

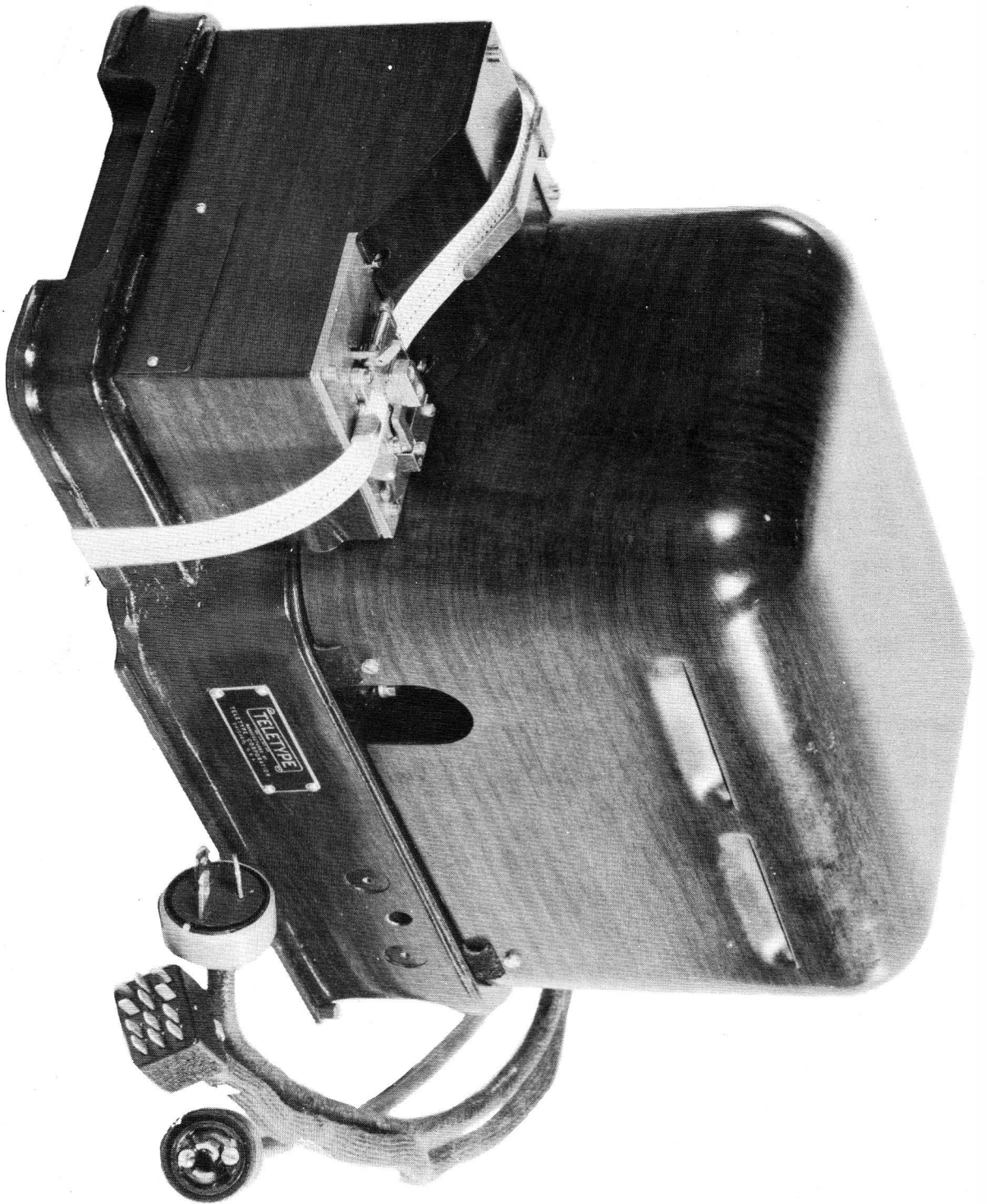
TELETYPE

PRINTING TELEGRAPH SYSTEMS

DESCRIPTION AND ADJUSTMENTS
OF XD79 AND XD95
DISTRIBUTORS
AND
MOTOR ARRANGEMENTS
EZ, EY, EX, AND GW

XD79EX	14AA	TRANSMITTER DISTRIBUTOR
XD79EY	14AB	TRANSMITTER DISTRIBUTOR
XD79EX	14AD	TRANSMITTER DISTRIBUTOR
XD95GW	14ABM	TRANSMITTER DISTRIBUTOR





CONTENTS

DESCRIPTION

	PAGE
Distributor Mechanism	3
End-of-Tape Mechanism	4
General	1
Tape Feed Mechanism	4
Tape Sensing Mechanism	2
Synchronous and Governed Motors	4

ADJUSTMENTS

Armature Plate Adjustment	7
Armature Spring Tension Adjustment	8
Carbon Brush Adjustment	12
Contact Lever Spring Tension Adjustment	12
Contact Tongues Alignment	11
Detent Bracket Adjustment	10
Detent Lever Spring Tension	8
Distributor Brushes	12
End-of-Tape Contact Pin Guide Adjustment	9
End-of-Tape Stop Contact Spring Adjustment	9
Feed Lever Adjusting Screw Adjustment	10
Feed Lever Spring Tension Adjustment	12
Feed Lever Upstop Adjustment	11
Feed Wheel Shaft Bearings Adjustment	8
General	6
Lower Contact Screws Adjustment	11
Magnet Core Adjustment	7
Main Shaft Adjustment	6
Main Shaft Clutch Torque Adjustment	13
Motor Position Adjustment	6
Operating Cam Adjustment	13
Operating Lever Adjusting Screw Adjustment	11
Retaining Lid Latch Spring Tension	10
Stop Lever Pilot Screws Adjustment	7
Start Magnet Bracket Adjustment	7
Stop Lever Spring Tension	8
Synchronous Motor-Starting Switch Adjustments	14
Tape Feed Pawl Spring Tension Adjustment	8
Tape Guide Adjustment	9
Tape Retaining Lid Latch Wearing Strip Shims Adjustment	10
Tape Retaining Lid Plate Adjustment	10
Tape Space Adjustment	9
Tape Transmitter Contacts	11
Upper Contact Screws Adjustment	12

GOVERNOR ADJUSTMENTS 15

Governor Brush Spring Plate Bracket Adjustment	16
Governor Brush Spring Pressure Adjustment	16
Governor Guard Adjustment	17
Governor Shims Adjustment	15

	Page
Inner and Outer Disc Contact Spring Adjustment	16
Speed Adjusting Lever Stop Plate Adjustment	15
Speed Adjusting Wheel Friction Washer Adjustment	15
Speed Setting	15

LUBRICATION

Points of Lubrication	18
---------------------------------	----

DESCRIPTION

GENERAL

The distributors described herein are motor driven devices, which translate code combinations from fully perforated or chadless tape into electrical impulses. These impulses (set up locally) are combined with impulses from an external source and these combined signals are used in printing telegraph transmitting or receiving circuits.

As the tape automatically feeds through the sensing mechanism, the tape pins sense the perforations in the tape and thereby determine the positions of the contact tongues with relation to the upper or lower contact screws. The signals received on the distributor segments are routed through the contact tongues to either the upper or lower contacts depending upon the selected combination in the tape.

The distributor combines the impulses from the local and external source and completes the connection to the signal line. Connections are made in sequence at a uniform rate of speed by the brushes which traverse the segments and collector rings.

The XD79 and XD95 distributors differ as shown below:

XD79

Wiring Diagram W.D. 2140
105057 Tape Guide Plate (Adjustable
eccentric tape guide posts)
104662 Cable Assembly (12 prong plug)

XD95

Wiring Diagram W.D. 2345
97468 Tape Guide Plate (Hole for end-
of-tape pin)
111630 Cable Assembly (12 prong plug)
108254 Cord Assembly (2 prong locking
plug)
End-of-Tape Mechanism
Spark protection for segment and
collector rings.

The various type of motor arrangements described herein will operate the main shaft at 420 R.P.M. with a transmitting speed of 368 O.P.M.

The EZ motor arrangement has a 110 volt, 60 cycle, A.C. synchronous motor operating at 1800 R.P.M. and is equipped with a 7 tooth pinion and a 30 tooth gear on the main shaft.

The EY motor arrangement has a 110 volt, 60 cycle, series wound, A.C. governed motor operating at 2102 R.P.M. and is equipped with a 10 spot target, a 300 ohm governor resistor, a 9 tooth pinion and a 45 tooth gear on the main shaft. The speed of the motor is set using a 87.6 V.P.S. tuning fork.

The EX motor arrangement has the same characteristics as the EY arrangement except, it has a 110 volt, shunt wound, D.C. governed motor equipped with a 500 ohm governor resistor.

The GW motor arrangement is the same as the EY except that it is equipped with a 106160 filter.

The units referred to above also have the following 14 type designations assigned to them:

XD79EZ	14AA Transmitter Distributor
XD79EY	14AB Transmitter Distributor
XD79EX	14AD Transmitter Distributor
XD95GW	14ABM Transmitter Distributor

The following is a detailed description of the operation of the various mechanisms of the apparatus:

TAPE SENSING MECHANISM

The contact levers (figure 3) are positioned vertically in the transmitter. They pivot on shaft S and have extensions to the right C, left A and downward B. The right-hand extensions project upward at the ends and have tape pins embedded in them.

An opening is provided in the tape guide plate, located above the right-hand extensions of the contact levers, to permit the tape pins to enter the code holes in the tape.

The left-hand extension of each contact lever carries a contact tongue which is attached to the contact lever by a pivotal mounting. Each contact tongue is positioned to move between two contact screws, a spacing contact screw above and a marking contact screw below.

A contact lever spring is attached to the mounting end of each contact and tends to hold it against the lower contact screw. A contact lever bail, pivotally mounted just below contact lever lower extension, has an arm extending downward engaging a transmitter operating lever.

The transmitter operating lever (figure 2) has a central pivot screw and moves in a horizontal plane. A roller on the rear end of the lever rides a transmitter operating cam mounted on the lower end of the main shaft.

The motion imparted to the transmitter operating lever by the operating cam causes the contact lever bail to rotate the contact levers on their shafts sufficiently to move the contact tongues up and down between the marking and spacing contact screws. After the tongues strike the upper screws, any additional clockwise rotation of the contact levers is absorbed by the contact lever springs.

When the main shaft is stopped (lug on stop cam against the end of stop lever) (figure 1) the contact tongues are held against the spacing or upper contact screws and the tape pins mounted on the right-hand extensions of the contact levers are held below the holes in the tape.

As the operating lever roller rides to the low part of its cam, the tape pins rise. If tape perforated with code combinations is in the tape guide at this time, the contact lever pins will project through the tape

wherever it is perforated and permit the associated contact tongues to rest on the marking or lower contact screws, while the pins which are blocked by the unperforated portions of the tape will cause the associated contact tongues to rest against the spacing or upper contact screws.

The tape will be held stationary and the contact tongues will maintain their positions as determined by the code combinations perforated in the tape while the distributor brushes are traversing the segments and collector ring.

The inner brush picks up signals from the line and the outer brush distributes them to their proper segments which, in turn, are connected to their corresponding contact tongues.

DISTRIBUTOR MECHANISM

The distributor brush arm is mounted on the upper end of the main shaft and is driven by a gear through the medium of a friction clutch.

The distributor commutator (figure 1) is made up of two concentric conducting rings mounted on an insulated disc. The outer ring is divided into five large and ten small segments. The inner ring has two segments; one is a small segment and the other a large segment which forms the most of the ring. The brushes on the brush arm wipe over the rings, thereby connecting the inner segments to the outer segments.

In the normal unoperated position, the main shaft is held stationary, because the lug of the stop cam is against the end of the stop lever. Under this condition the brush arm is positioned so that the one brush rests on the large inner ring segment and the other brush is on one of the small segments to the left of the stop segment on the outer segment ring.

When the start impulse is received, positive battery is applied to the operating magnet coils through the large inner ring segment and the small segment on the outer ring.

This will energize the operating magnet coils so that the stop lever is unlatched from the armature extension and is held out of the way of the lug on the stop cam, permitting the main shaft to rotate. See figure 1 for location of parts.

When the brush reaches the start segment it closes a path to transmit a start or positive battery signal. When the brush reaches the No. 1 segment the line signal will be connected to the No. 1 contact tongue. The same procedure takes place when the brush reaches the Nos. 2, 3, 4, and 5 segments on the outer ring.

When the brush reaches the stop segment on the outer ring, negative battery is applied to the stop segment from the small segment on the inner ring.

When the brush reaches the rest segment on the outer ring, the stop lever is latched on the operating armature extension by means of the reset extension of the stop lever which rides on the lug on the stop cam, resetting

the stop lever so that it will be latched during the time the operating magnet armature is in its unoperated position.

TAPE FEEDING MECHANISM

Positioned to the rear of the contact levers and pivoted on the contact lever shaft is a feed lever (figure 4) which is similar in shape to a contact lever.

The feed lever has a spring attached to its left-hand extension and a feed pawl mounted on its right-hand extension C. A feed pawl spring holds the feed pawl in contact with the feed wheel ratchet.

Pins on the circumference of the feed wheel (figure 3) project through an opening in the tape guide plate and mesh with the feed holes in the tape.

A retaining lid, under which the tape passes, holds the tape in contact with the feed wheel pins.

When the action of the contact lever bail on the contact lever moyes the tape pins downward, the feed lever responds in a similar manner, causing the feed pawl to engage a tooth on the feed wheel ratchet and rotate the feed wheel.

With each downward motion of the feed pawl, the tape will be advanced from right to left, the distance required to bring the succeeding code combination over the tape pins.

The setting of the feed pawl is such that it does not start to rotate the feed wheel until the tape pins have moved clear of the tape.

A feed wheel detent is provided to insure alignment of the code perforations with the tape pins. The position of the operating cam with relation to the distributor brush is such that the contact tongues are not moved from the lower contacts until after the brush has reached the stop segment.

END-OF-TAPE STOP MECHANISM

A means is provided for automatically stopping transmission when a length of tape has passed through the transmitter. This is accomplished by a pair of contacts located beneath the tape guide plate which are operated by a pin that projects through the tape guide plate (figure 1). When the tape retaining lid is closed, the end-of-tape stop pin is depressed and the contacts held closed so long as there is tape between pin and the lid. When the end of the tape passes the pin, the tension of the contact spring raises the pin and opens the contacts, stopping transmission.

SYNCHRONOUS AND GOVERNED MOTORS

Where regulated A.C. power is available, a synchronous motor may be used; otherwise, governed motors must be used.

Governed motors are available for operation on either A.C. or D.C. The speed is controlled by a centrifugal contact mechanism having commutator discs. The motors are mounted directly to the base casting and the resistors and condenser used with governed motors are mounted on the base and in the base cavity.

ADJUSTMENTS

GENERAL

The following adjustments are arranged in a sequence that would be followed if a complete readjustment of the unit were undertaken. This fact should be kept in mind when a single adjustment is to be made because a change in one adjustment may affect other adjustments. If one adjustment is changed, related adjustments should be checked.

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, remove the following parts: Distributor cover, tape exit guide, tape transmitter top plate, tape transmitter snap panel and distributor base plate. Also remove the left bracket from the transmitter assembly.

In the following text when reference is made regarding the left, right, rear, clockwise or counterclockwise direction, this reference is made when the unit is viewed from the front or transmitter end of the unit unless otherwise specified.

Do not rotate the governor or fan in a counterclockwise direction as this will cause the transmitting shaft to rotate backward, which may mutilate the distributor brushes (figure 1). A precaution which may be exercised to avoid mutilation of the distributor brushes is to loosen the brush holder clamp screw (figure 20) and turn the brush holder so as to lift the brushes from the disc.

NOTE: In the following text when reference is made regarding the rotation of the main shaft, the stop lever should be disengaged from the stop lug on the stop cam and the governor or fan rotated in a clockwise direction.

MAIN SHAFT ADJUSTMENT (Figure 5)

Rotate the main shaft until the operating roller just starts to ride up on the high part of the operating cam. Position the transmitting shaft so that there is some clearance between the lower surface of the cam and the upper surface of the operating lever when all the play of the operating lever is taken up in a direction to make the clearance a minimum. With the play in the operating lever taken up in a direction to make the clearance a maximum, this clearance should not exceed .040". To adjust, loosen the main shaft bearing cap screws and raise or lower the main shaft. Tighten the screws.

MOTOR POSITION ADJUSTMENT

There should be a minimum amount of backlash between the motor pinion and the main shaft gear throughout a complete revolution of the main shaft (figure 1). To adjust, loosen the motor mounting screws and position the motor. Tighten the screws.

MAGNET CORE ADJUSTMENT

The armature should strike both pole faces simultaneously and any air gap between the armature and the pole faces (when the armature is held against the pole faces) should not exceed .005". To adjust, loosen the start magnet core mounting screws and position the magnet core. Tighten the screws. See Figure 7 for location of parts.

ARMATURE PLATE ADJUSTMENT

The armature plate should cover fully the pole faces. To adjust, loosen the armature plate mounting screws and position the plate. Tighten the screws. See Figure 7 for location of parts.

STOP LEVER PILOT SCREWS ADJUSTMENT

For type of stop cam shown in Figure 6A use the following adjustment:

- (A) With the reset extension resting on the high part of the stop lug, there should be from .010" to .020" clearance between the top surface of the stop lever and the lower surface of the stop cam at the closest point. The stop lever should be free in its bearings but it should not have perceptible play. To adjust, loosen the stop lever pilot screw lock nuts and position the stop lever. Tighten the lock nuts.

For type of stop cam shown in Figure 6B use the following adjustment:

- (B) With the stop cam lug against the end of the stop lever, the bottom edge of the stop lever should be flush with or not more than .010" above the bottom edge of the lug on the stop cam. The stop lever should be free in its bearings, but it should not have perceptible play. To adjust, loosen the stop lever pilot screw lock nuts and position the stop lever. Tighten the lock nuts.

START MAGNET BRACKET ADJUSTMENT

When the armature is against the pole pieces and the armature extension resting on the bottom of the unlatch step of the stop lever, there should be from .002" to .006" clearance between the right edge of the unlatch step and the left edge of the armature extension at the closest point. Figure 7.

The right edge of the latch step of the stop lever shall be parallel to the left edge of the armature extension in its latched position.

With the armature in the latched position, the rear edge of the stop lever should be flush with or not more than .010" in front of the rear edge of the stop cam lug.

To adjust, loosen the start magnet bracket mounting screws and position the bracket. Tighten the screws.

ARMATURE SPRING TENSION ADJUSTMENT (Figure 8)

With the armature extension in its latched position (armature not attracted) and the stop lever held away from the end of the armature extension, it should require a pressure of 3 to 3-1/2 ozs. to start the armature moving when the push end of an 8 oz. scale is applied horizontally to the armature between the screws. To adjust, tighten or loosen the armature torsion spring by means of the bearing stud.

STOP LEVER SPRING TENSION

With the armature in its latched position, hook a 32 oz. scale over the left end of the stop lever and pull horizontally at right angles to the stop lever. It should require from 12 to 16 ozs. to start the lever moving. See Figure 8 for location of parts.

NOTE: When measuring this tension, the stop lever shall not touch the stop lug.

THE FOLLOWING ADJUSTMENTS, UP TO AND INCLUDING "FEED LEVER SPRING TENSION ADJUSTMENTS," ARE INTERRELATED AND MUST BE MADE IN THE ORDER GIVEN. THEREFORE, IF IT BECOMES NECESSARY TO CHANGE ANY ADJUSTMENT, ALL SUBSEQUENT ADJUSTMENTS IN THIS GROUP SHOULD BE CHECKED.

TAPE FEED PAWL SPRING TENSION ADJUSTMENT (Figure 9) - See Note (A)

Rotate the motor shaft until the feed pawl is in its uppermost position. Apply the push end of an 8 oz. scale to the feeding tip of the tape feed pawl and push horizontally toward the left. It should require 1 to 2 ozs. to hold the pawl in a vertical position. To adjust, loosen the feed pawl mounting screw and position the spring. Tighten the mounting screw.

DETENT LEVER SPRING TENSION (Figure 10) - See Note (A)

Hold the transmitter top plate upside down and in a horizontal plane. Make sure that the detent roller is resting in the hollow between two teeth on the feed wheel ratchet. Hook a 32 oz. scale over the end of the detent lever and pull horizontally against the tension of the spring. It should require 15 to 18 ozs. to start the detent lever moving.

FEED WHEEL SHAFT BEARINGS ADJUSTMENT - See Note (A)

The feed wheel shaft should be free in its bearings and should have some end play, not over .002". To adjust, loosen the feed wheel shaft bearing mounting screws and position the bearings. Tighten the screws. See Figure 10 for location of parts.

* * *

(A) This adjustment should be checked with the tape transmitter top plate removed.

TAPE SPACE ADJUSTMENT (Figure 13)

The clearance between the tape guide and the retaining lid plate should be .011" to .014" throughout the area of the retaining lid plate when the retaining lid is latched closed and the play taken up in a direction to make this clearance a minimum. To adjust, increase or decrease the number of shims installed between the retaining lid and the retaining lid plate.

TAPE GUIDE ADJUSTMENT (Figure 11)

When a piece of perforated tape is engaged with the pins of the feed wheel, there should be equal clearance between the edges of the tape and the tape guide. To adjust, loosen the tape guide mounting screws and position the guide. Tighten the screws.

THE FOLLOWING TWO ADJUSTMENTS PERTAIN TO UNITS EQUIPPED WITH AN END-OF-TAPE STOP MECHANISM. THIS MECHANISM CONSISTS OF A PAIR OF CONTACTS MOUNTED UNDER THE TAPE GUIDE, WIRED IN SERIES WITH THE TAPE STOP MAGNET, AND OPERABLE BY A PIN WHICH PROJECTS THROUGH THE TAPE GUIDE.

END-OF-TAPE STOP CONTACT PIN GUIDE ADJUSTMENT (Figure 14)

There should be .010" to .020" clearance between the end-of-tape stop pin and the shoulder of the tape guide plate when the side play of the pin is taken up in a direction to make this clearance a minimum. To adjust, loosen the stop pin guide mounting screws and position the guide. Locate the feed wheel shaft bearings so that the feed wheel shaft is free with not over .002" end play before tightening the screws.

END-OF-TAPE STOP CONTACT SPRING ADJUSTMENT (Figure 14)

- (a) Place a straight edge across the top of the tape guide plate directly over the end-of-tape stop pin. There should be .020" to .025" clearance between the bottom of the straightedge and the upper end of the stop pin. To adjust, bend the upper contact spring.
- (b) When the lower contact spring is resting against its stiffener, the contact points should be separated by .008" to .012". To adjust, bend the lower contact spring stiffener.
- (c) Place a piece of tape in the guide and close the tape retaining lid. It should require a pressure of 20 to 25 grams (applied at the contact points of the lower contact spring) to just open the contact points. To adjust, bend the lower contact spring. Remove the tape and recheck adjustment (b).

REPLACE THE TAPE TRANSMITTER TOP PLATE. WHEN DOING THIS, HOLD UP THE FEED PAWL SO THAT IT ENGAGES THE FEED WHEEL RATCHET. IF THE UNIT IS EQUIPPED WITH THE END-OF-TAPE STOP CONTACT MECHANISM, HOLD THE CONTACT OPERATING PIN TO PREVENT IT FROM FALLING OUT OF ITS GUIDE.

NOTE: There should be at least .020" clearance between the side of the feed pawl spring and the tape contact lever guide when the feed pawl is in its uppermost position. If this clearance does not exist,

refine the "Tape Feed Pawl Spring Tension Adjustment" within its specified limits to obtain the required clearance.

DETENT BRACKET ADJUSTMENT (Figure 11)

Obtain a piece of tape with a series of LETTERS perforations. Either regular or chadless tape may be used. Check the tape to determine if the spacing of the perforations meets the requirement of ten to the inch. (If chadless tape is used, fold the lids of one set of five perforations backwards so that the lids do not obstruct the holes.) Engage the feed perforations with the feed wheel so that the unobstructed holes are directly over the tape pins. Disengage the stop lever from the stop lug on the stop cam and rotate the governor or fan in a clockwise direction (when the unit is viewed from the front) until the tape pins are flush with the bottom of the tape. With the detent roller resting in an indent between two teeth of the feed wheel ratchet and the play of the tape on the feed wheel is taken up toward the left, the tape pin farthest to the right should just clear the right edge of its associated code hole. To adjust, loosen the detent bracket mounting screws and position the detent bracket. Tighten the screws.

TAPE RETAINING LID LATCH WEARING STRIP SHIMS ADJUSTMENT (Figure 12)

With a .003" thickness gage placed between the retaining lid and the front guide rail on the tape guide plate, the latch should not close freely. With the thickness gage removed and the retaining lid held against the front guide rail on the tape guide plate, the latch should operate freely under its own spring tension. To adjust, increase or decrease the number of shims installed between the latch wearing strip and the top plate.

TAPE RETAINING LID PLATE ADJUSTMENT

Place a piece of chadless tape in the tape guide (engage the feed holes on the pins on the feed wheel) and close the lid. The edges of the plate should be parallel to the shoulders of the tape guide and when the main shaft is rotated the retaining lid plate should not interfere with the lid of the chadless tape when the lids are raised by the tape pins. To adjust, loosen the retaining lid plate mounting screws and position the plate. Tighten the screws. See Figure 13 for location of parts.

RETAINING LID LATCH SPRING TENSION

With the slope on the latch resting against the top plate (not latched), hook an 8 oz. scale over the upper end of the latch and pull at right angles to the formed upper end of the latch. It should require 1-1/2 to 7 ozs. to start the latch moving on its pivot. See Figure 12 for location of parts.

FEED LEVER ADJUSTING SCREW ADJUSTMENT (Figure 15)

When the contact lever bail is slowly operated by hand, the feed pawl should engage the first tooth above the horizontal center of the feed wheel ratchet at the instant the tape pins are flush with the upper surface of the tape guide. To adjust, loosen the feed lever adjusting screw lock nut. Turn the adjusting screw clockwise if the tape pins are below the top surface

of the tape guide when the feed wheel starts to move or counterclockwise if the tape pins extend above the top surface of the tape guide when the feed wheel just starts to move.

OPERATING LEVER ADJUSTING SCREW ADJUSTMENT (Figure 18)

When the operating lever roller is on the highest part of its cam and the detent roller rests between two teeth on the feed wheel ratchet, there should be some clearance, not over .010", between the face of a tooth on the ratchet wheel and the face of the feed pawl. To adjust, loosen the operating lever adjusting screw lock nut and position the adjusting screw. Tighten the nut and recheck the clearance.

CONTACT TONGUES ALIGNMENT (Figure 16)

NOTE: The following adjustment is made during the initial assembly of the unit and should require attention only if the parts have been damaged or dismantled. To check, back off contact screws.

The contact tongues should be straight and parallel (both crosswise and lengthwise) to the upper contact screw bridge. The variation in alignment should not exceed .030". To adjust, bend the contact tongues.

FEED LEVER UPSTOP ADJUSTMENT (Figure 17)

With the operating lever roller on the low part of the operating cam and the detent roller resting in a notch between two teeth of the feed wheel ratchet, the lower surface of the feed pawl should be approximately .020" (gauge by eye) below the tip of the second tooth above the center of the feed wheel ratchet. Adjust by positioning the feed lever upstop. Hold the upstop so that its formed portion is in contact with the lever guide when tightening the mounting screw.

Rotate the motor manually until the contact lever bail just contacts the lobe of the feed lever. With the bail in this position there should be at least .002" clearance between the contact lever bail and each contact lever lobe (See Figure 19). If necessary, refine the feed pawl lever upstop.

NOTE: With the operating lever roller on the low part of the operating cam, there should be at least .010" clearance between the pivotal portion of the feed pawl or any part of the feed pawl spring and the feed wheel ratchet. If this clearance does not exist, refine the lever upstop adjustment to obtain the desired clearance.

TAPE TRANSMITTER CONTACTS

The contacts require very little attention because no current is flowing through the contacts at the moment the contact tongues leave the contact screws. When periodic inspection is made, the contacts should be cleaned with a contact burnisher or a piece of fine carborundum cloth. Particles of grit should be carefully wiped away after this operation.

LOWER CONTACT SCREW ADJUSTMENT (Figure 19)

Rotate the main shaft until the operating lever roller is resting on the low part of its cam and place a straightedge across the top of the tape

guide directly over the tape pins. There should be a clearance of .020" to .025" between the bottom of the straightedge and the top of each tape pin. To adjust, loosen the set screws of the upper and lower contact screws and back off the upper contact screws. Then adjust the lower contact screws to meet the requirement. Tighten the lower contact screw set screws.

NOTE: There should also be a clearance of at least .002" between the contact lever bail and the lobe of each contact lever. If this clearance does not exist, refine the lower contact screw adjustments within the specified limits to obtain the desired clearance.

UPPER CONTACT SCREW ADJUSTMENT (Figure 19)

With the operating lever roller on the low part of its cam, there should be a gap of .006" to .010" between the contact point of each upper contact screw and its associated contact tongue. To adjust, loosen the upper contact screw set screws and adjust the upper contact screws. Tighten the set screws.

CONTACT LEVER SPRING TENSION ADJUSTMENT (Figure 19)

With the operating lever roller on the low part of its cam, hook an 8 oz. scale under the horizontal portion of a contact lever (the scale rod just clearing the contact tongue pivotal mounting) and pull vertically upward. The pull required to separate the contacts should be 6 to 7 ozs. Use a test lamp to determine when the contacts break. Measure all contact lever springs in the same manner. To adjust, loosen the contact lever spring anchor terminal screws and position the anchors. Tighten the terminal screws.

FEED LEVER SPRING TENSION ADJUSTMENT (Figure 15)

With the operating lever roller on the low part of its cam, hook a 32 oz. scale over the end of the feed lever (just below the spring hole) and pull upward in line with the spring. It should require 17 to 19 ozs. to start the feed lever moving. To adjust, loosen the terminal screw and position the spring anchor. Tighten the terminal screw.

DISTRIBUTOR BRUSHES

The distributors are provided with carbon brushes. The contact pressure of the carbon brushes should be readjusted occasionally to compensate for brush wear. This is done by rotating the brush holder and resurfacing the brushes.

CARBON BRUSH ADJUSTMENT

- (1) With the main shaft in its stop position, loosen the three screws used for mounting the outer disc and move the adjustable disc so that the leading edge of the No. 5 segment is in line with the point 60 on the orientation scale.
- (2) Position the entire brush arm holder assembly so that the carbon brushes will not overlap their respective commutator rings during an entire revolution of the main shaft.

NOTE: This adjustment may be further refined by positioning each brush in its retainer slot of the brush arm.

- (3) The edge of the brushes should line up with the inscribed line on the adjustable disc. The brushes should be centrally located with respect to their associated segments. To adjust, loosen the brush spring clamp screw and position the brushes. Tighten the clamp screw. Recheck Item 2 - See Figure 20A.
- (4) Hook an 8 oz. scale under the end of each distributor brush spring and pull upward at a right angle to the end of the brush spring. It should require 2-1/2 to 3-1/2 ozs. to lift the brush from its segment. To determine this point, use a test lamp. See Figure 20B.

Adjust the spring tension in the following manner: Loosen the brush holder clamp screw so that the brush holder is friction tight. Rotate the brush holder counterclockwise until the brushes are lifted from their segments and adjust the brush springs by bending them slightly, if necessary, so that the contact surface of the brushes are equidistant from and parallel to the segments. Then rotate the brush holder clockwise until the brushes rest against the segments with a pressure of about 3-1/2 ozs. and tighten the clamp screw. Place a piece of fine sandpaper (approximately 1" wide) face up on the distributor disc and draw the brushes across it two or three times or until the bottoms of the brushes are parallel to the surface of the segments. Recheck the spring tension and readjust if it does not meet the requirements.

If it is found necessary to readjust the brush holder to obtain the proper spring tension, the brushes should be resurfaced in accordance with the foregoing instructions.

OPERATING CAM ADJUSTMENT

The operating cam should be positioned so that the No. 1 marking contacts close when the leading edge of the brush reaches the middle of the third segment to the left of the "stop" segment. The marking contacts shall not open until the trailing edge of the brush has passed beyond the end of the No. 5 segment by at least .060".

To adjust, place the main shaft in its stop position and loosen the mounting screws for the outer disc. Move the adjustable disc so that the brush is in the center of the small segment to the left of the "stop" segment. Loosen the operating cam mounting screws and position the cam. Tighten the screws. See Figures 1 and 2 for location of parts.

NOTE: Be careful when moving the adjustable disc so that the brushes do not catch in the slots between the segments.

MAIN SHAFT CLUTCH TORQUE ADJUSTMENT

With the motor running, it should require a pull of 32 to 36 ozs. to hold the brush arm stationary when a 64 oz. scale is hooked over the stop cam lug (figure 7). This measurement should be made when the unit is warm from recent operation; otherwise, the unit should be operated for at least ten minutes with the friction clutch slipping before the measurement is made. The operating cam should be relieved of the operating arm load during torque measurement. This may be done by removing the base plate and removing the operating arm. To adjust the clutch torque, loosen the adjustable clutch disc

lock nut and turn the disc clockwise to increase the torque or counterclockwise to decrease the torque. Hold the disc and tighten the lock nut against it. Use a 76289 spanner wrench. See figure 1 for location of parts.

REPLACE THE TRANSMITTER LEFT BRACKET, TRANSMITTER TOP COVER, TAPE EXIT GUIDE, SNAP PANEL, AND THE TRANSMITTER DISTRIBUTOR BASE PLATE.

SYNCHRONOUS MOTORS - STARTING SWITCH ADJUSTMENTS

The following requirements should not be checked unless there is reason to believe that the starting switch is out of adjustment.

- (a) Remove the motor unit from the base and remove the motor fan and pinion.
- (b) Remove the switch and shield screws and the switch commutator mounting screws. Remove the switch end shield.
- (c) Pull out the rotor until the brush holder spring is accessible and remove the spring.
- (d) The tension of the spring for 60 cycle motors should measure 3 to 3-3/4 ozs. when extended to a length of five inches, using an 8 oz. scale. The tension of the spring for 50 cycle motors should measure 1-1/2 to 2-1/2 ozs. when extended to a length of five inches, using an 8 oz. scale.
- (e) The brush holders should be mounted by means of the center set of mounting holes and should be free.
- (f) The brush holder stop pins should be safely within the holes of the fibre 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.
- (g) Replace the brush holder spring, making certain that the spring eyes are fully engaged with each other.
- (h) Replace the switch commutator screws and tighten the two screws alternately a little at a time until both screws are tight.
- (i) Replace the switch end shield screws, using the same precaution in tightening as above.
- (j) Apply the push end of a 12 lb. scale against the fan end of the shaft and push parallel to the shaft. It should require at least 7 lbs. pressure to start the shaft moving.
- (k) Replace the motor fan and pinion. Replace the motor on the base and remake the motor position adjustment.

GOVERNOR ADJUSTMENTS

SPEED ADJUSTING WHEEL FRICTION WASHER ADJUSTMENT (Figure 21)

In order to check this adjustment, it is necessary that the speed adjusting spring be adjusted so that it requires a pull of 13 to 14 ozs. to separate the governor contacts. To measure, hook a 32 oz. scale over the contact spring next to the contact and pull parallel to the speed adjusting spring. Adjust to the proper tension by means of the speed adjusting wheel.

Insert a bank pin radially in the leather of the adjusting wheel, hook a 32 oz. scale over the pin at the periphery of the wheel and pull at right angles to the radius. 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.

SPEED ADJUSTING LEVER STOP PLATE ADJUSTMENT

There should be .006" to .050" clearance between the speed adjusting lever wearing strip and the governor shell when the speed adjusting lever is held against the stop plate. To adjust, loosen the stop plate mounting screws and position the plate. Tighten the screws. See figure 22 for location of parts.

GOVERNOR SHIMS ADJUSTMENT

With the governor speed adjusting lever in its unoperated position, there should be at least .006" clearance between the wearing strip and the adjusting wheel when the adjusting wheel is opposite the wearing strip and all the end thrust of the motor armature is taken up in a direction to make this clearance a minimum. Adjust by increasing or decreasing the number of shims on the armature shaft between the governor hub and the end frame casting of the motor. See figure 22 for location of parts.

SPEED SETTING

When governed motors are used, a tuning fork is required for the purpose of checking the motor speed. The fork is equipped with shutters attached to the ends of the tines. The governor is equipped with a target having alternate black and white spots (figure 22).

To check speed, the target should be well illuminated. Tap the fork lightly to make it vibrate. Hold the fork so that the shutters are close to the eye, and view the target through the openings in the shutters. If the motor is running at the correct speed, the target will appear to be stationary. If the motor is running too fast, the spots will appear to be moving in the direction of motor rotation; 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.

To adjust the speed, stop the motor and turn the governor adjusting wheel in one direction or the other a little at a time, checking the speed after each adjustment until the correct speed is obtained.

INNER AND OUTER DISC CONTACT SPRING ADJUSTMENT (Figure 23) - See Note (B)

- (a) The distance from the inner surface of the governor cover to the highest point on the contact springs should be $25/32"$ to $27/32"$.
- (b) Place a "D" socket wrench over the nut located in the center of the governor cover. With a six inch 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 $19/32"$.
- (c) In a similar manner, measure the distance from the wrench to the point of contact on the outer disc contact spring. The distance should be $7/16"$ to $1/2"$.

To adjust for the above requirements, bend the inner and outer disc contact springs.

GOVERNOR BRUSH SPRING PLATE BRACKET ADJUSTMENT (Figure 22)

- (a) 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 22-B).
- (b) The surface of the brush spring plate bracket on which the brush spring plate is mounted should be in line with the outer surface of that part of the governor cover on which the target is mounted (figure 22-A).
- (c) The brush spring plate bracket should be parallel to the edge of the motor base plate.

To adjust for the above requirements, loosen the brush spring plate bracket mounting screws and position the bracket. Tighten the screws.

GOVERNOR BRUSH SPRING PRESSURE ADJUSTMENT (Figure 22)

- (a) The carbon brushes should exert a pressure of $4-1/2$ to $5-1/2$ ozs. against their associated discs. To measure, apply an 8 oz. scale to the spring near the carbon brush and push (or pull) horizontally until the brush starts to move away from the disc.

* * *

NOTE (B) This requirement should be checked with the governor guard, the brush spring plate, and the governor cover removed. See figure 22 for location of parts.

- (b) Both carbon brushes should lie flat against their associated discs and the outer edges of the brushes should be flush with, or not more than $3/64$ " inside of, the outer edge of the discs.

To adjust for these requirements, remove the brush springs and bend them if necessary. Reinstall springs and position them properly. Tighten the screws.

GOVERNOR GUARD ADJUSTMENT (Figure 22-A)

There should be at least $1/16$ " clearance between the governor guard and the edge of the target. Adjust by bending the governor guard if necessary. Replace the distributor cover.

* * *

LUBRICATION

Proper attention to lubrication is of the utmost importance. The lubricants listed in the lubrication specification should be used to lubricate the distributor. 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 except where the use of grease or oil-grease-oil is specified.

- * 1. Clutch felt washers - saturate with oil and apply coating of grease
 - 2. Main shaft - bearings
 - 3. Operating lever - bearing (oil hole which runs between top of base casting and operating lever bearing)
 - 4. Contact lever bail - bearings
 - 5. Contact levers - bearings
 - 6. Feed pawl - bearings
 - 7. Feed lever - bearings
 - 8. Feed wheel - bearings
 - 9. Detent lever - bearings
 - 10. Detent roller - bearings
 - 11. Retaining lid - bearings
 - *12. Stop lever felts - saturate with oil and apply coating of grease
 - *13. End of stop lever - oil, grease, oil
 - *14. Stop cam lug - latching and camming surfaces - oil, grease, oil
 - *15. End of armature lever - grease
 - *16. Latching steps of stop lever - grease
 - *17. Reset extension - oil, grease, oil
 - 18. Motor pinion - apply thin film of grease
 - 19. Main shaft gear - apply thin film of grease
 - 20. Operating cam - apply thin film of grease to periphery of cam
 - 21. Springs - oil both loops of all helical springs that exert a nominal tension of less than 2-1/2 pounds. Apply grease to both loops of all helical springs that exert a nominal tension of 2-1/2 pounds or more.
 - 22. Operating lever adjusting screw - apply thin film of grease to head of screw.
 - 23. End-of-tape stop contact pin - at guide bracket (oil sparingly)
 - 24. Motor bearings - oilers (two)
 - *25. Loops of clutch lever spring and entire length of armature retractive spring - grease
- * On these items, use Dixons No. 677 graphite gear lubricant at places where grease is specified instead of the grease listed in the lubrication specification.

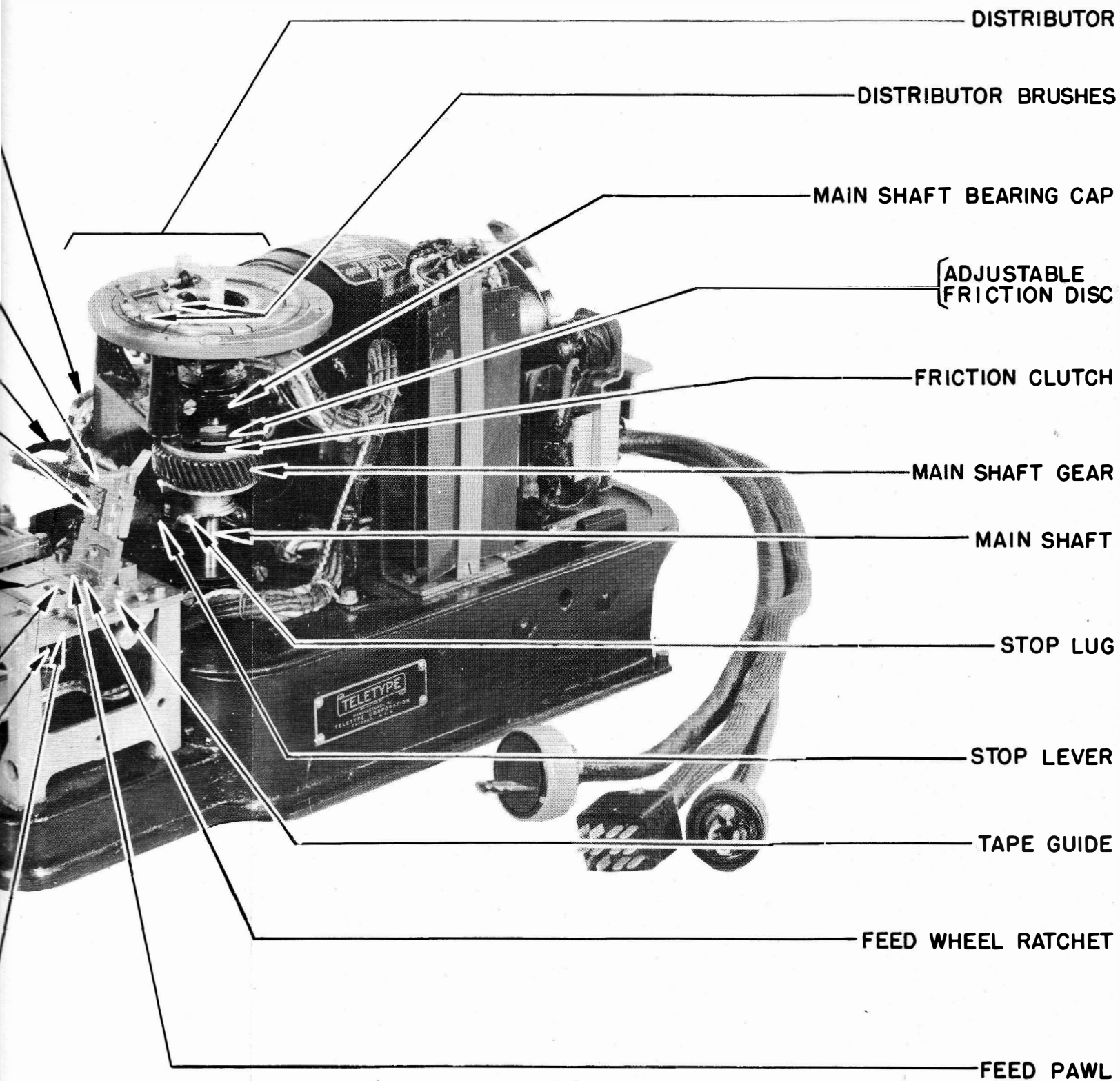


FIGURE 1

START MAGNET

TAPE RETAINING LID

START MAGNET
ARMATURE EXTENSION

TAPE RETAINING PLATE

TRANSMITTER

UPPER CONTACT
SCREWS (SPACING)

CONTACT LEVERS

TAPE PINS

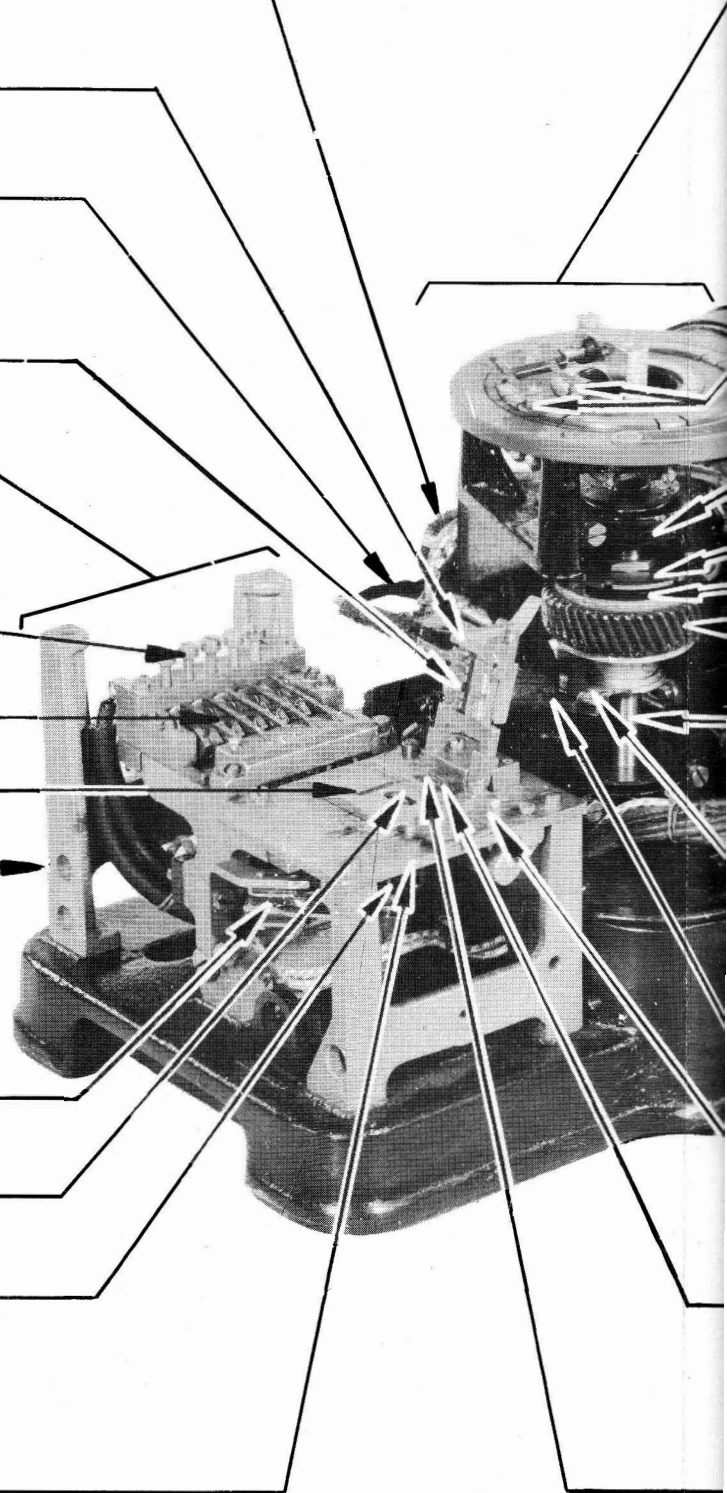
LEFT BRACKET

END-OF-TAPE CONTACTS

FEED WHEEL

END-OF-TAPE PIN

TAPE TRANSMITTER TOP PLATE



FIGURE

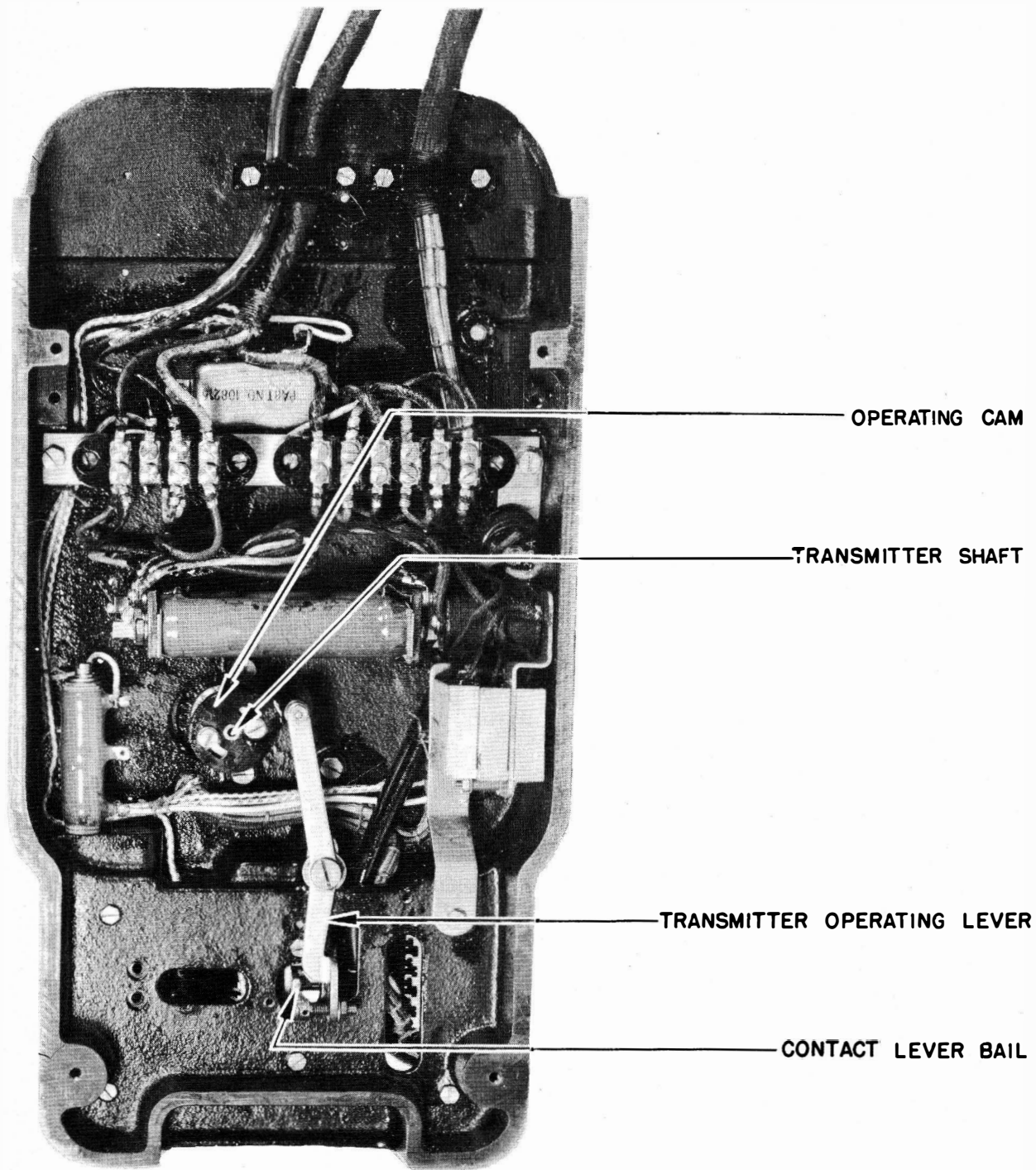


FIGURE 2

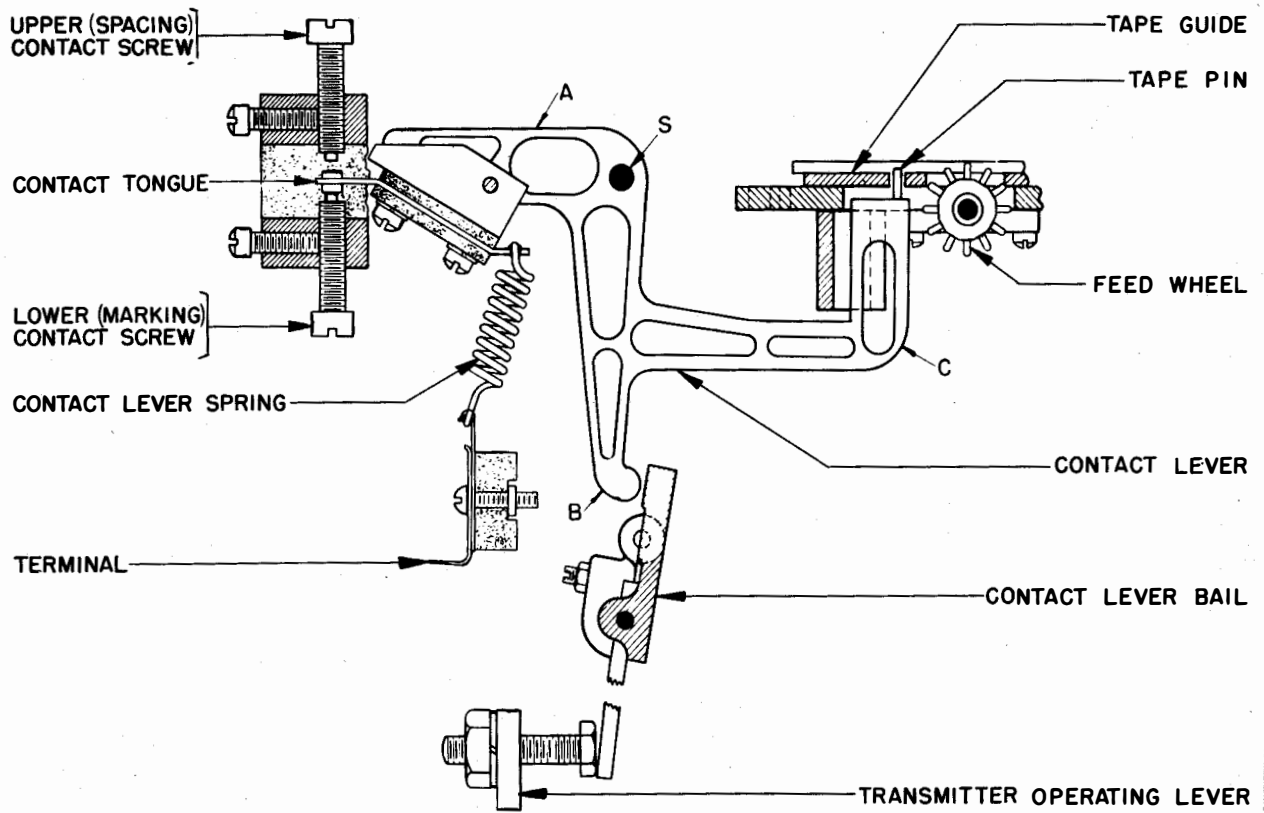


FIGURE 3

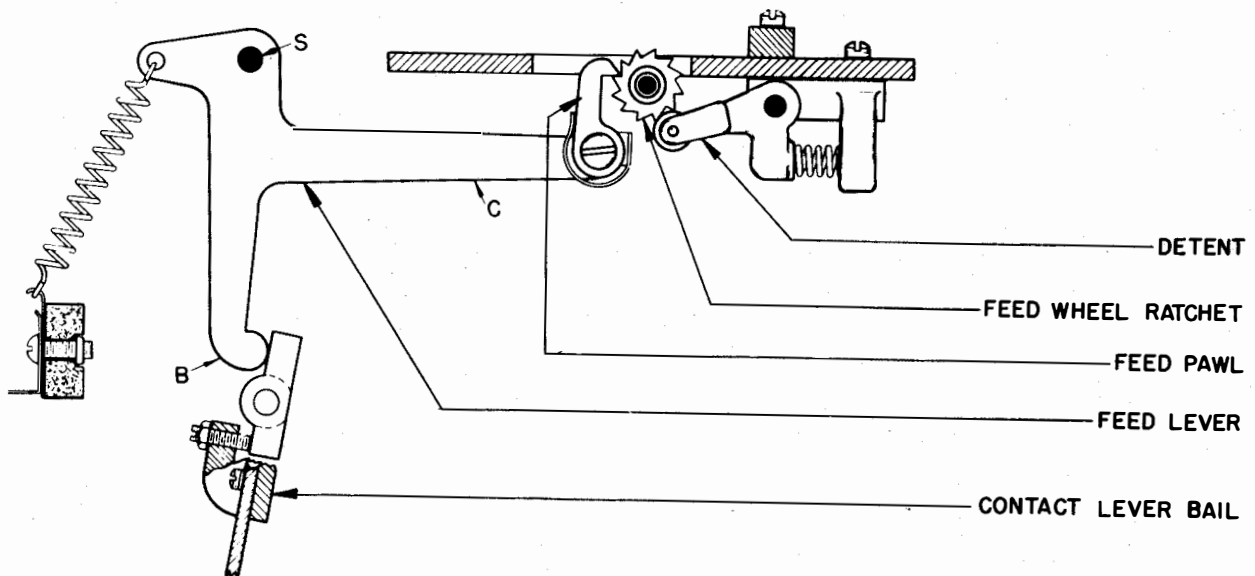


FIGURE 4

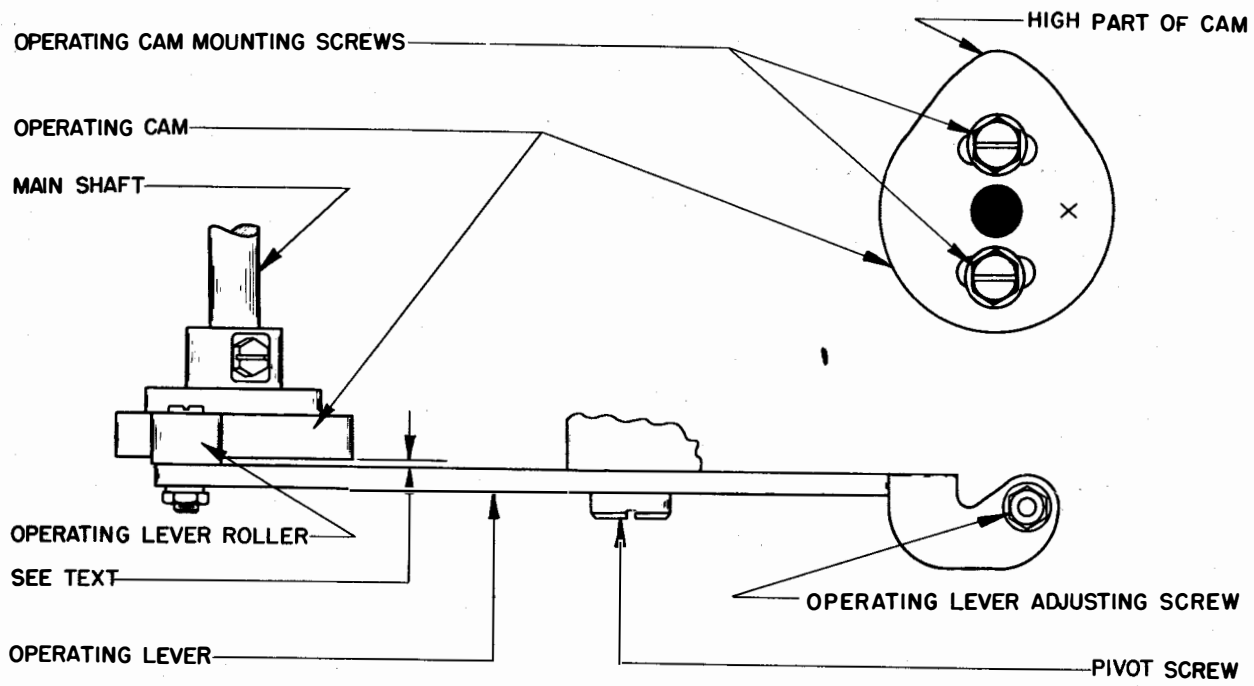
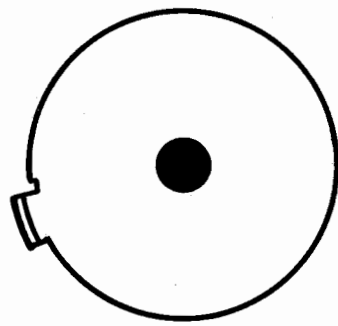
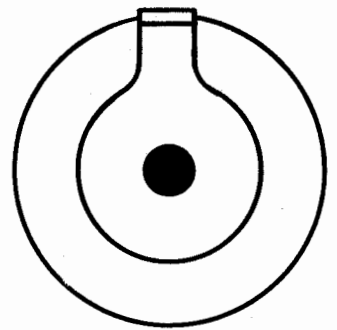


FIGURE 5



A



B

FIGURE 6

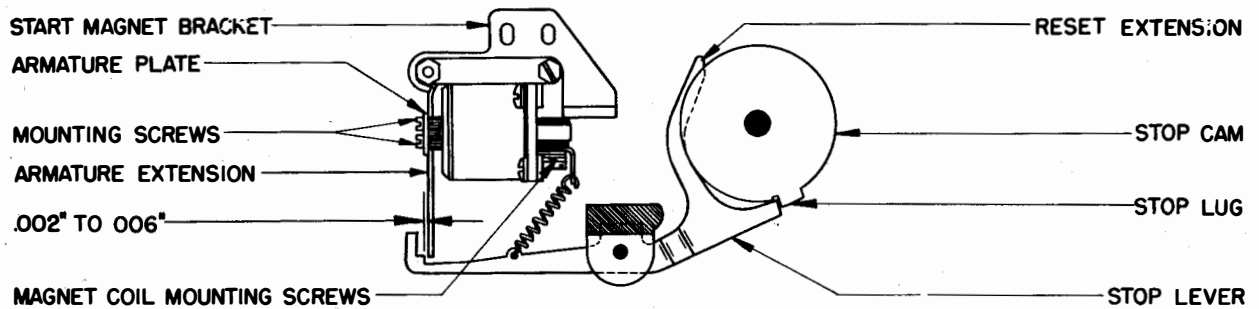
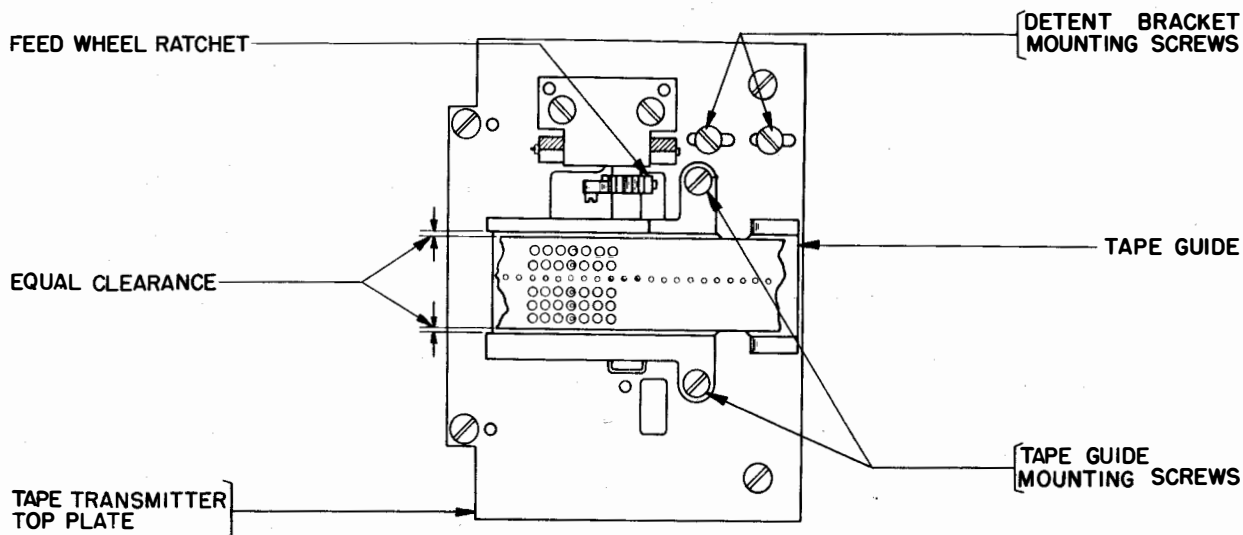
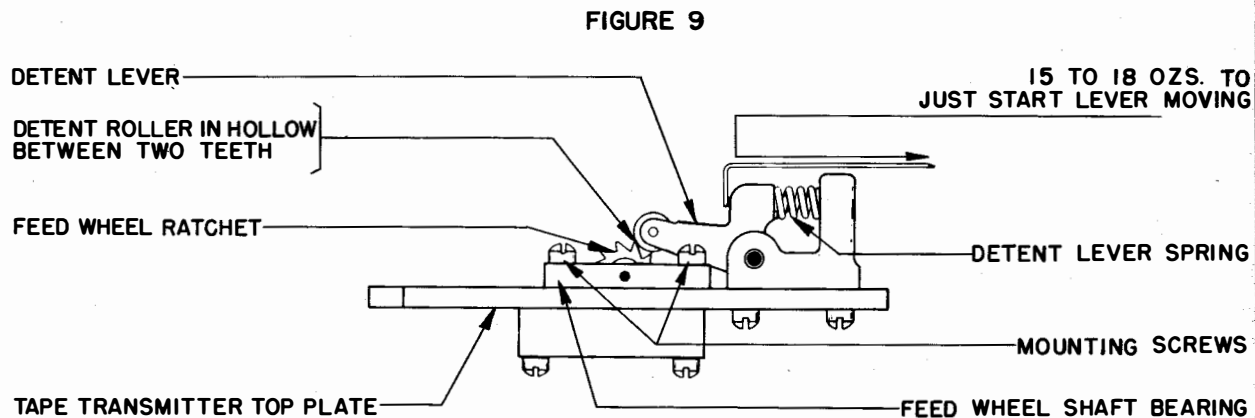
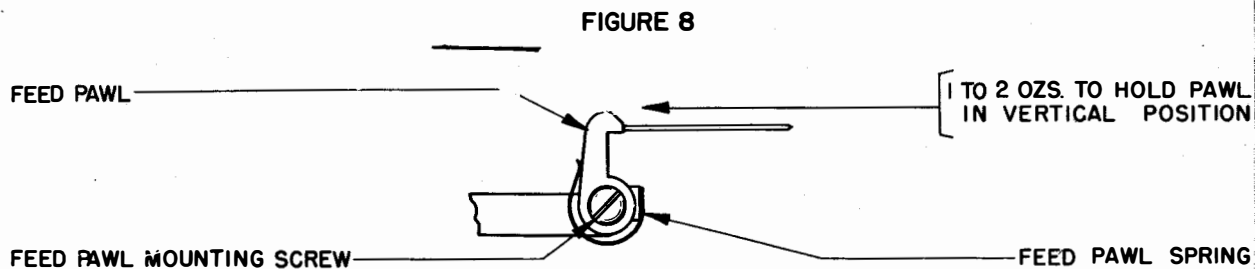
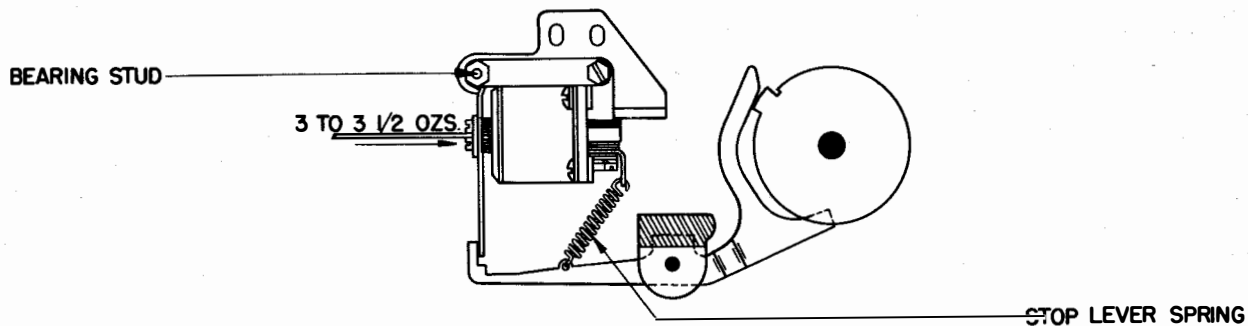


FIGURE 7



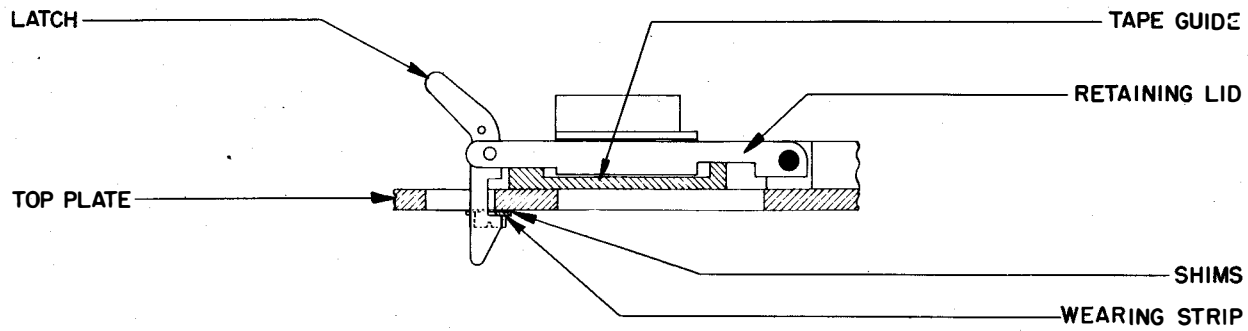


FIGURE 12

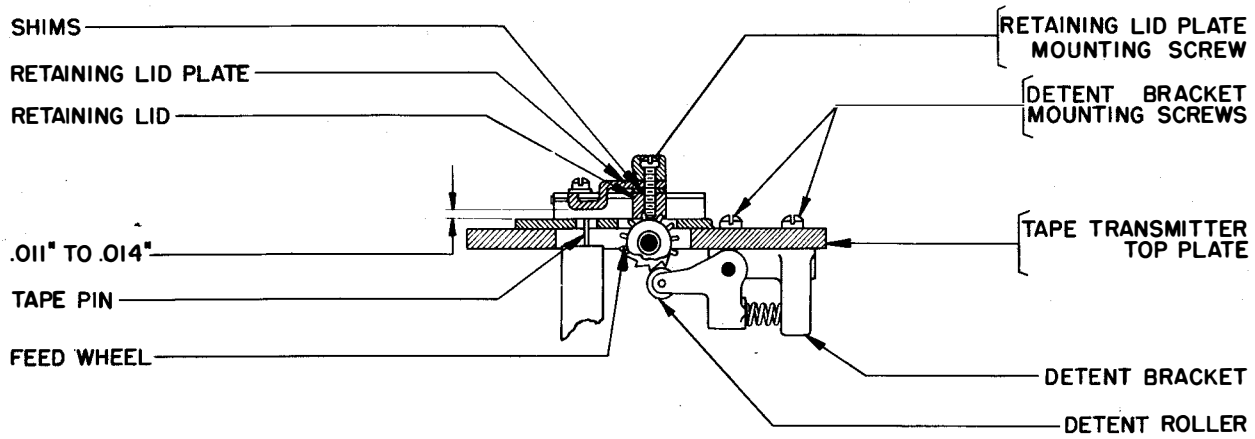


FIGURE 13

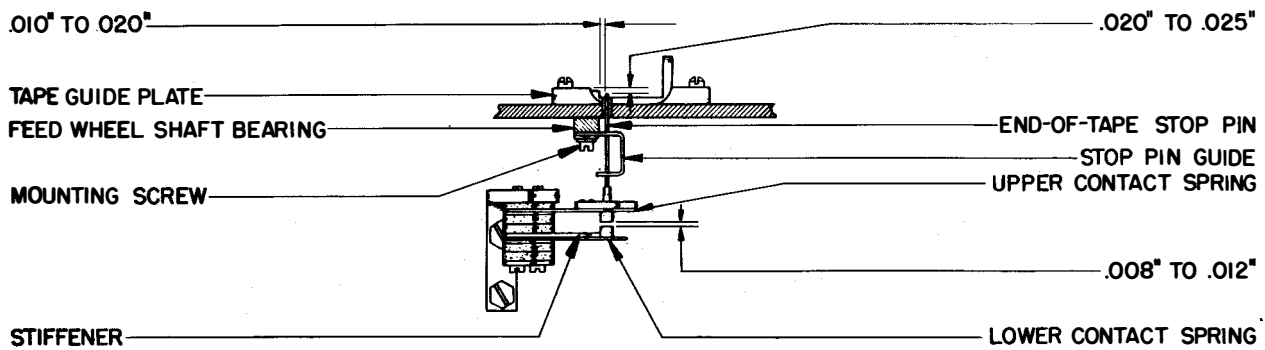


FIGURE 14

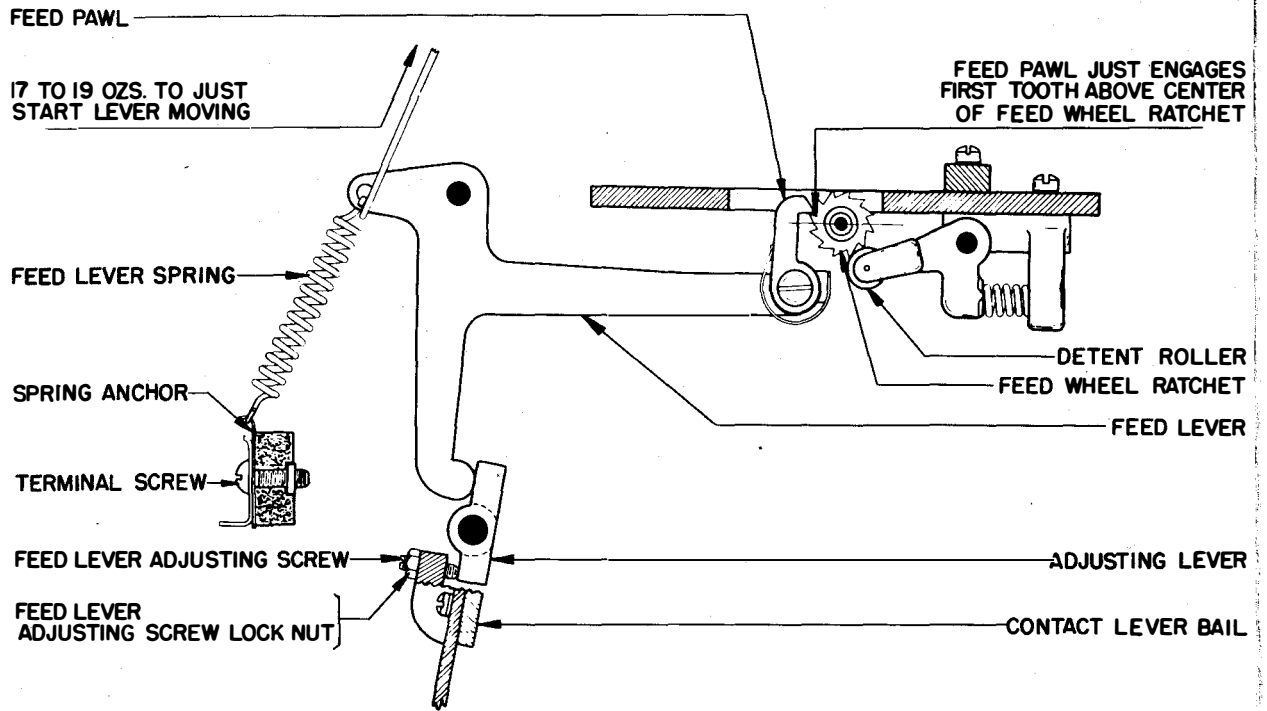


FIGURE 15

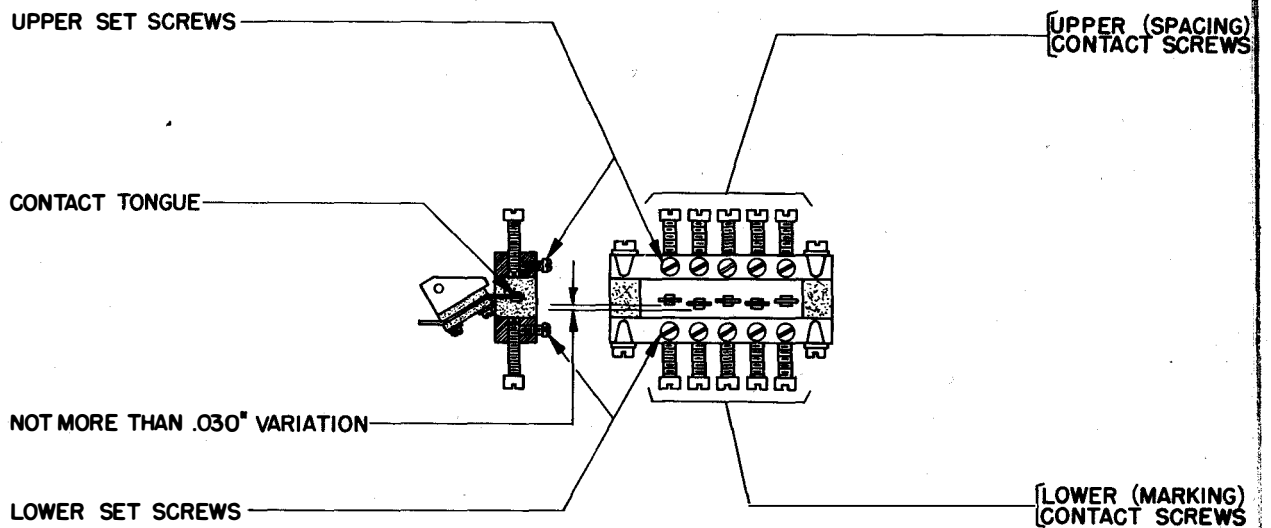


FIGURE 16

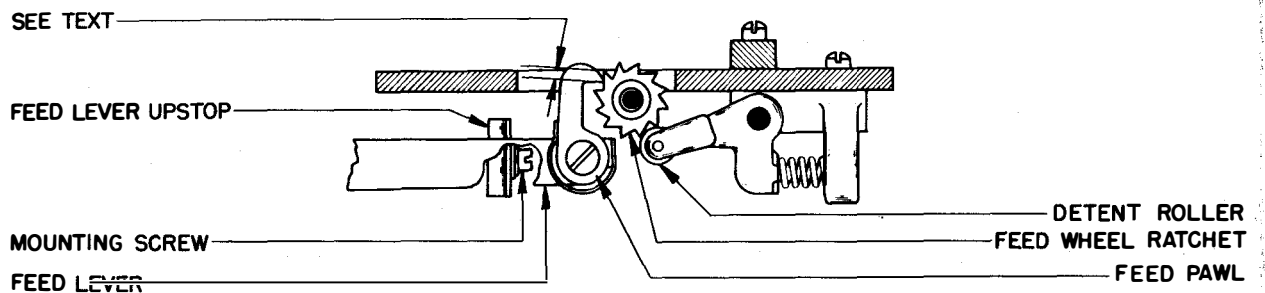


FIGURE 17

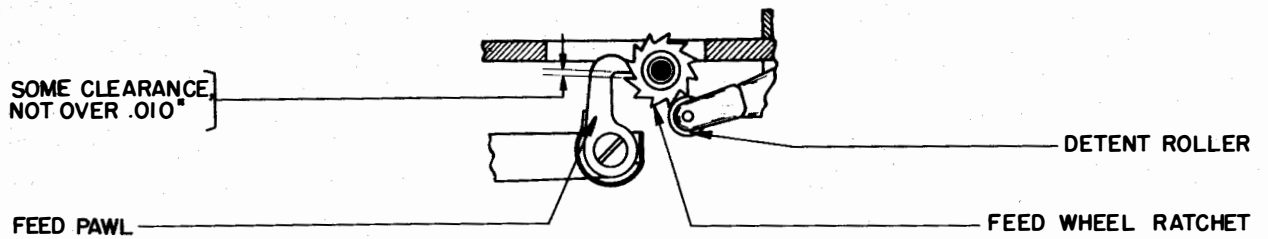


FIGURE 18

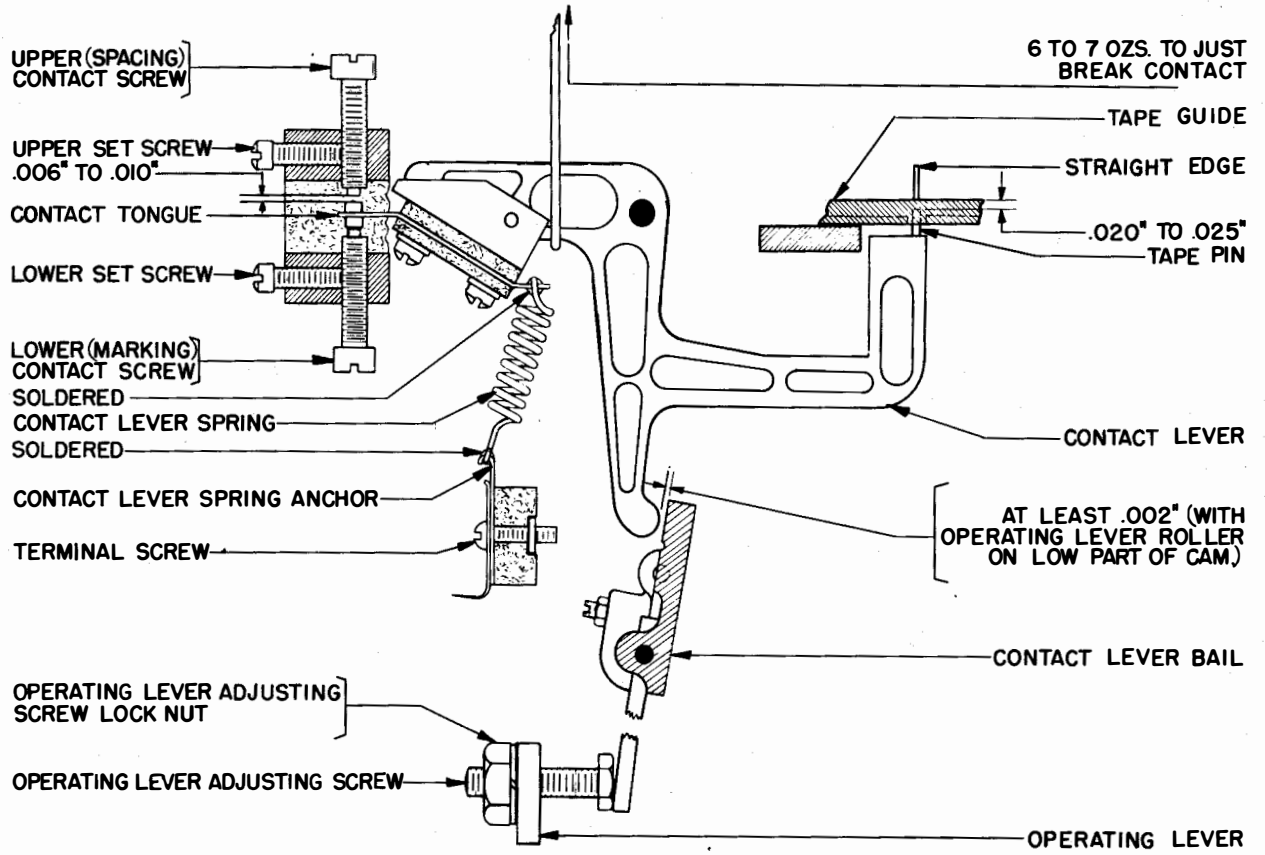


FIGURE 19

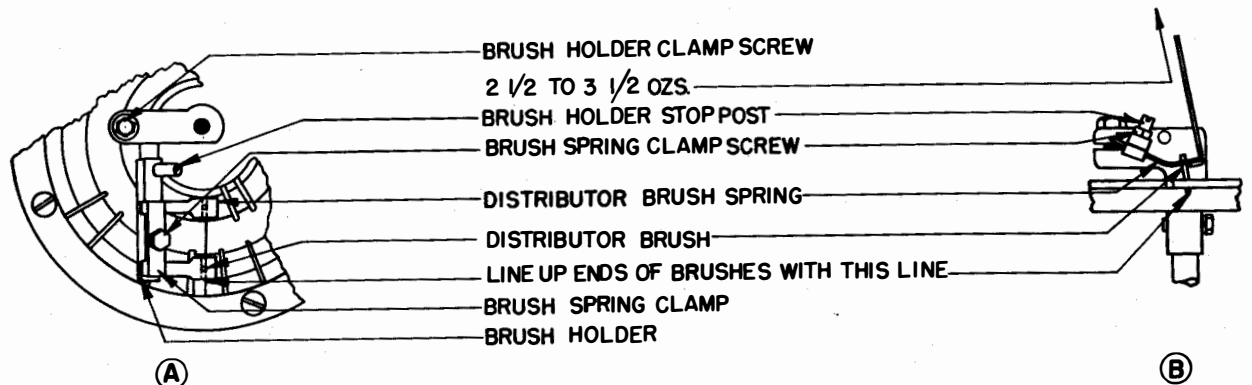


FIGURE 20

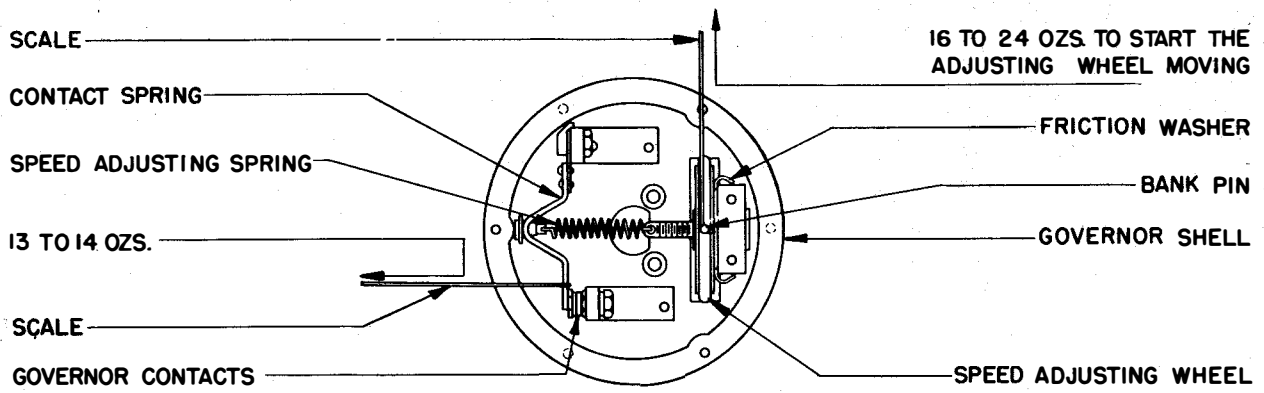


FIGURE 21

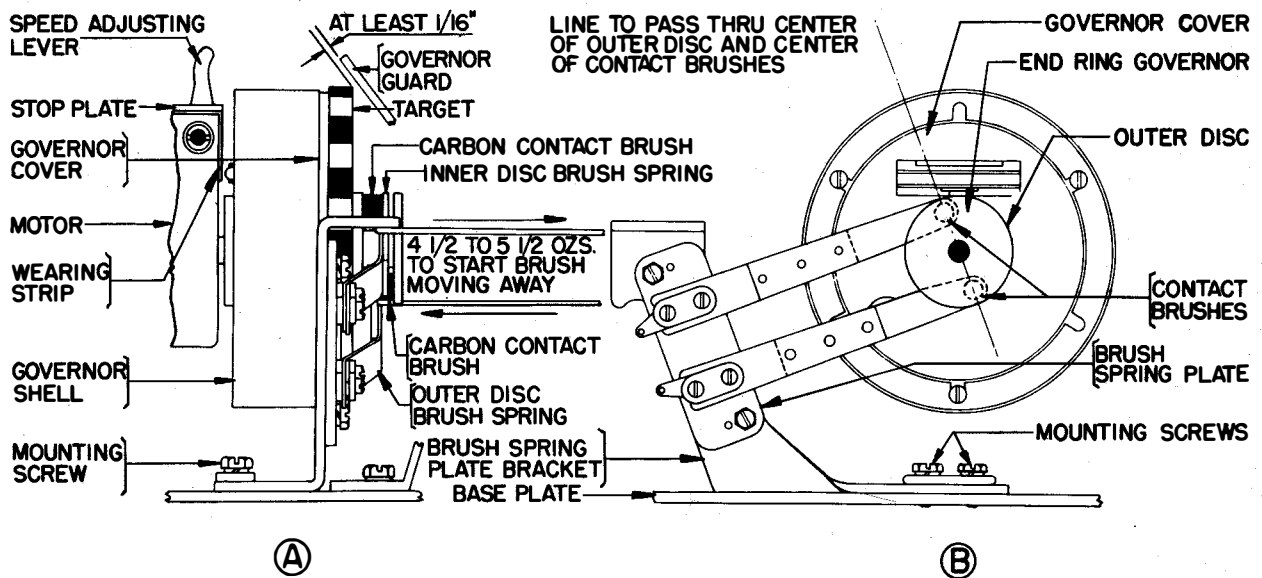


FIGURE 22

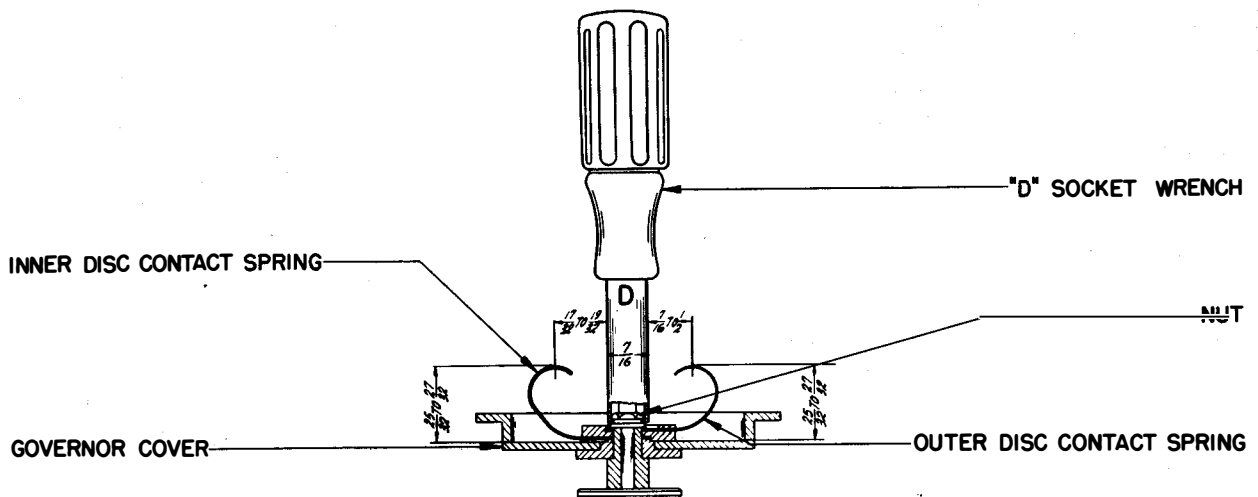


FIGURE 23