

## CHAPTER 33

# General Maintenance

### Failure of Matrices to Drop

**T**HE KEYBOARD KEY LEVER may be “hard” to the touch; the lever may be bent or perhaps there is gum on the sides where it comes in contact with the keyboard frame.

Examine the cam yoke and see if it drops down so that the cam rests on the rubber roll when the key is depressed. If it fails to function there may be gum on the sides of the cam yoke where it comes in contact with the frame just over the trigger, which would prevent the yoke from dropping down, or the stop pin may be bent.

If the cam fails to turn after it has dropped on the rubber roll, it may be dry on its pin, the pin broken, the teeth on the cam too smooth, or the rubber roll glazed. If new rubber rolls are put on and are oversize, the cam may not drop low enough to clear the stop pin. If the rubber roll is worn, or undersize, it will not lift the keyboard key rod high enough to give full throw to the escapement lever.

If a matrix has been released by the escapement and comes only partly out of the magazine, it will usually be found that there is rust or gum on the contact points of the escapement lever and the verge plunger, creating a friction that will not allow the escapement to fully open. To correct this, polish contact points or use graphite, but do not use oil. Examine the verge spring and see that it is not too strong, but of sufficient strength to bring the escapement verge back to normal position after the matrix has been released. Also see if the spring is worn where it comes in contact with the escapement verge.

The lugs of the matrices may be bent or burred enough to make them too broad to slide freely in the magazine channel. There may be gum on the matrix lugs or in the magazine channels.

If the lugs of thin matrices are too narrow, there is a possibility that matrices may overlap and get side by side in the magazine channel and wedge fast.

The escapement pawls may have worn spots at the top and interfere with the matrix when it passes over. This would be particularly noticeable when using thin matrices.

If the lower inside lug of a matrix is sheared off, it will fall into the verge pawl opening and fail to drop. It is also possible that there may be a shortage of matrices in the magazine.

If a thin matrix should fall flat on top of the channel entrance it may cause the matrices which are being distributed to “run wild” and get into the wrong channels.

### Transpositions

Transpositions may occur unless certain parts of the machine are in correct condition and adjustment to function properly.

The keyboard cams must have no slippage on the rubber rolls, the magazines

and matrices must be clean, and there must be no interference with the assembler entrance partitions. The keyboard rolls, the assembler and matrix delivery belts must run smoothly at full speed; the escapement verge pawls must not hesitate when coming back to normal position after releasing a matrix. The assembler star wheel must not be too badly worn, and the friction spring that pulls the star wheel shaft must be of sufficient strength to carry the matrices evenly into the assembling elevator.

The assembler slide must be kept clean, and the brake spring must be strong enough to prevent the slide from moving too far away from the matrices as they are being assembled.

The assembler chute spring must be adjusted so it will not unduly retard the matrices as they enter the assembling elevator.

The improved chute spring with which all new model machines are equipped needs very little adjustment for various sizes of matrices because it guides the matrices by the lugs instead of the body; but it is very important that the older type of chute spring be correctly adjusted so as not to interfere with the free travel of the matrices.

Care must be taken that oil does not get in the magazine.

After all the foregoing causes of transpositions have been checked, refer to Chapter 5, Fig. 5-5, which shows how the assembler entrance partitions should be shaped so as not to interfere with the free travel of the matrices into the assembler. The incorrect shape of these partitions is one of the principal causes of transpositions.

## Doublets

When a keyboard key is depressed, it sometimes happens that more than one matrix will drop. This is generally caused by the failure of the keyboard bar, Fig. 1-3, to drop back to normal position to return the trigger under the cam yoke. To correct this condition, remove the entire section of the keyboard bars as shown in Fig. 12-3, place flatwise and remove the two cross banking bars and polish them. Also polish any of the keyboard bars that may have caused trouble and see that the key lever is not bent or gummy on the sides at the front and back end. In some plants gasoline is used on the keyboard key bars to prevent doublets, but this practice does not effect a permanent cure. A rusty hinge rod may cause trigger to bind.

A broken keyboard cam stop pin would allow the cam to turn continuously, and all the matrices in the magazine channel controlled by the cam would be released from the magazine.

## Escapements

On all current models of the Linotype with the exception of the Models 9, 27 and 28, and all auxiliary magazines, the escapements are not attached to the magazines.

The escapement mechanism is mounted on a brass frame, fastened to the magazine frame with a screw and dowel at each end, and is easily removable from the machine for inspection or repairs.

The escapement consists of a verge fitted with two escapement pawls, an escapement plunger and a verge spring. When the escapement pawl is at its lowest point, the top should be flush with the bottom of the magazine channel so that the matrix will pass over freely.

If the pawls become worn or develop slight indentions at the top, they should be replaced. A verge spring that is worn flat on the bottom may cause enough

friction to interfere with the full movement of the verge. If the hole on which the verge fulcrums should become badly worn, there is a possibility that more than one matrix at a time will be released.

The escapements should be thoroughly cleaned once a year. Instructions for cleaning and for changing verges and pawls are given in Chapter 4 of this book. Do not use oil on any part of the escapement. Graphite used sparingly will tend to reduce friction, especially where the escapement levers come in contact with the plungers.

If the escapement has been taken off for repairs, be positive that all verge springs are in place before fastening the escapement guard. When renewing verges and pawls consult parts catalog for proper sizes.

## Spacebands

The spacebands should be cleaned after every eight hours of operation, using graphite sparingly. If metal is allowed to accumulate on the spaceband sleeves it will cause "hair lines."

When replacing the spacebands in their box, see that the sleeves face the right, and also make sure that the bottom of the first spaceband is held by the retaining plate; otherwise the spacebands will either drop too slowly or clog in the spaceband box.

If the spacebands fail to respond properly, the teeth on the cam may be too smooth or the rubber roll worn, glazed or cut. The spring on the spaceband key rod may not be strong enough to lift the spaceband box pawls to their full height. The pawls may be worn so as to engage more than one spaceband at a time, or they may be blunt on the ends or bind in their grooves. The sleeve on the spaceband may bind near the top, if the band has been bent or burred, and the bottom of the band would not be held by the retaining plate. The retaining plate may be too high to allow the bottom of the band to swing out when lifted by the pawls. Further information on the spacebands will be found in Chapter 6.

## Assembling a Line of Matrices

The assembler slide must be kept clean and no lubricant of any kind should be used. The brake blocks on the assembler slide must have sharp, square corners in order to grip the slide as it travels across, and the spring on the assembler slide brake must be strong enough to hold the brake blocks firmly against the slide so there will be no slippage or chatter.

The fiber matrix buffer on the front section of the assembling elevator should be inspected frequently and replaced when worn so that the matrices will pass over smoothly and also to prevent wear on the lower lugs of the matrices.

The ends of the assembler gate hinge rod, and the pin of the gate roller should be oiled slightly so the gate will close easily, and the gate should be adjusted so the matrices will fit snugly without binding.

Do not use oil where the assembling elevator slides in the gibs, but keep clean by polishing with a dry rag and use graphite as a lubricant if necessary.

When the assembling elevator is raised, the delivery slide will be easier to trip if a drop of oil is used on the top of the short finger of the delivery slide where it comes in contact with the delivery pawl.

## Line Delivery Slide

To operate smoothly, the grooves in which the line delivery slide travels must be kept clean, the air chamber must have the correct adjustment, the friction on the

long finger must cause the long finger to "take up" when a short line is sent in. The adjustment of the travel to the right of the line delivery slide is made with the line delivery cam lever split hub on the rear end of the line delivery shaft, and should be adjusted so the short finger of the delivery slide comes just beyond the delivery pawl. The line delivery slide delivery pawl is tripped by a thin steel wire fastened to the assembling elevator. This wire raises the delivery pawl and is adjustable for height with a small set screw underneath the wire bushing.

When the delivery slide moves to the left there is an adjusting screw which should be set so the short finger of the delivery slide will carry the last matrix in a line just inside the first elevator jaw retaining pawls, as shown in Fig. 5-9.

If a line of matrices does not enter smoothly into the first elevator jaws, the elevator slide may be too high or too low to register with the delivery channel. The first elevator slide may be gummy and will not settle to its normal position. If so, clean and oil slightly. Also examine the matrix retaining pawls to see that they are in good condition. If a line of matrices in the raised position binds as it enters the first elevator jaw, it may be that one of the matrix retaining pawls is worn; if so, replace both pawls, making sure that the tension is even.

If the movement of the delivery slide is sluggish, rub a small amount of oil placed on the finger tip on the face above the grooves where the friction plate of the long finger rests against the face plate.

### First Elevator Slide and Jaw

Keep the sides of the elevator slide free from gum and oil them occasionally.

The adjustment for height, to line with the delivery channel, is made by screw in first elevator auxiliary lever, also by turning the barrel of the link at the bottom of the slide. The adjustment to square the elevator jaw is made by four gibs, two upper and two lower. Adjust for height to line with transfer channel by screw on lower right side of slide.

If the face of the type has a poor alignment, examine the matrix adjusting bar 61, Fig. 9-10, and the duplex rail 2. If worn, replace.

If matrices fall off the line as the first elevator descends to the casting position, examine the matrix retaining pawls. They may be broken, worn, or too weak. If the movement of the line delivery slide is sluggish it is possible that the automatic starting pawl may be tripped off before the line is fully in place.

When replacing the back jaw of the first elevator, be sure it is square with the front jaw; otherwise the matrix retaining pawl will not be in the correct position, or the end of the jaw may strike the intermediate channel when the elevator is rising.

If a matrix falls off the right-hand of the elevator jaw after it leaves the vise jaws it may be due to a broken or worn matrix retaining pawl. If the trouble persists, shut off the machine just as the elevator leaves the vise jaws, and see if the end matrix is held in place, or if it comes against the extended face of the pawl. If found to be in the latter position, the simplest way to correct the trouble is to remove the back pawl and replace it with a slotted one (same as front pawl) and slide it as far as possible to the right, just so it will not bind, and then slide the front pawl out slightly to correspond.

If the line of matrices fails to seat properly between the vise jaws, it may be that the line is too full, or a matrix may have fallen out of the line and be resting on top of the vise cap in such a way as to prevent the line from seating. It is also possible that the back jaw of the first elevator has become bent in such a way as to bind on the vise jaw. A line of matrices that is too tight between the vise jaws must never be forced down, as this practice is apt to damage the lugs of

the matrices. It is always best to raise the first elevator jaw by hand and remove enough matrices to free the line.

On the later model Linotypes the knife wiper is operated from the first elevator slide, and at the top of the slide there is an adjustable plunger which is used to maintain a uniform stroke of the wiper regardless of the thickness of the slug being cast. If this plunger is incorrectly set it will not allow the first elevator to seat properly.

The adjustment to bring the lugs of the matrices to align with the mold groove is made with the center screw in the top of the first elevator slide. The other screw is for adjusting the vise automatic vertical lever so that the mold slide cannot come forward until the center screw rests on the vise cap. If this adjustment is not correct the lugs of the matrices are apt to be sheared off if a tight line is sent in.

### Justification

For proper justification of a line, the spacebands must be clean, the mold must not have accumulation of metal in the grooves or on the face, the matrices and spacebands must slide freely in the first elevator jaws, the center screw in the first elevator slide must be set so the matrices will not bind in the mold groove, the mold slide must not come forward far enough to bind the matrices and vise jaws, the vise justification rods must be kept free from gum and must be well lubricated. The justification bar must be kept free of any substance that might cause the bottom of the spacebands to slip sidewise and cause damage, especially when a line is sent in which contains only one spaceband.

### Mold Disk

As the first elevator descends to the casting position, the mold disk makes one-quarter of a turn and it is important that the disk turns freely so that when the mold slide advances, the locking studs in the mold disk will be in line with the stud blocks in the vise frame.

Lack of oil in the mold disk bearing or metal wedged between the back trimming knife and the disk will prevent its free movement. If metal has accumulated between the back knife and the disk it may be because the knife is dull or incorrectly set. Instructions for the care and adjustment of the back knife are given in detail in Chapter 12 of this book.

The brake on the mold turning shaft should have just enough tension to prevent the momentum of the disk from carrying the disk too far.

If the mold disk is noisy when it advances, adjust the shoes on the mold turning cam so that when they come in contact with the square blocks on the mold turning pinion, the mold disk locking studs will be in position to enter the stud blocks freely and without noise. This adjustment is explained in detail in Chapter 12 of this book.

### The Mold

When working around the molds, caution must be used so as not to damage them. The molds should be taken off occasionally to be cleaned, using Dixon's Mold Polish, listed in the Linotype Parts Catalogue as X-1588. This polish will thoroughly clean the molds without damaging them.

When the molds are removed, be careful not to loosen the two lower screws which hold the mold keeper in place. If these screws are loosened by accident, be sure the keeper is tight against the top before the screws are tightened.

Do not use damaged mold liners. If a wrong ejector blade has been used and

has bent the liner so it will not come flush with the back of the mold, this opening will allow metal to accumulate on the pot mouthpiece and cause "back squirts." The ends of the liners must be smooth, as a slight accumulation of metal or any roughness will interfere with the ejection of the slugs.

Before replacing the mold on the disk, clean the bearing surfaces of the mold and the disk and fasten with the four screws. To make certain the mold seats properly, turn the screws until they are almost but not quite tight, then fasten the center mold cap screw to bring the mold down on its bearing, and tighten the four mold screws firmly. Loosen the center mold cap screw to relieve any strain that may have been caused when the mold screws were tightened. The two end mold cap screws should always be tightened before the center one.

Never allow the pot mouthpiece to rest against the mold for any length of time as the excessive heat might draw the temper out of the mold or cause it to become warped.

### Mold Wipers

The back mold wiper is for the purpose of keeping the back of the molds free from metal accumulation, and should be adjusted so it will rest against the mold disk when the machine is in normal position. The felt on the wiper should occasionally be rubbed with graphite. If oil is used, it is apt to come through the mold and foul the matrices.

The felt on the front mold wiper should bear against the face of the molds when the mold disk turns. The felt on this mold wiper also should be occasionally rubbed with graphite.

### The Vise

When the machine is in normal position the vise may be lowered until it rests against the stop pin, and when in this position the mold slide may be pulled forward part way after disconnecting the ejector lever link and locking the mold cam lever handle down. This will allow ample room for inspecting the pot mouthpiece or the back knife.

If it becomes necessary to open the vise to the second position, turn the machine forward until the first elevator slide rests on the vise cap and stop the machine before the mold slide moves forward. Open the vise to its first position, withdraw the stop pin and lower the vise until the frame again rests on the stop pin which must be back to its normal position. With the machine in this position there will be no strain on the first elevator lever. The vise must never be lowered to either position if the justification levers are raised, or when the machine is near the casting position.

The mold slide can be removed while the vise is open to the second position by locking the mold cam lever handle down and disconnecting the ejector lever link, the ejector blade controller and the water hose.

### Vise Automatic

The vise automatic is for the purpose of throwing out the clutch if for any reason the first elevator jaws do not seat properly on the vise cap.

The setting of this automatic is described in detail in Chapter 10, and, if correctly adjusted, will prevent matrix lugs from being sheared off.

### Metal Pot

The product of the machine depends largely on the care and adjustment of the metal pot. The pot legs must be adjusted to bring the mouthpiece in alignment with the mold, otherwise the machine is apt to "back squirt." Other causes of

back squirts are damaged mold liners, a broken or weak pot lever spring, improper adjustment of the pot lever, metal on the back of the mold, the metal temperature too high or too low, or a foul plunger which "jumps" just before it descends and forces metal between the mouthpiece and the mold to prevent a good lockup. The metal temperature should be checked with a special thermometer which may be obtained from the Linotype Company and is listed in the Parts Catalogue as X-1480.

To obtain a solid slug with a clear face the metal must be of standard quality, the holes in the mouthpiece must be fully open, the vents in the mouthpiece must be sufficient to allow the air to escape from the mold, the pot plunger spring must not be too weak, the holes in the sides of the pot well must be kept open, and the metal in the pot must be kept at the proper level.

It is difficult to get a solid slug if the plunger is worn enough to allow metal to escape around the sides of the well when it descends, or if the vent in the bottom of the plunger is open too much. If the plunger is badly worn, replace with a new one of standard size, but if the pot well is worn, it may be necessary to install an oversize plunger. Oversize plungers are obtainable from the Linotype Company and will be furnished .005, .010, or .015" oversize as specified with the order.

It seldom happens, but it is possible for a plunger to stick in the well at the bottom of its stroke. If this does happen, push in the starting lever and withdraw the plunger pin; then allow the machine to come to normal position so that the pot mouthpiece will not rest against the mold. Dip metal from the pot until the well is exposed, then put some tallow or oil on the top of the stuck plunger and allow it to soak in. Grip the plunger rod with a monkey wrench and try to rock it from side to side; at the same time, with a light hammer tap the top of the plunger rod. Work the plunger upward slowly with a rotary movement and when it is removed both the well and the plunger should be cleaned thoroughly.

If the plunger is exceptionally hard to remove, additional leverage may be obtained in the following manner: Use a  $\frac{3}{8}$ " bolt about two inches long with two nuts. Fasten the bolt in the plunger rod opening, one nut on each side, then use a length of pipe with the end over the bolt head and place some blocking on the outer edge of the pot underneath the pipe. Then use the pipe as a lever to pry upward on the plunger rod. Grip the plunger rod with a monkey wrench and turn from side to side at the same time the rod is being pried upward.

It is a custom in many printing plants to clean the plungers daily, and this rule should be observed while the machine is new, but after continued use the plunger and well may become slightly worn and it may not be necessary to clean so often. Watch the plunger as it descends, and if it has a continued downward movement to the bottom of the well, it will not be necessary to clean every day. If a plunger fits loosely in the well, daily cleaning would be a detriment rather than a help.

### Pot Mouthpiece Wiper

The pot mouthpiece wiper is bolted to the back of the face plate of the machine and is operated by an extra cam which is built on the side of the first elevator cam. The wiper, which operates with a vertical motion, is faced with a heat-resisting material which wipes the mouthpiece on both the downward and upward stroke. The wiper is brought into operation just after the line is transferred. If desired, the wiper can be made non-operative by pushing in on a slidable pin which is located on the short arm of the operating lever. The face of the wiper must be adjusted so that when it operates it will bear evenly along the entire length of the mouthpiece and will wipe the whole surface of the mouthpiece uniformly where it contacts the mold.

## Automatic Pump Stop

The pump stop, when adjusted correctly, will prevent the pot plunger from operating if a short or improperly spaced line is sent in. When the machine is in normal position the short lever of the pump stop should be underneath a hardened block on the pump lever. The adjustment for the pump stop is made with a set screw in the end of the long connecting lever at the end of the right-hand vise jaw. When the line is fully justified, the short lever must be adjusted so it will just clear the hardened block on the pump lever. Additional details relating to the pump stop will be found in Chapter 13.

## Transfer

After the line is cast the first elevator slide rises to its highest position where the matrix line is transferred from the elevator jaws to the second elevator bar. The transfer must be smooth, without noise or friction. If a line of matrices does not transfer properly it may be that the recasting block is not thrown far enough out of the way, or there may be metal or dirt on the adjusting screw at the bottom of the elevator slide. The screw that holds the slide stop to the elevator slide may be loose, bent or broken; the matrices may bind in the first elevator jaws, or the matrix retaining pawls may be too strong or of unequal tension. The finger on the transfer slide may be bent and not press squarely against the matrices, the underside of the second elevator bar plate may be burred or gummy, or there may be metal or dirt on top of the intermediate channel where the second elevator bar plate rests. A bent spaceband or a matrix with damaged teeth would also interfere with the transfer. The roll on the second elevator cam lever must clear the cam when the machine is in the transfer position. The directions for adjusting the transfer will be found in Chapter 17.

## Ejection of Slugs

If a slug does not eject properly from the mold see if the ejector is set to correspond to the length of the slug being cast. Also see if the trimming knives are set correctly for the body of the slug. Do not try to force the slug from the mold until these two items have been checked.

To inspect the mold when a slug refuses to eject, push in on starting lever and turn the cam shaft backward by pressing down on the first elevator cam as far as it will go, which will release the pressure against the ejector lever pawl. Then pull back on the ejector lever handle and continue to turn the cam shaft backward until the mold disk is free from the locking studs which will allow the mold disk to turn.

If the trimming knives are set to a smaller size than the body of the slug, turn the machine backward by the same procedure as before mentioned, so that the slug will not press against the knives and they will be free to open.

If a slug hesitates when it is being ejected, this may be caused by mold liners with rough ends, the mold may have an accumulation of metal on its sides, the trimming knives set so as to dig into the sides of the slug, the trimming knives dull or nicked, the driving clutch leathers lifeless, worn or gummy, or the inside rim of the driving pulley may be slippery. A hollow slug, porous enough to allow the ejector blades to penetrate it, will either hesitate at the ejection point or not eject at all.

## Knife Block

As the slugs pass through the knife block the sides are trimmed to make them parallel and the correct size.



The left-hand knife must be adjusted to trim any overhanging portion of the type face without trimming the body of the slug. The knives must be kept sharp and free of nicks. In order to trim slugs parallel there can be no lost motion in the slide bearings. Further details relating to the adjustment and care of the knife block will be found in Chapter 15.

### Distributor

When the second elevator rises to deliver the line of matrices into the distributor box, see that the second elevator bar aligns with the distributor box bar. This alignment can be tested by placing a thick pi matrix on the second elevator bar and allowing the distributor shifter to go across very slowly (by hand) to see if there is any bind on the matrix as it passes the joint between the two bars. After the machine has had considerable use the second elevator bar may go too far back. If this condition exists the shifter slide guide, against which the second elevator rests, may be brought forward slightly by placing paper shims behind the casting.

The distributor box adjustments must be maintained correctly to prevent damage to matrices.

The matrix lift must be adjusted to raise the ears of the matrices high enough to clear the top of the distributor box rails before the matrix lugs are engaged by the distributor screws.

Examine the matrix lift, the bar point and the distributor box rails. The lip on the matrix lift must have a square shoulder so the matrices will not slip off when they are raised, and the lift must not engage more than one thin matrix at a time. The bar point must be straight with the bottom of the bar, and the corner must not be rounded nor the point bent sidewise. The distance between the end of the bar point and the edge of the distributor box rails must be a trifle more than enough to allow a .028" thin matrix to clear. If this distance is maintained, only one matrix at a time will be lifted. If a new bar point allows too much distance it may be necessary to replace the distributor box rails if they are worn.

The distributor shifter and the slide in which it travels must be kept clean. If any lubricant is needed use graphite instead of oil.

The matrix lift (on single distributor machines) should remain stationary when there are no matrices passing through the distributor box. This adjustment is made with a small projecting piece called the matrix lift stop which fits in a notch in the side of the matrix lift. The matrix lift stop must be adjusted closely so that when a line of matrices is passing through, the matrix lift will be pushed clear of the projection and allowed to operate.

Use oil sparingly in the distributor screw bearings. An excessive amount of oil here is apt to get on the distributor screws and foul the matrices.

The lower distributor screw must be free in its bearing so that the spring holds the spiral automatic pins in contact. The spring that holds the pins in contact must not be so strong as to cause the ears of the matrices to be bent if there should be a clog in the channel entrance. Detailed information on the care of the distributor will be found in Chapter 18. Information concerning the distributor clutch is given in Chapter 19.

### Channel Entrance

The channel entrance guides the matrices from the time they leave the distributor bar until they enter the magazine.

If large size matrices are to be used it will be necessary to adjust the distributor bar beam very closely to prevent the matrices, when released, from striking

the channel entrance partitions. To test, run in a lower-case matrix of the font to be used and turn the distributor screws by hand very slowly. When the matrix drops from the distributor bar, the bottom of the matrix should barely strike the partition on the right (viewed from the back of the machine). When the machine is operated under power it will be found that the added momentum of the distributor screws will carry the matrices far enough to drop into their channels without interference.

If a very strong spring is used on the spiral automatic of the lower distributor screw, there is a possibility that if the matrices clog in the channel entrance the partitions may be forced out of position. When clearing the channel entrance of clogged matrices, the entrance should be opened with a quick motion to prevent matrices from falling flatwise into the magazine. Sometimes when closing the channel entrance, the lower lug of a matrix may catch between the magazine and the channel entrance and leave a burr in the magazine channel or on the lower partition plate of the channel entrance. If this happens, remove the burr with a fine file so that the matrices will travel freely.

If the lugs of the matrices become worn too much they may not be guided correctly and the matrix may fall sideways, binding against the guides at the lower end of the channel entrance partitions.

The partitions must be in line with magazine channels to correctly guide the matrices. At each end of the channel entrance frame there is an adjusting screw which enables the entrance to be moved forward or backward as required.

When the matrices and magazine are cleaned, the channel entrance between the partitions should also be polished. A special brush for this purpose is supplied by the Linotype Company, and is listed as X-249 in the Parts Catalogue.

## The Magazine

For successful operation the magazine must be clean and free from oil or gum, and there must be no burrs in the channels.

When the magazines are removed from the machine they should be hung in a vertical position on a rack designed for that purpose, and the back cover should be closed to keep out dust or other foreign substance. Graphite should never be used as a lubricant in the magazine. It may help temporarily, but it will eventually cause gum to collect in the magazine and on the matrices.

Before a magazine is removed from the machine the locking bar must be moved to the left as far as it will go in order to lock the magazine and open the safety latch so the magazines may be raised from the escapement.

If the locking bar cannot be moved over it is likely that some of the matrices do not come all the way to the front of the magazine, and if so, touch the keys to bring the matrices into position. Never attempt to remove the top plate of a magazine as it will be difficult to reassemble without special equipment.

When the magazine is placed on a flat surface, the escapement cover, which contains the locking bar, may be removed for cleaning by loosening a screw at each end. Unless the magazine is empty this will expose the first two matrices in each channel and they may be moved back or taken out before the cover is fastened on again.

On each side plate of the magazine there is a  $\frac{1}{4}$ " hole, located about three and three-quarters inches from the front end. If for any reason the magazine does not seat properly on the escapement, and if it is filled with matrices, it may be examined by first inserting a rod through these holes in the sides of the magazine. This rod will hold the matrices back in the magazine with the exception of the first three matrices in each channel, which may be run out; after which the

escapement cover can be removed, as before mentioned. This will provide a clear view and make it easy to locate the trouble. If an old magazine is put on a new machine, it is possible that the magazine partitions do not fit in the grooves of the escapement bar casting.

When a magazine is being put on the machine, use care in sliding it back on the frame. If it is slammed back too hard, the matrices are apt to jar back enough to allow the lugs to drop through the openings in the bottom of the magazine, which would prevent the magazine from seating properly on the escapement.

Before the magazine is lowered to the frame it is well to rub the tips of the fingers across the slots to see that all matrices are in place. If the magazine is not properly seated the matrices are likely to spill on the floor.

### **Forty-Two Pica Machine**

On the forty-two pica machine particular attention should be given to the pump plungers. They must be kept clean, with their vents opened equally so that each plunger will exert an equal amount of pressure in the well to produce a solid slug. Also see that justification levers are kept well lubricated so they will have sufficient pressure to justify the widest lines.

If necessary to adjust the tension of the justification springs, hold the nut which is above the spring with a wrench or by hand and turn the spring rod with gas pliers or a Stillson wrench.

### **Two-in-One Single Distributor Machines**

On these model machines it is very important that the safety on the matrix guard lever be correctly adjusted so that the distributor bars and channel entrances cannot be changed while there are matrices on the distributor bar. This will prevent possible damage to the distributor bar and the matrix teeth. The instructions for adjusting this safety will be found in Chapter 26.

### **Multiple Distributor Models**

Use oil sparingly in distributor screw bearings, and keep the distributor boxes, especially the lower one, clean so that the matrices will slide freely. Also see that the chute which leads to the lower box is kept clean.

The matrix lift on the lower distributor box is flat at the top and it must be adjusted so that it will not lift more than one thin matrix at a time. Keep pusher rod clean and oil slightly. It is important to avoid excessive use of oil on all bearings of the distributor.