# CHAPTER 11

# The Vise and Justification

BEFORE A CAST can be made against a line of matrices and spacebands held in the first elevator jaw, the line must be manipulated in certain ways for certain definite purposes such as alignment with the mold, justification, lock-up, etc. After the cast has been made the line must be unlocked so that the matrices and spacebands can be conveyed upward for their distribution, and the cast slug trimmed and stored in the galley ready for use.

The mechanisms of the Linotype which perform such operations are mounted for the most part, on the vise frame, which is a casting occupying the left front portion of the machine.

## VISE FRAME

The vise frame consists of a casting having two legs joined together by bridges, and is pivoted at the lower ends of the legs on a shaft with bearings in the base of the machine. This shaft also supports the legs of the metal pot. The vise frame carries the justification bar and the rods, the guides for the first elevator slide, the mechanism for closing the vise jaws, the vise automatic rod, the mold disk dog, the mold locking stud blocks, the knife block, the knife wiper, the slug lever, the slug galley and the vise cap in which the vise jaws slide.

The vise cap is fastened to the top of the vise frame by four screws, and has on the underside of the rear, a longitudinal groove in which the vise jaws slide. The vise cap also takes the thrust and supports the first elevator jaw, when the line is locked up for casting the slug. Through the vise cap, at each end, are the vise locking screws which hold the vise in its vertical position and lock it to the frame of the machine. The vise locking screws, which are threaded in the vise cap, have on their ends a cam, which enters into the vise locking studs, one attached to the column and the other to the mold gear arm.

This method of mounting the vise frame allows it to be readily swung open to make accessible the mechanisms mounted on and back of it. There are two positions to which the vise frame, generally referred to simply as "the vise," can be lowered, or opened.

To open the vise to the first position it is merely necessary to first push the starting and stopping lever all the way back (as a safety precaution), and then turn the handles of the locking screws to a vertical position where they will be disengaged from the vise locking studs on the frame of the machine. The vise can then be let down until it is supported near its lower end by the vise frame rest stud. With the vise in this position, the mold slide can be pulled forward about two inches if its cam lever is first released.

The vise should never be opened at any time when the mold disk is forward far enough to bring its locking studs in contact with the mold disk locking stud blocks on the vise frame. Not only is it difficult to close it and re-lock it if this is done, but there is also danger of the justification levers getting out of their position under the collars on the justification rods.

To open the vise to the second position the machine should be stopped when the first elevator is resting on the vise cap, just before the mold disk advances. The starting and stopping lever should next be pushed all the way back (again as a precaution). Then lower the vise frame to the first position, after removing the inclined galley (as a further precaution). Next, hold up the vise frame slightly while retracting the vise frame rest stud, and then let the vise frame down slowly while pulling upward on the first elevator slide to avoid bending or breaking the first elevator slide link.

Never let the vise down to second position unless the first elevator is all the way down on the vise cap. In this position, the first elevator lever roller is opposite the lowest depression in the first elevator cam, and therefore, as the vise frame is let down the weight of the first elevator on the first elevator lever is

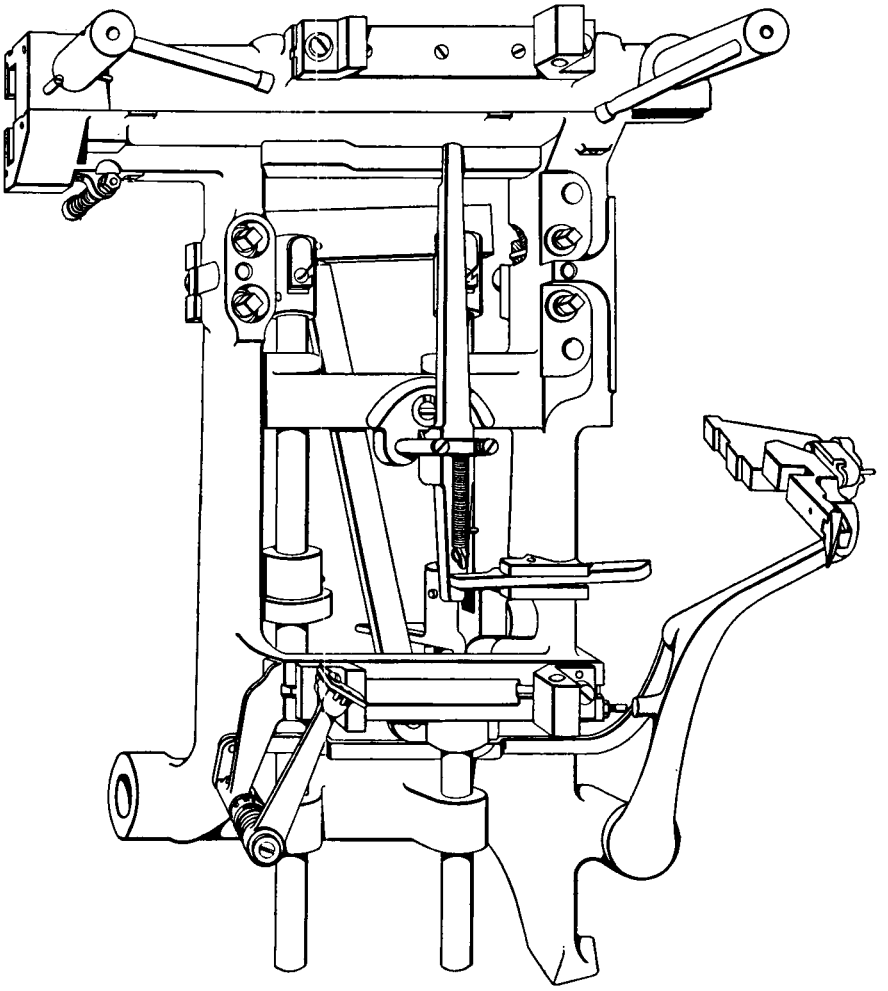

FIG. 1-11. View of vise frame with first elevator slide, galley, etc., removed.

supported by the cam. To lower the vise to second position at any other time is at the risk of breaking the first elevator lever.

With the vise opened to second position, the mold slide may be removed, but only after disconnecting various parts which are described in later chapters of this book.

As shown in Fig. 8-11 and 10-11, when the line is justified, the matrix at the

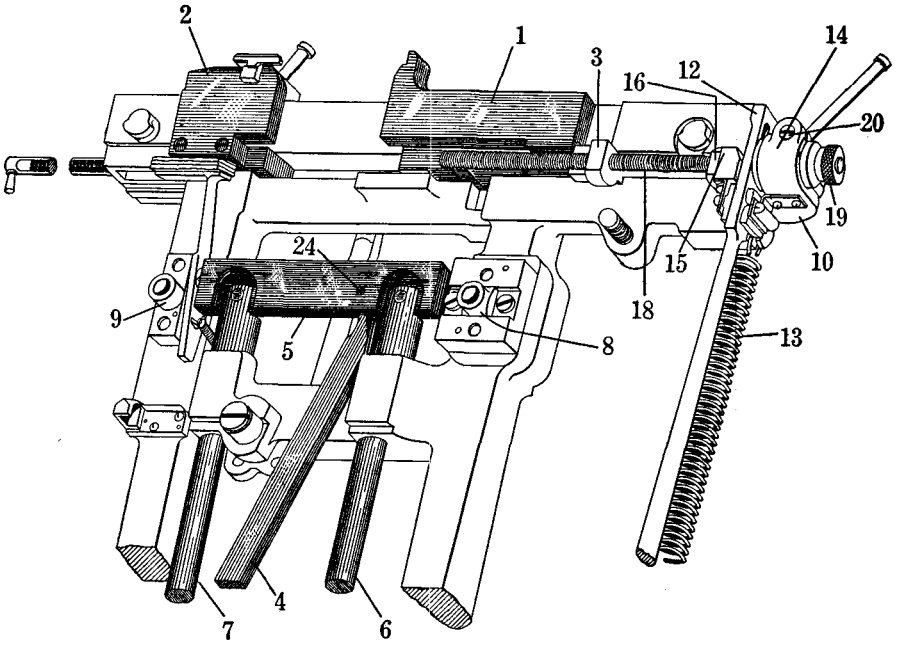


FIG. 2-11. Inside view looking down upon the vise frame when it is lowered to second position. *1* is the left-hand vise jaw, and *2* is the right-hand vise jaw. The right-hand vise jaw *2* has only a slight movement, in order to operate the pump stop, elsewhere described. The left-hand vise jaw may be set at different positions for various lengths of lines, the movement being controlled by the position of a locking block *3* which is adjustable along, and locked where desired upon, the adjusting rod *18*. The adjusting rod *18* has on it a number of circular grooves, one half em apart, so that the left-hand vise jaw *1* may be set for any length of line within the range of the machine. This adjusting rod has pinned to it a hardened wedge-block *15*. The wedge-block *15* has only a slight movement between the vise jaw wedge *12* and the lug *16* on the wedge bracket *10*, and it is always kept against the wedge surface by a compression spring which is around the adjusting rod *18* between the lug *16* and the wedge-block *15*. Adjustments finer than one half pica em are made by turning the bushing *19* which is threaded into the bearing *14* on a bracket fastened to the vise cap.

The justification bar *5* is mounted on the two rods *6* and *7*. The top end of the diagonal brace rod *4* supports the justification bar near the left end and the bottom end of the brace rod is supported in a jawed casting on the justification rod *7*. This brace determines the angle of the justification bar when its left end is not supported by the justification lever under the justification rod *6*, and it also prevents cramping of the parts when the vise frame is opened.

The left-hand mold disk locking stud block *8*, is sometimes called the "floating block" because it is not absolutely fixed on the vise frame, but is allowed to have a slight motion horizontally. The fixed mold disk stud locking block is shown at *9*. This block is screwed and doweled to the vise frame.

right-hand end of the line is forced against the right-hand, or short, vise jaw, and the matrix at the left-hand end is forced against the left-hand or long, vise jaw. The stop for the right-hand jaw is regulated by the adjusting screw in the knife block, and the stop for the left-hand jaw is regulated by the position of a locking block as described under Fig. 2-11. Half a pica em is the shortest distance the left-hand vise jaw can be adjusted by means of the block on the adjusting rod. If it is necessary to make a closer adjustment, the adjusting bushing which screws in the bearing bracket on the vise frame must be used for the purpose. The vise jaws should be adjusted so that the face of the type is flush at each end of the slug.

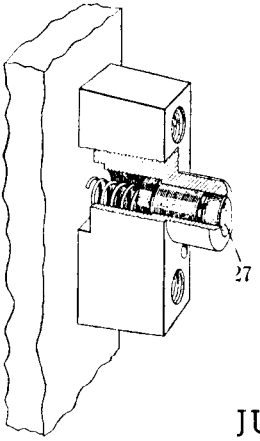


FIG. 3-11. View of mold disk locking stud block, showing the self-oiling locking stud bushing. The spring plunger 27, has on it a felt wiper which lubricates the interior of the bushing and expels any type metal chips, each time the bushings are used for locating the mold disk.

## JUSTIFICATION

When the first elevator has descended to its lowest position and is resting on the vise cap, the line of matrices and spacebands held by its jaw is then between the right-hand and left-hand vise jaws which are on the vise frame. But, before the first elevator slide has descended, the left-hand vise jaw is held open somewhat by the "short wedge" on the surface of the vise jaw wedge, making the distance between the vise jaws a little more than the finished length of the line.

As the first elevator slide is seated on the vise cap, the vise automatic rod is pushed down, carrying its blade below the mold disk dog, so that the machine is not stopped when the mold slide, carrying the mold disk and mold, is moved forward toward the matrices and spacebands. On the completion of this motion there is a space of about .010″ between the face of the mold and the back surfaces of the vise jaws. The casting edges of the matrices and spacebands are then substantially on a line with the back surfaces of the vise jaws.

The vise closing lever then rises, allowing the vise jaw wedge spring to raise the wedge. This action forces the left-hand vise jaw to the right just enough to make the proper distance between the vise jaws for the line when justified. The line of matrices and spacebands must always occupy a little less space than the distance between the vise jaws; and this slack, which varies constantly with different lines, must be taken up by driving upward the slides, or long wedges, of the spacebands. This operation is referred to as the "first justification."

### First Justification

As shown in Fig. 2-11, the justification bar is hinged close to its ends on vertical rods which are movable up and down in bearings on the vise frame, and is employed for the purpose of pushing up the spaceband wedges. The lower ends of

these vertical rods rest upon the ends of two long levers, one of which is called the "justification lever" and the other the "vise closing lever." The end of the latter is forked, and the right fork is employed for justification. The long levers extend back under the cam shaft, and are depressed positively by cam action, but

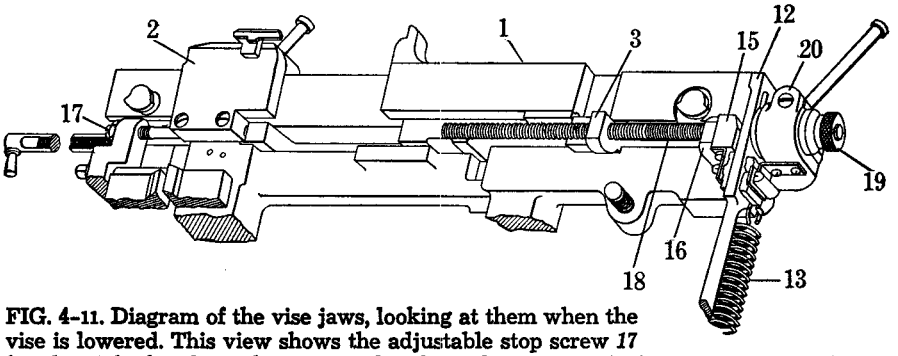


FIG. 4-11. Diagram of the vise jaws, looking at them when the vise is lowered. This view shows the adjustable stop screw *17* for the right-hand, or short, jaw, also the rod *18* upon which the locking block *3* is locked by the operator when setting the left-hand vise jaw *1* for the length of line to be cast.

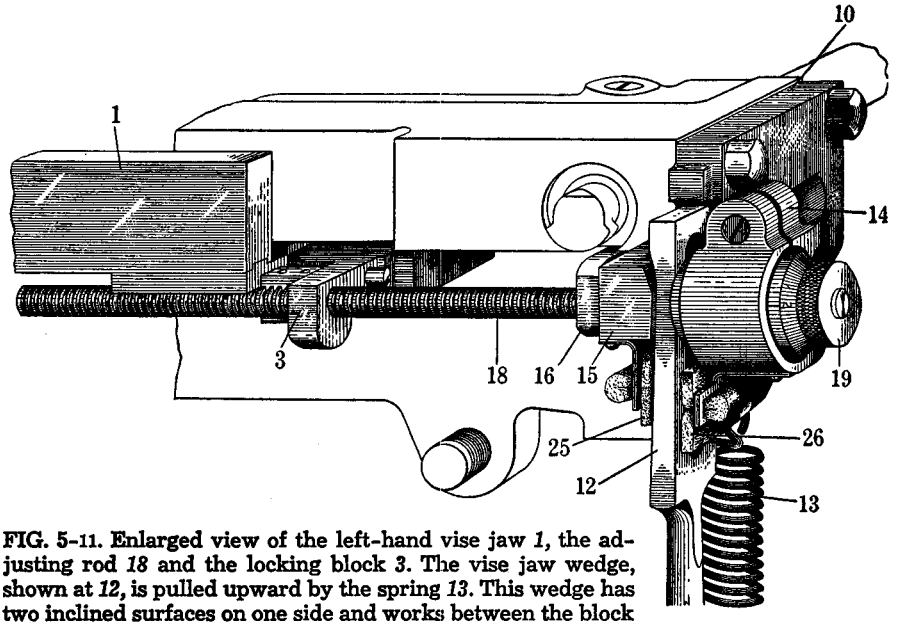


FIG. 5-11. Enlarged view of the left-hand vise jaw *1*, the adjusting rod *18* and the locking block *3*. The vise jaw wedge, shown at *12*, is pulled upward by the spring *13*. This wedge has two inclined surfaces on one side and works between the block *15* and the end of the adjustable bushing *19* which is threaded in the bearing *14* on the vise frame. The actions of the short wedge and the long wedge surfaces are explained in detail in the text of this chapter.

This view also shows the two wipers *25* and *26*, one for each side of the vise jaw wedge. These wipers, by keeping the hardened wedging surfaces clean, prevent them from becoming scored, and also assist in obtaining a smooth "breakaway" after the line has been cast. A quick and tight justification between the wedge and block with the least amount of friction possible between the surfaces of those two parts is highly desirable, especially when there are very few spacebands in the line.

are released by springs which are mounted under them not far forward of their fulcrums. It should be noted here that the spring for the justification lever is much the stronger of the two, and transposing the two springs will cause justification troubles.

The justification block is raised by the levers in order to drive up the spaceband wedges. During this upward motion, the top surface of the justification block

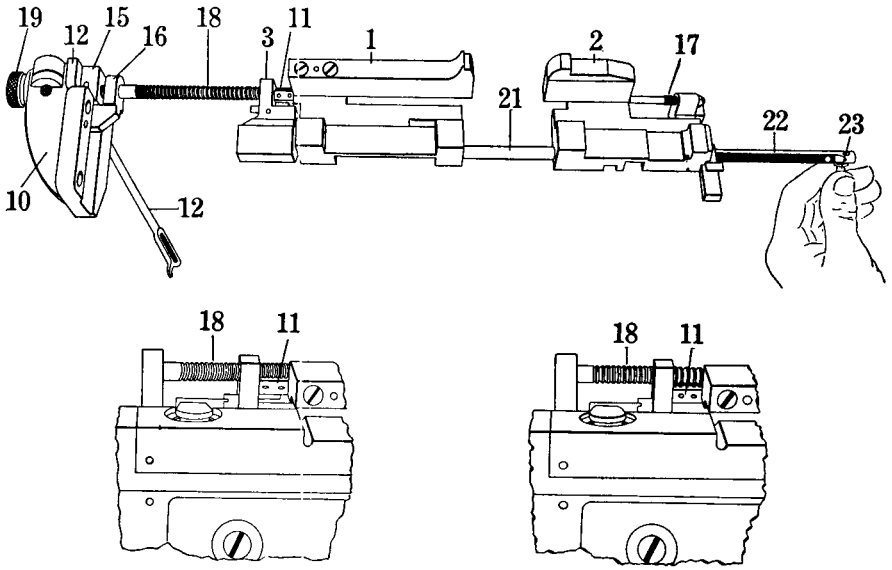


FIG. 6-11. Plan view, in perspective, of the vise jaws and the attachment for setting the left-hand vise jaw by the operator while seated at the machine.

The left-hand vise jaw is shown at *1*. *2* is the right-hand jaw which stops against the adjustable screw *17* on the knife block. *3* is the adjusting rod locking block and *18* is the left-hand vise jaw adjusting rod which has pinned to it the wedge block *15*, the left side of which is kept in contact with the wedge *12* by a coil spring pressing upon its right side. The coil spring is around the adjusting rod *18* and is backed by the lug *16* on the wedge bracket *10*.

The locking block *3* has on it a sliding locking piece *11*, the rear end of which is grooved to register with the circular projections around the adjusting rod *18*. This locking piece *11* is movable in and out of engagement with the adjusting rod *18* by a partial rotation of the adjusting bar *21* which has a scale *22* marked in graduations of one half ems, fastened upon its right end, which protrudes out from the vise cap. On this end is also a small operating handle *23*. The adjusting bar *21* passes through clearance holes in both the vise jaw blocks and is held in the locking block *3* in such a manner that a short downward movement of the operating handle *23* disengages the locking piece *11* from the adjusting rod *18*, and a longitudinal movement of the adjusting bar *21* carries the locking block along the adjusting rod *18* to which it can be re-locked by a short upward movement of the handle *23*. The locking piece *11* is engaged by a spring detent which holds it in or out of engagement with the adjusting rod *18*, as desired.

The enlarged lower left-hand view shows the locking piece *11* engaging the grooves in the adjusting rod *18* in such a manner as to hold the left-hand jaw *1* firmly in any set position without possibility of slipping.

The enlarged lower right-hand view shows the locking piece *11* disengaged from the adjusting rod *18*, allowing the left-hand jaw *1* to be moved freely.

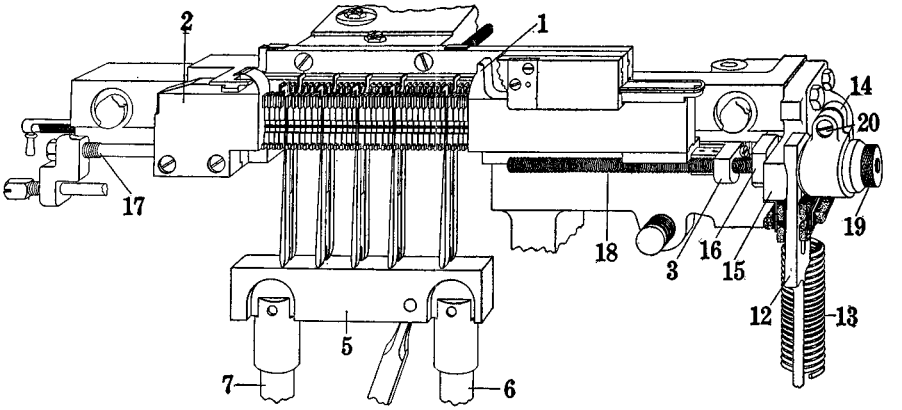


FIG. 7-11. View before the first justification showing the assembled line of matrices and spacebands between the jaws *1* and *2* loose, the spacebands hanging down.

This view also shows the vise justification bar *5* and the wedge *12*. The wedge *12* is at its lowermost position making the distance between the jaws a little more than the length of the slug when cast.

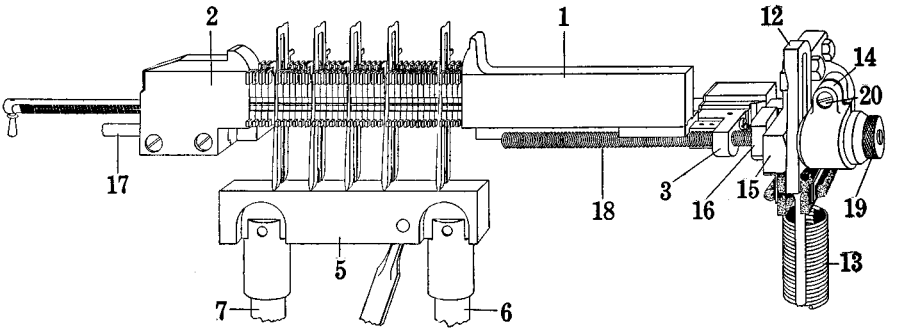


FIG. 8-11. View from rear of vise frame showing the first justification of the line. The wedge *12* has gone to its highest position and the left-hand jaw *1* is forced in, making the line just a little less than the proper length. The spaceband wedges have all been driven up an equal distance by the justification block which has been raised with its top surface horizontal.

is brought up horizontally by the action of the vise closing lever, which not only allows the wedge to be drawn up into position, but also comes in contact with the justification rod on the left and operates in conjunction with the justification lever on the first stroke. This gives an added pressure on the bar to spread the line of matrices if a large number of spacebands are being used, and due to the fact that the justification bar rises horizontally, there is less chance of bending a spaceband if only one is used in the line.

After the pressure of the springs under the long levers has driven the spacebands upward as far as they will go, the levers move downward and allow the justification block to do the same.

At the same time the vise jaw wedge descends, relaxing the pressure on the line, thus allowing freedom for the vertical alignment and the face alignment which is necessary before the justification takes place. It should be noted here

that even though the justification block is not, at this time, holding up the spaceband wedges, their friction in the line is holding them up; and even if one or more should happen to drop, no harm could come of it.

The vertical alignment is next made by the rise of the first elevator .010" so that the tops of the matrix lower lugs, already in the aligning grooves of the mold, are brought to bear against the tops of the grooves, and are held there by the pressure of the spring in the first elevator slide link.

The metal pot next advances and pushes the mold forward against the faces of the matrices, spacebands and vise jaws, to bring all of them into what is termed "face alignment." The metal pot then recedes and relieves the pressure of the mold on the line and the vise jaws. The vise-closing lever rises, allowing the vise jaw wedge-spring to raise the wedge to its proper height and moving the vise jaw inward to the exact length of the line. All is then ready for the "second justification."

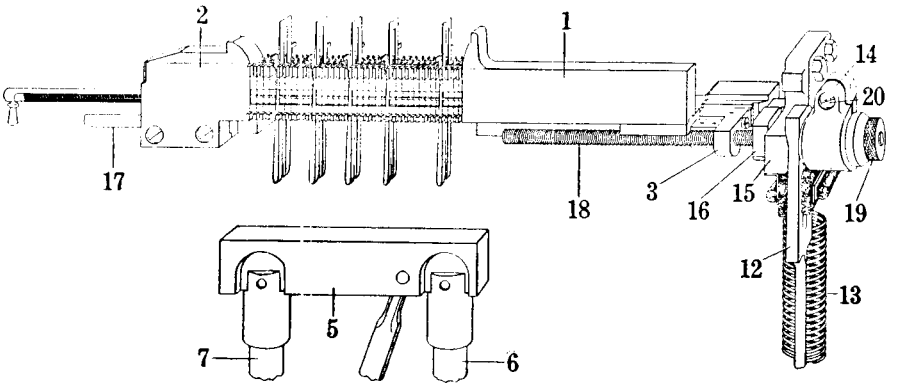


FIG. 9-11. View showing the vise justification bar 5 withdrawn after the first justification. The line of matrices and spacebands is between the vise jaws *1* and *2*. The wedge *12* is now drawn downward by the cam, relaxing the pressure which has been made by the spacebands in the first justification. This leaves the line of matrices and spacebands loose, but not enough so that the spacebands will fall down again. At this time the alignment of the matrices takes place by the lifting of the first elevator jaw.

## Second Justification

The justification and vise closing levers rise simultaneously, again causing the justification bar to rise horizontally and push the spaceband wedges upward to tightly wedge the line between the vise jaws so that no molten type-metal can possibly be forced between the matrices or spacebands and matrices in the line.

It can readily be seen that the spaceband wedges are driven up very little farther during the second justification, but any which may have been disturbed slightly during the face alignment are righted and all are held upward in order to fill out the line tightly while the line is being cast.

The metal pot next closes against the mold, forcing the mold against the aligned and justified line of matrices and spacebands to make the lock-up. After the cast has been made, the upward pressure on the first elevator is relieved, releasing the lower lugs of the matrices from strain. The justification lever and the vise closing lever descend, releasing the pressure on the line, and the metal pot and the mold slide carrying the mold then move backward, drawing the face of the slug out of the matrices.

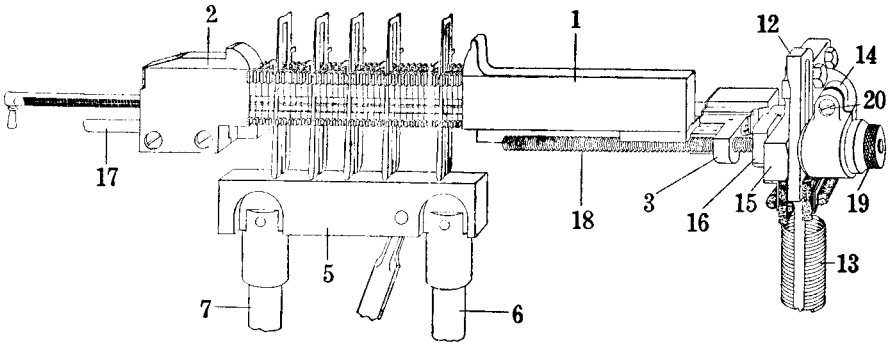


FIG. 10-11. Second justification. The wedge *12* has risen, compressing the line to the proper length. The justification bar 5 rises again with its top surface parallel with the floor, and presses the spacebands tightly between the matrices, ready for the casting of the slug.

The line of matrices is now aligned and justified and is ready for the mold to press against the line, the pot following the mold, and the slug is cast.

## MAINTENANCE

*Adjusting the Vise Jaws*—Fig. 4-11 shows the vise jaws as seen when the vise is lowered. When adjusting the vise jaws to bring the type face to the correct position on the slug, the short jaw *2* is adjusted with the set screw *17*, which is at the top of the knife block. To adjust the long jaw *1*, loosen the clamp screw *20*, and turn the knurled bushing *19* to get the proper setting. When that is correct, be sure to fasten the clamp screw tight so that the bushing will not work loose. The face of the type must come flush with the ends of the slug, especially when "twin" slugs are being set for very wide measure; otherwise, if there is a slight indention on the slug, a white line will show where the lines join.

*Adjusting the Justification Wedge*—The wedge *12* passes between pieces of felt *25* and *26*, as shown in Fig. 5-11, and these should be oiled frequently to allow the wedge to work smoothly. On the bottom of the wedge there is an adjusting screw, and if it should be necessary to adjust this, have the machine in normal position and bring the wedge down but not far enough to move the wedge block to the right. This adjustment is not often necessary, but it should be right so that the line of matrices and spacebands is completely unlocked after the cast is made.

*Care of the Justification Rods and Bar*—Fig. 2-11 shows a brace rod *4*, which connects the justification rods *6* and *7*, and the top of the rod is held by a screw *24*. This screw should be examined occasionally for wear.

The top of the justification bar should be kept free from graphite which it may collect from the spacebands. If the bar is too smooth, and there is only one spaceband in the line, the bottom of the band might slide and bend when justification takes place. If the bar is glazed or slippery, rub crosswise with an oilstone to slightly roughen up, but never grind cross grooves in the bar.

*Imperfect Justification*—When a machine does not justify perfectly, it may be due to one of several causes, and various tests must be made in order to locate the trouble. First try a matrix in the first elevator jaw and slide it all the way across to see that it does not bind in either the upper or lower positions, then a spaceband in different positions across the jaws to see that it does not bind on the

elevator back jaw. Also examine the duplex rail in the first elevator jaw and see that it does not come so far ahead as to cause the matrices or spacebands to bind. (See Chapter 10.)

If a line has failed to justify, examine the matrices in that particular line and see if the trouble is caused by a damaged lug binding in the elevator jaw. Also see that the mold does not come too far forward and bind the matrices. The mold slide should be set so that when the pot comes forward the first time, the mold recedes very slightly from the line of matrices when the pot pressure leaves the mold. (See Fig. 7-12.)

Another cause of faulty justification may be an improper setting of the matrix clearance on the first elevator slide which brings the lugs of the matrices in alignment with the mold groove. If enough clearance has not been allowed, the matrices may bind on the upper edge of the groove when justification takes place. The method of setting this alignment has been given in detail in Chapter 10. The set screw *29*, for adjusting to give the proper clearance is shown in Fig. 4-10. It sometimes happens that this clearance will differ slightly when the "flap," or simple two-letter attachment, is used to hold the elevator jaws in the raised position. It is possible that some part of the flap has become bent, holding the elevator jaws higher than .218", which is the proper distance between the regular and upper positions.

If a line has been set that did not justify properly, reset the same line and make a test in the following manner: Remove the plunger pin for safety, then send the line across with the starting lever pushed in. Shut off the power and when the motor has stopped, pull out the starting lever and turn the machine by hand very slowly with the driving pulley until the justification levers have raised the justification bar 5, to come in contact with the spacebands for the first justification; then, if the matrices are not spread out against the vise jaws, test each point carefully to see where the trouble lies. As mentioned before, see that the matrices do not bind in the elevator jaws, and that there is the right amount of clearance between the matrix lug and the mold groove. If the line still does not spread easily, use a light bar to raise up on the justification lever, and see if added pressure will spread the line, and if so, it may be necessary to increase the tension of the justification lever spring.

*Lubrication*—The justification rods *6* and *7* shown in Fig. 2-11, should be oiled frequently and should not be allowed to become gummy. The rear ends of the justification levers where they fulcrum on the shaft should be oiled regularly.