Chapter III

TRANSFER AND DISTRIBUTING MECHANISM

The third major division of the Intertype machine is the transfer and distributing mechanism. In the preceding description of the casting mechanism, the course of the matrices and spacebands was outlined from the delivery slide to the casting mechanism and the various parts of the mechanism concerned in the production of the slug were presented in the same sequence in which their actions take place on the machine. The chief parts described in the casting mechanism were the first elevator, the vise frame, the mold, mold disk and mold disk slide, the vise closing and justification mechanism, the knife block and the slug galley. From a general standpoint, therefore, the path of the matrices and spacebands has been traced from the time they were raised to the delivery slide to their presentation in front of the mold and the casting of the slug. Following the cast and while the mold disk is being turned three-quarters of a revolution to ejecting position, the first elevator rises to transfer position with the line of matrices and spacebands in the first-elevator jaw. While these two actions of the machine occur simultaneously, the movement of the matrices and spacebands to transfer position was temporarily disregarded so that the description of the casting mechanism could be completed as a unit. From the time the cast took place, therefore, we have followed the slug up to the point where it was carried in the mold to ejecting position, passed between the knives and came to rest in the slug galley.

After the slug has been cast and just before the first elevator begins to rise to transfer position with the matrices and spacebands, the matrix line is freed from its tight lock-up condition through action of the vise closing and justification mechanism. The vise closing and justification levers descend, lowering the vise justification block and releasing the upward pressure on the spacebands. In addition, the vise closing lever continues its downward movement sufficiently to pull the vise closing rod down to its full stroke. This opens the vise closing screw and permits the left vise jaw to withdraw slightly from the matrix line. These two actions free the matrix line and the first elevator begins at precisely this moment to lift the line from between the vise jaws and to raise it to transfer position.

The final automatic process of the machine—transfer and distribution—may be regarded as beginning at this point. The basic phases of transfer and distribution, following the sequence of machine actions, may be outlined in general terms as follows:

1. The first elevator raises the line of matrices and spacebands to the transfer channel. The upper position of the elevator, and consequently, the exact height to which the matrices and spacebands are raised, is controlled positively by an adjusting screw in the first-elevator slide stop, which is fastened at the bottom of

the first-elevator slide. The screw banks against the lower bridge of the vise frame and limits the upstroke of the first elevator at transfer position.

2. The second elevator descends, lowering the second-elevator bar to the transfer channel. The position of the bar in the channel is positively determined by an adjustable guide plate fastened to the front plate of the transfer channel. The guide plate aligns the teeth of the second-elevator bar exactly with the teeth of the matrices.

3. The elevator transfer lever and the spaceband lever move together. The matrices and spacebands are moved from the first-elevator jaw into the transfer channel by the elevator transfer slide finger, the teeth of the matrices engaging the teeth of the second-elevator bar. Since a V-shaped notch is cut in the sleeves of the spacebands, the sleeves clear the second-elevator bar as the line is transferred. The spacebands are supported in the transfer channel by the two sleeve lugs, which register with a groove in the front plate and a rail on the back plate of the channel.

4. The elevator transfer lever and the spaceband lever withdraw, permitting the second elevator to raise the matrices out of the transfer channel. When the matrices are clear of the channel and the levers, the levers move together again, causing the spaceband pawl to engage the spacebands and to return them to the spaceband box.

5. The second elevator, supporting the matrices by their teeth on the second-elevator bar, rises to normal position, with the second-elevator bar opposite and in alignment with the distributor box bar. As the second elevator approaches its seat at the distributor, the distributor shifter is moved to the left so that it will be ready to shift the matrices into the distributor box as soon as the second-elevator bar seats in position.

6. The distributor shifter is pulled to the right by a tension spring and moves the line of matrices into the distributor box. The distributor box matrix lift raises the matrices one by one into the distributor screws. As each matrix is moved forward by the screws, the teeth of the matrix engage the teeth of the distributor bar, which is fastened to the distributor beam directly above the channel entrance. When a matrix reaches a point directly above its channel in the magazine, there is a gap in the teeth of the distributor bar corresponding with the combination of teeth cut in the matrix. The matrix is thereby released and drops into its proper channel in the channel entrance, through which it is guided into its channel in the magazine.

The foregoing summary covers the chief machine actions concerned in the major automatic process of transfer and distribution. The basic sequence of these actions will be followed in the description of the transfer and distributing mechanism.

The Transfer

The transfer of the matrices and spacebands from the first-elevator jaw to the transfer channel is one of the most important actions of the machine. Proper operation of the machine and the preservation of the various parts of the transfer mechanism depend, to a great extent, upon the skill with which the transfer is adjusted and the care with which the parts are treated while in service. If the

transfer is not set properly, one of the most vital parts of the matrix—the combination teeth—will be subject to constant friction and wear. This wear will be manifested chiefly in distribution, because proper operation of the matrices on the distributor is almost wholly dependent upon the condition of the matrix combination teeth. In addition to this factor, it should be borne in mind that faulty transfer will affect the first-elevator front and back jaw, the transfer channel front and back plate, the second-elevator bar and other vital parts of the machine.

It should be understood, at the outset, that while there are relatively more parts to be taken into consideration when setting the transfer, *a properly adjusted transfer can be obtained very easily if the basic relationship of the transfer parts is understood and if a reasonable amount of time is given to their adjustment.* Time spent on the adjustment of the transfer is time well spent. If a properly adjusted transfer is maintained consistently, the matrices, spacebands and the various parts of the transfer mechanism will last longer and the operation of the machine will be proportionately more efficient. Once the transfer has been set, of course, the adjustment of the various parts will require changing only at long intervals.

Mechanical Requirements for Efficient Transfer. A properly adjusted transfer usually entails the setting of three basic mechanisms—the transfer bar, the first-elevator slide and the second-elevator bar. The combined setting of these three parts will ultimately govern the efficiency with which the matrices are transferred from the first-elevator jaw to the second-elevator bar. The transfer of the spacebands, of course, is automatically provided for when the transfer parts are set properly for the movement of the matrices. In order that the matrices will pass freely between the two points mentioned, two basic relationships must be provided on the machine:

1. Horizontal alignment of matrix teeth with the teeth of the second-elevator bar. When the first-elevator slide seats at transfer position with the line of matrices and spacebands in the first-elevator jaw, the upper position of the slide must be limited positively so that it will rise to the exact height required to align the matrix teeth horizontally with the teeth of the second-elevator bar. This setting is obtained by means of an adjusting screw in the first-elevator slide stop, which is fastened at the bottom of the first-elevator slide.

2. Centralized alignment of second-elevator bar teeth with the teeth of the matrices. When the second-elevator bar comes to rest in the transfer channel, the bar should be centrally located with respect to the triangular tooth recesses in the matrices. This setting insures an equal amount of clearance between the front and back teeth of the matrix and the corresponding teeth of the second-elevator bar. The adjustment is made principally by means of a guide fastened to the front plate of the transfer channel.

In addition to these basic settings, there are several related factors to be taken into consideration. After a slug has been cast and the matrix line has been loosened preparatory to the upward movement of the first-elevator slide, the spaceband wedges usually fall of their own weight if they have been lubricated properly with graphite and if they are in good condition. If a spaceband wedge should remain in the raised position, however, it would have to be depressed be-

fore the transfer could take place. A transfer bar is provided for this purpose. The same consideration applies to the matrices, which can be assembled in two positions. When the first-elevator jaw seats at transfer position, an operating bar fastened to the first-elevator slide guide retracts the first-elevator jaw duplex rail. This action withdraws the rail from under matrices assembled originally in auxiliary position, permitting the matrices to drop to normal position on a common level with the other matrices in the line. If the sides of the matrices are gummy, however, the matrices assembled on the rail might not drop freely to normal position. The transfer bar is provided, therefore, to insure this positive action. A movable pawl at the right end of the bar, as will be described later in detail, levels the matrices for final transfer as they enter the transfer channel.

First-Elevator Slide Guide

The actions of the machine preceding the upward movement of the first-elevator slide to transfer position, as outlined previously, are designed to free the matrix line from its tight lock-up condition between the vise jaws. Directly following the cast, the vise justification block is lowered, releasing the upward pressure on the spaceband wedges. In addition, the downward stroke of the vise closing lever and rod opens the vise closing screw, permitting the left vise jaw to withdraw slightly from the matrix line. These two actions usually suffice to permit the spaceband wedges to drop to position of their own weight. The unlocking of the matrix line, moreover, enables the first-elevator slide to lift the line freely from between the vise jaws as the slide begins to rise to transfer position.

The upward movement of the first-elevator slide to transfer position is shown in Fig. 126. The movements of the slide, as described in the section dealing with the first elevator, are controlled positively by the first-elevator cam and the series of levers which connect the slide with the cam. When the first elevator seats at transfer position, the first-elevator jaw and the line of matrices and spacebands come to position under the first-elevator slide guide. The guide, shown at *1*, Fig. 126, is fastened to the face plate frame 2. Mounted on the guide are a number of parts which fulfil various functions concerned with the transfer. The transfer bar *3* is fastened to the guide by two screws *4*. Two adjusting screws *5* threaded through guide *1* above the transfer bar *3* regulate the height of the transfer bar when it is set in position. The function of the transfer bar is to level the line of matrices and spacebands in preparation for the transfer. If a spaceband wedge fails to drop to normal position as the first elevator rises from the vise cap, the lower edge of the transfer bar will depress the wedge when the first elevator seats at transfer position. Similarly, if matrices assembled in auxiliary position fail to drop to normal position when the first-elevator jaw duplex rail is retracted at transfer position, the transfer bar will depress them slightly and start them dropping to normal position.

The transfer bar, of course, is set to clear the matrices and spacebands when the first elevator is at its extreme upward stroke in order to avoid wear on the matrix teeth and to insure perfect freedom when the line is being transferred. If the spaceband wedges or matrices still require depressing in order to level them for the transfer, therefore, a yielding part must be provided to furnish the neces-

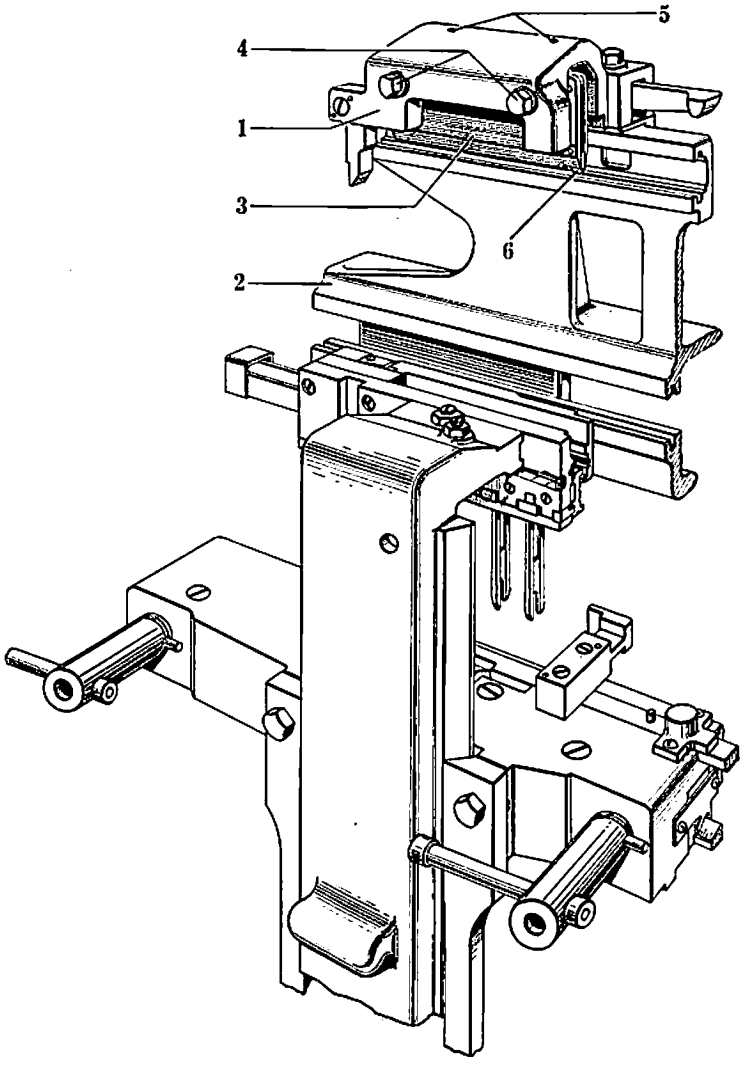

Fig. 126. The First-Elevator Slide Guide. The illustration shows the first elevator rising after the cast to transfer position, with the line of matrices and spacebands in the first-elevator jaw. When the first-elevator slide reaches its full upstroke to transfer position, the first-elevator jaw and the matrix line come to position under the first-elevator slide guide *1*. The guide and its parts are provided for the purpose of leveling the matrices and spacebands in preparation for the transfer.

sary depression with sufficient overmotion to prevent undue friction or wear. The transfer bar pawl *6* at the right end of the bar fulfils this function. The lower edge of the pawl rests normally below the lower edge of the transfer bar and the bottom of the second-elevator bar. As the line of matrices and spacebands is

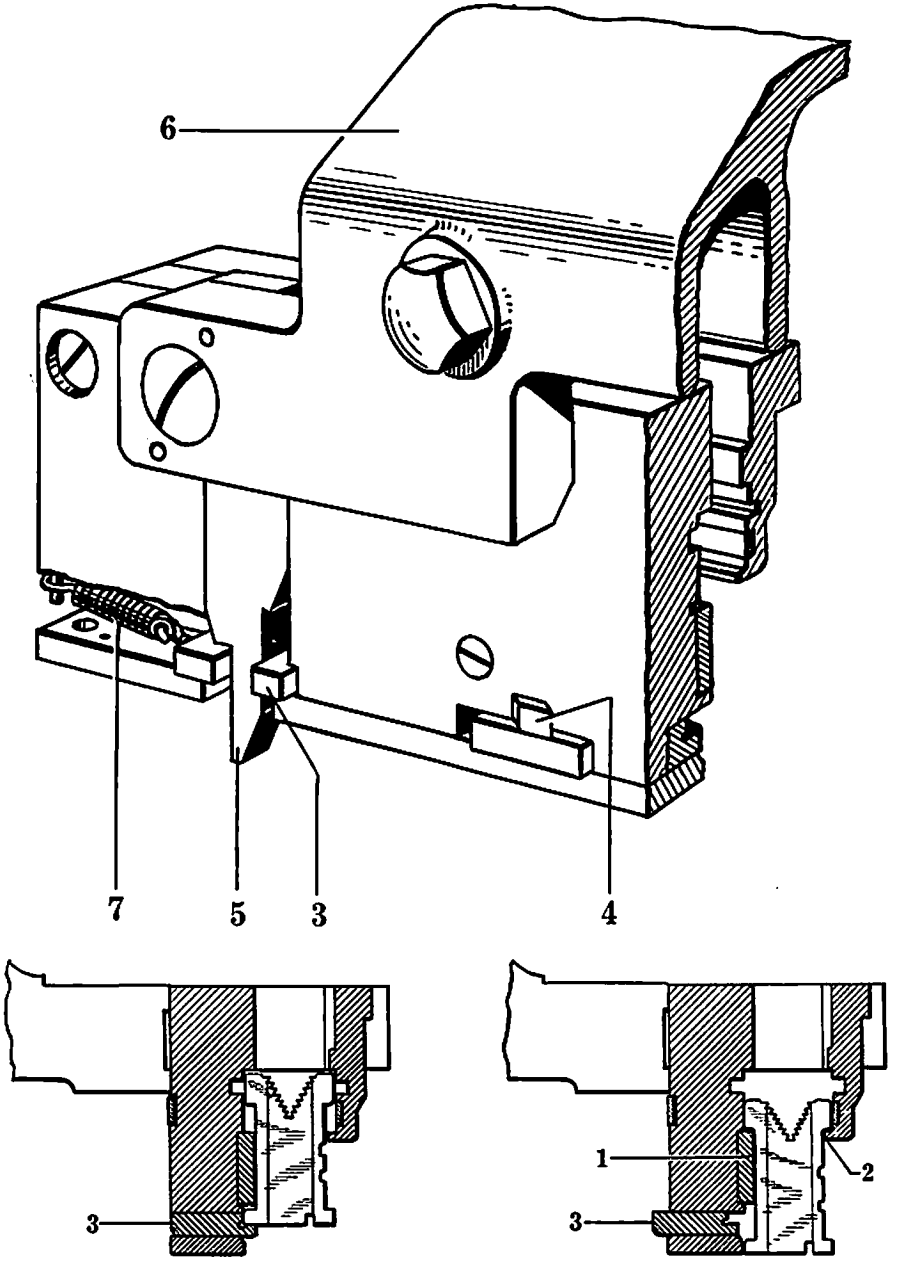

Fig. 127. The First-Elevator Jaw Duplex Rail and Operating Bar. The bar *5* is fastened to the first-elevator slide guide *6* and retracts the duplex rail *3* when the first elevator seats at transfer position. This causes matrices assembled in auxiliary position to drop to normal position in preparation for the transfer. All matrices, of course, must be on a common level to transfer to the second-elevator bar.

moved into the transfer channel, the pawl levels the matrix teeth exactly with the teeth of the second-elevator bar. The pawl has a slight amount of vertical play but it is set for exact alignment with the bottom of the second-elevator bar when it is at its highest stroke.

First-Elevator Jaw Duplex Rail and Operating Bar. The first-elevator jaw, as previously described, is provided with two levels of rails for supporting matrices assembled in normal and auxiliary position. The rails which support matrices in normal position consist of the adjusting bar *1*, Fig. 127, fastened to the first-elevator front jaw and a lip 2 on the back jaw. Both of these rails are fixed in position. The duplex rail *3*, which supports matrices in auxiliary position, is made movable so that the matrices assembled originally in italic or boldface position can be dropped to normal or roman position just before the transfer takes place. The duplex rail is provided with slides *4*, which operate in grooves in the

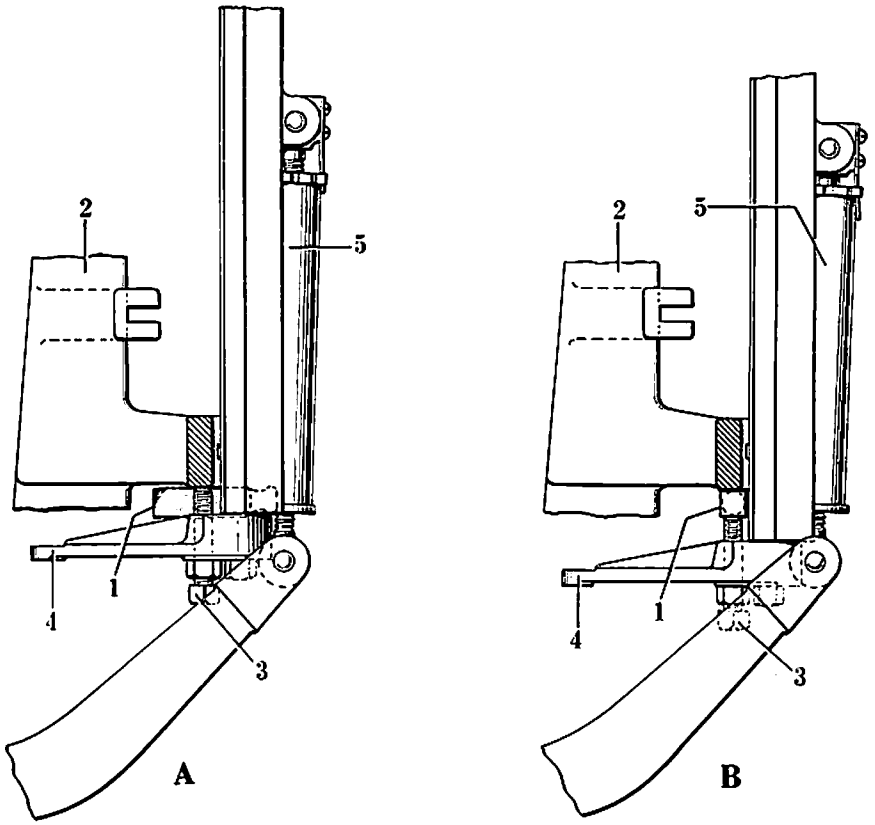

Fig. 128. The First-Elevator Slide Recasting Block is provided for recasting lines assembled wholly or partly in italic or boldface position. The block *1* (drawing B) prevents the first-elevator slide from making its full upstroke to transfer position. This prevents the first-elevator jaw duplex rail from rising high enough to engage and to be retracted by its operating bar on the first-elevator slide guide. The matrices assembled in auxiliary position, therefore, will remain on the duplex rail as long as the recasting block is in position.

first-elevator front jaw. When the first elevator makes its full upstroke to transfer position as regulated by the adjusting screw in the first-elevator slide stop, the first-elevator jaw duplex rail is retracted by an operating bar *5* fastened to the first-elevator slide guide *6*. The angular end of the operating bar engages the duplex rail as the first elevator seats at transfer position, causing the duplex rail to withdraw from the inside of the first-elevator jaw against tension of spring *7*. The matrices assembled originally in auxiliary position thereby drop to normal position on a level with the other matrices in preparation for the transfer. After the transfer has taken place, spring *7* returns the duplex rail *3* to position as the first elevator descends to normal position opposite the delivery channel.

First-Elevator Slide Recasting Block. When the first-elevator slide makes its full upstroke to transfer position, as described previously, the first-elevator jaw duplex rail *1*, Fig. 129, is withdrawn by the operating bar *2*. This action causes matrices in auxiliary position to drop to normal position in preparation for the transfer. To recast a line of matrices assembled wholly or partly on the rail, therefore, it is necessary to provide means for shortening the regular upstroke of the first-elevator slide to transfer position. The purpose in reducing the upstroke of the slide, of course, is to prevent the duplex rail from rising high enough to engage and to be withdrawn by the operating bar. The first-elevator slide recasting block fulfils this function.

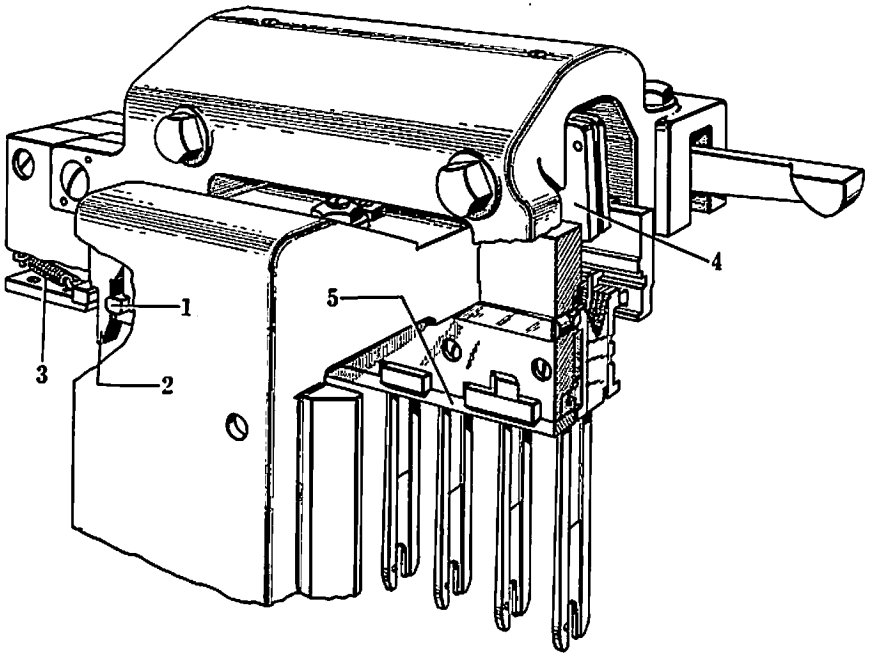

Fig. 129. The First Elevator at Transfer Position. The duplex rail *1* has been retracted by operating bar *2* against tension of spring *3*. Matrices assembled originally in auxiliary position are thereby dropped to normal position. The transfer bar *4* pushes the matrices and the spaceband wedges down if they fail to drop freely by gravity. A pawl at the right end of the transfer bar, being aligned with the bottom of the second-elevator bar, causes the matrix teeth to engage the second-elevator bar teeth freely when the line is transferred.

The recasting block is shown at *1*, Fig. 128. The block is pivoted on a screw threaded in the vise frame *2* and can be swung from the position shown in drawing A to the position shown in drawing B. When setting regular composition in which only one slug of each line is required, the recasting block is placed in the inoperative position shown in drawing A. With the block in this position, the first-elevator slide adjusting screw *3* in stop *4* banks against the lower bridge of the vise frame *2*. This permits the first-elevator slide to make its regular upstroke to transfer position. The duplex rail is retracted by the operating bar on the first-elevator slide guide and any matrices assembled originally in the auxiliary position are dropped to normal position. The line of matrices and spacebands is then transferred and distributed in the regular way.

When recasting lines assembled wholly or partly in italic or boldface position, the recasting block *1*, Fig. 128, is turned into position as shown in drawing B. As the first-elevator slide rises to transfer position in this instance, the adjustable stop screw *3* banks against the recasting block *1*, reducing the regular upstroke of the first-elevator slide by a distance equal to the thickness of the block. The block, of course, is sufficiently thick to prevent the first-elevator jaw duplex rail from engaging the operating bar on the first-elevator slide guide. Matrices assembled in auxiliary position are thereby retained on the duplex rail and the line can be recast as many times as desired as long as the recasting block is in position. The first-elevator lever link *5*, as described previously in connection with the first elevator, provides overmotion when the first-elevator slide rises to align the matrices and when it seats at transfer position. This overmotion is especially important when the recasting block is being used, because the normal upstroke of the first-elevator slide is reduced approximately one-half inch. *It is essential, therefore, that the first-elevator lever link eyebolt settings be maintained to provide for proper compression of the lever link spring.* The spaceband lever pawl latch should be moved in front of the pawl when recasting work is being done. The pawl is used ordinarily to lock the elevator transfer lever and the spaceband lever only when recasting lines of matrices in the normal or roman position. It is advisable, however, to lock the pawl always when recasting lines, whether the matrices are in normal or in auxiliary position.

The Transfer Channel

When the first-elevator slide reaches its full upstroke to transfer position, the matrices and spacebands in the first-elevator jaw are raised to the exact height required to align them with the transfer channel and the second-elevator bar. The transfer channel is illustrated in Fig. 130 with the front plate partly broken away to show the various parts. The channel consists principally of the front plate *1* and the back plate *2* held together by a number of screws *3*. The assembled channel is fastened to the face plate frame by screws *4* passing through the back plate. The front and back plate of the transfer channel are provided with rails and grooves suitable for supporting the matrices and spacebands during the transfer. There are two short rails *5* on the back plate and two corresponding rails on the front plate which support the matrices as they are moved into the transfer channel. Openings are provided between these rails to permit hair

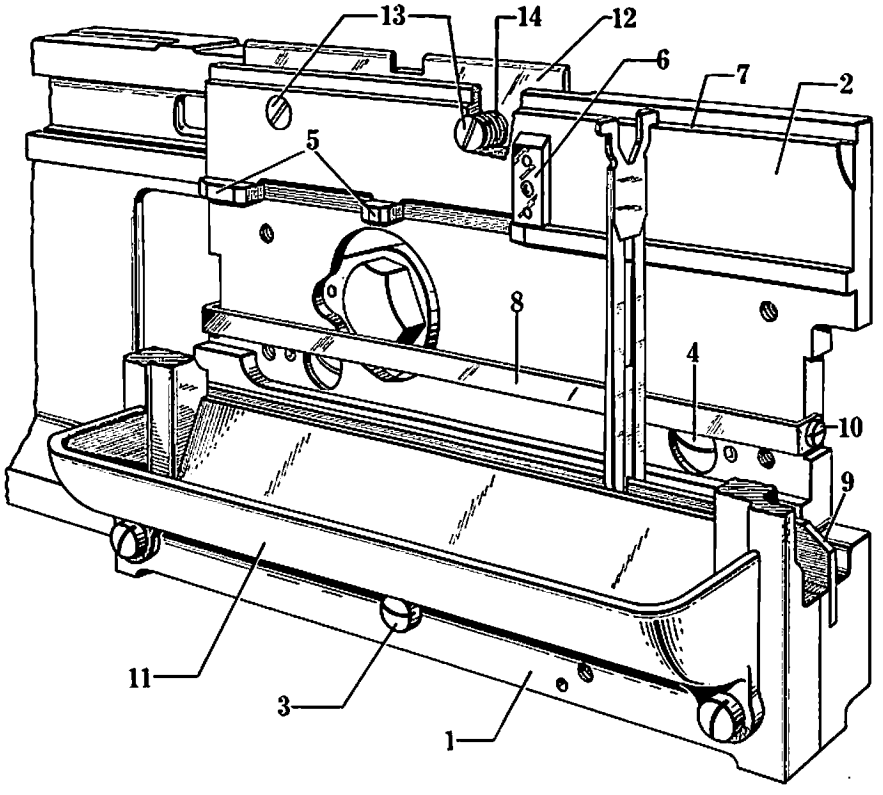

Fig. 130. The Transfer Channel. The front plate has been broken away to show the various parts of the channel. The second-elevator bar is located centrally within the channel during the transfer to receive the line of matrices. The functions of the transfer channel parts are outlined in the text.

spaces, logotypes and other special character matrices with blank tooth recesses to drop into the quad box *11*. As these matrices drop, they strike the top of the spaceband friction weight *8*, which deflects them into the quad box. A transfer matrix stop *6* is provided on the front and back plate of the channel to limit positively the distance to which the matrix line is moved to the right when it is transferred to the second-elevator bar. The stops prevent end matrices from sliding off the right end of the bar during the transfer and also locate the right end of full measure lines positively on the bar for clearance when the second-elevator bar seats at distributing position.

The spacebands are supported by their sleeve lugs by a rail *7* on the back plate and a groove in the front plate of the transfer channel. A rail *9* is provided at the bottom of the channel to prevent the spaceband sleeve lugs from twisting off the supporting groove and rail. The rail *9* registers with the slots in the bottom of the spaceband wedges and guides the spacebands until they reach the entrance to the spaceband box. The spaceband friction weight *8*, pivoted on two shoulder screws *10*, exerts friction on the spacebands as they are transferred with

the line from the first-elevator jaw and later, as they are returned to the spaceband box by the spaceband lever pawl. The friction weight steadies the spacebands during these movements.

The second-elevator adjustable guide plate *12* is fastened to the transfer channel back plate by two screws *13* passing through adjustable bushings *14*. This plate helps to locate the second-elevator bar when it is lowered to the transfer channel in preparation for the transfer. The adjustment of the plate is described below in connection with the setting of the transfer.

Setting the Transfer

The foregoing description of the parts concerned with the transfer of the line from the first-elevator jaw to the second-elevator bar indicates that an efficient transfer depends basically upon the adjustment of four mechanisms:

1. The first-elevator slide.
2. The lower second-elevator guide.
3. The second-elevator adjustable guide plate.
4. The transfer bar.

The proper adjustment of the transfer will be described in terms of these four mechanisms.

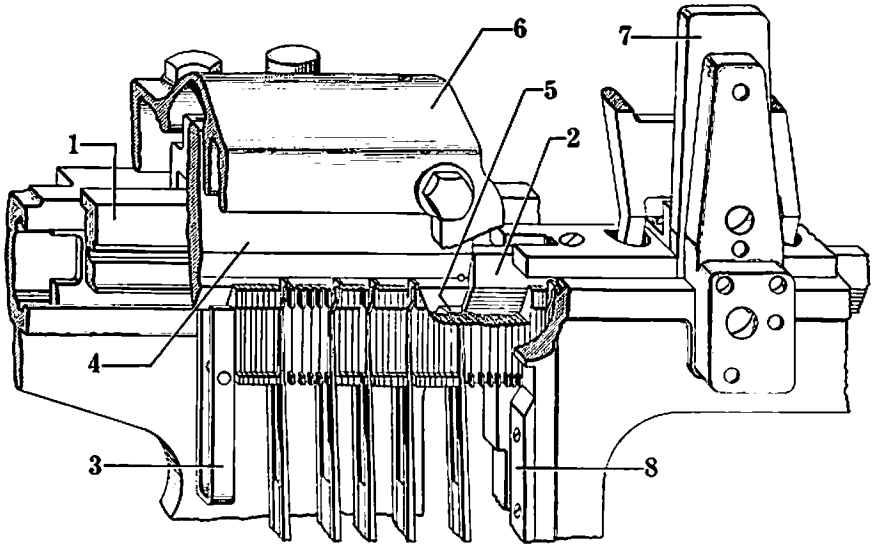

Fig. 131. Showing the line of matrices and spacebands in the process of being transferred from the first-elevator jaw *1* to the second-elevator bar *2* by the elevator transfer slide finger *3*. The transfer bar *4* leveled the matrices and spacebands when the first-elevator jaw came to position under the first-elevator slide guide *6*. As the line is moved into the transfer channel, pawl *5* levels the matrix teeth exactly with the teeth of the second-elevator bar *2*, causing the matrices to slide easily onto the bar. The second-elevator bar is located positively in the transfer channel by the adjustable lower guide *7*. The first-elevator jaw duplex rail return plate is shown at *8*. The function of this plate is to return the duplex rail positively to position in the first-elevator jaw as the first-elevator slide descends to normal position if the rail is not retracted by its spring.

Procedure for Adjusting Transfer. In setting the transfer, place a *new* pi matrix in the first-elevator jaw just inside the first-elevator jaw matrix detents. Lock the spaceband lever pawl latch, disconnect the pot pump plunger and run the machine ahead until the first and the second elevator seat at transfer position. (The machine will stop automatically at transfer position because the spaceband lever and the elevator transfer lever are locked in position by the spaceband lever pawl. The cam roll in the elevator transfer cam roll lever pushes the automatic safety pawl clear of the upper stopping lever when the levers are unlocked.) Push in the starting and stopping lever and turn off the motor. Place a piece of white paper in the transfer channel a little to the left of the spaceband box, then place an extension light on top of the channel over the piece of paper. The purpose of the light is to illuminate the interior of the transfer channel and the white paper provides a clear background against which the relationship of the matrix teeth to the second-elevator bar teeth can be seen by looking through the left end of the first-elevator jaw.

The First-Elevator Slide. The first-elevator slide, as outlined previously, raises the matrix line to the exact height required to align the matrix teeth horizontally with the teeth of the second-elevator bar when the machine is at transfer position. Look through the left end of the first-elevator jaw to determine whether the matrix teeth are properly aligned for height with respect to the second-elevator bar teeth. It is essential when viewing the relationship that the observer's eyes be kept level with the bottom of the transfer bar, as otherwise the correct relationship will not be seen. If the matrix teeth are too high or too low with respect to the corresponding teeth of the second-elevator bar, the upper position of the first-elevator slide at transfer position will require changing. The height to which the first elevator rises, as indicated previously, is controlled by the adjusting screw *3*, Fig. 128, in the first-elevator slide stop *4*. To lower the position of the slide, and consequently, of the matrix, the adjusting screw should be turned in; backing the screw off will permit the slide and the matrix to rise higher. When the matrix teeth are aligned exactly for height with the corresponding teeth of the second-elevator bar, tighten the lock nut on the adjusting screw securely. See that the screw does not move when tightening the nut.

Lower Second-Elevator Guide. The position of the second-elevator bar *2*, Fig. 132, in the transfer channel is controlled positively by the lower second-elevator guide *9* fastened to bracket *10* on the transfer channel front plate. The second-elevator bar is fastened to plate *3* and is pivoted on hinge pins passing through the legs of link *4*. Adjusting spring *7*, fastened to link *4* and to the second-elevator lever *1*, holds angle *6* against guide *9* when the second elevator is at transfer position. The spring also holds link *4* steadily against stop pins *5* while the second elevator is rising, preventing end matrices, especially in full measure lines, from being jarred off the second-elevator bar. The bar plate spring *8* steadies the second-elevator bar and plate with respect to link *4* as the second elevator is rising to the distributor.

After adjusting the first elevator for height at transfer position, the lower second-elevator guide *9* should be adjusted to position the second-elevator bar teeth centrally with respect to the teeth of the matrix. This setting insures an equal amount of clearance between the front and back teeth of the matrix and

the corresponding teeth of the second-elevator bar. Before adjusting the guide, look through the left end of the first-elevator jaw to determine in which direction the second-elevator bar is to be moved. If the bar is to be moved toward the back of the transfer channel, loosen screw *11* and turn in the set screws *12*. The fastening screw *11* should be tightened securely after each adjustment. When

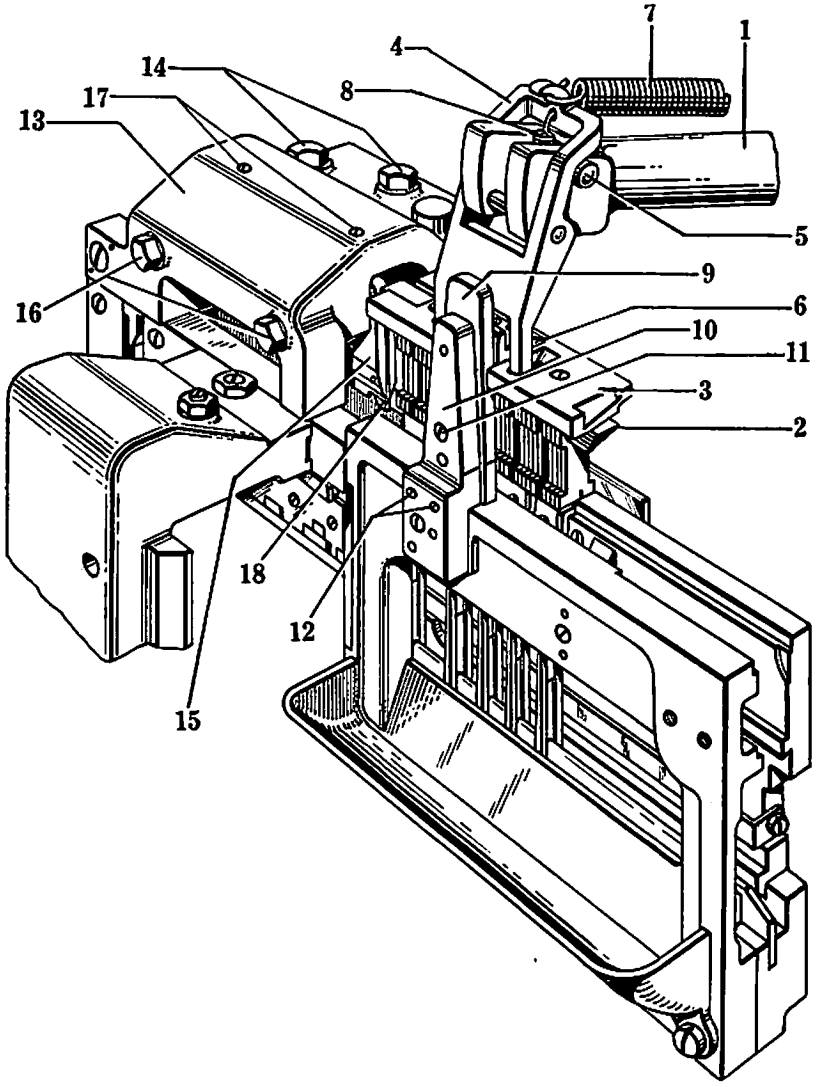

Fig. 132. View showing the line of matrices being lifted out of the transfer channel by the second elevator on its way upward to the distributor. The spacebands are held in the transfer channel by the front sleeve lugs, which entered a groove in the front plate of the channel when the line was transferred. The spacebands are returned to the spaceband box when the elevator transfer lever and the spaceband lever move together for the second time and then move back to normal position.

there is an equal amount of light between the front and back teeth of the matrix and the second-elevator bar, the clearance may be regarded as correct. It is essential in adjusting screws *12* that each screw be turned an equal distance in order that the second-elevator bar will be perfectly centralized within the transfer channel. It is possible, for example, to obtain approximately the proper relationship between the matrix teeth and the left end of the second-elevator bar with the second-elevator bar slightly off center toward the right end.

To verify the position of the second-elevator bar, remove the extension light and the paper from the transfer channel, start the motor and run the machine forward to normal position. Remove the pi matrix from the first-elevator jaw. Assemble a 30-em line, make sure that the spaceband lever pawl latch is locked and the pot pump plunger disconnected, then send the line over to the casting mechanism. When the machine stops at transfer position, push in the starting and stopping lever. While holding the spaceband lever with one hand, unlock the spaceband lever pawl latch, let the spaceband lever move slowly to the left, then draw the lever back to normal position and lock it. Grasp the line between the forefinger of each hand and move the line back and forth slowly between the first-elevator jaw and the second-elevator bar. If the bar is not centrally located in the transfer channel, the line will move with less freedom as it approaches the right end of the second-elevator bar. Readjust screws *12* until the line moves with freedom for the whole length of the second-elevator bar, then tighten screw *11* securely.

Second-Elevator Adjustable Guide Plate. The second-elevator adjustable guide plate *12,* Fig. 130, is provided to assist in locating the second-elevator bar when it seats at transfer position. After adjusting the lower second-elevator guide, as described above, the guide plate should be set so that there will be .005″ clearance between the front edge of the plate and the back edge of the second-elevator bar plate when the machine is at transfer position. Before adjusting the guide plate, run the machine forward to transfer position and determine how much clearance there is between the parts by moving each end of the second-elevator bar plate back and forth against the guide plate. Remove the transfer channel front plate screws *3,* lift off the quad box *11,* then work the front plate *1 gently* off the back plate. Under screws *13* in the back plate will be found two screw bushings *14,* by means of which guide plate *12* can be adjusted for position. Adjust the bushings, replace the parts, run the machine forward to transfer position and verify the clearance between the guide plate and second-elevator bar plate. It is essential that the clearance between parts be uniform at each end.

Transfer Bar. The transfer bar *15,* Fig. 132, should be set for height so that the bottom of pawl *18* will be level with the bottom of the second-elevator bar when the pawl is pushed up with a finger. After the setting is made, therefore, the bottom of the pawl will rest below the bottom of the second-elevator bar but will have sufficient overmotion to rise to a level with the bar when it is pushed up by the matrices during the transfer. The purpose of this adjustment is to level the matrix teeth exactly with the teeth of the second-elevator bar when the line is moved into the transfer channel.

To verify the position of the transfer bar, run the machine ahead to transfer position and feel the relationship between the transfer bar pawl and the bottom

of the second-elevator bar by running a finger back and forth between the two points. To raise or to lower the transfer bar, loosen screws *16*, Fig. 132, adjust screws *17*, then tighten screws *16* while holding the transfer bar up against the adjusting screws. It is essential that the transfer bar be parallel after the adjustment is made. To verify the parallelism of the bar, turn the machine forward to normal position, place a full-length slug on top of the first-elevator jaw, then raise the first-elevator slide by hand until the slug touches the bottom of the transfer bar. Lack of parallelism will be indicated by light between the slug and the bar and further adjustment will be required to correct the condition.

After the transfer bar has been set for height, make sure that there is a slight amount of clearance between the right end of the transfer bar and the left end of the second-elevator bar when the machine is at transfer position. The holes through which the transfer bar screws *16* pass are enlarged, making it possible to move the transfer bar sidewise as well as vertically. Hold the transfer bar up against the adjusting screws *17* and in the correct sidewise position when tightening screws *16*. The first-elevator slide guide *13* is doweled on the face plate frame and is fastened in position by screws *14*. The guide occupies a constant position once it is set.

Before running the machine under power, *the transfer should be put to a final test by moving a full line of matrices and spacebands back and forth between the first-elevator jaw and the second-elevator bar by hand.* Assemble the line, lock the spaceband lever pawl latch, disconnect the pot pump plunger and send the line over to the casting mechanism. When the machine stops at transfer position, push in the starting and stopping lever and turn off the motor. Grasp the line between the forefinger of each hand and move the line back and forth slowly between the first-elevator jaw and the transfer channel. If there is any undue friction, determine which of the four adjustable parts requires resetting and adjust it until the line transfers with the greatest possible freedom. A properly adjusted transfer is worth all the time and effort spent in setting the various parts. The fineness with which the parts are adjusted will determine ultimately the length of service secured from matrices and the efficiency with which the machine operates at transfer position.

General Maintenance of Transfer Mechanism

In addition to keeping the transfer mechanism in proper adjustment, it is essential that the various parts of the first-elevator jaw, the first-elevator slide guide, the transfer channel and the second elevator be cleaned and lubricated periodically. The first-elevator jaw should be kept free of dirt and gum, especially those surfaces which come into contact with the first-elevator slide guide. The first-elevator jaw duplex rail should be tested by hand occasionally to make sure that it is working freely. If it works stiffly, remove the cap *5*, Fig. 129, take out the rail and clean the parts thoroughly with gasoline. Rub some dry graphite on the small slides of the rail and return the parts to position. Apply a trace of oil weekly to the angular surface of the duplex rail operating bar *5*, Fig. 127, and and to the duplex rail return plate *8*, Fig. 131. The transfer bar *4* should be kept clean and the transfer bar pawl *5* should be cleaned and polished with graphite

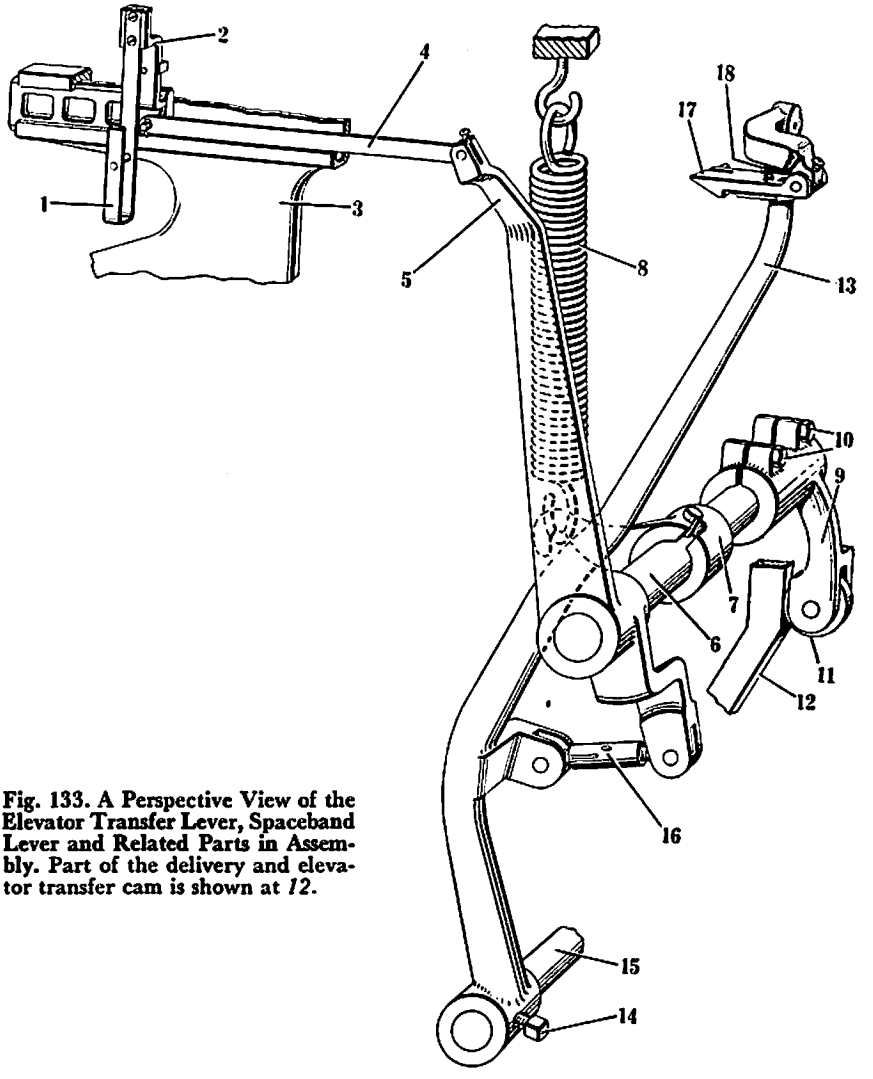

Fig. 133. A Perspective View of the Elevator Transfer Lever, Spaceband Lever and Related Parts in Assembly. Part of the delivery and elevator transfer cam is shown at *12*.

if it does not work freely. The pawl should always have a slight amount of vertical play. It is necessary at long intervals to replace the transfer bar pawl due to wear at the point where the pawl contacts the matrices.The transfer bar cannot be lowered to compensate for the wear because the beveled edges of the bar must clear the matrix teeth. The new pawl can be inserted easily in position when the two pins in the transfer bar are removed.

The transfer channel should be wiped occasionally with a clean cloth, especially the top surfaces of the front and back plates on which the second-elevator bar plate rests during the transfer. The lower second-elevator guide *9*, Fig. 132, and the second-elevator bar plate angle *6* should be cleaned with gasoline and

polished with dry graphite. Dirt or gum on these surfaces will disturb the alignment of the second-elevator bar with respect to the matrices during the transfer and will cause wear on the parts. The second-elevator bar should always be handled with care. If the teeth of the bar become burred or nicked, especially at the left end of the bar, the combination teeth of the matrices will be distorted. A small triangular file or a piece of emery cloth can be used to remove burrs from the bar and its teeth.

The Transfer Levers and Related Parts

The mechanism which imparts the movements necessary for the transfer of the matrices and spacebands is shown in Fig. 133. The mechanism consists of two basic assemblies — the elevator transfer assembly and the spaceband lever assembly—which are pivoted and connected in such a way that they operate as a unit. The chief function of the elevator transfer assembly is to transfer the line of matrices and spacebands from the first-elevator jaw to the transfer channel. The function of the spaceband lever assembly is to gather the spacebands left in the transfer channel after the matrices have been raised and to return the spacebands to the spaceband box.

The elevator transfer slide finger *1*, Fig. 133, is fastened to the transfer slide *2*. The upper and lower edges of the slide are beveled and run in grooves in the face plate frame *3*. The transfer slide is connected by link *4* with the elevator transfer lever *5*, which is pinned to a shaft *6* pivoted in bearings in the machine column. On the shaft is placed a spring arm *7*, to which is attached a long spring *8* inside the machine column. The elevator transfer cam roll lever *9* is clamped on the end of shaft *6* by screws *10*. The lever is provided with a cam roll *11*, which is held in contact with the elevator transfer cam *12* through action of spring *8*. The cam roll lever *9* is split so that it can be turned and clamped tightly in position on shaft *6* after the proper relationship between the lever and the cam has been established.

The spaceband lever *13* is held on a shaft *15* by a set screw *14*. The shaft is pivoted in bearings in the machine column. The spaceband lever is connected by an adjustable turnbuckle and eyebolt assembly *16* with the elevator transfer lever *5*. The spaceband lever pawl *17* is pivoted on a hinge pin at the upper end of the lever. The pawl is centrally located with respect to the spaceband box and the transfer channel and is held down on the box and channel plates by a compression spring *18*. Due to the method of pivoting and connecting the elevator transfer lever *5* and the spaceband lever *13*, as described previously, the movement of each lever is opposite to that of the other. If the elevator transfer lever *5* moves to the right, for example, the spaceband lever *13* will move to the left through a reverse movement imparted by turnbuckle *16*.

Movements of Transfer Levers. The elevator transfer lever *5*, Fig. 133, and the spaceband lever *13*, through their connection with the elevator transfer cam *12*, make four strokes or movements during one revolution of the cams. As soon as the first elevator and the second elevator seat at transfer position, the elevator transfer lever and the spaceband lever move together, causing finger *1* to transfer the line of matrices and spacebands from the first-elevator jaw to the transfer

channel. The matrix teeth engage the second-elevator bar teeth during this movement and the spaceband sleeve lugs enter the groove in the transfer channel front plate. Next, the rising contour of the elevator transfer cam causes the elevator transfer lever and the spaceband lever to withdraw, permitting the second elevator to lift the matrices out of the transfer channel. As soon as the second elevator and the matrices are clear of the channel and the levers, the levers move together again, this time far enough so that finger *1* enters the slot in the spaceband lever pawl *17*. The spacebands in the transfer channel are thereby gathered together and hooked under a formed lug on the spaceband lever pawl. A second rise on the elevator transfer cam finally causes the elevator transfer lever and the spaceband lever to return to normal position. The space-

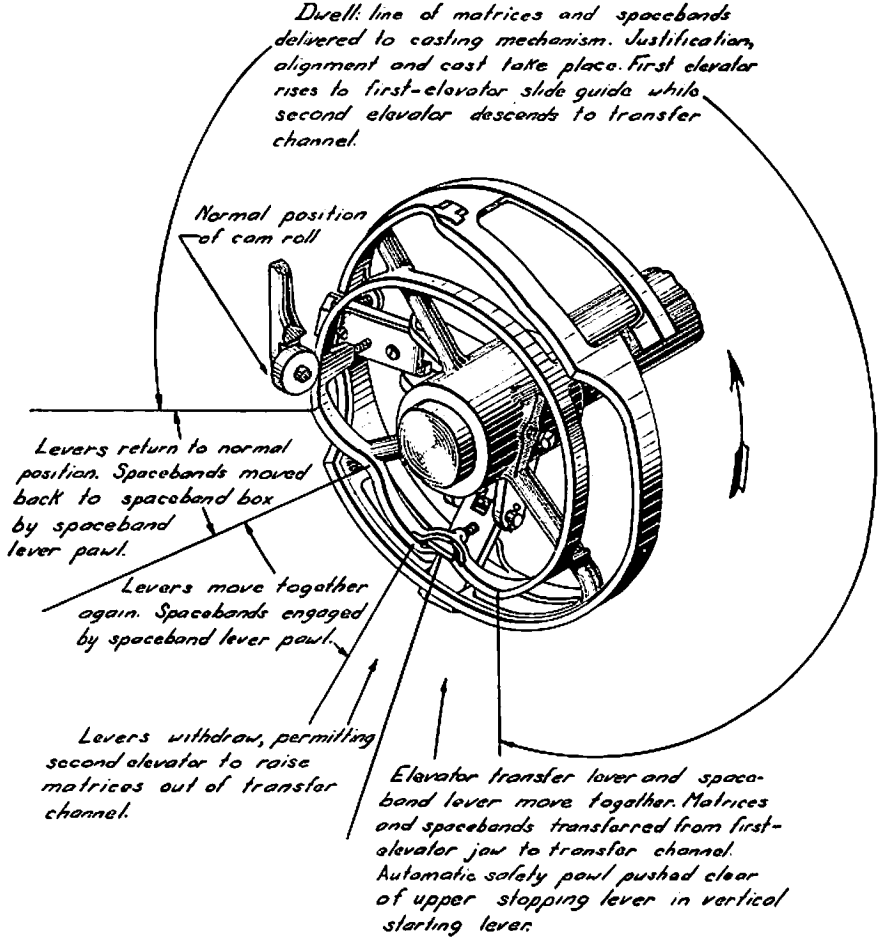

Fig. 133a. The Delivery and Elevator Transfer Cam, showing the surfaces of the elevator transfer cam which promote the main movements of the elevator transfer lever and the spaceband lever.