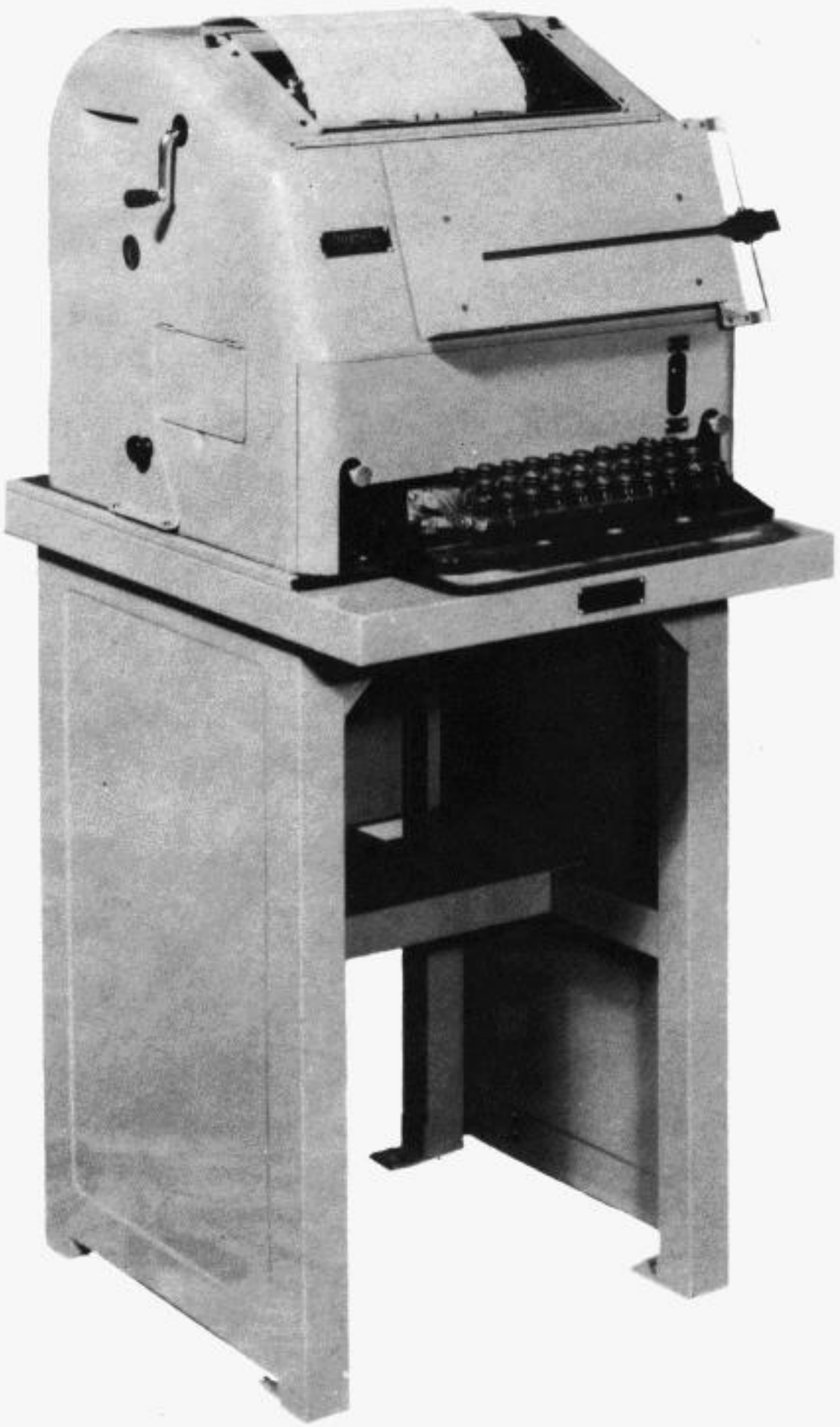
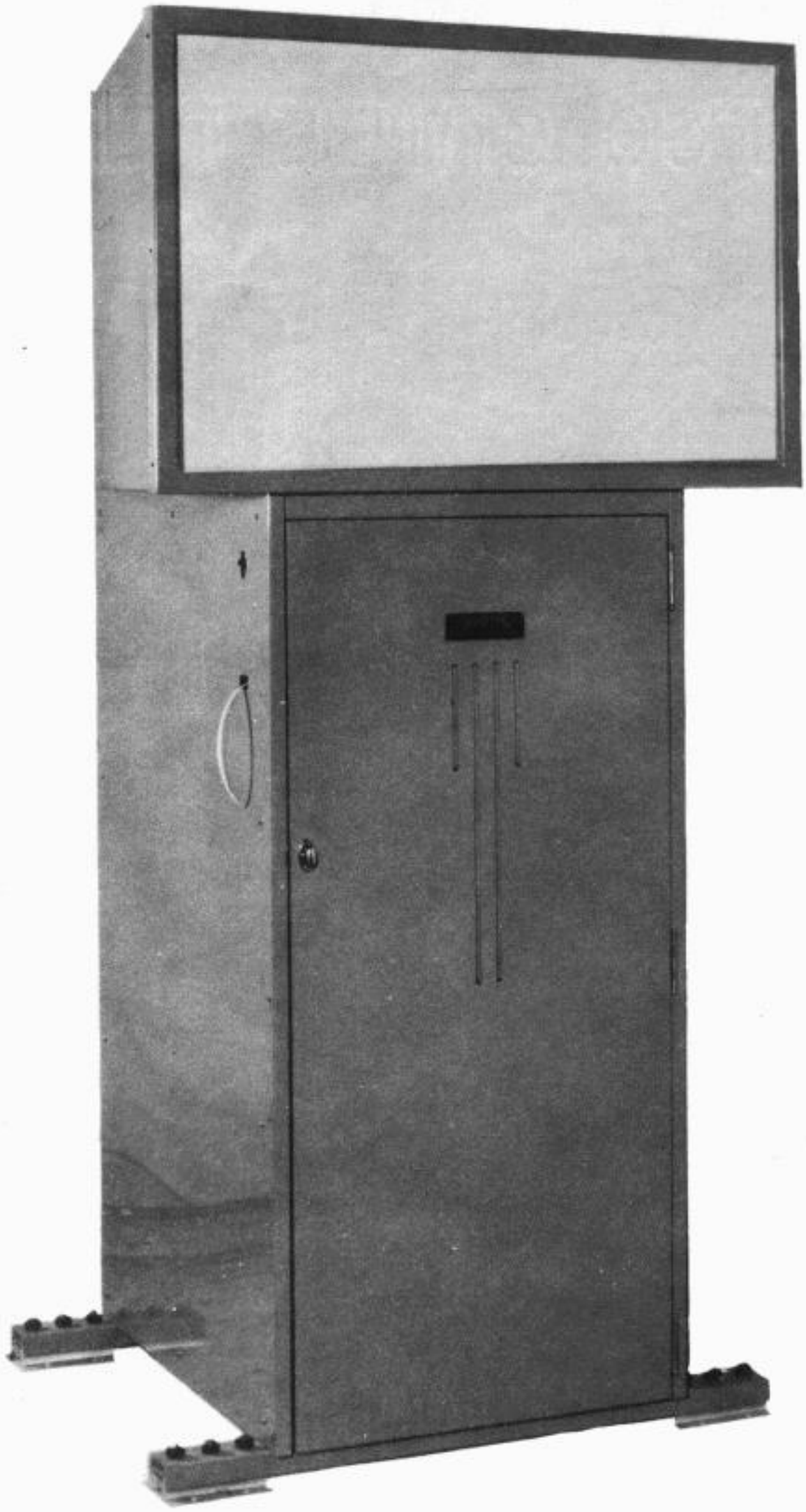
I. C. INSTRUCTION
BOOK 66-E



SENDING STATION



RECEIVER – PROJECTOR STATION

GUARANTEE

The contractor guarantees that the equipment will operate and function satisfactorily and reliably under all service conditions and in accordance with the specifications herein. Approval of design by the Government will not relieve the contractor of his responsibility for the satisfactory performance of the equipment in service. Any failure of the equipment to meet the specified performance or any defects in materials or workmanship that may develop during installation and test, or until the expiration of a period of one year's operation aboard ship after the completion of sea trials, shall be made good by and at the expense of the contractor for the replacement material furnished.

ELECTRICAL CHARACTER TRANSMISSION SYSTEM

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DESCRIPTION OF THE ELECTRICAL CHARACTER TRANSMISSION SYSTEM

GENERAL

General Description

This system provides means of transmitting typewritten information by printing telegraph from a sending station to one or more receiver-projector stations. Messages are transmitted from a Teletype Model 15 page printer at the sending station and are recorded simultaneously at all receiver-projector stations connected to the system.

Each receiver-projector station utilizes a projector cabinet which encloses two receiving units as follows: A Model 15 page typing unit which typewrites the message in successive lines on a continuous transparent web, from which it is projected on to a screen approximately three feet wide and two feet high; and a Model 14 tape printer which typewrites the message on a continuous narrow strip of paper tape which may be used for reference. A projector frame within the cabinet supports the Model 15 typing unit and the optical equipment.

The transmitting machine also typewrites a sending station record in successive lines on a continuous roll of paper which may be torn off in convenient page sizes for handling, filing, etc. The sending station printer set consists of a metal table, a typing unit, a transmitting keyboard, a printer base, a motor unit and a printer cover.

Signal and Control Circuits - Second Wire Used for Control

The selector magnets of all Teletype printers on the system are connected in series with the transmitting contacts of the sending printer.

One control relay is provided at the sending station and at each receiver-projector station. The page printer motor at the sending station and the tape and page printer motors at the receiving stations are connected to or disconnected from power by the contacts of their respective control relays. The windings of all control relays on the system are interconnected, subject to control by the manual switch on the page printer at the sending station. Because of the resistance of the control relay windings, two parallel control circuits of approximately equal resistance are provided.

Thus the motors of all printers connected to the system may be started or stopped simultaneously under control of the printer switch at the sending station.

Each receiver-projector station may be connected or disconnected from the system by means of a double-throw gang toggle switch at the sending station. When stations are so disconnected, approximately equivalent resistors are substituted in the signal and control circuits.

A projector lamp and exhaust fan in the projector cabinet at each receiver-projector station are turned on and off by means of a manual switch on the left side of each projector cabinet.

Signaling Code

The signaling code used to transmit characters is the "start-stop" five-unit code, which consists of five selecting impulses, used in various combinations of current and no-current intervals, and two synchronizing impulses. Each group of five selecting impulses is preceded by a start impulse and followed by a stop impulse. These start and stop impulses are used to maintain synchronism between all stations on the circuit. Impulses which energize the selector magnets on the printers are known as "marking" impulses and those which do not, as "spacing." Figure 1 shows graphically the five-unit code.

Transmitting Mechanism (Sending Station)

The keyboard transmitting unit is used to send electrical impulses of the five-unit code to the receiving mechanism of the typing units. These received impulses will cause the typing units at the connected stations to print a copy of the message sent by the keyboard operator.

The transmitting mechanism (Figure 28) consists essentially of a group of transmitting contact springs; a transmitting shaft with cam sleeve for operating the contacts, and three banks of key levers with associated mechanism for controlling the code transmitted by the contacts. The transmitting shaft is geared to the main shaft of the typing unit and rotates continuously while the motor is running. The transmitting cam sleeve is normally held stationary by the action of a clutch on the transmitting shaft. This clutch is normally held disengaged by a clutch throwout lever. When a key is depressed the driven member of a clutch (Figure 2) is permitted to move into engagement with the driving member, thus causing the cam sleeve to revolve. At the end of a revolution, the driven member of the clutch is disengaged from the driving member by the clutch throwout lever and the cam sleeve is brought to a stop until the next key is depressed.

Beneath the key levers are five selector bars and a universal bar extending the width of the keyboard. The selector bars are provided with saw-tooth shaped notches, as shown in Figure 3, according to the requirements of the signaling code. These bars rest on rollers and are guided at each end so that they may be easily moved endwise.

When a key is depressed, the key lever strikes the slanting sides of the selector bar notches, thus moving the bars either to the right or left depending upon whether the impulses, corresponding to the position of the bars, are "spacing" or "marking." The universal bar (Figure 2), which is connected to the trip-off pawl, controls the starting and stopping of the transmitting cam sleeve. It is pivoted at its two ends in such a way, that the depressing of any key moves it downward so as to actuate the clutch throwout lever. Thus, whenever a key is depressed, the selector bars are positioned to control the code and the universal bar is moved downward, in order to close the clutch and transmit the signal.

Each selector bar engages a vertical locking lever at its right extremity and positions it to correspond with the code impulse to be transmitted (Figure 3). Each locking lever controls the motion of a contact lever by either allowing the contact lever to close its contact when the cam sleeve revolves or restrict the motion of the contact lever. If the upper end of the locking lever is positioned to the left, corresponding to a spacing impulse, it engages the contact lever and prevents it from rising into the indent of the cam as it rotates, thus holding the circuit open for that impulse (Figure 3-A). If the locking lever is positioned to the right, corresponding to a marking impulse, it does not interfere with the movement of the contact lever (Figure 3-B). Then, as the cam sleeve revolves, the contact lever, riding on the surface of its cam, rises into the indent, thereby allowing its contact to close and send out a marking impulse. As the transmitting cam sleeve rotates, the impulses, either "marking" or "spacing," are transmitted in succession.

A start-stop cam controls an additional contact lever which, in turn, actuates the start-stop contacts. These contacts are opened at the beginning of each revolution of the cam sleeve to transmit the start impulse (spacing) and remain open during the transmission of the five code impluses. After the fifth code impulse has been transmitted, the start-stop contacts close and send the stop impulse (marking) to the line. These contacts will remain closed until the next key lever is depressed. A lock loop (Figure 28), which is raised by a lock loop cam at the end of each revolution to allow the new combination to be set up, is used, while in its downward position, to prevent a change in the combination being transmitted. This is done by holding the locking levers in their set positions while the signals are being transmitted. This arrangement also makes it impossible to depress another key until the signal for the previous character has been transmitted.

The keyboard is equipped with a space repeat device which permits the transmission of continuous spaces. When the space key lever is depressed, a space repeat rod (Figure 28), which is connected to the key lever extension, will rotate the intermediate pawl (Figure 2). The intermediate pawl will, in turn, hold the clutch lever out of engagement with the throwout cam on the clutch driven member. Thus, the transmitting cam sleeve will be permitted to revolve continuously until the space key lever is released.

BASIC FEATURES OF PAGE TYPING UNITS AND TAPE PRINTERS

Certain basic principles and operating features of modern five-unit code start-stop printing telegraph apparatus are common to the page printer used at the sending station and the page and tape printers used at the receiver-projector stations. In order to accentuate the similarity of these various units and avoid duplication of identical material, these basic principles and features are presented in this subsection only. Reference should be made to the following subsections of the descriptive section of this instruction book for information relating to particular features of these three types of machines:

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Printing

Printing is accomplished by means of type bars which are mechanically thrown against a platen. The type bar to be selected is determined by the setting of five code bars (Figures 27 and 36) which are controlled by line signals through the medium of the selector mechanism. The code bars are so arranged that notches along one edge will be lined up so as to permit a selected pull bar to move into the path of a pull bar bail. The pull bar bail engages and operates the pull bar, thus throwing its associated type bar against the platen.

Selecting Mechanism (Page and Tape)

The purpose of the selecting mechanism is to receive the impulses from the transmitting station and distribute them mechanically, thereby setting up various code combinations on the vanes and code bars (code bars only on tape printer). These combinations will determine the character to be printed or the function to be operated. The selector mechanism is actuated by a selector cam sleeve located on the main shaft of the typing unit (Figure 29). A friction clutch consisting of two felt washers, four friction discs and a compression spring (Figure 4) is used to drive the selector cam sleeve. The distribution of the impulses is controlled from the selector magnet (Figure 5) which receives the code impulses from the line. Normally, when the machine is running idle, the armature of the selector is held attracted and the stop arm of the selector cam sleeve is against a stop lever (Figure 5) which, in turn, is held by a trip latch. Because the stop arm which is part of the selector cam sleeve is engaged with the stop lever, the cam sleeve is prevented from revolving. When the start impulse is received, the armature is released and pulled away from the magnet pole pieces by the armature lever spring (Figure 6). This action will move the trip latch out of engagement with the stop lever, thereby releasing the stop arm and allowing the selector cam sleeve to revolve with the main shaft. As the cam sleeve revolves the armature cam moves the armature momentarily against the selector magnet. If the impulse is "marking," the magnet will continue to hold the armature in the attracted position during that impulse. However, if the impulse received is "spacing," the armature will be withdrawn from the magnet by the armature spring.

The position of each code bar is determined by the action of the respective selector cam, working in conjunction with a selector arm (Figure 6), which is controlled by the selector armature. Motive force is supplied to the code bars by selector lever springs through the medium of selector levers, swords, "T" levers, vanes and code bar bell cranks (on tape printer the "T" levers engage the code bars directly), see Figures 2 and 6. Assuming that the code signal for the letter "E" is being received, the action of the selector mechanism would be as follows: Upon the reception of the start impulse (a no-current impulse), the armature moves to the spacing position, thus imparting motion to the trip latch plunger (Figure 5) which, in turn, causes the trip latch bell crank to move the trip latch out of engagement with the stop lever, thereby releasing the selector cam sleeve stop arm as previously explained. The selector cam sleeve starts to revolve under the influence of its friction clutch, and the No. 1 selector cam engages No. 1 selector lever, when the first impulse of the letter "E" ("marking" impulse) has been received by the magnet from the line. The armature, which had been moved against the pole pieces by the armature cam, remains in that position

and holds the marking extension of the selector arm in the path of the marking arm of the sword. When the No. 1 cam actuates No. 1 selector lever, this lever is rotated counterclockwise, carrying with it the sword, which strikes the marking extension of the selector arm and is thereby rotated clockwise about its pivot point "A". This action positions the sword, so that, when No. 1 cam clears the selector lever, the selector lever spring will move the sword against the marking arm of the "T" lever and exert sufficient pressure to move the vane and code bar (code bar only in the case of tape printer) to their marking position. As the selector magnet is de-energized, when selector levers 2, 3, 4 and 5 are actuated by their cams, the armature and selector arm return to their spacing position as shown on Figure 6. In this position, the selector arm will be in the path of the spacing arms of the swords, causing them to rotate counterclockwise and apply pressure to the spacing arms of the "T" levers when the selector levers ride off the peaks of the cams. Pressure applied to the spacing arms of the "T" levers will then move the code bars to the spacing position. With No. 1 code bar in the "marking" position and Nos. 2, 3, 4 and 5 in the "spacing," there will be a notch in each code bar aligned for the "E" pull bar.

Locking Cam

The locking cam has five high and five low portions on its periphery against which the locking lever is held by its spring (Figure 7). During that part of each impulse, when the swords are being positioned by striking the selector arm, (at the time when any cam is operating the corresponding selector lever) a low portion of the locking cam is in contact with the locking lever. The selector arm will then be held firmly in position by the locking extension of the locking lever as it engages the locking wedge on the selector arm. When the locking lever is riding on the high portion of the locking cam, the locking extension will be held away from the locking wedge, and the selector arm will be free to move in response to the next movement of the armature. Because the armature cam starts to move the armature toward the selector magnet before the locking lever releases the selector arm, a selector arm spring is provided as a yield between the armature lever and the selector arm.

Synchronism

Transmitted signals sent out by the transmitting mechanism will not be interpreted correctly by the receiving mechanism, unless the receiving mechanism is kept in synchronism with the transmitted signals. Synchronism is maintained by having the receiving selector cam sleeves rotate faster than the transmitting cam sleeve and by use of the start and stop impulses in the following manner:

As previously described, 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 sleeve. The selector cam sleeve revolves one-seventh faster than the transmitting cam sleeve, but 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 one-seventh greater than the distance traveled by the transmitting cam sleeve from where it can control the transmission of one impulse to where it can

control the next. In other words, for a certain travel of the transmitting cam sleeve, the corresponding travel of the selector cam sleeve is one-seventh greater but, as the selector cam sleeve travels one-seventh faster, it will reach its second position at the same time the transmitting cam sleeve reaches its second position.

The selector cam sleeve completes its revolution before the transmitting cam sleeve completes its revolution, but the transmitting cam sleeve causes a stop impulse to be transmitted which stops the selector cam sleeve until the transmitting cam sleeve again causes the start impulse to be transmitted. Normally, when the selector cam sleeve is one-seventh faster than the transmitting cam sleeve, 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 exact speed, the selector cam sleeve remains at rest more or less, respectively. Of course, there may be a slight error in the relative position of the selector cam sleeve in the various positions, but the mechanisms are so constructed to provide for this and, due to the fact that the selector cam sleeve starts each revolution in unison with the transmitting cam sleeve, this error does not become accumulative.

PAGE TYPING UNIT (SENDING STATION)

Features which are common to all typing units are covered under "Basic Features of Page Typing Units and Tape Printers."

Main Shaft Assembly (Figure 29)

The main shaft is driven by a gear, located at the right end, which meshes with the motor pinion. To the left of the main shaft gear is the keyboard driving gear which connects with the transmitting shaft on the keyboard. The keyboard driving gear is omitted from machines at the receiving stations.

A spacing pinion, centrally located on the main shaft, meshes with a spacing gear mounted on a spacing shaft which is positioned vertically to the rear of the main shaft (Figure 30). The spacing pinion on the main shaft is driven by a friction clutch on its right and is controlled from an escapement ratchet on its left. Two escapement pawls mounted on a bail mounting shaft (Figure 8-B) govern the rotation of the escapement ratchet.

A bail cam unit having two cams; one for operating the printing bail (Figure 9) and the other for operating a function bail, is provided. The bail cam unit is driven by means of a jaw clutch and its revolutions are controlled from the selector, through the medium of a clutch throwout lever (Figure 4) and a sixth cam on the selector cam sleeve.

The selector cam sleeve is fitted over the left end of the main shaft and is driven by a friction clutch.

Main Shaft Clutch Throwout Lever

Following the selection of a character, the sixth cam on the selector cam sleeve disengages the clutch throwout lever from the jaw clutch on the main shaft. The clutch teeth then engage and the printing and function bail cams make a complete revolution. The printing and function bail cams operate their respective bails so as to print a selected character or perform a function. At the end of each revolution of the bail cam unit, the clutch throwout lever engages the projection on the clutch driven member and cams it out of engagement with the driving member. From the foregoing, it is obvious, that a selecting cycle and an operating cycle are required for each character or function. However, any character or function may be selected while the printing of the previous selection is taking place. This simultaneous action is known as "overlap."

Printing

The mechanism that enters into the printing of a character consists essentially of a printing bail cam, a printing bail, a pull bar bail, pull bars and type bars. See Figure 9.

The printing bail and its operating arm are mounted on the bail mounting shaft. The operating arm pivots below its central portion and has a roller attached to its lower end. The upper end of the operating arm mounts an adjusting screw which bears against the printing bail. A printing bail spring (Figure 31) hooked to the right side of the printing bail tends to pull the bail forward against the adjusting screw, thereby causing the operating arm roller to follow the printing bail cam. Rotary motion of the printing bail cam will cause the printing bail to move forward and back.

Mounted on top of the printing bail are two printing bail blades (Figure 31) that extend the length of the bail. These blades are provided to facilitate printing on all portions of the line. Located between the printing bail blades (when the carriage is in place) is a plunger roller (Figure 9) which extends downward from a pull bar bail plunger mounted on the carriage. The plunger is supported by guide rollers at its rear end and is attached to the pull bar bail at the front. The pull bar bail is located beneath the pull bars and is supported by a guide roller (Figure 32) at each end. The movement of the printing bail applies a reciprocating motion to the pull bar bail plunger and bail for the purpose of actuating the pull bars.

When the bail cam unit is in its normal stopped position, the printing bail operating arm roller is resting against the high portion of the printing bail cam. With this roller against the high portion of its cam, the printing bail and pull bar bail will both be in the rearmost position, thereby holding the forward ends of the pull bars raised clear of the code bars, so that the code bars may respond to selection. As the printing bail cam rotates, following the selection of a character, the printing bail operating arm roller rides to the low part of its cam, thus permitting the printing bail spring to move the printing and pull bar bails forward. As the pull bar bail moves forward, it will allow all pull bars to rest on the code bars under the tension of the pull bar springs. The selected pull bar will drop into the notch set up for it in the code bars, which will position it lower with respect to the bail than the other pull bars. As the pull bar bail continues

on its forward stroke, it will engage a notch on the selected pull bar, but will clear all unselected pull bars. The forward movement of the selected pull bar will cause its associated type bar to strike the platen. Before the pull bar bail reaches the limit of its forward travel, a stripper plate (Figure 9), located below the pull bars, cams the selected pull bar off the bail and momentum carries the type bar against the platen. As the roller on the printing bail arm rides to the high part of its cam, to complete the printing cycle, the printing and pull bar bails will be moved to their rear position. The pull bars will then be raised clear of the code bars so that they are free to respond to a new selection.

Locking Function Lever

A means is provided to hold the vanes in their selected positions until the printing of the character has taken place. This is accomplished by the use of a locking function lever. The locking function lever is the first on the right of the function levers, which are located immediately behind the vanes (Figure 10).

When the printing bail is in its rear position, the function lever bail, mounted on the printing bail (Figure 9), holds the locking function lever away from the vanes. When the printing bail is permitted to move forward, the function lever bail roller moves downward, allowing the function lever spring to pull the lever against the rear edges of the vanes. The locking function lever will engage each vane, whether its rear edge be raised by a marking impulse or brought downward by a spacing impulse, thus locking the vanes in their selected positions.

The operation of the remaining function levers is described under "Functions."

Spacing

Spacing is accomplished by moving the carriage. To facilitate spacing, the carriage is mounted on three support rollers (Figure 9); one of which operates on a rear carriage track, and two on a front. The rear track is a rectangular rod located below the platen assembly. The front track is a circular rod located above the vanes. The front track is slotted throughout its length, so that the heads of two carriage guide screws, located at either side of the carriage casting, will be guided therein.

The carriage is connected to the spacing shaft by means of a rack and pinion (Figure 9). The rack is mounted on the rear of the type bar carriage casting and the pinion is attached to the upper end of the spacing shaft. The spacing shaft, extending downward, passes through the spacing shaft gear. Just above its lower bearing, the spacing shaft mounts the carriage return clutch, the lower member of which is rigidly attached to the shaft. The upper member of the clutch connects with the spacing shaft gear. The carriage return clutch members are in engagement at all times except when the carriage is being returned from the end of a line. The function of this clutch is described under "Carriage Return."

The spacing shaft gear meshes with the spacing pinion on the main shaft as previously described under "Main Shaft." Spacing is controlled from the printing bail through the medium of the escapement pawls. The action is as follows: With the printing bail in its rear position, the rear escapement pawl is engaged with one of the teeth on the spacing escapement ratchet, thus holding the ratchet and spacing gears stationary. See (Figure 8-B). As the printing bail starts to move forward, the escapement pawl operating arm strikes the lower end of the rear pawl, thereby moving it out of engagement with the tooth on the escapement ratchet. At the same time the front escapement pawl moves against the ratchet and into the path of another tooth which it will engage after the ratchet has traveled one-sixth of a space. The printing operation then takes place. Near the end of the return stroke of the printing bail, the operating arm lifts the front escapement pawl out of engagement with the escapement ratchet and at the same time the rear pawl moves against the ratchet. This action will allow the spacing mechanism to revolve sufficiently to space the carriage five-sixths of a space at the end of which the rear escapement pawl will engage a tooth on the ratchet. The remaining one-sixth of a space will be added preceding the printing of the next character as described in the foregoing.

When the type bar carriage reaches the end of a line, the right margin adjusting screw (Figure 8-A) moves the spacing stop lever into the path of a projection on the spacing stop sleeve, thus blocking rotation of the spacing mechanism and preventing further spacing of the carriage.

Margin Signal Bell

Before the type bar carriage reaches the end of its travel, it operates the margin bell as a warning to the operator that the end of the line is near. See Figures 11 and 30. The margin bell pawl on the type bar carriage will depress the margin bell cam and rotate the margin bell cam shaft, thus moving the bell hammer away from the bell, against the tension of its spring. When the bell pawl has been spaced beyond the cam, the bell hammer will be released and its spring will cause the hammer to strike the bell.

Ribbon Feeding

The end of the ribbon feed lever engages the notched extension on the pull bar bail plunger (Figure 12). The ribbon feed pawl, which actuates the feed ratchet, is attached to the ribbon feed lever. With each operation of the pull bar bail plunger, the ribbon feed ratchet and the ribbon feed ratchet gear, which are rigidly connected, advance one tooth. This motion is extended through a train of gears and shafts to either of two ribbon spools for the purpose of feeding the ribbon.

Ribbon Reverse

Assuming that the ribbon is being wound on the right-hand spool and is almost unwound from the left, an eyelet inserted near the end of the ribbon will engage and rotate the left ribbon reverse arm. Rotation of this arm will move the left ribbon reverse pawl into the path of the ribbon reverse bail (Figure 13). As the bail moves toward the rear, it will engage the pawl and thereby shift the ribbon feed shaft to the left. The ribbon feed shaft gears will disengage on the right and engage on the left, causing the ribbon to wind on the left spool. The reversing operation will take place in a similar manner on the right side of the assembly when the eyelet near the right end of the ribbon engages with the right ribbon reverse arm.

Ribbon Oscillation

So as not to obscure the printing, the ribbon is moved below the printing line after each character has been printed. To accomplish this, the ribbon is supported by a ribbon carrier attached to the front end of a ribbon oscillator lever (Figure 14). The oscillator lever pivots on a shoulder screw in the front end of a shift lever and has a lower extension which connects with the left plunger arm on the pull bar bail plunger. An oscillator lever spring causes the oscillator lever to follow the movement of the left plunger arm. With the pull bar bail plunger in its rear position, the ribbon is normally held below the printing line. The forward movement of the plunger will permit the oscillator lever spring to raise the ribbon into the path of the type bar. The ribbon shift lever (Figure 14), on which the oscillator lever is mounted, pivots on a ribbon shift lever bracket. A shift lever spring hooked to the rear end of the shift lever, causes it to press its centrally located roller against a slide bar mounted on the under side of the platen assembly. See Figure 31. When the platen assembly shifts to either figures or letters position, the shift lever spring will cause the shift lever roller to follow the slide bar, making the oscillations of the ribbon equally effective in either upper or lower case.

Functions

The operations of functions is accomplished through the medium of function levers. When the printing bail is in its rear or normal position, the function lever bail (Figure 15), which is mounted on the printing bail, holds the function levers away from the vanes. As the printing bail moves forward, the function lever bail roller will move down off the high portions of the function lever rear arms, thus permitting the function lever springs to pull their respective levers against the vanes. The forward arms of the function levers are notched in accordance with requirements of the code, so that when a function combination is applied to the vanes, the selected function lever will move forward farther than those unselected.

When in the selected position, the rear arms of the function levers will be in the path of one of the blocking extensions of the function lever bail (Figure 15). The rear arm of the function lever will prevent the printing bail from moving forward sufficiently to allow the spacing mechanism to operate.

The function bail, mounted on the function bail shaft, is used to operate some of the functions and is actuated by the function bail cam. A function bail spring holds the function bail roller against its cam at all times. After the printing and function lever bails move forward sufficiently to release the function levers, the function bail roller starts to ride to the high part of its cam. The action of the cam moves the function bail blade toward the rear, causing it to engage and operate any function push bar that may have been raised into its path by a selected function lever. The function bail roller will then ride to the low portion of the function bail cam, and the bail blade will return to its forward position in readiness for the next function.

Carriage Return

When the carriage return function lever (second from the right) moves into engagement with the vanes, the function lever extension moves the carriage return latch bar (Figure 16) upward out of engagement with its latch. This releases the carriage return operating lever, which, actuated by its spring, moves the carriage return clutch fork upward so as to disengage the upper carriage clutch member from the lower member. The spacing shaft is then free to rotate independently of the spacing shaft gear and thereby permit the type bar carriage to be returned to its extreme left position by the carriage return spring (within the carriage return drum) through the medium of the draw strap (Figure 31). The notch on the reset bar will then be engaged by the function bail and the reset bar will be moved toward the rear. As the reset bar and the carriage return latch bar are both pivoted on the same operating lever screw the latch bar will be reset into engagement with its latch (Figure 16). In the meantime the function lever bail will have been returned to its upper position and the carriage return function lever extension will have been moved down below the latching surface of the carriage return latch bar.

As the carriage return clutch fork disengages the carriage return clutch, it also actuates a lock bar (Figure 16) which is linked to it. The sliding motion of the lock bar permits a shoulder on its upper edge to pass under and engage a lock bar latch mounted above the lock bar. Engagement of the lock bar with its latch will cause the carriage return clutch to be held disengaged until the carriage has fully returned to the extreme left position.

Just before the carriage reaches its extreme left position, a left margin adjusting screw (Figure 27), attached to the carriage, strikes the front end of a centrally pivoted dashpot lever. The rear end of the dashpot lever drives a dashpot plunger into the dashpot air chamber and thereby absorbs the shock. See (Figure 30)

At the end of its travel, the dashpot lever strikes the lower end of the lock bar latch, thus releasing the lock bar and allowing the carriage return clutch members to engage.

The carriage return lock bar extends beyond its latch so that it may be manually operated in order to return the carriage.

Figures Shift and Letters Shift

The figures shift function lever, third from the right, when selected will raise the figures shift push bar, so as to bring its notch into the path of the function bail blade (Figure 15). This push bar, when moved by the function bail, will rotate the right end of a shift link to which it is connected, toward the rear of the printer and the left end of the link toward the front. (See Figures 17 and 30.) As the shift link pivots, a shift lever, which is connected to its left end, will rotate counterclockwise and exert a downward pull on a shift vertical link which extends upward from the shift lever to the platen bracket. The rear of the platen assembly will be moved downward and held there by its detent while the platen roll will rise to the figures (shifted) position.

The letters push bar is connected to the left side of the shift link. When the letters push bar is operated by the function bail, the action on the platen assembly will be reversed, thus bringing the platen down to the letters (unshifted) position.

Spacing Function

Spacing other than that accompanied by printing (such as spacing between words, etc.) is accomplished in the same manner as that described under "spacing" except that there is no pull bar to be selected.

Line Feed Function

When the line feed function lever, first on the left, is selected, its lower extension raises the line feed push bar into the path of the function bail blade (Figure 16). When the function bail moves toward the rear of the printer, the line feed push bar rotates the line feed bail, thus pulling the line feed vertical link downward. Downward movement of the vertical link will operate the line feed lever which, in turn, will move the line feed pawl into engagement with the line feed ratchet and thereby rotate the platen one line space. When the line feed function lever is returned to its normal position by the function lever bail, the upper extension of this function lever will strip the line feed push bar off the function bail blade.

After each line feeding operation, a detent roller (Figure 31) locates itself between two teeth on a detent ratchet, thus regulating the space between lines, and holding the platen firmly in position during each line of printing. The detent ratchet is attached to the right-hand end of the platen.

When the single-double line feed lever (Figure 27) is in its upper position, the line feed pawl will be permitted to engage the first tooth only, over which it travels on the line feed ratchet, which will cause the platen to rotate a single line space. When the single-double line feed lever is in its lower position, it will allow the line feed pawl to engage the second tooth, over which it travels on the line feed ratchet and thereby cause the platen to rotate a double line space.

In order to facilitate paper feeding, a paper straightener rod and a series of platen pressure rollers are provided (Figure 9). The paper straightener rod is used to guide the paper as it is unwound from the roll. It is also used as a slack rod to prevent the paper from tearing. The pressure rollers hold the paper firmly against the platen to prevent slippage while line feeding.

RECEIVING PAGE TYPING UNIT (RECEIVING STATION)

The receiving page typing unit differs from the typing unit used at the sending station only in those special features necessary to adapt it for projector use. The special features are described in the following:

The receiving page typing unit and its associated motor are arranged for mounting on a projector frame within the lower section of the cabinet. The projector frame is mounted on rollers, thus permitting the typing unit, frame and optical apparatus to be rolled forward for greater accessibility.

In order to facilitate projection of the received copy, the receiving page typing unit makes use of a special platen roll; a series of special rollers to guide the transparent web to the printing position and carry it vertically through the field of the optical apparatus; and a rewinder to hold the web taut and rewind it on a spindle as it is advanced by each line feeding operation (see Figure 34).

The platen is mounted approximately vertically on a platen carriage which is linked to the type bar carriage. This linkage causes the platen to maintain the correct position back of the type bar guide as the type bar carriage travels. The platen bears against an extension spring (connected to the platen frame at each end) which gives to the platen a rotary motion as it travels with the type bar carriage. The draw strap drum for returning the carriage is mounted externally on the left side frame of the typing unit.

A ballast (Figure 34), which is used to insure uniform return of the type bar carriage when the typing unit is operating on an inclined plate, is mounted on tracks of a counter-ballast assembly attached to the projector frame, and is connected to the type bar carriage by means of draw straps.

Line feeding is effected by a feed roll and pressure roll mounted on brackets at the rear of the typing unit. The feed roll is actuated by a feed pawl which is connected to the regular line feed bail by a special line feed link.

The rewinder (Figure 34) is mounted above the typing unit on brackets attached to the projector frame. It is driven from a pulley attached to the main shaft (Figure 35). A driving belt connects the driving pulley with a driven pulley on the rewinder shaft. A friction clutch on the rewinder shaft exerts sufficient torque on the rewinder to hold the web taut.

A slide carrier to accommodate projector slides may be suspended above the platen.

A printing bail spring balancer bar, mounted on the spacing cross bar of the typing unit, is provided to secure uniform printing in both upper and lower case.

RECEIVING TAPE PRINTER

Features which are common to all typing units are covered under "Basic Features of Page Typing Units and Tape Printers."

Main Shaft Assembly (Figure 18)

The main shaft in the receiving tape printer is mounted vertically. It is driven by the motor through the medium of the motor pinion and worm gear. The upper surface of the worm gear, a felt washer, steel disc and spring comprise the main bail cam clutch. Projections on the steel disc fit into notches in the lower surface of the main bail cam. In a somewhat similar manner, projections on the upper portion of the main bail cam engage notches in the lower section of the driven member of the main shaft clutch. The main shaft clutch spring moves the driven clutch member upward so as to engage the driving member when permitted to do so by the clutch throwout lever.

The selector cam sleeve is driven through the medium of the friction clutch formed by the selector cam clutch spring, four steel discs and two felt friction washers.

Printing Mechanism (Figure 19)

The printing of any letter or the operation of any function is effected by the main bail. The main bail is attached to the upper end of the main bail plunger. The plunger is moved up and down by the main bail operating lever which engages a notch in the lower end of the plunger. Pivoted on the same shaft with the main bail operating lever is the main bail bell crank. Contact between the lever and the bell crank is made by means of the main bail adjusting screw. Tension exerted by the strike spring (attached to the main bail operating lever) holds the main bail bell crank roller against the periphery of the main bail cam.

At the end of each revolution of the main bail cam, the main bail bell crank roller will be on the high portion of the cam, and the main bail will be held in its lowest position against the tension of the striker spring. As the main bail cam revolves, the bell crank roller will move against the low portion of the cam, allowing the main bail to be pulled upward by the striker spring. During the upward motion of the main bail it will first allow all the pull bars to be pulled against the code bars by their respective springs. The selected pull bar will be pulled farther to the rear than the rest, into the path set up in the code bars. As the main bail continues on its upward stroke, it will engage the notch in the selected pull bar only, (the remaining ones being held out of engagement by the code bars) and carry the pull bar upward so that it throws the type bar, which is connected to it, against the platen thus printing the character. As the pull bar is moved upward, the stripper plate, located above the notches in the pull bars, cams the selected pull bar out of engagement with the main bail, shortly before the type bar reaches the platen. Momentum carries the type bar the remaining distance.

The main bail bell crank roller will again ride onto the high portion of the main bail cam as it completes its revolution. Thus, the main bail is brought back to its lower position and all the pull bars are positioned sufficiently forward to clear the code bars so that the code bars are free to move in either direction. The code bars are then set for the succeeding letter and the printing operation is repeated as previously described.

Code Bar Locking Lever (Figure 20)

The code bars must be held in their selected positions during the time in which printing of the characters takes place. This is accomplished by the code bar locking lever which is located to the right of the pull bars.

When the main bail is in its lower position the code bar locking lever is held away from the "V" shaped notches in the code bars. When the main bail moves upward, the code bar locking lever is permitted to be pulled by its spring, into the "V" shaped notches.

Spacing (Figure 22)

Spacing is accomplished by revolving the platen counterclockwise, the equivalent of one letter space, after each character is printed. A tape feed roll holds the paper tape against the platen, thereby causing the tape to move with the platen, see Figure 21. Geared to the platen shaft, is the spacing shaft, on which is mounted the spacer ratchet wheel.

The platen is rotated by means of the spacer operating lever through the medium of the spacer feed pawl which engages the spacer ratchet wheel (Figure 22). The spacer operating lever is located immediately in front of the main bail plunger and its roller is held against the plunger by the spacer operating lever spring. As the main bail plunger moves up and down the lever roller rides into and out of an indent in the plunger. The spacer feed pawl, attached near the lower end of the spacer operating lever, is held against the spacer ratchet wheel by its spring. Each time the plunger rises to actuate the printing of a character, the spacer feed pawl engages the next tooth on the ratchet wheel. On the down stroke of the plunger, the spacer operating roller will be pulled into the indent by the lever spring, thereby causing the feed pawl to rotate the spacer ratchet wheel on the spacing shaft. The motion of the spacing shaft is transmitted to the platen shaft through the spacing and platen shaft gears. Note: When functions are operated spacing is blocked (see "Spacing Cutout").

Spacing Cutout (Figure 22)

The spacer locking pawl is normally held out of engagement with the spacer operating lever by the rear extension on the spacer locking bail. During the operation of any function pull bar, an extension on its lower end will engage an arm of the spacer locking bail and raise it. The rear extension on the locking bail will be moved away from the spacer locking pawl so as to allow the spacer locking pawl spring to pull the pawl into engagement with a notch on the lower end of the spacer operating lever, thus making the spacer operating lever inoperative.

Ribbon Feeding (Figure 23)

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 of the two bevel gears on the ribbon spool shafts, causing one of the ribbon spools to be revolved.

Ribbon Reverse (Figure 24)

Reversing of the ribbon is accomplished in the same manner as described for the page typing unit (sending station). A detent plunger holds the bevel gears on the ribbon feed shaft in mesh with the ribbon spool shaft gear.

Figures Shift (Figure 25)

When the figures shift pull bar is raised by the main bail, its extension engages the carriage locking pawl and moves it out of engagement with the carriage locking toe. The carriage spring will then move the carriage to the forward or shifted position.

Letters Shift (Figure 26)

When the letters pull bar is raised by the main bail, its extension engages the rear arm of the shift rocker lever and moves the front arm of the shift rocker lever down against the shift rocker arm. The upper forked end of the shift rocker, in turn, will be moved toward the rear. The extension on the platen carriage, being engaged in the forked portion of the shift rocker, will move the carriage to its rear position. The carriage locking pawl then engages the carriage locking toe and holds the carriage in the "letters" position.

Counter-Balance

Mounted on the printer base plate, to the left of the platen, is a counter-balance which insures uniform shifting of the carriage when the printer is operating on an inclined plane.

PROJECTOR CABINET

The lower section of the projector cabinet encloses a projector frame which supports the receiving page typing unit, motor unit and optical system. The receiving tape printer is mounted on a hinged bracket attached to the cabinet side frame above the projector frame (Figure 33). The upper section mounts a screen, mirror and exhaust blower.

The projector frame is equipped with wheels that ride on two tracks, thus permitting the frame, typing unit and optical apparatus to be rolled forward for greater accessibility. When the projector frame is in the operating position, the wheels drop into recesses in the track. In this position, the frame is secured by bolts.

The optical system is illuminated by a 500 watt lamp and this illumination is controlled by a concave reflecting mirror and a condenser. The concave mirror is positioned close to the lamp and directs the light toward the condenser. The condenser consists of one double-convex lens and two plano-convex lenses. The condenser collects the light and concentrates it on the transparent web, where the web emerges from the typing unit, to provide maximum illumination of the portion of the message to be projected.

An objective lens (Figure 35), mounted on the main portion of the projector frame, magnifies the object (the message recorded on the transparent web) and focuses it on a translucent screen in the upper section of the cabinet. A small plane mirror is interposed between the object and the objective lens and a large plane mirror is interposed between the objective lens and the screen. Both plane mirrors are used to change the direction of the light beam.

A red filter assembly to give the projected light red color characteristics for preserving dark adaptation of personnel viewing the screen is provided in the supplies stowage case. When its use is required it is inserted in the objective lens housing on top of the objective lens.

A holder mounted on the right wall inside the lower section of the projector cabinet is provided for holding the filter assembly when not in use.

The lamp and concave mirror are enclosed in a lamp house and the lamp house and condenser are both mounted on a portion of the projector frame that is hinged at the rear and may be raised to permit easy access to the typing unit. See Figure 34.

The entire optical system is illustrated on drawing B59-1D,page 222.

INSTRUCTIONS FOR ASSEMBLING STATION EQUIPMENT

Sending Station

Instructions for Installing Parts to Secure Printer Base to Table

NOTE: The parts required for this purpose are packed with the table.

1. With the vertical sections of the 102349 brackets toward the center of the table, mount these brackets in the holes provided in the left and right pad retaining channels on the top of the table, using the 1179 screws, 2191 lock washers, 7002 washers, and 97908 spacers furnished. The spacers are to be mounted in the pad retaining channel at the bracket mounting screw holes.

2. Assemble a 2449 lock washer on the short threaded end of each of the four 102809 studs furnished, and assemble the studs into the tapped holes in the base unit base plate.

3. Add an 83814 spacing washer on each of the studs just assembled and set the base unit on the table so that the studs enter the holes in the resilient mountings. Insert the keyboard in the base unit and set the typing unit on the base unit. Make certain that there is approximately 1/16" clearance between the felt pad and the base plate. Use a sufficient number of 83814 washers to meet this requirement.

4. Secure the base unit to the resilient mountings using the 2846 washers, 2449 lock washers, and 34-1 nuts also furnished.

Instructions for Mounting Model 15 Printer Motor, Typing, and Keyboard Units on the Base Unit

NOTE: The motor unit, typing unit, and the keyboard unit should be mounted on the base unit in the following order.

Motor Unit

The motor unit is to be mounted on the rear right-hand corner of the base by means of three hexagon head screws. These screws are found in place on the base.

Remove the three motor unit mounting screws from the base and slide the motor unit in against the spring contacts. Holding it in this position, put the three mounting screws in place. Tighten the two front screws and then back them off about 1/4 of a turn. Do not tighten the rear mounting screw until the typing unit is in place.

Typing Unit

Underneath the typing unit are two hexagonal studs for the purpose of protecting the typing unit mechanism from injury when setting the unit on a bench, table, etc. These two studs enter clearance holes in the base unit.

To secure the typing unit to the base unit, three thumb screws are provided. Remove these screws from the base. The exact location of the typing unit on the base unit is determined by two dowel pins located in the two forward machined surfaces of the base unit. The right-hand dowel pin fits into a hole in the typing unit casting, while the left-hand dowel pin fits into a slot cut in the casting.

CAUTION: When setting the typing unit on the base unit, be very careful not to jam the bakelite main shaft gear against the motor pinion.

In lifting the typing unit, face the front of the unit. With the right-hand, take hold of the flat projection on the right-hand typing unit casting. With the left hand, take hold of the extreme lower front corner of the left-hand casting. Lifting and moving should be done carefully so as not to put any part under undue strain which might throw it out of adjustment.

When setting the typing unit on the base unit, lower the left side down first all the way, holding the right side so that when the left side is resting on the base unit, the main shaft gear is just ready to mesh with the motor pinion. Now with the left hand, turn the motor fly wheel, while at the same time lower the right end of the typing unit, taking care that the motor pinion properly meshes with the main shaft gear.

Alignment of Motor Pinion and Main Shaft Gear

(a) Facing the front of the base unit and with the keyboard removed from the base, visually check the lateral alignment of the motor pinion and the main shaft gear to determine if a center line of the gear coincides with a vertical line through the center of the hole in the motor pinion. If these lines do not coincide, remove the typing unit from the base unit and loosen the four motor mounting screws.

Replace the typing unit on the base unit, and shift the motor to obtain the foregoing condition as nearly as it is possible to determine by eye. See that the edges of the motor base are parallel to the edges of the motor plate. Then remove the typing unit and tighten the four motor mounting screws.

(b) Loosen the rear motor plate mounting screw and the lock nut on the motor plate adjusting screw. Replace the typing unit and tighten the three typing unit mounting thumb screws. By means of the adjusting screw, adjust the vertical position of the motor pinion until there is a barely perceptible amount of backlash between the motor pinion and the main shaft gear, at the point where there is the least amount of backlash in one complete revolution of the main shaft.

Apply a film of grease to the motor pinion.

Wire the printer base in accordance with wiring diagram.

Start the motor. Carefully readjust the vertical position of the motor pinion, by means of the adjusting screw, until the gear noise is reduced to a minimum.

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

Tighten the three motor plate mounting screws and the adjusting screw lock nut. Recheck the backlash between the motor pinion and the main shaft gear.

Keyboard Unit

CAUTION: When mounting the keyboard unit to the base unit, be very careful not to jam the bakelite gear on the keyboard unit against the steel gear it meshes with on the main shaft of the typing unit.

The keyboard unit slides into the opening in the front of the base unit upon two angle irons acting as rails. The two plates, fastened under the keyboard unit on the right and left-hand sides, go under the rails. The keyboard unit is held into place by means of the two thumb screws located on the keyboard unit.

Slide the keyboard unit into place slowly and, at the same time, rotate the motor flywheel back and forth so that the keyboard unit gear will mesh properly with the gear on the typing unit. When the keyboard unit is in place, tighten the two thumb screws.

Mounting the Printer Cover

Place the printer cover over the printer and secure it to the brackets on the table by means of a thumb screw in each side of the cover.

Paper Roll and Ribbon

See Figures 37 and 38.

RECEIVING STATION

1. (a) Remove the lower section of a projector cabinet (PCL-1) from its packing box.

   (b) If necessary to remove base in order to pass through doorways, etc., remove as a complete assembly the two channels with resilient mountings, the angle iron tracks and the floor plate. This may be done by removing the four bolts in the inner corners of the cabinet only.

(c) Move the unit to the point of installation and replace the base assembly if removed in (b).

(d) Fasten the unit to the deck by means of 1/2" bolts through the holes provided in the resilient mountings. (See drawing B59-1D for location of mounting holes.)

(e) Connect the six incoming wires to the control panel terminal block as shown in circuit B59-D.

2. (a) Select the upper section of a projector cabinet (PCU-1) having the same serial number as the lower section.

(b) Unpack the unit selected in (a) and place in position on top of the lower section of the cabinet with the open side of the upper section to the front. Secure the upper section to the lower section using the cap screws and washers provided. These parts may be found in a cloth bag tied inside of the upper section.

(c) Run the long two-wire cable, which is fastened in the lower section, up along the rear corner of the upper section to the blower and connect it to the two terminals to which the blower motor is connected. A cable clamp is provided on the blower mounting bracket to hold the cable in position.

3. (a) Unpack a 98048 mirror and mount it in the upper section of the cabinet using the screws and washers which are furnished in a bag tied to the frame of the mirror. The mirror frame bracket,which contains two mounting holes, fastens to a bracket located on the lower rear wall of the upper section. The other two brackets are fastened to the top of the upper section. The screws pass through body holes in the brackets into tapped holes in the cabinet.

(b) Remove the screen frame from the front of the upper section and install a 96864 projector screen. To do this, unroll the screen and place it over the opening in the upper section of the cabinet. Begin lacing by carrying the cord from the center eyelets on the upper and lower edges of the screen, over corresponding center studs on the cabinet. Lace from these centers toward each end and tie the ends of the lacing cord securely.

(c) Replace the screen frame.

5. (a) Unpack a projector frame unit (PF-2).

(b) Remove the string which is used to tie the counter-ballast (the block of steel on four rollers located at the rear of the frame) to the frame. See Figure 35.

(c) Place the web rewind spindle, which is tied to the frame, in position in the two brackets on top of the projector frame. The large pulley should be located to the left.

6. (a) Unpack a page typing unit (BP90/186) and assemble the two web spindle support brackets (Figure 34) which are with their mounting screw washers in a bag tied to the unit. The brackets should be assembled on the inside surfaces of the two feed mechanism mounting brackets. The bracket which carries the flat spring should be mounted on that feed mechanism bracket which is furthest from the carriage return spring drum.

   (b) Place a roll of transparent web on the spindle which is tied to the unit and place the spindle in position in the typing unit.

   (c) Install a ribbon in the machine as shown in Figure 38.

7. Remove the four thumb screws from the front plate on the projector frame and raise the hinged section of the frame upward to its latching position. Then place the typing unit in the frame and fasten it in position with the three thumb screws and one fillister head screw which are in a bag tied to the frame. Slip the counter-balance link over the post on the type bar carriage.

8. Check the "Motor Position Adjustment" as specified on Page 100.

9. Start the transparent web through the typing unit and projector frame as shown in Figure 147. Place the belt, which may be found tied to the projector frame, around the pulley on the typing unit and the pulley on the rewind spindle. The belt should be twisted once.

   Note: The transparent web should be centrally located on the rewind spindle approximately one-half inch from the flange on the spindle hub. The web will seek its own location on the spindle as the machine is operated.

10. (a) Unpack a tape printer (FP81DM103). Remove the four mounting nuts and washers from the screws in the tape printer hinged support bracket in the lower section of the cabinet and place the printer on the bracket with the platen roll to the front. Replace the nuts and washers thus fastening the printer securely in place.

    (b) Place a roll of tape in the tape reel container and feed it through the machine and out through the rectangular opening in the side of the cabinet. (See Figure 39.)

       Note: When placing a roll of tape in the tape container, be careful not to distort the roll so that its outer edge rubs against the sides of the container. This condition may cause improper functioning of the printer when the ship rolls.

    (c) Install a ribbon in the machine as shown on Figure 40.

    (d) Insert the six point plug in the upper receptacle on the control panel.

11. (a) Place the projector frame with page printer in position in the lower section of the projector cabinet and fasten in position by means of the four cap screws and washers which are in a bag tied to the projector frame.

    (b) Insert the six point plug in the lower receptacle on the control panel.

INSTRUCTIONS FOR CARE OF THE PROJECTOR SCREEN

CAUTION: Under no circumstances should the screen be folded, creased, or handled carelessly.

If a screen has been shrunken or wrinkled in storage, special care should be exercised when mounting it on the cabinet. The lacing should be tightened gradually over a period of several days in order to restore the screen to its original shape and size without damaging it.

Cleaning

The crystalline surface of the screen should be cleaned when necessary by a dry process, using a clean brush, not too harsh. The non-crystalline side of the screen which should always face toward the projector, may be cleaned with either a brush or a soft cloth. If this method is not sufficient, a clean soft cloth dampened with wood alcohol or grain alcohol may be used.

ADJUSTMENTS OF THE SENDING STATION EQUIPMENT

The following adjustments are arranged in a sequence that would be followed if a complete readjustment of the printer were undertaken. This fact should be kept in mind when a single adjustment is to be made.

When the text of any adjustment in these instructions specifies the setting up of a certain character or function, the following method should be used:

Rotate the main shaft until the printing bail is in its extreme rear position. Hold the front edges of those vanes down which correspond with the marking impulses of the combination (see Figure 1 for code chart) to be set up. Then rotate the main shaft in accordance with the instructions outlined in that particular adjustment.

The spring tension values given in these instructions were derived from measurements made with Teletype spring scales. These spring scales are calibrated for use in a vertical "pull" position. When used in any other position, the reading is an indicated value. Therefore, in order to obtain the proper spring value readings, the spring scales which are included in the tool list should be used.

NOTE: In all the figures of these instructions, fixed pivot points are designated by solid black circles.

TYPING UNIT ADJUSTMENTS

Instructions for Removing the Type Bar Carriage from the Typing Unit

To do this, operate the carriage return lock bar (Figure 85), and move the carriage to the extreme right. Operate the dashpot lever (Figure 85), locking the carriage in this position. Hold the carriage return spring drum so that the spring cannot unwind. Then unhook the draw strap from the carriage and hook the eyelet of the strap onto the margin bell hammer spring post (Figure 83). Move the right margin adjusting screw arm (Figure 55) to the rear. Operate the carriage return lock bar again and remove the carriage by sliding it off to the right.

Plunger Guide Roller Bracket Adjustment (Figure 41) - See Note (A)

There should be not more than .010" clearance between either the right or left end of the pull bar bail and the stripper plate when the bail is moved to its extreme forward position. Also the flanged guide roller should be parallel, or within .002" of being parallel, to the surface of the plunger, and both guide rollers should rotate freely.

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

To adjust the position of the pull bar bail with relation to the stripper plate, loosen the plunger guide roller bracket mounting screws and move the bracket to the right or left. To adjust the flanged roller with relation to the plunger, move the roller end of the bracket up or down with the mounting screws friction tight. Tighten the mounting screws.

Plunger Roller Eccentric Mounting Stud Adjustment (Figure 41) - See Note (A)

There should be some play, not more than .004", between the pull bar bail plunger and the rollers. Check for this play throughout the entire travel of the plunger.

Adjust the position of the eccentric mounting stud to obtain this requirement.

THE TYPE BAR SEGMENT ASSEMBLY SHOULD BE REMOVED FOR CHECKING THE TWO FOLLOWING SPRING TENSION REQUIREMENTS.

NOTE: To check the two following requirements, remove the type bar back stop (Figure 46), unhook the ribbon carrier from the ribbon oscillator lever (Figure 52), and remove the type bar segment mounting screws (Figure 42). Hold the pull bars out of engagement with the code bar mounting plate (as an aid, use a piece of string or wire under the pull bars), and slide the assembly forward.

Pull Bar Spring Tension (Figure 42) - See Notes (A) and (B)

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

Ribbon Feed Pawl Spring Tension (Figure 43) - See Notes (A) and (B)

With the pull bar bail (Figure 44) in its extreme rear position and the carriage held in its normal position, unhook the ribbon feed pawl spring from its post. With an 8 oz. scale held in a horizontal position and hooked in the spring eye, it should require 2-1/4 to 3-1/4 ozs. to pull the spring to its position length.

Replace the type bar segment assembly, the type bar back stop, and the ribbon carrier. Care should be taken to locate the ribbon oscillator lever (Figure 52) in its slot.

Code Bar Mounting Plate Adjustment (Figure 44)

With the pull bar bail in its extreme rear position, move the code bars to the right. Then move the pull bar bail opposite the pull bar humps.

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

There should be .006" to .020" clearance between the humps on all pull bars and the pull bar bail.

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

To adjust, remove the bell crank mounting plate assembly (Figure 53) from the type bar carriage assembly, being careful not to bend the bell crank retainers. Position the code bar mounting plate by means of its elongated mounting holes to secure the specified clearance.

Ribbon Feed Shaft Bearing Plates Adjustment (Figures 45 and 46) - See Note (A)

The left end of the ribbon feed shaft should be flush with the inner end of the left vertical feed shaft bevel gear teeth, when the ribbon feed shaft is in its left position and the left vertical feed shaft bevel gear is held in engagement with the ribbon feed shaft gear. A like condition should exist when the ribbon feed shaft is in its right position and the right vertical feed shaft bevel gear is held in engagement with it.

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

Ribbon Feed Shaft Detent Spring Adjustment (Figure 45) - See Note (A)

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

To adjust, loosen the mounting screws of the ribbon feed shaft detent spring, and position the spring.

Ribbon Feed Shaft Detent Spring Pressure (Figure 45) - See Note (A)

Move the ribbon feed shaft to its extreme left position. Hook a 32 oz. scale over the detent roller hub and pull horizontally toward the rear of the type bar carriage. It should require 19 to 23 ozs. to start the roller moving away from the detent. Then move the ribbon feed shaft to its extreme right position and check the pressure of the detent spring in the same manner. These two pressures should be within 2 ozs. of being equal.

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

To increase or decrease the spring pressure, remove the spring and bend it. To equalize the pressure, position the spring to right or left.

Vertical Ribbon Feed Shafts Adjustment (Figure 46) - See Note (A)

The lower ends of the right and left vertical ribbon feed shafts should be flush with the outside edges of their respective bevel gears.

Adjust by means of the bevel gear set screws, being sure that when the set screws are tightened they bear against the flat faces on the shafts.

Ribbon Spool Brackets Adjustment (Figure 46)

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

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

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

Ribbon Spool Shaft Spur Gears Adjustment (Figure 47)

The ribbon spool shafts should have some end play not more than .006".

To adjust, loosen the set screws of the vertical ribbon feed shaft spur gears and move the gears out of engagement with their respective ribbon spool shaft spur gears. Then position the ribbon spool shaft spur gears by means of their set screws. When tightening the set screws make certain that they bear against the flat faces on the shafts.

Vertical Ribbon Feed Shaft Spur Gears Adjustment (Figure 47)

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

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

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

Ribbon Spool Cups Adjustment (Figure 48)

The centers of the ribbon rollers should be 3/4" to 7/8" in front of a line through the centers of the ribbon spool shafts. There should be no bind between the ribbon spool shaft spur gears and the vertical ribbon feed shaft spur gears at any point in their engagement.

To adjust, position each ribbon spool cup by means of the nut on its ribbon spool cup bushing. When tightening the nut, take up the play between the ribbon spool cup bushing and the bracket in a direction to make the play between the spur gears a maximum. (See Figure 47 for location of parts.)

Vertical Ribbon Feed Shaft Spring Tension Adjustment (Figure 48)

Move the ribbon feed shaft to the right, thus disengaging its gear from the gear on the left vertical feed shaft. Hook an 8 oz. scale onto the pin on the left ribbon spool shaft and pull in a horizontal direction. It should require 2-1/2 to 3-1/2 ozs. to start the shaft turning. Move the ribbon feed shaft to the left and in the same manner check the spring tension of the right vertical ribbon feed shaft.

To adjust, position the collars on the vertical feed shafts (Figure 47), by means of their set screws to obtain the proper tension.

Ribbon Reverse Shafts Adjustment (Figure 49) - See Note (A)

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

To adjust, loosen the set screw of the ribbon reverse arm, and if necessary the set screws of the collar, and the link of the left ribbon reverse shaft. Position the shaft while holding the ribbon reverse arm up against the ribbon spool bracket and then tighten the ribbon reverse arm set screw. Adjust the right ribbon reverse shaft in the same manner.

Ribbon Reverse Shaft Collars Adjustment (Figure 49)

The ribbon reverse shafts should have some end play, not more than .008" and the ribbon reverse shaft collars should be positioned so that there is 1/4" to 5/16" between the centers of the set screws and the edges of their respective ribbon spool brackets.

To adjust, position the collars by means of their set screws while holding both ribbon reverse arms forward against their stops.

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

Ribbon Reverse Shaft Link Adjustment (Figure 50) - See Note (A)

The ribbon reverse bail should clear both left and right ribbon reverse pawls .015" to .040" when the pull bar bail is in its extreme rear position and both the left and right ribbon reverse arms are held forward against their stops. When checking the .015" clearance between either ribbon reverse pawl and the ribbon reverse bail, the play in the ribbon reverse bail should be taken up in a direction to make the clearance a minimum. When checking for the .040" clearance, the play in the ribbon reverse bail should be taken up in a direction to make the clearance a maximum.

To adjust, position the ribbon reverse shafts links by means of their set screws. At the same time see that the ribbon reverse pawl links do not bind at their shoulder screws.

Ribbon Reverse Pawl Spring Tension (Figure 50) - See Note (A)

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

Ribbon Reverse Bail Spring Compression (Figure 50) - See Note (A)

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

Type Bar Backstop Adjustment

With the pull bar bail in its extreme rear position there should be not less than .010" clearance between the backstop and the pull bars when the type bars are held in the guide. Make this check on the two end pull bars and the middle pull bar.

To adjust, set the up and down position of the type bar backstop by means of its elongated mounting holes to meet this requirement. (See Figure 46 for location of parts.)

NOTE: When making this adjustment, it is desired that the end type bars rest against the backstop along the entire width of the backstop. It is permissible, however, to allow a clearance of not more than .010" between the front end of the type bar and the backstop.

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

Ribbon Shift Lever Bracket Adjustment (Figures 51 and 52) - See Note (A)

The ribbon oscillator lever should move freely in its slot when its spring is unhooked.

To adjust, position the ribbon shift lever bracket by means of its enlarged mounting holes. Replace the ribbon oscillator lever spring.

Ribbon Oscillator Lever Spring Torsion (Figure 51) - See Note (A)

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

Ribbon Shift Lever Spring Tension (Figure 51) - See Note (A)

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

Margin Bell Pawl Spring Tension (Figure 52) - See Note (A)

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

Mounting of the Bell Crank Assembly (Figure 53)

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

First, mount the right end of the bell crank assembly with one of its mounting screws so that it is friction tight. Then rotate the assembly clockwise and engage the five bell cranks with their respective code bars. Replace the left mounting screw and tighten both screws. (See page 54 for final adjustment.)

Right Pull Bar Spring Bracket Adjustment (Figure 54) - See Note (A)

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

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

To adjust, loosen the mounting screw of the right pull bar spring bracket and position the bracket. Tighten the screw.

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

Left Pull Bar Spring Bracket Adjustment (Figure 54) - See Note (A)

With the pull bar bail in its extreme rear position, the left end pull bar and the second pull bar from the left end, should have some play, not more than .004", between the left spring bracket and the type bar when the type bar is in the type bar guide.

To adjust, loosen the mounting screw of the left pull bar spring bracket and position the bracket. Tighten the screw.

Margin Adjusting Screw Arm Spring Pressure (Figure 55) - See Note (A)

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

Carriage Support and Pull Bar Bail Plunger Rollers Adjustment - See Note (A)

The three carriage support rollers and the pull bar bail plunger roller should turn freely without end play.

To adjust, loosen the lock nuts and adjust the cone nuts. The rollers should turn freely without end play after lock nuts are tightened. (See Figure 59 for location of parts.)

REMOVE THE SCREWS THAT FASTEN THE TYPING UNIT TO THE BASE.

REMOVE THE TYPING UNIT AND REST IT ON ITS RIGHT SIDE.

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

Main Shaft Position

When the main shaft is rotated, the selector cams on the selector cam sleeve should line up with their respective selector levers.

To adjust, loosen the four screws that hold the main shaft bearing brackets, and position the main shaft. Then tighten the bearing bracket mounting screws.

Main Shaft Jaw Clutch Throwout Lever Adjustment (Figure 56)

With the clutch driven member fully cammed out of engagement with the driving member by the clutch throwout lever, there should be .010" to .020" clearance between the ends of the clutch teeth. The clutch throwout lever should be free from binds and should have no perceptible end play.

Adjust by means of the clutch throwout lever pivot screws.

Main Shaft Jaw Clutch Throwout Lever Spring Tension

Place the typing unit on its left side and rotate the main shaft until the clutch teeth are fully engaged. Hook an 8 oz. scale, held in a horizontal position, over the clutch throwout lever at the spring hole, and pull at right angles to the throwout lever. It should require 2-1/2 to 4 ozs. to start the lever moving. (See Figure 56 for location of parts.)

Main Shaft Jaw Clutch Spring Tension (Figure 57)

Place the typing unit on its right side. Rotate the main shaft until the low part of the printing bail cam is toward the bottom of the printer. With the teeth of the clutch driven member resting against the teeth of the driving member, but not engaged, hook a 32 oz. scale on the driven member in line with the low part of the printing bail cam and pull vertically downward. It should require 22 to 26 ozs. to separate the clutch teeth.

NOTE: After checking the 22 to 26 oz. pull, with the positive clutch teeth still separated, gradually reduce the tension exerted by the scale on the driven clutch member. The clutch teeth should engage, top to top, before the scale reading drops to 10 ozs.

Spacing Shaft Lower Bearing Bracket Adjustment (Figure 58)

There should be a minimum amount of play without binding at any point of engagement between the spacing shaft gear and the main shaft spacing gear during one complete revolution of the spacing shaft gear.

To adjust, place the typing unit in its normal upright position; unhook the carriage return operating lever spring from the spring post; move the eccentric away from the bearing bracket and position the bracket by means of its elongated mounting holes. Replace the carriage return operating lever spring and reposition the eccentric against the bearing bracket.

REPLACE THE TYPE BAR CARRIAGE IN ACCORDANCE WITH THE FOLLOWING INSTRUCTIONS:

Instructions for Replacing the Type Bar Carriage on the Typing Unit

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

Printing Bail Adjustment (Figure 59)

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

Check this adjustment with the type bar carriage in both its extreme right and left positions, and with the play in the pull bars taken up in a direction to make the clearance a minimum.

To adjust, position the printing bail by means of its adjusting screw and lock nut.

REMOVE THE TYPE BAR CARRIAGE.

Function Lever Bail Adjustment (Figure 60)

There should be .040" to .060" clearance between the rear edge of No. 1 vane and the front edges of the function levers when the main shaft is rotated until the printing bail is in its rearmost position and the No. 1 vane is held midway between its marking and spacing positions.

To adjust, position the function lever bail by means of its elongated mounting holes.

Blocking Plate Adjustment (Figure 60)

The position of the blocking plate should be as follows:

(a) With the "carriage return" combination selected and the main shaft rotated until the carriage return function lever is drawn completely into selection with the vanes, the travel of the function lever bail should be blocked by the selected function lever and the front edge of the right projection of the blocking plate should be flush within .005" of the top front edge of the rear prong of the carriage return function lever.

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

To adjust, remove the line feed push bar, and position the blocking plate by means of its slotted holes to meet the foregoing requirements. Replace the line feed push bar.

Selector Vanes Adjustment (Figure 60)

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

To adjust, loosen the vane clamping screws and position the vanes by means of their pilot screws. Tighten the clamping screws.

Function Bail Spring Tension (Figure 61)

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

Printing Bail Spring Tension Adjustment (Figure 62)

Rotate the main shaft until the printing bail is in its extreme rear position. Hook a 12 lb. scale over the left end of the adjusting lever, so that the hook on the scale engages the lever directly in the rear of the spring notch in the lever, and pull in line with the spring. It should require 7-1/2 to 8-1/2 lbs. to start the lever moving.

Adjust by means of the spring adjusting lever screw.

Selector Lever Spring Tension (Figure 65)

Place the typing unit on its right side. With the vanes in the marking position, rotate the main shaft until the function lever bail rests on the selected letters function lever. Move the swords manually to the spacing position. Hook a 32 oz. scale over the end of each selector lever at the cam sleeve assembly and pull in line radially to the main shaft. It should require 6 to 10 ozs. to start each selector lever moving.

Hold the swords away from the "T" levers and check each vane for freeness.

Selector Separator Plates Adjustment (Figure 64)

The leaf springs on all separator plates, except the front and rear plates, should exert a light pressure upon the swords. In order to make this adjustment it is necessary to remove the separator plates. The leaf springshould be bent at the narrow portions so that the ends will project .045" to .055" below the under surfaces of the straight portions.

Armature Lever Pivot Screw Adjustment (Figure 65) - See Note (A)

With the armature lever spring and the selector arm spring unhooked, the armature lever should be free on its pivots with barely perceptible end play.

Adjust by means of the outer pivot screw.

Selector Magnet Adjustment (Figure 66) - See Notes (A) and (B)

The centers of the curved surfaces of both selector magnet cores should touch the armature when the armature is held operated by hand.

To adjust, remove the selector magnet bracket from the typing unit. Loosen the selector magnet mounting screws and position the magnet; then tighten the mounting screws.

NOTE: The clearance between the curved surfaces of the magnet cores and the armature may be observed by holding the magnet in front of a light background.

REPLACE THE SELECTOR MAGNET BRACKET.

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

(B) This requirement should be checked with the selector magnet bracket removed.

Selector Arm Pivot Screw Adjustment (Figures 67 and 68) - See Note (A)

With the armature lever spring, the selector arm spring, and selector arm stop detent spring unhooked, the selector arm should be free on its pivots with barely perceptible end play. There should also be a clearance of .008" to .016" between the selector arm and the armature lever.

The end play may be adjusted by means of the outer pivot screw. If the clearance between the selector arm and the armature lever does not meet the foregoing requirement, it will be necessary to remove the selector magnet bracket and the selector arm bracket and adjust both pivot screws of the selector arm.

Selector Arm Bracket Adjustment (Figure 65) - See Note (A)

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

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

Unhook the armature lever spring at the spring arm, and with the selector arm in its operated (marking) position, move the marking arm of the No. 1 sword against the selector arm extension. Then rotate the selector arm slowly toward the spacing position until the selector arm just leaves the marking arm of the No. 1 sword. There should be some clearance, not more than .040", between No. 1 sword and the marking stop post.

With each selector lever on the peak of its cam, each associated sword should be tried for the foregoing requirement of some clearance, not more than .040".

To adjust, loosen the selector arm bracket mounting screws just enough to make the bracket friction tight. Then, to equalize the clearance between the swords and the stop posts, loosen the centralizing eccentric screw lock nut and turn the eccentric screw clockwise to provide more clearance on the spacing side or counterclockwise to provide more clearance on the marking side.

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

The centralizing eccentric screw should always be located so that its indicating line is adjacent to the marked scale that has been provided on the bracket to aid in gauging the amount the screw must be turned. Tighten the lock nut when the selector arm has been centralized.

To obtain the "some clearance, not more than .040"," requirement between the swords and the stop posts, insert the 90783 adjusting wrench in one of the two holes provided and turn the wrench to move the bracket closer to or farther from the swords as required. Then tighten the selector arm bracket mounting screws.

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

Replace the locking lever spring, selector arm spring, and armature lever spring.

Locking Wedge Adjustment (Figure 63) - See Note (A)

With the locking lever on a high part of its cam, the right end of the locking wedge should clear the locking lever by .006" to .010" when the end of wedge is held in line with the locking lever.

To adjust, loosen the locking wedge mounting screw and position the locking wedge in its guide; then tighten the mounting screw.

Selector Arm Locking Lever Spring Tension (Figure 63) - See Note (A)

With the selector arm locking lever on the high part of its cam, hook an 8 oz. scale on the end of the locking lever, at the spring hole, and pull in line with the spring. It should require from 4 to 5-1/2 ozs. to start the lever moving away from the cam.

Selector Arm Stop Detent Adjustment (Figure 67) - See Note (A)

With the locking lever on the low part of its cam, there should be an equal amount of clearance between the sides of the locking wedge and the locking lever when the selector arm is in the marking or spacing position.

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

To adjust, loosen the screw that mounts the selector arm stop detent eccentric post just enough to make the post friction tight.

Position the stop detent by turning the post; then tighten the post mounting screw.

Selector Arm Stop Detent Spring Tension (Figure 67) - See Note (A)

Unhook the stop detent spring from the locking lever guide and hook an 8 oz. scale in the spring eye. It should require 4 to 5 ozs. to pull the spring to its position length.

Selector Magnet Bracket Position Adjustment (Figure 69) - See Note (A)

Rotate the selector cam sleeve until the locking lever just drops off the high part of its cam; then rotate the cam sleeve backward until the rotation is stopped by the locking lever. With the selector arm locked in its marking position, there should be a clearance of .060" to .065" between the armature lever and the face of a tooth on the armature lever cam.

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

To adjust, loosen the selector magnet bracket mounting screws and the selector magnet bracket adjusting arm mounting screws just enough to make the bracket and adjusting arm friction tight. Then position the selector magnet bracket by means of the adjusting arm using the 90783 adjusting wrench. To do this, insert the adjusting wrench in the hole in line with the end of the adjusting arm and rotate the wrench.

Tighten the bracket and adjusting arm mounting screws.

Selector Magnet Bracket Adjustment (Figures 66-A and 66-B) - See Note (A)

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

To adjust, de-energize the magnet and rotate the selector cam sleeve until the armature lever is resting on a peak of the armature cam. Holding the cam sleeve in this position, turn the main shaft to a point where it moves the armature lever the greatest distance. Loosen the selector magnet bracket mounting screws and, by means of its adjusting screw, rotate the selector magnet bracket so that the armature just touches the pole faces; then turn the adjusting screw an additional one-tenth of a turn counterclockwise. This will press the armature firmly against the magnet cores. (While making the one-tenth of a turn adjustment, be careful to avoid lost motion due to loose fitting screw threads.) With the magnet energized, measure the clearance between the selector arm operating screw and the selector arm and if there is no clearance, back off the selector arm operating screw to provide at least .006". Then rotate the selector cam sleeve so that the armature lever is opposite an indent of its cam and again measure the clearance between the selector arm operating screw and the selector arm. If the difference in the two clearances exceeds .006", the selector magnet bracket adjusting screw should be turned clockwise. If the difference in the clearance is less than .004", turn the screw counterclockwise. Tighten the selector magnet bracket mounting screws.

Armature Lever Spring Tension Adjustment (Figure 66)

Unhook the armature lever spring from its spring arm and rotate the main shaft until the armature lever is on a high part of its cam. With a 32 oz. scale hooked in the spring eye, it should require 13 to 15 ozs. to pull the spring to position length.

To obtain the proper tension, at "position length," loosen the spring arm mounting nut and position the arm; then tighten the mounting nut.

Rehook the armature spring.

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

Selector Arm Operating Screw Adjustment (Figure 70) - See Note (A)

With the selector magnet energized and the selector cam sleeve rotated so that the armature lever is opposite an indent of its cam, there should be a clearance of .003" to .006" between the selector arm operating screw and the selector arm.

To adjust, loosen the selector arm operating screw lock nut and position the screw; then tighten the lock nut.

Selector Arm Spring Tension (Figure 71) - See Note (A)

Unhook the selector arm stop detent spring. With the armature lever on a high part of its cam, hook an 8 oz. scale over the end of the locking wedge and pull parallel to the selector arm spring. It should require 1-1/4 to 1-3/4 ozs. to start the selector arm moving.

Replace the detent spring.

Stop Lever Eccentric Screw Adjustment (Figure 72) - See Note (A)

The stop lever, on the range finder assembly, should overtravel the latching face of the trip latch by .004" to .006".

To adjust, loosen the stop lever eccentric screw nut and position the screw; then tighten the nut, making certain that the tightening of the nut does not disturb the adjustment.

Trip Latch Spring Compression (Figure 72) - See Note (A)

NOTE: When measuring this requirement, the range finder assembly should be held in a horizontal position.

Apply the push end of an 8 oz. scale, held in a vertical position, to the trip latch, as near to the stop lever as possible. It should require 1 to 1-1/2 ozs., when pushing upward, to start the trip latch moving.

Stop Lever Spring Tension (Figure 73) - See Note (A)

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

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

REPLACE THE RANGE FINDER ASSEMBLY

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

Trip-Off Screw Adjustment (Figure 74)

There should be some clearance, not more than .002", between the stop lever and the trip latch when the armature is in the unoperated position and the selector cam sleeve is rotated until the stopping edge of the stop lever is directly below the latching surface of the trip latch.

The trip latch plunger should have at least .002" end play (see Figure 72) when the armature is held in the attracted position and with the stop lever clear of the latching surface of the trip latch.

To adjust, loosen the trip-off screw lock nut and position the screw to meet the first requirement. The latter requirement serves as a check on the trip-off screw adjustment and also on the adjustment of the selector magnet bracket.

Platen Unit Pilot Screws Adjustment

The platen unit should be midway between the side frames and should be free on its bearings without side play.

To adjust, place the typing unit in its normal upright position and disconnect the line feed and shift vertical links at the upper shoulder screws. Unhook the platen balance spring and the shift detent spring. Then position the platen unit by means of its pilot screws to meet the foregoing requirements. Reconnect the line feed and shift vertical links and replace the platen balance spring and the shift detent spring. (See Figures 75 and 78 for location of parts.)

Platen Shift Stop Post Adjustment

The top and bottom surfaces of the platen shift stop post should be parallel to a line through the center of the platen detent roller screw and the platen pilot screw.

To adjust, loosen the platen shift stop post nut and rotate the post. (See Figure 75 for location of parts.)

REPLACE THE TYPE BAR CARRIAGE.

Letters Stop Screw Adjustment

With the platen in the letters position and the letter "N" type bar held lightly against the platen, the face of the letter "N" should conform to the curvature of the platen, when viewed along the axis of the platen. A further check may be made by inserting a sheet of paper with a carbon in the printer and pressing the letter "N" firmly against the platen. The impression made on the paper should be of uniform shade.

To adjust, raise the letters stop screw if the shading is lighter at the bottom of the character and lower it if the shading is lighter at the top. (See Figure 75 for location of parts.)

Figures Stop Screw Adjustment

With the platen in the letters position (down), print the letter "W" on the platen. Then with the platen in the figures position (up), the figure "2" should be in direct alignment with the letter "W" when the figure "2" is printed directly on the platen.

Adjust by means of the figures stop screw.(See Figure 75 for location of parts.)

REMOVE THE TYPE BAR CARRIAGE.

Figures, Letters, and Line Feed Function Lever Spring Tensions (Figure 76)

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

Blank Printing and Spacing Cutout Function Lever Spring Tension

Rotate the main shaft until the printing bail is in its extreme rear position. Then unhook the blank printing and spacing cutout function lever spring from the spring plate.

Hook a 32 oz. scale in the spring eye. It should require 22 to 30 ozs. to stretch the spring to its position length.

Function Bail Blade Adjustment (Figure 77)

NOTE: If the letters and figures shift mechanism has not been adjusted, it will be necessary to loosen the mounting screws of the shift link bracket, and move the bracket to its extreme rear position, before proceeding with the "Function Bail Blade Adjustment."

With the "figures," "line feed," and "letters" function levers alternately selected and the main shaft rotated until the travel of the function lever bail is blocked by the selected function lever, there should be .004" to .015" clearance between the rear edge of No. 1 vane and the bottom of a notch in the selected function lever.

To adjust, select the "figures" function lever and adjust the right end of the function bail blade, by raising or lowering it, by means of its elongated mounting holes, to secure the specified clearance between the rear edge of No. 1 vane and the bottom of a notch in the figures function lever. Then select the "line feed" function lever and adjust the left end of the function bail blade, by raising or lowering it, to secure the specified clearance between the rear edge of No. 1 vane and the bottom of a notch in the line feed function lever. If a like requirement is not met when the "letters" function lever is selected, it may be necessary to readjust both ends of the function bail blade.

Letters and Figures Shift Adjustment

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

To adjust, place the shift link bracket in the middle of the adjustment provided by the elongated mounting holes and tighten the mounting screws. Place the typing unit on its right side and rotate the main shaft until the function bail is in its extreme forward position. Adjust the turnbuckle on the shift vertical link so as to equalize (within .010") the clearance between the function bail blade and the shoulder on the letters push bar, when the platen is in the figures position, with the clearance between the function bail blade and the shoulder on the figures push bar, when the platen is in the letters position. Then select the "letters" and "figures" combinations alternately and check for the specified clearances between the shift stop post and the letters and figures stop screws. If either of these clearances is greater than .025" move the shift link bracket toward the front of the unit, if less than .010" move it toward the rear, after which a slight readjustment of the shift vertical link turnbuckle may be necessary to bring both clearances within the specified limits. Replace the shift detent spring and platen balance spring. (See Figures 75 and 76 for location of parts.)

Platen Balance Spring Tension (Figure 78)

With the platen in the "letters" position, unhook the platen balance spring from the platen unit side frame and hook a 12 lb. scale in the spring eye. It should require 3-1/2 to 5 lbs. to pull the spring to position length. Replace the spring.

Shift Detent Adjustment

When the platen is shifted from the "figures" to the "letters" position, the detent roller should ride equally on either side of the detent.

To adjust, position the shift detent by means of its eccentric shoulder screw. (See Figure 75 for location of parts.)

Shift Detent Spring Tension (Figure 75)

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

Letters and Figures Push Bars Spring Tensions (Figure 76)

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

Platen Shaft Adjustment

The platen shaft should have some end play not more than .004".

To adjust, position the friction assembly on the platen shaft by means of its set screws. (See Figure 89-B for location of parts.)

Single-Double Line Feed Detent Adjustment

When the single-double line feed lever is shifted from the "single" to the "double" line feed position the hump on the detent spring should travel equally on either side of the detent. (See Figure 75 for location of parts.)

To adjust, position the detent by means of its mounting screw.

Single-Double Line Feed Detent Spring Pressure - (Figure 75)

With the single-double line feed lever in the "single" line feed position, hook a 4 lb. scale, held in a horizontal position, over the extension of the lever and pull toward the front. It should require 1-1/4 to 3-1/4 lbs. to move the lever to the "double" line feed position.

Line Feed Detent Lever Adjustment

With the single-double line feed lever in the "single" line feed position (up), and the line feed bell crank operated by hand, the line feed pawl, when sliding off the rear edge of the single-double line feed lever, should just miss the edge of a tooth on the ratchet. (See Figure 75 for location of parts.)

To adjust, loosen the detent lever eccentric screw nut (Figure 78) and turn the eccentric screw so as to rotate the platen by means of the detent lever. Tighten the detent lever eccentric screw nut and check the adjustment for all the teeth on the line feed ratchet.

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

Line Feed Vertical Link Turnbuckle Adjustment (Figure 75)

With the single-double line feed lever in the "single" line feed position, select the "line feed" combination, and rotate the main shaft until the line feed push bar is being stripped from the function bail blade. Under this condition the platen should rotate one line space, the detent roller should rest in the hollow between two ratchet teeth, and there should be some clearance, not more than .015", between the line feed pawl and the front face of a tooth on the ratchet. Check each tooth on the ratchet for this clearance.

When gauging these clearances the play in the line feed mechanism should be taken up in a direction to make the clearance a maximum by pressing forward on the line feed pawl. To obtain this requirement, place the typing unit on its right side and adjust the length of the line feed vertical link by means of its turnbuckle.

Line Feed Push Bar Spring Tension

With the typing unit on its left side and the printing bail in its extreme rear position, apply the push end of an 8 oz. scale to the push bar, just to the rear of the function lever extension and push horizontally at right angles to the bar (see Figure 76). It should require 1-1/2 to 2-1/2 ozs. to start the push bar moving.

Line Feed Detent Lever Spring Tension (Figure 78)

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

Line Feed Pawl Spring Tension (Figure 75)

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

Line Feed Check Screw Adjustment (Figure 78)

The line feed check screw should drop in the twelfth notch from the detent roller. (When counting the notches, start with the notch just above the detent roller.) There should be some clearance, not more than .020", between the front face of the screw and the face of the tooth, at the point of minimum clearance, when the check screw is held in the bottom of a notch on the ratchet.

To adjust, loosen the line feed check screw lock nut and position the check screw to meet the foregoing requirements. Tighten the lock nut. Rotate the platen roll and check the clearance in each notch of the ratchet. If necessary, loosen the clamping nut of the line feed check post stop screw and back off the stop screw before making this adjustment.

Line Feed Check Post Stop Screw Adjustment (Figure 78)

When the line feed check post stop screw is held down against the casting, there should be .015" to .030" clearance between the line feed check screw and each tooth on the detent ratchet, when the platen is rotated.

To adjust, loosen the check post clamping nut and position the stop screw. Before tightening the clamping nut, see that the line feed check post is against the inner side of the casting and the end of the line feed check lever shaft is flush with the outer surface of the casting. Tighten the clamping nut.

Line Feed Check Lever Adjustment (Figure 78)

With the "line feed" combination selected and the main shaft rotated until the line feed pawl has reached its farthest travel in rotating the platen, the line feed pawl lever should be in contact with the check lever, there should be some clearance, not more than .015", between the lower edge of the line feed check screw and the bottom of any notch in the detent ratchet.

To adjust, loosen the check lever set screw and position the check lever. (See Figure 75 for location of parts.) Before tightening the set screw see that the shaft has some end play, not more than .004".

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

Line Feed Check Lever Spring Tension (Figure 75)

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

Pressure Roller Release Shaft Collars Adjustment (Figure 79)

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

Adjust the clearance of the release shaft arm by means of the right collar and adjust the end play by means of the left collar.

Pressure Roller Release Cams Adjustment (Figure 80)

With the pressure roller release shaft arm in its rear position, the high parts of the pressure roller release cams should rest on the high parts of the release levers.

To adjust, position the cams on the release shaft by means of their set screws.

Pressure Roller Tension Springs Adjustment (Figure 80)

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

Adjust by means of the spring adjusting lever screw.

Pressure Roller Release Lever Shafts Adjustment

With the inner surface of the paper chute mounting extensions against the casting, the outer ends of the release lever shafts should project beyond the outer surfaces of the paper chute mounting extensions by not more than 1/32". (See Figure 79 for location of parts.)

To Adjust, position the release lever shafts by means of their set screws.

Paper Chute Springs Tension (Figure 81-B)

With the pressure roller release shaft arm in its rear position, hook an 8 oz. scale over the rear edge of the paper chute, midway between the side frames, and pull at right angles to the rear flat surface. It should require 2 to 4 ozs. to start the paper chute moving.

Paper Fingers Adjustment (Figure 81-B)

The paper finger shaft stop arm should clear its stop post .004" to .020" with both paper fingers resting against the platen. The outer edge of the lower portion of each finger should be within 3/32" of the end of the rubber portion of the platen, and should not extend beyond the rubber portion.

To adjust, first position the right paper finger by means of its set screw to meet the foregoing requirements. Then set the left paper finger in a corresponding position.

Paper Fingers Shaft Spring Tension (Figure 81-B)

Hook a 32 oz. scale over the paper finger shaft stop arm, just above the stop post, and pull in line with the spring. It should require 14 to 18 ozs. to start the stop arm moving.

Paper Straightener Rod Stops Adjustment (Figure 81-B)

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

To adjust, position the stops by means of their elongated holes.

Paper Straightener Rod Springs Tension (Figure 81-B)

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

Paper Guides Adjustment (Figure 81-A)

The outer side of both paper guides should be .040" to .050" from the shoulder on their respective ends of the straightener rod.

To adjust, position the guides on the shaft by means of their set screws.

Spacing Escapement Pawl Operating Arm Adjustment (Figure 82)

With the "line feed" combination selected and the main shaft rotated until the function lever bail rests on the line feed function lever, there should be .020" to .040" clearance between the rear spacing escapement pawl and the low part of the spacing escapement ratchet.

To adjust, loosen the spacing escapement pawl operating arm mounting screws and position the arm. Tighten the mounting screws.

Spacing Escapement Pawl Spring Tension (Figure 82)

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

Margin Bell Hammer Adjustment (Figure 83)

With the bell hammer arm resting against the stop post, there should be .020" to .060" clearance between the bell and the bell hammer.

To adjust, bend the bell hammer arm along its entire length, avoiding a sharp bend at any point.

Margin Bell Hammer Spring Tension (Figure 83)

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

Carriage Return Latch Bar Latch Shims Adjustment (Figure 84)

With the letter "O" combination selected and the main shaft rotated until the printing bail is in its extreme forward position, there should be .004" to .010" clearance between the carriage return latch bar and the lobe on the rear extension of the carriage return function lever. When checking this clearance, the shoulder on the carriage return latch bar should be fully latched on the latch.

To adjust, add or remove shims between the carriage return latch bar latch and the function lever comb.

Carriage Return Latch Bar Latch Adjustment (Figure 84)

With the main shaft rotated until the function bail is in its extreme rear position, there should be .010" to .020" clearance between the shoulder on the carriage return latch bar and the latch. When checking this clearance, the shoulder on the carriage return reset bar should be fully engaged with function bail blade.

To adjust, position the latch to front or rear by means of its elongated mounting holes.

Carriage Return Lock Bar Latch Eccentric Screw Adjustment (Figure 85)

With the front end of the dashpot lever held in its extreme left position, there should be .006" to .015" clearance between the lower edge of the carriage return lock bar latch and the upper edge of the lock bar. When checking this clearance, all the play between the lock bar and the shoulder stud should be taken up in a direction to make this clearance a minimum.

Adjust by means of the lock bar latch eccentric screw.

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

Carriage Return Lock Bar Latch Spring Tension (Figure 85)

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

Carriage Return Lock Bar Adjustment (Figure 85)

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

Adjust the length of the lock bar by means of its sliding joint to obtain this clearance.

NOTE: Before making the foregoing adjustment, loosen the mounting screw of the carriage return clutch driven member and take up the play between the driven member and its mounting screw in a counterclockwise direction with respect to the shaft as viewed from the lower end of the shaft. Tighten the mounting screw.

Carriage Return Operating Lever Stop Screw Adjustment (Figure 85)

With the "carriage return" combination selected and the main shaft rotated until the carriage return function lever just trips the carriage return latch bar off its latch, there should be some clearance, not more than .020", between the lock bar shoulder and the edge of the lock bar latch. When checking this clearance, all the play in the lock bar connections should be taken up in a direction to make the clearance a minimum. This can best be done by pulling outward on the lock bar.

To adjust, set the height of the carriage return operating lever stop screw.

Carriage Return Reset Bar Spring Tension (Figure 85)

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

Carriage Return Function Lever Spring Tension (Figure 85)

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

Carriage Return Operating Lever Spring Tension (Figure 85)

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

Carriage Return Clutch Spring Compression (Figure 85)

With the shoulder of the carriage return latch bar resting against its latch and the carriage return lock bar latch held away from the lock bar, apply a 12 lb. push scale to the carriage return fork opposite the place where the fork engages the carriage return clutch. It should require 1-1/2 to 2-1/2 lbs. to start the driving clutch member moving away from the driven member.

Dashpot Lever Spring Tension

Unhook the dashpot lever spring from the spring post in the dashpot lever and hook a 32 oz. scale in the spring eye. With the front end of the dashpot lever in its extreme right position, it should require 18 to 24 ozs. to extend the spring to its position length.

Spacing Stop Lever Bracket Adjustment (Figure 86)

The lower end of the spacing stop lever should clear the driving disc of the main shaft .060" to .080". With the stop lever held against the stop on the bracket by means of its spring, there should be a clearance of .040" to .080" between the lower left edge of the stop lever and the right side of a tooth on the spacing stop sleeve, when the tooth is opposite the lever.

Adjust the stop lever bracket vertically by means to its enlarged mounting holes to meet the first requirement and adjust it horizontally to meet the latter requirement.

Spacing Stop Lever Spring Tension (Figure 86)

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

Carriage Guide Screws Adjustment (Figure 59)

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

Adjust by means of the guide screws and lock nuts.

Code Bar Bell Cranks Adjustment

The code bars should be carried firmly against their stops in both the marking and spacing positions, when the "letters" and "blank" combinations are alternately selected and the main shaft rotated until the function levers are lifted free from the rear edges of the vanes. With the "letters" combination selected, move the vanes, one by one, from the marking position to the spacing position and allow them to return to the marking position slowly. Note any of the code bars which are not carried firmly against their stops. (See Figure 87 for location of parts.)

Set up the "blank" combination on the selector and repeat the foregoing procedure. Again note any of the code bars which are not carried firmly against their spacing stops. If it is found that all the code bars are carried against the stops in the spacing position, and not in the marking position, or vice versa, it will be necessary to loosen the mounting screws and adjust the position of the bell crank mounting plate (up or down). If the plate is moved upward, the code bars may be caused to move farther toward the left, which is their marking position. If, however, it is found that only one or two of the code bars fail to be carried firmly against their stops in both the marking and spacing positions, the travel of the code bars may be adjusted by means of the bell crank eccentric bushings. When the bell crank assembly is finally adjusted, all five of the code bars should rest firmly against the marking and spacing stops, when the vanes are in their respective marking and spacing positions. Make sure that the upper end of the bell cranks do not engage the code bars deeply enough to bind.

Spacing Rack Adjustment (Figure 88)

There should be some backlash, not more than .006", between the spacing gear and the spacing rack along the entire travel of the rack.

To adjust, loosen the spacing rack mounting screws and adjust the rack toward the front or rear.

Locking Function Lever Spring Tension (Figure 61)

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

Carriage Return Spring Drum Adjustment

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

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

Paper Spindle Drag Spring Adjustment (Figure 89-A)

Insert an empty paper spindle in the slots, and lock it in place with the retaining plates. With both ends of the spindle shaft in the bottom of their slots, apply the push end of a 12 lb. scale to the left end of the spindle shaft and push toward the right side of the typing unit. It should require 5 to 8 lbs. to start the spindle moving. This pressure may be adjusted by bending the spindle drag spring.

Platen Friction Assembly Adjustment (Figure 89-B)

Move the pressure roller release shaft arm to its extreme rear position. Unhook the line feed detent lever spring, and place the platen handle vertically upward. Hook an 8 oz. scale over the end of the handle and pull horizontally toward the front of the typing unit. It should require 6 to 8 ozs. to start the platen rotating. Replace the detent lever spring. This tension may be regulated by means of the adjusting nuts on the friction assembly.

Motor Plate Adjustment

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

Adjust as follows:

(a) Place the typing unit on an adjusted base with motor assembly and tighten the mounting screws. Facing the front of the base unit and with the keyboard removed from the base, visually check the lateral alignment of the motor pinion and the main shaft gear to determine if a center line of the gear coincides with a vertical line through the center of the hole in the motor pinion. If these lines do not coincide, remove the typing unit from the base unit and loosen the four motor mounting screws.

Replace the typing unit on the base unit, and shift the motor, by taking up the play between the drilled motor mounting holes and the motor mounting screws, until the two lines previously mentioned coincide as nearly as it is possible to determine by eye. See that the edges of the motor base are parallel to the respective edges of the motor plate. Then remove the typing unit and tighten the four motor mounting screws.

(b) Loosen the rear motor plate mounting screw and the lock nut on the motor plate adjusting screw. Slightly loosen the two front motor plate mounting screws to prevent stripping of the threads while making the following adjustment.

Replace the typing unit and tighten the mounting screws. By means of the motor plate adjusting screw, adjust the vertical position of the motor pinion until there is a barely perceptible amount of backlash between the motor pinion and the highest point on the main shaft gear. This high point may be found by turning the main shaft for one complete revolution. Start the motor and carefully readjust the vertical position of the motor pinion by means of the adjusting screw until the gear noise is reduced to a minimum. Tighten the three motor plate mounting screws and the adjusting screw lock nut and recheck the backlash between the gears.

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

Left Margin Adjusting Screw Adjustment (Figure 85)

The first character of a line should print 3-9/16" plus or minus 1/16" from the left end of the platen.

To adjust turn the left margin adjusting screw in and lock the carriage in place by operating the dashpot lever, so that the carriage is in a position to print a character 3-9/16" (plus or minus 1/16") from the left edge of the platen. Make sure that the carriage return clutch members are fully engaged. Then reposition the adjusting screw, so that when the lock nut is slightly tightened to take up the end play in the threads, and a horizontal pull of 8 lbs. is exerted on the dashpot lever, applied with a 12 lb. scale at right angles to the curved surface 1/32" behind the margin adjusting screw, there is a slight clearance (not more than .002") between the end of the screw and the dashpot lever. Turn the left margin adjusting screw one-sixth turn in a direction to eliminate this clearance and tighten the lock nut.

Right Margin Adjusting Screw Adjustment (Figure 86)

The printer should normally print forty-five characters on a line before spacing is blocked by the spacing stop pawl.

To adjust, return the carriage to the left end of the line and back off the right margin adjusting screw. Then, with the right margin adjusting screw arm in engagement with its detent, space the carriage one less space than the number of characters desired per line; that is, forty-four spaces for normal lines of forty-five characters. (The carriage should then be in position to print the last character for the desired length of line.) Adjust the stop screw so that the spacing stop pawl is moved within .015" to .030" from a projection on the spacing stop sleeve.

Ribbon Oscillator Lever Adjustment

The ribbon should fully cover any character as it is being printed and its top edge should not be above the bottom edge of the printed character when the printing has been completed and the main shaft clutch has disengaged.

To adjust, shift the platen to the figures position (up) and loosen the ribbon oscillator lever clamping screw and nut. Position the ribbon oscillator lever and tighten the clamping screw and nut. Check this adjustment with the platen in the letters position (down). See Figure 90 for location of parts.

Spacing Clutch Torque (Figure 91)

After the motor has run for at least 10 minutes, operate the lock bar and hook a 32 oz. scale at the bottom of the uppermost projection on the spacing stop sleeve and pull horizontally toward the rear of the typing unit until the leading edge of the uppermost projection on the spacing stop sleeve is approximately vertical. With the main shaft rotating, it should require 14 to 19 ozs. to hold the spacing stop sleeve stationary.

Margin Signal Bell Adjustment

The bell should ring on the thirty-ninth character.

To adjust, return the carriage to the left end of the line. Then space the carriage thirty-nine spaces to the right. Loosen the margin bell cam thumb screw and adjust the cam so that its right side is in contact with the margin bell pawl; tighten the thumb screw. See Figure 83 for location of parts.

Selector Clutch Torque (Figure 92)

With the motor running at least 10 minutes, hook a 32 oz. scale to the selector cam sleeve stop arm. It should require 14 to 18 ozs. to hold the sleeve stationary.

Bail Cam Unit Friction Clutch Torque (Figure 92)

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

Dashpot Vent Screw Adjustment

The carriage should return from its right stop to its left stop without bouncing and with minimum shock, when the carriage return lock bar is held in its latched position.

Adjust by means of the dashpot vent screw and lock nut.

Instructions for Removing a Type Bar from the Type Bar Carriage

Remove the type bar carriage from the typing unit (see "Instructions for Removing the Type Bar Carriage from the Typing Unit" pages 28 and 29. Remove the ribbon and unhook the ribbon carrier. Remove the fillister head screws that secure the type bar guide to its adapter plate. Remove the type bar guide from its dowels on the adapter plate. Rotate the type bar on its fulcrum with one hand and with the other withdraw the associated pull bar sufficiently to permit the type bar to be removed from its slot in the casting.

When replacing a type bar reverse the foregoing procedure.

KEYBOARD ADJUSTMENTS

Lock Loop Spring Tension (Figure 93)

Rotate the transmitting cam sleeve until the lock loop roller is resting on the low part of its cam. Hook an 8 oz. scale in the lock loop spring hole and pull in line with the spring. It should require 4 to 5 ozs. to start the lock loop moving.

Locking Lever Shaft Bracket Adjustment (Figure 93)

With all the contact levers on the high parts of their cams, there should be some clearance, not more than .010", between the contact levers and the locking levers, when the locking levers are pressed downward by hand to make this clearance a minimum. Also the locking levers should travel equally on either side of the lock loop blade when the "letters" and "blank" keys are alternately depressed.

To adjust, add or remove shims between the locking lever shaft bracket and the keyboard casting to meet the first requirement and, before tightening the bracket mounting screws, position the bracket laterally to meet the second requirement.

Transmitting Contacts Gap Adjustment (Figure 93)

With any contact lever on the high part of its cam, the contact gap should be .020" to .025".

Bend the shorter contact springs to obtain this clearance.

Contact Spring Pressure (Figure 94)

With any contact lever on the low part of its cam, it should require a pressure of 4-1/2 to 5-1/2 ozs. to open the contact, when the push end of an 8 oz. scale is applied to the contact spring just above the contact point.

To adjust, bend the longer contact springs. Recheck the contact gap adjustment.

Clutch Spring Compression (Figure 95)

Hook a 32 oz. scale to the clutch driven member projection and pull directly in line with the shaft. It should require 9 to 12 ozs. to separate the clutch teeth.

Clutch Adjustment (Figure 96)

There should be .005" to .015" clearance between the clutch teeth when the clutch is fully disengaged.

To adjust, position the clutch throwout lever by means of shims placed between the throwout lever post and the bracket.

Lock Loop Roller Adjustment

Rotate the keyboard shaft until the clutch teeth are disengaged. Press the lock loop roller against its cam to fully disengage the clutch teeth and position the locking levers directly below the lock loop blade to make the clearance a minimum. Under these conditions there should be .008" to .015" clearance between the lock loop blade and the locking lever having the least clearance.

To adjust, position the roller pivot screw by means of its elongated mounting hole. (See Figure 93 for location of parts.)

Universal Bar Pilot Screws Adjustment

The universal bar should have some end play, not more than .010"; the universal bar extension should be approximately in the middle of the space between the "P" and "Carriage return" key levers; and the trip-off pawl should clear the sides of the stop plate mounting screws and the locking lever bracket, when the trip-off pawl is operated by depressing a key lever. (See Figure 96 for location of parts.)

To adjust, position the universal bar by means of its pilot screws.

Trip-Off Pawl Stop Plate Adjustment (Figure 96)

There should be .040" to .060" clearance between all key levers and the universal bar when the trip-off pawl is resting against the end of the stop plate.

To adjust, position the trip-off pawl stop plate by means of its elongated mounting holes.

Intermediate Pawl Eccentric Adjustment (Figure 96)

There should be .050" to .060" clearance between the trip-off pawl and the intermediate pawl, when the trip-off pawl is resting against the end of the stop plate and the intermediate pawl is against its eccentric.

To adjust, position the intermediate pawl eccentric.

Clutch Throwout Lever Eccentric Adjustment

The intermediate pawl should be held firmly between the clutch throwout lever eccentric and the intermediate pawl eccentric, when the clutch throwout lever is resting on the low part of the clutch driven member.

To adjust, position the clutch throwout lever eccentric. (See Figure 96 for location of parts.)

Trip-Off Pawl Eccentric Adjustment (Figure 97)

With the clutch throwout lever held against the high part of its cam and the clutch throwout lever eccentric held against the clutch throwout lever, the end of the trip-off pawl should clear the end of the intermediate pawl by not more than .004" when a key lever is slowly depressed.

NOTE: If necessary, bend the rear extension of the trip-off pawl stop plate so that, with the trip-off pawl in its operated position, there is at least .002" clearance between the formed up end of the stop plate and the lower edge of the trip-off pawl.

Adjust by means of the trip-off pawl eccentric screw.

NOTE: There are two positions of the eccentric screw that will provide the correct clearance. The high part of the eccentric should be positioned toward the rear of the keyboard in making this adjustment.

Clutch Throwout Lever Spring Tension

With the clutch teeth engaged and the clutch throwout lever resting against the low part of the clutch driven member, hold the intermediate pawl against its eccentric; at the same time hook an 8 oz. scale over the throwout lever just above the spring hole and pull in line with the spring. It should require 1-1/2 to 2-1/2 ozs. to start the lever moving. (See Figure 56 for location of parts.)

Trip-Off Pawl Spring Tension (Figure 98)

Unhook the trip-off pawl spring. With an 8 oz. scale hooked in the spring eye, it should require 3-1/2 to 4-1/2 ozs. to pull the spring to position length.

Transmitting Cam Cylinder End Play (Figure 99)

The transmitting cam cylinder should have some end play, not more than .002".

To adjust, position the bushing in the rear bearing bracket by means of its adjusting nuts.

Key Lever Spring Tension Adjustment (Figure 100)

The openings between the ends of all key lever springs except the spacer key lever spring, should measure 1-3/16". The spacer key lever spring should measure 1-15/16" across the opening between the ends.

Adjust by bending the springs.

Repeat Space Rod Adjustment (Figure 101)

With the space bar fully depressed by applying pressure at approximately the center of the bar, there should be .010" to .020" clearance between the clutch throwout lever and the high part of the throwout cam.

To obtain this requirement, adjust the repeat space rod by means of its adjusting nuts. (See Figure 96 for location of parts.)

Repeat Space Rod Bracket Adjustment (Figure 102)

There should be some clearance, not more than .008", between the formed end of the repeat space rod and the flat side of the transmitter rear bracket, throughout the entire travel of the repeat space rod, when the space bar is fully depressed. The front face of the repeat space rod bracket should be parallel to the rear surface of the transmitter rear bracket.

To adjust, position the repeat space rod bracket by means of its enlarged mounting holes.

Repeat Space Rod Spring Tension (Figure 102)

Hook an 8 oz. scale over the repeat space rod, just in front of the spring hole, and pull in line with the spring. It should require 1 to 2 ozs. to start the rod moving.

SYNCHRONOUS MOTOR REQUIREMENTS

NOTE: These requirements should not be checked unless there is reason to believe 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 end 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 should measure 3 to 3-3/4 ozs. when extended to a length of 5 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 with 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 unit on the base and check the motor plate adjustment.

BASE UNIT ADJUSTMENTS

Motor Unit Slip Connection Springs Adjustment

(a) With the motor unit in position on the base, hook a 4 lb. scale under one of the end motor unit slip connection end springs, just above the head of the terminal screw on the motor connection block, and pull toward the front of the base at right angles to the spring. It should require 2 to 4 lbs. to just break contact. Measure the pressure of the opposite end slip connection spring in the same manner. This pressure can be regulated by removing the motor unit and bending the springs.

(b) With the motor unit removed and a straight edge placed across the two end springs, there should be some clearance, not more than .015" between the two inner springs and the straight edge. Adjust by bending the two inner springs.

Line Jack Springs Adjustment

It should require 1 to 2 lbs. pressure, using a 12 lb. scale, on the curved part of the jack spring to just open the contacts. With the typing unit in position on the base, the line jack contacts should be separated .020" to .060".

Bend the long contact spring to obtain these requirements.

Keyboard Jack Springs Adjustment

It should require 1 to 2 lbs. pressure, using a 12 lb. scale on the curved part of the jack spring to just open the contact. With the keyboard inserted in the base, the keyboard jack springs should be separated .025" to .075". All slip connection springs should be in line.

To adjust, first remove the four base plate mounting screws and the base plate. Then remove the four screws that hold the slip connection mounting plate assembly to the base, so that the bakelite cover can be removed, and then replace the four screws. Next measure the pressure of the two keyboard jack springs. With the keyboard inserted in the base, the keyboard jack springs should now be separated by .005" to .025". This clearance may be measured from above the base by inserting a wire gauge between the contact springs. Bend the long contact spring of the two jack springs to obtain this spring tension and bend the short contact spring to meet this contact gap. (After the bakelite cover is replaced, the jack contact springs should be separated .025" to .075".) Remove the keyboard from the base and with a straightedge laid across the two keyboard jack springs, align the other slip connection contact springs by bending so that they just touch the straightedge. Remove the four slip connection mounting plate screws and insert the bakelite cover in its original position. Replace the four mounting screws previously removed. Finally, install the base plate on the base by means of its mounting screws.

Typing Unit Slip Connection Spring Adjustment

Remove the typing unit from the base. Hold a straight edge flush against the left rear milled surface on the base and extend the straight edge over the printer slip connections. There should be 7/8" clearance (plus or minus 1/64") between the straight edge and the curved part of the springs. Bend the slip connection springs to obtain this clearance.

Control Relay (Figure 103)

The control relay should be adjusted to meet the following requirements:

(a) Hold the relay plunger operated and hook a 32 oz. scale over the end of the outer contact spring and pull horizontally at right angles to the contact spring. It should require 12 to 16 ozs. to cause the outer contact spring to break contact with the middle contact spring.

Adjust by bending the outer contact spring.

(b) With the relay plunger held operated, there should be .030" to .040" clearance between the contact surfaces of the inner and middle contact springs.

Adjust by bending the inner contact spring.

(c) Hook an 8 oz. scale over the middle contact spring at the side of the contact and pull horizontally at right angles to the contact spring. It should require 1-1/2 to 2 ozs. to cause the middle contact spring to break contact with the inner contact spring.

Adjust by bending the middle contact spring.

(d) Recheck (b).

Control Line Current

The control relay has a coil resistance of approximately 355 ohms and requires an operating current of approximately 60 milliamperes.

Orientation

Mounted adjacent to the selector end of the main shaft of each typing unit is the range finder assembly which is used for the purpose of orientating the receiving mechanism to the transmitted signals.

The letters "RY" should be transmitted on the circuit (the letters "R" and "Y" sent alternately) continuously while the range is being determined.

While "RY" is being received, loosen the index arm thumb screw and shift the index arm toward "Zero" until errors begin to appear in the "RY". Then move it back slowly until these errors disappear. This position indicates one limit of the orientation range. Note the position on the scale.

Repeat the same performance toward the opposite end of the scale to find the other limit.

After the two limits (or extreme positions of perfect printing) have been found, the index arm of the range finder should be set midway between these two points.

Signal Line Current

Approximately 140 milliamperes at 115 volts, direct current, is required to operate the selector magnet.

Selector Magnet Resistance

Each tape and page printer have a selector magnet resistance of approximately 12 ohms (two 24 ohm coils connected in parallel.)

Local Power Requirements

The printers are equipped with 110 volt 60 cycle synchronous motors requiring approximately 100 watts for their operation.

LUBRICATION SPECIFICATION
SENDING STATION EQUIPMENT

Lubricants which may be ordered from the Teletype Corporation under the following numbers are recommended:

88970	1 Qt. of KS-7470 Oil
88971	1 Gal. of KS-7470 Oil
88973	1 Lb. of KS-7471 Grease
88975	KS-8319 Grease Gun

The above grease is recommended instead of oil for lubricating the motors. The 88975 grease gun should be used for injecting grease in the motor bearings. The gun may also be used for applying grease to other parts of the apparatus.

Instructions for Filling the Grease Gun

1. Unscrew the lubricant tube from the cap casting.

2. Insert fresh lubricant through the open end of the tube with the fingers. Apply gradually to eliminate air pockets.

3. Tamp the lubricant down solidly in the tube by pounding the closed end solidly against the palm of the hand. Continue to add lubricant until the tube is completely filled and the metal follower rests against the perforated tube cover.

4. Fill the cap casting with lubricant flush to the bottom side of the tube threads.

5. Screw the lubricant tube into the cap casting part way only. Then insert a pencil or rod through the perforated tube cover and exert pressure against the metal follower so as to expel any entrapped air past the tube threads. When lubricant begins to ooze through the threads, tighten the lubricant tube securely in the cap casting.

6. Operate the handle back and forth for several strokes or until lubricant is pumped from the nozzle. The gun is then ready for use. If the lubricant does not flow from the nozzle in a solid stream, it is an indication that all air has not been expelled from the lubricant tube. Invert the gun and pound the cap casting end against the palm of the hand to jar the lubricant into the pump cylinder.

Instructions for Lubricating Motor Ball Bearings

The motor bearings are packed with grease before the motor leaves the factory and under ordinary operating conditions need no additional lubrication for approximately two months. At the regular lubricating intervals one or two strokes of the plunger of the gun should apply sufficient grease to each bearing.

To lubricate, press the nozzle of the gun against the ball oiler and force the grease into the hole by pushing on the plunger of the gun. Care should be taken that the bearings are not overloaded. Overloading will result in the grease oozing out of the end castings and being thrown on other parts of the mechanism. After lubricating, the motor should be run for a few minutes and then any excess grease that has been forced out of the ends of the castings should be wiped off. Each time that the gun is used for lubricating a motor bearing, the plunger should first be depressed slightly to make sure that grease will be delivered.

GENERAL

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

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.

Type Bar Carriage Assembly

1. Type bars - at segment slot.
2. Code bars - at posts.
3. Code bar bell cranks - on wearing surfaces.
4. Pull bar bail guide rollers and guide surface (oil-grease-oil).
5. Plunger surface and rollers, surface of pull bar bail guide post (oil-grease-oil).
6. Operating roller (oil-grease-oil).
7. Carriage support rollers - three.
8. Ribbon reverse bail.
9. Ribbon feed shaft bearing - 3 oil holes.
10. Ribbon feed pawl.
11. Ribbon feed pawl operating lever pivot screw and wearing surface.
12. Ribbon feed ratchet - teeth.
13. Ribbon feed shaft bearings - upper and lower.
14. Ribbon feed mechanism gears.
15. Ribbon spool shafts bushings - remove spools.
16. Ribbon reverse shafts - upper and lower bearings, arms, pawls, and levers.
17. Margin bell pawl.
18. Ribbon shift lever and roller.
19. Oscillator lever shoulder screw and carriage casting slot.
20. Type bar carriage rack, space shaft pinion and travel.
21. Ribbon reverse detent.
22. Ribbon feed shaft detent - grease

Typing Unit Less Type Bar Carriage Assembly

A. Platen Unit

1. Shaft bearings (one in each shaft hub).
2. Line feed detent lever mounting shoulder screw.
3. Line feed detent roller.
4. Single-double line feed lever between flat spring and detenting cam and where single-double line feed lever fits into groove in platen shaft hub.
5. Line feed pawl and operating lever shoulder screws.
6. Shift detent roller - (grease).
7. Platen unit pivot bearings.
8. Upper ends of line feed and shift vertical links.
9. Paper straightener lever bearings.
10. Paper straightener rod supporting lever bearings.
11. Pressure roller release shaft and crank bearings.
12. Pressure roller release cams, crank and shoulder screws.
13. Pressure roller shafts - bearing surface.
14. Pressure roller sleeves (one drop each).
15. Letters and figures stop screws - grease ends.
16. Platen friction disc assembly - saturate felt washer with oil (separate discs).
17. Paper spindle bearings.
18. Line feed check lever shaft bearings.
19. Line feed detent ratchet - (apply grease sparingly).

B. Main Shaft

1. Hold right end of printer up about 6" and remove oil plug. Fill shaft until oil runs out of the left end.
2. Main clutch sliding member (oil freely).
3. Main clutch throwout lever pivots - (oil-grease-oil).
4. Main shaft friction washers - saturate with oil (separate discs).
   (a) Selector unit assembly - 2 friction washers.
   (b) Spacing clutch friction washer.
5. Armature lever cam felt washers on selector cam assembly.
6. Selector cam sleeve - each cam peak.
7. Main shaft right ball bearing - (oil-grease-oil).
8. Main shaft left ball bearing.
9. Thrust bearing - end balls.
10. Spacing clutch spring coils - (permitting oil to flow between prongs of driven member of spacing clutch and worm gear sleeve).
11. Spring (coils) which compresses friction washers of selector cam assembly - (oil will flow between prongs of nut on main shaft and friction disc which engages with this nut).
12. Cam unit and spacing clutch, oil holes.
13. Main clutch camming surface.
14. Main shaft cam surfaces - (grease).
15. Spacing escapement ratchet teeth - (grease).

C. Selector Unit

(Note: Be careful not to get oil between the pole faces of the selector magnets and the magnet armature).

1. Selector levers and swords - drop oil between separating plates of swords and levers.
2. Armature lever - 2 pivot screws.
3. Selector arm - 2 pivot screws, 2 sword contact points, locking tip, and detent.
4. Locking lever - separator surface and locking tip.
5. Range finder assembly - trip latch, trip latch plunger, bell crank lever, and stop lever.
6. "T" levers - (all points of contact).

Note: Selector cam sleeve is listed under Main Shaft.

D. Bail Unit Assembly

1. Bail assembly shaft bearings - fill oil cups
2. Between spacing pawls.
3. Function bail and printing bail operating arm bearings.
4. Function lever bail roller - two bearings (oil-grease-oil).
5. Roller surface to have film of grease.
6. Function bail and printing bail operating arm and rollers (oil-grease-oil).
7. Printing bail blades where plunger operating roller engages blades.
8. Printing bail adjusting screw head - (grease).

E. Vane Frame Assembly

1. Function levers in vane frame slot.
2. Function levers push bars and latch bars - in function lever comb.
3. Vane pilot screws - bearings.
4. Vanes front edges - where bell crank slotted ends slide in engagement with vanes.
5. Locking function lever - (apply grease in notches).

F. Spacing Shaft Assembly

1. Spacing shaft - upper bearing, oil; lower bearing, fill oil cup.
2. Carriage return clutch members prongs.
3. Spacing gear , lower - (grease).

G. Carriage Return Mechanism

1. Carriage return latch bar at point of engagement with latch - (grease).
2. Carriage return clutch release fork and operating lever bearings.
3. Carriage return push bar and latch bar operating lever shoulder screw.
4. Carriage return locking bar bell crank link shoulder screw.
5. Carriage return spring drum bearing.
6. Carriage return spring release lever shoulder screws.
7. Clutch release fork link shoulder screw.
8. Locking bar bell crank upper cross bar casting shoulder screw.

9. Locking bar and locking bar bell crank shoulder screw.
10. Locking bar latch and left-hand side frame shoulder screw.
11. Dashpot piston rod - one drop oil rubbed over surface of piston.
12. Dashpot lever mounting shoulder screw, and roller mounting pilot screw. (Grease at point of contact with left-hand margin adjusting screw.)
13. Type bar carriage assembly - upper and lower, track surface.
14. Carriage return spring - through oil holes in drum.
15. Spacing stop lever and shoulder screw.
16. Carriage return operating lever stop screw - (grease).

H. Shift-Unshift Mechanism

1. The "figures" and "letters" push bars shoulder screw.
2. Shift lever and shift link shoulder screw.
3. Shift lever and shift link joint.
4. Shift vertical link, lower end and detent lever shoulder screw.

I. Line Feed Function

1. Line feed push bar and bell crank lever shoulder screw.
2. Bell crank lever mounting shaft.
3. Vertical link and bell crank lever, lower end, shoulder screw.
4. Margin bell shaft - 2 bearings.

MOTOR UNIT

1. Motor pinion - (grease).
2. Motor bearing oilers - two

KEYBOARD

A. Lubrication on Bottom Side of Keyboard

1. Code bars - in slots and rollers.
2. Universal bar pilot screw - bearings.
3. Trip-off pawl link - joint.
4. Key levers on key lever shaft and in rear comb.
5. Locking levers - between pins in code bars.

B. Lubrication on Top Side of Keyboard

1. Key levers - in front comb.
2. Space bar loop - on space bar loop shaft.
3. Transmitting shaft - two oil cups.
4. Transmitting clutch - sliding member.
5. Cams - apply light film of grease to surfaces of all six.
6. Locking loop - pilot screw, bearings and roller.
7. Contact lever pivoting shaft and guiding comb.
8. Locking levers in locking lever comb.
9. Clutch throwout lever - bearings.
10. Trip-off and clutch lever pawls.
11. Transmitting shaft gear - (grease).
12. Repeat space rod at bearing points and points of contact.

ADJUSTMENTS OF THE RECEIVING STATION EQUIPMENT

The following adjustments are arranged in a sequence that would be followed if a complete readjustment of the printer were undertaken. This fact should be kept in mind when a single adjustment is to be made.

When the text of any adjustment in these instructions specifies the setting up of a certain character or function, the following method should be used:

Hold the selector armature operated and rotate the motor flywheel until the main shaft clutch is disengaged. Release the selector armature and continue to rotate the motor flywheel. As each selector lever rides to the peak of its cam, move the selector arm to marking or spacing so as to position the corresponding sword in accordance with the code combination (see code chart for code combination) to be set up.

The spring tension values given in these instructions were derived from measurements made with Teletype spring scales. These spring scales are calibrated for use in a vertical "pull" position. When used in any other position, the reading is an indicated value. Therefore, in order to obtain the proper spring value readings, the spring scales which are included in the tool list should be used.

NOTE: In all the figures of these instructions, fixed pivot points are designated by solid black circles.

RECEIVING TAPE PRINTER ADJUSTMENTS

Main Shaft Adjustment

When the main shaft is rotated, the selector cams on the selector cam sleeve should line up with their respective selector levers. To adjust, remove the range finder assembly, loosen the four screws that hold the main shaft bearing brackets (Figure 104), and set the position of the main shaft.

Main Shaft Clutch Throwout Lever Adjustment (Figure 104)

The clutch teeth should be separated by from .010" to .020" when fully disengaged. To secure this clearance, adjust the clutch throwout lever by means of its pivot screws. After the clearance is obtained, the clutch throwout lever should be free in its bearings with no perceptible end play.

Main Shaft Clutch Throwout Lever Spring Tension (Figure 104)

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

Main Shaft Clutch Spring Tension (Figure 105)

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

Motor Position Adjustment

There should be a minimum backlash without binding between the motor pinion and the main shaft gear. Check this backlash for one complete revolution of the main shaft. The position of the motor may be adjusted by means of the motor mounting screws.

Selector Separator Plates Adjustment (Figure 106)

The leaf springs of the separator plates should exert a light pressure upon the swords. In order to make this adjustment, it is necessary to remove the separator plates. The leaf springs should be bent at the narrow portions, so that the ends will be from .045" to .055" below the under surface of the straight portions.

Armature Lever Pivot Screw Adjustment (Figure 107) - See Note (A)

With the armature lever spring and the selector arm spring unhooked, the armature lever should be free on its pivots with barely perceptible end play.

To adjust, remove the selector magnet bracket, loosen the armature lever upper pivot screw lock nut and position the armature lever by means of its upper pivot screw. Tighten the lock nut and replace the selector magnet bracket.

Rehook the armature lever spring and the selector arm spring.

Selector Magnet Adjustment (Figure 108) - See Notes (A) and (B)

The centers of the curved surfaces of both selector magnet cores should touch the armature when the armature is held operated by hand.

To adjust, remove the selector magnet bracket from the typing unit. Loosen the selector magnet mounting screws and position the magnet; then tighten the mounting screws.

NOTE: The clearance between the curved surfaces of the magnet cores and the armature may be observed by holding the magnet in front of a light background.

Replace the selector magnet bracket.

Selector Arm Pivot Screw Adjustment (Figures 109 and 110) - See Note (A)

With the armature lever spring, the selector arm spring, and selector arm stop detent spring unhooked, the selector arm should be free on its pivots with barely perceptible end play. There should also be a clearance of .008" to .016" between the selector arm and the armature lever.

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

(B) This requirement should be checked with the selector magnet bracket removed.

The end play may be adjusted by means of the upper pivot screw. If the clearance between the selector arm and the armature lever does not meet the foregoing requirement, it will be necessary to remove the selector magnet bracket and the selector arm bracket and adjust both pivot screws of the selector arm.

Selector Arm Bracket Adjustment (Figure 107) - See Note (A)

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

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

Unhook the armature lever spring at the spring arm, and with the selector arm in its operated (marking) position, move the marking arm of the No. 1 sword against the selector arm extension. Then rotate the selector arm slowly toward the spacing position until the selector arm just leaves the marking arm of the No. 1 sword. There should be some clearance, not more than .040", between No. 1 sword and the marking stop post.

With each selector lever on the peak of its cam, each associated sword should be tried for the foregoing requirement of some clearance, not more than .040".

To adjust, loosen the selector arm bracket mounting screws just enough to make the bracket friction tight. Then, to equalize the clearance between the swords and the stop posts, loosen the centralizing eccentric screw lock nut and turn the eccentric screw clockwise to provide more clearance on the spacing side or counterclockwise to provide more clearance on the marking side.

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

The centralizing eccentric screw should always be located so that its indicating line is adjacent to the marked scale that has been provided on the bracket to aid in gauging the amount the screw must be turned. Tighten the lock nut when the selector arm has been centralized.

To obtain the "some clearance, not more than .040"," requirement between the swords and the stop posts, insert the 90783 adjusting wrench in one of the two holes provided and turn the wrench to move the bracket closer to or farther from the swords as required. Then tighten the selector arm bracket mounting screws.

Replace the locking lever spring, selector arm spring, and armature lever spring.

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

Locking Wedge Adjustment (Figure 111) - See Note (A)

With the locking lever on a high part of its cam, the right end of the locking wedge should clear the locking lever by .006" to .010" when the end of wedge is held in line with the locking lever.

To adjust, loosen the locking wedge mounting screw and position the locking wedge in its guide; then tighten the mounting screw.

Selector Arm Locking Lever Spring Tension (Figure 111) - See Note (A)

With the selector arm locking lever on the high part of its cam, hook an 8 oz. scale on the end of the locking lever, at the spring hole, and pull in line with the spring. It should require from 4 to 5-1/2 ozs. to start the lever moving away from the cam.

Selector Arm Stop Detent Adjustment (Figure 109) - See Note (A)

With the locking lever on the low part of its cam, there should be an equal amount of clearance between the sides of the locking wedge and the locking lever when the selector arm is in the marking or spacing position.

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

To adjust, loosen the screw that mounts the selector arm stop detent eccentric post just enough to make the post friction tight.

Position the stop detent by turning the post; then tighten the post mounting screw.

Selector Arm Stop Detent Spring Tension (Figure 109) - See Note (A)

Unhook the stop detent spring from the locking lever guide and hook an 8 oz. scale in the spring eye. It should require 4 to 5 ozs. to pull the spring to its position length.

Selector Lever Spring Tension (Figure 111) - See Note (A)

With the selector levers in their unoperated position, unhook the selector lever springs from their spring posts and hook a 32 oz. scale in the spring eye of each spring. It should require 20 to 24 ozs. to pull each spring to its position length. Rehook the springs.

Selector Magnet Bracket Position Adjustment (Figure 112) - See Note (A)

Rotate the selector cam sleeve until the locking lever just drops off the high part of its cam; then rotate the cam sleeve backward until the rotation is stopped by the locking lever. With the selector arm locked in its marking position, there should be a clearance of .060" to .065" between the armature lever and the face of a tooth on the armature lever cam.

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

To adjust, loosen the selector magnet bracket mounting screws and the selector magnet bracket adjusting arm mounting screws just enough to make the bracket and adjusting arm friction tight. Then position the selector magnet bracket by means of the adjusting arm using the 90783 adjusting wrench. To do this, insert the adjusting wrench in the hole above the end of the adjusting arm and rotate the wrench.

Tighten the bracket and adjusting arm mounting screws.

Selector Magnet Bracket Adjustment (Figures 108-A and 108-B) - See Note (A)

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

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

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

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

Armature Lever Spring Tension Adjustment (Figure 108)

Unhook the armature lever spring from its spring arm and rotate the main shaft until the armature lever is on a high part of its cam. With a 32 oz. scale hooked in the spring eye, it should require 13 to 15 ozs. to pull the spring to position length.

To obtain the proper tension, at "position length," loosen the spring arm mounting nut and position the arm; then tighten the mounting nut.

Rehook the armature spring.

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

Selector Arm Operating Screw Adjustment (Figure 113) - See Note (A)

With the selector magnet energized and the selector cam sleeve rotated so that the armature lever is opposite an indent of its cam, there should be a clearance of .003" to .006" between the selector arm operating screw and the selector arm.

To adjust, loosen the selector arm operating screw lock nut and position the screw; then tighten the lock nut.

Selector Arm Spring Tension (Figure 114) - See Note (A)

Unhook the selector arm stop detent spring. With the armature lever on a high part of its cam, hook an 8 oz. scale over the end of the locking wedge and pull parallel to the selector arm spring. It should require 1-1/4 to 1-3/4 ozs. to start the selector arm moving.

Replace the detent spring.

Stop Lever Eccentric Screw Adjustment (Figure 115) - See Note (A)

The stop lever, on the range finder assembly, should overtravel the latching face of the trip latch by .004" to .006".

To adjust, loosen the stop lever eccentric screw nut and position the screw; then tighten the nut, making certain that the tightening of the nut does not disturb the adjustment.

Trip Latch Spring Compression (Figure 115) - See Note (A)

NOTE: When measuring this requirement, the range finder assembly should be held in a horizontal position.

Apply the push end of an 8 oz. scale, held in a vertical position, to the trip latch, as near to the stop lever as possible. It should require 1 to 1-1/2 ozs., when pushing upward, to start the trip latch moving.

Stop Lever Spring Tension (Figure 116) - See Note (A)

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

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

REPLACE THE RANGE FINDER ASSEMBLY.

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

Trip-Off Screw Adjustment (Figure 117)

There should be some clearance, not more than .002", between the stop lever and the trip latch when the armature is in the unoperated position and the selector cam sleeve is rotated until the stopping edge of the stop lever is directly below the latching surface of the trip latch.

The trip latch plunger should have at least .002" end play (See Figure 115) when the armature is held in the attracted position and with the stop lever clear of the latching surface of the trip latch.

To adjust, loosen the trip-off screw lock nut and position the screw to meet the first requirement. The latter requirement serves as a check on the trip-off screw adjustment and also on the adjustment of the selector magnet bracket.

NOTE: Before making the following adjustments, it is necessary to remove the type basket from the typing unit. In order to avoid stretching springs and the possible bending of levers, the following method is suggested; Unhook the code bar locking lever spring and the letters pull bar spring. Remove the three type basket assembly mounting screws. Remove the right ribbon spool bracket front mounting screw, loosen the rear mounting screw, and swing the bracket so that the ribbon spool cup will not interfere with the basket. Hold the pull bars out of engagement with the pull bar guide (as an aid in holding the pull bars out of engagement with the pull bar guide, use a piece of wire or string around the upper ends of the pull bars). Disengage lower end of function pull bars from mechanism on base, and slide the assembly upward. Care should be taken that the pull bar toes are not jammed against the spacer locking bail or the signal bell hammer.

Spacer Detent Adjustment (Figures 118 and 119) - See Note (B)

There should be from .002" to .012" clearance between the face of the spacer feed pawl and the face of all teeth on the spacer ratchet wheel, when the spacer operating lever roller is resting in the bottom of the main bail plunger indent and the detent roller is resting in the hollow between two teeth. Gauge throughout one complete revolution of the ratchet wheel.

Adjust by means of the two adjusting screws which hold the detent lever plate to the main casting.

NOTE: In making this adjustment, it is possible to set the spacer detent in a position one full tooth off. This error, however, will affect the detent spring tension considerably, so it is advisable to check this spring tension upon completion of the adjustment.

Spacer Detent Lever Spring Tension (Figure 118) - See Note (B)

With the detent roller resting in the hollow between two teeth, hook a 12 lb. scale in the spring hole and pull in line with the spring. It should require from 3-1/4 to 3-3/4 lbs. to start the detent lever moving.

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

Spacer Feed Pawl Spring Tension (Figure 118) - See Note (B)

Hook an 8 oz. scale over the spacer feed pawl just below the sloped edge of the pawl and pull as nearly at right angles to the pawl as possible. It should require from 1 to 2 ozs. to start the pawl moving.

Spacer Operating Lever Spring Tension (Figure 119) - See Note (B)

Hook a 12 lb. scale over the spacer operating lever just below the roller and pull as nearly parallel to the spring as possible. It should require from 5 to 6 lbs. to start the lever moving.

Ribbon Feed Lever Spring Tension (Figure 120) - See Note (B)

Loosen the ribbon feed pawl and move it out of engagement with the ribbon feed ratchet. With the ribbon feed lever roller in the plunger indent, hook a 32 oz. scale over the top of the ribbon feed lever and pull horizontally toward the front of the unit. It should require from 12 to 18 ozs. to start the lever moving.

Spacer Locking Bail Spring Tension (Figure 121) - See Note (B)

Hook an 8 oz. scale in the spring hole in the left extension of the spacer locking bail and pull up vertically. It should require from 1-1/2 to 2 ozs. to start the bail moving.

NOTE: When taking this tension, hold the spacer locking pawl away from the bail.

Function Bar Bracket Plates Adjustments (Figure 122)

The two end pull bars supported by the function bar bracket plates should have an equal amount of play in the segment. Adjust both the right and left function bar bracket plates by rotating them on their mounting screws.

Pull Bar Springs Tension (Figure 123) - See Note (B)

Unhook the spring from each pull bar. With an 8 oz. scale held in a vertical position, hook the scale in the spring eye. It should require from 3 to 4 ozs. to pull each character pull bar spring to its position length and from 5-1/2 to 6-3/4 ozs. to pull corresponding function pull bar springs to their position length.

Remount the type basket. Care should be taken that the pull bar toes are not jammed against the spacer locking bail and the signal bell hammer. Replace the type basket assembly mounting screws. Replace the right ribbon spool front mounting screw and tighten rear mounting screw. See that the function bar spring bracket is replaced. Replace the code bar locking lever spring and the letters pull bar spring.

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

NOTE: If the code bar assembly is removed from the pull bar guide plate, care must be used in replacing, as excessive tightening of the code bar post nuts may cause the code bar separator collar to become embedded in the German silver separator washers. To prevent this, tighten the nuts as follows: First back off the nuts and turn the lower nut until the lock washer is pressed flat. Then with a wrench, hold the lower nut in this position while tightening the lock nut.

Pull Bar Guide Adjustment (Figure 124)

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

There should also be .004" to .080" clearance between the end of the No. 1 "T" lever and the bottom of the slot in the code bar. To meet these requirements, adjust the position of the pull bar guide by means of its mounting screws.

Main Bail Adjusting Screw Adjustment (Figure 104)

Rotate the main shaft until the main bail has reached its stop position (main bail roller on the high part of its cam.) With the code bars in the marking position, there should be .010" to .050" clearance between the pull bars and the code bars when the play in the main bail and pull bars is taken up so as to make this clearance a minimum. Check this clearance with the code bars in the spacing position.

To adjust, position the main bail adjusting screw by means of its lock nut.

Spacer Locking Pawl Bracket Adjustment (Figure 121)

The shoulder on the spacer locking pawl should clear the notched part of the spacer operating lever by from .040" to .050" when the main shaft is rotated until the spacer operating lever roller is on the high part of the main bail plunger. To adjust, position the spacer locking pawl bracket by means of its mounting screws.

Spacer Locking Bail Finger Adjustment (Figure 125)

There should be from .015" to .025" clearance between the latching edge of the spacer operating lever and the latching edge of the spacer locking pawl, when the "E" combination is set up and the main shaft rotated until the two edges are in line. To adjust, hold the spacer locking bail by means of the 72574 holding tool inserted under the type bar segment, alongside the carriage shaft gear and bend the spacer locking bail finger with the 72575 bending tool. The bending tool should be inserted horizontally between the motor and the main casting (on the left side of the unit).

Spacer Locking Pawl Spring Tension (Figure 121)

Set up the "blank" combination and rotate the main shaft until the main bail is in its extreme upper position. Position the typing unit so that it is resting on the motor. Hook an 8 oz. scale over the spacer locking pawl and pull up vertically. It should require from 1-1/2 to 2-1/2 ozs. to start the pawl moving.

Carriage Bracket Locating Plate Adjustment

After the front carriage bracket has been set in a position where the carriage moves freely back and forth in all positions of the spacing gear, the carriage bracket locating plate should be moved against the bracket, so that its three projections make contact with the bracket, and fastened in place. Thus, if the bracket is moved thereafter, it may be replaced in its proper position without further adjustment.

Figures Stop Screw Adjustment (Figure 126)

The figure "2" should print in the middle of the platen roll. Adjust by means of the "figures" stop screw and gauge by printing directly on the platen roll.

Carriage Locking Pawl Post Adjustment

The carriage locking pawl should set fully on the locking toe when the play of the pawl is taken up in either direction. To adjust, position the locking pawl post by means of its lock nut.

Carriage Locking Toe Adjustment (Figure 127)

The letter "W" should print in the middle of the platen roll. Adjust the carriage locking toe by means of its mounting screws and gauge by printing directly on the platen roll.

Left Tape Guide Adjustment (Figure 128)

The left tape guide should clear the platen roll by from .004" to .010" throughout one complete revolution of the platen roll. Adjust by means of its mounting screw.

Right Tape Guide Adjustment (Figure 128)

The right tape guide should be so adjusted that when a piece of tape is inserted through both right and left tape guides, it will align with the platen roll and the printing will be in the center of the tape. Adjust the right tape guide by means of its mounting screw.

There should be from .010" to .020" clearance between the platen roll and the end of the right tape guide when gauged throughout one complete revolution of the platen roll. Adjust by bending the right tape guide.

Tape Feed Roll Spring Tension (Figure 128)

With the tape feed roll resting on the platen, hook an 8 oz. scale over the end of the tape feed roll bearing screw and pull at right angles to the tape feed roll lever. It should require from 6 to 8 ozs. to start the lever moving.

Tape Chute Adjustment

The tape chute should be in alignment with the tape guide. Adjust by means of its mounting screws.

Shift Rocker Post Adjustment (Figure 129)

The sides of the shift rocker post should be parallel to the carriage shaft. Adjust by means of the shift rocker post lock nut.

Carriage Return Spring Tension (Figure 126)

Unhook the carriage return spring from the counterbalance lever. With the carriage in the "letters" position and the counterbalance lever held parallel to the front edge of the printer base, hook an 8 oz. scale in the spring eye and pull the spring to its normal position length. It should require a pull of 6-1/2 to 7-1/2 ozs.

Counterbalance Spring Tension (Figure 126)

Unhook the counterbalance spring from the counterbalance lever. With the carriage in the "letters" position and the counterbalance lever held parallel to the front edge of the printer base, hook an 8 oz. scale in the spring eye and pull the spring to its normal position length. It should require a pull of 6-1/2 to 7-1/2 ozs.

Carriage Locking Pawl Spring Tension (Figure 127)

With the carriage held in the "letters" position, hook an 8 oz. scale over the carriage locking pawl just below the spring hole and pull up in line with the spring. It should require from 1-1/2 to 2-1/2 ozs. to start the pawl moving.

Shift Rocker Lever Post Adjustment (Figure 130)

The front surface of the shift rocker lever post should be parallel to the front edge of the base plate. Position the post by means of its lock nut.

Carriage Extension Adjustment (Figure 129)

The carriage extension should travel equally on either side of a vertical line through the center of the shift rocker bearing screw, when the carriage is moved from the "figures" to the "letters" position. Adjust by means of the carriage extension mounting screws.

Shift Rocker Adjustment (Figure 130)

With the carriage in the "figures" position, select the "letters" combination and rotate the main shaft until the main bail roller is on the low part of its cam. Lift the main bail by hand to its highest position. The carriage locking toe should overtravel the carriage locking pawl, not more than .020". Adjust the shift rocker by means of its adjusting screw to meet this requirement.

Instructions for Removing a Type Bar

Remove the carriage spring, the ribbon from the guide, and the two screws from the carriage front bracket. Lift the carriage assembly off. Move the type bar forward and downward until the teeth on the type bar are disengaged from those on the pull bar. The type bar may then be unhooked from the fulcrum rod and removed.

To replace a type bar, hook it over the fulcrum rod. If the teeth are meshed properly, the type bar will rest against the pad when the top of its pull bar is in line with the other pull bars. If the type bar does not rest against the pad, move the type bar downward again until the teeth are out of mesh and then raise the pull bar as many teeth as is necessary to permit the type bar to resume its correct position.

Replace the carriage, making sure that the bracket is against the positioning plate, and tighten the bracket mounting screws.

The type bars should be free in their segment slots with a minimum amount of side play. To check the freeness of a type bar, move it down so that the pallet rests lightly on the platen roll. Then when the type bar is released, it should return to its normal position against the type bar pad. If necessary, the sides of the type bar may be lapped on a fine stone to prevent binding in the segment slot.

Carriage Capstan Nuts Adjustment (Figure 127)

The carriage locking toe should overtravel the notch in the carriage locking pawl by from .020" to .025" when the carriage capstan nuts are against the front carriage bearing.

Adjust by means of the carriage capstan nuts.

Ribbon Guide Adjustment

There should be from .040" to .050" clearance between the printing surface of the platen roll and both sides of the ribbon guide. To measure this clearance, insert the gauge horizontally between the printing surface of the platen roll and both sides of the ribbon guide.

To adjust, position the ribbon guide by means of its mounting screws. There should be from 3/16" to 7/32" clearance between the tongue of the guide and the side of the platen roll.

Bend the guide if necessary to secure this clearance, and recheck the previous adjustment.

Ribbon Spool Cups Adjustment (Figure 131)

The centers of both ribbon rollers should be within 4-11/16" to 4-13/16" from the typing unit base plate.

To adjust, loosen the ribbon spool cup lock nuts (Figure 132) and rotate the cups.

Right and Left Ribbon Spool Shaft Gears Adjustment (Figure 132)

The right and left ribbon spool shafts should have some end play, not more than .004". To adjust, position the bevel gears on the ends of the shafts.

Ribbon Spool Shafts Spring Compression Adjustment (Figure 132)

Move the ribbon feed shaft to its left-hand position. Hook an 8 oz. scale over the pin in the right ribbon spool shaft, and pull horizontally at right angles to a line through the center of the pin and the center of the ribbon spool shaft. It should require from 3-1/2 to 5 ozs. to start the ribbon shaft moving. The proper compression of the ribbon spool shaft spring can be obtained by means of the spring adjusting collar. Move the ribbon feed shaft to its right-hand position, and adjust the left-hand spring compression in the same manner.

Ribbon Reverse Shafts Adjustments (Figure 133)

The ends of the right and left ribbon reverse shafts should clear their respective ribbon spool cups by from .010" to .020" when the ribbon reverse arms are held against the brackets to make the clearance a minimum.

To adjust, position the ribbon reverse arms on the ribbon reverse shafts by means of their set screws.

Ribbon Reverse Shafts Collar Adjustments (Figure 133)

Both right and left ribbon reverse shafts should have some end play, not more than .004".

To adjust, position the collar on each shaft by means of its set screw and locate the set screws so that they are easily accessible when the ribbon reverse arms are against the ribbon spool cups.

Ribbon Reverse Pawl Link Adjustments (Figure 134)

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

To adjust, position the ribbon reversing arms on the ribbon reverse shafts by means of their set screws.

Ribbon Feed Shaft Safety Spring Compression (Figure 135)

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

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

Ribbon Feed Shaft Detent Plunger Spring Compression (Figure 136)

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

Ribbon Check Pawl Adjustment

The upper end of the ribbon check pawl (Figure 137) should be 1/16" (plus or minus 1/64") below the lower surface of the pull bar guide.

Adjust by means of the ribbon check pawl mounting screw.

Ribbon Check Pawl Spring Pressure (Figure 137)

With an 8 oz. scale hooked over the extreme lower end of the ribbon check pawl and pulled at right angles to the pawl, it should require from 6 to 8 ozs. to start the pawl moving away from the ratchet.

NOTE: Make certain that the working edge of the pawl does not bind against a tooth on the ratchet when taking this pressure. To adjust, bend the ribbon check pawl.

Ribbon Feed Pawl Adjustment

The ribbon feed pawl (Figure 137) should be so positioned, that the ratchet will be moved one or two teeth throughout a complete revolution of the main shaft. To adjust, position the ribbon feed pawl by means of its mounting screw.

Ribbon Feed Pawl Spring Pressure (Figure 137)

With an 8 oz. scale hooked over the extreme front edge of the ribbon feed pawl and pulled at right angles to the pawl, it should require from 6 to 8 ozs. to start the pawl moving away from the ribbon feed ratchet.

NOTE: Make certain that the feeding edge of the pawl does not bind against a tooth on the ratchet when taking this pressure. To adjust, bend the ribbon feed pawl spring.

Right and Left Ribbon Reverse Pawls Spring Tension (Figure 135)

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

Left Function Pull Bar Spring Bracket Adjustment (Figure 138)

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

Right Function Pull Bar Spring Bracket Adjustment (Figure 139)

With the main bail in its extreme downward position, hook an 8 oz. scale over the code bar locking lever in line with the No. 1 code bar and pull horizontally at right angles to the locking lever. It should require from 5 to 6 ozs. to start the locking lever moving. Adjust by positioning the right function pull bar spring bracket by means of its lock nut.

Main Bail Cam Clutch Torque (Figure 140)

Remove the gear guard and the tape reel container. This torque should be taken with the motor running at least 10 minutes, and when the selector magnet is energized. Press down on the main bail so as to move the main bail roller away from its cam. With a 32 oz. scale hooked into the screw hole on top of the main bail cam and pulling at right angles to the radius, it should require a pull of from 18 to 24 ozs. to start the cam moving opposite to its normal direction of rotation.

Selector Clutch Torque (Figure 141)

With the motor running at least 10 minutes, hook a 32 oz. scale to the selector cam sleeve stop arm. It should require a pull of from 14 to 18 ozs. to hold the sleeve stationary.

Synchronous Motor Requirements

For these requirements refer to Page 61.

Main Bail Spring Adjustment

The printing blow; i.e., the force with which the type bars strike the platen, can be adjusted by means of the main bail spring adjusting screw. This adjusting screw is mounted just to the left of the upper clutch throwout lever pivot screw, which is shown in Figure 104.

While the printer is printing, loosen the lock nut holding the main bail spring adjusting screw, and turn the screw in a counterclockwise direction until the printer starts to fail to print clearly. Now turn this screw in a clockwise direction until a good clear copy is obtained without embossing the paper. Tighten the lock nut.

LUBRICATION SPECIFICATION
RECEIVING TAPE PRINTER

Lubricants which may be ordered from the Teletype Corporation under the following numbers are recommended:

88970	1 Qt. of KS-7470 Oil
88971	1 Gal. of KS-7470 Oil
88973	1 Lb. of KS-7471 Grease
88975	KS-8319 Grease Gun

The above grease is recommended instead of oil for lubricating the motors. The 88975 grease gun should be used for injecting grease in the motor bearings. The gun may also be used for applying grease to other parts of the apparatus.

Instructions for Filling the Grease Gun

(See page 65).

Instructions for Lubricating Motor Ball Bearings

(See page 65).

GENERAL

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

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.

Note: Be careful not to get oil between the pole faces of the selector magnet and the magnet armature.

1. Selector levers and swords - drop oil between separator plates of swords and levers.
2. Armature lever - 2 pivot screws.
3. Selector arm - 2 pivot screws, 2 sword contact points, locking tip, and detent.
4. Locking lever - separator surface and locking tip.
5. Range finder assembly - trip latch, trip latch plunger, bell crank lever, and stop lever.
6. "T" levers - (all points of contact).
7. Selector cam sleeve - drop of oil on each cam peak.
8. Armature lever cam felt oiler - saturate.
9. Code bars - at posts.
10. Main shaft - remove rear mounting screw of the range finder and swing the range finder so as to expose top of main shaft. Fill shaft through hole in center of retaining disc. Wipe excess oil off top of retaining disc.

11. Selector clutch felt friction washers - pry the driving discs apart with screw driver and saturate felts with oil. Do this at two diametrically opposite places at both top and bottom felt washers.
12. Clutch throwout lever - 2 pivots.
13. Main bail cam clutch - saturate felt washer by applying oil between edge of disc and main shaft gear. A drop of oil should be applied through the spring to each disc prong.
14. Main bail cam prongs - apply oil through spring.
    Swing motor back.
15. Main bail roller - oil, grease, oil.
16. Main bail plunger - fill oil cup.
17. Main bail lever - fill oil cup just above typing unit terminal block. Also oil end of lever in main bail plunger.
18. Main bail - fill groove with oil and put drop of oil on top of square vertical guide post.
19. Pull bars - one drop of oil on top of each pull bar.
20. Type bar gears - pull each type bar down against platen. Put drop of oil on top of type bar gear at rear of segment slot.
21. Ribbon feed ratchet and ribbon feed gears - drop of oil on teeth.
22. Ribbon feed shaft detent plunger.
23. Ribbon feed shaft - 2 oil holes.
24. Ribbon feed lever - oil hole.
25. Ribbon feed lever roller.
26. Ribbon spool shafts - 2 bearings each.
27. Ribbon reverse pawls and links - 4 bearings each side of printer.
28. Ribbon reverse shafts - 2 bearings each.
29. Tape feed roll - oil hole.
30. Shift rocker and shift rocker lever - 2 pivot bearings.
31. Carriage locking pawl - 1 pivot bearing.
32. Spacer locking bail - 2 pivots.
33. Spacer locking pawl - 1 pivot bearing.
34. Platen shaft - 4 bearings.
35. Platen guide.
36. Spacer shaft - 2 bearings and gear. The rear bearing may be oiled from the rear of the printer.
37. Spacer detent lever - pivot and roller.
38. Spacer operating lever and roller.
39. Spacer feed pawl.

Grease should be applied to the following:

1. Motor pinion and main shaft gear.
2. Main bail adjusting screw - end of screw.
3. Each anchor for main bail spring, spacer lever spring, and spacer detent lever spring.
4. Code bar locking lever where it bears on main bail.
5. Ribbon feed shaft detent.
6. Clutch throwout lever - end of lever on camming surface.

ADJUSTMENTS OF THE RECEIVING PAGE TYPING UNIT

When the text of any adjustment in these instructions specifies the setting up of a certain character or function, the following method should be used:

Rotate the main shaft until the printing bail is in its extreme rear position. Hold the front edge of those vanes down which correspond with the marking impulses of the combination (see code chart for code combination) to be set up. Then rotate the main shaft in accordance with the instructions outlined in that particular adjustment.

NOTE: Until otherwise specified, the following adjustments should be made with the typing unit in position in the projector frame.

Platen Frame Pilot Screw Adjustment - See Note A

The platen frame should be approximately midway between the typing unit side frames and should be free on its bearings without side play. Also the link arms should not bind on the web shift bail (Figure 34).

To adjust, disconnect the shift vertical link at the upper shoulder screw. Unhook the platen shift detent spring. Then position the platen frame by means of its pilot screws to meet the foregoing requirements. See Figures 75, 78 and 143 for location of parts.

Reconnect the shift vertical link and replace the platen shift detent spring.

Link Arms Adjustment - See Note A

The link arms should be perpendicular.

Adjust by moving the link arm studs in the web shift bail.

Threading the Transparent Web into the Typing Unit - See Note A

The transparent web should be threaded into the typing unit as shown in Figure 147.

Lower Web Guide Adjustment - See Note A

Adjust the position of the lower web guide (Figure 147) by means of the large holes in its mounting brackets so that the guide is horizontal. This may be checked by pulling the web until that section which lies horizontally between the feed roll and the lower guide roller is taut. The left and right edges of the web should be equally taut along this horizontal span. This condition may be obtained by shifting the lower web guide. Tighten the lower web guide mounting screws making certain that the position of the web guide is not altered when the screws are tightened.

(A) This adjustment should be made with the typing unit in position in the projector frame.

Upper Roller Brackets Preliminary Adjustment - See Note A

The transparent web should be vertical.

Adjust by means of the upper roller brackets mounting screws.

Platen Shift Detent Preliminary Adjustment - See Note A

The platen shift detent should be positioned midway between its vertical adjustment limits.

Adjust by means of its eccentric mounting screw.

Letters and Figures Stop Screw Preliminary Adjustment - See Note A

These stop screws should be adjusted to provide equal detent action when the carriage is shifted to upper or lower case and also to provide 7/32" clearance between upper stop screw and the shift stop post with the post resting on the lower stop screw. See Figure 75 for location of parts.

Platen Eccentric Adjustment (Figure 148) - See Note A

Roll the transparent web which leaves the platen around the rewind spindle so that the web between the platen and the spindle is taut. Position the platen, by means of its eccentric, so that it just touches the web. Then rotate the eccentric approximately 45 degrees more in a direction toward the web. Tighten the eccentric mounting screw.

Lateral Position of the Platen - See Note A

The type pallets should strike at approximately the center of the platen as shown in Figure 148, so that both sides of the "N" character will print with an equal impression.

Adjust by means of the eccentric in the platen carriage bracket.

Platen Preliminary Vertical Adjustment - See Note A

The "N" character should strike the platen approximately midway between the upper and lower edge of the printing surface of the platen.

Adjust if necessary by removing the platen and inserting a shim under the platen. (Note: Not more than one shim should be inserted.)

REMOVE THE TYPING UNIT FROM THE PROJECTOR FRAME IN ACCORDANCE WITH THE FOLLOWING INSTRUCTIONS:

(A) This adjustment should be made with the typing unit in position in the projector frame.

Instructions for Removing the Typing Unit from the Projector Frame

Remove the projector frame from the cabinet. Remove the four thumb screws from the front of the projector frame. Raise the hinged portion of the frame and secure its supporting bar. Disconnect the selector magnet leads from the terminal block on the frame. Remove the three large thumb screws and the fillister head screw that secure the typing unit to the frame. Remove the winder belt from the pulley on the printer main shaft. Disconnect the counter-ballast draw strap link from the stud on the type bar carriage. This can be done by taking hold of the link at each end and moving it toward the counter-ballast assembly. Depress the link so that it rests below the stud on the carriage. Sever the transparent web above the platen. Tilt the inner side of the typing unit upward and carefully remove it from the frame making sure that the link arms extending upward from the platen frame do not jam against the upper cross bar.

Instructions for Removing the Type Bar Carriage from the Typing Unit

Shift the platen frame to the "figures" position (up) and remove the two mounting screws which secure the platen carriage draw bar (Figure 148) to the extension bar. Remove the draw bar. Remove the ribbon carrier. Then operate the carriage return lock bar and move the carriage to the extreme right. Operate the dashpot lever, locking the carriage in this position. Hold the carriage return spring drum so that the spring cannot unwind. Unhook the draw strap from the carriage and hook the eyelet of the strap onto the post provided for this purpose on the right side frame. Move the right margin adjusting screw to the rear. Operate the carriage return lock bar again and remove the carriage by sliding it off to the right.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Plunger Guide Roller Bracket Adjustment
(See page 28)

Plunger Roller Eccentric Mounting Stud Adjustment
(See page 29)

Pull Bar Spring Tension
(See page 29)

Ribbon Feed Pawl Spring Tension
(See page 29)

Code Bar Mounting Plate Adjustment
(See page 29)

Ribbon Feed Shaft Bearing Plates Adjustment
(See page 30)

Ribbon Feed Shaft Detent Spring Adjustment
(See page 30)

Ribbon Feed Shaft Detent Spring Pressure
(See page 30)

Vertical Ribbon Feed Shafts Adjustment
(See page 31)

Ribbon Spool Brackets Adjustment
(See page 31)

Ribbon Spool Shafts Spur Gears Adjustment
(See page 31)

Vertical Ribbon Feed Shaft Spur Gears Adjustment
(See page 31)

Ribbon Spool Cups Adjustment
(See page 32)

Vertical Ribbon Feed Shaft Spring Tension Adjustment

Move the ribbon feed shaft to the right, thus disengaging its gear from the gear on the left vertical feed shaft. Hook an 8 oz. scale onto the pin on the left ribbon spool shaft and pull in a horizontal direction. It should require a pull of 1 to 2 ozs. to start the shaft rotating. Move the ribbon feed shaft to the left and in the same manner check the spring tension of the right vertical ribbon feed shaft.

To adjust, position the collars on the vertical ribbon feed shafts (Figure 47) by means of their set screws.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Ribbon Reverse Shafts Adjustment
(See page 32)

Ribbon Reverse Shaft Collars Adjustment
(See page 32)

Ribbon Reverse Shaft Link Adjustment
(See page 33)

Ribbon Reverse Pawl Spring Tension
(See page 33)

Ribbon Reverse Bail Spring Compression
(See page 33)

Type Bar Backstop Adjustment
(See page 33)

Ribbon Shift Lever Bracket Adjustment
(See page 34)

Ribbon Oscillator Lever Spring Torsion
(See page 34)

Ribbon Shift Lever Spring Tension
(See page 34)

Mounting of the Bell Crank Assembly
(See page 34)

Right Pull Bar Spring Bracket Adjustment
(See page 34)

Left Pull Bar Spring Bracket Adjustment
(See page 35)

Margin Adjusting Screw Arm Spring Pressure
(See page 35)

Carriage Support and Pull Bar Bail Plunger Rollers Adjustment
(See page 35)

REST THE TYPING UNIT ON ITS SIDE.

Main Shaft Position
(See page 36)

Main Shaft Jaw Clutch Throwout Lever Adjustment
(See page 36)

Main Shaft Jaw Clutch Throwout Lever Spring Tension
(See page 36)

Main Shaft Jaw Clutch Spring Tension
(See page 36)

Spacing Shaft Lower Bearing Bracket Adjustment
(See page 36)

REPLACE THE TYPE BAR CARRIAGE IN ACCORDANCE WITH THE FOLLOWING INSTRUCTIONS:

Instructions for Replacing the Type Bar Carriage on the Typing Unit

Shift the platen frame to the "figures" position and rotate the main shaft until the printing bail is in its rear position. Then move the right margin adjusting screw arm on the carriage to the rear, so that it is approximately 45 degrees from vertical. Hold the carriage in the right hand and rest the left front carriage support roller on the right end of the front carriage track. Move the carriage slowly to the left until the rear carriage support roller rests on the upper track. Operate the carriage return lock bar, and move the pull bar bail to its rearmost position by pushing on the right pull bar bail roller with the right thumb. Move the carriage farther to the left, making sure that the bell cranks engage their respective vanes, that the right front carriage support roller and guide screw properly engage the front carriage track and that the pull bar bail plunger roller is between the printing bail blades. When the carriage has been moved far enough to the left to permit the right margin adjusting screw to clear the spacing stop lever, restore the

right margin adjusting screw arm to its normal vertical position, and then shift the carriage to its extreme right position and lock it in place by operating the dashpot lever. Hold the carriage return spring drum so that the spring does not unwind. Then unhook the eyelet of the draw strap from the post on the side frame and hook it over its mounting post on the carriage. Operate the carriage return lock bar to permit the carriage to return to its extreme left position. Replace the platen carriage draw bar and the ribbon carrier.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Printing Bail Adjustment
(See page 37)

REMOVE THE TYPE BAR CARRIAGE FROM THE TYPING UNIT.

Function Lever Bail Adjustment
(See page 38)

Blocking Plate Adjustment
(See Page 38)

Selector Vanes Adjustment
(See page 38)

Function Bail Spring Tension
(See page 38)

Printing Bail Spring Tension Adjustment

Rotate the main shaft until the printing bail is in its extreme rear position. Hook a 12 lb. scale over the left end of the adjusting lever so that the hook on the scale engages the lever directly in the rear of the spring notch in the lever and pull in line with the spring. It should require 10 to 11 lbs. to start the lever moving. See Figure 62 for location of parts.

Adjust by means of the spring adjusting lever screw.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Selector Lever Spring Tension
(See page 39)

Selector Separator Plates Adjustment
(See page 39)

Armature Lever Pivot Screw Adjustment
(See page 39)

Selector Magnet Adjustment
(See page 39)

Selector Arm Pivot Screw Adjustment
(See page 40)

Selector Arm Bracket Adjustment
(See page 40)

Locking Wedge Adjustment
(See page 41)

Selector Arm Locking Lever Spring Tension
(See page 41)

Selector Arm Stop Detent Adjustment
(See page 41)

Selector Arm Stop Detent Spring Tension
(See page 41)

Selector Magnet Bracket Position Adjustment
(See page 41)

Selector Magnet Bracket Adjustment
(See page 42)

Armature Lever Spring Tension Adjustment
(See page 42)

Selector Arm Operating Screw Adjustment
(See page 43)

Selector Arm Spring Tension
(See page 43)

Stop Lever Eccentric Screw Adjustment
(See page 43)

Trip Latch Spring Compression
(See page 43)

Stop Lever Spring Tension
(See page 43)

REPLACE THE RANGE FINDER ASSEMBLY.

Trip-Off Screw Adjustment
(See page 44)

Platen Shift Stop Post Adjustment
(See page 44)

REPLACE THE TYPE BAR CARRIAGE.

Letters Stop Screw Final Adjustment

With the platen in the letters position (down) the lower case character on the "N" type bar should strike the platen midway between the upper and lower edge of the printing surface of the platen.

Adjust by means of the letters stop screw (Figure 142).

Figures Stop Screw Final Adjustment

With the platen in the letters position (down) print the letter "W" on the platen. Then, with the platen in the figures position (up), the figure "2" should be in direct alignment with the letter "W" when the figure "2" is printed directly on the platen.

Adjust by means of the figures stop screw (Figure 142).

REMOVE THE TYPE BAR CARRIAGE.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Figures, Letters, and Line Feed Function Lever Spring Tensions
(See page 45)

Blank Printing and Spacing Cutout Function Lever Spring Tension
(See page 45)

Function Bail Blade Adjustment
(See page 45)

Letters and Figures Shift Adjustment

With the shift detent spring removed and the "letters" and "figures" combinations alternately selected, the shift stop post should move to within .010" to .025" of the letters stop screw and the figures stop screw respectively, when the main shaft is rotated until the function bail is in its extreme rear position and the selected push bar is held in engagement with the function bail blade. The platen should be placed in the "figures" position (up) before selecting the "letters" combination and in the "letters" position (down) before selecting the "figures" combination.

To adjust, place the shift link bracket in the middle of the adjustment provided by the elongated mounting holes and tighten the mounting screws. Place the typing unit on its right side and rotate the main shaft until the function bail is in its extreme forward position. Adjust the turnbuckle on the shift vertical link so as to equalize (within .010") the clearance between the function bail blade and the shoulder on the letters push bar, when the platen is in the figures position, with the clearance between the function bail blade and the shoulder on the figures push bar, when the platen is in the letters position. Then select the "letters" and "figures" combinations alternately and check for the specified clearances between the shift stop post and the letters and figures stop screws. If either of these clearances is greater than .025" move the shift link bracket toward the front of the unit, if less than .010" move it toward the rear, after which a slight readjustment of the shift vertical link turnbuckle may be necessary to bring both clearances within the specified limits. Replace the shift detent spring. See Figures 75 and 76 for location of parts.

Platen Shift Detent Final Adjustment

When the platen is shifted to the "figures" or "letters" positions, the detent roller should travel approximately equally on either side of the detent.

To adjust, position the shift detent by means of its eccentric shoulder screw. (See Figure 75 for location of parts.)

Platen Shift Detent Spring Tension (Figure 142)

Hook a 12 lb. scale over the end of the shift detent lever, just below the camming surface, and pull in line with the spring. It should require 3-1/2 to 4-1/2 lbs. to start the lever moving.

Link Arm Spring Tension (Figure 143)

With a 32 oz. scale hooked in the slot in the upper end of the link arm, it should require 9 to 12 ozs. to pull (horizontally toward the rear of the typing unit) either link arm against its stop.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Letters and Figures Push Bars Spring Tensions
(See Page 46)

Pressure Roll Bar Adjustment (Figure 150)

The pressure roll bar should have only perceptible end play. To adjust, remove the left pilot screw from the feed roll bracket and add or remove shims between the left end of the pressure roll bar and feed roll bracket.

Pressure Roll Release Arm Adjustment (Figure 144)

Unhook the pressure roll release arm spring. The pressure roll release arm should engage its latch by the thickness of the arm when the end play in the pressure roll shaft is taken up in a direction away from the latch. Adjust by means of the elongated mounting holes in the release arm. Replace the spring.

Pressure Roll Release Arm Spring Tension (Figure 144)

With the pressure roll release arm in its latched position, hook a 64 oz. scale over the upper end of the pressure roll release arm and pull horizontally toward the rear of the typing unit. It should require a pull of 24 to 36 ozs. to start the release arm moving away from the latch.

Feed Roll Shaft Adjustment

With the pressure roll release arm in its latched position, the line feed pawl should ride fully on the feed roll ratchet when the feed roll has barely perceptible end play. There should also be at least .010" clearance between the side of the feed roll ratchet and the detent lever when the end play in the feed roll is taken up so as to make this clearance a minimum.

To adjust, position the set collar on the left end of the feed roll shaft (as observed from the rear of the typing unit) and add or remove shims between the hub of the feed roll ratchet and the bushing at the right end of the shaft. See Figures 144 and 145 for location of parts.

Feed Pawl Adjustment (Figure 145)

With the "blank" combination selected rotate the main shaft until the printing bail is in its extreme rear position. Then, with the detent roller resting in the hollow between two teeth on the feed roll ratchet, there should be .050" to .070" clearance between the peak of the tooth to be engaged on the feed roll ratchet and the peak of the engaging surface of the feed pawl, when these two points are held opposite each other.

Adjust by means of the feed pawl eccentric. Check for this clearance on a number of teeth around the ratchet.

Feed Pawl Link Adjustment (Figure 146)

Set the typing unit on its right-hand side. Select the "line feed" combination and rotate the main shaft until the blocking extension of the function lever bail rests on the line feed function lever. Then, with the function bail in the extreme forward position, there should be .010" to .030" clearance between the shoulder of the line feed push bar and the function bail blade.

Adjust by means of the elongated holes in the feed pawl link.

Line Feed Push Bar Spring Tension

With the typing unit on its right side and the printing bail in its extreme rear position, apply the push end of an 8 oz. scale to the line feed push bar, just to the rear of the function lever extension, and push horizontally at right angles to the bar. It should require 1 to 2 ozs. to start the push bar moving. See Figure 76 for location of parts.

Feed Pawl Spring Tension (Figure 145)

With the "blank" combination selected, rotate the main shaft until the printing bail blade is in its extreme rear position. Hold the line feed bail manually so that the feed pawl eccentric just clears the feed pawl stop. Hook an 8 oz. scale over the end of the feed pawl just below its engaging surface and pull parallel to the spring. It should require from 3/4 to 2-1/2 ozs. to pull the feed pawl away from the feed roll ratchet.

Feed Roll Detent Lever Spring Tension (Figure 145)

With the detent roller resting in the hollow between two teeth on the feed roll ratchet, hook a 64 oz. scale over the end of the detent lever and pull upward. It should require 44 to 56 ozs. to start the lever moving.

Slack Bar Spring Tension

Hold the slack bar (Figure 147) upward against its stop and unhook the left slack bar spring from its spring post. With an 8 oz. scale hooked in the end of the spring it should require 3/4 to 1-3/4 ozs. to pull the spring to position length.

Rehook this spring over its spring post and repeat the procedure on the right slack bar spring.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Spacing Escapement Pawl Operating Arm Adjustment
(See Page 50)

Spacing Escapement Pawl Spring Tension
(See Page 51)

Carriage Return Latch Bar Latch Shims Adjustment
(See Page 51)

Carriage Return Latch Bar Latch Adjustment
(See Page 51)

Carriage Return Lock Bar Latch Eccentric Screw Adjustment
(See Page 51)

Carriage Return Lock Bar Latch Spring Tension
(See Page 52)

Carriage Return Lock Bar Adjustment
(See Page 52)

Carriage Return Operating Lever Stop Screw Adjustment
(See Page 52)

Carriage Return Reset Bar Spring Tension
(See Page 52)

Carriage Return Function Lever Spring Tension
(See Page 52)

Carriage Return Operating Lever Spring Tension
(See Page 53)

Carriage Return Clutch Spring Compression
(See Page 53)

Dashpot Lever Spring Tension
(See Page 53)

Spacing Stop Lever Bracket Adjustment
(See Page 53)

Spacing Stop Lever Spring Tension
(See Page 53)

Carriage Guide Screws Adjustment
(See Page 53)

Code Bar Bell Cranks Adjustment
(See Page 54)

Spacing Rack Adjustment
(See Page 54)

Type Bar Guide Adapter Plate Adjustment

NOTE: The accuracy of the "Platen Eccentric Adjustment" should be checked before making the following adjustment.

With the platen in the "letters" position, there should be 11/64 to 7/32" space between the rear edge of the type bar guide and the nearest point on the platen. This adjustment is obtained when necessary, by adding or removing shims between the type bar guide adapter plate and the type bar segment. Before finally tightening the mounting screws, position the type bar guide to right or left so as to permit all type bars to pass freely through the guide.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Locking Function Lever Spring Tension
(See Page 54)

Carriage Return Spring Drum Adjustment

Rotate the main shaft until the printing bail is in its extreme rear position. Hook a 12 lb. scale over the lower part of the right ribbon spool bracket, and pull in a line parallel to the carriage track. It should require 2-1/4 to 2-3/4 lbs. to start the carriage moving away from its extreme left position. When measuring this tension the carriage return lock bar should be held in approximately its latched position so as to disengage the clutch teeth, and the dashpot lever should be held in its operated position.

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

Printing Bail Spring Balancer Position (Figure 149)

With the typing unit on its right side and with the platen frame in the figures position, set up the "E" combination and rotate the main shaft until the printing bail is in its extreme forward position. Hook an 8 oz. scale over the end of the balancer bar and pull horizontally toward the front of the typing unit. It should require 4 to 8 ozs. to pull the balancer bar away from the shift push bar.

Adjust by means of the elongated holes in the balancer bar bracket.

REFER TO SENDING STATION TYPING UNIT ADJUSTMENTS FOR THE FOLLOWING:

Ribbon Oscillator Lever Adjustment
(See Page 56)

Spacing Clutch Torque
(See Page 57)

Selector Clutch Torque
(See Page 57)

Bail Cam Unit Friction Clutch Torque
(See Page 57)

Dashpot Vent Screw Adjustment

With the typing unit disconnected from the counter-ballast mechanism and the carriage return lock bar held in its latched position, the carriage should return from its right stop to its left stop without bouncing and with minimum shock.

Adjust by means of the dashpot vent screw and lock nut.

PLACE THE TYPING UNIT IN THE PROJECTOR FRAME AND SECURE IT BY MEANS OF THE THREE THUMB SCREWS AND THE ONE FILLISTER HEAD SCREW.

Left Margin Adjusting Screw Adjustment (Figure 85) - See Note A

The first character of a line should be typed so as to provide a margin of 3/8" plus or minus 1/16" from the left edge of the character to the left edge of the web.

To adjust, turn the left margin screw in and lock the carriage in place by operating the dashpot lever so that the carriage is in a position to print the left edge of the character "M" 3/8" (plus or minus 1/16") from the left edge of the web. Make sure that the carriage clutch members are fully engaged. Then reposition the margin screw so that when the lock nut is slightly tightened to take up the end play in the threads, and a horizontal pull of 8 lbs. is exerted on the dashpot lever (applied with a 12 lb. scale at right angles to the curved surface 1/32" behind the margin adjusting screw) there is a slight clearance, not more than .002", between the end of the screw and the dashpot lever. Turn the left margin screw one-sixth turn in a direction to eliminate this clearance and tighten the lock nut.

Right Margin Adjusting Screw Adjustment - See Note A

The typing unit should print 46 characters on a line before spacing is blocked by the spacing stop lever.

(A) This adjustment should be made with the typing unit in position in the projector frame.

To adjust, return the carriage to the left end of the line and back off the right margin screw. Then, with the right margin screw arm in engagement with its detent, space the carriage 45 spaces. (The carriage should then be in position to type the last character desired in the line.) Adjust the stop screw so that the spacing stop lever is moved within .015" to .030" from a projection on the spacing stop sleeve. See Figure 86 for location of parts.

Motor Position Adjustment - See Note A

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

To adjust, add or remove shims under the motor feet to regulate the gear backlash. Position the motor by means of the large holes in the motor feet to obtain lateral alignment.

(A) This adjustment should be made with the typing unit in position in the projector frame.

LUBRICATION SPECIFICATION
RECEIVING PAGE TYPING UNIT

Lubricants which may be ordered from the Teletype Corporation under the following numbers are recommended:

88970	1 Qt. of KS-7470 Oil
88971	1 Gal. of KS-7470 Oil
88973	1 Lb. of KS-7471 Grease
88975	KS-8319 Grease Gun

The above grease is recommended instead of oil for lubricating the motors. The 88975 grease gun should be used for injecting grease in the motor bearings. The gun may also be used for applying grease to other parts of the apparatus.

Instructions for Filling the Grease Gun
(See Page 65)

Instructions for Lubricating Motor Ball Bearings
(See Page 65)

The following lubrication list covers the special mechanisms of the receiving page typing unit. For lubrication of mechanisms that correspond with those of the sending station typing unit, see "Lubrication Specification Sending Station Equipment" Page 65.

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 below, except where the use of grease or oil-grease-oil is specified:

1. Feed roll shaft (one in each shaft hub)
2. Feed pawl guide (grease)
3. Feed roll ratchet (grease)
4. Line feed push bar at engaging surface with function bail blade (grease)
5. Left-hand margin adjusting screw (grease)
6. Right-hand margin adjusting screw (grease)
7. Printing bail spring balancer
   a. At pivot point
   b. At engaging surface with shift push bar (grease)
8. Upper and lower paper guide rollers (one in each roller hub)
9. Platen carriage bracket shafts
10. Link arms at pivot points

Oil both loops of the following helical springs that exert a nominal tension of less than 2-1/2 lbs:

a. Link arm springs
b. Pressure roll release arm springs
c. Line feed push bar spring
d. Feed pawl spring
e. Detent lever roller spring
f. Slack bar springs

Apply grease to both loops of the following helical springs that exert a nominal tension of 2-1/2 lbs. or more:

a. Platen shift detent lever spring
b. Printing bail spring

ADJUSTMENTS OF THE PROJECTOR FRAME

In the following adjustments, use of the word "front" shall mean in a direction toward the door of the projector cabinet as the apparatus normally rests in the operating position. "Right" shall mean to the observer's right when facing the door of the cabinet.

Carriage Frame Typing Unit Support Plates Adjustment

Loosen the mounting screws of the four typing unit support plates (Figure 34) until they are just friction tight. Place a completely adjusted receiving page typing unit in position in the frame and fasten it securely to the plates by means of the three thumb screws and one fillister head screw provided, sliding the plates if necessary to align them with the typing unit mounting holes. Position the typing unit so that the front platen bracket support rod is parallel (as gauged by eye) with the angle iron which supports the web shift detent bracket. Tighten the typing unit support plates mounting screws.

Condenser Lens Frame Stop Screws Adjustment

The condenser lens frame stop screws (Figure 34) should be set so as to provide alignment of the four front condenser lens plate thumb screw holes with the corresponding tapped holes in the frame.

Counter-Ballast Draw Straps Adjustment

All slack in the counter-ballast draw straps should be taken up. This may be accomplished by means of the elongated holes in the draw straps connecting links. Further adjustment may be obtained, when necessary, by means of the elongated holes in the right draw strap roller mounting plate.

Counter-Ballast Return Spring Adjustment

With the counter-ballast moved to the right about three-fourths of its total available travel, hook a 12 lb. scale over the top right roller mounting stud and pull horizontally to the right. It should require from 2-1/4 to 2-3/4 lbs. to start the counter ballast moving. Wind or unwind the spring, as may be necessary, to meet this requirement.

NOTE: The counter-ballast should be disconnected from the typing unit when making this adjustment.

Counter-Ballast Dashpot Vent Screw Adjustment

The counter-ballast should return from its right stop to its left stop without bouncing and with minimum shock when pulled to the extreme right and allowed to return. Adjust by means of the dashpot vent screw and lock nut.

NOTE: The counter-ballast should be disconnected from the typing unit when making this adjustment.

Counter-Ballast Dashpot Lever Spring Tension

Unhook the dashpot lever spring from the dashpot lever and hook a 32 oz. scale in the spring eye. With the dashpot lever held to the extreme left, it should require a pull of 10 to 14 ozs. to extend the spring to its position length.

Counter-Ballast Dashpot Plunger Adjustment

Connect the counter-ballast to the type bar carriage by sliding the draw strap connecting link over the link connecting post provided on the type bar carriage. Return the carriage to the beginning of the line. The counter-ballast dashpot plunger should be from 3/16 to 5/16 of an inch from its fully returned position.

Adjust by moving the link connecting post mounting plate to the left or right as may be required. Further adjustment may be obtained if necessary by repositioning the draw strap ends in the draw strap connecting link as permitted by the elongated mounting holes.

Refinement of Dashpot Vent Screw Adjustment

When the counter-ballast is connected to the type bar carriage a refinement of the vent screw adjustment on the two dashpots (one on the typing unit and one for the counter-ballast) may be necessary. If so, adjust the vent screws as may be required to insure return of the type bar carriage and counter-ballast without bounce and with minimum shock when the type bar carriage is moved to the extreme left and allowed to return.

Motor Position Adjustment

There should be a barely preceptible amount of backlash between the motor pinion and the highest point on the main shaft gear. The lateral alignment of the motor pinion and the main shaft gear should be such that the center line of the gear coincides with a vertical line through the center of the hole in the motor pinion. Adjust the gear backlash by means of 71156 shims located as may be required under the motor feet. Position the motor laterally by means of its elongated mounting holes to secure gear alignment.

Web Rewind Spindle Friction Clutch Adjustment

With the motor running and the web rewind belt in operating position, hook a 32 oz. scale in the set screw hole on the end of the web rewind spindle next to the large pulley. It should require a pull of 16 to 20 ozs. to just start rotating the spindle against the friction clutch. Adjust by means of the adjusting nuts on the friction clutch.

Web Shift Detent Adjustment

The web shift detent bracket (Figure 34) should be adjusted so that (1) the vertical play in the link arms at their pivot points is approximately equal in the figures and letters positions, and (2) alternate figures and letters characters print on a straight line.

To make this adjustment, back off the two web shift bail stop screws until they are clear of the web shift bail. Also, loosen the web shift detent bracket mounting screws until they are friction tight. Slide the bracket up or down, as may be required to equalize the play in the web shift vertical links pivot points. Lock the bracket mounting screws.

Advance the web shift bail stop screws until the lower screw just touches the bail when the bail is in the letters position and the upper screw just touches the bail when the bail is in the figures position. Then turn the two screws in equal amounts (approximately 1/2 turn at a time) until alternate figures and letters characters print on a straight line.

Web Shift Detent Spring Tension

Unhook the web shift detent spring from its spring post and hook a 12 lb. scale in the spring eye. The spring should measure 4-1/2 to 7 lbs. when pulled to position length.

Upper Web Roller Bracket Spring Tension

The upper web roller bracket springs should have a tension of 19 to 23 ounces. To check, remove one end of a spring, hook a 32 oz. scale in the spring eye and pull to position length.

Note: In the following adjustments of the optical system, a pair of very dark glasses should be worn to protect the eyes from the intense light of the projector lamp.

The adjustments of the optical system are so interrelated that each affects certain of the others. Therefore, in making these adjustments it may be necessary to recheck previous adjustments as succeeding adjustments are made. When making a complete adjustment of the optical system all optical components should be set at approximately the mid point of their respective adjusting ranges before proceeding with these adjustments.

Projector Lamp Socket Adjustment

Loosen the lamp socket clamping screw and turn the socket until the filament supporting wires face directly toward the front of the lamp house. Tighten the clamping screw.

Projector Lamp Focusing Adjustment

Place an opaque noninflammable sheet of material (for example, a piece of sheet steel) between the lamp and the reflecting mirror. Also place a small piece of paper on top of the objective lens. Apply a source of 115 volt power to the projector lamp. Loosen the lamp socket bracket mounting screws and focus the filament of the lamp on the piece of paper by sliding the bracket back and forth. Tighten the bracket mounting screws. Loosen the lamp socket clamping screw and slide the socket up or down until the image of the filament on the piece of paper is approximately in the center of the objective lens.

Projector Frame Tracks Adjustment

Place the projector frame with typing unit into the cabinet. The projector frame wheels should settle into the depressions provided in the projector frame tracks and the four projector frame mounting holes should line up with the corresponding holes in the tracks. To adjust, loosen the track mounting screws, position the track to meet this requirement, and tighten the mounting screws. Secure the carriage frame in position using the four cap screws provided.

Small Mirror Pivot Screws Adjustment

Print one full line of copy. Loosen the small mirror pivot thumb screws until they are just friction tight. Then rotate the mirror about its pivots until the full line of copy appears fairly close to the lower edge of the screen. Tighten the pivot thumb screws.

Objective Lens Focusing Adjustment

Focus the printed line of copy on the screen by means of the objective lens.

Small Mirror Extension Brackets Adjustment (Figure 35)

Loosen the small mirror extension brackets clamping thumb screws until they are just friction tight and locate the mirror in the center of its adjustable limits. Rotate the mirror about one of its extension bracket clamping thumb screws as a pivot until the line of copy is parallel to the lower horizontal portion of the screen frame. Tighten the clamping thumb screws.

Left-Hand Margin Adjustment on Screen

Print a character at the lower left-hand corner of the screen and measure the width of the left-hand margin. Advance the character to the top of the screen and again measure the width of the margin. If the margin is wider at the top than at the bottom, proceed as follows: Loosen the four screws which fasten the small mirror bracket to the extension brackets. Swing the mirror bracket forward as permitted by the elongated holes in the extension brackets and tighten the four screws. Recheck the foregoing three adjustments and again check the left-hand margin on the screen as outlined in the foregoing. If further correction is necessary repeat the above procedure.

If the margin at the top of the screen is narrower than at the bottom of the screen, the small mirror bracket should be swung to the rear.

Refinement of the Objective Lens Focusing Adjustment

Feed a printed line to the top of the screen and then print another full line at the bottom. Focus the objective lens carefully until the best possible focus is obtained on the bottom line. If the upper line is slightly out of focus, loosen the upper web roller (the roller which carries the two slide carrier locating collars) support brackets and slide the roller backward or forward as may be required to bring the top line into proper focus. Be careful to keep the upper roller parallel to the web guide roller immediately below when making this adjustment.

Left-Hand Margin Width Adjustment

After all optical adjustments have been completed the left-hand margin on the screen should be from 3/8 to 1-1/4 inches in width and it should be possible to project at least forty-five properly spaced characters per line.

If the left-hand margin is too narrow it will be necessary to adjust the left margin adjusting screw to shift the first character on the screen one space to the right. To do this loosen the left margin adjusting screw locknut and withdraw the screw four full turns. Then turn the margin screw in or out slightly as may be required so that when the locknut is tightened to take up play in the threads, and a horizontal pull of 8 lbs. is exerted on the dashpot lever applied with a 12 lb. scale at right angles to the curved surface 1/32" behind the margin adjusting screw, there is a slight clearance (not more than .002") between the end of the screw and the dashpot lever. Turn the left margin adjusting screw one-sixth turn in a direction to eliminate this clearance and tighten the locknut.

Refinement of Projector Lamp Focusing Adjustment

If, after all optical adjustments have been completed, there is a slight shading in one or more corners of the screen, this shading may be removed by loosening the projector lamp bracket mounting screws and moving the lamp toward the condenser lenses until the shading disappears. Care should be taken to keep the image of the filament centrally located on the objective lens.

NOTE: The foregoing adjustment will throw the image of the filament on the objective lens slightly out of focus. This is not objectionable, however, provided the screen illumination is uniform.

Slide Carrier Collars Adjustment

Place a slide carrier in position in the machine by attaching the hooks over the upper web roller and locating the lower projection on the slide carrier to the left and up against the lower web roller. (The lower web roller is the roller immediately below the rear platen casting support rod.) Locate the slide carrier laterally so that the clear portion of the slide is centrally located when projected on the screen. Bring the slide carrier locating collars up against the hooks on the slide carrier and lock in position.

LUBRICATION SPECIFICATION FOR PROJECTOR FRAME

Lubricants which may be ordered from the Teletype Corporation under the following numbers are recommended:

88970	1 Qt. of KS-7470 Oil
88971	1 Gal. of KS-7470 Oil
88973	1 Lb. of KS-7471 Grease
88975	KS-8319 Grease Gun

The above grease is recommended instead of oil for lubricating the motors. The 88975 grease gun should be used for injecting grease in the motor bearings. The gun may also be used for applying grease to other parts of the apparatus.

Instructions for Filling the Grease Gun
(See Page 65)

Instructions for Lubricating Motor Ball Bearings
(See Page 65)

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

1. Projector frame rollers (four).
2. Counter-ballast draw strap rollers (two).
3. Counter-ballast draw strap link at point of engagement with post on typing unit - grease.
4. Counter-ballast rollers.
5. Counter-ballast roller tracks.
6. Dashpot piston rod.
7. Dashpot lever mounting shoulder screw.
8. Dashpot piston rod at point of contact with counter ballast - grease.
9. Counter-ballast return spring.
10. Counter-ballast return spring escapement ratchet - grease.
11. Web rewind spindle - two points.
12. Web rewind friction clutch - saturate felt with oil.
13. Web rollers (two) - two points each.
14. Vertical links shoulder screws (two).
15. Web shift detent lever - two points.
16. Web shift stop screws (two) - grease.
17. Paper shift mechanism pivot points - two.
18. Motor pinion - grease.
19. Motor bearings (two) - grease.
20. Counter-ballast dashpot lever spring - oil both loops.
21. Web shift detent spring - grease both loops.

NOTE: When lubricating the projector frame remove the blower cover plate on the side of the cabinet and place a few drops of oil in each of the two motor oilers.

ADJUSTMENTS OF THE PROJECTOR CABINET

Control Relay Adjustments

For these adjustments, refer to Page 63.

Projector Frame Tracks Adjustment

For this adjustment, refer to Page 106.

ALPHABETICAL INDEX OF ADJUSTMENTS

Adjustments of Page Printer

	Tools Required		Page: Sending Station	Page: Receiving Station
Base Unit				
Control Relay	138-55	8 oz. scale	63	
	138-58	32 oz. scale		
	93811	.030" gauge		
	96385	.040" gauge		
		Pliers		
Keyboard Jack Springs Adjustment	4841	12 lb. scale	62	
	93823	.005" gauge		
	93825	.025" gauge		
Line Jack Springs Adjustment	4841	12 lb. scale	62	
	96377	.020" gauge		
	96393	.060" gauge		
		Pliers		
Motor Unit Slip Connection Springs Adjustment	82711	4 lb. scale	62	
	96375	.015" gauge		
Typing Unit Slip Connection Springs Adjustment			63	
Keyboard				
Clutch Adjustment	95367	5/16"-1/4" wrench	58	
	93823	.005" gauge		
	96375	.015" gauge		
Clutch Throwout Lever Eccentric Adjustment	138-34	1/4" open wrench screw driver	59	
Intermediate Pawl Eccentric Adjustment	96391	.050" gauge	59	
	96393	.060" gauge		
	138-34	1/4" open wrench screw driver		
Key Lever Spring Tension Adjustment		suitable scale	60	

	Tools Required		Page Sending Station	Page Receiving Station
Lock Loop Roller Adjustment	96371 96375 138-36	.008" gauge .015" gauge 3/16"-1/4" wrench screw driver	59	
Locking Lever Shaft Bracket Adjustment	96373	.010" gauge screw driver	58	
Repeat Space Rod Adjustment	96377 96373 (2) 138-36	.020" gauge .010" gauge 3/16"-1/4" wrench	60	
Repeat Space Rod Bracket Adjustment	96371	.008" gauge screw driver	60	
Transmitting Cam Cylinder End Play	96356 (2) 95366	.002" gauge 3/8"-9/16" wrench	60	
Transmitting Contacts Gap Adjustment	96377 93825 72003	.020" gauge .025" gauge Spring bender	58	
Trip-Off Pawl Eccentric Adjustment	96356 93822 138-34	.002" gauge .004" gauge 1/4" open wrench screw driver	59	
Trip-Off Pawl Stop Plate Adjustment	96385 96393 89954	.040" gauge .060" gauge 1/4" socket wrench	59	
Universal Bar Pilot Screws Adjustment	96373 138-36	.010" gauge 3/16"-1/4" wrench	59	
Typing Unit				
Armature Lever Pivot Screw Adjustment	75765 95367	Spring hook - pull 5/16"-1/4" wrench screw driver	39	92

	Tools Required		Page Sending Station	Page Receiving Station
Armature Lever Spring Tension Adjustment	75503 138-58 138-36	Spring hook - push 32 oz. scale 3/16"-1/4" wrench	42	93
Bail Cam Unit Friction Clutch Torque	138-58	32 oz. scale	57	99
Blocking Plate Adjustment	93823 89954 138-36	.005" gauge 1/4" socket wrench 3/16"-1/4" wrench screw driver	38	92
Carriage Guide Screws Adjustment	96371 138-36	.008" gauge 3/16"-1/4" wrench screw driver	53	98
Carriage Return Latch Bar Latch Adjustment	96377 96373 89954	.020" gauge .010" gauge 1/4" socket wrench	51	97
Carriage Return Latch Bar Latch Shims Adjustment	93822 96373 89954	.004" gauge .010" gauge 1/4" socket wrench	51	97
Carriage Return Lock Bar Adjustment	96377 96373 89954	.020" gauge .010" gauge 1/4" socket wrench	52	97
Carriage Return Lock Bar Latch Eccentric Screw Adjustment	96360 96375 138-36	.006" gauge .015" gauge 3/16"-1/4" wrench screw driver	51	97
Carriage Return Operating Lever Stop Screw Adjustment	96377 (2) 138-36	.020" gauge 3/16" -1/4" wrench	52	97
Carriage Return Spring Drum Adjustment	4841 4838	12 lb. scale 3/8"-7/16" wrench	54	98

	Tools Required		Sending Station	Receiving Station
Carriage Support and Pull Bar Bail Plunger Rollers Adjustment	95367 4838	5/16"-1/4" wrench 3/8"-7/16" wrench	35	91
Code Bar Bell Cranks Adjustment	95367	5/16"-1/4" wrench screw driver	54	98
Code Bar Mounting Plate Adjustment	96371 96377 89955	.008" gauge .020" gauge 5/16" socket wrench	29	89
Control Line Current			63	
Dash Pot Vent Screw Adjustment	95367	5/16"-1/4" wrench screw driver	57	99
Feed Pawl Adjustment	138-36 96391 96399	3/16"-1/4" wrench .050" gauge .065" gauge screw driver		96
Feed Pawl Link Adjustment	89954 96373 93811	1/4" socket wrench .010" gauge .030" gauge screw driver		96
Feed Roll Shaft Adjustment	89954 96373	1/4" socket wrench screw driver .010" gauge		95
Figures Stop Screw Adjustment	(2) 95367	5/16"-1/4" wrench screw driver	45	
Figures Stop Screw Final Adjustment	(2) 95367	5/16"-1/4" wrench screw driver		94
Function Bail Blade Adjustment	93822 96375	.004" gauge .015" gauge screw driver	45	94
Function Lever Bail Adjustment	96385 96393 89955	.040" gauge .060" gauge 5/16" socket wrench	38	92

	Tools Required		Page Sending Station	Page Receiving Station
Instructions for Removing the Type Bar Carriage from the Typing Unit			28	89
Instructions for Removing a Type Bar from the Type Bar Carriage	screw driver		57	
Instructions for Removing the Typing Unit from the Projector Frame				89
Instructions for Replacing the Type Bar Carriage on the Typing Unit			37	91
Lateral Position of the Platen	(2) screw drivers			88
Left Margin Adjusting Screw Adjustment	4841	12 lb. scale	56	99
	(2) 95367	5/16" 1/4" wrench		
	4838	3/8"-7/16" wrench		
	96356	.002" gauge		
Left Pull Bar Spring Bracket Adjustment	93822	.004" gauge	35	91
	138-36	3/16"-1/4" wrench		
Letters and Figures Shift Adjustment	75765	Spring hook - pull	46	94
	96373	.010" gauge		
	93825	.025" gauge		
	(2) 95367	5/16"-1/4" wrench		
	89954	1/4" socket wrench		
		screw driver		
Letters and Figures Stop Screw Preliminary Adjustment	(2) 95367	5/16" -1/4" wrench screw driver		88
Letters Stop Screw Adjustment	(2) 95367	5/16"-1/4" wrench screw driver	44	
Letters Stop Screw Final Adjustment	(2) 95367	5/16"-1/4" wrench screw driver		93

	Tools Required		Page Sending Station	Page Receiving Station
Line Feed Check Lever Adjustment	96375 93822	.015" gauge .004" gauge screw driver	48	
Line Feed Check Post Stop Screw Adjustment	96375 93811 138-36	.015" gauge .030" gauge 3/16"-1/4" wrench screw driver	48	
Line Feed Check Screw Adjustment	96377 138-36	.020" gauge 3/16"-1/4" wrench	48	
Line Feed Detent Lever Adjustment	138-36	3/16"-1/4" wrench screw driver	47	
Line Feed Vertical Link Turnbuckle Adjustment	96375 (2) 95367	.015" gauge 5/16"-1/4" wrench	47	
Link Arms Adjustment	138-36	3/16"-1/4" wrench		87
Local Power Requirements			64	
Locking Wedge Adjustment	96360 96373 138-36	.006" gauge .010" gauge 3/16"-1/4" wrench	41	93
Lower Web Guide Adjustment	89955	5/16" socket wrench		87
Main Shaft Position	89954	1/4" socket wrench screw driver	36	91
Main Shaft Jaw Clutch Throwout Lever Adjustment	96373 96377 138-127	.010" gauge .020" gauge 3/8"-7/16" wrench	36	91
Margin Bell Hammer Adjustment	96377 96393	.020" gauge .060" gauge pliers	51	
Margin Signal Bell Adjustment			57	

		Tools Required	Page Sending Station	Page Receiving Station
Motor Plate Adjustment	4838	3/8"-7/16" wrench	55	
	(2) 95367	5/16"-1/4" wrench		
Motor Position Adjustment	138-127	3/8"-7/16" wrench		100
Mounting of the Bell Crank Assembly	95367	5/16"-1/4" wrench screw driver	34	91
Orientation			63	
Paper Fingers Adjustment	93822	.004" gauge	50	
	96377	.020" gauge		
	138-36	3/16"-1/4" wrench		
Paper Guides Adjustment	96385	.040" gauge	50	
	96391	.050" gauge		
		screw driver		
Paper Spindle Drag Spring Adjustment	4841	12 lb. scale	55	
Paper Straighten Rod Stops Adjustment	93811	.030" gauge	50	
	96391	.050" gauge		
		screw driver		
Platen Eccentric Adjustment	(2)	Screw drivers		88
Platen Frame Pilot Screws Adjustment	89954	1/4" socket wrench		87
	87697	1/2"-3/4" wrench		
	4838	3/8"-7/16" wrench		
		screw driver		
Platen Friction Assembly Adjustment	138-55	8 oz. scale	55	
	87697	1/2"-3/4" wrench		
	76280	capstan wrench		
Platen Preliminary Vertical Adjustment		screw driver		88
Platen Shaft Adjustment	83822	.004" gauge	47	
		screw driver		
Platen Shift Detent Final Adjustment	89955	5/16" socket wrench		
		screw driver		95
Platen Shift Detent Preliminary Adjustment	89955	5/16" socket wrench		88
		screw driver		

	Tools Required		Sending Station	Receiving Station
Platen Shift Stop Post Adjustment	89955	5/16" socket wrench	44	93
	138-36	3/16"-1/4" wrench		
Platen Unit Pilot Screws Adjustment	89954	1/4" socket wrench	44	
	4838	3/8"-7/16" wrench		
	87697	1/2"-3/4" wrench		
	75765	Spring hook - pull		
Plunger Guide Roller Bracket Adjustment	96373	.010" gauge	28	89
	96356	.002" gauge		
	89955	5/16" socket wrench		
Plunger Roller Eccentric Mounting Stud	93822	.004" gauge	29	89
	138-36	3/16"-1/4" wrench		
	95367	5/16"-1/4" wrench		
Pressure Roll Bar Adjustment	Screw driver			95
Pressure Roller Release Arm Adjustment	89954	1/4" socket wrench		95
Pressure Roller Release Cams Adjustment	Screw driver		49	
Pressure Roller Release Lever Shafts Adjustment	Screw driver		49	
Pressure Roller Release Shaft Collars Adjustment	93822	.004" gauge		
		screw driver	49	
Pressure Roller Tension Springs Adjustment	4841	12 lb. scale	49	
	95367	5/16"-1/4" wrench		
		screw driver		
Printing Bail Adjustment	96373	.010" gauge	37	92
	96391	.050" gauge		
(2)	95367	5/16"-1/4" wrench		
		screw driver		
Printing Bail Spring Balancer Position	138-36	3/16"-1/4" wrench		98
	138-55	8 oz. scale		
Printing Bail Spring Tension Adjustment	4841	12 lb. scale	39	92
	95367	5/16"-1/4" wrench		
		screw driver		

	Tools Required		Page Sending Station	Page Receiving Station
Ribbon Feed Shaft Bearing Plates Adjustment	89954	1/4" socket wrench	30	89
Ribbon Feed Shaft Detent Spring Adjustment	138-36	3/16"-1/4" wrench	30	89
Ribbon Oscillator Lever Adjustment	Screw driver		56	99
Ribbon Reverse Shafts Adjustment	96385 96393 89954	.040" gauge .060" gauge 1/4" socket wrench screw driver	32	90
Ribbon Reverse Shaft Collars Adjustment	96371	.008" gauge screw driver suitable scale	32	90
Ribbon Reverse Shaft Link Adjustment	96373 96385	.010" gauge .040" gauge screw driver	33	90
Ribbon Shift Lever Bracket Adjustment	89954	1/4" socket wrench	34	90
Ribbon Spool Brackets Adjustment	96375 89954	.015" gauge 1/4" socket wrench	31	90
Ribbon Spool Cups Adjustment	4838	3/8"-7/16" wrench suitable scale	32	90
Ribbon Spool Shaft Spur Gears Adjustment	96360	.006" gauge screw driver	31	90
Right Margin Adjusting Screw Adjustment	96375 93811 138-36	.015" gauge .030" gauge 3/16"-1/4" wrench screw driver	56	99
Right Pull Bar Spring Bracket Adjustment	93822 138-36	.004" gauge 3/16"-1/4" wrench	34	91
Selector Arm Bracket Adjustment	90783 75765 96385 89954	Adjusting wrench Spring hook - pull .040" gauge 1/4" socket wrench	40	93

	Tools Required		Page Sending Station	Page Receiving Station
	138-36	3/16"-1/4" wrench screw driver		
Selector Arm Operating Screw Adjustment	93833	.003" gauge	43	93
	96360	.006" gauge		
	(2) 138-36	3/16"-1/4" wrench		
Selector Arm Pivot Screw Adjustment	75765	Spring hook - pull	40	92
	96371	.008" gauge		
	96375	.015" gauge		
	89954	1/4" socket wrench		
	95367	5/16"-1/4" wrench		
Selector Arm Stop Detent Adjustment	95367	5/16"-1/4" wrench screw driver	41	93
Selector Clutch Torque	138-58	32 oz. scale	57	99
Selector Magnet Adjustment	89954	1/4" socket wrench	39	92
	138-36	3/16"-1/4" wrench		
Selector Magnet Bracket Adjustment	89954	1/4" socket wrench	42	93
	93822	.004" gauge		
	96360	.006" gauge		
	96371	.008" gauge		
	96373	.010" gauge		
	138-36	3/16"-1/4" wrench		
	6617	Tommy screw driver		
Selector Magnet Bracket Position Adjustment	96393	.060" gauge	41	93
	96399	.065" gauge		
	89954	1/4" socket wrench		
	90783	Adjusting wrench		
Selector Magnet Resistances			64	
Selector Separator Plates Adjustment	96389	.045" gauge	39	92
	93827	.055" gauge		
	89954	1/4" socket wrench		
Selector Vanes Adjustment	93822	.004" gauge screw driver	38	92
Shift Detent Adjustment	89955	5/16" socket wrench screw driver	46	
Signal Line Current			64	

	Tools Required		Page Sending Station	Page Receiving Station
Single-Double Line Feed Detent Adjustment	95367	5/16"-1/4" wrench screw driver	47	
Spacing Clutch Torque	138-58	32 oz. scale	57	99
Spacing Escapement Pawl Operating Arm Adjustment	96377 96385 138-36	.020" gauge .040" gauge 3/16"-1/4" wrench screw driver	50	97
Spacing Rack Adjustment	96360 138-36	.006" gauge 3/16"-1/4" wrench	54	98
Spacing Shaft Lower Bearing Bracket Adjustment	89955	5/16" socket wrench screw driver	36	91
Spacing Stop Lever Bracket Adjustment	96385 96393 96405 95367	.040" gauge .060" gauge .080" gauge 5/16"-1/4" wrench	53	98
Stop Lever Eccentric Screw Adjustment	93822 96360 89954	.004" gauge .006" gauge 1/4" socket wrench screw driver	43	93
Synchronous Motor Requirements	138-55 4841 75503	8 oz. scale 12 lb. scale Spring hook - push screw driver	61	
Threading the Transparent Web into Typing Unit				87
Trip-Off screw Adjustment	96356 138-36	.002" gauge 3/16"-1/4" wrench screw driver	44	93
Type Bar Backstop Adjustment	96373 89954	.010" gauge 1/4" socket wrench	33	90
Type Bar Guide Adapter Plate Adjustment	Screw driver			98

	Tools Required		Page Sending Station	Page Receiving Station
Upper Roller Brackets Preliminary Adjustment	138-36	3/16"-1/4" wrench		88
Vertical Ribbon Feed Shafts Adjustment	screw driver		31	90
Vertical Ribbon Feed Shaft Spring Tension Adjustment	138-55	8 oz. scale screw driver	32	90
Vertical Ribbon Feed Shaft Spur Gears Adjustment	Screw driver		31	90

Spring Tensions of Page Printer

Keyboard

Clutch Spring Compression	138-58	32 oz. scale	58	
Contact Spring Pressure	138-55	8 oz. scale	58	
Clutch Throwout Lever Spring Tension	138-55	8 oz. scale	60	
Lock Loop Spring Tension	138-55	8 oz. scale	58	
Repeat Space Rod Spring Tension	138-55	8 oz. scale	61	
Trip-Off Pawl Spring Tension	138-55	8 oz. scale	60	

Typing Unit

Blank Printing and Spacing Cutout Function Lever Spring Tension	138-58 75765	32 oz. scale Spring hook - pull	45	94
Carriage Return Clutch Spring Compression	4841	12 lb. scale	53	97
Carriage Return Function Lever Spring Tension	82711	4 lb. scale	52	97
Carriage Return Lock Bar Latch Spring Tension	138-58	32 oz. scale	52	97
Carriage Return Operating Lever Spring Tension	4841 75765	12 lb. scale Spring hook - pull	53	97

	Tools Required		Page Sending Station	Page Receiving Station
Carriage Return Reset Bar Spring Tension	138-55	8 oz. scale	52	97
Dashpot Lever Spring Tension	138-58 75765	32 oz. scale Spring hook - pull	53	97
Feed Roll Detent Lever Spring Tension	82711	4 lb. scale		96
Feed Pawl Spring Tension	138-55	8 oz. scale		96
Figures, Letters, and Line Feed Function Levers Spring Tension	138-58	32 oz. scale	45	94
Function Bail Spring Tension	82711 75765	4 lb. scale Spring hook - pull	38	92
Letters and Figures Push Bars Spring Tensions	138-55	8 oz. scale	46	95
Line Feed Check Lever Spring Tension	138-55	8 oz. scale	49	
Line Feed Detent Lever Spring Tension	4841	12 lb. scale	48	
Line Feed Pawl Spring Tension	138-55	8 oz. scale	48	
Line Feed Push Bar Spring Tension	138-55	8 oz. scale	48	96
Link Arm Spring Tension	138-58	32 oz. scale		95
Locking Function Lever Spring Tension	82711 75765	4 lb. scale Spring hook - pull	54	98
Main Shaft Jaw Clutch Spring Tension	138-58	32 oz. scale	36	91
Main Shaft Jaw Clutch Throwout Lever Spring Tension	138-55	8 oz. scale	36	91
Margin Adjusting Screw Arm Spring Pressure	82711	4 lb. scale	35	91
Margin Bell Hammer Spring Tension	138-58	32 oz. scale	51	

	Tools Required		Page Sending Station	Page Receiving Station
Margin Bell Pawl Spring Tension	138-55	8 oz. scale	34	
Paper Chute Springs Tension	138-55	8 oz. scale	50	
Paper Fingers Shaft Spring Tension	138-58	32 oz. scale	50	
Paper Straightener Rod Springs Tension	138-58	32 oz. scale	50	
Platen Balance Spring Tension	4841	12 lb. scale	46	
Platen Shift Detent Spring Tension	4841	12 lb. scale		95
Pressure Roll Release Arm Spring Tension	82711	64 oz. scale		95
Pull Bar Spring Tension	138-55	8 oz. scale	29	89
Ribbon Feed Pawl Spring Tension	138-55 75765	8 oz. scale Spring hook - pull	29	89
Ribbon Feed Shaft Detent Spring Pressure	138-58	32 oz. scale	30	89
Ribbon Oscillator Lever Spring Torsion	138-55	8 oz. scale	34	90
Ribbon Reverse Bail Spring Compression	82711	4 lb. scale	33	90
Ribbon Reverse Pawl Spring Tension	138-55	8 oz. scale	33	90
Ribbon Shift Lever Spring Tension	4841 75765	12 lb. scale Spring hook - pull	34	91
Selector Arm Locking Lever Spring Tension	138-55 75765	8 oz. scale Spring hook - pull	41	93
Selector Arm Spring Tension	138-55 75765	8 oz. scale Spring hook - pull	43	93
Selector Arm Stop Detent Spring Tension	138-55 75765	8 oz. scale Spring hook - pull	41	93

	Tools Required		Page: Sending Station	Page: Receiving Station
Selector Lever Spring Tension	138-58	32 oz. scale	39	92
Shift Detent Spring Tension	2727	25 lb. scale	46	
Single Double Line Feed Detent Spring Pressure	82711	4 lb. scale	47	
Slack Bar Spring Tension	138-55	8 oz. scale		97
Spacing Escapement Pawl Spring Tension	138-58	32 oz. scale	51	97
Spacing Stop Lever Spring Tension	138-58	32 oz. scale	53	98
Stop Lever Spring Tension	138-55	8 oz. scale	43	93
Trip Latch Spring Compression	138-55	8 oz. scale	43	93

Adjustments of Tape Typing Unit

	Tools Required		Page
Armature Lever Pivot Screw Adjustment	75765	Spring hook - pull	71
	95367	5/16"-1/4" wrench	
		Screw driver	
Armature Lever Spring Tension Adjustment	75503	Spring hook - push	74
	138-58	32 oz. scale	
	138-36	3/16"-1/4" wrench	
Carriage Bracket Locating Plate Adjustment		Screw driver	79
Carriage Capstan Nuts Adjustment	96377	.020" gauge	81
	93825	.025" gauge	
	(2) 6617	Tommy	
Carriage Extension Adjustment	89954	1/4" socket wrench	80
Carriage Locking Pawl Post Adjustment	89954	1/4" socket wrench	79
Carriage Locking Toe Adjustment	89954	1/4" socket wrench	79
Figures Stop Screw Adjustment	138-36	3/16"-1/4" wrench	
		Screw driver	79
Function Bar Bracket Plates Adjustments	138-36	3/16"-1/4" wrench	77
Instructions for Removing a Type Bar	75765	Spring hook - pull	
		Screw driver	81
Left Function Pull Bar Spring Bracket Adjustment	138-55	8 oz. scale	84
	138-36	3/16"-1/4" wrench	
Left Tape Guide Adjustment	93822	.004" gauge	79
	96373	.010" gauge	
		Screw driver	
Locking Wedge Adjustment	96360	.006" gauge	73
	96373	.010" gauge	
	138-36	3/16"-1/4" wrench	

	Tools Required		Page
Main Bail Adjusting Screw Adjustment	96373 96391 95367	.010" gauge .050" gauge 5/16"-1/4" wrench Screw driver	78
Main Bail Cam Clutch Torque	138-58	32 oz. scale Screw driver	84
Main Bail Spring Adjustment	95367	5/16"-1/4" wrench Screw driver	84
Main Shaft Adjustment	89954	1/4" socket wrench Screw driver	70
Main Shaft Clutch Throwout Lever Adjustment	96373 96377 138-127	.010" gauge .020" gauge 3/8"-7/16" wrench,	70
Motor Position Adjustment	95367	5/16"-1/4" wrench	71
Pull Bar Guide Adjustment	89955 96371 96377	5/16" socket wrench .008" gauge .020" gauge	78
Ribbon Check Pawl Adjustment		Screw driver Suitable scale	83
Ribbon Check Pawl Spring Pressure	138-55	8 oz. scale Screw driver	83
Ribbon Feed Pawl Adjustment	89954	1/4" socket wrench Screw driver	83
Ribbon Feed Pawl Spring Pressure	138-55	8 oz. scale Screw driver	83
Ribbon Guide Adjustment	96385 96391 138-36	.040" gauge .050" gauge 3/16"-1/4" wrench	81
Ribbon Reverse Pawl Link Adjustment	96375 93825 138-36	.015" gauge .025" gauge 3/16"-1/4" wrench Screw driver	82
Ribbon Reverse Shafts Adjustment	96373 96377 138-36	.010" gauge .020" gauge 3/16"-1/4" wrench Screw driver	82

	Tools Required		Page
Ribbon Reverse Shafts Collar Adjustments	93822	.004" gauge Screw driver	82
Ribbon Spool Cups Adjustments	4838	3/8"-7/16" wrench Suitable scale	82
Ribbon Spool Shafts Spring Compression Adjustment	138-55	8 oz. scale Screw driver	82
Right and Left Ribbon Spool Shaft Gears Adjustment		Screw driver	82
Right Function Pull Bar Spring Bracket Adjustment	138-55 138-36	8 oz. scale 3/16"-1/4" wrench	84
Right Tape Guide Adjustment	96373 96377 138-36	.010" gauge .020" gauge 3/16"-1/4" wrench Screw driver	79
Selector Arm Bracket Adjustment	90783 75765 96385 89954 138-36	Adjusting wrench Spring hook - pull .040" gauge 1/4" socket wrench 3/16"-1/4" wrench Screw driver	72
Selector Arm Operating Screw Adjustment	93833 96360 (2) 138-36	.003" gauge .006" gauge 3/16"-1/4" wrench	75
Selector Arm Pivot Screw Adjustment	75765 96371 96375 89954 95367	Spring hook - pull .008" gauge .015" gauge 1/4" socket wrench 5/16"-1/4" wrench	71
Selector Arm Stop Detent Adjustment	95367	5/16"-1/4" wrench Screw driver	73
Selector Clutch Torque	138-58	32 oz. scale	84

	Tools Required		Page
Selector Magnet Adjustment	89954	1/4" socket wrench	71
	138-36	3/16"-1/4" wrench	
Selector Magnet Bracket Adjustment	89954	1/4" socket wrench	74
	93822	.004" gauge	
	96360	.006" gauge	
	96371	.008" gauge	
	96373	.010" gauge	
	138-36	3/16"-1/4" wrench	
	6617	Tommy	
		Screw driver	
Selector Magnet Bracket Position Adjustment	96393	.060" gauge	73
	96399	.065" gauge	
	89954	1/4" socket wrench	
	90783	Adjusting wrench	
Selector Separator Plates Adjustment	96389	.045" gauge	71
	93827	.055" gauge	
	89954	1/4" socket wrench	
Shift Rocker Adjustment	89954	1/4" socket wrench	81
		Screw driver	
Shift Rocker Lever Post Adjustment	89954	1/4" socket wrench	80
Shift Rocker Post Adjustment	89954	1/4" socket wrench	80
Spacer Detent Adjustment	75503	Spring hook - push	76
	89955	5/16" socket wrench	
	138-36	3/16"-1/4" wrench	
	96356	.002" gauge	
	93828	.012" gauge	
		Screw driver	
Spacer Locking Bail Finger Adjustment	96375	.015" gauge	78
	93825	.025" gauge	
	72574	Holding tool	
	72575	Bending tool	
Spacer Locking Pawl Bracket Adjustment	96385	.040" gauge	78
	96391	.050" gauge	
	89954	1/4" socket wrench	

	Tools Required		Page
Stop Lever Eccentric Screw Adjustment	93822	.004" gauge	75
	96360	.006" gauge	
	89954	1/4" socket wrench	
		Screw driver	
Synchronous Motor Requirements	138-55	8 oz. scale	84
	4841	12 lb. scale	
	75503	Spring hook - push	
		Screw driver	
Tape Chute Adjustments	138-36	3/16"-1/4" wrench	80
Trip-Off Screw Adjustment	96356	.002" gauge	76
	138-36	3/16"-1/4" wrench	
		Screw driver	

Spring Tensions of Tape Typing Unit

Carriage Locking Pawl Spring Tension	138-55	8 oz. scale	80
Carriage Return Spring Tension	138-55	8 oz. scale	80
	75765	Spring hook - pull	
Counter-Balance Spring Tension	138-55	8 oz. scale	80
	75765	Spring hook - pull	
Main Shaft Clutch Spring Tension	138-58	32 oz. scale	70
Main Shaft Clutch Throwout Lever Spring Tension	138-55	8 oz. scale	70
Pull Bar Spring Tension	138-55	8 oz. scale	77
	75765	Spring hook - pull	
Ribbon Check Pawl Spring Pressure	138-55	8 oz. scale	83
Ribbon Feed Lever Spring Tension	138-58	32 oz. scale	77
Ribbon Feed Pawl Spring Pressure	138-55	8 oz. scale	83
Ribbon Feed Shaft Detent Plunger Spring Compression	4841	12 lb. scale	83
		Screw driver	

	Tools Required		Page
Ribbon Feed Shaft Safety Spring Compression	4841	12 lb. scale	83
Ribbon Spool Shafts Spring Compression Adjustment	138-55	8 oz. scale Screw driver	82
Right and Left Ribbon Reverse Pawls Spring Tension	138-55	8 oz. scale	84
Selector Arm Locking Lever Spring Tension	138-55	8 oz. scale	73
Selector Arm Spring Tension	138-55 75765	8 oz. scale Spring hook - pull	75
Selector Arm Stop Detent Spring Tension	138-55 75765	8 oz. scale Spring hook - pull	73
Selector Lever Spring Tension	138-58 75765	32 oz. scale Spring hook - pull	73
Spacer Detent Lever Spring Tension	4841	12 lb. scale	76
Spacer Feed Pawl Spring Tension	138-55	8 oz. scale	77
Spacer Locking Bail Spring Tension	138-55	8 oz. scale	77
Spacer Locking Pawl Spring Tension	138-55	8 oz. scale	79
Spacer Operating Lever Spring Tension	4841	12 lb. scale	77
Stop Lever Spring Tension	138-55	8 oz. scale	75
Tape Feed Roll Spring Tension	138-55	8 oz. scale	80
Trip Latch Spring Compression	138-55	8 oz. scale	75

Adjustments of Projector Frame

	Tools Required		Page
Carriage Frame Typing Unit Support Plate Adjustment	95367	5/16"-1/4" wrench Screw driver	103
Condenser Lens Frame Stop Screws Adjustment	4838	3/8"-7/16" wrench Screw driver	103
Counter-Ballast Dashpot Plunger Adjustment	138-36	3/16"-1/4" wrench	104
Counter-Ballast Dashpot Vent Screw Adjustment	4838	3/8"-7/16" wrench Screw driver	103
Counter-Ballast Draw Straps Adjustment	89954 89955 138-36	1/4" socket wrench 5/16" socket wrench 3/16"-1/4" wrench	103
Counter-Ballast Return Spring Adjustment	89955 82711	5/16" socket wrench 4 lb. scale	103
Large Mirror Adjustment (Left-Hand Margin Width)	4838	3/8"-7/16 wrench	106
Motor Position Adjustment	138-127	3/8"-7/16" wrench	104
Objective Lens - Preliminary Adjustment			106
Objective Lens - Final Adjustment			106
Projector Frame Tracks Adjustment	87697	1/2"-3/4" wrench	106
Projector Lamp Focusing Adjustment	4838 95367	3/8"-7/16" wrench 5/16"-1/4" wrench Screw driver	105
Projector Lamp Reflector Focusing Adjustment	95367	5/16"-1/4" wrench Screw driver	106
Projector Lamp Socket Adjustment	4838	3/8"-7/16" wrench	105
Refinement of Dashpot Vent Screw Adjustment	95367	5/16"-1/4" wrench Screw driver	104

	Tools Required		Page
Refinement of Projector Lamp Focusing Adjustment	4838 95367	3/8"-7/16" wrench 5/16"-1/4" wrench Screw driver	107
Slide Carrier Collars Adjustment		Screw driver	107
Small Mirror Adjustment			106
Web Rewind Spindle Friction Clutch Adjustment	87697 76280 138-58	1/2"-3/4" wrench Capstan wrench 32 oz. scale	104
Web Shift Detent Adjustment	95367	5/16"-1/4" wrench (2) Screw driver	104

Spring Tensions of Projector Frame

Counter-Ballast Dashpot Lever Spring Tension	75765 138-58	Spring hook - pull 32 oz. scale	104
Upper Web Roller Bracket Spring Tension	138-58	32 oz. scale	105
Web Shift Detent Spring Tension	4841	12 lb. scale	105

Adjustments of Projector Cabinet

	Tools Required		Page
Control Relay Adjustments	138-55	8 oz. scale	109
	138-58	32 oz. scale	
	93811	.030" gauge	
	96385	.040" gauge	
		Pliers	
Projector Frame Tracks Adjustment	87697	1/2"-3/4" wrench	109

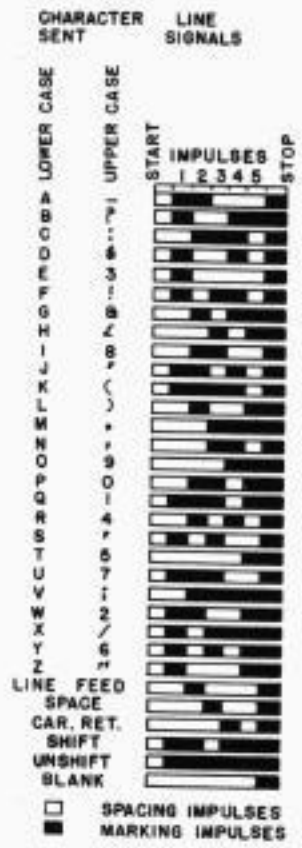


FIGURE 1

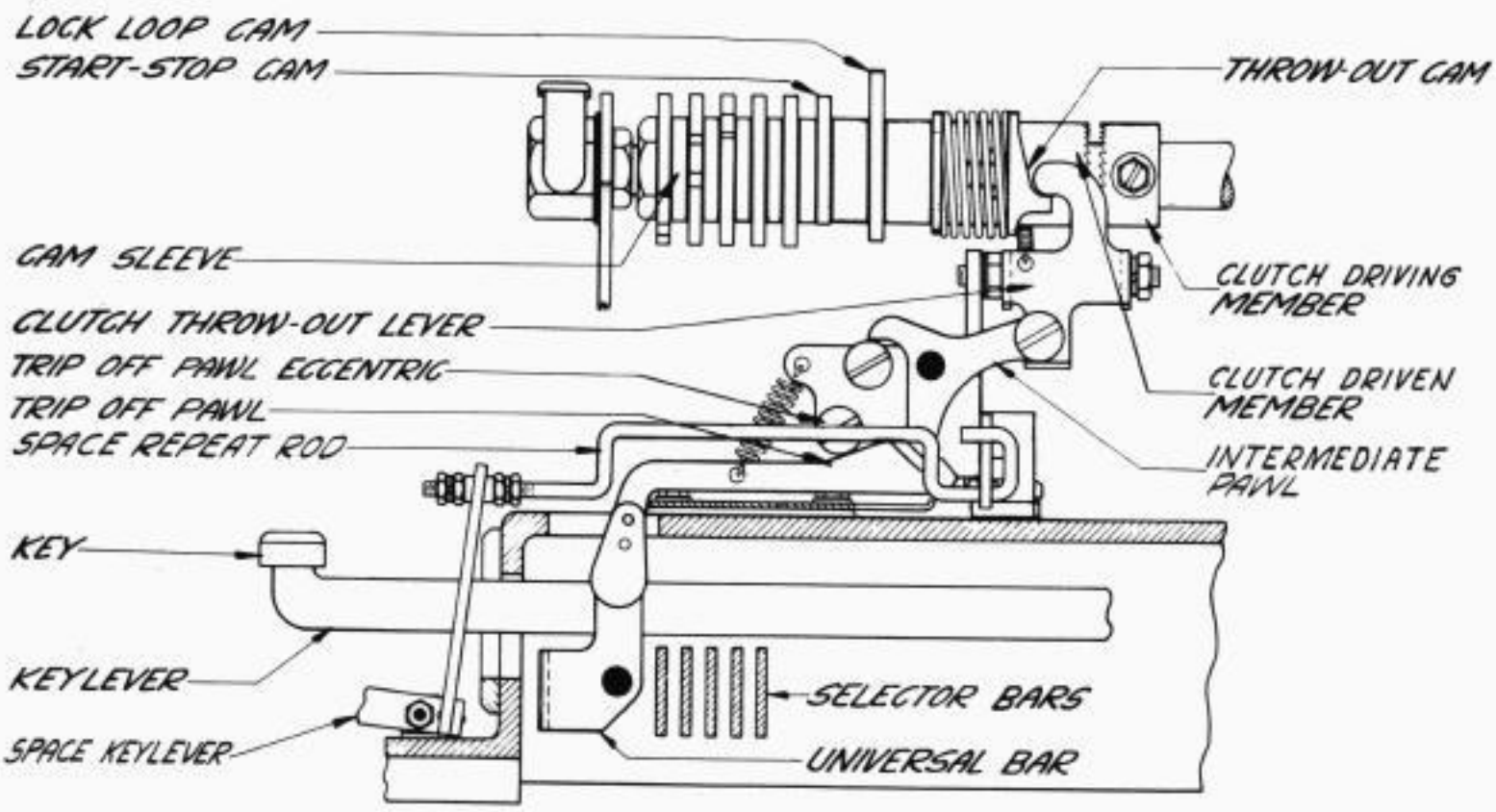


FIGURE 2

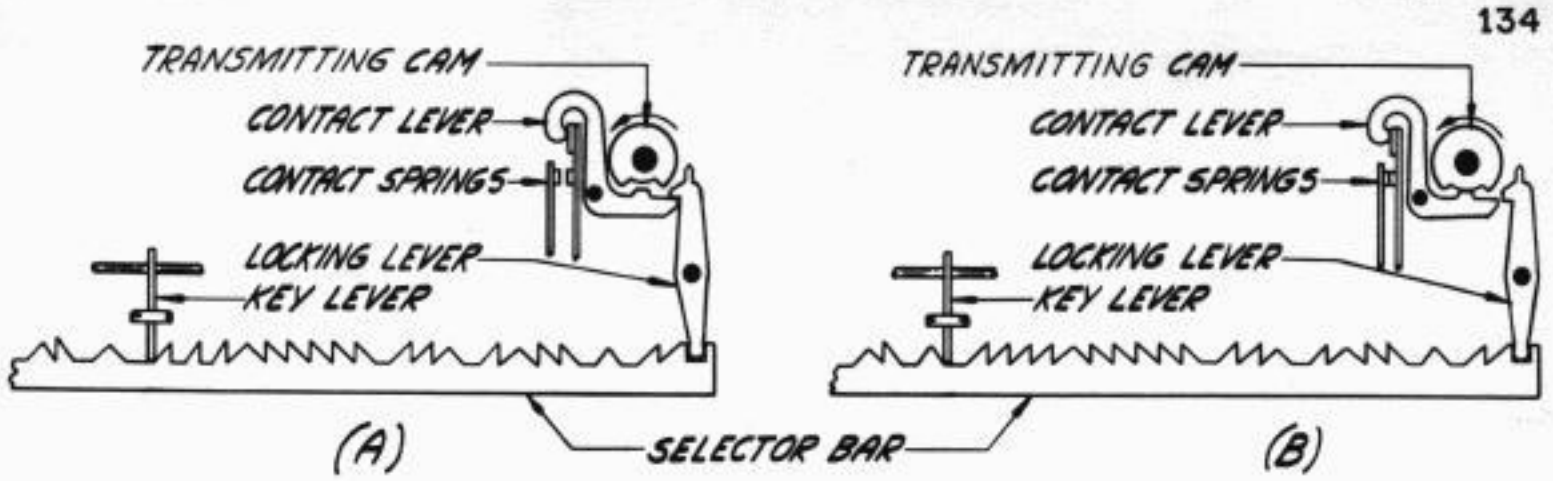
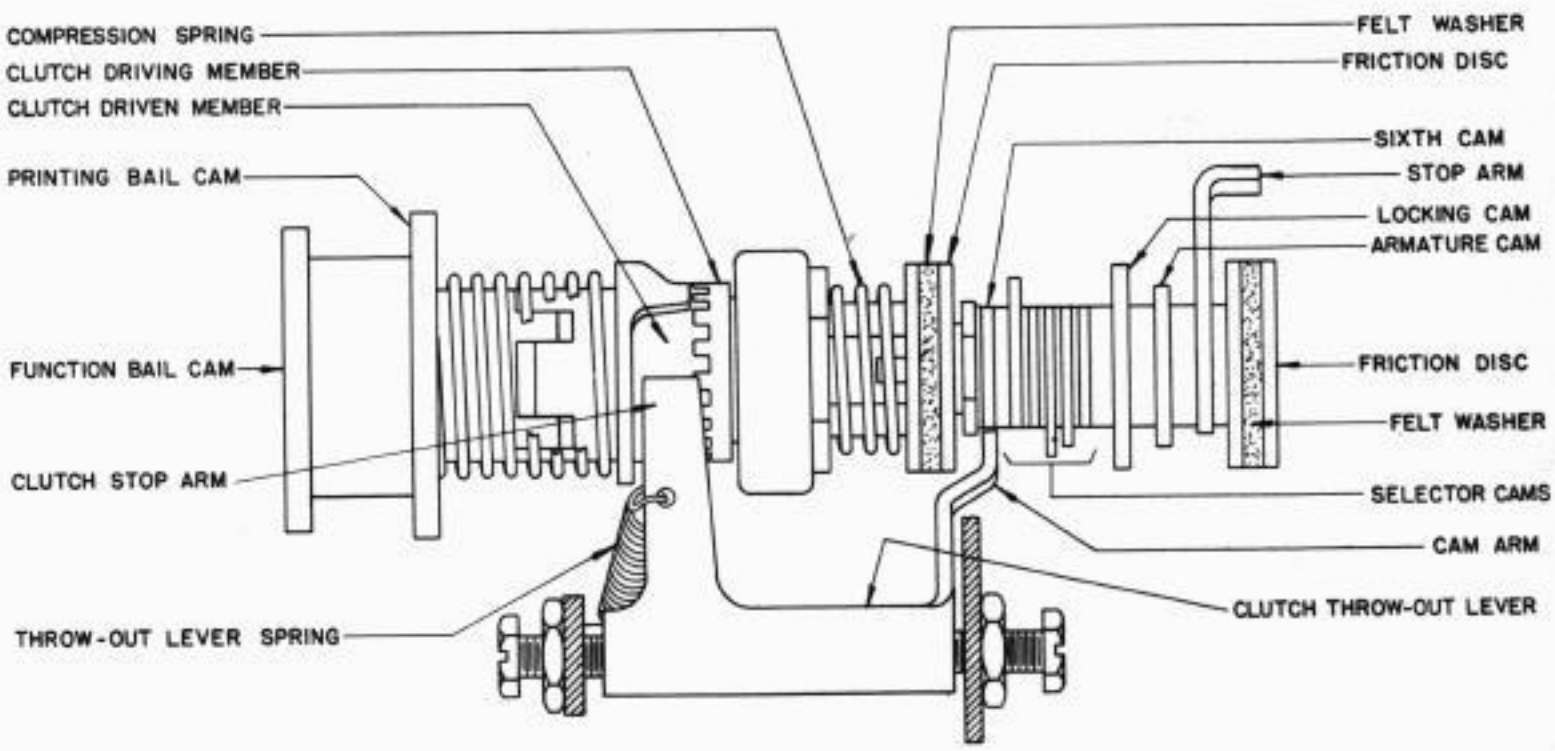


FIGURE 3



REAR VIEW

FIGURE 4

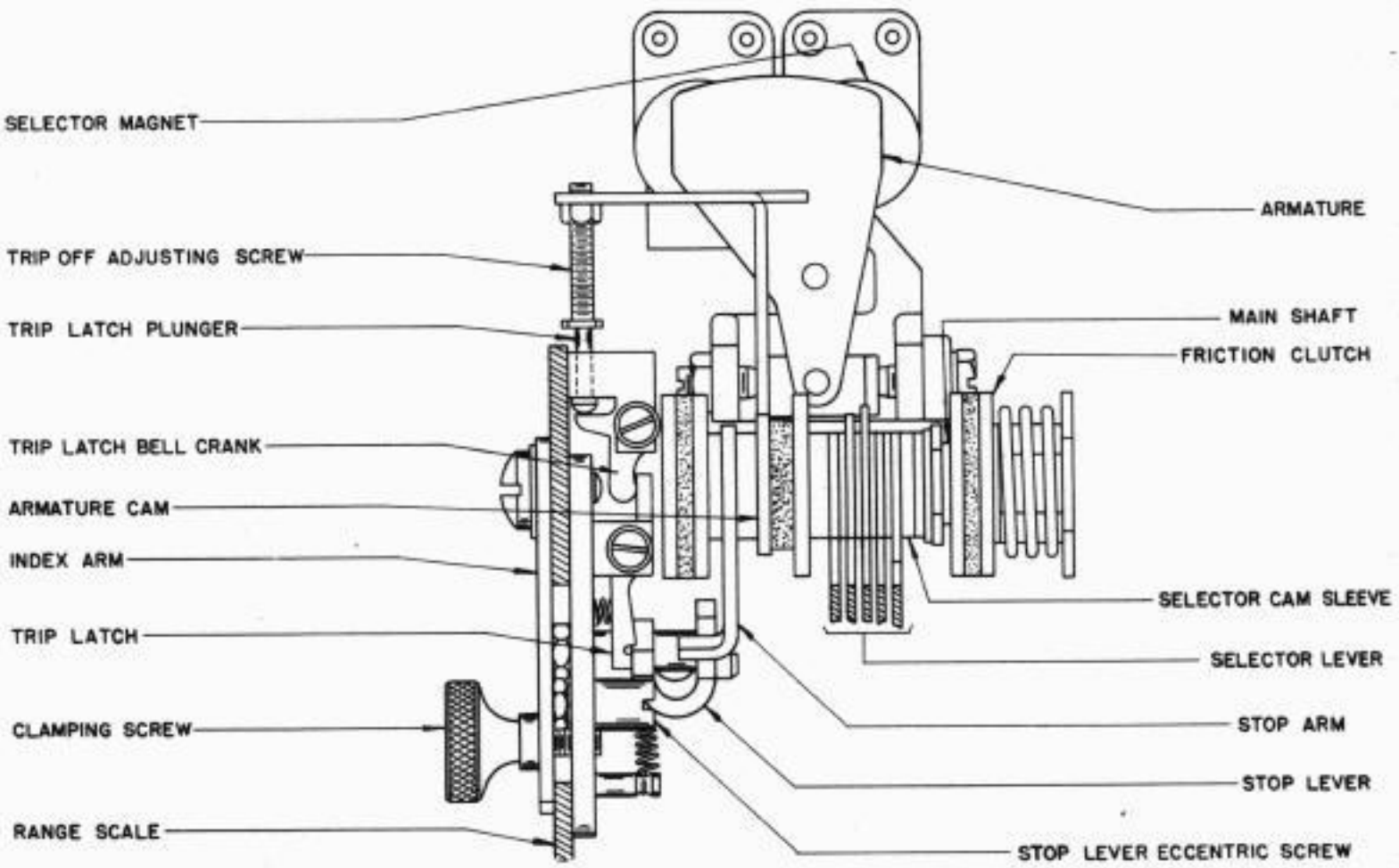


FIGURE 5

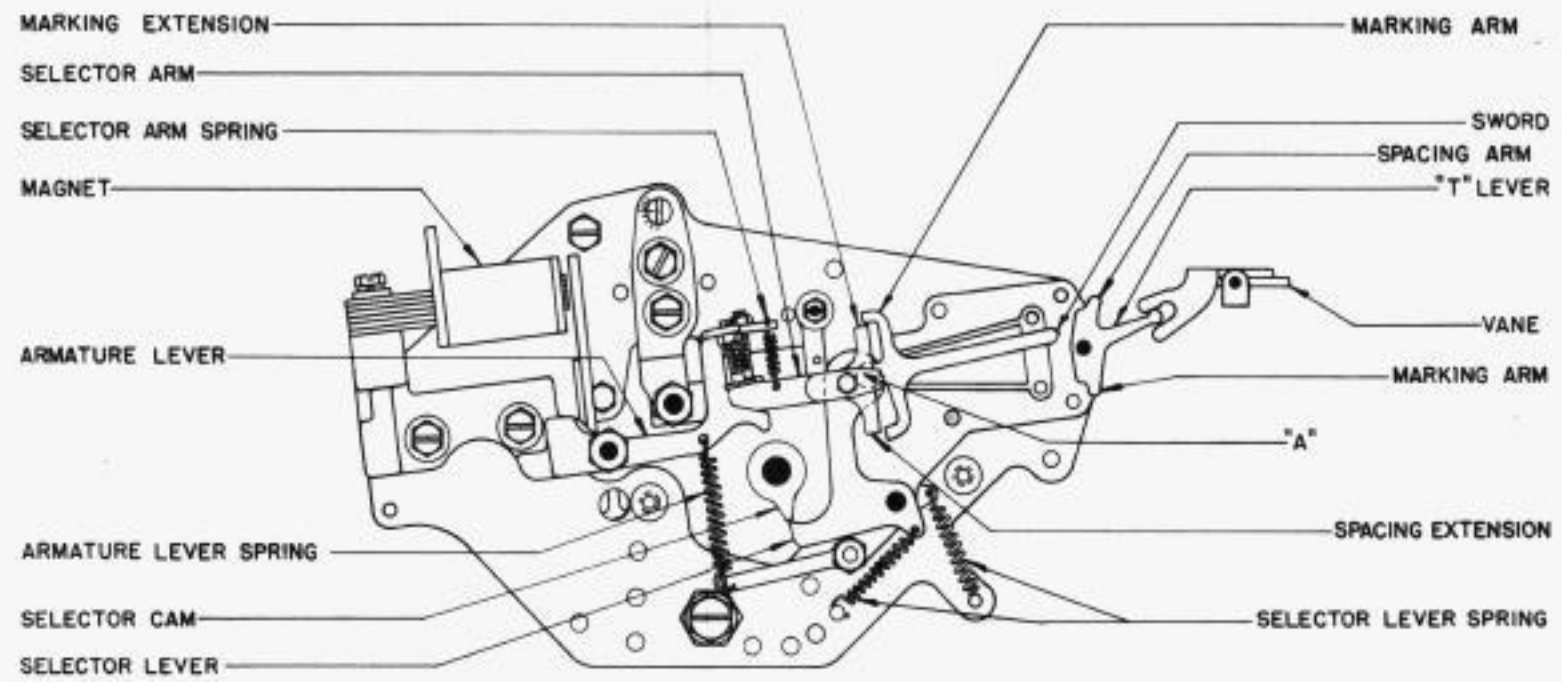


FIGURE 6

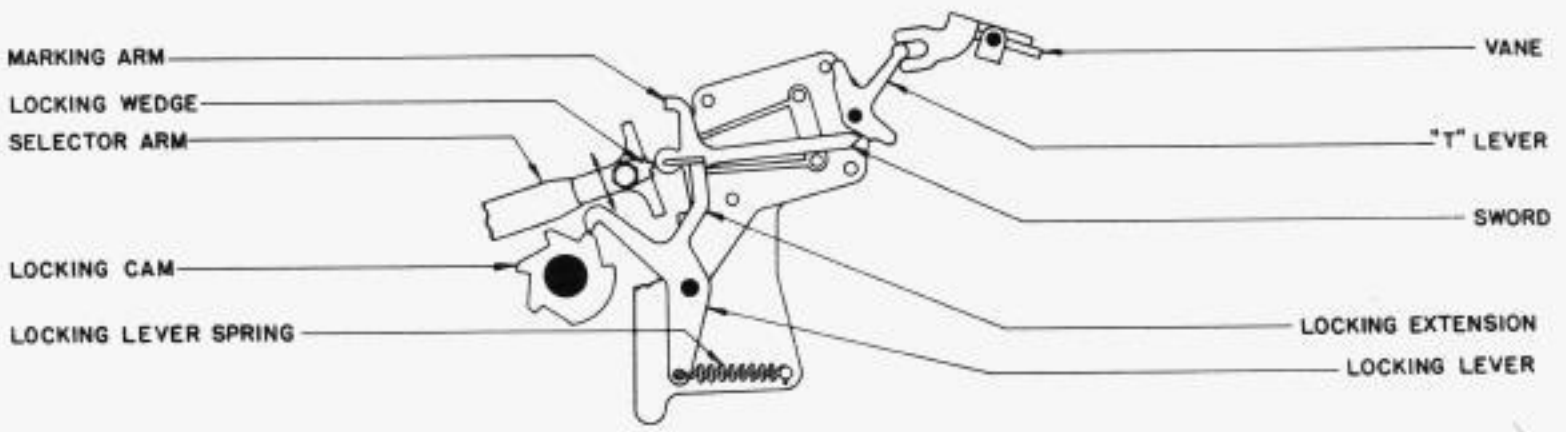


FIGURE 7

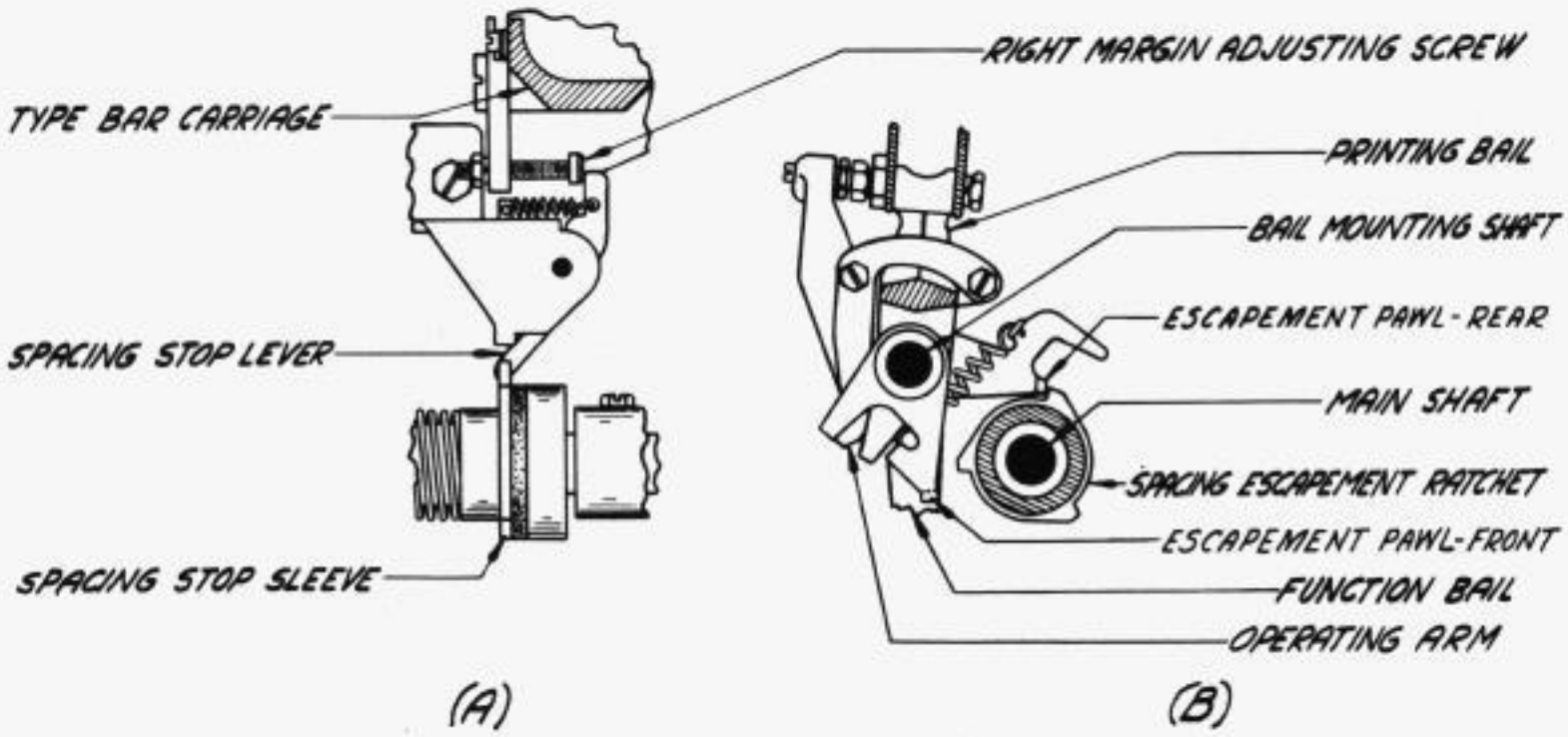


FIGURE 8

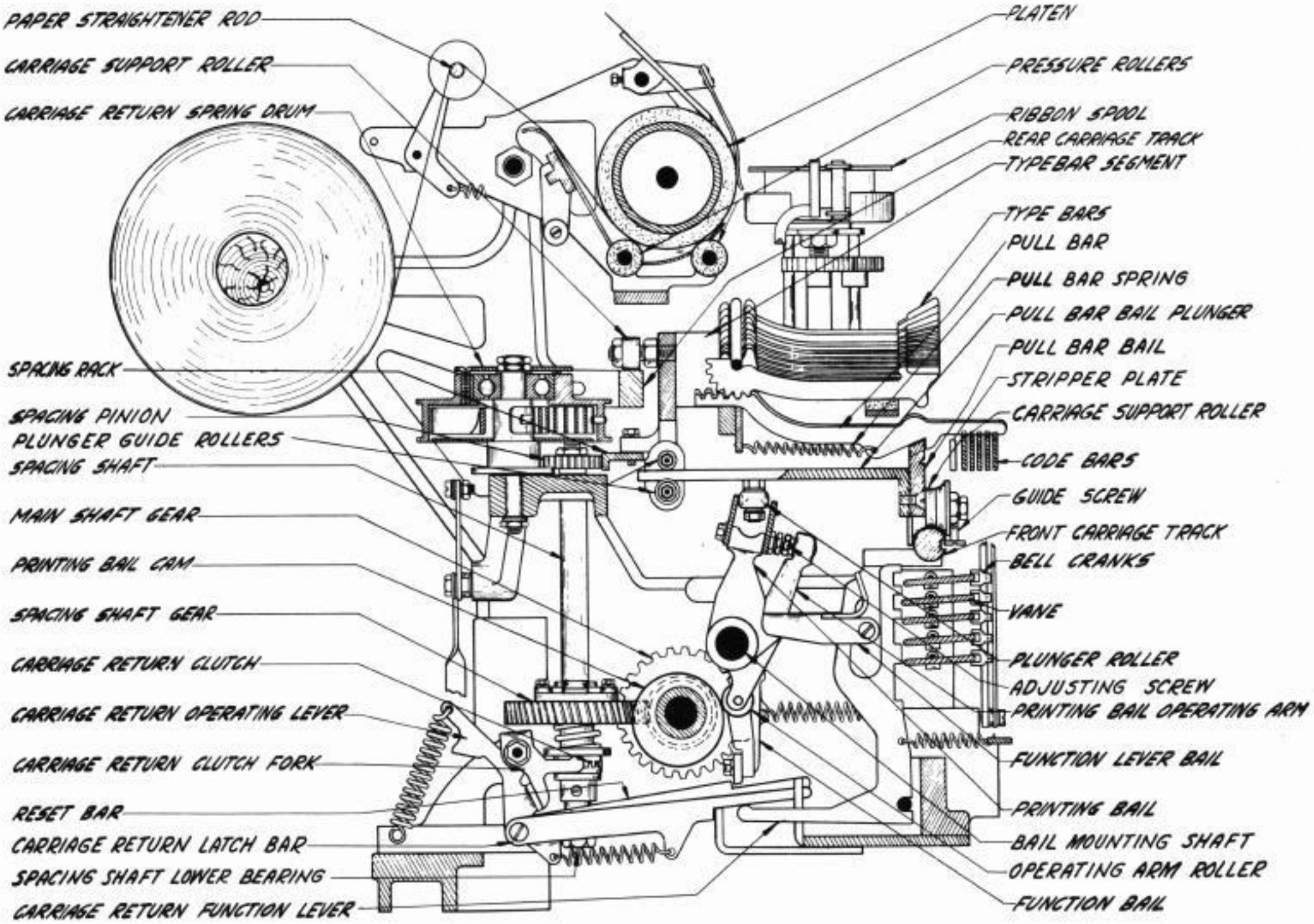

PAPER STRAIGHTENER ROD
CARRIAGE SUPPORT ROLLER
CARRIAGE RETURN SPRING DRUM
SPACING RACK
SPACING PINION
PLUNGER GUIDE ROLLERS
SPACING SHAFT
MAIN SHAFT GEAR
PRINTING BAIL CAM
SPACING SHAFT GEAR
CARRIAGE RETURN CLUTCH
CARRIAGE RETURN OPERATING LEVER
CARRIAGE RETURN CLUTCH FORK
RESET BAR
CARRIAGE RETURN LATCH BAR
SPACING SHAFT LOWER BEARING
CARRIAGE RETURN FUNCTION LEVER
PLATEN
PRESSURE ROLLERS
RIBBON SPOOL
REAR CARRIAGE TRACK
TYPEBAR SEGMENT
TYPE BARS
PULL BAR
PULL BAR SPRING
PULL BAR BAIL PLUNGER
PULL BAR BAIL
STRIPPER PLATE
CARRIAGE SUPPORT ROLLER
CODE BARS
GUIDE SCREW
FRONT CARRIAGE TRACK
BELL CRANKS
VANE
PLUNGER ROLLER
ADJUSTING SCREW
PRINTING BAIL OPERATING ARM
FUNCTION LEVER BAIL
PRINTING BAIL
BAIL MOUNTING SHAFT
OPERATING ARM ROLLER
FUNCTION BAIL

FIGURE 9

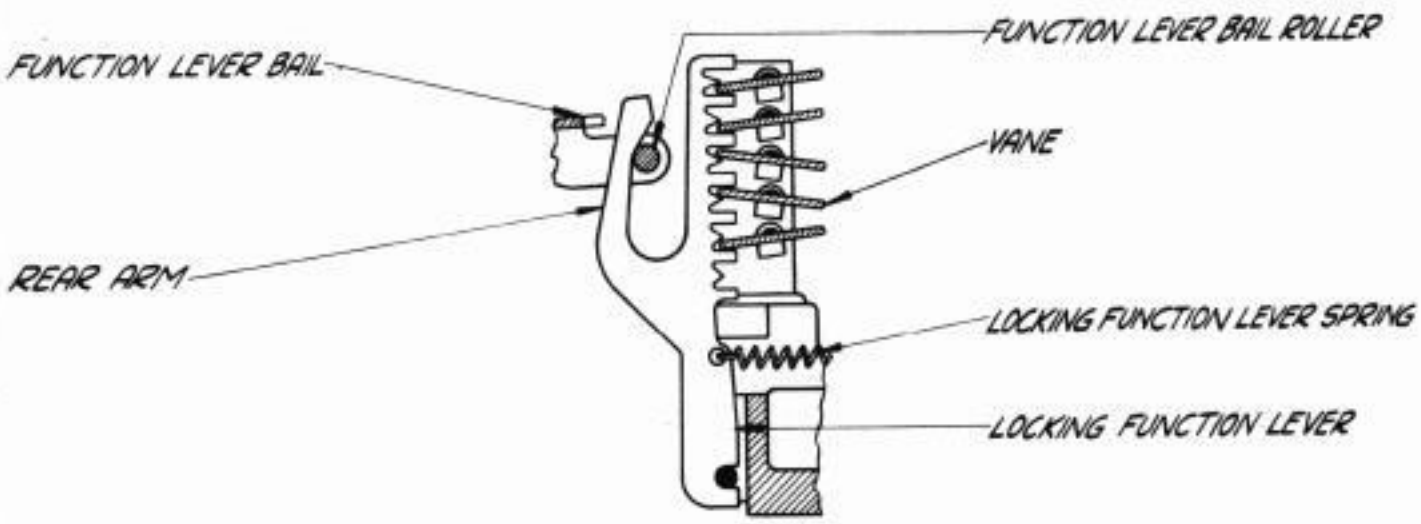


FIGURE 10

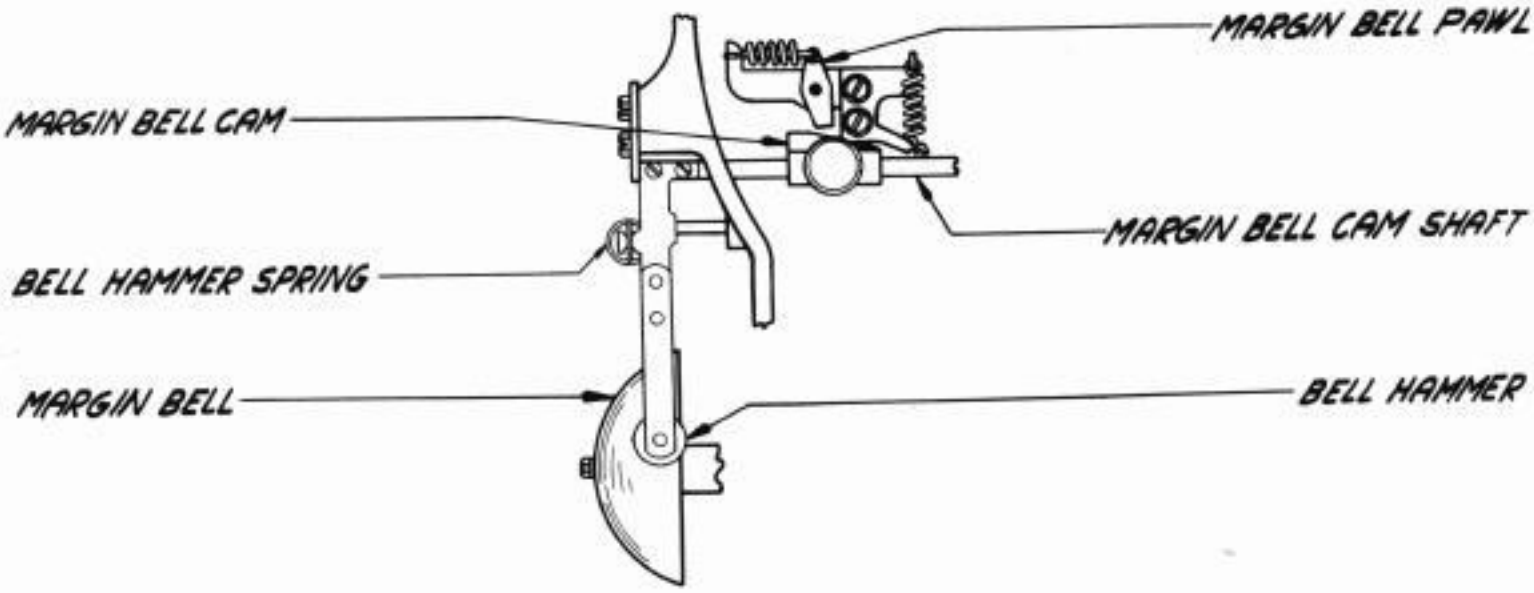


FIGURE 11

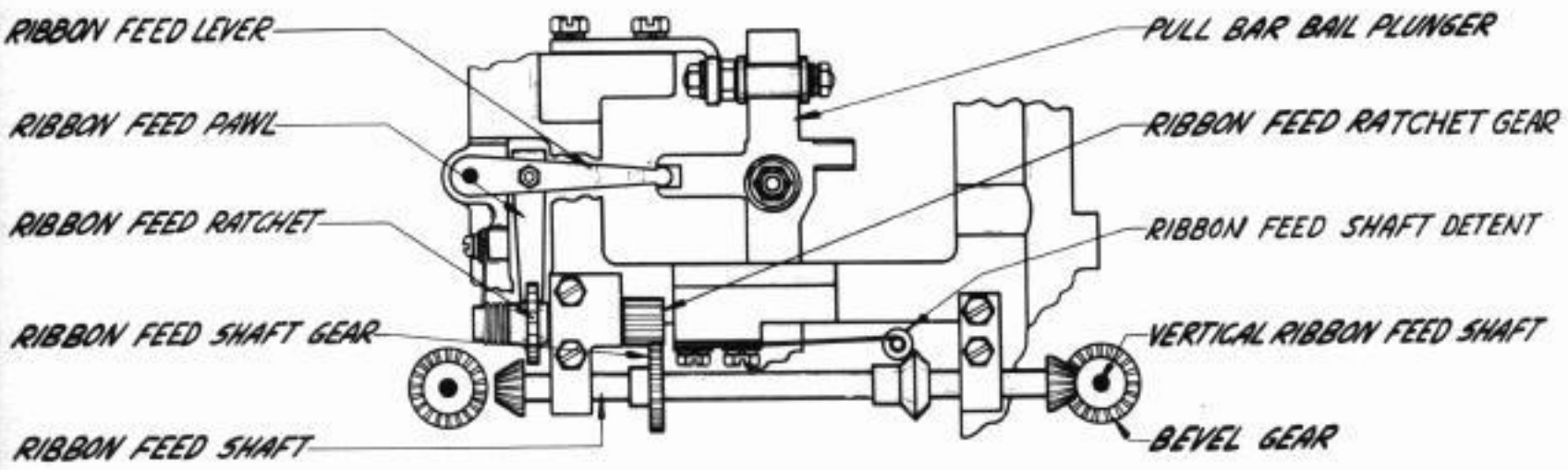


FIGURE 12

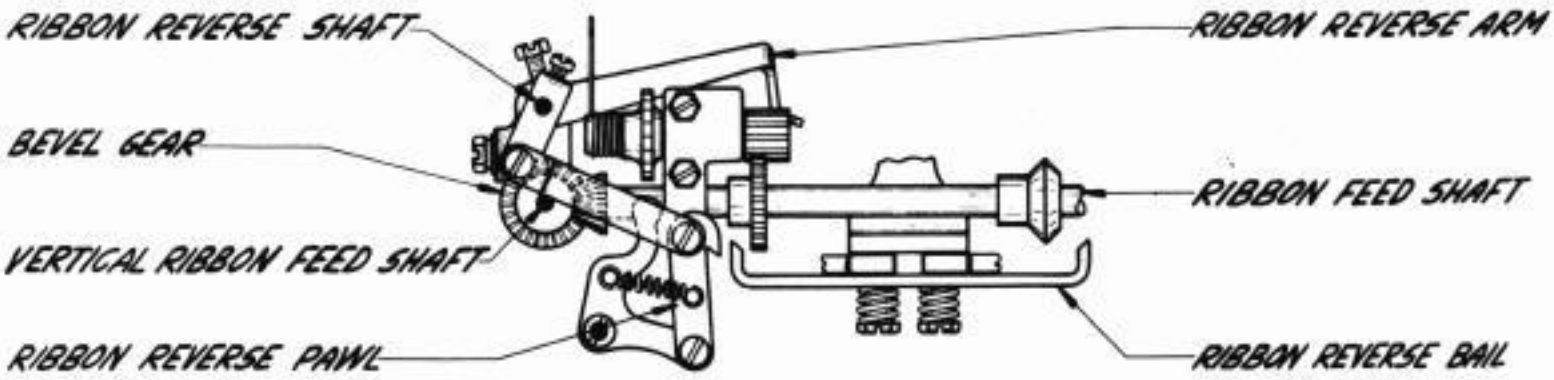


FIGURE 13

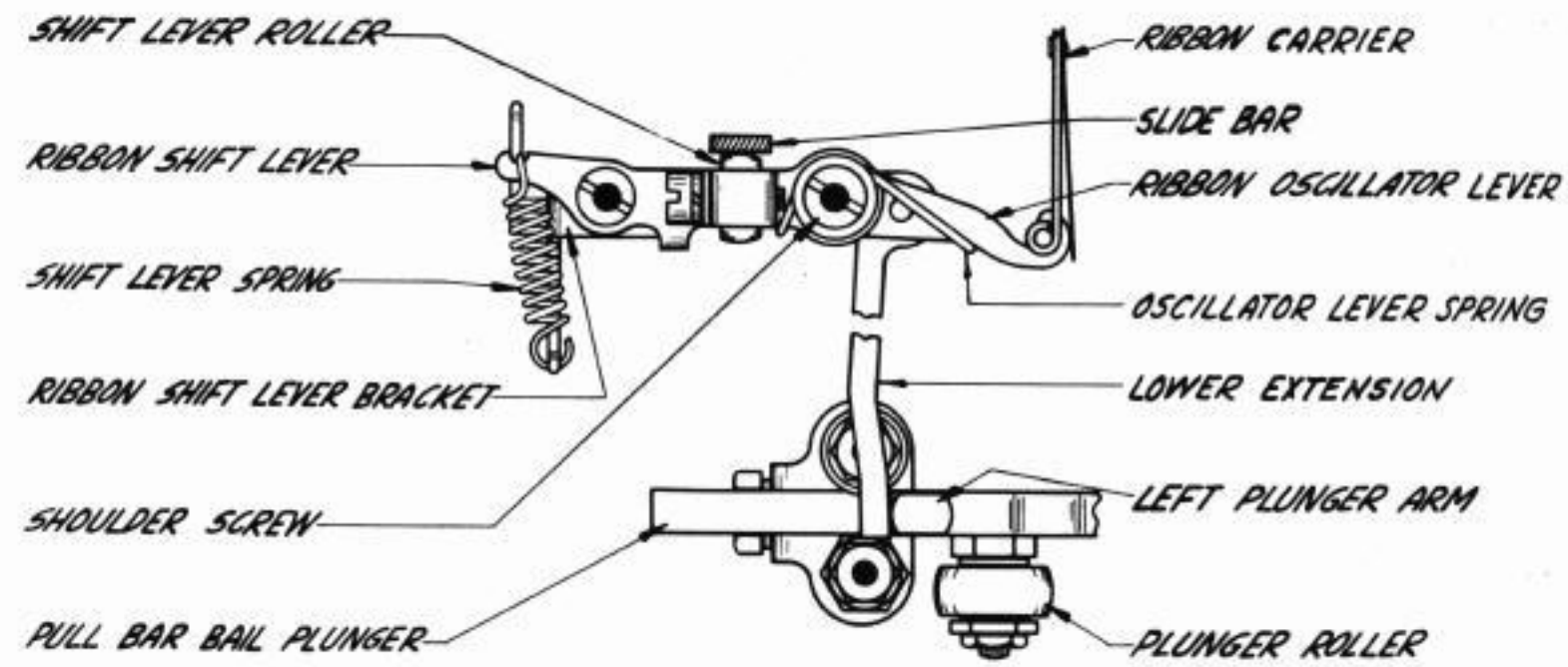


FIGURE 14

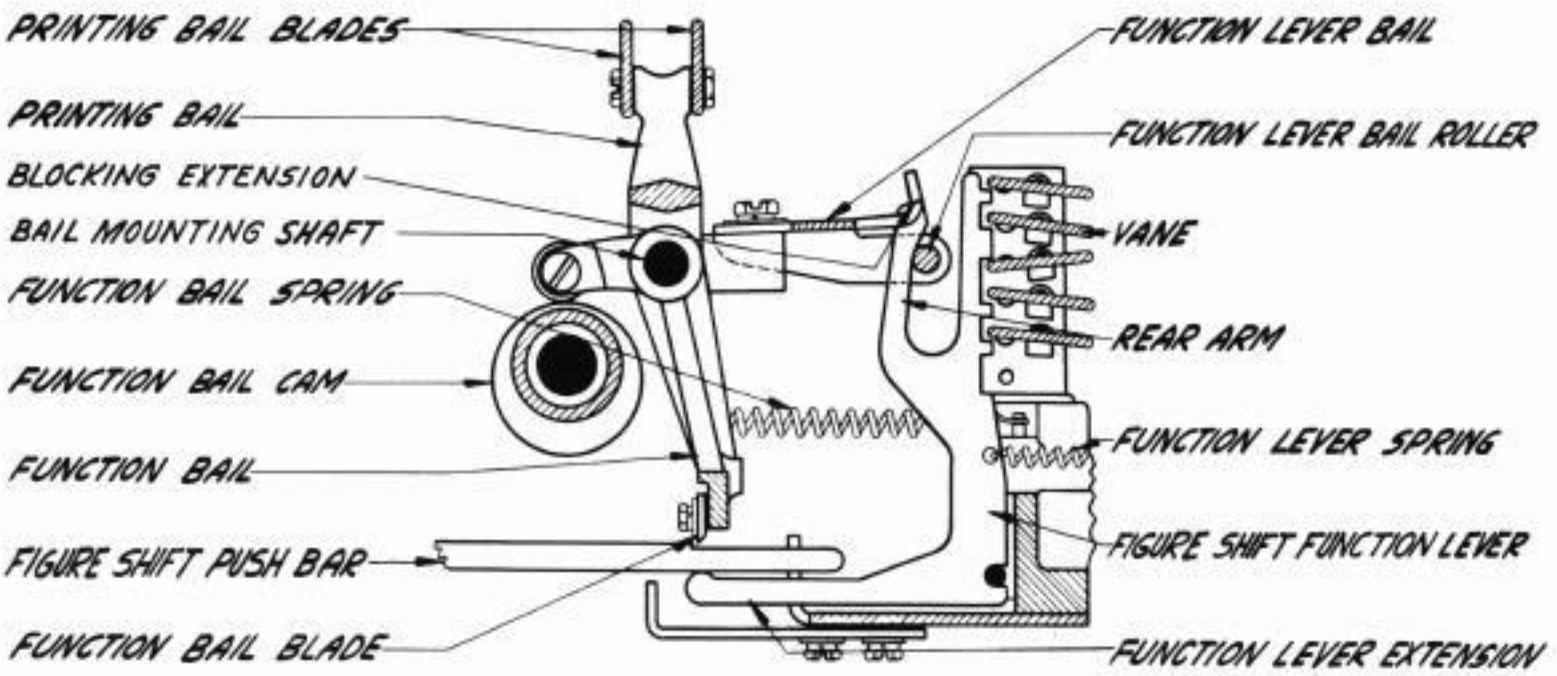


FIGURE 15

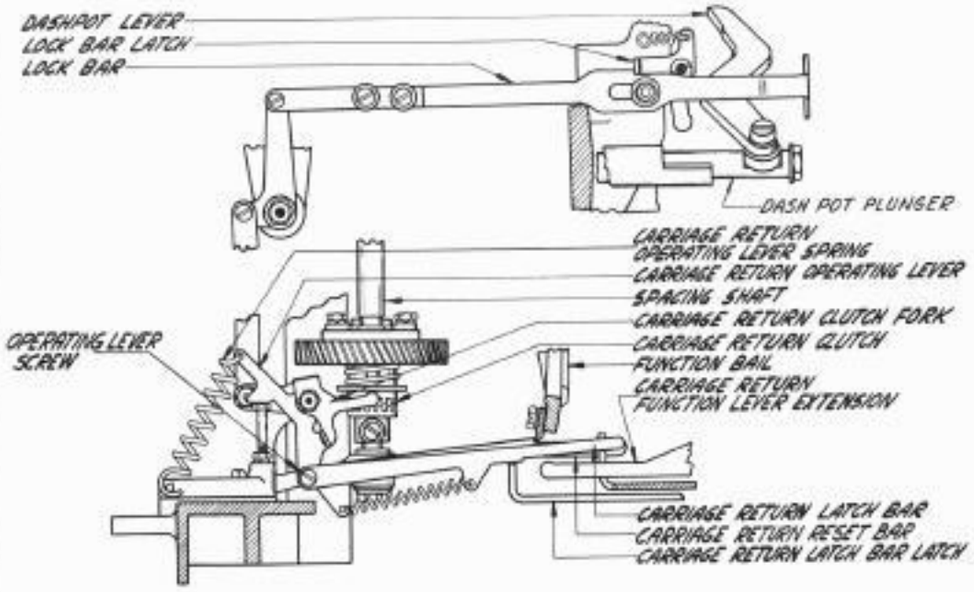


FIGURE 16

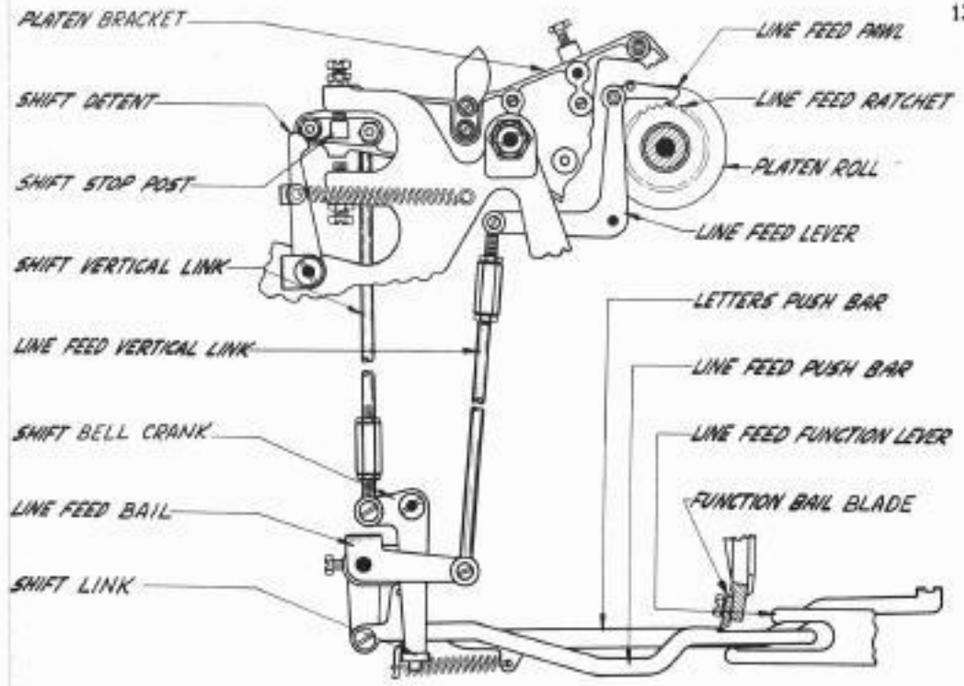


FIGURE 17

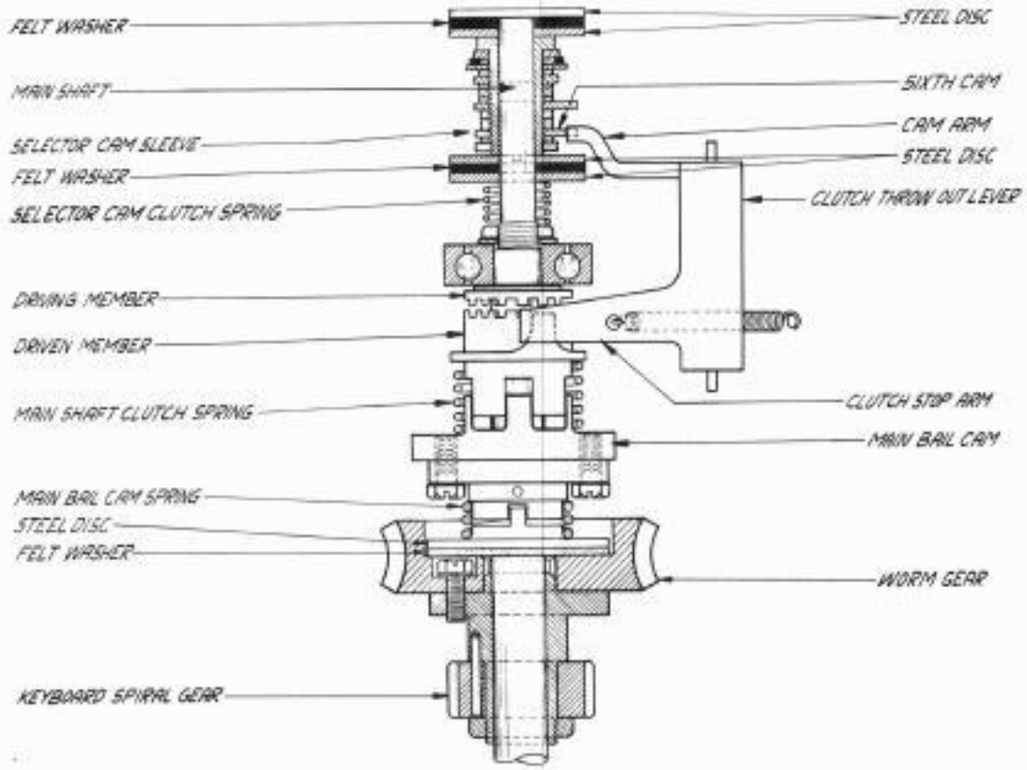


FIGURE 18

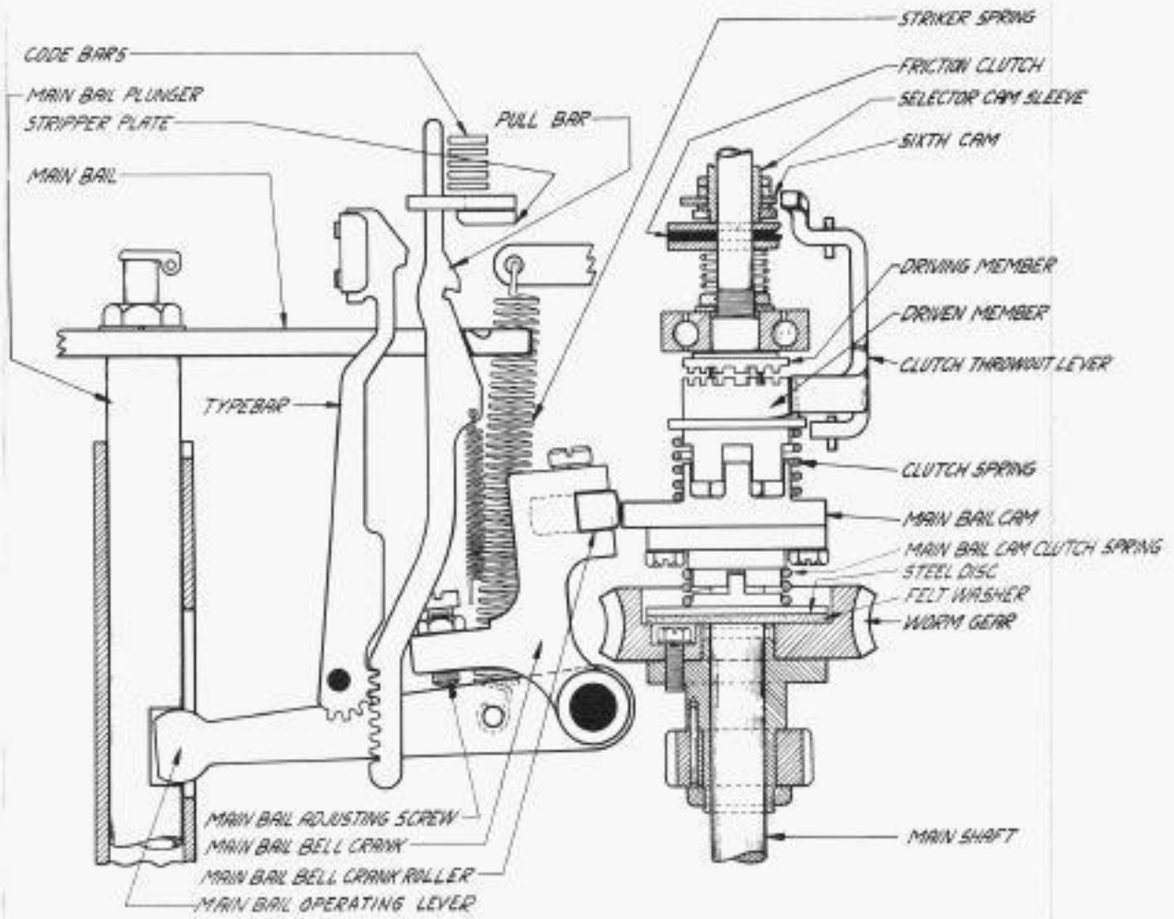


FIGURE 19

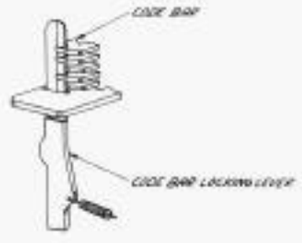


FIGURE 20

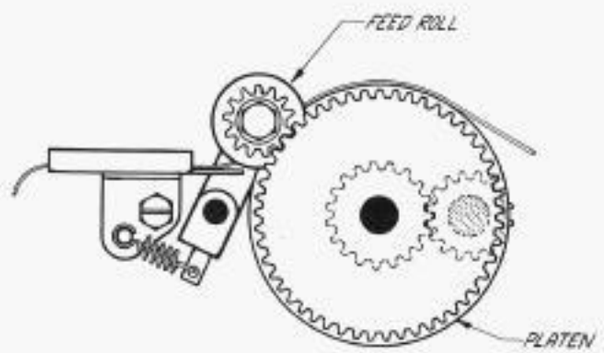


FIGURE 21

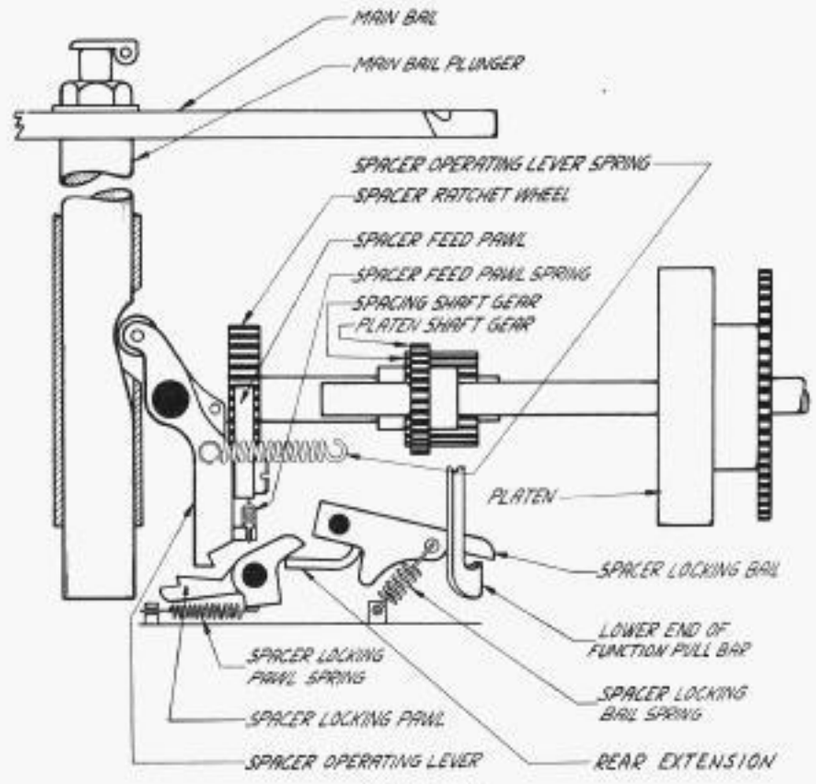


FIGURE 22

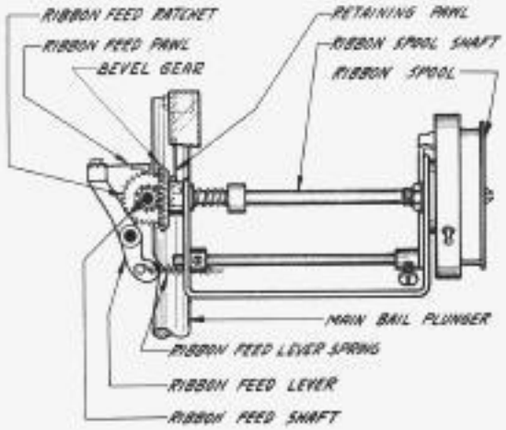


FIGURE 23

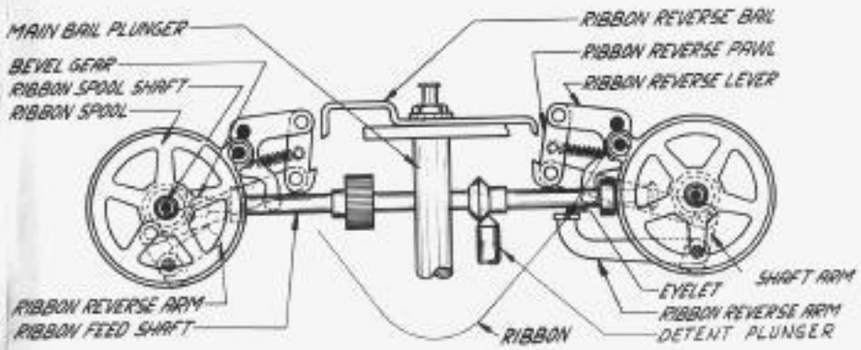


FIGURE 24

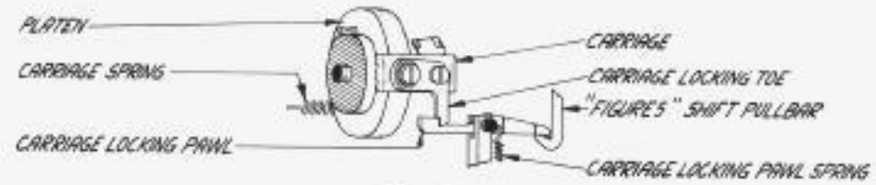


FIGURE 25

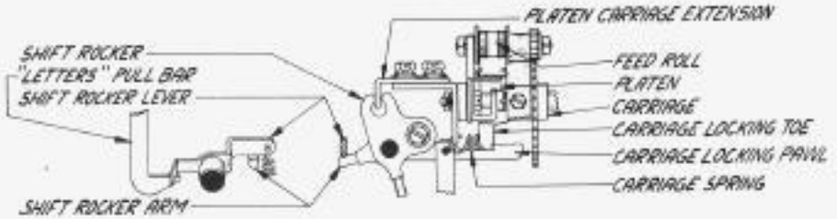


FIGURE 26

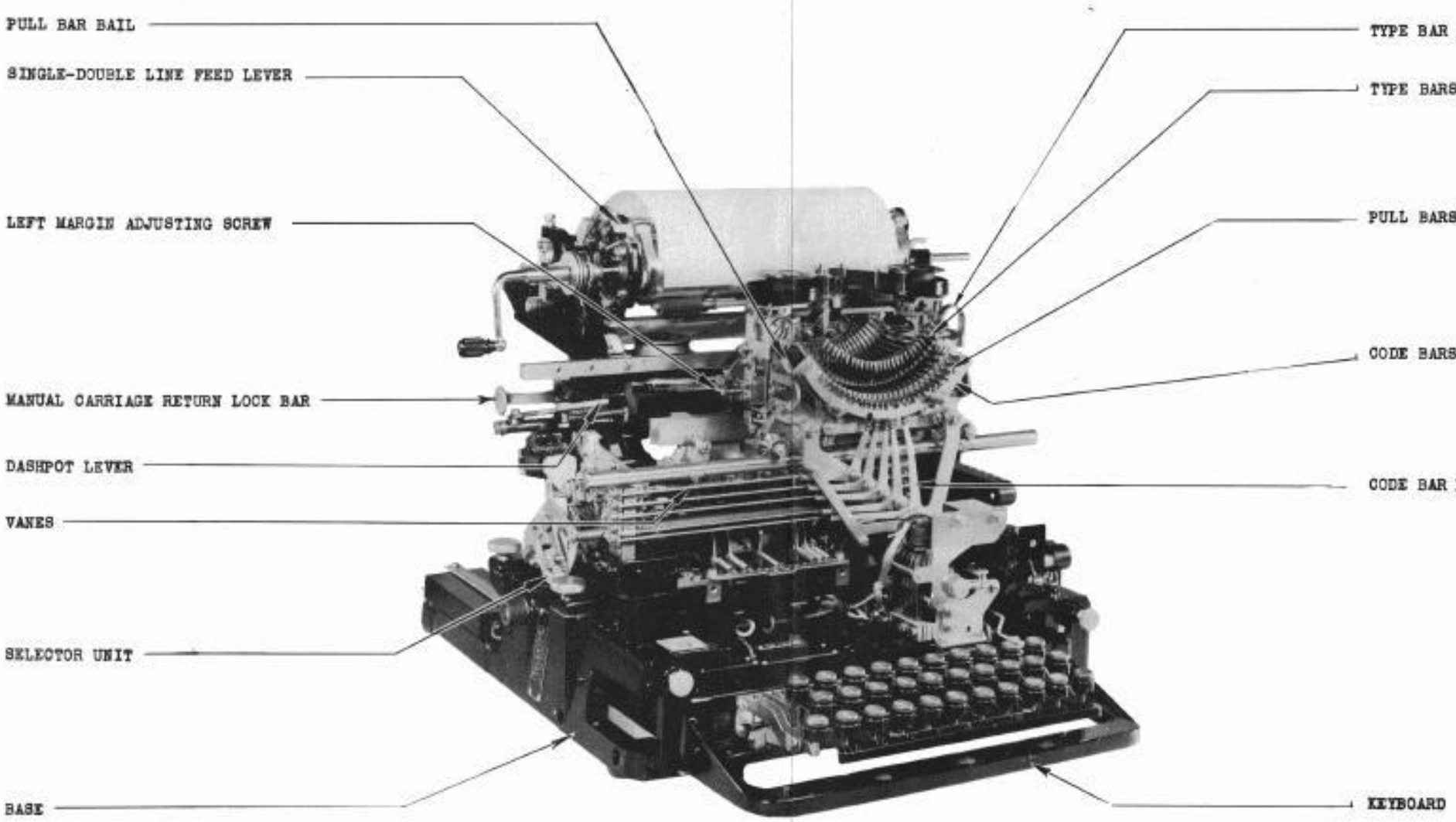


FIGURE 27– PAGE PRINTER– SENDING STATION

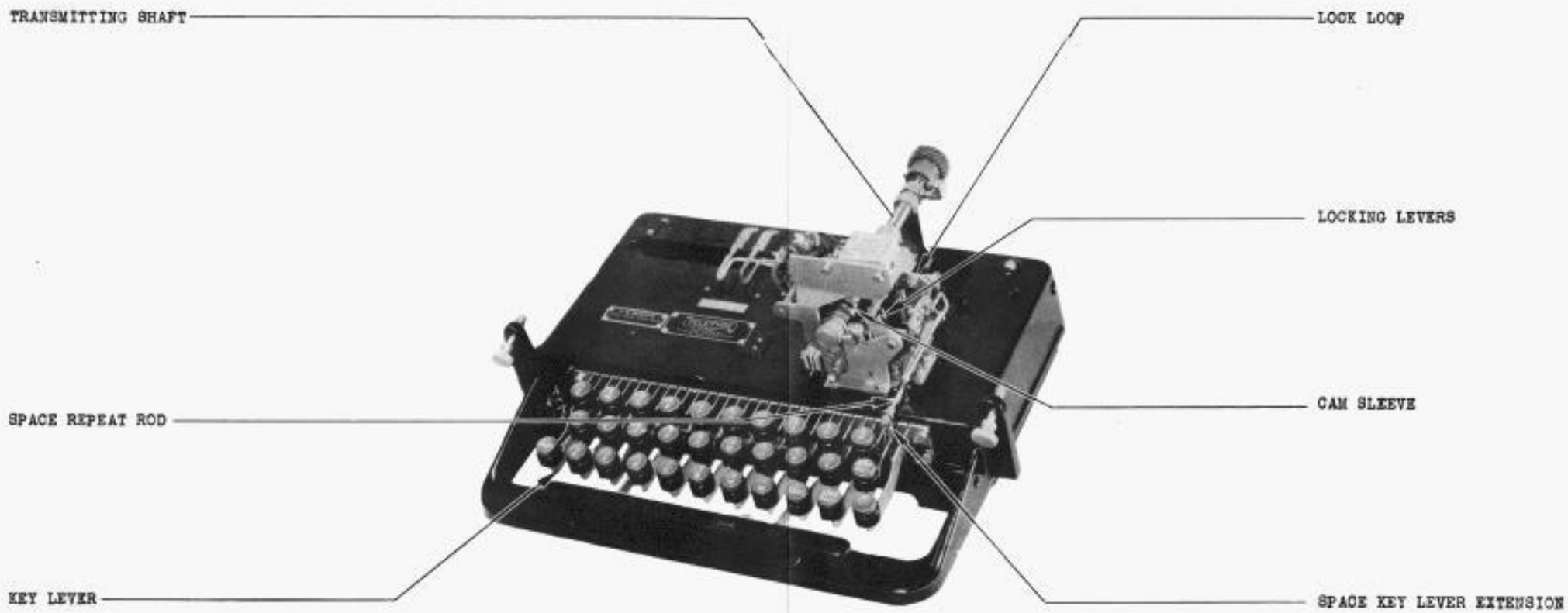


FIGURE 28- TRANSMITTING KEYBOARD

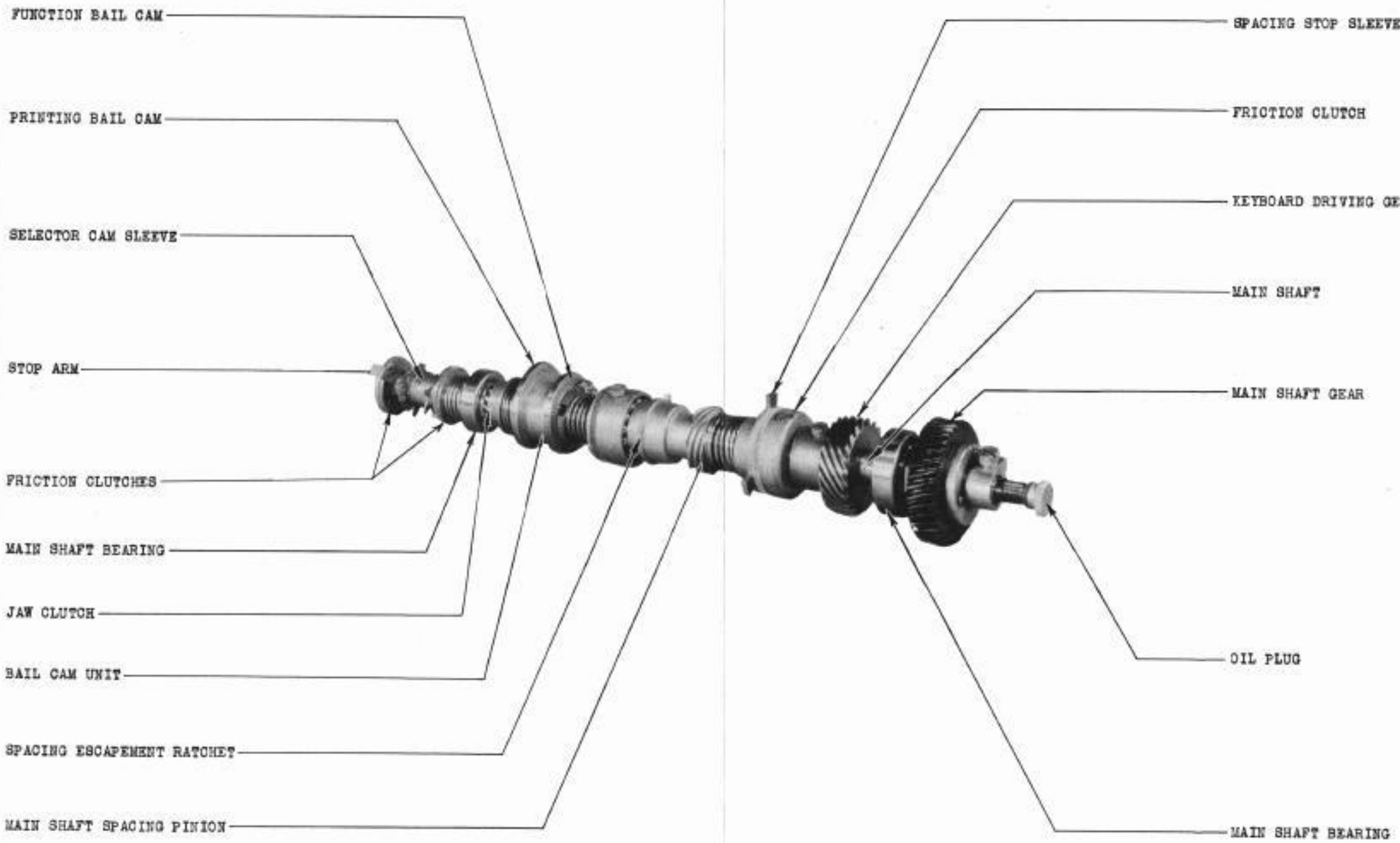


FIGURE 29—MAIN SHAFT—PAGE TYPING UNIT

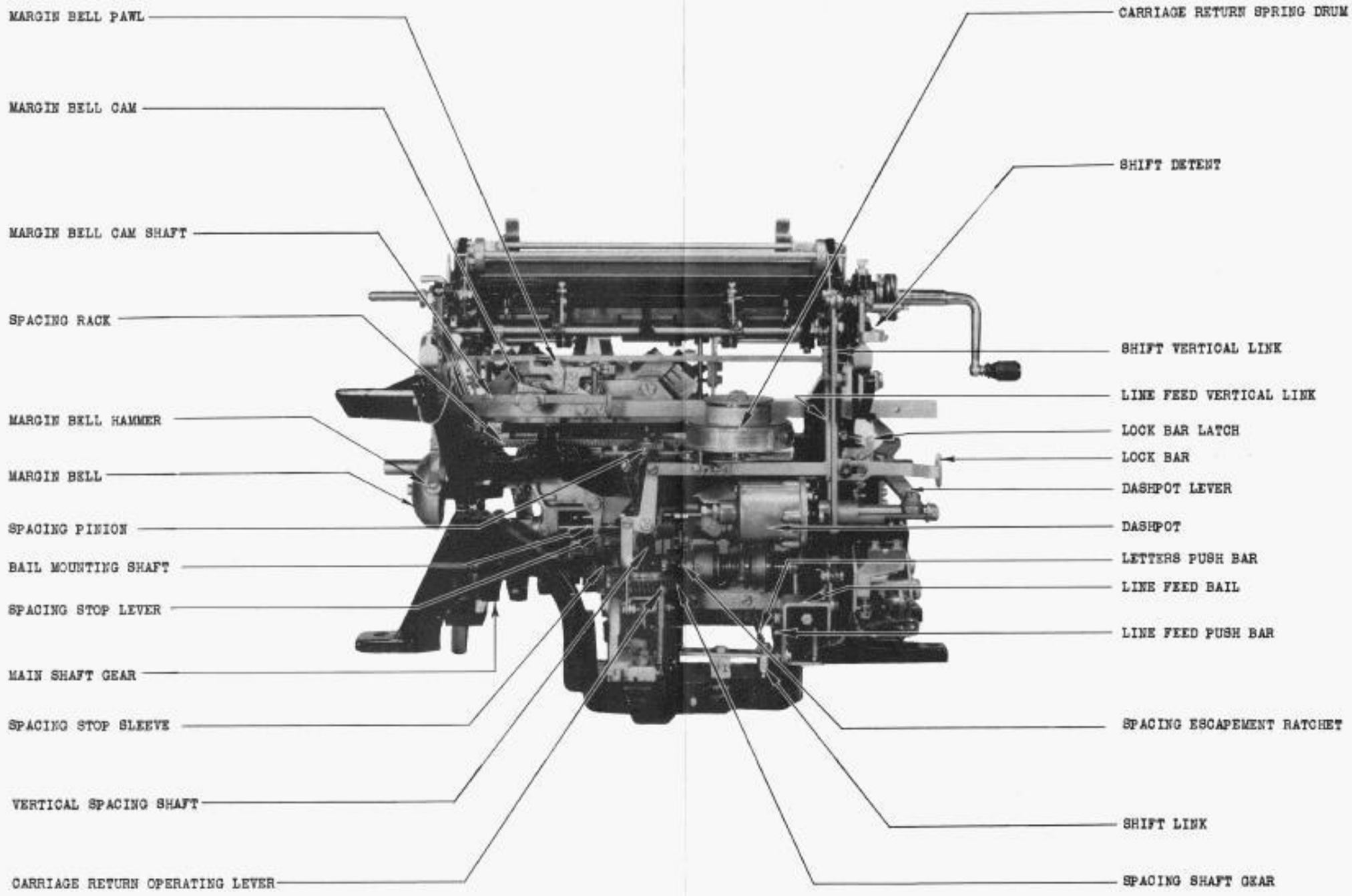


FIGURE 30- PAGE TYPING UNIT- SENDING STATION
(REAR VIEW)

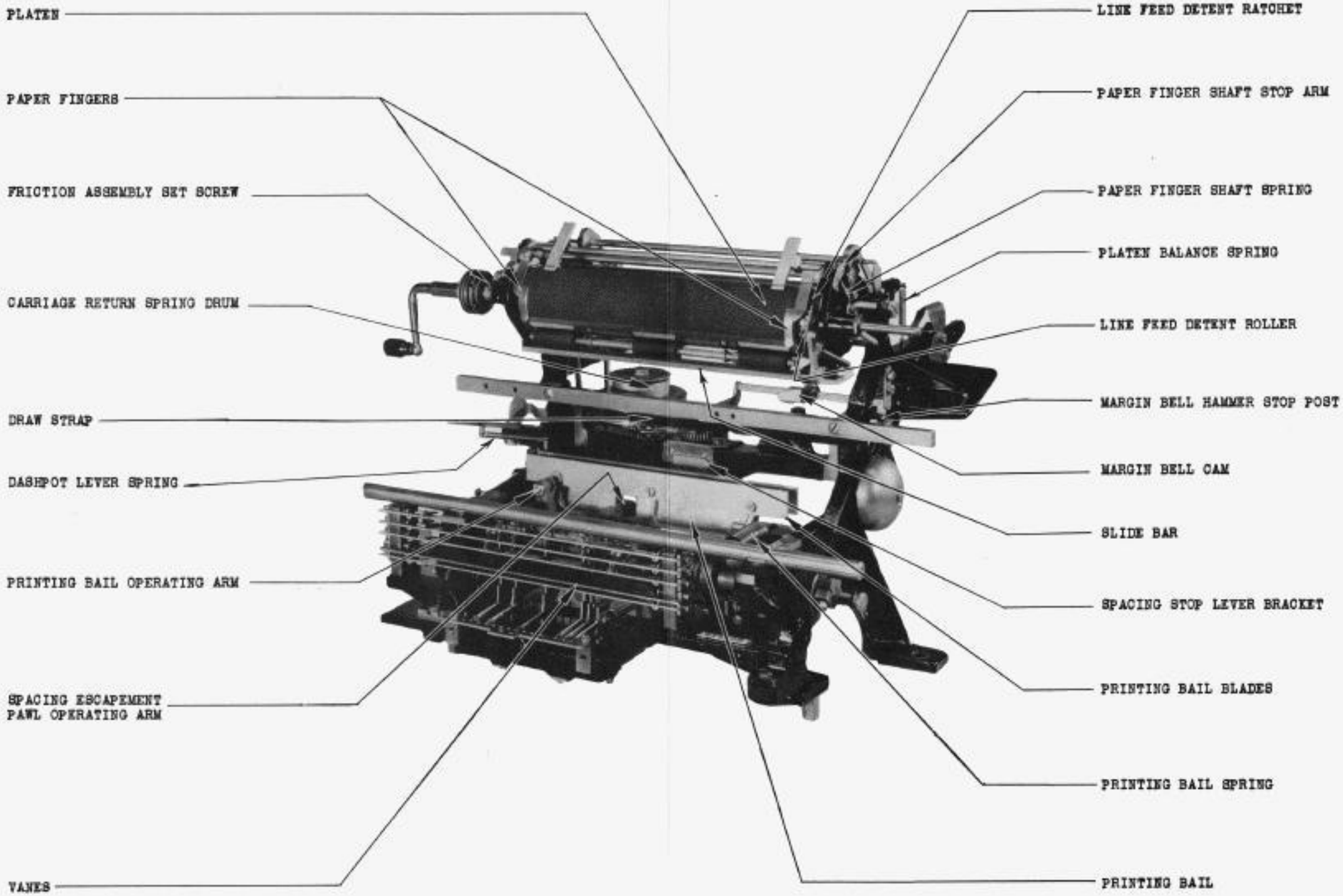


FIGURE 31–PAGE TYPING UNIT–SENDING STATION
(TYPE BAR CARRIAGE REMOVED)

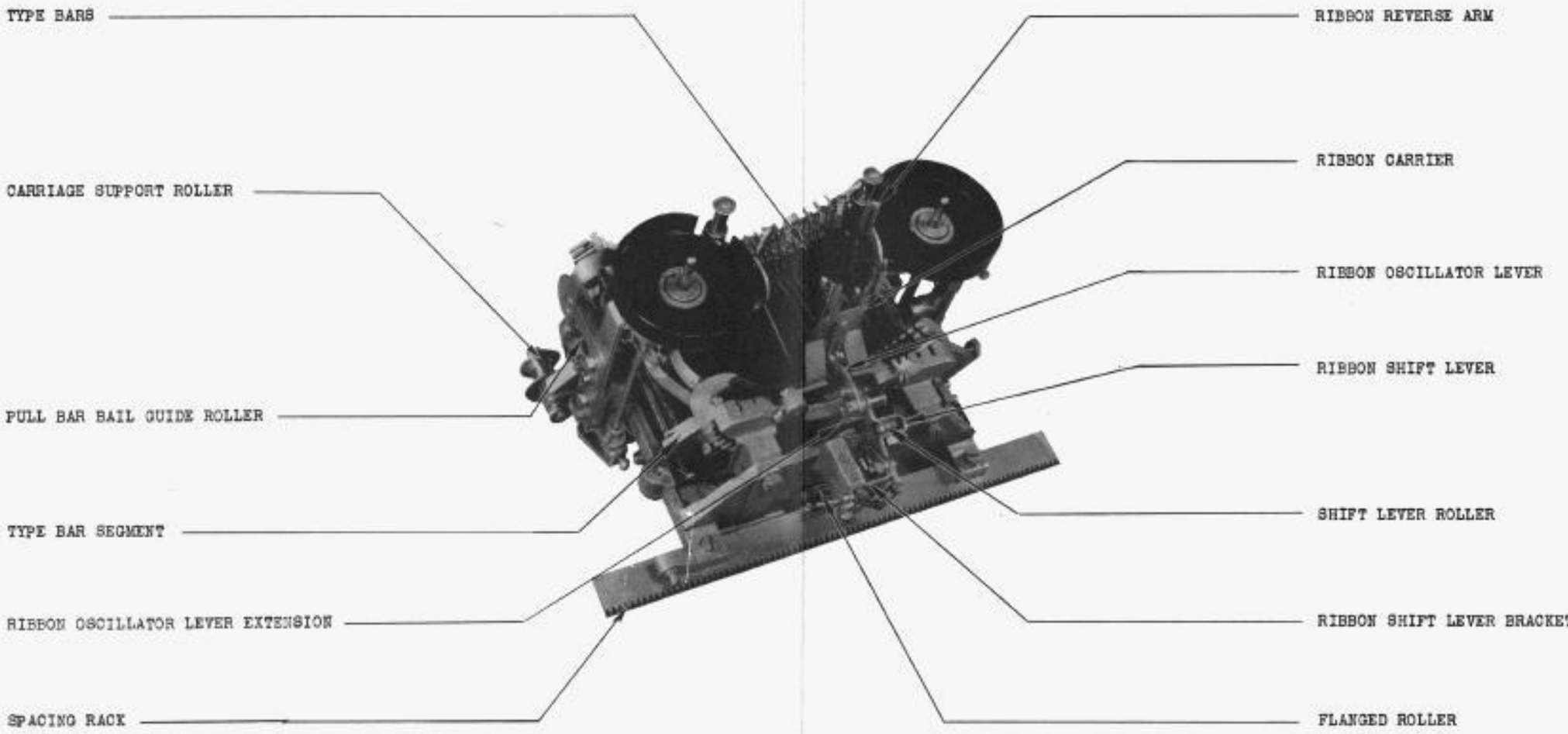


FIGURE 32–TYPE BAR CARRIAGE-SENDING STATION

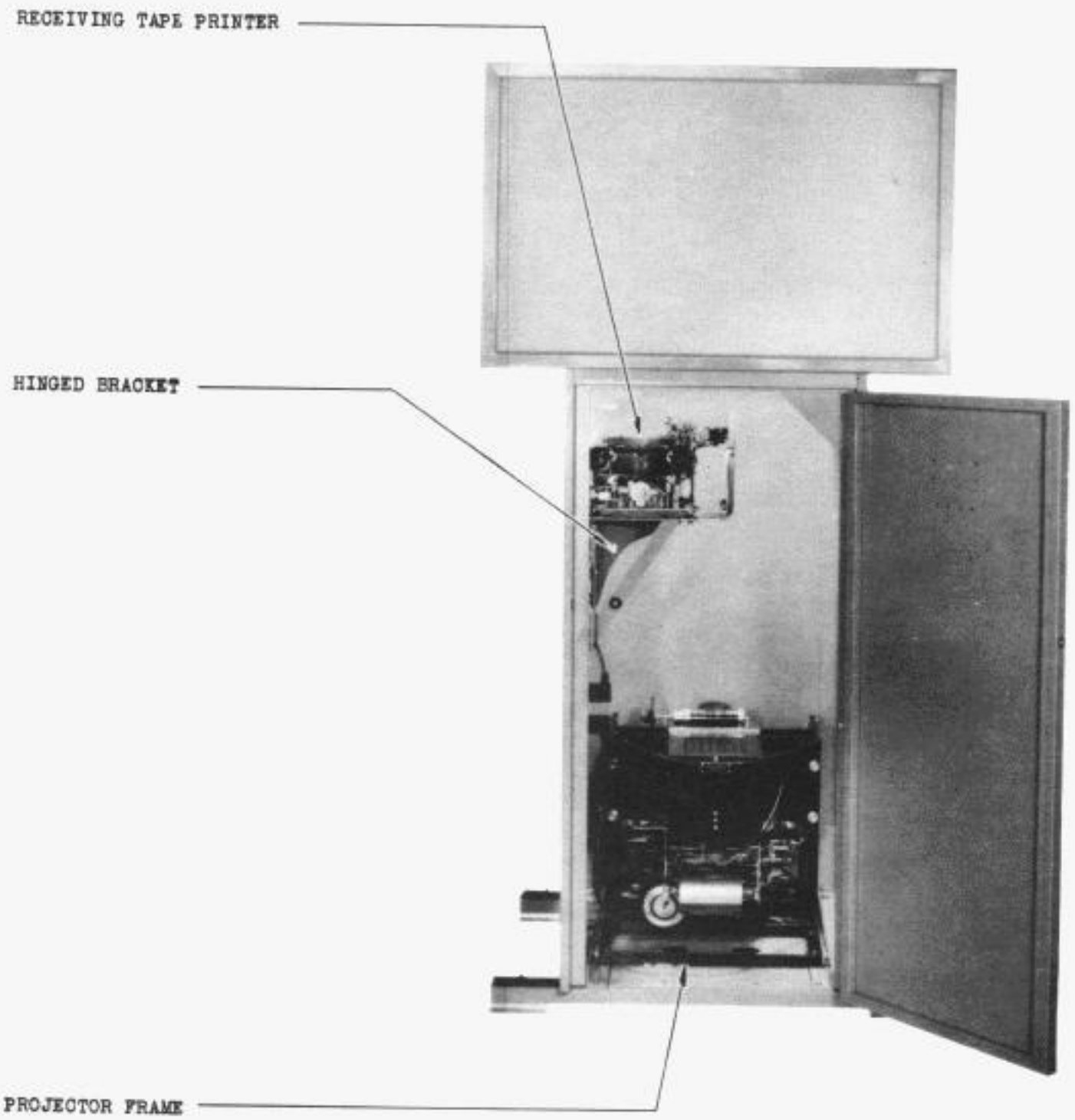


FIGURE 33- PROJECTOR CABINET (OPEN)

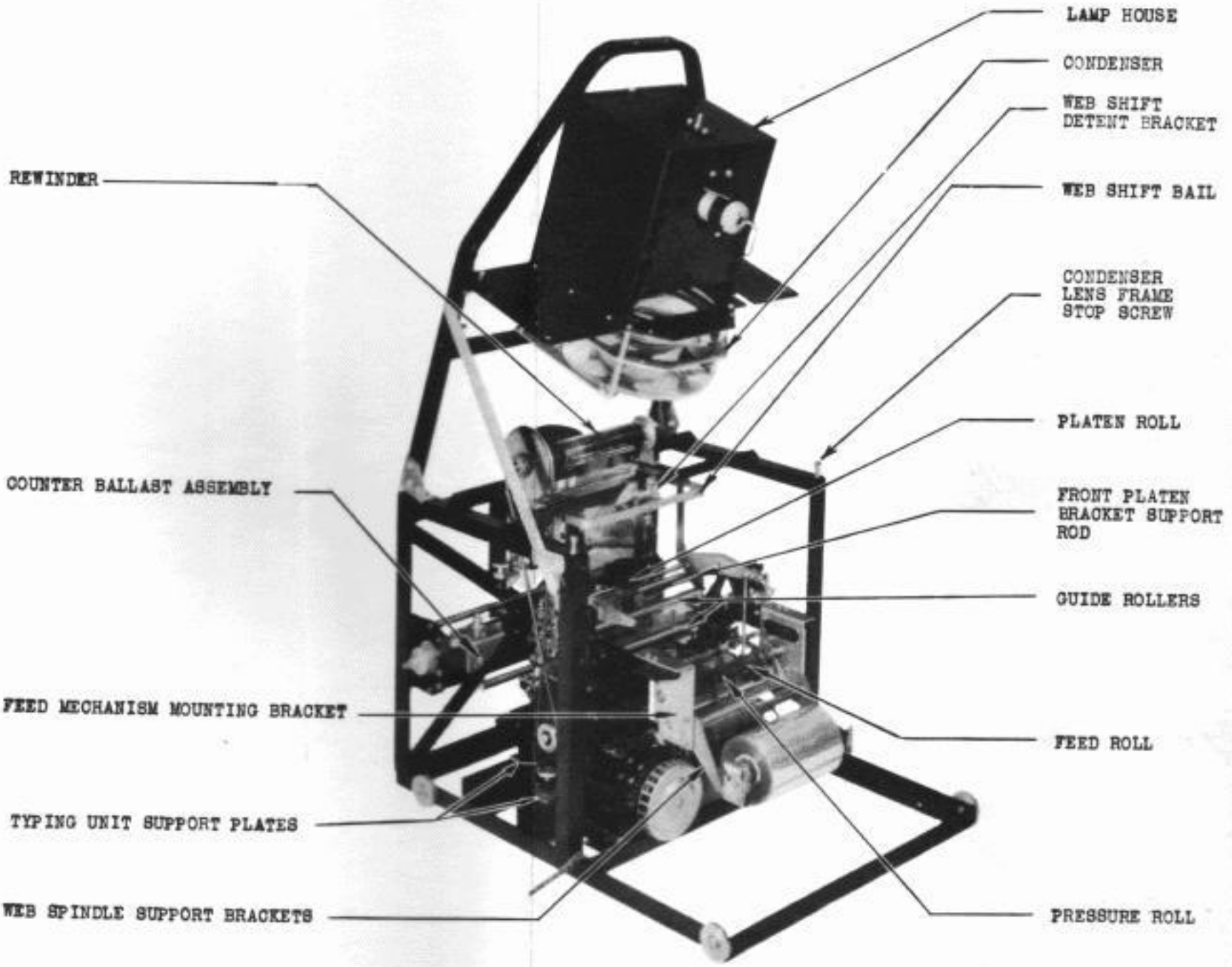


FIGURE 34—PROJECTOR FRAME (FRONT VIEW)

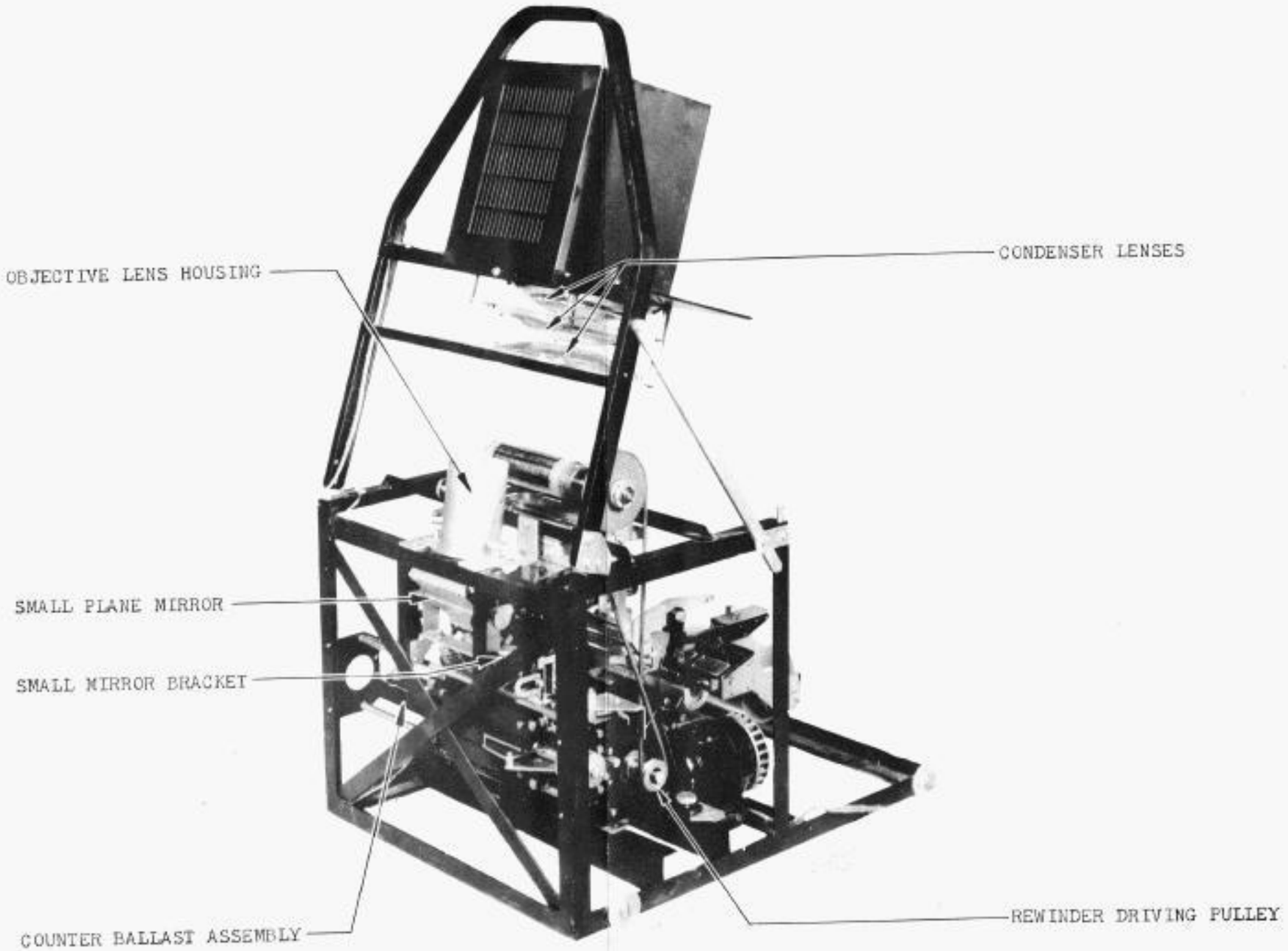


FIGURE 35 - PROJECTOR FRAME (REAR VIEW)

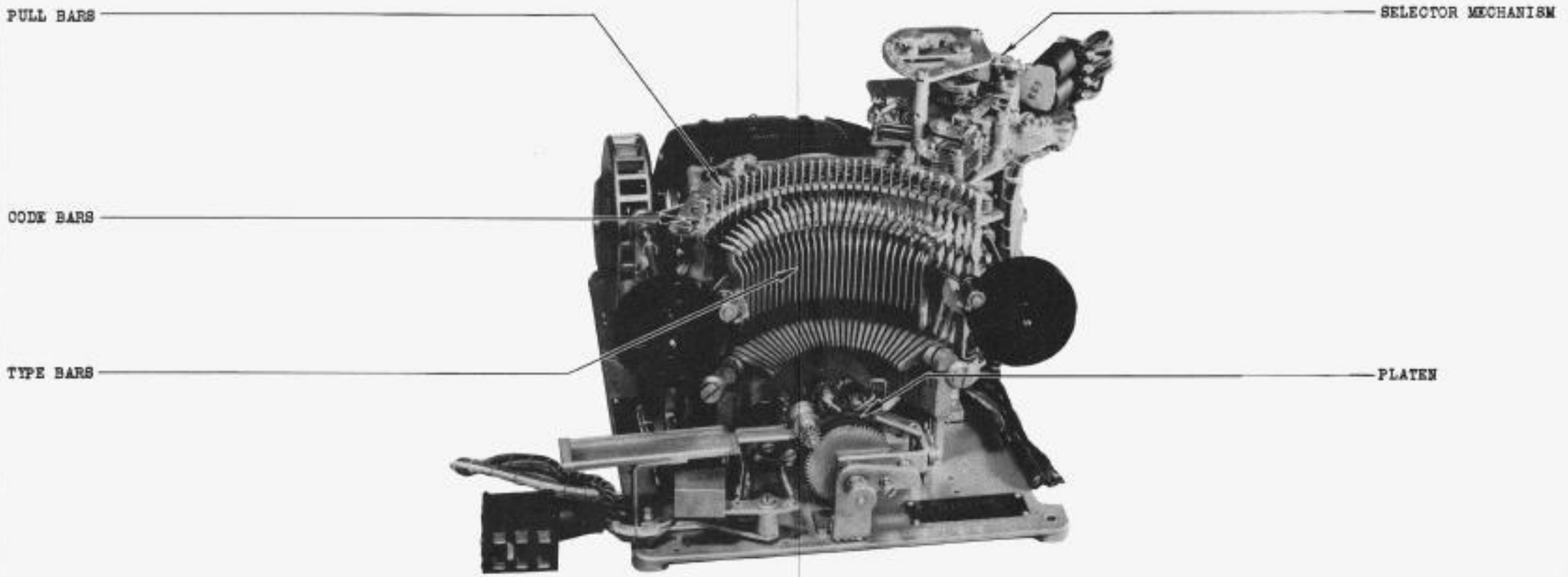


FIGURE 36—RECEIVING TAPE PRINTER

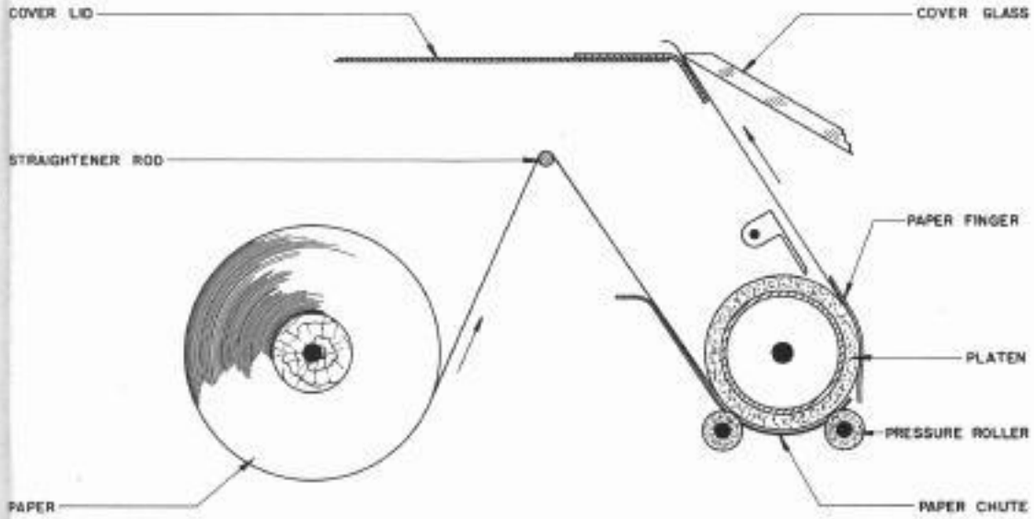


FIGURE 37

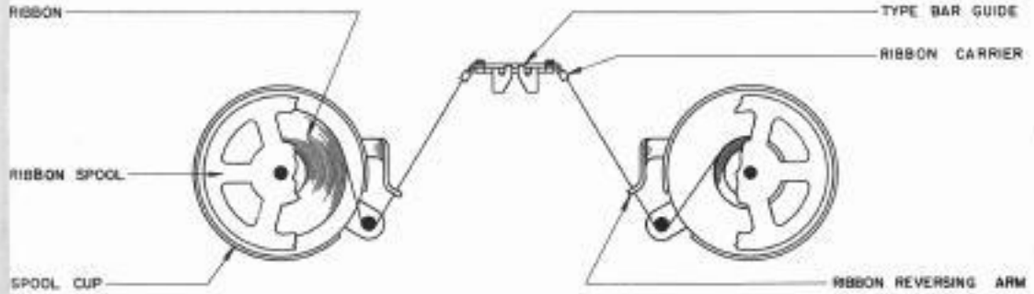


FIGURE 38

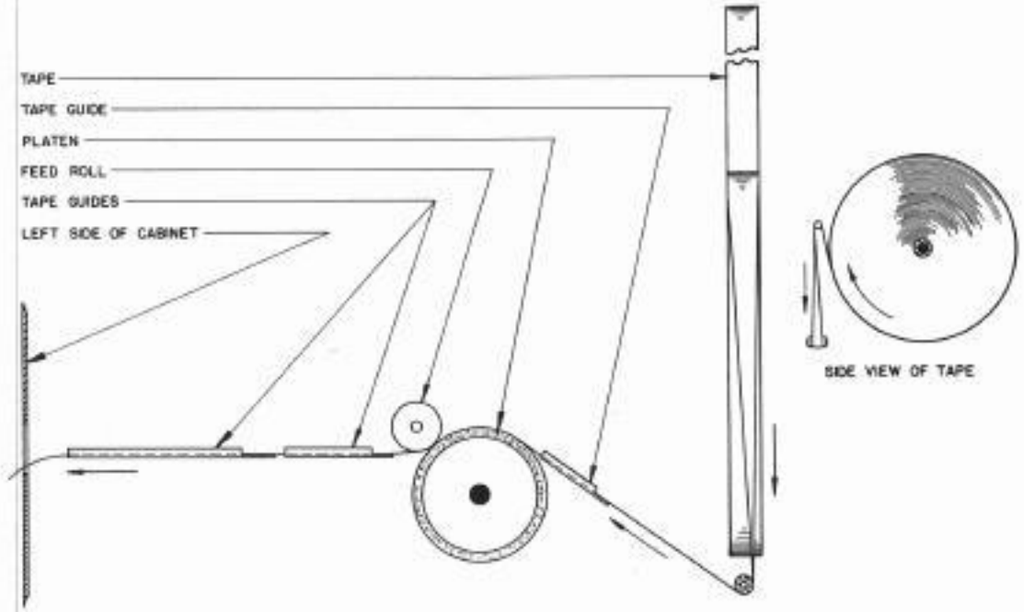
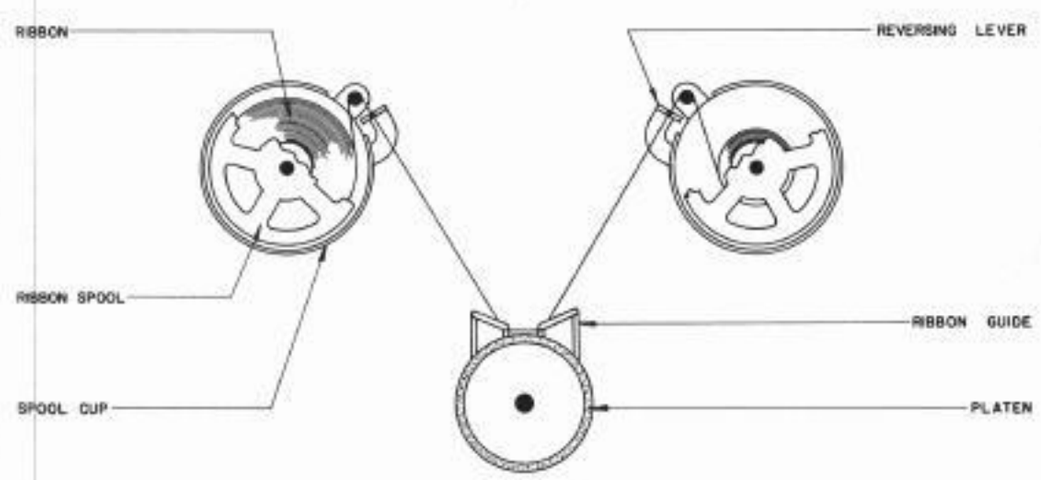


FIGURE 39



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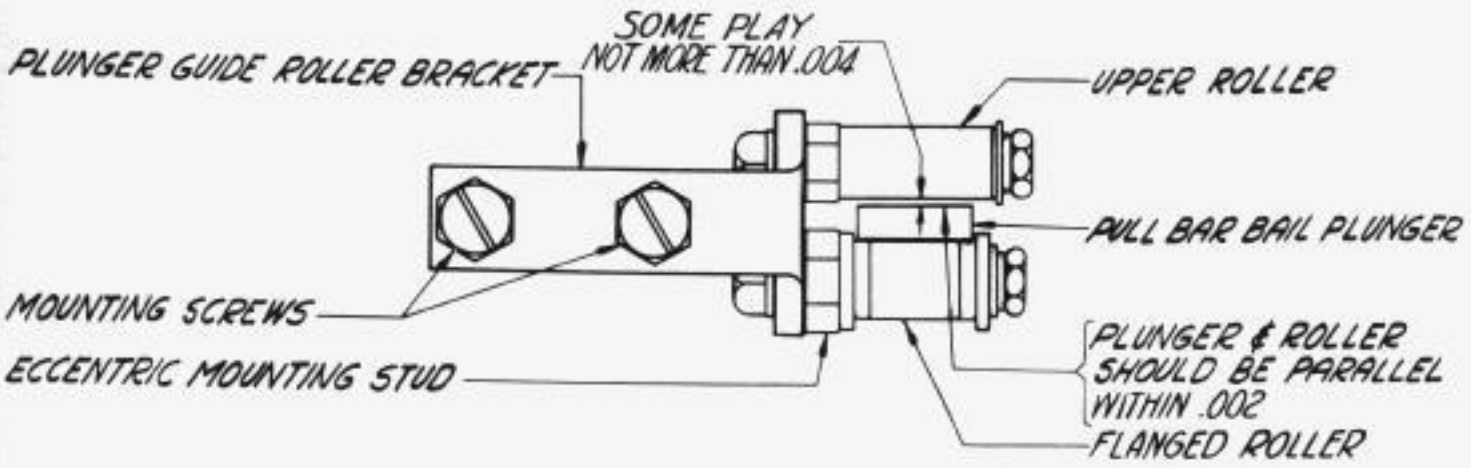

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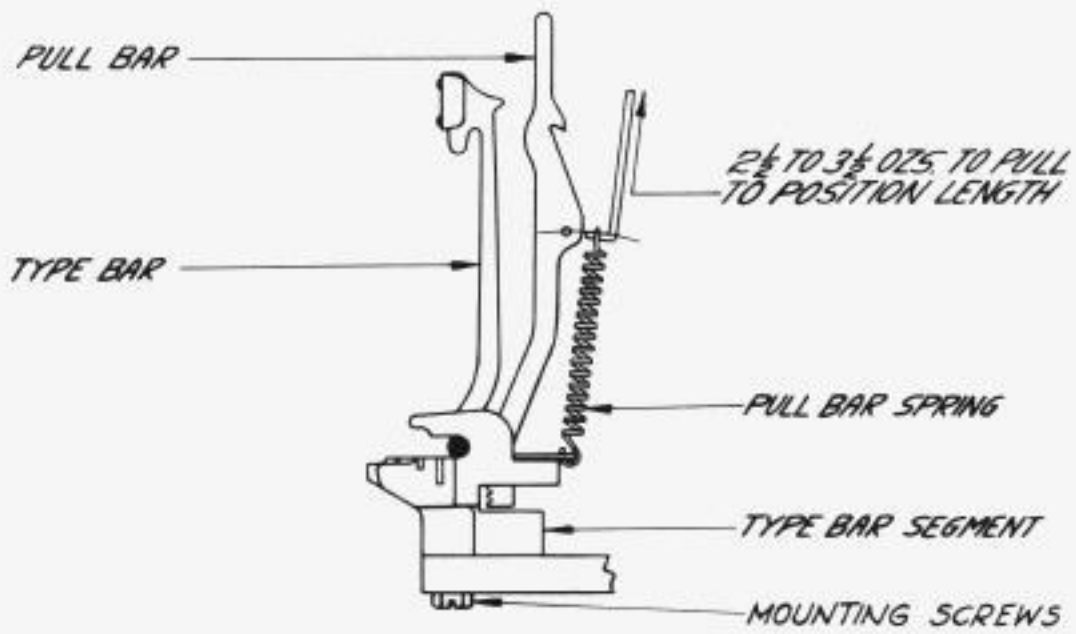

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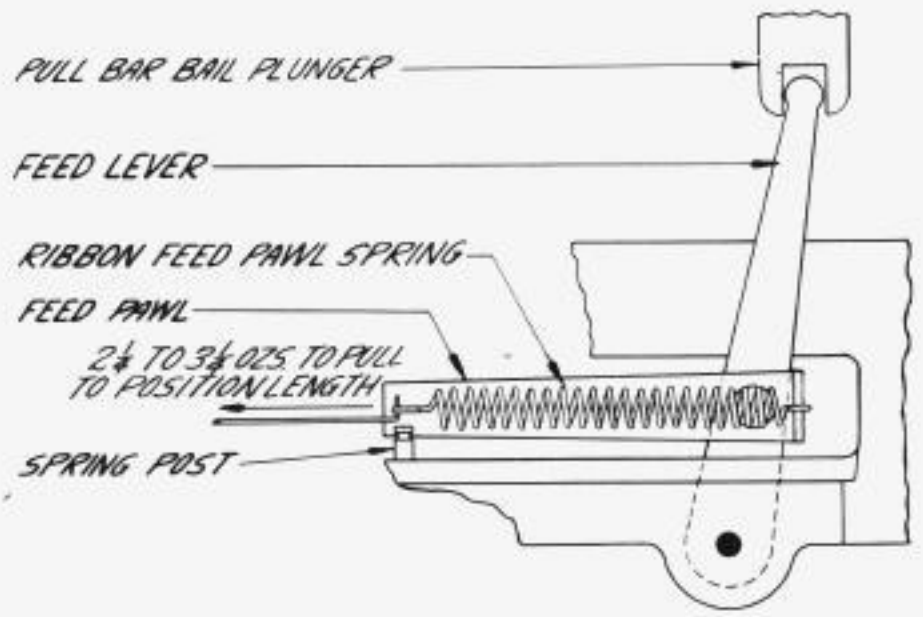

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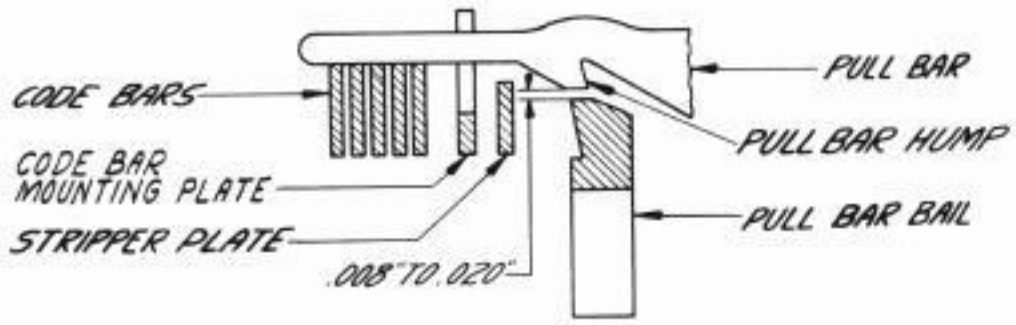

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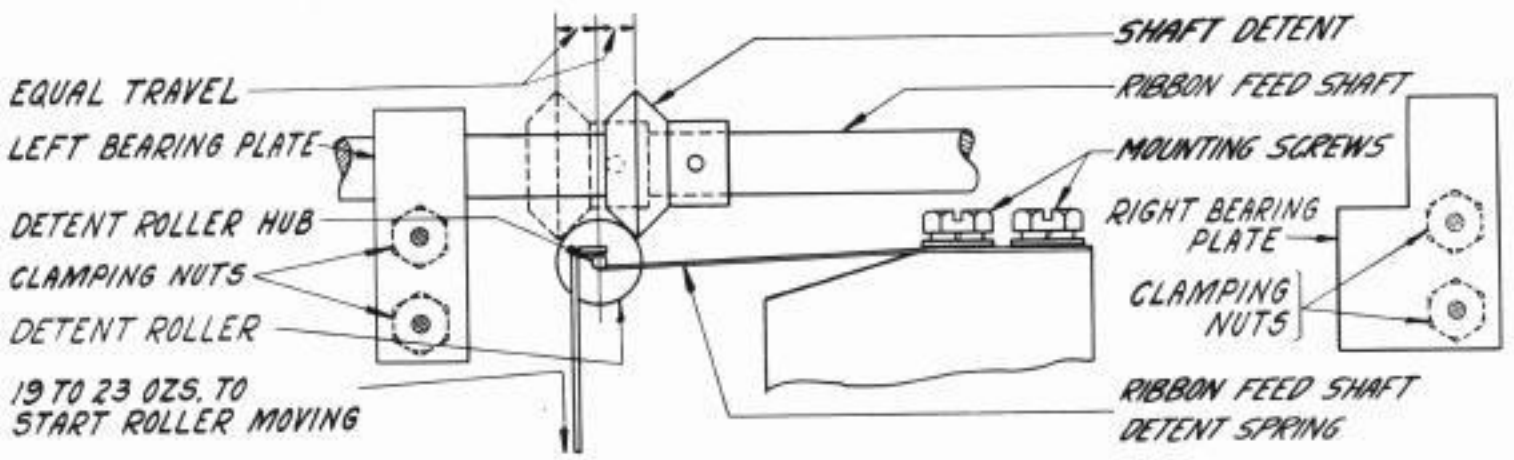

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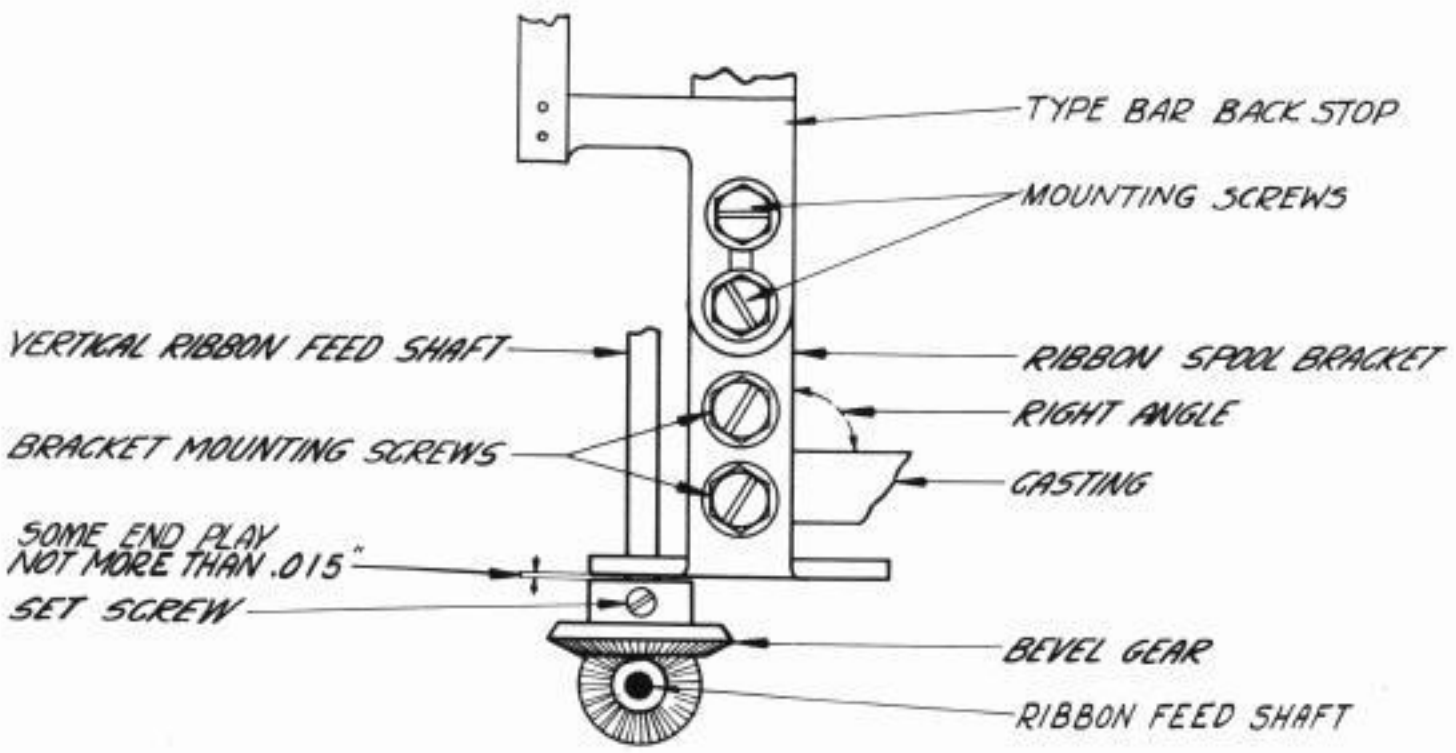

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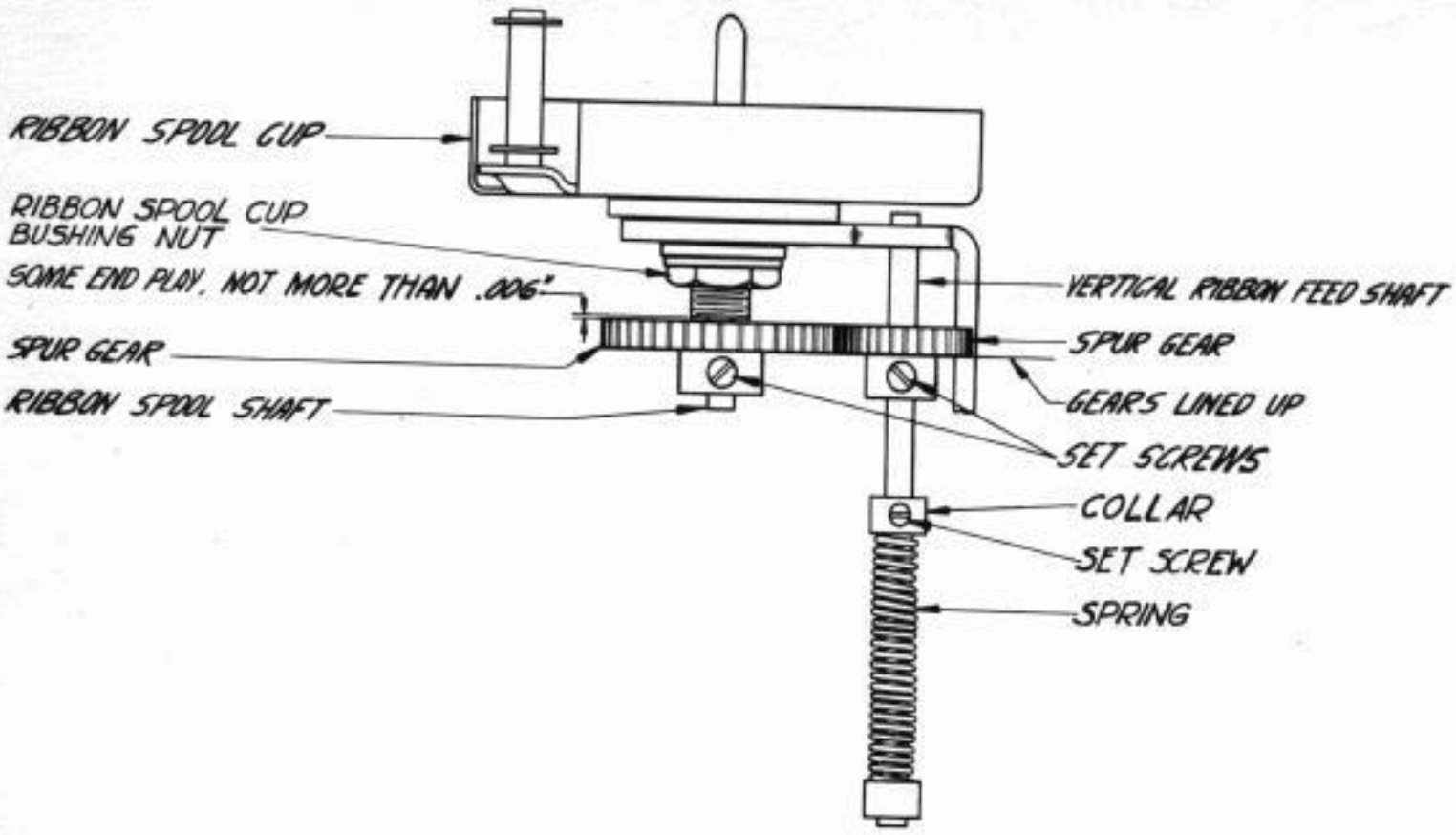

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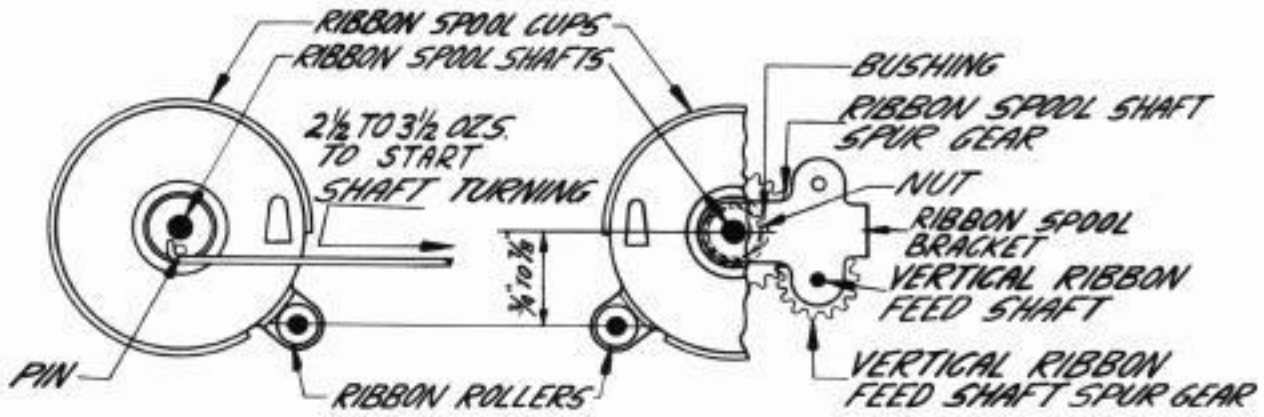

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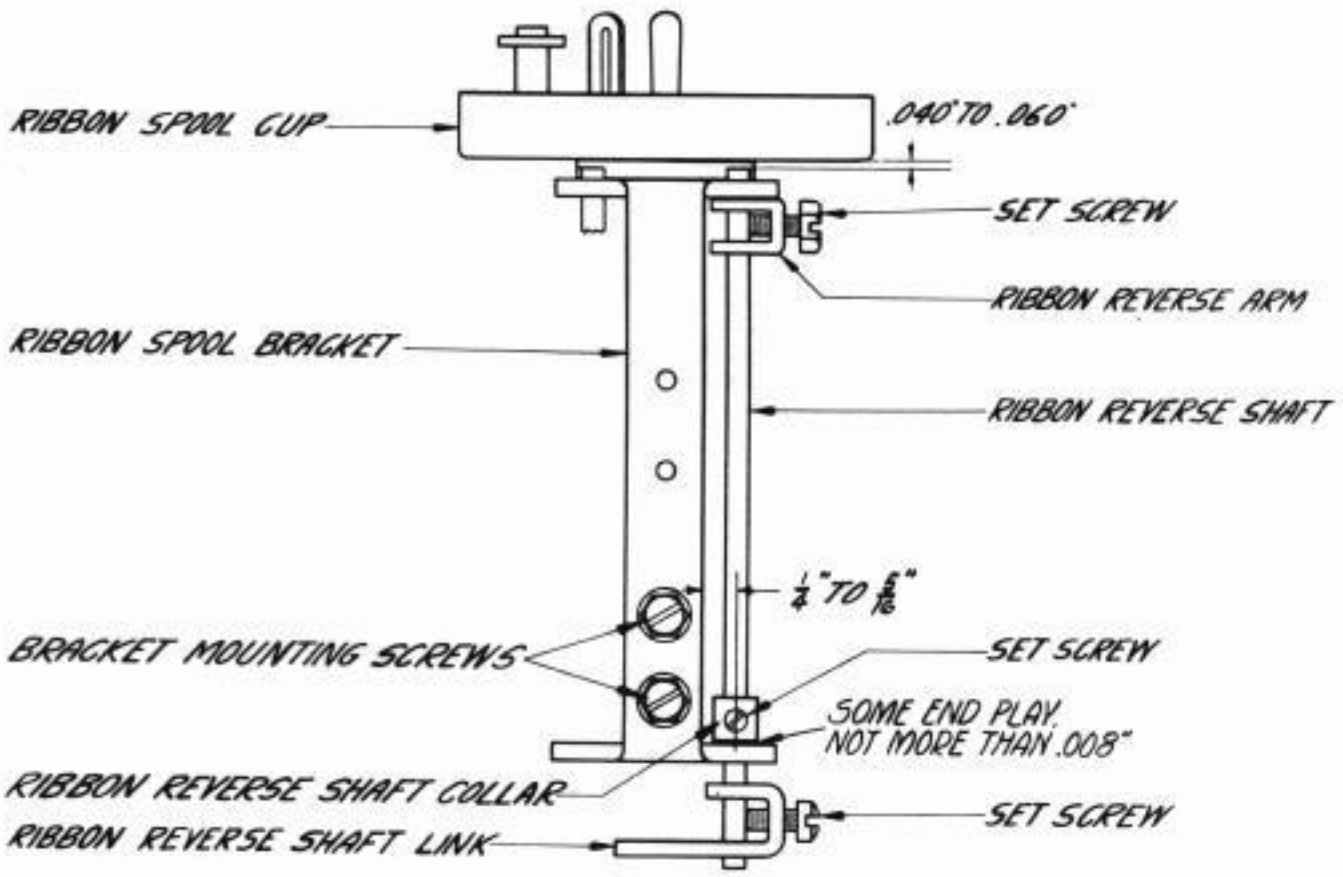

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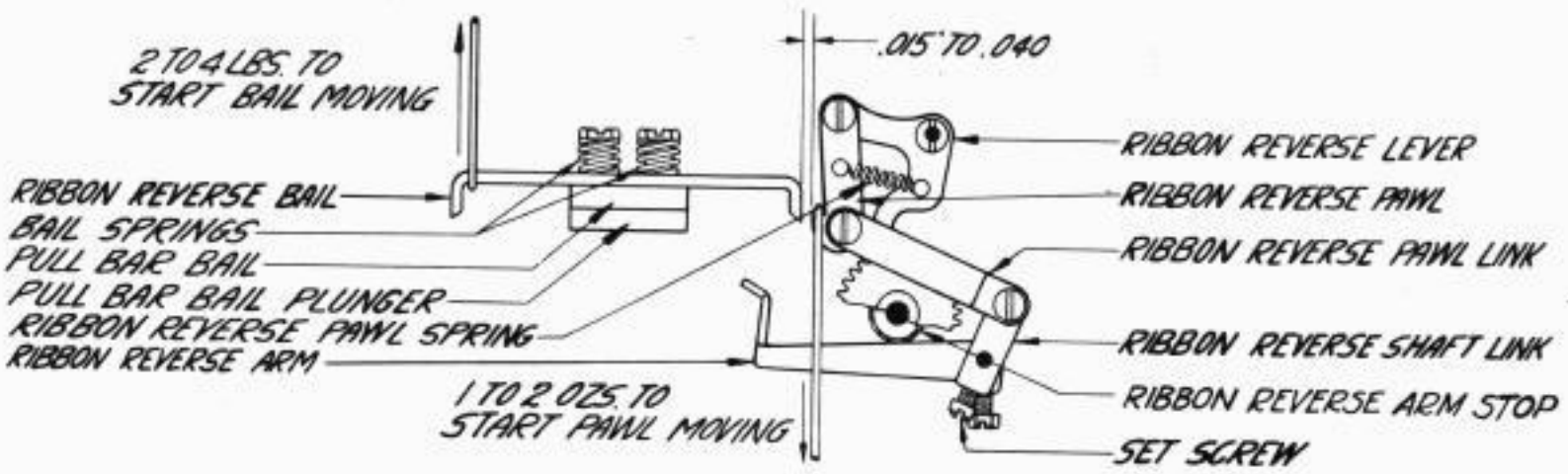

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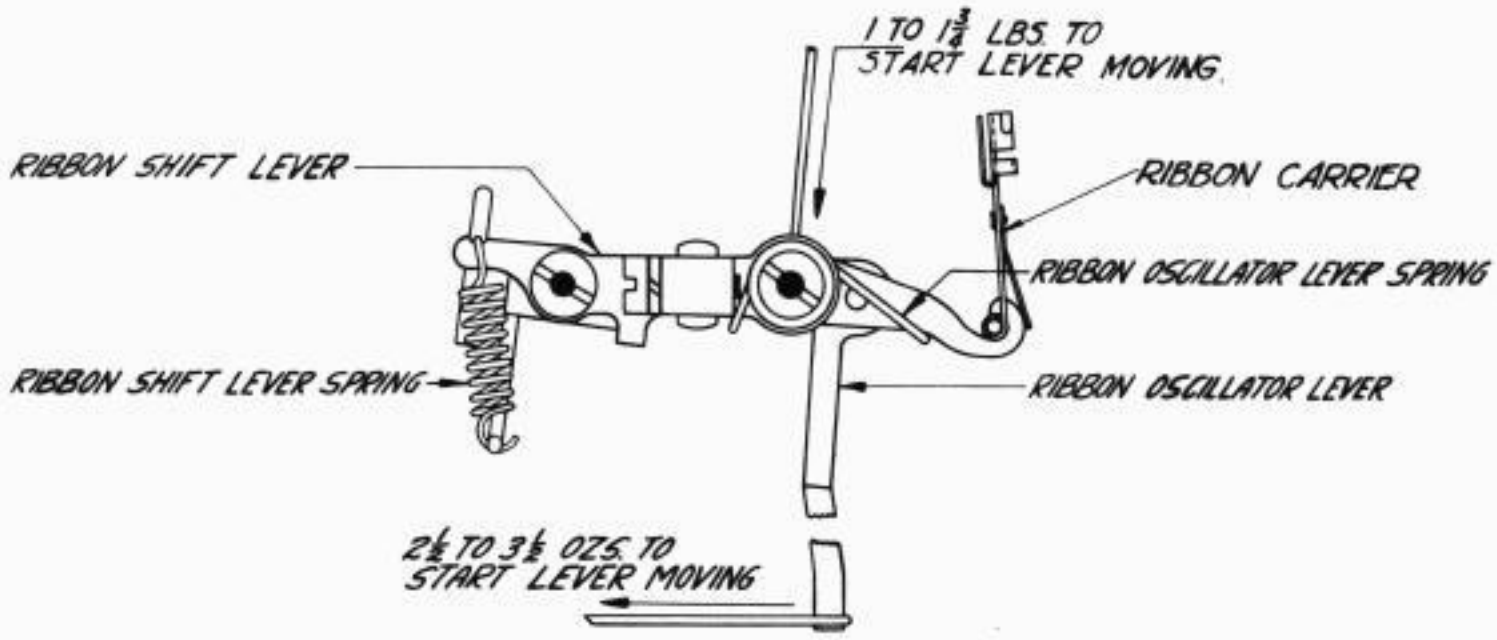

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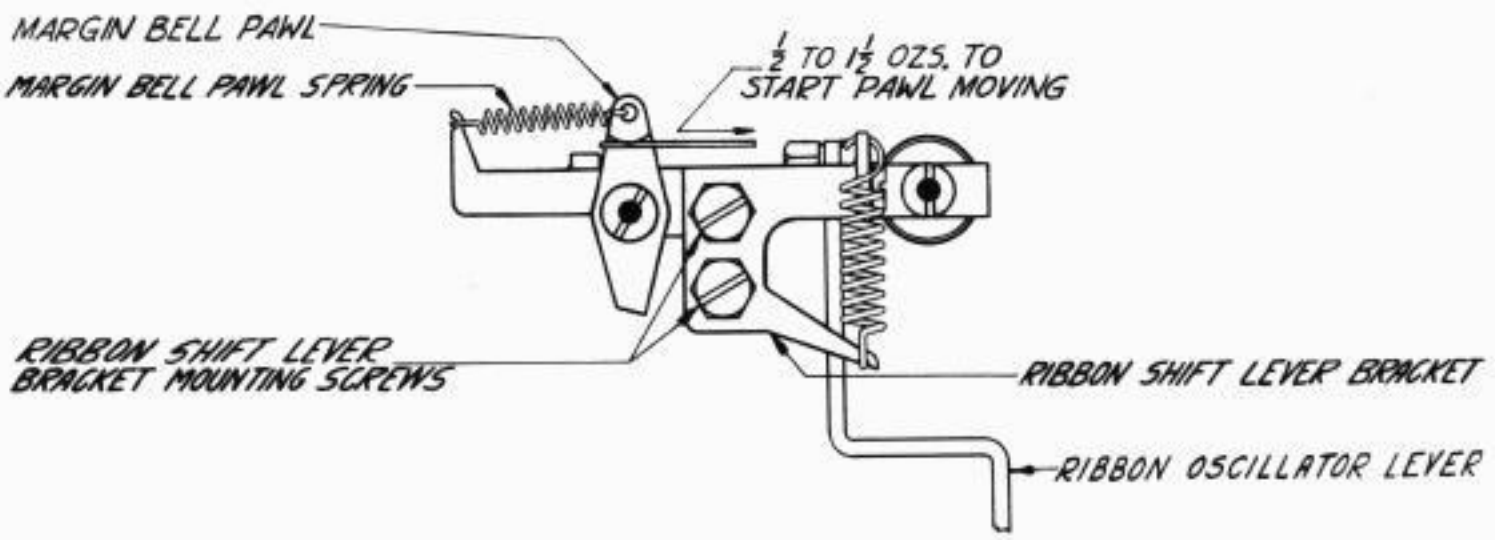

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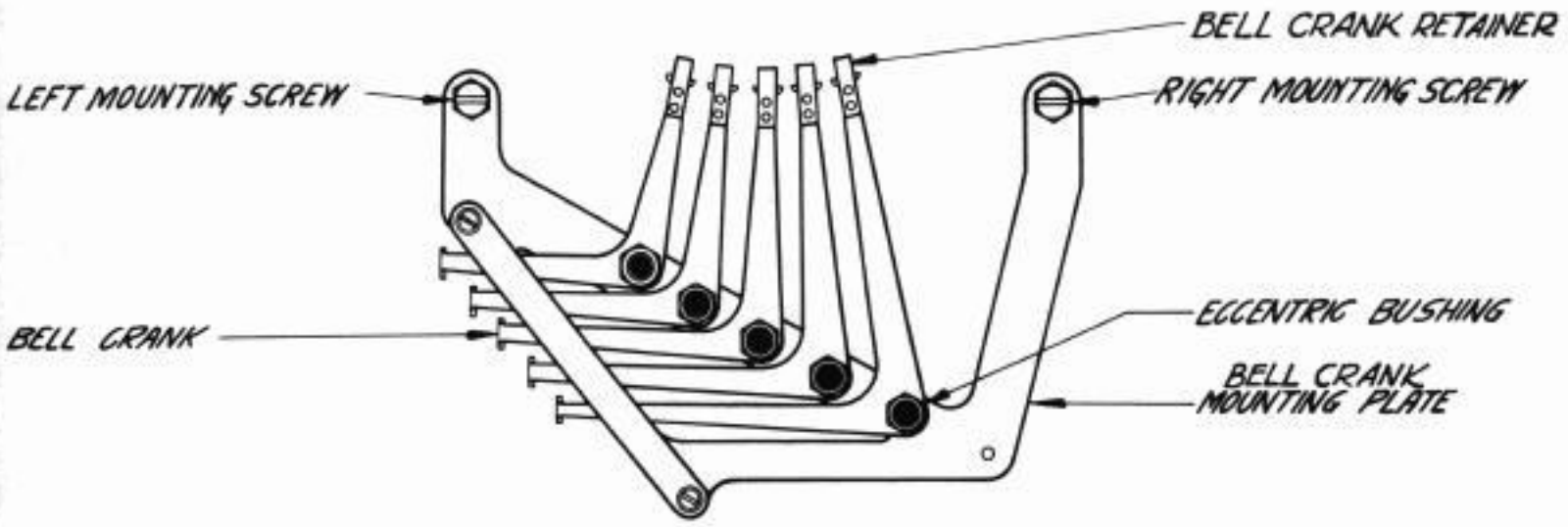

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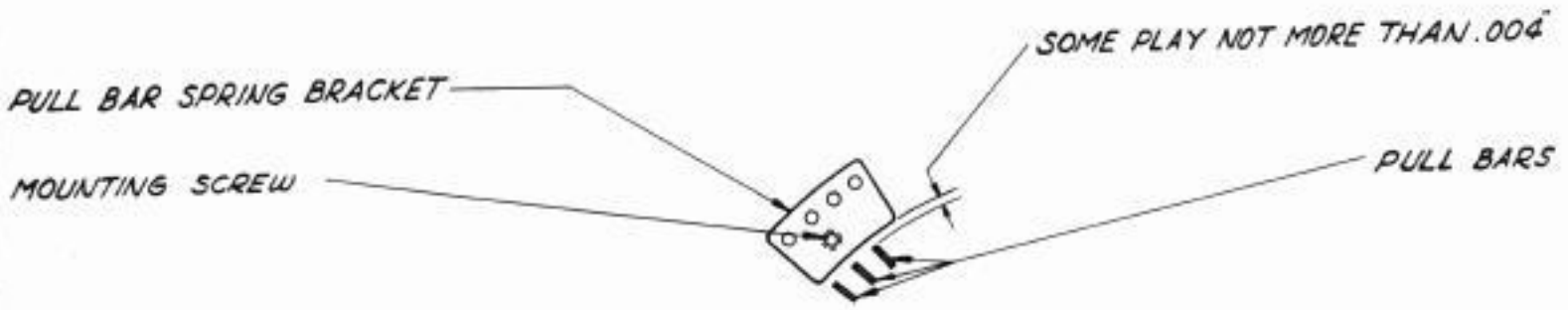

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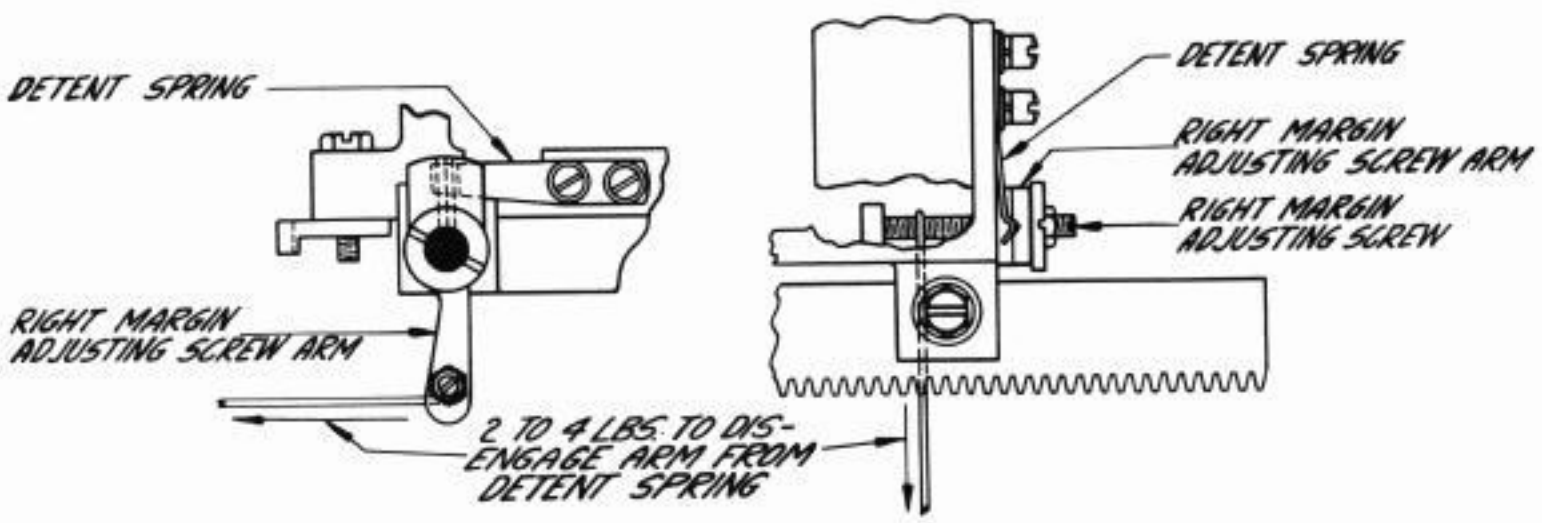

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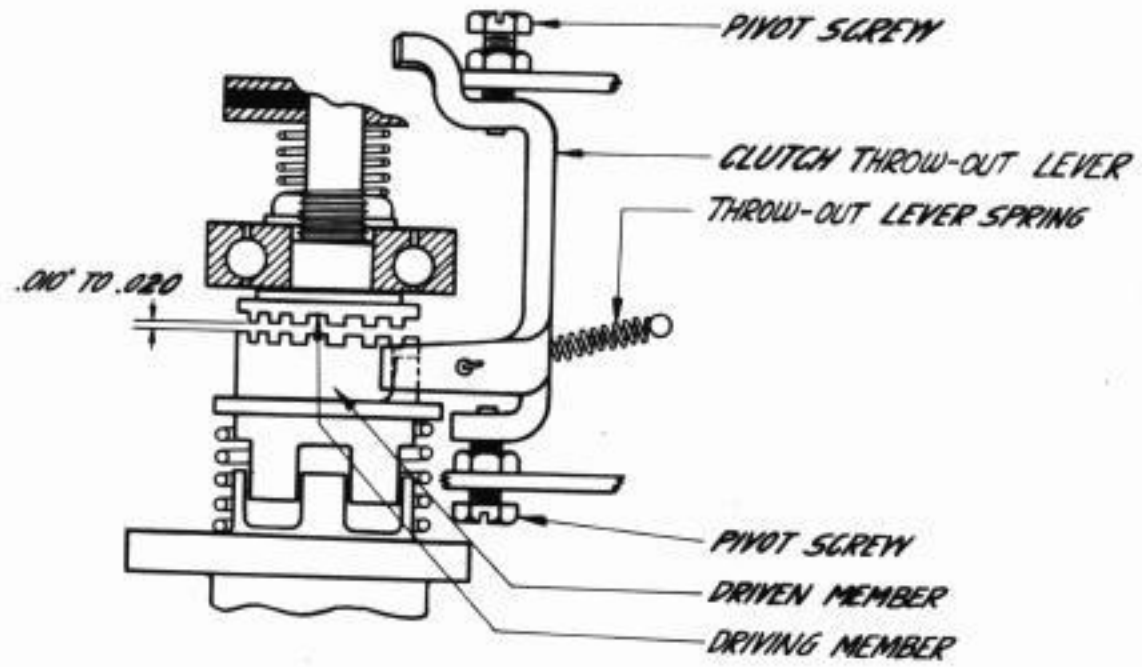

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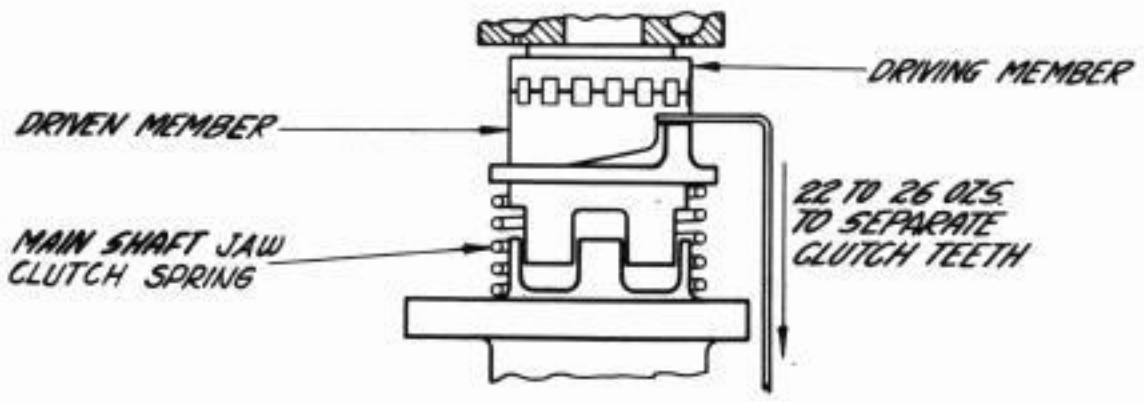

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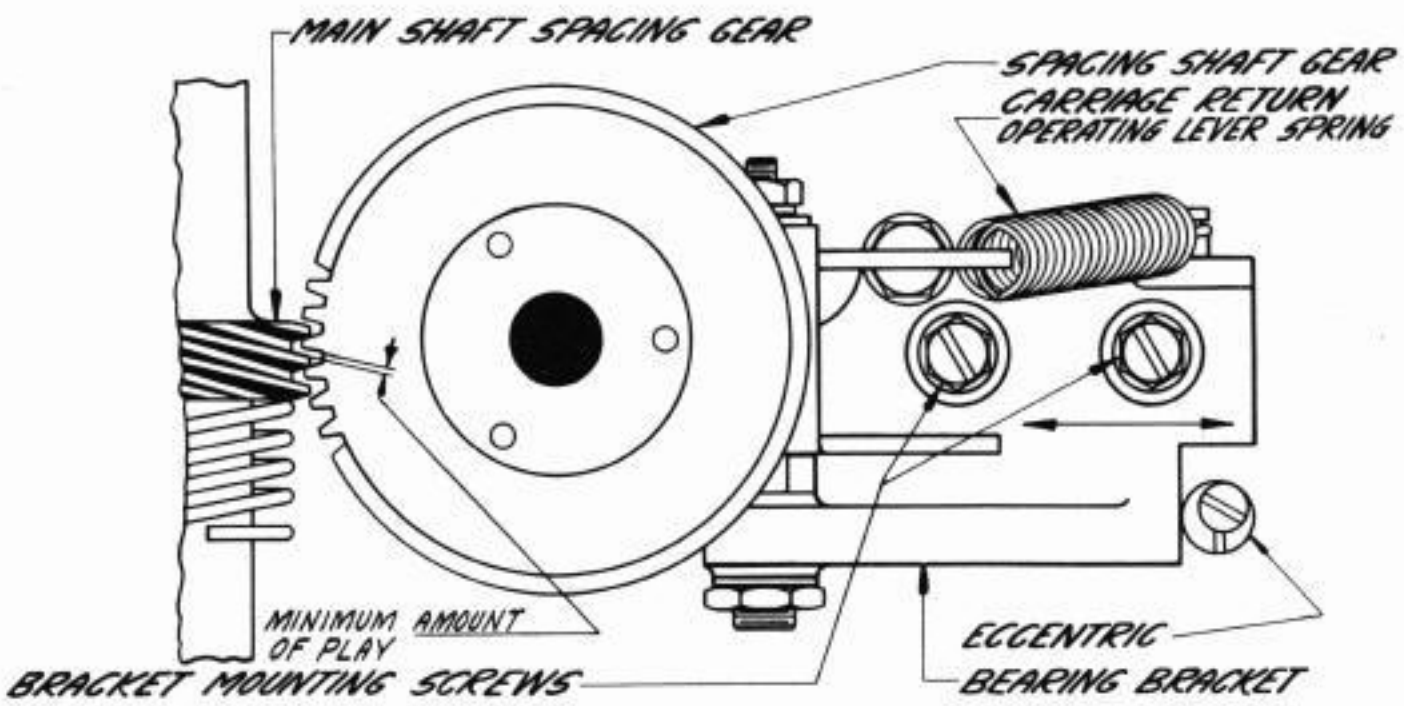

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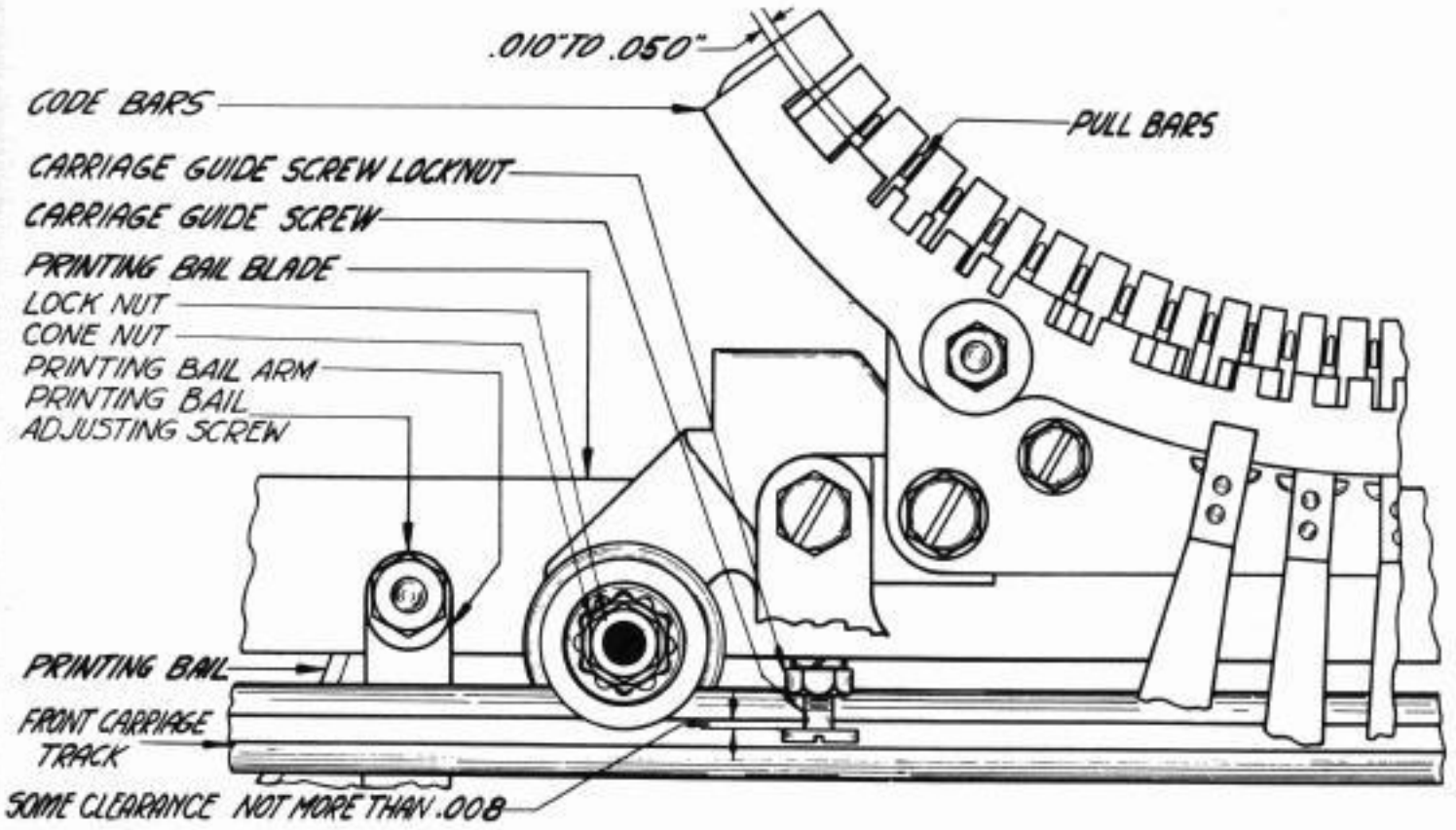

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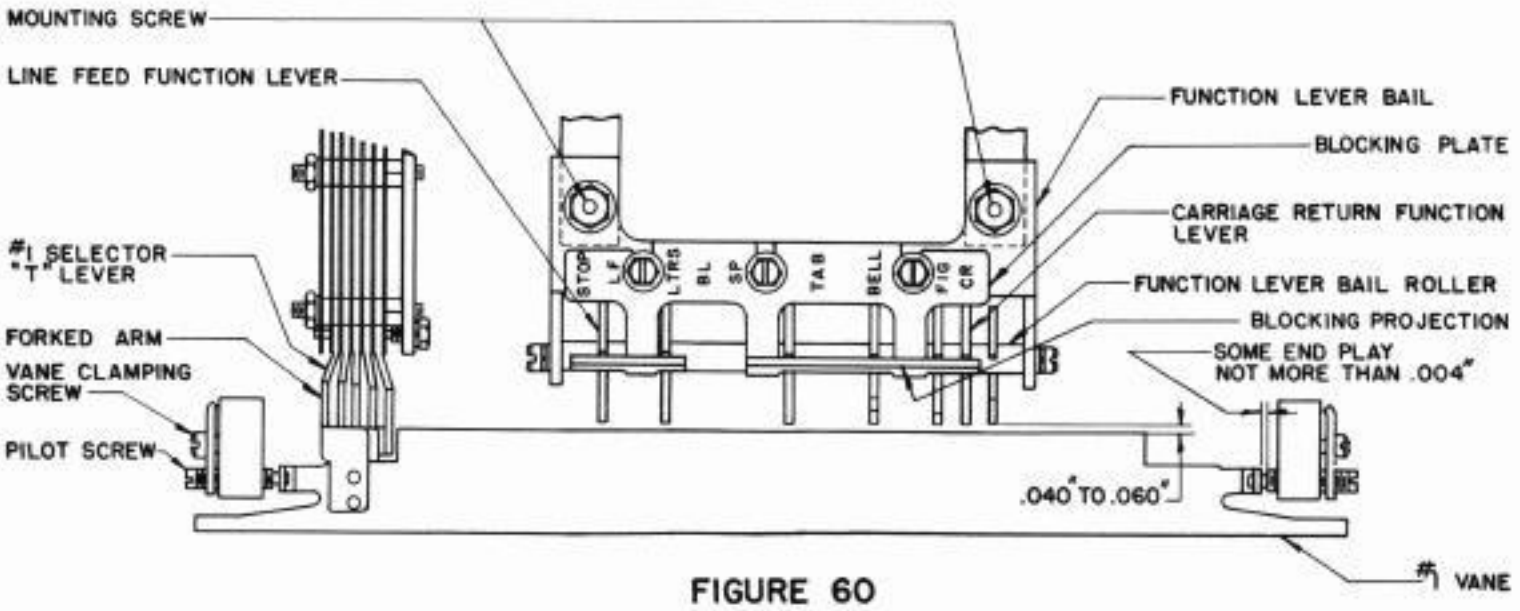

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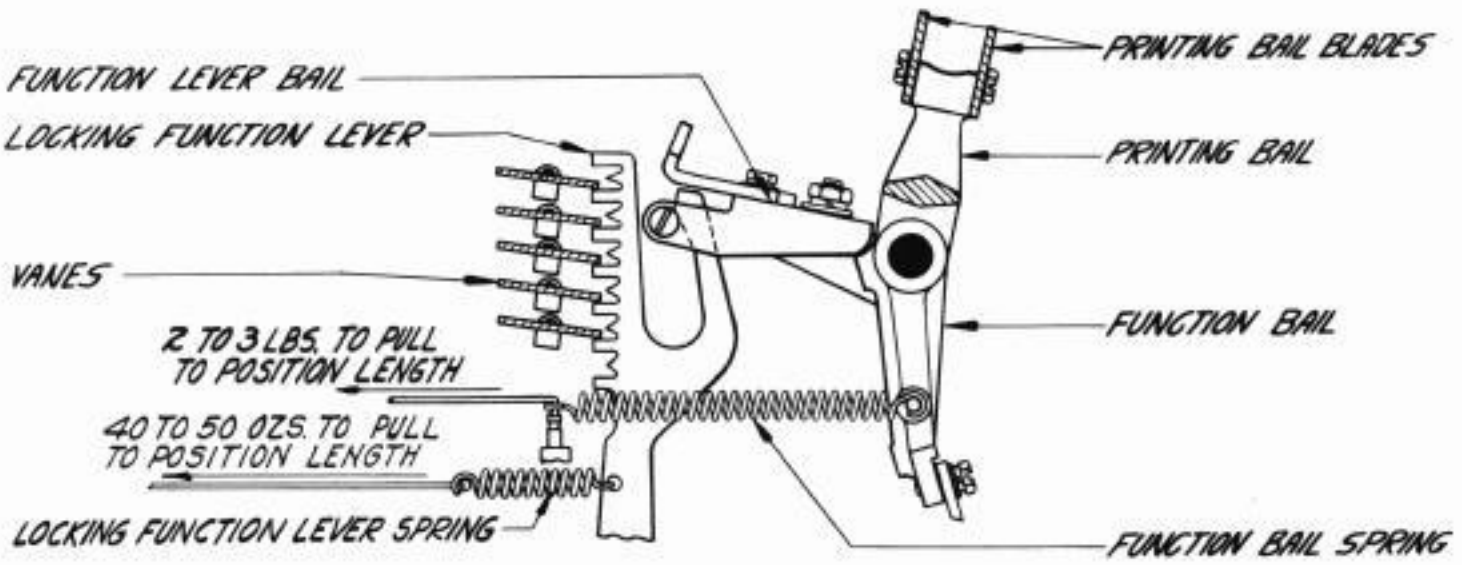

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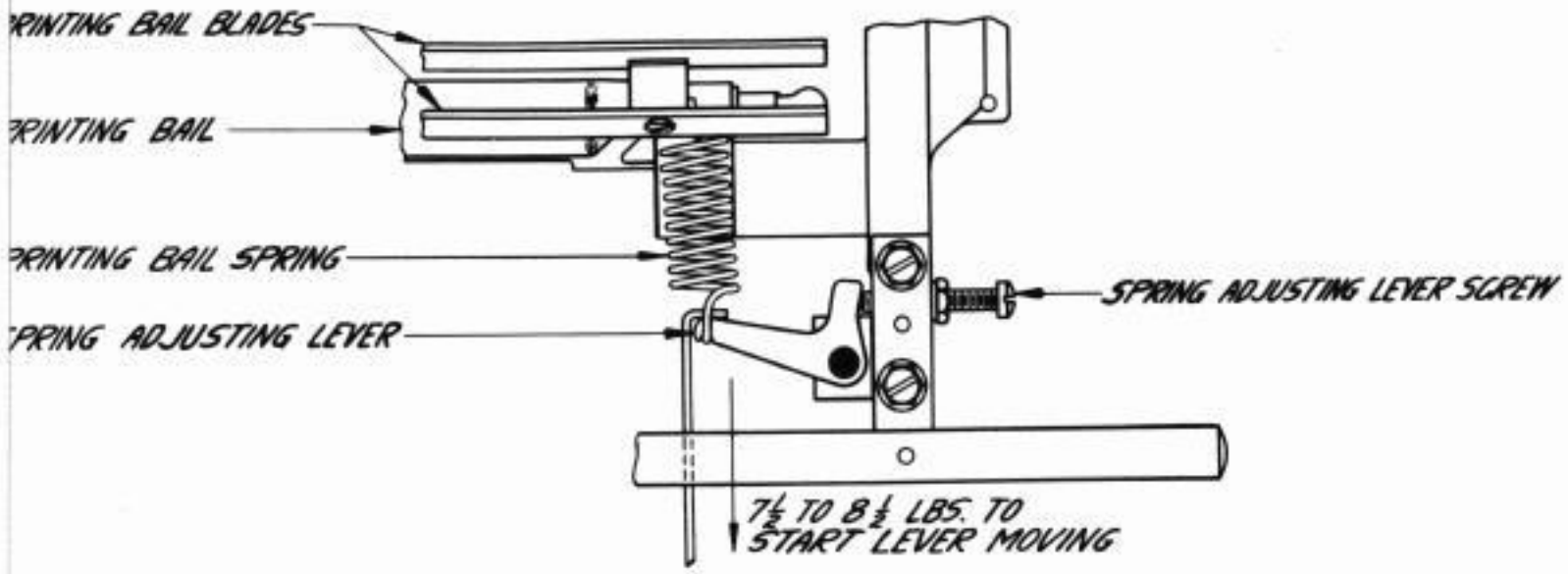

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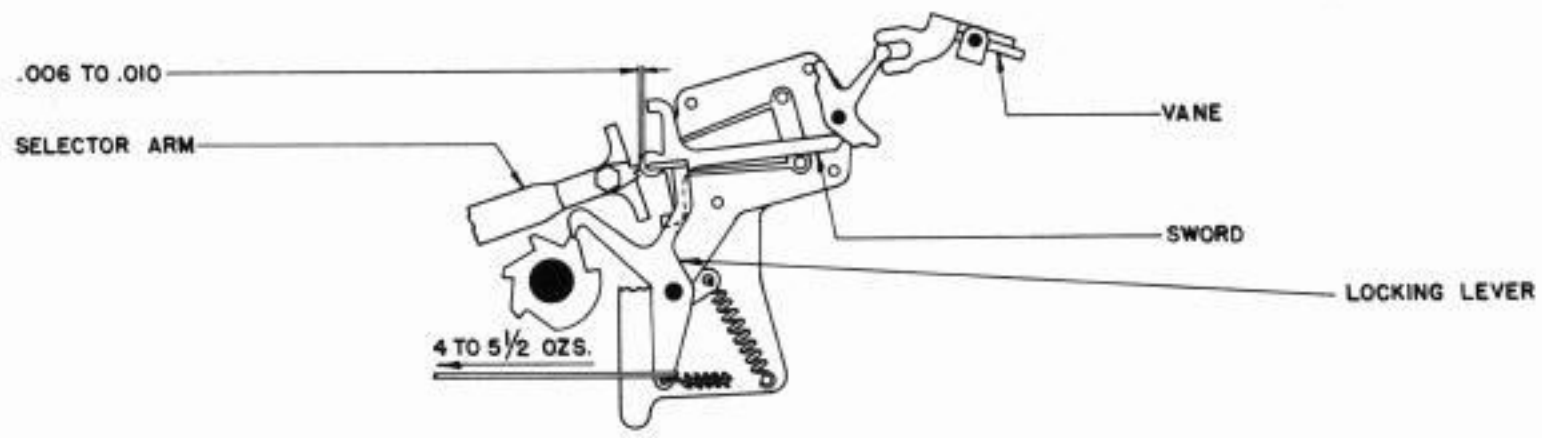

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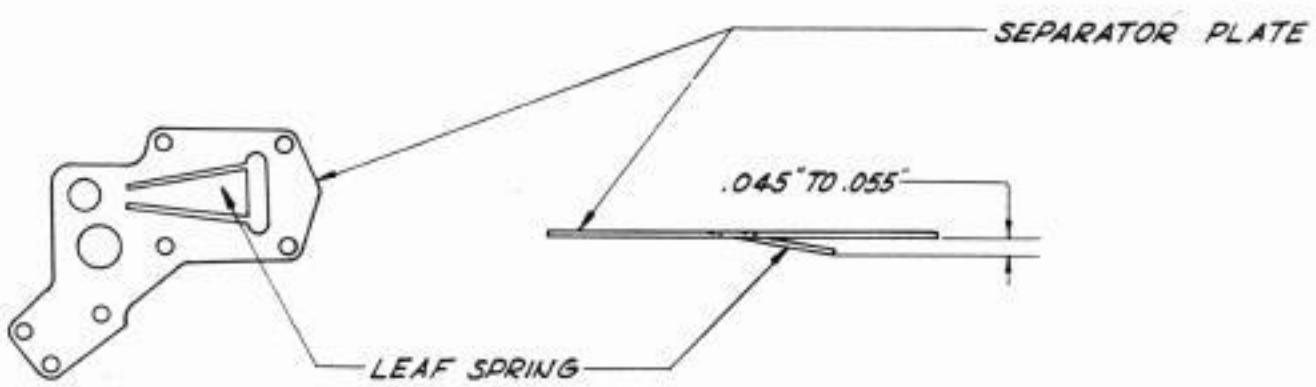

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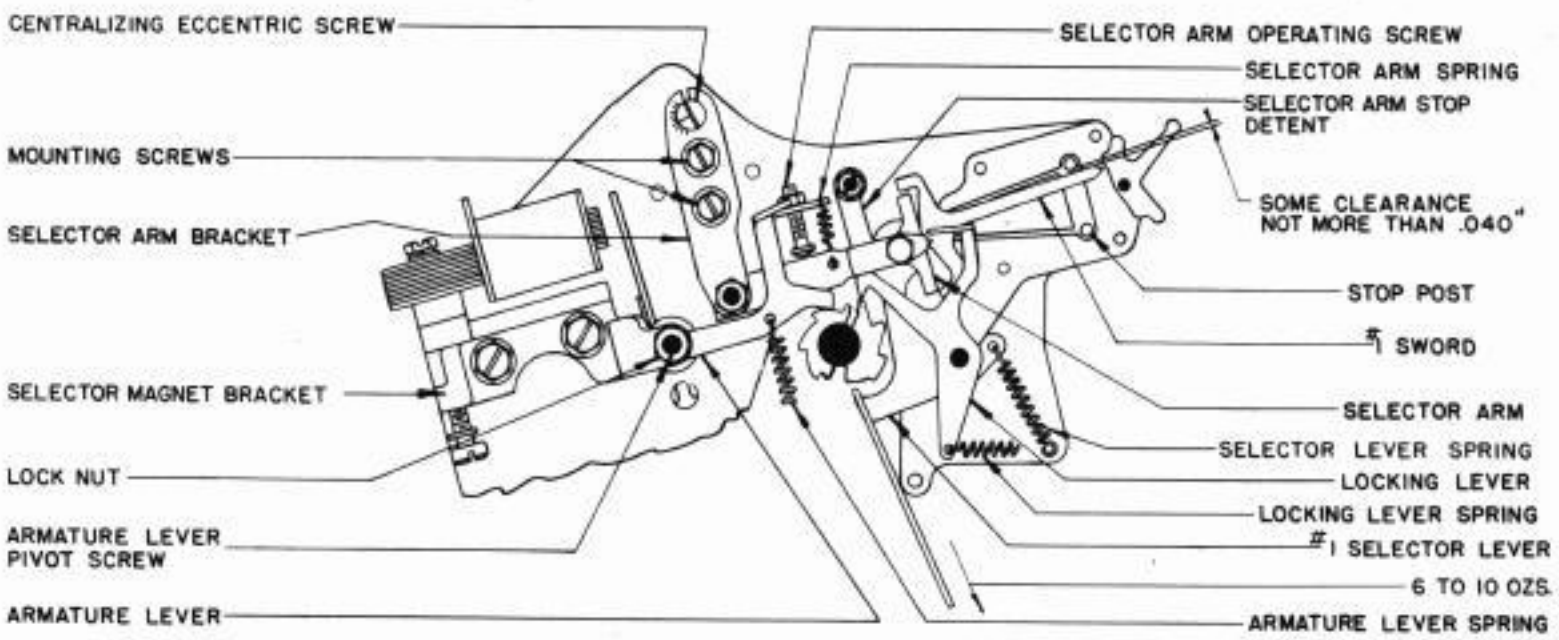

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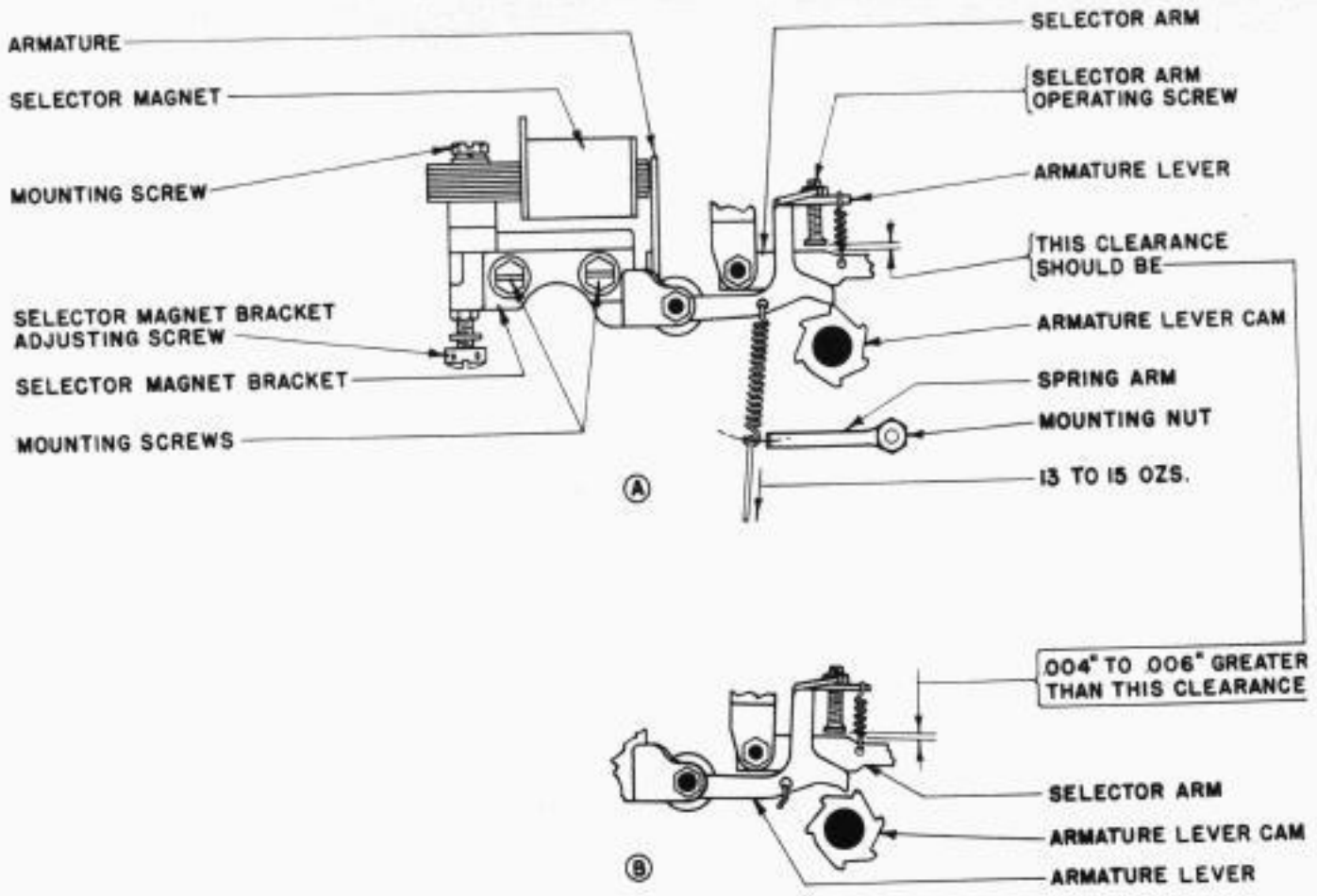

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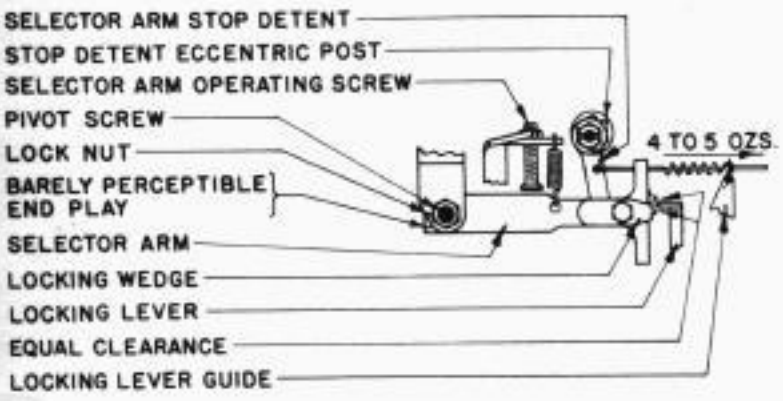
FIGURE 66



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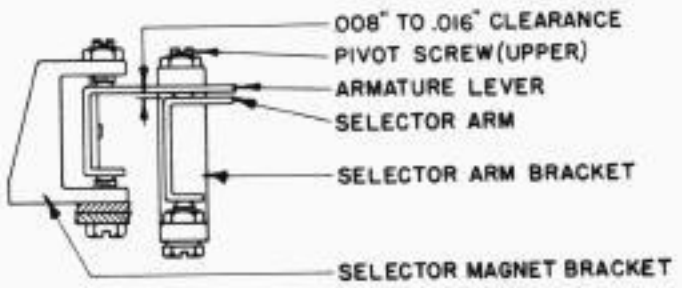

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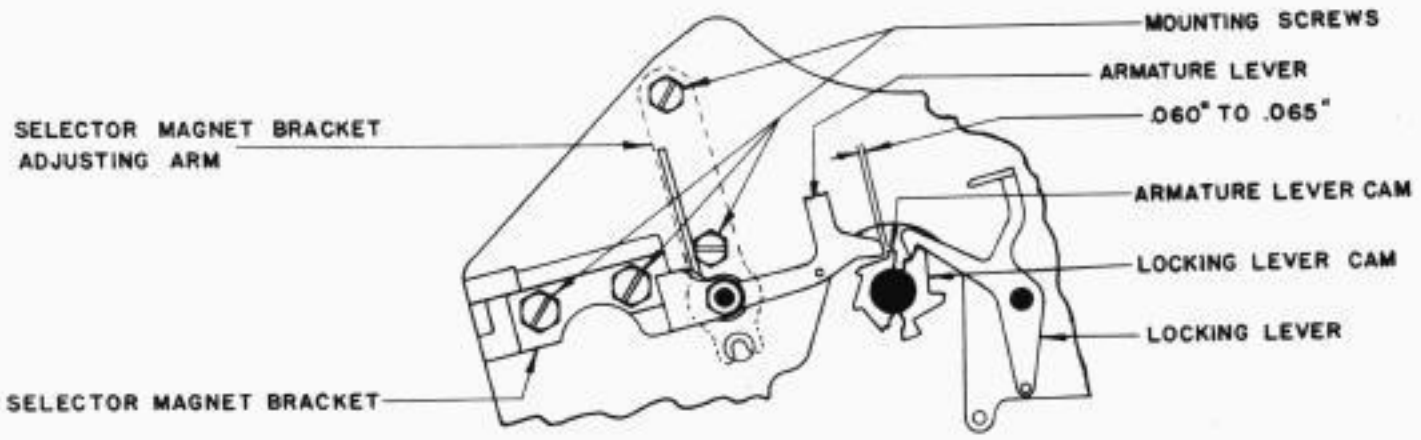
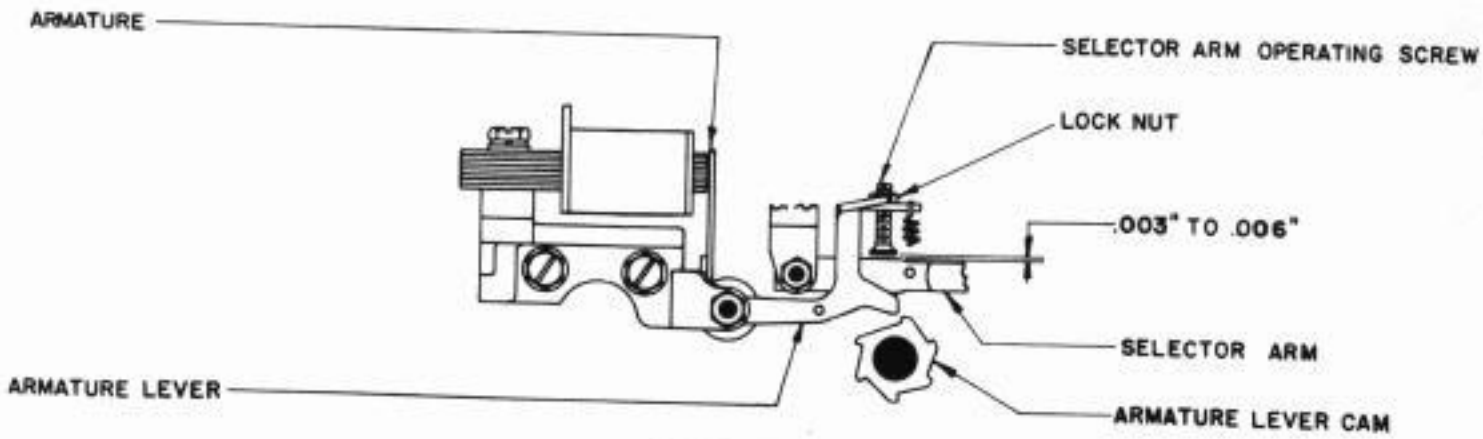


FIGURE 69



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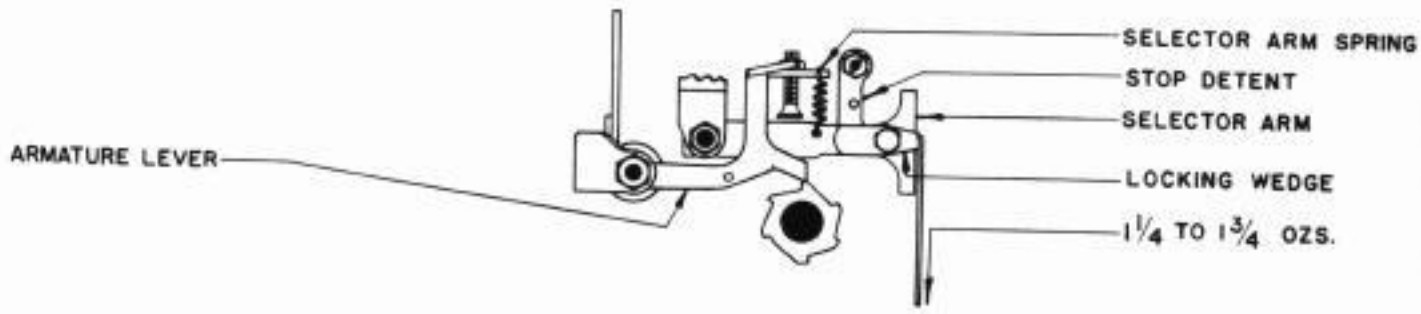

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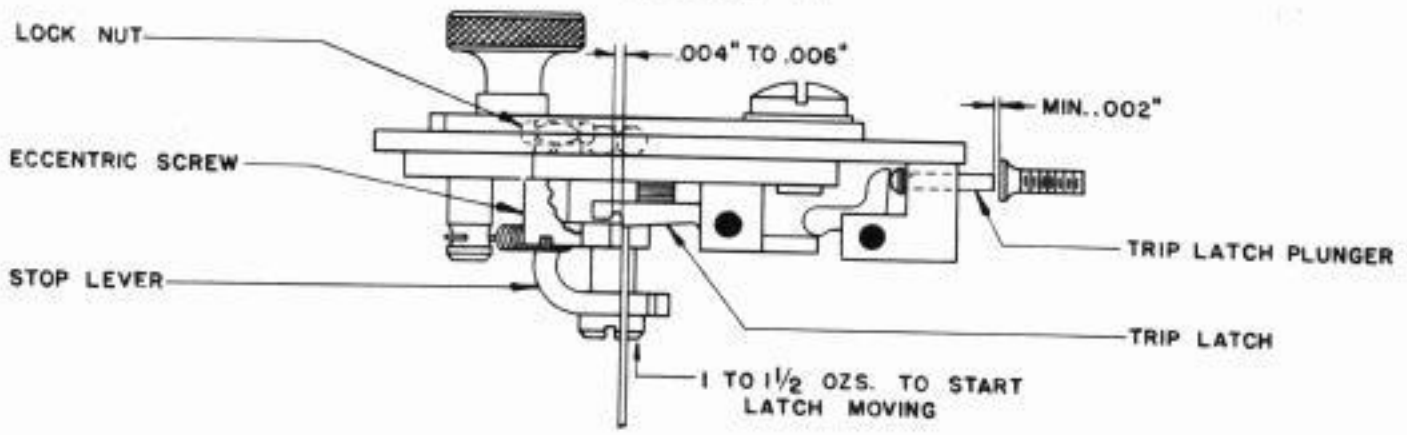

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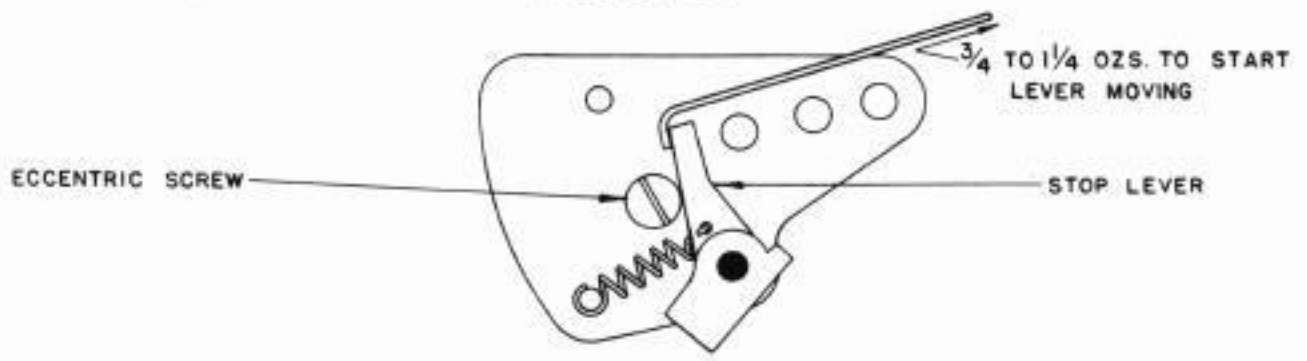

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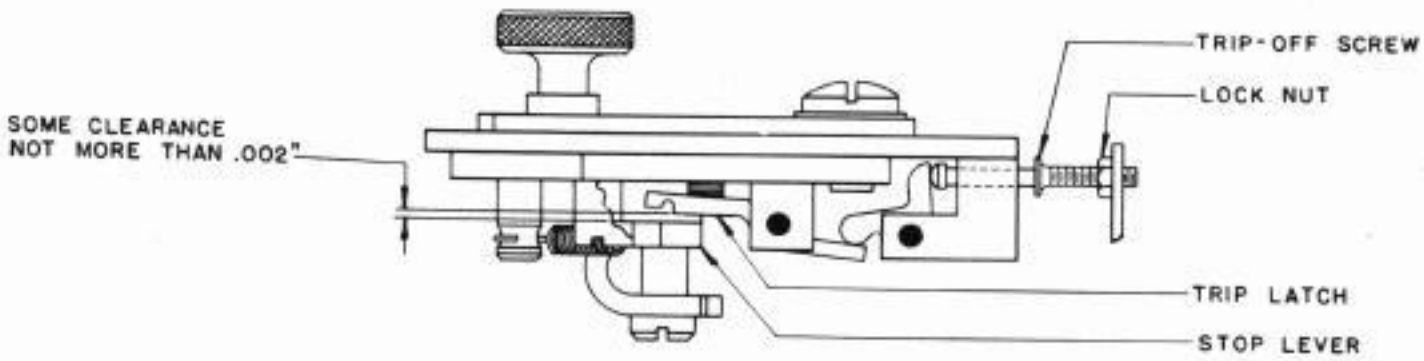

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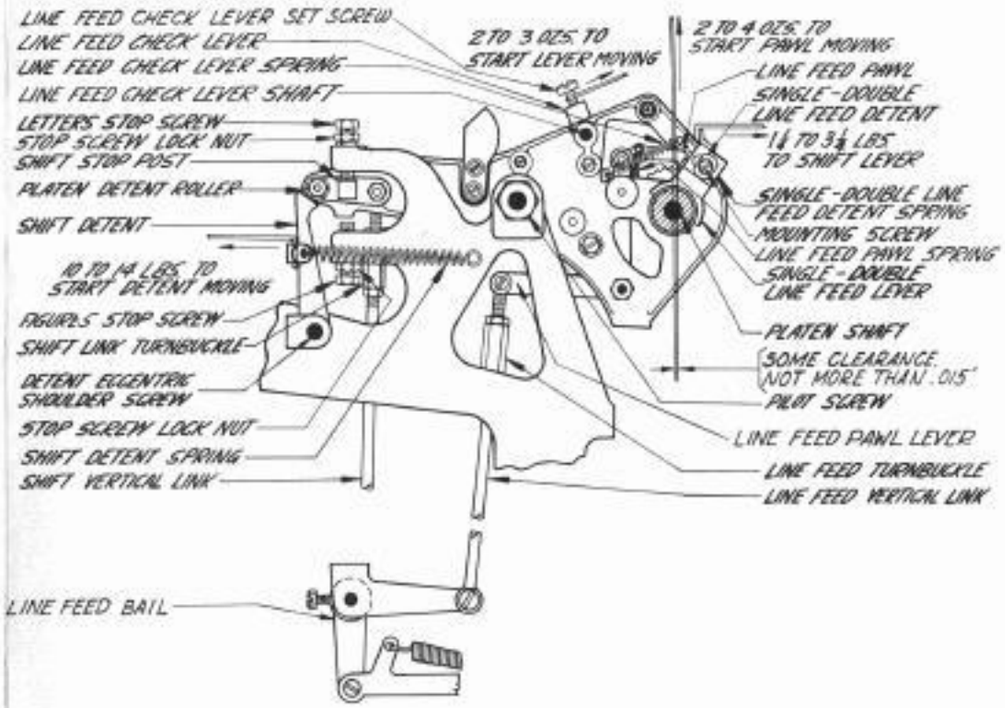

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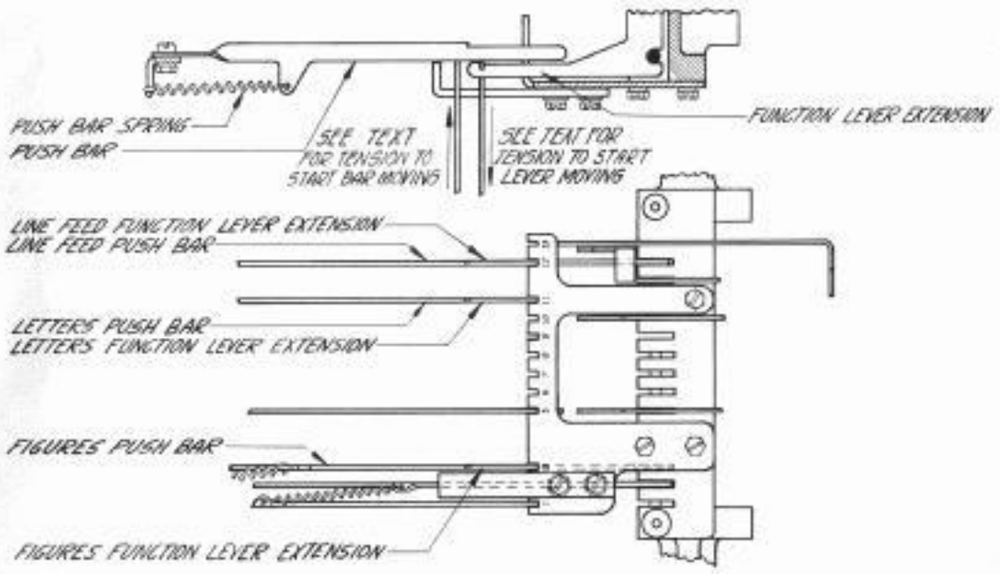

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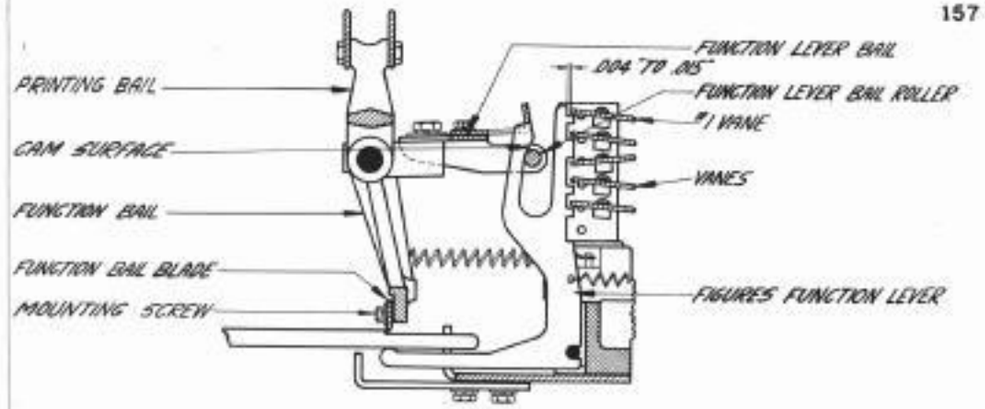

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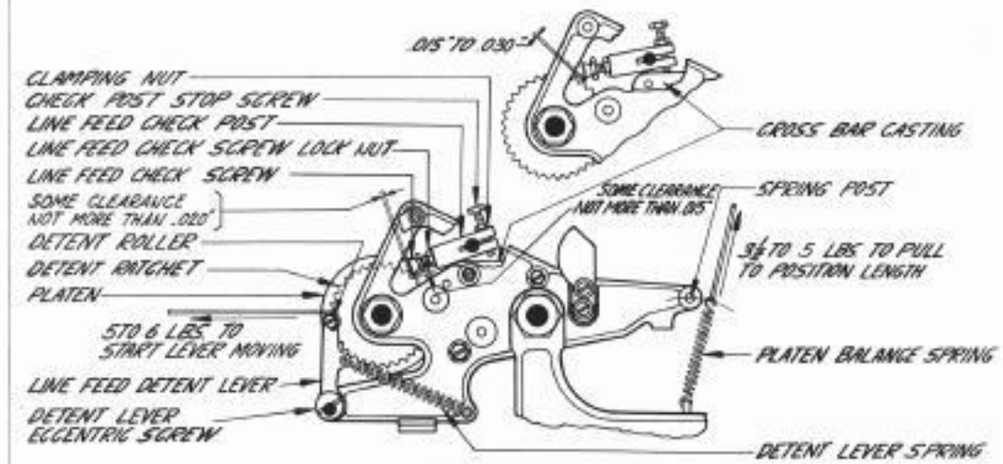

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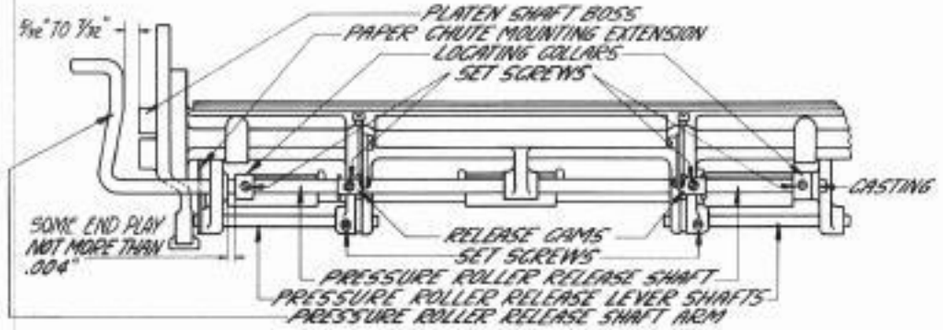

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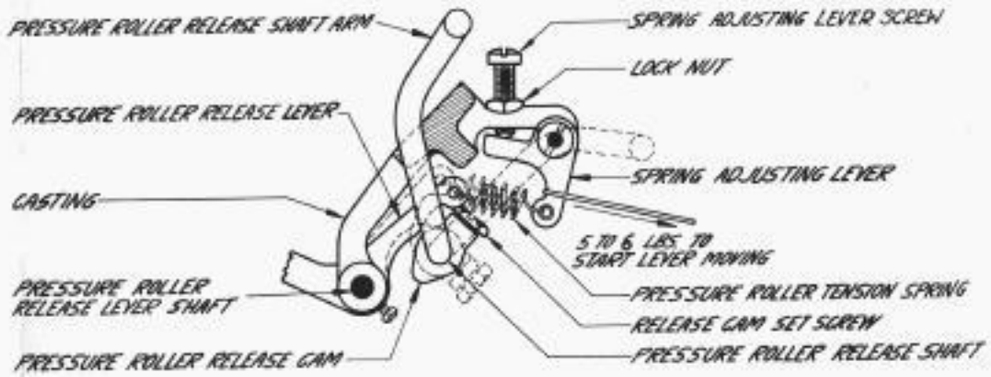

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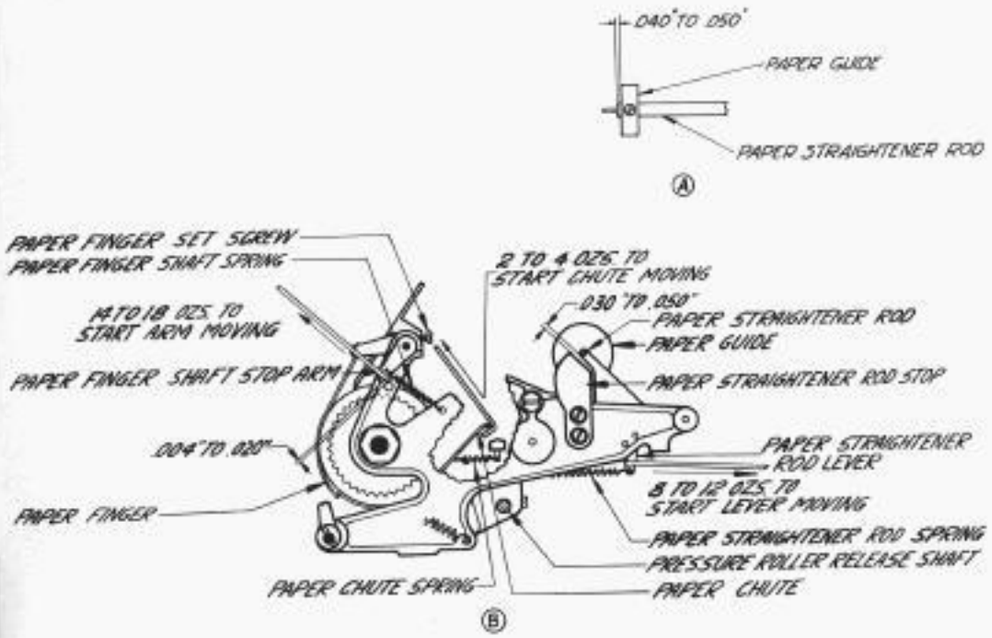
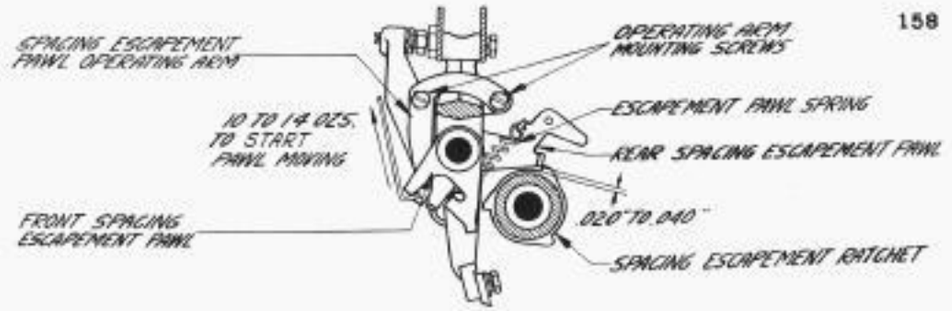


FIGURE 81



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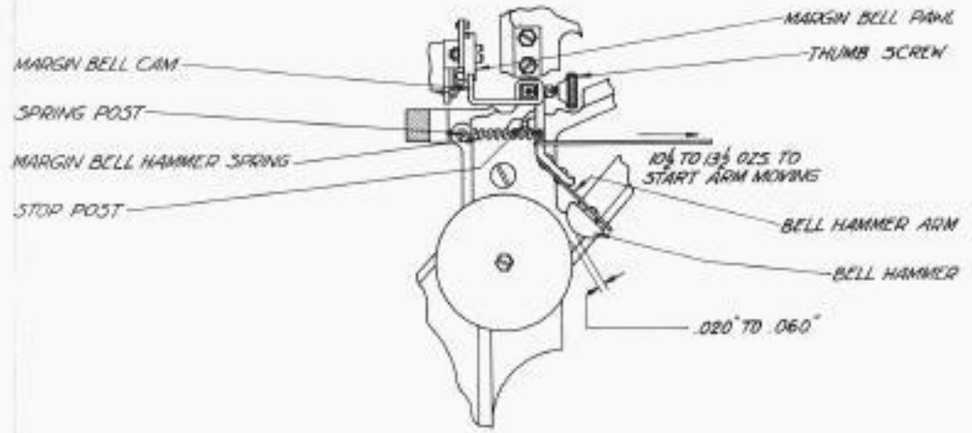

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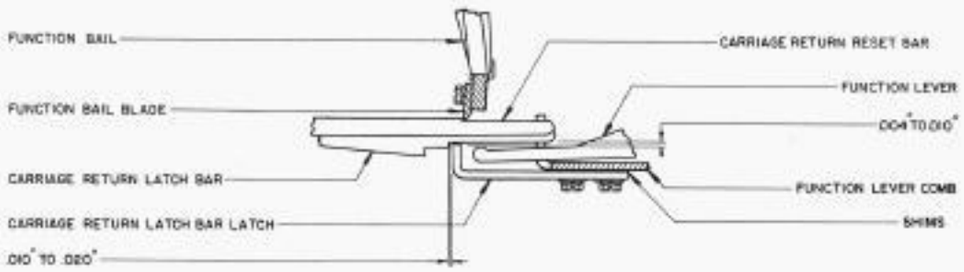

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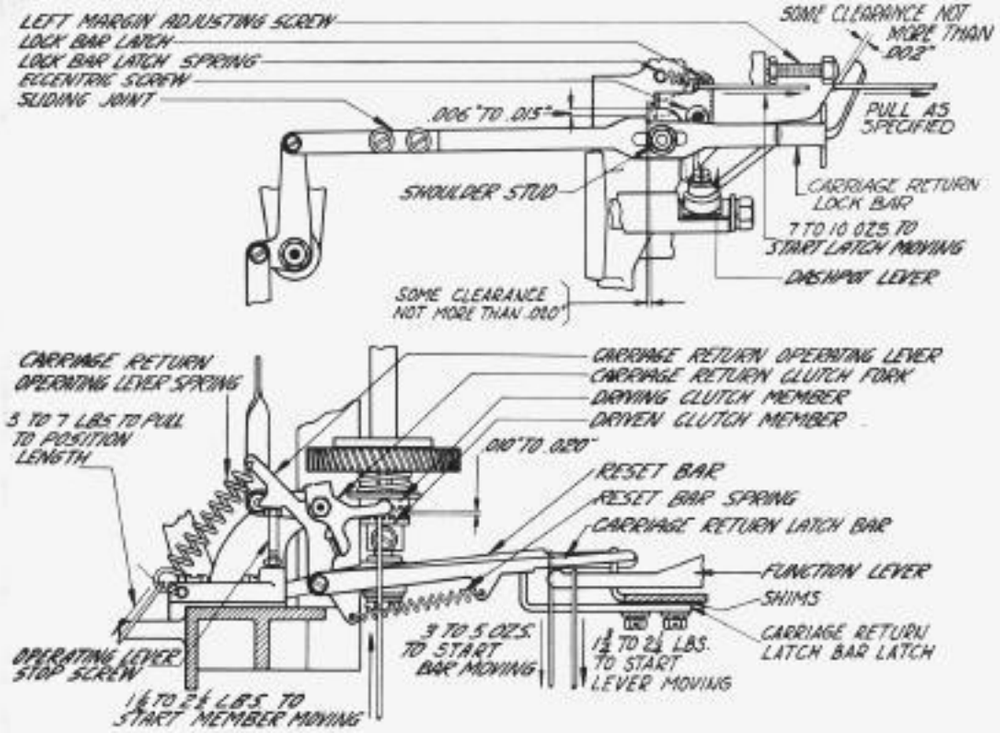

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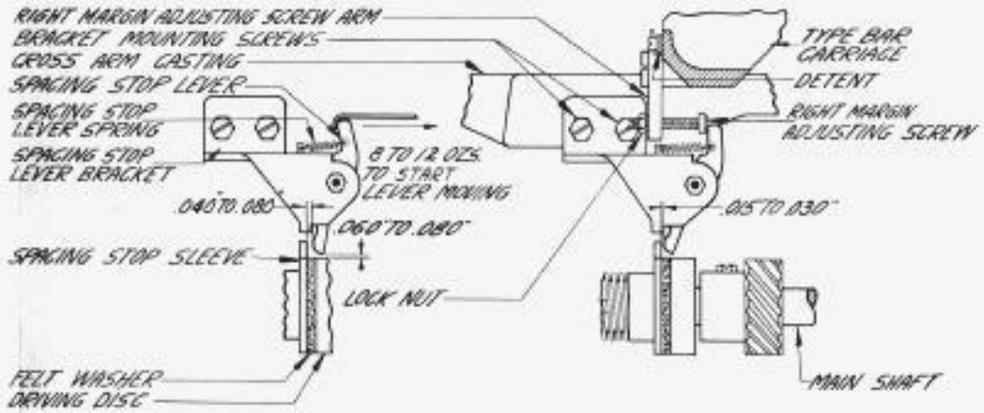

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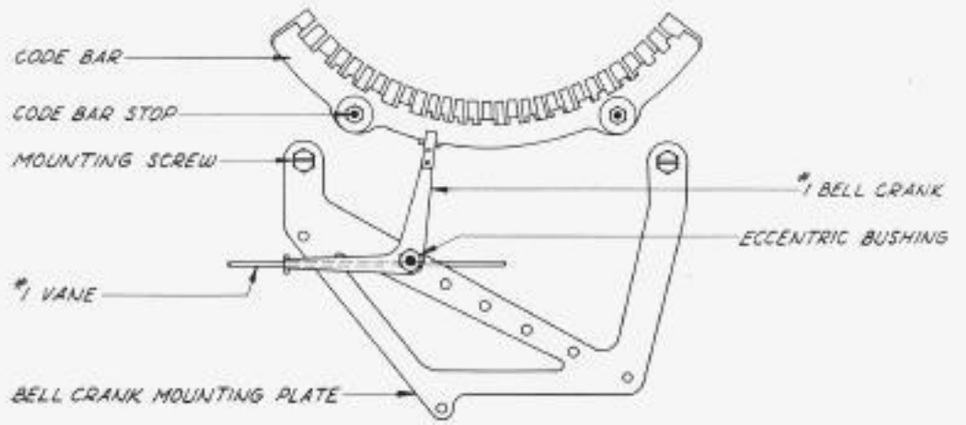

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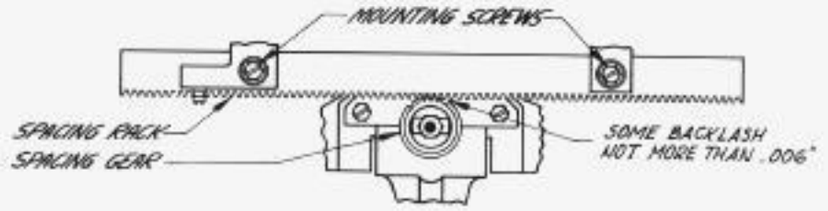

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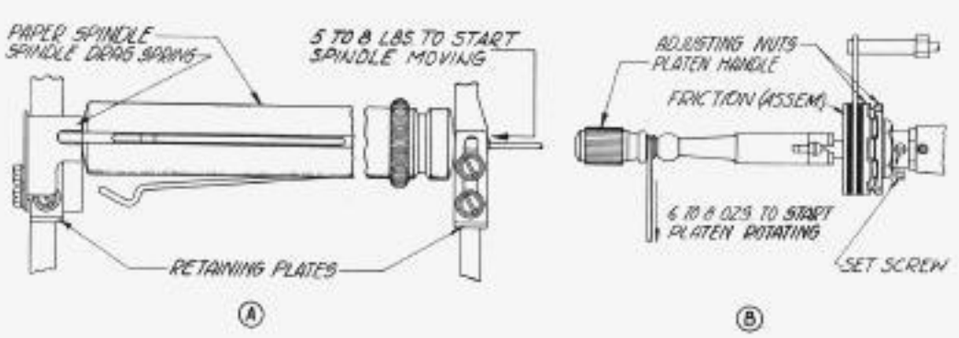

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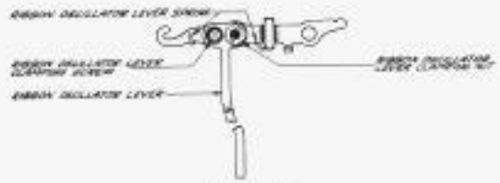

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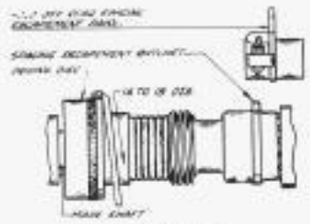
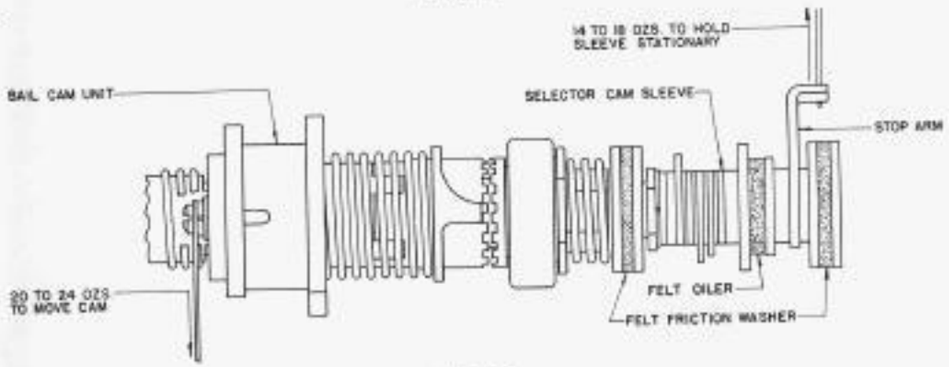


FIGURE 91



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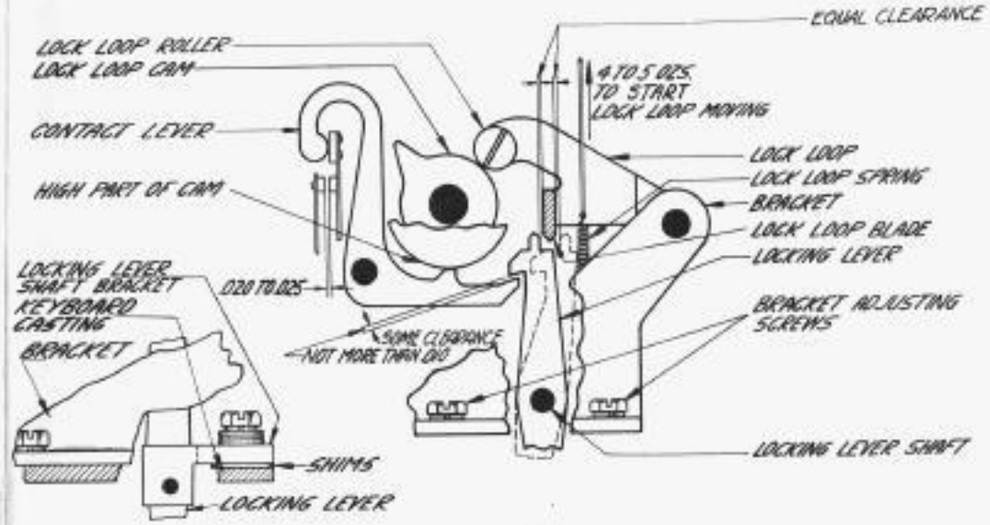
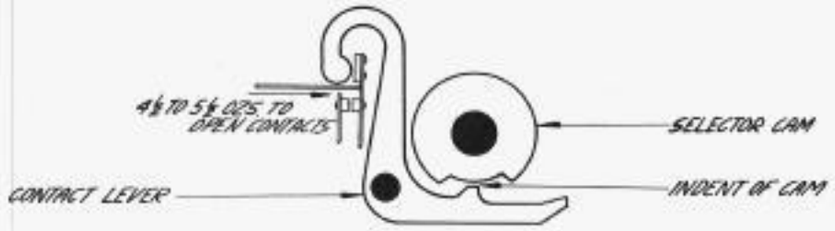


FIGURE 93



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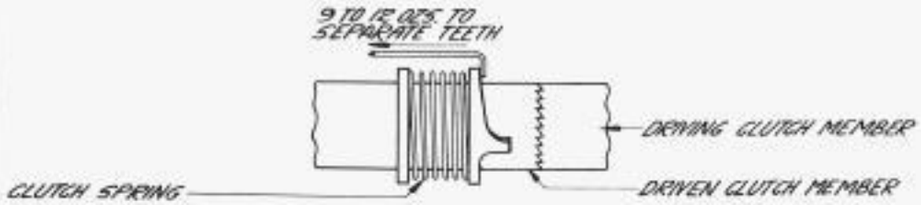

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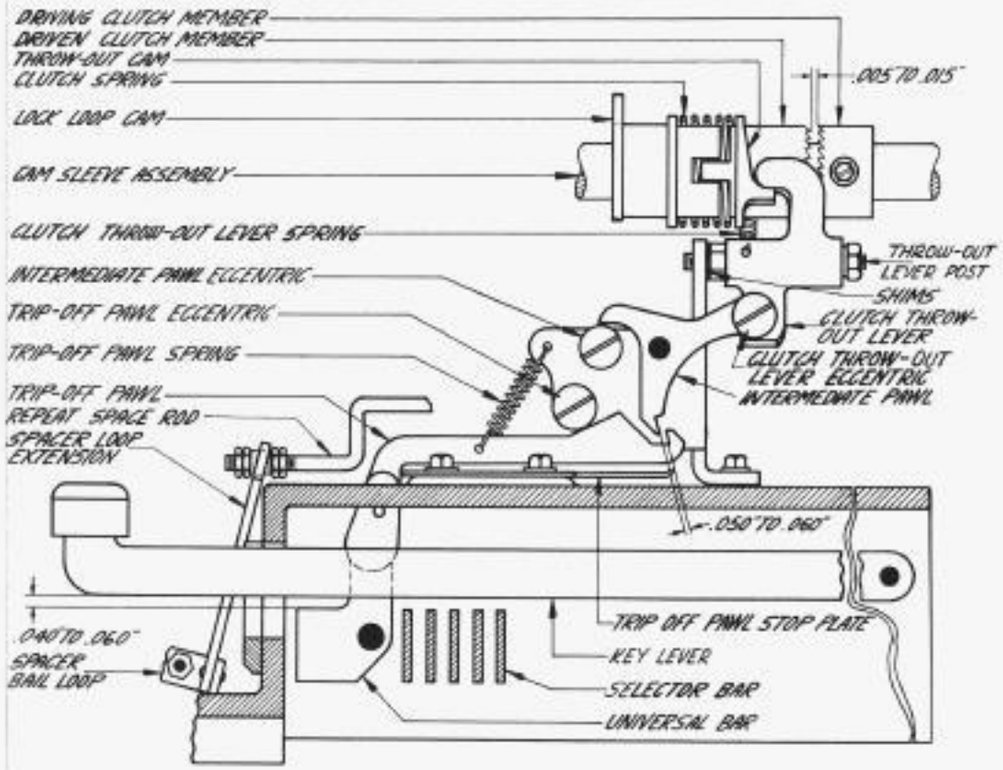

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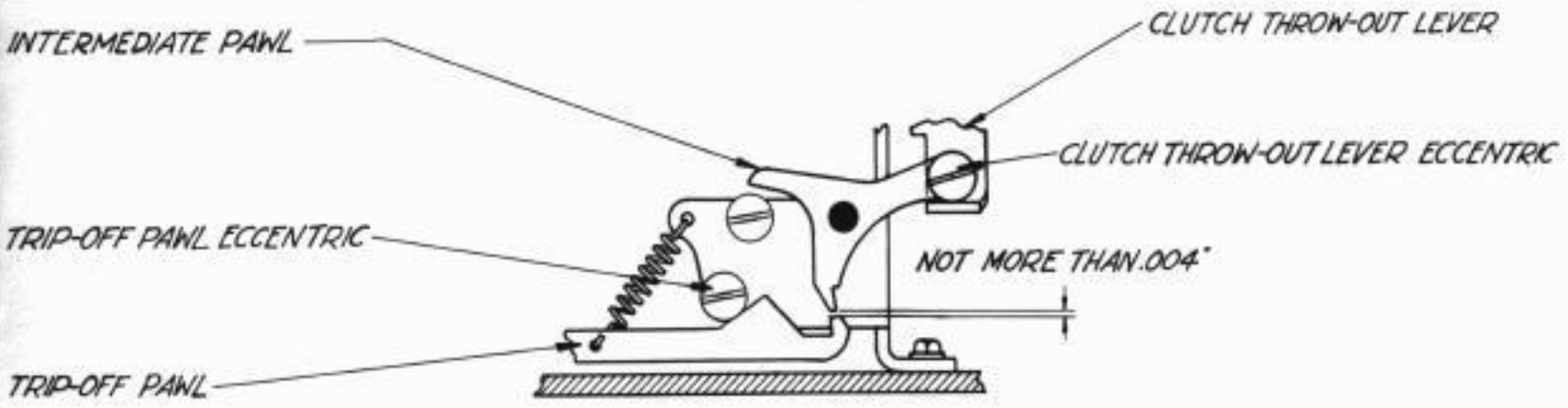


FIGURE 97

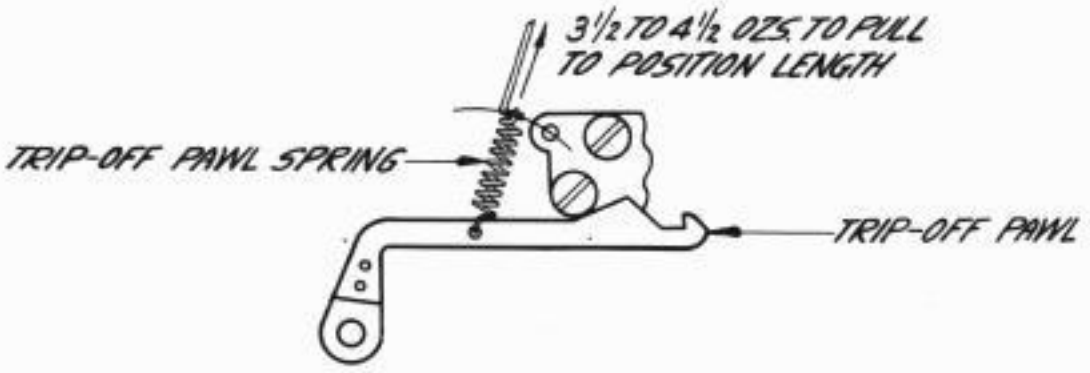


FIGURE 98

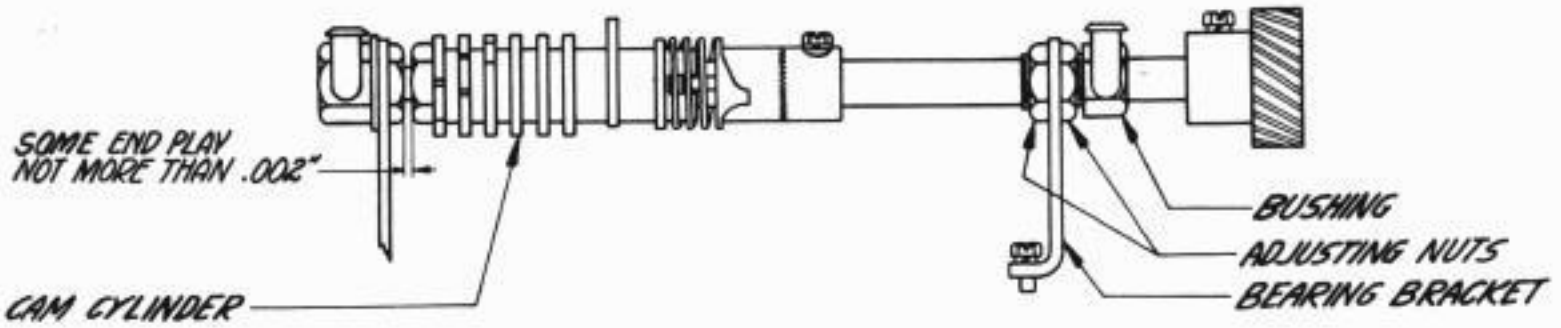


FIGURE 99

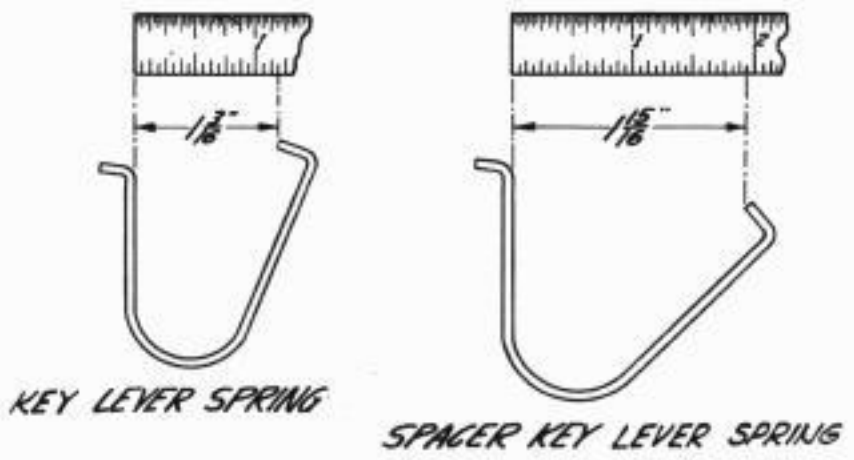
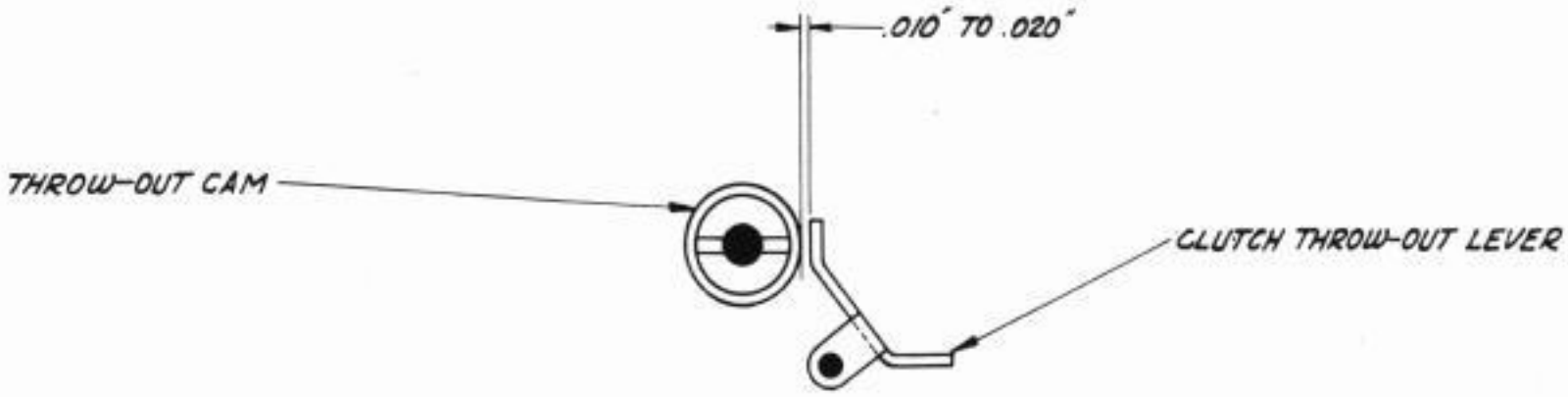


FIGURE 100



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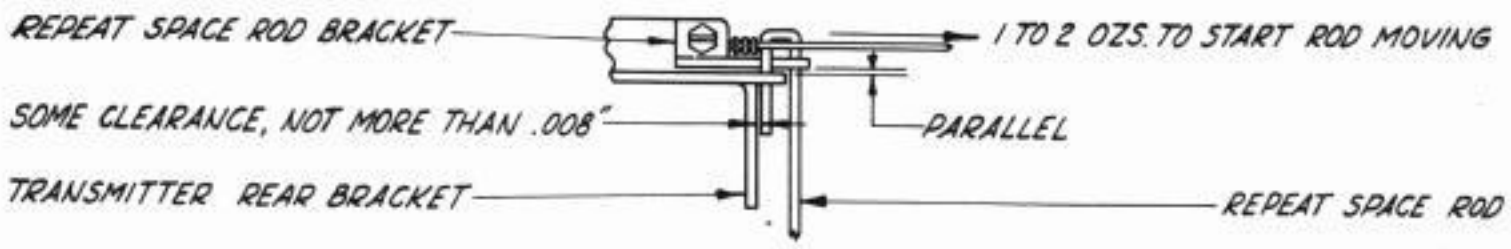


FIGURE 102

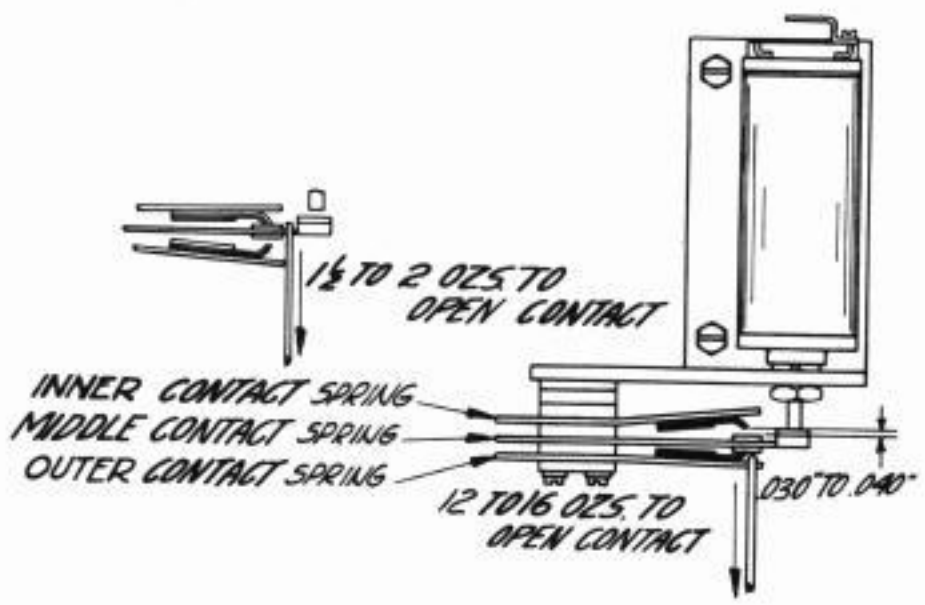
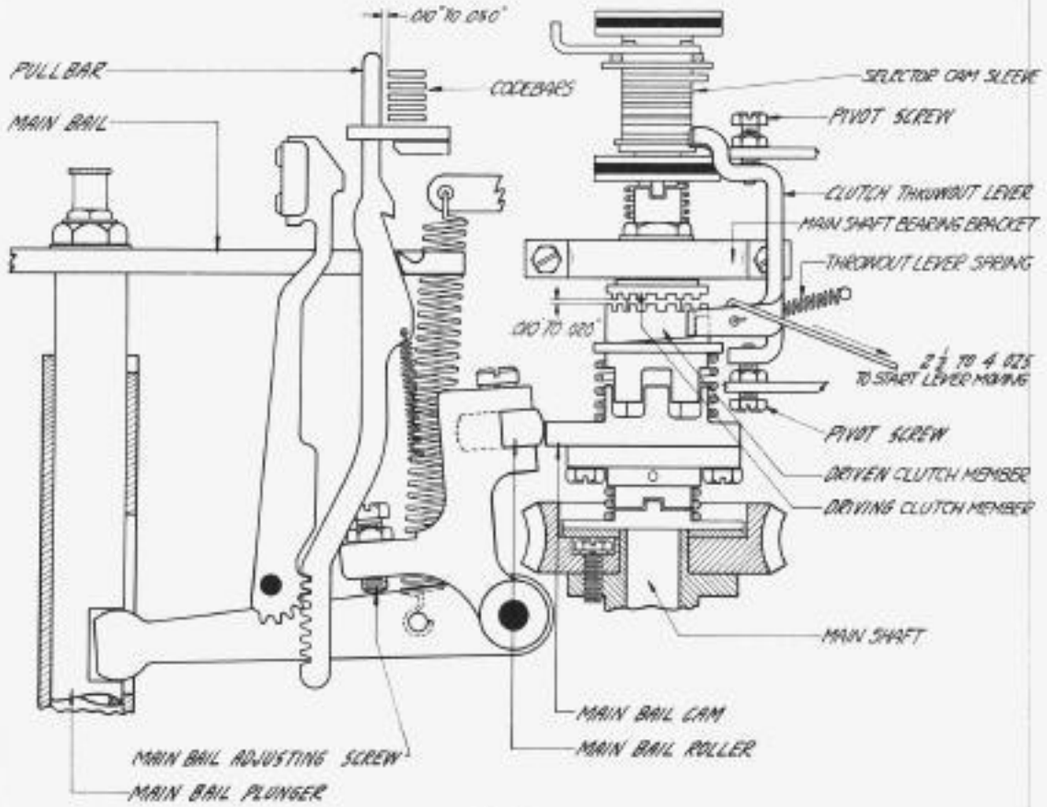


FIGURE 103



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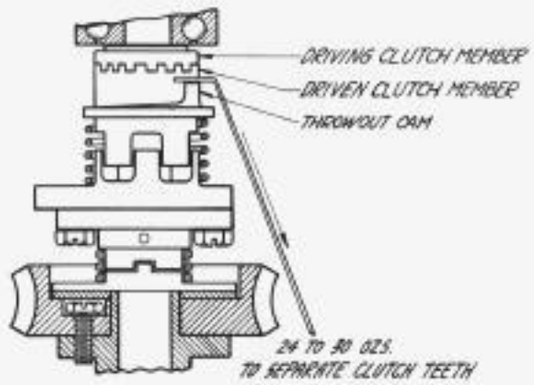

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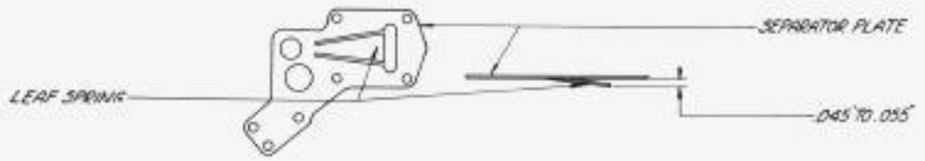


FIGURE 106

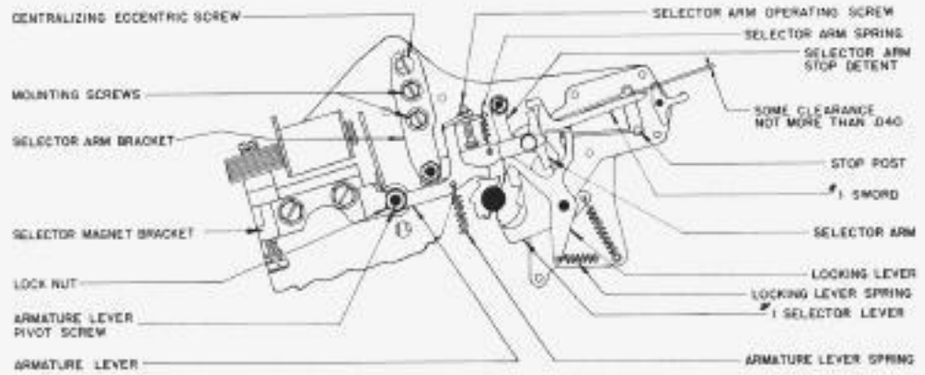


FIGURE 107

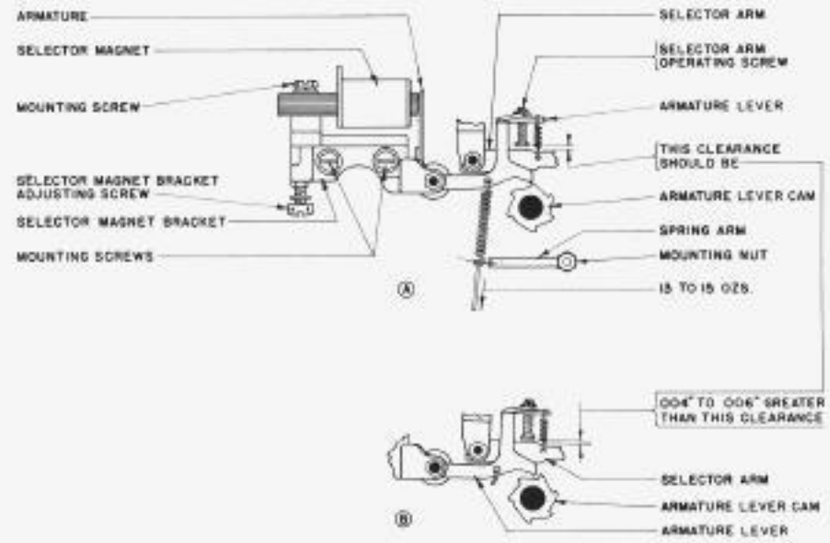


FIGURE 108

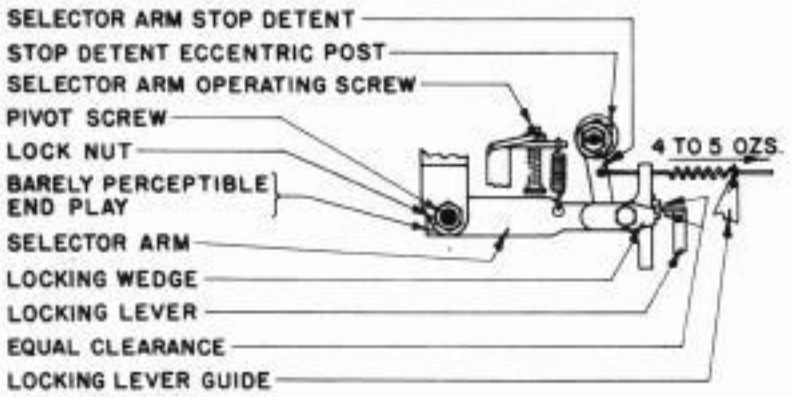


FIGURE 109

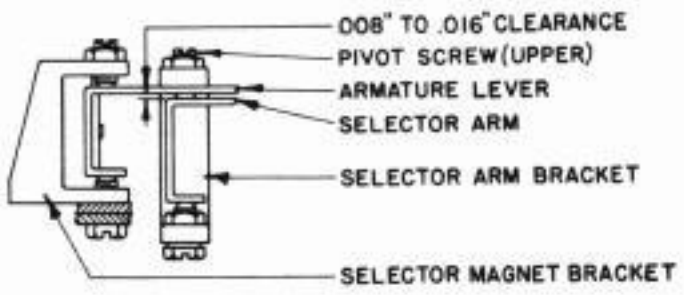


FIGURE 110

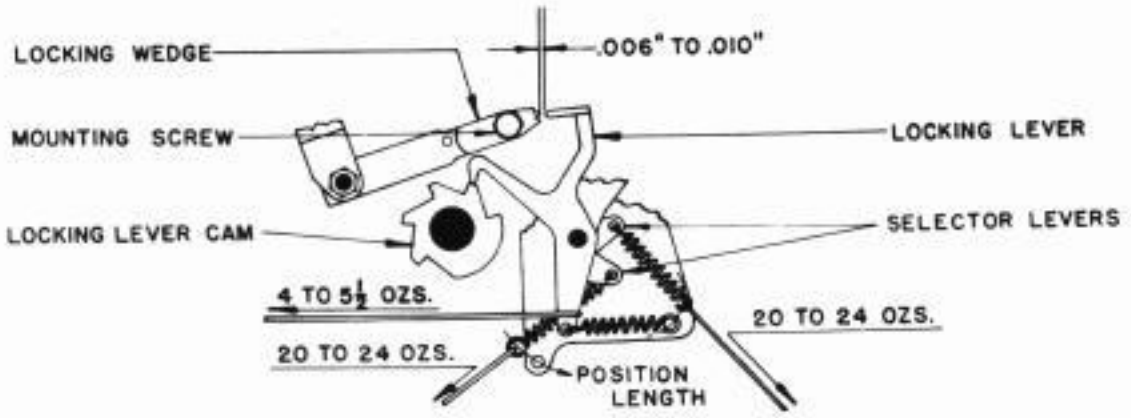


FIGURE 111

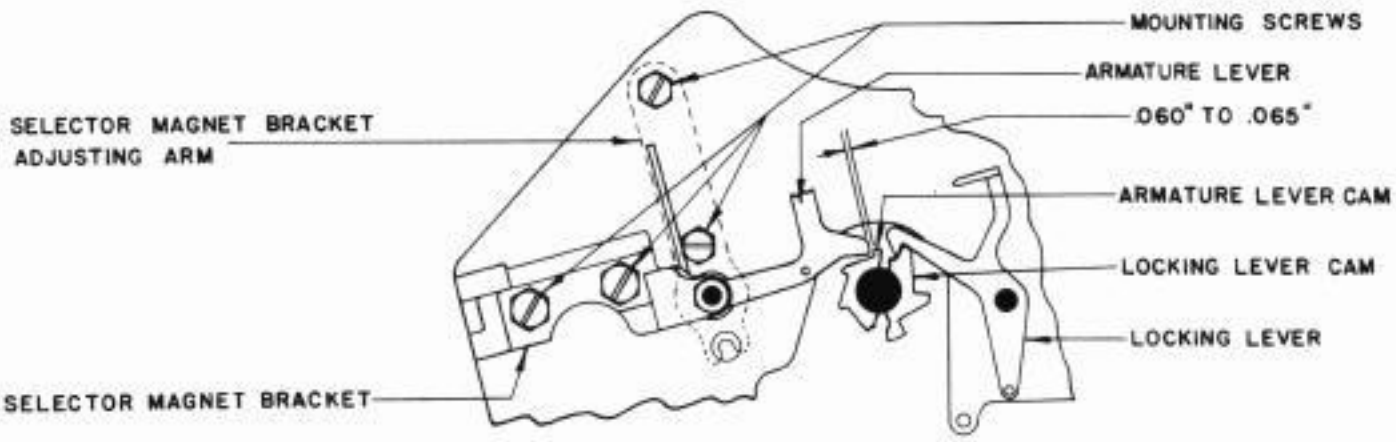


FIGURE 112

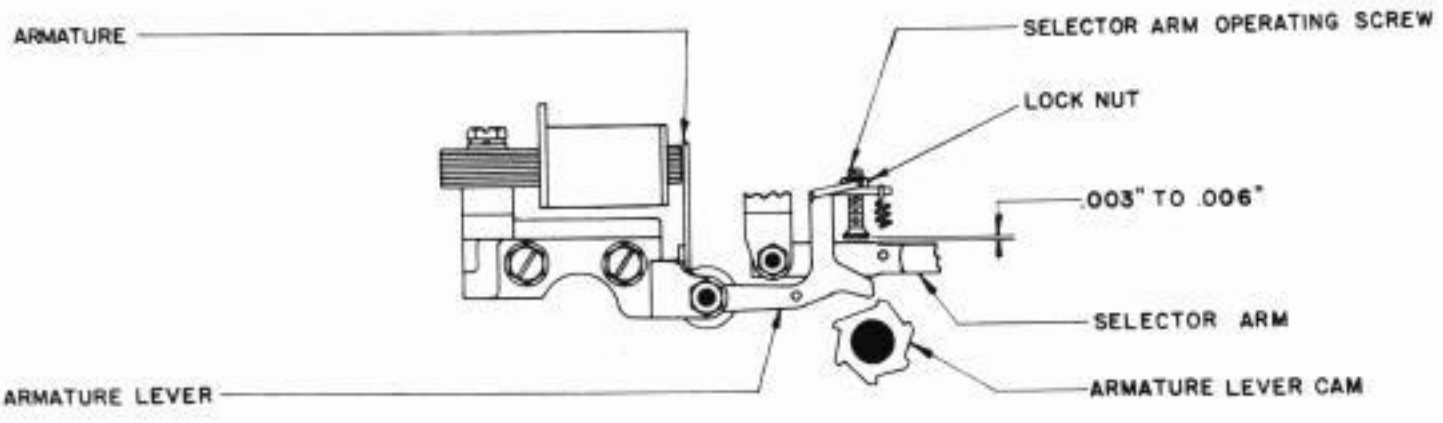
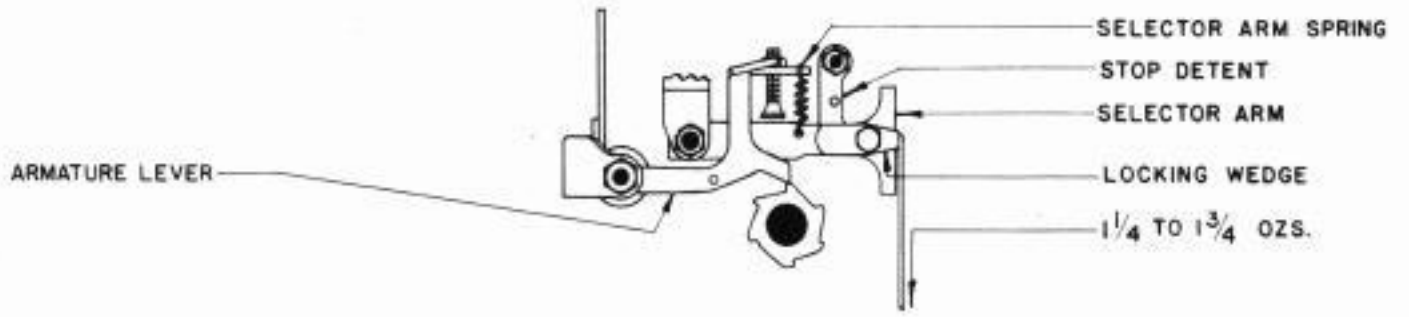


FIGURE 113



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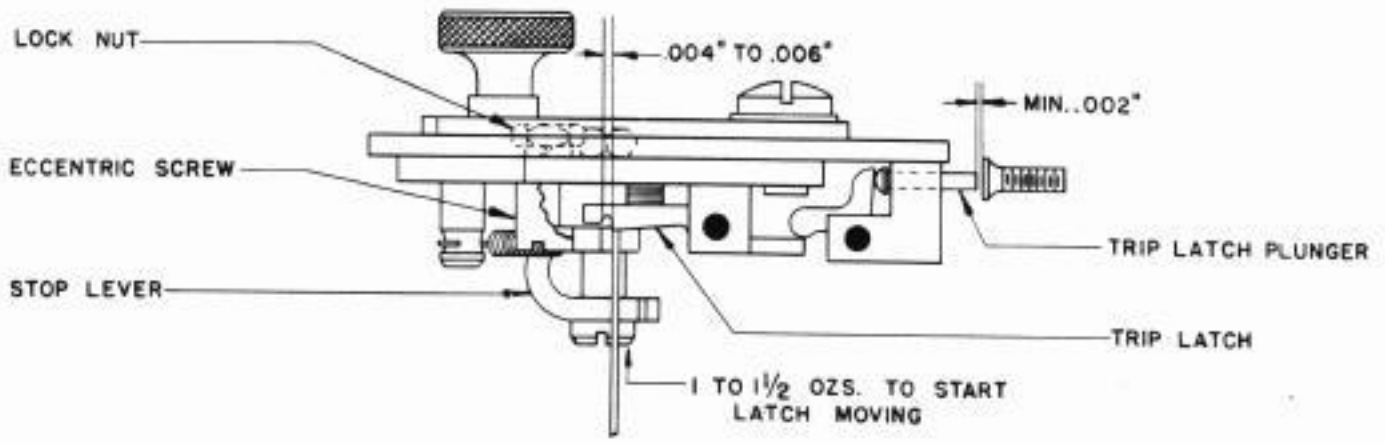


FIGURE 115

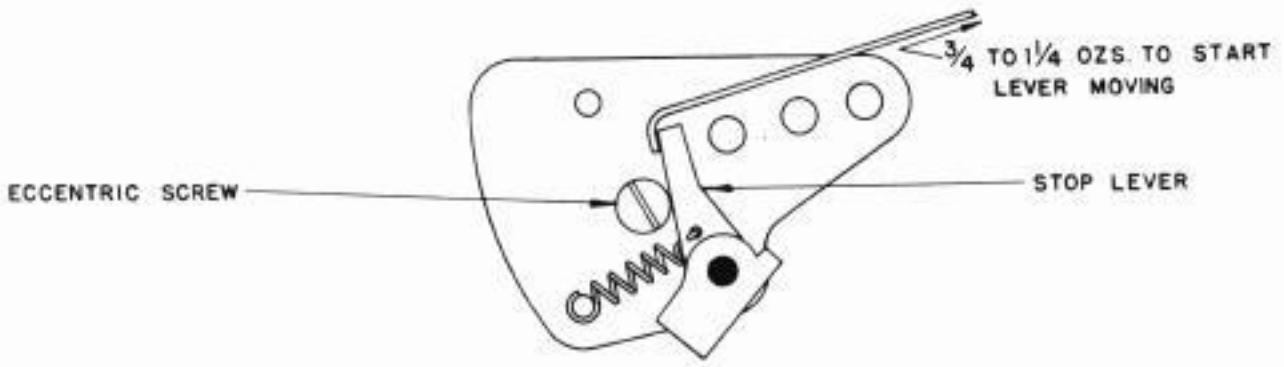


FIGURE 116

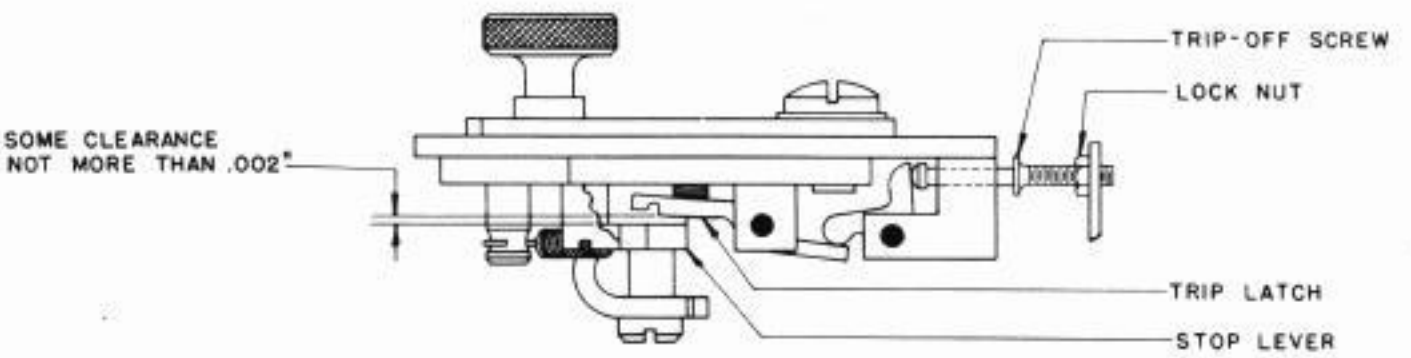


FIGURE 117

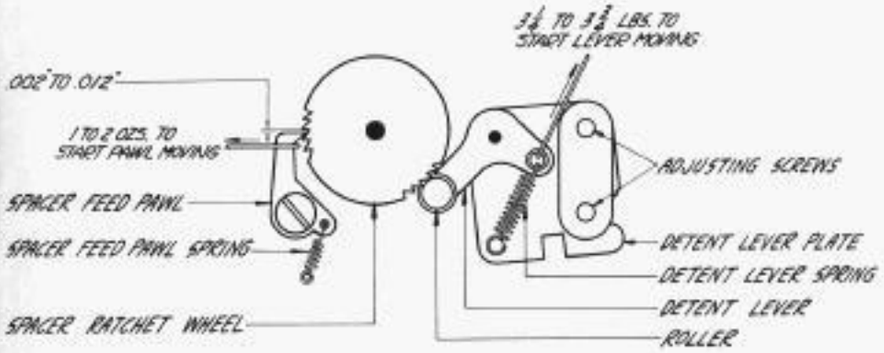


FIGURE 118

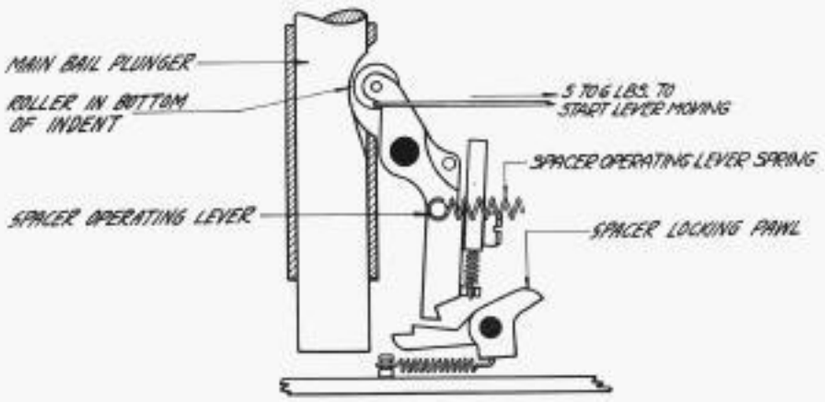


FIGURE 119

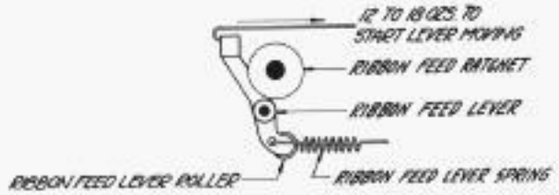


FIGURE 120

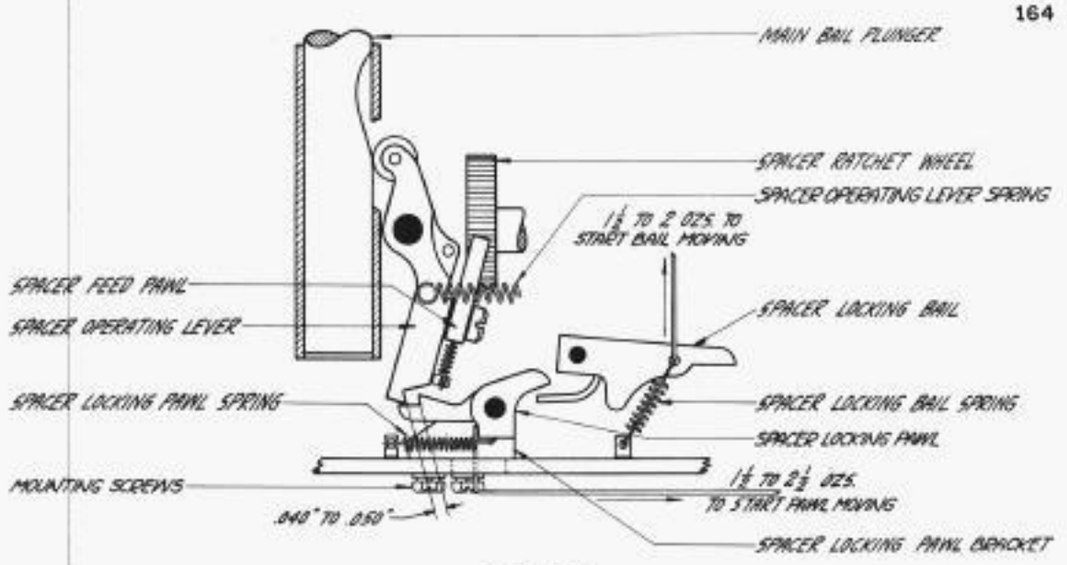


FIGURE 121

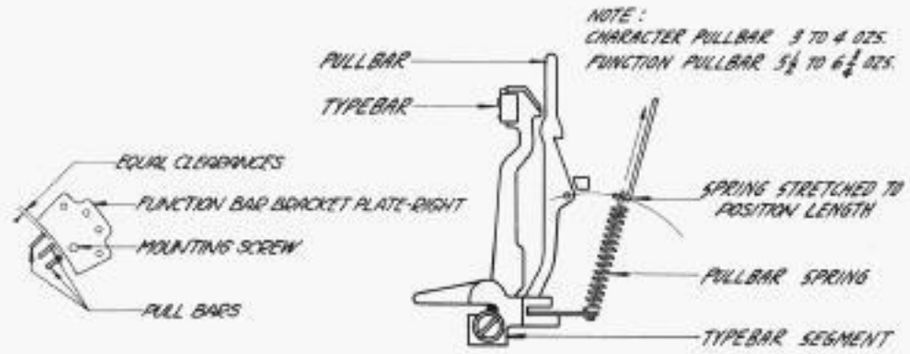


FIGURE 122

FIGURE 123

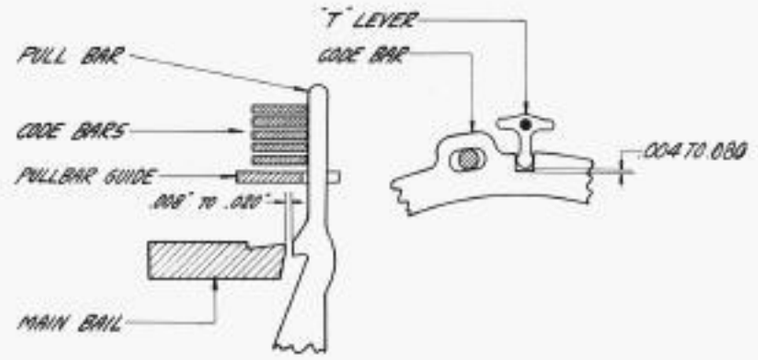


FIGURE 124

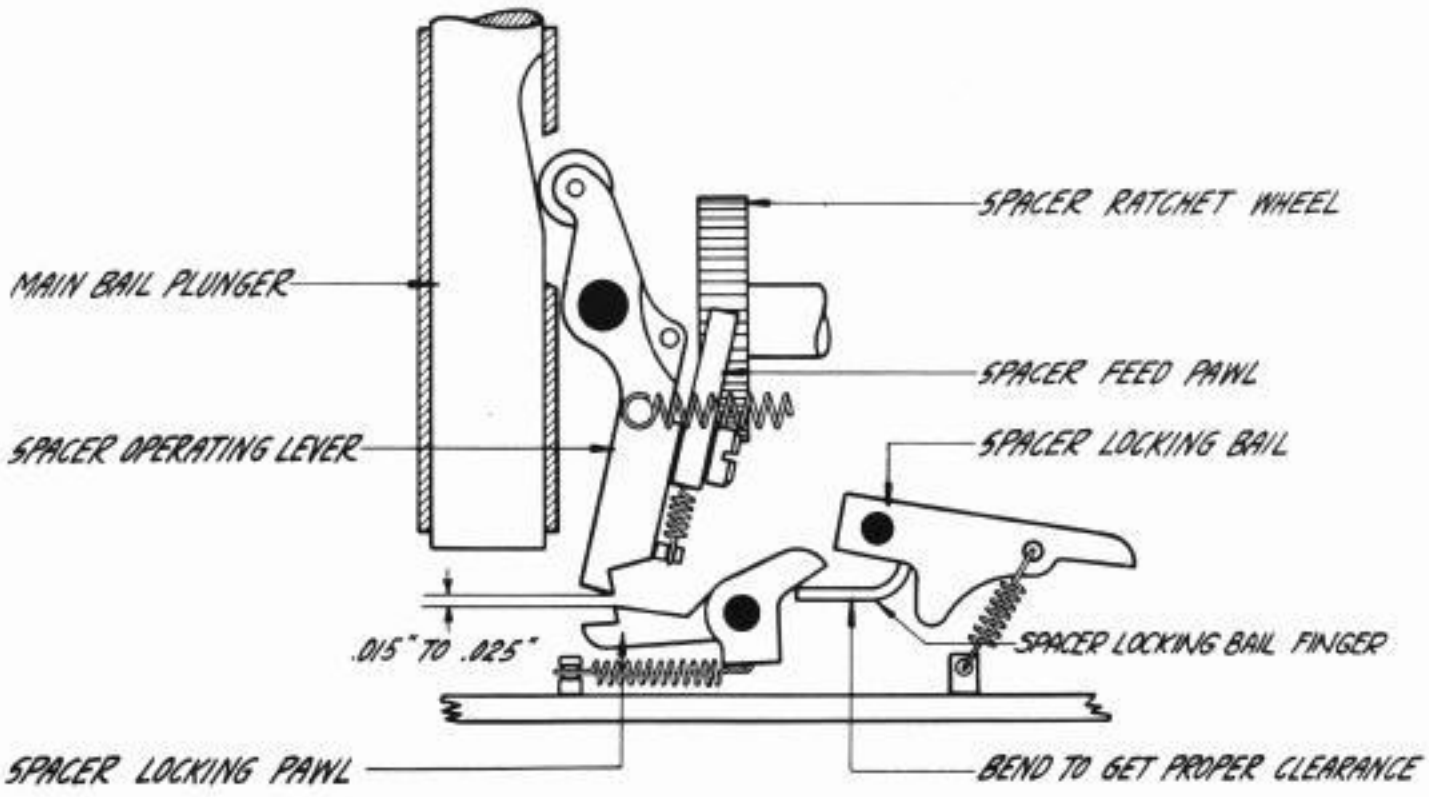


FIGURE 125

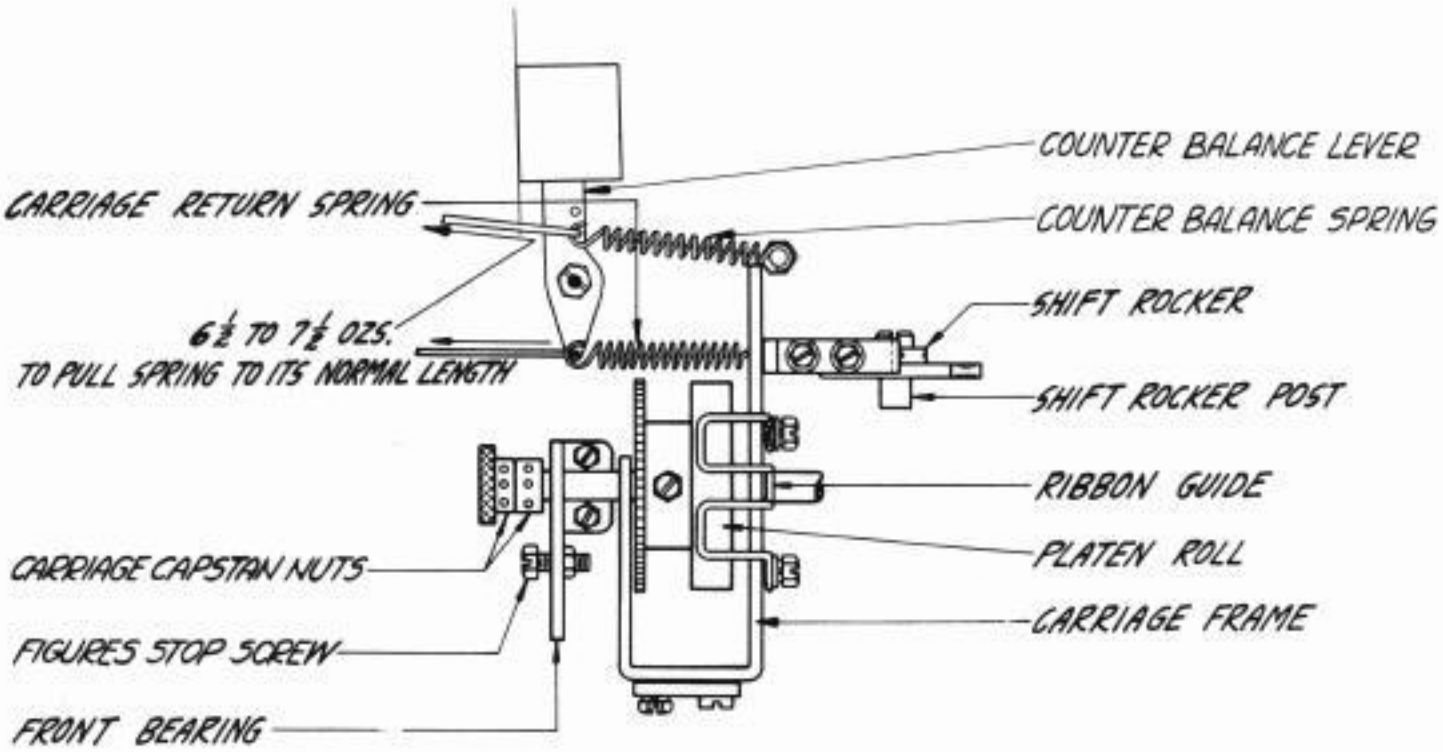


FIGURE 126

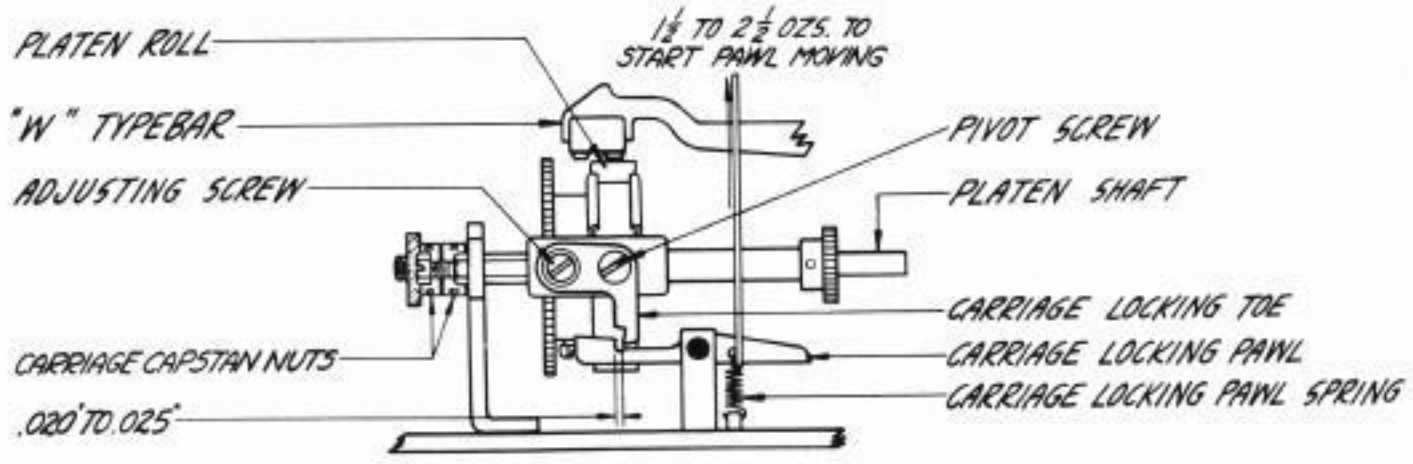


FIGURE 127

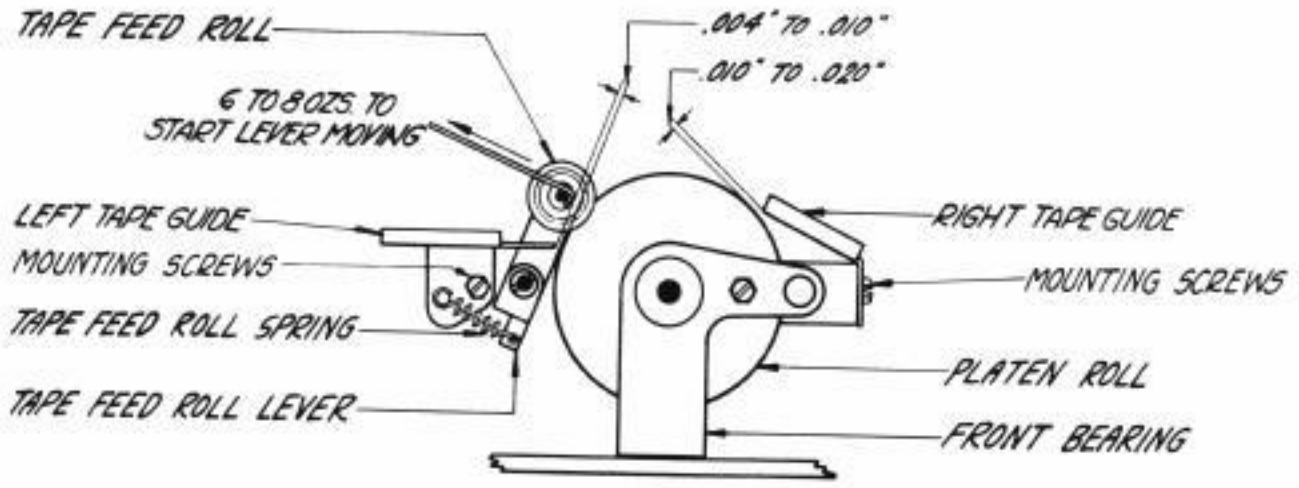


FIGURE 128

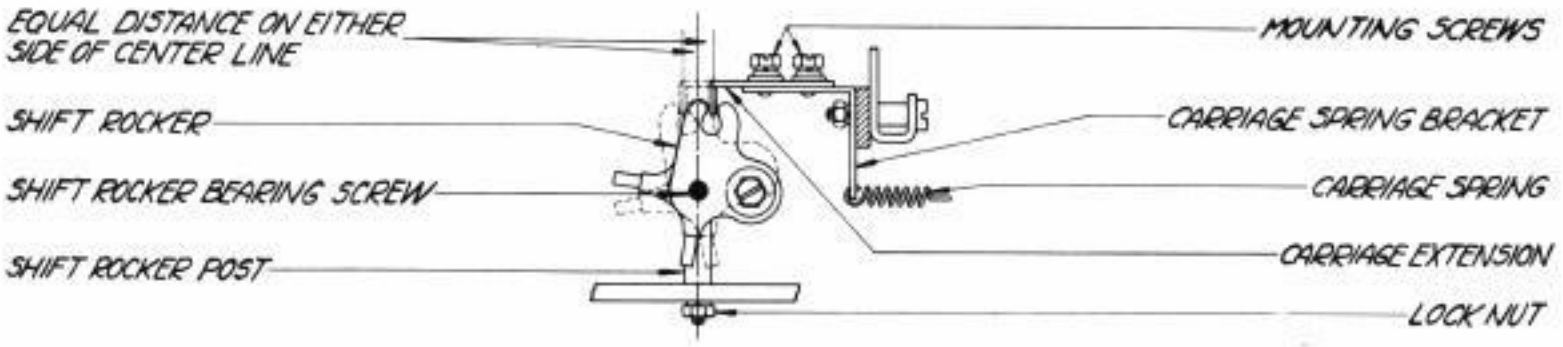


FIGURE 129

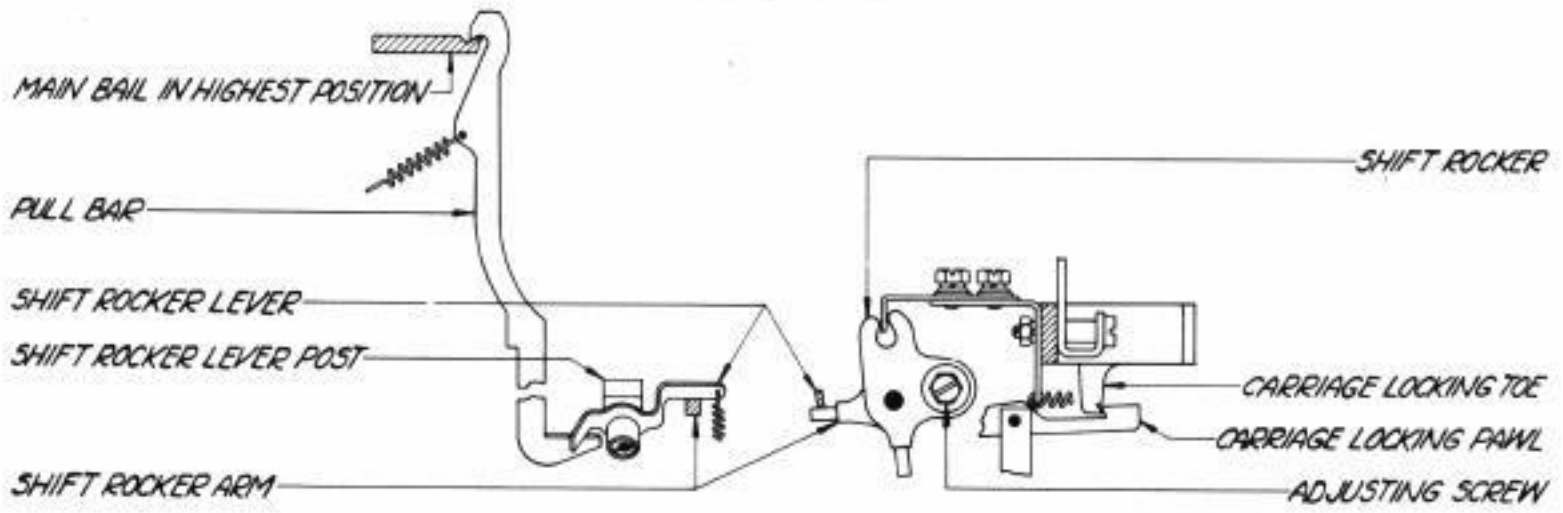


FIGURE 130

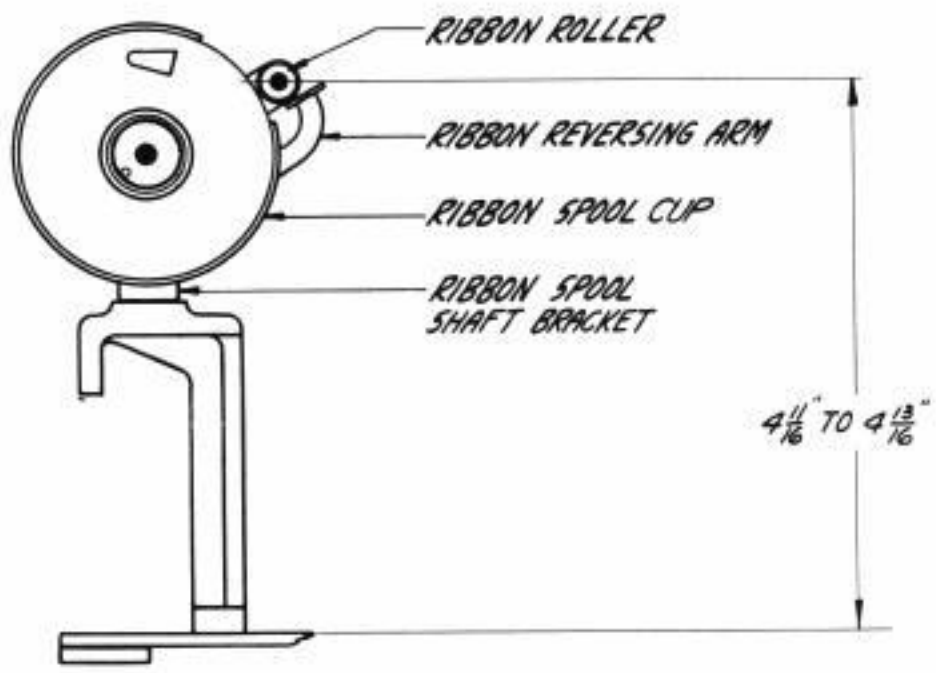


FIGURE 131

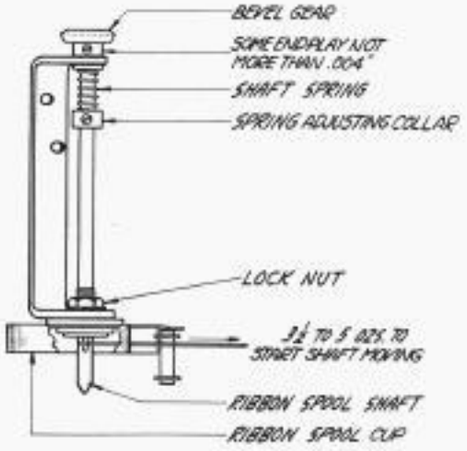


FIGURE 132

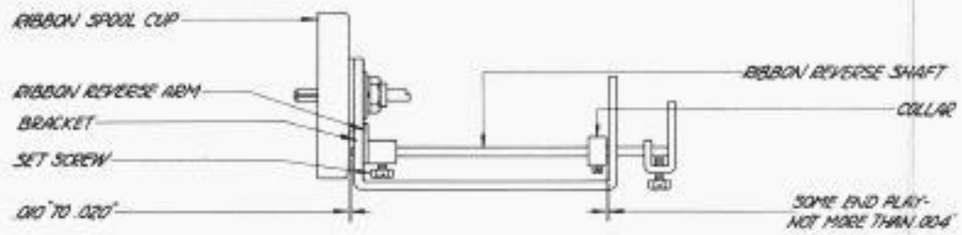


FIGURE 133

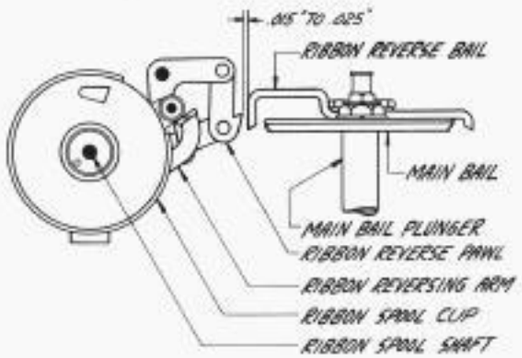


FIGURE 134

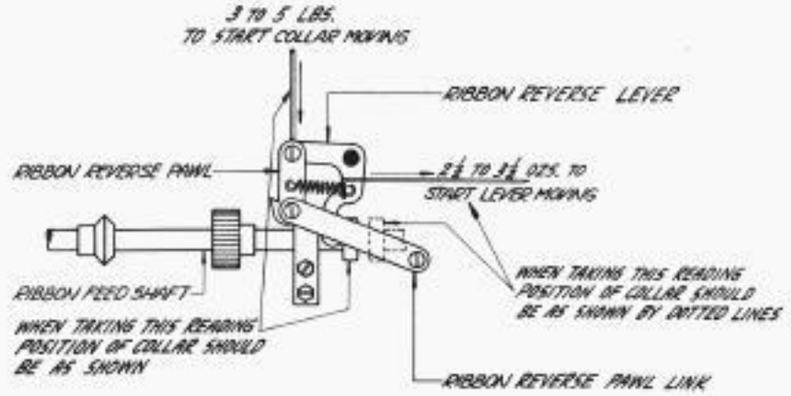


FIGURE 135

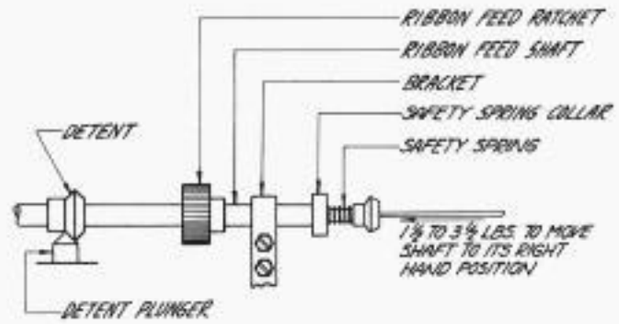


FIGURE 136

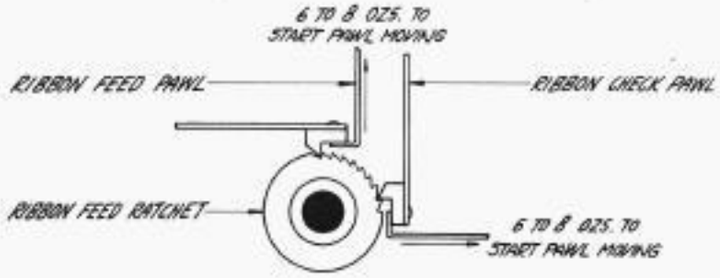


FIGURE 137

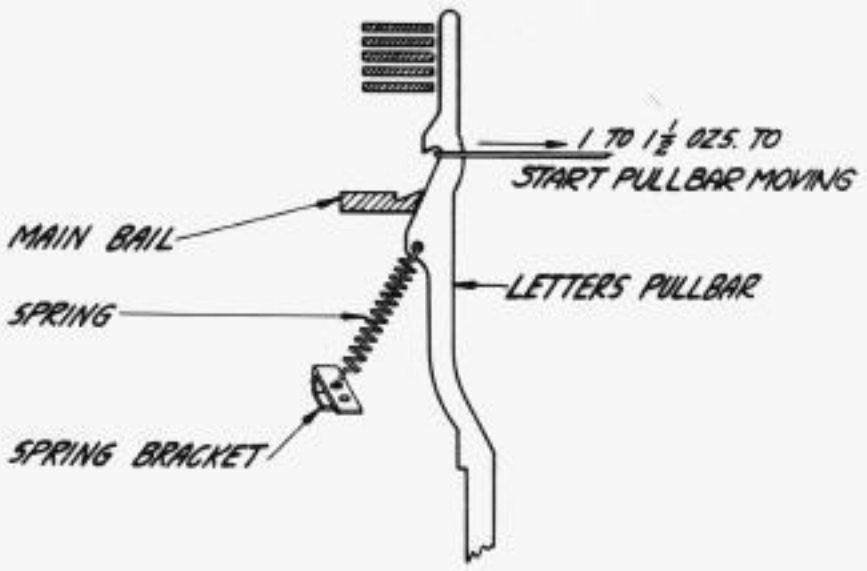


FIGURE 138

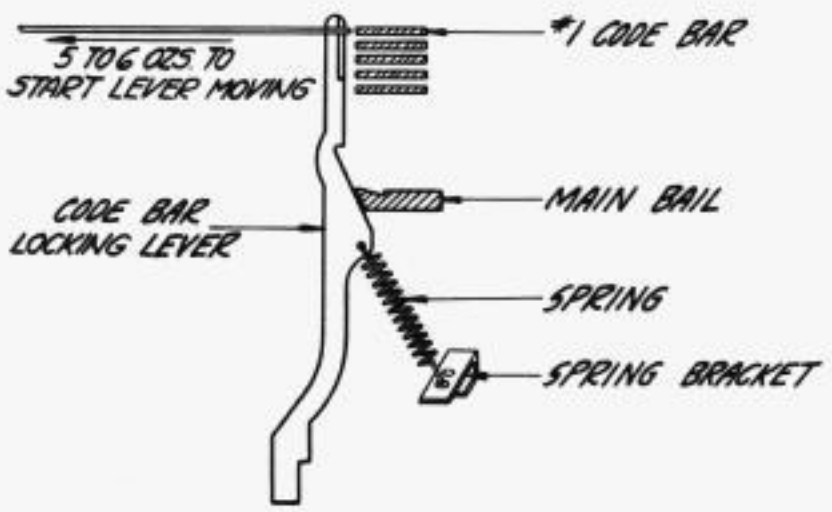


FIGURE 139

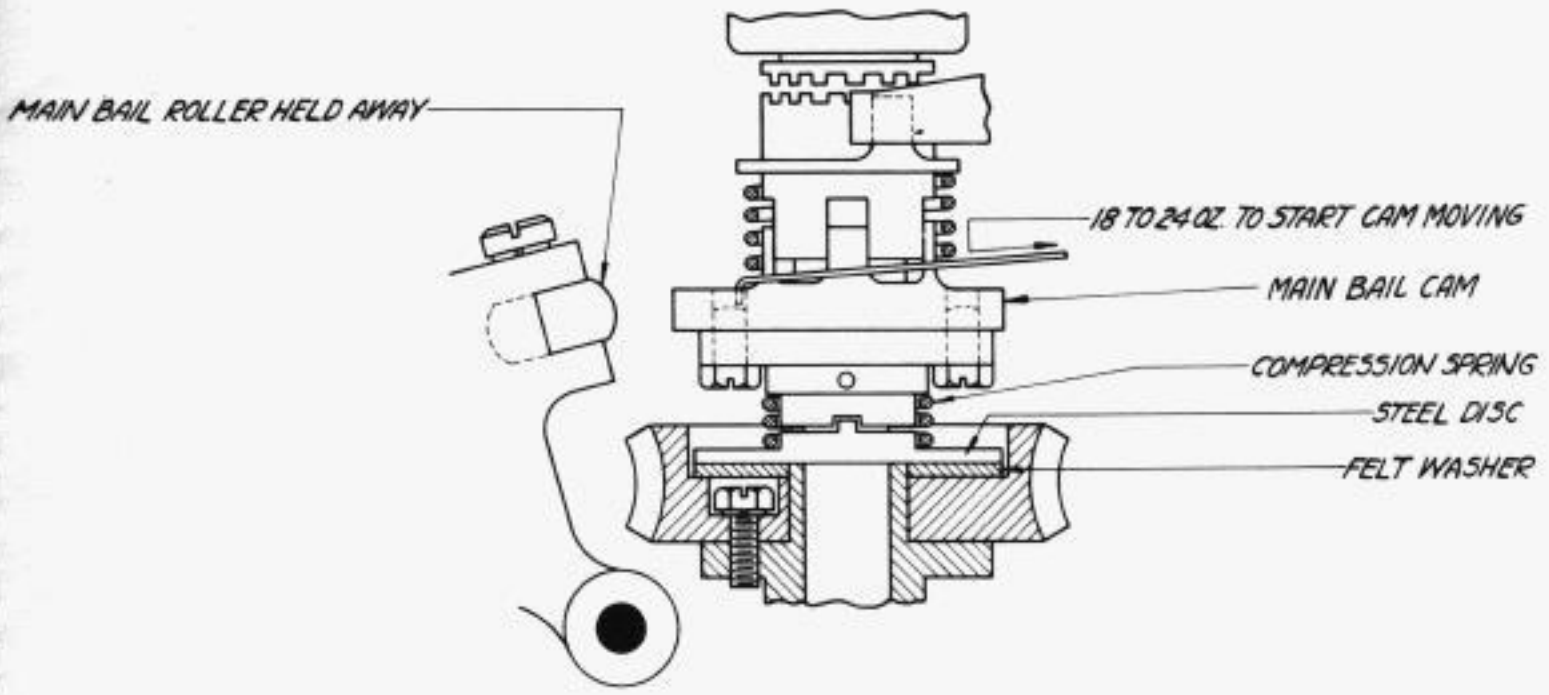


FIGURE 140

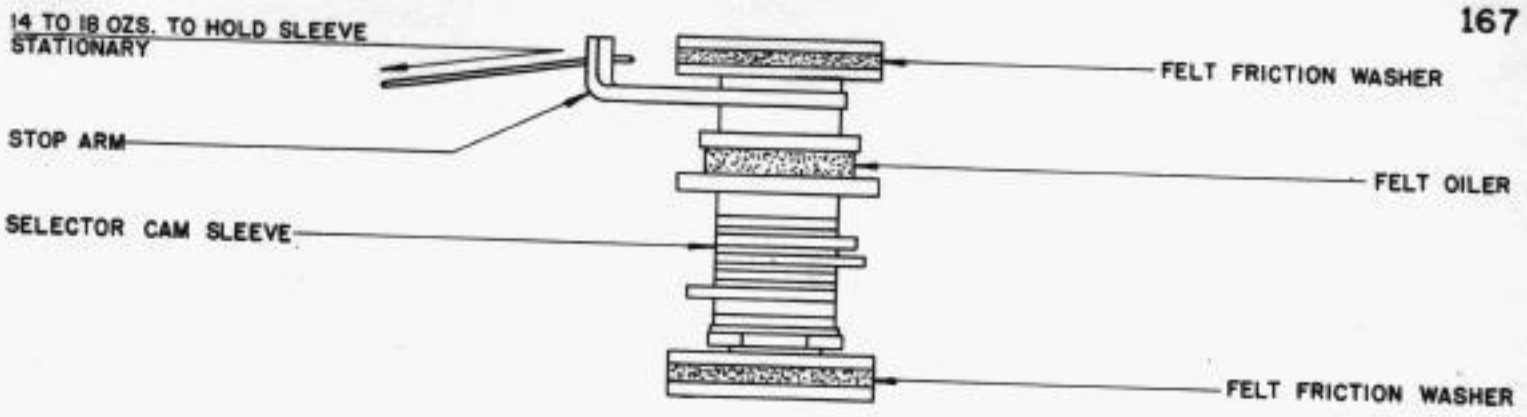
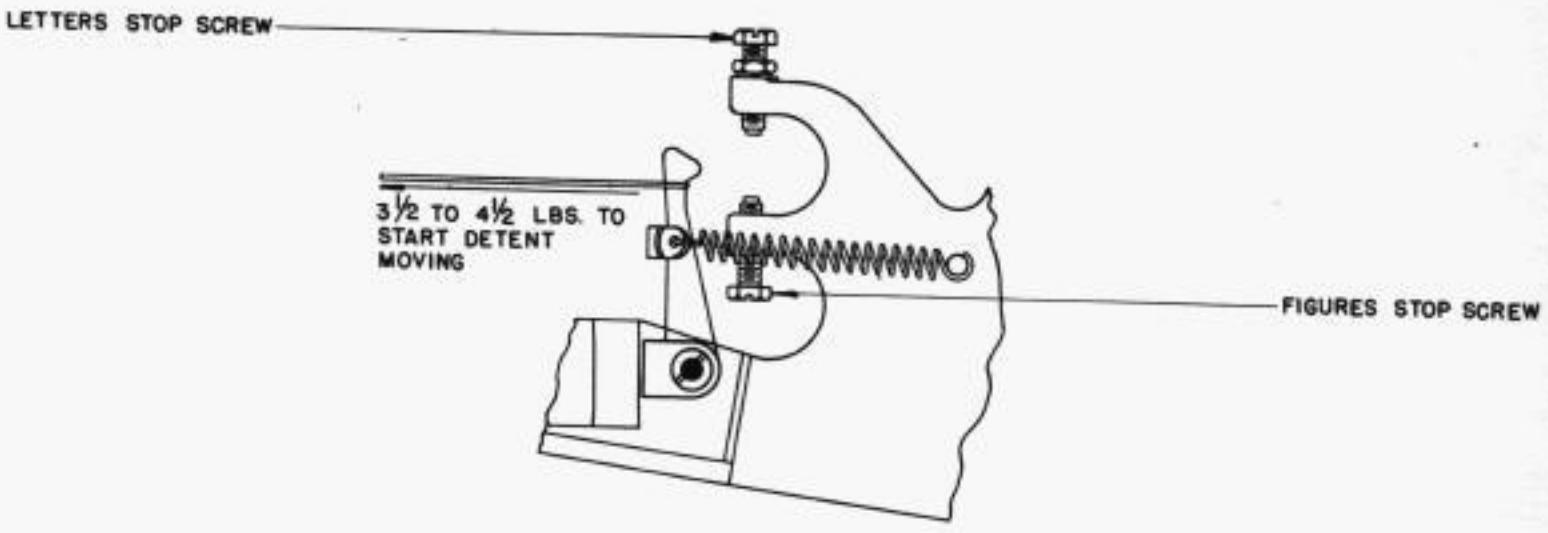


FIGURE 141



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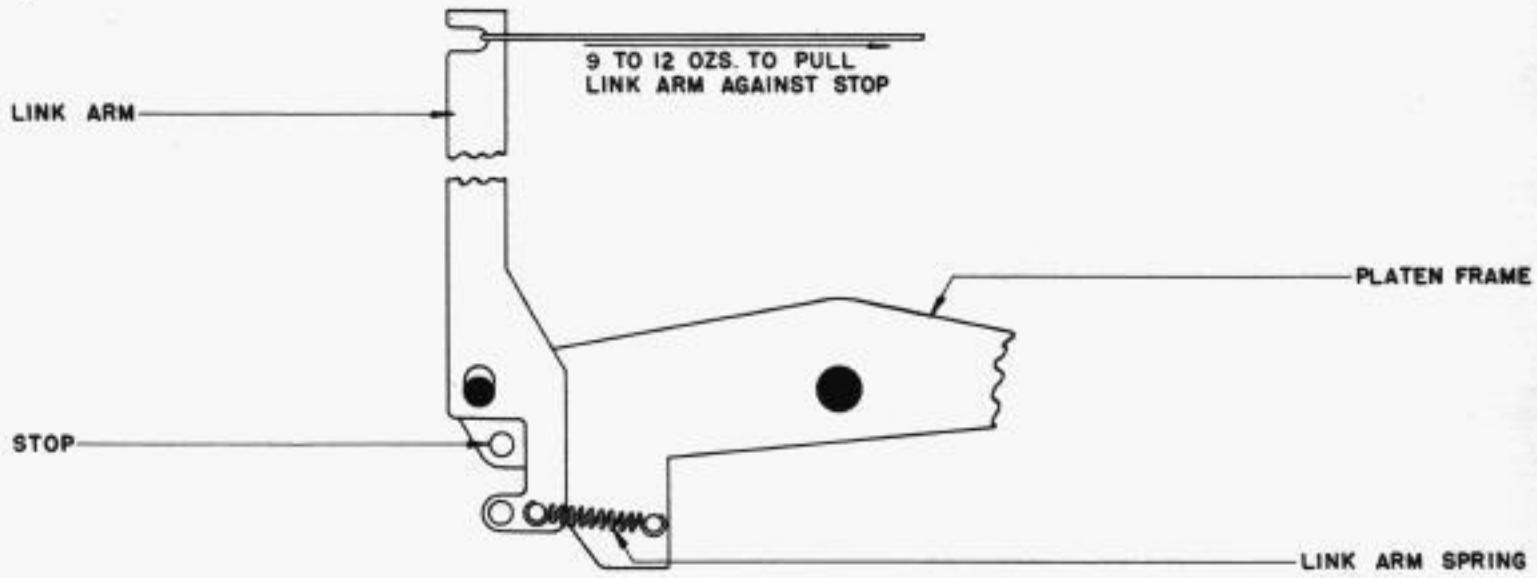


FIGURE 143

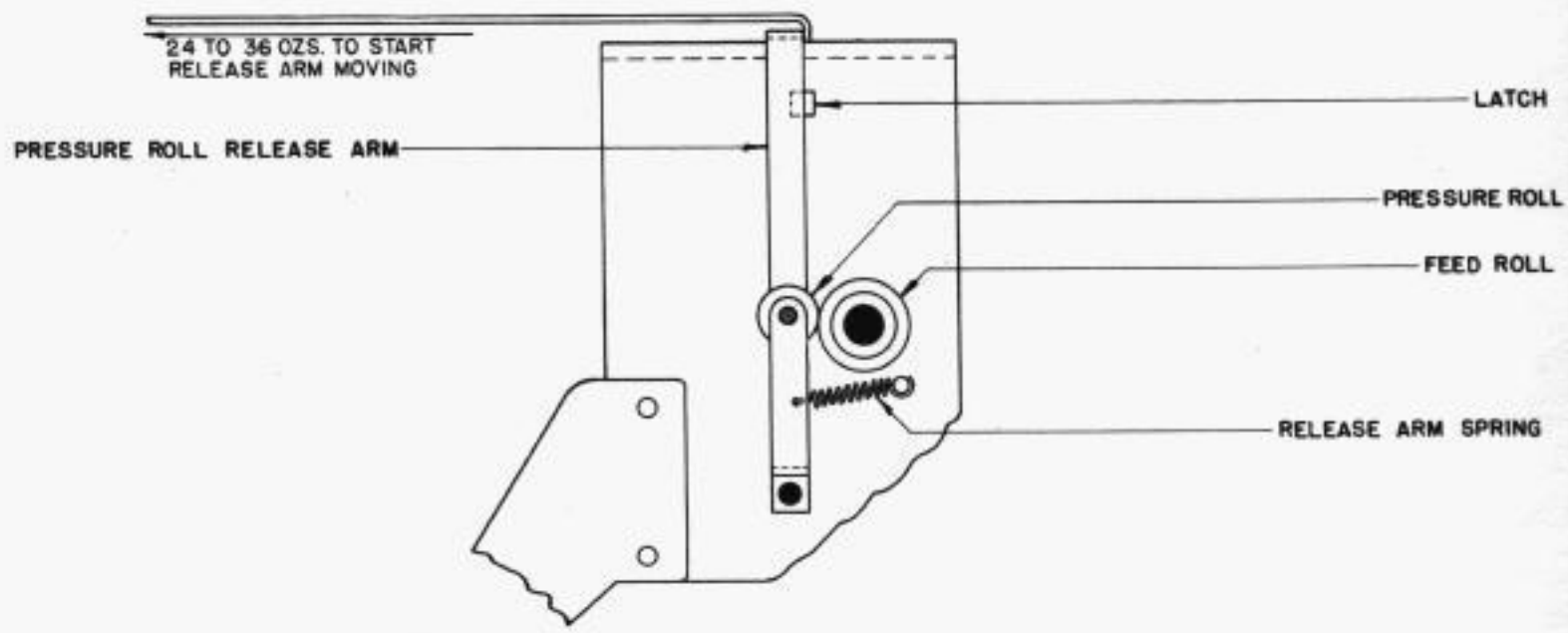


FIGURE 144

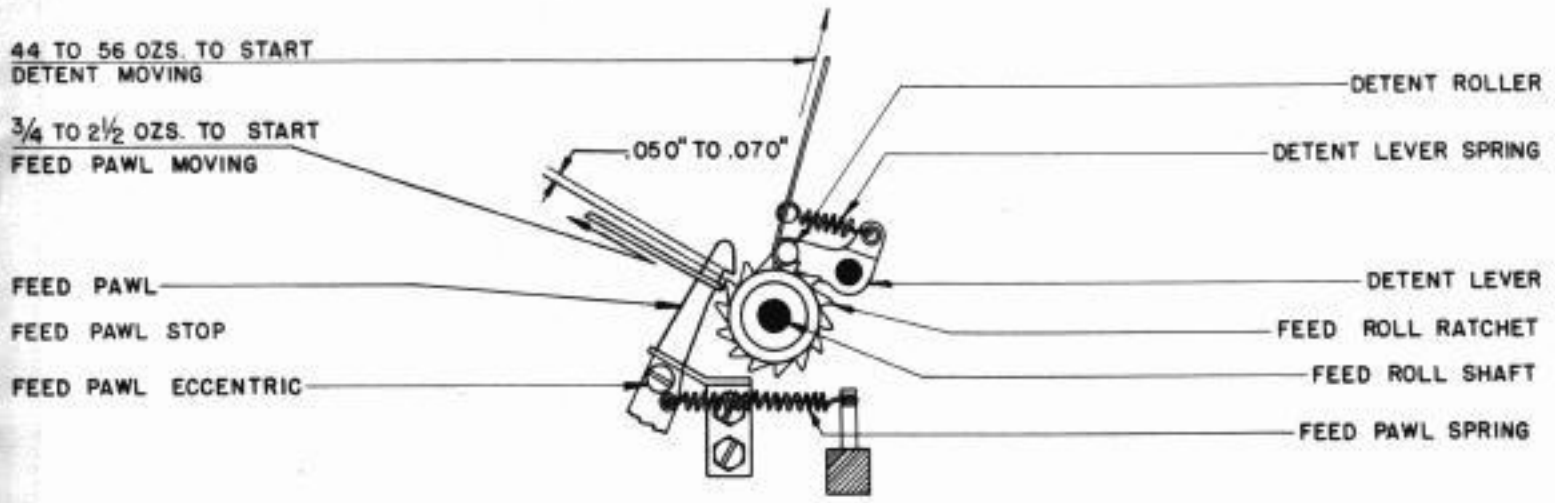


FIGURE 145

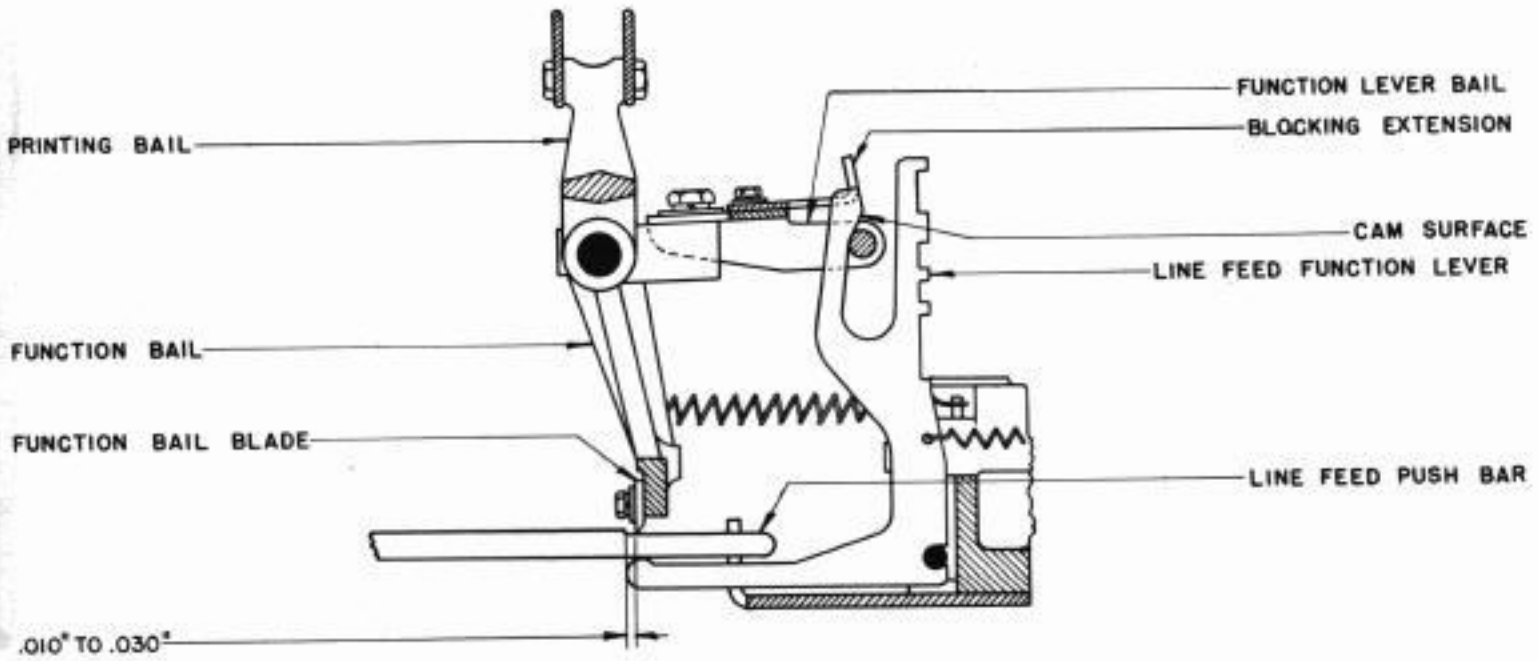


FIGURE 146

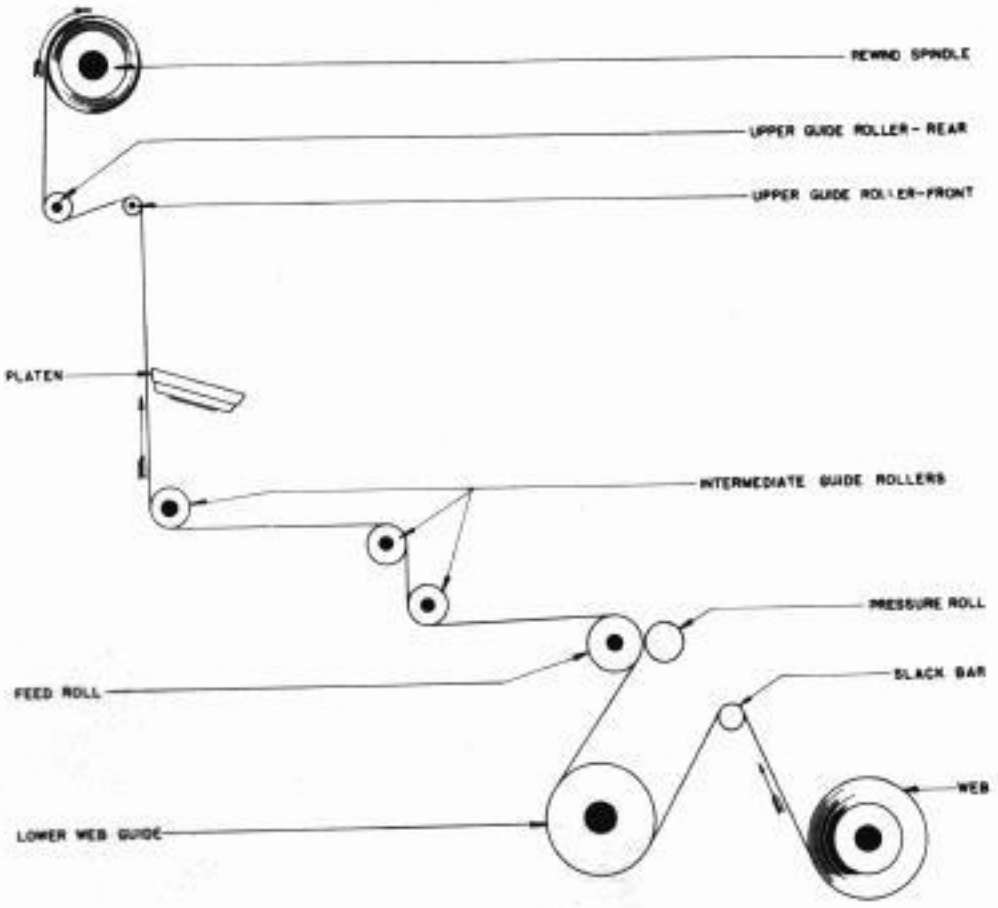


FIGURE 147

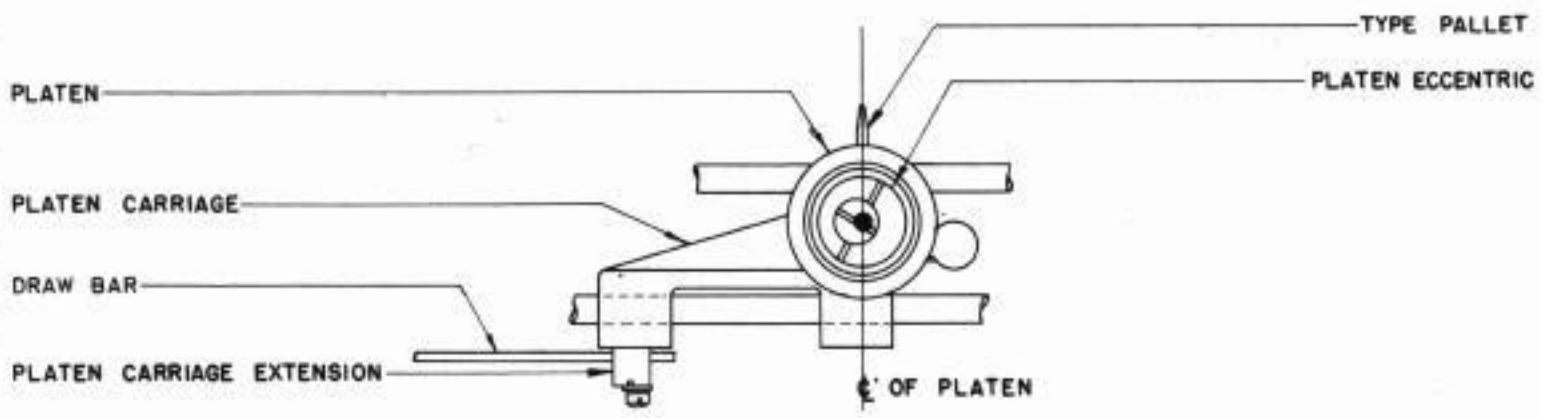


FIGURE 148

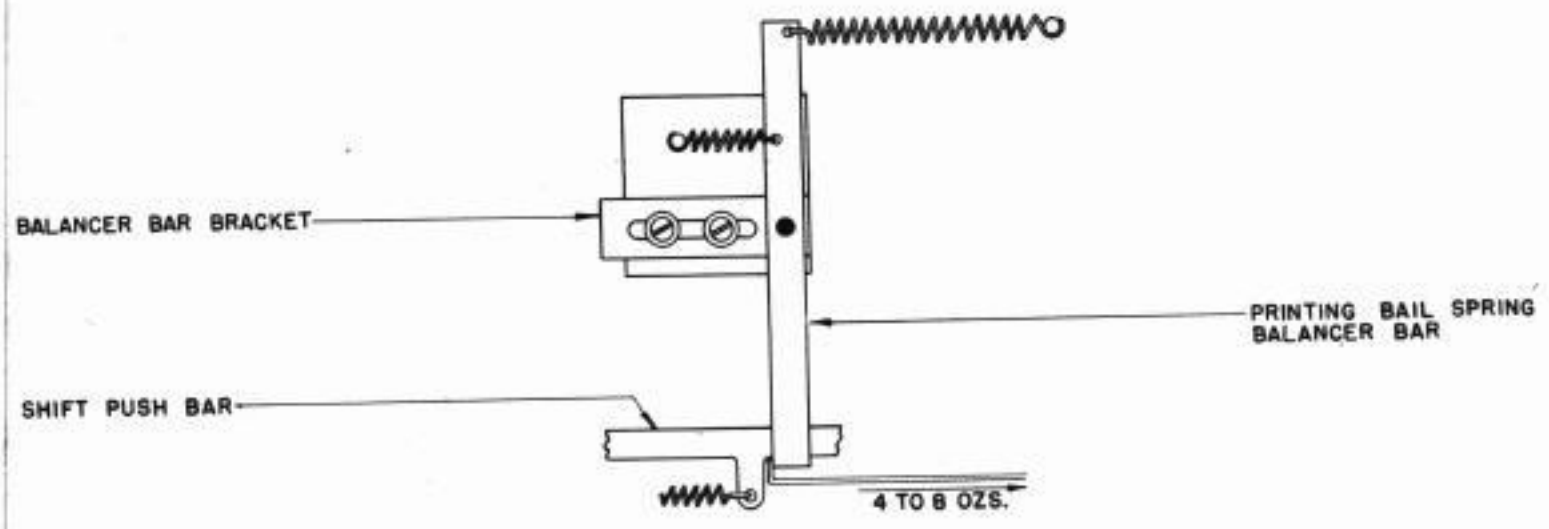


FIGURE 149

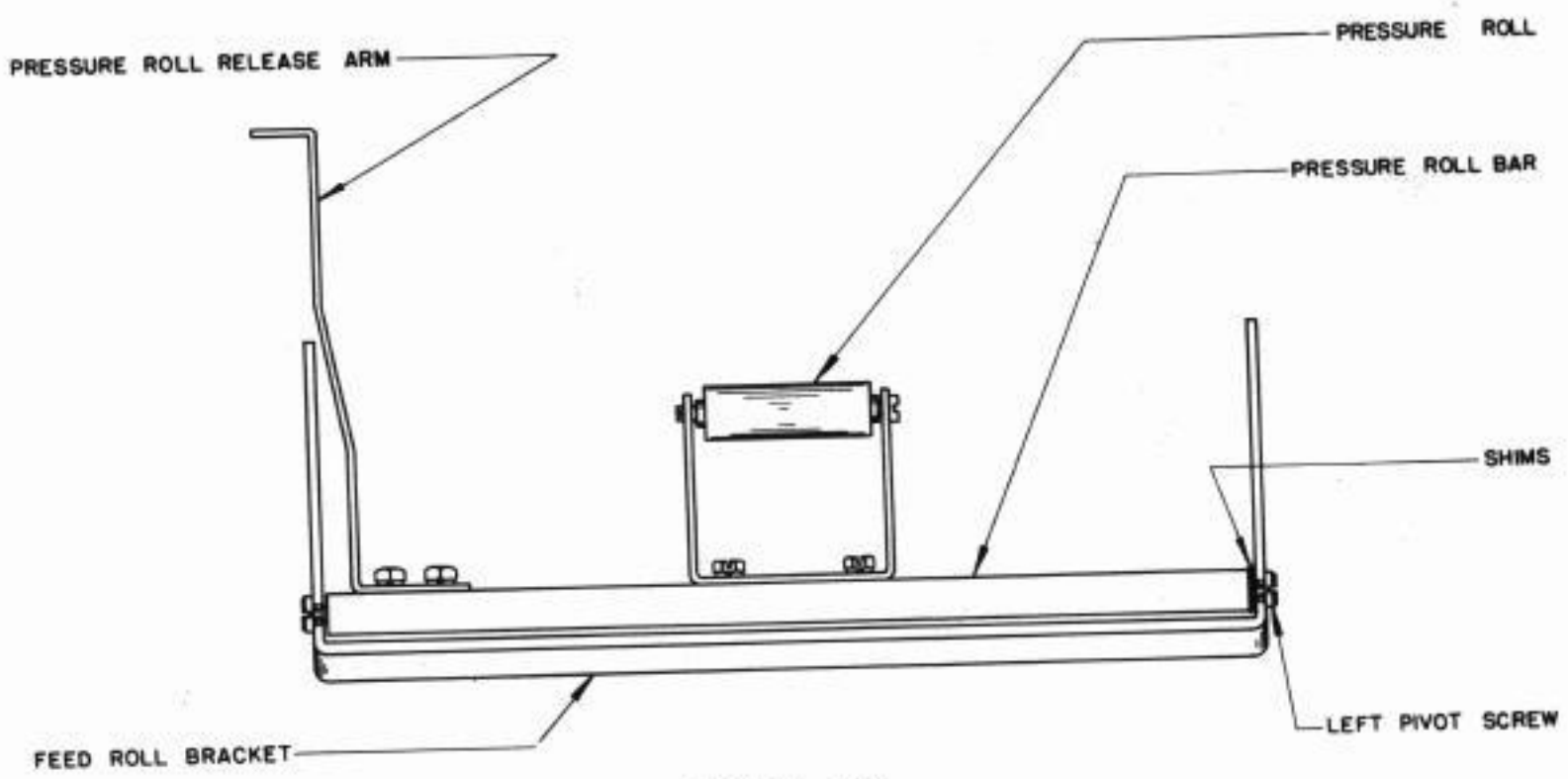
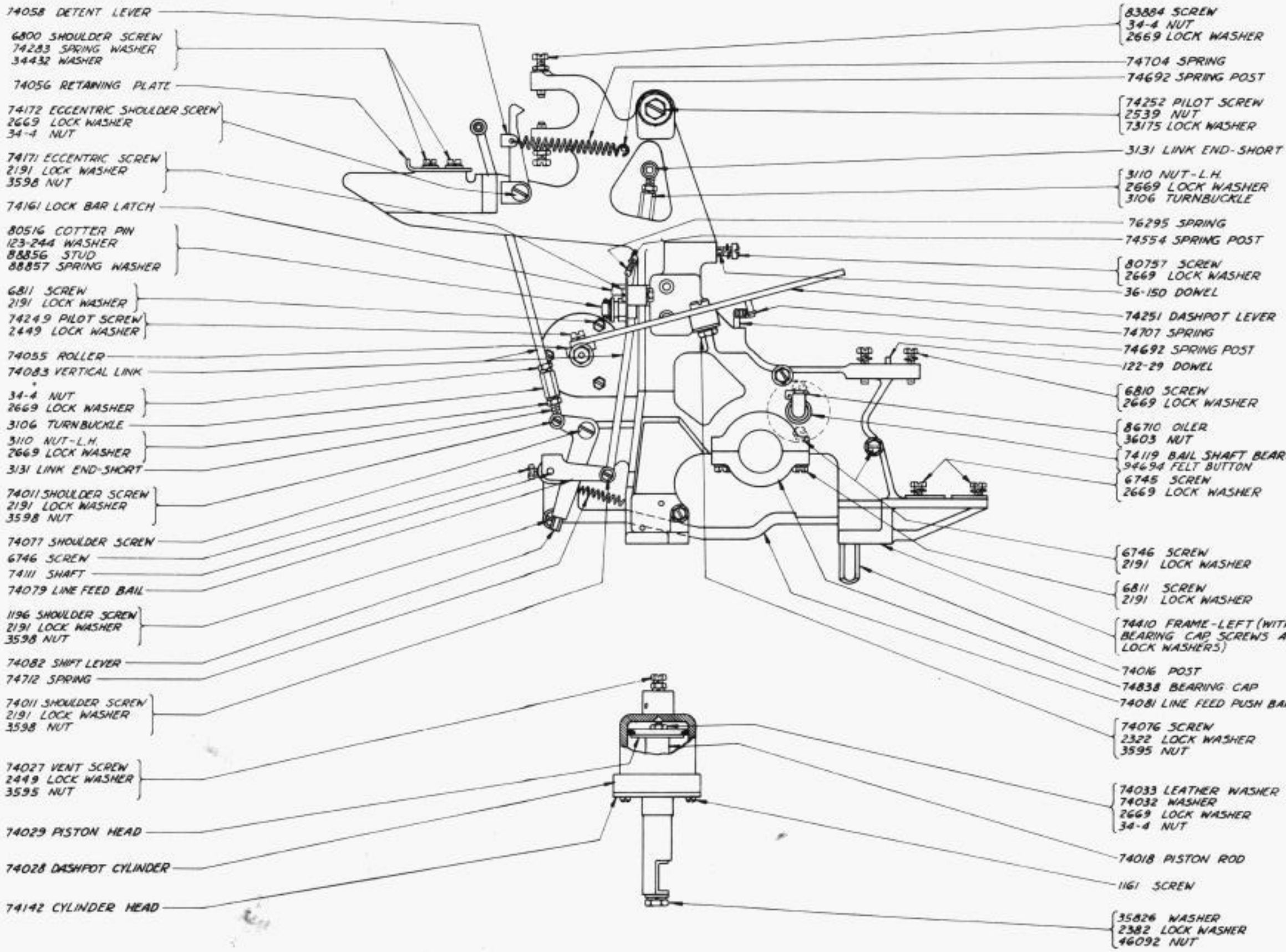
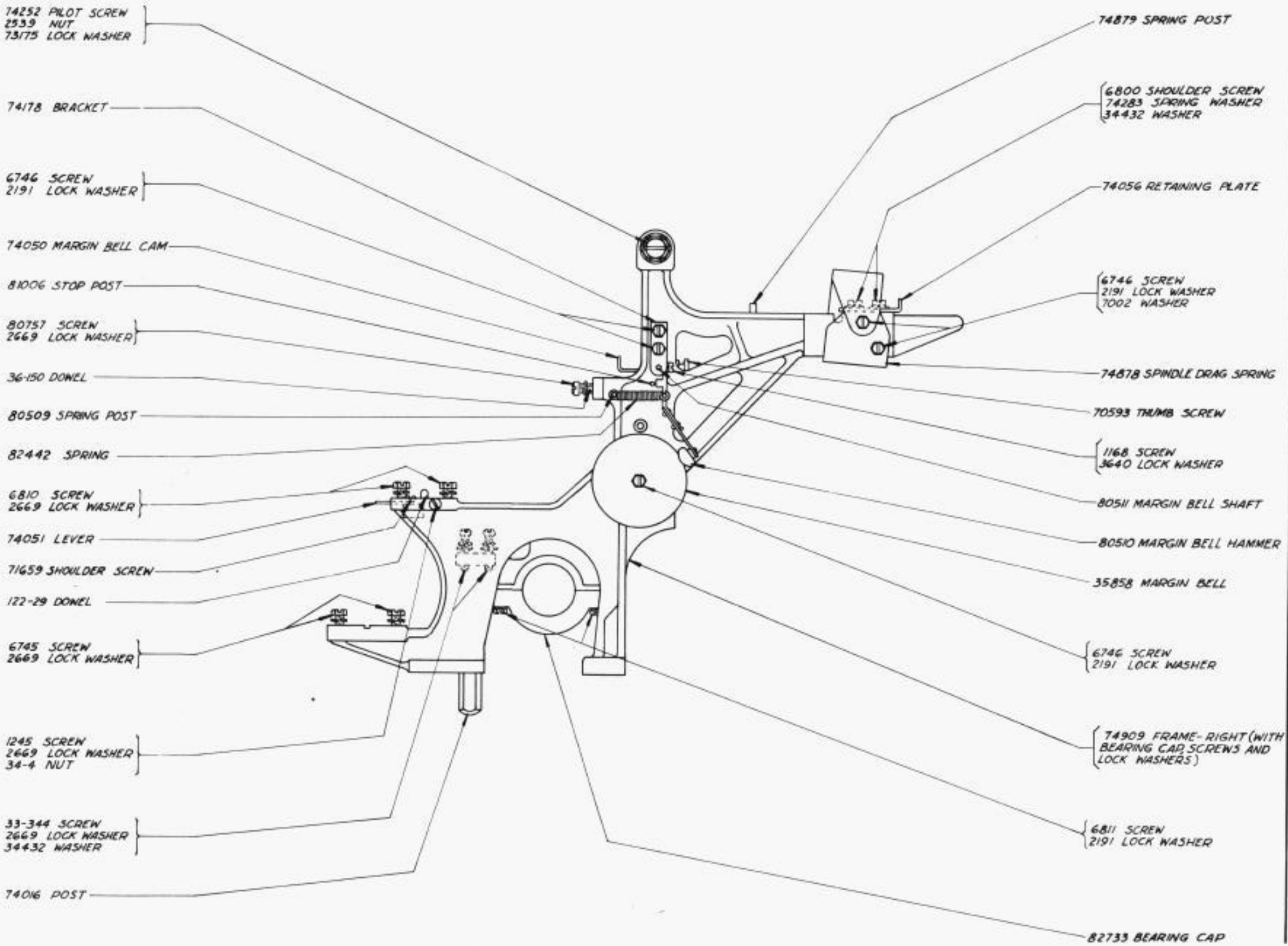
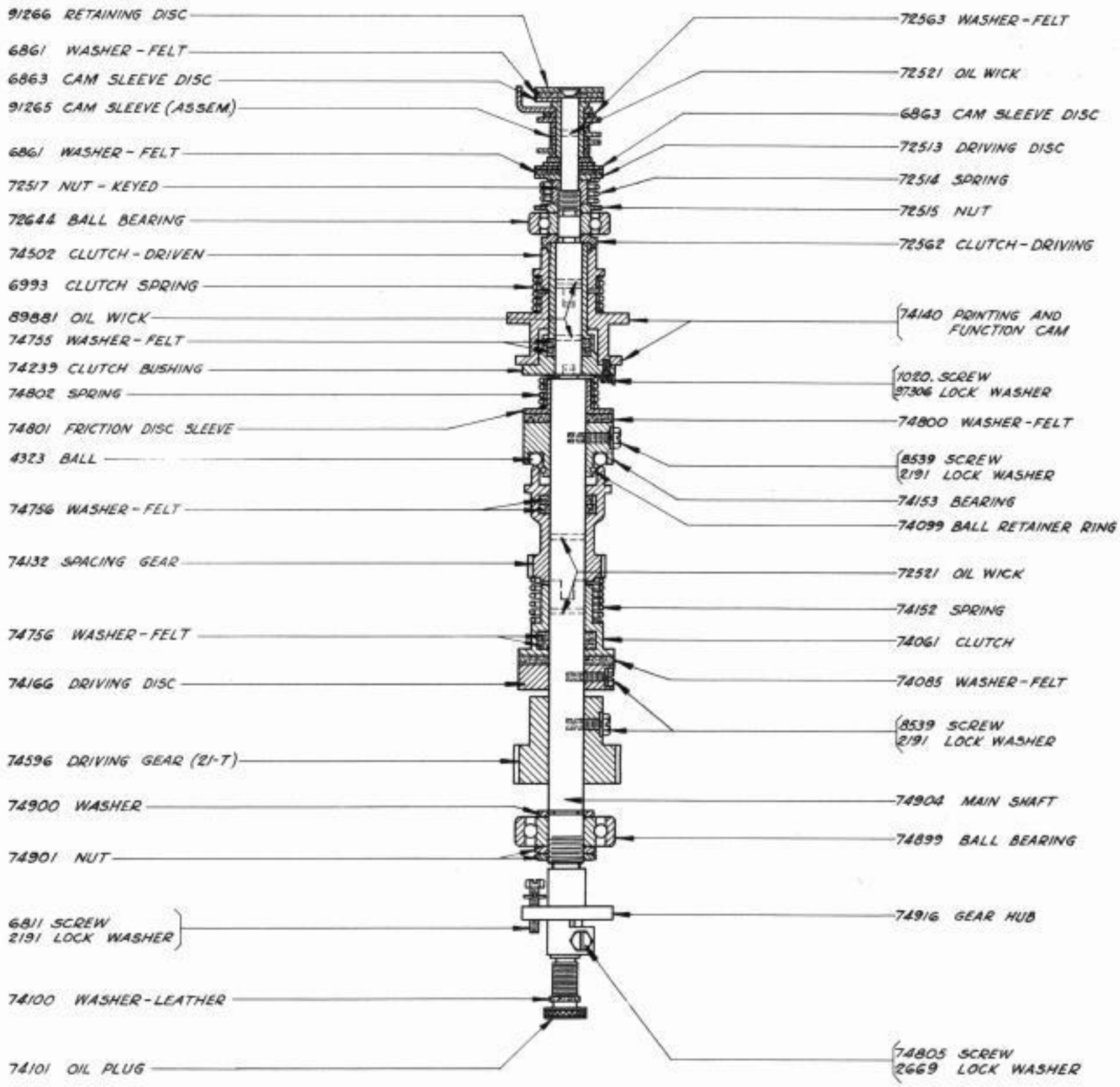
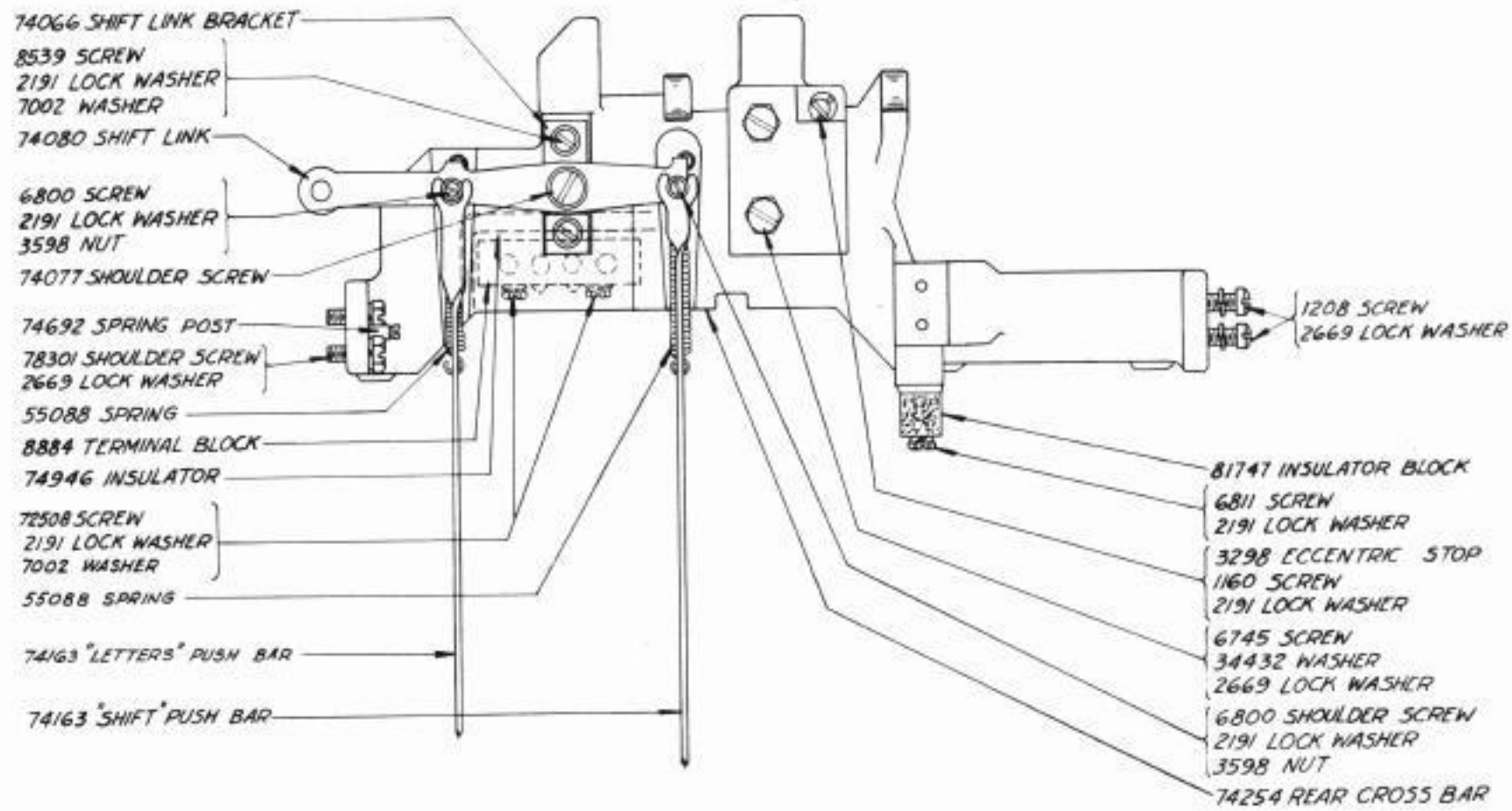


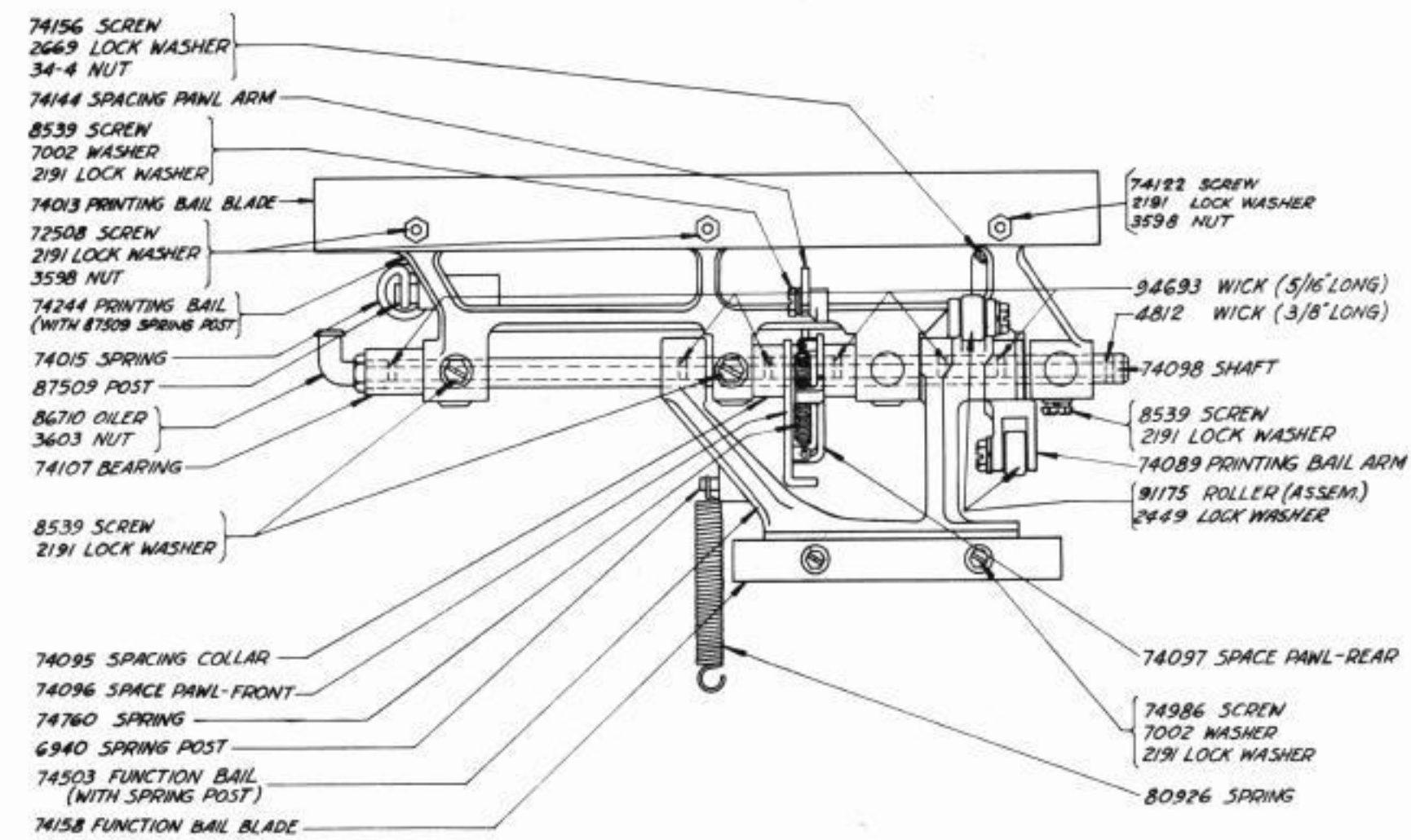
FIGURE 150

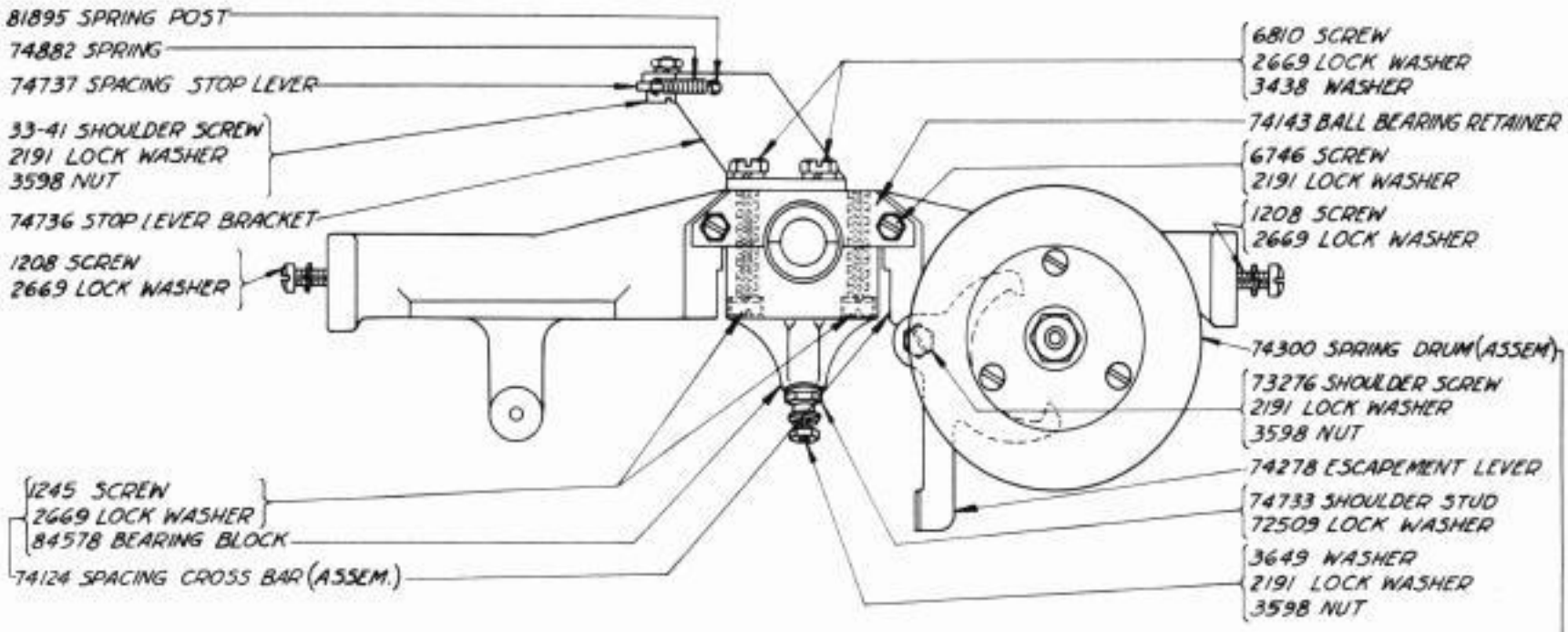

74058 DETENT LEVER
6800 SHOULDER SCREW
74283 SPRING WASHER
34432 WASHER
74056 RETAINING PLATE
74172 ECCENTRIC SHOULDER SCREW
2669 LOCK WASHER
34-4 NUT
74171 ECCENTRIC SCREW
2191 LOCK WASHER
3598 NUT
74161 LOCK BAR LATCH
80516 COTTER PIN
123-244 WASHER
88856 STUD
88857 SPRING WASHER
6811 SCREW
2191 LOCK WASHER
74249 PILOT SCREW
2449 LOCK WASHER
74055 ROLLER
74083 VERTICAL LINK
34-4 NUT
2669 LOCK WASHER
3106 TURNBUCKLE
3110 NUT-L.H.
2669 LOCK WASHER
3131 LINK END-SHORT
74011 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74077 SHOULDER SCREW
6746 SCREW
74111 SHAFT
74079 LINE FEED BAIL
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74082 SHIFT LEVER
74712 SPRING
74011 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74027 VENT SCREW
2449 LOCK WASHER
3595 NUT
74029 PISTON HEAD
74028 DASHPOT CYLINDER
74142 CYLINDER HEAD
83884 SCREW
34-4 NUT
2669 LOCK WASHER
74704 SPRING
74692 SPRING POST
74252 PILOT SCREW
2539 NUT
73175 LOCK WASHER
3131 LINK END-SHORT
3110 NUT-L.H.
2669 LOCK WASHER
3106 TURNBUCKLE
76295 SPRING
74554 SPRING POST
80757 SCREW
2669 LOCK WASHER
36-150 DOWEL
74251 DASHPOT LEVER
74707 SPRING
74692 SPRING POST
122-29 DOWEL
6810 SCREW
2669 LOCK WASHER
86710 OILER
3603 NUT
74119 BAIL SHAFT BEARING
94694 FELT BUTTON
6745 SCREW
2669 LOCK WASHER
6746 SCREW
2191 LOCK WASHER
6811 SCREW
2191 LOCK WASHER
74410 FRAME-LEFT (WITH BEARING CAP SCREWS AND LOCK WASHERS)
74016 POST
74838 BEARING CAP
74081 LINE FEED PUSH BAR
74076 SCREW
2322 LOCK WASHER
3595 NUT
74033 LEATHER WASHER
74032 WASHER
2669 LOCK WASHER
34-4 NUT
74018 PISTON ROD
1161 SCREW
35826 WASHER
2382 LOCK WASHER
46092 NUT


74252 PILOT SCREW
2539 NUT
73175 LOCK WASHER
74178 BRACKET
6746 SCREW
2191 LOCK WASHER
74050 MARGIN BELL CAM
81006 STOP POST
80757 SCREW
2669 LOCK WASHER
36-150 DOWEL
80509 SPRING POST
82442 SPRING
6810 SCREW
2669 LOCK WASHER
74051 LEVER
71659 SHOULDER SCREW
122-29 DOWEL
6745 SCREW
2669 LOCK WASHER
1245 SCREW
2669 LOCK WASHER
34-4 NUT
33-344 SCREW
2669 LOCK WASHER
34432 WASHER
74016 POST
74879 SPRING POST
6800 SHOULDER SCREW
74283 SPRING WASHER
34432 WASHER
74056 RETAINING PLATE
6746 SCREW
2191 LOCK WASHER
7002 WASHER
74878 SPINDLE DRAG SPRING
70593 THUMB SCREW
1168 SCREW
3640 LOCK WASHER
80511 MARGIN BELL SHAFT
80510 MARGIN BELL HAMMER
35858 MARGIN BELL
6746 SCREW
2191 LOCK WASHER
74909 FRAME-RIGHT (WITH BEARING CAP SCREWS AND LOCK WASHERS)
6811 SCREW
2191 LOCK WASHER
82733 BEARING CAP

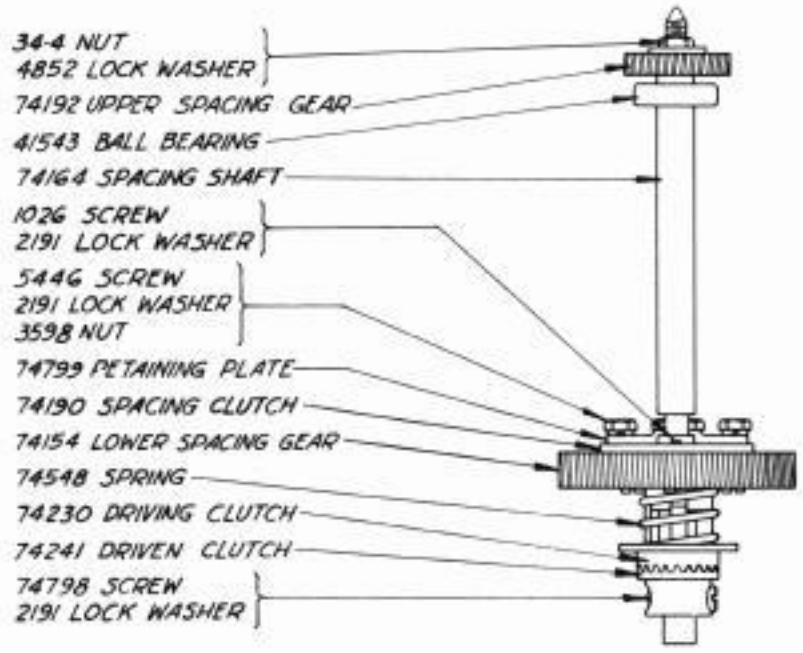

91266 RETAINING DISC
6861 WASHER - FELT
6863 CAM SLEEVE DISC
91265 CAM SLEEVE (ASSEM)
6861 WASHER - FELT
72517 NUT - KEYED
72644 BALL BEARING
74502 CLUTCH - DRIVEN
6993 CLUTCH SPRING
89881 OIL WICK
74755 WASHER - FELT
74239 CLUTCH BUSHING
74802 SPRING
74801 FRICTION DISC SLEEVE
4323 BALL
74756 WASHER - FELT
74132 SPACING GEAR
74756 WASHER - FELT
74166 DRIVING DISC
74596 DRIVING GEAR (21-T)
74900 WASHER
74901 NUT
6811 SCREW
2191 LOCK WASHER
74100 WASHER - LEATHER
74101 OIL PLUG
72563 WASHER - FELT
72521 OIL WICK
6863 CAM SLEEVE DISC
72513 DRIVING DISC
72514 SPRING
72515 NUT
72562 CLUTCH - DRIVING
74140 PRINTING AND FUNCTION CAM
1020. SCREW
97306 LOCK WASHER
74800 WASHER - FELT
8539 SCREW
2191 LOCK WASHER
74153 BEARING
74099 BALL RETAINER RING
72521 OIL WICK
74152 SPRING
74061 CLUTCH
74085 WASHER - FELT
8539 SCREW
2191 LOCK WASHER
74904 MAIN SHAFT
74899 BALL BEARING
74916 GEAR HUB
74805 SCREW
2669 LOCK WASHER

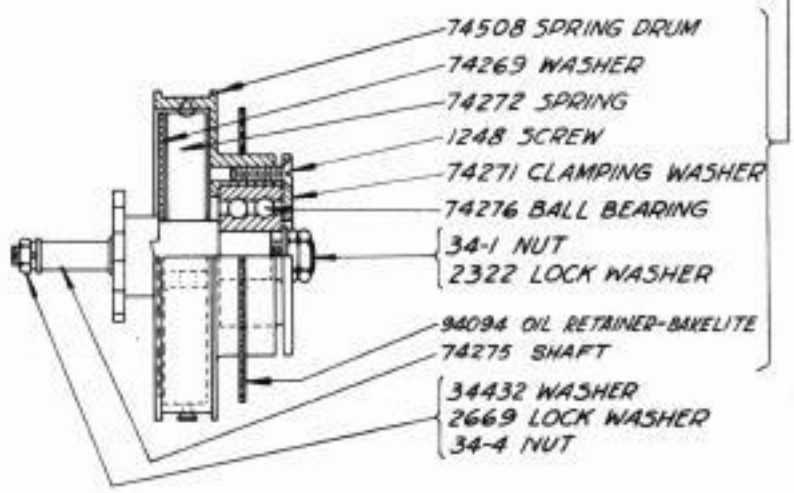

74066 SHIFT LINK BRACKET
8539 SCREW
2191 LOCK WASHER
7002 WASHER
74080 SHIFT LINK
6800 SCREW
2191 LOCK WASHER
3598 NUT
74077 SHOULDER SCREW
74692 SPRING POST
78301 SHOULDER SCREW
2669 LOCK WASHER
55088 SPRING
8884 TERMINAL BLOCK
74946 INSULATOR
72508 SCREW
2191 LOCK WASHER
7002 WASHER
55088 SPRING
74163 "LETTERS" PUSH BAR
74163 "SHIFT" PUSH BAR
1208 SCREW
2669 LOCK WASHER
81747 INSULATOR BLOCK
6811 SCREW
2191 LOCK WASHER
3298 ECCENTRIC STOP
1160 SCREW
2191 LOCK WASHER
6745 SCREW
34432 WASHER
2669 LOCK WASHER
6800 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74254 REAR CROSS BAR

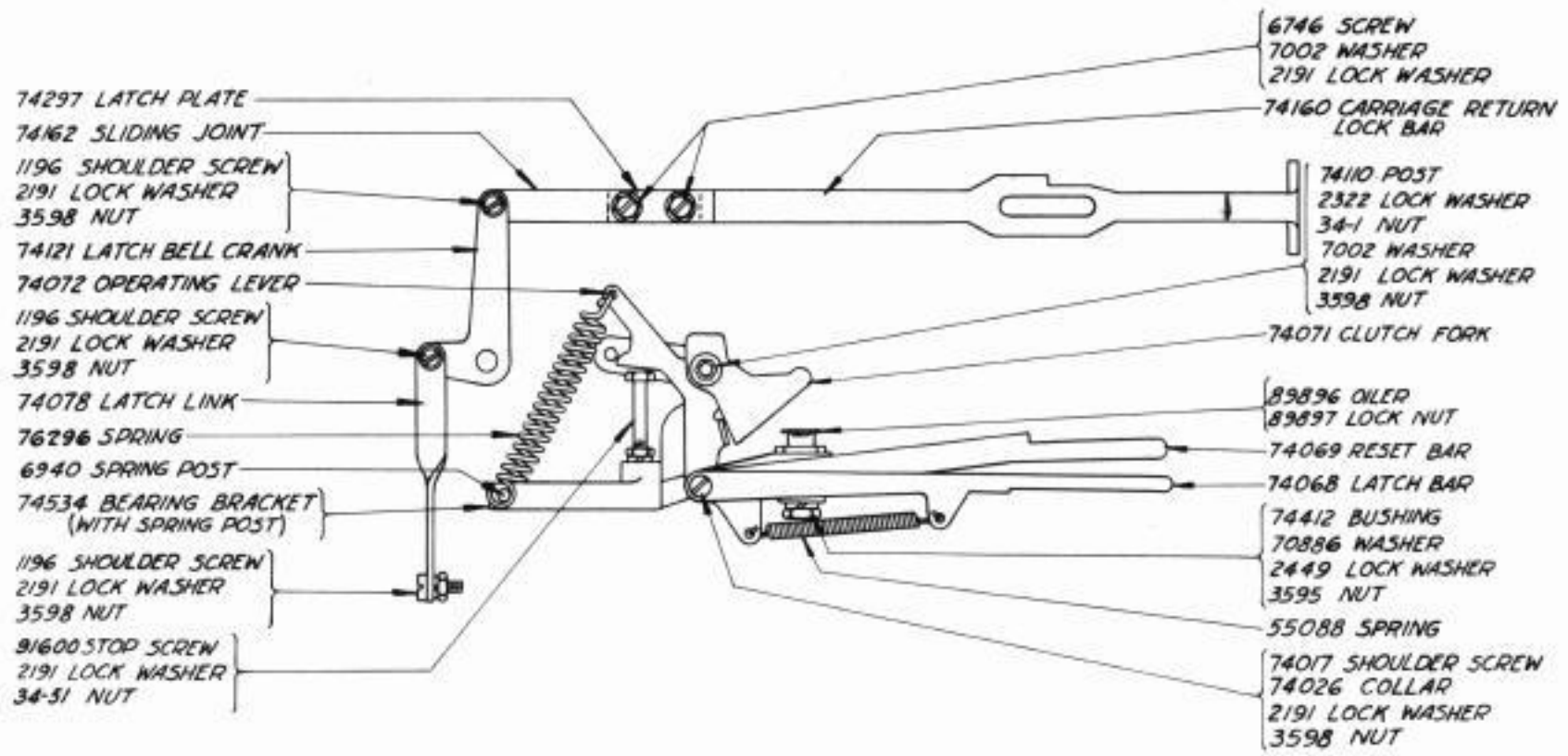

74156 SCREW
2669 LOCK WASHER
34-4 NUT
74144 SPACING PAWL ARM
8539 SCREW
7002 WASHER
2191 LOCK WASHER
74013 PRINTING BAIL BLADE
72508 SCREW
2191 LOCK WASHER
3598 NUT
74244 PRINTING BAIL
(WITH 87509 SPRING POST)
74015 SPRING
87509 POST
86710 OILER
3603 NUT
74107 BEARING
8539 SCREW
2191 LOCK WASHER
74095 SPACING COLLAR
74096 SPACE PAWL-FRONT
74760 SPRING
6940 SPRING POST
74503 FUNCTION BAIL
(WITH SPRING POST)
74158 FUNCTION BAIL BLADE
74122 SCREW
2191 LOCK WASHER
3598 NUT
94693 WICK (5/16" LONG)
4812 WICK (3/8" LONG)
74098 SHAFT
8539 SCREW
2191 LOCK WASHER
74089 PRINTING BAIL ARM
91175 ROLLER (ASSEM.)
2449 LOCK WASHER
74097 SPACE PAWL-REAR
74986 SCREW
7002 WASHER
2191 LOCK WASHER
80926 SPRING

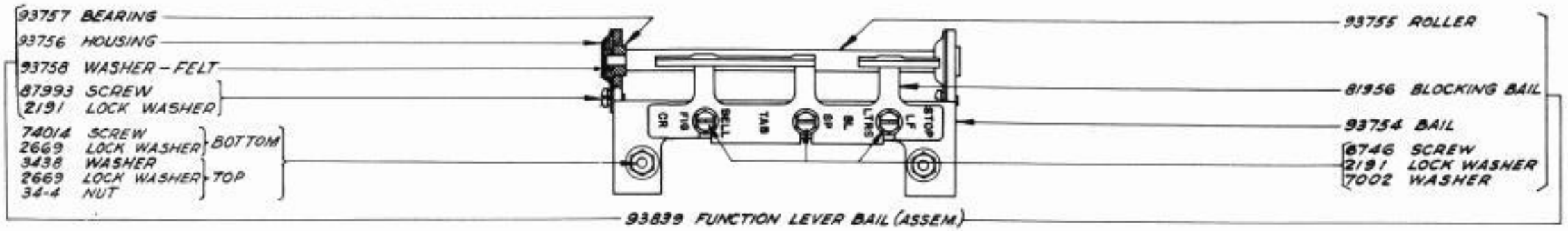

81895 SPRING POST
74882 SPRING
74737 SPACING STOP LEVER
33-41 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74736 STOP LEVER BRACKET
1208 SCREW
2669 LOCK WASHER
1245 SCREW
2669 LOCK WASHER
84578 BEARING BLOCK
74124 SPACING CROSS BAR (ASSEM.)
6810 SCREW
2669 LOCK WASHER
3438 WASHER
74143 BALL BEARING RETAINER
6746 SCREW
2191 LOCK WASHER
1208 SCREW
2669 LOCK WASHER
74300 SPRING DRUM (ASSEM)
73276 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74278 ESCAPEMENT LEVER
74733 SHOULDER STUD
72509 LOCK WASHER
3649 WASHER
2191 LOCK WASHER
3598 NUT

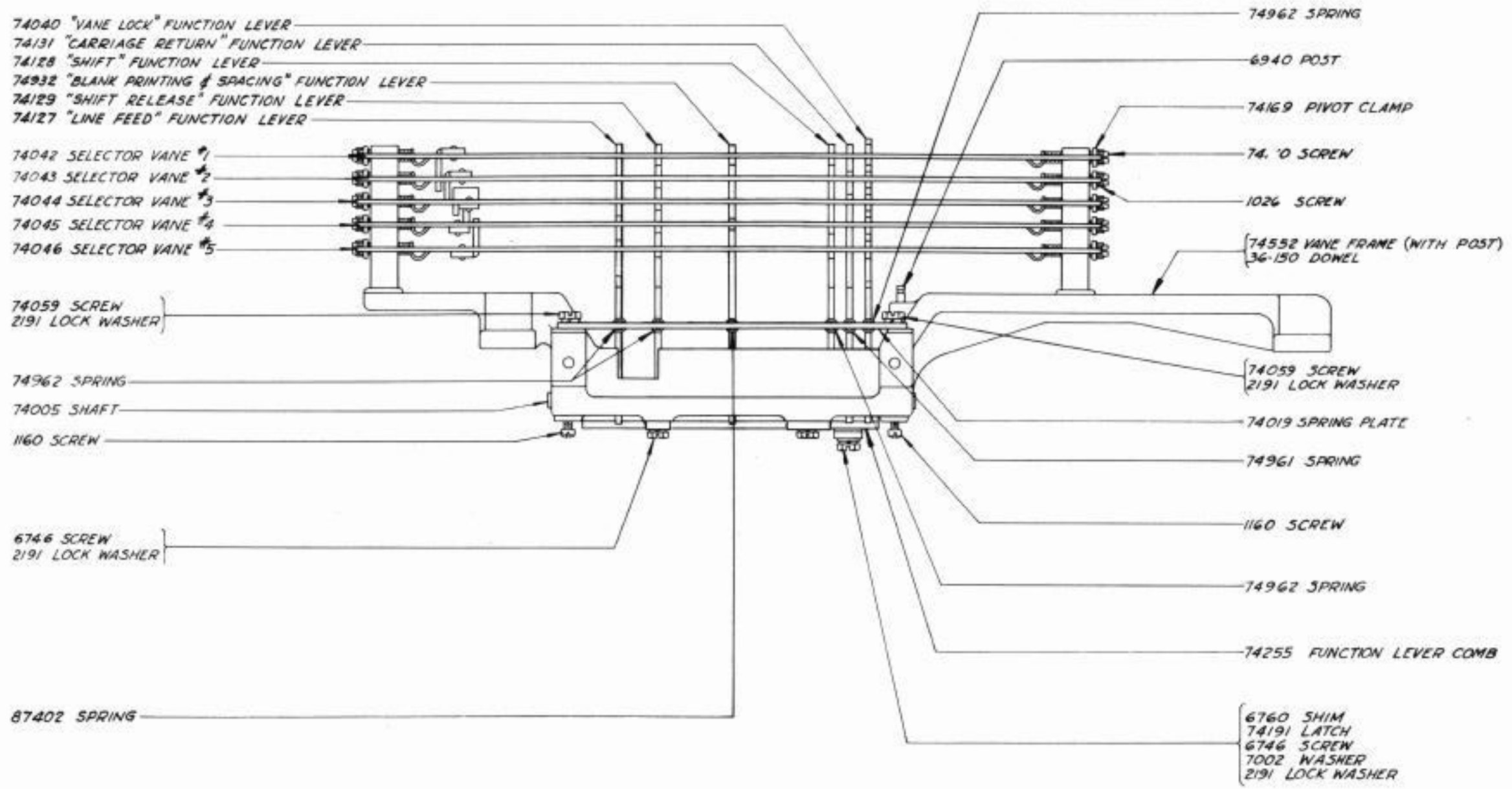

74359 DRAW STRAP

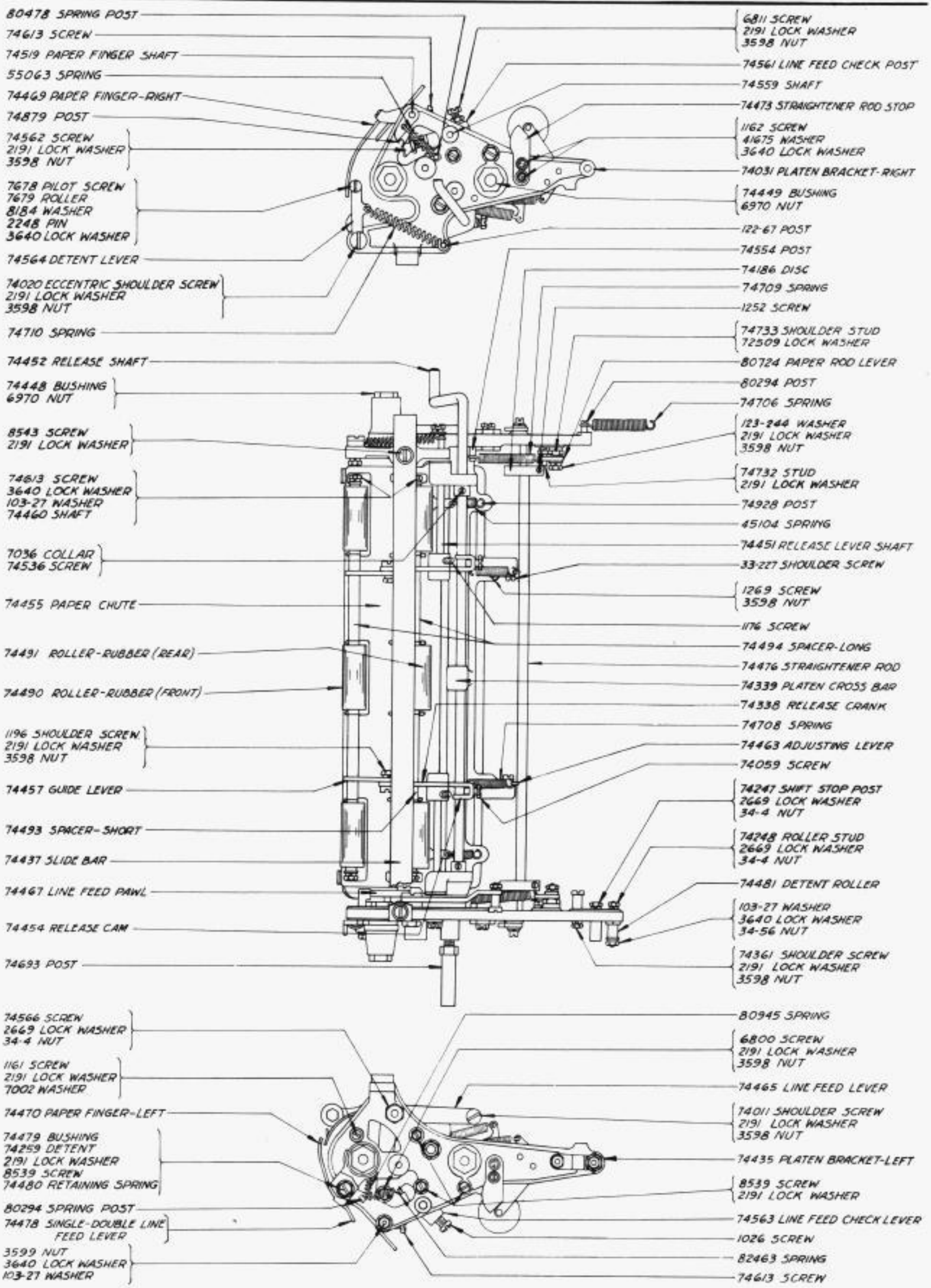

34-4 NUT
4852 LOCK WASHER
74192 UPPER SPACING GEAR
41543 BALL BEARING
74164 SPACING SHAFT
1026 SCREW
2191 LOCK WASHER
5446 SCREW
2191 LOCK WASHER
3598 NUT
74799 RETAINING PLATE
74190 SPACING CLUTCH
74154 LOWER SPACING GEAR
74548 SPRING
74230 DRIVING CLUTCH
74241 DRIVEN CLUTCH
74798 SCREW
2191 LOCK WASHER

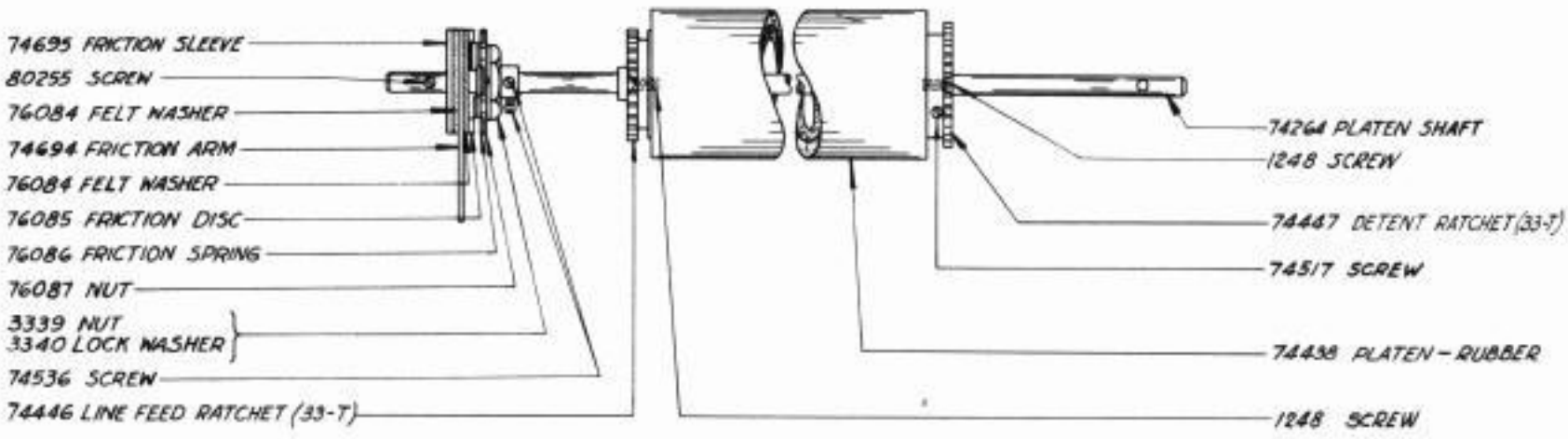

74508 SPRING DRUM
74269 WASHER
74272 SPRING
1248 SCREW
74271 CLAMPING WASHER
74276 BALL BEARING
34-1 NUT
2322 LOCK WASHER
94094 OIL RETAINER-BAKELITE
74275 SHAFT
34432 WASHER
2669 LOCK WASHER
34-4 NUT

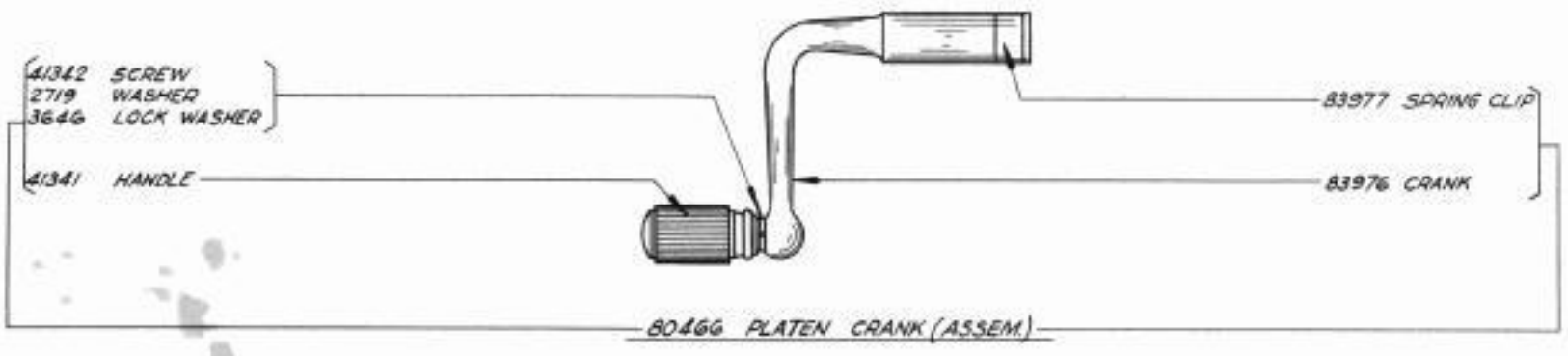

74297 LATCH PLATE
74162 SLIDING JOINT
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74121 LATCH BELL CRANK
74072 OPERATING LEVER
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74078 LATCH LINK
76296 SPRING
6940 SPRING POST
74534 BEARING BRACKET (WITH SPRING POST)
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
91600 STOP SCREW
2191 LOCK WASHER
34-51 NUT
6746 SCREW
7002 WASHER
2191 LOCK WASHER
74160 CARRIAGE RETURN LOCK BAR
74110 POST
2322 LOCK WASHER
34-1 NUT
7002 WASHER
2191 LOCK WASHER
3598 NUT
74071 CLUTCH FORK
89896 OILER
89897 LOCK NUT
74069 RESET BAR
74068 LATCH BAR
74412 BUSHING
70886 WASHER
2449 LOCK WASHER
3595 NUT
55088 SPRING
74017 SHOULDER SCREW
74026 COLLAR
2191 LOCK WASHER
3598 NUT


93757 BEARING
93756 HOUSING
93758 WASHER – FELT
87993 SCREW
2191 LOCK WASHER
74014 SCREW
2669 LOCK WASHER
3436 WASHER
2669 LOCK WASHER
34-4 NUT
BOTTOM
TOP
93755 ROLLER
81956 BLOCKING BAIL
93754 BAIL
6746 SCREW
2191 LOCK WASHER
7002 WASHER
93839 FUNCTION LEVER BAIL (ASSEM.)


74040 "VANE LOCK" FUNCTION LEVER
74131 "CARRIAGE RETURN" FUNCTION LEVER
74128 "SHIFT" FUNCTION LEVER
74932 "BLANK PRINTING & SPACING" FUNCTION LEVER
74129 "SHIFT RELEASE" FUNCTION LEVER
74127 "LINE FEED" FUNCTION LEVER
74042 SELECTOR VANE #1
74043 SELECTOR VANE #2
74044 SELECTOR VANE #3
74045 SELECTOR VANE #4
74046 SELECTOR VANE #5
74059 SCREW
2191 LOCK WASHER
74962 SPRING
74005 SHAFT
1160 SCREW
6746 SCREW
2191 LOCK WASHER
87402 SPRING
74962 SPRING
6940 POST
74169 PIVOT CLAMP
74. '0 SCREW
1026 SCREW
74552 VANE FRAME (WITH POST)
36-150 DOWEL
74059 SCREW
2191 LOCK WASHER
74019 SPRING PLATE
74961 SPRING
1160 SCREW
74962 SPRING
74255 FUNCTION LEVER COMB
6760 SHIM
74191 LATCH
6746 SCREW
7002 WASHER
2191 LOCK WASHER

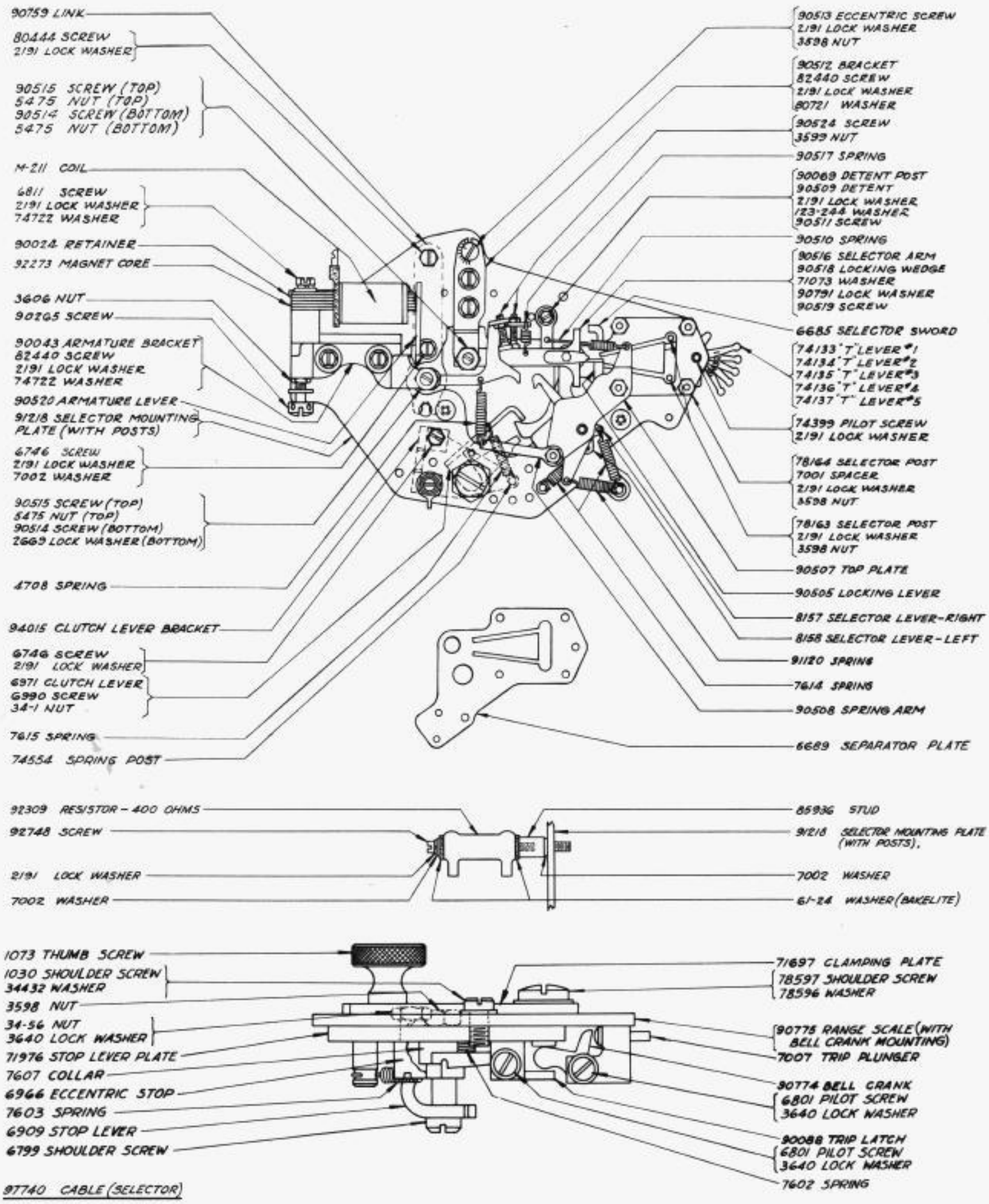

80478 SPRING POST
74613 SCREW
74519 PAPER FINGER SHAFT
55063 SPRING
74469 PAPER FINGER-RIGHT
74879 POST
74562 SCREW
2191 LOCK WASHER
3598 NUT
7678 PILOT SCREW
7679 ROLLER
8184 WASHER
2248 PIN
3640 LOCK WASHER
74564 DETENT LEVER
74020 ECCENTRIC SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74710 SPRING
74452 RELEASE SHAFT
74448 BUSHING
6970 NUT
8543 SCREW
2191 LOCK WASHER
74613 SCREW
3640 LOCK WASHER
103-27 WASHER
74460 SHAFT
7036 COLLAR
74536 SCREW
74455 PAPER CHUTE
74491 ROLLER-RUBBER (REAR)
74490 ROLLER-RUBBER (FRONT)
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74457 GUIDE LEVER
74493 SPACER-SHORT
74437 SLIDE BAR
74467 LINE FEED PAWL
74454 RELEASE CAM
74693 POST
6811 SCREW
2191 LOCK WASHER
3598 NUT
74561 LINE FEED CHECK POST
74559 SHAFT
74473 STRAIGHTENER ROD STOP
1162 SCREW
41675 WASHER
3640 LOCK WASHER
74031 PLATEN BRACKET-RIGHT
74449 BUSHING
6970 NUT
122-67 POST
74554 POST
74186 DISC
74709 SPRING
1252 SCREW
74733 SHOULDER STUD
72509 LOCK WASHER
80724 PAPER ROD LEVER
80294 POST
74706 SPRING
123-244 WASHER
2191 LOCK WASHER
3598 NUT
74732 STUD
2191 LOCK WASHER
74928 POST
45104 SPRING
74451 RELEASE LEVER SHAFT
33-227 SHOULDER SCREW
1269 SCREW
3598 NUT
1176 SCREW
74494 SPACER-LONG
74476 STRAIGHTENER ROD
74339 PLATEN CROSS BAR
74338 RELEASE CRANK
74708 SPRING
74463 ADJUSTING LEVER
74059 SCREW
74247 SHIFT STOP POST
2669 LOCK WASHER
34-4 NUT
74248 ROLLER STUD
2669 LOCK WASHER
34-4 NUT
74481 DETENT ROLLER
103-27 WASHER
3640 LOCK WASHER
34-56 NUT
74361 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74566 SCREW
2669 LOCK WASHER
34-4 NUT
1161 SCREW
2191 LOCK WASHER
7002 WASHER
74470 PAPER FINGER-LEFT
74479 BUSHING
74259 DETENT
2191 LOCK WASHER
8539 SCREW
74480 RETAINING SPRING
80294 SPRING POST
74478 SINGLE-DOUBLE LINE FEED LEVER
3599 NUT
3640 LOCK WASHER
103-27 WASHER
80945 SPRING
6800 SCREW
2191 LOCK WASHER
3598 NUT
74465 LINE FEED LEVER
74011 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74435 PLATEN BRACKET-LEFT
8539 SCREW
2191 LOCK WASHER
74563 LINE FEED CHECK LEVER
1026 SCREW
82463 SPRING
74613 SCREW



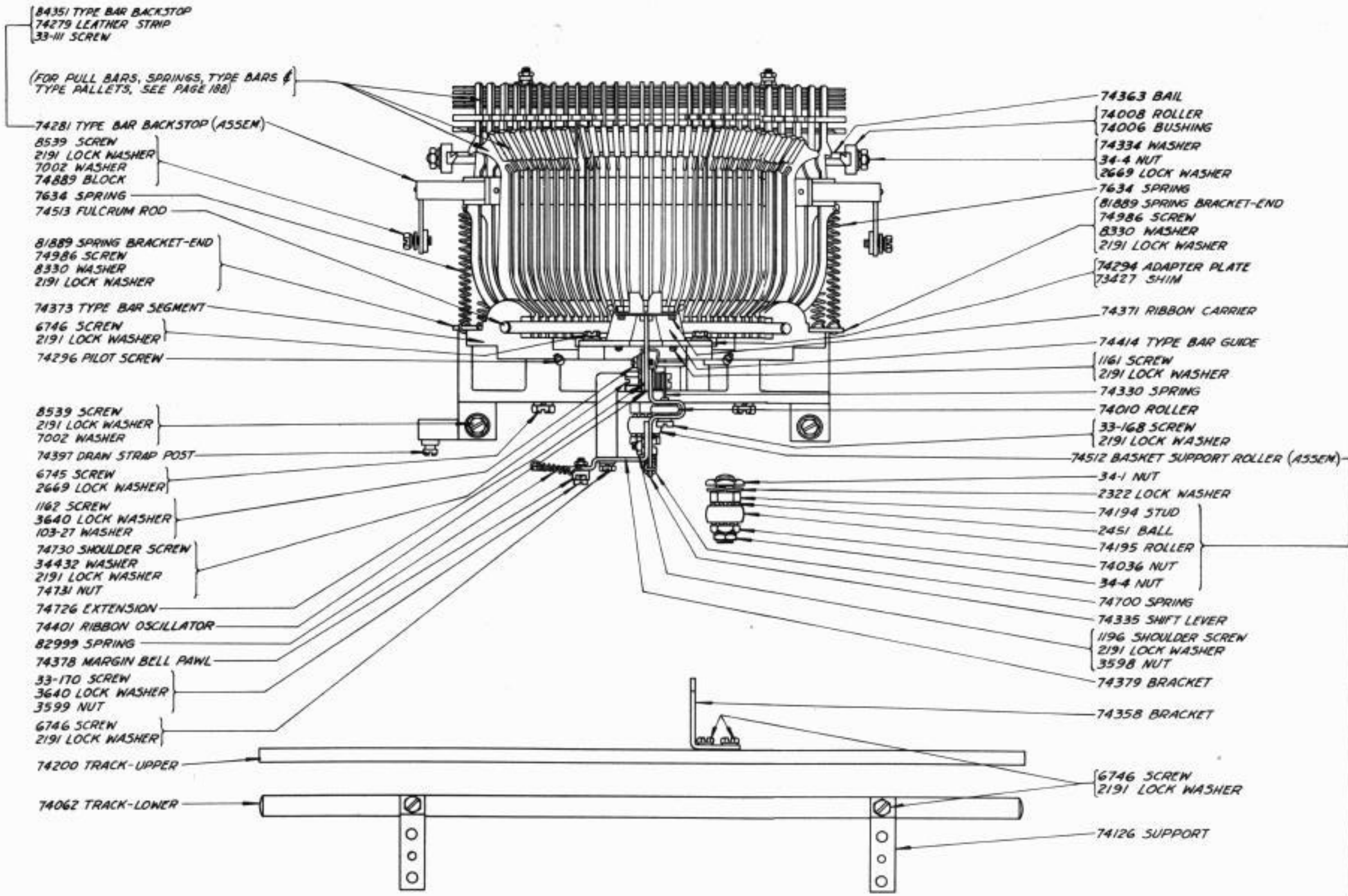


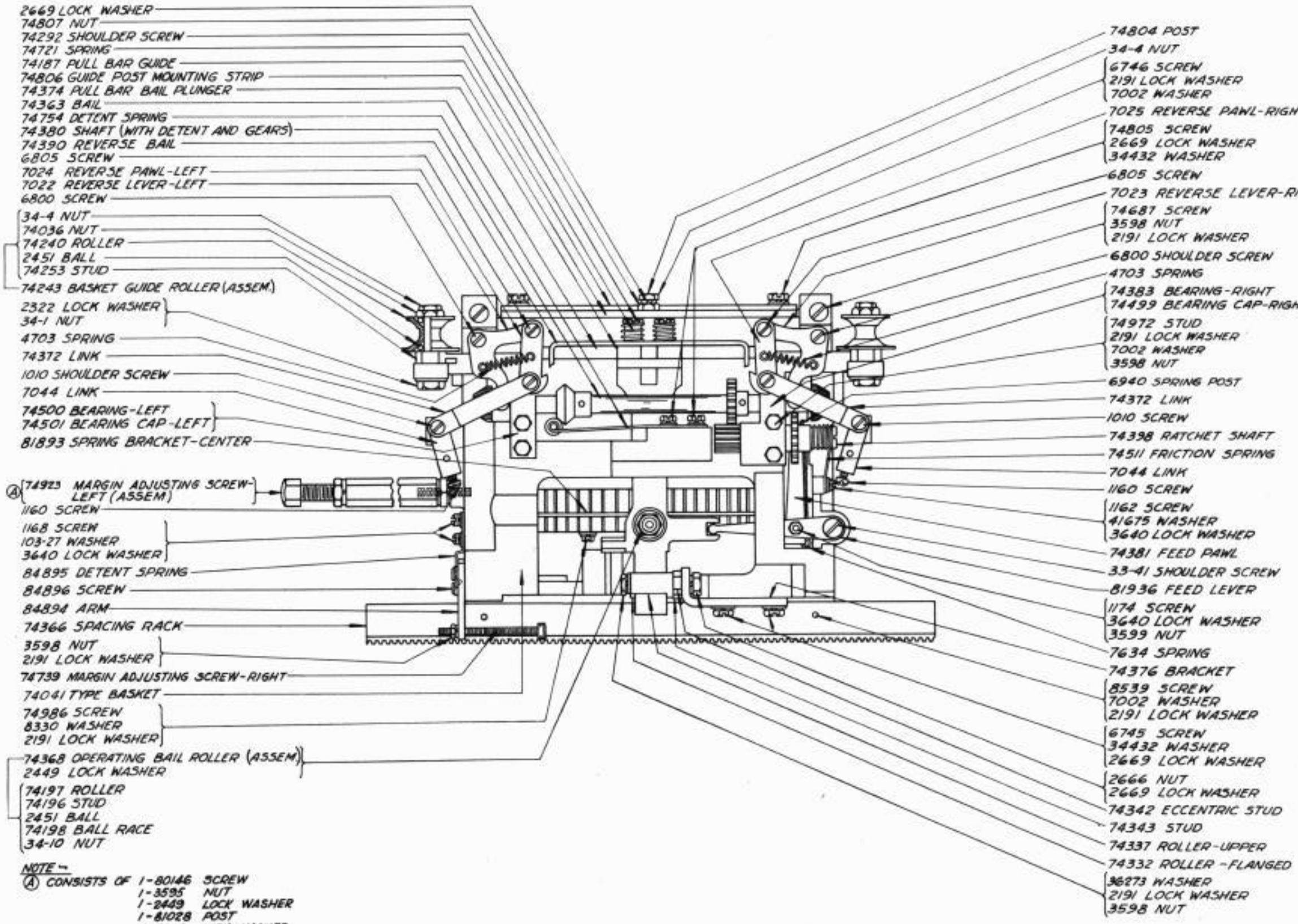
74876 PAPER ROLL SPINDLE (ASSEM)
(INCLUDES 74877 SPRING)

78903 ROLL OF PAPER - YELLOW

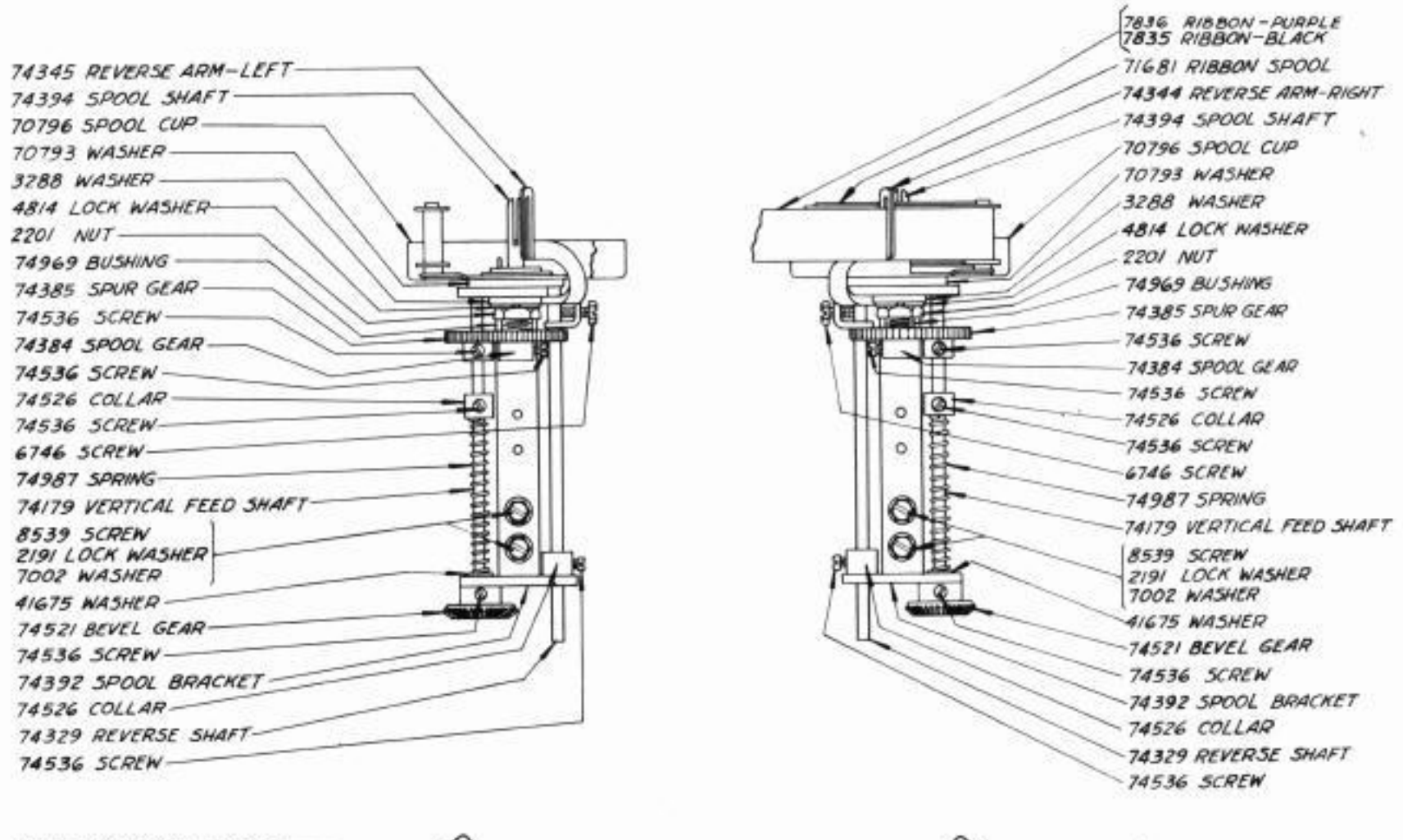


97740 CABLE (SELECTOR)

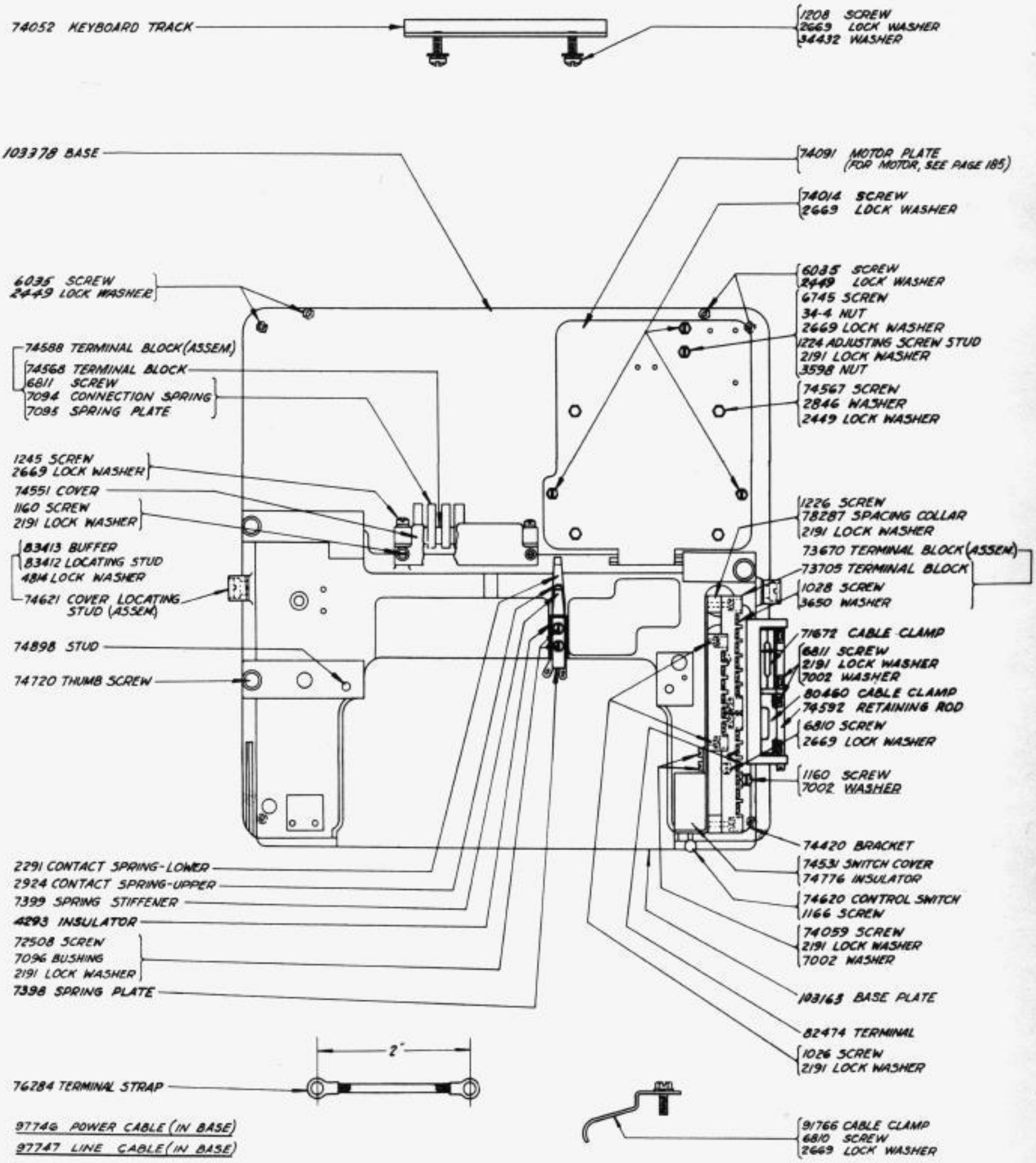

84351 TYPE BAR BACKSTOP
74279 LEATHER STRIP
33-111 SCREW
(FOR PULL BARS, SPRINGS, TYPE BARS & TYPE PALLETS, SEE PAGE 188)
74281 TYPE BAR BACKSTOP (ASSEM)
8539 SCREW
2191 LOCK WASHER
7002 WASHER
74889 BLOCK
7634 SPRING
74513 FULCRUM ROD
81889 SPRING BRACKET-END
74986 SCREW
8330 WASHER
2191 LOCK WASHER
74373 TYPE BAR SEGMENT
6746 SCREW
2191 LOCK WASHER
74296 PILOT SCREW
8539 SCREW
2191 LOCK WASHER
7002 WASHER
74397 DRAW STRAP POST
6745 SCREW
2669 LOCK WASHER
1162 SCREW
3640 LOCK WASHER
103-27 WASHER
74730 SHOULDER SCREW
34432 WASHER
2191 LOCK WASHER
74731 NUT
74726 EXTENSION
74401 RIBBON OSCILLATOR
82999 SPRING
74378 MARGIN BELL PAWL
33-170 SCREW
3640 LOCK WASHER
3599 NUT
6746 SCREW
2191 LOCK WASHER
74200 TRACK-UPPER
74062 TRACK-LOWER
74363 BAIL
74008 ROLLER
74006 BUSHING
74334 WASHER
34-4 NUT
2669 LOCK WASHER
7634 SPRING
81889 SPRING BRACKET-END
74986 SCREW
8330 WASHER
2191 LOCK WASHER
74294 ADAPTER PLATE
73427 SHIM
74371 RIBBON CARRIER
74414 TYPE BAR GUIDE
1161 SCREW
2191 LOCK WASHER
74330 SPRING
74010 ROLLER
33-168 SCREW
2191 LOCK WASHER
74512 BASKET SUPPORT ROLLER (ASSEM)
34-1 NUT
2322 LOCK WASHER
74194 STUD
2451 BALL
74195 ROLLER
74036 NUT
34-4 NUT
74700 SPRING
74335 SHIFT LEVER
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74379 BRACKET
74358 BRACKET
6746 SCREW
2191 LOCK WASHER
74126 SUPPORT

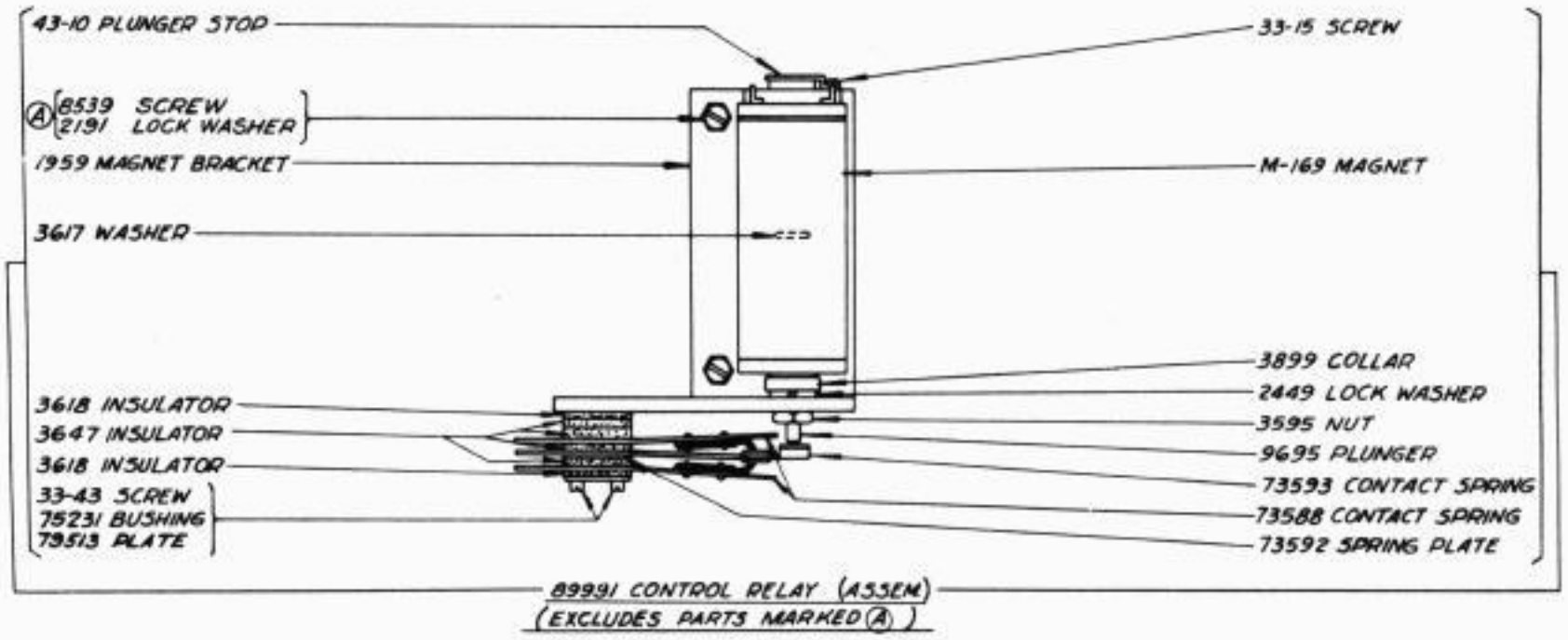


NOTE —
Ⓐ CONSISTS OF 1-80146 SCREW
1-3595 NUT
1-2449 LOCK WASHER
1-81028 POST
1-4814 LOCK WASHER
1-81027 STUD
1-76156 WASHER

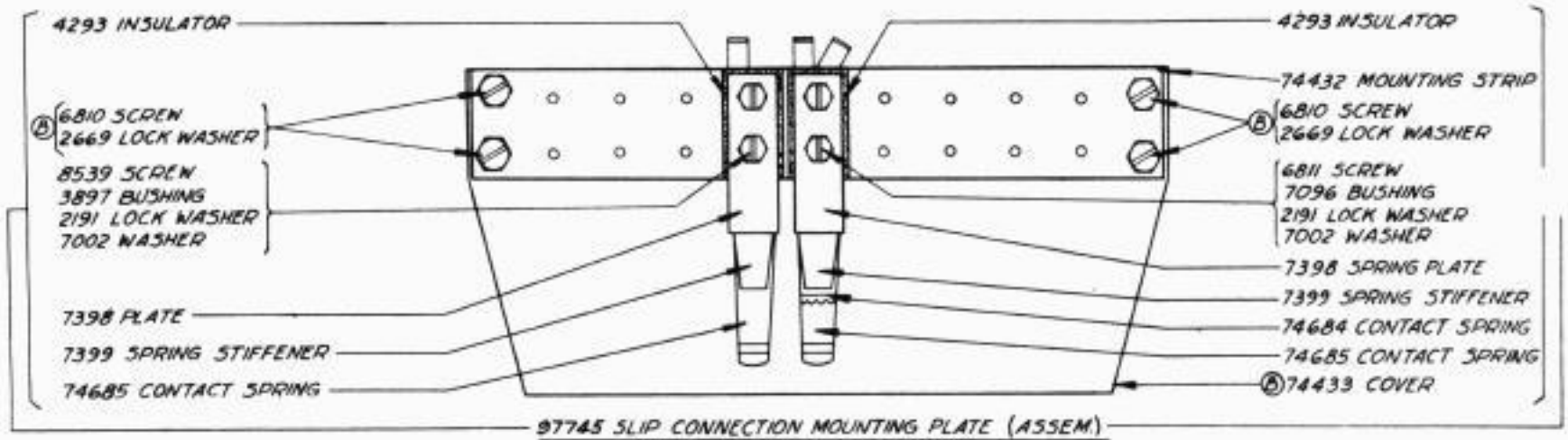


CODE BARS	
NO. STAMPED ON BAR	CATALOG NUMBER
1 D	74180
2 D	74181
3 D	74182
4 D	74183
5 D	74184

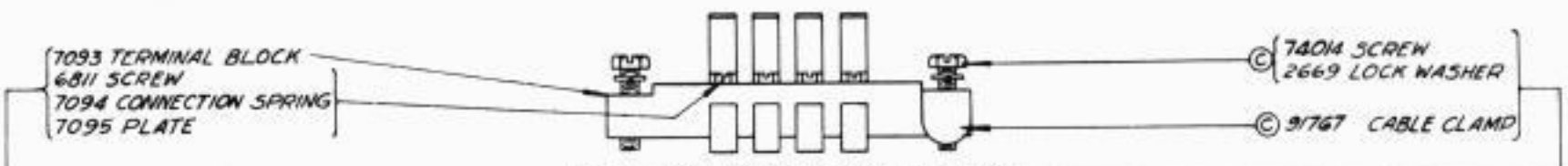

74052 KEYBOARD TRACK
1208 SCREW
2669 LOCK WASHER
34432 WASHER
103378 BASE
74091 MOTOR PLATE (FOR MOTOR, SEE PAGE 185)
74014 SCREW
2669 LOCK WASHER
6035 SCREW
2449 LOCK WASHER
6035 SCREW
2449 LOCK WASHER
6745 SCREW
34-4 NUT
2669 LOCK WASHER
1224 ADJUSTING SCREW STUD
2191 LOCK WASHER
3598 NUT
74588 TERMINAL BLOCK (ASSEM.)
74568 TERMINAL BLOCK
6811 SCREW
7094 CONNECTION SPRING
7095 SPRING PLATE
74567 SCREW
2846 WASHER
2449 LOCK WASHER
1245 SCREW
2669 LOCK WASHER
74551 COVER
1160 SCREW
2191 LOCK WASHER
1226 SCREW
78287 SPACING COLLAR
2191 LOCK WASHER
73670 TERMINAL BLOCK (ASSEM.)
73705 TERMINAL BLOCK
83413 BUFFER
83412 LOCATING STUD
4814 LOCK WASHER
74621 COVER LOCATING STUD (ASSEM.)
1028 SCREW
3650 WASHER
71672 CABLE CLAMP
74898 STUD
74720 THUMB SCREW
6811 SCREW
2191 LOCK WASHER
7002 WASHER
80460 CABLE CLAMP
74592 RETAINING ROD
6810 SCREW
2669 LOCK WASHER
1160 SCREW
7002 WASHER
74420 BRACKET
74531 SWITCH COVER
74776 INSULATOR
74620 CONTROL SWITCH
1166 SCREW
74059 SCREW
2191 LOCK WASHER
7002 WASHER
2291 CONTACT SPRING-LOWER
2924 CONTACT SPRING-UPPER
7399 SPRING STIFFENER
4293 INSULATOR
72508 SCREW
7096 BUSHING
2191 LOCK WASHER
7398 SPRING PLATE
103163 BASE PLATE
82474 TERMINAL
1026 SCREW
2191 LOCK WASHER
2"
76284 TERMINAL STRAP
91766 CABLE CLAMP
6810 SCREW
2669 LOCK WASHER
97746 POWER CABLE (IN BASE)
97747 LINE CABLE (IN BASE)



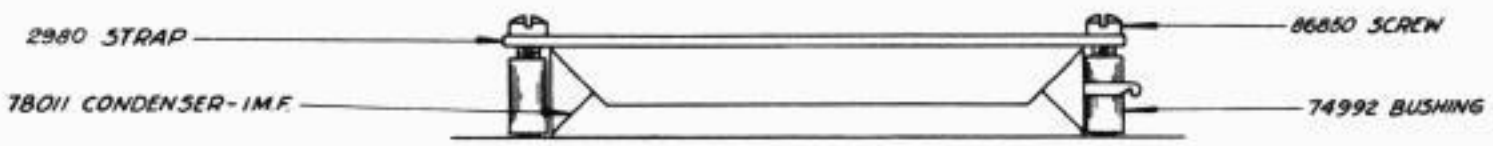
89991 CONTROL RELAY (ASSEM)
(EXCLUDES PARTS MARKED Ⓐ)

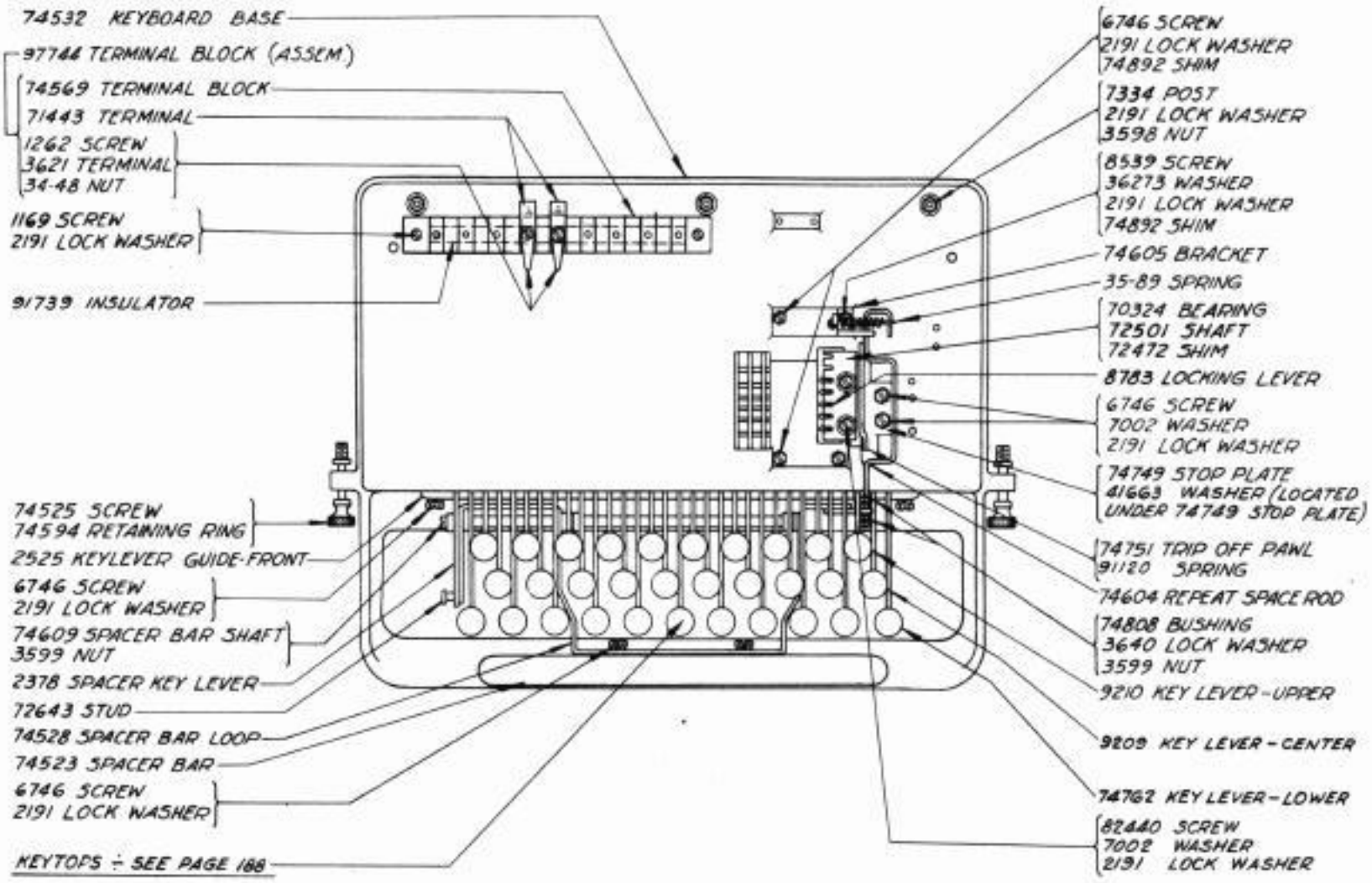


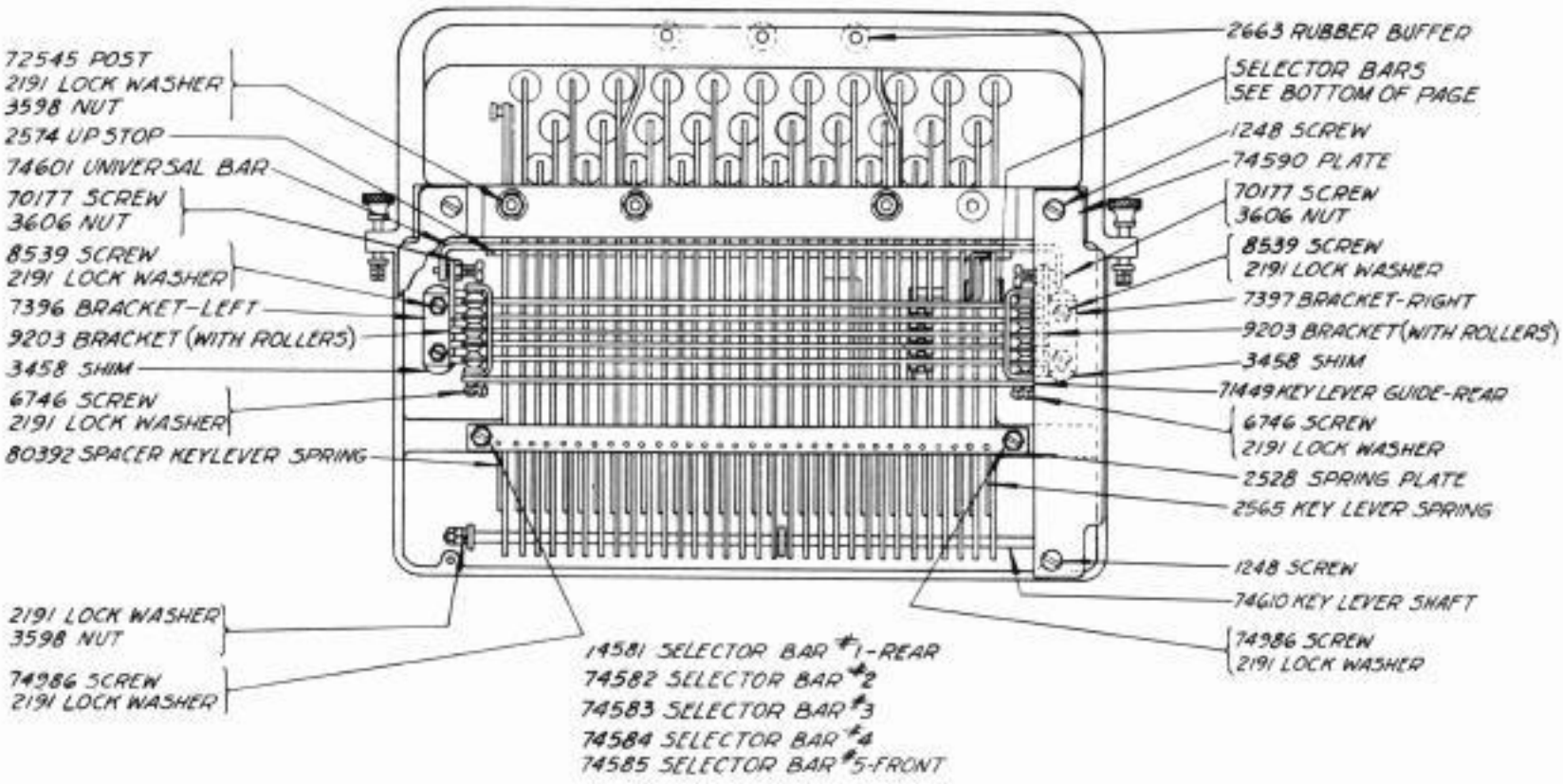
97745 SLIP CONNECTION MOUNTING PLATE (ASSEM)
(EXCLUDES PARTS MARKED Ⓐ)

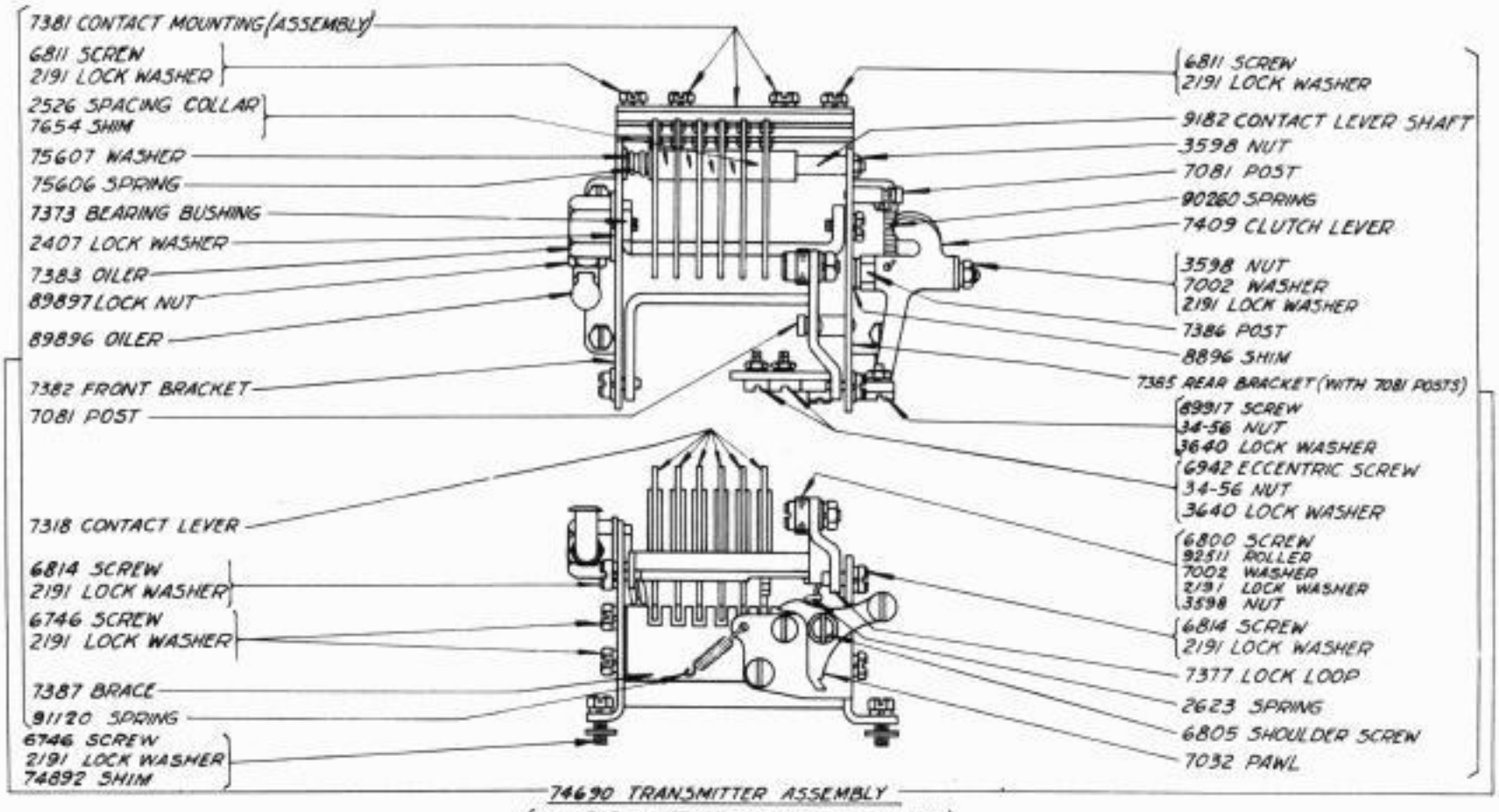


74627 CONNECTION STRIP (ASSEM)
(USED TO MAKE CONTACT WITH TERMINAL BLOCK ON MOTOR UNIT)
(EXCLUDES PARTS MARKED Ⓒ)

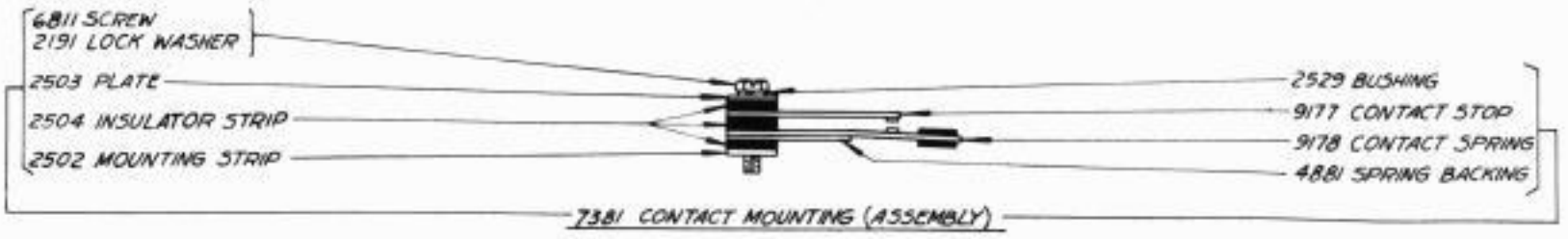



74532 KEYBOARD BASE
97744 TERMINAL BLOCK (ASSEM)
74569 TERMINAL BLOCK
71443 TERMINAL
1262 SCREW
3621 TERMINAL
34-48 NUT
1169 SCREW
2191 LOCK WASHER
91739 INSULATOR
74525 SCREW
74594 RETAINING RING
2525 KEYLEVER GUIDE-FRONT
6746 SCREW
2191 LOCK WASHER
74609 SPACER BAR SHAFT
3599 NUT
2378 SPACER KEY LEVER
72643 STUD
74528 SPACER BAR LOOP
74523 SPACER BAR
6746 SCREW
2191 LOCK WASHER
KEYTOPS - SEE PAGE 188
6746 SCREW
2191 LOCK WASHER
74892 SHIM
7334 POST
2191 LOCK WASHER
3598 NUT
8539 SCREW
36273 WASHER
2191 LOCK WASHER
74892 SHIM
74605 BRACKET
35-89 SPRING
70324 BEARING
72501 SHAFT
72472 SHIM
8783 LOCKING LEVER
6746 SCREW
7002 WASHER
2191 LOCK WASHER
74749 STOP PLATE
41663 WASHER (LOCATED UNDER 74749 STOP PLATE)
74751 TRIP OFF PAWL
91120 SPRING
74604 REPEAT SPACE ROD
74808 BUSHING
3640 LOCK WASHER
3599 NUT
9210 KEY LEVER-UPPER
9209 KEY LEVER-CENTER
74762 KEY LEVER-LOWER
82440 SCREW
7002 WASHER
2191 LOCK WASHER

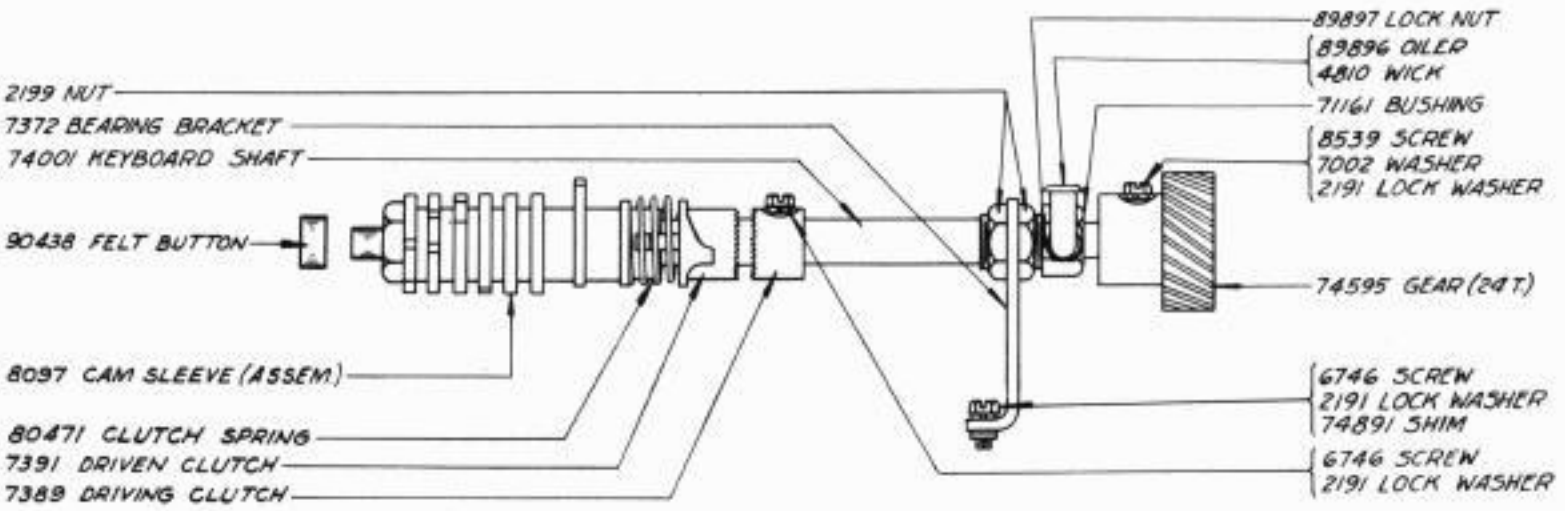

72545 POST
2191 LOCK WASHER
3598 NUT
2574 UP STOP
74601 UNIVERSAL BAR
70177 SCREW
3606 NUT
8539 SCREW
2191 LOCK WASHER
7396 BRACKET-LEFT
9203 BRACKET (WITH ROLLERS)
3458 SHIM
6746 SCREW
2191 LOCK WASHER
80392 SPACER KEYLEVER SPRING
2191 LOCK WASHER
3598 NUT
74986 SCREW
2191 LOCK WASHER
14581 SELECTOR BAR #1-REAR
74582 SELECTOR BAR #2
74583 SELECTOR BAR #3
74584 SELECTOR BAR #4
74585 SELECTOR BAR #5-FRONT
2663 RUBBER BUFFER
SELECTOR BARS
SEE BOTTOM OF PAGE
1248 SCREW
74590 PLATE
70177 SCREW
3606 NUT
8539 SCREW
2191 LOCK WASHER
7397 BRACKET-RIGHT
9203 BRACKET (WITH ROLLERS)
3458 SHIM
71449 KEY LEVER GUIDE-REAR
6746 SCREW
2191 LOCK WASHER
2528 SPRING PLATE
2565 KEY LEVER SPRING
1248 SCREW
74610 KEY LEVER SHAFT
74986 SCREW
2191 LOCK WASHER

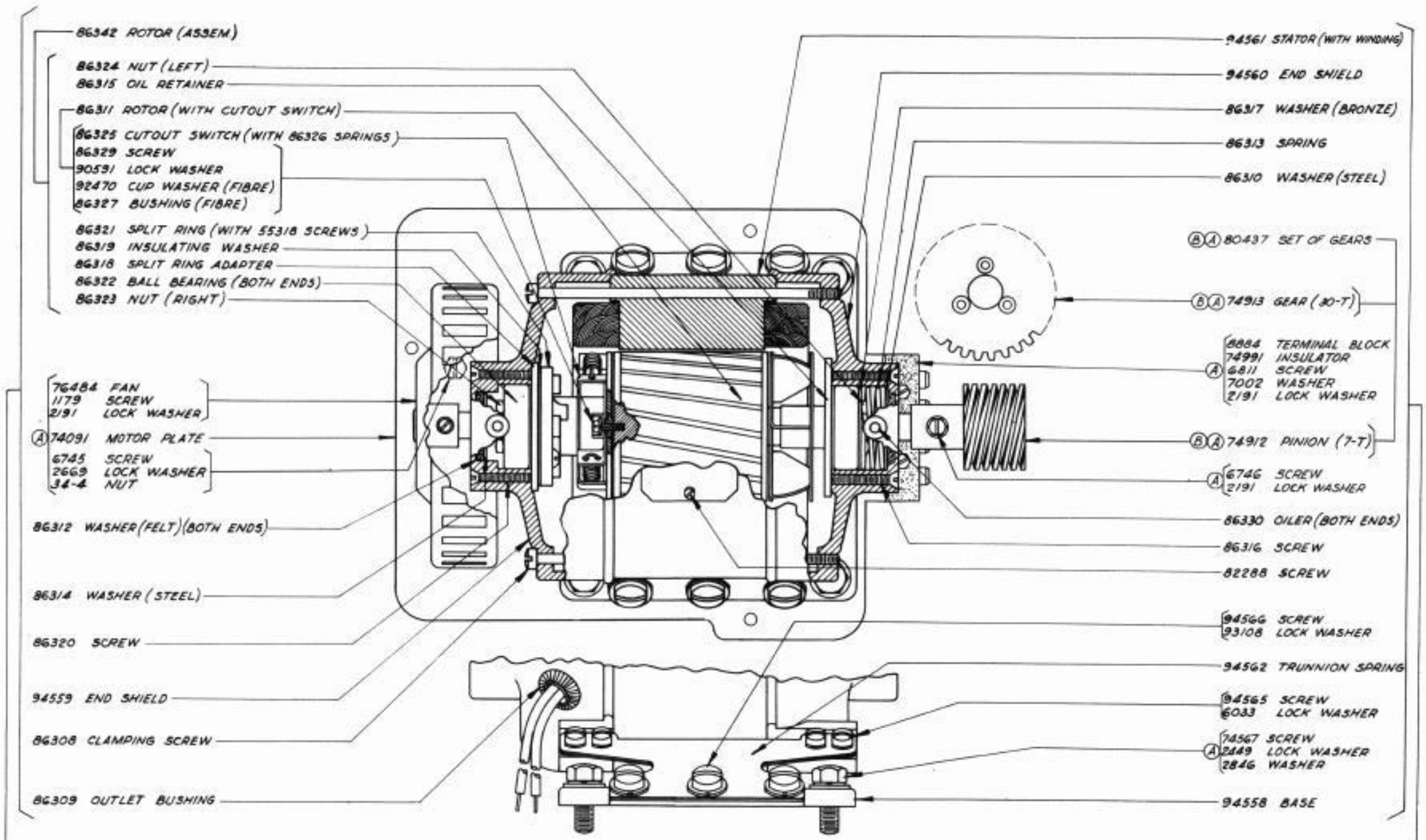


74690 TRANSMITTER ASSEMBLY
(WITH 7381 CONTACT MOUNTING ASSEMBLY)



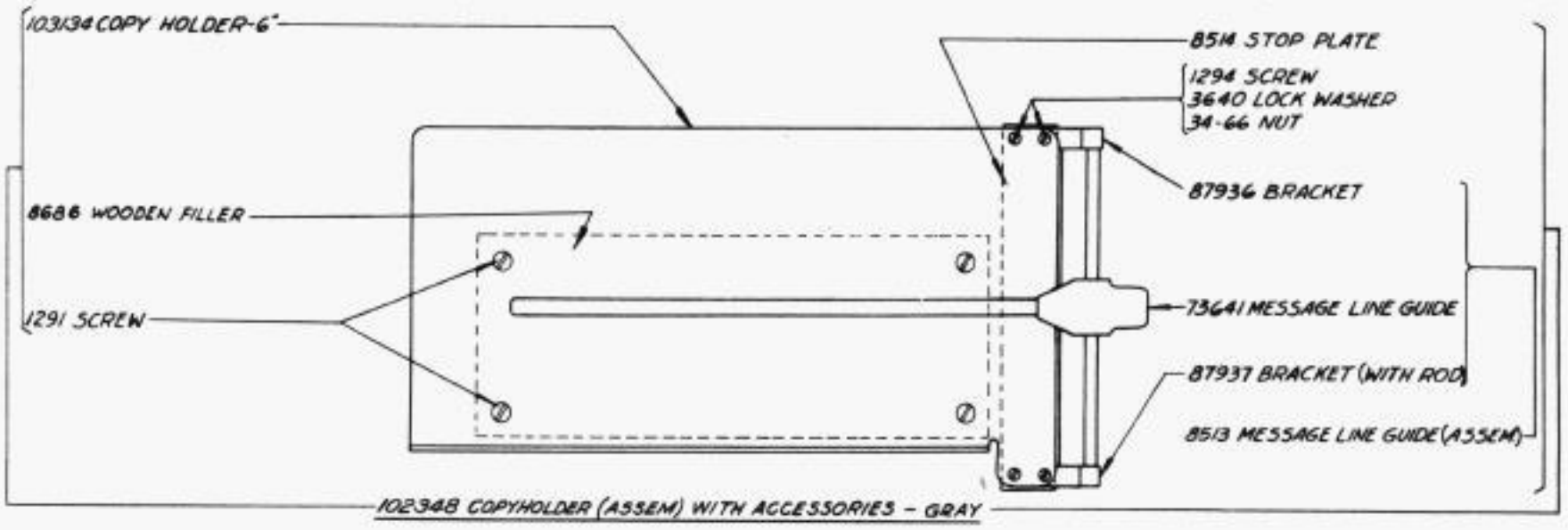
7381 CONTACT MOUNTING (ASSEMBLY)

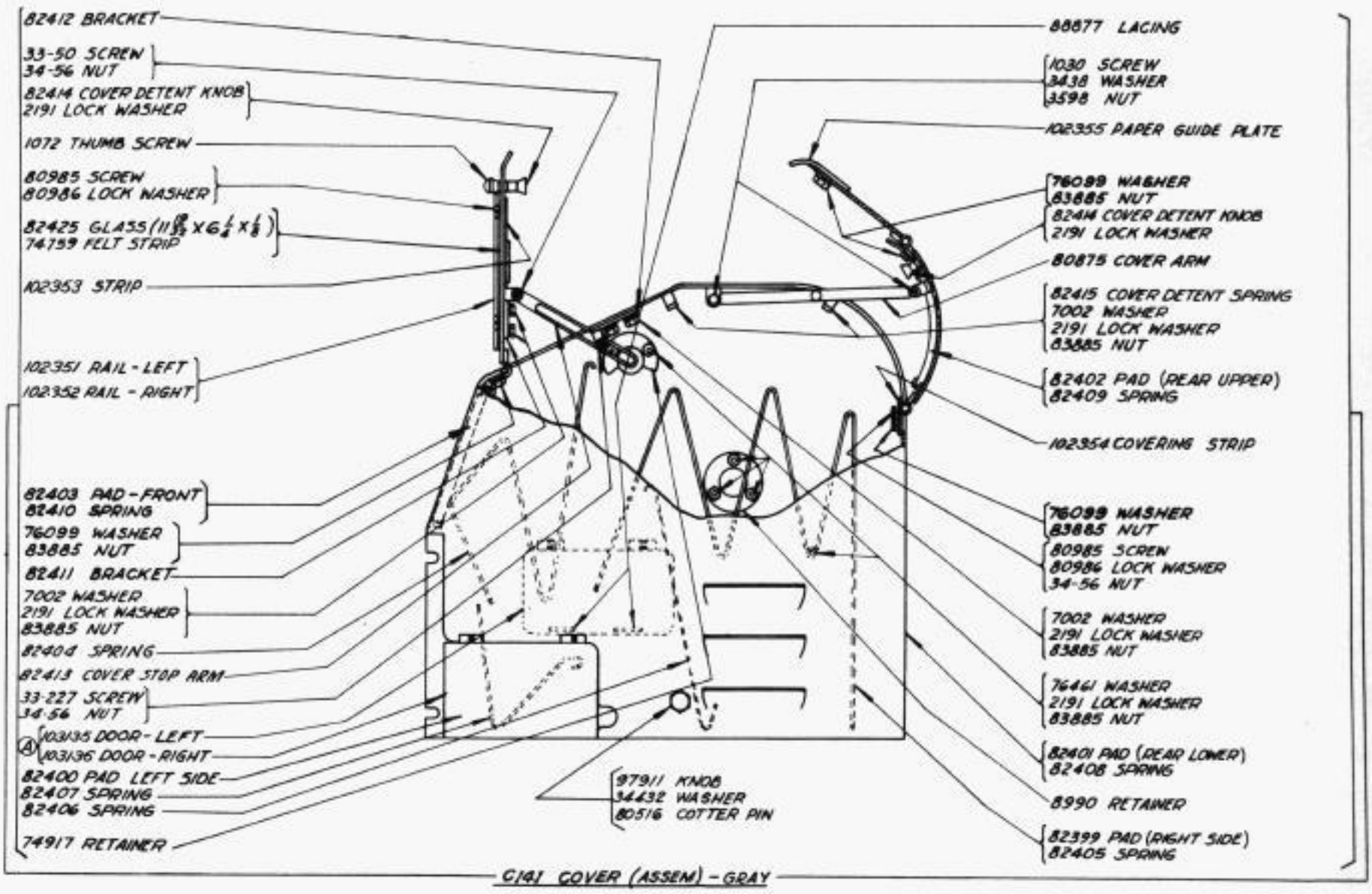


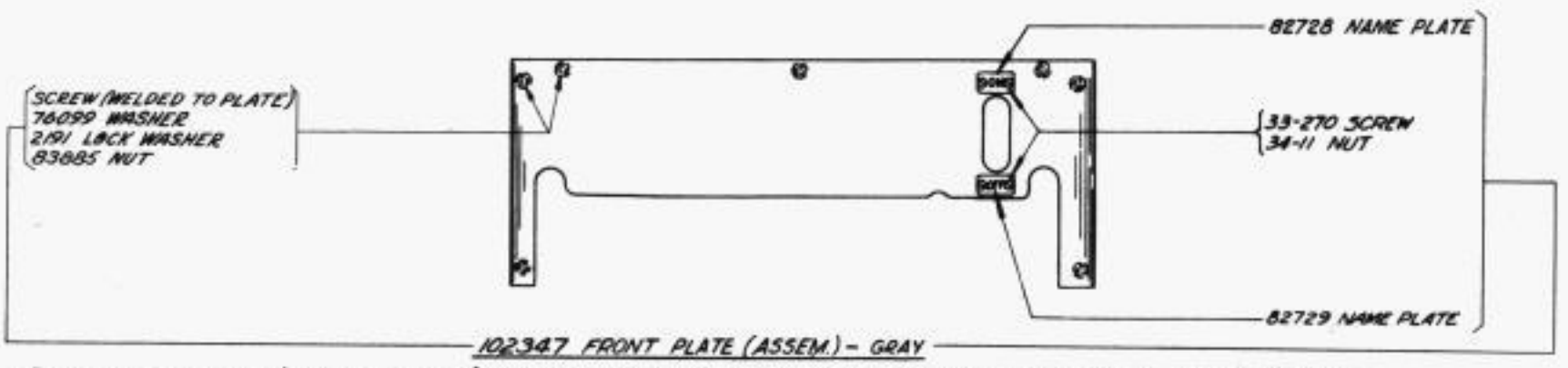


92575 SYNCHRONOUS MOTOR 1/40 H.P., 110 V., 60 CYCLE A.C (EXCLUDES PARTS MARKED (A))

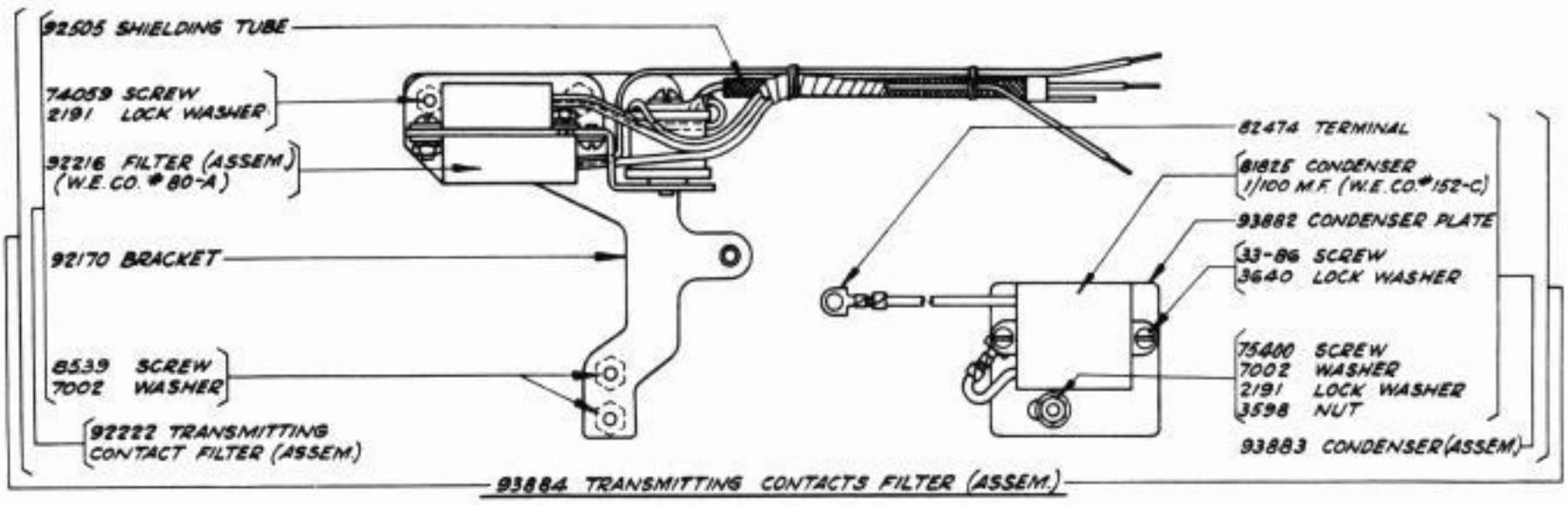
MU-15 SYNCHRONOUS MOTOR UNIT (ASSEM) (EXCLUDES PARTS MARKED (B))

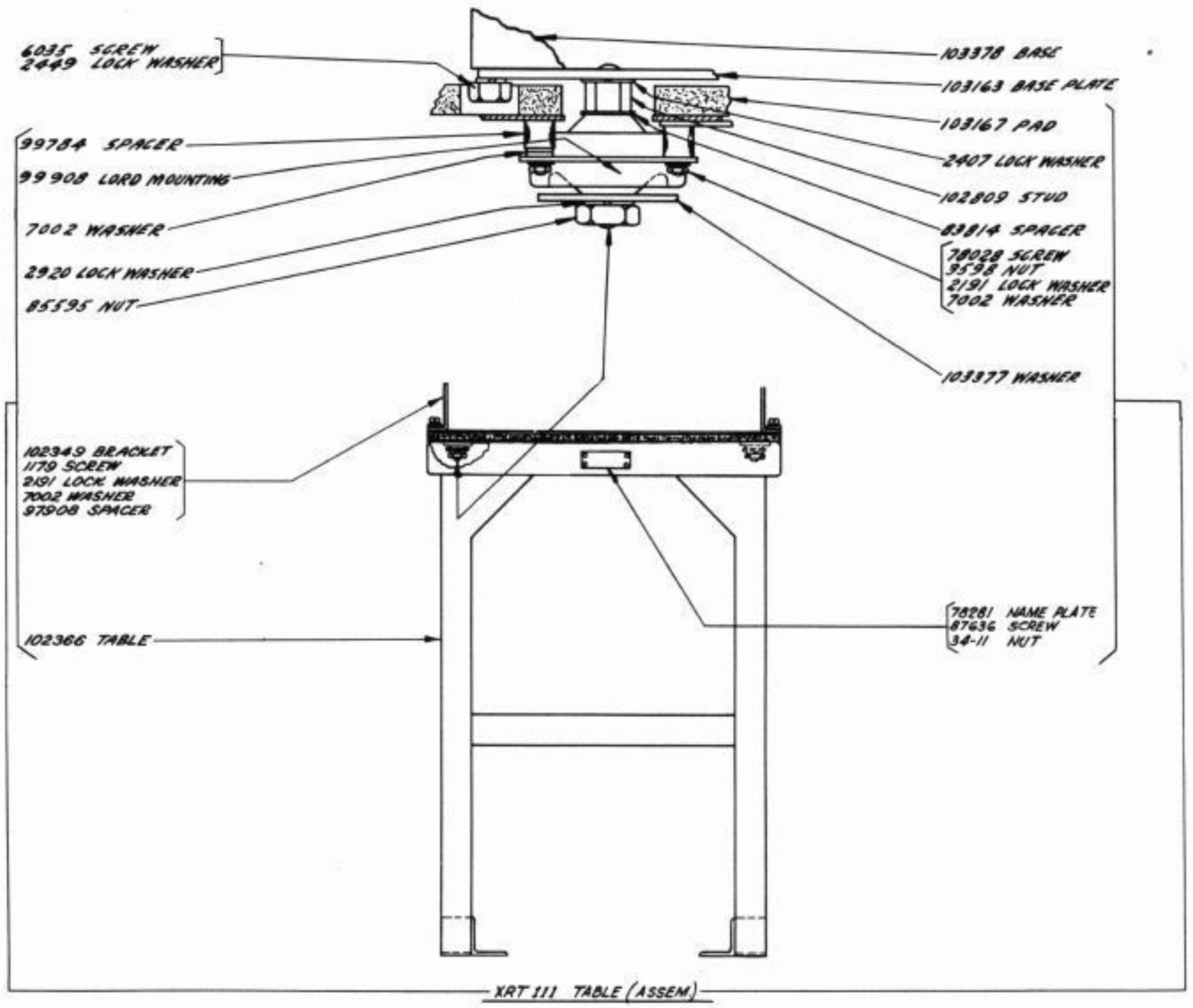






Ⓐ INCLUDES HINGES (WELDED TO DOOR), 74637 HINGE SPRINGS, 103-27 WASHER, 3640 LOCK WASHER AND 34-66 NUTS.


92505 SHIELDING TUBE
74059 SCREW
2191 LOCK WASHER
92216 FILTER (ASSEM.)
(W.E.CO. # 80-A)
92170 BRACKET
8539 SCREW
7002 WASHER
92222 TRANSMITTING
CONTACT FILTER (ASSEM.)
82474 TERMINAL
81825 CONDENSER
1/100 M.F. (W.E.CO.# 152-C)
93882 CONDENSER PLATE
33-86 SCREW
3640 LOCK WASHER
75400 SCREW
7002 WASHER
2191 LOCK WASHER
3598 NUT
93883 CONDENSER (ASSEM.)
93884 TRANSMITTING CONTACTS FILTER (ASSEM.)

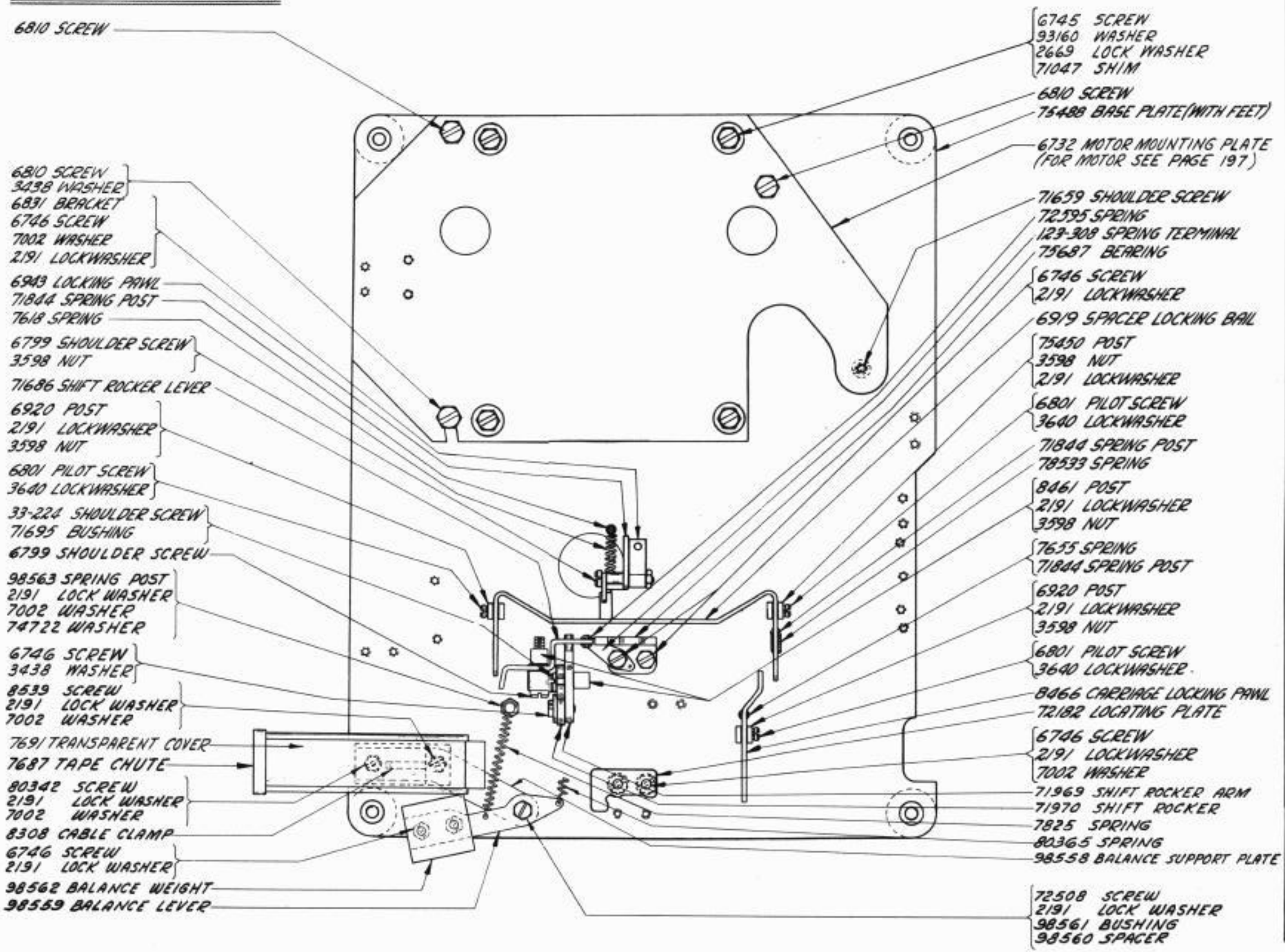

6035 SCREW
2449 LOCK WASHER
99784 SPACER
99908 LORD MOUNTING
7002 WASHER
2920 LOCK WASHER
85595 NUT
103378 BASE
103163 BASE PLATE
103167 PAD
2407 LOCK WASHER
102809 STUD
83814 SPACER
78028 SCREW
3598 NUT
2191 LOCK WASHER
7002 WASHER
103377 WASHER
102349 BRACKET
1179 SCREW
2191 LOCK WASHER
7002 WASHER
97908 SPACER
102366 TABLE
78281 NAME PLATE
87636 SCREW
34-11 NUT
XRT 111 TABLE (ASSEM.)

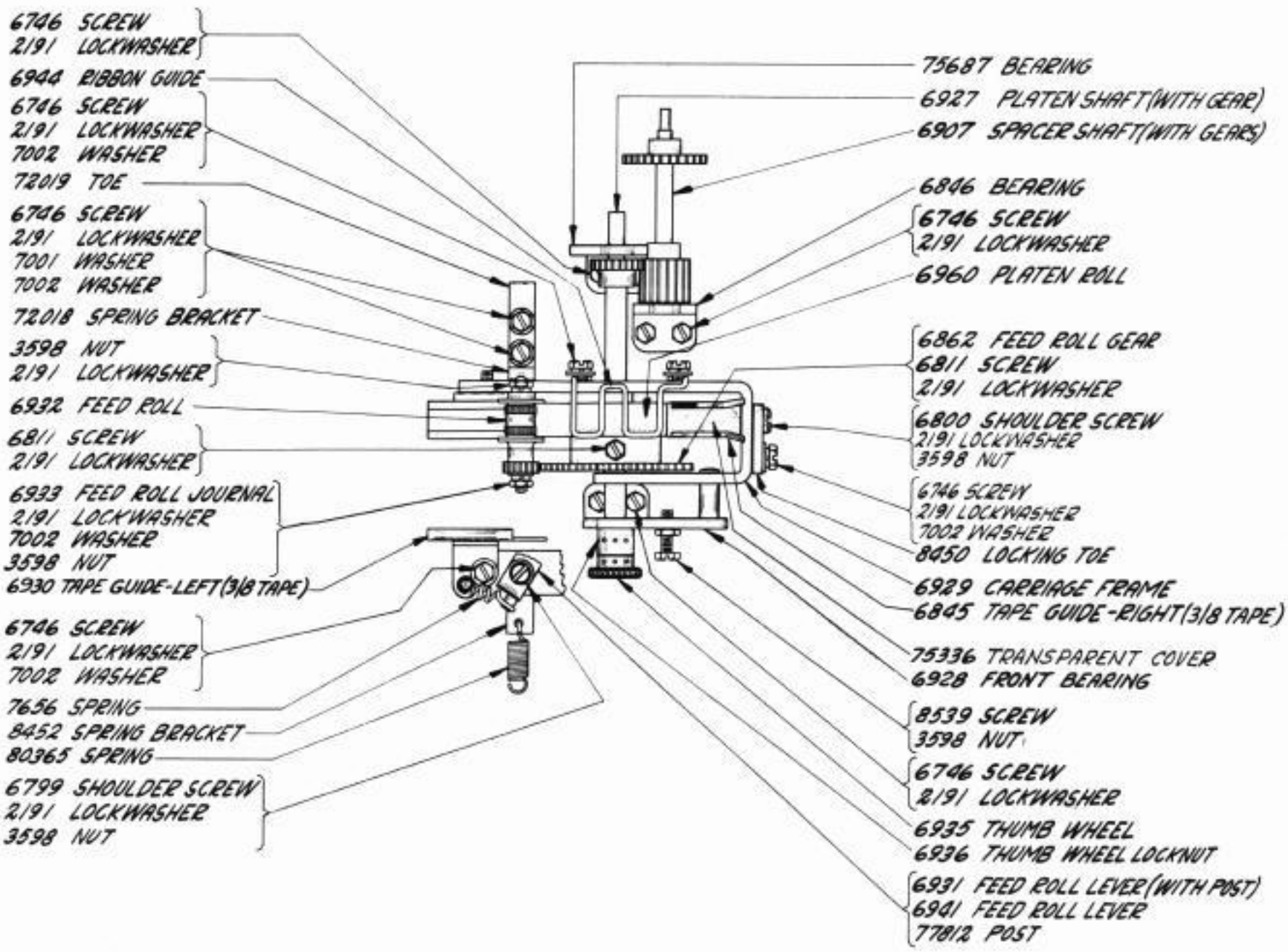
80924 SET OF TYPE BAR PALLETS

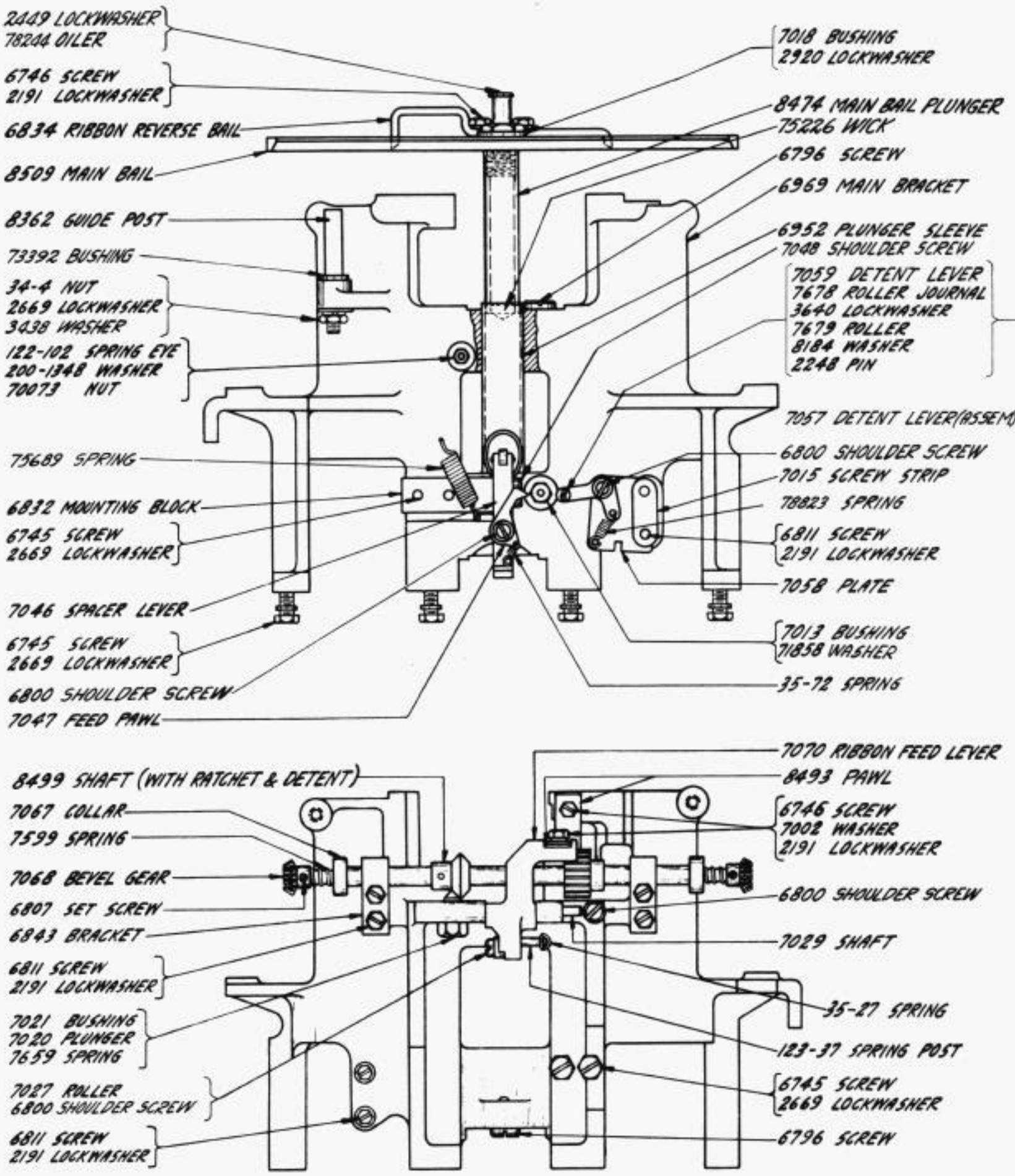
89953 SET OF SPRING CUSHION KEYTOPS

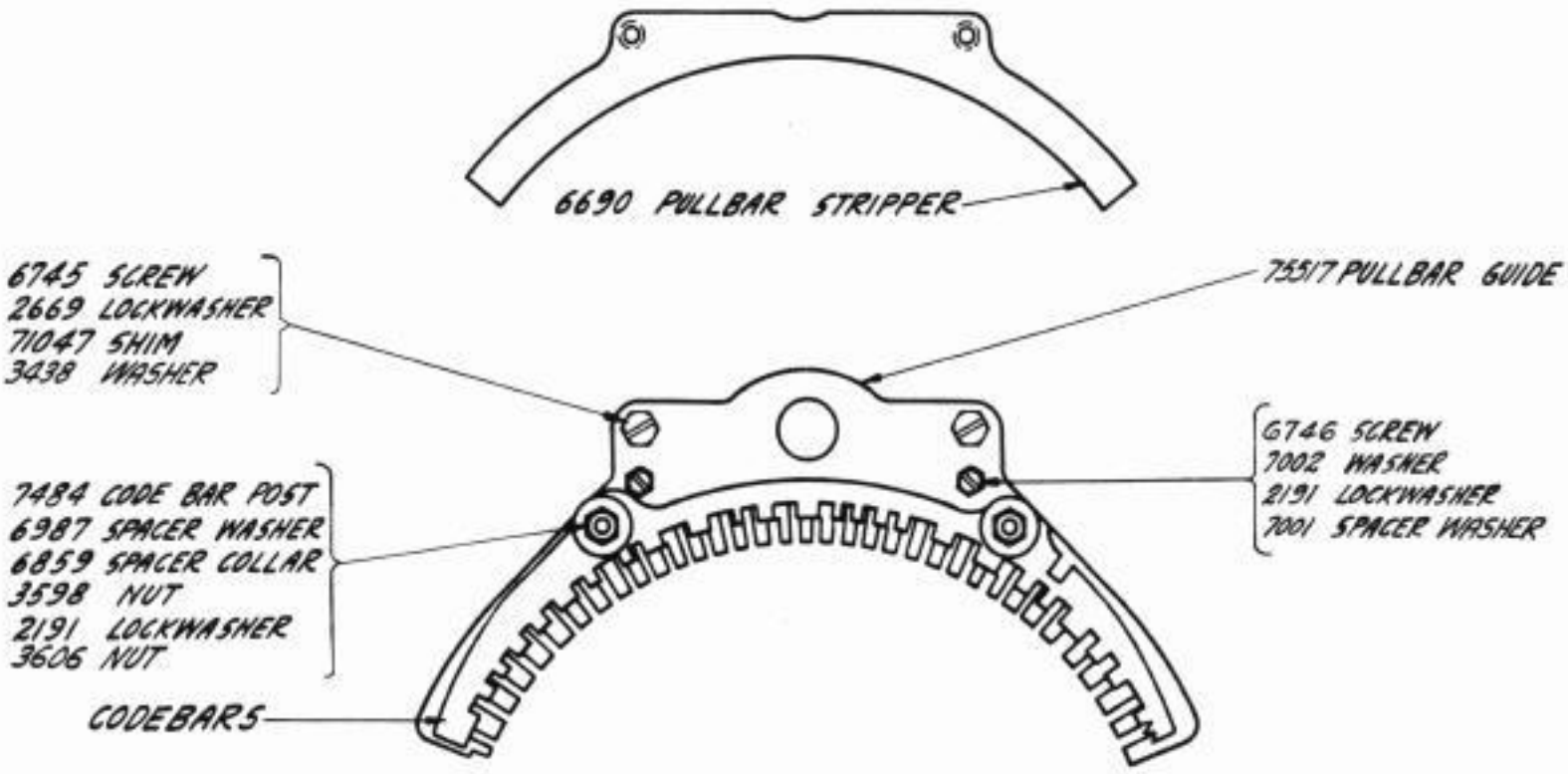
NUMBER OF POSITION IN SEGMENT	PULL BARS		PULL BAR SPRING	TYPE BARS (WITHOUT PALLETS)		TYPE BAR PALLETS		TYPE BARS (WITH PALLETS)		SPRING CUSHION KEYTOPS
	CATALOG NUMBER	DESCRIPTION		CATALOG NUMBER	NUMBER STAMPED ON BAR	CATALOG NUMBER	DESCRIPTION	CATALOG NUMBER	NUMBER STAMPED ON BAR	CATALOG NUMBER
1										
2										
3	74185	STANDARD	7634	74203	3	74303	Z "	74643	3	78970
4	74185	"	7634	74204	4	74304	K (	74644	4	78956
5	74185	"	7634	74205	5	74305	B ?	74645	5	78947
6	74185	"	7634	74206	6	74306	P 0	74646	6	78961
7	74185	"	7634	74207	7	74307	Y 6	74647	7	78969
8	74185	"	7634	74208	8	74308	M .	74648	8	78958
9	74185	"	7634	74209	9	74309	U 7	74649	9	78965
10	74185	"	7634	74210	10	74310	L)	74650	10	78957
11	74185	"	7634	74211	11	74311	H Æ	74651	11	78953
12	74185	"	7634	74212	12	74312	O 9	74652	12	78960
13	74185	"	7634	74213	13	74313	I 8	74653	13	78954
14	74185	"	7634	74214	14	74314	N ,	74654	14	78959
15	74185	"	7634	74215	15	74315	E 3	74655	15	78950
16	74185	"	7634	74216	16	74316	T 5	74656	16	78964
17	74185	"	7634	74217	17	74317	A -	74657	17	78946
18	74185	"	7634	74218	18	74318	J '	74658	18	78955
19	74185	"	7634	74219	19	74319	R 4	74659	19	78963
20	74185	"	7634	74220	20	74320	D $	74660	20	78949
21	74185	"	7634	74221	21	74321	C :	74661	21	78948
22	74185	"	7634	74222	22	74322	F !	74662	22	78951
23	74185	"	7634	74223	23	74323	W Z	74663	23	78967
24	74185	"	7634	74224	24	74324	G &	74664	24	78952
25	74185	"	7634	74225	25	74325	V ;	74665	25	78966
26	74185	"	7634	74226	26	74326	Q 1	74666	26	78962
27	74185	"	7634	74227	27	74327	X /	74667	27	78968
28	74185	"	7634	74228	28	74328	S "	74668	28	80551
							BLANK			78971
							FIGS.			78972
							LTRS.			78973
							CAR. RET.			78976
							LINE FEED			78978

98067 CABLE (ASSEM)(WITH 98453 PLUG)

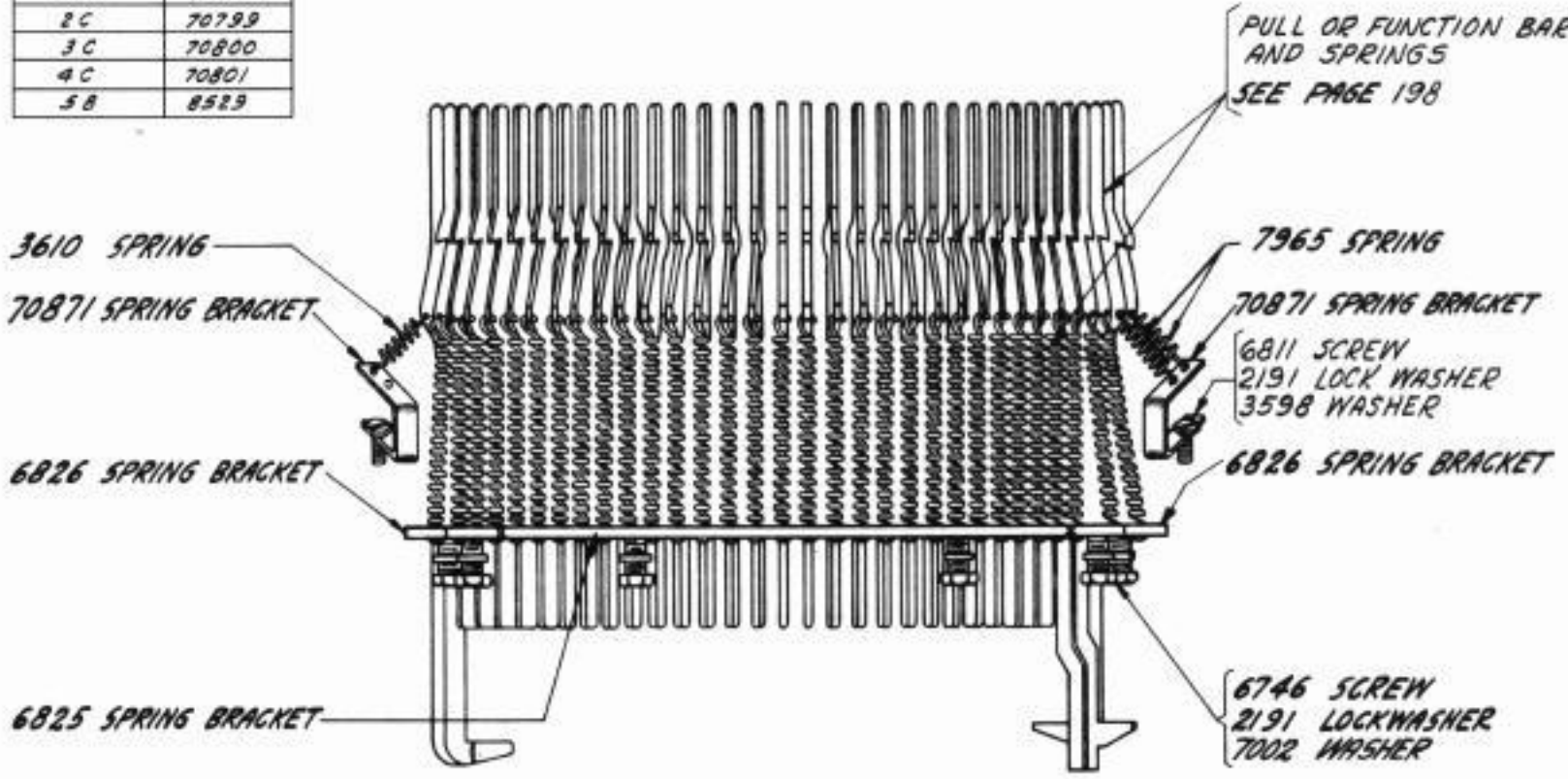



6746 SCREW
2191 LOCKWASHER
6944 RIBBON GUIDE
6746 SCREW
2191 LOCKWASHER
7002 WASHER
72019 TOE
6746 SCREW
2191 LOCKWASHER
7001 WASHER
7002 WASHER
72018 SPRING BRACKET
3598 NUT
2191 LOCKWASHER
6932 FEED ROLL
6811 SCREW
2191 LOCKWASHER
6933 FEED ROLL JOURNAL
2191 LOCKWASHER
7002 WASHER
3598 NUT
6930 TAPE GUIDE-LEFT(3/8 TAPE)
6746 SCREW
2191 LOCKWASHER
7002 WASHER
7656 SPRING
8452 SPRING BRACKET
80365 SPRING
6799 SHOULDER SCREW
2191 LOCKWASHER
3598 NUT
75687 BEARING
6927 PLATEN SHAFT(WITH GEAR)
6907 SPACER SHAFT(WITH GEARS)
6846 BEARING
6746 SCREW
2191 LOCKWASHER
6960 PLATEN ROLL
6862 FEED ROLL GEAR
6811 SCREW
2191 LOCKWASHER
6800 SHOULDER SCREW
2191 LOCKWASHER
3598 NUT
6746 SCREW
2191 LOCKWASHER
7002 WASHER
8450 LOCKING TOE
6929 CARRIAGE FRAME
6845 TAPE GUIDE-RIGHT(3/8 TAPE)
75336 TRANSPARENT COVER
6928 FRONT BEARING
8539 SCREW
3598 NUT
6746 SCREW
2191 LOCKWASHER
6935 THUMB WHEEL
6936 THUMB WHEEL LOCKNUT
6931 FEED ROLL LEVER(WITH POST)
6941 FEED ROLL LEVER
77812 POST

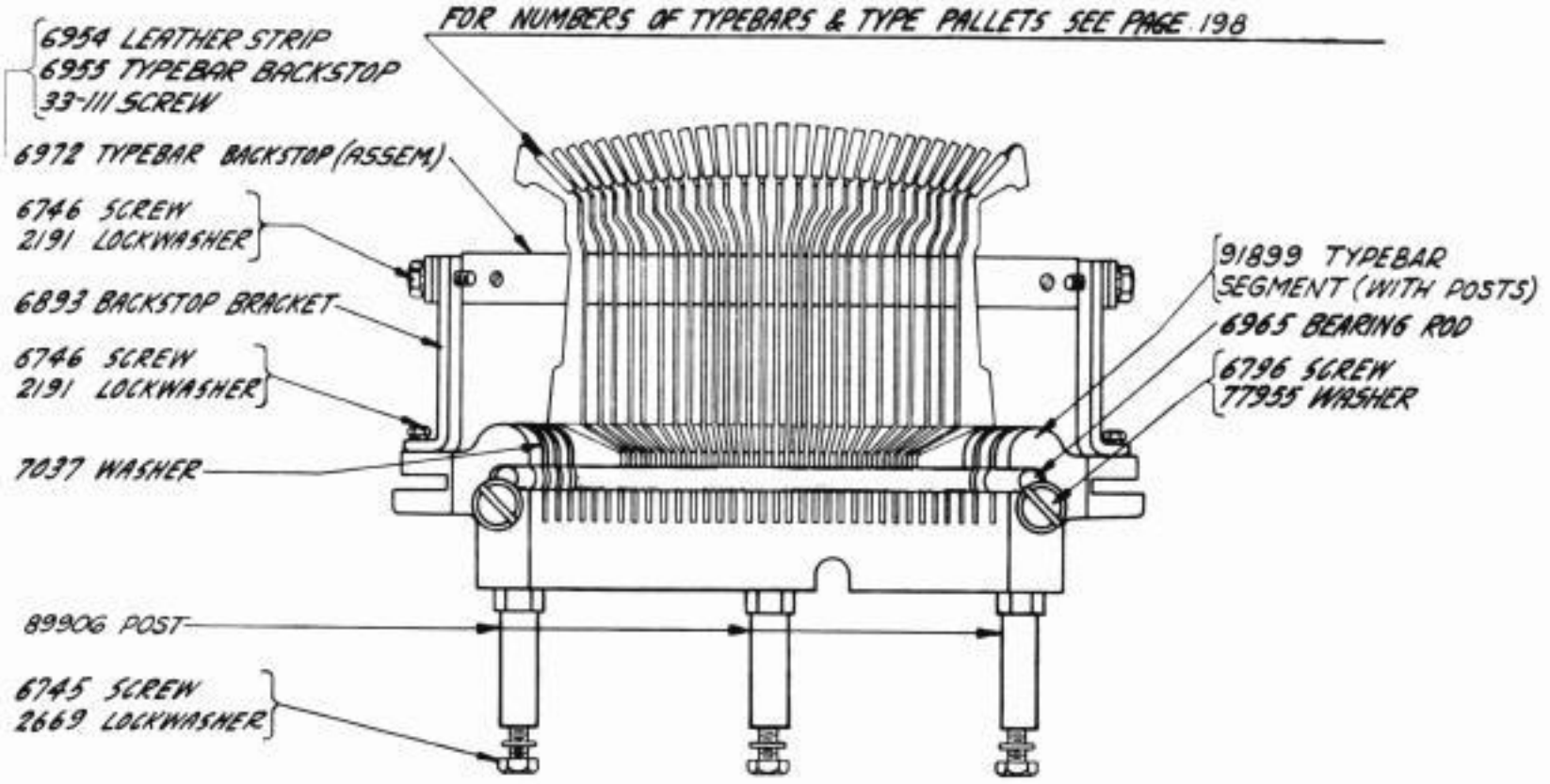

2449 LOCKWASHER
78244 OILER
6746 SCREW
2191 LOCKWASHER
6834 RIBBON REVERSE BAIL
8509 MAIN BAIL
8362 GUIDE POST
73392 BUSHING
34-4 NUT
2669 LOCKWASHER
3438 WASHER
122-102 SPRING EYE
200-1348 WASHER
70073 NUT
75689 SPRING
6832 MOUNTING BLOCK
6745 SCREW
2669 LOCKWASHER
7046 SPACER LEVER
6745 SCREW
2669 LOCKWASHER
6800 SHOULDER SCREW
7047 FEED PAWL
7018 BUSHING
2920 LOCKWASHER
8474 MAIN BAIL PLUNGER
75226 WICK
6796 SCREW
6969 MAIN BRACKET
6952 PLUNGER SLEEVE
7048 SHOULDER SCREW
7059 DETENT LEVER
7678 ROLLER JOURNAL
3640 LOCKWASHER
7679 ROLLER
8184 WASHER
2248 PIN
7057 DETENT LEVER(ASSEM)
6800 SHOULDER SCREW
7015 SCREW STRIP
78823 SPRING
6811 SCREW
2191 LOCKWASHER
7058 PLATE
7013 BUSHING
71858 WASHER
35-72 SPRING
8499 SHAFT (WITH RATCHET & DETENT)
7067 COLLAR
7599 SPRING
7068 BEVEL GEAR
6807 SET SCREW
6843 BRACKET
6811 SCREW
2191 LOCKWASHER
7021 BUSHING
7020 PLUNGER
7659 SPRING
7027 ROLLER
6800 SHOULDER SCREW
6811 SCREW
2191 LOCKWASHER
7070 RIBBON FEED LEVER
8493 PAWL
6746 SCREW
7002 WASHER
2191 LOCKWASHER
6800 SHOULDER SCREW
7029 SHAFT
35-27 SPRING
123-37 SPRING POST
6745 SCREW
2669 LOCKWASHER
6796 SCREW

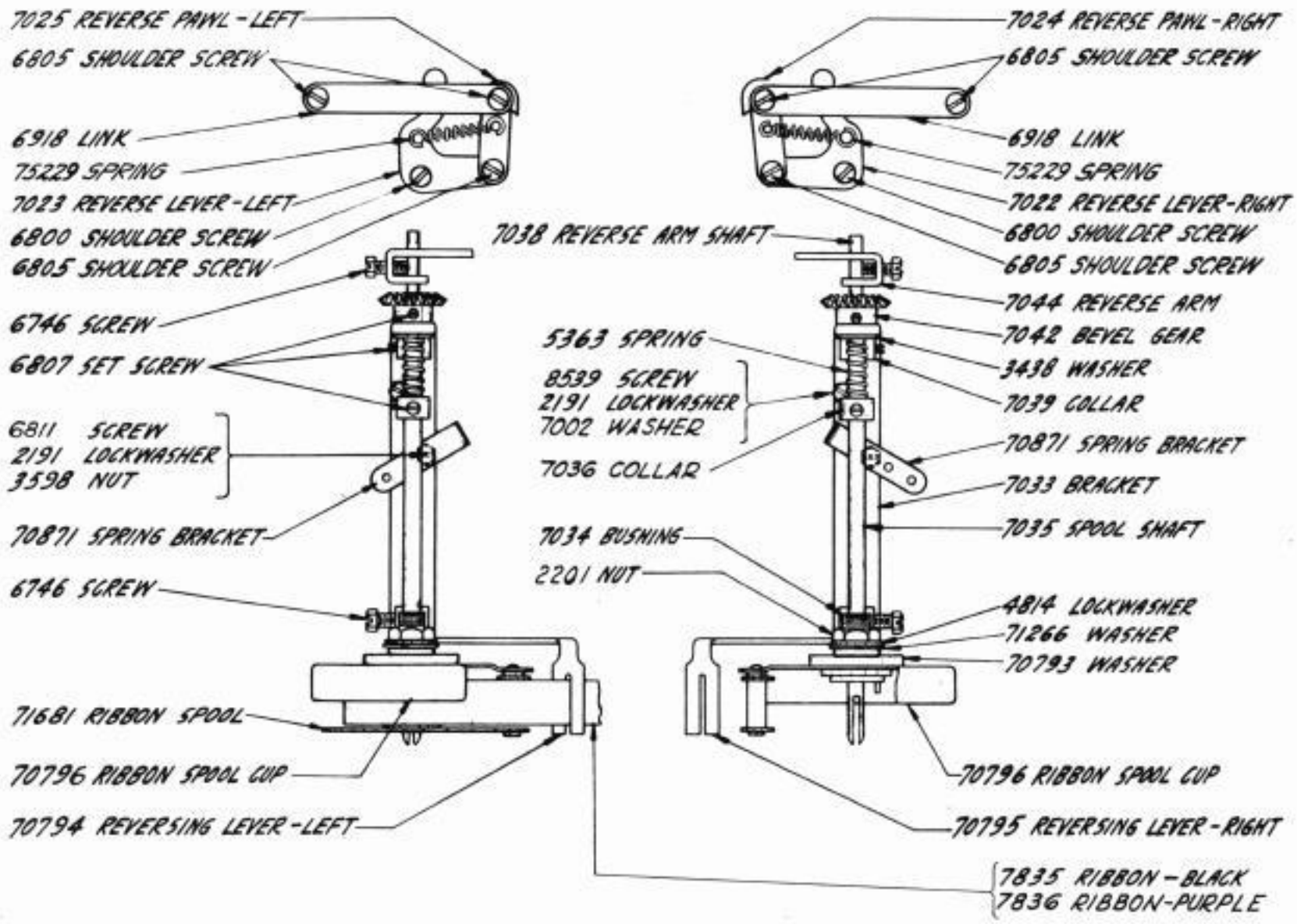


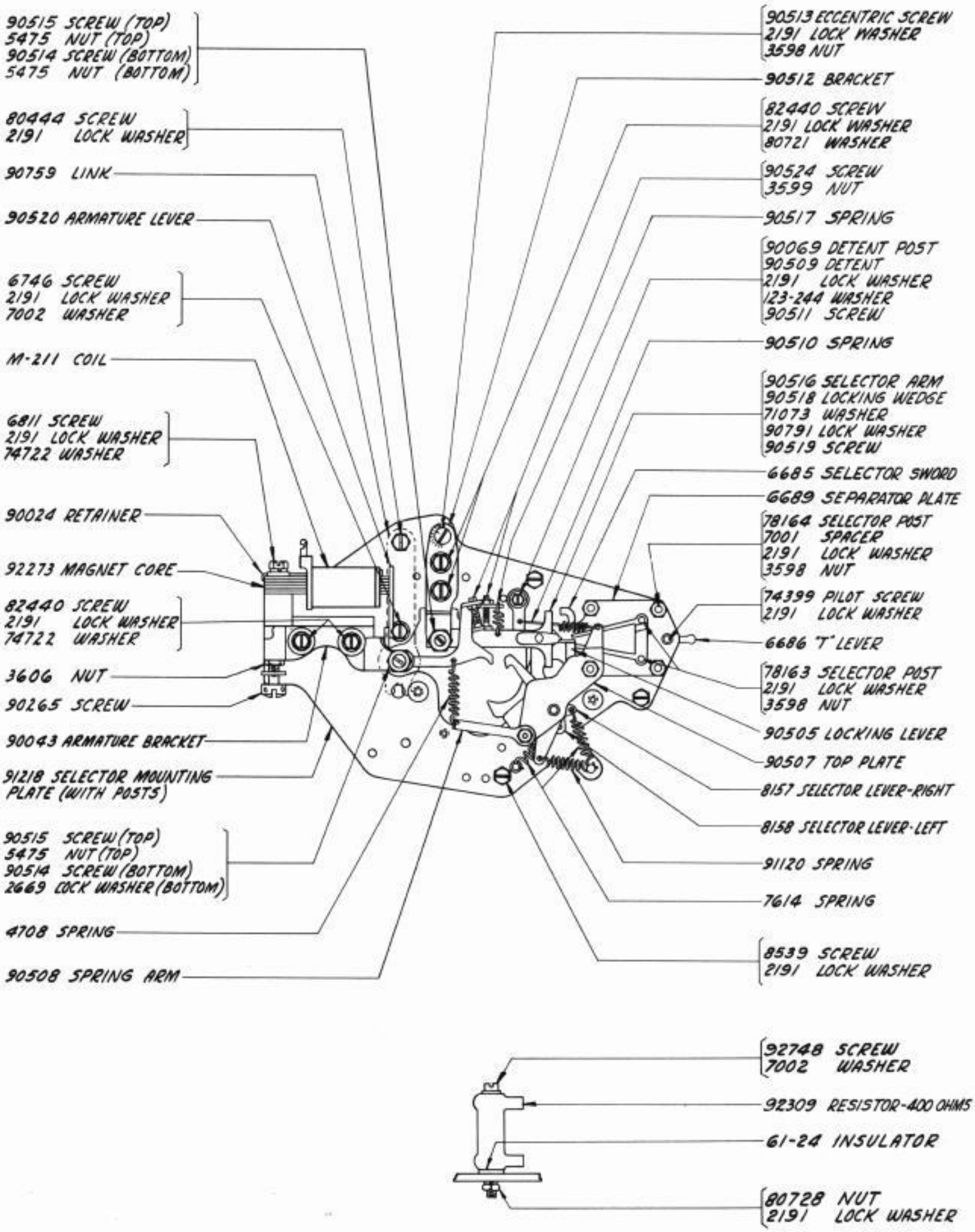
CODE BARS	
NO. STAMPED ON CODE BAR	CATALOG NO.
1 B	8453
2 C	70799
3 C	70800
4 C	70801
5 B	8529



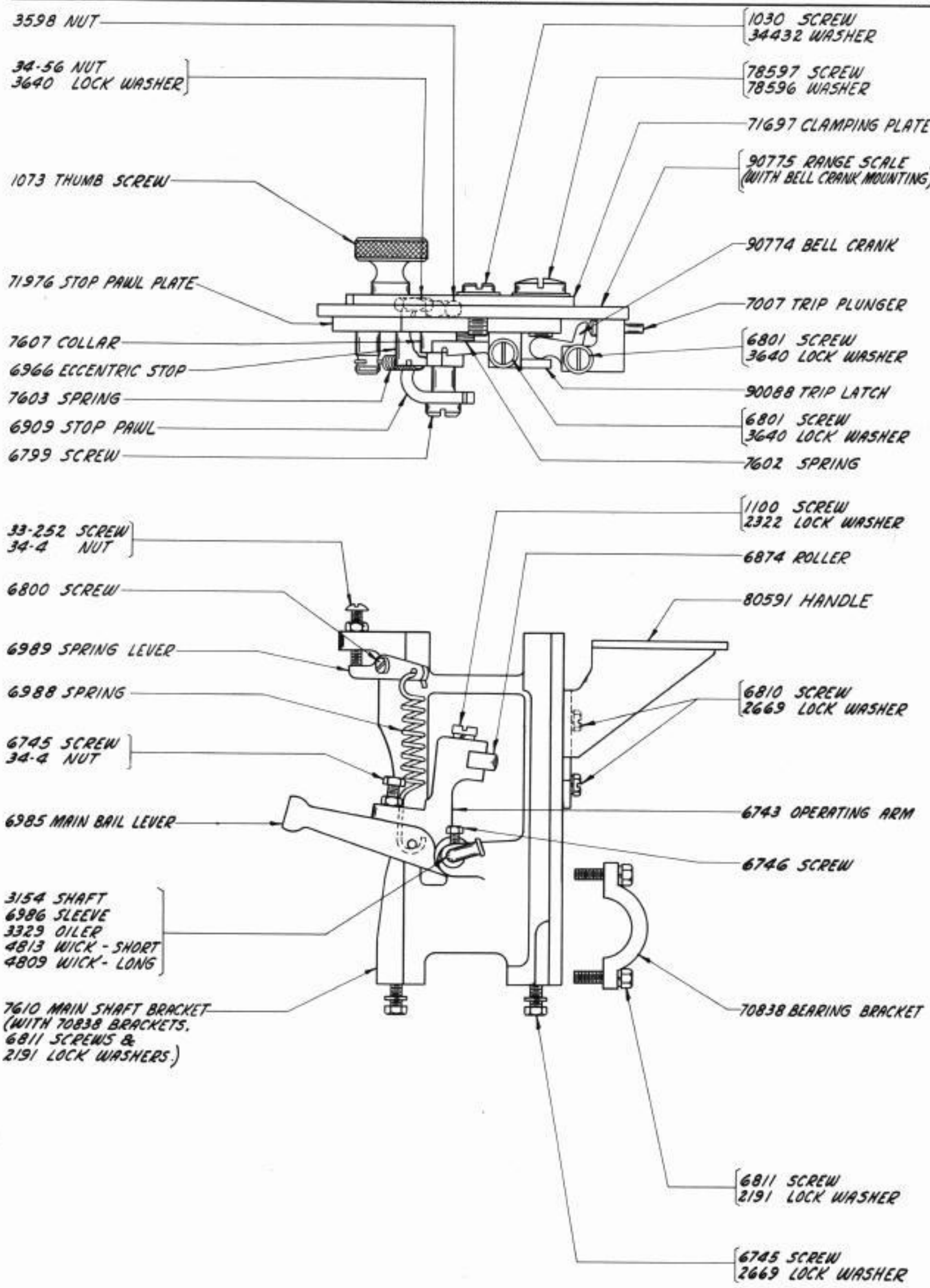
FOR NUMBERS OF TYPEBARS & TYPE PALLETS SEE PAGE 198

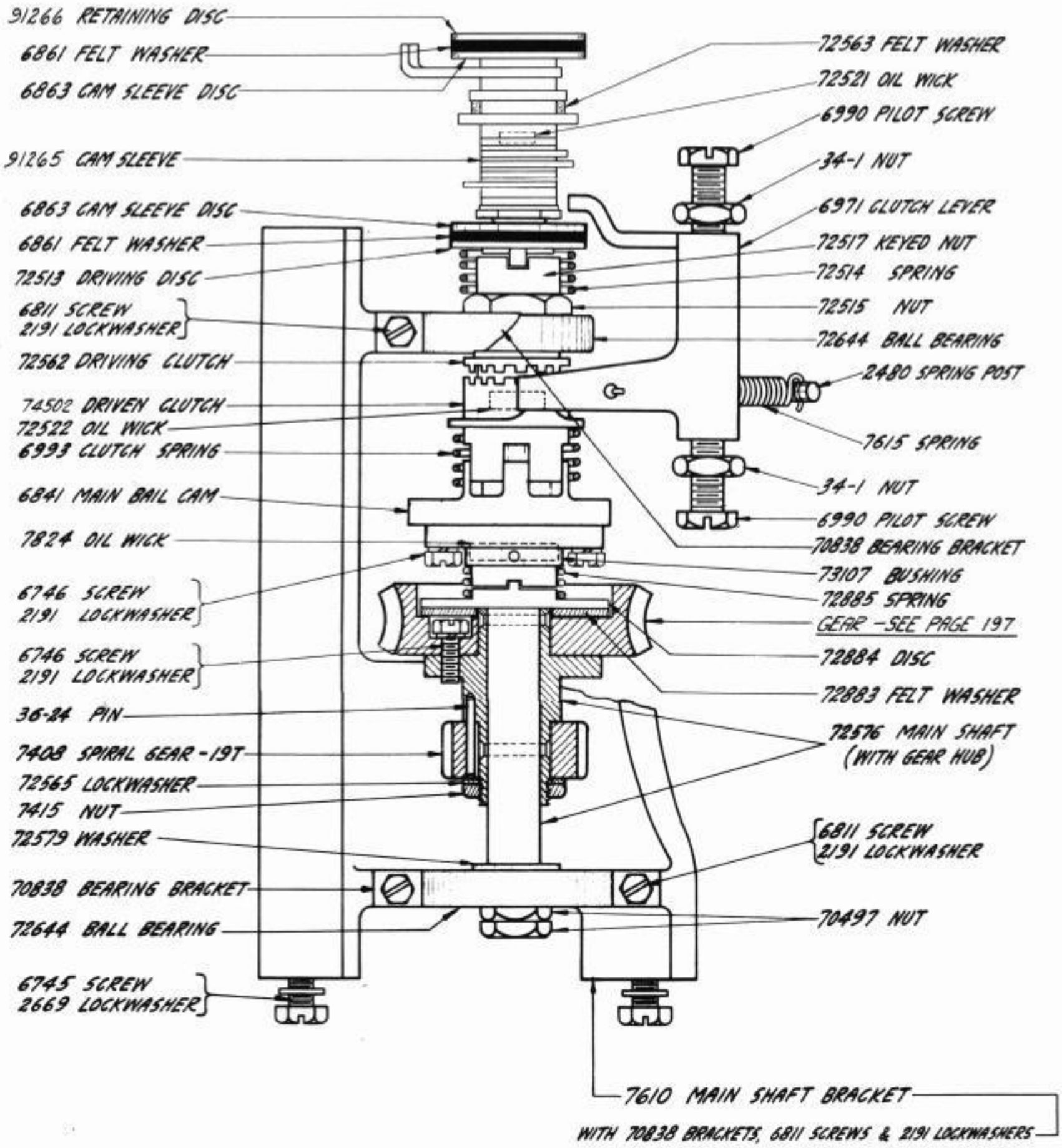


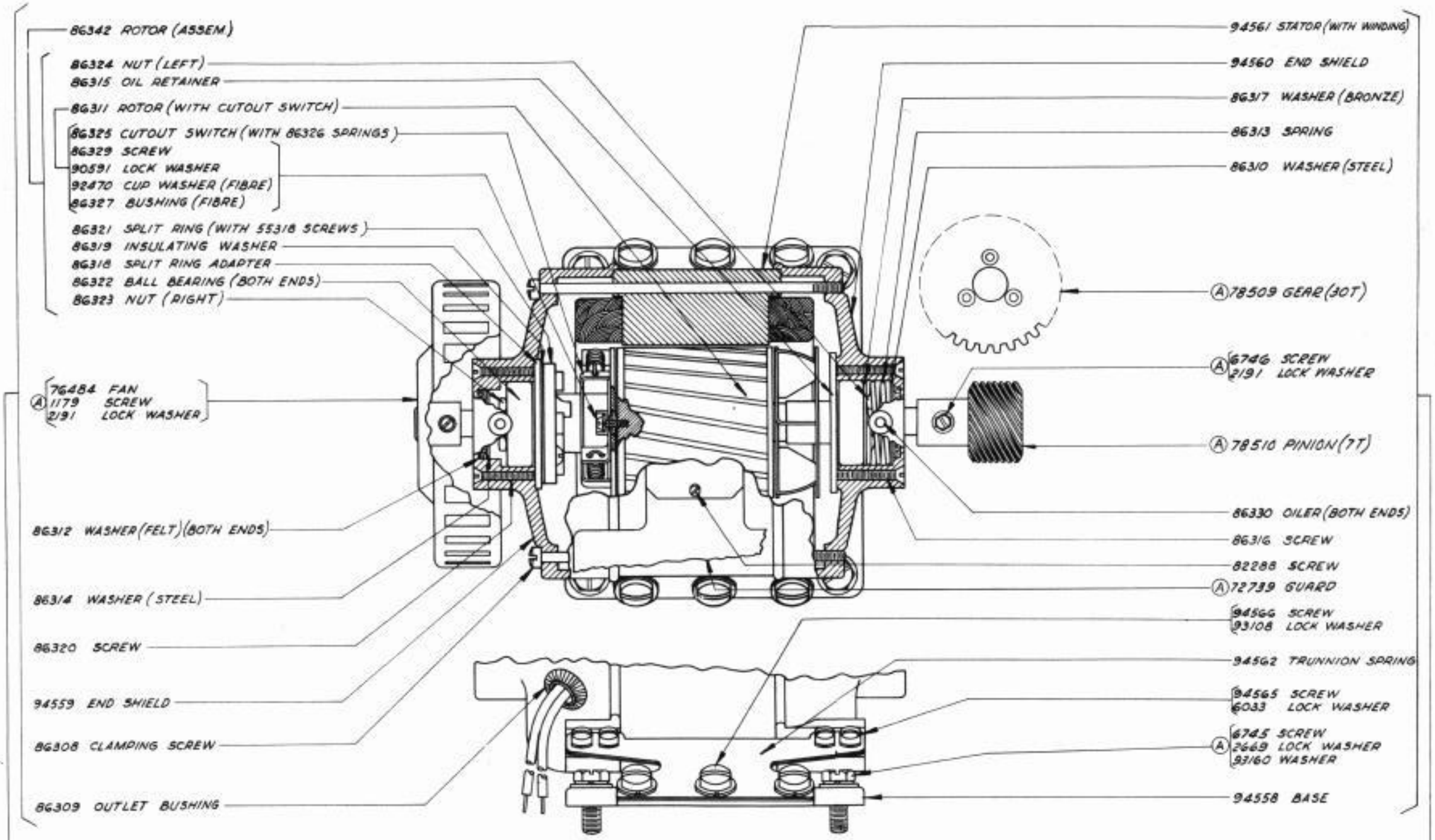



90515 SCREW (TOP)
5475 NUT (TOP)
90514 SCREW (BOTTOM)
5475 NUT (BOTTOM)
80444 SCREW
2191 LOCK WASHER
90759 LINK
90520 ARMATURE LEVER
6746 SCREW
2191 LOCK WASHER
7002 WASHER
M-211 COIL
6811 SCREW
2191 LOCK WASHER
74722 WASHER
90024 RETAINER
92273 MAGNET CORE
82440 SCREW
2191 LOCK WASHER
74722 WASHER
3606 NUT
90265 SCREW
90043 ARMATURE BRACKET
91218 SELECTOR MOUNTING PLATE (WITH POSTS)
90515 SCREW (TOP)
5475 NUT (TOP)
90514 SCREW (BOTTOM)
2669 LOCK WASHER (BOTTOM)
4708 SPRING
90508 SPRING ARM
90513 ECCENTRIC SCREW
2191 LOCK WASHER
3598 NUT
90512 BRACKET
82440 SCREW
2191 LOCK WASHER
80721 WASHER
90524 SCREW
3599 NUT
90517 SPRING
90069 DETENT POST
90509 DETENT
2191 LOCK WASHER
123-244 WASHER
90511 SCREW
90510 SPRING
90516 SELECTOR ARM
90518 LOCKING WEDGE
71073 WASHER
90791 LOCK WASHER
90519 SCREW
6685 SELECTOR SWORD
6689 SEPARATOR PLATE
78164 SELECTOR POST
7001 SPACER
2191 LOCK WASHER
3598 NUT
74399 PILOT SCREW
2191 LOCK WASHER
6686 "T" LEVER
78163 SELECTOR POST
2191 LOCK WASHER
3598 NUT
90505 LOCKING LEVER
90507 TOP PLATE
8157 SELECTOR LEVER-RIGHT
8158 SELECTOR LEVER-LEFT
91120 SPRING
7614 SPRING
8539 SCREW
2191 LOCK WASHER

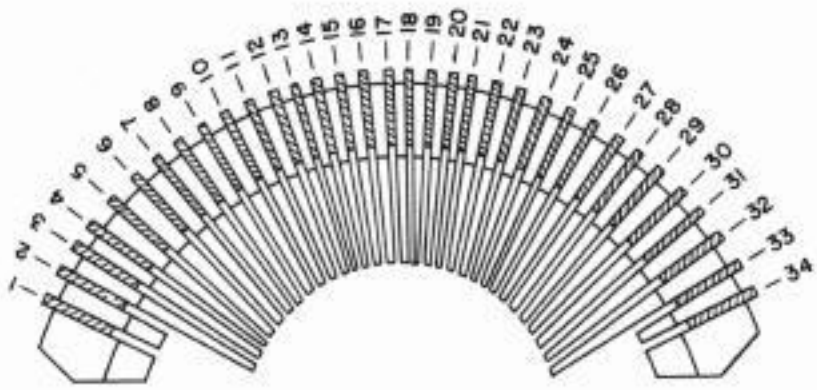
92748 SCREW
7002 WASHER
92309 RESISTOR-400 OHMS
61-24 INSULATOR
80728 NUT
2191 LOCK WASHER


3598 NUT
34-56 NUT
3640 LOCK WASHER
1073 THUMB SCREW
71976 STOP PAWL PLATE
7607 COLLAR
6966 ECCENTRIC STOP
7603 SPRING
6909 STOP PAWL
6799 SCREW
1030 SCREW
34432 WASHER
78597 SCREW
78596 WASHER
71697 CLAMPING PLATE
90775 RANGE SCALE
(WITH BELL CRANK MOUNTING)
90774 BELL CRANK
7007 TRIP PLUNGER
6801 SCREW
3640 LOCK WASHER
90088 TRIP LATCH
6801 SCREW
3640 LOCK WASHER
7602 SPRING
33-252 SCREW
34-4 NUT
6800 SCREW
6989 SPRING LEVER
6988 SPRING
6745 SCREW
34-4 NUT
6985 MAIN BAIL LEVER
3154 SHAFT
6986 SLEEVE
3329 OILER
4813 WICK - SHORT
4809 WICK - LONG
7610 MAIN SHAFT BRACKET
(WITH 70838 BRACKETS.
6811 SCREWS &
2191 LOCK WASHERS.)
1100 SCREW
2322 LOCK WASHER
6874 ROLLER
80591 HANDLE
6810 SCREW
2669 LOCK WASHER
6743 OPERATING ARM
6746 SCREW
70838 BEARING BRACKET
6811 SCREW
2191 LOCK WASHER
6745 SCREW
2669 LOCK WASHER


91266 RETAINING DISC
6861 FELT WASHER
6863 CAM SLEEVE DISC
91265 CAM SLEEVE
6863 CAM SLEEVE DISC
6861 FELT WASHER
72513 DRIVING DISC
6811 SCREW
2191 LOCKWASHER
72562 DRIVING CLUTCH
74502 DRIVEN CLUTCH
72522 OIL WICK
6993 CLUTCH SPRING
6841 MAIN BAIL CAM
7824 OIL WICK
6746 SCREW
2191 LOCKWASHER
6746 SCREW
2191 LOCKWASHER
36-24 PIN
7408 SPIRAL GEAR - 19T
72565 LOCKWASHER
7415 NUT
72579 WASHER
70838 BEARING BRACKET
72644 BALL BEARING
6745 SCREW
2669 LOCKWASHER
72563 FELT WASHER
72521 OIL WICK
6990 PILOT SCREW
34-1 NUT
6971 CLUTCH LEVER
72517 KEYED NUT
72514 SPRING
72515 NUT
72644 BALL BEARING
2480 SPRING POST
7615 SPRING
34-1 NUT
6990 PILOT SCREW
70838 BEARING BRACKET
73107 BUSHING
72885 SPRING
GEAR - SEE PAGE 197
72884 DISC
72883 FELT WASHER
72576 MAIN SHAFT
(WITH GEAR HUB)
6811 SCREW
2191 LOCKWASHER
70497 NUT
7610 MAIN SHAFT BRACKET
WITH 70838 BRACKETS, 6811 SCREWS & 2191 LOCKWASHERS

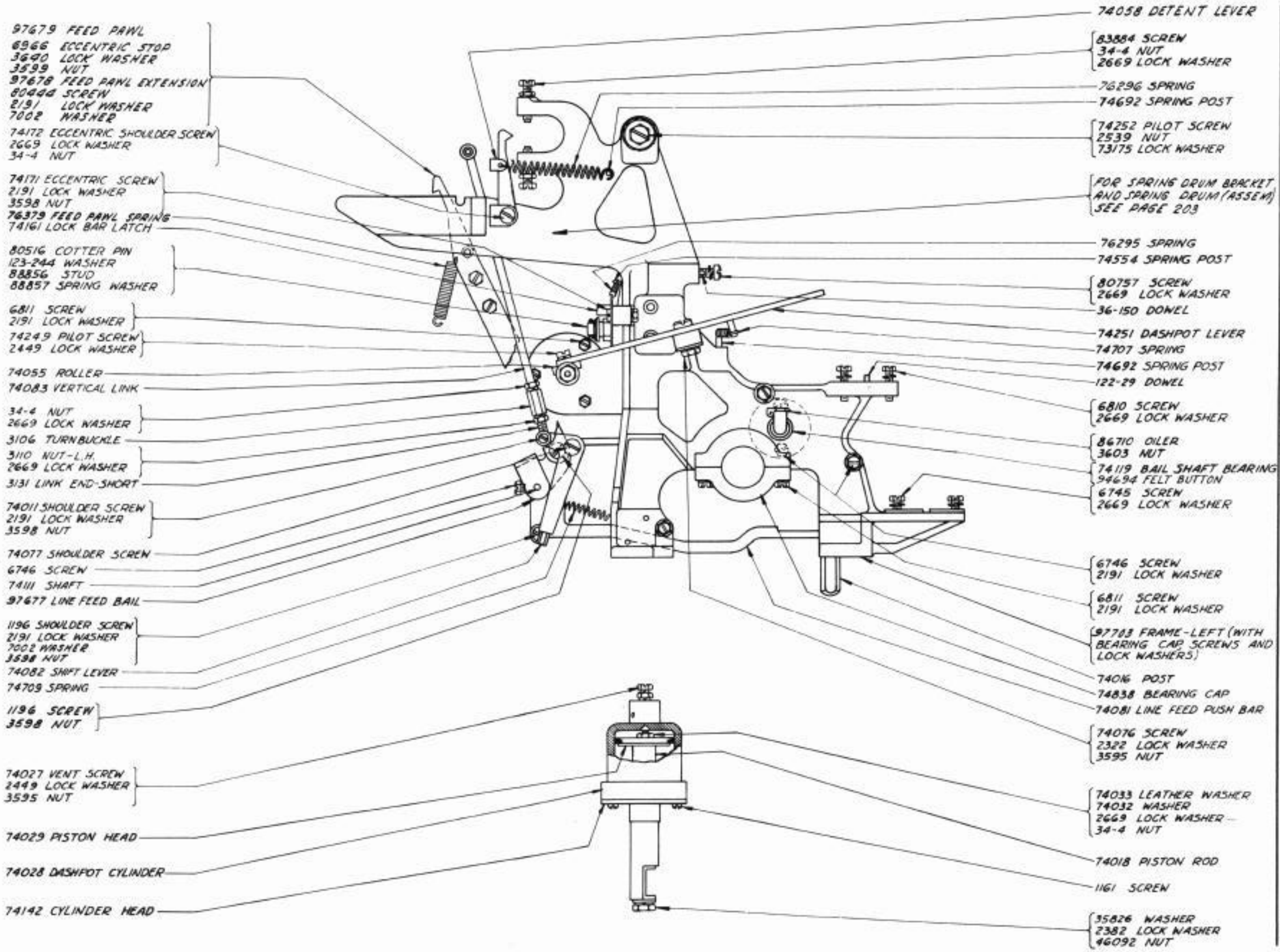


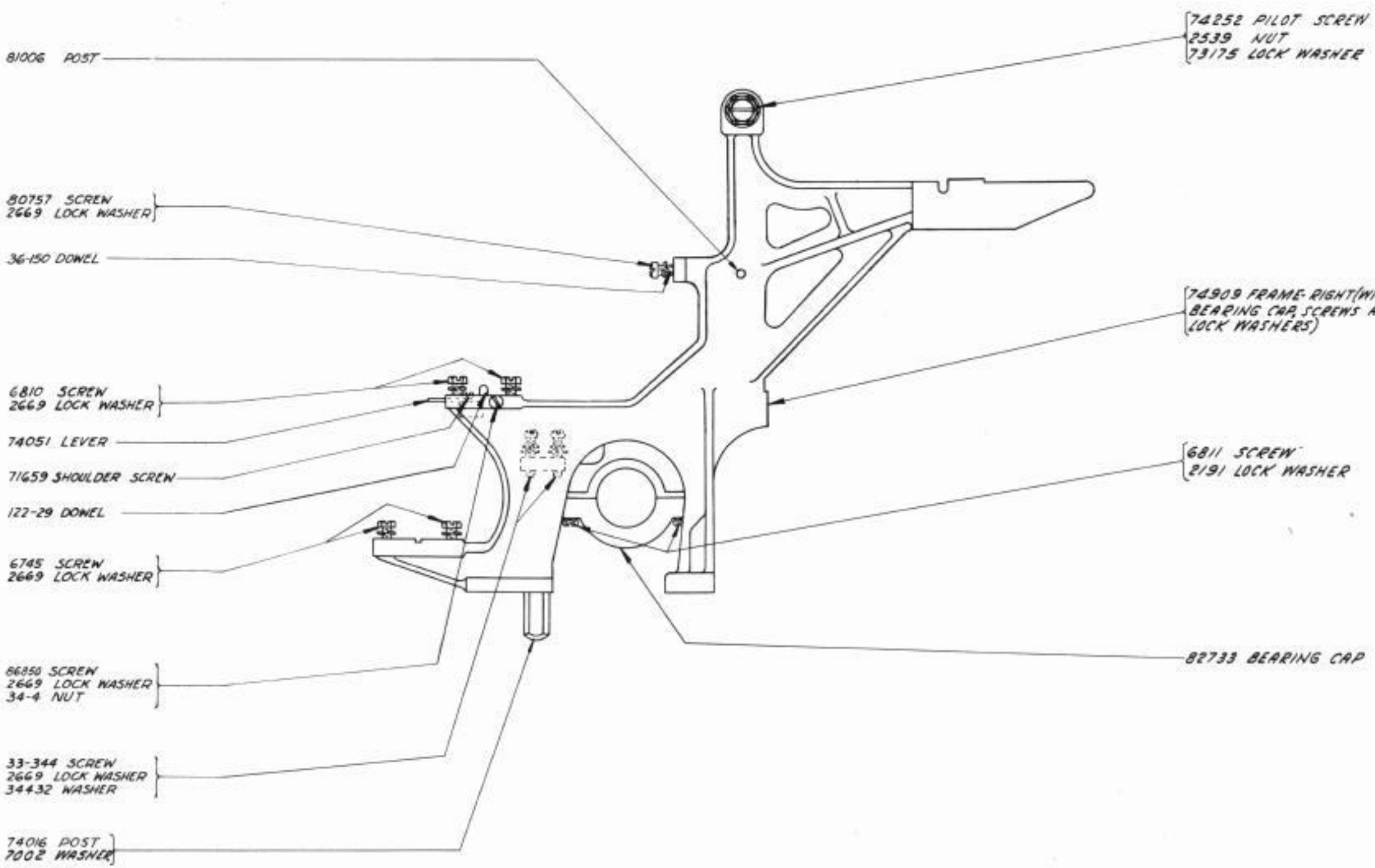
92575 SYNCHRONOUS MOTOR 1/40 H.P., 110 V., 60 CYCLE A.C (EXCLUDES PARTS MARKED (A))

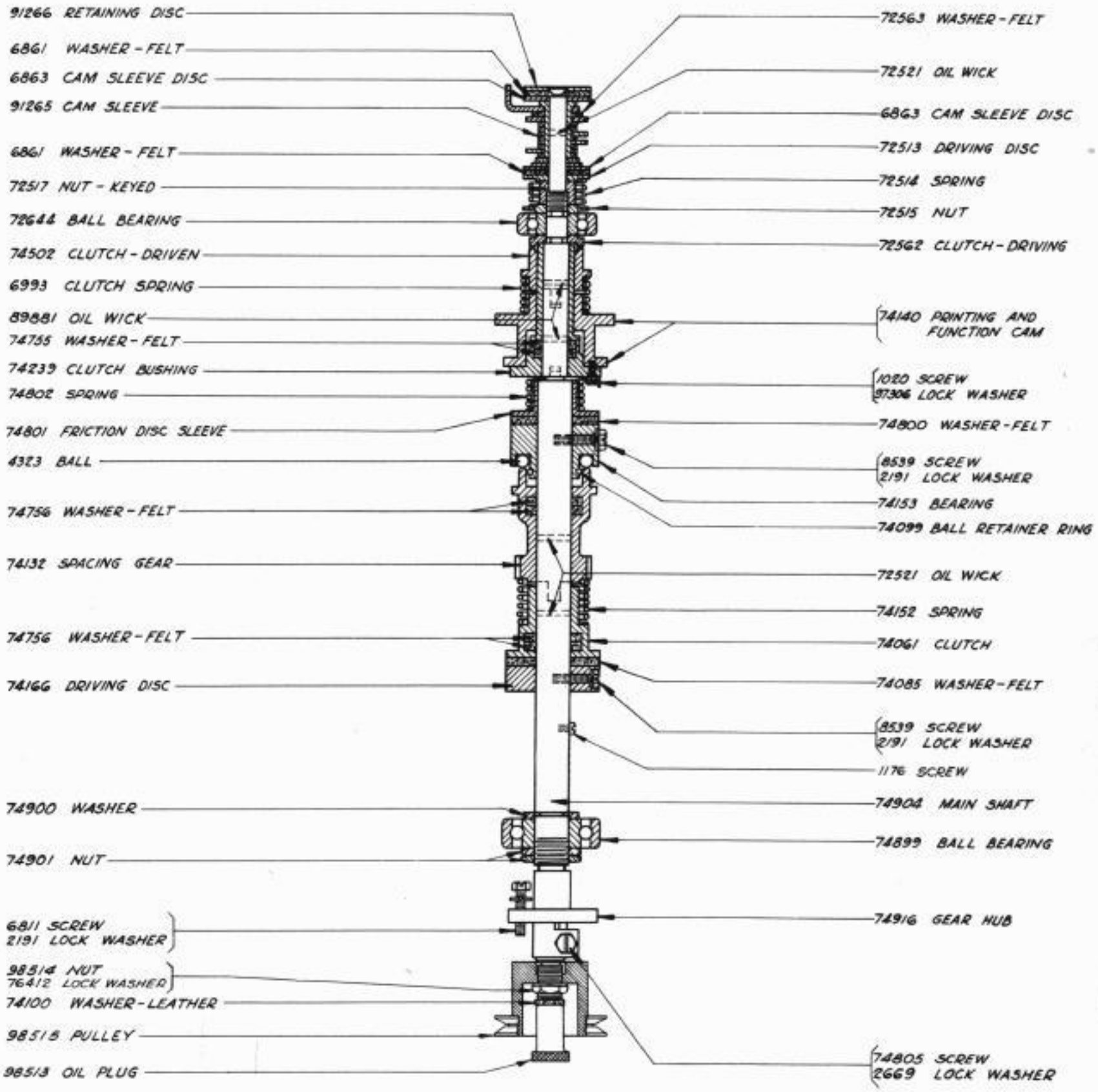


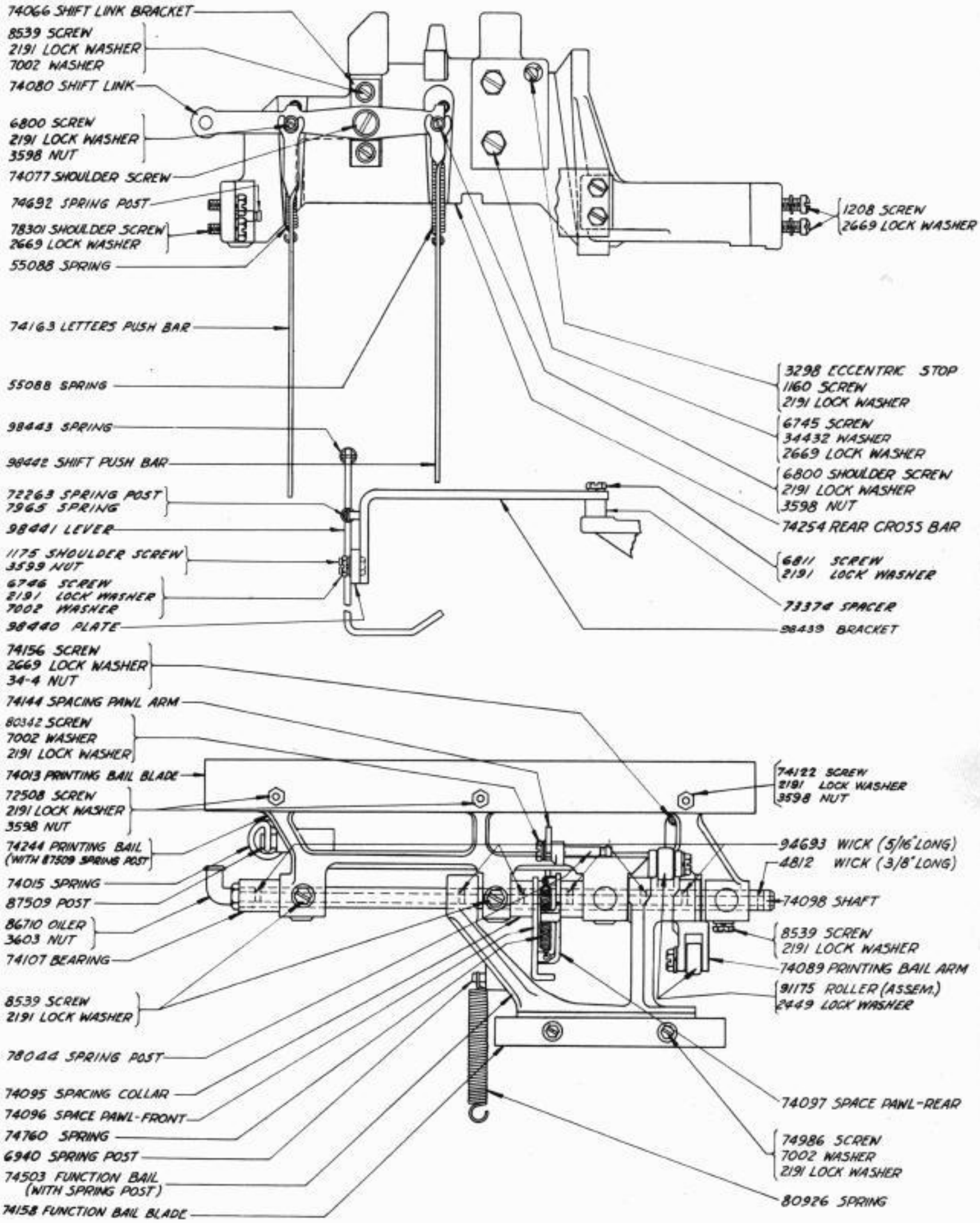
82170 SET OF TYPE BAR PALLETS

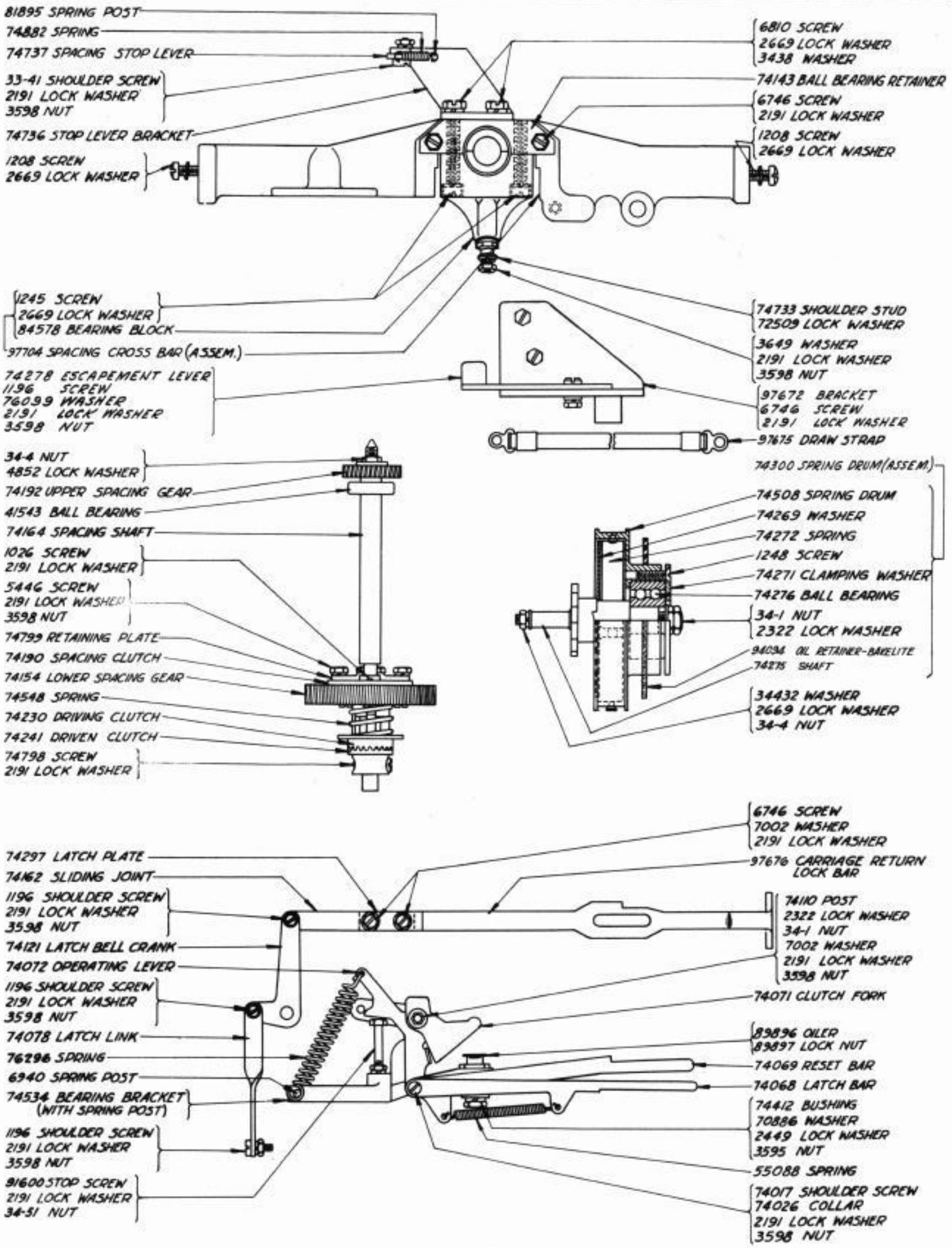
NUMBER OF POSITION IN SEGMENT	PULL & FUNCTION BAR		PULL & FUNCTION BAR SPRING	TYPE BAR WITHOUT PALLET		TYPE BAR PALLET		TYPE BAR WITH PALLET
	CATALOG NUMBER	DESCRIPTION		CATALOG NUMBER	NUMBER STAMPED ON BAR	CATALOG NUMBER	DESCRIPTION	
2	6916	LTRS. SHIFT	7965					
3								
4	8458	"S" PULL BAR	7634	7421	1	8289	S *	72933
5	6692	STANDARD	7634	7422	2	7282	X /	70952
6	6692	"	7634	7423	3	7275	Q 1	70953
7	6692	"	7634	7424	4	78503	V ;	82244
8	6692	"	7634	7425	5	7265	G &	70955
9	6692	"	7634	7426	6	7281	W 2	70956
10	6692	"	7634	7427	7	8288	F !	72935
11	6692	"	7634	7428	8	78502	C :	82243
12	6692	"	7634	7429	9	7261	D ½	70959
13	6692	"	7634	7430	10	7276	R 4	70960
14	6692	"	7634	7431	11	8287	J "	72938
15	6692	"	7634	7432	12	7259	A —	70962
16	6692	"	7634	7433	13	7278	T 5	70963
17	6692	"	7634	7434	14	7263	E 3	70964
18	6692	"	7634	7435	15	78506	N ,	82247
19	6692	"	7634	7436	16	7267	I 8	70966
20	6692	"	7634	7437	17	7273	O 9	70967
21	6692	"	7634	7438	18	7266	H £	70968
22	6692	"	7634	7439	19	7270	L)	70969
23	6692	"	7634	7440	20	7279	U 7	70970
24	6692	"	7634	7441	21	78501	M .	82242
25	6692	"	7634	7442	22	7283	Y &	70972
26	6692	"	7634	7443	23	7274	P 0	70973
27	6692	"	7634	7444	24	7260	B ?	70974
28	6692	"	7634	7445	25	7269	K (	70975
29	6692	"	7634	7446	26	7284	Z "	70976
30	6692	"	7634	7447	27	78505	, ,	82246
31	6692	"	7634	7448	28	78504	. .	82245
32	77204	BLANK	7825					
33	6917	FIGS. SHIFT	7825					
34	6915	CODE SET LOCKING LEVER	3610					


97679 FEED PAWL
6966 ECCENTRIC STOP
3690 LOCK WASHER
3599 NUT
97678 FEED PAWL EXTENSION
80466 SCREW
2191 LOCK WASHER
7002 WASHER
74172 ECCENTRIC SHOULDER SCREW
2669 LOCK WASHER
34-4 NUT
74171 ECCENTRIC SCREW
2191 LOCK WASHER
3598 NUT
76379 FEED PAWL SPRING
74161 LOCK BAR LATCH
80516 COTTER PIN
123-244 WASHER
88856 STUD
88857 SPRING WASHER
6811 SCREW
2191 LOCK WASHER
74249 PILOT SCREW
2449 LOCK WASHER
74055 ROLLER
74083 VERTICAL LINK
34-4 NUT
2669 LOCK WASHER
3106 TURNBUCKLE
3110 NUT-L.H.
2669 LOCK WASHER
3131 LINK END-SHORT
74011 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74077 SHOULDER SCREW
6746 SCREW
74111 SHAFT
97677 LINE FEED BAIL
1196 SHOULDER SCREW
2191 LOCK WASHER
7002 WASHER
3698 NUT
74082 SHFT LEVER
74709 SPRING
1196 SCREW
3598 NUT
74027 VENT SCREW
2449 LOCK WASHER
3595 NUT
74029 PISTON HEAD
74028 DASHPOT CYLINDER
74142 CYLINDER HEAD
74058 DETENT LEVER
83884 SCREW
34-4 NUT
2669 LOCK WASHER
76296 SPRING
74692 SPRING POST
74252 PILOT SCREW
2539 NUT
73175 LOCK WASHER
FOR SPRING DRUM BRACKET AND SPRING DRUM (ASSEM) SEE PAGE 203
76295 SPRING
74554 SPRING POST
80757 SCREW
2669 LOCK WASHER
36-150 DOWEL
74251 DASHPOT LEVER
74707 SPRING
74692 SPRING POST
122-29 DOWEL
6810 SCREW
2669 LOCK WASHER
86710 OILER
3603 NUT
74119 BAIL SHAFT BEARING
94694 FELT BUTTON
6745 SCREW
2669 LOCK WASHER
6746 SCREW
2191 LOCK WASHER
6811 SCREW
2191 LOCK WASHER
97703 FRAME-LEFT (WITH BEARING CAP SCREWS AND LOCK WASHERS)
74016 POST
74838 BEARING CAP
74081 LINE FEED PUSH BAR
74076 SCREW
2322 LOCK WASHER
3595 NUT
74033 LEATHER WASHER
74032 WASHER
2669 LOCK WASHER
34-4 NUT
74018 PISTON ROD
1161 SCREW
35826 WASHER
2382 LOCK WASHER
46092 NUT

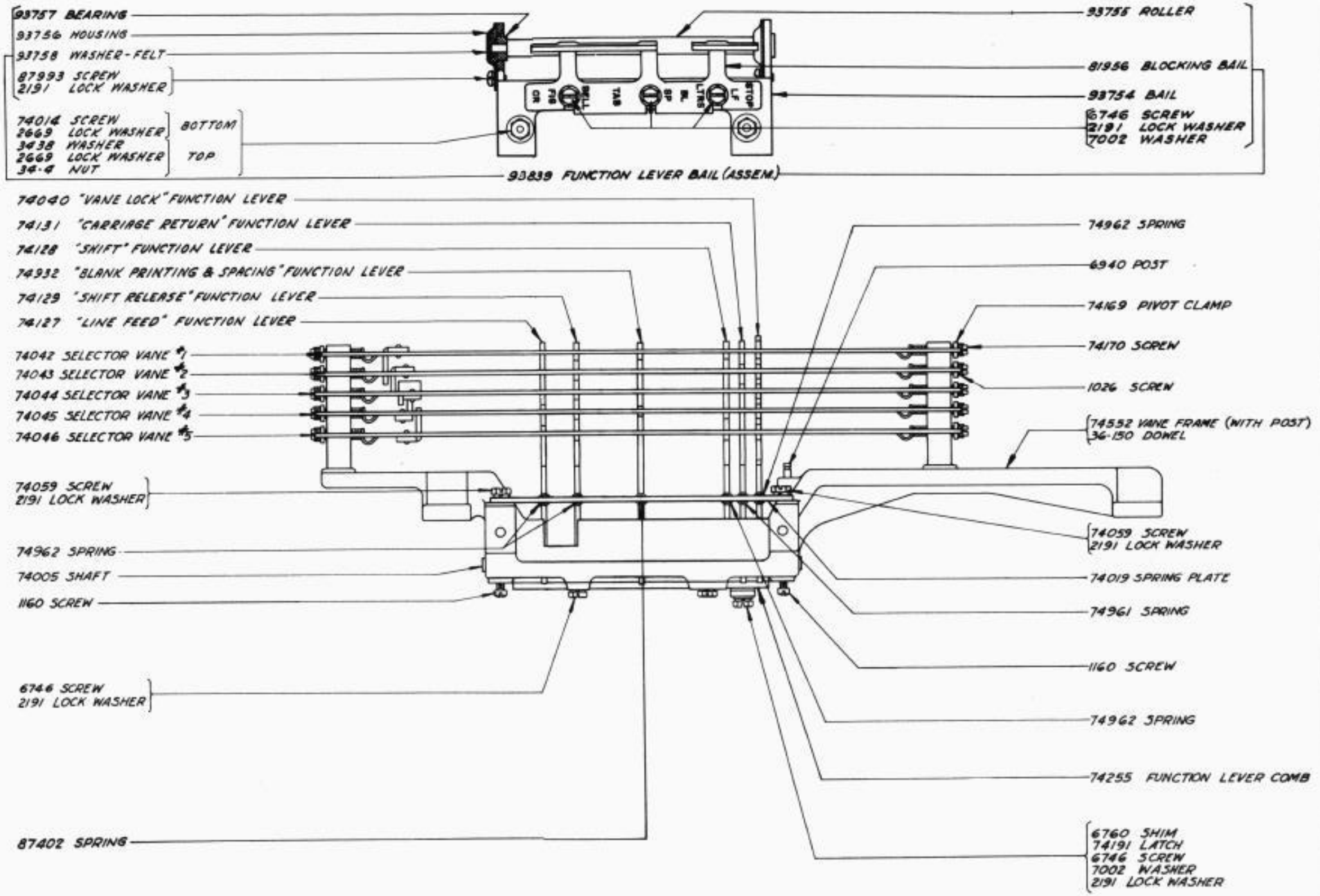

81006 POST
80757 SCREEN
2669 LOCK WASHER
36-150 DOWEL
6810 SCREEN
2669 LOCK WASHER
74051 LEVER
71659 SHOULDER SCREEN
122-29 DOWEL
6745 SCREEN
2669 LOCK WASHER
66850 SCREEN
2669 LOCK WASHER
34-4 NUT
33-344 SCREEN
2669 LOCK WASHER
34432 WASHER
74016 POST
7002 WASHER
74252 PILOT SCREW
2539 NUT
73175 LOCK WASHER
74909 FRAME-RIGHT(WITH BEARING CAP, SCREWS AND LOCK WASHERS)
6811 SCREW
2191 LOCK WASHER
82733 BEARING CAP

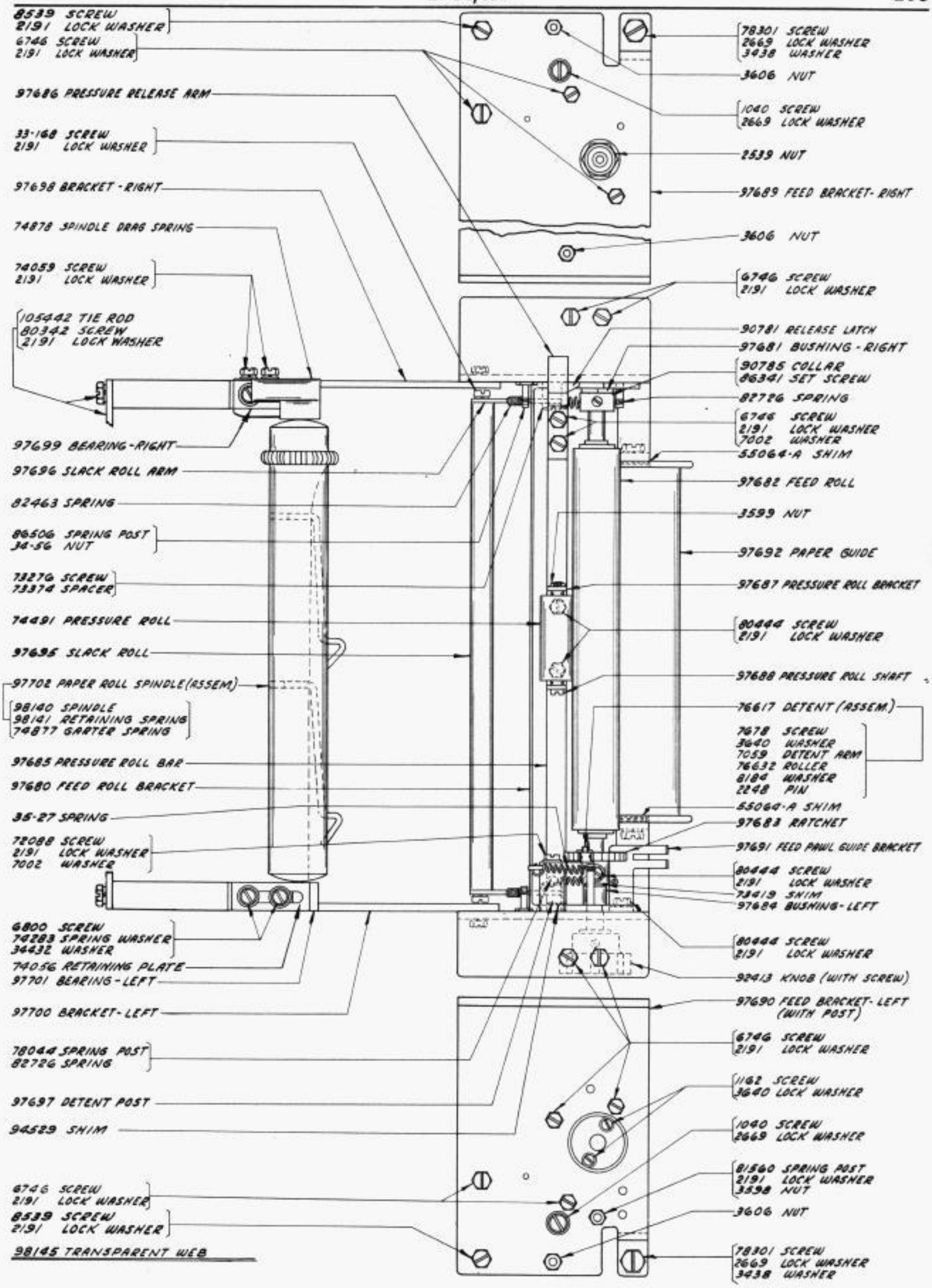

91266 RETAINING DISC
6861 WASHER - FELT
6863 CAM SLEEVE DISC
91265 CAM SLEEVE
6861 WASHER - FELT
72517 NUT - KEYED
72644 BALL BEARING
74502 CLUTCH - DRIVEN
6993 CLUTCH SPRING
89881 OIL WICK
74755 WASHER - FELT
74239 CLUTCH BUSHING
74802 SPRING
74801 FRICTION DISC SLEEVE
4323 BALL
74756 WASHER - FELT
74132 SPACING GEAR
74756 WASHER - FELT
74166 DRIVING DISC
74900 WASHER
74901 NUT
6811 SCREW
2191 LOCK WASHER
98514 NUT
76412 LOCK WASHER
74100 WASHER - LEATHER
98518 PULLEY
98513 OIL PLUG
72563 WASHER - FELT
72521 OIL WICK
6863 CAM SLEEVE DISC
72513 DRIVING DISC
72514 SPRING
72515 NUT
72562 CLUTCH - DRIVING
74140 PRINTING AND FUNCTION CAM
1020 SCREW
97306 LOCK WASHER
74800 WASHER - FELT
8539 SCREW
2191 LOCK WASHER
74153 BEARING
74099 BALL RETAINER RING
72521 OIL WICK
74152 SPRING
74061 CLUTCH
74085 WASHER - FELT
8539 SCREW
2191 LOCK WASHER
1176 SCREW
74904 MAIN SHAFT
74899 BALL BEARING
74916 GEAR HUB
74805 SCREW
2669 LOCK WASHER

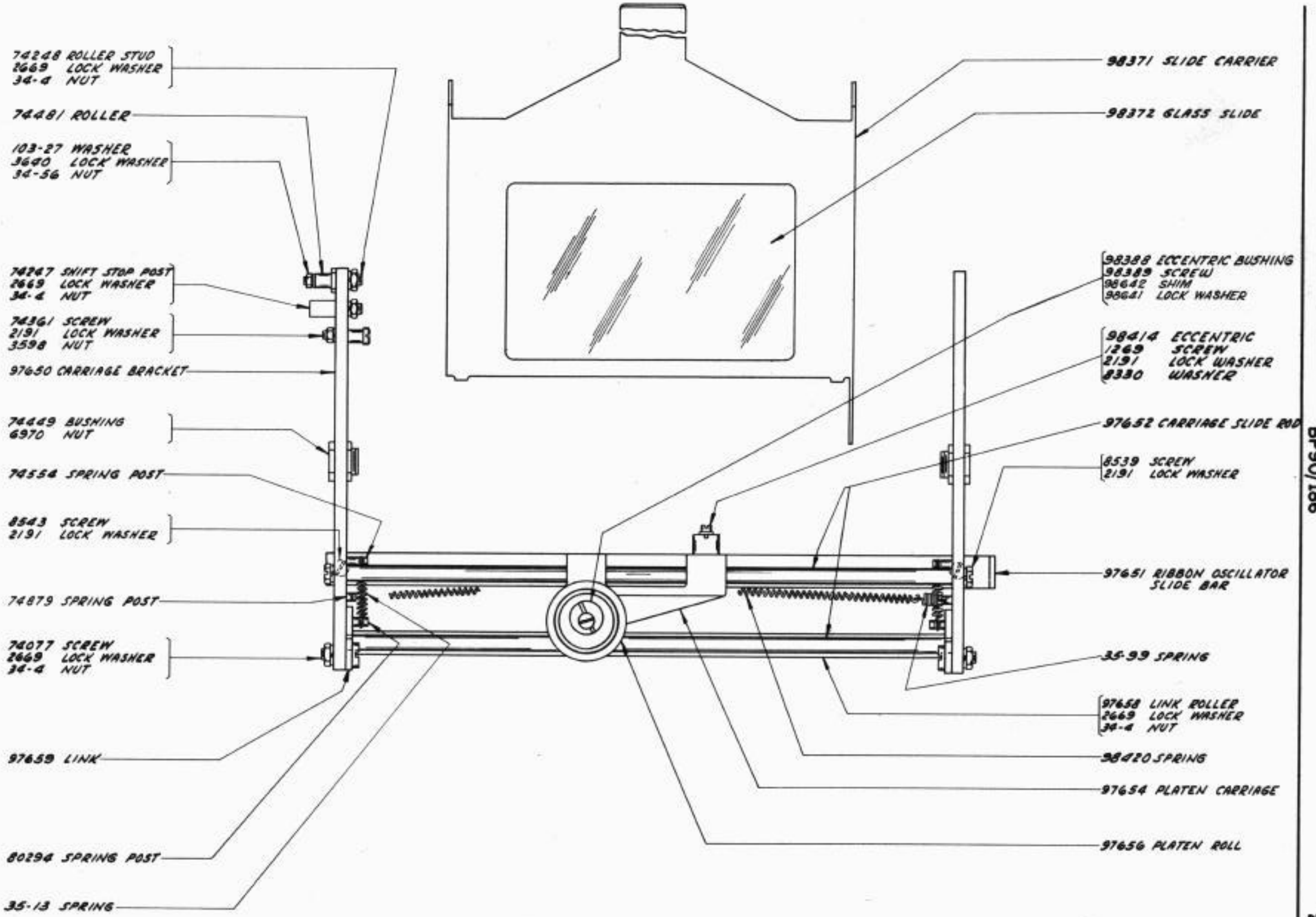

74066 SHIFT LINK BRACKET
8539 SCREW
2191 LOCK WASHER
7002 WASHER
74080 SHIFT LINK
6800 SCREW
2191 LOCK WASHER
3598 NUT
74077 SHOULDER SCREW
74692 SPRING POST
78301 SHOULDER SCREW
2669 LOCK WASHER
55088 SPRING
74163 LETTERS PUSH BAR
55088 SPRING
98443 SPRING
98442 SHIFT PUSH BAR
72263 SPRING POST
7965 SPRING
98441 LEVER
1175 SHOULDER SCREW
3599 NUT
6746 SCREW
2191 LOCK WASHER
7002 WASHER
98440 PLATE
74156 SCREW
2669 LOCK WASHER
34-4 NUT
74144 SPACING PAWL ARM
80342 SCREW
7002 WASHER
2191 LOCK WASHER
74013 PRINTING BAIL BLADE
72508 SCREW
2191 LOCK WASHER
3598 NUT
74244 PRINTING BAIL (WITH 87509 SPRING POST
74015 SPRING
87509 POST
86710 OILER
3603 NUT
74107 BEARING
8539 SCREW
2191 LOCK WASHER
78044 SPRING POST
74095 SPACING COLLAR
74096 SPACE PAWL-FRONT
74760 SPRING
6940 SPRING POST
74503 FUNCTION BAIL (WITH SPRING POST)
74158 FUNCTION BAIL BLADE
1208 SCREW
2669 LOCK WASHER
3298 ECCENTRIC STOP
1160 SCREW
2191 LOCK WASHER
6745 SCREW
34432 WASHER
2669 LOCK WASHER
6800 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74254 REAR CROSS BAR
6811 SCREW
2191 LOCK WASHER
73374 SPACER
98439 BRACKET
74122 SCREW
2191 LOCK WASHER
3598 NUT
94693 WICK (5/16" LONG)
4812 WICK (3/8" LONG)
74098 SHAFT
8539 SCREW
2191 LOCK WASHER
74089 PRINTING BAIL ARM
91175 ROLLER (ASSEM.)
2449 LOCK WASHER
74097 SPACE PAWL-REAR
74986 SCREW
7002 WASHER
2191 LOCK WASHER
80926 SPRING

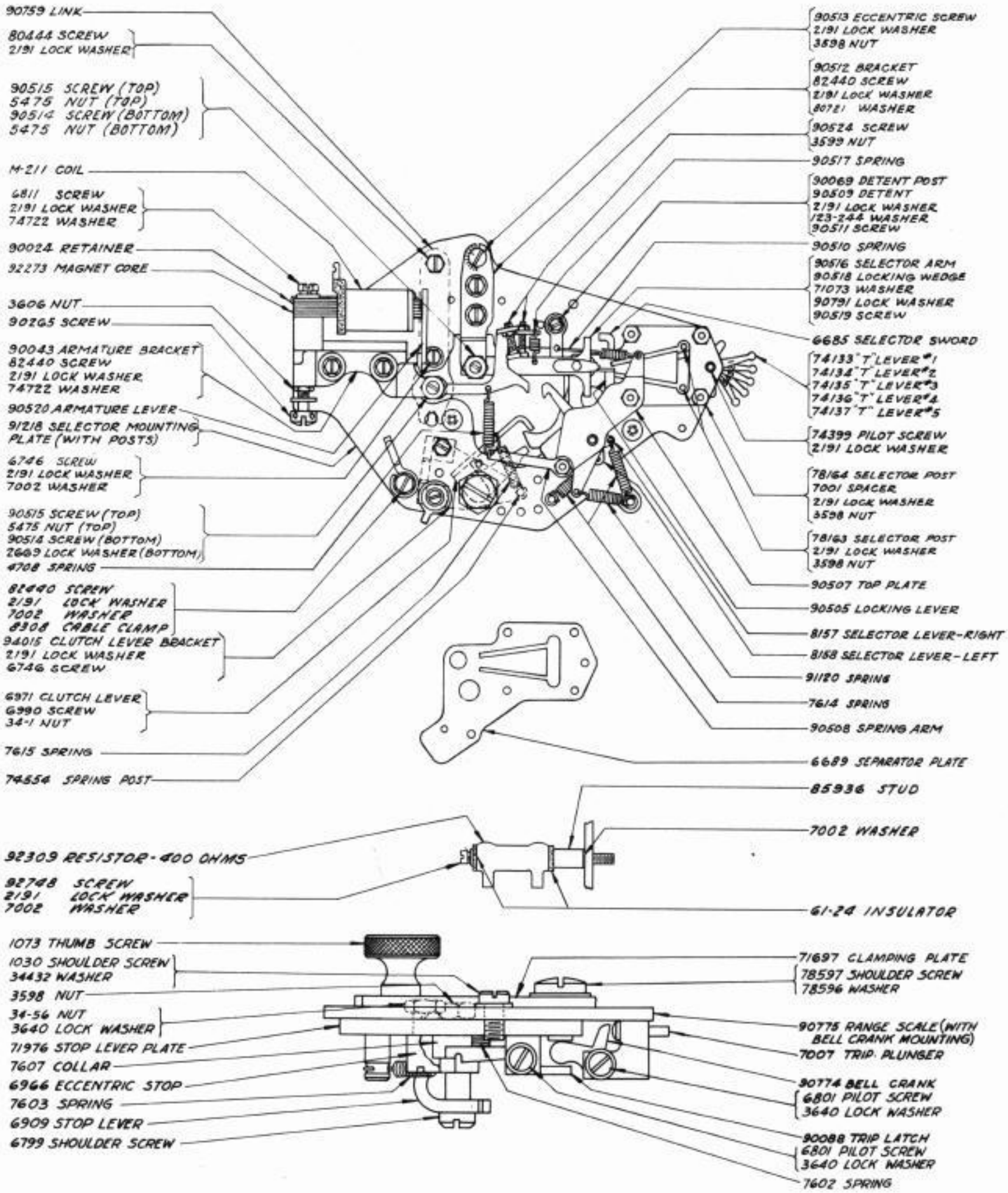

81895 SPRING POST
74882 SPRING
74737 SPACING STOP LEVER
33-41 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74736 STOP LEVER BRACKET
1208 SCREW
2669 LOCK WASHER
6810 SCREW
2669 LOCK WASHER
3438 WASHER
74143 BALL BEARING RETAINER
6746 SCREW
2191 LOCK WASHER
1208 SCREW
2669 LOCK WASHER
1245 SCREW
2669 LOCK WASHER
84578 BEARING BLOCK
97704 SPACING CROSS BAR (ASSEM.)
74278 ESCAPEMENT LEVER
1196 SCREW
76099 WASHER
2191 LOCK WASHER
3598 NUT
74733 SHOULDER STUD
72509 LOCK WASHER
3649 WASHER
2191 LOCK WASHER
3598 NUT
97672 BRACKET
6746 SCREW
2191 LOCK WASHER
97675 DRAW STRAP
34-4 NUT
4852 LOCK WASHER
74192 UPPER SPACING GEAR
41543 BALL BEARING
74164 SPACING SHAFT
1026 SCREW
2191 LOCK WASHER
5446 SCREW
2191 LOCK WASHER
3598 NUT
74799 RETAINING PLATE
74190 SPACING CLUTCH
74154 LOWER SPACING GEAR
74548 SPRING
74230 DRIVING CLUTCH
74241 DRIVEN CLUTCH
74798 SCREW
2191 LOCK WASHER
74300 SPRING DRUM (ASSEM.)
74508 SPRING DRUM
74269 WASHER
74272 SPRING
1248 SCREW
74271 CLAMPING WASHER
74276 BALL BEARING
34-1 NUT
2322 LOCK WASHER
94034 OIL RETAINER-BAKELITE
74275 SHAFT
34432 WASHER
2669 LOCK WASHER
34-4 NUT

74297 LATCH PLATE
74162 SLIDING JOINT
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74121 LATCH BELL CRANK
74072 OPERATING LEVER
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
74078 LATCH LINK
76296 SPRING
6940 SPRING POST
74534 BEARING BRACKET (WITH SPRING POST)
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
91600 STOP SCREW
2191 LOCK WASHER
34-51 NUT
6746 SCREW
7002 WASHER
2191 LOCK WASHER
97676 CARRIAGE RETURN LOCK BAR
74110 POST
2322 LOCK WASHER
34-1 NUT
7002 WASHER
2191 LOCK WASHER
3598 NUT
74071 CLUTCH FORK
89896 OILER
89897 LOCK NUT
74069 RESET BAR
74068 LATCH BAR
74412 BUSHING
70886 WASHER
2449 LOCK WASHER
3595 NUT
55088 SPRING
74017 SHOULDER SCREW
74026 COLLAR
2191 LOCK WASHER
3598 NUT

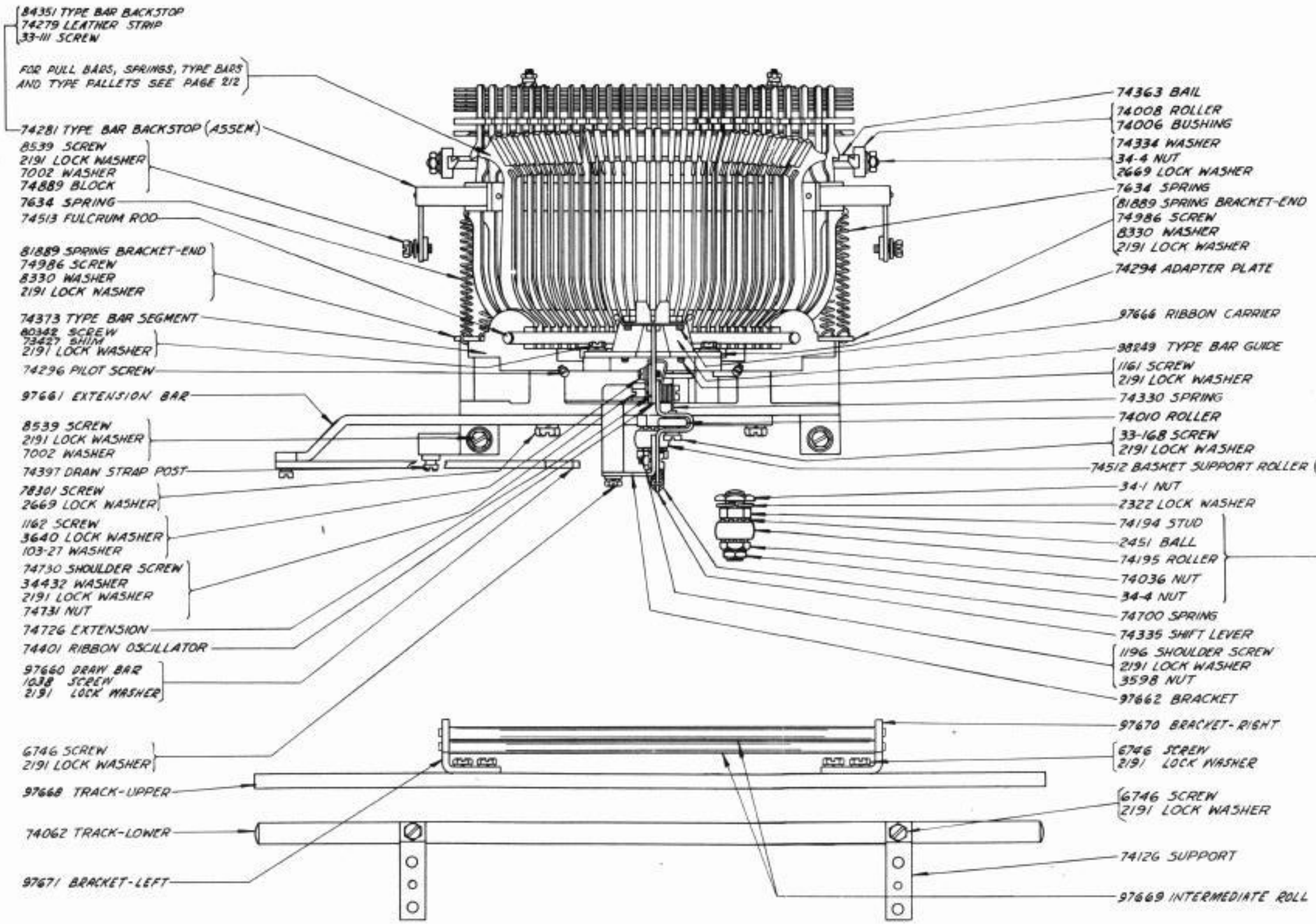

93757 BEARING
93756 HOUSING
93758 WASHER-FELT
87993 SCREW
2191 LOCK WASHER
74014 SCREW
2669 LOCK WASHER
3438 WASHER
2669 LOCK WASHER
34-4 NUT
BOTTOM
TOP
93839 FUNCTION LEVER BAIL (ASSEM.)
93755 ROLLER
81956 BLOCKING BAIL
93754 BAIL
6746 SCREW
2191 LOCK WASHER
7002 WASHER
74040 "VANE LOCK" FUNCTION LEVER
74131 "CARRIAGE RETURN" FUNCTION LEVER
74128 "SHIFT" FUNCTION LEVER
74932 "BLANK PRINTING & SPACING" FUNCTION LEVER
74129 "SHIFT RELEASE" FUNCTION LEVER
74127 "LINE FEED" FUNCTION LEVER
74042 SELECTOR VANE #1
74043 SELECTOR VANE #2
74044 SELECTOR VANE #3
74045 SELECTOR VANE #4
74046 SELECTOR VANE #5
74059 SCREW
2191 LOCK WASHER
74962 SPRING
74005 SHAFT
1160 SCREW
6746 SCREW
2191 LOCK WASHER
87402 SPRING
74962 SPRING
6940 POST
74169 PIVOT CLAMP
74170 SCREW
1026 SCREW
74532 VANE FRAME (WITH POST)
36-150 DOWEL
74059 SCREW
2191 LOCK WASHER
74019 SPRING PLATE
74961 SPRING
1160 SCREW
74962 SPRING
74255 FUNCTION LEVER COMB
6760 SHIM
74191 LATCH
6746 SCREW
7002 WASHER
2191 LOCK WASHER

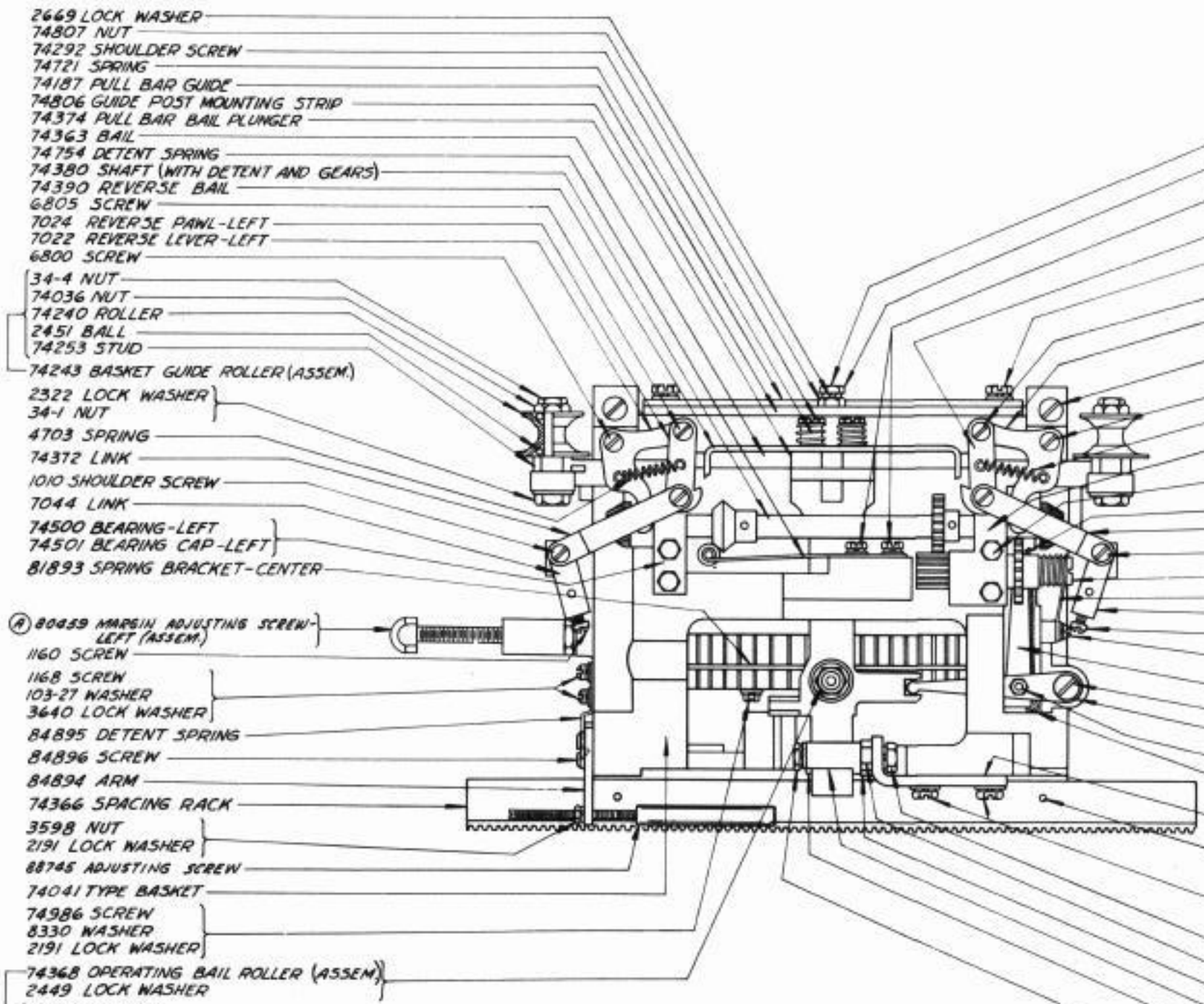

8539 SCREW
2191 LOCK WASHER
6746 SCREW
2191 LOCK WASHER
97686 PRESSURE RELEASE ARM
33-168 SCREW
2191 LOCK WASHER
97698 BRACKET - RIGHT
74878 SPINDLE DRAG SPRING
74059 SCREW
2191 LOCK WASHER
105442 TIE ROD
80342 SCREW
2191 LOCK WASHER
97699 BEARING - RIGHT
97696 SLACK ROLL ARM
82463 SPRING
86506 SPRING POST
34-56 NUT
73276 SCREW
73374 SPACER
74491 PRESSURE ROLL
97695 SLACK ROLL
97702 PAPER ROLL SPINDLE (ASSEM)
98140 SPINDLE
98141 RETAINING SPRING
74877 GARTER SPRING
97685 PRESSURE ROLL BAR
97680 FEED ROLL BRACKET
35-27 SPRING
72088 SCREW
2191 LOCK WASHER
7002 WASHER
6800 SCREW
74283 SPRING WASHER
34432 WASHER
74056 RETAINING PLATE
97701 BEARING - LEFT
97700 BRACKET - LEFT
78044 SPRING POST
82726 SPRING
97697 DETENT POST
94529 SHIM
6746 SCREW
2191 LOCK WASHER
8539 SCREW
2191 LOCK WASHER
98145 TRANSPARENT WEB
78301 SCREW
2669 LOCK WASHER
3438 WASHER
3606 NUT
1040 SCREW
2669 LOCK WASHER
2539 NUT
97689 FEED BRACKET - RIGHT
3606 NUT
6746 SCREW
2191 LOCK WASHER
90781 RELEASE LATCH
97681 BUSHING - RIGHT
90785 COLLAR
86341 SET SCREW
82786 SPRING
6746 SCREW
2191 LOCK WASHER
7002 WASHER
55064-A SHIM
97682 FEED ROLL
3599 NUT
97692 PAPER GUIDE
97687 PRESSURE ROLL BRACKET
80444 SCREW
2191 LOCK WASHER
97688 PRESSURE ROLL SHAFT
76617 DETENT (ASSEM)
7678 SCREW
3640 WASHER
7059 DETENT ARM
76632 ROLLER
8184 WASHER
2248 PIN
55064-A SHIM
97683 RATCHET
97691 FEED PAWL GUIDE BRACKET
80444 SCREW
2191 LOCK WASHER
78419 SHIM
97684 BUSHING - LEFT
80444 SCREW
2191 LOCK WASHER
92413 KNOB (WITH SCREW)
97690 FEED BRACKET - LEFT (WITH POST)
6746 SCREW
2191 LOCK WASHER
1162 SCREW
3640 LOCK WASHER
1040 SCREW
2669 LOCK WASHER
81560 SPRING POST
2191 LOCK WASHER
3598 NUT
3606 NUT
78301 SCREW
2669 LOCK WASHER
3438 WASHER


74248 ROLLER STUD
2669 LOCK WASHER
34-4 NUT
74481 ROLLER
103-27 WASHER
3690 LOCK WASHER
34-56 NUT
74247 SHIFT STOP POST
2669 LOCK WASHER
34-4 NUT
74361 SCREW
2191 LOCK WASHER
3598 NUT
97650 CARRIAGE BRACKET
74449 BUSHING
6970 NUT
74554 SPRING POST
8543 SCREW
2191 LOCK WASHER
74879 SPRING POST
74077 SCREW
2669 LOCK WASHER
34-4 NUT
97659 LINK
80294 SPRING POST
35-13 SPRING
98371 SLIDE CARRIER
98372 GLASS SLIDE
98388 ECCENTRIC BUSHING
98389 SCREW
98642 SHIM
98641 LOCK WASHER
98414 ECCENTRIC
1269 SCREW
2191 LOCK WASHER
8330 WASHER
97652 CARRIAGE SLIDE ROD
8539 SCREW
2191 LOCK WASHER
97651 RIBBON OSCILLATOR SLIDE BAR
35-99 SPRING
97658 LINK ROLLER
2669 LOCK WASHER
34-4 NUT
98420 SPRING
97654 PLATEN CARRIAGE
97656 PLATEN ROLL

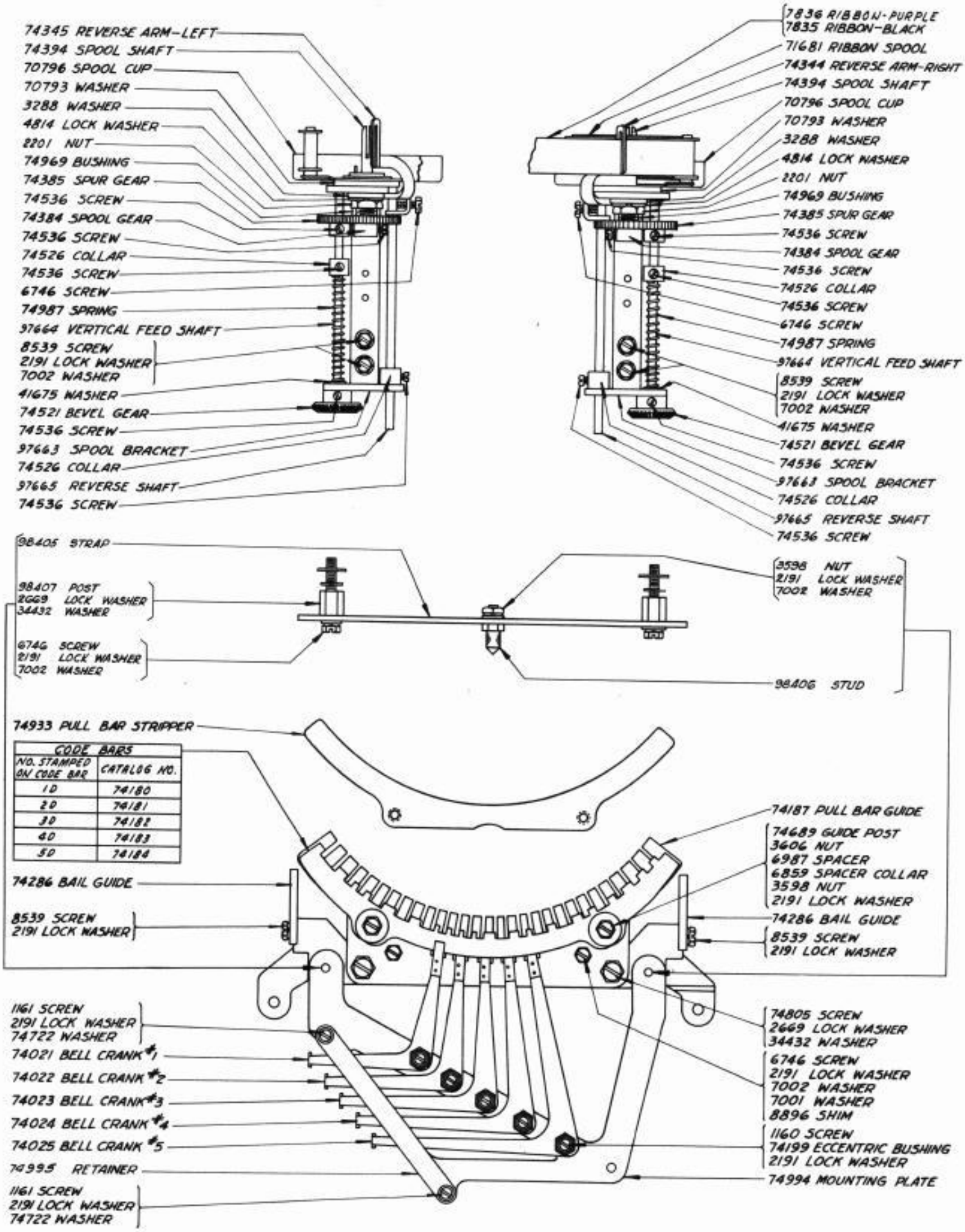


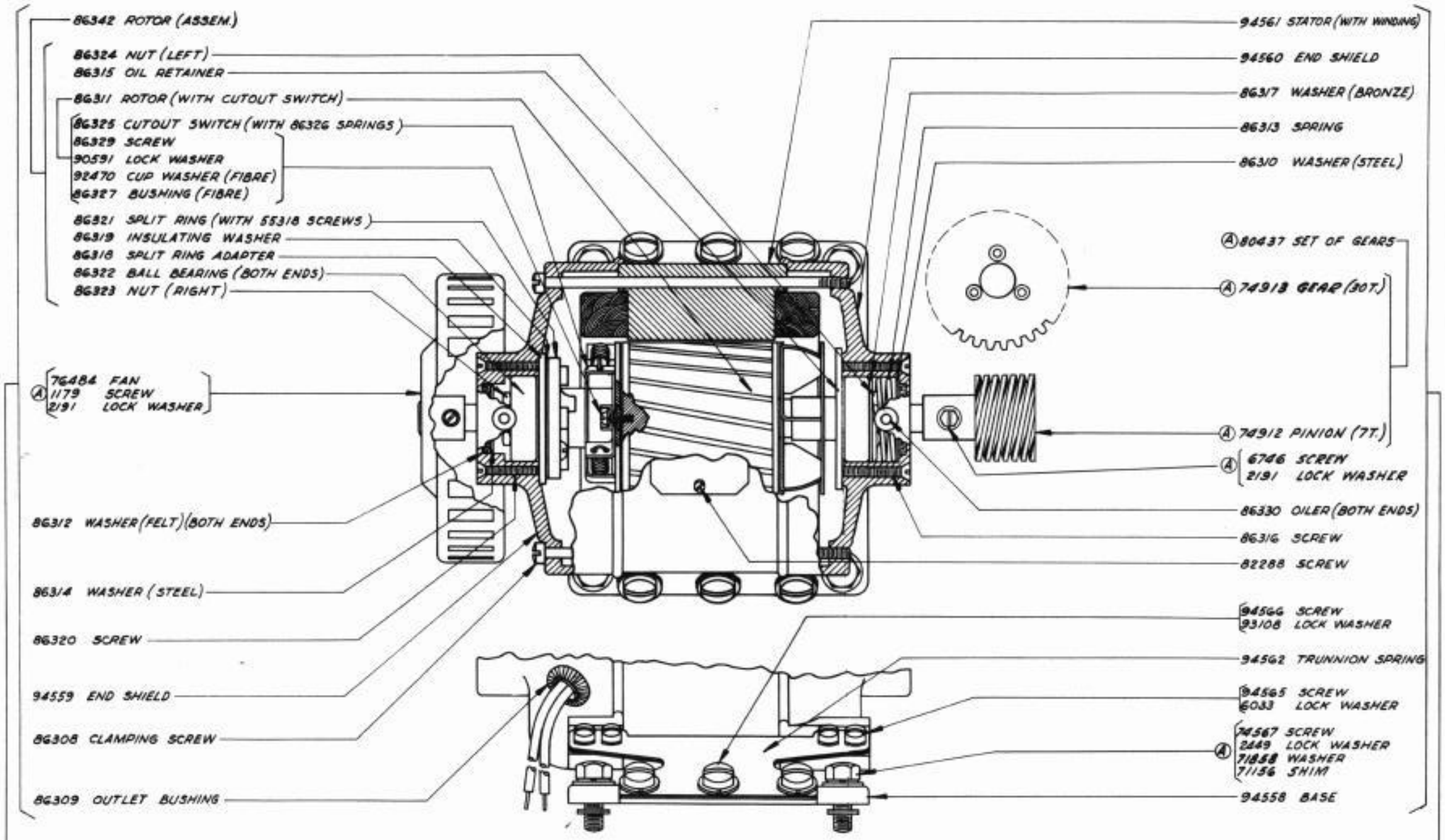
97713 CABLE - SELECTOR


84351 TYPE BAR BACKSTOP
74279 LEATHER STRIP
33-111 SCREW
FOR PULL BARS, SPRINGS, TYPE BARS AND TYPE PALLETS SEE PAGE 212
74281 TYPE BAR BACKSTOP (ASSEM)
8539 SCREW
2191 LOCK WASHER
7002 WASHER
74889 BLOCK
7634 SPRING
74513 FULCRUM ROD
81889 SPRING BRACKET-END
74986 SCREW
8330 WASHER
2191 LOCK WASHER
74373 TYPE BAR SEGMENT
80342 SCREW
73427 SHIM
2191 LOCK WASHER
74296 PILOT SCREW
97661 EXTENSION BAR
8539 SCREW
2191 LOCK WASHER
7002 WASHER
74397 DRAW STRAP POST
78301 SCREW
2669 LOCK WASHER
1162 SCREW
3640 LOCK WASHER
103-27 WASHER
74730 SHOULDER SCREW
34432 WASHER
2191 LOCK WASHER
74731 NUT
74726 EXTENSION
74401 RIBBON OSCILLATOR
97660 DRAW BAR
1038 SCREW
2191 LOCK WASHER
6746 SCREW
2191 LOCK WASHER
97668 TRACK-UPPER
74062 TRACK-LOWER
97671 BRACKET-LEFT
74363 BAIL
74008 ROLLER
74006 BUSHING
74334 WASHER
34-4 NUT
2669 LOCK WASHER
7634 SPRING
81889 SPRING BRACKET-END
74986 SCREW
8330 WASHER
2191 LOCK WASHER
74294 ADAPTER PLATE
97666 RIBBON CARRIER
38249 TYPE BAR GUIDE
1161 SCREW
2191 LOCK WASHER
74330 SPRING
74010 ROLLER
33-168 SCREW
2191 LOCK WASHER
74512 BASKET SUPPORT ROLLER (ASSEM)
34-1 NUT
2322 LOCK WASHER
74194 STUD
2451 BALL
74195 ROLLER
74036 NUT
34-4 NUT
74700 SPRING
74335 SHIFT LEVER
1196 SHOULDER SCREW
2191 LOCK WASHER
3598 NUT
97662 BRACKET
97670 BRACKET-RIGHT
6746 SCREW
2191 LOCK WASHER
6746 SCREW
2191 LOCK WASHER
74126 SUPPORT
97669 INTERMEDIATE ROLL

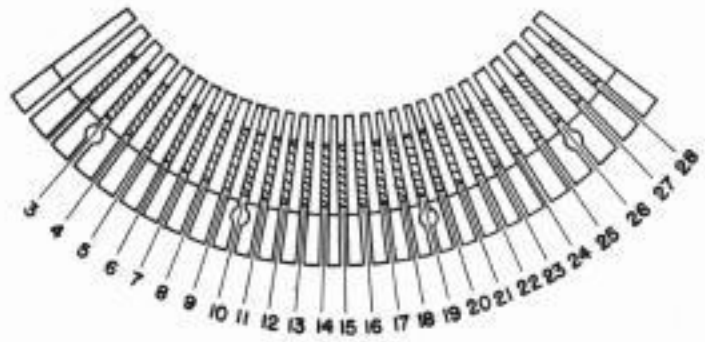


NOTE:-
(A) CONSISTS OF 1 91850 SCREW
1 91851 NUT
1 76156 LOCK WASHER


74345 REVERSE ARM-LEFT
74394 SPOOL SHAFT
70796 SPOOL CUP
70793 WASHER
3288 WASHER
4814 LOCK WASHER
2201 NUT
74969 BUSHING
74385 SPUR GEAR
74536 SCREW
74384 SPOOL GEAR
74536 SCREW
74526 COLLAR
74536 SCREW
6746 SCREW
74987 SPRING
97664 VERTICAL FEED SHAFT
8539 SCREW
2191 LOCK WASHER
7002 WASHER
41675 WASHER
74521 BEVEL GEAR
74536 SCREW
97663 SPOOL BRACKET
74526 COLLAR
97665 REVERSE SHAFT
74536 SCREW
7836 RIBBON-PURPLE
7835 RIBBON-BLACK
71681 RIBBON SPOOL
74344 REVERSE ARM-RIGHT
74394 SPOOL SHAFT
70796 SPOOL CUP
70793 WASHER
3288 WASHER
4814 LOCK WASHER
2201 NUT
74969 BUSHING
74385 SPUR GEAR
74536 SCREW
74384 SPOOL GEAR
74536 SCREW
74526 COLLAR
74536 SCREW
6746 SCREW
74987 SPRING
97664 VERTICAL FEED SHAFT
8539 SCREW
2191 LOCK WASHER
7002 WASHER
41675 WASHER
74521 BEVEL GEAR
74536 SCREW
97663 SPOOL BRACKET
74526 COLLAR
97665 REVERSE SHAFT
74536 SCREW
98405 STRAP
98407 POST
2669 LOCK WASHER
34432 WASHER
6746 SCREW
2191 LOCK WASHER
7002 WASHER
3598 NUT
2191 LOCK WASHER
7002 WASHER
98406 STUD
74933 PULL BAR STRIPPER
CODE BARS
NO. STAMPED ON CODE BAR | CATALOG NO.
1D | 74180
2D | 74181
3D | 74182
4D | 74183
5D | 74184
74286 BAIL GUIDE
8539 SCREW
2191 LOCK WASHER
74187 PULL BAR GUIDE
74689 GUIDE POST
3606 NUT
6987 SPACER
6859 SPACER COLLAR
3598 NUT
2191 LOCK WASHER
74286 BAIL GUIDE
8539 SCREW
2191 LOCK WASHER
1161 SCREW
2191 LOCK WASHER
74722 WASHER
74021 BELL CRANK #1
74022 BELL CRANK #2
74023 BELL CRANK #3
74024 BELL CRANK #4
74025 BELL CRANK #5
74995 RETAINER
1161 SCREW
2191 LOCK WASHER
74722 WASHER
74805 SCREW
2669 LOCK WASHER
34432 WASHER
6746 SCREW
2191 LOCK WASHER
7002 WASHER
7001 WASHER
8896 SHIM
1160 SCREW
74199 ECCENTRIC BUSHING
2191 LOCK WASHER
74994 MOUNTING PLATE

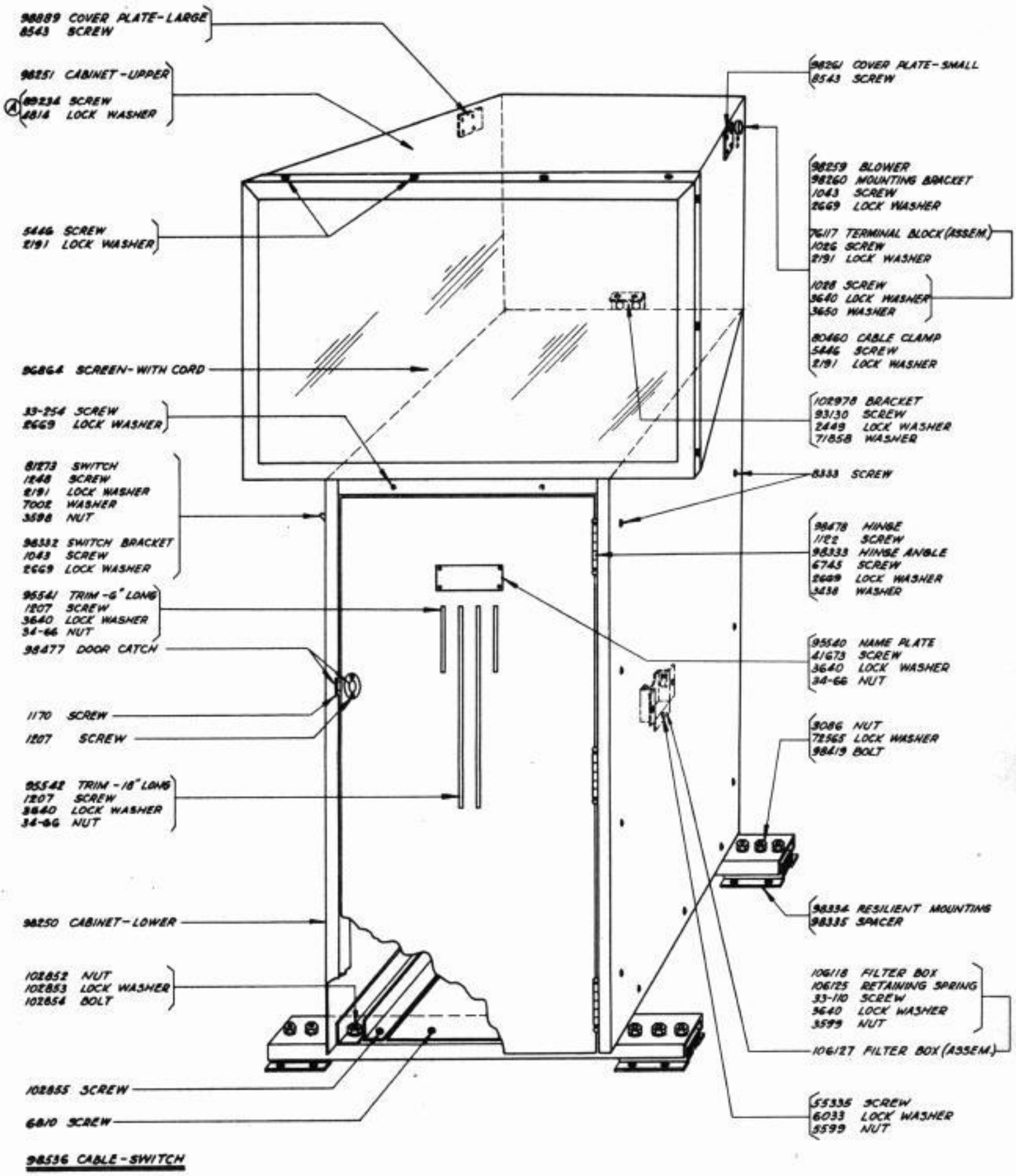


92575 SYNCHRONOUS MOTOR 1/40 H.P., 110 V., 60 CYCLE A.C (EXCLUDES PARTS MARKED Ⓐ)



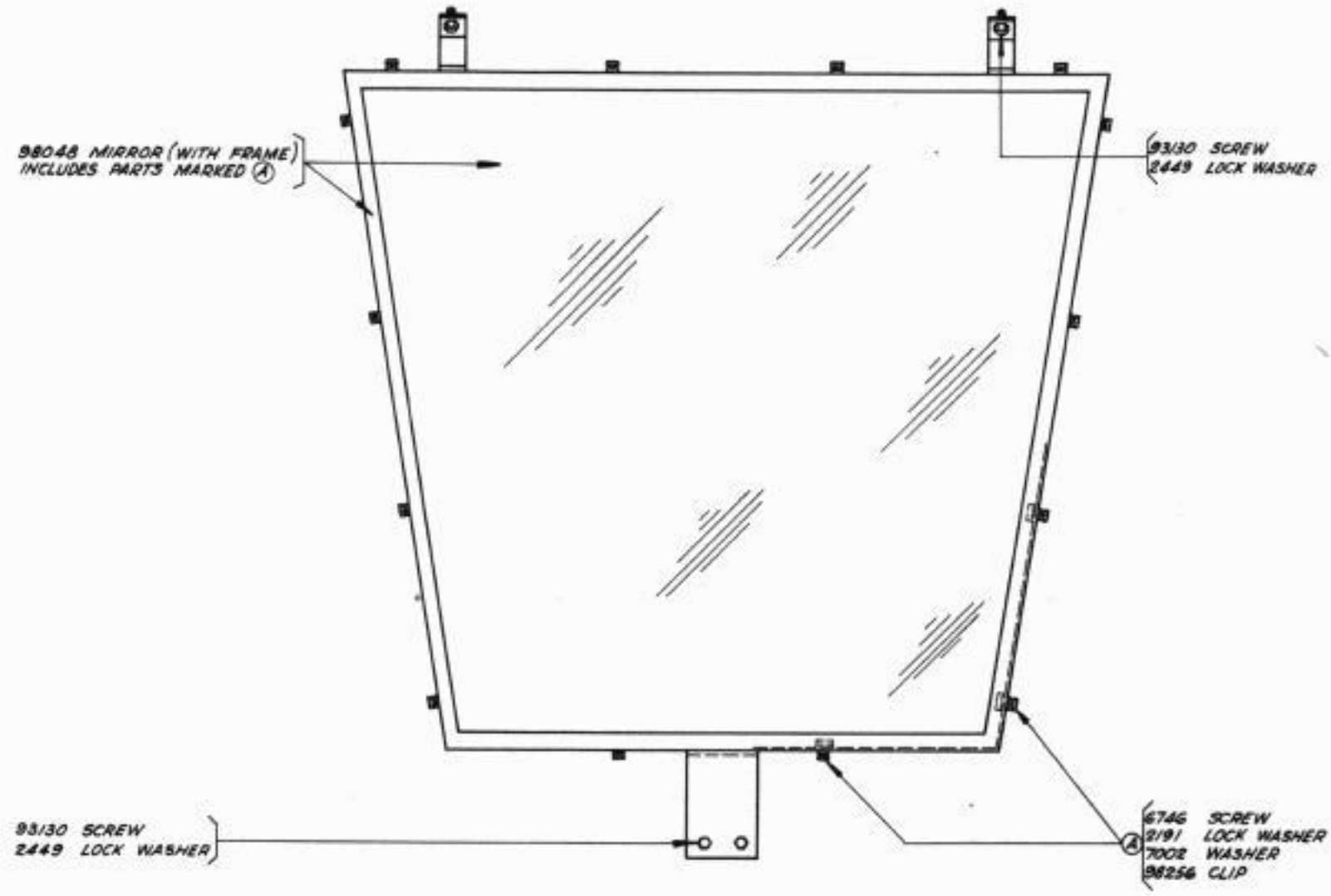
98044 SET OF TYPE BAR PALLETS

NUMBER OF POSITION IN SEGMENT	PULL BARS		PULL BAR SPRING	TYPE BARS WITHOUT PALLETS		TYPE BAR PALLETS		TYPE BAR WITH PALLET
	CATALOG NUMBER	DESCRIPTION		CATALOG NUMBER	NUMBER ON BAR	CATALOG NUMBER	DESCRIPTION	
1								
2								
3	74185	STANDARD	7634	74203	3	98043	2 "	98172
4	74185	"	7634	74204	4	98042	K (	98173
5	74185	"	7634	74205	5	98041	8 ?	98174
6	74185	"	7634	74206	6	98040	P 0	98175
7	74185	"	7634	74207	7	98039	Y 6	98176
8	74185	"	7634	74208	8	98038	M .	98177
9	74185	"	7634	74209	9	98037	U 7	98178
10	74185	"	7634	74210	10	98036	L)	98179
11	74185	"	7634	74211	11	98035	H £	98180
12	74185	"	7634	74212	12	98034	O 9	98181
13	74185	"	7634	74213	13	98033	I 8	98182
14	74185	"	7634	74214	14	98032	N ,	98183
15	74185	"	7634	74215	15	98031	E 3	98184
16	74185	"	7634	74216	16	98030	T 5	98185
17	74185	"	7634	74217	17	98029	A -	98186
18	74185	"	7634	74218	18	98028	J '	98187
19	74185	"	7634	74219	19	98027	R 4	98188
20	74185	"	7634	74220	20	98026	D $	98189
21	74185	"	7634	74221	21	98025	C :	98190
22	74185	"	7634	74222	22	98024	F !	98191
23	74185	"	7634	74223	23	98023	W 2	98192
24	74185	"	7634	74224	24	98022	G &	98193
25	74185	"	7634	74225	25	98021	V ;	98194
26	74185	"	7634	74226	26	98020	Q 1	98195
27	74185	"	7634	74227	27	98019	X /	98196
28	74185	"	7634	74228	28	98018	S '	98197

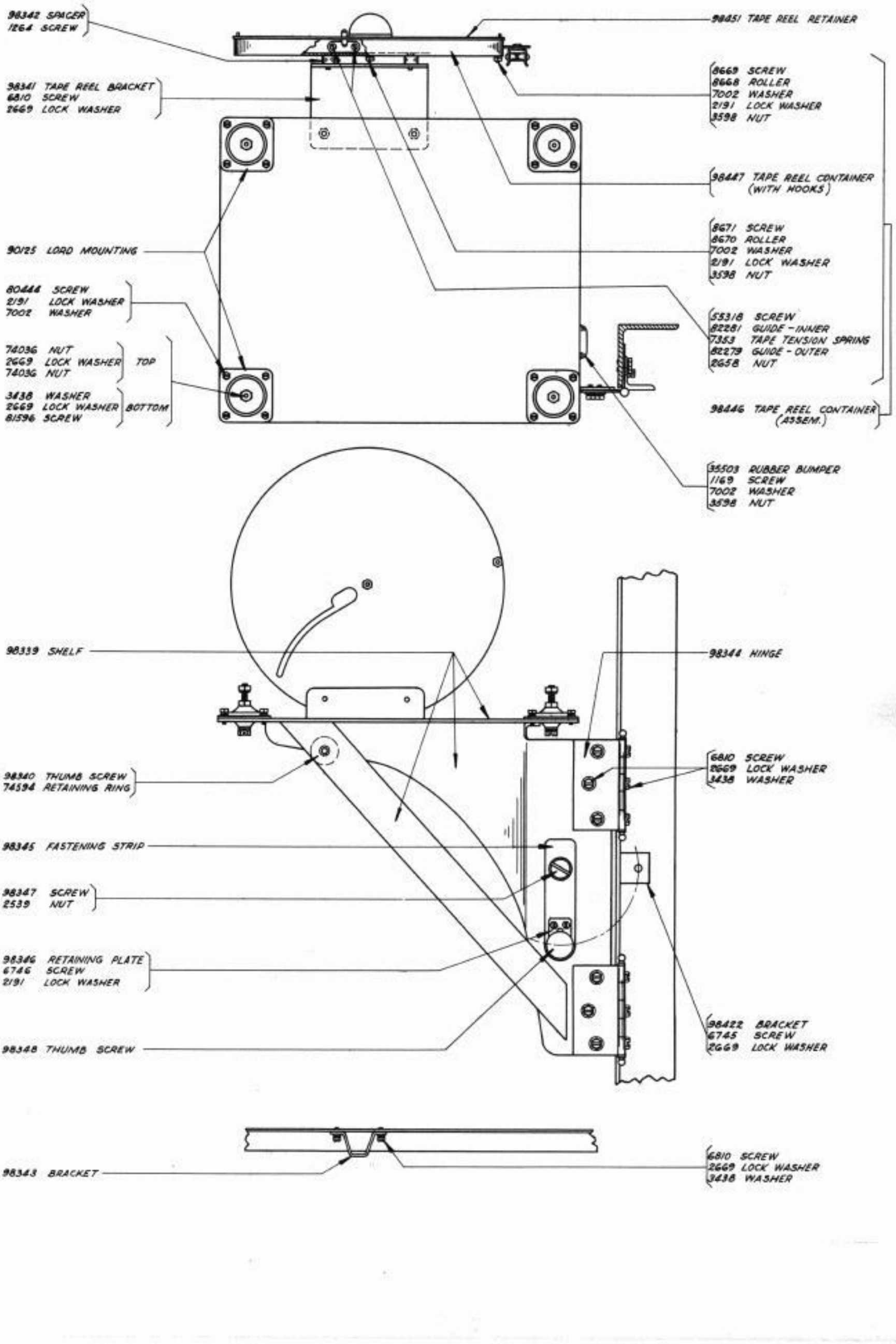


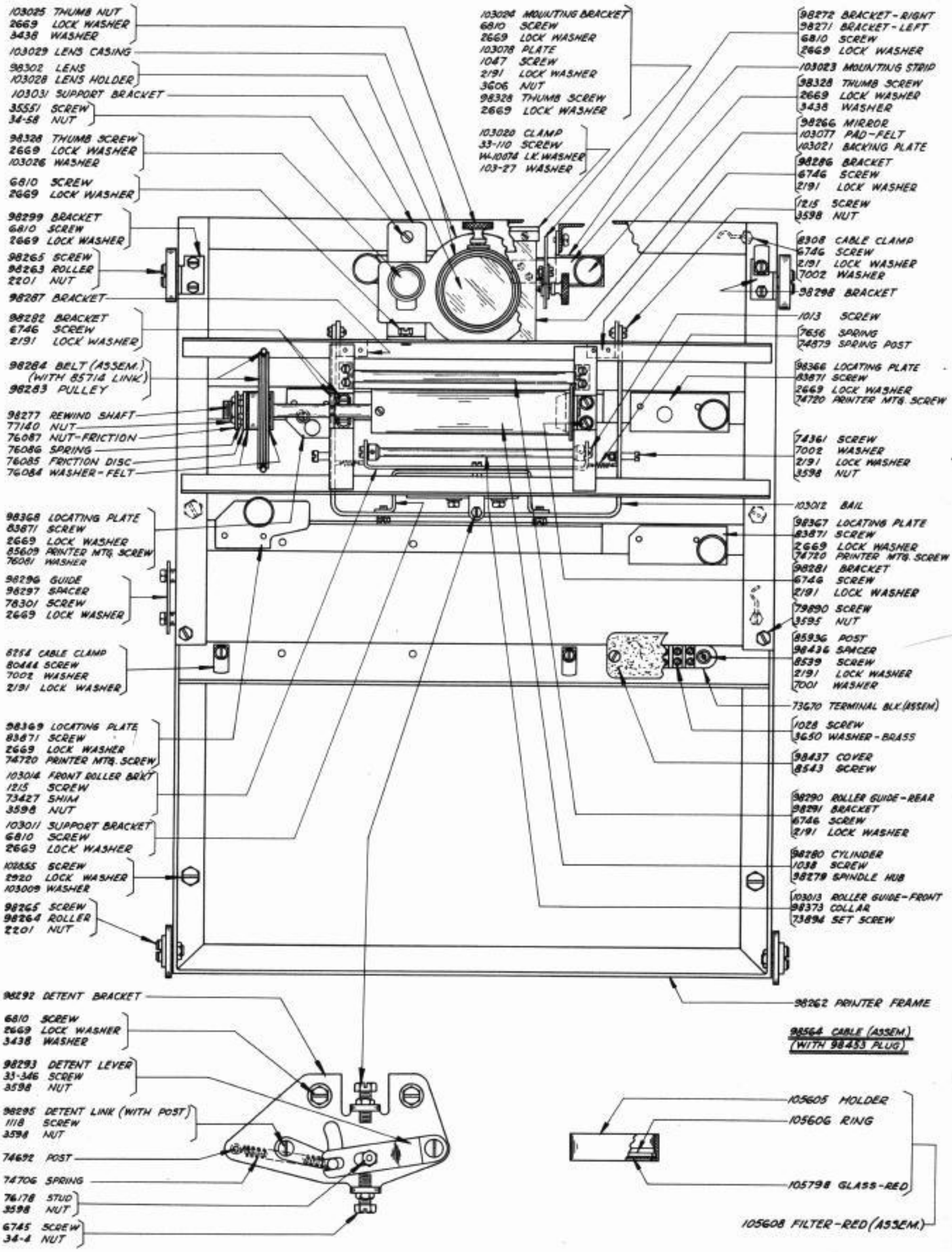
Ⓐ THE 89234 SCREWS AND 4814 LOCK WASHERS ARE USED TO FASTEN THE UPPER AND LOWER CABINETS TOGETHER.

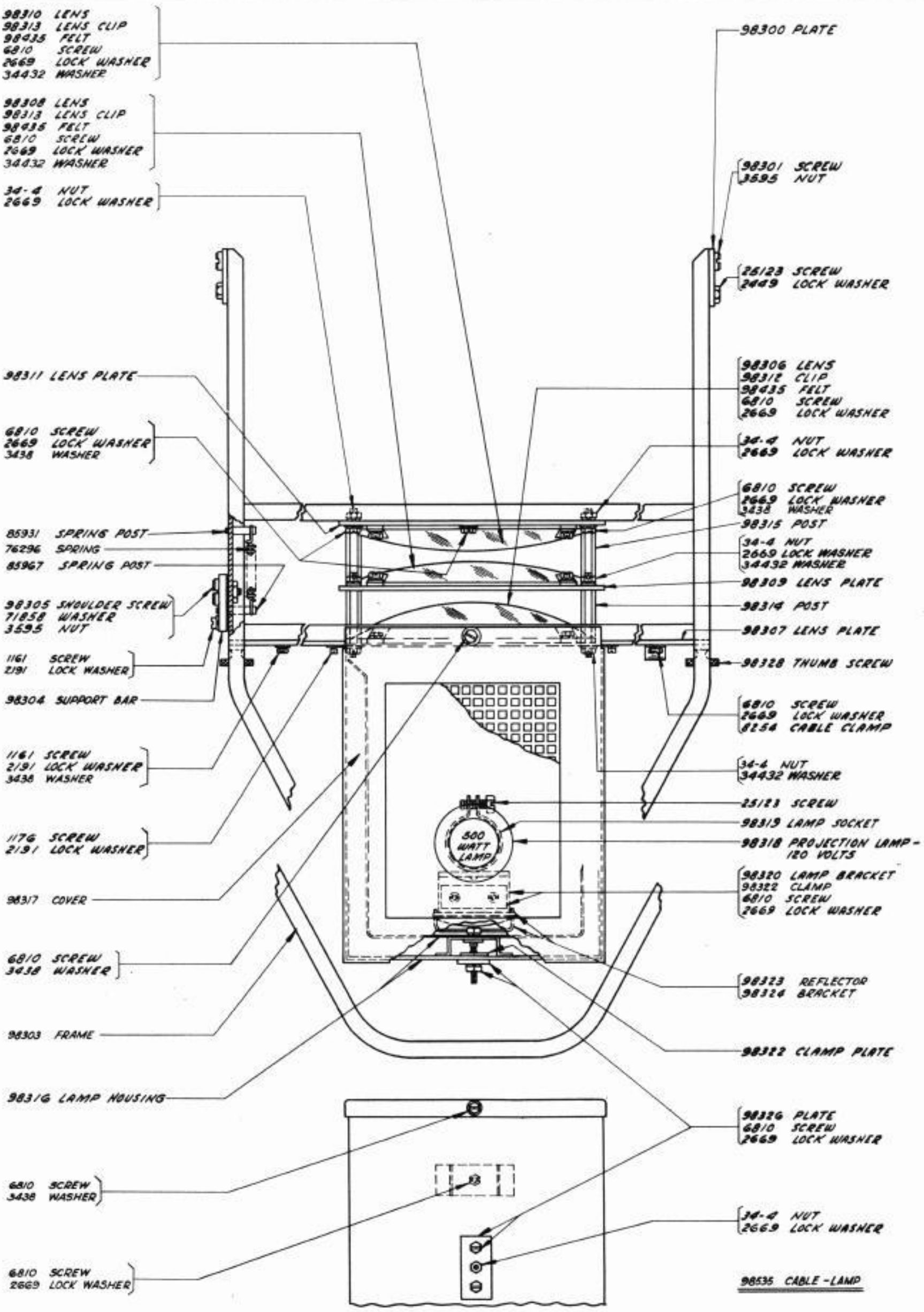
98067 CABLE (ASSEM) (WITH 98453 PLUG) FOR FP810M103
98564 CABLE (ASSEM) (WITH 98453 PLUG) FOR PF2

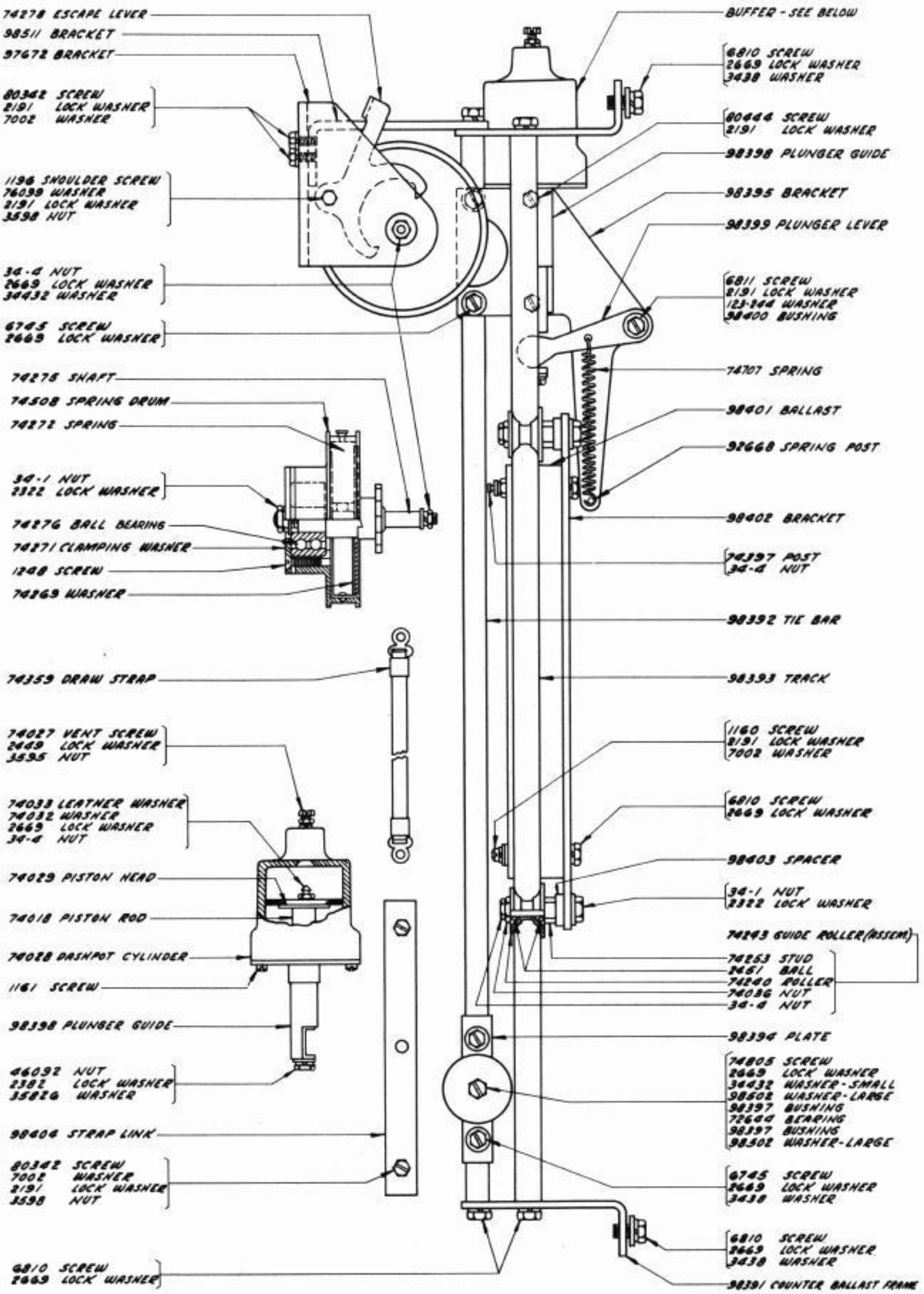


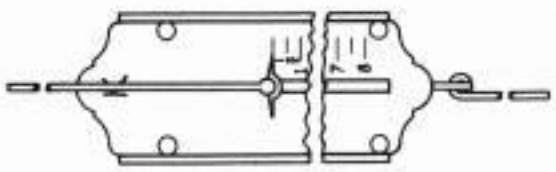
98527 CABLE - CONTROL RELAY


98342 SPACER
1264 SCREW
98341 TAPE REEL BRACKET
6810 SCREW
2669 LOCK WASHER
90125 LORD MOUNTING
80444 SCREW
2191 LOCK WASHER
7002 WASHER
74036 NUT
2669 LOCK WASHER
74036 NUT
TOP
3438 WASHER
2669 LOCK WASHER
81596 SCREW
BOTTOM
98451 TAPE REEL RETAINER
8669 SCREW
8668 ROLLER
7002 WASHER
2191 LOCK WASHER
3598 NUT
98447 TAPE REEL CONTAINER (WITH HOOKS)
8671 SCREW
8670 ROLLER
7002 WASHER
2191 LOCK WASHER
3598 NUT
55318 SCREW
82281 GUIDE - INNER
7353 TAPE TENSION SPRING
82279 GUIDE - OUTER
2658 NUT
98446 TAPE REEL CONTAINER (ASSEM.)
35503 RUBBER BUMPER
1169 SCREW
7002 WASHER
3598 NUT
98339 SHELF
98344 HINGE
98340 THUMB SCREW
74594 RETAINING RING
98345 FASTENING STRIP
98347 SCREW
2539 NUT
98346 RETAINING PLATE
6746 SCREW
2191 LOCK WASHER
98348 THUMB SCREW
6810 SCREW
2669 LOCK WASHER
3438 WASHER
98422 BRACKET
6745 SCREW
2669 LOCK WASHER
98343 BRACKET
6810 SCREW
2669 LOCK WASHER
3438 WASHER

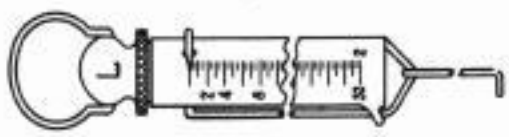

103025 THUMB NUT
2669 LOCK WASHER
3438 WASHER
103029 LENS CASING
98302 LENS
103028 LENS HOLDER
103031 SUPPORT BRACKET
35551 SCREW
34-58 NUT
98328 THUMB SCREW
2669 LOCK WASHER
103026 WASHER
6810 SCREW
2669 LOCK WASHER
98299 BRACKET
6810 SCREW
2669 LOCK WASHER
98265 SCREW
98263 ROLLER
2201 NUT
98287 BRACKET
98282 BRACKET
6746 SCREW
2191 LOCK WASHER
98284 BELT (ASSEM.) (WITH 85714 LINK)
98283 PULLEY
98277 REWIND SHAFT
77140 NUT
76087 NUT-FRICTION
76086 SPRING
76085 FRICTION DISC
76084 WASHER-FELT
98368 LOCATING PLATE
83871 SCREW
2669 LOCK WASHER
85609 PRINTER MTG. SCREW
76081 WASHER
98296 GUIDE
98297 SPACER
78301 SCREW
2669 LOCK WASHER
8754 CABLE CLAMP
80444 SCREW
7002 WASHER
2191 LOCK WASHER
98369 LOCATING PLATE
83871 SCREW
2669 LOCK WASHER
74720 PRINTER MTG. SCREW
103014 FRONT ROLLER BRKT
1215 SCREW
73427 SHIM
3598 NUT
103011 SUPPORT BRACKET
6810 SCREW
2669 LOCK WASHER
103055 SCREW
2920 LOCK WASHER
103009 WASHER
98265 SCREW
98264 ROLLER
2201 NUT
103024 MOUNTING BRACKET
6810 SCREW
2669 LOCK WASHER
103078 PLATE
1047 SCREW
2191 LOCK WASHER
3606 NUT
98328 THUMB SCREW
2669 LOCK WASHER
103020 CLAMP
33-110 SCREW
W4-10674 LK. WASHER
103-27 WASHER
98272 BRACKET-RIGHT
98271 BRACKET-LEFT
6810 SCREW
2669 LOCK WASHER
103023 MOUNTING STRIP
98328 THUMB SCREW
2669 LOCK WASHER
3438 WASHER
98266 MIRROR
103077 PAD-FELT
103021 BACKING PLATE
98286 BRACKET
6746 SCREW
2191 LOCK WASHER
1215 SCREW
3598 NUT
8308 CABLE CLAMP
6746 SCREW
2191 LOCK WASHER
7002 WASHER
98298 BRACKET
1013 SCREW
7656 SPRING
74879 SPRING POST
98366 LOCATING PLATE
83871 SCREW
2669 LOCK WASHER
74720 PRINTER MTG. SCREW
74361 SCREW
7002 WASHER
2191 LOCK WASHER
3598 NUT
103012 BAIL
98367 LOCATING PLATE
83871 SCREW
2669 LOCK WASHER
74720 PRINTER MTG. SCREW
98281 BRACKET
6746 SCREW
2191 LOCK WASHER
79890 SCREW
3595 NUT
85936 POST
98436 SPACER
8539 SCREW
2191 LOCK WASHER
7001 WASHER
73670 TERMINAL BLK. (ASSEM)
1028 SCREW
3650 WASHER-BRASS
98437 COVER
8543 SCREW
98290 ROLLER GUIDE-REAR
98291 BRACKET
6746 SCREW
2191 LOCK WASHER
98280 CYLINDER
1038 SCREW
98279 SPINDLE HUB
103013 ROLLER GUIDE-FRONT
98373 COLLAR
73894 SET SCREW
98262 PRINTER FRAME
98564 CABLE (ASSEM) (WITH 98453 PLUG)
98292 DETENT BRACKET
6810 SCREW
2669 LOCK WASHER
3438 WASHER
98293 DETENT LEVER
33-346 SCREW
3598 NUT
98295 DETENT LINK (WITH POST)
1118 SCREW
3598 NUT
74692 POST
74706 SPRING
76178 STUD
3598 NUT
6745 SCREW
34-4 NUT
105605 HOLDER
105606 RING
105798 GLASS-RED
105608 FILTER-RED (ASSEM.)


98310 LENS
98313 LENS CLIP
98435 FELT
6810 SCREW
2669 LOCK WASHER
34432 WASHER
98308 LENS
98313 LENS CLIP
98435 FELT
6810 SCREW
2669 LOCK WASHER
34432 WASHER
34-4 NUT
2669 LOCK WASHER
98311 LENS PLATE
6810 SCREW
2669 LOCK WASHER
3438 WASHER
85931 SPRING POST
76296 SPRING
85967 SPRING POST
98305 SHOULDER SCREW
71858 WASHER
3595 NUT
1161 SCREW
2191 LOCK WASHER
98304 SUPPORT BAR
1161 SCREW
2191 LOCK WASHER
3438 WASHER
1176 SCREW
2191 LOCK WASHER
98317 COVER
6810 SCREW
3438 WASHER
98303 FRAME
98316 LAMP HOUSING
6810 SCREW
3438 WASHER
6810 SCREW
2669 LOCK WASHER
98300 PLATE
98301 SCREW
3595 NUT
25123 SCREW
2449 LOCK WASHER
98306 LENS
98312 CLIP
98435 FELT
6810 SCREW
2669 LOCK WASHER
34-4 NUT
2669 LOCK WASHER
6810 SCREW
2669 LOCK WASHER
3438 WASHER
98315 POST
34-4 NUT
2669 LOCK WASHER
34432 WASHER
98309 LENS PLATE
98314 POST
98307 LENS PLATE
98328 THUMB SCREW
6810 SCREW
2669 LOCK WASHER
8254 CABLE CLAMP
34-4 NUT
34432 WASHER
25123 SCREW
98319 LAMP SOCKET
500 WATT LAMP
98318 PROJECTION LAMP - 120 VOLTS
98320 LAMP BRACKET
98322 CLAMP
6810 SCREW
2669 LOCK WASHER
98323 REFLECTOR
98324 BRACKET
98322 CLAMP PLATE
98326 PLATE
6810 SCREW
2669 LOCK WASHER
34-4 NUT
2669 LOCK WASHER
98535 CABLE - LAMP

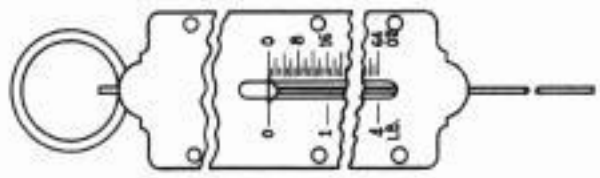

74278 ESCAPE LEVER
98511 BRACKET
97672 BRACKET
80342 SCREW
2191 LOCK WASHER
7002 WASHER
1196 SHOULDER SCREW
76099 WASHER
2191 LOCK WASHER
3598 NUT
34-4 NUT
2669 LOCK WASHER
34432 WASHER
6745 SCREW
2669 LOCK WASHER
74275 SHAFT
74508 SPRING DRUM
74272 SPRING
34-1 NUT
2322 LOCK WASHER
74276 BALL BEARING
74271 CLAMPING WASHER
1248 SCREW
74269 WASHER
74359 DRAW STRAP
74027 VENT SCREW
2449 LOCK WASHER
3595 NUT
74033 LEATHER WASHER
74032 WASHER
2669 LOCK WASHER
34-4 NUT
74029 PISTON HEAD
74018 PISTON ROD
74028 DASHPOT CYLINDER
1161 SCREW
98398 PLUNGER GUIDE
46092 NUT
2382 LOCK WASHER
35826 WASHER
98404 STRAP LINK
80342 SCREW
7002 WASHER
2191 LOCK WASHER
3598 NUT
6810 SCREW
2669 LOCK WASHER
BUFFER - SEE BELOW
6810 SCREW
2669 LOCK WASHER
3438 WASHER
80444 SCREW
2191 LOCK WASHER
98398 PLUNGER GUIDE
98395 BRACKET
98399 PLUNGER LEVER
6811 SCREW
2191 LOCK WASHER
123-344 WASHER
98400 BUSHING
74707 SPRING
98401 BALLAST
92668 SPRING POST
98402 BRACKET
74397 POST
34-4 NUT
98392 TIE BAR
98393 TRACK
1160 SCREW
2191 LOCK WASHER
7002 WASHER
6810 SCREW
2669 LOCK WASHER
98403 SPACER
34-1 NUT
2322 LOCK WASHER
74243 GUIDE ROLLER(ASSEM)
74253 STUD
2461 BALL
74240 ROLLER
74086 NUT
34-4 NUT
98394 PLATE
74805 SCREW
2669 LOCK WASHER
34432 WASHER-SMALL
98502 WASHER-LARGE
98397 BUSHING
72644 BEARING
98397 BUSHING
98502 WASHER-LARGE
6745 SCREW
2669 LOCK WASHER
3438 WASHER
6810 SCREW
2669 LOCK WASHER
3438 WASHER
98391 COUNTER BALLAST FRAME
6810 SCREW
2669 LOCK WASHER



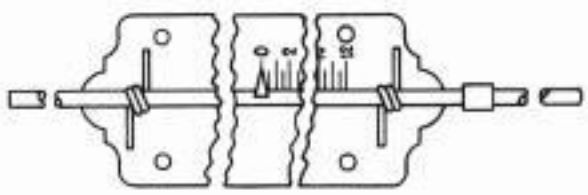
138-55 SCALE – 8 OZ.



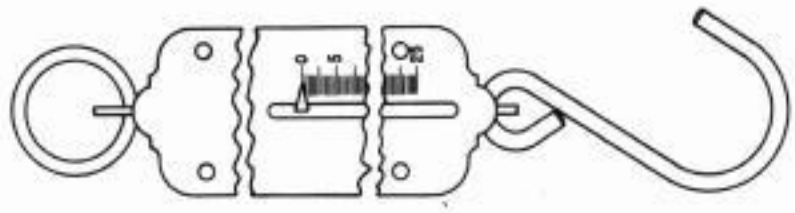
138-58 SCALE – 2 LB.



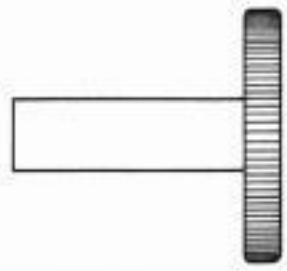
62711 SCALE – 4 LB.



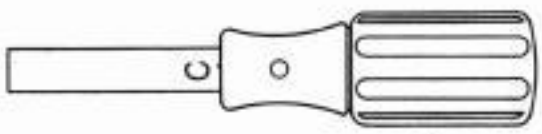
4841 SCALE – 12 LB.



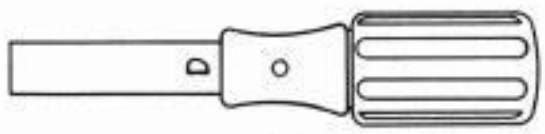
2727 SCALE – 25 LB.



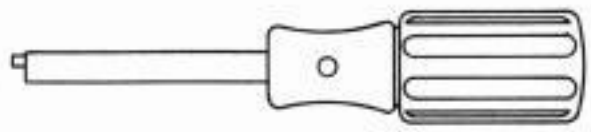
74903 HANDWHEEL



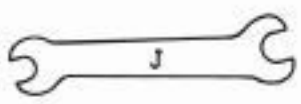
89954 SOCKET WRENCH – $\frac{1}{4}$"



89955 SOCKET WRENCH – $\frac{5}{16}$"



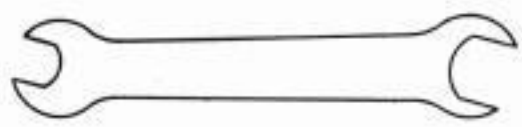
90783 ADJUSTING WRENCH



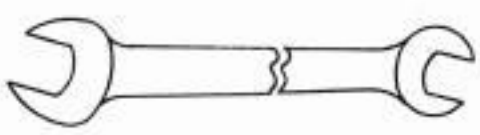
138-36 OPEN WRENCH-$\frac{3}{16}$"ϕ$\frac{1}{4}$"
2 REQUIRED

138-34 OPEN WRENCH-$\frac{1}{4}$"

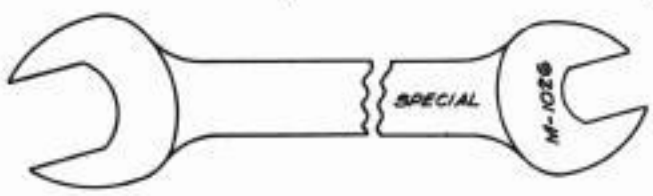
95367 OPEN WRENCH-$\frac{1}{4}$"ϕ$\frac{5}{16}$"
2 REQUIRED



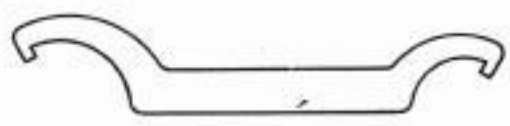
138-187 OPEN WRENCH-$\frac{3}{8}$"ϕ$\frac{7}{16}$"
95366 OPEN WRENCH-$\frac{3}{8}$"ϕ$\frac{9}{16}$" (2 REQUIRED)



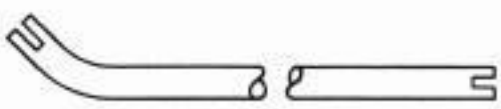
4838 OPEN WRENCH-$\frac{3}{8}$"ϕ$\frac{7}{16}$"
2 REQUIRED



87697 OPEN WRENCH-$\frac{1}{2}$"ϕ$\frac{3}{4}$"



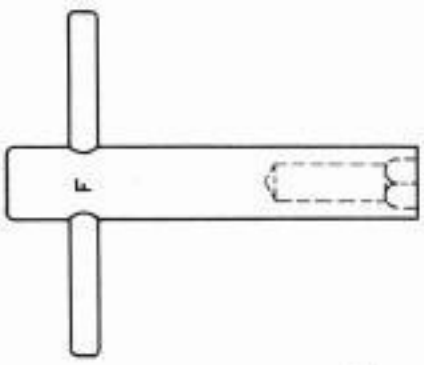
76280 CAPSTAN WRENCH-$\frac{15}{16}$"ϕ1$\frac{1}{4}$"



72574 LOCKING BAIL FINGER HOLDING TOOL

72575 LOCKING BAIL FINGER BENDING TOOL

72003 CONTACT SPRING BENDER



138-28 SOCKET WRENCH-$\frac{7}{16}$"

6617 TOMMY
2 REQUIRED

91117 CONTACT FILE

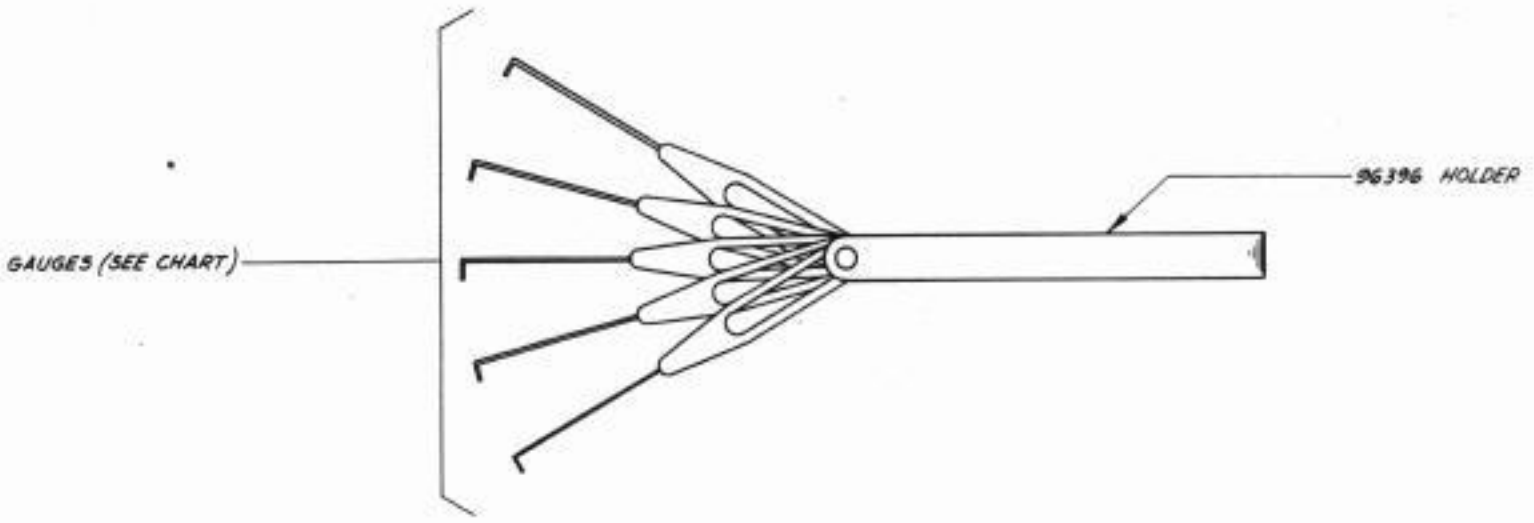
95368 SCREW DRIVER

88993 CONTACT BURNISHER

75503 SPRING HOOK – PUSH

75765 SPRING HOOK – PULL

77618 CASE FOR SMALL TOOLS



PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	SET NUMBER (INCLUDING HOLDER)
96356	.002	93833	.003	93822	.004	93823	.005	96360	.006	98493
96371	.008	96373	.010	93828	.012	96375	.015	96377	.020	98494
93825	.025	93811	.030	96385	.040	96389	.045	96391	.050	98495
93827	.055	96393	.060	96399	.065	96405	.080	——	—	98496

ACTUAL

SENDING STATION

RECEIVER - PROJECTOR STATIONS

RECEIVER - PROJECTOR STATION 1

SWITCH BOX SENDING STATION

SCHEMATIC

NOTES:

COLOR CODE

WIRING KEY

CURRENT REQUIREMENTS

NO.	DESCRIPTION	DATE	AUTHORITY
	ALTERATIONS		

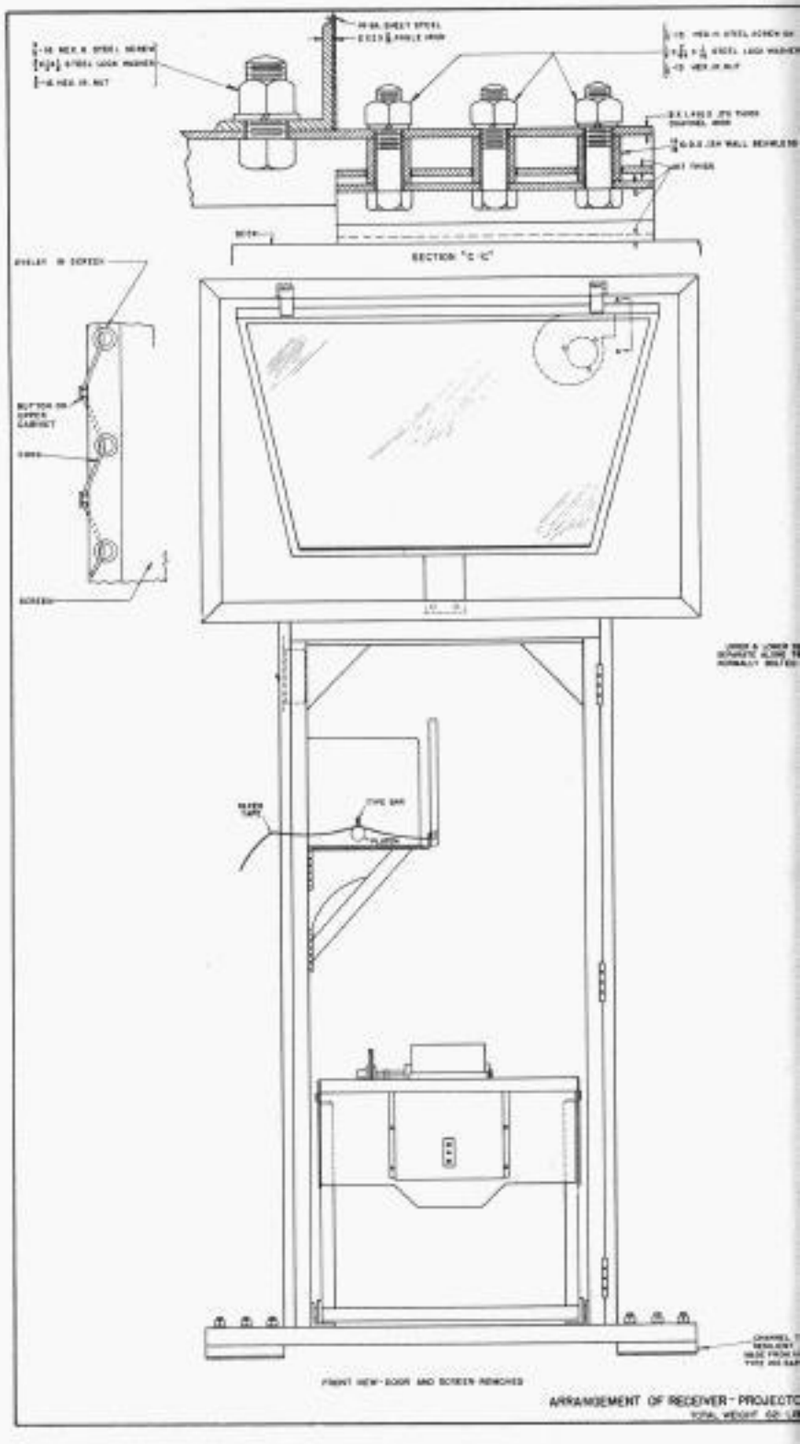
TELETYPE CORPORATION
CHICAGO, ILLINOIS

B-59-D

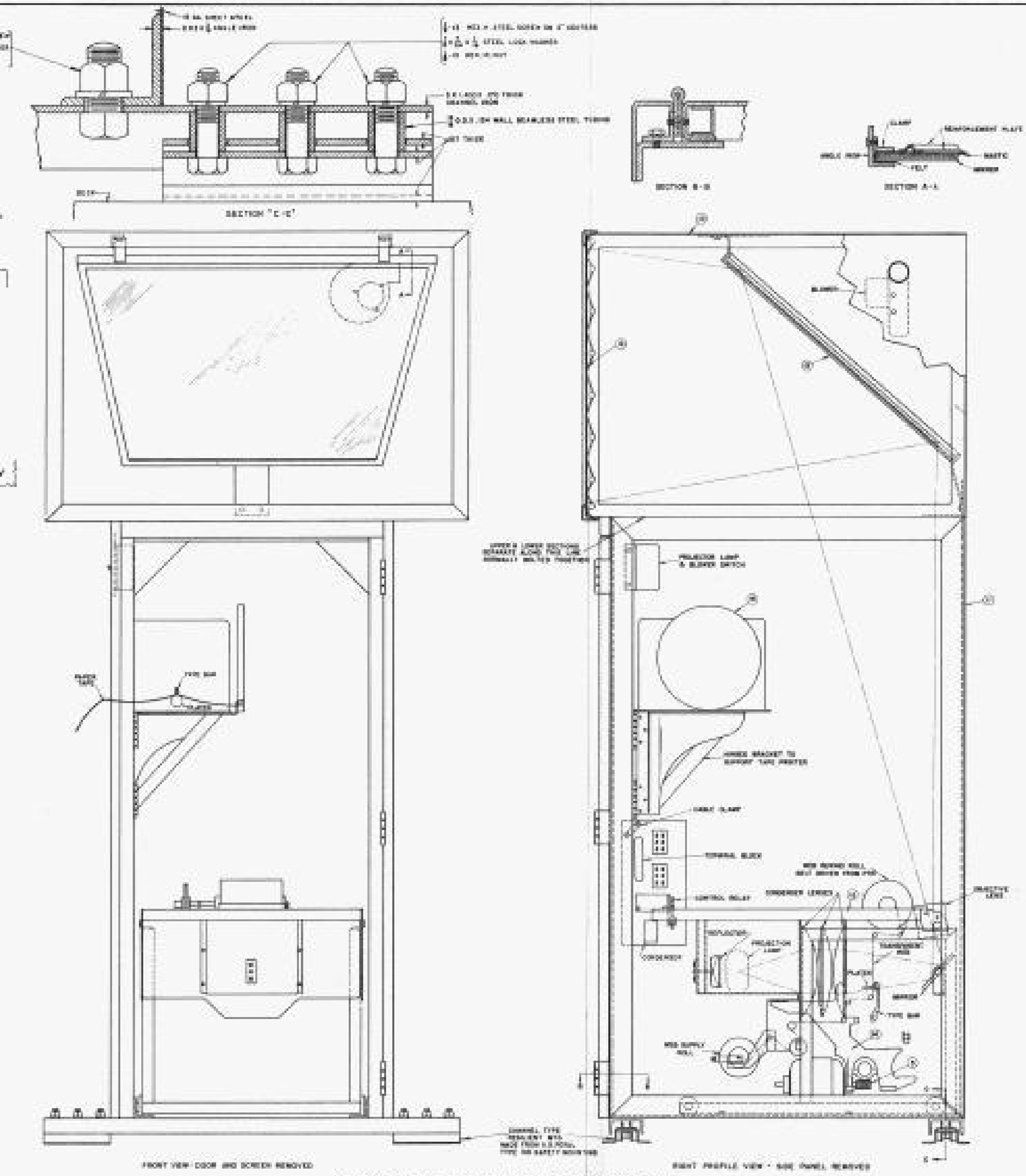
CONTRACTORS PLAN NUMBER

ELECTRICAL CHARACTER
TRANSMISSION SYSTEM
WIRING DIAGRAM
ONE SENDING STATION
FOUR RECEIVER- PROJECTOR STATIONS

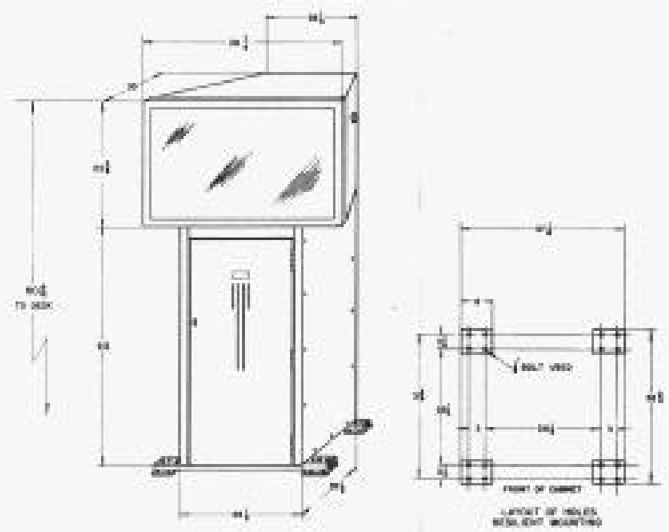
BUREAU OF SHIPS PLAN NUMBER



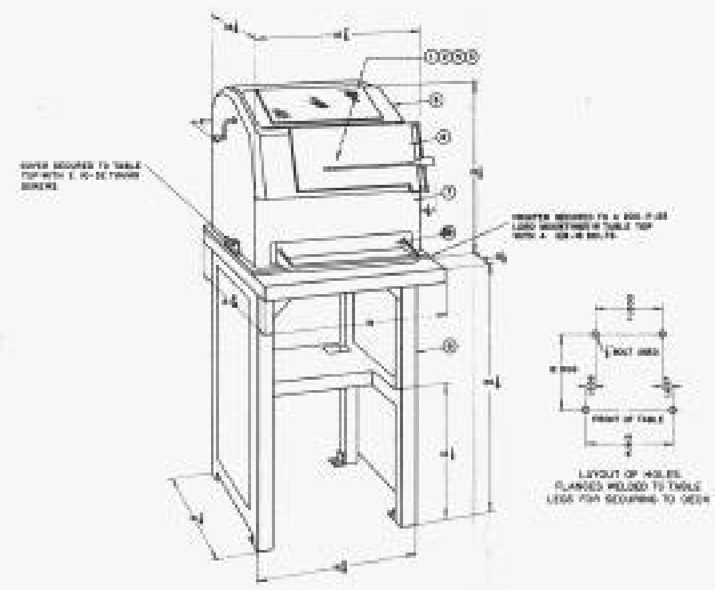
ARRANGEMENT OF RECEIVER - PROJECTO



ARRANGEMENT OF RECEIVER-PROJECTOR STATION EQUIPMENT
TOTAL WEIGHT 601 LBS.



RECEIVER-PROJECTOR STATION



SENDING STATION
TOTAL WEIGHT 104 LBS.

LIST OF EQUIPMENT							
ITEM NO.	NAME OF ITEM	QUANTITY		IDENTIFYING NUMBERS SUPPLIER	IDENTIFYING NUMBERS BUREAU	REMARKS	NET WEIGHT EACH POUNDS
EACH SENDING STATION CONSISTS OF							
1	TAPE TYPING UNIT	1		[illegible]			27
2	PRINTER BASE	1		[illegible]		[illegible]	11
3	SENDING KEYBOARD	1		[illegible]		[illegible]	[illegible]
4	MOTOR UNIT	1		[illegible]		[illegible]	18
5	SET OF PRINTER GEARS	1		[illegible]		FOR 368 O.P.M. (?)	1
6	PRINTER COVER	1		[illegible]		[illegible]	18
7	COVER FRONT PLATE	1		[illegible]		[illegible]	2
8	COPYHOLDER	1		[illegible]		[illegible]	2
9	METAL TABLE	1		[illegible]		[illegible]	40
EACH RECEIVER-PROJECTOR STATION CONSISTS OF							
10	PROJECTOR CABINET-UPPER	1		PCU-1		SEE NOTE-1	[illegible]
11	PROJECTOR CABINET-LOWER	1		PCL-1		SEE NOTE-2	[illegible]
12	PROJECTOR SCREEN	1		[illegible]			2
13	SCREEN MIRROR	1		[illegible]		[illegible]	30
14	RECEIVING PAGE TYPING UNIT	1		[illegible]			30
15	PROJECTOR FRAME	1		PF-2		[illegible]	80
5	SET OF PRINTER GEARS	1		[illegible]		[illegible]	1
16	RECEIVING TAPE PRINTER	1		[illegible]		[illegible]	30

NOTE-1 PROJECTOR CABINET-UPPER: [illegible] ANGLE IRON FRAME COVERED WITH [illegible] GAUGE SHEET STEEL SPOT WELDED IN POSITION GRAY ALKYD FINISH.

NOTE-2 PROJECTOR CABINET-LOWER: [illegible] ANGLE IRON FRAME COVERED WITH [illegible] GAUGE SHEET STEEL. REAR PANEL SPOT WELDED AND SIDE PANELS BOLTED IN POSITION. GRAY ALKYD FINISH.

CV40
CV39
CV38
CV37
CV36
CV35
CV34
CV33
CV32
CV31

TELETYPE CORPORATION
CHICAGO, ILLINOIS

B-59-ID

CONTRACTORS PLAN NUMBER

SCALE [illegible] DRAWN BY [illegible] DATE [illegible]
TRACED BY [illegible] CHECKED BY [illegible] APPR'D BY [illegible]
APPROVED [illegible]

FORWARDED TO BUREAU APPROVED ...... DATE [illegible]
LETTER NUMBER [illegible]
...... REFERENCE ......
SUPERVISOR OF S.B., U.S.N. ......

...... PLAN
EXAMINED AND FOUND CORRECT ...... SUPERVISOR OF SHIPBUILDING U.S.N.
DATE

ELECTRICAL CHARACTER TRANSMISSION SYSTEM

ARRANGEMENT AND OUTLINE DIMENSIONS OF STATION EQUIPMENT

CONTRACT [illegible]

BUREAU OF SHIPS PLAN NUMBER

NO.	DESCRIPTION	DATE	AUTHORITY

ALTERATIONS

TELETYPE CORPORATION
CHICAGO, ILLINOIS

B-59-2D

CONTRACTORS PLAN NUMBER

SCALE - - - - - - - - DRAWN BY P.M.B. DATE 12-12-42

TRACED BY P.M.B. CHECKED BY L.J.C. ENG'R'D. BY L.J.C.

APPROVED A.H.B.

FORWARDED TO BUREAU APPROVED DATE 5-25-43 AND 5-31-43

LETTER NUMBER
N140s-2269A (665-512)

REFERENCE

SUPERVISOR OF S.B., U.S.N.

PLAN

EXAMINED AND FOUND CORRECT

DATE

SUPERVISOR OF SHIPBUILDING U. S. N.

ELECTRICAL CHARACTER TRANSMISSION SYSTEM

SPARE PARTS SUPPLIES AND TOOLS

CONTRACT N140s-2269A

BUREAU OF SHIPS PLAN NUMBER

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO.B59- 2D BUSHIPS NO.
NUMBERS OF VESSELS: CV31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s - 2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
5	1	SET OF PRINTER GEARS	80437		
14	1	RECEIVING PAGE TYPING UNIT	BP90/186		
15	1	PROJECTOR FRAME	PF2		

CASE NO. 1

MANUFACTURERS CATALOG NUMBER OF CASE 98516

WHEN REORDERING REFER TO ORDER SA 37099

NUMBER OF SHEETS 1 SHEET NO. 1

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59- 2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s - 2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
16	1	RECEIVING TAPE PRINTER	FP8IDM103		

CASE NO. 2

MANUFACTURERS CATALOG NUMBER OF CASE 98517

WHEN REORDERING REFER TO ORDER: SA 37099

NUMBER OF SHEETS 1 SHEET NO 1

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59- 2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s - 2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
13	1	SCREEN MIRROR	98048		

CASE NO. 3

MANUFACTURERS CATALOG NUMBER OF CASE 98518

WHEN REORDERING REFER TO ORDER: SA 37099

NUMBER OF SHEETS 1 SHEET NO 1

LIST OF TOOLS

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
17	1	SOCKET WRENCH 7/16	138-28		
18	1	OPEN WRENCH 1/4	138-34		
19	2	OPEN WRENCH 3/16-1/4	138-36		
20	1	SCALE 8 OZ.	138-55		
21	1	SCALE 32 OZ.	138-58		
22	1	SCALE 25 LB.	2727		
23	2	OPEN WRENCH 3/8-7/16	4838		
24	1	SCALE 12 LB.	4841		
25	2	TOMMY	6617		
26	1	CONTACT SPRING BENDER	72003		
27	1	LOCKING BAIL FINGER HOLDING TOOL	72574		
28	1	LOCKING BAIL FINGER BENDING TOOL	72575		
29	1	HAND WHEEL	74903		
30	1	SPRING HOOK PUSH	75503		
31	1	SPRING HOOK PULL	75765		
32	1	CAPSTAN WRENCH 15/16-1 1/4	76280		
33	1	CASE FOR SMALL TOOLS	77618		
34	1	SCALE 4 LB.	82711		
35	1	OPEN WRENCH 1/2-3/4	87697		
36	1	CONTACT BURNISHER	88993		
37	1	SOCKET WRENCH 1/4	89954		
38	1	SOCKET WRENCH 5/16	89955		
39	1	ADJUSTING WRENCH	90783		
40	1	CONTACT FILE	91117		
41	2	OPEN WRENCH 3/8-9/16	95366		
42	2	OPEN WRENCH 1/4-5/16	95367		
43	1	SCREW DRIVER	95368		
44	1	SET OF GAUGES .002"-.003"-.004"-.005"-.006"	98493		
45	1	SET OF GAUGES .008"-.010"-.012"-.015"-.020"	98494		
46	1	SET OF GAUGES .025"-.030"-.040"-.045"-.050"	98495		
47	1	SET OF GAUGES .055"-.060"-.065"-.080"	98496		

CASE NO. 4

MANUFACTURERS CATALOG NUMBER OF CASE 98519

WHEN REORDERING REFER TO ORDER SA 37099

NUMBER OF SHEETS 1 SHEET NO 1

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
48	1	SHOULDER SCREW	33-346		
49	6	NUT (10-32 HEX.)	34-4		
50	4	NUT (2-56 HEX.)	34-11		
51	2	SPRING	35-13		
52	8	SPRING	35-27		
53	4	SPRING	35-72		
54	1	SPRING	35-89		
55	2	SPRING	35-99		
56	2	SPRING EYE	122-102		
57	4	MAGNET COIL	M-211		
58	6	SCREW (6-40 X 3/8)	1026		
59	6	SCREW (4-40 X 1/4)	1028		
60	2	PILOT SCREW (1/4 X 32)	1100		
61	1	THUMB SCREW	1104		
62	6	SCREW (6-40 X 5/16)	1160		
63	6	SCREW (6-40 X 1/4)	1161		
64	6	SCREW (6-40 X 3/16)	1176		
65	1	SHOULDER SCREW	1215		
66	50	LOCK WASHER	2191		
67	10	LOCK WASHER	2322		
68	36	BALL	2451		
69	4	KEY LEVER SPRING	2565		
70	8	SPRING	2623		
71	25	LOCK WASHER	2669		
72	8	SHIM	3458		
73	12	NUT (6-40 HEX.)	3598		
74	4	SPRING	3610		
75	10	LOCK WASHER	3646		
76	4	SPRING	4703		
77	4	SPRING	4708		
78	2	LOCK WASHER	4852		
79	6	SCREW	5446		
80	6	NUT	5475		
81	4	SWORD	6685		
82	2	T-LEVER	6686		
83	3	PULL BAR	6692		
84	8	SCREW (10-32 X 1/2 HEX. HD.)	6745		
85	8	SCREW (6-40 X 5/16 HEX. HD.)	6746		
86	6	SHOULDER SCREW (6-40)	6800		
87	4	PILOT SCREW (4-40)	6801		
88	4	SCREW	6807		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE 98520

WHEN REORDERING REFER TO ORDER: SA-37099

NUMBER OF SHEETS 7 SHEET NO. 1

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N 140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
89	6	SCREW (10-32 X 3/8 HEX. HD.)	6810		
90	6	SCREW (6-40 X 5/8 HEX. HD.)	6811		
91	2	TRIP LATCH	6830		
92	40	FELT WASHER	6861		
93	1	CAM SLEEVE DISC	6863		
94	1	ROLLER	6874		
95	4	STOP LEVER	6909		
96	1	PULL BAR	6916		
97	1	PULL BAR	6917		
98	2	ECCENTRIC SCREW	6942		
99	1	LOCKING PAWL	6943		
100	1	RIBBON GUIDE	6944		
101	12	PLATEN ROLL	6960		
102	1	CLUTCH THROWOUT LEVER	6971		
103	1	TYPE BAR BACKSTOP	6972		
104	1	MAIN BAIL LEVER	6985		
105	2	MAIN BAIL SPRING	6988		
106	1	CLUTCH SPRING	6993		
107	1	FEED PAWL	7047		
108	1	CONTACT LEVER	7318		
109	1	CONTACT MOUNTING (ASSEM.)	7381		
110	1	DRIVING CLUTCH	7389		
111	1	DRIVEN CLUTCH	7391		
112	1	SPIRAL GEAR	7408		
113	1	CLUTCH LEVER	7409		
114	1	TYPE BAR	7421		
115	1	" "	7422		
116	1	" "	7423		
117	1	" "	7424		
118	1	" "	7425		
119	1	" "	7426		
120	1	" "	7427		
121	1	" "	7428		
122	1	" "	7429		
123	1	" "	7430		
124	1	" "	7431		
125	1	" "	7432		
126	1	" "	7433		
127	1	" "	7434		
128	1	" "	7435		
129	1	" "	7436		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE: 98520

WHEN REORDERING REFER TO ORDER: SA-37099

NUMBER OF SHEETS 7 SHEET NO. 2

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N 140s - 2269 A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
130	1	TYPE BAR	7437		
131	1	" "	7438		
132	1	" "	7439		
133	1	" "	7440		
134	1	" "	7441		
135	1	" "	7442		
136	1	" "	7443		
137	1	" "	7444		
138	1	" "	7445		
139	1	" "	7446		
140	1	" "	7447		
141	1	" "	7448		
142	4	SPRING	7602		
143	4	"	7603		
144	10	"	7614		
145	4	"	7615		
146	4	"	7618		
147	6	"	7634		
148	2	"	7655		
149	2	"	7656		
150	1	ROLLER JOURNAL	7678		
151	1	ROLLER	7679		
152	2	SPRING	7825		
153	2	"	7965		
154	4	SELECTOR LEVER - RIGHT	8157		
155	4	SELECTOR LEVER - LEFT	8158		
156	1	CARRIAGE LOCK PAWL	8466		
157	2	PAWL	8493		
158	6	SCREW	8539		
159	2	SCREW	8543		
160	20	SHIM	8896		
161	1	KEY LEVER - CENTER	9209		
162	1	KEY LEVER - UPPER	9210		
163	1	PLATEN HANDLE	41341		
164	1	SCREW (8-40 X 1¼)	41342		
165	1	SPRING	55063		
166	3	SPRING	55088		
167	1	PILOT SCREW	70177		
168	1	BEARING BRACKET	70838		
169	4	WASHER	71073		
170	10	SHIM	71156		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE: 98520

WHEN REORDERING REFER TO ORDER: SA - 37099

NUMBER OF SHEETS 7 SHEET NO 3

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59 - 2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
171	1	CABLE CLAMP	71672		
172	1	CONTROL RELAY (ASSEM.)	72484		
173	2	DRIVING DISC	72513		
174	6	SPRING	72514		
175	2	DRIVING CLUTCH	72562		
176	2	BALL BEARING	72644		
177	10	SHIM	73427		
178	1	ROLLER	74010		
179	2	SPRING	74015		
180	1	SCREW (ECCENTRIC SHOULDER)	74020		
181	1	BELL CRANK #1	74021		
182	1	" " #2	74022		
183	1	" " #3	74023		
184	1	" " #4	74024		
185	1	" " #5	74025		
186	6	LEATHER WASHER	74033		
187	6	SCREW (6-40 X 7/32)	74059		
188	6	FELT WASHER	74085		
189	1	T-LEVER #1	74133		
190	1	" #2	74134		
191	1	" #3	74135		
192	1	" #4	74136		
193	1	" #5	74137		
194	4	PILOT SCREW	74170		
195	4	PULL BAR	74185		
196	2	ECCENTRIC BUSHING	74199		
197	1	TYPE BAR	74202		
198	1	" "	74203		
199	1	" "	74204		
200	1	" "	74205		
201	1	" "	74206		
202	1	" "	74207		
203	1	" "	74208		
204	1	" "	74209		
205	1	" "	74210		
206	1	" "	74211		
207	1	" "	74212		
208	1	" "	74213		
209	1	" "	74214		
210	1	" "	74215		
211	1	" "	74216		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE 98520

WHEN REORDERING REFER TO ORDER SA-37099

NUMBER OF SHEETS 7 SHEET NO 4

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
212	1	TYPE BAR	74217		
213	1	" "	74218		
214	1	" "	74219		
215	1	" "	74220		
216	1	" "	74221		
217	1	" "	74222		
218	1	" "	74223		
219	1	" "	74224		
220	1	" "	74225		
221	1	" "	74226		
222	1	" "	74227		
223	1	" "	74228		
224	6	SPRING	74272		
225	3	TYPE BAR BACKSTOP	74281		
226	2	SPRING	74330		
227	2	DRAW STRAP	74359		
228	1	SHOULDER SCREW	74361		
229	3	CLUTCH-DRIVEN	74502		
230	1	FRICTION SPRING	74511		
231	6	SCREW (6-40 X 5/32)	74536		
232	1	GEAR	74595		
233	6	SCREW (6-40)	74687		
234	1	SPRING	74700		
235	2	"	74707		
236	1	"	74708		
237	2	"	74709		
238	1	"	74710		
239	2	THUMB SCREW (1/4 X 20)	74720		
240	1	KEY LEVER-LOWER	74762		
241	6	FELT WASHER	74800		
242	1	PAPER ROLL SPINDLE	74876		
243	1	BALL BEARING	74899		
244	1	GEAR	74913		
245	2	SPRING	74961		
246	2	"	74962		
247	2	"	75229		
248	1	"	75689		
249	6	FELT WASHER	76084		
250	2	SPRING	76086		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE 98520

WHEN REORDERING REFER TO ORDER: SA-37099

NUMBER OF SHEETS 7 SHEET NO 5

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59- 2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO.: N140s - 2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
251	1	STUD	76178		
252	2	LOCK BAR LATCH SPRING	76295		
253	2	SPRING	76296		
254	2	"	76379		
255	1	SPACER KEY LEVER SPRING	80392		
256	1	PLATEN CRANK (ASSEM.)	80466		
257	10	COTTER PIN	80516		
258	1	FUNCTION BAIL SPRING	80926		
259	1	SPRING	80945		
260	2	SCREW	81596		
261	1	SPRING	82463		
262	1	"	82999		
263	1	CONDENSER	83054		
264	1	DETENT SPRING	84895		
265	1	SPRING	87402		
266	4	SPRING WASHER	88857		
267	2	SCREW	89234		
268	2	SPRING	90260		
269	1	LOCKING LEVER	90505		
270	2	SPRING	90510		
271	2	SCREW	90514		
272	2	"	90515		
273	1	SELECTOR ARM	90516		
274	2	SPRING	90517		
275	2	LOCKING WEDGE	90518		
276	2	SCREW	90519		
277	1	ARMATURE LEVER	90520		
278	10	LOCK WASHER	90791		
279	2	SPRING	91120		
280	4	ROLLER	91175		
281	1	CAM SLEEVE (ASSEM.)	91265		
282	1	RETAINING DISC	91266		
283	2	STOP SCREW	91600		
284	1	MOTOR 110V. A.C.	92575		
285	2	SCREW	93130		
286	1	THUMB NUT	97499		
287	24	PLATEN	97656		
288	6	RIBBON SHIELD	97666		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE 98520

WHEN REORDERING REFER TO ORDER: SA 37099

NUMBER OF SHEETS 7 SHEET NO. 6

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140$_s$-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
289	6	DRAW STRAP	97675		
290	1	SWITCH	97842		
291	1	DETENT LEVER	98293		
292	1	DETENT LINK (COMPLETE)	98295		
293	1	PROJECTOR LAMP SOCKET	98319		
294	1	THUMB SCREW	98328		
295	1	SPACER	98335		
296	1	SCREW	98340		
297	1	SHOULDER SCREW	98347		
298	1	THUMB SCREW	98348		
299	3	ECCENTRIC BUSHING	98388		
300	3	SCREW	98389		
301	2	BOLT	98419		
302	2	SPRING	98420		
303	2	SHIFT BAR	98442		
304	2	SPRING	98443		
305	1	RECEPTACLE	98452		
306	2	OIL PLUG	98513		
307	2	ONE QUART CAN KS7470 OIL	88970		
308	2	ONE LB. CAN KS7471 GREASE	88973		
309	1	GREASE GUN	88975		

CASE NO. 5

MANUFACTURERS CATALOG NUMBER OF CASE 98520

WHEN REORDERING REFER TO ORDER: SA-37099

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
310	10	ROLLS PRINTER PAPER	78903		
311	8	SLIDE HOLDERS	98371		
312	40	GLASS SLIDE	98372		
313	12	BELT	98284		
12	4	PROJECTOR SCREEN	96864		

CASE NO. 6

MANUFACTURERS CATALOG NUMBER OF CASE 98521

WHEN REORDERING REFER TO ORDER: SA-37099

NUMBER OF SHEETS 1 SHEET NO 1

LIST OF SPARE PARTS AND SUPPLIES

REPRODUCED FROM MANUFACTURERS DRAWING NO. 859-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

ITEM NUMBER	QUANTITY	NAME	IDENTIFICATION		
			MANUFACTURER'S DATA		BUREAU DRAWING
			CATALOG NUMBER		
314	10	ROLLS TRANSPARENT WEB	98145		
315	100	ROLLS PRINTER TAPE	80161		
316	48	PRINTER RIBBON - BLACK	7835		
317	24	PROJECTOR LAMP	98318		
318	6	RESISTOR - 30 OHMS	80625		
319	9	RESISTOR - 350 OHMS	77362		
320	3	RESISTOR - 100 OHMS	88083		
321	2	RESISTOR - 1050 OHMS (600-300-150)	90384		
322	6	RED FILTER ASSEMBLY	105608		

CASE NO. 7

MANUFACTURERS CATALOG NUMBER OF CASE 98522

WHEN REORDERING REFER TO ORDER: SA-37099

NUMBER OF SHEETS 1 SHEET NO. 1

LIST OF SPARE PARTS BOXES

REPRODUCED FROM MANUFACTURERS DRAWING NO. B59-2D BUSHIPS NO.
NUMBERS OF VESSELS: CV 31 TO CV 40 INCLUSIVE

APPLICATION: ELECTRICAL CHARACTER TRANSMISSION SYSTEM
APPLIANCE: COMPLETE SYSTEM
NAVY CONTRACT NO: N140s-2269A

MANUFACTURER: TELETYPE CORPORATION

CASE NO.	QTY. PER VESSEL	CASE SIZE - INCHES			WEIGHT - LBS.		MFR'S. CATALOG NUMBER	CONTENTS ITEM NUMBERS
		A, WIDTH	B DEPTH	C HEIGHT	CONTENTS ONLY	BOX AND CONTENTS		
*1	1	30	24	24	128	222	98516	5 14 & 15
2	1	18	15	9	30	58	98517	16
3	1	36	36	6	43	116	98518	13
4	1	18	6	6	5	22	98519	17 TO 47 INCL.
5	1	18	12	9	34	67	98520	48 TO 309 INCL.
6	1	36	18	15	64	152	98521	12,310 TO 313 INCL.
7	1	36	18	15	99	186	98522	314 TO 321 INCL.

*NOTE:
CASE 1 IS SPECIAL IN THAT THE FRONT SIDE IS HINGED AT THE BOTTOM AND CASE IS EQUIPPED WITH 4 HANDLES SEE FIGURE 1.

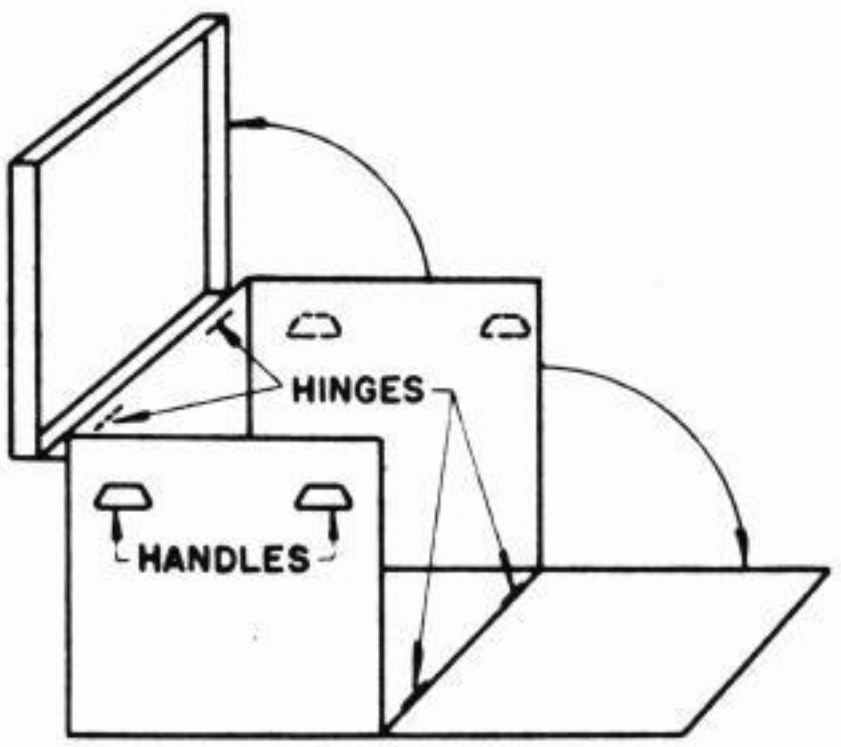


FIGURE 1

WHEN REORDERING REFER TO ORDER:
SA 37099

NUMBER OF SHEETS 1 SHEET NO 1