

CHAPTER 9

Delivery Slide and Channel

THUS FAR we have been concerned with the assembling of a line of matrices and spacebands into the assembling elevator and lifting the line up to the level of the delivery carriage. We shall now consider this carriage, or slide, which is not only the conveyor for the assembled line across the gap separating the assembling and casting mechanisms of the Linotype, but is also the link between the work of the operator and that of the automatic portion of the machine.

DELIVERY SLIDE

The release of the delivery slide by the very last part of the upward movement of the assembling elevator serves to transfer the line from the assembling elevator, allows the elevator to descend and starts the cycle of automatic operations which produce the finished Linotype slug. This movement of the delivery slide is toward the left, and it pushes the assembled line through the delivery channel and into the jaws of the first elevator, which is waiting at that level to receive it.

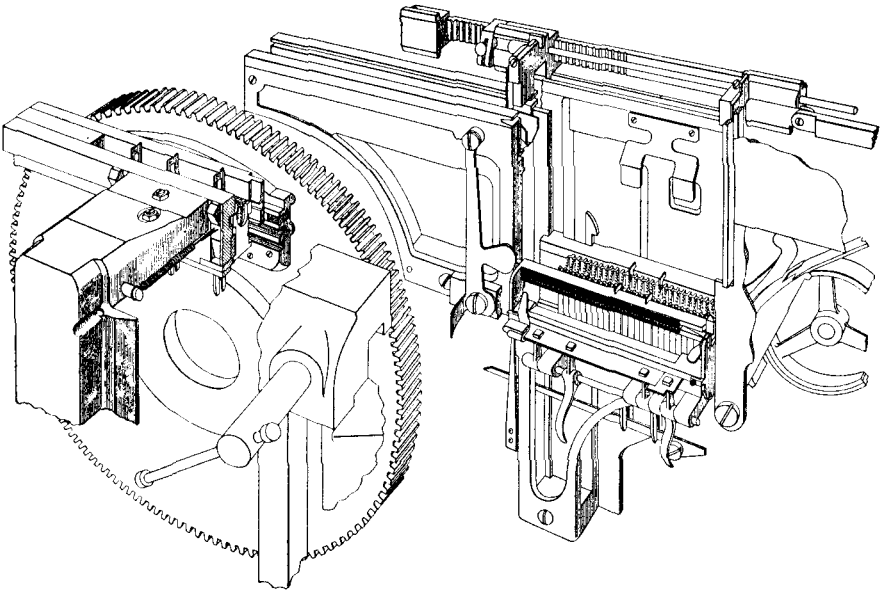


FIG. 1-9. Diagrammatic view of the delivery of the line of matrices and spacebands from the assembling elevator to the first elevator jaw to the position for casting. In this view is shown a part of a line of matrices in the assembling elevator, and a line in the first elevator jaw ready for casting.

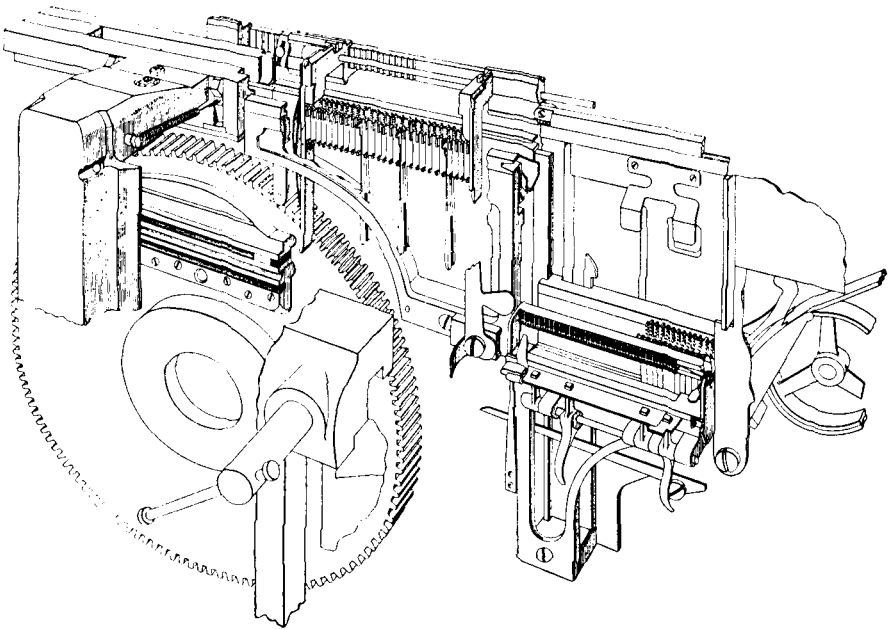


FIG. 2-9. Diagrammatic view of the delivery of a line of matrices and spacebands from the assembling elevator to the first elevator jaw. In this view is shown a part of a line of matrices in the assembling elevator, also a waiting line, which the first elevator is ready to receive from the delivery slide.

A "waiting line" is a line which is sent in by the operator before the first elevator has returned to its normal position after delivering the previous line to the second elevator. Until the first elevator is ready to receive it, the new line is held in the delivery channel by the delivery slide, because the spring which causes this slide to move toward the left is prevented from moving it any farther, being controlled by the contour of the delivery cam. Because this new line has been carried that far over, the assembling elevator has descended so the operator can assemble matrices into it. When the rotating cam shaft has brought the moving parts back to normal position, the spring then automatically delivers the waiting line into the first elevator and the cam shaft continues to rotate.

The delivery slide, which travels in a slideway cut in the face plate, carries a fixed short finger at the right, and a movable finger to the left of the short finger. These two fingers serve to hold the assembled line between them, the short finger serves to push the line toward the left when the slide is released.

It is obvious that the short finger at the right need not be long, because the retaining pawls on the assembling elevator hold the right-hand end of the assembled line; and too, the left-hand finger must be long enough to form a limiting surface for the left-hand end of the assembled line just as soon as the line begins to be raised away from the assembler slide finger. The lower end of the long finger is hinged to the upper end both to enable the operator to conveniently remove matrices from the assembling elevator and to prevent any tendency of the long finger to accidentally damage a spaceband upon the return movement of the slide.

Normally, the delivery slide rests at the end of its right-hand movement directly over the assembling elevator and with its two fingers positioned properly to receive the assembled line. It is held in this position by the delivery pawl, shown in Fig. 4-9, which is held by a stud and operated by a spring which holds the pawl down in front of the upward extension on the short finger. This delivery pawl has, close to its end, a notch so shaped that it will catch the extension on the short finger in case the slide should not be returned far enough for the end of the delivery pawl to take hold. Thus, this notch acts as a safety to hold the slide against movement to the left after the cam no longer holds it to the right.

When released, the delivery slide is free to be moved to the left by tension of a strong coil spring mounted in the column of the machine, and the speed of this motion is controlled by the cushioning effect of a piston inside of an air cylinder on the back of the column. This cylinder is mounted vertically. Its bottom end is open, and its closed top end has a small hole through which the air escapes when pushed by the piston. During this movement toward the left the delivery slide releases the latch which has been preventing the descent of the assembling elevator and the movement of the slide is limited by an adjustable stop screw 41, Fig. 5-9, on a small bracket 42 in the slideway of the face plate. Just as the slide is stopped against this screw, it causes the casting mechanism to be sent into

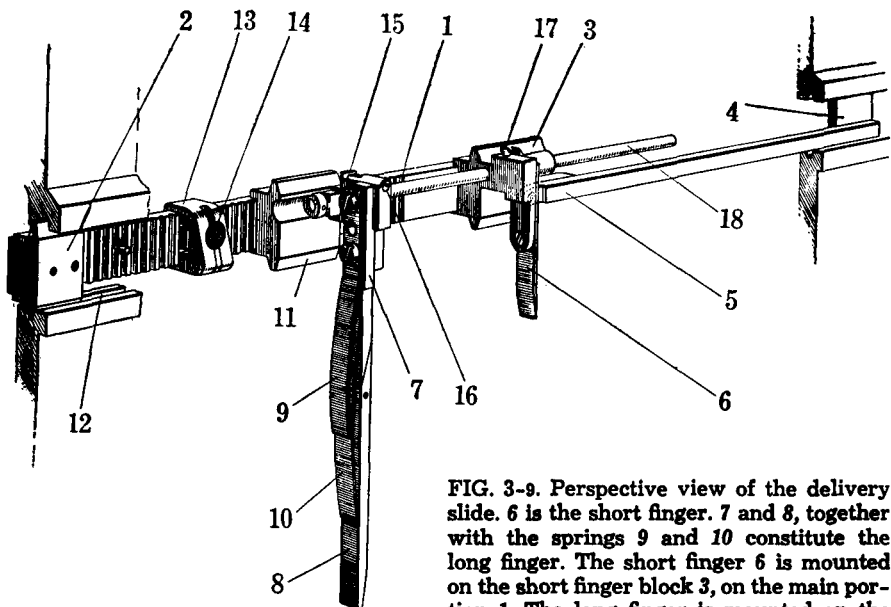


FIG. 3-9. Perspective view of the delivery slide. 6 is the short finger. 7 and 8, together with the springs 9 and 10 constitute the long finger. The short finger 6 is mounted on the short finger block 3, on the main portion 1. The long finger is mounted on the block 11 which slides on the main portion 1

and is held in place by a spring pressure shoe 15. The block 11 banks against a clamp block 13 which is slidable along 1 and held from movement thereon by a small clamp 14 which fits into notches cut one em apart in the main portion 1. The block 11 has fastened to it, a rod 18 which bears in the short finger block 3 to hold block 11 and the long finger in alignment, aided by spring pressure shoe noted above. The slide block 2 is fixed at the left end of the notched portion 1 and at the right end is the assembling elevator releasing bar, or "trail." This trail, consisting of the bar 5 and the slide 4 to guide it, serves to release the assembling elevator latch at the proper time and also to prevent the latch from hooking up assembling elevator when there is a waiting line in delivery channel.

action through mechanism which is illustrated and described later in this chapter. The return movement of the slide is by positive action of surface 37 of the delivery cam on the cam shaft, as shown in Fig. 6-9.

The adjustable stop screw with the delivery slide against it should always be adjusted so that the left side of the short finger on the carriage is $\frac{13}{32}$ " from the right end of the first elevator jaws, as shown in Fig. 5-9. The last matrix of an assembled line will then be inside the two spring pawls.

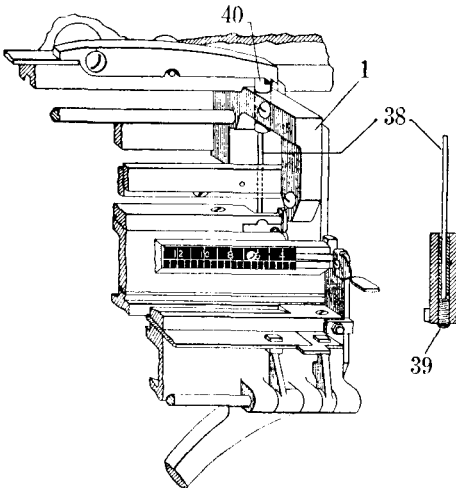


FIG. 4-9. View showing the delivery slide 1, the starting pin 38, (also shown in a separate view with the adjusting screw 39), and the way in which the starting pin trips the pawl 40, allowing the delivery slide to deliver the line through the delivery channel into the first elevator jaw.

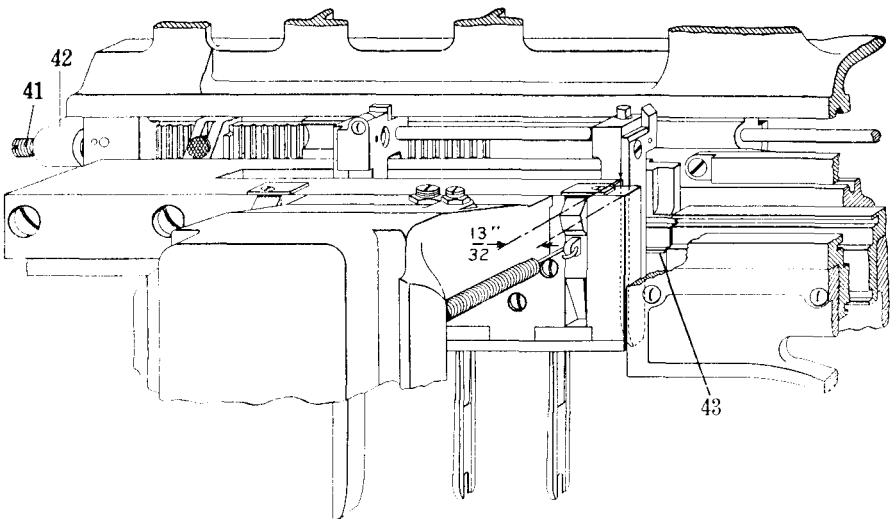


FIG. 5-9. View showing left side of the short finger on the delivery slide $\frac{13}{32}$ " inside the first elevator jaw. The adjustable stop screw 41 on the small bracket 42 in the slide-way of the face plate, with the delivery slide held against it, should be adjusted to this setting. Rails 43 of the first elevator jaw should be very little below the rails of the intermediate channel.

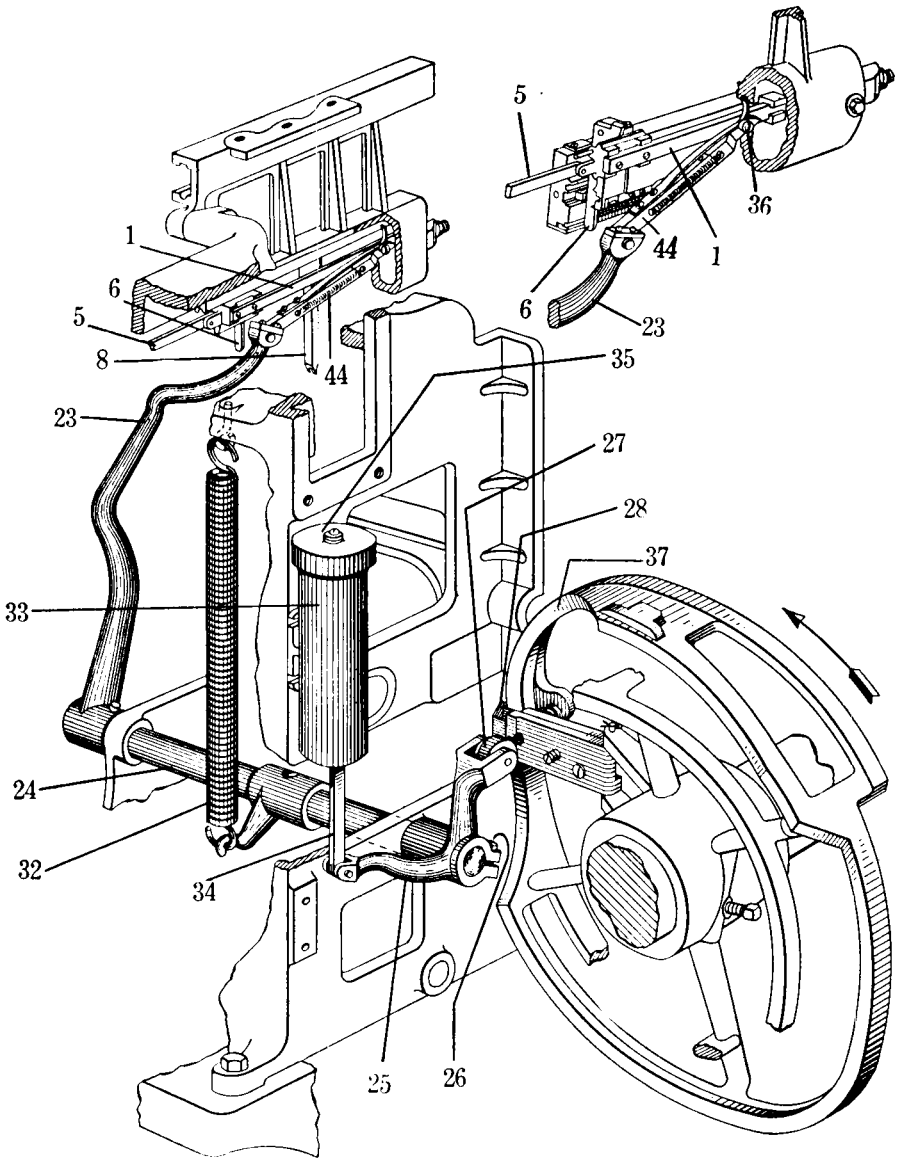


FIG. 6-9. View of automatic starting device, which starts one revolution of the cam shaft when the line of matrices is delivered into the first elevator jaws by the delivery slide. In this view, 1 is the delivery slide; 5 is the assembling elevator releasing bar; 6 is the short finger; 8 is the long finger; 44 is the delivery lever link; 23 is the delivery lever; 24 is the shaft on which this lever is mounted; 25 is a short cam lever having two arms and is also mounted on the shaft 24 and is clamped to it by the bolt 26. At the end of the lever 25 is a cam roller 27 which strikes upon the automatic starting and stopping pawl 28, and rolls on the cam surface 37 of the delivery cam. The automatic starting and stopping pawl 28 is pushed sideways when struck by the roller 27.

When the delivery slide is returned to the right by the delivery cam, the short finger must go far enough beyond the end of the delivery pawl to ensure being caught by the pawl; but it should not go so far beyond it as to bear on the spaceband box chute, lest the chute be sprung out of shape and delay the dropping of spacebands on their way to the assembling elevator.

The adjustment is made by moving the two-armed split cam lever 25 (Fig. 6-9) on its shaft 24. First remove the spaceband box so as to have a clear view of the pawl and the finger. Then turn the cam shaft by hand until the highest part of the delivery cam is opposite the cam lever roller and loosen bolts 26. Hold the delivery slide short finger in a position just clear of the spaceband box chute, move the roller against the cam and tighten the bolts 26. If this adjustment is made while the metal pot is hot, it must be done quickly to prevent heating the

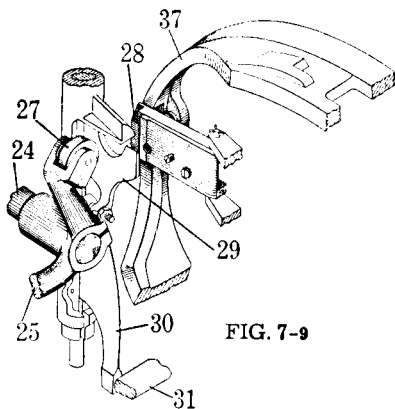


FIG. 7-9

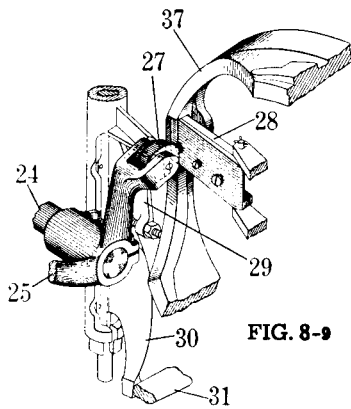


FIG. 8-9

FIG. 7-9. Showing the parts in their normal position, at rest.

FIG. 8-9. Showing the cam roller 27 at the innermost position at which time the line has been delivered into the first elevator jaws. As soon as the pawl 28 has been pushed off the lever 29, the lower part of this lever is thrown outward; the lower end of the lever 30, is thereby allowed to release its pressure on the side of lever 31, which lever releases the clutch spring, allowing the clutch to engage and the cam shaft to start to revolve. The cam shaft continues to revolve until the pawl 28 again strikes the lever 29 thereby throwing out the lower end of the lever 30 against the side of lever 31 which acts to throw out the clutch and stop the rotation of the cam shaft.

The delivery lever 23 is connected to the delivery slide 1 by means of the link 44, Fig. 6-9, on one end of which is a stud held down by a small plate into a depression in the top end of the delivery lever 23; and the opposite end of the link has a notch which fits over a shoulder screw 36 on the back of the delivery slide 1, and is held onto the stud by a long flat spring fastened to the link. In case of an interference with the free return of the carriage, the link will slip off the shoulder screw. This serves as another safety device.

The movement of the shaft 24, and therefore, the movement of the delivery slide toward the first elevator jaws, is caused by the strong spring 32, which is shown in Fig. 6-9. Although the spring starts to act suddenly, this action is soon resisted and cushioned by a piston inside of the cylinder 33, also shown in Fig. 6-9. This cylinder is open at the bottom, and the top has an adjustable outlet 35 for air compressed by the piston. By this action, the line when delivered into the first elevator jaws comes to a stop gently. As shown in Fig. 6-9, the piston is connected by a link 34 to one arm of the two-armed cam lever 25.

mold too much, because the mold and mouthpiece are in contact when the cam shaft is in this position.

After adjusting the stop screw for the movement of the delivery slide toward the left, and also making the adjustment for its positive movement toward the right, it may be necessary to adjust the plate on the automatic stopping pawl with relation to that pawl, so that when the delivery slide is sent over, the roller on the split cam lever will push the pawl $\frac{1}{8}$ " clear of the upper stopping lever 29, Fig. 7-9. This adjustment is made by first loosening the binding screw which holds the plate to the pawl, next, turning the adjusting screw, and then re-tightening the binding screw.

With respect to this adjustment, it is presupposed that the stopping pawl is correctly located $\frac{1}{8}$ " from the rim of the cam, and that it rests $\frac{1}{4}$ " upon the upper stopping lever 29. (See Figs. 2 and 3-21.) Those adjustments were made on the machine when new, and are not likely to have changed, but the method of making them is described in Chapter 21.

It is readily understood that the adjustment for the positive right-hand movement of the delivery slide should be made before adjusting the plate on the automatic stopping pawl; if this is not done, the adjustment of the plate may need to be re-made. Therefore, it is better to test the adjustment for the right-hand movement of the delivery slide first.

DELIVERY CHANNEL

The distance traveled by the line of matrices to the first elevator jaw is about nine inches, and as they pass out of the assembling elevator into the delivery channel, two grooves in the delivery channel register with the assembling elevator so that the lower lugs of the matrices which may be in either the upper or lower position in the assembling elevator will be sustained in their corresponding positions while passing through the delivery channel to the first elevator jaw.

MAINTENANCE

Adjusting Travel of Delivery Slide—The instructions for setting the return of the delivery slide so that it will come just beyond the delivery pawl were given previously in this chapter. If it travels too far it will press too hard against the spaceband chute, and if a line is sent to the waiting position while another line is being cast, it may not go far enough into the delivery channel to allow the trailer of the delivery slide to trip the latch on the assembling elevator, when it will be necessary to wait until the machine is nearly in the normal position before the assembling elevator can be lowered to start the next line.

Before making the adjustment on the delivery slide, make sure the set-screw which holds the delivery cam to the main shaft is tight. If this set-screw has worked loose it may make a difference in the setting if the cam has shifted slightly; also, if not kept tight, it will cause wear on the key which holds the delivery cam to the main shaft, and if a 30-em line is sent in, the long finger may not be drawn back quickly enough to clear the spacebands on the right-hand side, as the wear on the key would make a slight difference in the timing of the delivery cam.

The adjusting screw which forms the stop for the delivery slide at the left side should be set to allow the short finger to travel $\frac{1}{32}$ " into the elevator jaws, as mentioned before in this chapter. If not convenient to measure the distance, be sure the short finger carries the last matrix inside the retaining pawls.

When a line has been sent in, and the delivery slide rests against the set-screw on the left-hand side, the delivery lever roll 27, Fig. 7-9, should move the starting pawl 28 just far enough to clear the stopping lever 29.

If a line is sent in, and the travel of the delivery slide is sluggish as it enters the first elevator jaws, and the starting pawl is moved too far, the machine will start before the last matrix has been caught by the retaining pawls, and the end matrices will fall off.

The Long Finger—The long finger on the slide is held in position by a movable block fitted with a ratchet to hold in the grooves of the slide, and when changing to different length lines, the long finger should be brought as close as possible without binding the matrices when the line is delivered. If too much space is

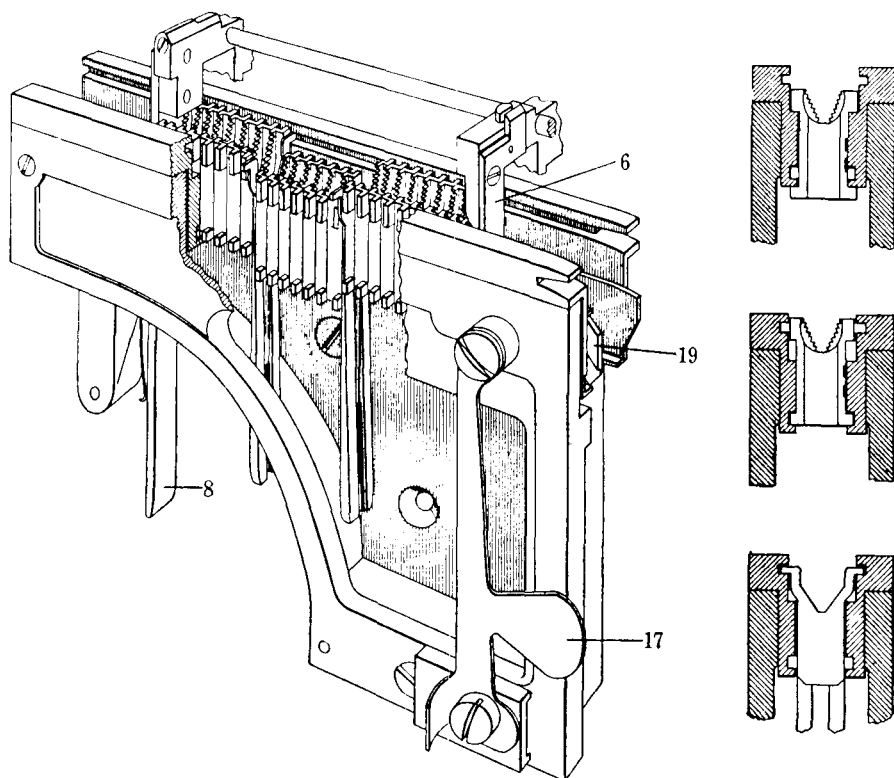


FIG. 9-9. View of the delivery channel with a portion of the channel cut away to show the matrices and spacebands in different positions. The channel is simply a passageway for the matrices and spacebands in the same positions in which they are received from the assembling elevator. 6 is the short finger; 8 is the long finger; 19 is the hanging cam piece mentioned in Chapter 8 which is lifted by the elevator duplex rail long finger on the assembling elevator long upper rail, when that rail is in; 17 is the hanging lever which is engaged by the projection auxiliary line safety lever cam also, on the assembling elevator long upper rail when that rail is in. It prevents raising the assembling elevator with matrices on the upper rail until the filling piece in use when casting display faces has been thrown back.

The sectional views at the right show how the matrices and spacebands are supported while passing through the delivery channel.

allowed, there is a possibility that the matrices may become twisted if a loose line is sent in.

The long finger must be straight, and can be tested by allowing the slide to go over to the right-hand end of the intermediate channel, using that as a square.

The Delivery Slide Long Finger Friction—As illustrated in Fig. 3-9, 15 shows a small brass friction plate which rests against the face plate, just above the delivery slide groove. It is held by a coil spring and is adjustable for tension by the screw 16 on the outer end. The purpose of this friction plate is to hold the long finger against the line of matrices as it is delivered to the elevator jaws. If a comparatively short line is sent in, the friction must cause the long finger to remain stationary until the line of matrices has carried over and pressed against it, remaining so until the line is completely delivered.

If wear shows on the friction plate and it needs to be replaced, remove the screw 16 which holds the spring, and, with a small screwdriver remove the screw from the plate. This work will be easier if the delivery slide is removed from the machine.

Cushion—As illustrated in Fig. 6-9, 33 shows the delivery air cushion cylinder which has been previously described in this chapter. This carries a piston, on the top of which is a leather washer. The top of the cylinder has a vent 35, which can be adjusted to control the speed with which the slide travels.

If the machine is casting a line, and the slide is sent over to the waiting position, the action of the air cushion must be smooth, so as not to jar the long finger away from the matrices.

The air cushion should be cleaned occasionally in order to insure its continued proper action. Wash the inside of the cylinder and the outside of the piston with gasoline. Dampen the edges of the leather washer with a light oil and set the air vent so the delivery slide will travel without jarring.

To Remove Delivery Slide—Shut off the machine just before it comes to the normal position, remove the bracket that forms the stop for the delivery slide at the left, then send the slide over, and, looking from the rear, see that the machine is in a position so that the front end of the connecting link 44, Fig. 6-9 is exposed. Take a medium-sized screwdriver and press the point between the link and spring, twisting screwdriver edgewise to separate the ends, which will allow the slide to be drawn out.

Other Points to Watch—The guiding rod 18, Fig. 3-9, which is fastened to the long finger block and extends through the short finger block should be kept free from gum so it will slide freely to allow the long finger to take up the slack when delivering the line.

On the back of the delivery slide bar is a screw 36, Fig. 6-9, by which the delivery lever link is connected to the slide, and to keep it from working loose there is a small pin that goes all the way through the slide and the end of the screw. When replacing, drive out the pin before attempting to remove the screw. It will be necessary to drill a hole in the screw (from top and bottom of slide for proper alignment of hole) for a new pin after the screw has been tightened.

Examine the stud at the other end of the link where it is attached to the delivery lever, and if worn, replace it with a new one.

The blocks 11 and 3, also shown in Fig. 3-9, which hold the long and short fingers to the delivery slide will probably show signs of wear, especially the long finger block, due to the pressure of the friction spring, and if allowed to wear too much, the bottom of the long finger will lean so far in it will strike the bottom rail of the assembling elevator when a line is sent away. It is good practice when

the blocks are worn to replace both, which will give a better fit to the guiding rod 18. If the long finger block alone is replaced, the rod must slide freely through the hole in the short finger block, so the long finger can "take up" as mentioned before.

The starting pin 38, Fig. 4-9, should be kept clean so it will immediately drop into position as the delivery slide starts across.

Lubrication—If the movement of the slide is sluggish it can usually be overcome by rubbing a small amount of oil, placed on the finger tip, on the face above the grooves, where the friction plate 15, Fig. 3-9, slides over.

DO NOT USE OIL IN THE GROOVES WHERE THE DELIVERY SLIDE BLOCKS TRAVEL. The oil may eventually gum up the channels. Keep channels clean and use a small amount of graphite if necessary.