be followed for "breaking in" a new mold. When the mold is placed on the mold disk, five to ten slugs should be cast and as soon as ejection becomes difficult, the mold should be permitted to cool for a few minutes. Eight to ten slugs can then be cast and the mold should be permitted to cool again. This process is carried on until the casting surfaces of the mold body and cap take on an oxide discoloration. The discoloration is of a brownish-red color at first and is usually obtained after about fifty slugs have been cast by the gradual process described above. As additional slugs are cast, the oxide film becomes greyish in color and extends from the back of the mold to the front. Once this film is formed, it will act as an insulating layer between the mold surfaces and the slugs and ejection will be easy from then on.

It is sometimes necessary to polish the mold in order to remove small particles of metal which adhere to the mold body and cap. When mold polish is used, it should be applied to the mold surfaces with a flat pine stick. The stick should be moved in circular strokes and should be held flat on the surface being polished. Tilting the stick will tend to round the edges of the mold. After the parts have been cleaned, remove the polish with a cloth. Most of the oxide film formed on the casting surfaces of the mold will be removed when mold polish is used. Consequently, before the mold is placed in use again, it should be subjected to the gradual "breaking in" process described above until a new film is formed.

The Mold Disk and Mold Disk Slide

The molds are mounted on the mold disk *1*, Fig. 44, which has teeth *2* cut in its circumference. The mold disk is mounted on a stud *3*, which passes through

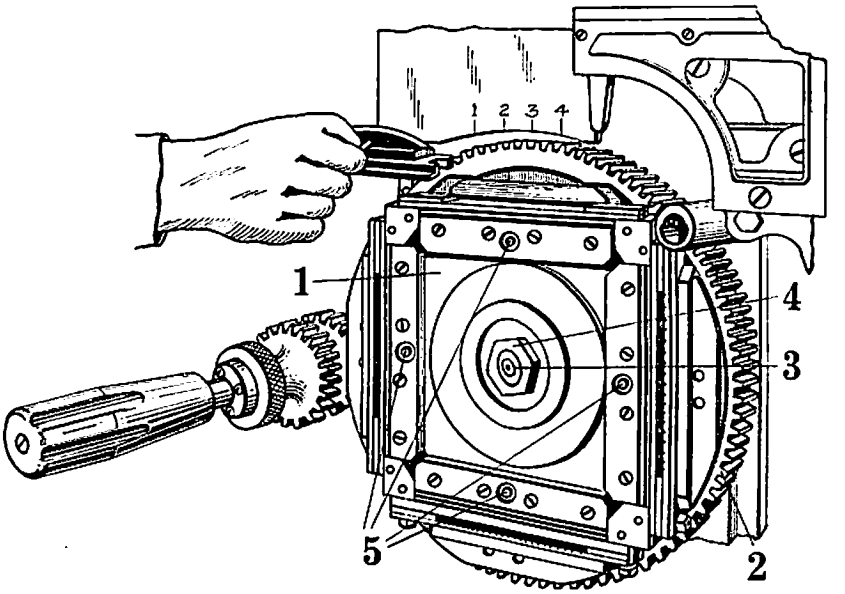

Fig. 44. Showing how an Intertype mold cap is removed when the liners are being changed. All parts of the mold are completely accessible for cleaning before new liners are inserted.

the center of the disk and is fastened at the front by a nut *4*. At the rear of the disk the stud revolves in a bearing in the mold disk slide arm, *1*, Fig. 45. A left-hand nut *2* on the end of the stud holds the mold disk in proper relationship to its bearing. On the outer end of the arm is mounted the back knife *3*, which trims the slug to type height. The arm *1* is part of a casting known as the mold disk slide *4*. The upper and lower edges of the slide are beveled and run in beveled bearings on the left side of the machine column. There is a semi-circular notch *5* at the rear end of the mold disk slide into which fits a roll on the mold cam lever (not shown). Another roll on the opposite side of the lever fits into a cam groove in the mold cam and driving gear. The mold cam lever is suspended at the top on a hinge pin in the mold cam lever handle. The lever can be raised far enough by means of the handle to disengage the roll from the notch in the mold disk slide. The slide and disk can then be pulled forward a few inches or removed entirely after disconnecting and removing the ejector lever link.

Movements of the Mold Disk and Mold Disk Slide. The mold disk, as stated above, is mounted on an arm which is part of the mold disk slide casting. The slide serves two main functions: it moves the mold disk forward to the vise frame and back from the frame at the proper time, and its arm serves as a bearing in which the mold disk stud is free to revolve. The mold disk makes a number of

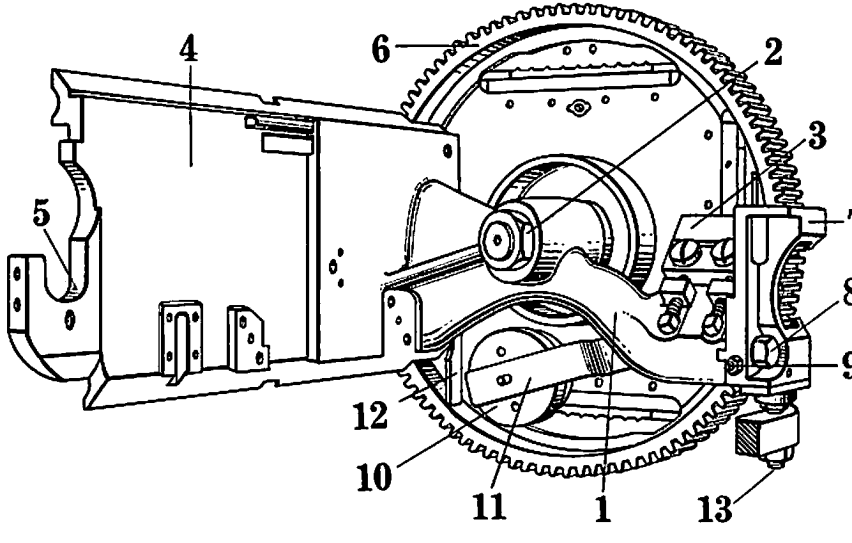

Fig. 45. Perspective View of the Mold Disk, Mold Disk Slide and Related Parts in Assembly. The movements of the mold disk slide *4* and the mold disk *6* are described fully in the text. The mold disk guide *7*, fastened to the outside end of arm *1* by screw *8*, steadies the mold disk when the base of the slug is being trimmed by the back knife *3*. The guide should be set so that its front lugs contact the rim of the mold disk without binding. To obtain this adjustment loosen screw *8*, turn screw *9* and tighten screw *8*. Always make sure that guide *7* is correctly adjusted and that screw *8* is tight before attempting to adjust the back knife *3*.

Inside container *10* is a wiper felt, which is held against the mold disk through action of spring *11*. The function of the felt is to wipe the back of the molds as the disk revolves. The mold disk scraper *12* prevents metal shavings from lodging between the mold disk slide and mold disk.

forward, backward and rotary movements during one revolution of the cams. As the first elevator descends and carries the line of matrices and spacebands between the vise jaws, the mold disk turns one-quarter of a revolution, bringing the mold in use to a horizontal position in front of the matrix line. The mold disk then moves forward to within .010" of the matrix line, the toes of the matrices entering the alignment grooves in the mold body. First justification and vertical alignment of the matrices take place when the mold disk is in this position. After the first elevator has lifted the matrices slightly to align them vertically, the metal pot advances and pushes the mold against the matrix line, aligning the matrices facewise. The pot and the mold disk move back, providing freedom for second justification of the matrix line. The mold advances against the aligned and justified matrix line and then the pot locks against the back of the mold. After the slug is cast, the pot withdraws from the mold and the mold disk backs completely away from the vise frame. The mold disk turns three-quarters of a revolution, carrying the slug in the mold past the back knife to ejecting position. The mold disk moves forward again, its locking studs entering the stud block bushings on the vise frame. The slug is ejected from the mold and the disk backs away from the frame to normal position. The two rotary movements of the mold disk are caused by two segments on the mold turning cam, which engage a bevel pinion on a short shaft inside the mold gear arm. A spur gear on the bevel pinion shaft meshes with a pinion on the mold driving pinion shaft and turns the shaft whenever either segment engages the bevel pinion. The forward and backward movements of the mold disk and mold disk slide are caused by the mold cam, which moves the slide and disk through two rolls on the mold cam lever.

The Mold Disk and Mold Driving Mechanism

The mold disk, as described above, makes two rotary movements during one complete revolution of the cams. The disk turns one-quarter of a revolution, bringing the mold in use to a horizontal position in front of the matrix line in preparation for the cast. After the slug has been cast, the disk turns three-quarters of a revolution, carrying the slug in the mold to ejecting position. These partial revolutions are caused by a short segment *1*, Fig. 46, and a long segment

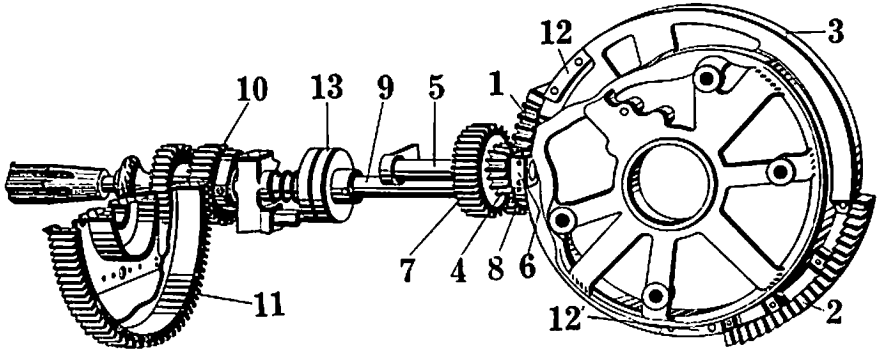

Fig. 46. Side View of the Vise Closing and Mold Turning Cam and the Mold Driving Mechanism in Assembly

2, which are fastened in different positions on the mold turning cam *3*. During the revolution of cam *3*, each segment meshes at the proper time with a bevel pinion *4* mounted on a shaft *5* inside the mold gear arm. A square block *6* and a spur gear *7* are attached to the bevel pinion. The spur gear is always in mesh with the mold driving pinion *8*, which is pinned to the mold driving pinion shaft *9*. On the front end of shaft *9* is mounted the mold disk driving pinion *10*, which meshes with the teeth of the mold disk *11*. When either segment meshes with the bevel pinion *4*, shaft *9* revolves through action of spur gear *7* and pinion *8*, causing the mold disk to turn through its connection with pinion *10*. The short segment turns the mold disk one-quarter of a revolution and the long segment turns the disk three-quarters of a revolution.

When the mold disk completes each rotary movement, it must stop in such a position that the mold disk locking studs *5*, Fig. 44, will be directly in line with the stud block bushings *1* and *2*, Fig. 47, on the vise frame. The square block *6*, Fig. 46, serves this function. The block has two hardened facings fastened on two of its sides. Just in back of each segment on the mold turning cam is mounted a steel shoe *12* and *12'* held in place by screws passing through adjustable screw bushings (detail drawing, Fig. 50). As segments *1* and *2*, Fig. 46, pass out of en-

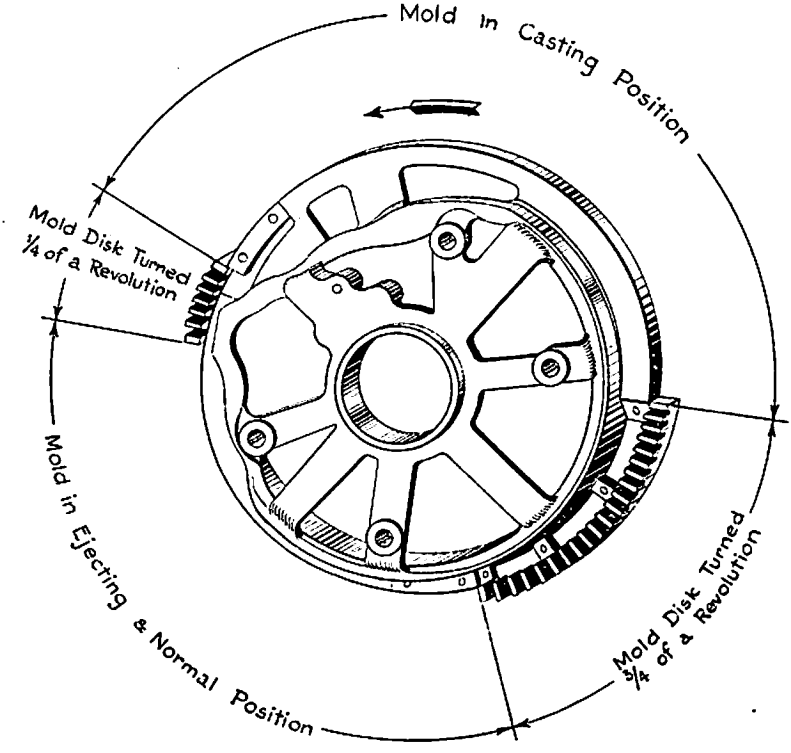

Fig. 46a. The Vise Closing and Mold Turning Cam, showing the parts of the mold turning cam which promote the rotary movements of the mold disk

gagement with bevel pinion *4*, the facings on the square block engage shoes *12* and *12'* snugly. This action stops the mold disk in such a position that its locking studs will enter the stud block bushings freely when the mold disk slide moves the disk forward to the vise frame at casting and ejecting position. Depressions

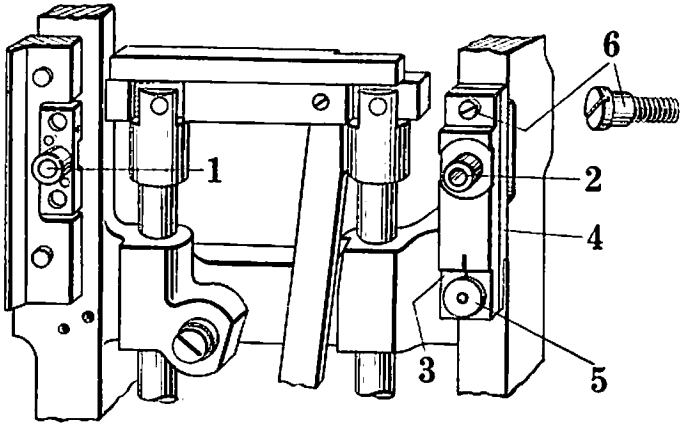

Fig. 47. Showing the mold disk locking stud bushings *1* and *2*, which hold the mold disk in position when it is forward at casting and ejecting position. The right-hand bushing *1* is mounted on a single fixed block. The left-hand or floating stud block consists of two plates *3* and *4* joined at the bottom by a hinge stud *5*. The upper end of plate *3* can move slightly from side to side as permitted by the shoulder on screw *6*.

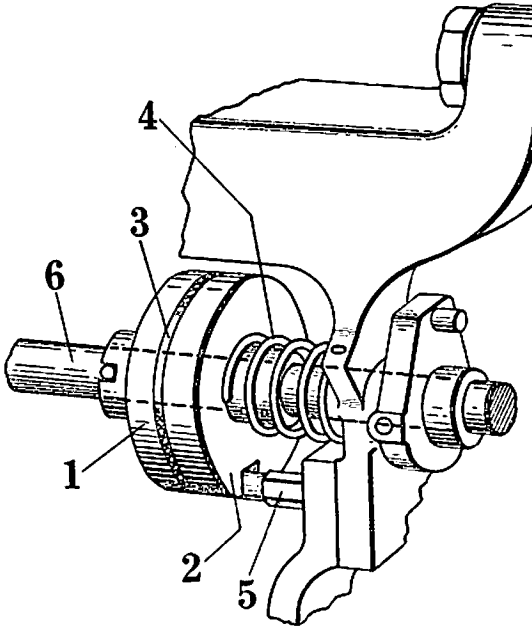

Fig. 48. The Mold Driving Pinion Shaft Friction Disk, which steadies the mold disk as it completes its quarter and three-quarter turns. The device consists of a back disk *1*, a front disk *2* and a circular piece of leather *3*. The back disk *1* is pinned to the mold driving pinion shaft *6*. The front disk *2* is free on shaft *6* and is held in a stationary position by the mold gear arm support screw *5*. Spring *4* constantly urges disk *2* against leather *3* and disk *1*. There are no adjustments to be made on this device.

are provided at certain points on the mold turning cam to permit the square block to turn when the segments are in engagement with the bevel pinion. At the front end of shaft *9* is mounted a friction disk *13*, which consists of two disks, a circular piece of leather and a spring. The purpose of this device is to take up any lost motion between the gears and pinions on the shaft and to steady the mold disk as it completes each rotary movement. The details of the friction disk are shown in Fig. 48.

Adjustments: The Back Knife. The function of the back knife *1*, Fig. 49, is to trim the base of the slug so that the slug will be type high. The knife is clamped to the outer end of the mold disk slide arm *2* by two screws *3*. The knife can be adjusted in relation to the back of the mold by means of two screws *4*. The back knife should be set square with the back of the mold and its trimming edge should bear very lightly against the mold surfaces. A good method to follow in making this adjustment is to use red lead on the back of the mold. Wipe the mold surfaces with a clean cloth, apply a thin coat of red lead to the mold cap

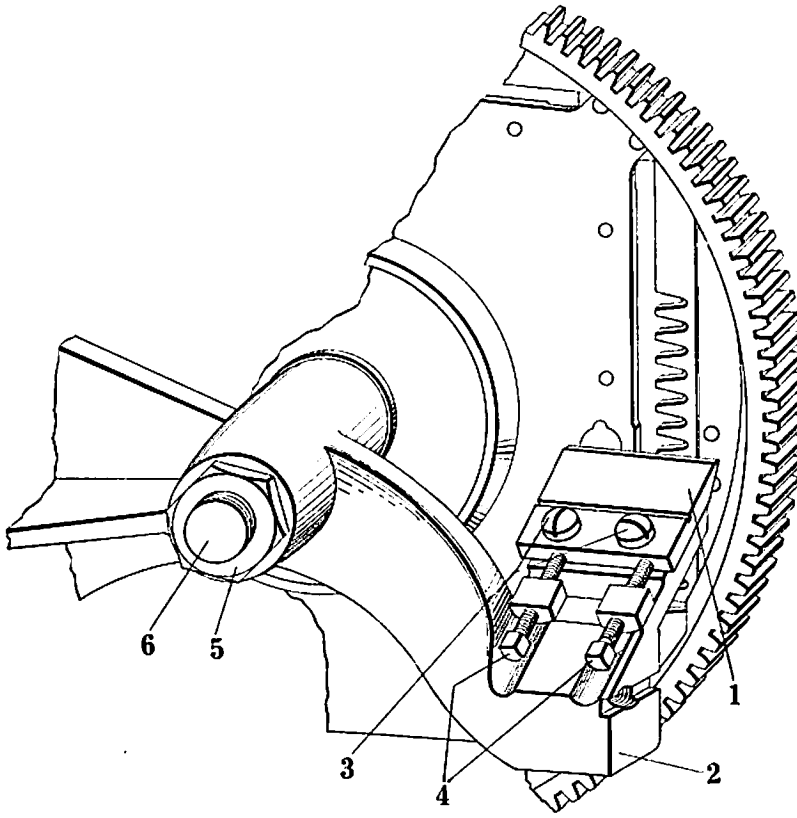

Fig. 49. View of the back knife, which trims the base of the slug so that the slug will be type high. The adjustment of the back knife is described in the text. Nut *5* screwed on the end of stud *6* holds the mold disk in proper relationship to its bearing in the mold disk slide arm *2*. If it is necessary to remove the mold disk from its bearing, unscrew nut *5* from the stud. The stud and nut have left-hand screw threads.

and mold body and turn the disk slowly by hand until the red lead comes into contact with the knife. If the knife is set correctly, it will remove the red lead without binding against the surfaces of the mold.

The Mold Turning Cam Shoes. When the facings on square block *6*, Fig. 46, engage the steel shoes *12* and *12'* on the mold turning cam *3*, there should be about .002" clearance between the parts. The clearance should not exceed this amount. This adjustment, which is the same for both shoes, can be obtained by means of two screw bushings threaded into the rim of the mold turning cam under each shoe. The shoe *12* in back of the short segment *1*, Fig. 46, should be adjusted first. Remove screws *1*, Fig. 50, adjust bushings *2* (detail drawing) and replace the shoe and the binding screws. Turn the machine forward by hand until the shoe engages the facing on the square block. The two parts should fit snugly with a very slight amount of clearance. In making this adjustment, it is important that the two bushings under shoe be turned an equal amount so that the shoe will be parallel with the facing on the square block. After the shoe has been adjusted for clearance, therefore, check its parallelism by measuring with a micrometer the distance from the outside surface of the cam to the inside surface of the shoe at both ends of the shoe as indicated by the curved arrows, Fig. 50. The measurements must be the same at both ends. The same method should be followed in setting the shoe in back of the long segment.

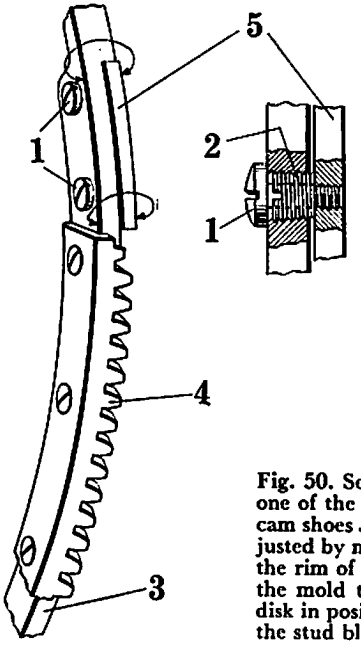

Fig. 50. Section of the rim of the mold turning cam *3*, showing one of the mold turning segments *4* and one of the mold turning cam shoes *5*. The detail drawing shows how the shoe *5* can be adjusted by means of adjustable screw bushings *2* threaded through the rim of the mold turning cam. These shoes engage facings on the mold turning bevel pinion square block and stop the mold disk in position so that the mold disk locking studs will align with the stud block bushings on the vise frame.

The Mold Disk Slide and Related Mechanisms

The forward and backward movements of the mold disk and mold disk slide, as stated previously, are promoted by a cam groove known as the mold cam, which moves the slide and disk through two rolls on the mold cam lever. The mold cam lever *1*, Fig. 51, is pivoted at the top on a hinge pin *2* in the mold cam lever handle *3*. Mounted on an eccentric stud *4* at the bottom of the lever is a cam roll *5*, which runs in the cam groove in the mold cam and driving gear *6*. On the opposite side of the lever is mounted another roll *7*, which fits into a semicircular notch at the rear end of the mold disk slide *8*. As cam *6* revolves, the shape of the cam groove causes roll *5* to move the slide and disk forward and backward through roll *7* on lever *1*. The five main forward and backward move-

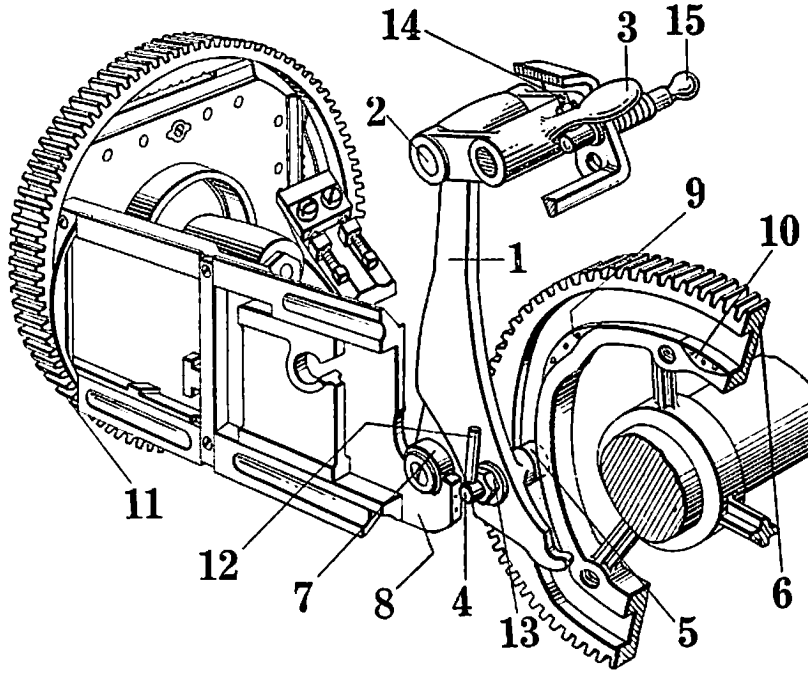

Fig. 51. Perspective View of the Mold Disk Slide and Related Parts in Assembly. The slide *8* can be disconnected from the mold cam lever *1* by withdrawing pin *15* and depressing handle *3*. When pin *15* is released, it will hold handle *3* and lever *1* up high enough so that roll *7* will be out of engagement with the mold disk slide *8*.

ments of the mold disk and mold disk slide are thus controlled by the cam groove. The disk moves forward to within .010″ of the matrix line so that the line can be aligned and justified. The disk then moves forward the additional .010″, locking against the matrix line for the cast. The disk withdraws after the cast with the slug in the mold. After the disk has turned three-quarters of a revolution, it then moves forward to the vise frame to ejecting position. The slug is ejected from the mold and the disk withdraws to normal position. Two hardened steel shoes are fastened on the cam groove at the points where the first two forward movements of the slide and disk occur. Shoe *9* moves the disk forward to within .010″ of the matrix line. Shoe *10*, being .010″ higher than shoe *9*, moves the disk forward the additional .010″ and locks the mold against the matrix line in preparation for the cast.

Mold Cam Roll Eccentric Stud Adjustment. When the mold disk slide makes its first forward movement, the face of the mold should advance to within .010″ of the vise jaws. The distance that the mold disk *11*, Fig. 51, moves forward is controlled by the eccentric stud *4* in the mold cam lever *1*. To check the adjustment of the stud, remove the first-elevator back jaw and the line stop, disconnect the pot pump plunger, close the vise jaws and run the machine ahead until the first elevator seats on the vise cap. Place three strips of newspaper between the vise jaws and the face of the mold. (Three strips of ordinary newspaper measure

approximately .010" in thickness.) Turn the machine forward by hand until roll *5*, Fig. 51, is on the high point of shoe *9*. When the machine is in this position, the paper strips should bind slightly as they are pulled upward. If the paper strips bind too much or do not bind at all, the stud *4* is out of adjustment. The stud can be turned in its bearing by means of a handle *12* after nut *13* is loosened. Pushing the handle towards the front of the machine will draw the mold away from the vise jaws; pulling the handle towards the back of the machine will move the mold closer to the vise jaws. After the adjustment has been obtained, tighten the nut on the stud, being careful that the stud does not move while tightening the nut. In replacing the first-elevator back jaw, make sure that it is flush at both ends with the front jaw.

The mold cam roll eccentric stud adjustment is a basic setting and should be checked periodically to make sure that it is always correct. Proper justification and alignment of matrix lines depend to a great extent upon the condition of this adjustment. Like other basic settings on the machine, *the mold cam roll eccentric stud adjustment should be positive at all times.*

Mold Cam Lever Handle. Threaded through the mold cam lever handle *3*, Fig. 51, is a screw *14*, which banks against stop pin *15*. The purpose of the screw is to take up any lost motion when the mold withdraws with the slug. With the

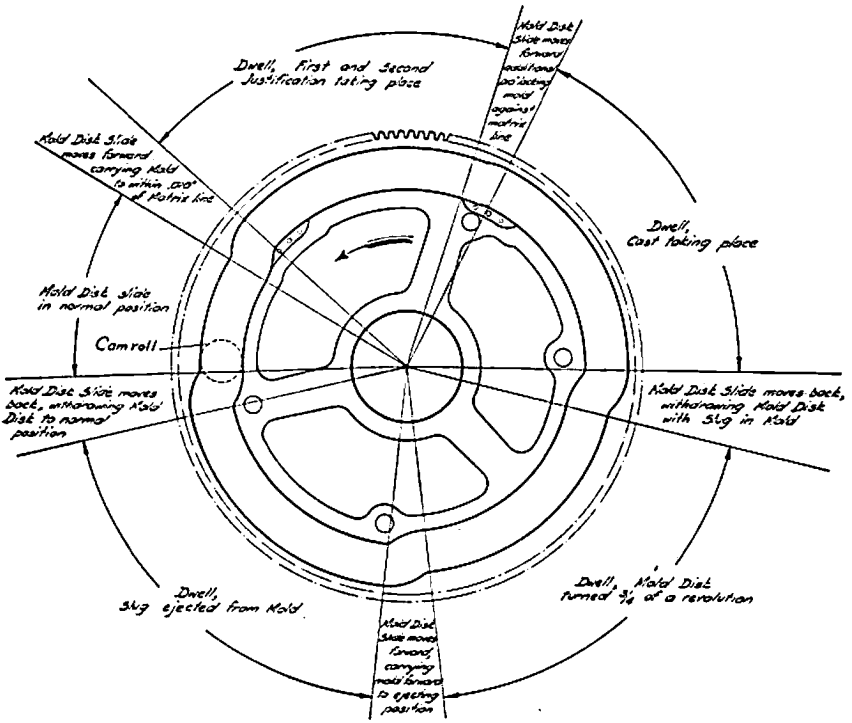

Fig. 51a. The Mold Cam and Driving Gear, showing the surfaces of the mold cam which promote the forward and backward movements of the mold disk and mold disk slide.

machine in normal position, adjust screw *14* until there is about .010" play between the screw and pin *15,* then tighten the nut on the screw.

Mold Disk Guide Support Screw. Mold disk guide support screw *13,* Fig. 45, serves as a bearing for the mold disk guide *7* and it supports the mold disk slide *4* on the left-hand side. The screw should be adjusted in relation to the guide so that when the disk *6* moves forward to the vise frame, the mold disk locking studs will enter the stud block bushings on the vise frame smoothly. To obtain this adjustment, run the machine ahead until the first elevator seats on the vise cap. Pull out stop pin *15,* Fig. 51, and depress the mold cam lever handle *3.* Pull the mold disk forward until the locking studs enter the stud block bushings on the vise frame. Turn screw *13,* Fig. 45, until the circular disk on top of the screw just touches the mold disk guide *7.* Push the disk back and pull it forward a few times to observe whether the locking studs enter the stud block bushings freely. If they do not, adjust screw *13* until the required condition is obtained, then tighten the nut on the screw.

Mold Disk Slide Safety Attachment

The purpose of the mold disk slide safety attachment is to stop the machine automatically when the mold disk is prevented from making its normal forward movement to the vise frame at casting position. There are a number of obstructing conditions which will interfere with the normal operation of the mold disk and the mold disk slide. If a display mold is placed in operation and the first-elevator alignment stop bar is not moved to the proper position, the mold cap will bank against the first-elevator jaw and will prevent the mold disk from moving forward. Similarly, if a matrix or spaceband lodges between the mold disk and the vise frame, the normal forward movement of the mold disk and slide will be obstructed. The mold disk slide safety attachment is designed to stop the machine automatically when any of these abnormal conditions is present. When the obstruction is removed, the machine operates as though the safety device were not present.

First Style Mold Disk Slide Safety Attachment. The first style safety attachment operates the clutch mechanism through mold cam safety lever *7,* Fig. 52, which is pivoted on the mold cam lever *1.* As was described previously, the mold cam lever connects the mold disk slide *2* with the mold cam *3* through two rolls *5* and *6.* Roll *6* is mounted on an eccentric stud in the mold cam lever. Roll *5* is mounted on the mold cam safety lever *7,* which is pivoted on a hinge pin *8* in the mold cam lever *1.* Spring *9* holds safety lever *7* in the proper position with respect to lever *1* and also establishes a positive relationship between rolls *5* and *6.* The purpose of the spring is to permit overmotion if the forward movement of the mold disk is obstructed. In the normal operation of the machine, the mold cam *3* moves the mold disk and mold disk slide forward to casting position when roll *6* is on the high point of shoe *4.* If nothing obstructs the movement of the mold disk and slide, the machine will complete its revolution as though the safety device were not present.

When the mold disk is prevented from making its normal forward movement to the vise frame, however, the mold disk slide is held back a corresponding dis-

tance and becomes immovable. As shoe *4* contacts roll *6*, therefore, the pressure which normally moves the slide and disk forward is transferred to the mold cam safety lever *7*. Roll *5*, banking against the immovable slide *2*, causes safety lever *7* to swing through a small arc until the lower end of the lever banks against the mold disk slide safety stop lever *10*. Spring *9* permits the overmotion necessary for the movement of safety lever *7*. Lever *10* is pivoted on a hinge pin *11* in a fixed bracket *12*. The lower end of the lever bears against screw *13* in the automatic stop forked lever *14*. The forked lever in turn bears against flange *15* on driving shaft *16*. Links *18* and *18'* then draw friction buffers *19* and *19'* away from the inner rim of driving gear pulley *20*, thereby stopping the machine. Whenever the mold disk slide safety attachment operates, it is necessary to back the machine in order that the obstruction to the forward movement of the mold disk can be removed. At the same time, spring *9* will return lever *7* and roll *5* to normal position.

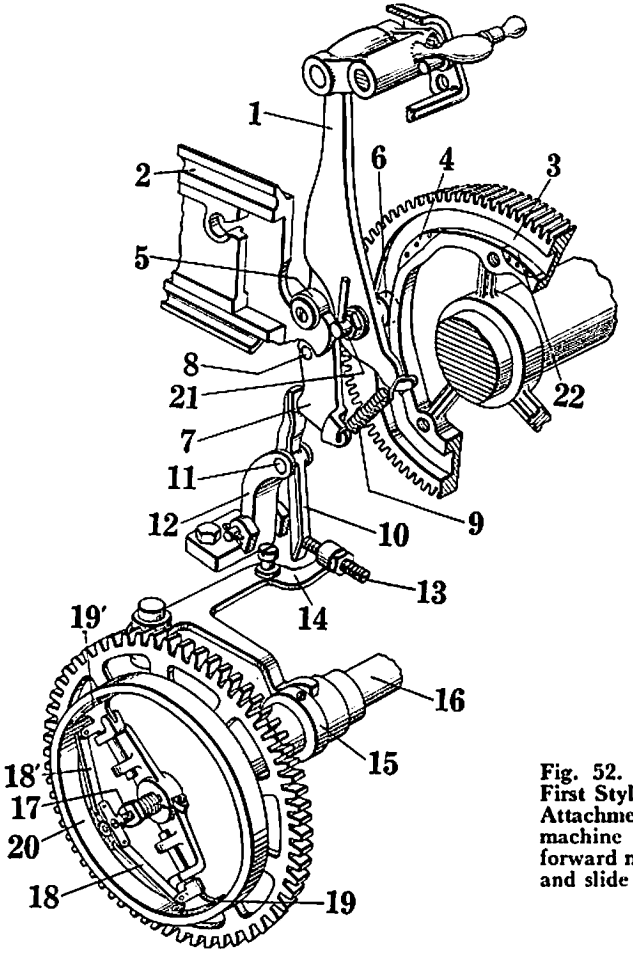

Fig. 52. Perspective View of the First Style Mold Disk Slide Safety Attachment. This device stops the machine automatically when the forward movement of the mold disk and slide is obstructed.

Adjustment of First Style Mold Disk Slide Safety Attachment. Two basic adjustments should be checked before setting the mold disk slide safety attachment. First, see that the mold cam roll eccentric stud *21*, Fig. 52, is adjusted so that when roll *6* is on the high point of shoe *4*, the face of the mold will advance to within .010″ of the vise jaws. Next, see that there is 15/32″ space between flange *15* and the bearing in the cam shaft bracket and that there is 1/32″ space between flange *15* and forked lever *14* when the starting and stopping lever is pulled all the way out. If these basic adjustments are correct, turn the machine forward by hand until roll *6* is on the high point of shoe *22*. With the starting and stopping lever out and the power off, adjust screw *13* until there is 1/32″ space between the end of the screw and lever *10*, then tighten the nut on the screw. A dummy mold should be placed in operating position while this adjustment is being made because the mouthpiece will be locked against the back of the mold. A regular mold would be overheated by the mouthpiece.

To check the setting, turn the machine forward by hand until the first elevator descends to the vise cap and before the mold disk moves forward. Place a 1/16″ obstruction between the mold and the vise jaws. With the power off and the starting and stopping lever out, turn the machine forward by hand. The clutch rod *17* should draw the friction buffers away from the driving pulley when the mold contacts the obstruction. The adjusting screw *13*, should not be adjusted too close to lever *10*. If there is less than 1/32″ clearance between the parts at casting position, the friction buffers *19* and *19′* will be moved away from the driving pulley *20* and the machine will stall.

New Style Mold Disk Slide Safety Attachment. The new style attachment operates the clutch mechanism through the upper stopping lever *1*, Fig. 53. Extending to the right and forming part of the lever casting is a bracket, in the outer end of which is machined a square slot. The mold slide safety stop *2* is placed in the slot and is held in position by a cover *3*. An extension *4* is fastened to stop *2*. Threaded through the extension is an adjusting screw *5*, which banks against plate *6* fastened to the end of the mold disk slide *7*. Spring *8*, fastened to extension *4* at the rear and to a pin at the front, constantly urges stop *2* and extension *4* towards the front of the machine. Screw *5* is thereby held in contact with the banking plate *6* on the mold disk slide *7*. As the slide moves forward and backward, therefore, the safety stop *2* will move a corresponding distance. The safety stop dog *9*, fastened to the delivery and elevator transfer cam *10*, operates the mold disk slide safety device when the mold disk is prevented from making its normal forward movement at casting position.

In the normal operation of the machine, the mold cam roll *11* moves the mold disk slide *7* forward at casting position through the mold cam lever roll *12*. If the slide moves forward all the way, safety stop *2* will move forward far enough to clear dog *9* on cam *10*. If the normal forward movement of the mold disk is obstructed, however, the mold disk slide is held back a corresponding distance. This leaves stop *2* directly in line with dog *9*. As cam *10* turns, dog *9* banks on the top of stop *2* and depresses the stop. Since the stop is mounted in the upper stopping lever casting, the lever *1* is depressed and the machine is stopped in the regular way. When the machine is backed up, the obstructing condition can be corrected and at the same time, stop *2* will assume its proper position. The

mold cam safety lever spring *14* serves the same function on the new style attachment as it did on the old style device. The spring permits the overmotion necessary for the movement of safety lever *13*, which is pivoted in the same way on the mold cam lever.

Adjustment of New Style Mold Slide Safety Attachment. As in the case of the first style safety attachment, the mold cam roll eccentric stud setting and the clutch adjustments should be checked before attempting to adjust the new style attachment. When these settings have been verified, the mold slide safety stop *2*, Fig. 53, can be adjusted by means of screw *5*. Turn the machine forward by hand until the mold cam roll *6*, Fig. 52, is on the high point of shoe *4*. Adjust screw *5*, Fig. 53, so that stop *2* just clears dog *9*, then tighten the nut on the screw. The clearance between the stop and the dog should not exceed 1/64". It

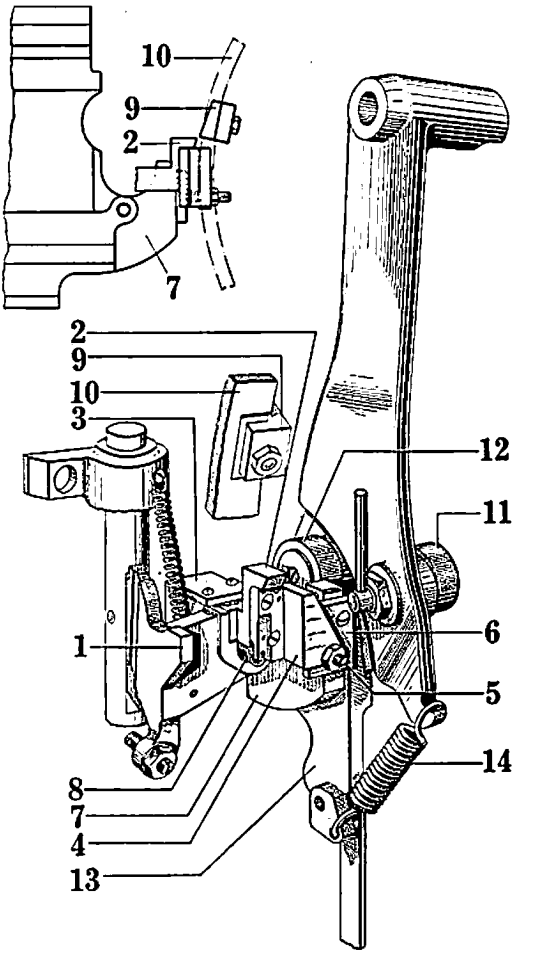

Fig. 53. The New Style Mold Slide Safety Device. This device stops the machine directly through the upper stopping lever. Like the first style device, it functions automatically when the forward movement of the mold disk and slide is obstructed.

is essential that the stop 2 move freely in its bearing at all times. The stop should be cleaned occasionally and lubricated with a light oil which will not gum.

Vise Closing and Justification Mechanism

Up to this point, the line of matrices and spacebands has been positioned between the vise jaws by the first elevator. The mold disk has turned one-quarter of a revolution, bringing the mold in use to a horizontal position in front of the matrix line. The mold disk slide has moved the mold disk forward to within .010″ of the matrix line, the toes of the matrices entering the alignment grooves in the mold body. When the machine has reached this point in its revolution, the justification mechanism begins to justify (spread out) the matrix line in preparation for the cast. The length of the matrix line is usually shorter than the measure being set. The average line sent into the casting mechanism may be from one to three ems shorter than its ultimate length on the slug. This variation or slack in the length of matrix lines is taken up by the spacebands, which spread the lines out tightly between the vise jaws. As explained previously, the spaceband consists of a short sleeve and a long wedge. The short sleeves of the spacebands are held in position in the first-elevator jaw by their lugs so that only the long wedges can move during justification of the line. As the wedges of the spacebands are driven upward, the matrix line is spread out until the space between the vise jaws is filled. Every line of the measure being set is thus justified to the positive and uniform length provided between the vise jaws.

The upward movement of the spacebands which spreads the matrix line out tightly between the vise jaws is caused by the vise justification block *4*, Fig. 54. The block is actuated on each side by a separate lever and cam assembly. The

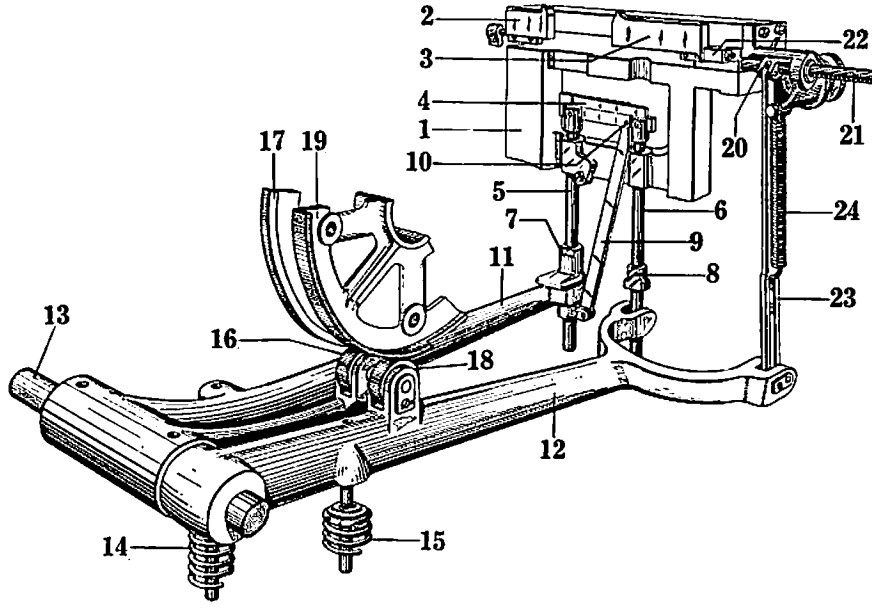

Fig. 54. Perspective View of the Justification and Vise Closing Mechanism in Assembly

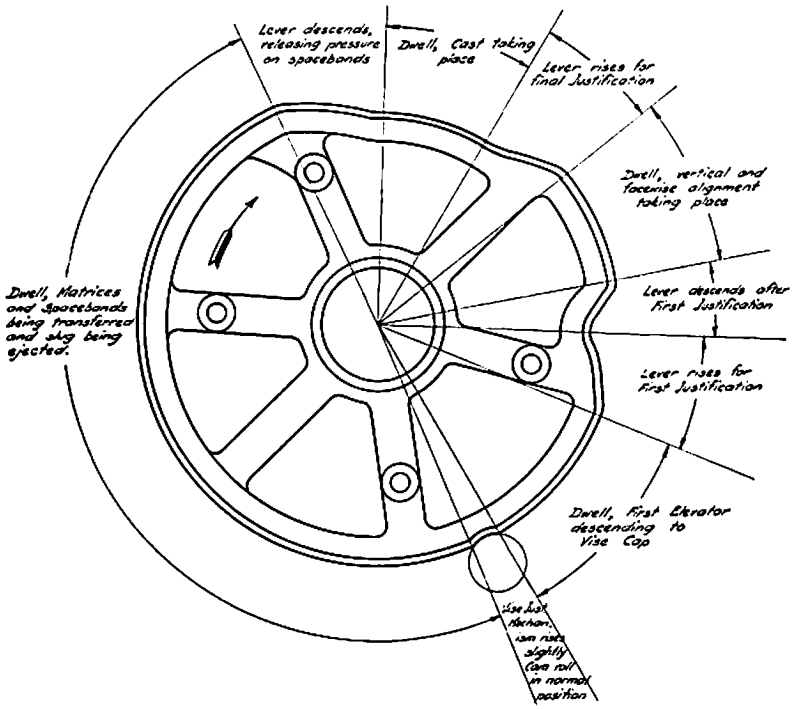

Fig. 54a. The Justification Cam, showing the surfaces of the cam which promote the main movements of the justification lever

justification lever *11*, following the contour of the justification cam *17* through roll *16*, operates the left side of the justification block *4*.* The vise closing lever *12*, following the contour of the vise closing cam *19* through roll *18*, operates the right side of block *4*. Both levers are pivoted on a shaft *13* at the rear of the machine. The cam rolls on the justification and vise closing levers are held in contact with their respective cams through action of two large compression springs. Spring *14* holds cam roll *16* in contact with cam *17* and spring *15* fulfils the same function with respect to cam roll *18* and cam *19*.

The arrangement of the vise justification mechanism provides for an inclined position of the vise justification block *4*, Fig. 54. The block is fastened to a bar which is pivoted at each end on two rods *5* and *6*. These rods move vertically in bearings in the vise frame *1*. Pinned to the lower end of the first vise justification rod *5*, is a collar *7*, which rests on the front end of the justification lever *11*. A collar *8* is pinned also to the lower part of the second vise justification rod *6*. As shown in the illustration, this collar is *not* in contact with the vise closing lever *12* when the machine is in normal position. Consequently, the normal position of the vise justification block *4* is inclined, the left-hand end of the block resting higher than the right-hand end. The vise justification bar brace *9* supports the

*All mechanisms referred to in Fig. 54 are being viewed from the rear of the machine, as shown in the illustration. The only exception is the left and right vise jaws, which are so designated.

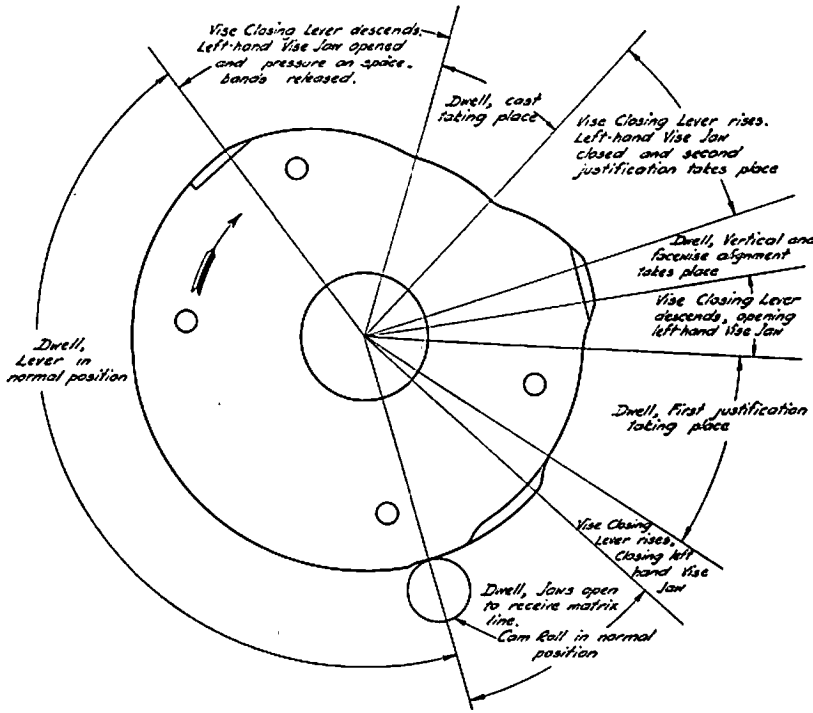

Fig. 54b. The Vise Closing Cam, showing the surfaces of the cam which promote the main movements of the vise closing lever

right-hand side of the justification block *4*. There is a beveled notch in the upper end of brace *9* through which a shoulder screw *10* passes. The screw can move slightly in the notch, providing overmotion on the right side of block *4*. This overmotion is necessary during second justification, when the right-hand end of the block is raised level with the left-hand end. The amount of movement provided for screw *10* is just enough to permit the justification block to assume a horizontal position.

In addition to operating part of the vise justification mechanism, the vise closing lever *12*, Fig. 54, also operates the vise closing attachment. The purpose of the attachment is to close and to open the left-hand vise jaw *3* during justification and after the cast. The vise closing screw *20*, operating in a threaded bearing, moves the left-hand vise jaw towards and away from the matrix line through rack *21* and block *22*. The vise closing screw is connected to a rod *23*, which is attached to the front end of the vise closing lever *12* by a hinge pin. The vise closing spring *24*, attached to the connecting rod *23* and to the vise closing bracket at its upper end, pulls the connecting rod upward as permitted by lever *12*. Whenever the vise closing lever rises, therefore, screw *20* closes the left-hand vise jaw *3* through rack *21* and block *22*. Whenever the vise closing lever descends, screw *20* opens and the left-hand vise jaw is permitted to move away slightly from the matrix line. The right-hand vise jaw *2* has a slight idle movement but occupies a constant position during justification.

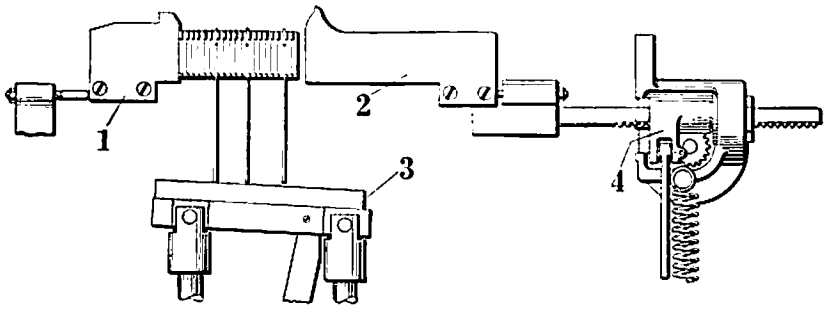

Fig. 55. Showing the vise justification mechanism just before first justification. The line of matrices and spacebands has been positioned between the vise jaws *1* and *2* by the first elevator. The inclined position of the vise justification block *3* is also shown. The vise closing screw *4* is open.

Justification Movements. The justification of the matrix line is accomplished by two upward movements of the vise justification block *4*, Fig. 54. The first upward movement of the block is controlled by the justification lever *11*, which operates the left side of the vise justification mechanism. The justification block *4*, as shown in the illustration, rests normally in an inclined position, with its left-hand end higher than its right-hand end. When the justification lever rises for the first justification stroke, therefore, the justification block, operated only on the left-hand side, is moved upward at an angle corresponding to its original inclined position. The spacebands assume this angle at the end of the first justification stroke. As shown in Fig. 56, the spaceband at the left of the line is driven up further than those at the right. After first justification, the cams depress the justification and vise closing levers, lowering the vise justification block as shown in Fig. 57.

There is a definite reason for justifying the line in the manner just described. As stated previously, the length of the matrix line is usually shorter than the measure being set: the average line sent in to the casting mechanism may be from one to three ems shorter than its ultimate length on the slug. When the first

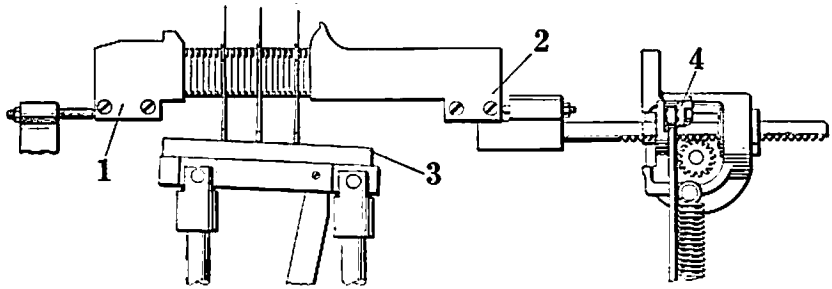

Fig. 56. Showing the matrix line at first justification. The vise closing screw *4* has closed, and the left vise jaw *2* has been moved in to the proper length. The justification block *3* has been raised on an inclined plane by the justification lever. The angular stroke of the block has driven the spacebands upward consecutively, those near the right-hand jaw *1* being driven up higher than those near the left-hand jaw *2*.

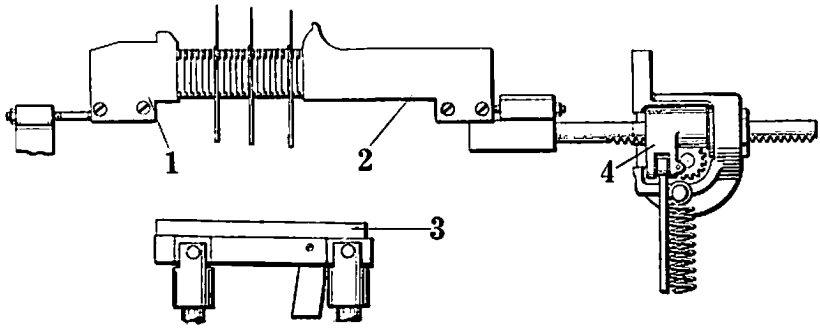

Fig. 57. Showing the vise justification mechanism after first justification. The justification block *3* has lowered, releasing the upward pressure on the spacebands. The vise closing lever has opened the vise closing screw *4*, releasing the sidewise pressure of the left vise jaw *2* from the matrix line. These movements provide freedom in the matrix line for vertical and facewise alignment.

elevator descends and carries the line between the vise jaws, however, the right-hand end of the line is always presented in a positive position with respect to the right-hand vise jaw. If the casting stroke of the delivery slide is set properly, the last matrix on the right of the line will be positioned fairly close to the right-hand vise jaw. This relationship between the jaw *1* and the matrix line is shown in Fig. 55. If the line is shorter than the measure being set, therefore, the slack between the jaws and the line will occur at the left. This slack is represented in Fig. 55 by the space between the left-hand vise jaw *2* and the matrix line. Since the variation in the length of the matrix line always occurs at the left, the first upward stroke of the justification block must help the spacebands to move towards the left-hand vise jaw. The angular stroke of the block at first justification is designed to facilitate this movement. As shown in Fig. 56, the block *3* is tilted toward the left-hand vise jaw *2* at the end of the first justification stroke. The spacebands have been pushed up consecutively from the right vise jaw toward the left vise jaw, thereby moving the matrix line in the required direction.

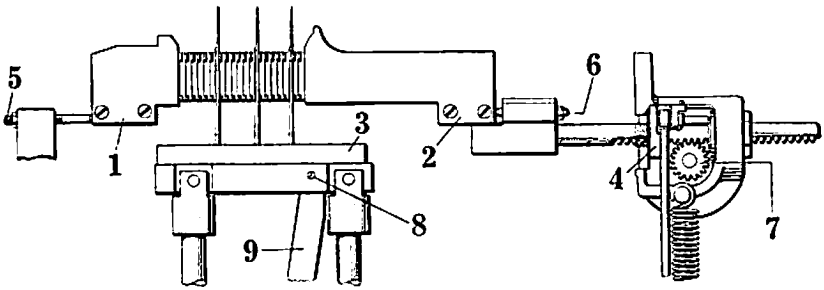

Fig. 58. Showing the matrix line at second justification. The vise closing screw *4* has closed again, and the left vise jaw *2* is moved forward to the exact length of line to be cast. The justification block *3* has been raised on a horizontal plane by the vise closing lever and the justification lever. The horizontal position of the block is determined by screw *8*, which moves in a beveled notch in brace *9*. In rising the second time, the block contacts the spaceband nearest the left-hand jaw *2* first and the rest in succession.