matrix aligns with the feeler, the matrix is lifted into the back distributor. Following the automatic selection of the matrices in the manner described, the matrices are conveyed in the regular way along the front and back distributors, from which point they drop into the upper or lower channel entrance and return to the upper or lower main and side magazines from which they were originally drawn.

The general summary of the distributing process and the description of the double distributor mechanism presented in the foregoing material may be regarded as an outline of the subjects to be described in connection with the distributing mechanism. As in the preceding sections on the assembling, casting and transfer mechanisms, the basic sequence of machine actions will be adhered to in the following description of the distributing mechanism.

## Distributor Box (Single Distributor)

The purpose of the distributor box is to receive the line of matrices from the second-elevator bar and to raise the matrices one by one into the distributor screws. The construction of the box applied to single distributor machines is shown in Fig. 142. The distributor box front and back plates are fastened to the distributor box bracket *1*, which supports and locates the assembled box in relation to the distributor. The locating pins *2* inserted in the bracket rest on a ledge provided in the distributor beam. These pins establish a parallel relationship between the box and the distributor and also determine the vertical position of the box. The sidewise position of the distributor box with respect to the distributor bar, screws, etc. is determined by a slot *3* of precise size in the distributor box bracket *1*. When the distributor box is placed on the machine, the left-hand distributor front screw bracket, which is fastened to the distributor beam, fits snugly into the slot in the distributor box bracket and consequently fixes the sidewise position of the distributor box. Whenever the distributor box is removed and returned to the machine, therefore, it can assume only the one definite position provided for by the locating parts described. A bolt threaded in the distributor beam clamps the distributor box in position.

The distributor box bar *4*, Fig. 142, is inserted in a slot in bracket *1* and is held in position by a hinge pin *5* and a stop pin *6*. The distributor box bar is not held rigidly in position, as previously stated, but is permitted to have a slight vertical movement at its right end on pin *6*. At this end of the bar there is a projecting lug *7*, which fits between the second-elevator bar and second-elevator bar plate when the second elevator seats at normal or distributing position. When the second-elevator bar engages the lug on the distributor box bar, therefore, the teeth of the respective bars are aligned exactly, producing what may be regarded essentially as one continuous bar for the movement of the matrices as they are pushed into the distributor box by the distributor shifter.

When the matrices are moved into the distributor box, they are supported by the distributor box bar until they are within approximately one-half inch of the vertical banking faces of the distributor box rails. As each matrix leaves the bar, its upper lugs ride on the distributor box upper rails, one of which is shown at *8*, Fig. 142. The matrix continues forward on the upper rails until it reaches the vertical shoulders or banking faces of the distributor box rails. The banking

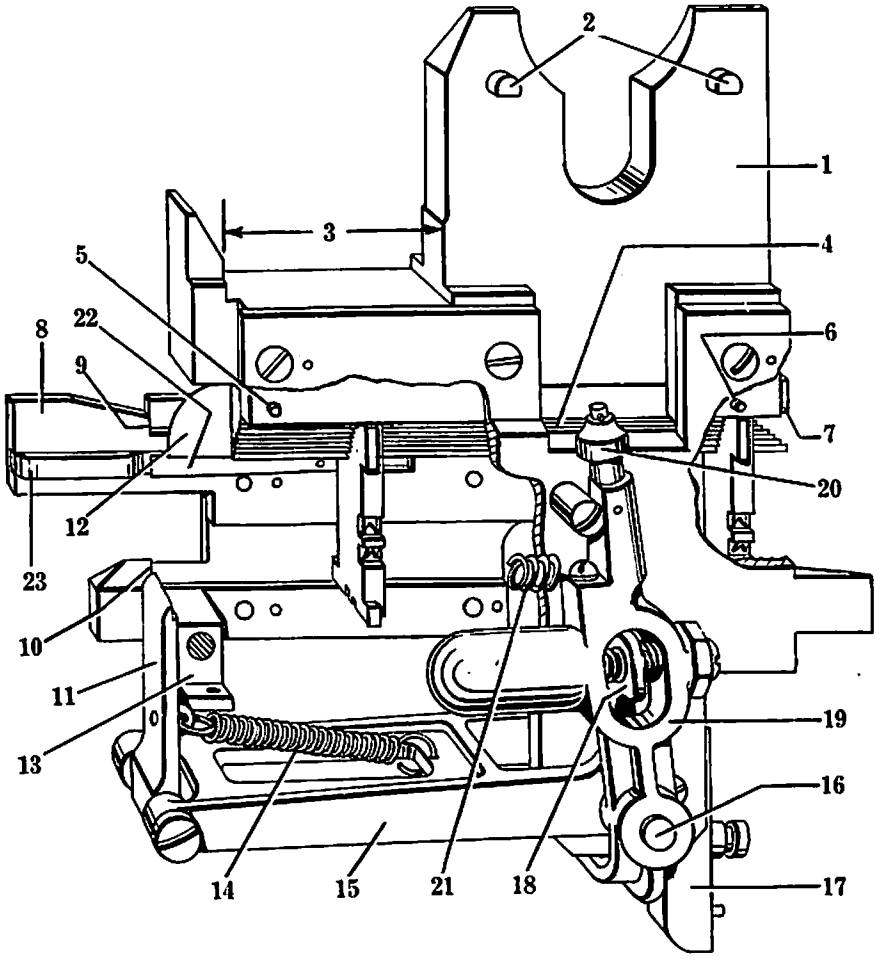


**Fig. 142. The Single Distributor Box.** The back plate has been broken away to show the parts provided inside the box for supporting and guiding the matrices.

faces, two of which are indicated at *9* and *10*, stop the forward movement of the matrix temporarily to locate the base of the matrix precisely with respect to the distributor box matrix lift *11*.

At the left end of the distributor box bar there is a slot in which the distributor box bar point *12*, Fig. 142, is inserted. The function of the bar point is to create a passage of precise size at the front of the distributor box through which only one matrix can be lifted at a time into the distributor screws. The bar point registers with a slot which is cut to a uniform depth in all matrices except the thinnest. The relationship between the bar point and the slot in the matrix is indicated clearly in drawings *A* and *B*, Fig. 145. The end of the bar point extends to within .040″ of the vertical banking faces of the four distributor box rails, against which each matrix must bank as it is being raised into the dis-

tributor. The position of the bar point with respect to the distributor box rails is shown in detail drawing *C*. As the first matrix in the distributor box is being raised by the matrix lift, therefore, the second matrix is prevented from rising through friction because it is positioned under the bar point.

The distributor box matrix lift *11*, Fig. 142, is held in contact with an adjustable block *13* through tension of spring *14*. The setting of block *13* controls the position of lift *11* with respect to the vertical shoulders *9* and *10* of the distributor box rails and consequently, governs the engagement of the lift with respect to the lower front edge of the matrix. The matrix lift *11* is inserted in the front end of the matrix lift lever *15*, which is pivoted on a hinge pin *16* in hub *17*. On the right end of the lift lever *15* there is an extension lug *18* which fits between a compression spring and an adjusting screw in the matrix lift cam lever *19*. The cam lever is provided with a cam roll *20*, which is held in contact with a cam on the distributor back screw through action of spring *21*.

The relationship between the distributor box and the distributor screws is shown in Fig. 143. The distributor box is clamped to the distributor beam by the bolt *1* to which is pinned a handle *2*. The distributor box matrix lift cam *3* is pinned to the distributor back screw *13* and imparts movement to the matrix lift

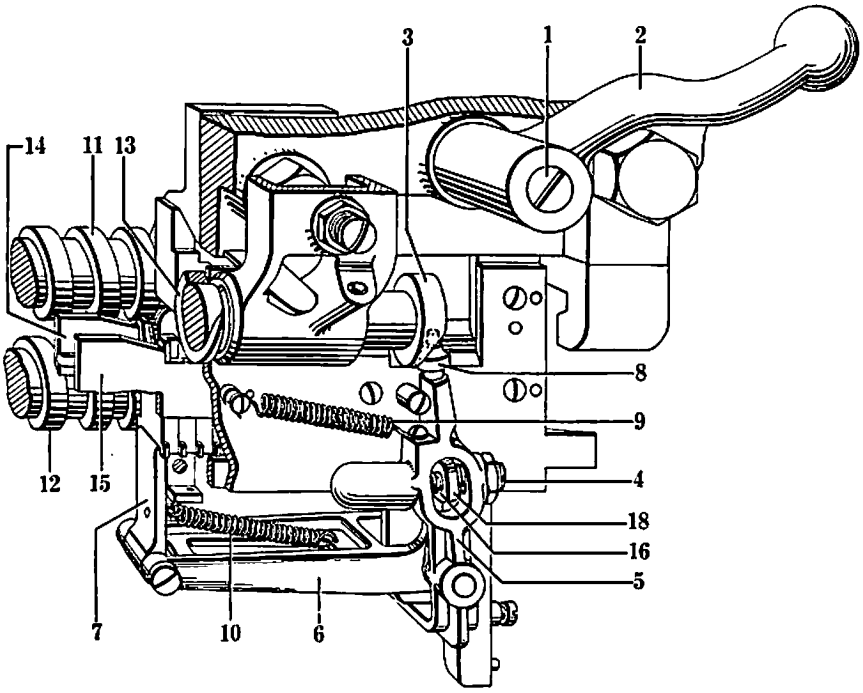


**Fig. 143. Single Distributor Box in Relation to Distributor Screws.** The low point of the matrix lift cam *3* has come to position opposite roll *8*, permitting spring *9* to pull lever *5* forward. This action lowers lever *6* and lift *7* until the lift comes to position under the matrix through action of spring *10*. As the distributor screws continue to revolve, roll *8* will ride up on the high point of the cam *3*, causing lift *7* to raise the matrix 1/32" clear of the distributor box rails *14* and *15*.

*7* through cam lever *5* and lift lever *6*. When the line of matrices is pushed into the distributor box by the distributor shifter, the first matrix in the line comes to position against the four vertical shoulders of the distributor box rails. As the distributor screws revolve, the low point of the matrix lift cam *3* comes to position opposite roll *8*, permitting spring *9* to pull cam lever *5* forward. This action lowers lever *6* and lift *7* until the lift comes to position under the first matrix through action of spring *10*. The position of the lift with respect to the matrix is shown clearly in drawing *A*, Fig. 144. As the distributor screws continue to revolve, the matrix, Fig. 143, is raised by lift *7* as roll *8* rides up on the high point of cam *3*. The height to which the matrix is lifted is controlled by an adjusting screw *4*, which is set so that the undersides of the matrix lugs are raised 1/32″ above the vertical banking faces of the distributor box rails. The lifting of the matrix, as stated previously, is timed with respect to the rotation of the distributor screws so that the matrix is raised into the beginning point of the distributor screw threads as it enters the distributing mechanism. The relationship between

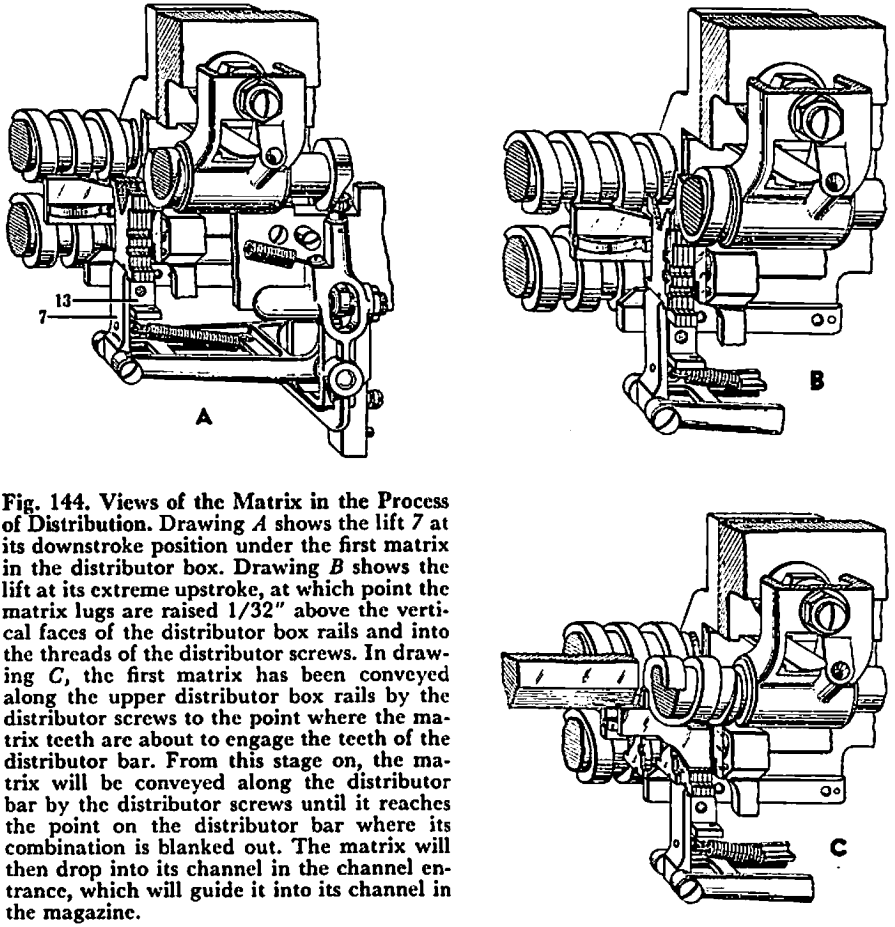


**Fig. 144. Views of the Matrix in the Process of Distribution.** Drawing *A* shows the lift *7* at its downstroke position under the first matrix in the distributor box. Drawing *B* shows the lift at its extreme upstroke, at which point the matrix lugs are raised 1/32″ above the vertical faces of the distributor box rails and into the threads of the distributor screws. In drawing *C*, the first matrix has been conveyed along the upper distributor box rails by the distributor screws to the point where the matrix teeth are about to engage the teeth of the distributor bar. From this stage on, the matrix will be conveyed along the distributor bar by the distributor screws until it reaches the point on the distributor bar where its combination is blanked out. The matrix will then drop into its channel in the channel entrance, which will guide it into its channel in the magazine.

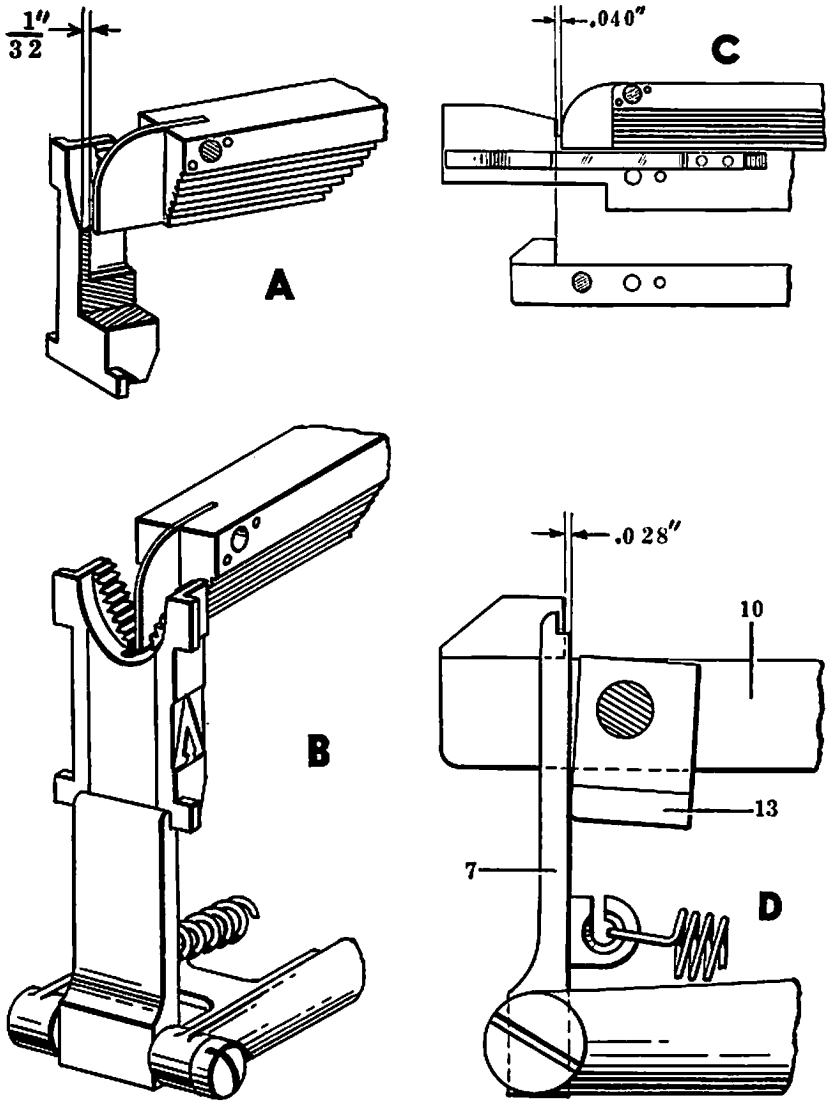


**Fig. 145. Detail Views of the Distributor Box Bar Point and the Matrix Lift.** The function of the bar point is to permit only one matrix to be lifted into the distributor screws at a time. Drawing *A* illustrates the matrix partly in section to show the thickness of the matrix body at the point where the bar point slot is cut. Drawing *B* shows the matrix in position ready to be raised by the matrix lift. Drawing *C* shows the .040″ space provided between the front of the bar point and the vertical faces of the distributor box upper rails. Drawing *D* shows the adjustable distributor box block *13*, by means of which the .028″ engagement of lift *7* with the matrix is set.

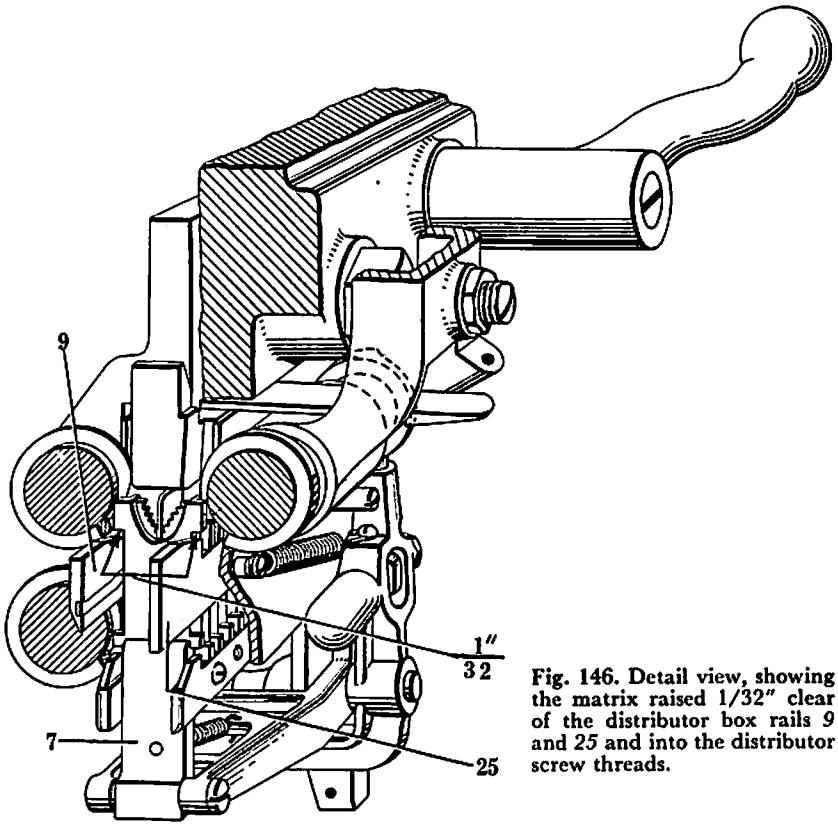


**Fig. 146. Detail view, showing the matrix raised 1/32″ clear of the distributor box rails *9* and *25* and into the distributor screw threads.**

the matrix and the distributor parts at the time the lift has raised the matrix to its highest position is shown in drawing *B*, Fig. 144, and in Fig. 146.

After the matrix lift *7*, Fig. 143, has raised the matrix to position above the vertical shoulders of the distributor box rails, there is a dwell on the matrix lift cam *3* which causes the lift to hold the matrix in this position until the revolving distributor screws *11*, *12* and *13* engage three of the matrix lugs. As the distributor screws start to convey the matrix forward and up the inclined surfaces of the upper rails *14* and *15*, the matrix lift *7* descends to position under the next matrix in the distributor box. In the meantime, the distributor screws convey the first matrix forward to the level surfaces of rails *14* and *15*, at which point the matrix teeth engage the teeth of the distributor bar. This precise relationship between the matrix, distributor box rails and distributor bar is indicated in drawing *C*, Fig. 144.

Two springs *22* and *23*, Fig. 142, are provided in the distributor box upper rail *8* to steady matrices at two important points during distribution. The first spring *22* is provided to hold the matrix nearest the vertical shoulders of the distributor box rails squarely in position when the distributor shifter is retracted to receive another line of matrices from the second elevator. The spring bears

against the body of the matrix and prevents it from twisting or falling away from the banking faces of the rails. The auxiliary spring *23* contacts matrices as they are being conveyed along the level surfaces of the upper distributor box rails by the distributor screws. The spring is so located that it holds the matrices upright, especially thick matrices with offset lugs, just at the point where the matrix teeth engage the teeth of the distributor bar.

**Adjustments: Distributor Box Block.** The engagement of lift *7*, Fig. 144, with the base of the matrix is adjusted by means of the distributor box block *13*. The block is inserted between the distributor box lower front and back plate rails and is held in position by a screw passing through the block. The block can be adjusted most easily with the distributor box removed from the machine. Retract the distributor shifter, back the machine by hand until the second-elevator bar lowers and disengages from the distributor box bar, open the channel entrance, remove the font distinguisher, turn handle *2*, Fig. 143, clockwise until it is stopped and remove the distributor box from the machine. Raise the matrix lift *7*, Fig. 145, by hand and observe the relationship between the seat of the lift and the banking face of the distributor box lower front plate rail *10*. The edge of lift *7* should be .028″ forward of the rail's banking face, as indicated in detail drawing *D*. To obtain this setting, loosen the screw passing through block *13*, move the block sidewise by means of the small adjusting screw until the .028″ relationship is established, then tighten the fastening screw securely.

**Distributor Box Matrix Lift.** The function of the distributor box matrix lift, as outlined previously, is to raise the matrix to a point where the upper matrix lugs are 1/32″ above the vertical banking faces of the upper distributor box rails. This relationship is indicated in Fig. 146, which shows lift *7* at its highest point and the undersides of the upper matrix lugs 1/32″ above the vertical shoulders of the upper distributor box rails *9* and *25*. The height to which the matrix lift raises the matrix is set by means of an adjusting screw *4*, Fig. 143, threaded in the cam lever *5*. The adjusting screw banks against an extension lug *18* on lift lever *6* and by turning the screw in or out, the lift lever *6* and lift *7* can be raised or lowered with respect to the matrix. The height to which the matrix is raised as governed by the shape of the matrix lift cam *3*, therefore, can be increased or decreased by adjusting screw *4*.

In making the adjustment, disengage the distributor driving belt from the intermediate distributor driving pulley, turn the distributor screws by hand until the low point of cam *3*, Fig. 143, is opposite roll *8* and insert a line of matrices in the distributor box. Turn the distributor screws slowly by hand until roll *8* is on the high point of cam *3* and see whether the upper matrix lugs are 1/32″ above the banking faces of the upper distributor box rails, as indicated in Fig. 146. If the matrix has been raised too high, turn screw *4*, Fig. 143, clockwise to lower lever *6* and lift *7;* turning the screw counter-clockwise will produce the opposite effect. Test the adjustment by hand with succeeding matrices and if the 1/32″ relationship is present, tighten the lock nut securely. Observe the lifting of the matrices with the distributor running under power as a final check.

A spring *16*, Fig. 143, is interposed between the extension *18* on the lift lever *6* and the cam lever *5* to permit overmotion in case an obstruction prevents lift *7* from raising the matrix. If a matrix turns out of position, for example, lift *7* will

be prevented from rising, but spring *16* will compress as roll *8* rides up on the high point of cam *3* and no damage will be done to the distributor box.

## Replacing Distributor Box Parts

It should be apparent from the foregoing description that an efficient transfer of matrices from the distributor box to the distributor screws and bar depends, to a great extent, upon the consistent maintenance of several important relationships. While the parts of the distributor box are made of the most durable materials, the constant friction to which they are subjected as lines of matrices are delivered and distributed will eventually result in wear and will necessitate the replacement of parts at various intervals. Most of the parts last a long time before any appreciable wear occurs.

**Distributor Box Rails.** It is highly important that the distributor box rails be kept in good condition, especially the vertical shoulders or faces of the rails against which the matrices bank before they are lifted into the distributor screws. In addition to the fact that each matrix line is pushed against the rail faces as it enters the distributor box, each matrix in the line slides upward against the faces as it is raised by the matrix lift. Wear on the vertical faces should not be permitted to exceed .010″, because the space between the faces and the distributor box bar point will then be greater than .050″. The space originally provided at this point in new distributor boxes is .040″, as indicated in drawing *C*, Fig. 145. Excessive space between the faces and the bar point is objectionable, of course, because two thin matrices may be raised at a time and their lugs may be damaged or thick matrices may turn out of position as they enter the distributor screws.

In replacing distributor box rails, all four should be renewed at the same time to insure a perfectly square banking point for the matrix at the feeding end of the distributor box. The front and back plates of the distributor box should be cleaned thoroughly before the new rails are fastened in position. It may be necessary to dress the dowel holes in the rails slightly with a small round needle file if the dowels do not slide freely into the holes. When the rails are in position, make sure that the distributor box bar point will permit only one matrix to be lifted at a time. Slide a new matrix into the box against the rail faces and observe the engagement of the point with the slot in the matrix. If the bar point is not long enough to hold a second matrix down, it should be replaced with a new one. At the left end of the two upper distributor box rails (viewed from the front of the machine), small bosses or raised surfaces are provided to hold the matrices in uniform alignment as their font slots register with the font distinguisher indicator finger. There should be no more than .005″ clearance between the bosses and the body of the matrix when the matrix teeth are engaged with the distributor box bar teeth.

The last relationship to be checked when distributor box rails are replaced is the engagement of the matrix teeth with the teeth of the distributor bar, which is controlled, as previously described, by the height of the upper distributor box rails. The function of the upper rails in holding the matrix in the precise vertical position required to align the matrix teeth with those of the distributor bar is

illustrated clearly in detail drawing *C*, Fig. 144. To test the upper rails, insert a new pi matrix in the distributor box, turn the distributor screws slowly by hand until the matrix advances almost to the end of the upper rails, then back the distributor screws slightly away from the matrix lugs. Raise the back distributor screw, grasp the matrix and move it vertically and horizontally to make sure that it is free. If the matrix binds vertically, either of the upper rails may be too high. Remove the distributor box and place a small square across the tops of the upper rails. If either rail is high, it will be necessary to stone or grind it slightly to match the height of the other. Sometimes the distance between the two upper rails is not sufficient to permit the matrix to leave the box freely. There should be approximately 1/32" freedom between the rails and the body of the matrix and if this clearance is not present, it will be necessary to fit the upper front rail slightly to provide the necessary space.

**Distributor Box Matrix Lift.** The square seat or edge of the distributor box matrix lift *7*, Fig. 145, which engages the matrix may in time become so rounded that it will slip away from the matrix during the lifting operation. This is especially harmful in that the lift may slip before the matrix is raised clear of the vertical shoulders of the distributor box rails, resulting in bent or damaged matrix lugs. The seat of the lift must always be perfectly square so that it can engage and lift each matrix with a positive movement. If the lift is not too badly worn, its sharp right-angle edge can be restored with a flat oil stone. In other cases, it is usually advisable to renew the matrix lift. Whenever the lift is ground or replaced, the setting of the distributor box block should be checked to insure .028" engagement of the lift with the matrix.

**Distributor Box Matrix Lift Cam.** After a long period of use, the distributor box matrix lift cam *3*, Fig. 143, or the cam roll *8* may require replacement. The matrix lift cam is pinned in a definite position on the distributor back screw and not only imparts the lifting action to the matrix lift but also times the raising of the matrix in relation to the rotation of the distributor screws. If the surface of the matrix lift cam which causes the lift to raise the matrix out of the distributor box wears to such an extent that the lift raises the matrix too late to clear the distributor screw threads, the cam will have to be replaced with a new one.

Before removing the worn matrix lift cam, inspect the vertical banking faces of the distributor box rails to make sure that they have not worn beyond the permissible limit. It is essential that the faces of the rails be in good condition as otherwise the setting of the new matrix lift cam will be inaccurate in that it will be adjusted to an incorrect relationship.

The setting of the matrix lift cam lever adjusting screw *4*, Fig. 143, should also be checked before the matrix lift cam is removed. When roll *8* is on the high point of cam *3*, make sure that the matrix lugs are lifted 1/32" clear of the upper rail shoulders, as indicated in Fig. 146. This setting is basic and should be approximately correct in order to facilitate the process of applying the new cam.

To remove the worn matrix lift cam, release the distributor back screw bracket spring catch and raise the back distributor screw. Turn the screw until the taper pin in the cam is in position for removal. To facilitate the setting of the new cam, observe the position of the old cam on the back screw so that when the new cam is placed on the shaft, the lifting surface of the cam will assume the

same general position. Drive out the taper pin, remove the worn cam and place the new one in position. Turn the cam until the hole in the cam sleeve coincides with the hole in the distributor screw, then fasten the cam in position by tightening the 8-32 headless set screw in the cam sleeve. Lower the distributor back screw and mesh its gear with that of the upper front screw, making sure that the gears are in time.

Place a new matrix with thick lugs in the distributor box, turn the distributor screws slowly by hand and stop turning the instant the matrix lift touches the bottom of the matrix and begins to raise it. At this precise position, viewing the parts from the rear of the machine, there should be 1/32″ clearance between the left side of the matrix lugs and the right side of the distributor screw threads at the point where the matrix enters the threads. The specific clearance required between the matrix lugs and the screw threads is indicated clearly in Fig. 147. If the exact clearance relationship is not present, it is an indication that the raising of the matrix as controlled by the matrix lift cam is not timed properly with respect to the rotation of the distributor screws. This condition is remedied simply by turning the matrix lift cam on the distributor back screw until the matrix lift starts to raise the matrix when the distributor screw threads are 1/32″ clear of the left side of the matrix, as illustrated in Fig. 147.

When the matrix lift cam has been located in the proper position, several lines of matrices of all thicknesses should be run through the distributor as a final check on the accuracy of the setting. The matrices must enter the distributor screws freely, clearing the right side of the distributor screw threads and rising with a steady, uniform movement. When the necessary clearance has been obtained, the matrix lift cam can be pinned in position. If the various parts of the distributing mechanism are in good condition, the final position of the new

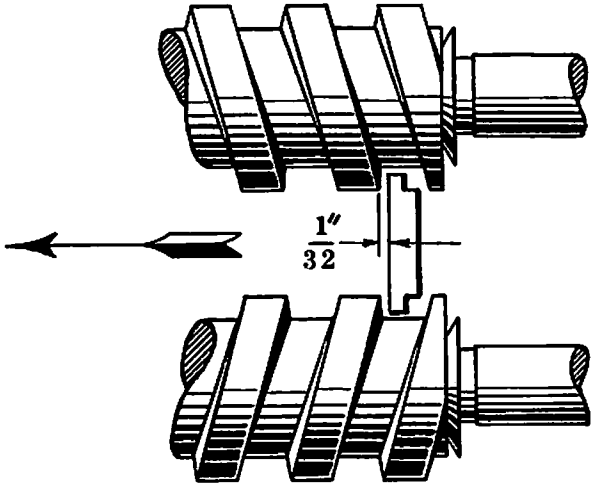


Fig. 147. Detail view, showing the 1/32″ clearance between the distributor screw threads and the front of the matrix lugs as the matrix is about to enter the threads. This clearance is established when the distributor box matrix lift cam is pinned in position on the distributor back screw.

matrix lift cam on the distributor back screw will coincide with that occupied by the old cam. It will be necessary in this instance only to drill through the cam and ream it for the taper pin, after which the taper pin can be driven in the tapered hole already provided in the distributor back screw. If the hole in the new matrix lift cam does not match that in the distributor screw, however, it will be necessary to plug the hole in the screw with the old taper pin and dress it flush before pinning the cam in its new position. Before removing the cam, draw a mark at the end of the distributor screw inside the cam to indicate its setting position.

The distributor box matrix lift cam roll *8*, Fig. 143, will require replacement chiefly when it wears unevenly due to lack of lubrication of the roll and stud. If the cam roll becomes elliptical in shape, the upstroke of the matrix lift will vary and matrices will not be lifted positively above the banking faces of the distributor box rails. Whenever the matrix lift cam or cam roll is replaced, the setting of the matrix lift should be checked to insure 1/32″ clearance between the matrix lugs and the vertical banking faces of the distributor box rails. The procedure for making this adjustment has been described already in connection with distributor box adjustments.

**Care and Maintenance.** The distributor box should be removed from the machine at regular intervals and cleaned thoroughly. The constant passage of matrices through the box tends to build up an accumulation of graphite and gummy substances on the rails and plates which not only interferes with distribution but also fouls the magazines and other parts of the machine through which the matrices travel. A high grade solvent should be used to clean the various parts of the distributor box. The face of the distributor shifter slide buffer also tends to become gummy and should be cleaned at the same time. The matrix lift cam lever *5*, Fig. 143, and the stud on which cam roll *8* is mounted should be lubricated once a week. The matrix lift cam *3* and roll *8* should be cleaned occasionally and a light film of oil should be applied to the surface of the cam.

## Mixer Distributor Box

The function of the distributor box applied to mixer or double distributor machines is the same as that of the distributor box applied to single distributor machines—it receives the matrices from the second-elevator bar and presents them to the matrix lift, which raises them one by one into the distributor screws. Due to the fact that the mixer distributor box is designed to deliver matrices to two distributors, however, its construction differs in several respects from that already described and illustrated in the case of the distributor box applied to single distributor machines.

The construction of the mixer distributor box is shown in Fig. 148. The distributor box bar *2* is inserted in a slot in block *1* and is held in position by pins *3* and *4*. Like the distributor box bar applied to single distributor machines, the mixer distributor box bar has a slight amount of play at its right end on pin *4* so that its teeth can be aligned with those of the second-elevator bar when the elevator seats at distributing position. When the matrices are moved into the distributor box by the distributor shifter, they are supported by the distributor box

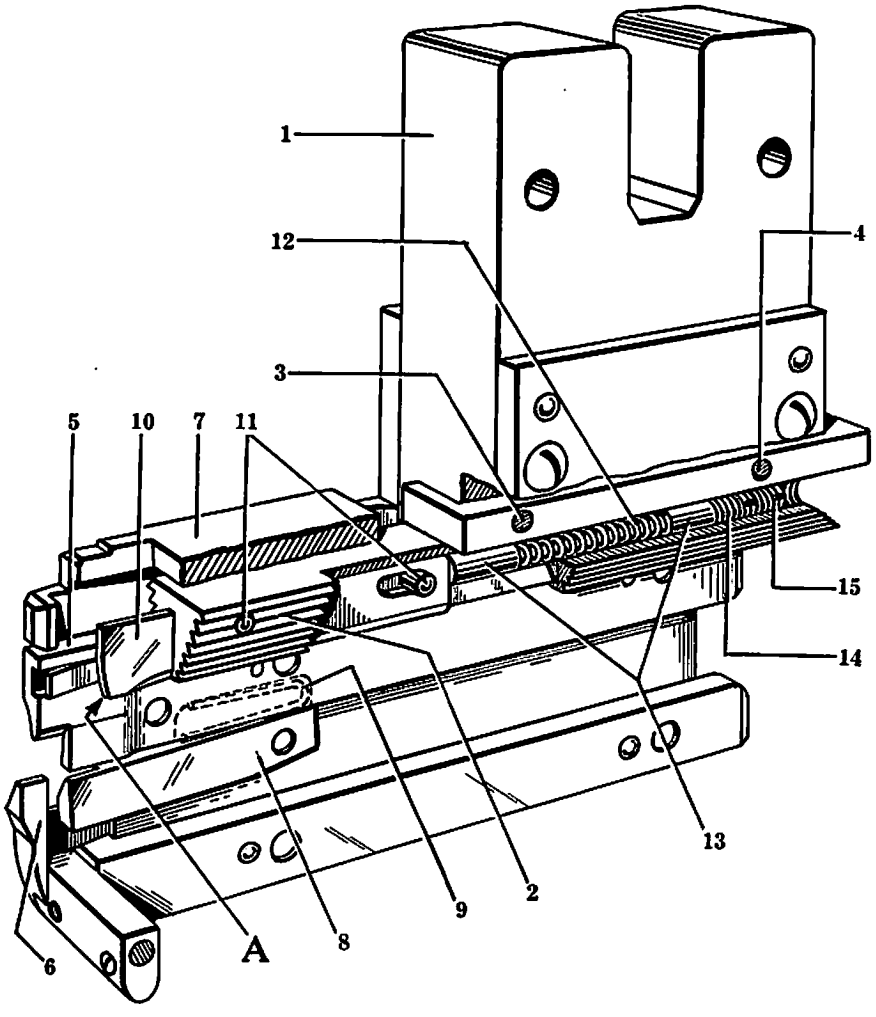


**Fig. 148. Mixer Distributor Box.** The back plate has been broken away to show the construction of the bar point and other parts inside the box.

bar and then ride off the bar onto the distributor box upper rails, one of which is shown at *5*. The upper rails support the matrices by their upper lugs until they bank against the four locating points at the feeding end of the distributor box. Two of these banking points consist of shoulders on the lower rails, one of which is shown at *6*. The other two locating lugs are provided on the distributor box upper rail buffer *7*, which is fastened to the front and back plates of the distributor box just above the upper rails. Two pawls are provided in the mixer distributor box to hold matrices down positively on the upper rails as they ride off the distributor box bar. The pawls, one of which is shown at *8*, are pivoted on

shoulder screws and are held down by small U-shaped springs *9* inserted in recesses in the upper rails. As the matrices leave the distributor box bar and ride on the upper rails, the pawls bear on the lower lugs of the matrices and insure clearance as the matrices pass under the distributor box bar point *10*. The space between the front ends of the pawls and the banking faces of the distributor box lower rails is sufficient to permit matrices with the maximum size lugs to pass freely.

The mixer distributor box bar point *10*, Fig. 148, serves the same function as the point applied to single distributor boxes in that it permits only one matrix to be lifted out of the box at a time. Unlike the single distributor bar point, however, the mixer bar point does not occupy a fixed position but is permitted to move to the right as certain matrices are raised above the distributor lift rail into the distributor screws. The point *10* is inserted in a slot in the distributor box bar *2* and is supported by two pins *11* passing through elongated holes in the bar point. A compression spring *12* is interposed between two plungers *13* and holds the bar point in its normal position to the left. As various thick matrices with deep bar point slots are raised above the distributor lift rails, the body of the matrix at the bottom of the bar point slot moves the bar point slightly to the right. As soon as the matrix is clear of the lift rails, spring *12* returns the bar point to normal position. Adjusting screw *14* governs the tension of spring *12* and screw *15* locks the setting.

An important feature to note in connection with the mixer distributor box bar point *10*, Fig. 148, is that the rounded underside *A* of the point is of perfect radial shape, having a ¼″ radius. The shape of the bar point at its front end is extremely important to efficient matrix distribution. If the rounded surface of the point does not conform to the radial surface of the matrix at the bottom of the bar point slot, the bar point may dig into the body of the matrix and prevent it from rising freely into the distributor screws. Minor variations occasioned by wear in the shape of the bar point can sometimes be corrected by stoning the binding surface, but when the point wears to such an extent that its original relationship to the matrix is disturbed, it is necessary to replace the part.

Another fact to be noted in connection with the mixer bar point is that certain wide matrices manufactured for single distributor machines in previous years may not pass the mixer bar point in cases where single distributor matrices are reworked for mixer machines. In former times, a hole was drilled in the body of wide matrices to decrease their weight. (An elongated slot is now milled in wide matrices for the same purpose.) The bar point slot cut in certain of the older matrices was deep enough for the single distributor machine but is too shallow for the mixer distributor box bar point. To run such matrices in the mixer machine, it is necessary to return them to the factory for recutting of the bar point slot.

## Matrix Lift Mechanism (Mixer)

The relationship between the mixer distributor box, the matrix lift mechanism and other distributor parts is shown in Fig. 149. The distributor box *4* is located on the distributor box arm *2* by means of dowels *5* and is clamped in position by a wing nut *6*. Unlike the distributor shifter slide guide applied to

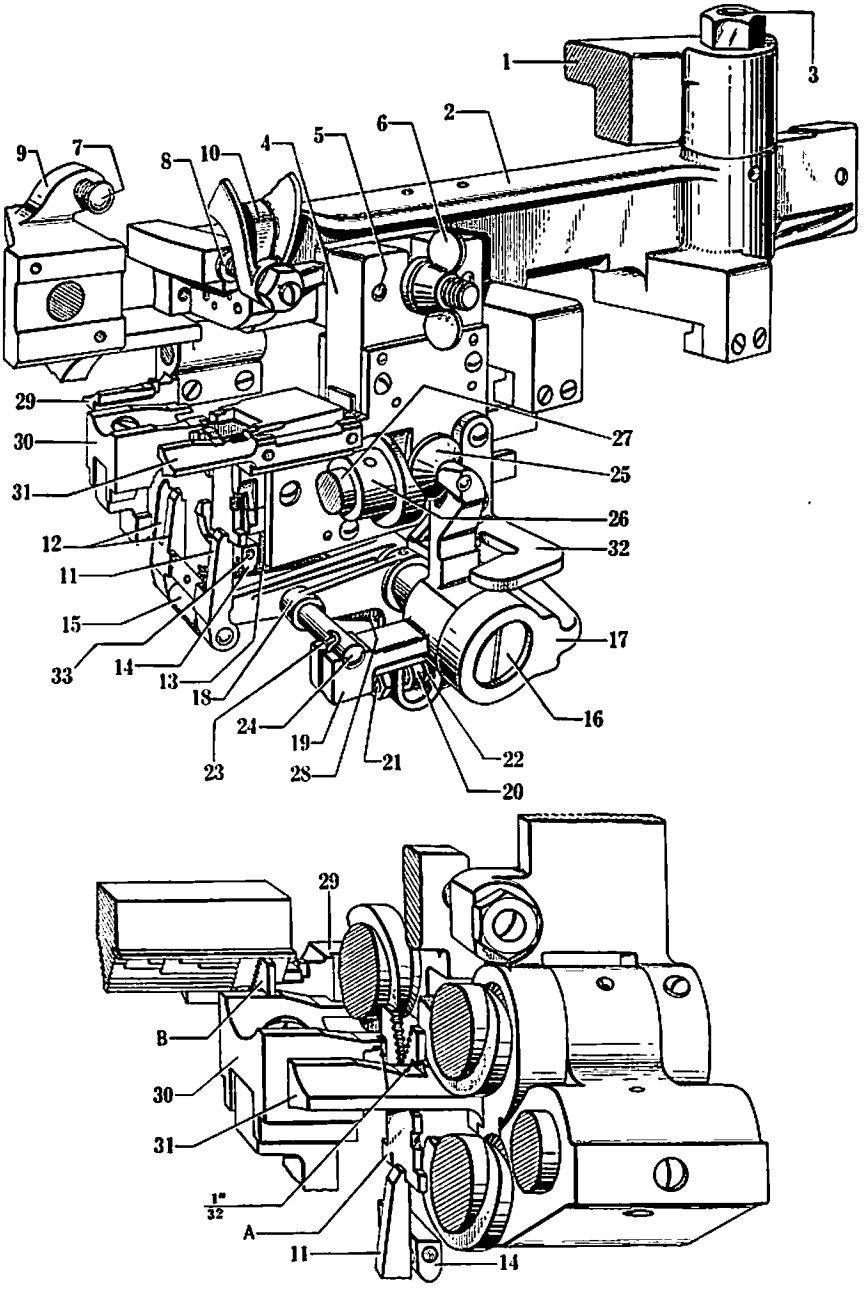


**Fig. 149. Perspective View of the Mixer Distributor Box and Matrix Lift Mechanism.** The detail illustration shows how the matrices are lifted into the distributor screws and are conveyed along the lift rails, which support the matrices until they engage the teeth of the distributor bars.

single distributor machines, the distributor box arm *2* is not fastened in a fixed position on the mixer machine but is pivoted on a stud *3* passing through the distributor beam *1*. This pivotal arrangement is provided to permit arm *2* to move the distributor box *4* to position opposite the front and back distributors as matrices from the upper and lower magazines are presented to the font selector mechanism. The movement of arm *2* and consequently, the location of the distributor box and matrices in relation to the front and back distributors, is limited by a screw *7* in the distributor front screw bracket *9* and another screw *8* in a bracket *10* fastened to the distributor beam. Screw *7* locates the distributor box in its correct position with respect to the front distributor and screw *8* fulfils the same function with respect to the back distributor. The movement of arm *2* and distributor box *4* between the front and back distributors is controlled automatically, as previously described, by a font selector and distributor box clutch mechanism, which operates on the basis of mixer selector notches cut in the base of the matrices. The selector and distributor box clutch mechanism is described in the sections following the present outline of the matrix lift mechanism.

The mixer matrix lift mechanism operates on the same basic principle as the single distributor matrix lift mechanism. Due to the fact that the mixer mechanism is designed to distribute matrices to a double distributor, however, the design of the lift mechanism differs in several respects from that already described and illustrated in the case of the single distributor machine.

A double matrix lift is provided for the mixer distributor. The rear lift *11*, Fig. 149, raises matrices into the back distributor and the front lift *12* raises matrices into the front distributor. The location of both lifts with respect to the lower front edge of the matrix is governed by an adjustable block *14* fastened between the distributor box lower front and back plate rails. The block can be adjusted horizontally to permit the lifts to engage the matrices by .028″. The front and back lifts are made as one part and are held positively against block *14* by spring *13* when the distributor box is in position opposite the front or back distributor. Just before the distributor box starts to move from one distributor to another, the lifts are thrown forward by the font selector arms and are held clear until the distributor box comes to position.

The matrix lift is pivoted on a pin at the front end of lift lever *15*, Fig. 149. The lift lever is pivoted on a stud *16* passing through the font selector bracket *17*. Lift lever *15* is provided with an extension lug *20* which fits between an adjusting screw *21* and a compression spring *22* in the lift lever yoke *18*. Yoke *18* is connected with cam lever *19* by a spring *23*, which engages a guide pin *24* in the yoke. The various parts just described, therefore, indicate that movement of cam lever *19* will be imparted to the matrix lifts *11* and *12* through the connections outlined. The movements of the cam lever which cause the lifts to rise and to descend are imparted by the matrix lift cam *26*, which is pinned to the lower distributor back screw *27*. The cam roll *25* is held positively against cam *26* by a tension spring *28* fastened to the font selector bracket *17* at one end and to the matrix lift lever *15* at the other.

When the line of matrices is moved into the mixer distributor box by the distributor shifter, the first matrix in the line banks against the four vertical faces of the distributor box rails, as shown in Fig. 149. These banking points locate

the matrix positively with respect to the lifting edge of the matrix lift *11*. As the distributor screws revolve, the low point of the matrix lift cam *26* comes to position opposite roll *25*, permitting cam lever *19* to move forward through action of spring *28*. This lowers lever *15* and lift *11* until the seat of the lift comes to position under the matrix through action of spring *13*. As the distributor screws continue to revolve, roll *25* rides up on the high point of cam *26*, causing lift *11* to move upward and to raise the matrix out of the distributor box, above the distributor lift rails and into the distributor screws.

The distributor lift rails are shown at *29*, *30* and *31*, Fig. 149. The center lift rail *30* is fastened at the top of an extension arm of the font selector bracket and is located under the distributor middle screw. The front lift rail *29* is fastened to the left-hand distributor front screw bracket and the rear lift rail *31*, to the left-hand distributor back screw bracket. These lift rails serve the same purpose as the extended distributor box upper rails applied to the single distributor box in that they support the matrices by their two upper lugs as they are conveyed forward by the distributor screws and engage the teeth of the distributor bar. The rear lift rail *31* and the adjacent surface of the center lift rail *30* support matrices as they are carried forward into the back distributor; the front lift rail *29* and the adjacent surface of the center lift rail *30* fulfil the same function at the front distributor.

The distributor box is shown in position opposite the back distributor in Fig. 149. All matrices drawn originally from the lower main and side magazines are lifted into the back distributor by lift *11* and are conveyed along the distributor bar to the proper channels in the magazine. As each matrix is lifted out of the distributor box, it is raised 1/32″ above the center lift rail *30* and the rear lift rail *31*, as shown by the matrix *A* in the detail drawing. The matrix lift *11* holds the matrix in this position until the revolving distributor screws engage three of the matrix lugs and start to move the matrix forward to the inclined surfaces of the lift rails. The matrix lift then descends to position under the next matrix in the distributor box while the distributor screws convey the first matrix forward to the level surfaces of the lift rails. Just before the matrix rides off the lift rails, its combination teeth engage the teeth of the distributor bar, as illustrated by matrix *B* in the detail drawing.

The actions just outlined regarding the lifting of the matrices into the back distributor are the same in the case of the front distributor. When matrices drawn originally from the upper main and side magazine are presented to the back font selector, as described in the following section on the font selector mechanism, the distributor box clutch mechanism is tripped automatically and the distributor box is moved to position opposite the front distributor. The matrices are then raised by the front lift *12*, Fig. 149, above the front lift rail *29* and the adjacent part of the center rail *30*, from which point the distributor screws convey them forward to the front distributor bar for distribution in the regular manner.

The mixer matrix lift cam lever *19*, Fig. 149, is mounted freely on stud *16* so that it can move sidewise with the distributor box as matrices from the upper and lower magazines cause the distributor box to move from one distributor to the other. A shifter *32* fastened to the distributor box causes cam lever *19* to fol-