CHAPTER 26

"Two-in-One" Model Linotypes

AS ALREADY EXPLAINED in Chapter 4, this designation is applied to all Linotypes equipped with some combination of 90-channel and 72-channel main magazines which may be varied according to the composition to be produced. Such Linotypes are not given separate and distinct model numbers, but are referred to as the "Two-in-One" type of the Models 8, 14, 29, 30, 31, 32, and 33.

"TWO-IN-ONE" MODELS 29 AND 30

The design of "Two-in-One" Models 29 and 30 is such that there is imposed the limitation that mixing can occur only from the top two magazines and from the lower two magazines. The magazines must be arranged in two like pairs—either 72-90 and 72-90, or 90-72 and 90-72. Matrices from magazines No. 2 and No. 3 cannot be mixed in a line of composition.

It has already been shown in Chapter 4 how, on all "Two-in-One" machines, a supplementary set of keyboard key rods and related parts allow the one keyboard to release matrices from both 90- and 72-channel magazines; and it can readily be seen that properly spaced partitions on each of the two guide holders, and on the upper assembler entrance on Models 29 and 30 serve to correctly guide the matrices after release.

As already noted in the description of the Model 29, there is a "mixing key" at the right of the keyboard. When this key is depressed it starts in motion the cam mechanism which on these models not only positions the upper assembler entrance, but also positions the key rod slide *14* (shown in Fig. 18-4) with the intermediate lever *15*, under the proper set of keyboard key rods as required for 72- or 90-channel magazine escapement operation.

The "Two-in-One" Model 30 provides one or two display matrix faces in the main magazines to supplement the larger display faces in the auxiliary magazines. By running caps and figures in the auxiliary magazines and lower-case matrices in the 72-channel main magazines, the operator may have complete fonts of regular width 36-point and condensed 48-point faces available from the one keyboard in addition to two 90-channel magazines containing text faces and other auxiliary magazines carrying condensed faces up to 60 point.

These models are equipped with two distributor bars and two channel entrances fixed according to whether the top one of each pair of magazines contains 90 channels or 72 channels.

Because Models 25 and 26 are regularly equipped with a single assembler front, as on non-mixing machines, the "Two-in-One" type requires the addition of the revolving front used on non-mixing "Two-in-One" machines, and illustrated by sectional views in Figs. 15 and 18-4.

SINGLE DISTRIBUTOR "TWO-IN-ONE" LINOTYPES

As shown in Chapter 4, the release of matrices from the two types of magazines by the operation of one and the same keyboard is accomplished through a supplementary set of keyboard key rods and related mechanism, and the correct guiding of the matrices after release is provided for by a "revolving front." On Models 31 and 32 the revolving front is operated by hand and is automatically locked in either of its two positions as the hand is removed. At the right-hand end near the operating knob there is an indicator which shows whether the revolving front is in position for 72- or 90-channel magazines. On Models 31 and 32 the change of the keyboard from 90- to 72-character operation, or vice versa, according to whichever magazine is brought into operative position, is accomplished automatically by a mechanism called the Channel Chooser, which is described in detail in this chapter.

Distribution of matrices into 90-channel and 72-channel magazines on the same machine requires two separate combinations of distributor bar and channel entrance—one combination for the 90-channel magazines, and one for the 72-channel magazines. Therefore, single distributor "Two-in-One" Linotypes are so provided, with a manually operated mechanism for placing either combination of distributor bar and channel entrance into operative position.

Channel Chooser

On four-magazine Model 31 and 32 Linotypes equipped with both 72- and 90-channel magazines, the keyboards are supplied with 90 keybuttons. By means of a device which has been named the "Channel Chooser" mounted at the rear of the keyboard, the keyboard is changed from 90- to 72-channel magazine operation automatically when the operator manipulates the shifting mechanism to change from a 90- to 72-channel magazine. The eighteen extra key buttons and associated matrix releasing mechanisms then are rendered inoperative so long as the 72-channel magazine is in operating position. Any combination of magazines may be placed on the machine.

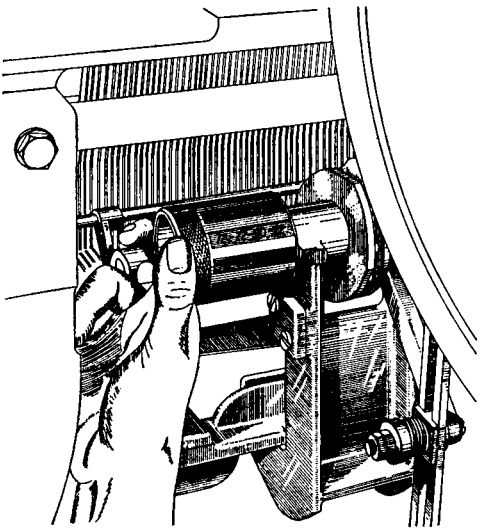

FIG. 1-26. View showing the Channel Chooser and method of setting.

Changing keyboard operation from 90 to 72 operation or vice versa is accomplished by the automatic shifting of a key rod slide *20*, Fig. 2-26, upon which is mounted a bank of key rod levers. When the slide is shifted, 90-channel magazine operation as represented by the rear row of 90 key rods at *53* is changed to 72-channel magazine operation as represented by the front row of 72 key rods at *54*. In other words, while there are 90 key rod levers on the slide *20*, only 72 of them contact the front row of

72 key rods. Seventy-two-channel operation is designated to the operator by the color of the keyboard buttons.

The Channel Chooser requires setting only when the magazines are first placed on the magazine frames and, so long as the magazines remain as originally placed on the machine, it is not reset. If a 72-channel magazine is substituted for a 90-channel magazine, then it is necessary to reset the Channel Chooser to suit the new arrangement and to substitute the correct escapement and channel entrance locating block.

Fig. 2-26 shows the assembled cam bracket *1* fastened to the keyboard rod lever slide bracket *2* which in turn is suspended from the frame-work of the ma-

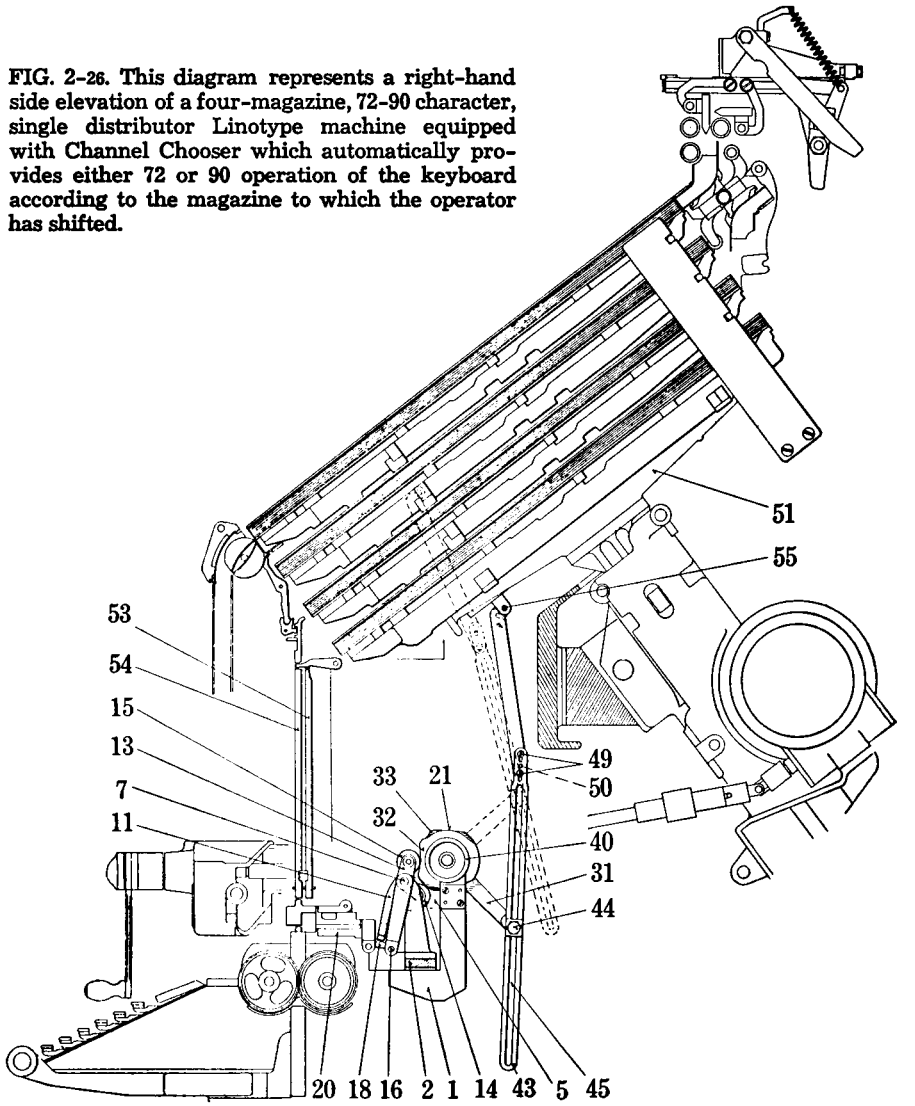

FIG. 2-26. This diagram represents a right-hand side elevation of a four-magazine, 72-90 character, single distributor Linotype machine equipped with Channel Chooser which automatically provides either 72 or 90 operation of the keyboard according to the magazine to which the operator has shifted.

chine. Mounted on the bracket *2* there are two end bearings *3* and *4*, Fig. 4-26, which through accurate alignment with two inner bearings *5* and *6* serve to journal the rocker arm shaft *7*, Fig. 3-26.

Pivotally mounted on the latter by its two end arms *8* and *9* and the central arm *10* is a rocker arm *11*. Extending from the central arm *10* there are two projections *12* and *13* spread apart from each other, somewhat in Y-shaped formation, and also offset in sidewise relation, each projection bearing an anti-friction roll *14* and *15*.

The lower ends of the arms *8* and *9* are shaped with forked bearing projections *16* and *17* which carry pivotally mounted links *18* and *19* connecting with the keyboard rod slide *20*, see Figs. 2, 3 and 4-26.

The indicator cam shaft unit *21* shown in Fig. 2-26 is supported in bearings *22* and *23* formed on the bracket *1*, see Fig. 3-26, and consists of the cam shaft *24* which rotates on a stud *25* mounted in the bearing *23* in accurate alignment with the bearing *22* which embraces the large diameter *26* of the cam shaft. The shoulder *27* of the cam shaft *24* and the bearing end plate *28* form an annular chamber *29* for a compression spring *30* which, through the action of end thrust against the plate *28* forces the cam shaft *24* toward the slide cam arm *31*.

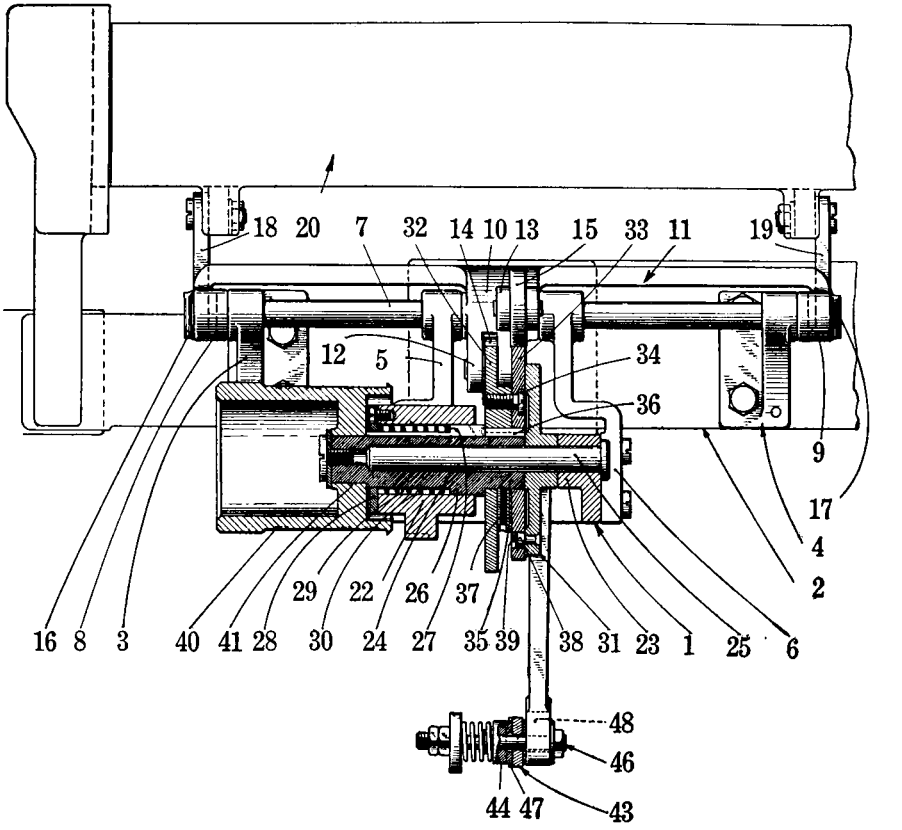

FIG. 3-26. Plan view of Model 31-32, 72-90 character Channel Chooser, shown partially in horizontal cross-section.

The relative positions of the keyboard rod slide *20* are controlled by two cams *32* and *33*, held together as a unit by screws *34* and secured to a shouldered portion *35* of the cam shaft by key *36* and set screw *37*.

The cams *32* and *33* are always in contact with their respective anti-friction rolls *14* and *15*, due to the Y-shaped formation of the projections *12* and *13*, and work in unison so that any upward or downward movement of the magazines will impart motion to the cams through the slide cam arm *31* and turn the rocker arm *11* on the shaft *7*, Fig. 5-26, to move the keyboard rod slide *20*, to its forward or rearward position, by means of the connecting links *18* and *19*, Figs. 2, 3 and 4-26. The cam *32* acting on the anti-friction roll *14* moves the slide *20* toward the front for 72-character operation, and the cam *33* acting on the anti-friction roll *15* moves the slide *20* toward the rear for 90-character operation. (See Fig. 5-26.)

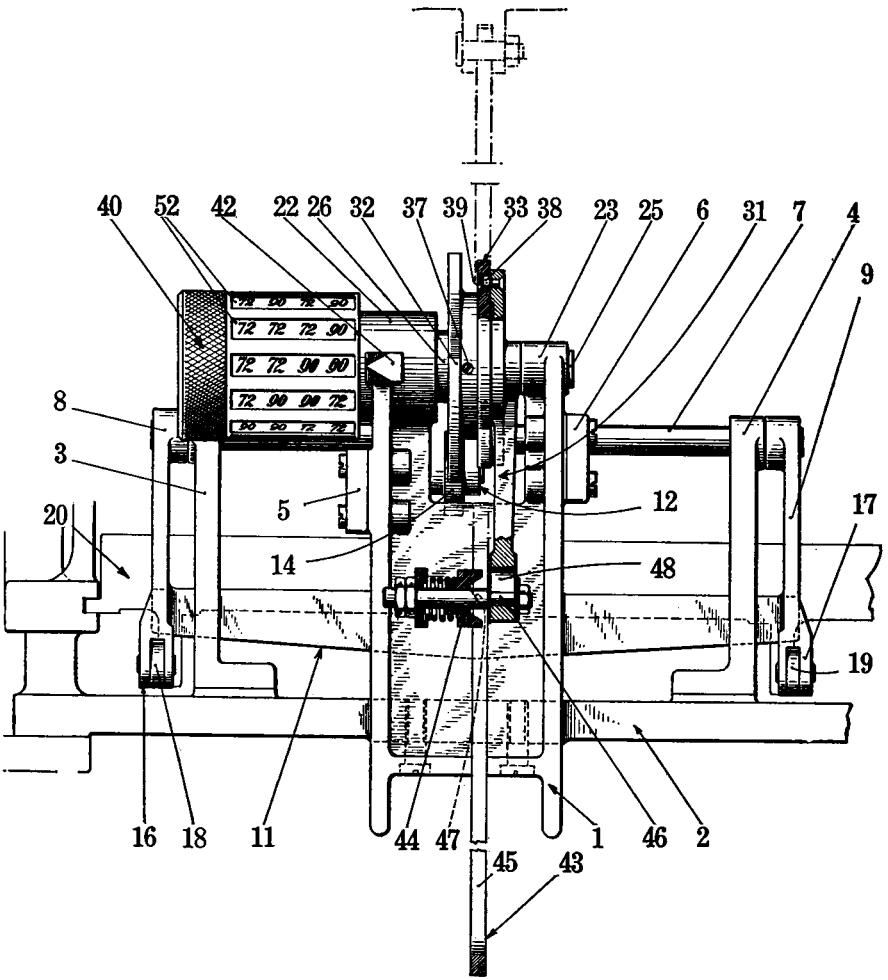

FIG. 4-26. This diagram represents a rear elevation of the automatic Channel Chooser mechanism on Models 31-32 machines.

The cam *33* is held under spring compression against a flange on the hub portion of the slide cam arm *31*, Fig. 3-26. The flange carries three coupling pins *38*, Figs. 4 and 5-26, that engage three corresponding pin holes *39* in the side of the cam *33* which have been selected by means of a cylindrical indicator *40*, shown in Fig. 4-26 and in cross-section in Fig. 3-26.

The indicator *40* is keyed to a shank *41* on the cam shaft *24*, see Fig. 3-26, and has twelve flat surfaces on its periphery with markings to correspond to eleven different changes of magazine sequence, one being repeated to produce a simpler cam profile.

Operating Sequences

The magazines may be arranged for any of the following sequences:

72	90	72	90	90	90	72	72	72	72	90	90
90	72	90	90	90	72	72	72	72	90	90	72
72	90	90	90	72	72	72	90	90	72	72	90
90	90	90	72					72	72	90	72

Setting the Channel Chooser

The setting of the channel chooser is performed with the upper magazine in operating position by pulling the indicator *40* with the cam shaft unit, toward the left (facing the rear of the machine) against the pressure of the spring *30*, Fig. 3-26. This movement disengages the holes *39* in the cam *33* from the coupling pins *38* in the flange of the slide cam arm *31*, and the cylindrical indicator is free to be rotated in any direction until the markings for the required magazine sequence are aligned with the pointer *42* as shown in Fig. 4-26.

The cylindrical indicator is then moved toward the right so that pin holes *39* engage the coupling pins *38* which by the expansion of the spring *30* will be held in positive engagement with the cam *33*.

The cam *33* is provided with twelve pin holes accurately spaced in circular formation so that a different group of holes is used for each setting of indicator.

The slide cam arm *31* is connected to the link *43* by means of a friction detent *44* held under spring compression in the elongated slot *45* by means of pin *46*. The detent is formed with a rectangular tongue which rides in the slot *45* and a transverse wedge projection enters a V-cut *47* on both sides of the elongated slot *45* of the link *43*. The pin *46* is connected through the elongated slot *48* to the slide cam arm *31* under sufficient spring compression to operate the slide *20*, but will yield if any obstruction interferes with its movement. (See Figs. 2, 3, 4 and 5-26.)

The link *43* is provided with elongated slots at the upper end for adjustment and connected by screws *49* and pin *50* to an intermediate link pivoted at *55* on the under side of the lower magazine frame *51*, Fig. 2-26.

Channel Chooser Cam Action

A consideration of the cam action will show that *32* and *33* are what are known as conjugate cams which in this case act upon two cam rolls *14* and *15*. The rolls are of exactly the same outside diameter and are on two projections *12* and *13* which are equal in length and with the projection *17* form a Y-shaped lever.

Remembering that four consecutive positions of the cam roll on the periphery of the cam are always used as the four magazines are raised and lowered, and that, after any four consecutive cam roller positions on the cam have been used, the cam is always returned to the same place in relation to the cam roll that it occupied just after the cylinder and cam were set for that combination, and noting also that each succeeding combination employs the last three numbers from the

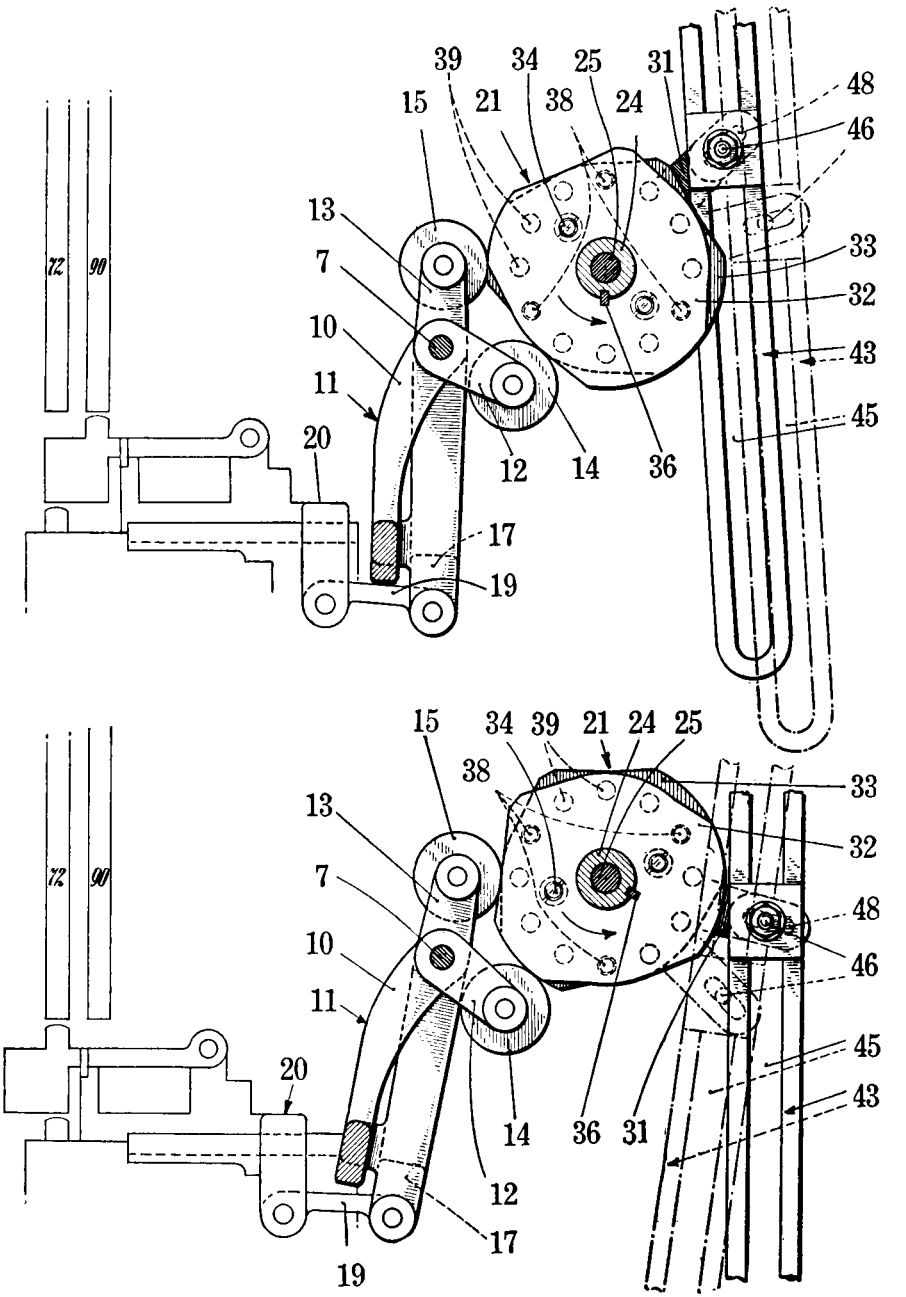

FIG. 5-26. The upper view represents a vertical section of the Channel Chooser showing the cam portion and keyboard rod lever slide in position to operate 90-character magazines. The lower view shows the keyboard rod lever slide in position to operate 72-character magazines.

preceding combination and adds a new number of its own, a study of the magazine combinations *52* as marked on the cylindrical indicator shows the following, as the roller and cam are set at successive positions:

Combination No. 1..72, 90, 72, 90
Combination No. 2.....90, 72, 90, 90
Combination No. 3.....72, 90, 90, 90
Combination No. 4.....90, 90, 90, 72
Combination No. 5.....90, 90, 72, 72
Combination No. 6.....90, 72, 72, 72
Combination No. 7.....72, 72, 72, 90
Combination No. 8.....72, 72, 90, 90
Combination No. 9.....72, 90, 90, 72
Combination No. 10.....90, 90, 72, 72
Combination No. 11.....90, 72, 72, 90
Combination No. 12.....72, 72, 90, 72

Therefore, those portions of the periphery of the cam *32* which hold the projection *17* toward the front of the machine (designated by 72), and those portions of the periphery of the same cam which allow the same projection to be pulled or pushed toward the rear of the machine (designated by 90), must follow one another in a sequence made up of Combination No. 1 and the last number on each of the succeeding combinations, as follows: 72, 90, 72, 90, 90, 90, 72, 72, 72, 90, 90, 72, and 72, 90, 72, which last three numbers are again the first three numbers of Combination No. 1; and, with the addition of 90, are Combination No. 1 of a second revolution of the cylinder.

Because the cam roll *15* on the projection *13* must follow the periphery of its own cam *33* while the cam roll *14* on the projection *12* follows the periphery of its own cam *32*, which has been designed according to the scheme as above outlined, the periphery of the cam *33* is designed to allow this. Thus, they are conjugate cams which together act like one grooved cam, but allow more advantageous construction of the cam mechanism.

It will be noted that although there are twelve settings for the cylinder, there are but eleven different combinations. Examination of the foregoing table of combinations shows that Combinations No. 5 and No. 10 are alike—and unavoidably so. This reduces the number of possible combinations to one less than the number of divisions on the cylinder.

Keyboard Rod Lever Slide Shifting Mechanism on "Two-in-One" Models 8, 14, 25 and 26

This mechanism, forerunner of the Channel Chooser on the "Two-in-One" Master Model Linotypes, serves on the "Two-in-One" Models 8, 14, 25 and 26 the same purpose as the Channel Chooser on the later model Linotypes, which is to automatically move the keyboard rod lever slide forward or backward and hold it, according to whether a 90-channel magazine or a 72-channel magazine is brought into operating position on the machine. As applied to a three-main magazine "Two-in-One" model machine (Model 8 or 14) it permits six different magazine arrangements, generally referred to as:

1. *Standard*—Upper magazine, 72-channel; intermediate and lower magazines, 90-channel.

2. *Special No. One*—Upper and intermediate magazines, 72-channel; lower magazine, 90-channel.

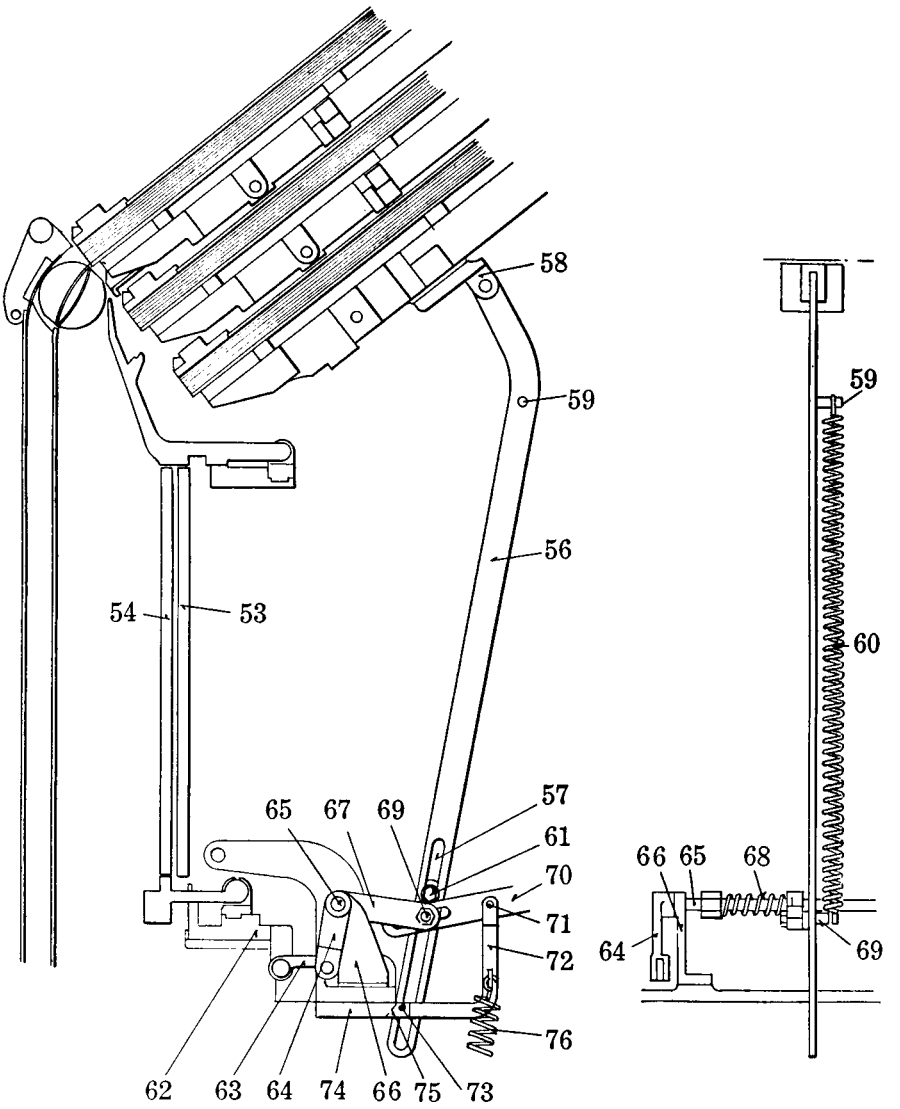

FIG. 6-26. View showing setting of the Keyboard Rod Lever Slide Shifting Mechanism on "Two-in-One" Models 8 and 14, when set for *Standard* arrangement of magazines.

This setting is made as follows: (1) Bring 72-channel (top) magazine into operating position. (2) Press lever arm *67* fully down and then adjust filler piece *61* until it just contacts the arm link stud *69*. Then secure the filler *61* in this position by means of its washer and lock nut. The head of the filler piece *61* is now to the right when viewed from the rear of the machine. The link spring *60* is attached to the spring stud *59* and the spring stud end of the link stud *69*, and tends to pull the lever *67* upward. The rear row of 90 key rods is designated at *53* and the front row of *72* key rods is designated at *54*.

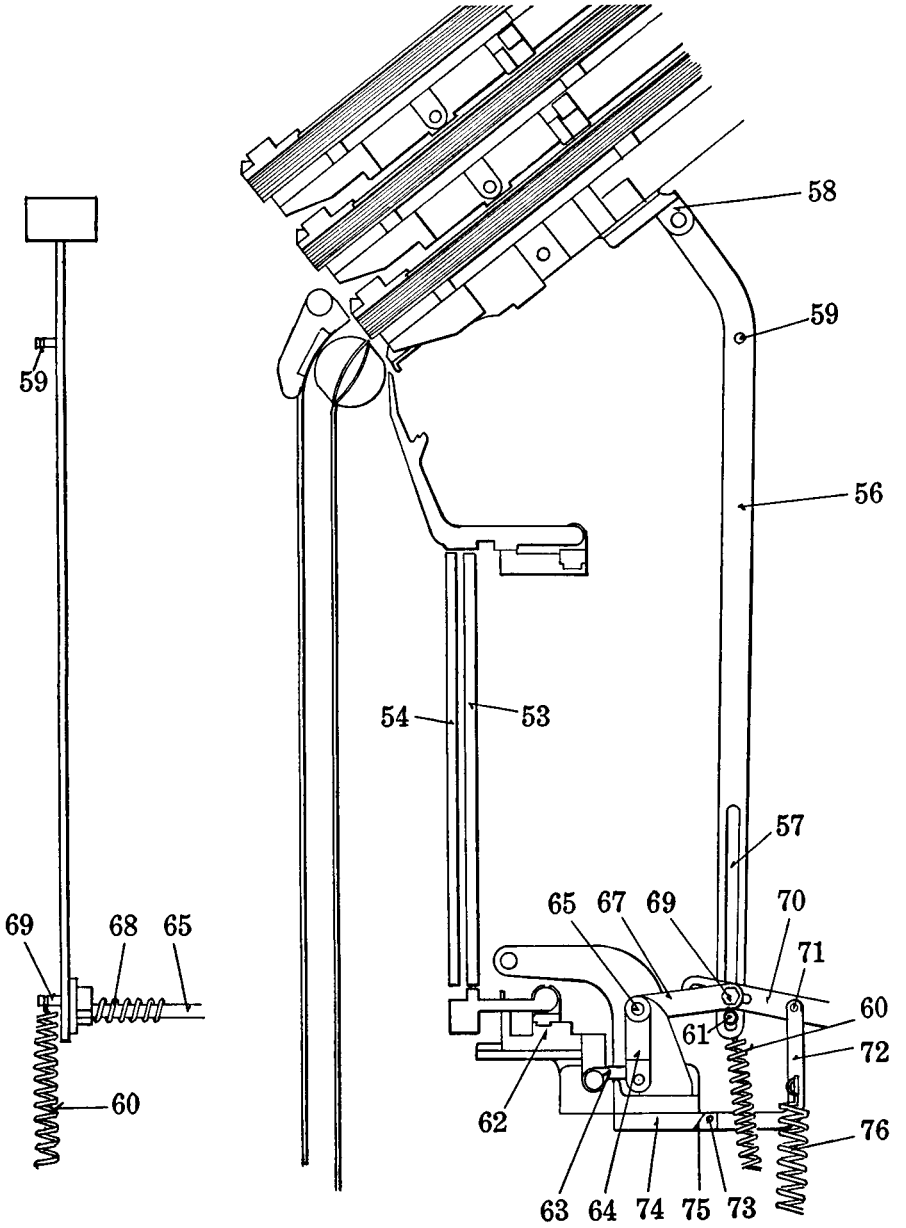

FIG. 7-26. View showing same mechanism set for *Special Arrangement No. One* of magazines. This setting is made as follows: (1) Loosen filler piece *61*, place it under the link stud *69* and reverse the link spring *60* so that it now tends to pull the lever arm *67* downward. (2) Bring the 90-channel (bottom) magazine into operating position. (3) Press the lever *67* upward until resisted slightly by the torsion spring *68* around the shaft *65*. Then adjust the filler piece *61* until it contacts the arm link stud *69* and lock the filler piece *61* in this position.

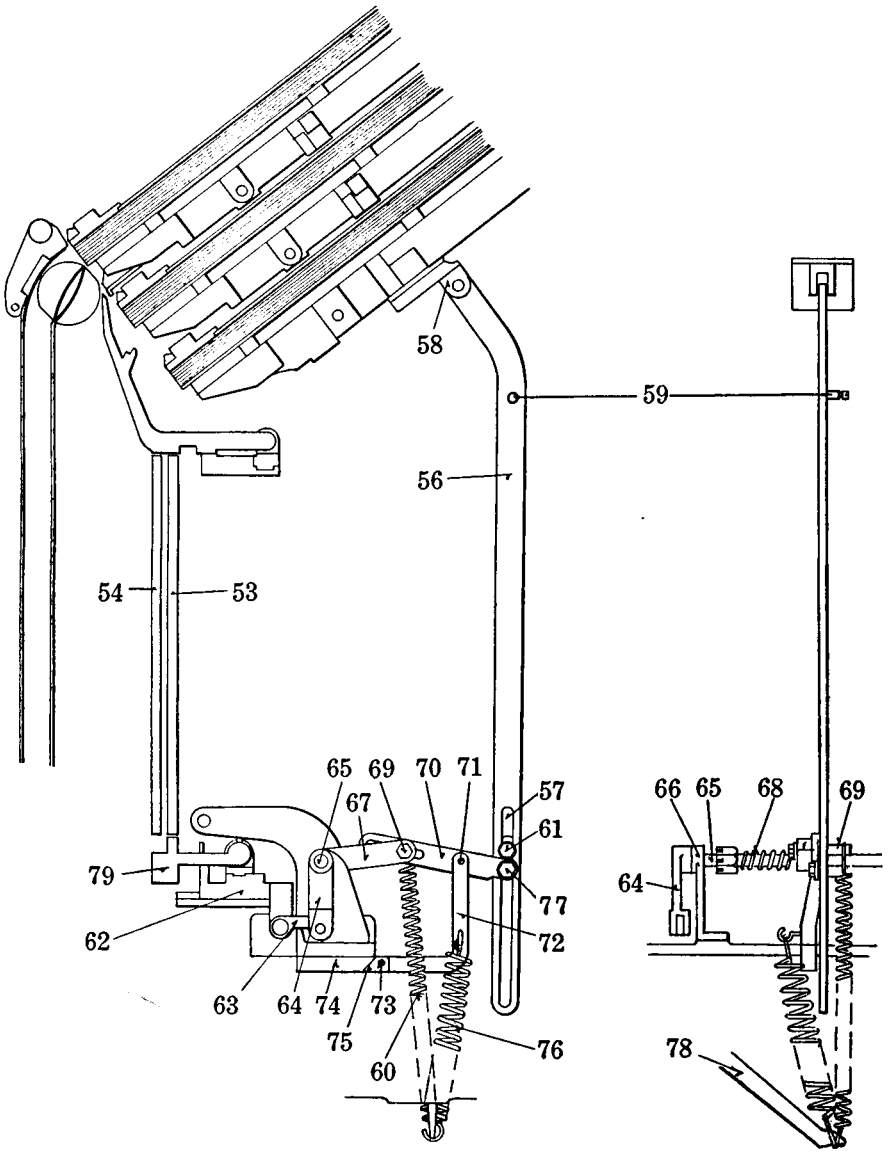

FIG. 8-26. View showing same mechanism set for *Special Arrangement No. Two* of magazines. This setting is made as follows: (1) Lower the 90-channel (top) magazine into operating position. (2) Temporarily remove link spring *60*. (3) Press outer end of reversing lever *70* fully down, until the keyboard rod levers *79* are directly under the 90-channel key rods. Then bring the filler piece *61* down until it just contacts the link spring stud *77*, and lock the filler piece in this position. (4) Restore the link spring *60* to pull down on the stud *69*.

3. *Special No. Two*—Upper magazine, 90-channel; intermediate and lower magazines, 72-channel.

4. *Special No. Three*—Upper and intermediate magazines, 90-channel; lower magazine, 72-channel.

5. *Alternate No. One*—All three magazines alike, 72-channel.

6. *Alternate No. Two*—All three magazines alike, 90-channel.

The mechanism is so designed and constructed that, by various relative arrangements of a few of its parts, it can be set to correctly shift the keyboard

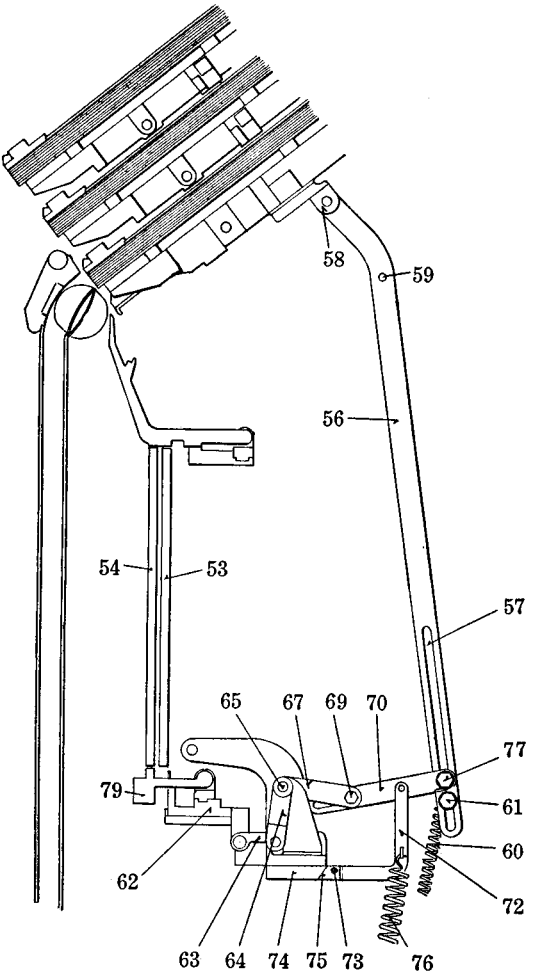

FIG. 9-26. View showing same mechanism set for *Special Arrangement No. Three*. This setting is made as follows: (1) Raise the 72-channel (bottom) magazine into operating position. (2) Temporarily remove the link spring *60*. (3) Press outer end of reversing lever *70* upward until the keyboard rod levers *79* are directly under the 72-channel key rods. Then raise the filler piece *61* until it just contacts the reversing lever spring stud *77*, and lock filler piece *61* in this position. (4) Attach link spring *60* to pull down on the stud *77*.

rod lever slide for each of the six main magazine arrangements as required. The various possible settings of the parts are shown in Figs. 6, 7, 8 and 9-26 in which *56* is a long slide arm link swingingly attached at *58* to a bracket on the bottom of the lower magazine frame. *57* is a long slot at the lower end of the link. *59* is a stud on the side of link *56* for the attachment of link spring *60*, when necessary. *61* is a filler piece which slides in the slot *57* and can be fixedly located at any position in the slot in order to act upon levers which serve to move the keyboard rod lever slide forward or backward.

The slide *62* is connected by means of two short links *63* to two levers *64* which are pinned to the shaft *65* in bearing brackets *66* on a casting which is fastened to the base of the machine. The shaft *65* has pivoted on it a lever arm *67* which is held by an adjustable torsion spring *68* against a stop on the shaft so that the lever arm *67* cannot be moved downward without turning the shaft, but can be moved upward around the shaft by acting against the spring *68* when such relative movement is necessary to prevent breakage of parts.

The lever arm *67* has fastened in its end the arm link stud *69* which slides in the slotted front end of the reversing lever *70* which pivots at *71* in another lever *72*, itself pivoted at *73* in the frame *74*. The lever *72* cannot move around pivot *73* in a downward direction because it is positively stopped from such movement by the surface *75* in contact with the frame *74*, and held there by the overthrow spring *76* which does allow the lever *72* and the pivot *71* to rise when such upward movement is necessary to prevent breakage of parts as the lower magazine is raised above the delivery point of the matrix while the mechanism is set at some of its possible settings.

The reversing lever *70* has at its rear end, the lever link stud *77* adapted at certain settings of the parts, to slide in the slot *57* of the long slide arm link *56* and also to serve as an attachment point for the spring *60*, the lower end of which is then hooked to the arm *78* with the overthrow spring *76*.

The setting for *Alternate Arrangement No. One* of magazines (all three 72-channel) requires only that the keyboard rod levers *79* be held forward stationary under the 72-character key rods. The parts of the mechanism should be set as shown in Fig. 7 or 8-26, and the link *56* removed.

The setting for *Alternate Arrangement No. Two* of magazines (all three 90-channel) requires only that the keyboard rod levers *79* be held rearward stationary under the 90-character key rods. The parts of the mechanism should be set as shown in Fig. 9-26, and the link *56* removed.

Mechanism for Positioning Distributor Bar and Corresponding Channel Entrance on Single Distributor "Two-in-One" Linotypes

This mechanism, as before stated, is on Single Distributor Linotypes only. A thorough understanding of it requires close study of Figs. 10 to 17-26 and the description accompanying them as a group, not separately.

Distributor change from 72- to 90-character operation, or vice versa, is made manually by means of a handle at the front of the machine. The distributor bars and channel entrances are pivoted, and the movement of the handle in combination with a cam action swings into place the distributor bar and also the channel entrance to correspond with the distributor bar.

The handle is connected to the channel entrance unit end bracket. When the handle is pulled forward, the channel entrance unit is moved backward, and when

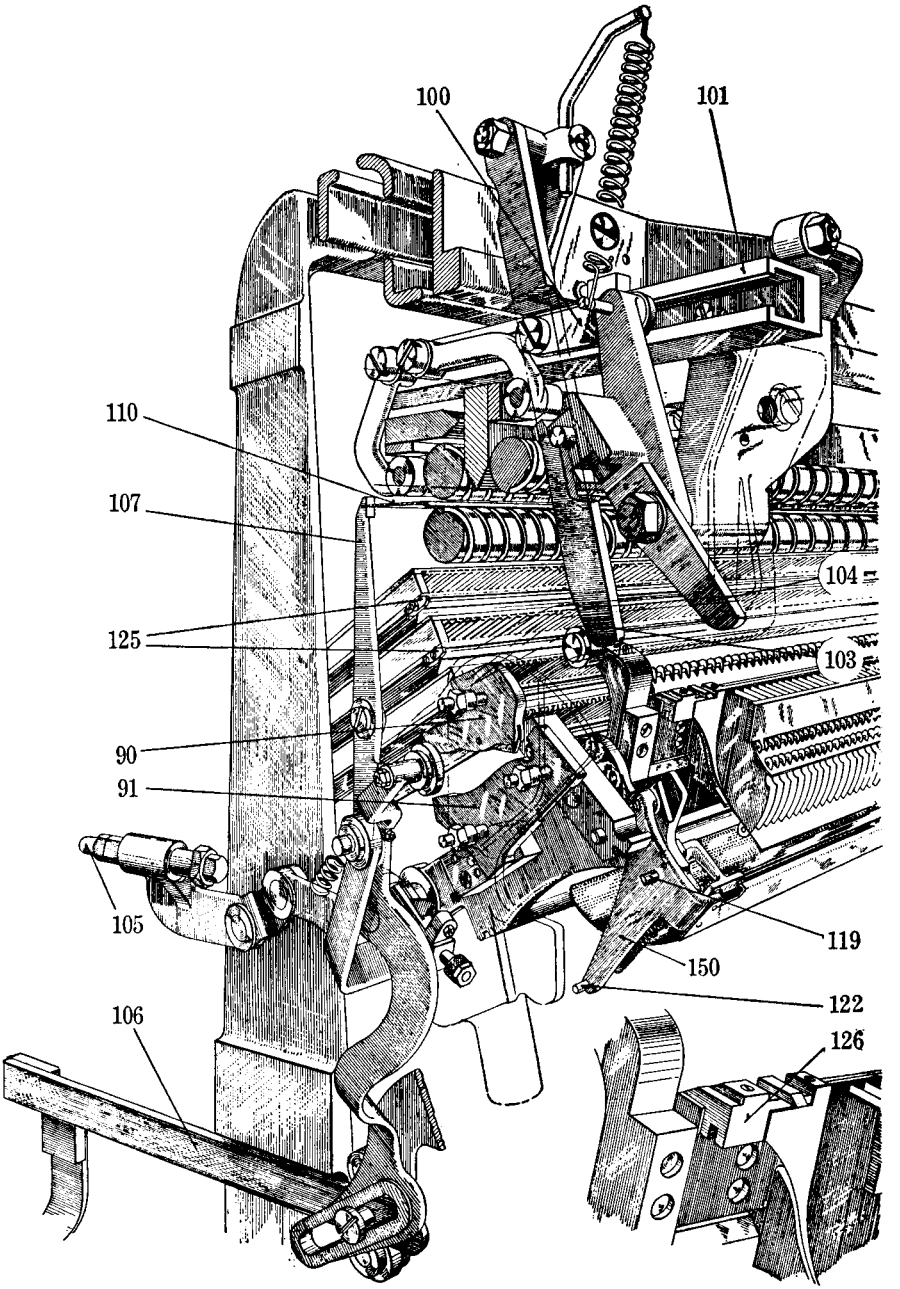

FIG. 10-26. Perspective view from rear of machine, with channel entrance bracket in phantom, showing channel entrance unit and distributor shifter levers in position to complete the change from 90-character operation to 72-character operation.

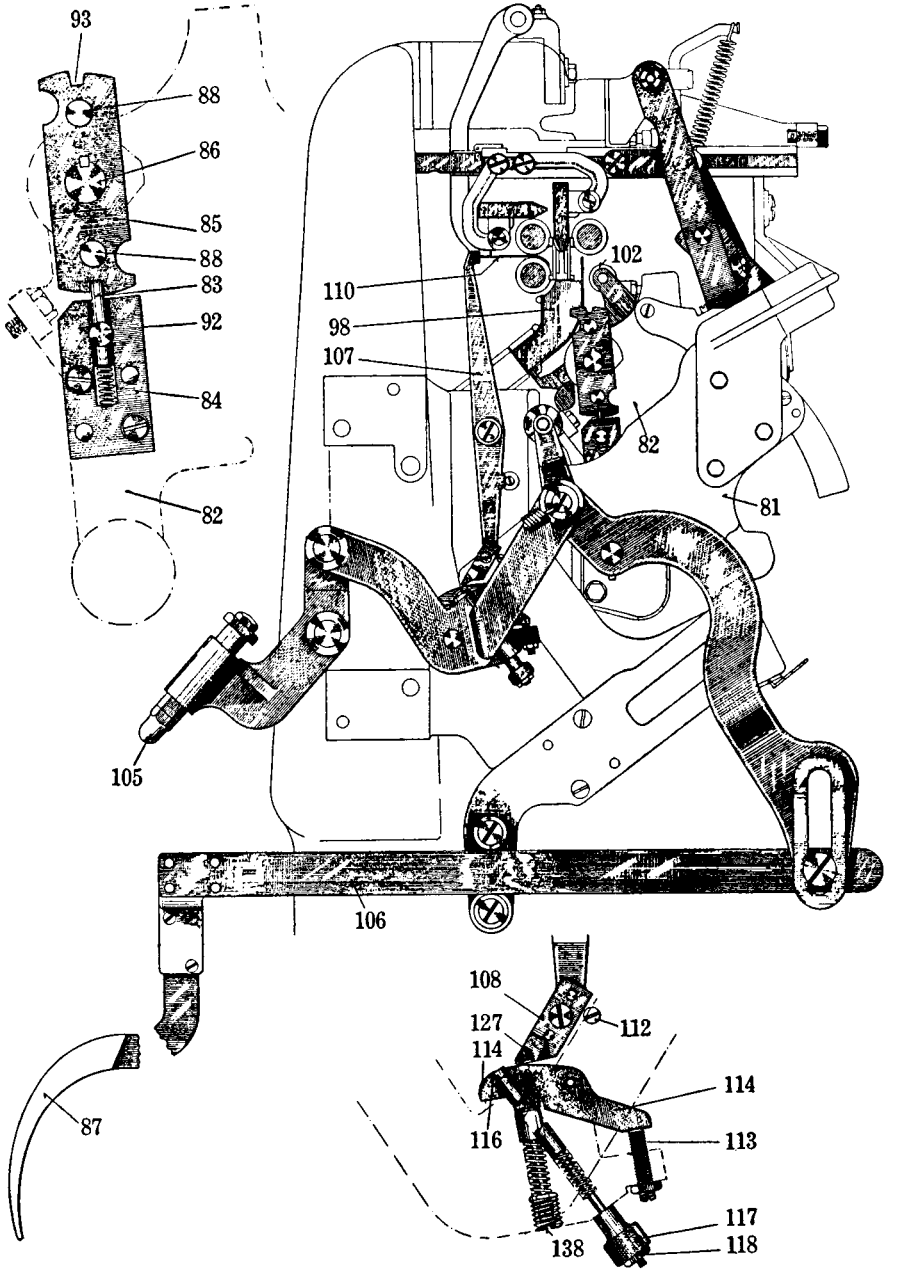

FIG. 11-26. Diagram of assembled "Two-in-One" mechanism for Model 32 Linotype, with channel entrance and distributor bar in 90-character operating position. Additional enlarged views show at upper left, the revolving block and fixed plate in locked position; and, at lower right, the safety device which operates in conjunction with the matrix guard.

this reaches a certain position the end of the cam movement releases a latch and another cam channel starts the rotation of the channel entrance unit. When the handle is pushed backward, the channel entrance and distributor bar units revolve into place.

At the end of the channel entrance unit there are two rollers which are offset, and as the channel entrance is brought forward, one roll engages one of the upright levers which is connected to a slide on which the distributor bar links are fastened, and the distributor bar swings into position as the channel entrance is closed to operating position.

There is a safety device which prevents changing the position of the magazines if there are matrices on the distributor bar. This safety is very important, and is described in detail with diagrams showing its operation and adjustment. If this safety device does not function correctly, the matrices or distributor bar may be damaged and unnecessary expense incurred.

There is also another safety device, which prevents matrices from entering onto the distributor bar if the channel entrance does not correspond with the magazine which is in the operating position. Looking at the machine from the rear, it will be noticed that at the left-hand side of each magazine frame there is fastened to it a steel piece *125*, Fig. 10-26, on which there is a slight projection which is in a different position sidewise when using the 72-channel magazines than when using the 90-channel magazines. If this projecting piece *125* does not

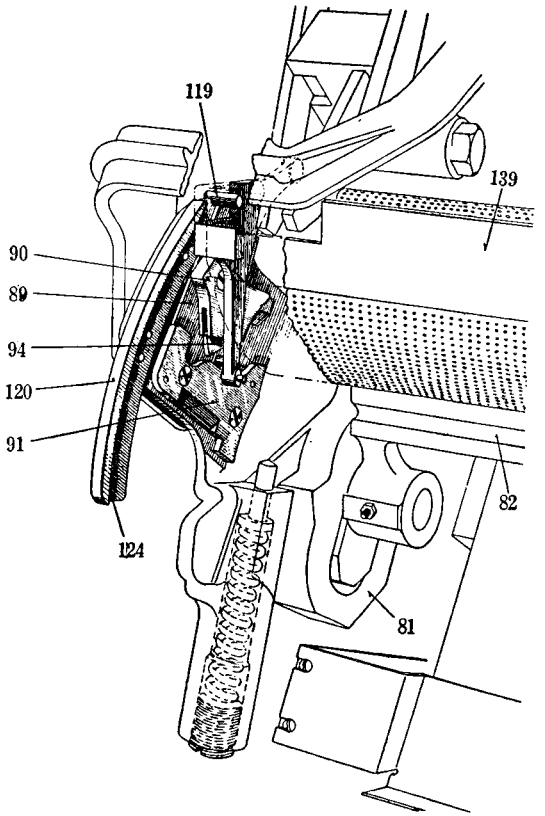

FIG. 12-26. View of channel frame and cam plates in operating position.

align with the slotted piece *126* on the channel entrance unit, the entrance will not close completely until the proper magazine has been brought into place, thus preventing matrices from entering the wrong magazine.

Fig. 14-26 shows the distributor bar locking bracket *128* which is fastened to the channel entrance unit. This bracket has two adjusting screws *129* which come in contact with one or the other of the distributor bar shift levers *103* or *104*. When the channel entrance is closed the screws must be adjusted to hold the distributor bar against the banking screw.

When the 72-character distributor bar is in operating position it is positively locked in place so that it cannot possibly be forced up. It is held in place by the distributor bar retaining lever *130*, and is operated by a cam *131* which is fastened to the side of the channel entrance bracket as shown in Fig. 17-26. The retaining lever *130* is pivoted on a shaft and one end of the lever extends to the front of the distributor bar and has a set screw *133* for adjustment. On its other end is a long flat surface which extends backward and is tapered at the end. While the channel entrance remains closed, the cam *131* rests against the surface of the retaining

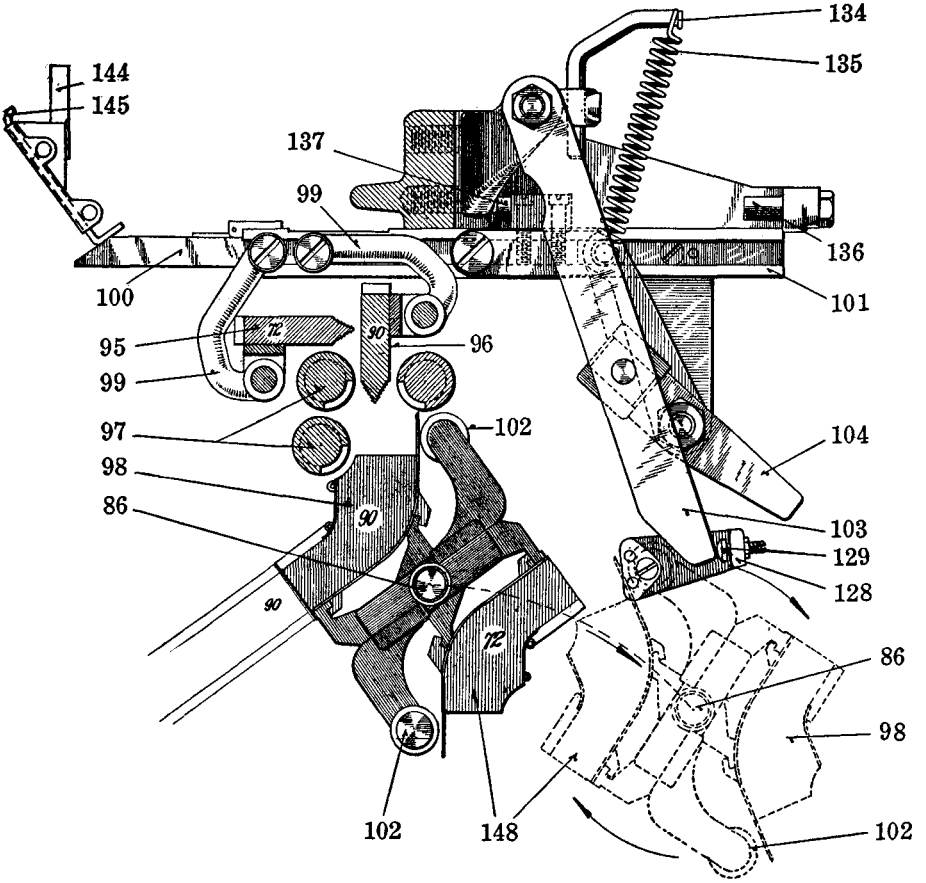

FIG. 13-26. Diagram of channel entrance unit and distributor bars in position for 90-character operation. The dotted outline of the channel entrance unit indicates its travel in effecting the change from 90- to 72-character operation.

lever *130*, thereby holding the adjusting screw *133* in contact at the front of the distributor bar. When the channel entrance is lowered for inspection, or to make a change, the spring *132* raises the retaining lever so that the distributor bar may be rotated.

At the front of the distributor beam there is an indicator plate which changes automatically when the distributor bars are shifted, and shows whether the 90- or 72-character distributor bar is in operating position. This is shown in Fig. 13-26, and consists of a bracket *144* with a slidable plate *145*. When the 90-tooth combination distributor bar is in operating position the slide *100* will raise the plate *145* to bring the figure 90 opposite the opening in housing, and when the distributor bars are reversed, the plate *145* will drop down and expose figure 72.

If the matrix guard lever is correctly adjusted, the distributor bars and channel entrances cannot be changed until all matrices have cleared the distributor bar on their way to the magazine.

Referring to Figs. 11 and 13-26, the channel entrances are arranged back to back in relation to each other and are pivotally mounted as a unit on a horizontal axis so as to be reversible at will for interchange.

The channel entrance unit is pivoted between two end brackets, the right-hand bracket being shown at *81*. It is normally held in position by two springs which are attached to the main distributor bracket, the left-hand one of which is shown at *147* in Fig. 17-26. As thus arranged, the pivoted frame *82* may be

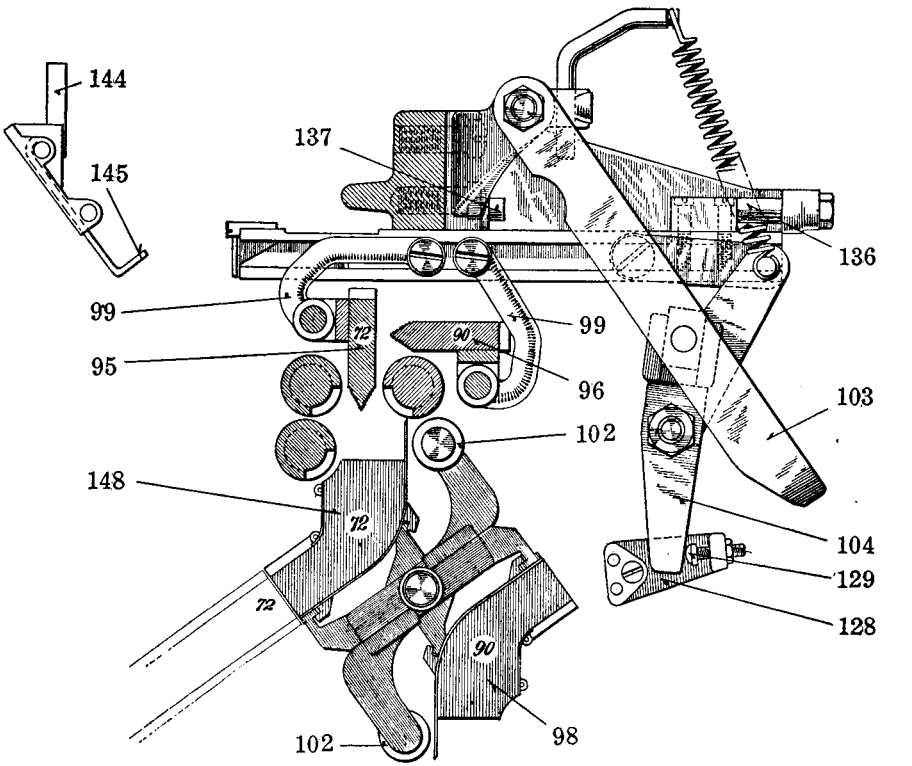

FIG. 14-26. View similar to Fig. 13-26, showing diagram of channel entrance unit and distributor bars in position for 72-character operation.

swung back and forth to move the entrance in use into and out of operating position, and at the same time permit the rotation of the channel entrance unit.

Normally the channel entrances are locked against rotation by the spring latch *83* slidably mounted within a plate *84* secured to the frame *82*, and adapted to engage one or the other of a pair of notches *93* formed in the opposite ends of a revolving block *85*, the latter being fastened to trunnion *86* which extends through its bearing in the frame *82*.

When a change is to be made from a 90- to a 72-channel magazine, the operation is effected by means of the handle *87* on the lever rod *106*. When the handle is pulled forward the entrance is moved backward in a semi-circle and partially turned by one of the studs *88* in the revolving block *85* passing through the channel *89*, Fig. 12-26, which is formed by the plates *90* and *91*. But, first the latch *83*, Fig. 11-26, in the plate *84* is withdrawn when the pin *92* passes over the front end of the cam plate *91*, thereby releasing the latch from the notch *93* in revolving block *85*.

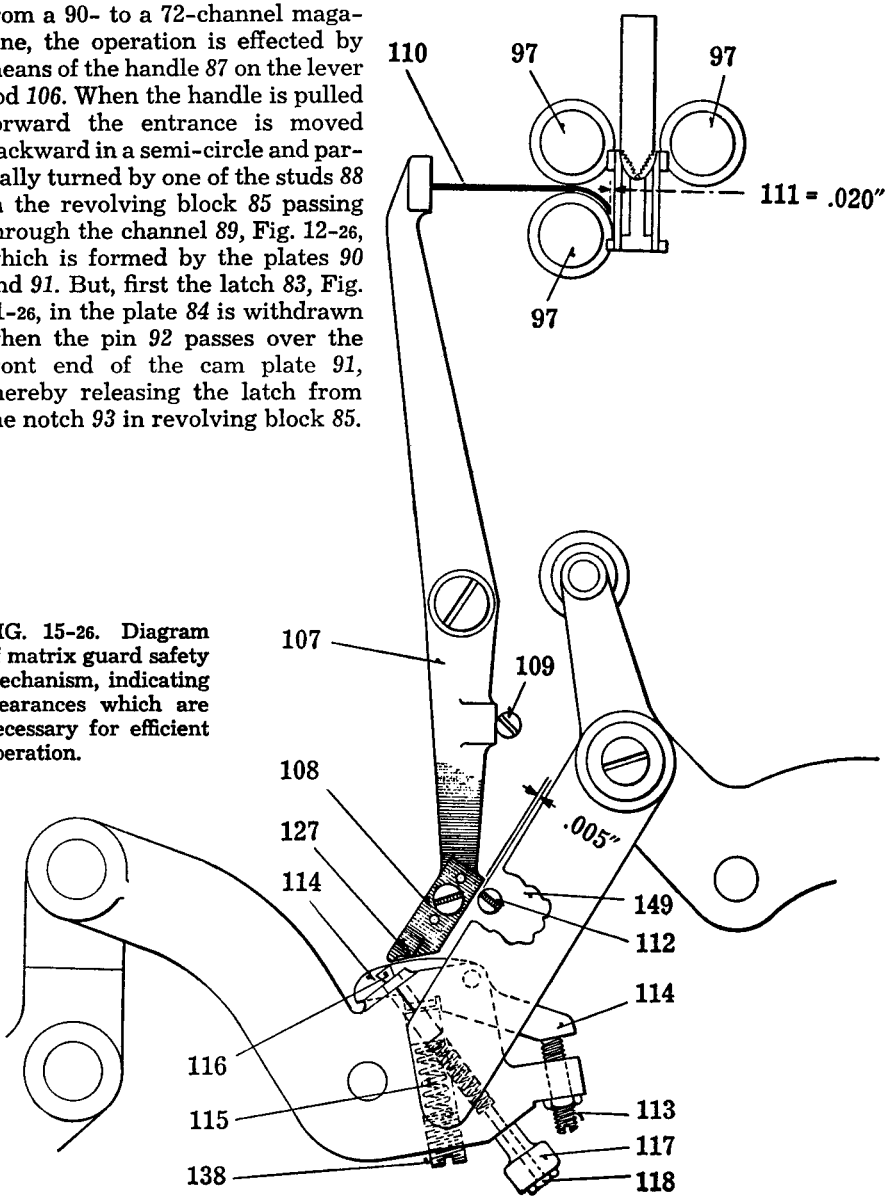

FIG. 15-26. Diagram of matrix guard safety mechanism, indicating clearances which are necessary for efficient operation.

The stud *88* on the revolving block *85* passes through the channel *89* past the safety pawl *94*, Fig. 12-26, which springs back into place, and, as the channel entrance control lever rod handle *87* is pushed back, the safety pawl *94* will cause the stud *88* on the revolving block *85* to travel through the upper part of the channel *89* to complete the half-turn of the channel entrance unit.

Referring to Fig. 13-26, the distributor proper consists of two distinct distributor bars *95* and *96*, and a common set of distributor screws *97*.

The bar *96* is provided with 90 combinations which are equally spaced apart to correspond to the spacing of the partitions in the channel entrance *98*. The bar *95* is provided with only 72 combinations unequally spaced apart to correspond to the partition spacing in the channel entrance *148*.

The distributor bars are separately pivoted at each end so that either bar may be rocked into operative relation to the distributor screws. Each distributor bar is connected by a distributor bar shifter link *99* to an overlying horizontal bar *100*, Fig. 13-26, which is slidably mounted in a guide *101* fastened with screws and dowels to a fixed bracket.

The shifting of the distributor bars is accomplished in conjunction with and at the same time the channel entrance is changed. They are counterbalanced by a spring *135*, the upper end of which is attached to an adjustable rod *134*. The spring should be just strong enough to balance the distributor bars when they revolve.

There are two rollers *102* which are fastened to the left-hand end of the channel entrance unit, and these rollers are offset so as to come in contact with one or the other of the two distributor bar shifter levers *103* or *104*. When the channel entrance control lever rod handle *87* is pulled forward, the channel entrance is

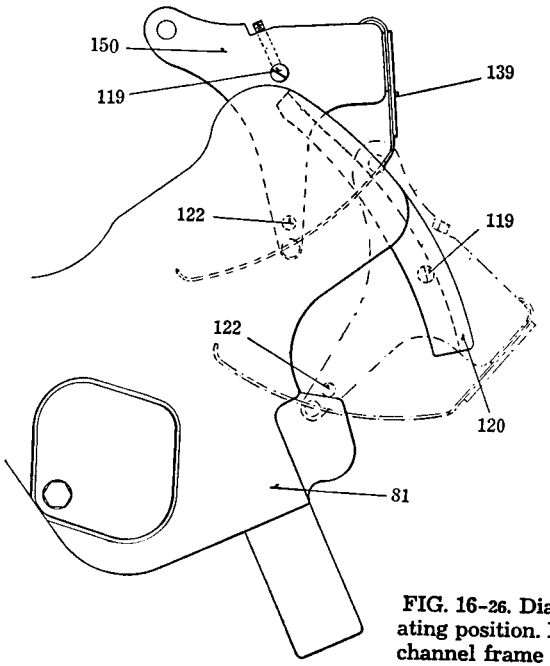

FIG. 16-26. Diagram of channel frame in operating position. Dotted lines indicate position of channel frame when opened for inspection.

opened and partially revolved, and when the handle *87* is pushed back one roller *102* comes in contact with distributor bar shifter levers *103* or *104*. When the roll *102* presses against the long shifter lever *103* the link slide *100* will be carried toward the back of the machine and the 72-character distributor bar will be carried into position as shown in Fig. 14-26. When changing back, the roll *102* on the channel entrance will come in contact with the short shifter lever *104*, carrying the slide toward the front and bringing the 90-character distributor bar into position, as shown in Fig. 13-26.

Fig. 11-26 shows a plunger *105* with a cushion spring. This plunger serves as a buffer to reduce the shock when the shifter lever rod is pulled all the way out to make a change.

There is a safety device which operates in connection with the matrix guard

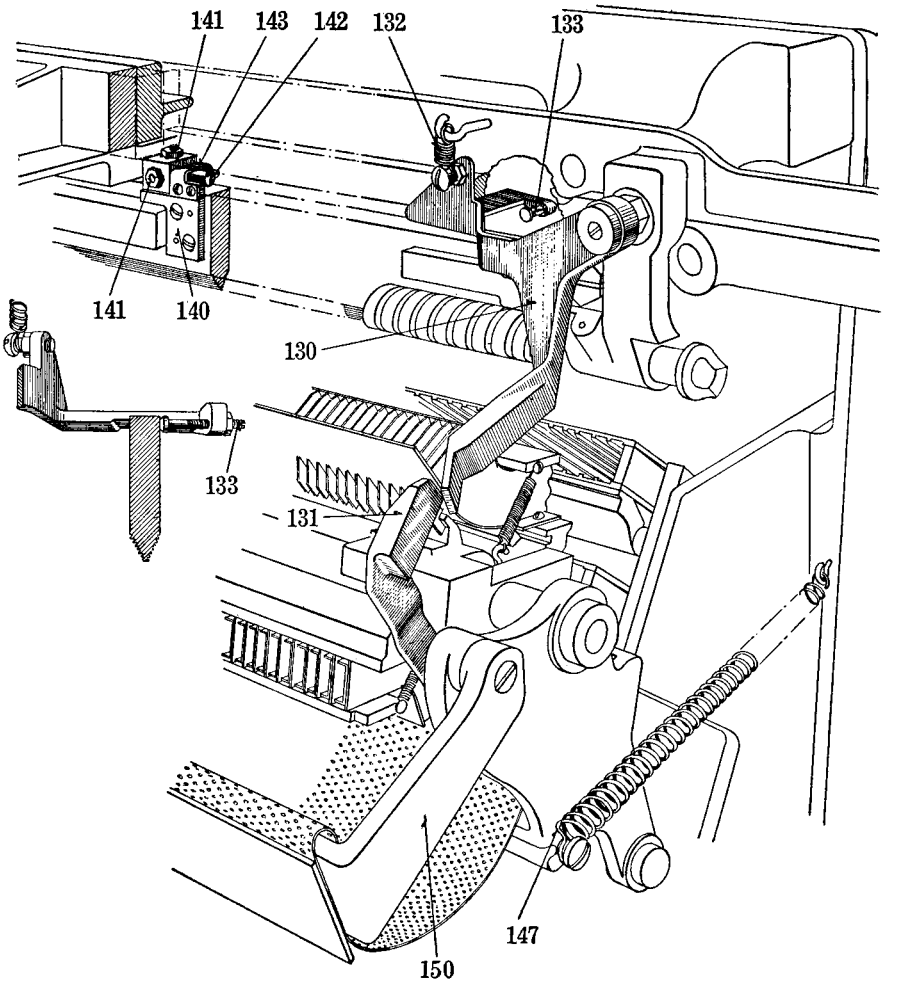

FIG. 17-26. Perspective view from the rear of the machine, showing the distributor bar retaining lever cam *131* contacting the distributor bar retaining lever *130;* and also additional mechanism for securing distributor bar in correct operating position.

110, Fig. 15-26; if correctly adjusted, the channel entrances and distributor bars cannot be changed while there are matrices on the bars, thus preventing possible damage to the bars or matrices.

Fig. 15-26 shows the details of this safety device. *107* is the matrix guard lever, the upper end of which rests against the matrix guard *110*. At the lower end of the lever *107* there is a steel shoe *108*, the end of which is in contact with the top surface of the cam *114*.

If an attempt is made to change the channel entrance and distributor bar before the matrices are all distributed, the matrix guard lever *107* will press against the matrix guard *110* and when its movement is stopped by a matrix on a distributor bar, the steel shoe *108* at the lower end of the lever *107* will depress the cam *114* enough to allow the point of the shoe *108* to engage the neck of the plunger *116*. This action will allow the entrance to be opened only part way. If it is necessary to open the entrance far enough to clear it of clogged matrices, the knurled knob *117* must be pulled down so that the point *127* of the steel shoe *108* will be disengaged from the neck of the plunger *116*. This will allow the channel entrance to be opened far enough to clear it of matrices.

MAINTENANCE

Adjusting the Safety Mechanism—Fig. 15-26 shows in detail the safety device which operates in conjunction with the matrix guard, so that if there are any matrices on the distributor bar, the channel entrances or distributor bars cannot be rotated until all matrices have been distributed, and it is very important that all adjustments are made properly to prevent damage to matrices or distributor bars.

Shown at *107* is the matrix guard lever, the upper end of which rests against the matrix guard, and at the lower end the hardened steel shoe *108* comes in contact with the upper surface of the adjustable steel cam *114*.

When making the adjustment, run a matrix on the distributor bar and be sure that the guard lever *107* is set in position, as shown in the diagram. See that the center projection rests against the banking screw *109*, and with the upper end bearing against the matrix guard *110*. There must be a clearance of approximately .020″ between the inside of the matrix guard *110* and the matrix on the distributor bar, as shown at *111*. There must also be a clearance of .005″ between the end of the lever *107* and the operating stud *112* located on the upper end of the connecting bar *149*. These settings can be obtained by bending the lever *107*, as it is made of gun metal for this purpose.

Remove the matrix from the distributor and with the lever *107* in normal operating position adjust the screw *113* until the cam *114* just clears the hardened steel shoe *108* on the lower end of lever *107*. Now, with no matrix on the distributor bar, adjust the tension on the spring *115* with the screw *138* just so that the front end of the cam *114* will not be depressed when the safety device is operated, but so that it will be depressed if there is a matrix on the distributor bar. Again with no matrix on the distributor bar, adjust the plunger *116* by loosening the lock nut *118* and turning the knurled knob *117* until the upper end of the plunger just clears the point *127* on the steel shoe *108* as it rides over the cam *114* and then lock in this position.

Run a matrix onto the distributor bar by hand and then operate the safety. If all the adjustments are correctly made, the cam *114* will be depressed by the lever *107*, permitting the hook *127* on the shoe *108* to hook into the neck on the upper end of the plunger *116*, thus preventing the possibility of revolving the channel entrance unit and the distributor bars.

To Open the Channel Entrance—Fig. 16-26 shows an end view of the channel entrance and the matrix tray. The matrix tray is held up in position by a spring, and whenever the channel entrance is to be opened, press down on the matrix tray *139* before starting to open the entrance so that the guide pin *119* will enter under the shelf *124* of the cam *120* to prevent the channel entrance unit from revolving, Fig. 12-26. At the same time, by means of the knurled knob *117*, Fig. 15-26, pull plunger *116* fully down to clear the hardened shoe *108*. Then continue to press down on the matrix tray, being careful that the guide pin *119* is sliding under the shelf *124* of the cam *120* until the stop pin *122* banks on the shelf of the channel entrance bracket.

The above procedure permits partial opening of the channel entrance without revolving the distributor bars, thus permitting the removal of clogged matrices without injury to the mechanism or matrices.

Revolving the Channel Entrances—The end cam action for revolving the channel entrances is illustrated in Fig. 12-26. When the channel entrances are revolved the guide pin *119* passes over the upper surface of the cam *120*, and the stud on the revolving block passes through the channel *89* past the safety pawl *94*. Examine this safety pawl occasionally to see that it drops back into position so that the stud on the revolving block will continue to follow the channel *89* to complete the half-revolution of the channel entrance.

On each distributor bar there is fastened a small bracket *140*, Fig. 17-26, containing two adjusting screws *141*, and a flat steel spring *143* with a curved end which snaps over a stud *142* fastened to the distributor beam. When either of the two distributor bars is rotated into position the curved end of the flat spring *143* snaps over the stud *142* to hold the distributor bar in place.

The distributor bar with the 72-tooth combination has an additional lock to prevent any upward movement of the distributor bar. This lock is formed by the distributor bar retaining lever, as shown in Fig. 17-26.

The front screw in the bracket *140*, Fig. 17-26, is for the purpose of adjusting the distributor bar to align with the distributor box, and the top screw should be set so it will just rest against the stud *142* and serve as an additional support for the distributor bar.

After the distributor bar has been adjusted properly in relation to the distributor box, refer to Fig. 13-26, which shows the slide *100* and the banking screws *136* and *137*. When the 90-tooth combination distributor bar is in the locked position, the banking screw *137* should be adjusted to bear easily against the banking block which is fastened to the slide *100*. When the distributor bars are reversed, adjust the banking screw *136* in the same manner. When the distributor bars are shifted these banking screws act as shock absorbers to reduce the strain on the stud against which the distributor bars are locked.

This same diagram shows two rolls *102* which are attached to the end of the channel entrance unit. While the entrance is completing its revolution, one of these rolls presses against one or the other of the upright levers *103* or *104*, and shifts the distributor bar to correspond with the channel entrance.

These rolls are mounted on eccentric pins and should be adjusted to carry the slide *100* easily against the banking studs without undue strain.