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TELETYPE

PRINTING TELEGRAPH SYSTEMS

DESCRIPTION

REPERFORATOR TRANSMITTER DISTRIBUTOR
(NONTYPING—FULLY PERFORATED TAPE)
(FRXD3)

REPERFORATOR TRANSMITTER DISTRIBUTOR
(TYPING—CHADLESS TAPE)
(FRXD4)

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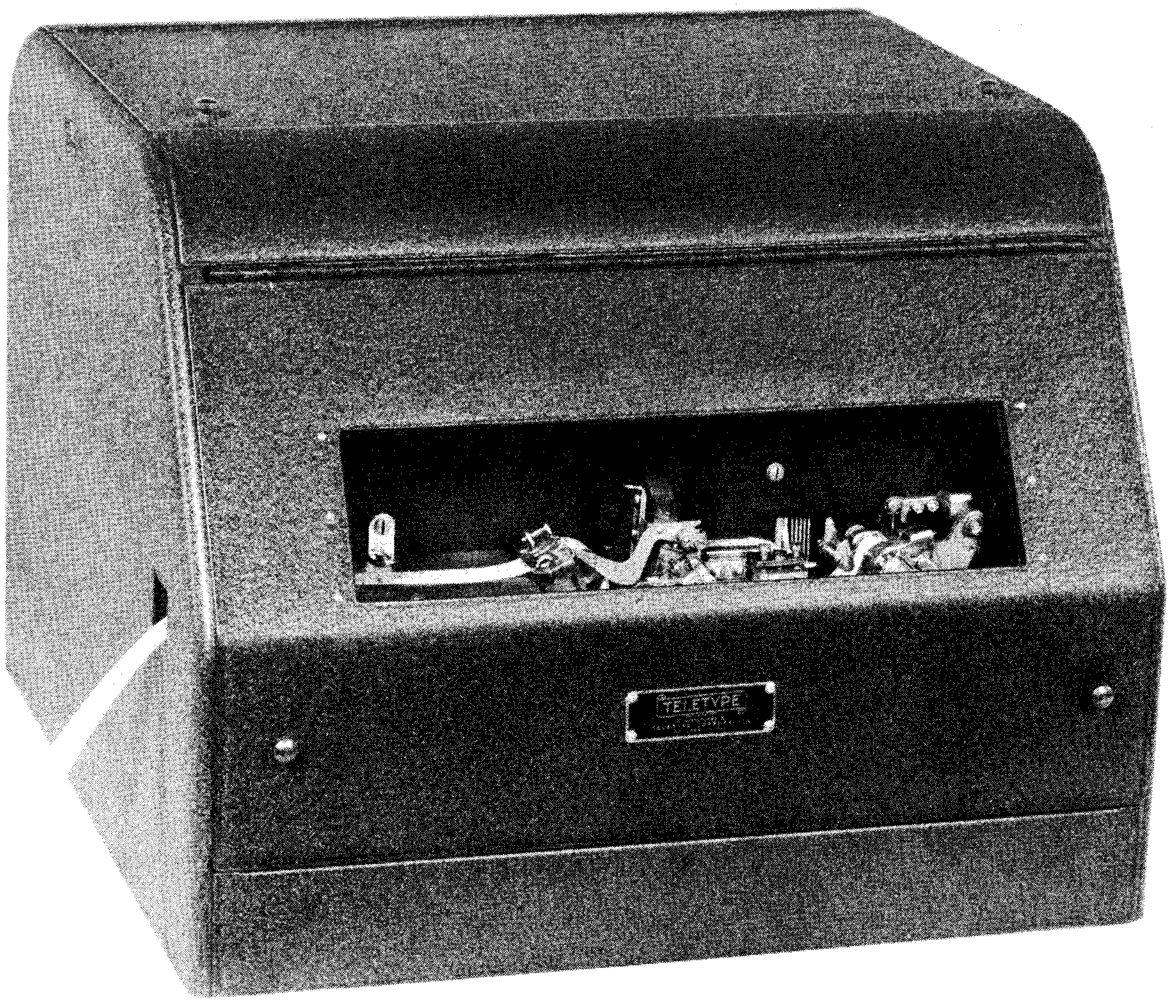


REPERFORATOR TRANSMITTER DISTRIBUTOR WITH COVER
(NON-TYPING FRXD3)

REPERFORATOR TRANSMITTER DISTRIBUTOR WITH COVER
(TYPING FRXD4)

C O N T E N T S

DESCRIPTION

DESCRIPTION

GENERAL

The FRXD3 and FRXD4 reperforator transmitter distributors have the same mechanical features with the exception of the following:

(A) The FRXD3 is equipped with a non-typing reperforator which produces a fully perforated tape (see Figure 1).

(B) The FRXD4 is equipped with a typing reperforator which produces a chadless printed tape (see Figure 2).

The Reperforator Transmitter Distributor is a motor driven mechanism which combines in a single unit the functions of a typing or non-typing reperforator and a tape transmitter distributor which permits the transmission of the last perforated character.

The unit provides a fully automatic mechanism in which the perforated tape may be stored in the form of a loop for subsequent transmission, or in which all the combinations in the tape up to and including the last character perforated may be transmitted. This is accomplished by means of a pivoted tape transmitter which moves along the tape as it becomes taut, until it reaches a position one character space (.100") away from the point at which the code perforations are made in the tape. Both the typing and non-typing reperforator mechanisms use standard 11/16 wide perforated tape.

SIGNALING CODE

The signaling code used to operate the typing reperforator is known as the five unit code. It consists of 32 arrangements of current and no-current impulses of code combinations, each consisting of five parts. To print a certain character the code combination assigned to that character must be received. These combinations are shown in Figure 3. Each group of five selecting impulses is preceded by a start impulse and followed by a stop impulse. The start and stop impulses are used to maintain synchronism between the transmitting and receiving apparatus.

NON-TYPING REPERFORATOR

The mechanisms of the non-typing reperforator are the same as the mechanisms described under TYPING REPERFORATOR except that no typing mechanism is provided and a fully perforated tape is produced instead of a chadless tape. Blank code bars are used instead of the regular code bars since no pull bars are selected for printing. Note: Typing mechanism is described under the four subheadings: PRINTING, RIBBON FEED, RIBBON REVERSE, and UPPER AND LOWER CASE MECHANISM.

TYPING REPERFORATOR

GENERAL

The typing reperforator uses a method of tape perforating known as chadless perforating to permit perforation of the tape in the same space that is occupied by the printed characters. The punchings, or chads, are not completely severed from the tape but remain attached to it at their leading edges so as to form lids over the holes. The printed characters are legible because the perforating does not eliminate any portion of the tape.

Typing and perforating occur simultaneously, but due to the fact that the platen is to the right of the perforator die block, characters are typed at the right of their respective perforations. The separation between the printed character and its associated perforation is six character spaces. This separation must be taken into account when tearing message tapes from the unit or in cutting the tape. When the tape is to be used for transmission by means of an external transmitter distributor, the end of the tape should include all of the printed characters in the message and the first printed character of the message must be preceded by at least six sets of code perforations in order to transmit the entire message.

When a message tape is inserted in the tape guide of an external transmitter distributor, and the printed symbol of the character to be transmitted is positioned opposite the tape locating mark impressed in the tape guide, the code perforation for that character will be over the tape sensing pins in position for transmission. Under this condition, if the tape retainer of the transmitter distributor is fastened over the tape, the tape locating mark will be covered, but the printed character will be visible immediately to the right of the tape retainer.

MAIN SHAFT ASSEMBLY

Motion for the setting up of selections and for the performance of all functions is derived from cams mounted on the main shaft (Figure 4). This shaft is driven by a motor through the medium of a pinion and worm gear. The selector cam sleeve is fitted over the end of the main shaft and is driven through the medium of a friction clutch formed by two pairs of steel discs separated by felt washers. The main bail cam (which provides motion for all other funtions of the receiving unit except selecting, perforating and spacing) and the punch arm cam are assembled in one unit and are driven by a positive clutch consisting of a driving member and a driven member.

SELECTING MECHANISM

The selecting mechanism translates the signal line impulses into mechanical motion which causes the code bars to be positioned in accordance with the intelligence impulses received during the selecting cycle. The translation of signal line impulses into mechanical motion is accomplished by the selector magnet, the armature, the selector arm, the armature cam, and the armature spring (Figure 5). An extension of the armature which rides on the armature cam, moves the armature against the magnet at the time a signal line impulse is received. The armature will be held against the magnet if a current (marking) impulse is received, and will be released from the magnet if a no-current (spacing) impulse is received. The selector arm is actuated by the armature extension because the selector arm spring makes a yield connection between these two parts. Each selecting cycle is preceded by a no-current or start impulse which permits the cam sleeve to start rotating by releasing its stop arm (Figure 6). The armature spring causes the head of the trip-off screw to depress the trip latch plunger actuating the bell crank and trip latch which unlatches the stop lever.

Each code bar is positioned by a selector cam through the medium of a selector lever, sword, and T lever (Figures 5 and 6). To illustrate, suppose that a series of impulses corresponding to the code combination for the letter E is to be received. At the beginning of the start impulse, the armature moves away from the magnet, releasing the stop arm. The selector cam sleeve starts to revolve, and the No. 1 selector cam engages the No. 1 selector lever during the time that the first intelligence impulse of the signal is being received. At the same time the armature cam moves the armature against its magnet. Since the first intelligence impulse of the E code combination is a current impulse, the magnet is energized, holding the right-hand end of the selector arm in the path of the right-hand sword arm. As the No. 1 cam rotates clockwise, it rotates the No. 1 selector lever counterclockwise causing the No. 1 sword to strike the right-hand end of the armature extension and to pivot at point A. This positions the No. 1 sword so that when the No. 1 cam rotates past the tip of the No. 1 selector lever, the selector lever spring will cause the sword to depress the left end of the T lever, moving the No. 1 code bar to the right (see position Figure 5).

Since the Nos. 2, 3, 4, and 5 intelligence impulses for the E selecting cycle are no-current impulses, the magnet armature moves to the released position with the left-hand end of the selector arm in the path of the left-hand sword arm. As the Nos. 2, 3, 4, and 5 cams operate and release their associated selector levers, the associated code bars either remain in their left-hand position or are moved there by the swords. With the No. 1 code bar to the right and the Nos. 2, 3, 4, and 5 code bars to the left, there will be a notch in each code bar opposite the E pull bar. (See Figure 7 for location of pull bar in relation to code bars.)

The selector arm is locked (Figure 8) while the positioning of each sword is taking place and it is unlocked after the selector cams pass the peaks of their associated selector levers. This is accomplished by a cam operated locking lever which engages a wedge on the selector arm. Because the armature cam starts to move the armature toward the selector magnet before the locking lever releases the selector arm, the selector arm spring acts as a yield between the armature extension and the selector arm, (Figure 5).

TAPE FEED-OUT MECHANISM

This mechanism is used for the purpose of starting a roll of tape through the prepunch and perforating mechanisms or to prepare a series of rubouts (when the line is idle and the selector magnet is engergized).

The tape feed-out mechanism is mounted on top of the selecting unit and consists of a tape feed out lever, a release rod, a spring, and mounting screws (Figures 1 or 2 and 6). It provides a means of releasing the trip latch of the range scale assembly manually freeing the selector clutch cam sleeve to rotate while the selector magnet is energized. The release lever is mounted on a range scale mounting post of the selector plate and pivots at this point. The lever has two arms, one projecting to a position to engage the bell crank of the range scale assembly, the other mounted to the clutch release rod. The release rod is mounted to a bracket and a post by two elongated holes so that it may be moved back and forth. A spring is attached to the rod to hold it in a forward position.

When pressure is applied to the release rod of the tape feed-out mechanism, the release lever turns slightly in a counterclockwise direction causing one of the tape-out lever arms to actuate the bell crank of the range scale and release the trip latch. The selector clutch cam sleeve is then free to rotate as long as the lever is pressed. As soon as pressure is taken off the release rod, the release rod spring pulls the mechanism out of engagement with the range scale bell crank and the selector clutch cam sleeve is stopped by the trip latch re-engaging the stop pawl of the range scale. When this mechanism is used the LETTERS code combination will be perforated in the tape since the magnet is energized during the complete revolution of the selector cam sleeve.

CLUTCH THROWOUT LEVER

During the positioning of the No. 5 selector sword, the sixth cam of the selector cam sleeve disengages the clutch stop arm from the clutch driven member (Figure 4) allowing the main shaft clutch spring to move the clutch members into engagement causing the main bail cam and punch arm cam to rotate. At the end of each revolution, the clutch stop arm of the clutch throwout lever engages the cam surface of the projection on the driven clutch member, camming it out of mesh with the driving clutch member. Thus it may be seen that immediately after the completion of a selecting cycle the main bail cam and punch arm cam will be permitted to rotate one revolution to perform the operations required for printing and perforating, respectively.

PRINTING

The power for the performance of printing and other functions (except selecting, perforating and spacing) is derived from the main bail which is operated by the main bail cam through the medium of a bell crank, lever, and plunger (Figure 7). In the normal stop position, the main bail bell crank roller is on the high part of its cam as shown in Figure 7. In this position the main bail engages the camming surface of the pull bars, pushing them forward away from the code bars so that the code bars can be positioned by the selector mechanism. When the main bail cam rotates, the main bail bell crank roller rides down the slope of the main bail cam permitting the main bail spring to raise the bail through the medium of the main bail plunger and the main bail lever.

As the main bail moves upward, the pull bar springs move the pull bars toward the code bars. The unselected pull bars are blocked by the code bars, but the selected pull bar moves into the path set up by the alignment of notches in the code bars, and a hooklike projection on the rear edge of the selected pull bar is engaged by the main bail, causing the pull bar to be raised. The rack and gear connection between the pull bar and type bar causes the type bar to rotate about its pivot toward the platen. As the pull bar is moved upward, the sloping surface of the rear projection on the pull bar strikes a stripper plate causing the pull bar to be disengaged from the main bail shortly before the type bar reaches the platen. Momentum carries the type bar the remaining distance to the platen. As the main bail cam continues its rotation, it restores the main bail and pull bars to their normal stop position.

Letter characters are printed near the top of the tape and figure characters are printed near the bottom of the tape.

CODE BAR LOCKING LEVER

The code bars are locked in position after each selection by the code bar locking lever, located in the extreme right-hand slot of the pull bar guide (Figure 9-A). The locking lever is brought into engagement with "V" shaped notches in the code bars by a spring during the early part of the upward stroke of the main bail. It is cammed out of engagement with the notches by the main bail as the main bail nears the end of its downward stroke (Figure 7). When the code bars are not engaged by the locking lever (Figure 9-B), they are free to be positioned by the selector swords and "T" levers (Figure 5).

CODE PUNCH MECHANISM

Power for perforating the tape is derived from the punch arm cam on the main shaft which actuates the code punches by means of the punch arm through the medium of the punch arm bracket, punch arm link, punch bail, and punch selector fingers (Figure 10). The punch selector fingers are positioned by the punch bell crank springs so that the selection set up in the code bars will be perforated in the tape. The positioning of the punch selector fingers takes place early in the upward stroke of the main bail. The motion of the code bar locking lever is utilized to operate the code bar bell cranks which move toward the code bars with the locking levers (Figure 9-A and B). If a code bar has been positioned to the right, the motion of the associated code bar bell crank will be blocked by the code bar as the code bar locking lever moves toward the code bars, and the punch selector finger will remain in position to engage the punch as shown in Figure 10. If the code bar has been positioned to the left, the code bar bell crank will be free to follow the code bar locking lever, and the train of linkage between the code bar bell crank and the punch bell crank will cause the punch bell crank to be turned in a clockwise direction, thus moving the punch selector finger to the right in a position so there will be no engagement with the punch.

Shortly after the punch selector fingers have been positioned, the punch arm cam rotates the punch bail through the medium of the punch arm bracket and the punch arm link. As the punch bail cam rotates, the selector fingers which are in line with the punches raise the punches to perforate the tape. A feed pawl attached to the punch bail rotates the feed roll after each code combination is perforated advancing the tape for the next combination to be perforated (Figure 10).

FEED HOLE PRE-PUNCH MECHANISM

In order to permit the last character combination perforated in the tape to be sensed at a point .100" from the code punches, the feed holes must be perforated in the tape before it reaches the code punches. This is accomplished by means of a pre-punch mechanism. This mechanism consists of a lower bail, an upper bail, a feed pawl, a feed roll assembly, a tape tension lever, a feed hole punch, and a detent lever with a roller (Figure 11). The mechanism is operated with each revolution of the punch arm cam through the medium of the punch arm and punch arm link. The parts are so assembled and adjusted that when the lower extension of the lower bail is moved to the left by the punch arm link, the left end of the upper bail moves downward causing the feed hole punch to enter its die block and perforate the tape. At the same time this motion is taking place the feed pawl is moved upward.

When the lower extension of the lower bail of the pre-punch mechanism is moved to the right the reverse motion of the upper bail and the feed pawl takes place causing the feed hole punch to withdraw from the tape just before the feed pawl rotates the feed roll by engaging a tooth on its ratchet during its downward movement. At the same time the feed roll is rotated the detent roller rides over a tooth on the star wheel of the feed roll assembly to insure even spacing of the feed hole perforation. Since the feed hole punch is located several feed hole spaces to the right of the feed roll it is necessary to assist the mechanism manually, when inserting tape, until properly spaced feed holes reach the feed roll. This may be done by applying a slight pressure to the tape tension lever so that the feed roll will grip the tape.

OVERLAP

In summarizing the selecting, printing, and perforating operations described in the foregoing, it should be noted that the selecting cycle is followed immediately by the operating cycle. Near the end of the selecting cam sleeve revolution, the sixth cam trips the clutch throwout lever, allowing the main bail cam and punch arm cam to make one revolution. Thus it may be seen that the printing of a character or the operation of a function requires time equivalent to both a selecting and an operating cycle. However, the selection of the next character may be made at the same time that the performance of the previous operation is taking place. This arrangement is known as overlap and is used to facilitate printer operation at high speeds. Without this feature, it would be necessary to allow time for operation after each selection.

RIBBON FEEDING

The ribbon feed lever is operated by an indent in the main bail plunger. Attached to the upper end of the ribbon feed lever is the ribbon feed pawl which engages with the teeth on the ribbon feed ratchet. With each operation of the main bail, the ratchet is rotated a slight amount. This motion is carried through either one or two bevel gears on the ribbon spool shafts, causing one of the ribbon spools to be revolved (Figures 12 and 13).

RIBBON REVERSE

Assuming that the ribbon is being wound on the left-hand spool and is almost unwound from the right-hand spool, an eyelet which is fastened to the ribbon will engage and move the right-hand ribbon reverse arm. This arm moves the right-hand ribbon reverse pawl into the path of the ribbon reverse bail (Figure 13). As the bail moves downward it engages the ribbon reverse pawl moving the ribbon feed shaft to the right (Figure 14). This will disengage the left-hand ribbon feed bevel gears and engage the right-hand bevel gears. The ribbon will then be wound on the right-hand spool. The reversing operation takes place in a similar manner on the left-hand side of the assembly when the eyelet near the left end of the ribbon engages with the left-hand ribbon reverse arm.

UPPER AND LOWER CASE SHIFT MECHANISM

The platen consists of a disc of synthetic rubber about 1/4" in diameter mounted on a steel bar about 3/8" square and about 2" long. This assembly fits on the platen frame which is mounted so that it can be shifted back and forth on shafts in the platen shift bracket. (Figure 15)

To print letters when the platen is in the FIGURES position the LETTERS pull bar is selected. As the main bail moves upward it raises the LETTERS pull bar and a horizontal projection at the lower end of the pull bar engages the shift latch (Figure 16) and turns it in a clockwise direction. This latch which engages a notch on the shift bail (Figures 15 and 16) moves out of engagement with its notch and frees the shift bail to be turned counterclockwise on its axis by the pull of its spring. As this bail turns, an extension arm at the upper side of the bail engages the platen frame and moves it toward the rear of the machine until it is latched by the shift lever (Figure 17). In this position the platen will support the tape opposite the letters on the type pallets.

Engaging the rear extension of the shift bail is an intermediate bail which is caused to turn clockwise by the foregoing action of the shift bail. The intermediate bail adjusting screw at the rear end of the intermediate bail is then positioned above the lowest travel of the main bail plunger extension bracket (Figure 15). All this action takes place during the upward movement of the main bail plunger. As the main bail plunger moves downward again the plunger extension strikes the intermediate bail adjusting screw driving it downward to reset this chain of linkage and restore the shift latch to its latched position in the notch of the shift bail.

Note: The foregoing action will also take place when the SPACE selection is made if the machine is equipped with a space pull bar.

To print figures when the platen is in the LETTERS position, the FIGURES pull bar is selected (Figure 17). As the main bail moves upward, it raises the FIGURES pull bar, and a horizontal projection at its lower extremity unlatches the shift lever from the platen frame allowing the platen frame spring to move the platen frame to the FIGURES (forward) position against the FIGURES stop screw (Figure 15). In this position, the platen will support the tape opposite the figures on the type pallets.

MOTOR SPEED CONTROL

In order to maintain the motors at the transmitting and receiving stations at the proper speeds, the apparatus is equipped with either constant speed motors (synchronous -- will operate only on regulated AC current) or with governed speed motors (will operate on AC or DC current).

When a governed speed motor is used the governor is attached to one end of the motor shaft. This governor and a resistor control the speed of the motor. The motor governor (Figure 18) is used to shunt the resistor in and out of the motor circuit. This is done by means of the governor contact arm. The contact arm spring (Figure 18) holds this contact arm against the stationary contact until the centrifugal force of the contact arm (as the motor and governor rotate) overcomes the tension of the contact arm spring. When the contacts open, the resistor is shunted into the motor circuit, reducing the speed of the motor. When the contacts close, the resistance is shunted out of the motor circuit, increasing the speed of the motor. The rapid operation of these contacts tends to hold the motor at a constant speed. The tension of the spring determines the speed at which the motor will operate, since it holds the contact of the contact arm against its stationary companion contact. Therefore, the speed may be adjusted by turning the speed adjusting wheel (which extends through the cover of the governor) in a direction to increase or decrease the tension of the spring.

The governor is equipped with a target consisting of alternate black and white spots. A speed indicator (tuning fork with shutters attached to the ends of the tines) is used to visually check the motor speed. With a properly adjusted spring tension, the spots on the target appear to be stationary, when observed through the shutters of the vibrating tuning fork. No speed setting is required on printers equipped with synchronous motors since they are constant speed motors.

SYNCHRONISM

In order that the signals sent out by the transmitting station may be interpreted correctly by the receiving units, it is necessary to keep the receiving units in synchronism with the transmitted signals. Synchronism is maintained by having the receiving selector cam sleeve rotate faster than the transmitting cam cylinder and by use of the start and stop impulses in the following manner:

The reception of the start impulse starts the selector cam sleeve on the receiving unit revolving. At that moment, the selector cam sleeve is in unison with the transmitting cam cylinder. The selector cam sleeve is so constructed that the distance traveled from the position where the cam sleeve starts to move a selector lever to the position where it starts to move the next selector lever is greater than the distance traveled by the transmitting cam cylinder, from where it can control the transmission of one impulse to where it can control the transmissions of the next impulse. In other words, for a certain travel of the transmitting cam cylinder, the corresponding travel for the selector cam sleeve is greater, but as the selector cam sleeve travels faster, it will reach its second position at the same time the transmitting cam cylinder reaches its second position.

The selector cam sleeve completes its revolution before the transmitting cam cylinder, but the transmitting cam cylinder sends out the stop impulse which stops the selector cam sleeve until the transmitting cam cylinder again sends out the start impulse. Usually the selector cam sleeve is one-seventh faster than the transmitting cam cylinder, and the selector cam sleeve is at rest one-seventh of the transmission time. If the speed of the selector cam sleeve is faster or slower than the proper speed, the cam remains at rest more or less, as the case may be. Of course, there may be a slight error in the relative position of the selector cam sleeve in the various positions, but the mechanism is so constructed as to compensate for this and, due to the fact that the selector cam sleeve starts each revolution in unison with the transmitting cam cylinder, this error does not become accumulative.

ORIENTATION

In order to utilize the receiving margin of the selector mechanism to the best advantage, it is necessary to place the starting point of the selector cam sleeve in the most favorable position. This is accomplished by means of the range finding mechanism.

Mounted on the stop lever plate of the range finding mechanism are the stop lever and the trip latch which can be moved, thereby varying the relation between the start of the selector cam sleeve and the time the selector cams operate the selector levers (Figure 6). A graduated scale indicates the setting of the stop mechanism, and a thumb screw holds it in place after it has been set.

The range is determined while receiving "RY" on the receiving unit, by moving the range finder index arm in one direction until errors appear and then moving it back slowly until the errors disappear, noting the position on the scale. In a similar manner, the other limit of the range is located by moving the index arm toward the opposite end of the scale. The proper setting is midway between these two limits.

PIVOTED TAPE TRANSMITTER AND DISTRIBUTOR MECHANISM

GENERAL

The pivoted tape transmitter and distributor mechanism consists essentially of a tape sensing and a tape feeding mechanism, a transfer mechanism, a set of transmitting contacts, a set of distributor contacts, a sensing cam shaft assembly and a distributor cam shaft assembly. Each of these shafts get their power from the motor through the medium of the main shaft and the subshaft assembly.

PIVOTED TRANSMITTER YOKE

The tape sensing and tape feeding mechanisms are arranged so that the portions of these mechanisms that feed and sense the tape are mounted on a pivot yoke (Figure 1 and 2). This yoke is moved toward the perforator die block by the tape feeding mechanism which pulls it along the tape so that the tape can be sensed up to and including the last combination perforated.

Also this yoke can be moved away from the perforator die block by the perforated tape (until it rests against its backstop) to permit the tape to move downward into a storage compartment or form a loop between the perforator die block and the yoke.

SENSING SHAFT MAGNET CONTACT

This contact is located directly under the rear of the perforating die block and is operated by the pivoting motion of an extension on the rear of the transmitter yoke. Its function is to make and break a circuit to the sensing shaft magnet. As the tape is advanced out of the perforator die block the pivoted transmitter yoke moves to the left away from the die block and the transmitter yoke extension permits the contact to close. When the contact is closed a circuit is completed through the sensing shaft magnet which attracts its armature and pulls the sensing shaft clutch throwout lever (which is attached to it) out of engagement with its clutch member. This frees the sensing shaft cam sleeve to rotate with the sensing shaft and operate the tape feeding and tape sensing mechanisms.

After perforation is stopped the pivoted sensing mechanism is pulled to the right along the tape by means of the tape feeding mechanism, until the extension at the rear of the transmitter yoke opens the contact, breaking the circuit to the sensing shaft magnet. When the sensing shaft clutch throwout lever is released from the power of the magnet, it is pulled by its spring into engagement with the camming surface of the clutch driven member causing the clutch teeth to disengage and stop the tape feeding and tape sensing mechanisms. The contact is adjusted in such a manner that it opens just as the sensing fingers sense the last perforation in the tape and the pivoted mechanism comes to rest against the die block.

TAPE DEPRESSOR (TAPE OPERATING BAIL)

A tape depressor is provided to start the tape moving downward into the storage compartment when transmission is stopped or does not keep up with the tape as it is being perforated. As soon as a loop of tape forms, an arm of the tape depressor engages the pivoted yoke to prevent its movement when the tape is being pulled from the storage compartment after transmission is again resumed. When the stored tape has been fed through the sensing mechanism until the loop shortens, it will lift the tape depressor out of the way to free the sensing mechanism for movement along the tape until it reaches the perforator die block.

TAPE FEEDING MECHANISM

The tape is fed through the tape sensing mechanism or the tape sensing mechanism is advanced along the tape in order to sense the code combinations in the tape. The tape is fed through the sensing mechanism by the tape feed pin oscillating arm and the tape feed arm (Figure 19). These arms are actuated by the tape feed arm oscillating lever bail and the tape feed lever respectively. Each arm is pivotally attached to its associated part on the same center as the pivoted yoke and is operated in the pivoted yoke by cams on the sensing shaft. The tape feed arm oscillating lever bail is clamped to the tape feed pin oscillating lever extension, which rides on its cam; and the tape feed lever is clamped to the tape feed lever extension. A roller on the lower end of the tape feed lever extension rides on its cam. The tape feeding operations in the various steps of one complete cycle are as follows:

(1) In the initial position the pins in the upper end of the tape feed pin oscillating arm engage with the tape (Figure 19). From this position the tape feed pin oscillating arm is advanced to its second position as the tape feed arm roller rides down the cam surface of the tape feed pin oscillating arm in response to action by its operating spring and cam. The tape feed arm roller then wedges between the cam surface of the tape feed pin oscillating arm and a surface on the transmitter yoke to hold the tape feed pin oscillating arm firmly against its adjusting screw (Figure 20). At this time the tape feed lever extension roller is held suspended from its cam due to the wedging position of the tape feed arm roller.

(2) The tape is then clamped in position by the tape holding finger pin (located just in front of the sensing pins) and the tape-out finger pin (located behind the sensing pins) pressing the tape upward against the transmitter lid. These fingers are operated by cams on the sensing shaft through the medium of their respective operating levers.

(3) Immediately thereafter, the oscillating lever extension moves to the high part of its respective cam causing the tape feed pin oscillating arm to move downward disengaging its pins from the tape. At the same time the tape feed lever extension roller engages the low part of its cam (Figure 21).

(4) The tape feed lever extension roller then rides to the high part of its cam pushing the tape feed arm roller up the cam surface on the tape feed pin oscillating arm. This arm is then pulled horizontally to the right against its stop by means of two springs and takes a position directly under the next set of feed holes (Figures 22).

(5) The last step in this cycle is the upward movement of the tape feed pin oscillating arm to re-engage the tape and the downward movement of the tape-out pin and holding pin to release their hold on the tape. These movements are brought about as the tape feed pin oscillating lever extension moves to the low part of its cam and the holding pin lever and tape-out pin lever cam followers move to the high part of their cams (the initial position).

These movements take place with each complete revolution of the sensing shaft cam sleeve to feed the tape through the sensing mechanism.

TAPE-OUT AND TAPE RELEASE LEVERS

The tape-out and tape release levers are located directly in front of the sensing mechanism (Figures 1 or 2). These levers are interlocked with associated pawls forming a mechanism with the following functions under the given conditions:

(1) When the tape release lever is pressed the feed pins become latched out of engagement with the feed holes in the tape. This permits the operator to move the tape back and forth in the transmitter as desired or to remove the end of a tape without raising the transmitter lid. When the tape-out lever is pressed the tape release lever becomes unlatched and the feed pins re-engage the tape.

(2) When the trailing end of a tape enters the transmitter the tape-out pin rises and causes the tape-out contact to open through the medium of its operating lever and extension. This contact breaks a circuit to the sensing magnets and causes the transmitter to stop. The contact becomes latched by an extension on the tape-out lever and can be released only by pressing the tape-out lever.

Thus it may be seen that if either or both the tape release lever or the tape-out contacts are latched out they will be released by pressing the tape out lever.

Note: In order to prevent mutilation of the tape care should be taken to place the perforated holes of the tape directly over the pins before pressing the tape-out lever. These levers should not be operated unless the transmitter is stopped.

SIGNAL TRANSFER AND STORAGE MECHANISM

At the same time step two in the tape feeding cycle is taking place the sensing fingers feel the tape and take a setting according to the code combination punched in the tape. The selector levers may assume either of two positions according to whether their associated sensing finger pins are blocked by the tape or pass through a hole in the tape (Figure 23). If tape, perforated with code combinations, is in the sensing mechanism at this time, the sensing fingers under these perforations will project their pins through the holes in the tape and permit their selector lever cam followers to be pulled toward the low part of their respective cams; while the other selector levers will be held in their upward position as their sensing finger pins strike the unperforated portions of the tape. The transfer bail roller will then ride to the high part of its cam moving the T transfer levers to the right against their selector levers.

The mechanism is now positioned so that the operated selector levers (those which have their sensing finger pins through perforations in the tape) will have their lower extensions in line with the lower arm of their respective T transfer levers. The unoperated selector levers (those which have their sensing finger pins against the tape) will have their upper extensions in line with the upper arm of their respective T transfer levers. Those T transfer levers engaging the operated selector levers will rotate clockwise moving their transfer slides upward and closing their respective transfer contacts through the medium of their contact bail; whereas, those T transfer levers engaging the unoperated selector levers will be rotated counterclockwise moving their transfer slides to the downward position to open their respective contacts through the medium of their contact bail.

It should be noted that if one or more transfer contacts do not require a change in setting from the previous selections there will be no engagement between the corresponding selector levers and their associated T transfer levers. Therefore, the positions of the T transfer lever, the transfer slide, and the contact bail will remain unchanged.

Let us trace the operation of the mechanism from the perforated tape to the setting of the transfer contacts for the letter E code combination. In the stop position (Figure 23) the sensing fingers are held flush or below the top surface of the tape selector yoke plate on which the tape slides. This is due to the fact that the selector lever cam followers are on the high part of their cams. As the cam sleeve of the sensing shaft rotates in a counter-clockwise direction to a point on the cam where the selector lever cam followers are freed from the cam, the selector levers (being acted upon by their selector lever springs) turn on their shaft in a counterclockwise direction causing the sensing fingers to rise and sense the tape. Since the letter E code combination is perforated in the tape the No. 1 sensing finger pin passes through the hole in the tape. The No. 1 selector lever continues to turn in a counterclockwise direction until its lower arm takes a position in line with the lower extension of the No. 1 T transfer lever (Figure 24). The remaining sensing fingers (being blocked by the tape) hold the upper arms of their selector levers in line with the upper extensions of their T transfer levers.

The transfer bail roller which is also operated from a cam on the sensing shaft assembly then rides to the high part of its cam moving the axis, on which the T transfer levers are pivoted, to the right. As this motion is brought about the lower extension of the No. 1 T transfer lever engages the lower arm of the No. 1 selector lever and the T transfer lever rotates slightly in a clockwise direction. The end of the T transfer lever which is engaged in the No. 1 transfer slide moves the No. 1 transfer slide upward as the T transfer lever rotates. A projection on this transfer slide moves on a cam like surface on the No. 1 contact bail arm causing the arm to rotate on its axis slightly in a counterclockwise direction. At the top of this contact bail arm is an eccentric which is adjusted against an insulator on the No. 1 transfer contact spring. As the contact bail arm rotates counterclock-wise the contact spring is moved to the left until it closes the contact.

From the description of the foregoing action it may be seen that if the code being sensed in the tape permits a sensing finger to pass through the tape the associated transfer contact will be closed or if the code being sensed in the tape blocks a sensing finger pin the associated transfer contact will be open. These transfer contacts originate five electrical circuits which may be connected to external apparatus.

SIGNAL RETRANSMITTER

Associated with the sensing mechanism is a distributing mechanism which consists of a magnet controlled cam shaft assembly and a set of distributor contacts. This mechanism is located directly under the sensing mechanism. The function of this mechanism is to transmit pulse elements of a code combination which is set up on the five distributor contacts by means of five electrical circuits, and send them in the proper sequence to the line.

The contacts on the right side of the distributor contact assembly are wired individually and respectively on the same circuits that originate in the five transfer contacts previously described. The SS, 1, 2, 3, 4, and 5 contacts on the left side of the distributor contact assembly are wired together and in turn connected in the **line** circuit (Figure 25).

The distributor contacts are mechanically operated from the cam shaft through the medium of contact levers and close invariably with each revolution of the cam assembly (Figure 26). The cams are arranged on their assembly in such a manner that the contacts are made to close and open in timed relation to each other during each revolution of the cam shaft assembly. MARKING and SPACING impulses are sent to the line in the order in which they are set up electrically on the distributor contacts. Let us assume that the letter "E" code combination is set up mechanically on the transfer contacts, and these contacts are connected directly to the distributor contacts instead of passing through the external apparatus. Under this condition the No. 1 transfer contact is closed connecting current to the No. 1 distributor contact, while the Nos. 2, 3, 4, and 5 transfer contacts are open and no current is connected to the Nos. 2, 3, 4, and 5 distributor contacts.

When operating locally the distributing shaft cam sleeve assembly is set in motion when a contact, operated from the sensing shaft through the medium of a contact lever, closes completing a circuit to the distributor magnet which becomes energized. As the magnet is energized it attracts its armature and causes the throwout lever (which is attached to the armature) to free the distributor cam sleeve assembly to rotate. As the cam sleeve assembly rotates the distributor start-stop contact opens and sends a start (SPACING) impulse to the line. This contact remains open until the Nos. 1, 2, 3, 4, and 5 distributor contacts all close and open in sequence. Since No. 1 distributor contact has current, and Nos. 2, 3, 4, and 5 distributor contacts have no current, a MARKING impulse followed by four SPACING impulses enters the line. The start-stop contact then closes to send a stop (MARKING) impulse to the line completing the cycle. Thus a code combination for the letter E which was set up on the transfer contacts of five separate electrical circuits is sent into the line through the distributor contacts.

"D" contact, which is a timing contact, is used in connection with a station identification device. It closes after the No. 3 distributor contact opens in the foregoing cycle and opens after the start-stop contact closes.

The pattern of the code combinations to be sent to the line may be received from the transfer storage contacts associated with the sensing mechanism previously described through an external apparatus or it may be received from remote relay controlled contacts. If the code combination to be sent into the line comes from a remote source through remotely controlled relays the sensing mechanism (if operating) may be stopped from the remote source to send a different message to the line. This remote source may be identified through an automatic station identification device used in connection with this unit. After the transmission from the remote source is completed the sensing mechanism may be released and local transmission resumed. While the foregoing operations are taking place an incoming message may be received and stored in the tape for future transmission.

TAPE CONTAINER (Figure 1 or 2)

Supported above the motor of this machine is the tape container which contains a tape reel and a tape out lever. The tape reel is free to revolve on its pivot and permits tape to be fed from the container as it is needed by the prepunch mechanism. The tape out lever is mounted to a bracket on the container with one end projecting to the outside. The tape out lever serves a double purpose. First, it exerts a slight pressure on the roll of tape and prevents the tape and reel from revolving too freely. Second, the external projection operates a contact which is made to close when the roll of tape is almost consumed by the machine. When this contact closes it completes a circuit to a remote device used to give a warning signal.

TRANSMITTING CLUTCH RELAY AND THE SWITCHING RELAY

Located at the rear of the machine are two relays. The upper one is a switching relay and the lower one is the transmitting clutch relay. These relays operate in connection with an external apparatus and make it possible to operate the distributing cam sleeve and the transmitting cam sleeve by energizing their respective clutch magnets from a remote source. "D" contact previously referred to also operates in conjunction with these relays.

SIGNAL LINE RELAY (Figure 1 or 2)

The reperforator transmitter base provides facilities for mounting a signal line relay on the right rear side. The function of this relay is to reproduce the line signals in a local circuit for the operation of the selector magnets.

LINE SELECTOR CIRCUIT CLOSING JACK

The reperforator transmitter base is equipped with a jack which automatically shunts the line and selector magnet slip connection terminals when the relay is removed from its mounting. The purpose of this jack is to permit removal of the relay for examination or replacement without opening the signal line or selector circuit. The jack is mounted under the base and has a plunger assembled on it which protrudes through the base. When the relay is placed on the unit the base of the relay depresses the plunger which opens the contacts in the jack.

RADIO FREQUENCY INDUCTION SUPPRESSORS

Radio frequency inductions suppressors are connected across various operating contacts to suppress radio frequency induction, permitting radio receiving sets to be used in close proximity to the reperforator transmitter.

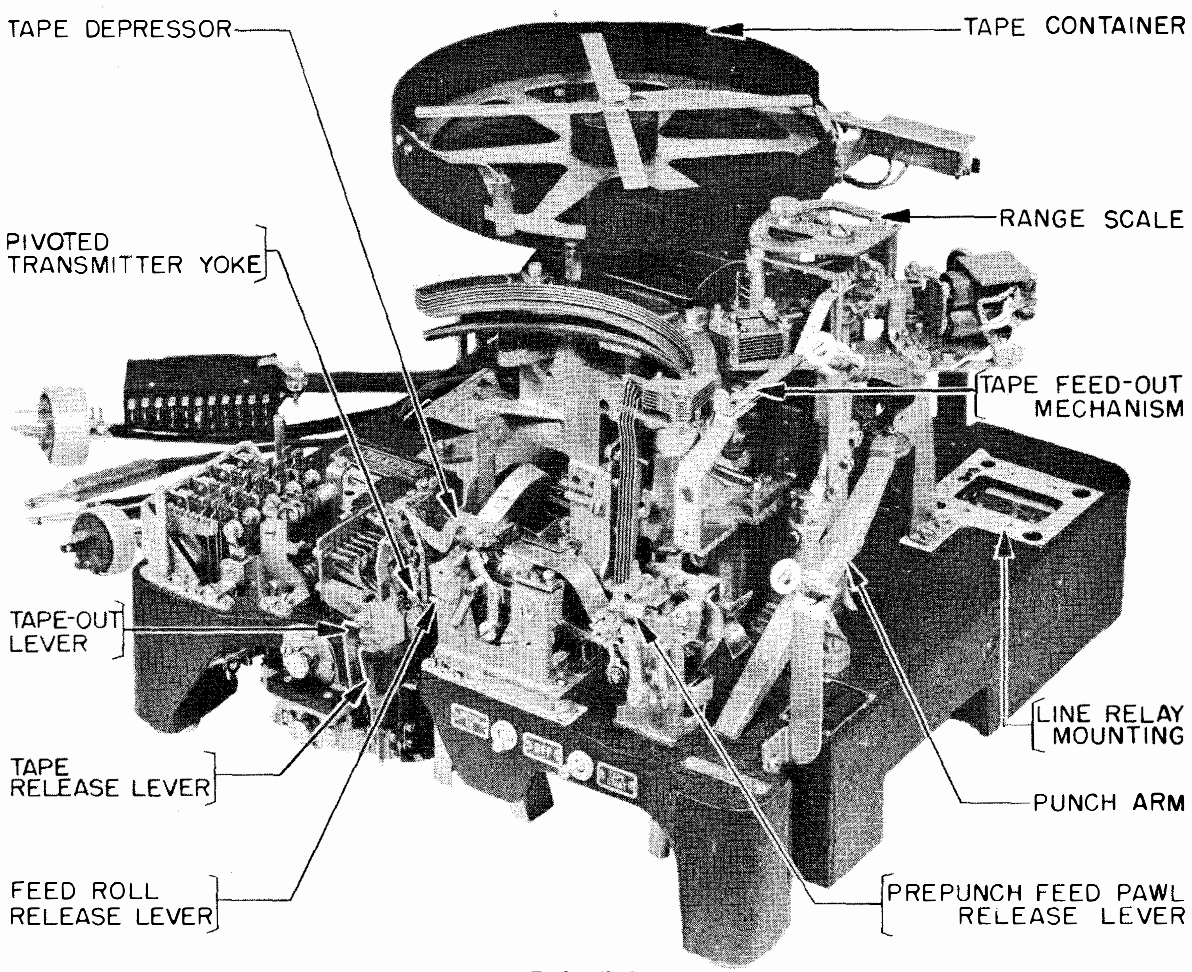


FIGURE I

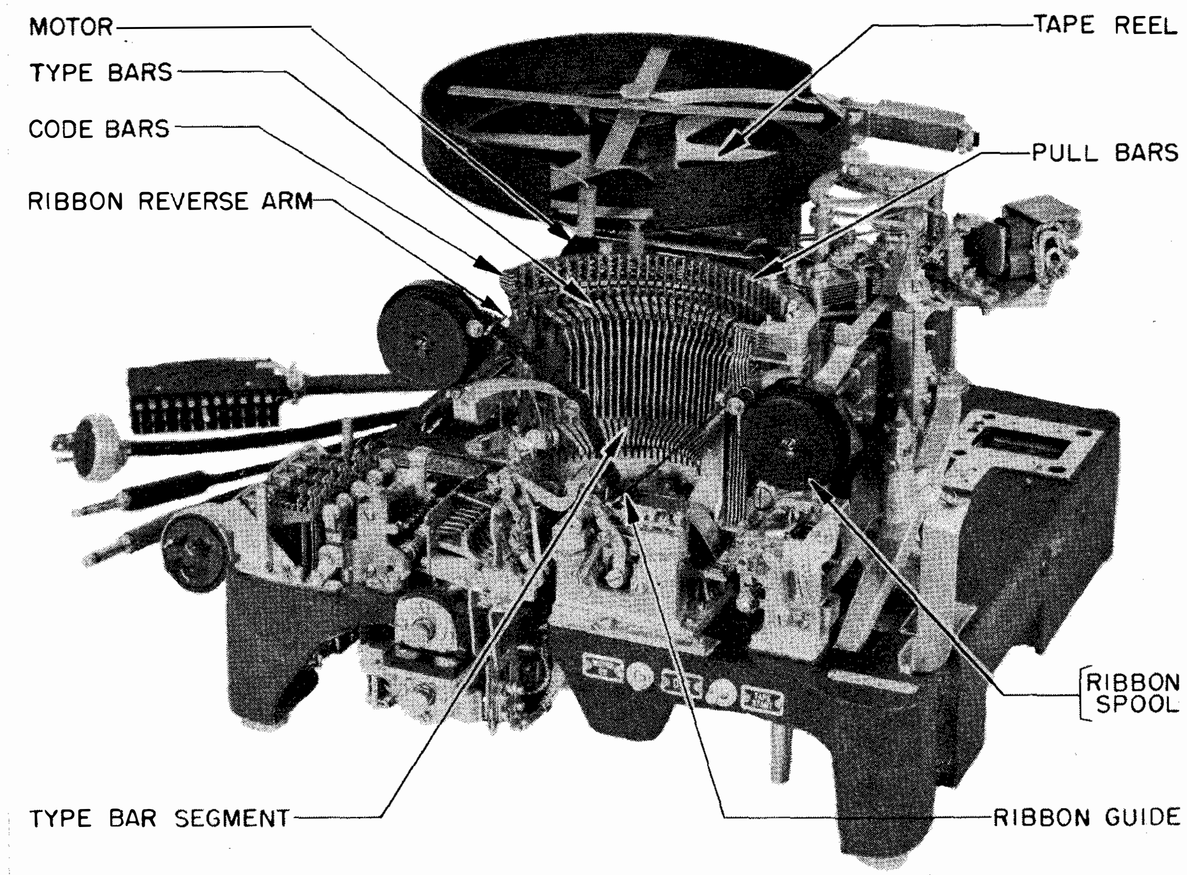
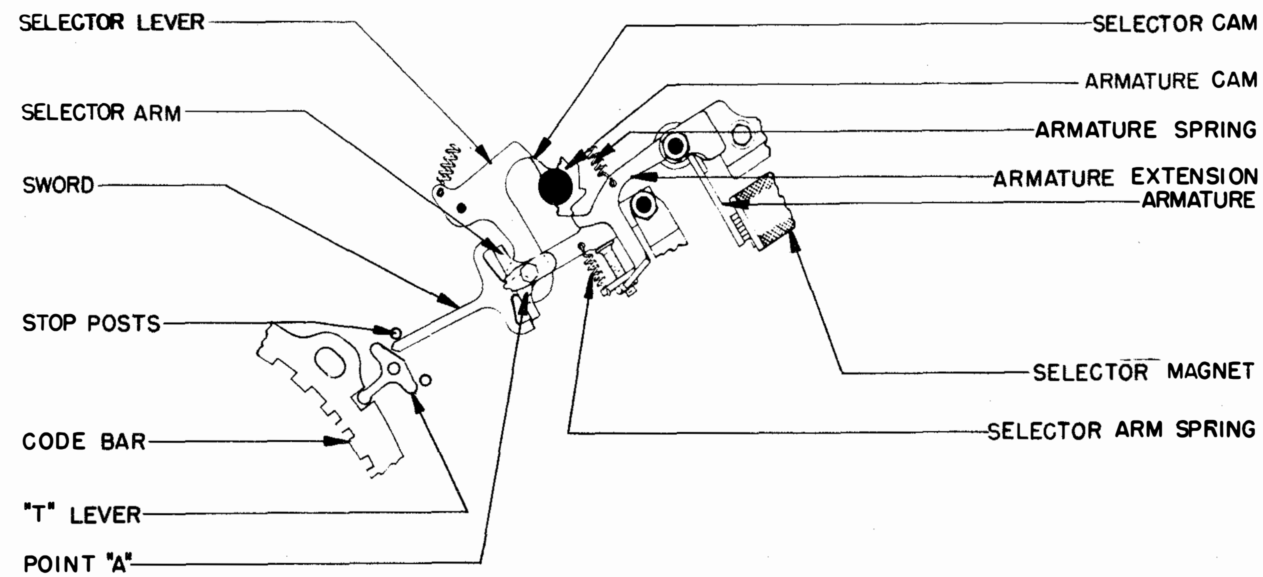


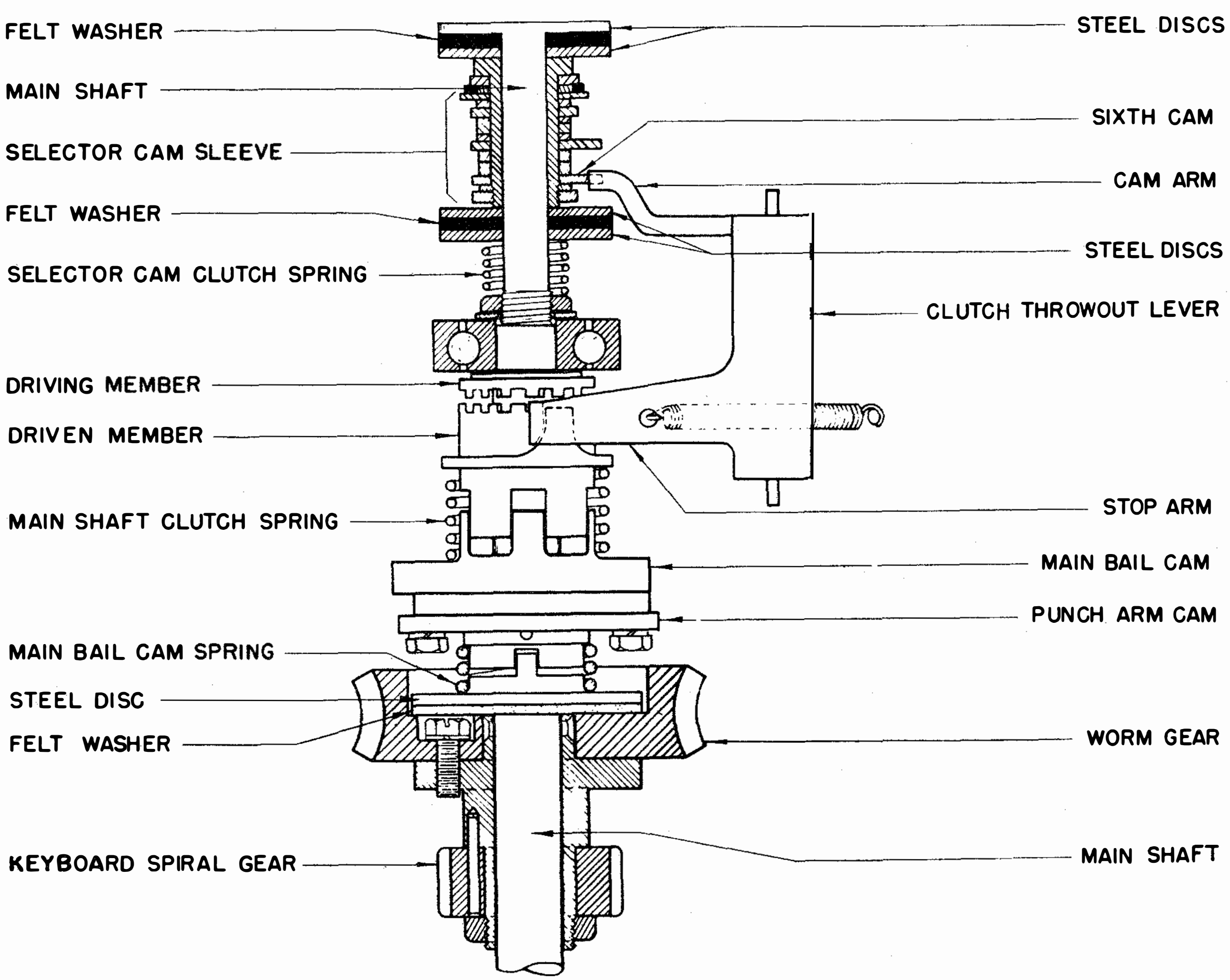
FIGURE 2

UPPER 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	C.R.	L.F.	SPACE	LTR. SHIFT	FIG. SHIFT
UPPER CASE	WEATHER SYMBOLS	↑	⊕	○	↗	3	→	↘	↓	8	↙	←	↖	•	⦷	9	Ø	1	4	🔔	5	7	⦶	2	/	6	+	−	<	≡			
	COMMUNICATIONS	−	?	:	$	3	!	&	£	8	'	(	)	.	,	9	Ø	1	4	🔔	5	7	;	2	/	6	"	≀	<	≡			
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	C.R.	L.F.	SPACE	LTR. SHIFT	FIG. SHIFT
	1	●	●		●	●	●				●	●						●		●		●		●	●	●	●					●	●
	2	●		●				●		●	●	●	●				●	●	●			●	●	●						●		●	●
	FEED HOLES	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	3			●			●		●	●		●		●	●		●	●		●		●	●		●	●					●	●	
	4		●	●	●		●	●			●	●		●	●	●			●				●		●				●			●	●
	5		●					●	●				●	●		●	●	●			●		●	●	●	●	●					●	●

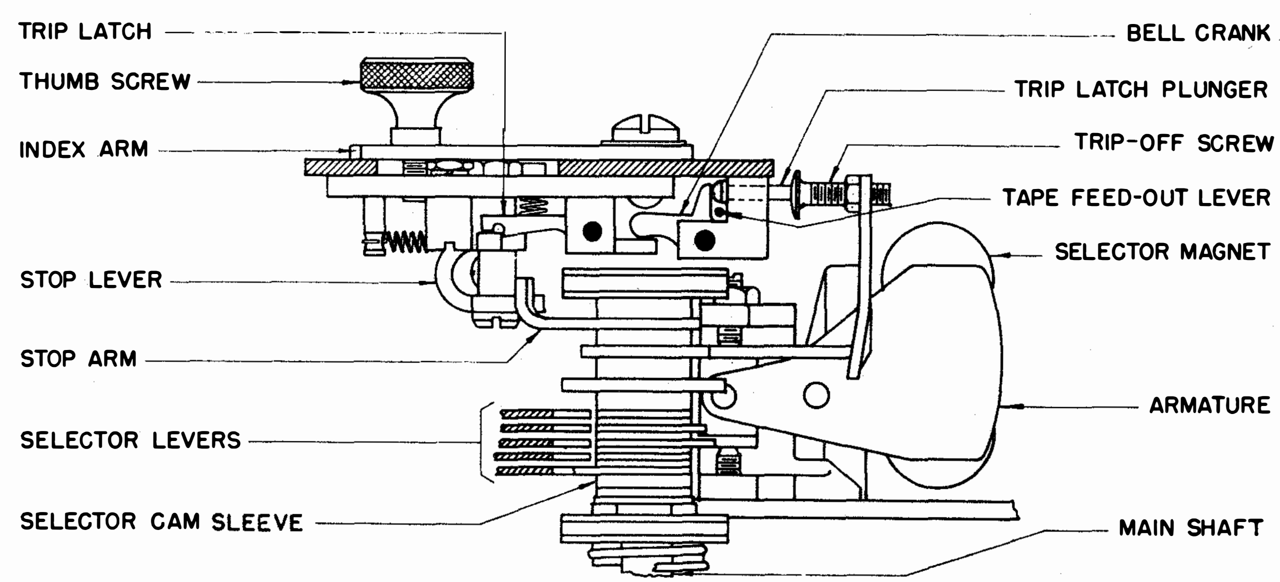
FIGURE 3



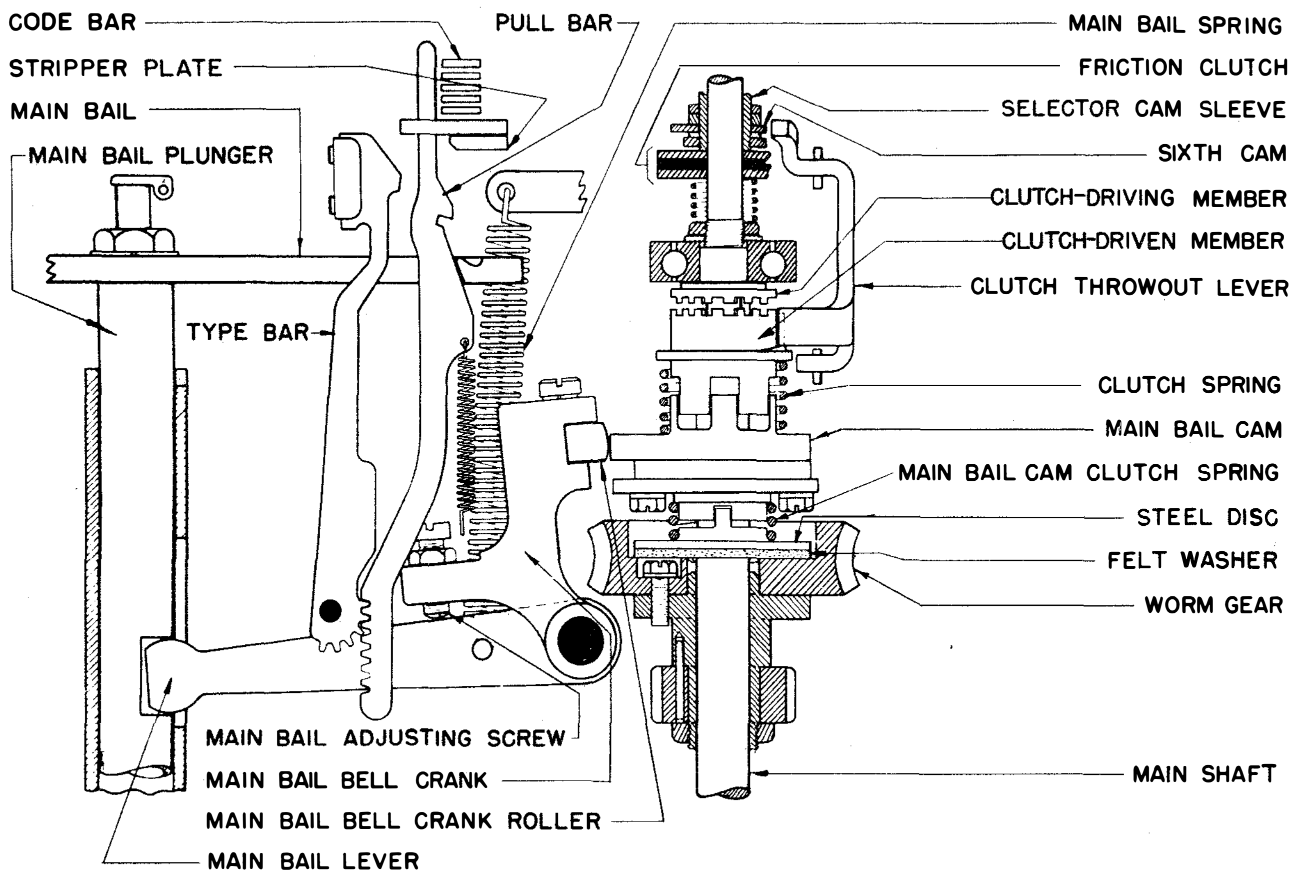
TOP VIEW
FIGURE 5



RIGHT SIDE VIEW
FIGURE 4

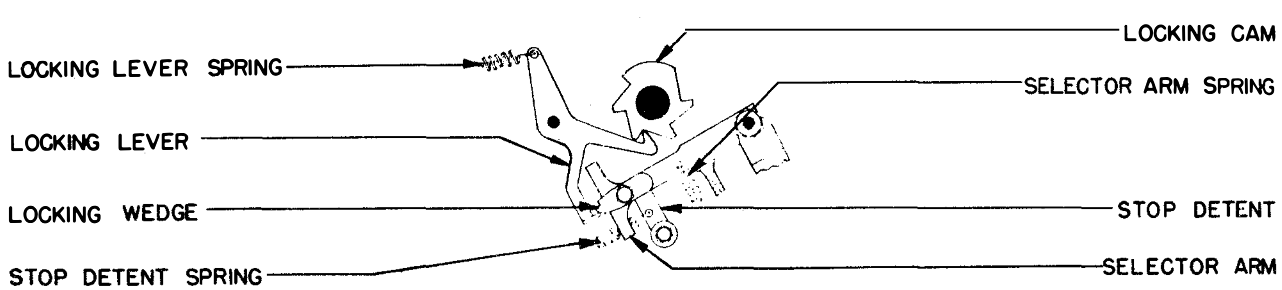


LEFT FRONT VIEW
FIGURE 6



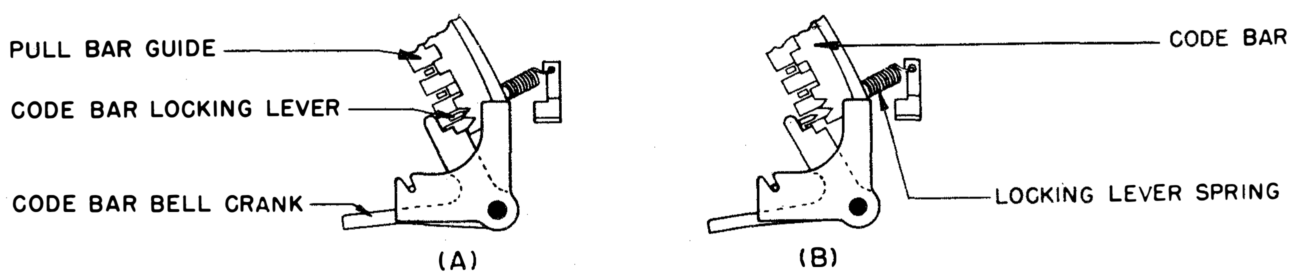
RIGHT SIDE VIEW

FIGURE 7



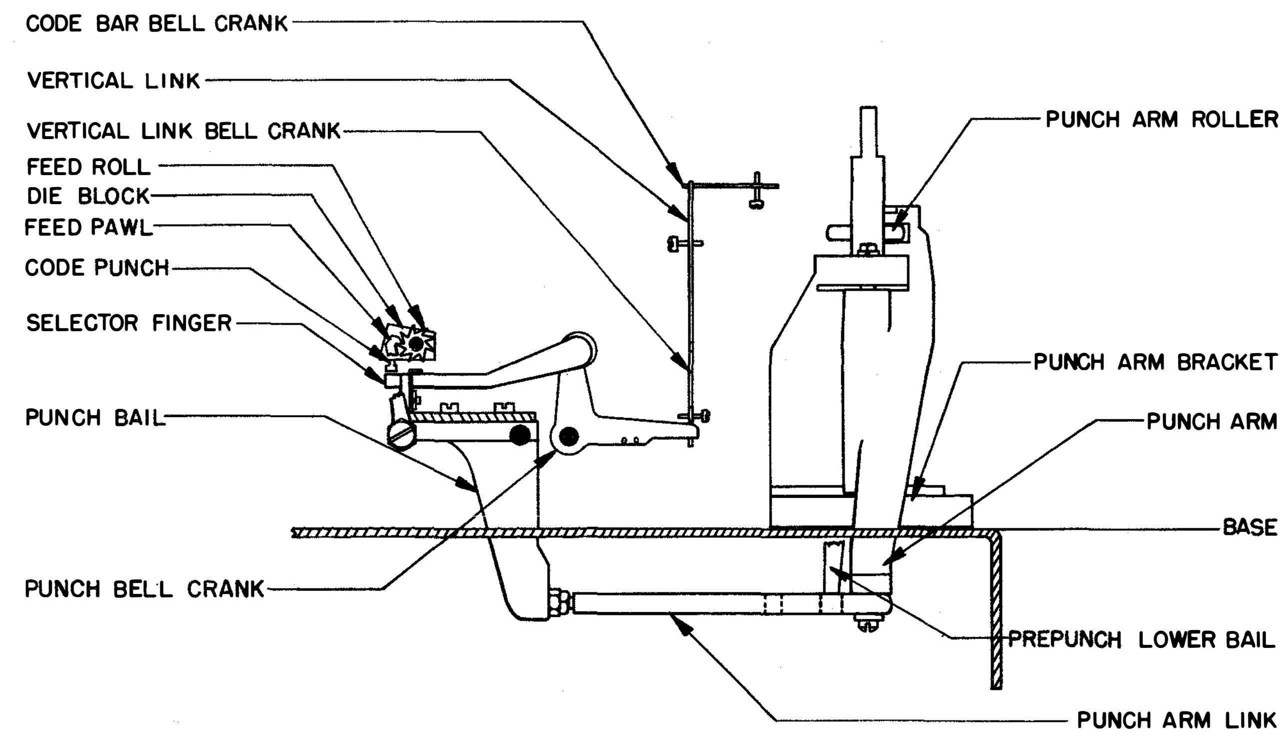
TOP VIEW

FIGURE 8



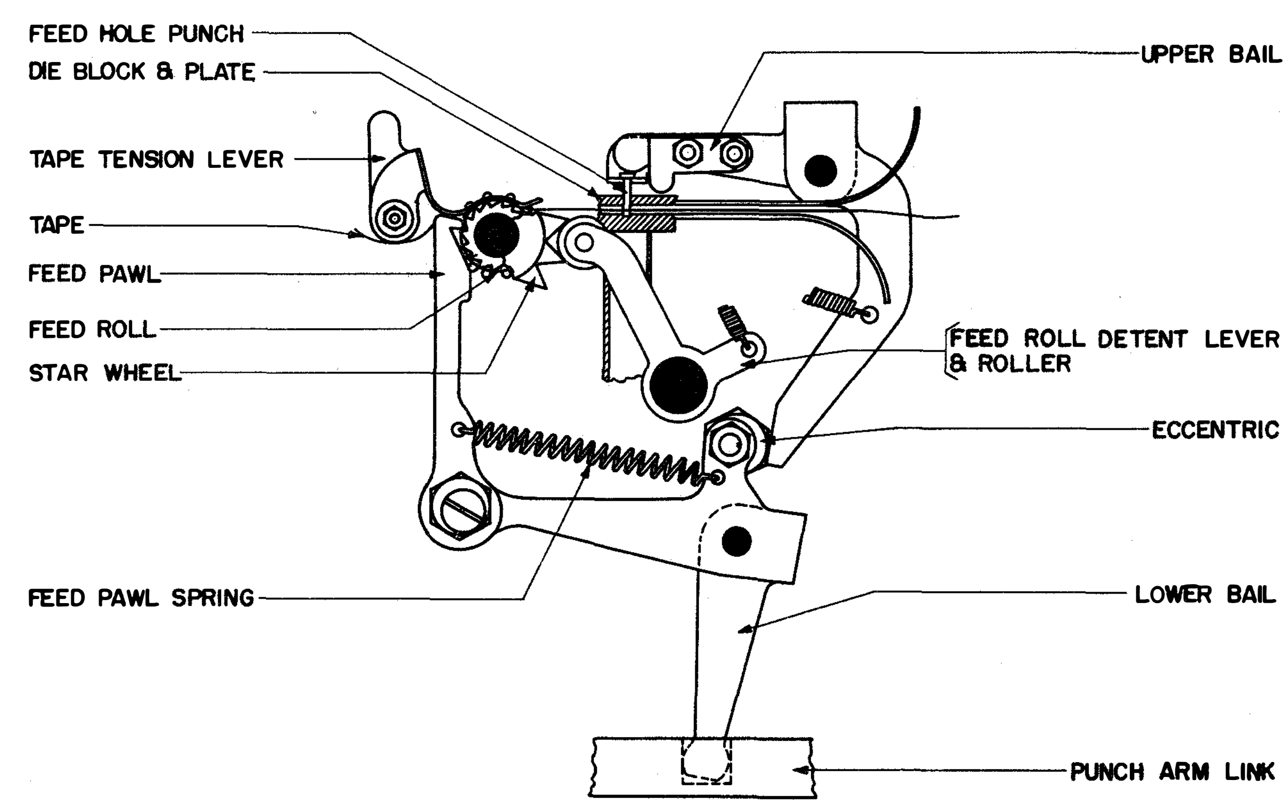
TOP VIEW

FIGURE 9



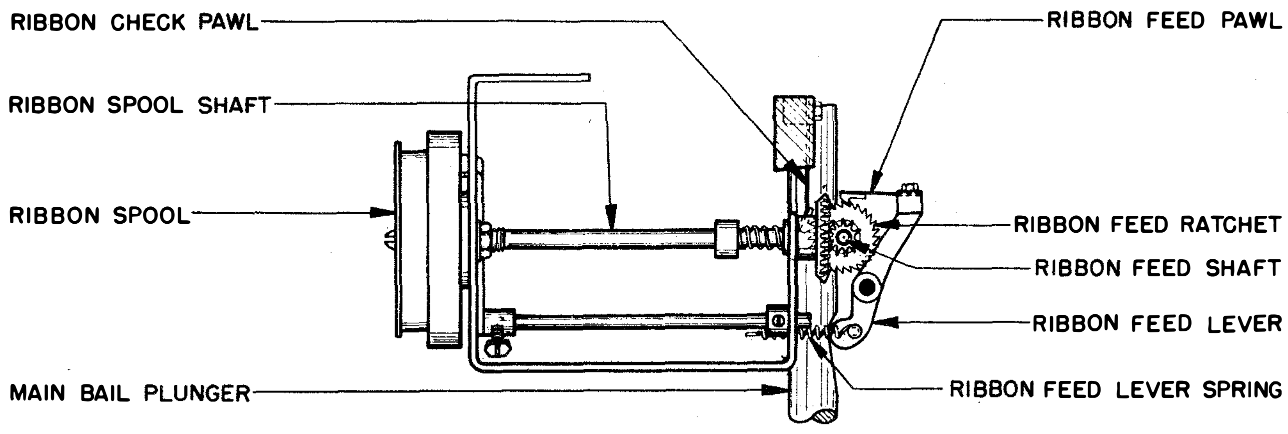
FRONT VIEW

FIGURE 10

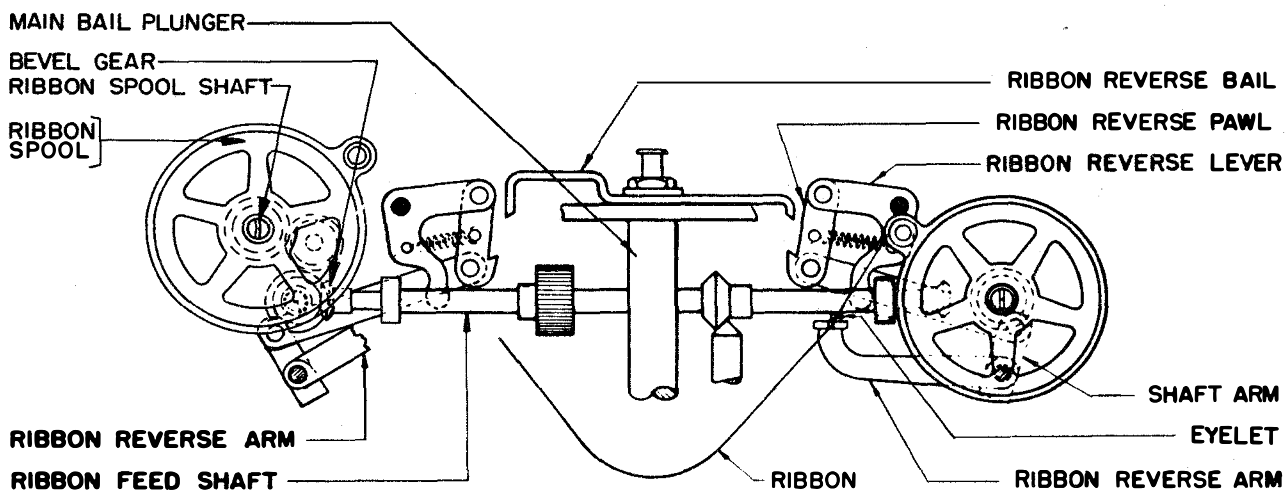


FRONT VIEW

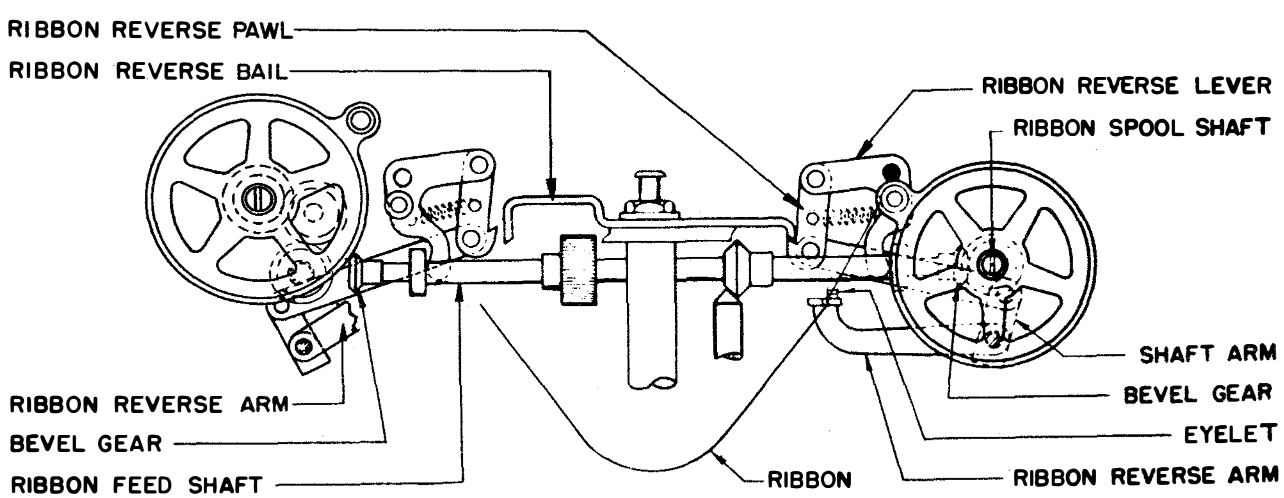
FIGURE 11



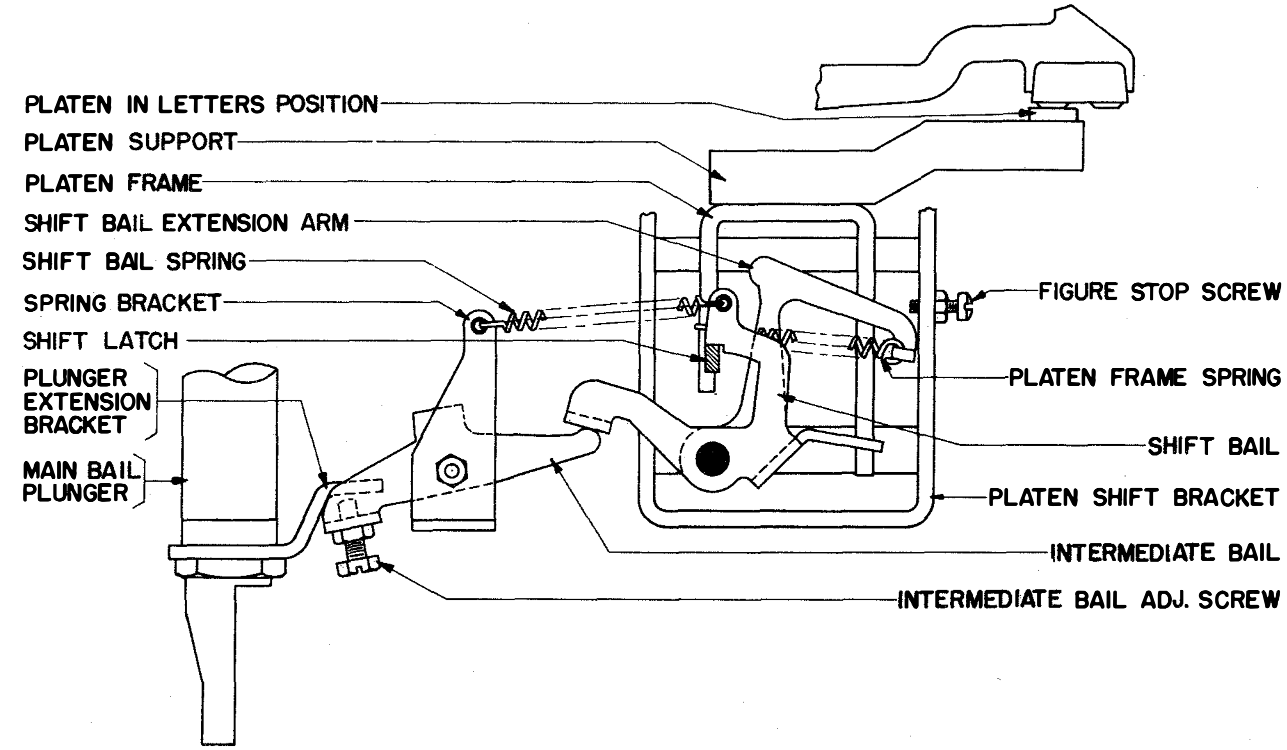
RIGHT SIDE VIEW
FIGURE 12



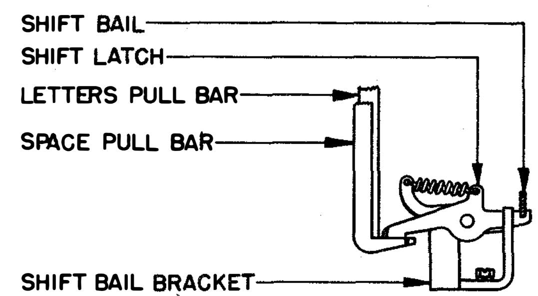
FRONT VIEW
FIGURE 13



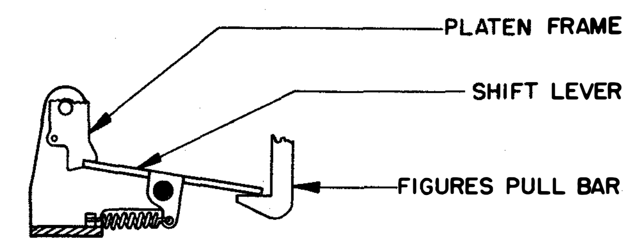
FRONT VIEW
FIGURE 14



LEFT SIDE VIEW
FIGURE 15



FRONT VIEW
FIGURE 16



FRONT VIEW
FIGURE 17

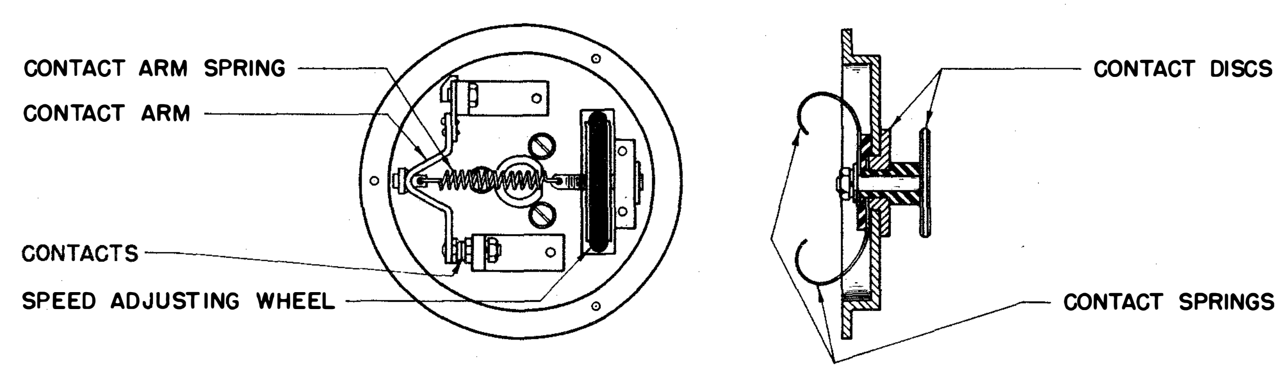
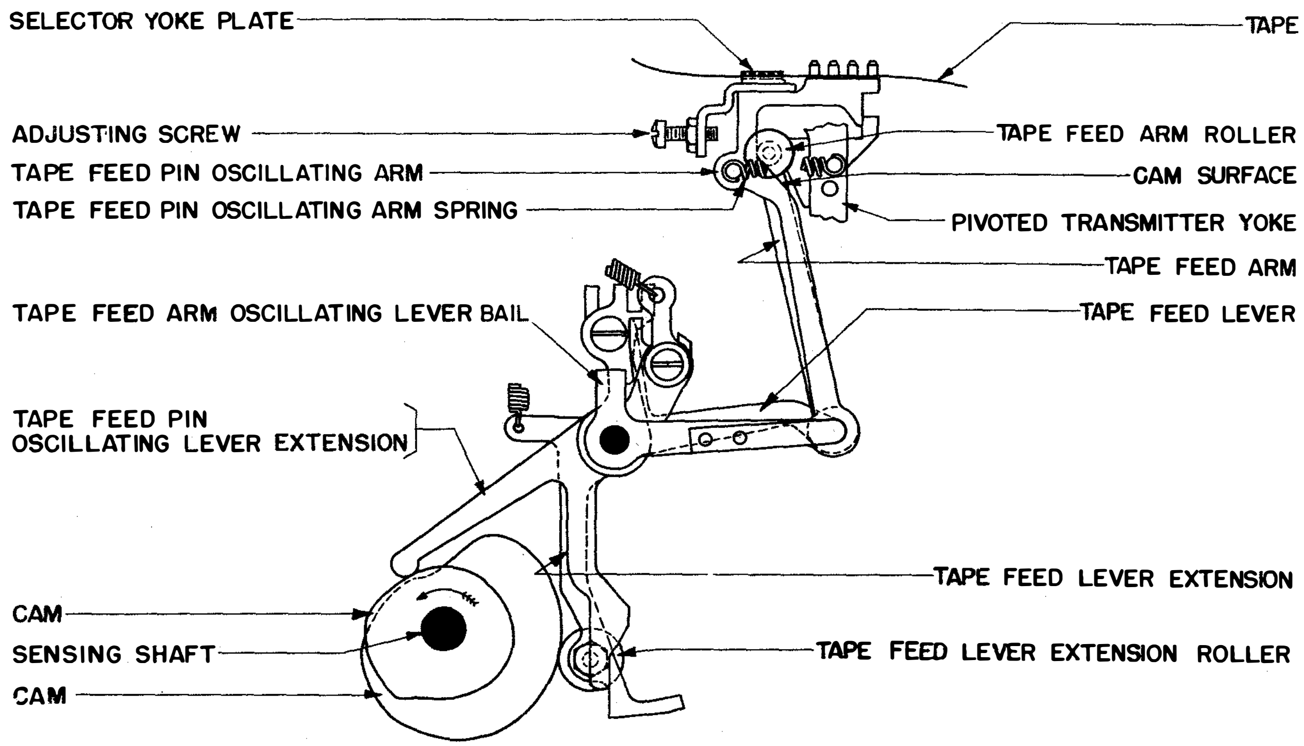
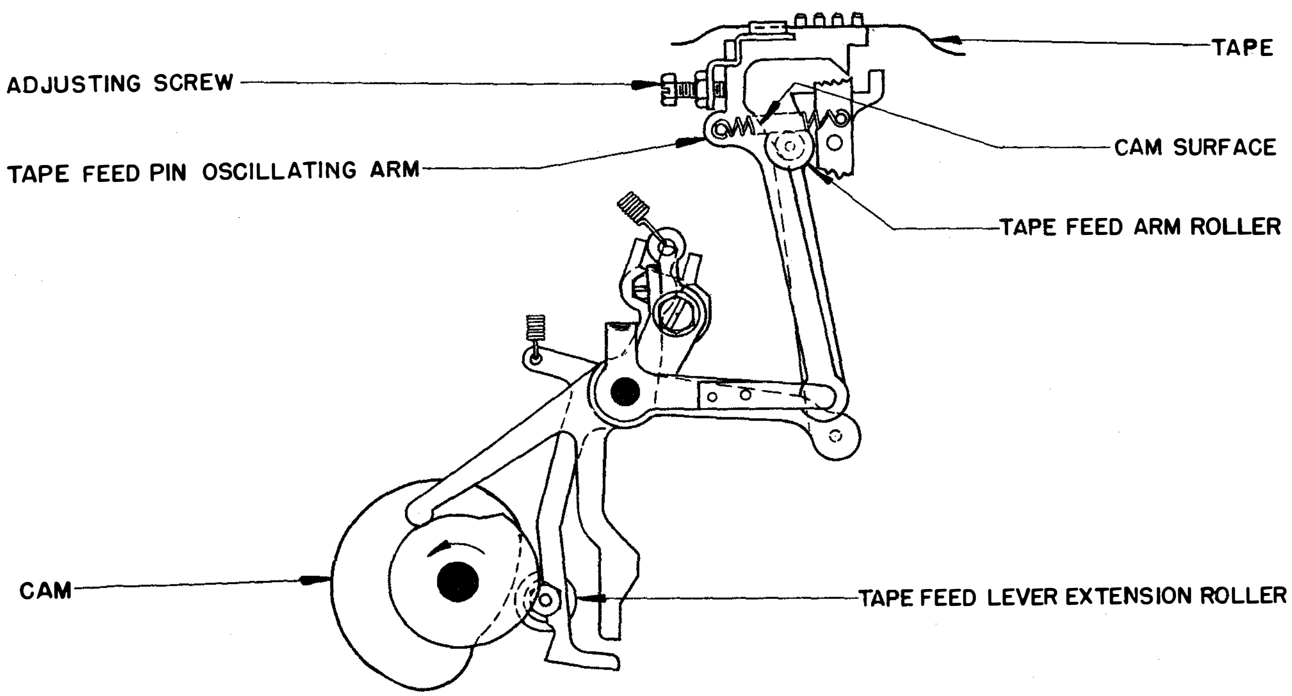


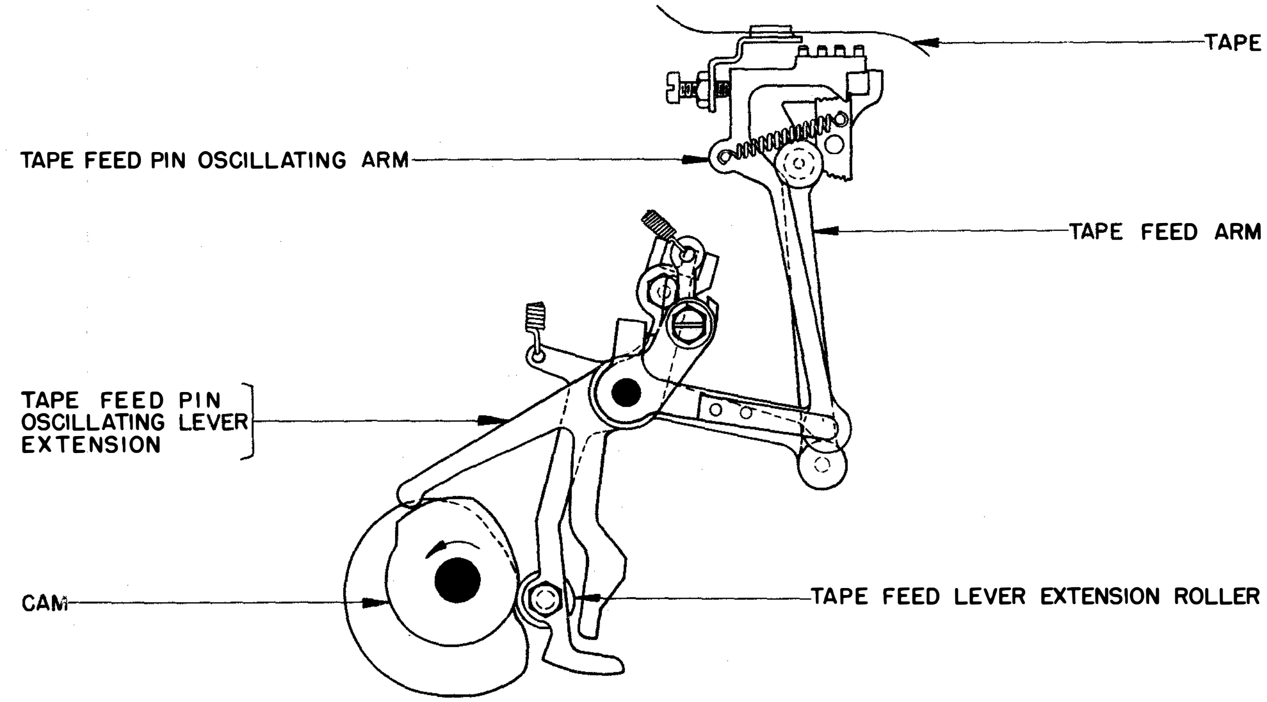
FIGURE 18



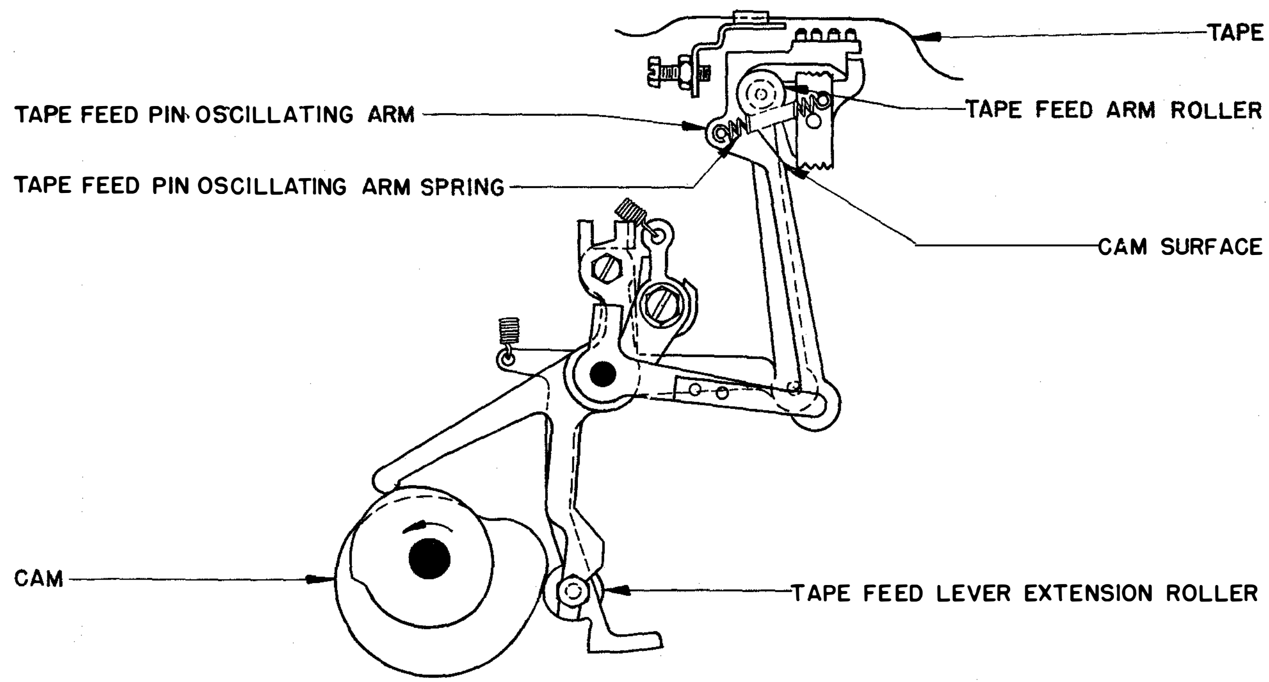
FRONT VIEW
FIGURE 19



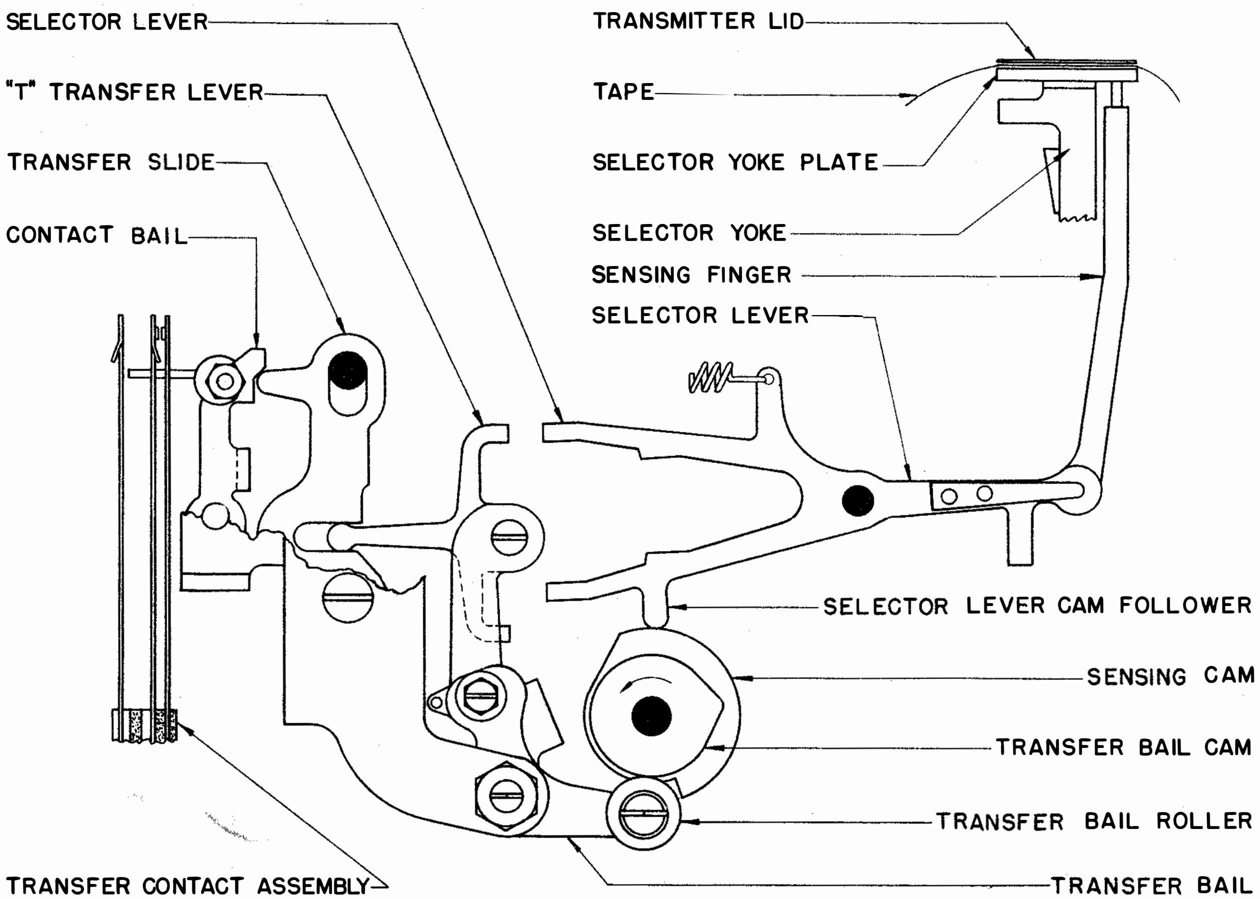
FRONT VIEW
FIGURE 20



FRONT VIEW
FIGURE 21

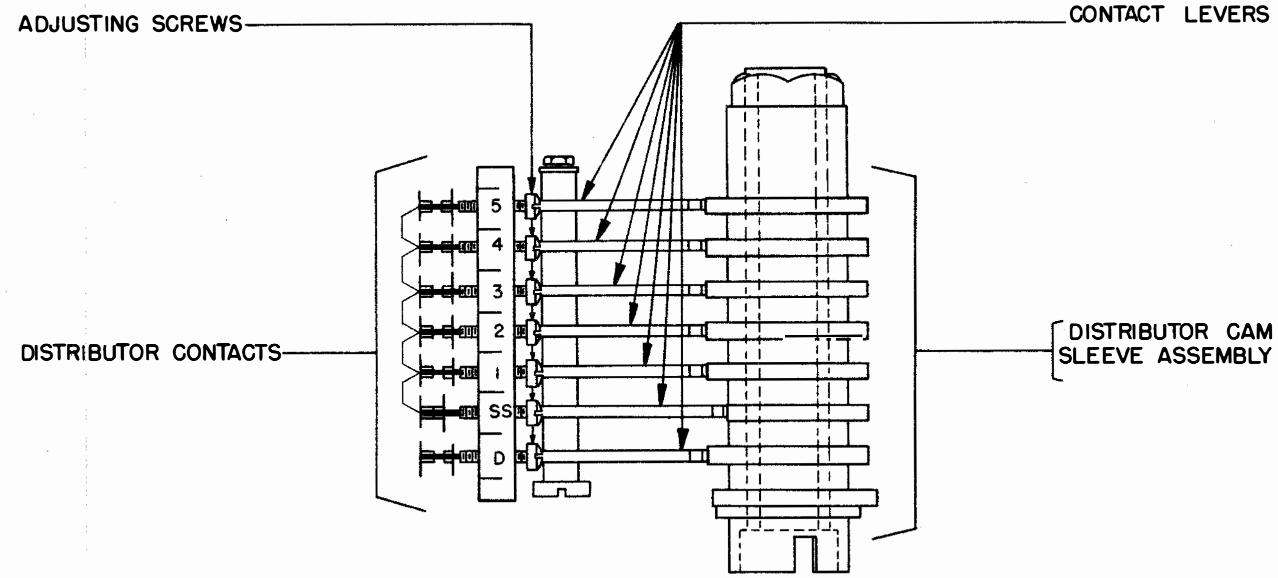


FRONT VIEW
FIGURE 22



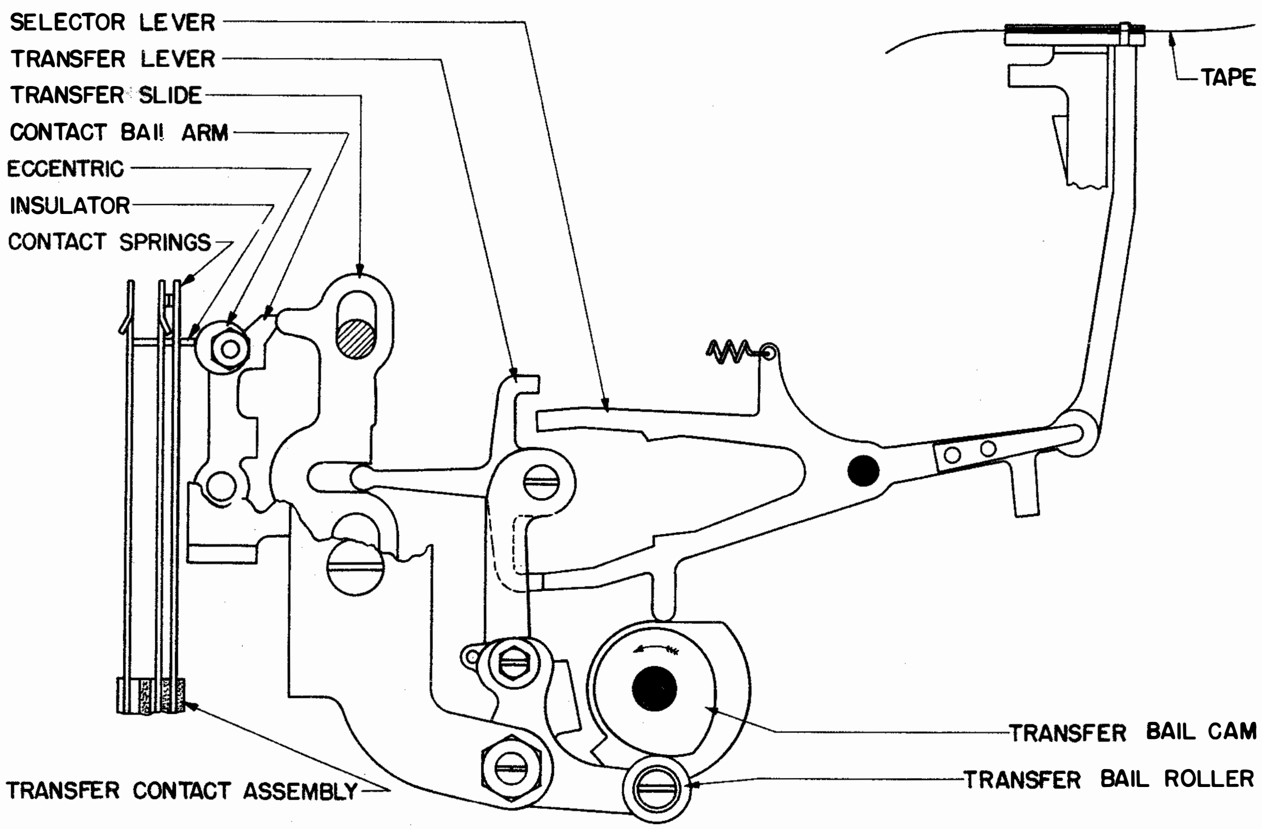
FRONT VIEW

FIGURE 23



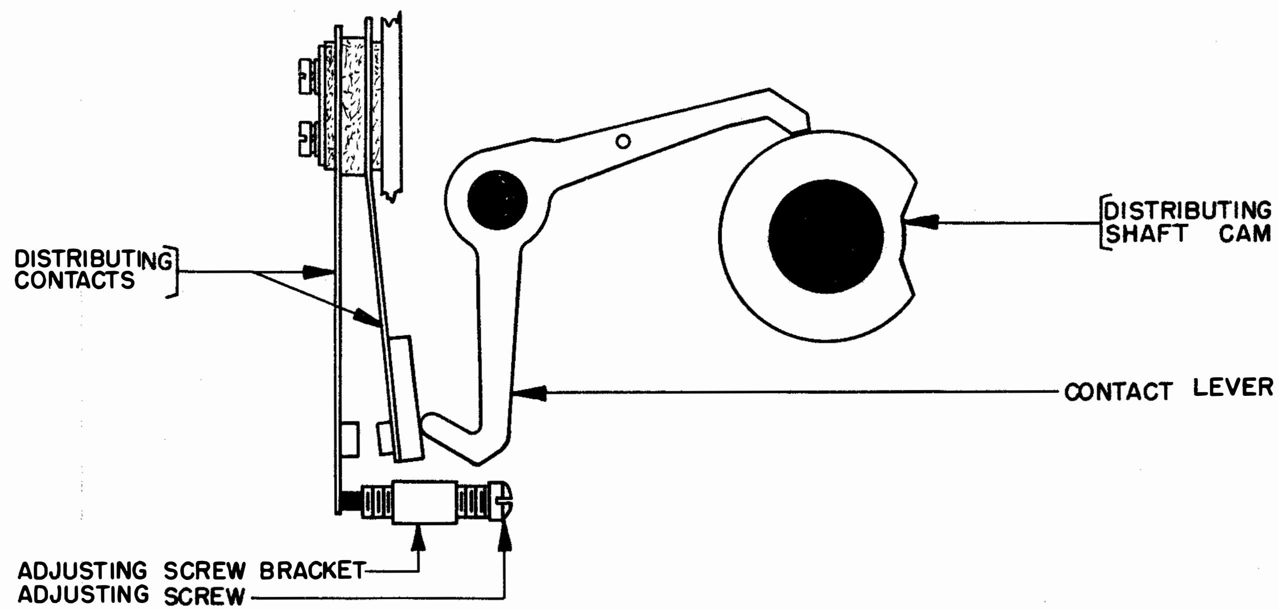
BOTTOM VIEW

FIGURE 25



FRONT VIEW

FIGURE 24



FRONT VIEW

FIGURE 26