IV. Distribution

We now come to the third great division of the Linotype mechanism. We have followed the matrix from the magazine to the assembler, and thence to the casting mechanism, and the slug has been produced by the injection of the molten metal by the pump in the pot crucible. The action of the cam shaft now withdraws the pot from the mold, withdraws

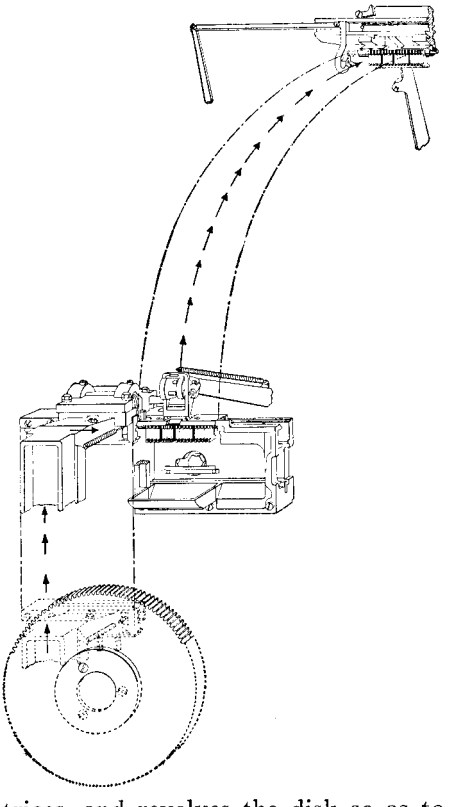


FIG. 97.—Diagrammatic view of the transfer of a line of matrices from the casting point up to the distributor box.

In this view is shown on dotted lines the first-elevator jaw with a line of matrices at the casting point in front of the mold and the mold disk. The arrows indicate the direction of the first-elevator jaw as it rises to the upper transfer channel. Here the first-elevator jaw is shown in full lines. Horizontal arrow indicates the direction of the transfer of the matrices into the transfer channel and a line of matrices assembled on the second-elevator bar.

The arrows indicate the movement of the second-elevator bar upward until it rests against the distributor beam in front of the distributor box ready to be transferred by the distributor shifter.

the mold disk from the line of matrices, and revolves the disk so as to bring the mold in front of the knives, and the slug is ejected into the galley. While this is taking place Cam No. 3 unlocks the line through the action of the wedge, as described in Figs. 47 and 83. The first elevator now rises through the action of cam No. 1 until it comes into register with the intermediate channel.

As the line is now unlocked, while the first elevator rises, the bands of the spaceband wedges usually fall by their own weight. If they do not do this, they strike upon the bar *53* shown in Fig. 98, and are forced downward. On the first elevator there are two levers *51*, shown in Figs. 98 and 99. These two levers have a beveled surface at their upper end

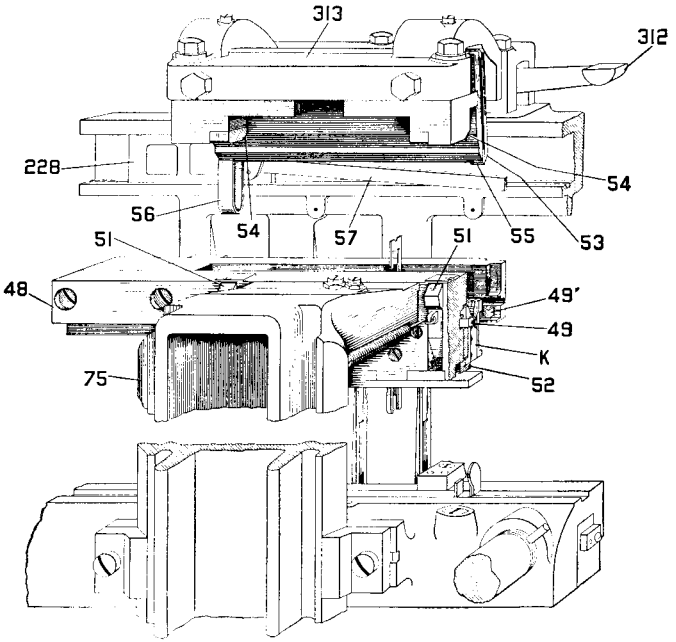


FIG. 98.—View showing the first-elevator jaw rising with the line of matrices and spacebands after the cast has taken place. *53* shows the bar having a beveled edge at its lower side, and this beveled edge is adapted to push down the spacebands in case they do not fall by their own gravity. *54* shows the two beveled edges adapted to engage with the levers *51* which withdraw the shelf *52*, allowing the matrices to fall by gravity to the lower, or roman, level. In case the matrices do not fall by gravity, the beveled edge of the block *53* pushes them down in the same manner as it does the spacebands. The matrices should fall by their own weight and will do so unless the jaw is sprung. *55* is a pawl which is quite thin so that it may pass between the two lower teeth of a matrix. The lower edge of this pawl is exactly on a line with the lower tooth of the second-elevator bar and pushes the wedges of the spacebands to their lowest position so as to clear the second elevator bar. *56* is the pusher operated by the link *57* through a lever and cam not shown in this view. The pusher *56* carries the matrices out of the first-elevator under the pawl *55*, and on to the second-elevator bar. The pusher *56* is called the elevator-transfer slide finger.

which strikes against beveled surfaces, shown at *54* in Fig. 98, and force the upper end of each lever inward, and at the other end the levers move the shelf that supports the matrices in the upper, or italic, position to the front, releasing the matrices in the upper, or italic, position, which fall by their own gravity so that they hang by their upper ears.

In case the matrices do not fall from the italic position by their own weight, they are brought down by the block *53*, which has previously pushed down the spacebands. The matrices are now all in the roman, or lower, position, and their distributing teeth are all in alignment. The

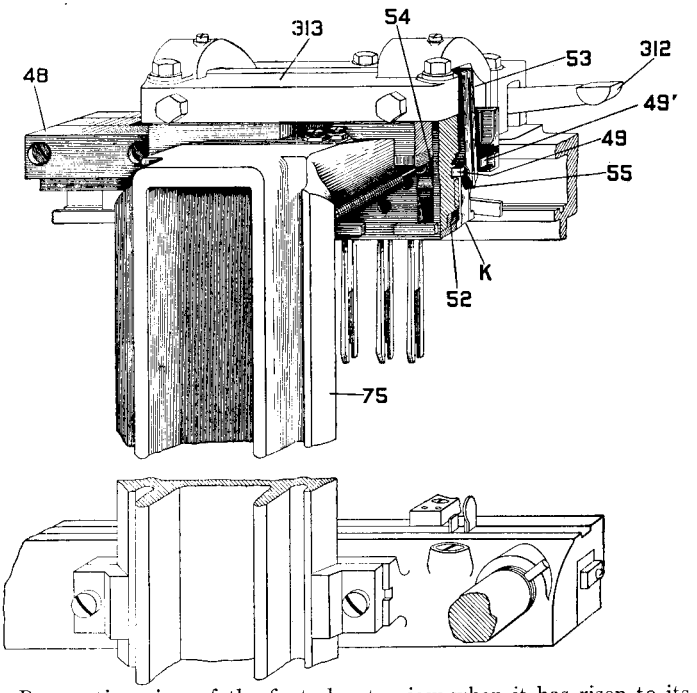


FIG. 99.—Perspective view of the first-elevator jaw when it has risen to its highest position ready for the discharge of the matrices into the upper channel. The bar *53* has pressed the matrices and spacebands down, and the pawl *55*, which is in exact line with the lower tooth of the second-elevator bar, compels the spacebands in their transfer to register with the teeth of the second-elevator bar when they are pushed out of the first-elevator jaw.

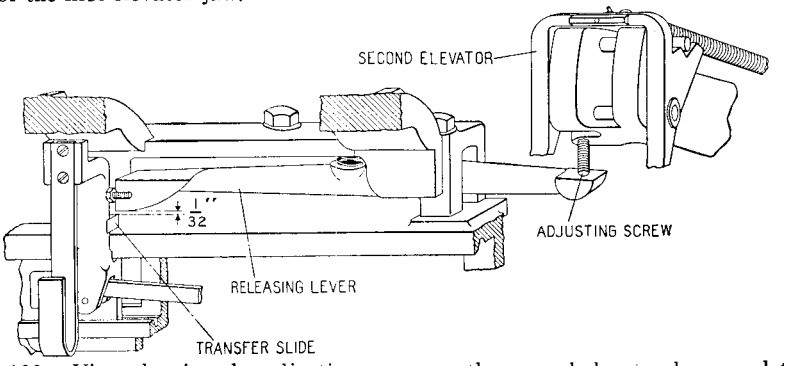


FIG. 100.—View showing the adjusting screw on the second-elevator lever and the distance of the releasing lever from the projection on the transfer slide.

spacebands are also in their normal position. The transfer lever operated by a cam now carries the line of aligned matrices and spacebands out of the first-elevator jaw past the pawls, into the upper transfer channel, as

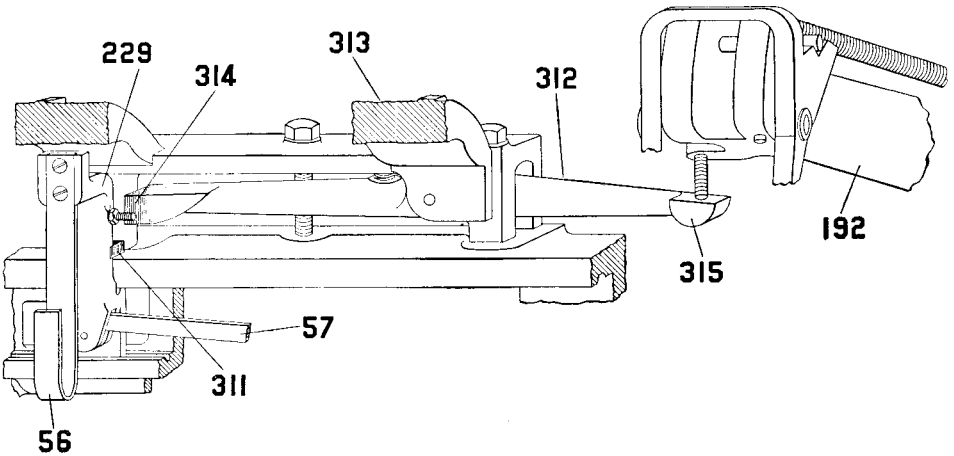


FIG. 101.—Enlarged view showing the method of locking the elevator transfer slide. When the machine is in normal position the lever *312* locks the elevator-transfer slide, but when the second elevator descends a screw strikes on the end of the lever *312* shown at *315*, raises the other end of the lever *312*, unlocking the elevator-transfer slide and allowing the matrices to be transferred upon the second-elevator bar.

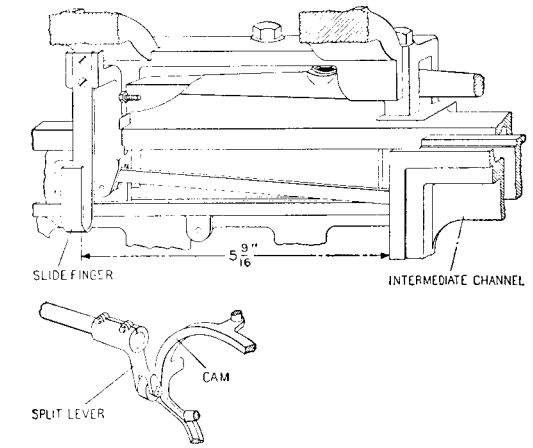


FIG. 102.—Elevator transfer slide ready to push over the line of matrices into the second elevator. The lower part of the figure shows a portion of the lever and cam which operate the elevator transfer slide. The lever has a split bearing and is held on the shaft by two bolts and it is thus possible to set it in any desired position.

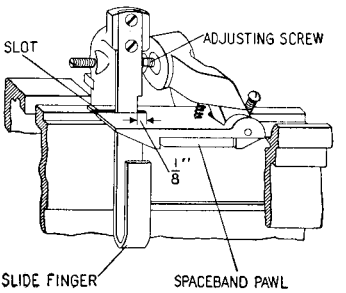


FIG. 103.—The spaceband pawl and the slide finger at their closest position when they have pushed the spacebands together and the pawl has passed by them so as to return them into the spaceband box or magazine.

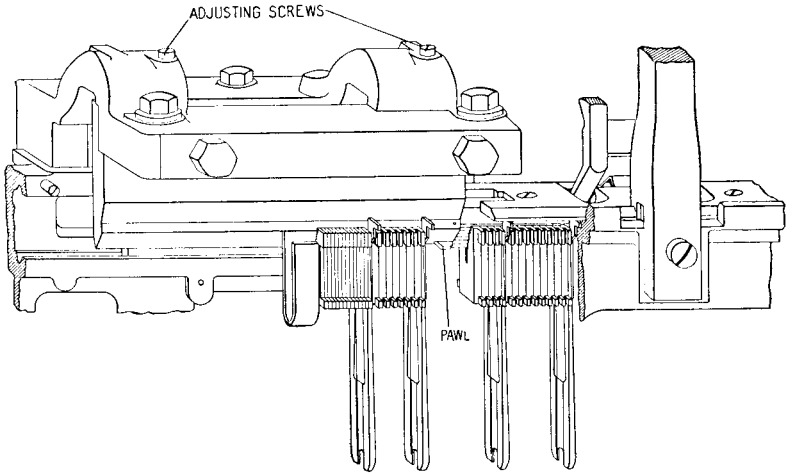


FIG. 104.—View of the line of matrices and spacebands going through what is called "the upper transfer;" that is, the line is passing from the first-elevator jaws in their highest position into the intermediate channel.

shown in Fig. 105. The matrices also pass under a pawl *55* in Figs. 98 and 104 that levels or aligns them exactly, so that the teeth of the matrices will go smoothly onto the teeth of the second-elevator bar and cause the wedges of the spacebands to clear the second elevator bar. It will be noted that this transfer channel has only two rails at the bottom, which support the matrices by their lower ears. The shoulders of the spacebands, being wider than the ears of the matrices, register with and enter a groove in the front part of the intermediate channel as shown in Fig. 27. The notch in the bottom of the spacebands registers with a rail in the bottom of the intermediate channel. This rail prevents the spacebands from twisting in the transfer.

At the time of this transfer, the second elevator *198*, which is mounted on a lever, is in register with the intermediate channel, as shown in Fig. 105. This second elevator, as shown in Fig. 105, consists of a flat surface *198* having mounted beneath it a short section of a distributor bar. This short section of the distributor bar has seven teeth on it, corresponding to the teeth in the matrices. When the transfer, which has been described, has taken place, the teeth of the matrices, engaging with the second-elevator bar, the matrices are all held upon this bar by the teeth of the bar. The spacebands, however, having no distributor teeth, are not held upon this second-elevator bar, and hence, when the second-elevator bar is raised it carries the matrices along with it, while the spacebands are retained by their shoulders in the groove as previously described, and are left behind. The matrices are now carried through the air by the second-elevator lever to a point where the second-elevator bar registers with the distributor box.

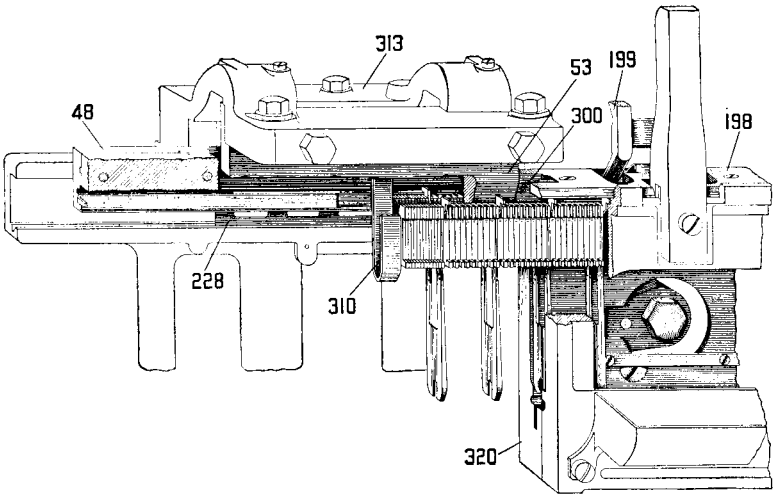


FIG. 105.—Another view showing the line of matrices being transferred into the intermediate channel. A part of the casting *320* is cut away so as to show the line of matrices and spacebands passing on to the second-elevator bar *300*. This is called the "upper transfer."

The teeth of the second-elevator bar *300* must be in exact alignment to receive the teeth of the matrices as they are passed on to the bar.

The first-elevator bar *48* must be adjusted so that as the matrices pass from the jaw they will exactly register with the grooves in the second-elevator bar.

In making this adjustment, the machine should be stopped when the first-elevator jaw *48* has just reached its upper position and before the matrices are transferred. If a few matrices are left in the first-elevator jaw *48*, they can be transferred into the second-elevator bar *300* with the fingers, and the first-elevator jaw should be adjusted up or down by the screw at the lower end of the first-elevator slide until the transfer made with the fingers feels smooth and easy.

The lugs *54*, shown in Fig. 98, are then adjusted so that the first-elevator jaw *48* will be lined up for smooth transfer of matrices. It will be noted that these lugs *54* perform a double function; one, of pushing in a lever to align the matrices, as described on page 108, Fig. 98; the other, to guide the jaw *48* in line with second elevator.

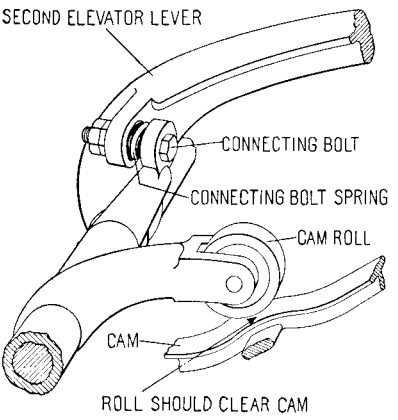
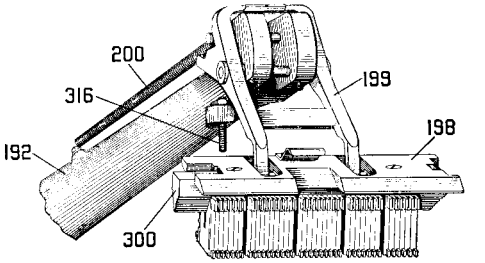


FIG. 106.—View of the second-elevator lever, the safety spring, the short arm carrying the roll, and a small portion of the cam when the machine is in normal position. At this time the cam roll should clear the surface of the cam by the thickness of a piece of cardboard.



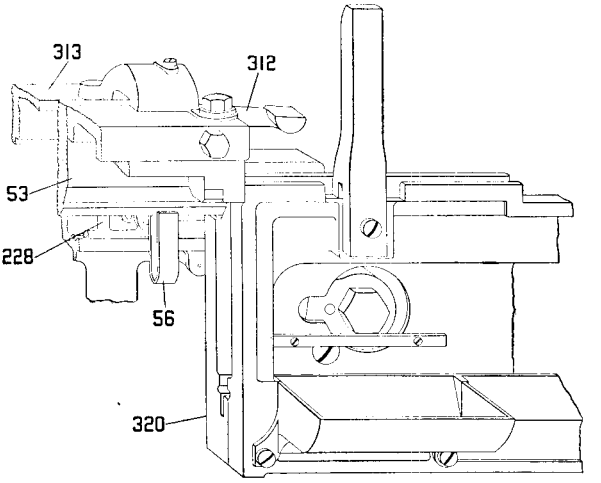


FIG. 107.—View showing the line of matrices on the second elevator starting upward to be transferred to the distributor box. The intermediate channel *320* retains the spacebands.

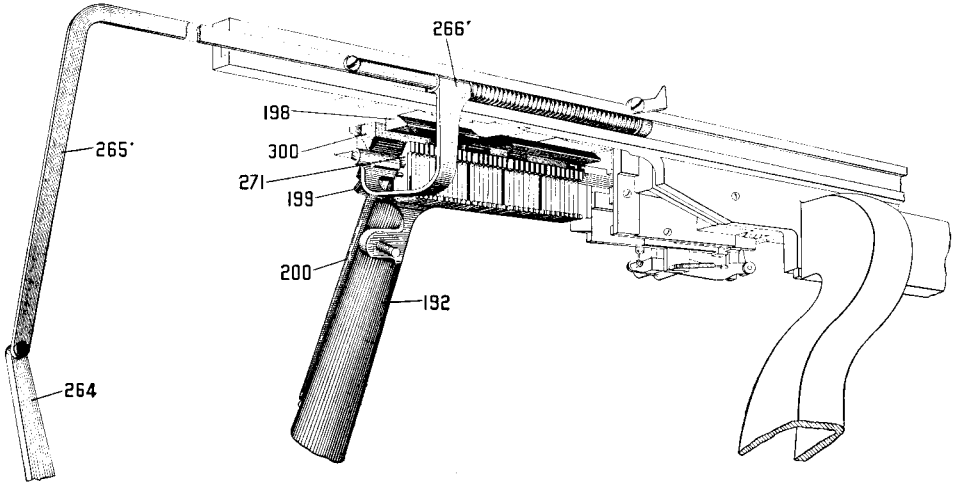


FIG. 108.—Another view of the distributor shifter *266′* and the distributor-shifter link *265′*. This is the form which is used in the Model 9 machine and some other models. In other respects the view shows a line of matrices ready to be pushed into the distributor box off the second-elevator bar *300*. Substantially this arrangement is common to all models.

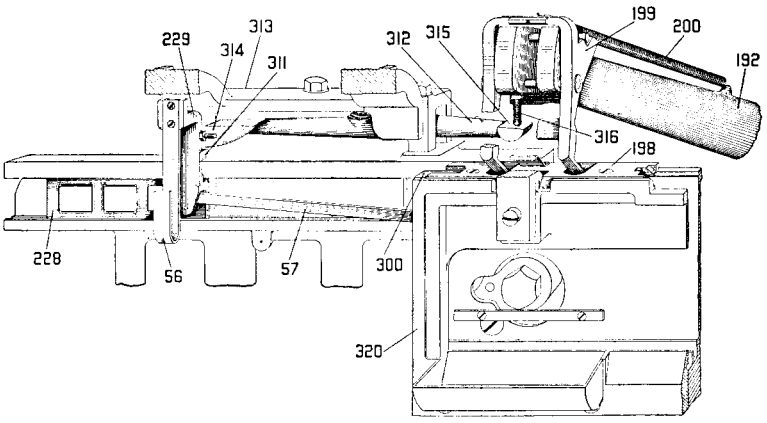


FIG. 109.—Mechanism for transferring the line from the first-elevator jaw into the intermediate channel. *228* is the elevator transfer slide, which is adapted to slide in grooves in the upper part of the face plate.

Attached to the elevator-transfer slide is the elevator-transfer slide finger *56*. The lower part of this finger *56* is curved upward, and is adapted to push the line of matrices out of the first-elevator jaw into the intermediate channel *320*. Pivoted in the first-elevator slide guide *313*, is the elevator-transfer slide releasing lever *312*, which has a projection *314* on the front of its left-hand end. This projection, when the machine is in normal position, locks the elevator-transfer slide stop *311*, which is attached to the elevator-transfer slide *228*, and prevents it going to the right until the second elevator *198*, as it descends to receive the line of matrices in the intermediate channel, unlocks it, by the adjusting screw *316* in the second-elevator lever *192*, striking upon the end of the elevator-transfer slide releasing lever *312* at *315*, raises the other end, which permits the elevator-transfer slide to move to the right.

This screw *316* should be adjusted so that the projection *314* will just clear the elevator-transfer slide stop *311* when the second-elevator bar *300* is fully down in position to receive the line of matrices.

DISTRIBUTION OF SPACEBANDS

The spacebands, as previously described, are left in the intermediate channel. Through the action of the cams *219* and *220* in Fig. 76, the spacebands are pushed together by the transfer lever *234* and the spaceband lever *234*, as shown in Fig. 28. The bunch of spacebands is then transferred to the spaceband box or magazine, by another movement of the spaceband lever *234*. They are prevented from twisting sidewise or falling out of the grooves by a slot in the bottom of the spaceband which engages with a rail in the bottom of the upper transfer channel.

The spacebands are pulled by the pawl of the spaceband lever beyond the incline shown at *341*, Fig. 28, so that the spacebands slide down this incline by gravity and pile up in the spaceband box, or magazine, in a position to be assembled again. The pawl of the spaceband lever must be set to perform this action surely and smoothly.

SECOND ELEVATOR LEVER AND BAR

The second elevator lever carries the second elevator, upon which the matrices are hanging by the teeth, from the intermediate channel to the distributor, where they align with the distributor box bar, so that they can be transferred into the distributor box. The second elevator is attached to the lever, by the second-elevator link, which permits it to take its proper position in both the upper and lower positions.

In the front of the second-elevator bar plate *198*, is a slot which engages with the post on the front plate of the intermediate channel, and positions the second elevator endwise as it descends, while it takes its position front and back, from a projecting lip on the top edge of the front plate of the intermediate channel, which brings the second-elevator bar in the center of the intermediate channel, parallel with it, and in proper position to receive the line of matrices as it is transferred from the first-elevator jaw.

Near the end of the second-elevator lever is a screw *316* that strikes upon the elevator transfer slide releasing lever *315*, Fig. 109. This releasing lever normally holds the elevator-transfer slide *229* from moving, and its motion is only allowed when the releasing lever has been tripped by the screw *316*. At the upper end of its motion, the second elevator fits into recesses in the distributor shifter slide guide, which is fastened to the distributor beam. In this upper position the second elevator is positioned endwise, by the slot in second-elevator lever *192*, Fig. 107.

The object of the parts just described is to bring the second elevator (which carries the matrices by their teeth) into exact alignment with another small bar having teeth upon it, and known as the distributor box bar. This distributor box bar is not fastened solidly in the distributor box, but is pivoted, so as to have a slight motion, and there is a small projection on its end which fits between the second-elevator bar and the second-elevator bar plate, and causes the teeth of the two bars to align exactly so that the matrices can transfer from one to the other.

THE DISTRIBUTOR BOX

The distributor box is that part of the mechanism through which the matrices pass in going from the second elevator on to the distributor bar. It consists of a bracket, having a notch on the upper side by which it may be attached to the distributor beam by a bolt and handle, mounted on the beam, so that it can be readily taken off and put on the machine. In a slot in the lower edge of this bracket is pivoted the distributor box bar, along which the matrices slide as they are transferred through the box. Fastened to the sides of the bracket are two plates, one on the front and one on the back, and attached to these plates are the distributor box rails *370* and *371*, Figs. 111 and 112. Pivoted in a lug on the back plate are two levers, the distributor box matrix lift lever *353* and the cam lever *357*.

The distributor box matrix lift lever operates the matrix lift *362*, which lifts the matrices into the distributor screws. The distributor box matrix lift lever is operated by a cam *360*, mounted on the distributor screw, by the cam lever *357*. When the matrices are transferred from the second elevator into the distributor box they are carried by their teeth on to the distributor box bar, until they reach the right-hand end, when they leave the teeth and are supported by their upper ears, on the upper rails, and are pushed against the vertical shoulders of the upper and lower rails,

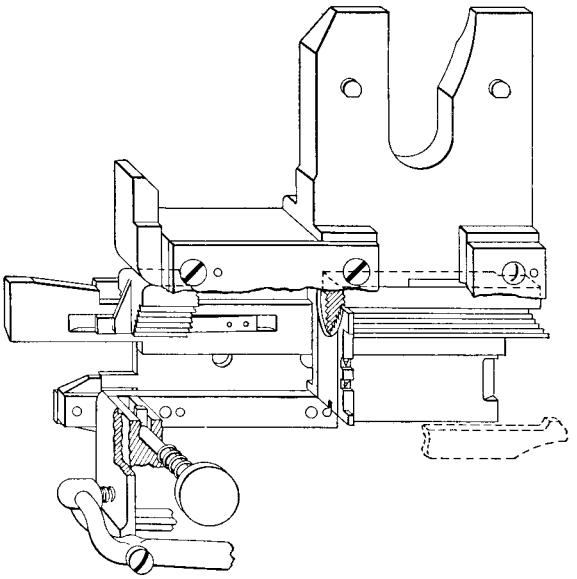


FIG. 110.—A matrix traversing the inside of the distributor box along the toothed bar, the back side of the distributor box being partly cut away for purposes of illustration.

in which position they are ready to be lifted into the distributor screws. At the left-hand end of the distributor box are two lower tilting rails, with a projection on them, against which the matrices strike. At the right-hand end of this section of the distributor bar is a thin blade which is let into the distributor bar, and is called the distributor-box bar point. This point is about one thirty-second of an inch thick.

The rails, previously mentioned, end in two upwardly projecting shoulders, as shown in Figs. 111 and 112. In the right-hand end of the distributor box there are two lower rails having similar shoulders, as shown in the same figures, so that when the matrix comes to the extreme end of the distributor box, the upper ears of the matrix, as shown in Fig. 112, rest against the shoulders *370* and the lower ears against the shoulders *371*. The distributor blade, previously mentioned, engages with a notch

which is found in all matrices except the thinnest. The front end of this blade is about thirty thousandths of an inch back of the shoulders. As the matrix is lifted by the action of the lift the distributor blade enters the notch in the matrices and prevents a second matrix from rising, on account

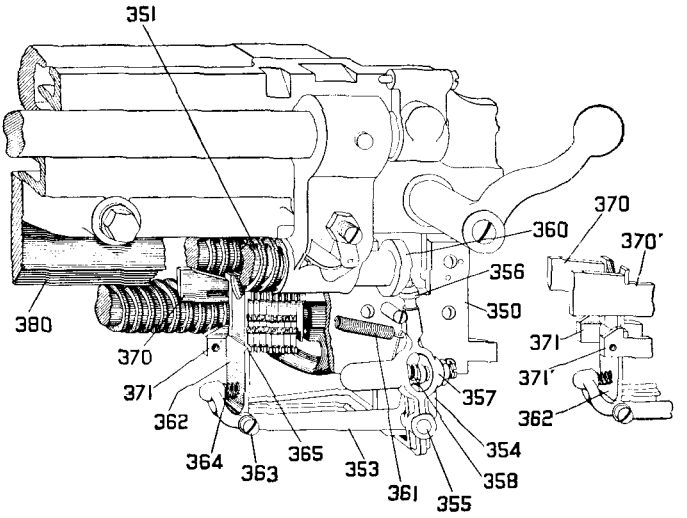


FIG. 111.—Enlarged view of the distributor lift and its action.

In the small view at the right hand are two rails, *370* and *370'*. These rails are mounted on the inside of the distributor box, and project forward in between the distributor screws. These rails have vertical shoulders about three sixteenths of an inch high, against which the ears of the matrices rest.

The lower ears of the matrices come against the shoulders in another pair of rails, *371* and *371'*.

In the large view, the lift *362* is shown just ready to lift a matrix. The upper part of the lift has a very narrow shelf upon it, *365*. This shelf goes under the lower edge of the matrix, and when the cam *360* revolves, the distributor box matrix lift lever *353* is raised, carrying up the lift *362*, raising the matrix up into the distributor screws.

of friction with the matrix being lifted. This arrangement of the distributor-bar blade and the notches milled in the matrices is equivalent to making all matrices at this point of the same thickness.

On a lug, or projection, of the back side of the distributor box is mounted the distributor lever and lift. The distributor lever is shown at *353* in Fig. 111 and the lift at *362* in the same figure. The distributor lever is operated by a vertical lever *357* having upon its side a small roller. This roller engages with a small cam that is mounted on the end of one of the distributor screws, as shown at *360* in Fig. 111. The operation of the cam *360* through the vertical stud *357* and the distributor lever *353* causes the distributor lift to rise and fall at a certain time with reference to the distributor screws.

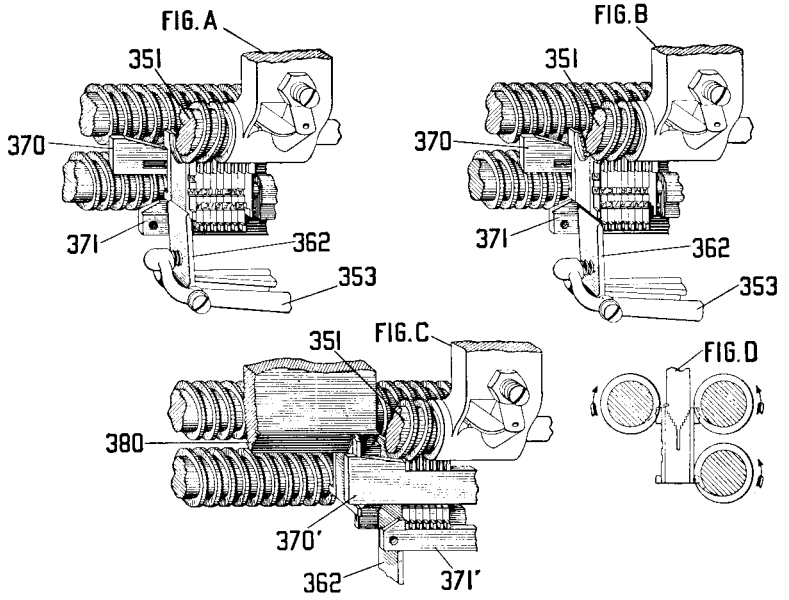


FIG. 112.—Several views showing the action of the lift. Figure A shows the matrix just lifted over the shoulders of the rails *370* and *371*. The front rail in this view is cut away, and a part of the distributor box, to make the illustration more clear.

Figure B shows the matrix lifted entirely over the shoulders into the threads of the distributor screws, and the distributor lift *362* leaving the matrix and going down to its original position.

Figure C shows the matrix being carried forward up the inclined part of the rails *370* and just ready to go on to the distributor bar. The top of the rail *370* is parallel with the bottom of the rail for a short distance, and is of such a height as to bring the teeth of the matrix opposite the grooves in the distributor bar *380*.

The further revolution of the distributor screws carries the matrix onto the distributor bar *380*, and the bar sustains the matrices by the teeth as they are being carried along on the distributor bar until such time as the combination in the teeth of the matrix comes to the combination in the distributor bar which is cut away; whereupon the matrix, being no longer sustained, drops off the distributor bar into the channel entrance.

Figure D is a sectional view of the three distributor screws, the distributor bar, and the matrix hanging thereon, showing the engagement of the threads of the distributor screws with the ears of the matrix.

The lift is timed so that it will raise the matrix between the threads of the screws and hold it there until the threads of the screws have pushed the matrix forward upon the rails.

DISTRIBUTOR BOX MATRIX LIFT CAM

The distributor box matrix lift cam is fastened to the end of the distributor back screw by a taper pin. The cam cannot be adjusted, and should not be taken off unless it is worn, and should be replaced by a new one. To apply a new one drive out the taper pin and take off the cam,

placing the new one on the distributor screw in such a position that the hole in the cam will match the hole in the distributor screw. To hold it in position use an 8 x 32 headless screw in the tapped hole in the hub of the cam. Place a thick matrix with full-size ears in the distributor box, and see that the distributor box matrix lift is adjusted so that when the cam roll is on the high part of the cam the upper ears of the matrix will be raised about one thirty-second of an inch above the shoulder of the distributor box upper rails. After this adjustment is made use the same matrix and turn the distributor screws by hand. As the lift starts to raise the matrix between the threads of the screws, the front or side of the matrix opposite the distributor pusher should be about one thirty-second of an inch back of the threads of the screws. If it is not, loosen the small screw and turn the cam, so that when the matrix starts to raise it will clear the threads of the screws by about one thirty-second of an inch. This provides for any wear on the shoulders of the rails and still permits the matrix to be raised without striking the threads of the screws. Fasten the cam securely with the small screw and run a few lines through to be sure the cam is set right. If it is, ream out the hole through both the cam and distributor screw and drive in a taper pin. The small screw can then be removed. Before applying a new matrix lift cam be sure that the distributor box rails, both upper and lower, are not worn on the shoulders. If they are, put on new rails before applying the new cams. The replacing of the cam is not often necessary.

BENDING OF MATRICES

It occasionally happens that the thin matrices are bent in the distributor box. In general the box gives little trouble in its operation, but like all mechanical devices, parts become worn and it is necessary at times to replace them. These parts are illustrated in exaggerated form shown in Fig. 113. Any of the following causes will bend matrices:

First, the wear on the shoulders of the rails *370* should never be permitted to exceed .050″ between the bar point and shoulders of rails *370*. Nearly all the distributor box trouble is due to worn rails, causing a space between the shoulders of the rails and the bar point large enough to allow two thin matrices to be lifted at one time, damaging the ears of the thin matrices, and permitting the thick matrices to become twisted.

Second, distributor box lift not raising matrix high enough to clear the shoulders of rails *370*, Figs. 111 and 112. The lift *362*, Fig. 111, should be adjusted to raise the matrix ears one thirty-second of an inch above the shoulders of distributor box rails *370*, Figs. 111 and 112.

Third, distributor bar point or blade, Figs. 110 and 124, worn or damaged.

Fourth, the distributor-shifter buffer shown at *271* in Fig. 108 may be gummy or sticky, and if it happens that the matrix is being lifted just as the distributor shifter goes back for the next line, the matrix may slip

off the shelf on the lift after it has been partly raised. This is shown in Fig. 113.

Fifth, the shelf on the distributor lift, after long use, becomes rounded so that it does not hold with a firm grip underneath the matrix, and the matrix may slip off the lift after it has been partly raised.

Sixth, the little spring that holds the distributor lift against the matrix may become stretched and weak and not hold the distributor lift firmly

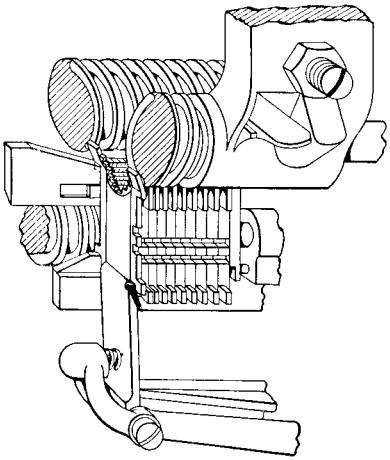


FIG. 113.—View showing a thin matrix bent by the action of the screws because the lift has not raised it above the shoulders and the rails of the distributor box.

against the matrix, so that the matrix may slip off the shelf after it has been partly raised. These last two points may combine to make trouble.

Each of the six points above mentioned should then be carefully looked into. In all these cases, when the screws bend or bruise the matrices as mentioned above, they must be repaired before using.

THE DISTRIBUTOR SCREWS

The two upper distributor screws run in fixed bearings, as do all the distributor screws on the Model 9. Upon all the models where there is a single distributor, comprising three screws, the lower distributor screw is pivoted, so as to swing outward and upward, as shown in Fig. 114. This is done to give access to the matrix on the distributor bar. When this is done, the small gear at the left-hand side of the machine which drives the lower distributor screw comes out of mesh. In order that it may always be in the proper time there is in this distributor screw what is called a "hunting tooth;" that is, in one gear there is a pin inserted between the teeth, and there is a corresponding hole in the gear teeth with which it meshes. The gears cannot be meshed unless the hunting tooth is in proper position.

The distributor screws have a thread upon them with one-quarter of an inch pitch; that is, the matrix is carried along the distributor bar one-quarter of an inch for every revolution of the distributor screw. In most of the models the distributor screws are about one inch in outside diameter. In the Model 9, and some of the other models, the diameter of these screws is reduced to three-quarters of an inch. In the later models the distributor screws, instead of having a pitch of one quarter of an inch, have a pitch of one-third or one-half inch. That is to say, every revolution

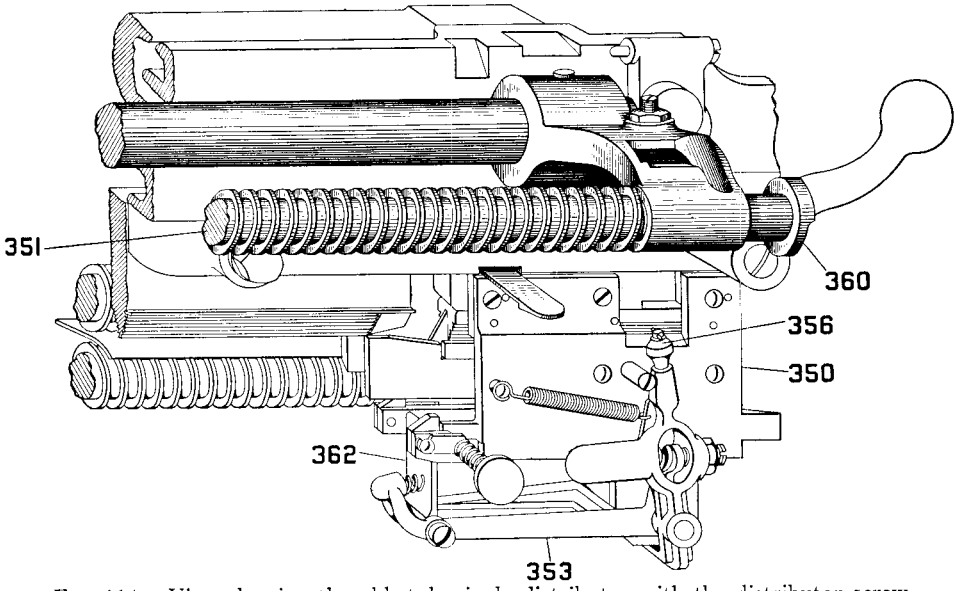


FIG. 114.—View showing the old-style single distributor with the distributor screw thrown out so as to remove matrices from the bar.

of the distributor screw carries the matrix along the distributor bar a distance of one third, or, in some cases, one half of an inch. This carries the matrices along the bar much more rapidly and moves the matrices away from the distributor box much more quickly, leaving a greater space between each successive matrix, so that, although the matrices are traveling more rapidly along the bar, there is less chance for interference by the succeeding matrix striking against a preceding matrix as it is falling from the distributor bar.

DRIVING MECHANISM AND CLUTCH OF THE DISTRIBUTOR

The distributor is operated by a friction clutch which slips if anything stops the distributor screws. This is shown in Figs. 115 and 116. The clutch consists of a disk *460* mounted on a sleeve *459* which has a spline, and a spring *461* presses this disk against the face of the driving pulley *462*. The shaft that carries the friction disk has upon it a gear that meshes

with the gears of the distributor screws. Mounted on the sleeve *459* is a collar *458* which has cams or teeth in its side. Just below this is a distributor clutch lever *456*, having a tooth *457* in its end which engages with one of the cams of the collar *458* and forces the sleeve *459* away from the distributor clutch pulley, thereby stopping the motion of the distributor screws.

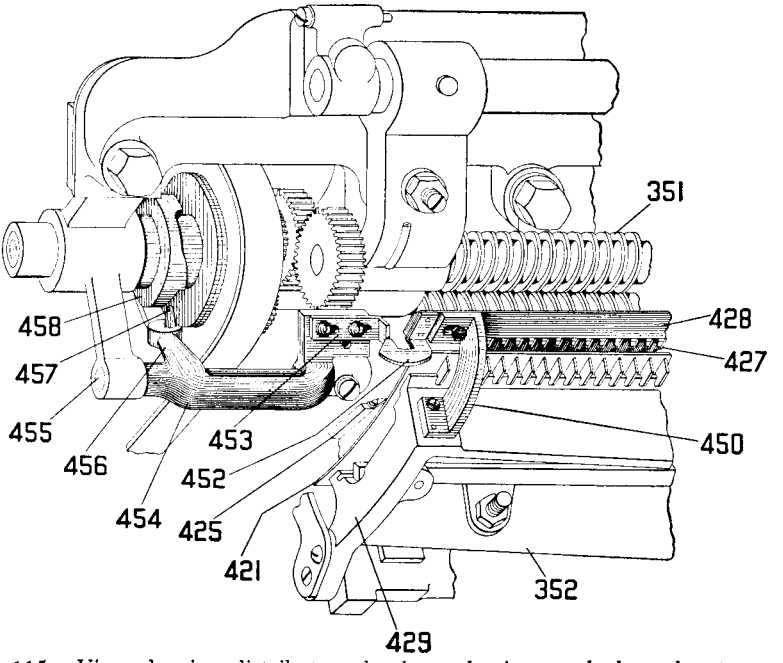


FIG. 115.—View showing distributor clutch mechanism, and channel entrance in normal position and the method of stopping the distributor when the matrices clog and fail to go through the channel entrance into the magazine.

351 is the distributor screw, and *352* is the channel entrance. Mounted on the channel-entrance casting are two brackets *450*. These two brackets carry a toothed bar *427*. At the end of this bar there is a small catch *452*. This catch normally stands in contact with a bracket *453*. The bracket *453* is mounted on a casting *454*, which in turn is mounted on a short shaft *455*. This casting *454* has a lever on it *456* through which passes a screw having a tooth, or pin, *457*.

The casting *454* is free to swing on the shaft *455*, and the pin *457* is urged upward by a spring not shown in this view. So long as the catch *452* rests against the bracket *453*, the tooth *457* is held in position out of the path of the cam *458*, but when the catch *452* is moved endwise, the projecting part of the bracket *453* drops into the notch in the catch *452*, allowing the tooth *457* to move up and engage a tooth of the cam *458*, which throws out the clutch and stops the distributor screw, as will be more fully shown in another view.

DISTRIBUTOR AUTOMATIC STOP

In most of the Linotype machines now in use the distributor automatic stop is constructed as follows: Fig. 116 shows a view of the partitions in the channel entrance. The upper part of these partitions is flexible,

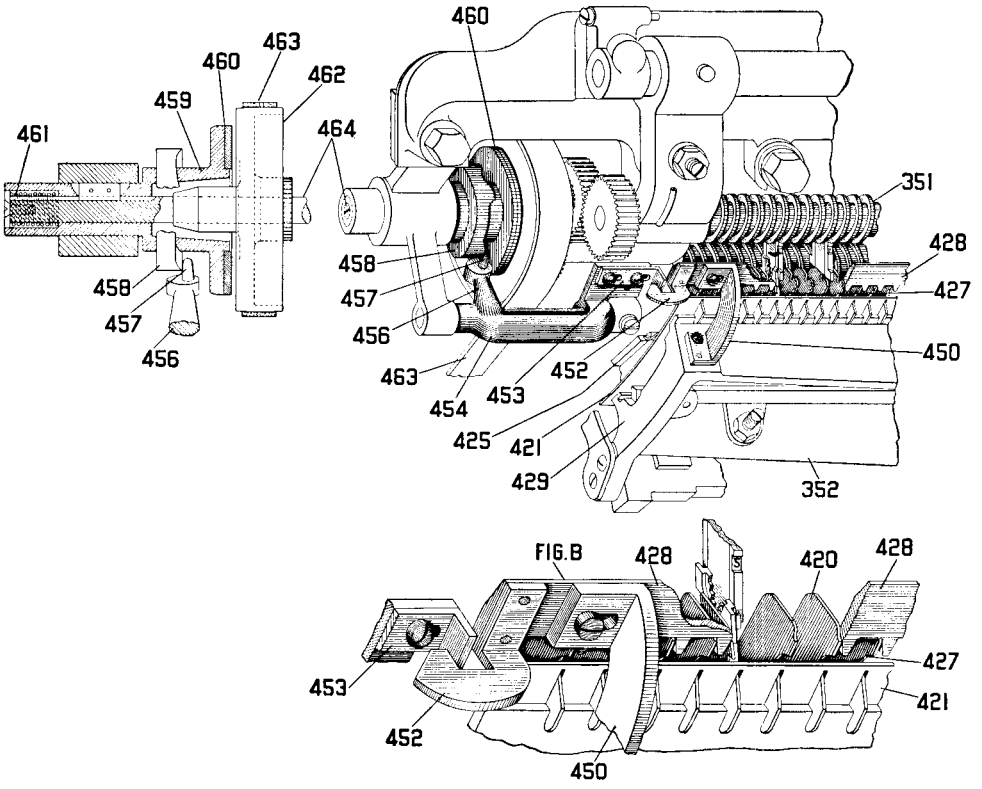


FIG. 116.—View of the means for stopping the distributor when the matrices clog. This view shows a matrix in the channel entrance which has failed to get out of the way of the following matrix.

The view shows the matrix on the distributor bar pressing against the matrix partly in the channel entrance and pressing against the partition. This flexible partition moves the toothed bar *428* to the left, as you stand behind the machine, allowing the bracket *453* to enter the notch of the catch *452*, permitting the casting *454* to swing back and throw the tooth *457* upward into the cam *458*. This is shown in an enlarged view just below in Fig. B. This causes the sleeve *459* to move slightly to the left, releasing the clutch *460* so that the drive of the distributor screws is released and the motion of the distributor screws stops. The clutch disk *460* is held in action by the spring *461*.

After the channel entrance is open and the clogging matrix removed, upon closing the channel entrance, the bracket *452* strikes against the bracket *453*, drawing the tooth *457* downward and out of engagement, whereupon the spring *461* brings the clutch *460* into engagement and the distributor screws revolve normally.

The motion of the distributor screws is communicated to them by the pulley *462* and by the belt *463*, which is driven by the intermediate shaft, not shown in this view. The clutch *460* is made of a leather or fiber washer, which presses against the smooth surface of the pulley when the clutch is in action. The sleeve *459* is splined into the shaft *464*, and attached to the right of this shaft is a small gear, which meshes in the distributor screw gears, and drives the screws.

and is made of spring brass. These partitions at their rear edge engage with small notches in a long bar. This bar, at its left-hand end (as you stand behind the machine), engages with a little catch *452*, shown in Fig. 115. When the machine is in normal position, the little catch *452* rests upon this bracket *453* and holds the lever *456* (previously described) out of contact with the cam-shaped collar.

It will be manifest that if the bar *428* is moved to the left (as you stand behind the machine) the bracket *453* will drop into the notch in the catch *452*, allowing the lever *456* to swing upward, and the tooth *457* will make contact with the cam shaped collar, throwing it to the left, disengaging the clutch and stopping the motion of the distributor screws.

The movement of the bar *428* to the left is caused by the pressure of a matrix under the impulse of the screws against the flexible channel entrance partition, and the movement of the partition, which moves the bar *428* so as to operate the automatic stop, as previously described. This stop does not work so long as a matrix falls into the channel entrance and gets out of the way of the distributor screws. The distributor automatic stop only works when, for any cause, the matrix fails to fall into the channel entrance and go on its way.

There is an adjustment on the small bracket *453* that enables the operator to set the automatic so that it will trip and stop the distributor screws by greater or less left-hand movement of the bar *428*. The left-hand movement of the bar *428* should not be more than about one thirty-second of an inch to trip. The views 115 and 116 are taken from the rear of the machine.

This automatic stop has proved to be very efficient and satisfactory, and is now running in many thousands of machines all over the world. It requires, however, a little care and attention. The bar *428* should move very freely. It should not be allowed to become sticky with gum, or its action in any way hindered. Its left-hand movement, as previously mentioned, should not be more than one thirty-second of an inch. If it is more than this, the spring partitions are bent too far, and after being so bent a number of times the brass partition *420* in Figs. 116 and 122 loses is elasticity, and the partition "sets". The partition must then be bent backward into its proper position with a pair of pliers. When a partition has entirely lost its elasticity it is necessary to remove it and replace it by another. This will seldom occur if the automatic is properly set and the motion of the spring partition is not too great.

TO REMOVE THE DISTRIBUTOR BOX

To remove the distributor box, turn the machine back until the second elevator descends a few inches from the distributor beam, withdraw distributor-shifter and lock it, then unscrew the locking screw of the distributor box to the right as far as it will go without forcing. The box can then be removed in a downward direction.

ADJUSTMENT OF THE LOWER DISTRIBUTOR BOX

Place the distributor box in the machine and turn the distributor screw, until the distributor box lower escapement cam roll rides on the lower point of the cam. Adjust the escapement cam lever adjusting screw until the point of escapement pawl clears the bottom of the slot in the matrix about one sixty-fourth of an inch. See that the male pawl point

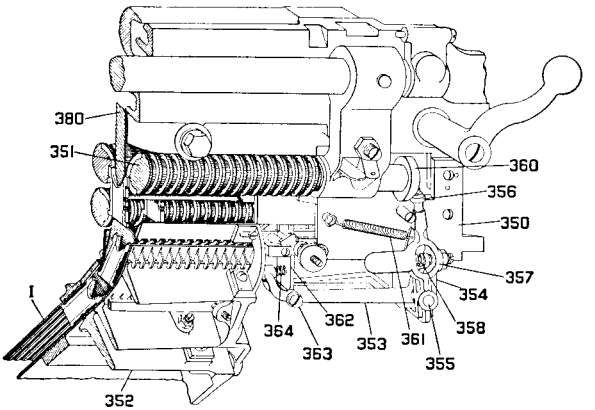


FIG. 117.—View showing the distributor box *350* in its relation to the distributor screws *351* and to the channel entrance *352* and the magazine.

The distributor box *350* is composed of two plates fastened together at the top and open at the bottom. There is a lug, or projection, on the bottom of the distributor box, in which is mounted a pivot *355*. On this pivot there is mounted a lever called the "matrix lift lever" *354*.

This lever is operated by a second vertical lever *357*. Between the lever *357* and the lever *354* is interposed a spring *358*. This acts as a safety device so that if a matrix gets caught, or there is anything to prevent the upward movement of the lever *353*, the spring will contract so that nothing is broken.

Mounted at the top of the lever *357* is a small roll *356*. This roll works against the surface of a cam *360*. This cam *360* is mounted on a bearing shaft for the distributor screws *351*. The shape of the cam *360* is such as to cause it to raise the lever *353*, hold it in position a certain length of time, and then allow it to return to normal position. The return is caused by the spring *361*. Mounted at the outer end of the lever *353* is a small vertical lever *362*. This lever *362* is mounted upon a pivot *363*.

A small spring *364* presses the lever *362* toward the left of the machine, as you stand in front of it. This lever *362* is called the distributor "lift," as it is used to raise the matrices so that their ears engage the threads of the distributor screws that carry the matrices along the distributor bar.

does not become bent. This point should admit a thin matrix only between both pawls. The female pawl must have a retaining hold on the matrix of at least one thirty-second of an inch when the male pawl is adjusted, to allow the matrix to clear the bottom of the slot.

In the Model 9 machine the matrices pass from the second-elevator bar into the primary distributor, where they are separated and delivered to any one of the four distributors as pre-determined. This is accomplished

by using four bridges, and a series of notches in the lower end of the matrix. These notches are arranged in combinations, using three notches by which arrangement it is possible to get 41 different combinations. The primary distributor consists of a distributor box in which the matrices are raised into the screws and carried on to a short distributor bar. On this distributor bar the teeth are cut away at certain places, and directly underneath where the teeth are cut away is a bridge. As the matrices pass over the bar they will ride on the bridge where the teeth are cut away, unless the combination of 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 predetermined distributor.

If the combination of notches in the matrix does not correspond with the combination of the bridge, the matrix will be carried forward and on to 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 combinations correspond. By this device the matrices are distributed into any one of the four distributors, which in turn carry them along their distributor bar until they drop into the channel entrance. This upper distributor box, although of somewhat different shape, acts exactly as the ordinary distributor box.

MULTIPLE DISTRIBUTORS

In this form of distribution the matrices pass from the second-elevator bar into an upper distributor box and stop against the distributor-box rails. They are then raised over the rails by the matrix lift. There is a device called a "bridge" mounted on the lower side of the upper distributor box on which the matrices for the upper magazine ride until the teeth of the matrix catch on the distributor bar. The matrices for the lower magazine *have a notch in the bottom* so that they do not ride on the bridge as they are carried forward, but drop so that the teeth of the

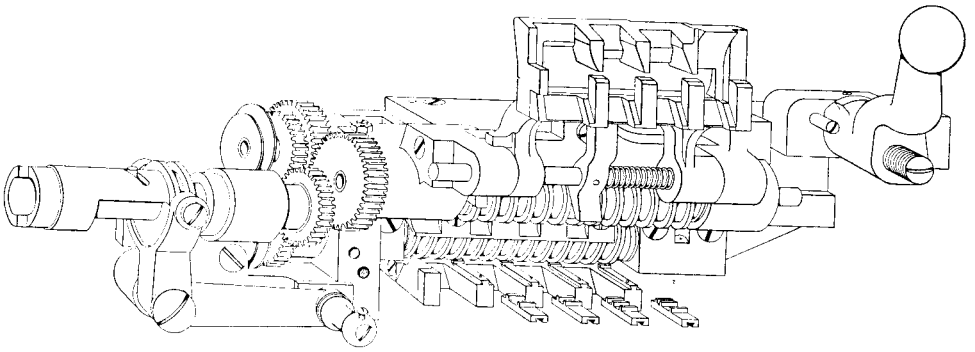


FIG. 117a.—Distributing mechanism; primary distributor assembled.

matrices do not engage the distributor bar, and they are then carried off the end of the rails, falling from the upper distributor box through a tube into the lower distributor box, where they are separated by an escapement and delivered to the lower distributor rail and screws.

It is very important to keep these distributor screws, the distributor bar, and the distributor box absolutely free from oil. Never permit oil to flow beyond the bearings of these parts.

Care should be taken to see that the escapements in the lower distributor boxes work freely at all times. If dirt is allowed to accumulate the escapements will not work freely; the matrices will be prevented from separating, and cause clogs in the distributor box. By removing the hinge screw and the small jam nut, the escapement can be readily removed and cleaned. Benzine must *not* be used to clean the escapements. They should be wiped off well with a dry rag or a piece of waste. Dry graphite or the best clock oil may be used, preferably the former, but care should be taken that no loose graphite remains. It is a good plan to remove and clean the lower distributor box at least once a day. Kerosene oil has been successfully used as a lubricant for the separating pawls.

DISTRIBUTOR-BOX RAILS—MODEL 9

Distributor-box rails, if allowed to become worn, will damage the lugs of thin matrices, permit thick matrices to become twisted as they enter the screws, and otherwise cause damage and trouble. *Nearly all distributor-box troubles can be traced to worn rails or cam.* One set will last at least a year, generally much longer, and they are inexpensive to renew. In ordering be careful to specify the model and serial number of the Linotype, as well as the part number of the rails.

TO RUN IN UPPER MAGAZINE MATRICES CUT FOR LOWER

There is a device that can be used on the matrix bridge (part G-649) to prevent matrices cut for the lower magazine from straddling the bridge and dropping into the lower distributor box. When this device is in place the matrices cut for the lower magazine will be distributed into the upper magazine. This is of use only on Models 2 and 4.

THE CHANNEL ENTRANCE

The partitions, shown in Figs. 116 and 122 form channels through which the matrices, as they fall off the distributor bar, are conducted into the entrance of the magazine. The upper ends of these channel-entrance partitions have been described. At the lower end the partitions are crimped, as shown in Fig. 122, or two lugs are used to guide the matrices by the ears. The object of the crimping at the lower end of the partition, or the lugs, is to compel the matrices to enter between the points of the magazine channels, and to prevent the thinner matrices from falling

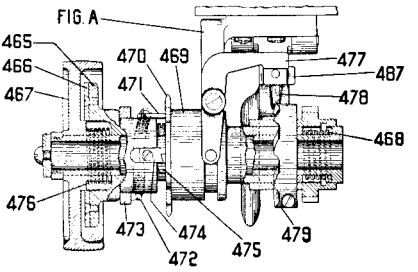
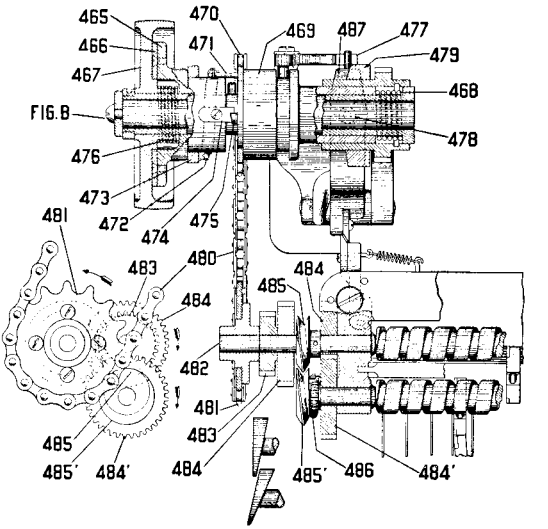


FIG. 118.—Views of another form of distributor stop. This form of distributor stop was used first on the Model 9 machine, but has since been adopted for all models. In this form of distributor stop the partitions are not flexible, but are fixed, as shown in Fig. C. It is possible, therefore, to make these partitions much thinner than the flexible partitions, allowing larger matrices to drop into the channel entrance.

The distributor is stopped by the friction of a clogged matrix upon the lower distributor screw, causing it to lag behind the upper distributor screws and get out of time with them, which brings the stopping mechanism into action.

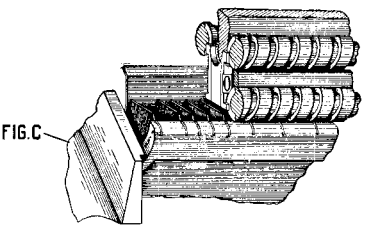
In Fig. A, *465* is a clutch sleeve having upon its surface a leather or fiber washer *466*. This clutch is shown here out of engagement with the pulley *467*. The clutch is urged inward against the pulley *467* by a spring *468*.

Mounted on the sleeve *465* is a pawl *474*. This pawl has a notch in it adapted to engage with a pawl *475* mounted on the collar *469*. These two pawls, *474* and *475* are held normally in mesh with each other by the spring *476*. In this view the clutch is shown out of engagement and the pawls are not in mesh, and are held in position by the spring *472*.



In the collar *469* there is a groove, and in this groove a pin is mounted upon a bell-crank lever *477*. This bell-crank lever works against another lever *487*, in which there is a tooth *478*. This tooth *478* engages with a cam *479*, which pulls the sleeve *465* away from the pulley *466*, fast on the bearing of the screw and the distributor screws stop. This view shows the mechanism as it would appear to one standing on a high stool and looking down upon it from above.

Fig. B shows the same mechanism with the clutch engaged and with the pawls *474* and *475* in mesh. This is a rear view and is shown as it would appear to one standing



on the floor back of the machine. The sprocket wheel *470* drives through a chain *480* another small sprocket *481*. This sprocket is fast upon a shaft *482*, which is an extension of the upper distributor screw. Mounted on this shaft are small gears *483* and *484*, and also a small portion of a screw thread *485*. These screw threads are so arranged that the thin part of the thread on the upper screw is opposite the thick part of the thread on the lower distributor screw. The small pinion *484* is pinned to the shaft; the corresponding pinion *488* is not fast upon the shaft, but is fast to the screw thread *485*. The lower distributor screw is pulled along by a small spring partly wrapped around the shaft *486* and fast to the screw thread. These screw threads are shown in diagram in the small view at the left.

So long as the distributor screws are in exact time, that is to say, so long as the thin part of the screw *485* is opposite the thick part of its mate *485'*, the screws will revolve regularly. If, however, from any cause the lower distributor screw is caused to slow up or change its relation, the two surfaces on the screw threads *485* lock against each other and stop the motion of the screws.

This puts a strain upon the distributor chain *480*, which overcomes the spring *476*, throwing the pawls *474* and *475* out of mesh and throwing the tooth *478* into the cam *479*, which pushes the sleeve *465* away from the pulley *466*, allowing it to run free and the whole distributor mechanism stops.

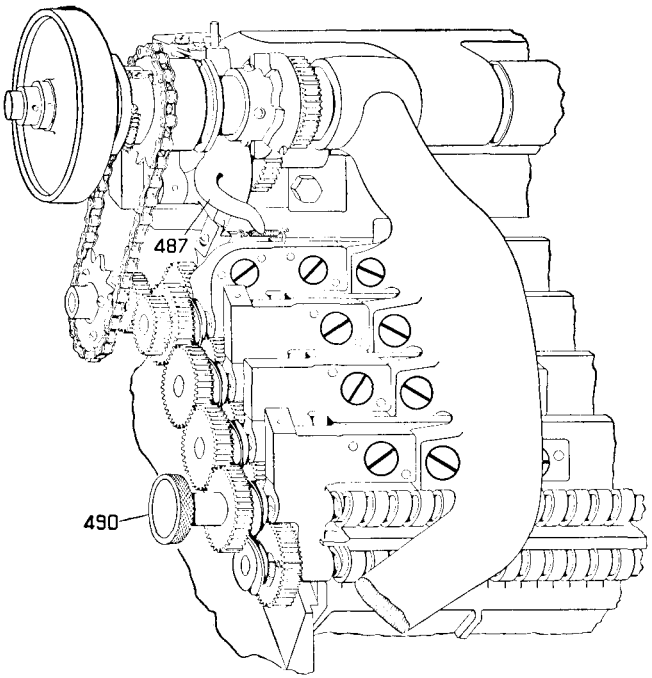


FIG. 119.—Diagram, on the rear of the machine, of the multiple distributor as used in the Model 9.

This multiple distributor is of the same general form as that shown in Fig. 116, 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.

sideways so that they will not enter the magazine at all. The crimping is of different thickness on the partitions.

The upper side of the magazine channel entrance, Fig. 122, is composed of two parts one of them a strip which is perforated and through these perforations the lugs on the partitions project and a wire is run through to

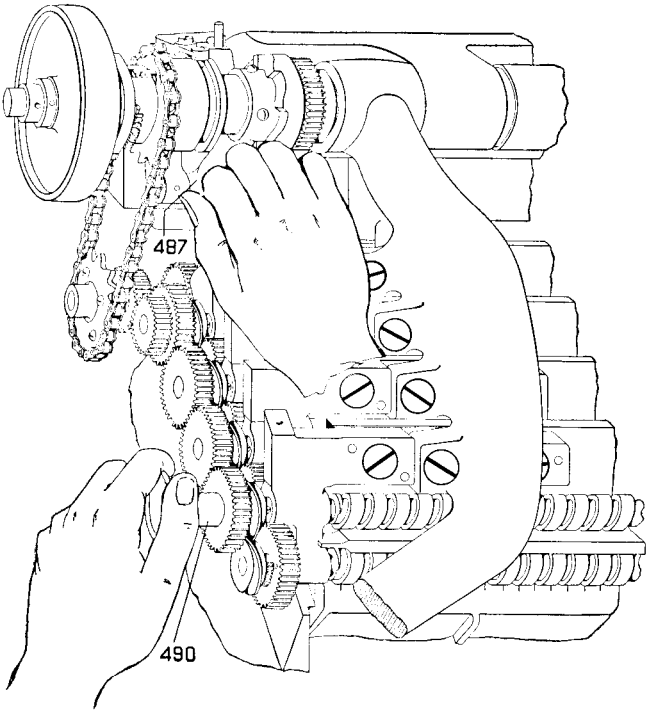


FIG. 120.—Another view of the rear of the Model 9 set of distributor screws. The view shows the method of starting the distributor screws after a clogged matrix has been removed.

In the view the right hand is shown raising the hand lever *487*, which throws in the clutch against the driving pulley. With the left hand the little hand wheel *490* is revolved backward a short distance to disengage the lock of the screw threads, which stops the distributor screws.

A short turn backward of the hand wheel *490* and raising the hand lever *487*, which throws in the clutch, permits the distributor screws to revolve normally.

hold them. The lower part of the upper side of the channel entrance is hinged and can be raised if necessary to remove matrices and to prevent injury when the channel entrance is opened if a matrix is partly in the magazine and partly in the channel entrance. The lower side of the magazine channel entrance is formed of one curved piece of brass. The lower edge of this brass plate running along the magazine should be a little above

the lower plate of the magazine. This distance should not exceed fifteen thousandths of an inch. This is for the purpose of preventing the matrix from hitting an obstruction and compelling it to rise in order to enter the magazine. The upper side of the channel entrance is composed of two pieces. Just above the crimp in the partitions above described there is a flap, or door, *425*, extending the entire length of the channel entrance, which can be raised up so that access can be had to the matrices, and to prevent damage when the matrices are fast in the magazine, and it is necessary to open the channel entrance. This is shown in Fig. 122.

SPIRAL AUTOMATIC DISTRIBUTOR STOP

Recently another form of distributor stop has been adopted for all models. This distributor stop was first used on the Model 9, and was found to work so well that it has been adopted to all machines.

In this form of automatic stop the channel-entrance partitions are not elastic, but are fixed, as shown in Fig. 118, Fig. C. This allows them to be made about one-half the thickness of the elastic channel-entrance partitions. This gives an opportunity for larger matrices to be used.

In this form of automatic distributor stop the front upper distributor screw and the lower distributor screw have upon them two rotary wedges. These wedges are fastened to the screws. These wedges are so set that the thin edge of one wedge is opposite the thicker portion on the other distributor screw. So long as the distributor screws are in a certain relation to each other the threads of these screws pass one another, and the distributor screws will revolve, as shown in Fig. 118. The screw thread on the lower distributor screw is fastened to the screw shaft and the gear is not fast on the shaft, but is loose thereon, and is attached to the screw thread by a spiral spring. As the gear with the spiral spring revolves, it pulls the screw around with it, and so long as the lower distributor screw does not get out of time with the upper distributor screw the screws revolve freely. If, however, any friction is placed upon the lower screw it gets out of time with the upper screw. The threads are not now in position to pass one another, and they lock together, stopping the distributor screws. At the same time the lever *477*, shown in Fig. 118, is tripped a little to the right (as you stand in front of the machine). This throws out the clutch, as shown in Fig. 122.

The friction that puts the lower distributor screw out of time with the upper one is caused by the pressure against a matrix that fails to fall into the channel entrance. As soon as the matrix rubs against the distributor screw, the screw is retarded, the little spiral spring stretches; the screw threads are now out of time, and in a very small portion of a revolution they interfere with one another and a lock occurs, stopping the distributor, as above described. The spring at proper tension should not bind the ears or lugs of matrices when they drag the lower screw. If tension is too strong thin matrices will be damaged.

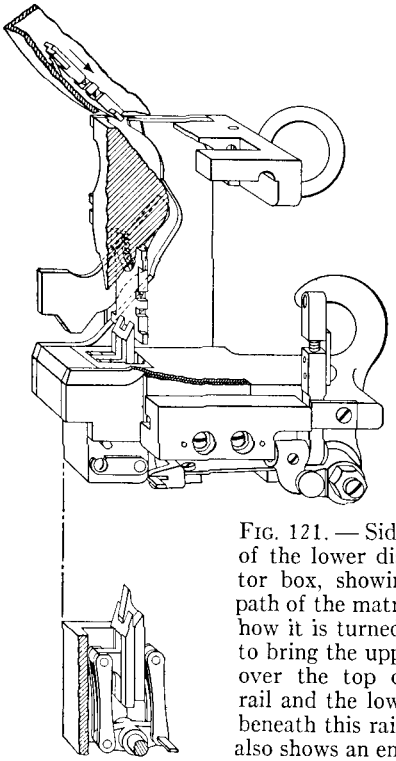


FIG. 121. — Side view of the lower distributor box, showing the path of the matrix and how it is turned so as to bring the upper ear over the top of one rail and the lower ear beneath this rail. This also shows an enlarged view of the pawls.

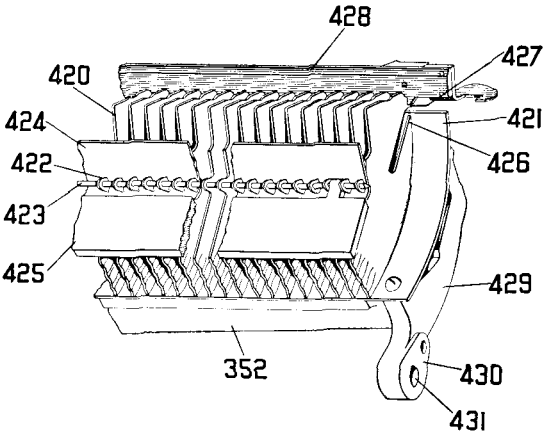


FIG. 122.—An enlarged view of a portion of the channel entrance. The channel entrance is the device which guides the matrices when they drop off the distributor bar into the channels, or grooves, in the magazine. The channel entrance consists of a number of thin partitions *420*. These partitions are secured in a grooved brass plate *421*. The partitions *420* have shoulders at their upper and lower extremities which fit over the top of the plate *421* and into slots cut in the bottom of the brass plate *421*.

There is a third projection in the channel-entrance partitions *420* which has a hole in it, and through these projections *422* is threaded a wire *423* to hold them in position. The top of the channel entrance consists of two plates, one of which is fixed, *424*, and the other pivoted to swing like a door, *425*. This door, or flap, *425* can be raised in order to get at the matrices in the channel-entrance partitions.

The channel-entrance partitions have a slot cut in their upper part at an angle *426* which makes the upper part of the partition flexible. In this flexible part there is a small projection *427* which is adapted to register with notches in a bar *428*, the use of which has been described.

The plate *421* and all the mechanisms above described in this figure are mounted upon a cast-iron frame *429*, the width of which is equal to the width of the magazine. At the bottom of this casting there are two lugs *430* having pivoted holes *431* so that the channel entrance can be mounted on the magazine frame or the upper part of the distributor bracket in such a way that the whole channel entrance can be opened or closed by revolving around the pins which fit in the pivot holes *431*.

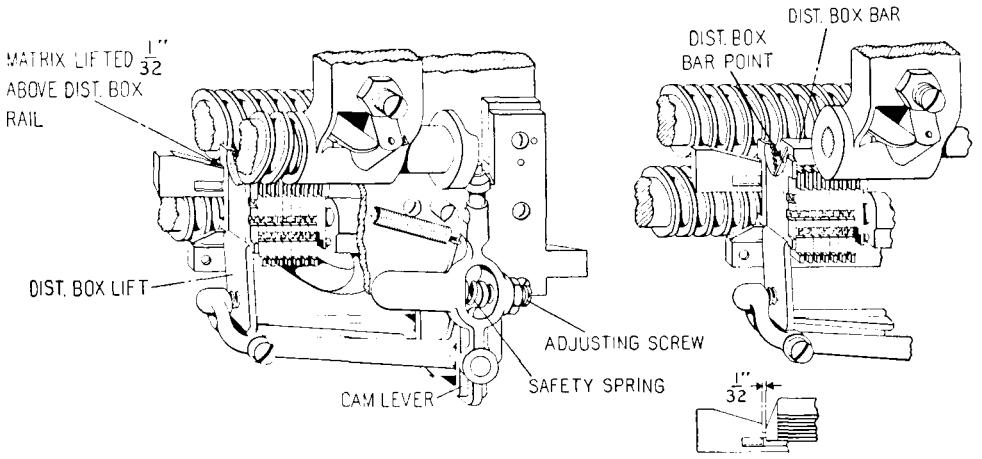


FIG. 124.—View showing the matrix being lifted over the shoulders of the distributor-box rails and shows the adjusting screw for setting the lift so as to raise the matrix one thirty-second of an inch above the shoulder of the rail.

Assembled on the distributor clutch pulley washer clutch flange are two distributor clutch stops. These are called left-hand stops. Fastened to the distributor clutch flange are two distributor clutch stops, called right-hand stops. When the distributor is operated the right hand stops are held on the left hand stops by two spiral springs. One end of each spring is fastened to an adjustable spring collar that slips over the distributor clutch flange; the other ends are fastened to the pulley washer clutch flange. These stops force the pulley washer flange against the driving pulley, operating the distributor. The tension of these two spiral springs should be just tight enough to hold the stops together. When the spiral locks, the tension of the springs should permit the right hand stops to leave the left hand, releasing the pressure on the driving pulley. Too much spring tension will have a tendency to bend the matrices or prevent the proper operation of the distributor screws.

To start the distributor, it is only necessary to remove the matrix that has caused the stoppage, turn the lower distributor screw slightly

backward with the little hand wheel; the screw threads are now in time, and by lifting up the latch, the clutch is released and the distributor is free to go on.

THE MAGAZINE

The magazine consists of two brass plates of a trapezoidal shape, fastened together by screws passing through separating pieces. The inside surfaces of these brass plates have ninety-two grooves, one sixteenth of an inch deep. These grooves are called "channels", and are adapted to receive and guide the ears of the matrices and form a storage for them. At the upper end of the magazine, the space between the channels laterally is uniformly one quarter of an inch. The space between the channels at this

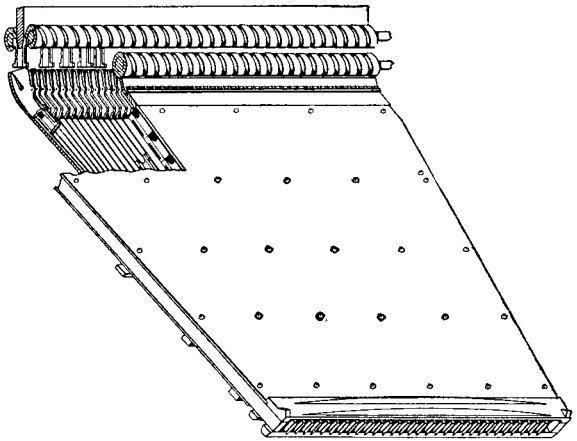


FIG. 125.—Perspective view showing the magazine, the distributor screws, the channel entrance, and the matrices passing along the distributor bar and ready to fall off into the partitions of the channel entrance and ready to pass down into the channels of the magazine.

The upper left-hand corner of the magazine is cut away to show the entrance of the matrices into the magazine.

point is milled away so that the channel is at its upper end V-shaped, and is approximately one quarter of an inch in width at the top. The grooves, or channels, in the magazine are not parallel, but converge toward the front so that at the front end of the magazine the matrices are brought as near together as possible without actually touching. There are nine different widths to these channels, which correspond to the thickness of the ears of the matrices. The channel is ten thousandths of an inch wider than the ear of the matrices, so that the matrices can ride along freely and at the same time can be guided by the channel, so that there is very little sidewise motion.

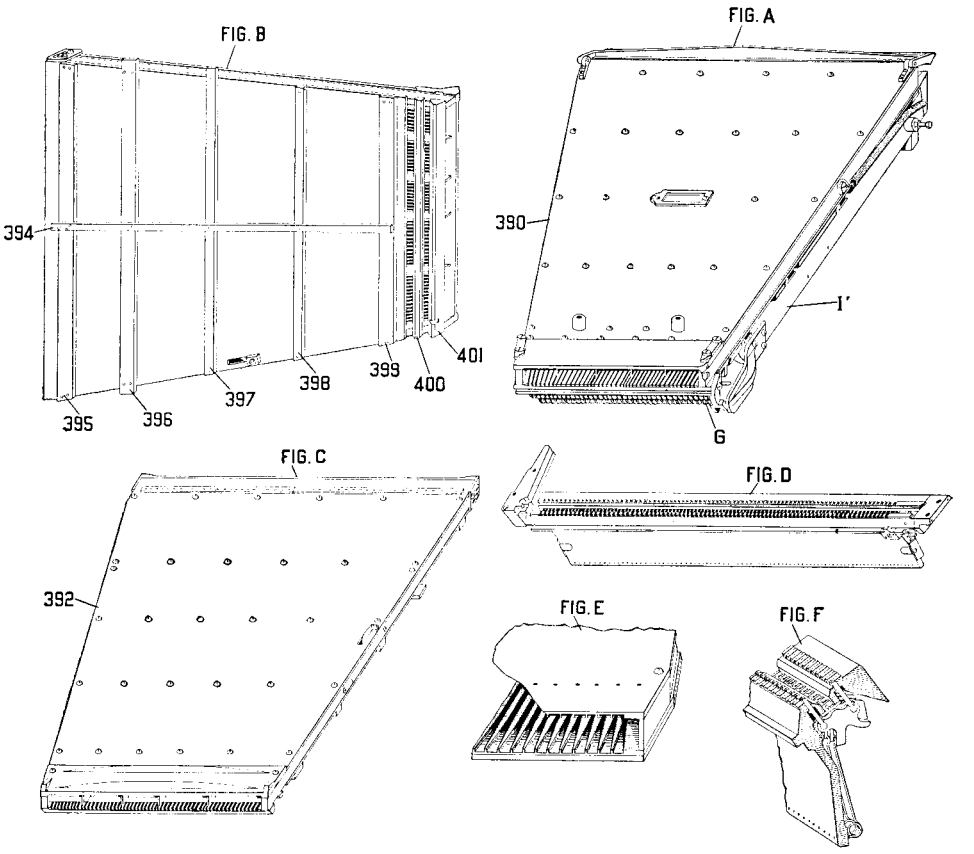


FIG. 126.—Views of the magazine. Fig. A shows a perspective view of the magazine *390* and the cast-iron frame which supports it *I'*. The type of magazine shown in this view is the one originally used, and is called the "Model 1 magazine." In this form the escapements *G* are attached to the magazine, and the magazine *390* and the frame *I'* are fastened together and are removed and replaced on the machine together and form a unit.

Fig. C shows a perspective view of the magazine which is most used in the different models of the Linotype, and is known as the "Model 5 magazine," being first used on this model, but afterward on others. In this type of magazine the escapements are not fastened to the magazine, but are carried separately in a frame called the "escapement bar," shown in another view.

Fig. B shows a view of the under side of this magazine, with a light frame composed of a central bar *394* and crossbars *395*, *396*, *397*, *398*, and *399*. All of these bars are made of steel. There are also two crossbars of brass, *400* and *401*.

Fig. D is a plan view of the escapement bar.

Fig. E is a view of the upper part of the magazine with a portion cut away so as to show the channels made in V-shape at the top. This form is common to all magazines.

Fig. F is a side view of the escapement bar. This bar remains on the machine and registers with and delivers the matrices from the magazines, which can be removed and replaced.

AUXILIARY MAGAZINES

On the Models 14, 17 and 19, there is used an auxiliary magazine. This is illustrated in Fig. 127. This magazine has parallel channels, twenty-eight in number. The magazine proper is not the full length of the ordinary magazine but the lower part *60* is made so that it is easily removable from the machine, while the upper part *59* remains permanently upon the machine. The channels of the short magazine *60* hold only ten matrices. The use of this magazine is confined to special char-

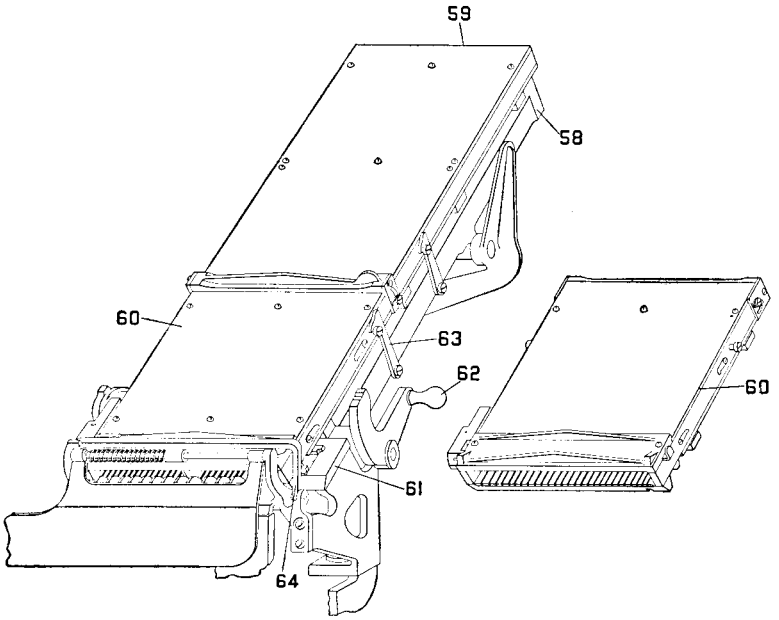


FIG. 127.—View of the supplementary, or auxiliary, magazine. This magazine is used in the Models 14, 17, and 19. The mechanism consists of a frame *58*, which is mounted on the machine, and extends to the right-hand side of the main magazine. The magazine is divided into two parts the upper part *59* and the lower part *60*. A view of the lower part of the magazine *60* is shown at the right of the main figure.

In this mechanism the escapement bar *61* carries the escapements which are separate from the magazine, as in the Model 5 magazine. The magazine *60* has a locking bar, and when the locking bar is in position the magazine can be removed and replaced by other magazines. In the supplementary, or auxiliary, magazine, each channel of the magazine *60* contains not more than ten matrices, and the magazine *60*, as a whole, has only twenty-eight channels, which are parallel, and not at different angles as in the large magazines. The auxiliary magazine is intended to contain only a limited number of characters.

62 is a handle with a cam arrangement for throwing up the magazine *60*, so that it may be more easily removed; *63*, latches which hold down the upper part of the magazine in place after it is upon the machine. The front end of the magazine is held by a bail *64*, similar to the one used in the Model 5 magazine. The matrices are released from the magazine by keyboard.

acters where the full number of matrices in the channel is not needed. The matrices are discharged by a manually operated keyboard and the matrices fall upon an extension of the assembler belt and are delivered by this belt into the regular assembler.

THE ESCAPEMENT

The ordinary escapement has been described previously in Fig. 7. This form of escapement was used in the original Model 1 Linotype, and in this machine the escapement mechanism is fastened to the lower end of the magazine and forms an integral part of it.

In the Model 5 machine the escapement is of the same general character, but it is mounted in a separate frame that registers with corresponding slots in the magazine in the same manner as magazine 60, as shown in Fig. 127. When the matrices are fastened in the magazine by the locking bar, the magazine can be raised and removed from the escapement. This allows one escapement to answer for a large number of magazines. It is desirable that there should be a magazine for every font of matrices that is used frequently. The construction described above saves the expense of the escapement mechanism on each magazine. The magazines are also somewhat lighter. When the magazines are on the machine they rest upon a frame, and when off the machine, if they are hung vertically, they need no support. This does away with the weight of the cast-iron frame, which is fastened to and forms a part of the magazine on the earlier models of the Linotype. With the form of magazine above described the magazines *should not be piled upon one another or left resting against the wall,* but should be hung vertically, either in a frame or supported on the wall by two hooks.

Model 9 Escapement.—In the Model 9 machine there is a somewhat different form of escapement. This escapement consists of a single piece, as shown in Fig. 9, and the action of the matrices is shown in Fig. 23. In this form of escapement the whole set of escapements is attached to the magazine in a manner similar to that described in the Model 1 magazine. These magazines, however, have only a light frame, similar to that used on the Model 5 magazine, and are supported in the machine in side plates.

MULTIPLE MAGAZINE LINOTYPES

The original Linotype machine had only one magazine, which was removable and could be replaced by magazines containing another font of matrices. These first magazines used in the Model 1 machine had a heavy cast-iron frame, so that it required two men to remove and replace one of the magazines. As the art advanced it was necessary to use more than one magazine upon the machine, and the Model 2 was designed.

This had two magazines, the lower one of which, however, was not supposed to be removed from the machine. This proved satisfactory for a time, and a large number of these machines were manufactured and a

considerable number of them are still in use. It soon, however, became apparent that the removal and replacement of magazines was a serious loss of time, and although in the Model 5 machine the magazine was made much lighter and more easily removed, it was still found that it was desirable to have a greater number of magazines permanently upon the machine with some means of transferring the use of one magazine or another without removing it from the machine. This brought in the use of the Model 8 and the Model 9 machines.

In the Model 8 machine there are three magazines mounted upon a frame which in turn is mounted on a barrel containing a screw by which the frame can be raised or lowered at will of the operator, as illustrated in Fig. 128. The screw in the barrel is revolved by a handle at the right.

A screw *518* is caused to revolve by means of a handle *510* through the shafts *520* and *513* and beveled gears *514* and *515*. Turning the handle *510* causes the screw *518* to revolve, raising or lowering the frame containing the magazines. The magazines are locked in place by means of two side bars which are operated by a lever *511* working through lever and link connections, by which these bars are thrown out of locking position by pushing the handle *510* directly inward. In operating position the magazines should rest on the locking bars.

The raising and lowering of the magazines on the Model 8 as just described brings any one of the three magazines into register with the assembler front and the distributor screws.

The Model 8, on the whole, has been a most popular and useful machine, and there are a great many thousands of them in use. On almost all small newspapers at least three sizes of type are used, such as 5½ point, 6 point and 8 point; or 6, 8 and 10 point. It is, therefore, a very great convenience to have these magazines with the proper fonts, which can be quickly brought into register and use.

On the larger newspapers it has been found advantageous to have a display font in one of the three magazines. Ordinarily only two of the magazines would be used on the news part of the paper, but when a pressure of "ads" comes in the extra magazine containing the display font can be used to help out the "ad" alley.

This machine uses the same magazines as are used on the Model 5 and the Model 14. These magazines can be readily removed from the machine and others put in their place, but the use of three magazines to a considerable extent obviates the necessity of change of magazines.

In book and job work it is also found convenient to have at least three sizes ready for use on one machine. Many books, pamphlets, circulars and work of this sort require at least three sizes of type, and in this work the Model 8 has proved to be very advantageous.

It is this "flexibility" which has caused the very large sale and use of this machine.

In book and job offices a considerable number of extra magazines are usually required. This is because the varied work of such offices requires a considerable number of different faces.

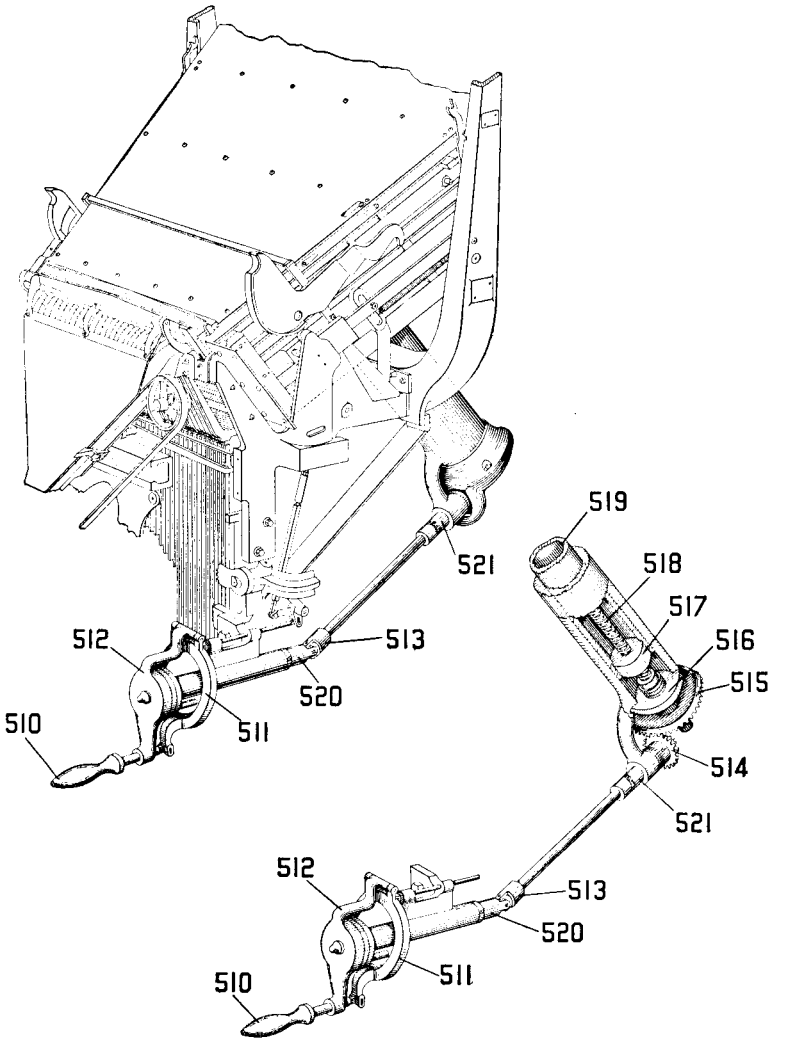


FIG. 128.—View of the magazine-elevating mechanism as used on the Models 8 and 14 machines.

510 is a handle; *511* is a lever hinged at the top. When the handle *510* is pressed inward it operates through a series of levers to unlock the bars which hold the magazines in position. When the handle *510* is revolved through the universal joint and the shaft *513*, a beveled pinion *514* is caused to revolve, which operates on a corresponding gear *515*, which causes the screw *518* to revolve, carrying the tubular slide *519* up or down, thereby raising or lowering the magazines.

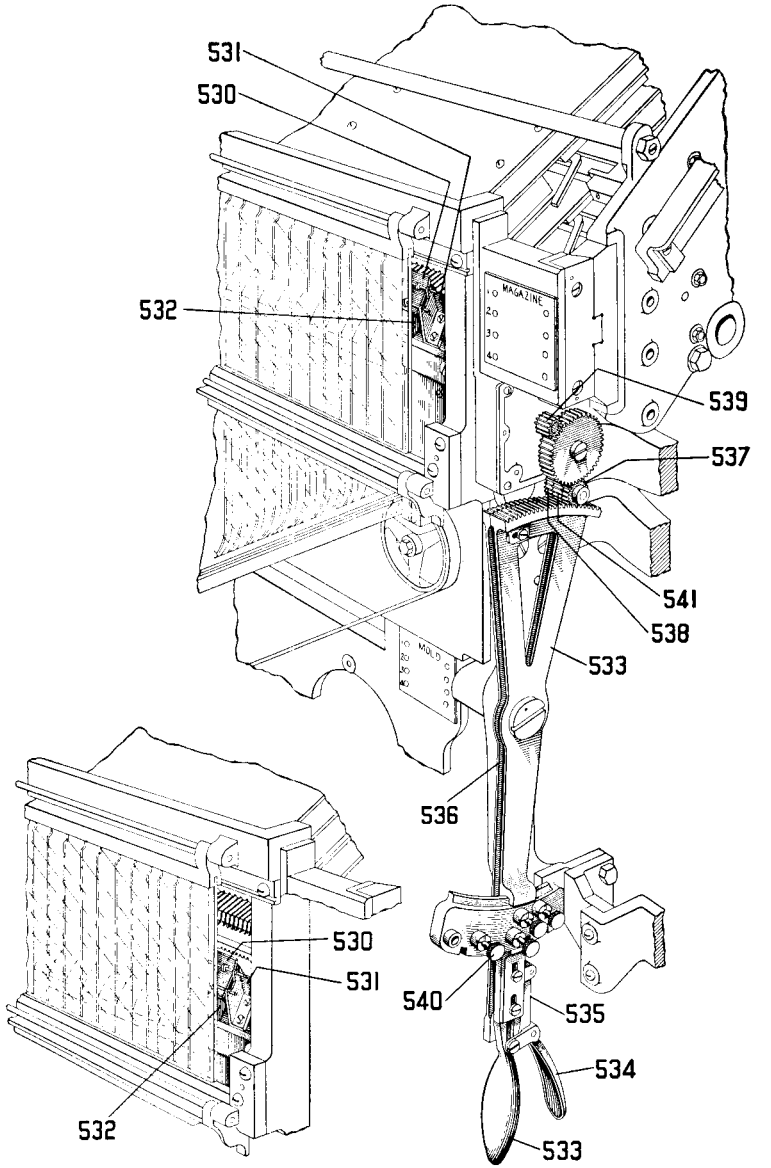


FIG. 129.—View showing operation of raising and lowering of the front on Model 9 Linotype. By pressing handle *534* against handle *533*, pinion *538* is caused to revolve, bringing reeds *532* front, and out of register with the escapements of the magazines. By moving handle *533* forward or back, the pinion *541* operating through an idler gear on pinion *539* raises or lowers the front until the proper position is reached, when the part *535* snaps into one of four notches on the sector, thus holding the front in position. When handle *534* is released, pinion *538* is caused to revolve by a spring, which is not shown in the drawing, thereby bringing the subsidiary reeds under the escapements in the Model 9 magazines and the machine is ready to operate.

It is best, wherever possible, to have sets of matrices stored in magazines so that these magazines can be quickly placed on the machine with their fonts of matrices. Separate fonts of matrices to be run in and out of magazines have not been found advantageous as a general rule. It is so easy to get fonts mixed up in such cases.

Proper receptacles should be made for these magazines. The Linotype Company makes some of these magazine holders. As these magazines are somewhat expensive, care should be taken that they are not damaged when off the machine or when being replaced upon the machine. Magazines should never be left standing against the wall on the floor and they should always be protected if possible from the dust and dirt of the room. From a magazine which is full of dust and dirt the matrices will not run properly, and much time will be lost on this account.

Of late years "split magazines" containing small fonts have proved to be quite useful in special work not requiring a full font of matrices. These magazines and small fonts are cheaper than the regular magazines and fonts, and can, therefore, be used to advantage and with considerable economy. These magazines also should have proper racks or receptacles, and where there is room, the regular rack made by the Linotype Company is preferable.

A change of magazines requires a certain amount of lost time. This lost time may become a very serious loss to the office if the precautions above mentioned are not taken. The successful printing offices are those where proper equipment and system reduce lost time to lowest terms.

We have now followed the course of a matrix through the machine. Beginning with the touch of the finger on the keyboard keybutton, which trips the cam yoke trigger, allowing the keyboard cam to fall upon the revolving rubber roll, causing the cam to revolve and raise the keyboard rod, thereby operating the escapement pawls and permitting the matrix to come out of the magazine and fall through the assembler guides upon the assembler belt, and be carried thereby over the assembler star into the assembling elevator. When the line is assembled the line of matrices is raised in the assembling elevator, transferred through the delivery channel into the first-elevator jaw, which carries it downward between the vise jaws, where the operations of justification and alignment take place, whereupon the mold comes forward against the line of matrices, the pot comes against the mold, the pump plunger is forced down, and the metal is driven into the mold against the matrices, forming the slug. The pot then retracts and the mold disk revolves (trimming the bottom of the slug) to the ejecting position, where the slug is ejected between the knives (which trim the sides) into the galley.

While the mold disk is revolving to the ejecting point, the first-elevator jaw is raised to the intermediate channel, the line of matrices and spacebands is transferred into the intermediate channel, the matrices

engaging with the second-elevator bar, which is raised to the distributor box; the matrices are transferred from the second-elevator bar into the distributor box, are lifted one at a time into the screws, and are carried along by the screws until they reach the point where the combination on the distributor bar corresponding to the teeth of the matrix is cut away, whereupon the matrix falls into the channel entrance and is guided by the channel entrance into the magazine, thus completing the cycle of operation; meanwhile the spacebands have been transferred by their levers into the spaceband box, or magazine.