

## CHAPTER 28

### The Model 9

**T**HIS LINOTYPE which was designed for intricate composition with Roman, bold face, italics, small caps or special characters mixed in the same line, and also for head and advertising composition, is a four magazine plural distributor, or mixing machine. Matrices from all four magazines can be assembled in the same line and distributed during continuous composition. All maga-

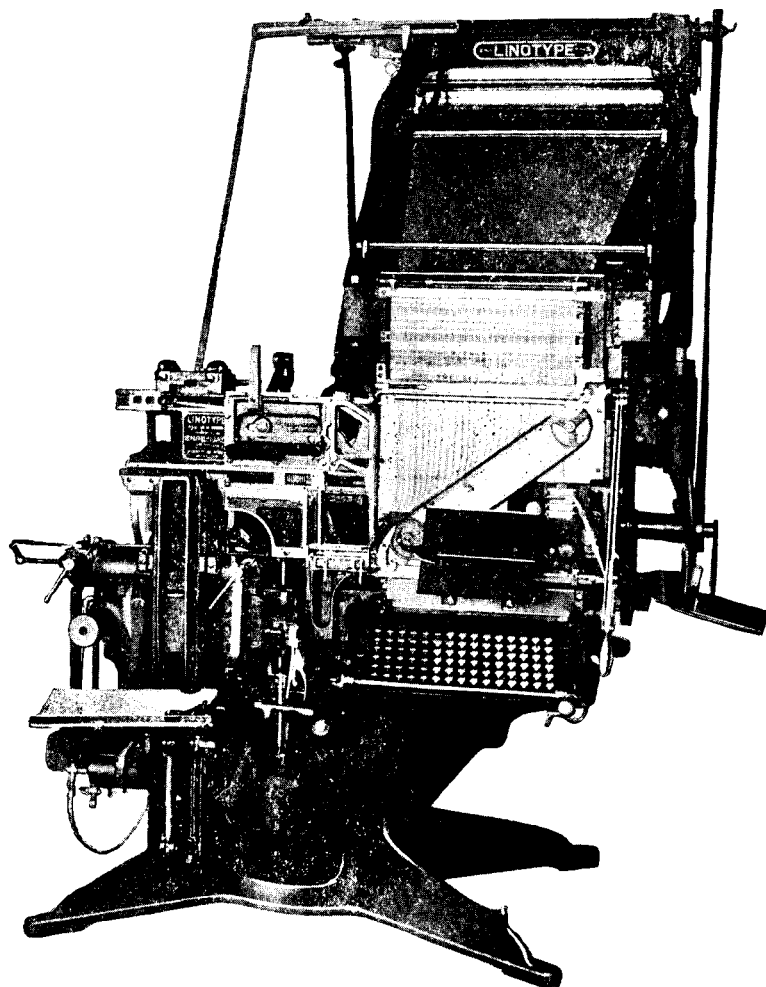


FIG. 1-28. Model 9 Linotype as viewed from the front of the machine.

zines are 90-channel, interchangeable with one another but not with those of other models.

The mechanisms for justification, casting and transfer are practically the same as on other Linotype models, and therefore require no description here except to note how some of them are varied slightly and yet accomplish their purpose.

This model differs radically from other plural distributor models now built in that the magazines are not raised and lowered. Instead, the assembler front is raised and lowered to register with the magazines, and the key rods are raised and lowered with the assembler front to operate the escapements on whichever of the four magazines it is desired to use. The Model 9 distributes matrices simultaneously into the four magazines by means of a compact distributor having four distributor bars and nine distributor screws. Previously to being distributed into their proper magazines the matrices are fed from a primary distributor box through a primary distributor which separates them according to the magazine into which they are to be distributed, allowing each matrix to fall through its proper chute to one of four distributor boxes which feeds it to a distributor bar. The primary distributor also separates the pi matrices from the magazine matrices and allows them to drop through a pi chute to the pi stacker.

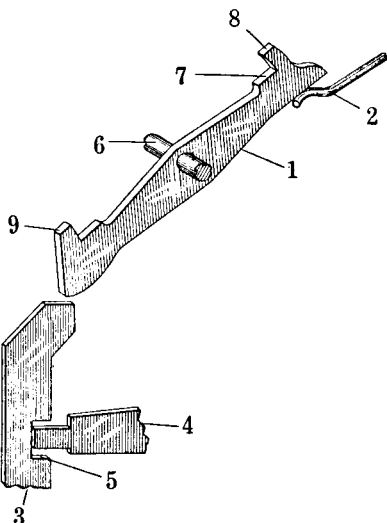
## ASSEMBLING MECHANISM

Each of the four 90-channel magazines with which this machine is equipped has fastened to it a bank of one-piece escapements and their springs mounted in an escapement frame. These escapements are operated by subsidiary key rods carried in a frame which is itself carried by an assembler front capable of being raised and lowered by a handle, and locked in any of four positions to bring the assembler front and the subsidiary key rods in register with any of the four magazines and its escapements, also to bring the proper one of four notches on the rear edge

FIG. 2-28. View showing the one-piece escapement used on the magazines of the Model 9 Linotype.

The escapement 1 pivots on the rod 6 in a frame 18 fastened to the magazine and it is returned to its normal inactive position and held there by the spring 2 which holds the surface 7 up against the bottom of the magazine lower plate. The rear end 8 projects up through a rectangular slot into the matrix channel and the front end 9 is guided in a slot cut in the front end of the channel.

The action of this escapement is not the same as that on other Linotype models. Study of Fig. 3-28 shows that when the forward end 9 is raised into the matrix channel by action of the subsidiary key rod 3, the projection 8 on the rear end is lowered, thereby allowing the matrix to slide in its channel until arrested by the forward end 9 of the escapement. When the subsidiary key rod 3 drops, the spring 2 raises the rear end projection 8 upward into the path of the upper lug of the following matrix, while at the same time the forward projection 9 descends to allow the first matrix to escape from the magazine.



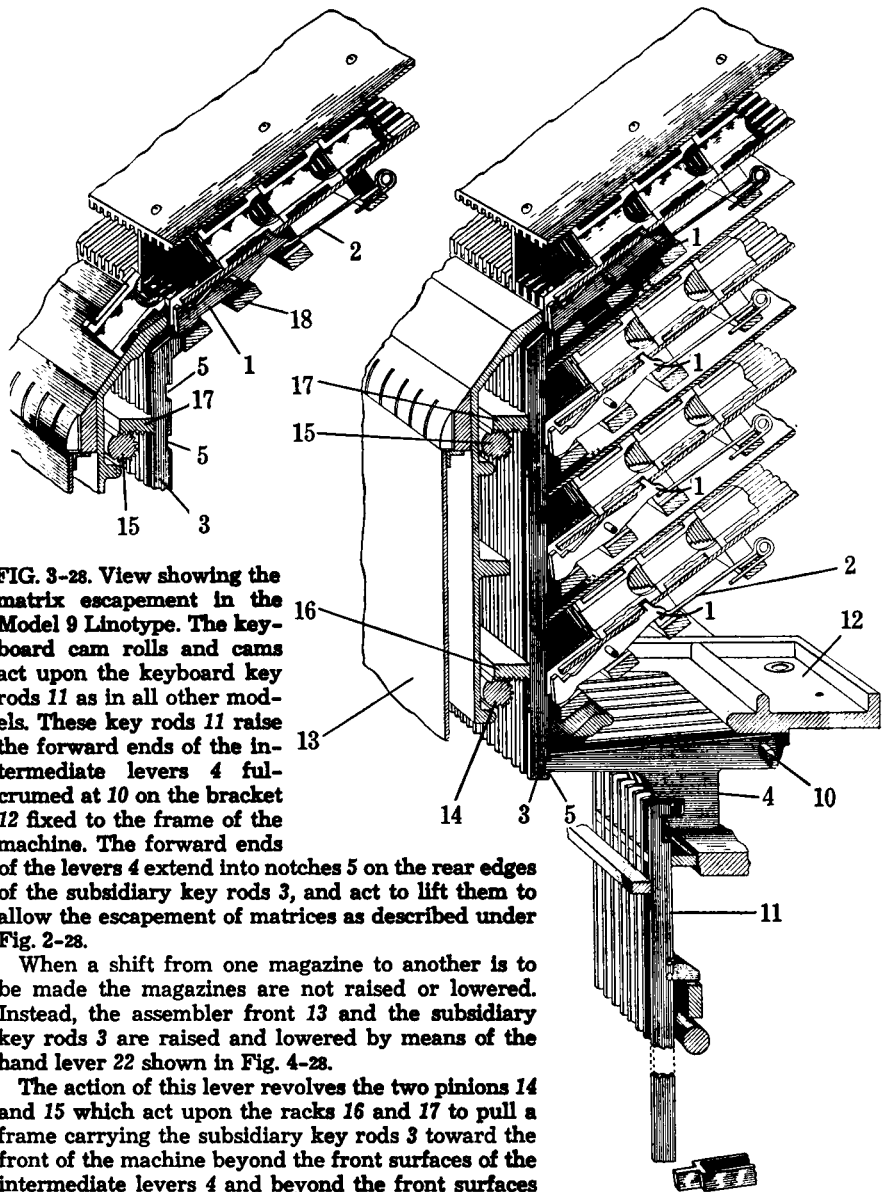


FIG. 3-28. View showing the matrix escapement in the Model 9 Linotype. The keyboard cam rolls and cams act upon the keyboard key rods 11 as in all other models. These key rods 11 raise the forward ends of the intermediate levers 4 fulcrumed at 10 on the bracket 12 fixed to the frame of the machine. The forward ends of the levers 4 extend into notches 5 on the rear edges of the subsidiary key rods 3, and act to lift them to allow the escapement of matrices as described under Fig. 2-28.

When a shift from one magazine to another is to be made the magazines are not raised or lowered. Instead, the assembler front 13 and the subsidiary key rods 3 are raised and lowered by means of the hand lever 22 shown in Fig. 4-28.

The action of this lever revolves the two pinions 14 and 15 which act upon the racks 16 and 17 to pull a frame carrying the subsidiary key rods 3 toward the front of the machine beyond the front surfaces of the intermediate levers 4 and beyond the front surfaces of the escapement 1.

The front 13 and the subsidiary key rods 3 can be raised or lowered as a unit to register with any one of the four magazines and escapements. When the front registers with the desired magazine, the handle is released and a spring acts to rotate the pinions 14 and 15 to move the frame carrying the subsidiary key rods 3 back against its stop, thereby registering the subsidiary key rods 3 with the escapements 1 of that magazine and causing the ends of the levers 4 to enter the proper level of notches 5 on the rear edges of the subsidiary key rods 3.

of the subsidiary key rods into register with the front ends of a bank of intermediate levers in a frame which is fixedly mounted on the frame of the machine. These intermediate levers are raised by the keyboard key rods, and transmit their motion upward through the subsidiary key rods to the one-piece escapements as shown in Figs. 2 and 3-28.

This shiftable front with its operating mechanism and handle is all carried in a frame or "gate" which is easily swung open to make room for magazine changes or for accessibility to other parts. This swinging frame is closed and securely held in exact alignment during operation of the machine.

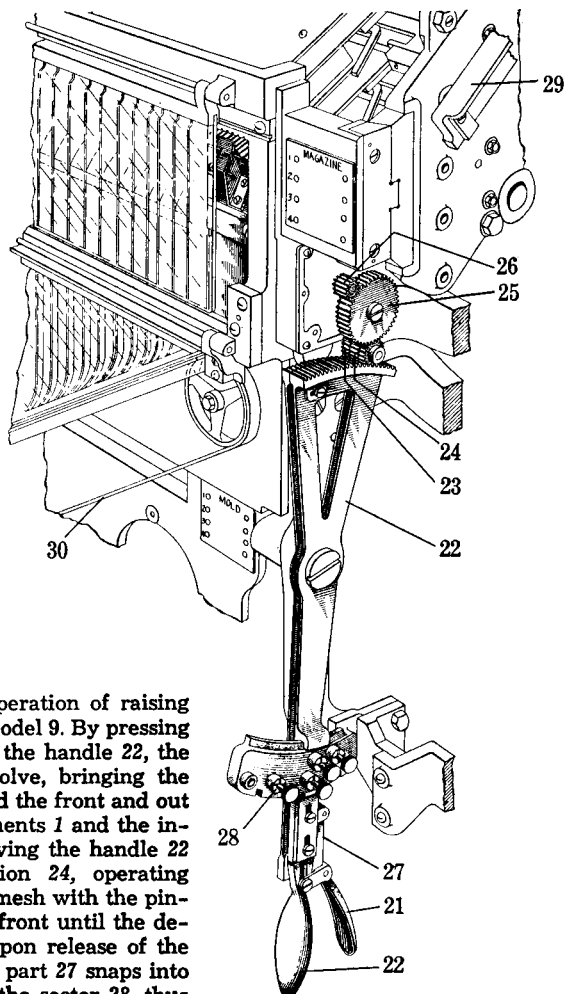


FIG. 4-28. View showing operation of raising and lowering the front on Model 9. By pressing the handle lever 21 against the handle 22, the pinion 23 is caused to revolve, bringing the subsidiary key rods 3 toward the front and out of register with the escapements 1 and the intermediate levers 4. By moving the handle 22 forward or back the pinion 24, operating through an idler gear 25 in mesh with the pinion 26, raises or lowers the front until the desired position is reached. Upon release of the handle lever 21, the locking part 27 snaps into one of the four notches on the sector 28, thus securely and accurately holding the front in position. At the same time the pinion 23 is caused by a spring, not shown in the drawing, to revolve and thereby move the frame carrying the subsidiary key rods 3 rearward against a stop and in register to operate the escapements on the magazine.

As shown in this figure, a single assembler belt 30 transfers the matrices to the star wheel and assembling elevator.

Removal and change of magazine is accomplished through the use of two magazine supporting arms (one of which is shown stored on the side of the magazine frame side plate at 29 in Fig. 4-28). These supporting arms, for use, are locked to the insides of the magazine frame side plates at any of the four magazine levels, as desired, and extend forward and downward to act as slides and supports for a magazine during the change. They are then removed and stored as shown.

## DISTRIBUTING MECHANISM

A very general description of the distribution has already been given earlier in this chapter. It will now be considered somewhat more in detail.

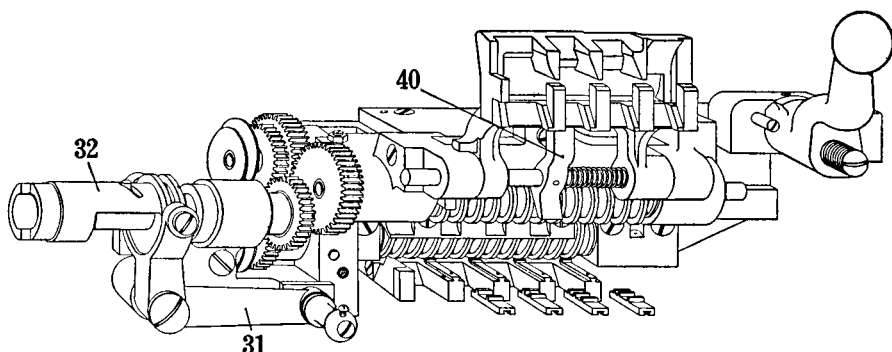


FIG. 5-28. Assembled primary distributor for Model 9 Linotype.

On the Model 9 the matrices pass from the second elevator to the distributor box, upper, in which they are lifted up into the three short conveyor screws of the primary distributor, which is a mechanism for separating the matrices according to the magazines in which they are to be distributed. In the primary distributor the matrices are conveyed along a short distributor bar which has the seven teeth on each side except for four short spaces from which all teeth have been removed. Directly below each of these four spaces there is a support carrying a matrix bridge over which the bottoms of the matrices pass.

Each bridge has projections on it, and each matrix is notched to agree with whichever bridge has been selected for its particular font. These bridge projections and matrix notches are arranged in combinations of three and by this arrangement it is possible to obtain forty-one different combinations. As the matrices pass along the bar they ride on the bridge where the teeth are cut away, unless the combination of the notches in the lower end corresponds with the bridge combination, in which case the matrix falls so that the teeth will not re-engage the teeth on the distributor primary bar, and as the matrix is carried across the bridge it falls through a chute into the lower distributor box of the pre-determined distributor.

If the combination of notches in the matrix does not correspond with the combination of the bridge, the matrix is carried forward and onto the teeth of the distributor bar again. In this way, each matrix tries the different bridges until it finds the one where the notches and bridge combination correspond. By this device the matrices are distributed into any one of the four distributors, which in turn carries them along their distributor bar until they drop into the channel

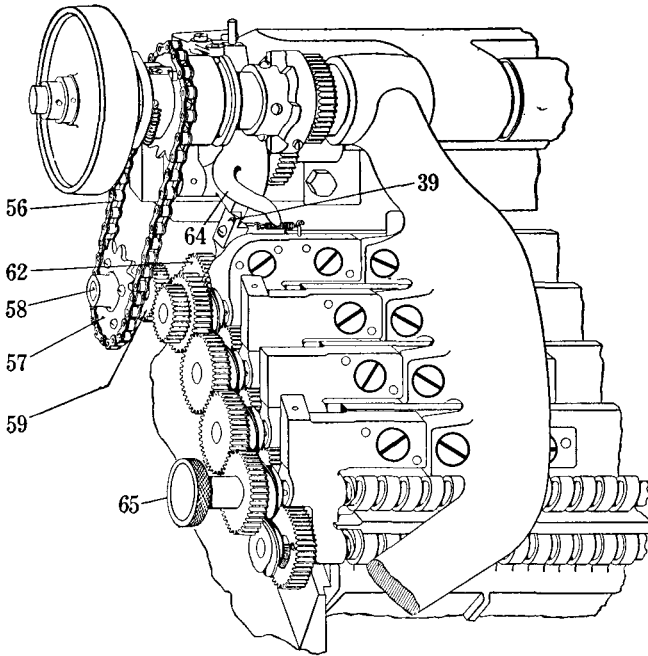
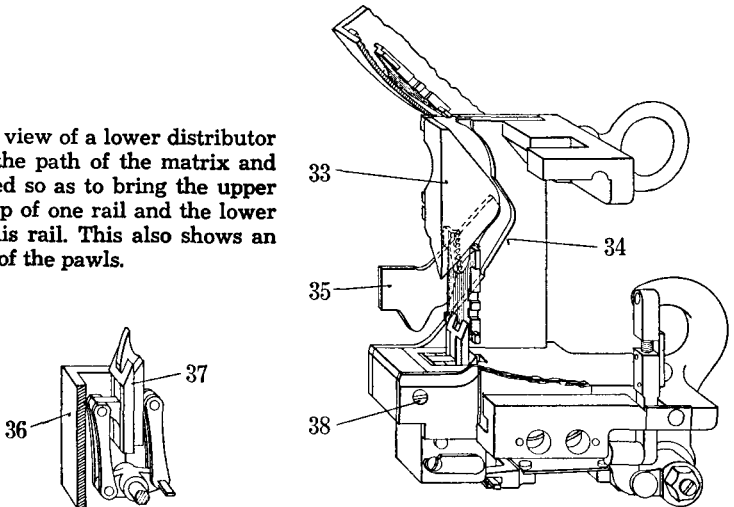


FIG. 6-28. Diagram, from the rear of the machine, of the multiple distributor used on the Model 9.

This multiple distributor is of the same general form as on other models except that there are four sets of distributor screws.

Beginning at the top of the view, the lower distributor screw of the highest set of three distributor screws forms one of the upper two of the second set of distributor screws, and so on down to the lowest. By this arrangement nine distributor screws form four sets of three distributor screws each.

FIG. 7-28. Side view of a lower distributor box, showing the path of the matrix and how it is turned so as to bring the upper lug over the top of one rail and the lower lug beneath this rail. This also shows an enlarged view of the pawls.



entrance. The upper distributor box, although of somewhat different shape, acts similarly to the distributor box on single distributor models.

The distributors for the four magazines are all mounted on a single bracket, so arranged as to be easily opened for inspection.

All matrices used in the Model 9 must have the bevel notch in addition to the bridge notches for the magazines. All pi matrices are supplied without bridge notches. They pass to a pi stacker through the pi tube at the end of the primary distributor.

Further information with regard to bridge notches on Model 9 matrices is contained in Chapter 29.

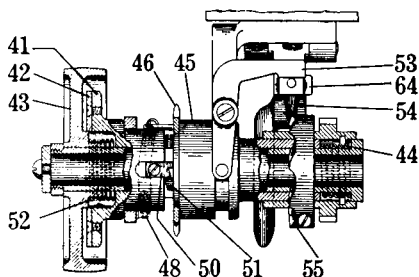
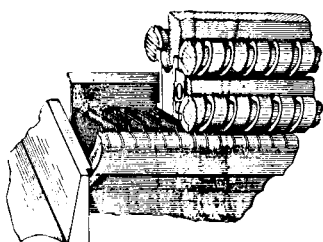


FIG. 8-28. Views showing the distributor clutch on Model 9.

A plan view, partly in section, is shown at the upper right. The lower view is from the back of the machine and partly in section. To the left of this view is a partial end view of the sprocket which is turned in the direction shown to drive distributor screws.

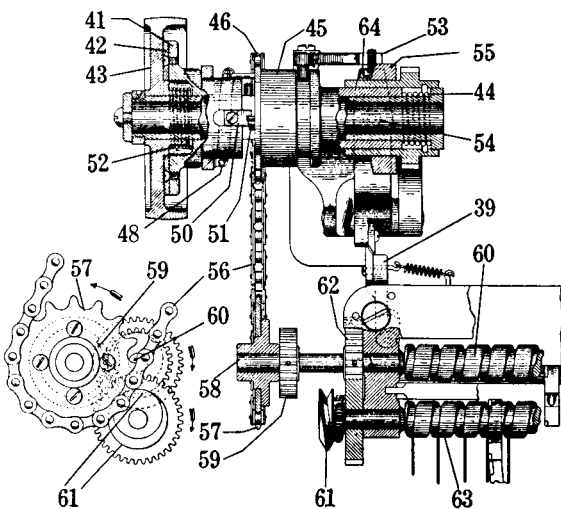
The upper left-hand view is a perspective sectional view showing portions of one distributor, a set of screws and the top of one channel entrance with its partitions.

In the upper right-hand view 41 is a clutch sleeve having upon its surface a leather or fiber washer 42. This clutch is shown out of engagement with the pulley 43. The clutch is urged inward against the pulley 43 by a spring 44.

Mounted on the sleeve 41 are two pawls 50. These pawls have each a notch adapted to engage with pawls 51 mounted on the collar 45. The pawls 50 and 51 are held normally in mesh with each other by the spring 52. In this view the clutch is shown out of engagement, the pawls are not in mesh and are held in position by the spring 48.

In the collar 45 there is a groove, and in this groove a pin is mounted upon a bell-crank lever 53. This bell-crank lever works against another lever 64 in which there is a tooth 54. This tooth 54 engages with a cam 55, which pulls the sleeve 41 away from the pulley 43, causing the distributor screws to stop.

In the lower view the same mechanism is shown with the clutch engaged and with the pawls 50 and 51 in mesh. The sprocket wheel 46 drives through a chain 56 another



sprocket 57. This sprocket 57 is fast on a shaft 58 which is an extension of the upper distributor screw. Also fast on the same distributor screw shaft 58 are the gears 59 and 62. This shaft 58 is the end of the front upper distributor screw of the top set of distributor screws. The gear 59 drives four other distributor screws 60, each of which is the upper rear screw of a set of distributor screws. To the end of each of these four screws is pinned a spiral automatic and a spur gear. Gear 62 drives another set of four screws 63, each of which acts as the lower rear screw of a set of distributor screws. To the end of each of these other four screws is pinned a spiral automatic 61, but the gear is not pinned. Instead, on these other four screw ends the gears are held in relation to the spiral automatics in exactly the same manner as on single distributor machines, and their action is the same, except that on this machine the action is through a train of gears—not quite so direct, but yet just as effective. That action is to lock the screws against turning. This locking puts a strain on the sprocket chain 56 sufficient to overcome the spring 52 which has been holding the pawls 50 and 51 in mesh while distribution was in progress. The tooth 54 on the lever 64 is now thrown into the path of the cam surfaces 55 by the bell-crank lever 53. The action of any of these cam surfaces 55 against the tooth 54 which has no movement possible crosswise of the machine, pulls the sleeve 41 with its facing 42 away from the side of the pulley 43, allowing the pulley to run free and the remainder of the distributor mechanism to stop.

After the cause of the stoppage has been removed, the distributor is started again as shown in Fig. 9-28.

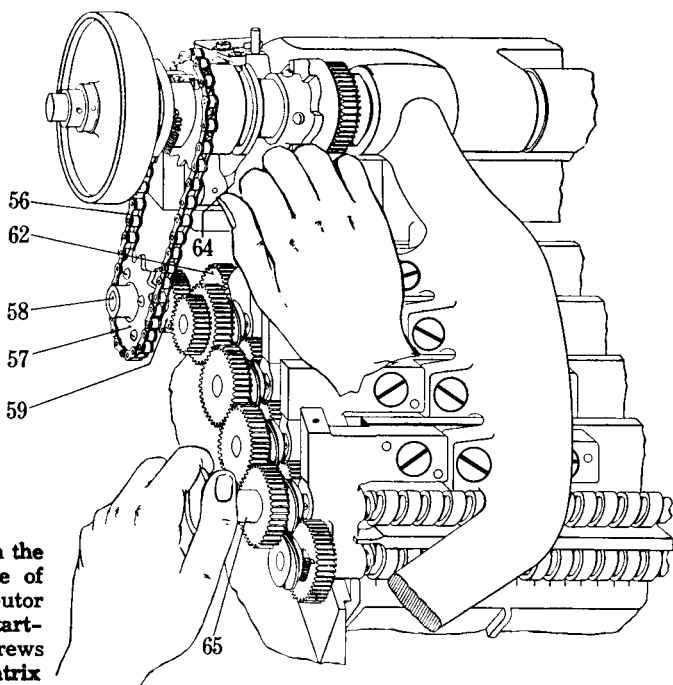


FIG. 9-28. View from the rear of the machine of the Model 9 distributor showing method of starting the distributor screws after a clogged matrix has been removed.

The right hand is shown raising the hand lever 64, which throws the clutch against the driving pulley. With the left hand the hand wheel 65 is revolved backward a short distance to disengage the lock of the spiral automatics, which have acted to stop the distributor screws.

A short turn backward of the hand wheel 65 and raising the hand lever 64, which throws the clutch, permits the distributor screws to revolve normally.



### Distributor Clutch

The Model 9 distributor clutch is the same in principle as that used on other models and described in Chapter 19, but because this model has a multiple distributor some variations in the construction of the clutch are necessary. The clutch is shown in Fig. 8-28 and its action is described. The action of the spiral automatics, which serve to disengage the clutch when the lower screw of any of the four sets of distributor screws is retarded so as to be out of correct timing with the other two screws of that set, is exactly the same as already described in Chapter 18, and does not require further description here.

As has been described, the spiral automatics operate to disengage the distributor clutch in the same manner as on a single distributor machine, but if matrices clog in the channel entrances it is necessary to swing the main distributor upward away from the channel entrances, and the throw-out of the clutch is accomplished in a different manner.

Fig. 6-28 shows the hand lever 64 which rests on the pawl trip lever 39 fastened to the distributor assembly. Normally the trip lever 39 is underneath the hand lever 64 to hold it in a raised position, but when the distributor is swung upward

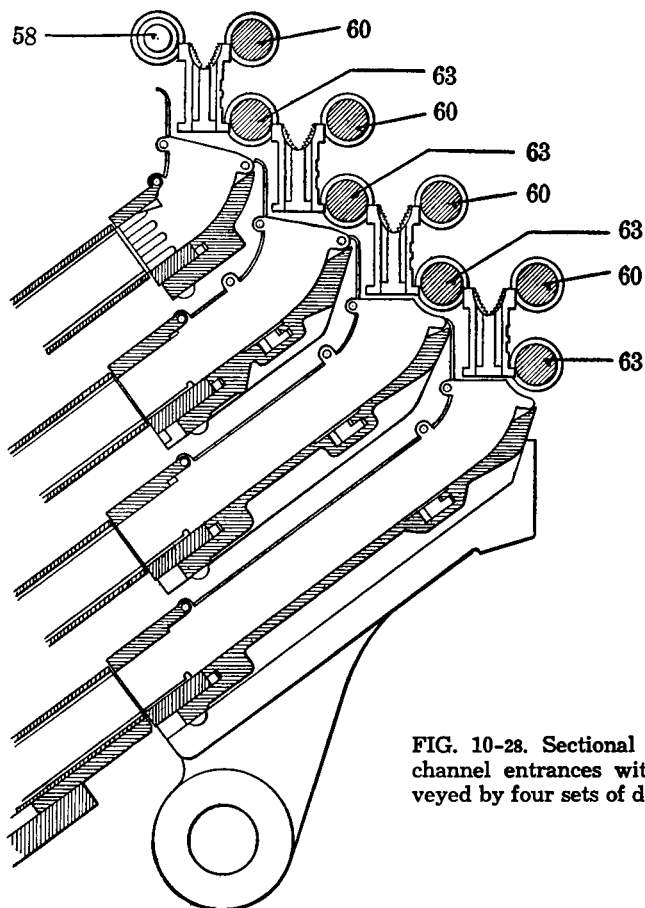


FIG. 10-28. Sectional side view of Model 9 channel entrances with matrices being conveyed by four sets of distributor screws.

the hand lever drops down, releasing the pressure on the bell-crank 53, Fig. 8-28, allowing the tooth 54 to fall against the side of the cam 55, and throwing out the clutch in the manner described.

## MAINTENANCE

*Cleanliness, Lubrication, Etc.*—The most important detail for the successful operation of the Model 9 is to keep the distributor screws and distributor boxes clean and free from gum which might accumulate from the excessive use of oil.

Fig. 7-28 shows the lower distributor box. The separating block 33 over which the matrices slide, must be kept polished, and the edges of the rails 34 and 35 must also be kept clean. If the edges of the rails are rubbed with a soft pine stick it will be found preferable to the use of gasoline. The chutes which guide the matrices from the primary distributor to the lower distributor box must also be kept clean.

The escapement pawls 37 must travel freely in the guide 36. To remove them for cleaning loosen the binding screw 38, which will allow the entire assembly to be withdrawn from the bottom. When the pawls are reassembled in the blocks rub the parts well with graphite. The upper end of the pawls 37 must be close enough together so that one matrix only will be allowed to pass over the points. If there is too much lost motion between the pawl points it may cause the matrices to clug in the distributor box.

Fig. 3-28 shows the subsidiary key rods and how they operate the escapements. When the rod 3 presses against the escapement there is a slight sliding motion, and to overcome any friction that might be caused by dryness or rust, rub the tops of the rods 3 with graphite occasionally and also use some graphite on the ends of the levers 4 where they come in contact with the notch 5 on the subsidiary key rods. The assembler front is held in place with a latch at the left-hand side and when swung open the graphite may easily be applied with the tip of the finger.

*The Primary Distributor Clutch*—The main distributor clutch has been previously described in this chapter, but in addition to this there is also a clutch for the primary distributor. Referring to Fig. 5-28, the clutch collar is shown at 32. At 31 is the clutch lever which has a spring pressure detent pin at the end to hold the clutch lever in place. The primary distributor also has the spiral automatics, and if matrices are clogged at this point the detent pin will be forced down by the clutch collar to stop the distributor. To start the primary distributor, turn backward on the distributor screws until the spiral automatics are released, then after the main distributor is running press upward on the clutch lever 31 to engage the clutch.

*To Remove the Primary Distributor Box*—Pull back and lock the distributor shifter, then slide the back rail support keeper 40 sidewise and swing the rail support upward. Above the distributor box there is a movable latch which holds the back distributor screw in place. Move this latch sidewise, swing up the back rail support and the distributor screw. Turn latch under to hold it in place, turn distributor box locking handle and the distributor box may be removed without turning the machine backward.

*Clogged Matrices*—If matrices clog in the main distributor box and extend up into the chute, turn the locking screw so the flange will clear the distributor box and slide the box out. This can be easily done, as the separating block which is held in place with detents will slide from the box rails.

If matrices are clogged in the main distributor, first press down on the lever 31 to release the clutch from the primary distributor, and release the latches at each end of the main distributor and swing upward; then loosen the latch at the left-hand end of the channel entrance and lower entrance to expose matrices. Around the shaft which holds the distributor in place there is a heavy coil spring which may be adjusted to counterbalance the weight of the distributor.

*Adjustment of Magazines and Movable Assembler Entrance Front*—The front ends of the magazines rest on flat steel bars, and these bars are adjustable side-wise to bring the magazine channels in correct alignment with the assembler entrance partitions. There is also an adjustment to bring the front end of the magazine the proper distance from the movable assembler entrance. This distance should be from .010 to .020".

Fig. 4-28 shows how the movable assembler entrance front, which contains the subsidiary key rods, is raised and lowered. On the frame just inside the gears which are above the handle 22 there is a flat spiral spring that may be adjusted to counterbalance the weight of the movable assembler entrance. The grooves in which the movable entrance travels should be kept clean and free from oil, and should occasionally receive a small amount of graphite, and all movable shafts should be kept lubricated so that the subsidiary key rods will be carried underneath the magazine escapements.

When the assembler front is changed from one position to another, there should be a slight pressure against the handle 22 when the lever handle 21 is about to spring into place.

If certain matrices fail to drop directly after making a shift, again snap the handle lever 21 to make sure that the tops of the subsidiary key rods are all the way under the escapements.