, the left ends of the punch selector fingers should engage the guide comb in the left end of the punch bail by not less than one-half the thickness of the comb. See Figure 33 for location of parts.
- (B) When the main bail is in its lowest position, there should be some clearance between the backstop and the right end of all punch selector fingers. To adjust, position the punch selector finger backstop by means of its mounting screws in the elongated mounting holes.

IN ORDER TO CHECK THE TWO FOLLOWING ADJUSTMENTS, IT WILL BE NECESSARY TO REMAKE THEM

PUNCH BAIL LINK ADJUSTMENT (Figure 33)

- (A) Back off the main bail spring adjusting screw until the spring arm is in a position that will reduce the spring tension on the main bail to a minimum.
- (B) Back off the punch bail upstop screw.
- (C) Loosen the clamping screws of the punch bail link and adjust the length of the link by shifting the adjusting projections with a screw driver so that when the LETTERS combination is selected and the unit is operated under power the LETTERS combination will be perforated and the feed hole will be just punched cleanly through the tape.
- (D) Restore the main bail spring adjusting screw to its former setting, approximately, and tighten its lock nut.

PUNCH BAIL UPSTOP SCREW ADJUSTMENT (Figure 33)

With BLANK combination selected and with the punch arm cam roller on the highest part of its cam, advance the upstop screw (in the punch bail) against the bottom plate of the punch block until an unperforated section of tape can be inserted in the punch block. Then back off the upstop screw until the tape is just held friction tight between the feed hole punch and the upper die plate. Back off the upstop screw an additional one-quarter turn and tighten the lock nut.

Operate the unit under power with the LETTERS combination selected and determine whether or not the feed holes are punched cleanly in the tape. (By cleanly is meant a well-defined hinged lid with no fibrous edges and with no appreciable tear at the hinged portion of the feed hole lid. A slight tear is permissible at the hinged portion of the code perforations.) If the feed holes are not cleanly punched, a refinement of the "Punch Bail Link Adjustment" and "Punch Bail Upstop Screw Adjustment" may be necessary.

PUNCH ARM ROLLER PRESSURE CHECK (Figure 27)

It should require 4 to 16 lbs. to start moving the punch arm roller away from the punch cam, when the punch arm roller is on the highest part of the punch cam. To check, hook a 25 lb. scale over the roller stud lock nut, as shown in Figure 27, and pull horizontally. If this requirement is not met, refine the punch bail upstop screw adjustment and recheck the roller pressure.

FEED ROLL DETENT FINAL ADJUSTMENT

Refine the adjustment of the feed roll detent eccentric so that the perforations in the tape meet the standard spacing of ten holes to the inch. This may be checked by perforating a length of tape consisting of a series of nine BLANKS followed by a LETTERS combination and checking it against the 2215 tape gauge.

FEED PAWL ECCENTRIC FINAL ADJUSTMENT (Figure 33)

When the motor is rotated by hand, the feed pawl should rotate the feed roll a full step on each downward stroke. Check by holding the detent lever free of the star wheel (Figure 28) during the downward stroke of the feed pawl. With the correct adjustment, the star wheel should not move when re-engaged by the detent. Readjust the tape feed pawl eccentric to meet this requirement.

TAPE STRIPPER PLATE ADJUSTMENT

There should be some clearance, not over .010", between the upper edge of the tape stripper plate and the feed roll. Check throughout a complete revolution of the feed roll. To adjust, position the stripper plate by utilizing its elongated mounting holes. See Figure 28 location of parts.

TAPE TENSION LEVER SPRING TENSION ADJUSTMENT (Figure 35)

Hook an 8 oz. scale over the end of the slotted extension of the tape tension lever and pull at right angles to the lever. It should require a pull of 5 to 5 1/2 ozs. to start the slotted extension of the lever moving away from the feed roll. To adjust, loosen the tape tension lever stud lock nut and rotate the stud in either a clockwise or counterclockwise direction. (See Figure 30 for location of parts) Then tighten the lock nut.

SHIFT ROCKER POST ADJUSTMENT

The sides of the shift rocker post should be parallel to the platen shaft. Adjust by loosening the shift rocker post lock nut and rotating the post. Tighten the lock nut. See Figure 36 for location of parts.

SHIFT ROCKER LEVER POST ADJUSTMENT

The front surface of the shift rocker lever post should be parallel to the front edge of the base plate. Adjust by loosening the shift rocker lever post lock nut and rotating the post. Then tighten the lock nut.

SHIFT BELL CRANK ADJUSTMENT (Figure 36)

With the platen shaft held so that the front face of the downward extension of the shift bell crank is opposite the mark in the top surface of the shift lever, the horizontal extension of the shift bell crank should line up approximately with the vertical center line through the shift rocker bearing screw. To adjust, bend the horizontal extension of the shift bell crank.

NOTE: Some of the early shift levers were not marked. The mark should be .140" to the rear of the forward shoulder.

SHIFT BELL CRANK GUIDE ADJUSTMENT

The platen assembly should shift freely in the shift bell crank guide slot and the printing face on the platen should be approximately horizontal. To adjust, position the shift bell crank guide. See Figure 37 for location of parts.

SHIFT ROCKER ADJUSTMENT (Figure 37)

NOTE: When checking this adjustment it will be necessary to swing the motor out of the way.

With the platen assembly in the forward FIGURES position, select the letters pull bar and rotate the main shaft until the main bail roller is on the low part of its cam. Lift up on the pull bar bail near its center to make sure that the bail has reached its extreme upward travel. Under these conditions, the vertical arm of the shift bell crank should overtravel the rear shoulder of the shift lever by not more than .015". Adjust the shift rocker by means of its adjusting screw to meet this requirement.

PULL BAR LOCK-OUT LEVER ADJUSTMENT (Figures 38 and 39)

With the platen in the figures position and the bell pull bar selected, rotate the main shaft to a point where the main bail is approximately .010" below the bell pull bar notch, (Figure 38A). Under this condition, there should then be .010" to .040" clearance between the side of the bell pull bar and the pull bar lock-out lever roller (Figure 38B), and the S pull bar should be cammed out of the code bar slot by .004" to .020". (Figure 38C).

Now place the platen in its letters position. With the bell combination set up, rotate the main shaft until the main bail is moved to within approximately .010" of the notch in the S pull bar. (Figures 39-A and 39-B). Under this condition, the bell pull bar should be cammed out of the code bar slot by .004" to .020". (Figure 39-C).

To meet the foregoing requirements, position the adjusting lever by utilizing the play in its mounting holes.

PLATEN CENTERING ADJUSTMENT

The platen should be centered with respect to the vertical alignment of the N type bar pallet. To adjust, lower the N type bar to the platen and align the platen by adding or removing shims between the platen block and the locating collar. (Figure 36-A)

RIBBON GUIDE ADJUSTMENT

- (1) The ribbon should be centrally located with respect to any type pallet.
- (2) The height of the ribbon guide should be such that the ribbon is held approximately 1/32" above the tape.
- (3) In operation, the ribbon should remain central with respect to the type pallets, and the rear edge should not curl.

Position the ribbon guide toward the front or rear to meet the first requirement. Bend the ribbon guide adjacent to the main casting to meet the second requirement. The latter requirement may be met by bending the forward end of the lower part of the ribbon guide upward to eliminate the tendency to curl. See Figure 30 for location of parts.

FEED ROLL DETENT LEVER SPRING TENSION (Figure 35)

With a 32 oz. scale hooked over the detent lever at the roller and pulling at right angles to the detent lever, it should require 10 to 15 ozs. to start the roller moving away from the star wheel.

PUNCH ARM SPRING TENSION (Figure 33)

With the punch arm cam roller on the low part of its cam, hook a 12 lb. scale over the punch arm spring post and pull in line with the spring. It should require 3 1/2 to 4 1/2 lbs. to start the roller moving away from its cam.

PUNCH BELL CRANK SPRING TENSION (Figure 33)

With the main bail roller on the high part of its cam and the tape guide removed, hook an 8 oz. scale under the horizontal arm of each punch bell crank at the spring and pull vertically upward. It should require 2 to 3 ozs. to start each bell crank moving. Replace the tape guide.

PLATEN SHIFT SPRING TENSION (Figure 30)

With the platen in the LETTERS position, apply the push end of an 8 oz. scale to the front end of the platen shaft and push horizontally toward the rear. It should require 5 to 7 1/2 ozs. to start the shift bell crank extension moving away from the rear shoulder of the shift lever.

PLATEN YIELD SPRING TENSION (Figure 30)

With the platen shaft held in the extreme rear position, apply the push end of a 32 oz. scale to the front end of the platen guide shaft and push horizontally toward the rear. It should require 12 to 20 ozs. to start the platen block moving on the platen shaft.

SHIFT LEVER SPRING TENSION

With the shift bell crank held toward the rear (away from the shoulder on the shift lever) apply an 8 oz. scale to the shift lever and push downward in line with the right edge of the platen shaft. It should require 1/2 to 1 oz. to start the lever moving. See Figure 36 for location of parts.

TAPE GUIDE SPRING ADJUSTMENT

The tape guide spring should be positioned so that the edge of the spring is parallel to the upper edge of the punch unit casting. The curved pressure tip should engage the tape at a point opposite the cutout in the tape guide and should press the tape firmly against the rear side of the guide channel in the punch block without buckling the tape. See Figure 30 for location of parts. Adjust the position of the spring by means of its mounting screw; bend the spring to provide the required spring pressure.

NOTE: If the tape guide prevents the tape guide spring from pressing the tape against the side of the guide channel in the punch block, add sufficient shims, between the tape guide mounting post and the perforator main bracket, to just meet the foregoing requirement. Maintain some clearance between the rear edge of the tape guide and the punch bail.

BELL HAMMER ECCENTRIC SCREW ADJUSTMENT

With the bell pull bar selected and the main bail in its uppermost position, there should be a clearance of .065" to .085" between the bell hammer lip and the bell hammer post. (Figure 40).

To adjust, position the bell hammer eccentric screw by means of its lock nut, keeping the high part of the eccentric to the rear.

SIGNAL BELL ADJUSTMENT

The signal bell should be positioned so as to obtain the most satisfactory bell tone. To adjust, loosen the bell mounting screw, using the slotted hole in the bell mounting bracket to position the bell. When adjusted there should be at least .010" clearance between the bell and the bell bracket mounting screw, the left ribbon spool bracket, and the handle on the left side of the unit.

MAIN BAIL SPRING TENSION ADJUSTMENT

The printing blow, i.e., the force with which the type bars strike the platen, and the force required for shifting the platen shaft assembly from the FIGURES to the LETTERS position, is regulated by the main bail spring

adjusting screw. This spring adjusting screw is located just to the left of the clutch throwout lever upper pivot screw which is shown in Figure 2.

With the motor running, send alternate LETTERS and FIGURES signals to the typing reperforator unit. Back off the main bail spring adjusting screw until the platen fails to return to the LETTERS position. Then turn the screw in a clockwise direction until the platen just moves to the LETTERS and FIGURES positions without any failures. Turn the screw clockwise an additional 1 1/2 turns and tighten the lock nut. With the main shaft clutch disengaged and a 25 lb. scale hooked to the spring adjusting lever directly below the spring, it should require not more than 15 1/2 lbs. to start the spring adjusting lever moving.

MAIN BAIL CAM CLUTCH TORQUE (Figure 41)

This torque should be measured after the motor has been running at least ten minutes with the main bail cam stationary. Press downward on the main bail so as to move the main bail roller away from its cam and at the same time hold the punch arm cam roller away from its cam. With a 32 oz. scale hooked into the screw hole on top of the main bail cam and pulling at right angles to the radius, it should require a pull of 18 to 24 ozs. to start the cam moving opposite to its normal direction of rotation.

SELECTOR CLUTCH TORQUE (Figure 42)

This torque should be measured after the motor has been running at least ten minutes with the selector cam sleeve stationary. Hook a 32 oz. scale to the selector cam sleeve stop arm. It should require a pull of 14 to 18 ozs. to hold the selector cam sleeve stationary. This clutch torque depends on the condition of the felt friction washers and the friction clutch spring. If difficulty is encountered in securing the specified torque, shims may be placed at the lower end of the friction clutch spring. The selector cam sleeve 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)

GOVERNOR ADJUSTMENTS

GOVERNOR SHELL ADJUSTMENTS (Figure 43)

REMOVE THE GOVERNOR COVER AND SPEED ADJUSTING SPRING

- (1) The governor contact points should meet squarely and there should be at least .010" clearance between the governor spring bracket and the rim of the governor shell. To adjust, position the governor spring bracket by means of its mounting screws.

NOTE: If necessary, reposition the "fixed contact" bracket to facilitate squaring up the contacts.

- (2) There should be a gap of .015" to .040" between the governor contacts. To adjust, bend the governor contact spring.

REPLACE THE SPEED ADJUSTING SPRING

SPEED-ADJUSTING WHEEL FRICTION WASHER SPRING PRESSURE (Figure 43)

To measure this requirement, remove the governor adjusting bracket and rotate the speed adjusting wheel to a point where the governor contact pressure is 13 to 14 ozs., as indicated by hooking a 32 oz. scale over the contact spring next to the contact point and pulling parallel to the speed adjusting spring. Then insert a bank pin (radially) in the leather rim of the speed adjusting wheel, and hook a 32 oz. scale over the pin and pull at a tangent to the periphery of the adjusting wheel. It should require 16 to 24 ozs. to start the wheel moving. To adjust the friction, remove the friction washer and bend the large projections.

INNER AND OUTER DISC CONTACT SPRING ADJUSTMENT (Figure 44)

The inner and outer disc contact springs should conform to the following requirements, which may be checked by removing the governor cover, target, and brush spring plate:

- (1) The distance from the inside surface of the governor cover to the highest point on the contact springs should be $25/32$ " to $27/32$ ".
- (2) Place a "D" (138-26) socket wrench over the nut located in the center of the governor cover that is used to hold the contact springs in place. With a 6" scale, measure the radial distance from the vertical surface of the wrench to the point where the scale touches the curved surface of the inner disc contact spring. This distance should be $17/32$ " to $19/32$ ".
- (3) In a similar manner, measure the distance from the wrench to the point of contact on the outer disc contact spring. This distance should be $7/16$ " to $1/2$ ".

These requirements may be obtained by bending the contact springs. Replace the governor cover, target, and brush spring plate.

GOVERNOR BRUSH SPRING PLATE BRACKET ADJUSTMENT

The governor brush spring plate bracket should be positioned to meet the following requirements:

- (1) A line established by the center of the outer disc and the center of one of the brushes, should pass through some portion of the other brush. (Figure 45).
- (2) The surface of the brush spring plate bracket, on which the brush spring plate is mounted, should be in alignment with the outer surface of that part of the governor cover on which the target is mounted. (Figure 46).

- (3) The bracket should be parallel to the edge of the motor base plate.

Adjust the brush spring plate bracket by utilizing its mounting slots.

GOVERNOR BRUSH SPRING PRESSURE (Figure 46)

- (1) INNER DISC BRUSH SPRING

Hook an 8 oz. scale over the inner spring just in front of the carbon contact brush. Pulling horizontally away from the motor, it should require 4 1/2 to 5 1/2 ozs. to start the brush moving away from the disc.

- (2) OUTER DISC BRUSH SPRING

Apply an 8 oz. push scale against the outer brush spring, just in front of the carbon contact brush. Pushing horizontally toward the motor, it should require 4 1/2 to 5 1/2 ozs. to start the brush moving away from the disc.

To obtain the correct brush spring pressure, remove and bend the brush springs. When the springs are replaced and the pressure obtained, take care that the contact brushes lie flat against their respective discs, and that the outer edges of the brushes are either flush with, or not more than 3/64" inside the outer edges of the discs. Replace the governor adjusting bracket.

NOTE: If necessary, level off brushes by passing a piece of No. 00 sandpaper between the brush and disc.

GOVERNOR ADJUSTING BRACKET ADJUSTMENT (Figure 46)

The adjusting surface of the governor adjusting bracket should clear the speed adjusting wheel by .020" to .060". Bend the governor adjusting bracket if necessary to secure this clearance.

GOVERNOR SHIM ADJUSTMENTS

There should be at least .006" clearance between the adjusting lever wearing strip and the adjusting wheel when the adjusting wheel is opposite the wearing strip and the play of the armature is taken up in a direction to make this clearance a minimum by overcoming the armature end thrust spring. To adjust, install shims on the armature shaft between the governor hub and the end frame casting if necessary. See Figure 46 for location of parts.

SYNCHRONOUS MOTORS

STARTING SWITCH ADJUSTMENTS

NOTE: These requirements should not be checked unless there is reason to believe the starting switch is out of adjustment.

- (1) Remove the motor unit from the base and remove the motor fan and pinion.

- (2) Remove the switch end shield screws and the switch commutator mounting screws, also the switch end shield.
- (3) Pull out the rotor until the brush holder spring is accessible and remove the spring.
- (4) Spring tension for 50 and 60 cycle motors should be 1 1/2 to 2 1/2 ozs., and 3 to 3 3/4 ozs. respectively, when extended to a length of 5 inches, using an 8 oz. scale.
- (5) The brush holders should be mounted by means of the center set of mounting holes and should be free.
- (6) The brush holder stop pins should be safely within the holes of the fiber disc when all the play in the brush holders has been taken up to make the engagement of the pins with the disc a minimum.
- (7) Replace the brush holder spring, making certain that the spring eyes are fully engaged with each other.
- (8) Replace the switch commutator screws and tighten the two screws alternately, a little at a time, until both screws are tight.
- (9) Replace the switch end shield screws, using the same precaution in tightening as above.
- (10) Apply the push end of a 12 lb. scale against the fan end of the shaft and push parallel with the shaft. It should require at least 7 lbs. pressure to start the shaft moving. (Applies to A. C., D. C., and synchronous motors.)
- (11) Replace the motor fan and pinion. Replace the motor unit on the base and check the motor plate adjustment.

LUBRICATION

The oil and grease specified in the supplement furnished with this bulletin should be used to lubricate the Model 14 typing reperforator.

Oil both loops of all helical springs that exert a nominal tension of less than 2 1/2 lbs. Apply grease to both loops of all helical springs that exert a nominal tension of 2 1/2 lbs. or more.

Unless otherwise specified, one or two drops of oil at each of the places indicated will be sufficient. Use oil for lubrication at all of the places listed in the following, except where the use of grease is specified:

SELECTOR MECHANISM

NOTE: Be careful not to get oil between the pole-faces of the selector magnets and the armature.

- (1) Armature bearings (2) very sparingly.
- (2) Trip latch plunger, trip latch, bell crank, and stop lever of range finder assembly.
- (3) Swords and selector levers - drop oil between separator plates.
- (4) Selector "T" levers - all points of contact.
- (5) Armature locking lever - at pivot.
- (6) Selector cam sleeve - each cam peak.
- (7) Locking wedge - at point of contact.
- (8) Code bars - at posts.

MAIN SHAFT

Remove range scale rear mounting screw, swing scale out of the way and fill shaft through hole in center of retaining disc. Replace range scale and its rear mounting screw.

- (1) Locking lever cam felt oil ring - saturate.
- (2) Selector cam friction washers - saturate.
- (3) Main cam friction disc - saturate.
- (4) Ball bearings (2).
- (5) Clutch throwout lever (2) bearings - grease end of lever.
- (6) Clutch - oil freely.
- (7) Compression spring (3) allow oil to flow into prongs under springs.
- (8) Gears and motor pinion - grease.
- (9) Main bail cam - grease.
- (10) Punch arm cam - grease.

MAIN BAIL

- (1) Main bail roller - oil, grease, oil
- (2) Main bail plunger - fill oil cup and saturate oil wick.
- (3) Main bail lever - fill oil cup just above terminal block.
- (4) Also oil end of lever in main bail plunger.
- (5) Main bail - fill groove with oil - also drop of oil on top of square vertical guide post.
- (6) Main bail adjusting screw - grease end of screw.
- (7) Main bail spring anchor - grease.
- (8) Main bail lever spring post - (8) 90752 felt washers - saturate.

PULL BARS, TYPE BARS, AND CODE BARS

- (1) Pull bars - one drop of oil on top of each bar.
- (2) Pull bar lockout lever - pivot and (2) rollers
- (3) Type bar gears - pull each type bar down against platen and put drop of oil on top of type bar gear at rear of segment slot.
- (4) Code bar locking lever - grease lever at point of contact with main bail.

RIBBON MECHANISM

- (1) Ribbon feed ratchet and feed gears - oil teeth.
- (2) Ribbon feed shaft detent plunger.
- (3) Ribbon feed shaft (2) oil holes.
- (4) Ribbon feed lever - oil hole.

- (5) Ribbon feed lever roller.
- (6) Ribbon spool shafts - (2) bearings each.
- (7) Ribbon reverse pawls and links - (4) bearings on each side.
- (8) Ribbon reverse shafts - (2) bearings each.
- (9) Ribbon feed shaft detent - grease.

PLATEN SHIFT MECHANISM

- (1) Shift rocker fork.
- (2) Shift rocker and shift rocker lever - (2) pivot bearings.
- (3) Platen shaft - (2) bearings.
- (4) Platen block shaft bearing.
- (5) Platen guide shaft bearing.
- (6) Shift lever - (2) bearings.
- (7) Shift lever where it comes in contact with shift bell crank.
- (8) Shift bell crank guide.

REPERFORATING MECHANISM

- (1) Punch arm casting roller - oil - grease - oil.
- (2) Punch arm casting bearings (2) oil holes.
- (3) Punch bail adjusting link (2) bearings.
- (4) Punch bail pilot screw (2) bearings.
- (5) Punch bar bell crank bearings and at slot in punch bars.
- (6) Vertical lever bell crank bearings and at points of contact with punch bar bell cranks.
- (7) Vertical lever lower guide comb slots.
- (8) Vertical lever pivot screw
- (9) Vertical lever upper guide comb slots.
- (10) Code bar bell cranks at bearing and point of contact with vertical levers and code bar locking lever.
- (11) Punch bars at punch bail guide comb.
- (12) Feed pawl bearing.
- (13) Feed roll bearing (2) places.
- (14) Feed roll detent bearing and roller.
- (15) Star wheel - grease.
- (16) Tape tension lever (2) bearings.

Remove excess oil from the type bar segment and the typing reperforator base and be sure there is no oil or grease on the selector magnet pole-faces or the armature face.

MOTOR UNIT

- (1) Motor pinion - grease.
- (2) Motor bearing oilers - (2)
- (3) Motor speed adjusting lever - pilot screw.

UPPER CASE	-	?	:	\$	3	!	&	£	8	'	()	.	,	9	Ø	1	4	BELL	5	7	;	2	/	6	"	BLANK	<	≡	SPACE	LTR. SHIFT	FIG. SHIFT
LOWER CASE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	BLANK	<	≡	SPACE	LTR. SHIFT	FIG. SHIFT
1	●	●		●	●	●				●	●					●	●	●			●	●	●	●	●					●	●	
2	●		●				●		●	●	●					●	●	●			●	●	●	●	●					●	●	
FEED HOLES	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3			●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					●	●
4		●	●	●		●	●			●	●	●	●	●	●		●				●	●	●	●	●					●	●	
5		●				●	●				●	●	●	●	●		●			●	●	●	●	●	●					●	●	

FIGURE 1

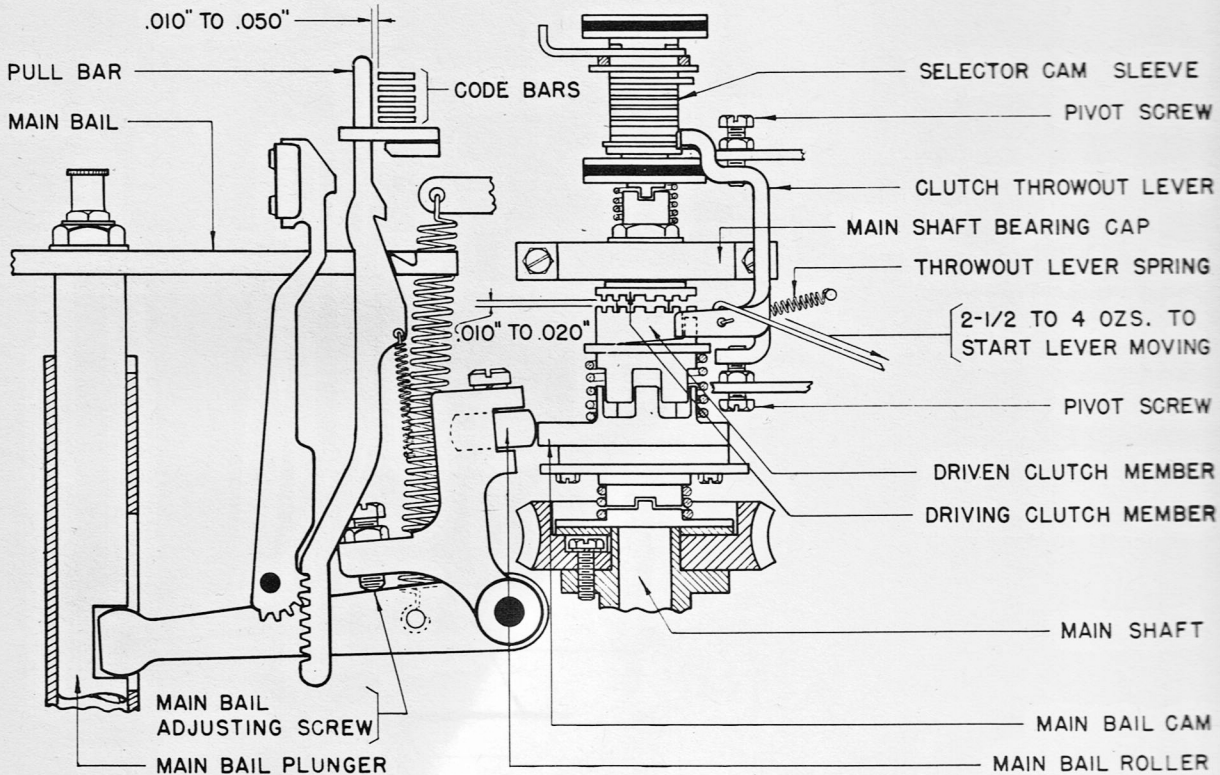


FIGURE 2

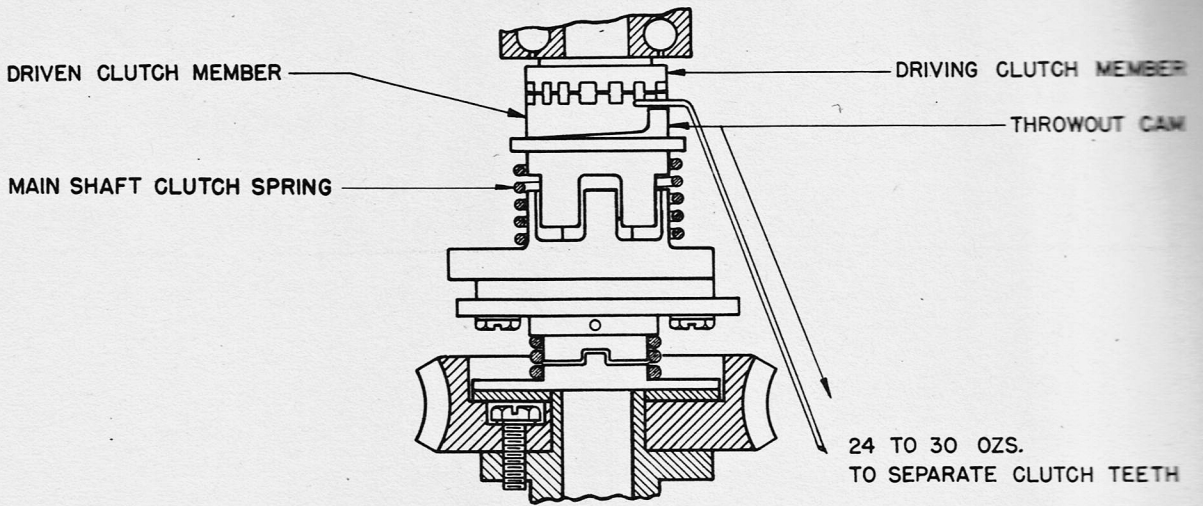


FIGURE 3

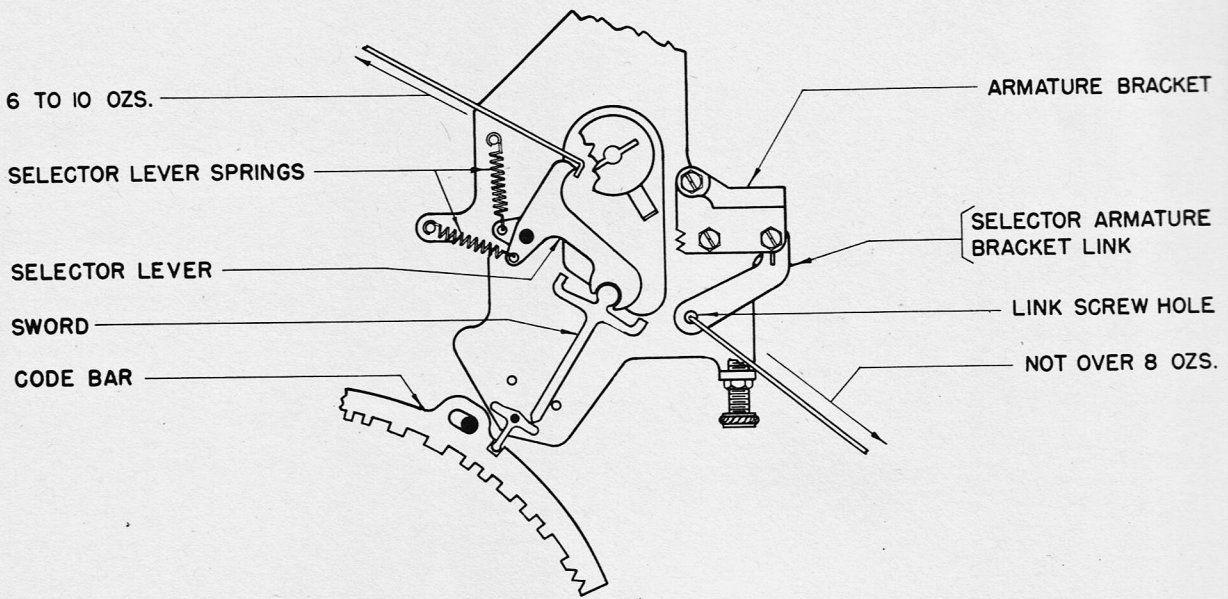


FIGURE 4

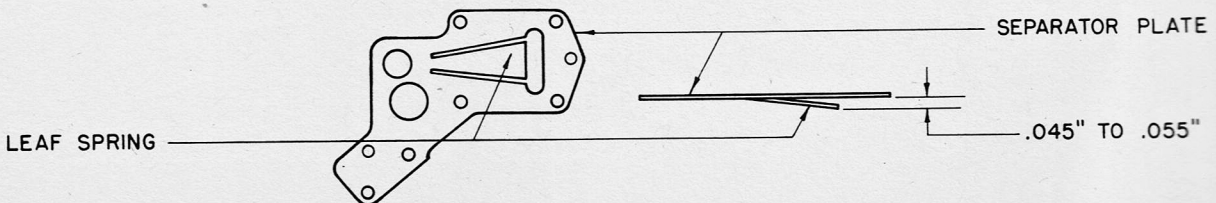


FIGURE 5

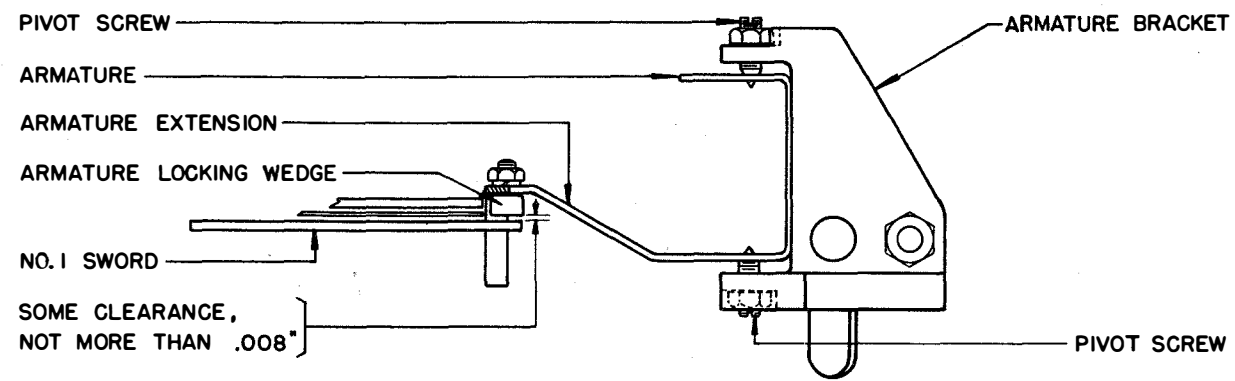


FIGURE 6

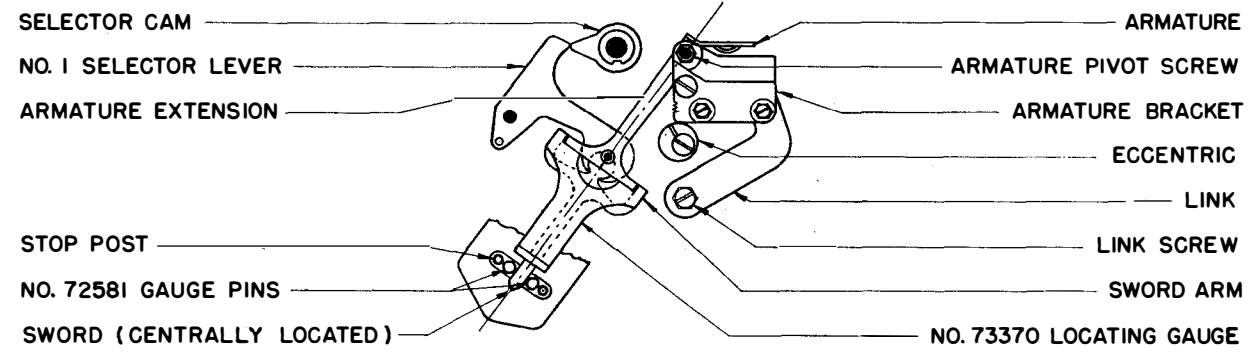


FIGURE 7

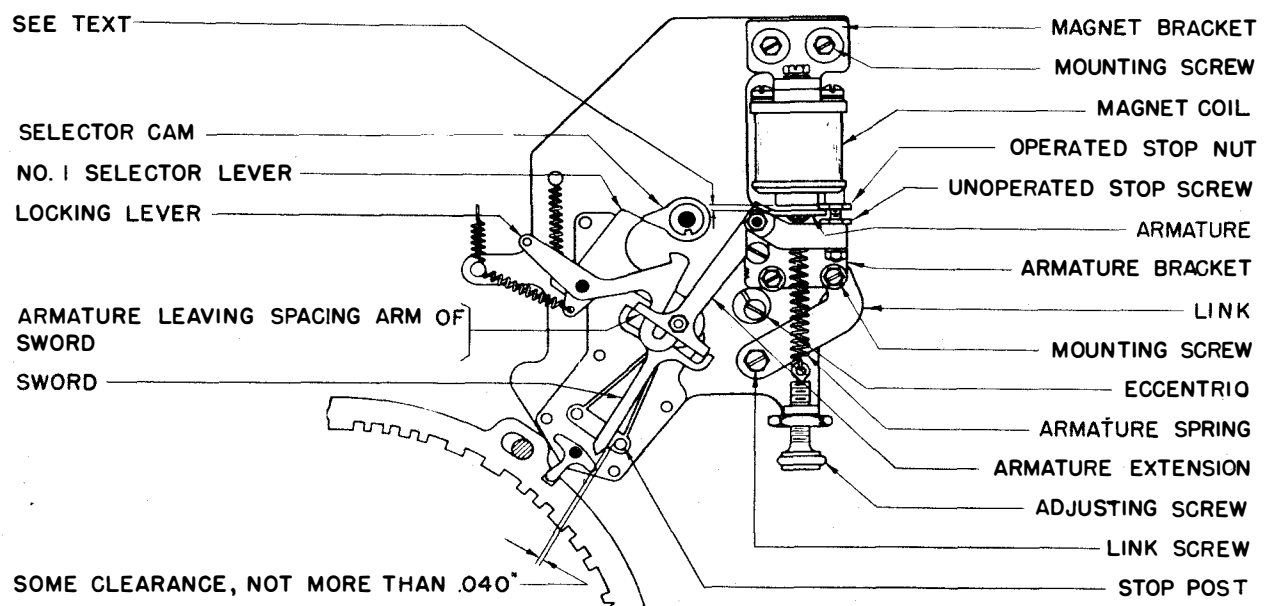


FIGURE 8

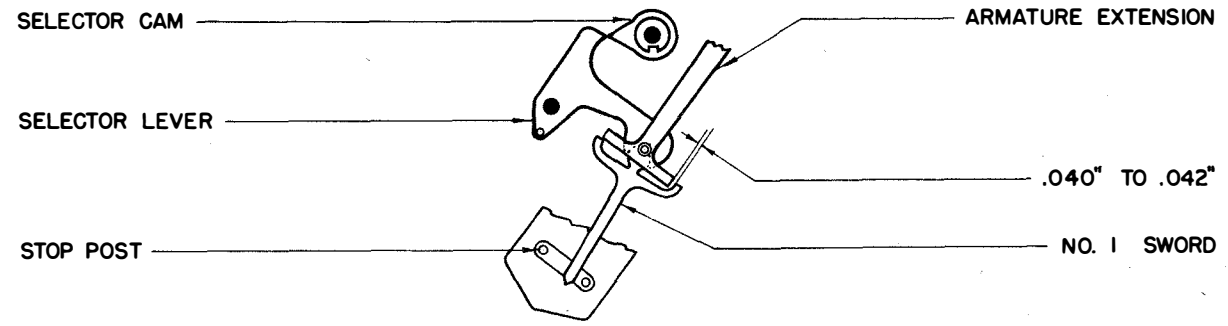


FIGURE 9

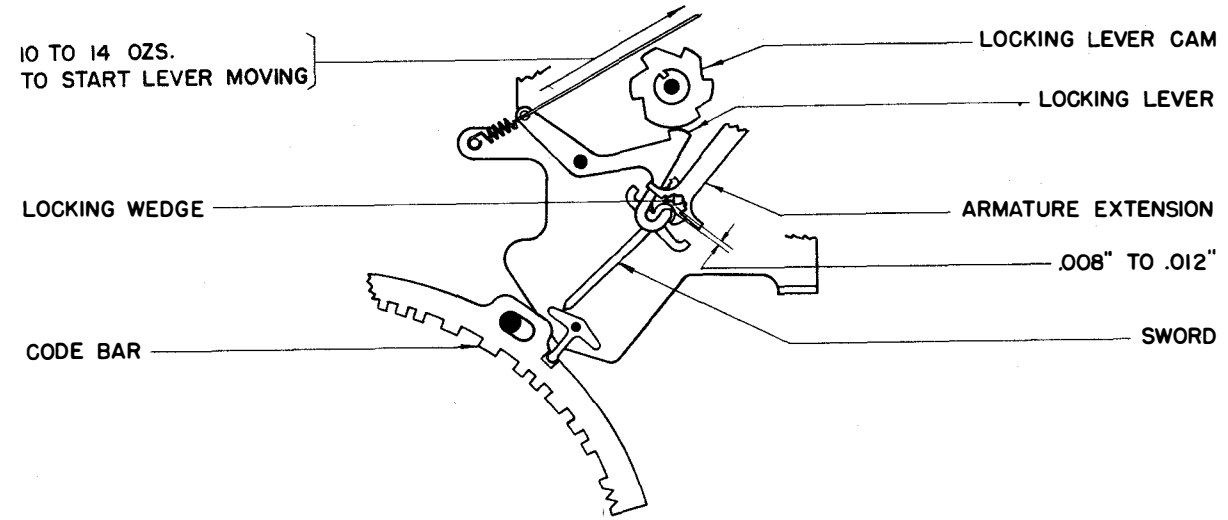


FIGURE 10

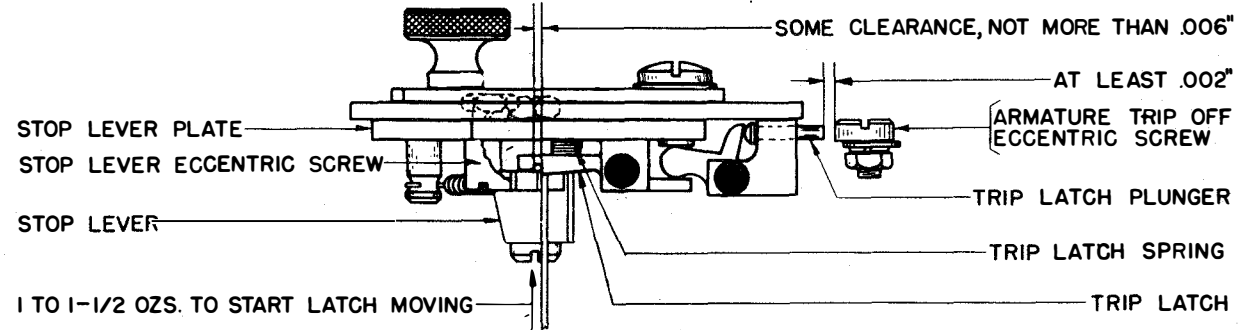


FIGURE 11

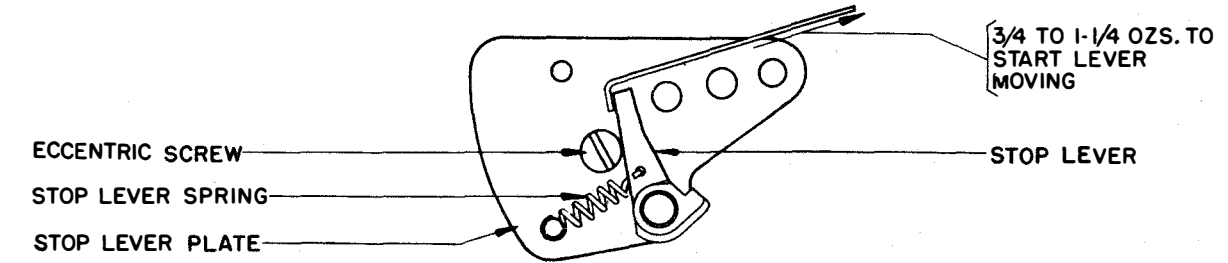


FIGURE 12

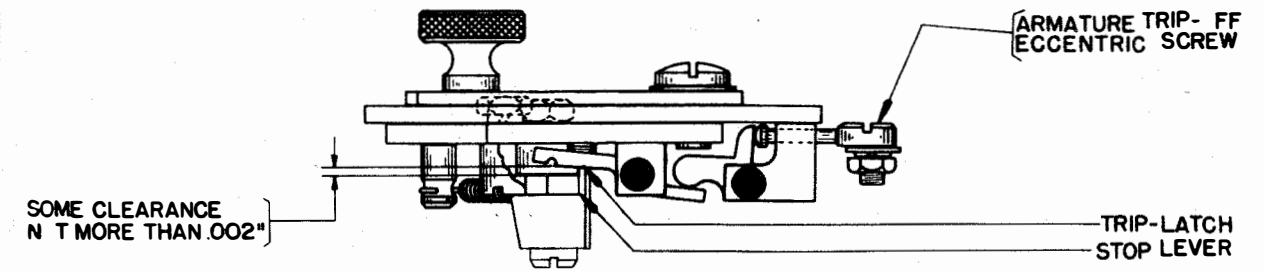


FIGURE 13

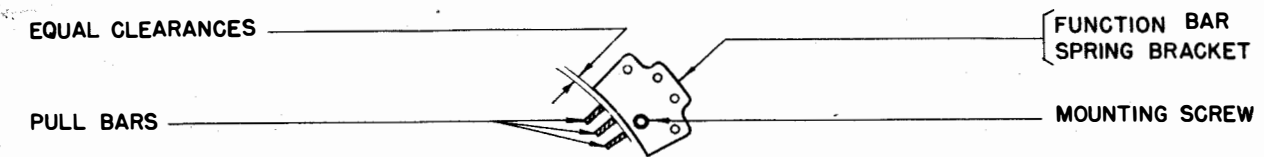


FIGURE 14

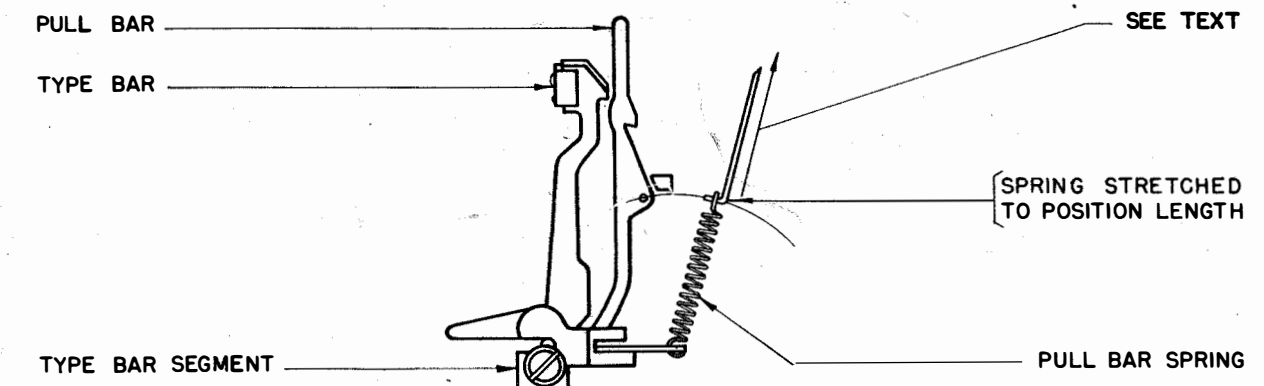


FIGURE 15

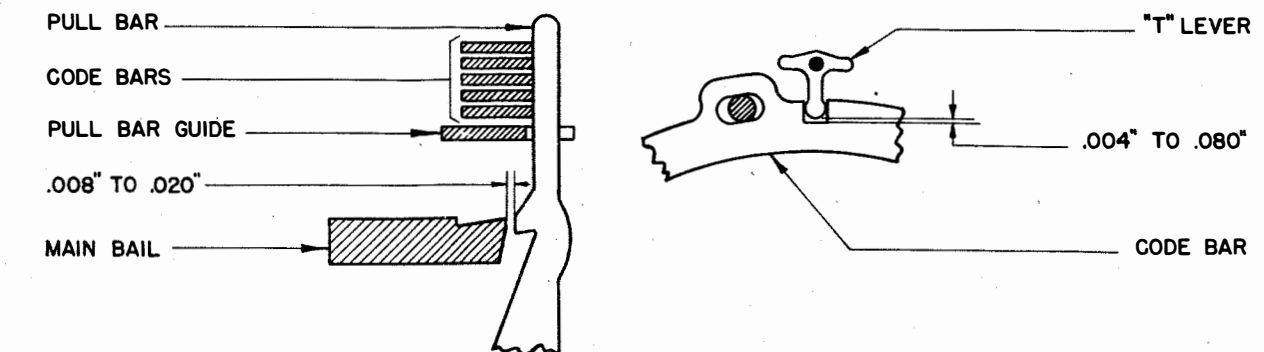


FIGURE 16

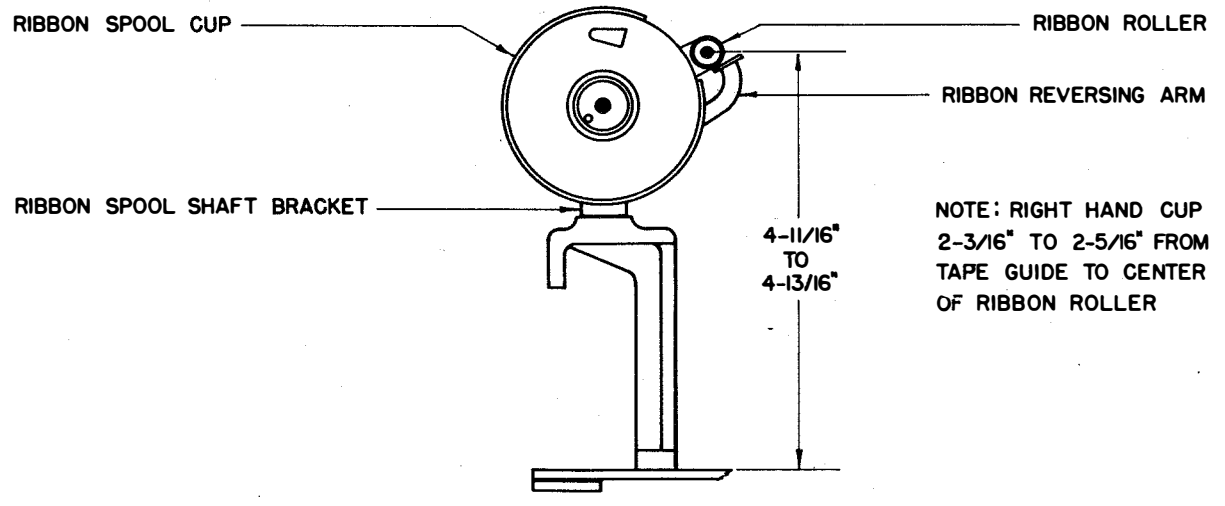


FIGURE 17

NOTE: RIGHT HAND CUP
 2-3/16" TO 2-5/16" FROM
 TAPE GUIDE TO CENTER
 OF RIBBON ROLLER

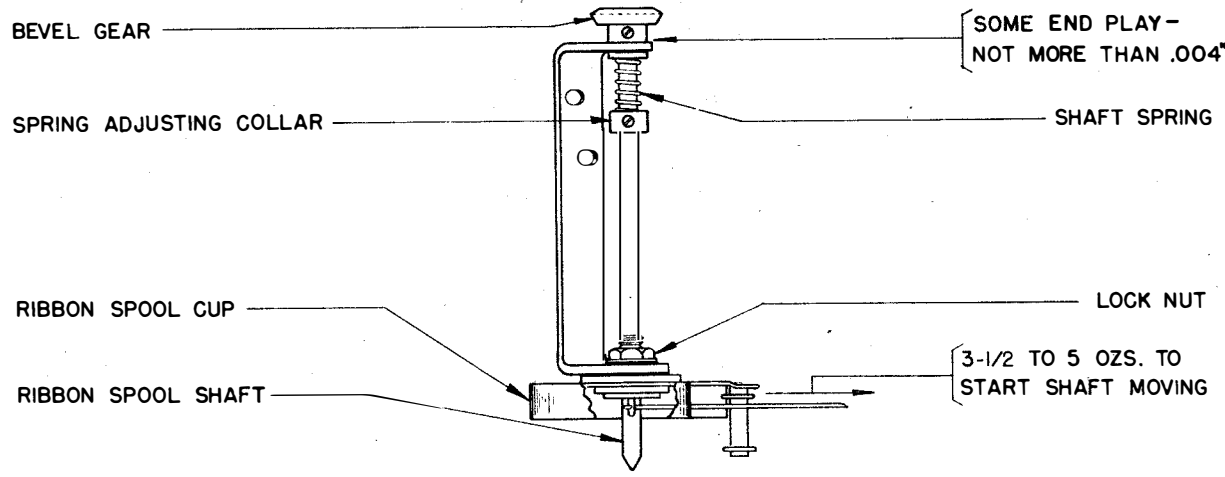


FIGURE 18

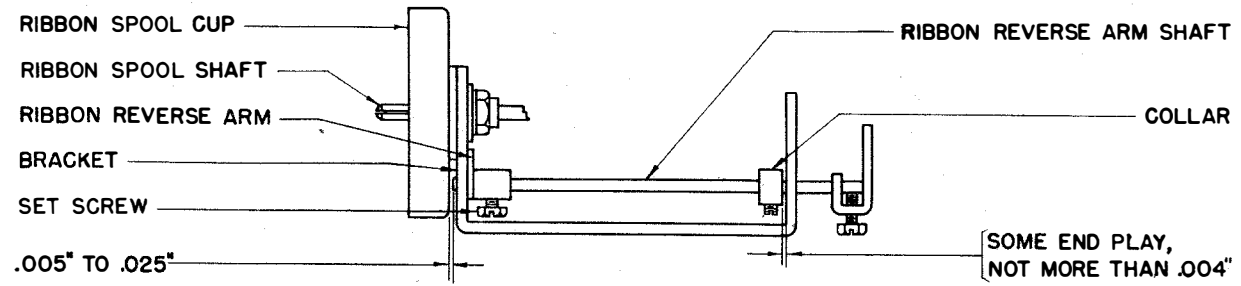


FIGURE 19

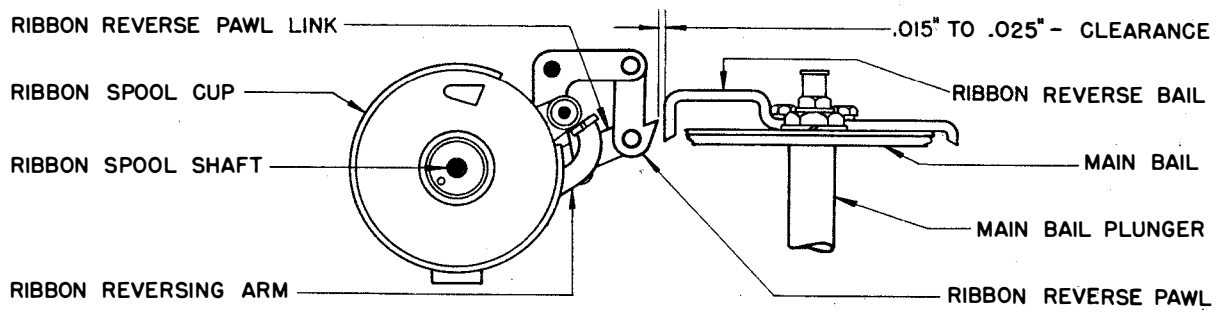


FIGURE 20

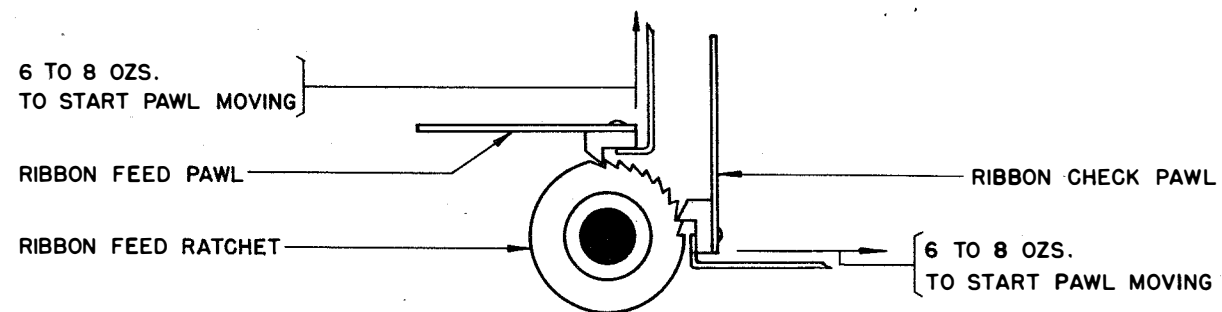


FIGURE 24

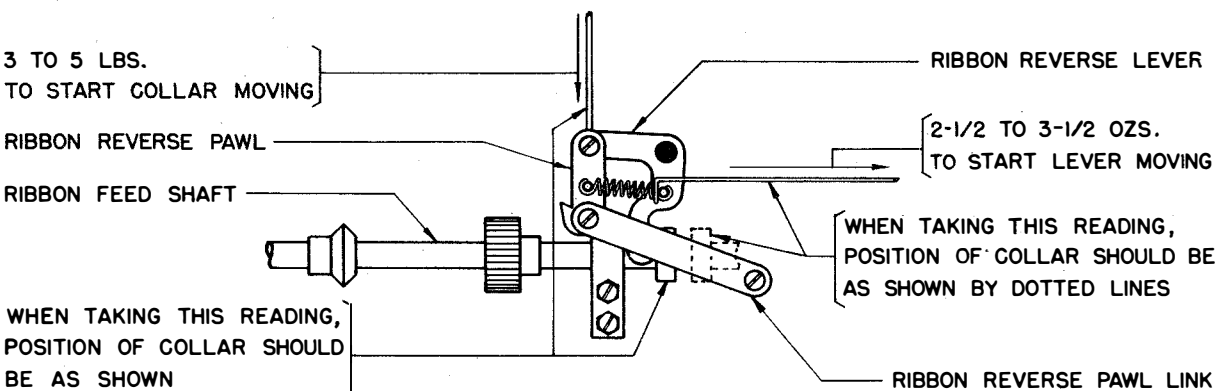


FIGURE 21

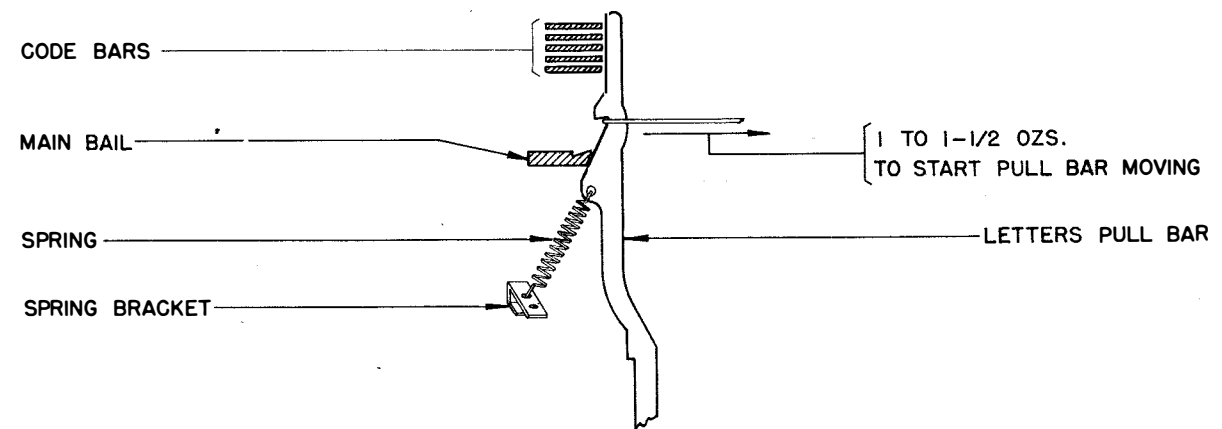


FIGURE 25

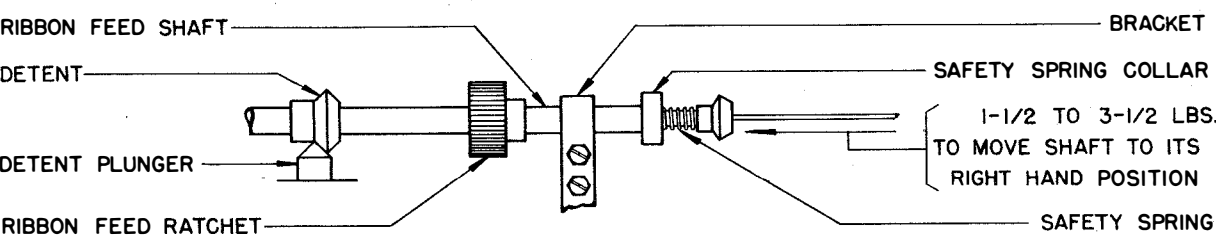


FIGURE 22

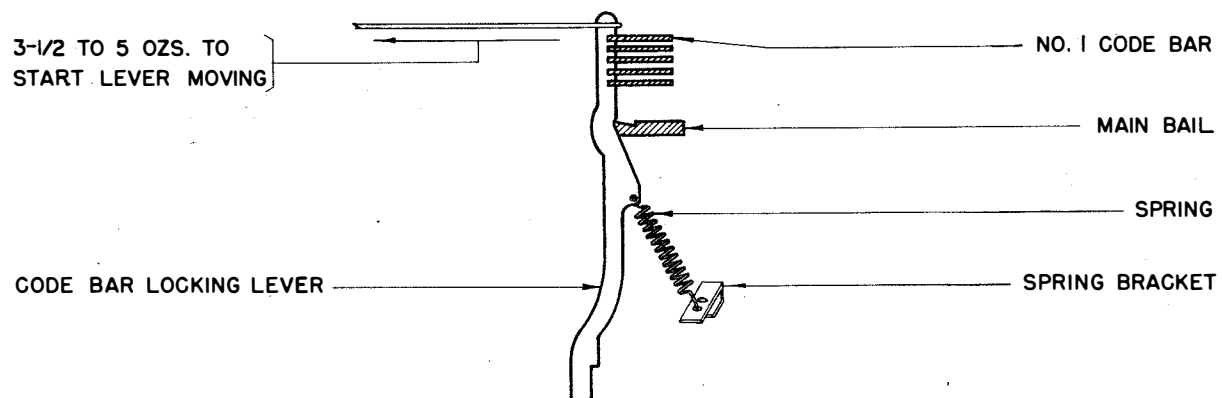


FIGURE 26

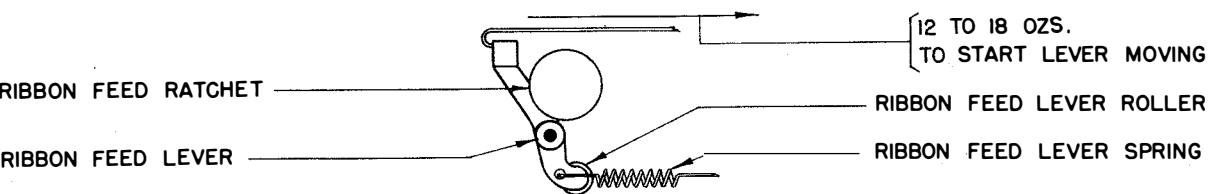


FIGURE 23

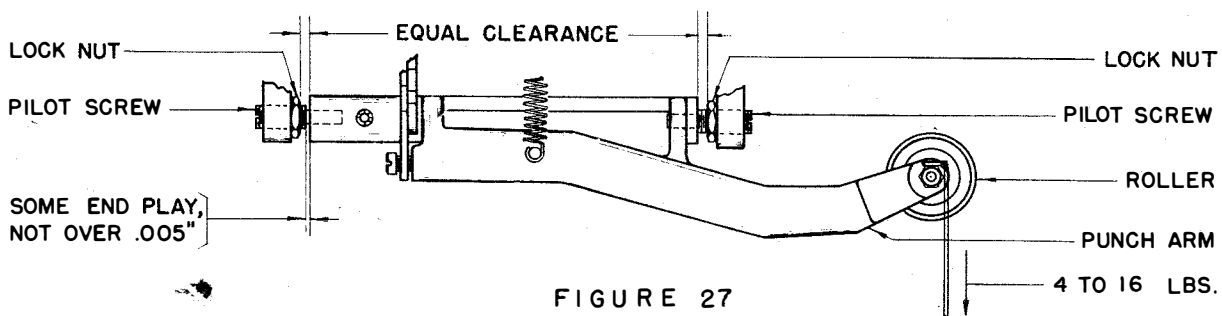


FIGURE 27

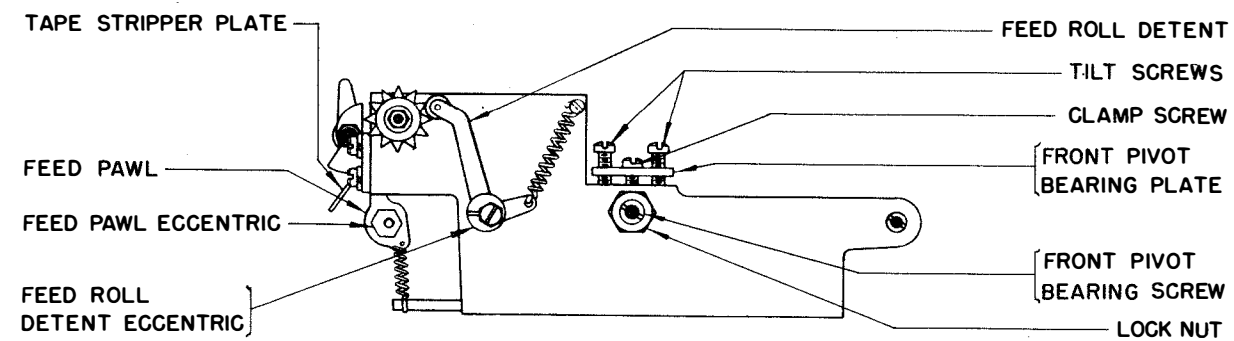


FIGURE 28

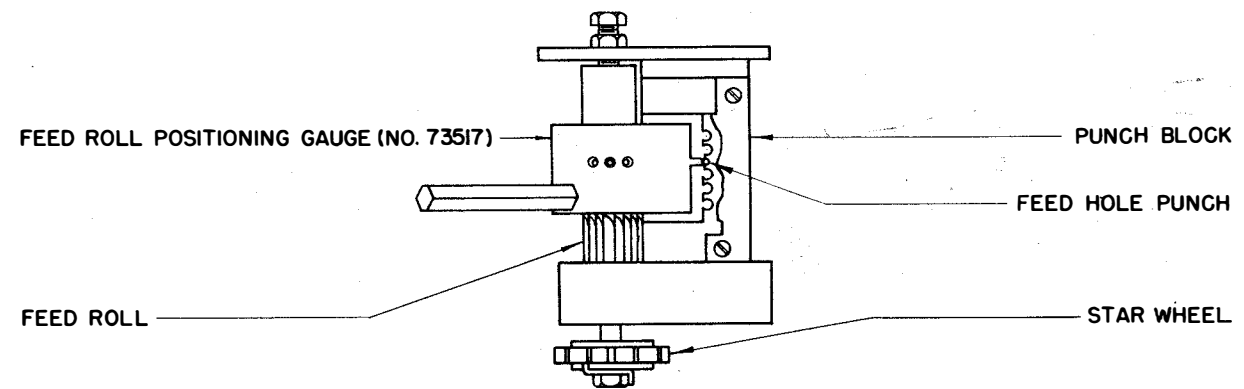


FIGURE 32

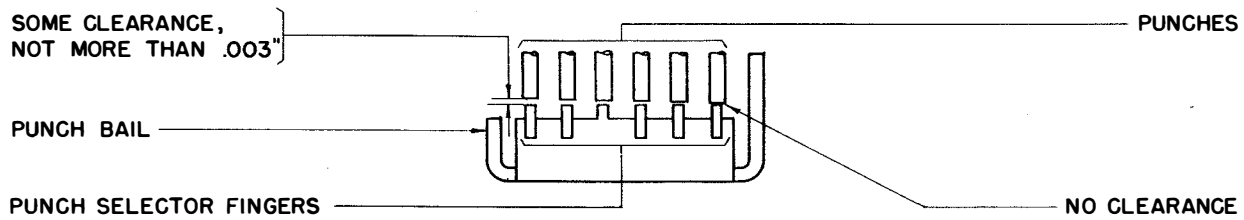


FIGURE 29

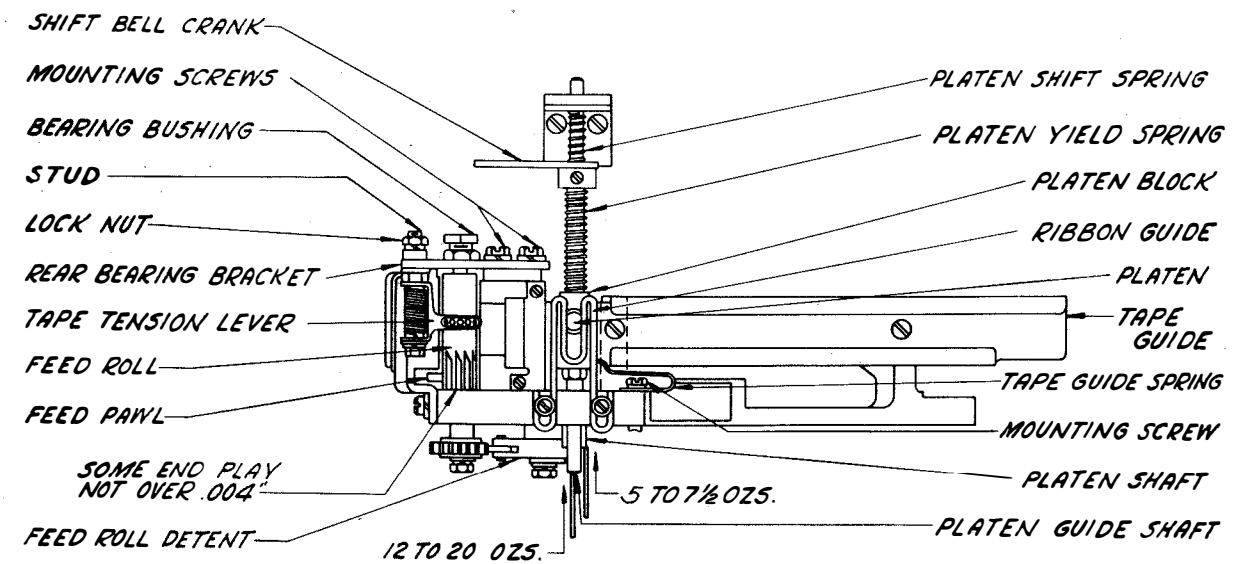


FIGURE 30

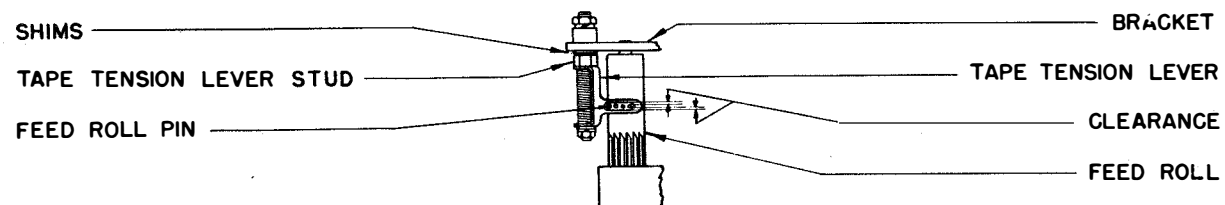


FIGURE 31

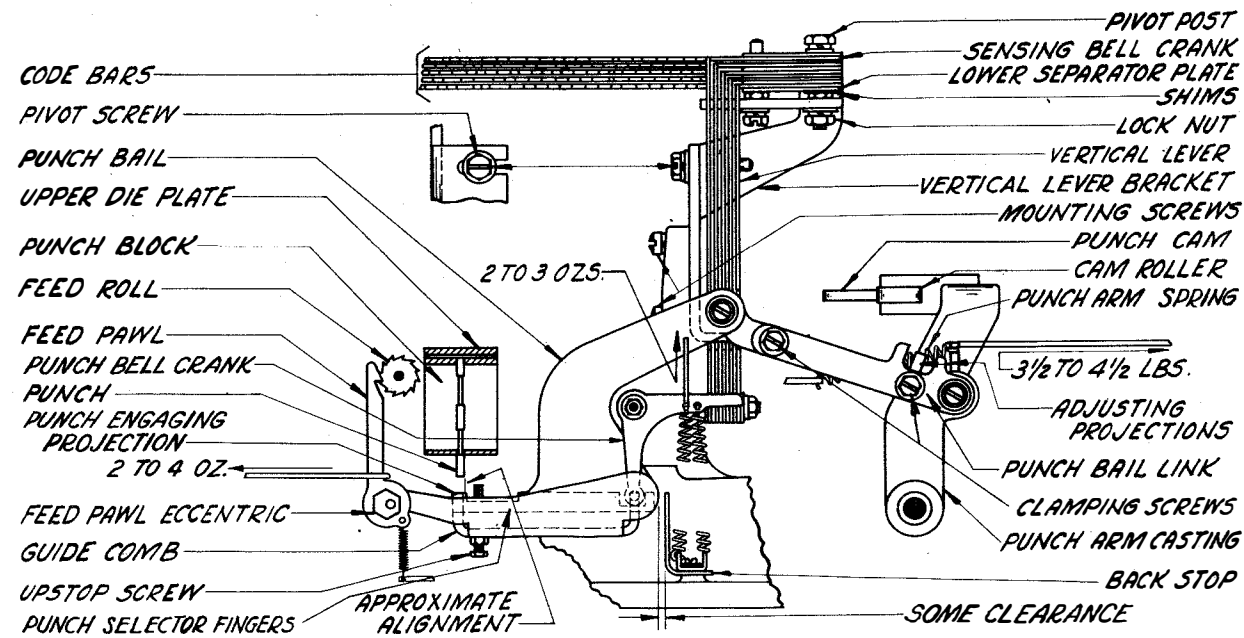
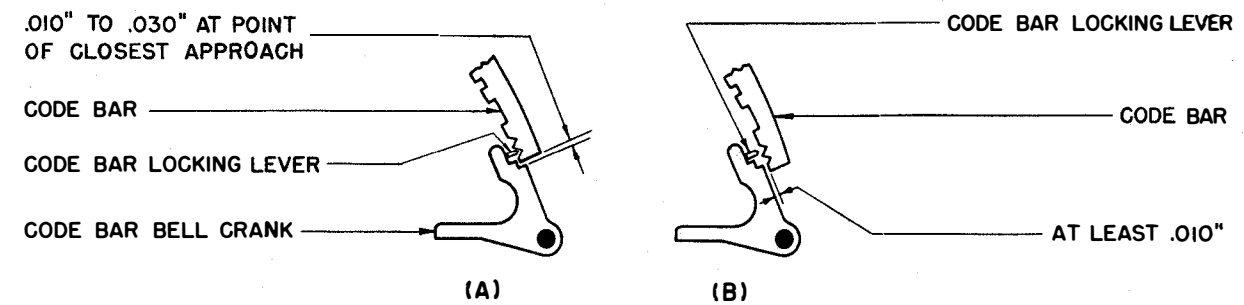
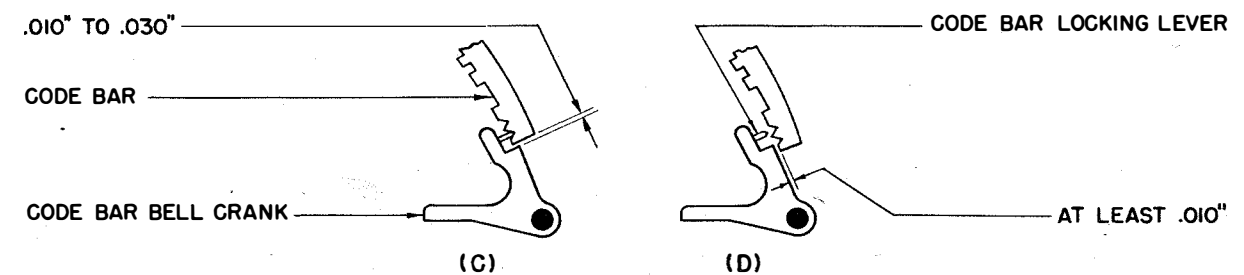


FIGURE 33



(A)

(B)



(C)

(D)

FIGURE 34

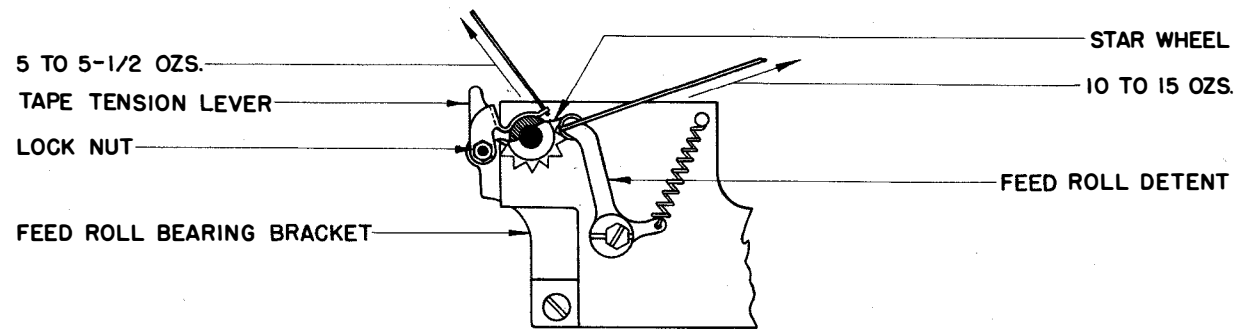


FIGURE 35

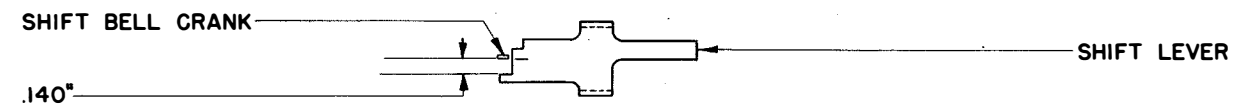
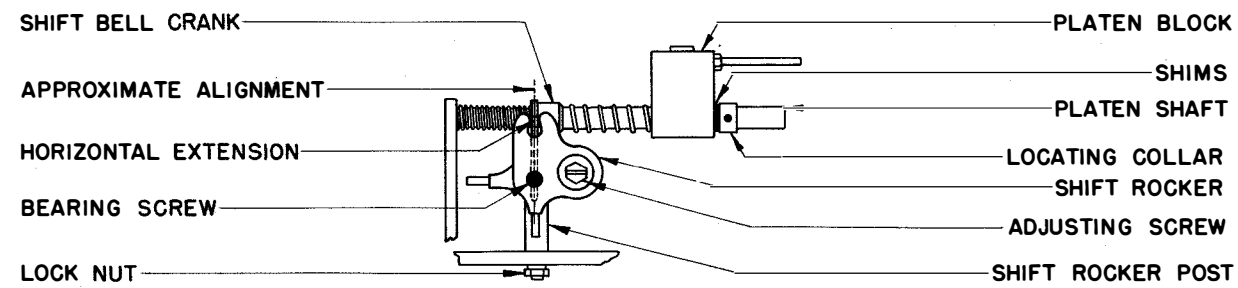


FIGURE 36

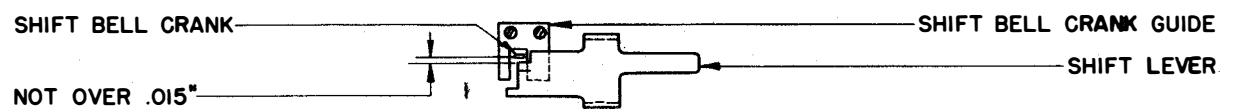
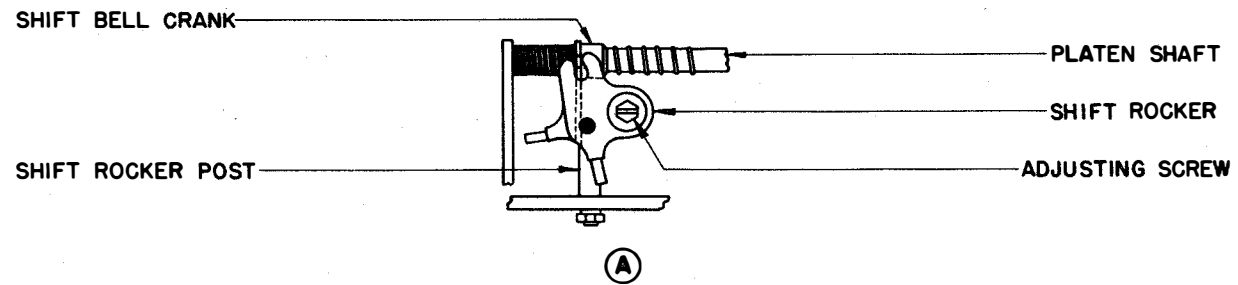


FIGURE 37

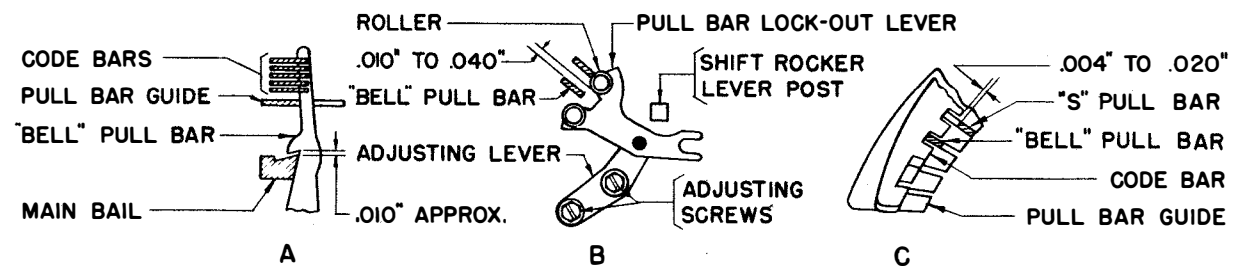


FIGURE 38

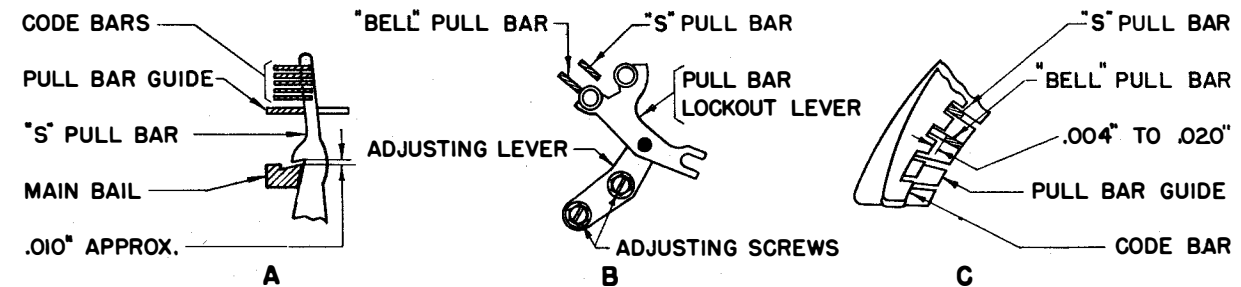


FIGURE 39

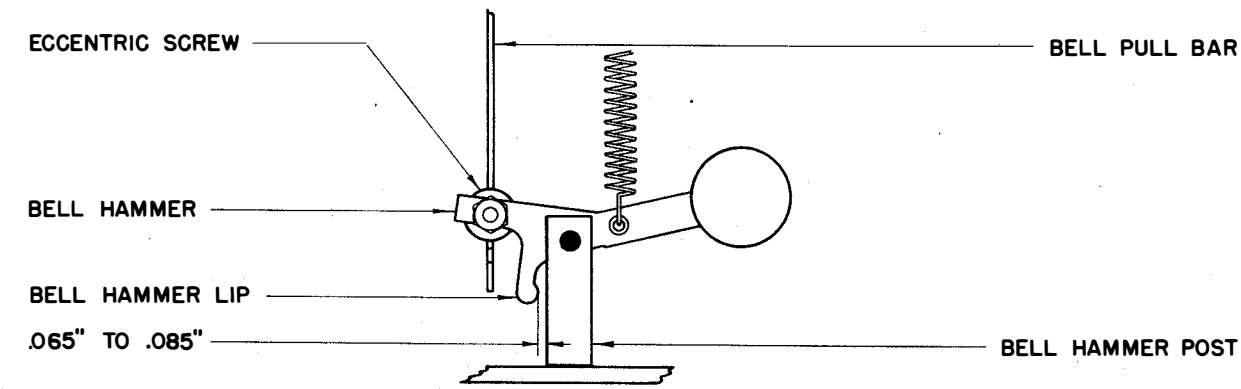


FIGURE 40

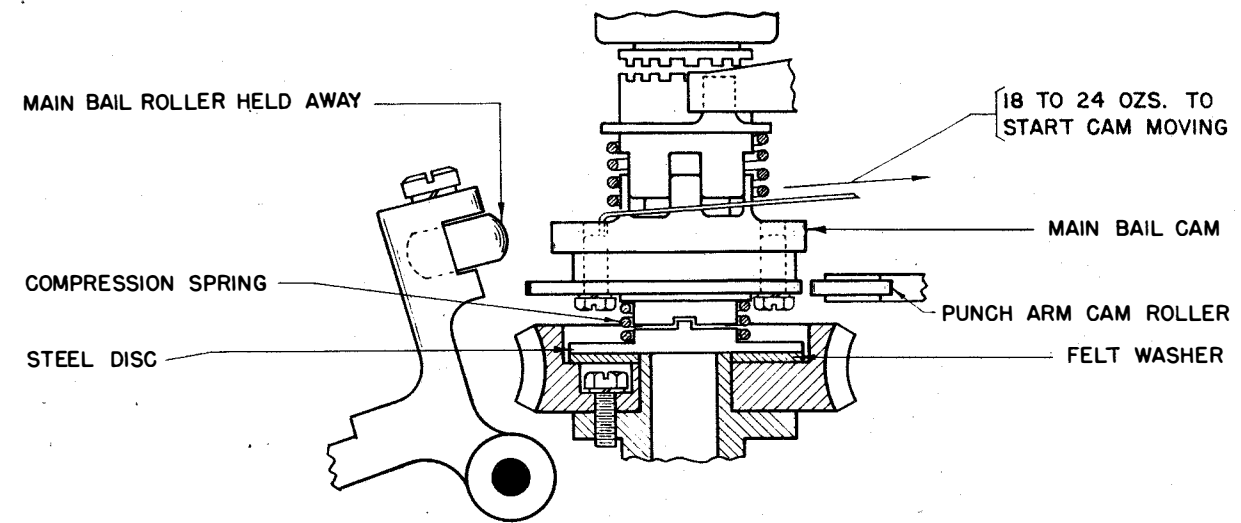
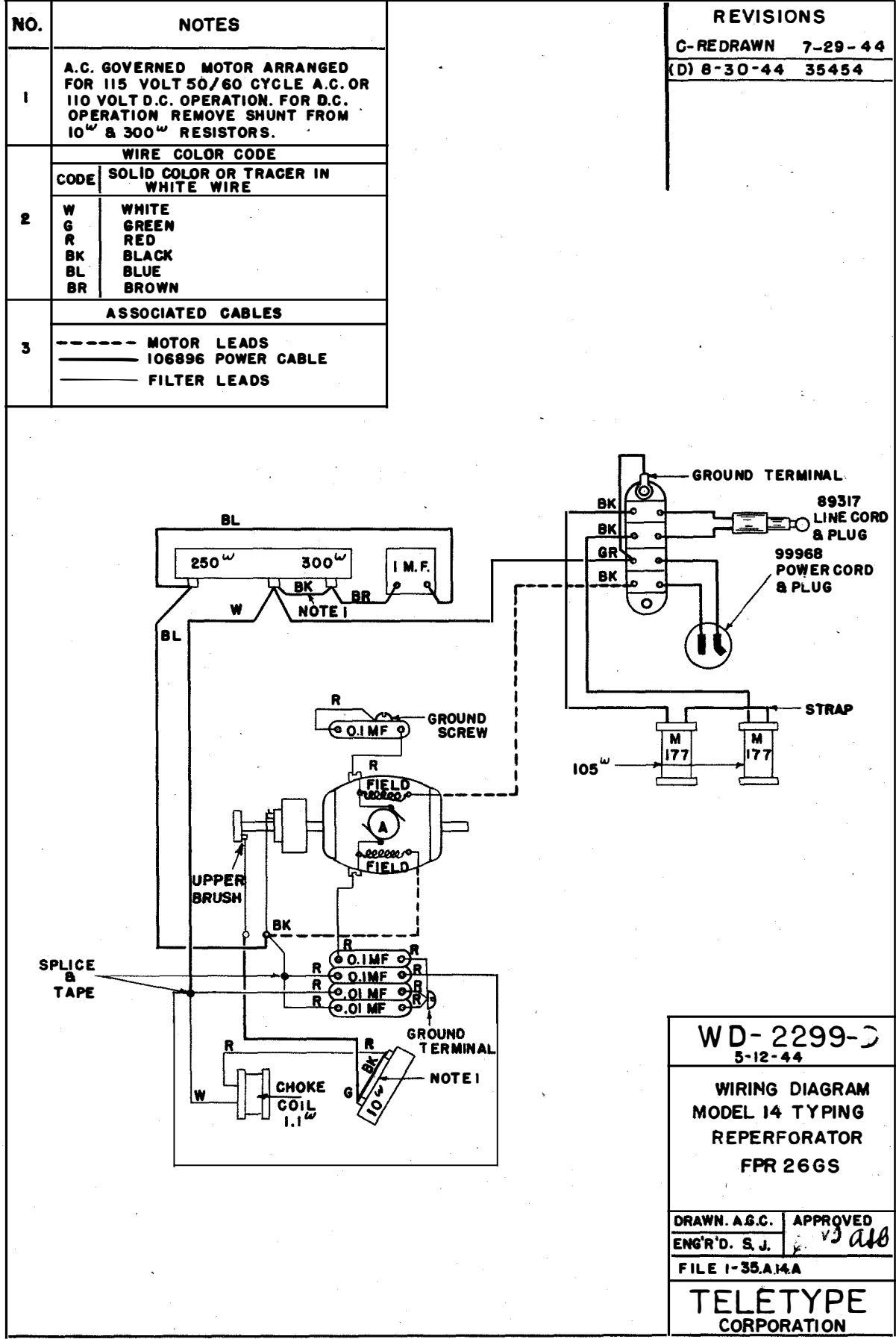
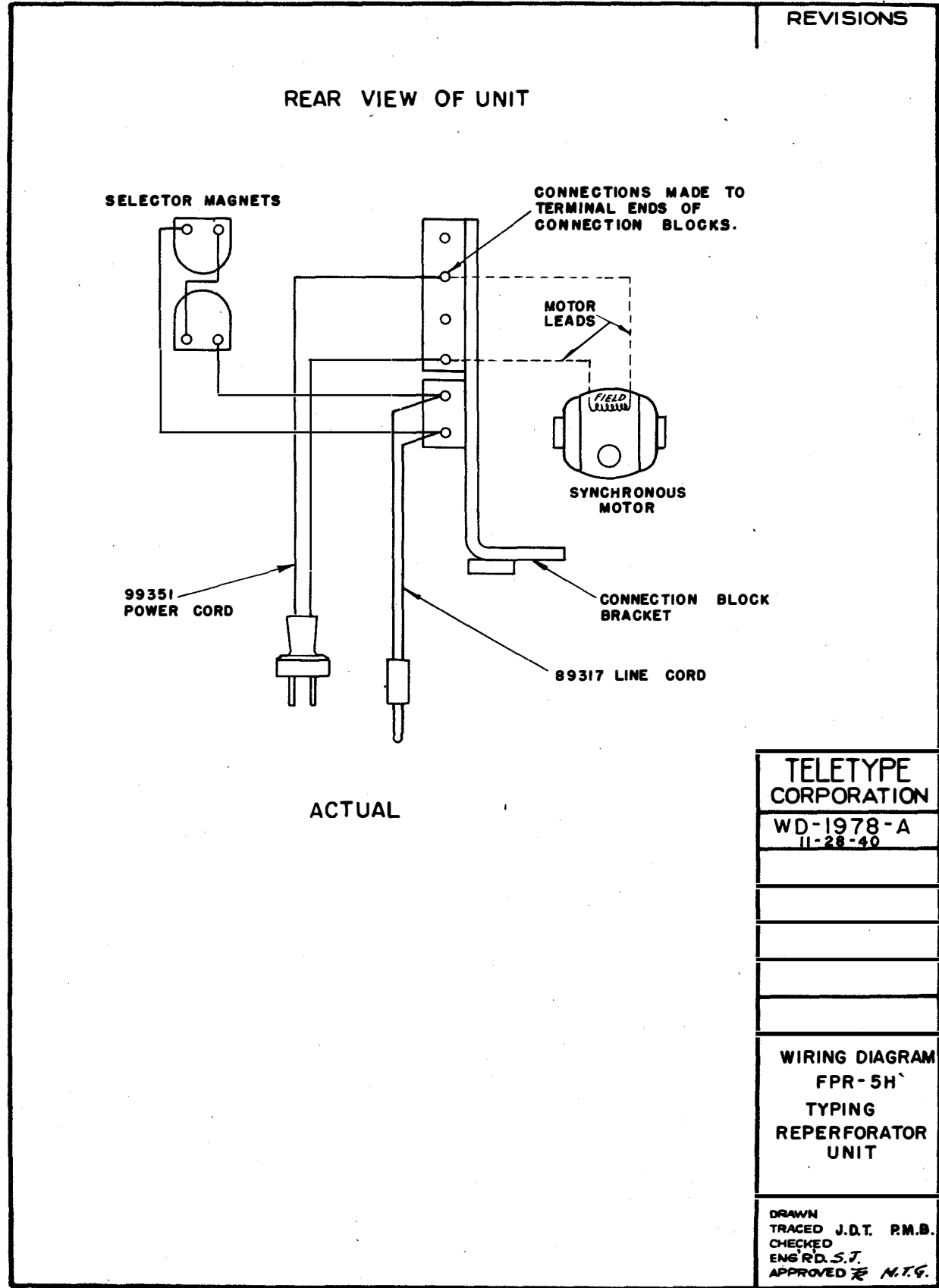


FIGURE 41



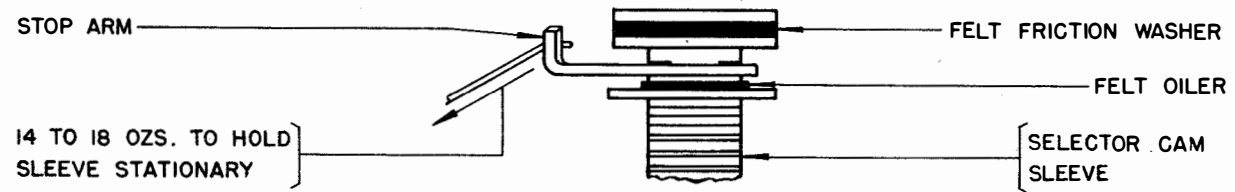


FIGURE 42

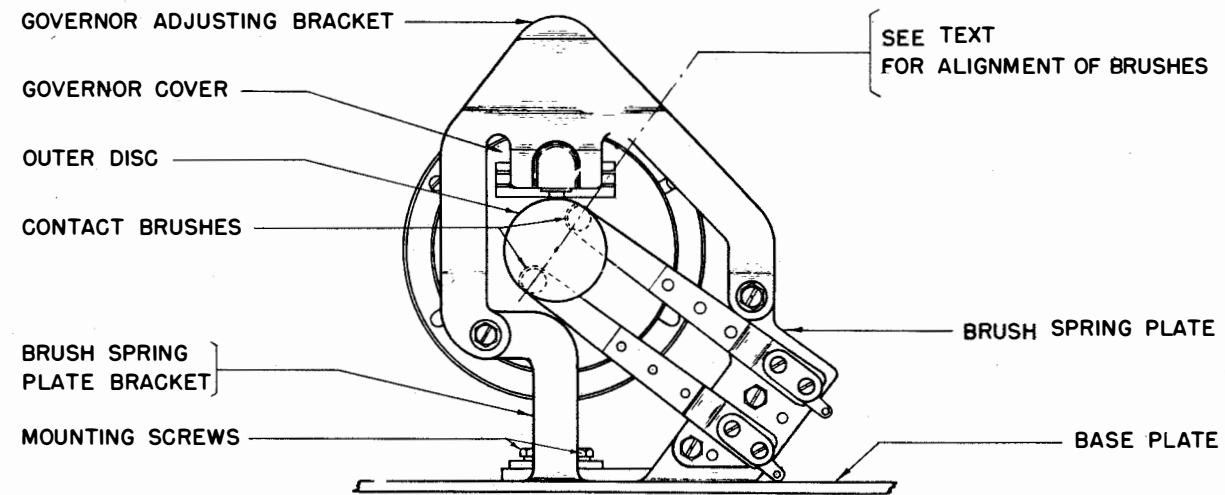


FIGURE 45

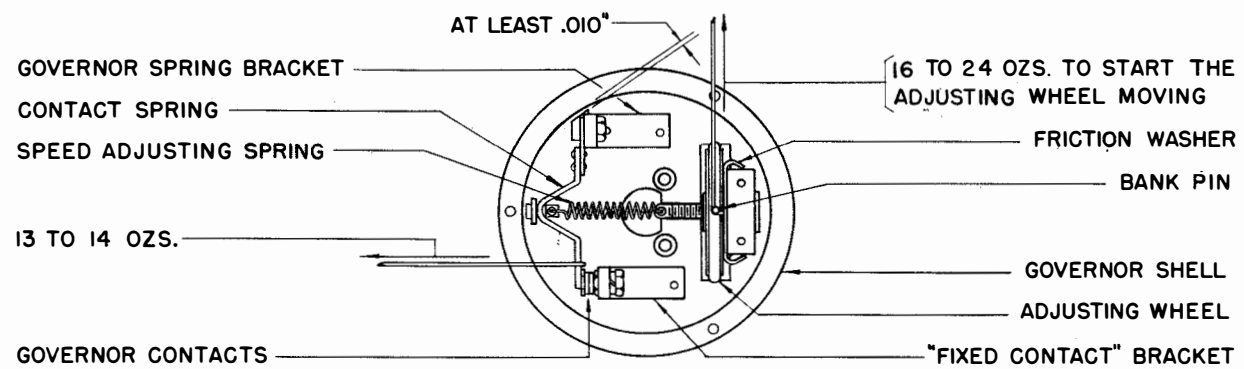


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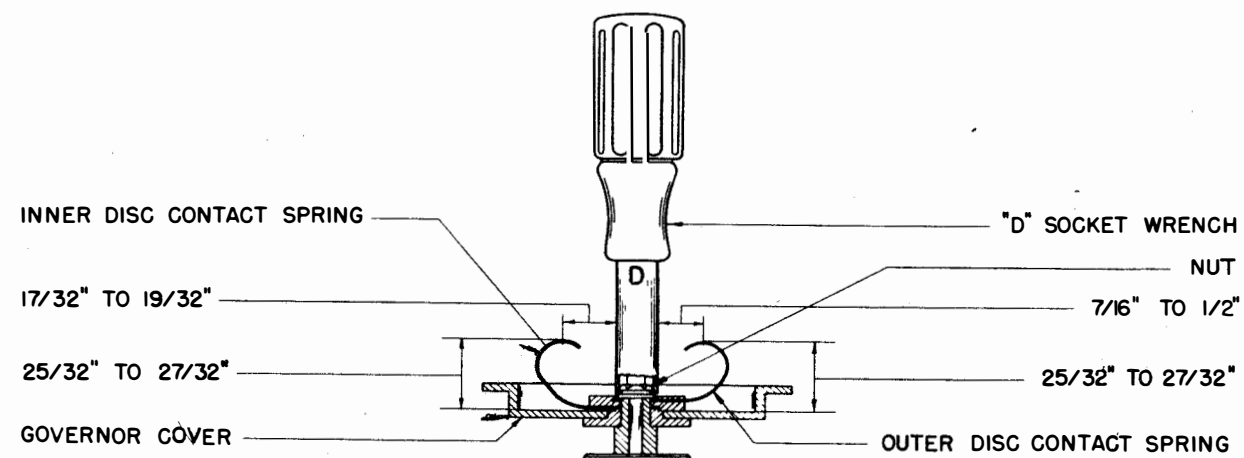


FIGURE 44

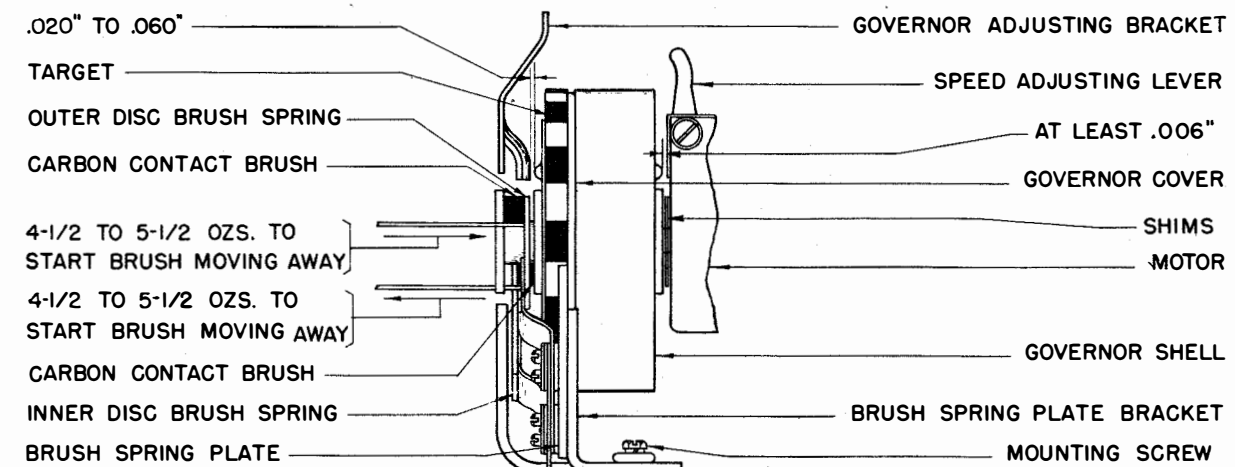


FIGURE 46