

CHAPTER 15

The Knife Block

THE EJECTOR which has just been described serves to push the slug out of the mold and between two knives which trim it to the proper point size, with its long sides parallel. The trimming action starts very shortly after the beginning of the ejection of the slug, while the slug is almost entirely in the mold and guided by the walls of the mold.

The left-hand knife which is fastened to the vise frame is wholly for the purpose of trimming whatever overhang or "fins" may be cast near the top of the constant, or smooth, side of the slug; and it should be set so that it will just touch the body of the slug. It is held to the vise frame by two large square-head screws which pass through the frame from the front and are threaded through the body of the knife.

The right-hand knife trims the slug for thickness by shaving only the ribs which are cast on the slug.

The right-hand knife is mounted movably upon a block, which is held on the vise frame. This block, with all its parts for moving and holding the right-hand knife to its various positions parallel with the stationary left-hand knife, is called the "Knife Block."

The knife block, as shown in Fig. 1-15, consists of several parts fastened together and carrying a slide which is movable horizontally so that the right-hand knife, mounted on the slide, can be moved toward or away from the left-hand knife, accurately positioned relative to the left-hand knife, and then rigidly held at various distances so as to trim the slug ejected between the knives to any of twenty desired thicknesses.

Because of the setting-screw method of adjustment, the thicknesses can be made to vary within reasonable limits from the point sizes as marked on the scale which shows the distances between the knives. The general practice, however, is to have the distances between the knives agree with the scale of point sizes because they are standard units of measurement.

The adjustable hardened setting screws are held and locked in a sector which is rotated by a hand operated sector turnknob, so that any one of the twenty setting screws may be brought in line with the hardened button on the end of the knife slide. When the knob is released the slide-button is held against the setting screw by two compression springs, and the sector is also positively locked in position against any rotation.

When it is desired to change the setting of the right-hand knife, the knob is grasped and first turned slightly clockwise. This action causes a cam, which is controlled as to its rotation by the knob, to force the slide slightly to the left away from its stop on the setting screw in the sector, and hold it so that the setting screw button on the slide will clear each and every setting screw while the sector is being rotated. This movement can take place only after the operator has pulled the knob slightly out toward him in order to release the lock pin which locks the sector against rotation.

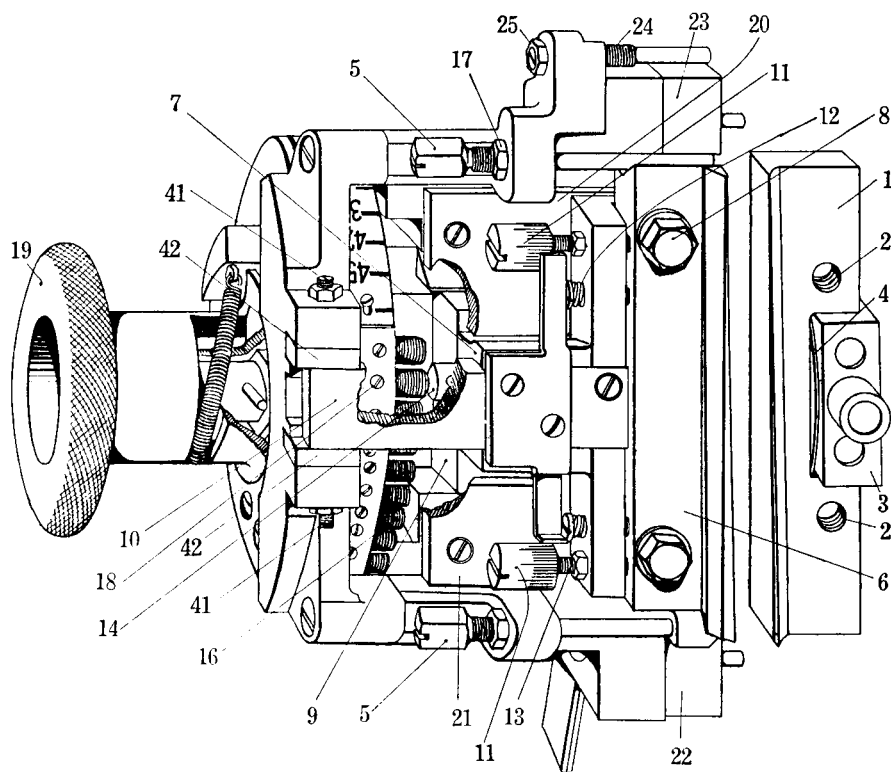


FIG. 1-15. View showing rear of knife block. 1 is the left-hand knife which is held to the vise frame by screws threaded into the holes 2 and extending through clearance holes in the vise frame, to the front. These screws have large square heads. 3 is the right-hand mold locking stud block. The knife block casting is held to the vise frame by screws and dowels indicated in Fig. 2-15.

The left-hand knife 1 is adjusted by the screws 5 which act against the pressure of the spring 4 which reacts against the mold locking stud block. This adjustment should be made only after the screws at 2 and the lock nuts 17 on the adjusting screws 5 have been loosened.

The right-hand knife 6 is mounted on the slide bracket 7 and held by the screws 8. The slide bracket 7 has fastened to it the slide 9 and the slide bracket support 10. Both the slide 9 and the support 10 are controlled by adjustable gibs so that they may slide without any lost motion or "shake" which might affect the right-hand knife 6. The knife is adjustable on the slide bracket 7 for parallelism with the left-hand knife 1, by means of the micrometer screws 11 against the action of the springs 12, after the screws 8 and the micrometer screw lock nuts 13 have been loosened. The setting screw button 14 at the end of the slide bracket 7 held by the slide springs 15 (See Fig. 2-15) against a setting screw 16 determines the horizontal distance between the vertical edges of the trimming knives 1 and 6. The setting screws are prevented from turning by the pressure of the set screws 18 on them. 19 is the sector turning knob. The slide 9 is held in place by the slide gibs 20 and 21. The liners 22 and 23 serve as spacers for the knife block casting. As here shown, the knives can trim a 45-point slug. 24 is the vise jaw, right-hand, adjustable stop screw. It is locked by the lock nut 25.

Thereafter, the sector may be rotated as desired, so long as the slight forward pull on the knob is maintained. When the stationary pointer is in line with the desired mark on the point scale, it is necessary only to let go of the knob, which then recedes, by spring action, to lock the sector accurately; and then, by action

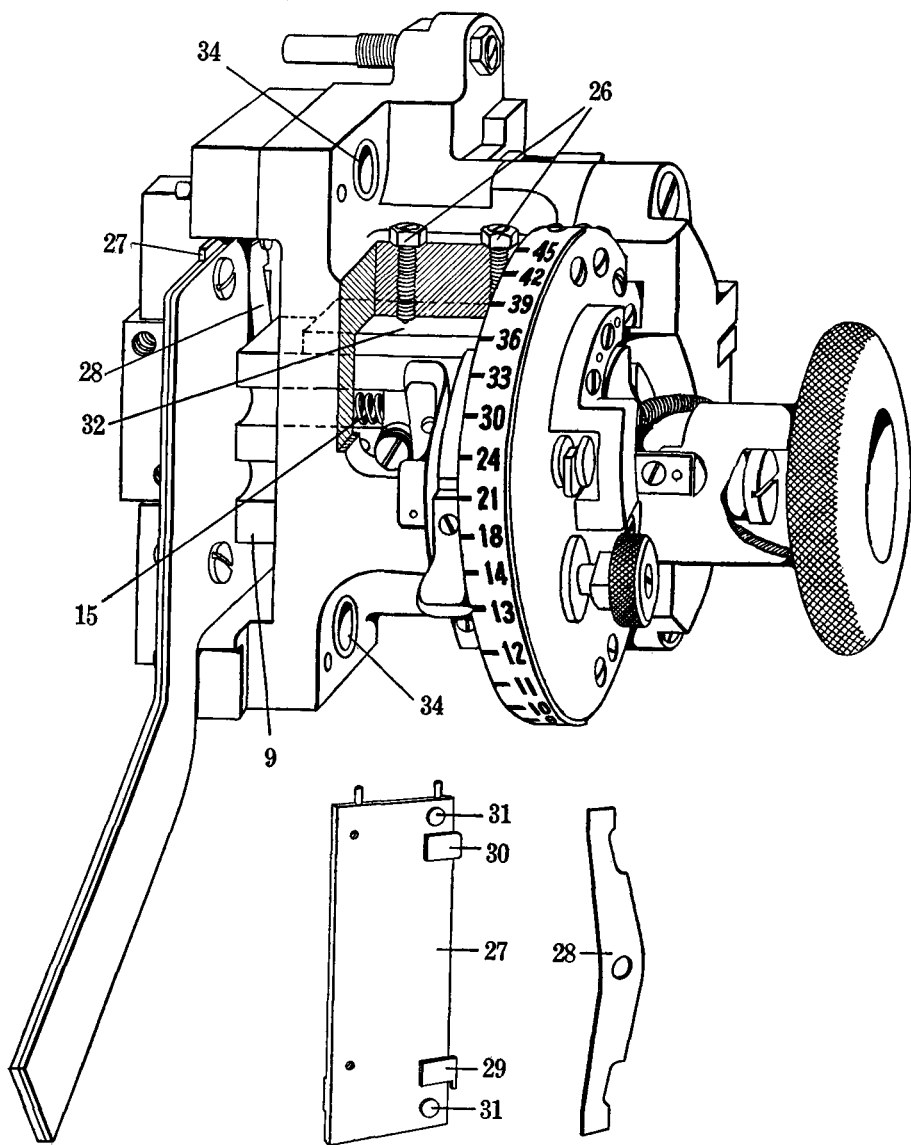


FIG. 2-15. Showing a front view of the knife block. 26 shows the screws for making the adjustment on the gib 32. 27 is the spring plate, 28 is the spring plate spring, and 29 and 30 show the lower and upper lugs on the spring plate. 31 shows the two studs with undercut heads, and 34 marks the holes through which the two screws pass to fasten the knife block to the vise frame.

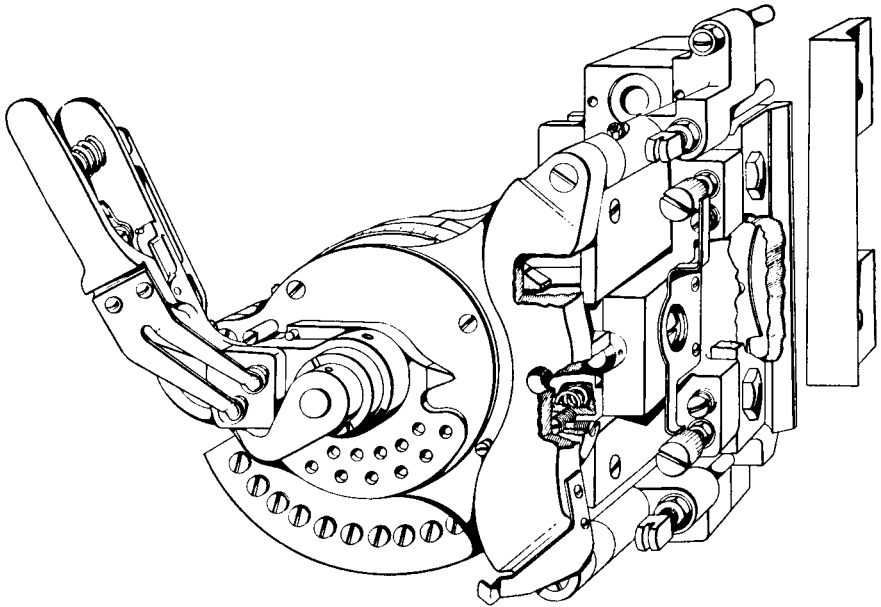


FIG. 3-15. View of old style knife block, showing operating handle which has been superseded by the sector turning knob 19, shown in Fig. 1-15. The mechanism and maintenance of this knife block is substantially the same as the new style knife block, described in detail in this chapter, with the exception of the slide bracket support 10, also shown in Fig. 1-15, which has been added to the new style block for greater rigidity and, therefore, more accurate trimming of slugs.

of another spring, the knob is rotated slightly counter-clockwise and brought to rest against and under the head of a round stop-stud. This last action causes the cam controlled by the knob to free the knife slide so that its springs can hold it tightly against the sector setting screw, which is then in line with the hardened button on the end of the slide. The point scale is on the periphery of the disk which contains the sector of twenty setting screws which serve to set the right-hand knife so as to trim the slugs to any of the commonly used thicknesses, from 5 to 45 points, inclusive.

In case a slug should not readily pass between the knives—which may happen if they have been wrongly set, or if neglected so as to become very dull—it is desirable to be able to widen the distance between the knives to allow the slug to pass between them. It can be readily seen that the method of setting the knives, as above described, cannot be used in such a case, because there would then be no possibility for the cam to push the knife slide toward the left. Therefore, another method must be employed to “open” the knives. This method is simply to partially rotate the circular stop-stud against which the sector turnknob stop is resting, and thereby free the knob so that it may be pulled out sufficiently to unlock the sector, which may then be rotated counter-clockwise to release the slug. Such rotation under this condition will be slightly noisy, due to a series of contacts between the setting screws on the sector with the hardened button on the knife slide. In a case as above described, it is best to first stop the machine and to move the cam shaft backward slightly by hand, in order to relieve the pressure of the ejector blade from the slug.

As the trimmed slug leaves the knife block it is held between two steel plates which prevent it from tipping to the right or left while falling into the galley. The left-hand plate is stationary, but the right-hand plate, which is called the spring plate, is held in place by two large lugs at the back of the plate. It is forced toward the left against the side of the outgoing slugs by a flat spring called the spring plate spring 28, Fig. 2-15, which has just enough tension to exert a light, even pressure to prohibit slugs from tipping.

The lower end of the slug plate extends forward and down in order to form one side of the passageway through which the slug slides down into the inclined galley now in almost universal use.

MAINTENANCE

The maintenance of the knife block is principally a matter of adjustment, rather than the replacement of the various parts.

The left-hand knife must be adjusted to cut close, but it must not trim any metal from the body of the slug, as that would interfere with ejection when the slug passes through the knives.

Fig. 1-15 shows the knife block in detail. 1 is the left-hand knife which rests against the adjusting screws 5 and is held in place with two square-headed screws passing through the vise frame. It is possible for this knife to be forced away from the adjusting screws if it should be subjected to some undue strain, as there is no support on its left-hand side. If that should occur, it is only necessary to loosen the two square-headed screws in the knife and the spring 4 will bring the knife back to its original position.

Adjusting the Knives—If the left-hand knife is to be adjusted to trim the slug closer to the edge, loosen the lock nuts 17, and turn the adjusting screws 5 out slightly before loosening the square-headed screws in the knife.

The right-hand knife is fastened to the movable slide 9 with two hexagon-head screws 8. Before adjusting this knife, examine the slide 9 and determine if there is any lost motion. If so, it will be difficult to keep the knives parallel when different length slugs are set. To make the adjustment, refer to Fig. 2-15 which shows two screws 26 which reach to a gib placed over the top of the slide, and as the screws are turned down, the gib presses on the top of the slide to eliminate excessive play.

A simple way to make this adjustment is to first turn the knife block so that the scale registers 5 point, then loosen the lock nut on the adjusting screw 26, Fig. 2-15, and turn the screw down tight against the gib 32, which will lock the knife slide 9, at 5 point. Open the knife block all the way until the dial registers 45 point, which will leave a space between the setting screw button 14, and the setting screw 16. Then with a screwdriver, loosen the gib set screw 26 very slowly until the slide 9 snaps over against the setting screw 16. Hold the screw steady and tighten lock nut. Adjust the other screw in the same manner as described above.

After this adjustment has been made, the support gib screws 41, Fig. 1-15, should be adjusted to bring the support gibs 42 just to bear against the slide bracket support 10, to take up the play, but not so tight as to interfere with the adjustment described above.

This additional support adjustment at the right-hand end of the slide 9 is on all late model knife blocks. The adjusting screws are moved just enough to support the end of the slide but must not be tight against it. This adjustment must be made after the first one is completed.

If the slide should become gummy and not slide freely in the guide, a small amount of kerosene applied on the bearing surfaces will cut the gum and also act as a lubricant.

When adjusting the right-hand knife for parallel, use slugs of the maximum width-capacity of the machine, then loosen the lock nuts on the micrometer adjusting screws 11, shown in Fig. 1-15, and when the adjusting screws are moved, the marks will show how much the knife will change when the knife clamping screws 8 are loosened. When the knife has been set parallel, tighten the lock nuts on the adjusting screws to hold them in place. A micrometer must be used to measure the slugs to determine the exact setting.

Each of the setting screws, as shown at 16 in Fig. 1-15, is independently adjustable so that slugs of any point size can be trimmed "close" or "full." This is sometimes desirable for spacing effects between lines.

If the slug measures the same at both ends, check the ribs at the center of the slug and see that they correspond with the measurement at the ends. If the center ribs measure thinner than the ends, the right-hand knife may be warped, and if so, it may be necessary to use an oilstone on the edge of the knife to make the slug parallel. It is very important that the ribs on the slug measure the same all the way across, otherwise when a change is made from wide to narrow measure, the short slug might not be parallel.

When setting the knives use lower-case matrices in the "test" line. Capital letter matrices have a slight overhang, and when the slug is trimmed, there is more metal to remove, resulting in more pressure on the knives and a possible slight variation in the setting. This will be particularly noticeable on machines that have been in use for some time.

If slugs are "off their feet," (the bottom thinner than the top of the slug) it may be caused by the left-hand knife not trimming close enough and leaving an overhang at the top of the slug. This condition may also be caused by dull knives, worn or loose mold locking studs, or worn stud blocks.

To insure a slug trimming parallel there must be no lost motion in the mold locking studs or stud blocks. To test this, leave the vise closed and turn the machine backward until the mold disk is fully advanced and the locking studs are in place, then pull ahead on the handle of the mold disk pinion and rock it from side to side to see if there is any lost motion in the mold disk. If there is any looseness, it will be proof that the locking studs or stud blocks are worn.

The knife block is fastened to the vise frame with two hexagon head screws indicated at 34 in Fig. 2-15. Before removing the knife block from the machine, it is important to see that the lock nuts are tight on the left-hand knife adjusting screws 5, Fig. 1-15.

If the screws are not locked in place they might move, and when the knife block is fastened in place the set screws might force the left-hand knife out of place. Also see that the surfaces of the liners 22 and 23 are perfectly clean, so that when the knife block is fastened in place the knives will remain in parallel.

If the knife block is removed from the machine for repairs, test the knives for parallel after it has again been fastened in place on the machine.

Referring to Fig. 2-15, 27 shows the right-hand side spring plate on which are riveted two lugs, 29 and 30. The lower lug 29 has a small projection extending from its lower side; on the inside at the lower end of the right-hand knife there is a slot with a pin across, and the projection on the lower lug fits over the pin in the knife to keep the spring plate in position. 28 shows the spring that forces the spring plate to the left; 31 shows the two studs with undercut heads.

On the later model machines the spring plate is fastened to the slug plate with

two screws. The movement of the slug plate is thereby limited in constant relation to the right-hand knife. The purpose of this is to eliminate the possibility of damage to overhanging characters on slugs, and maintain the spring pressure on regular slugs. The movement of this side spring plate is limited by the screws to .005".

When the knife block is being assembled, place the projection of the lower lug 29 over the pin in the side of the right-hand knife. It will be noticed that spring plate spring 28 has the side cut away at each end. The ends of the spring fit under the cutout heads of the studs 31 and below that point the spring is cut away enough to clear the spring plate lugs when the spring plate is pressed down.

Fig. 1-15, shows the right-hand vise jaw adjusting screw 24, which controls the position of the type on the face of the slug so that it will have neither an indention nor overhang.

When an adjustment is made with this screw, see that it does not affect the adjustment of the pot pump safety stop, which has been described in a previous chapter.

Sharpening the Trimming Knives—If the side trimming knives are very dull, or the edges nicked, they should be returned to the Linotype Company to be ground. Send both knives, as they are ground in pairs to make sure they will always be of equal height.

If only the edges of the knives are dull, they may be dressed with a lapping block and an oilstone. A lapping block suitable for this purpose can be obtained from the Linotype Company, listed in the parts catalogue as F-317, together with a knife support block, F-701, and No. 120 powdered emery, X-491, also to be used in lapping the knives.

For best results, proceed in the following manner: Sprinkle the surface of the lapping block with the powdered emery and moisten with kerosene. Hold the face 43 of the knife flat on the lapping block and rub, as shown to the left in Fig. 4-15. The face 45 should then be held firmly against the knife support block and

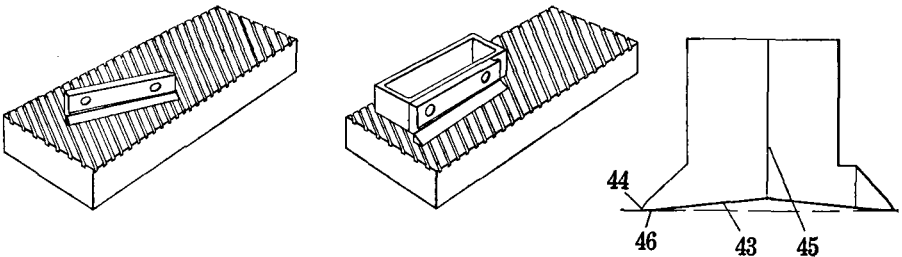


FIG. 4-15. Showing correct procedure in sharpening the trimming knives. The view to the right illustrates how the knives are tapered for proper trimming and smooth ejection of the slug.

the cutting edge 46 rubbed over the lapping block, as shown in the middle view, Fig. 4-15, being careful that this edge is not ground back farther than $\frac{1}{4}$ ". Then dress the edge 44 with a fine oilstone.

As shown to the right in Fig. 4-15, the knives are tapered. This taper allows the slug to be ejected with the least possible resistance, and the original angles of the knives must always be preserved to prevent them from digging into the slug when trimming.