

Feb. 14, 1933.

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1,897,064

MACHINE FOR SHAPING SHOE UPPERS

Filed March 5, 1930

3 Sheets-Sheet 1

Fig. 1.

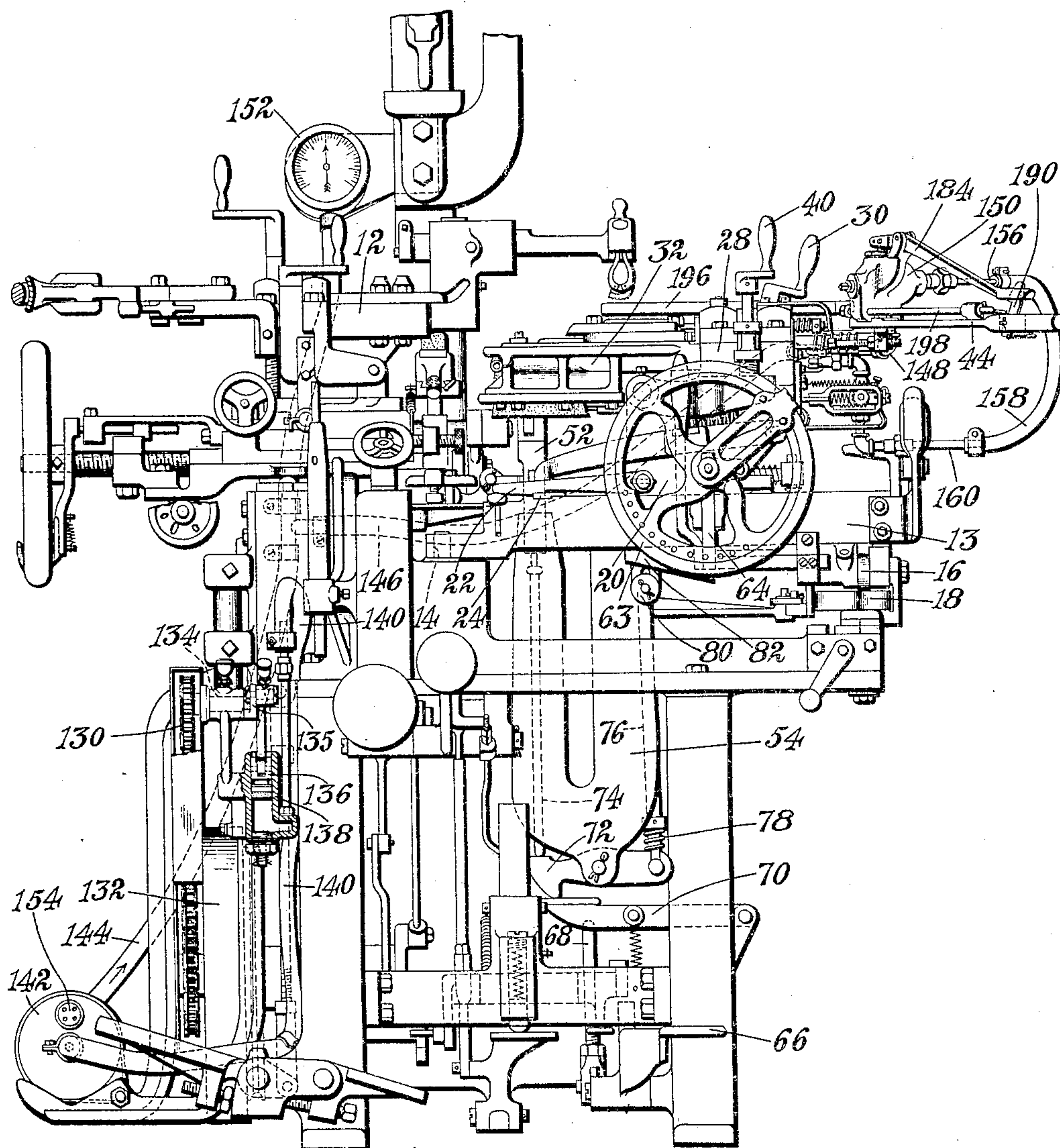
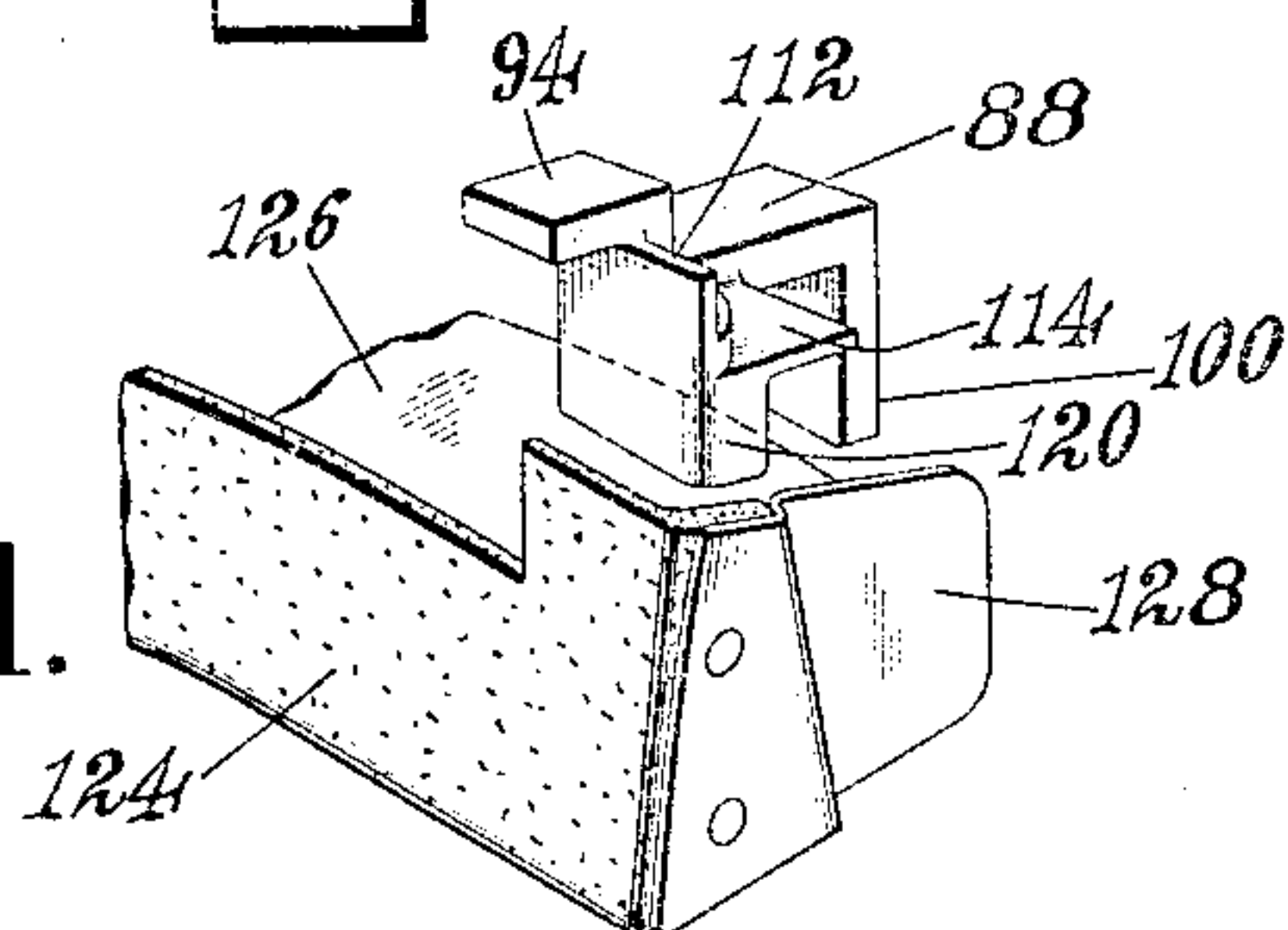


Fig. 11.



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3 Sheets-Sheet 3

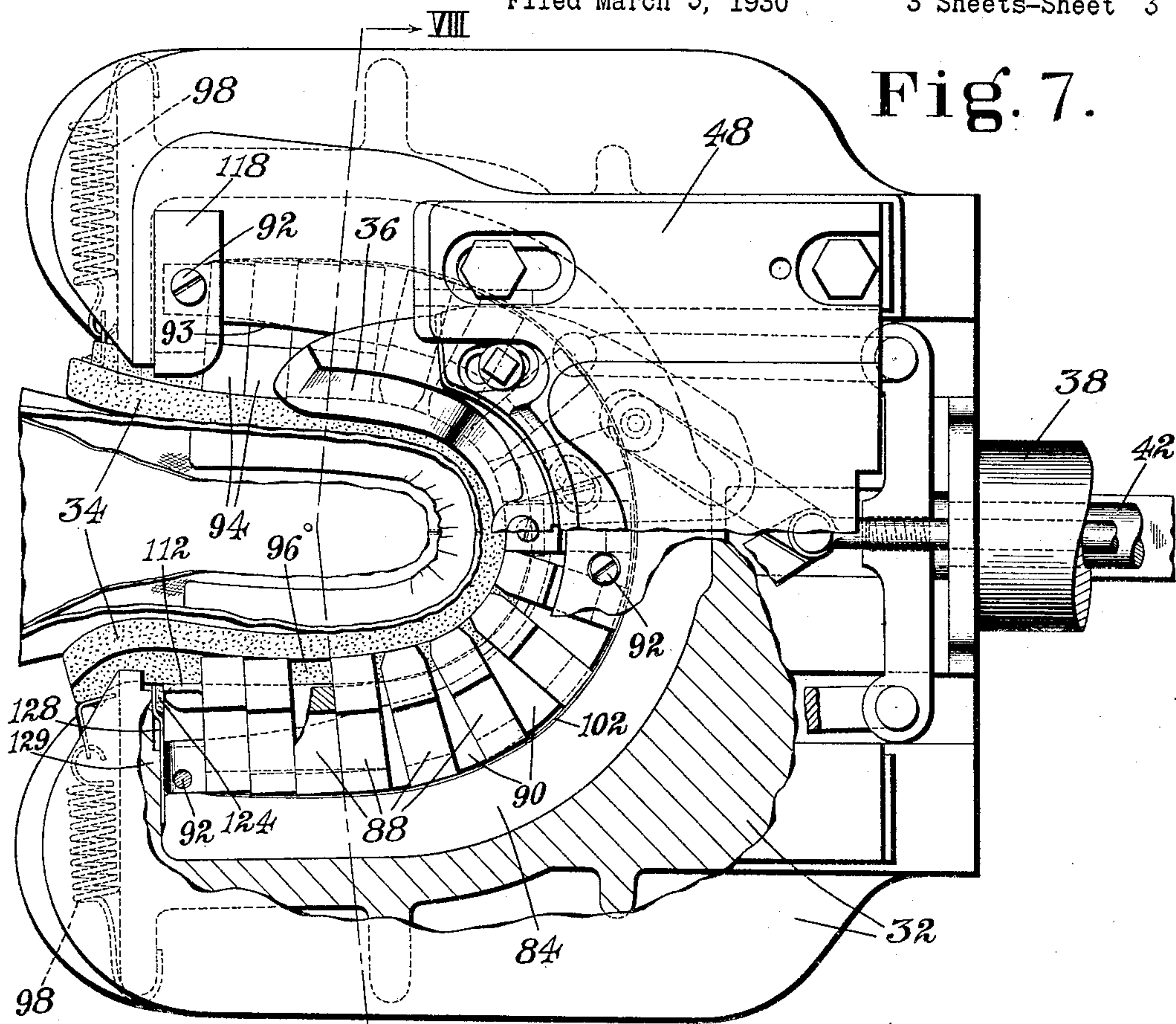


Fig. 7.

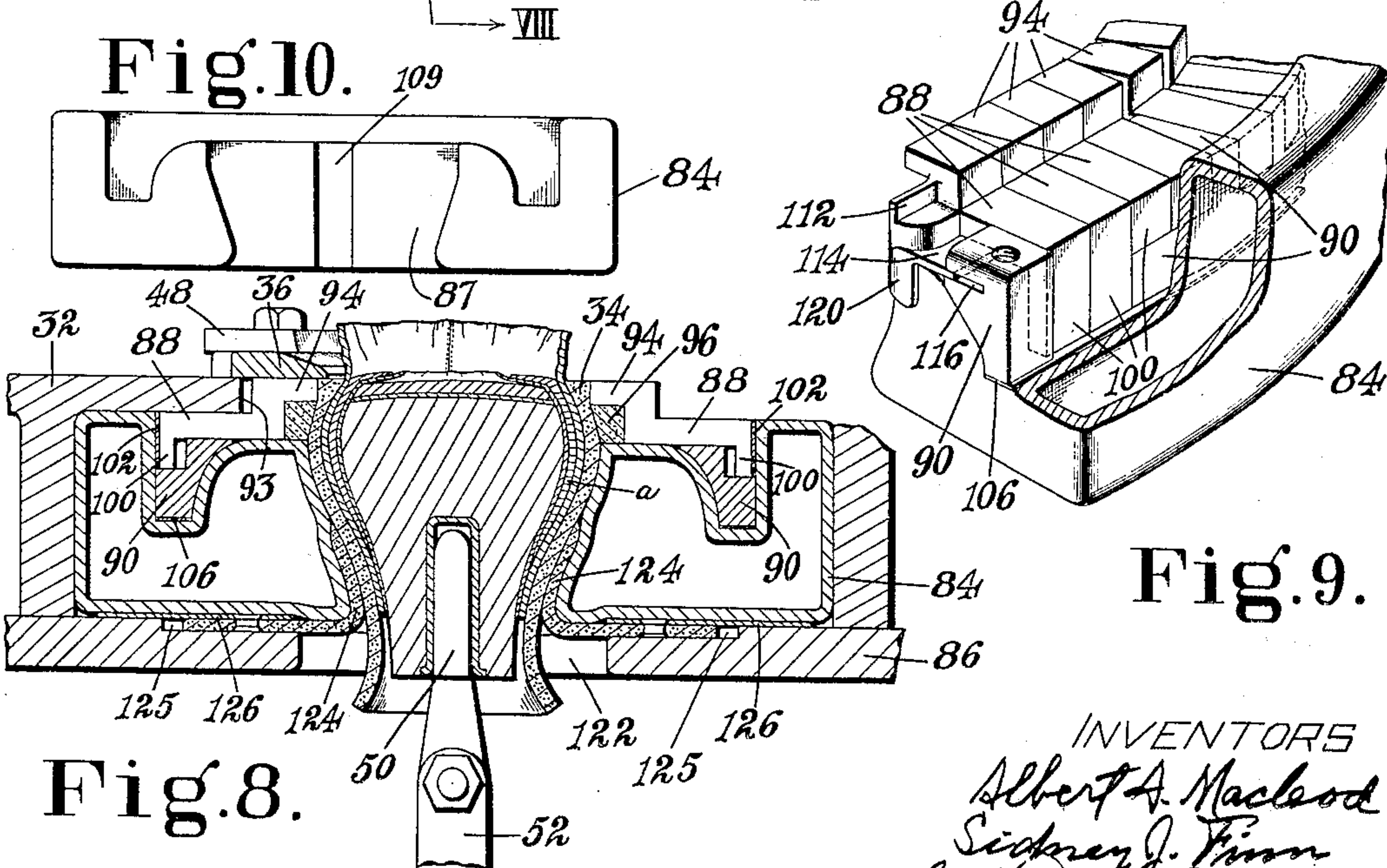


Fig. 10.

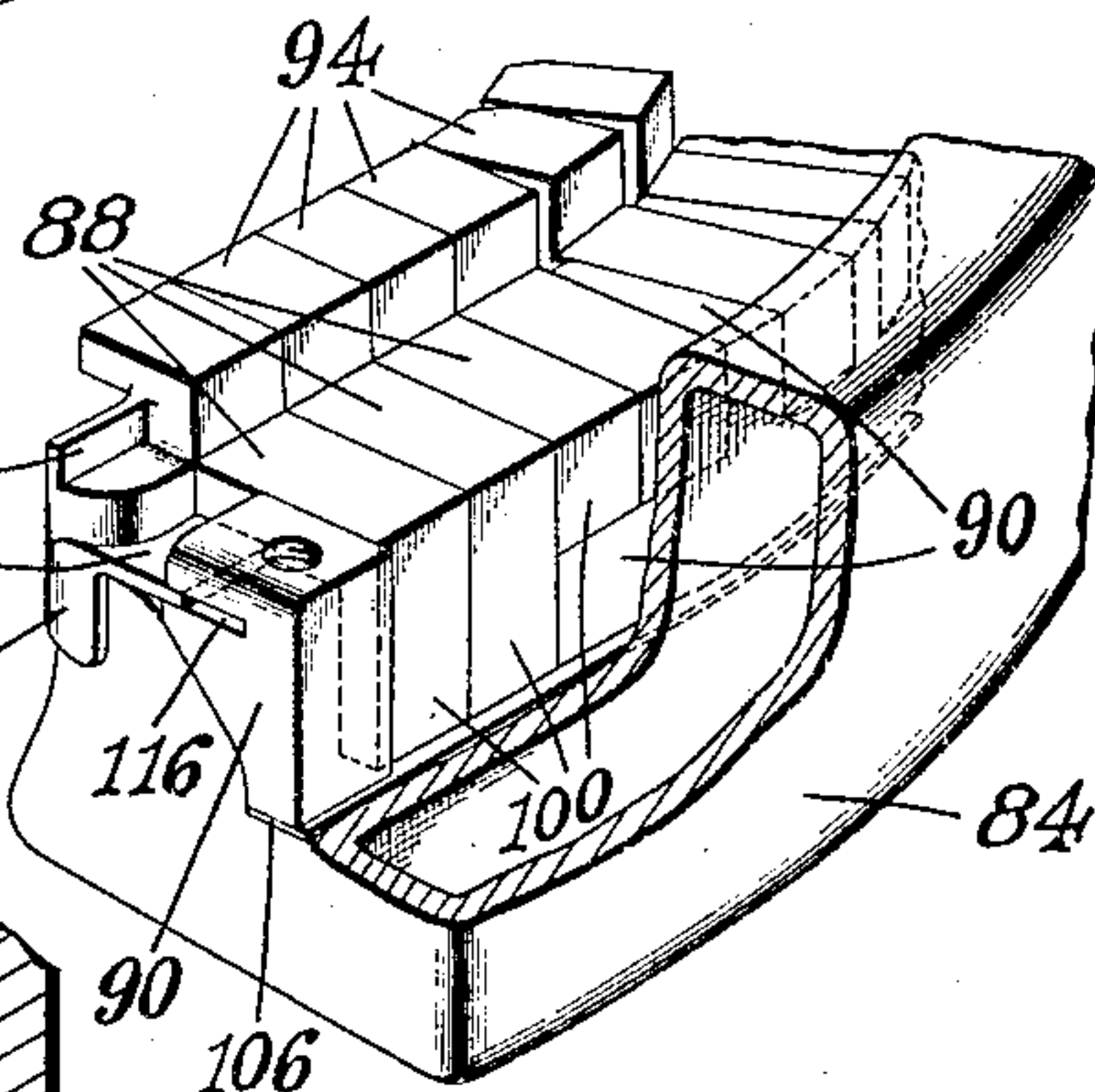


Fig. 9.

Fig. 8.

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MACHINE FOR SHAPING SHOE UPPERS

Application filed March 5, 1930. Serial No. 433,422.

This invention relates to machines for use in the manufacture of shoes, and more particularly, in various important aspects, to machines for shaping shoe uppers over lasts or other forms. The invention is herein illustrated in its application to means for lasting the heel ends of shoes in a lasting machine of the bed type, but it is to be understood that it is not limited to machines of that particular type nor to means for operating on that particular portion of the shoe.

In shaping the heel-end portion of upper materials (hereinafter frequently referred to inclusively as the upper) over a last or other form, it is usually necessary to apply heavy pressure around the end of the upper in order to shape it closely to the contour of the end and side faces of the form and also to hold it effectively in the required shape, especially near the edge of the bottom face of the form, during the shaping or wiping of its marginal portion inwardly over the form. Such pressure is especially necessary in operating on the heel end of the upper because of the presence in most work of a comparatively stiff counter, whether the counter has or has not been previously molded to approximate the shape of the form. For applying the pressure there is commonly used a heel band shaped to embrace the heel end of the upper and molded to conform approximately to the contour of the form, although somewhat flexible to permit it to be closed and opened and also to operate on uppers and forms of different sizes, together with mechanism for closing the heel band about the upper end form and for pressing it against the upper.

It is an object of the present invention to provide improved means for shaping shoe uppers, and more particularly, in one important aspect, to provide better means than heretofore for applying shaping and holding pressure to the heel end portion of upper materials. For the purpose in view the machine herein shown comprises in its organization novel means whereby fluid pressure is utilized for the upper-shaping operation. The invention is illustrated in its application to a type of machine including wipers for

wiping the margin of the heel end of the upper over an insole on a last, a heel band for embracing the heel end of the upper below the wipers, and a shoe support movable to carry the last and its shoe materials toward the heel band and wipers; and in combination with these parts there is provided a flexible fluid container shaped to embrace the heel band and expansible by fluid pressure to press the heel band against the upper. The heel band is preferably made, as heretofore, of comparatively stiff, although somewhat flexible, material, such as sole leather, molded to approximate the contour of the heel end of the last, and as herein illustrated also the fluid container, which may be made of rubber, is molded to present toward the heel band a pressing face having a normal contour heightwise of the last approximating that of the heel band and the last, so that in its expansion no substantial stretching of any portion of it will be necessary to conform it preliminarily to the contour of the heel band before it becomes effective to press the heel band against the upper. By the use of such pressing means insurance is afforded that the pressure will be effectively distributed over the different portions of the upper around the heel end of the last and that the pressure will be adequate in the different locations to conform the upper properly to the contour of the last. While the illustrated embodiment of the invention thus includes a heel band and a separate fluid container for pressing it against the upper, it is to be understood that the invention is not necessarily limited to this particular combination.

In order to render the flexible fluid container effective to apply the required amount of pressure to the upper and also to prevent any damage to the container in its expansion, it is necessary to confine it effectively against excessive expansion in all locations except where its pressure is directed toward the upper. Accordingly the invention further provides novel means for confining the container, the construction shown comprising automatically operative means for properly confining it under all conditions of use regardless of the size of the upper and of

the form over which the upper is shaped. As illustrated, the container is mounted in a receptacle which confines portions of it that are comparatively remote from the last, the receptacle having upper and lower walls which extend inwardly toward the last but terminate at a distance from the heel band and last to afford room for the opening and closing of the heel band and to allow also for the operation of the machine on uppers and lasts of different sizes. To confine portions of the container near the last against excessive expansion in the space between one of these walls and the heel band, there are provided a plurality of members arranged to extend inwardly beyond this wall and movable toward and from the last to maintain effective control of the container in all positions of the heel band. These members, as illustrated, are arranged to operate in substantially contiguous relation to the wiping faces of the heel wipers, and serve the further important purpose of preventing contact of the flexible container with the wipers and any substantial pressure of the container on the wipers. The construction is further such that the movable controlling members are forced inwardly toward the last by the expansion of the container, and thus serve to transmit the pressure of the container to portions of the heel band and upper that are located close to the wipers, where it is especially important that effective pressure be applied, while also confining the container and preventing its contact with the wipers as above described. For preventing excessive expansion of the container in the space between the heel band and the lower wall of the receptacle, and also for preventing excessive expansion lengthwise of the last of the end portions of the container located near the heel band at the opposite sides of the last, there is provided a flexible member which extends around the heel band in overlapping relation to these different portions of the container and as illustrated extends into a position between the container and the heel band, together with members movably mounted in the above-mentioned receptacle for controlling the flexible member while permitting it to be forced inwardly toward the last by the expansion of the container. In the different means thus provided for confining the container, for preventing it from engaging or pressing objectionably on the wipers, and for transmitting its pressure to portions of the upper, various novel features of the invention are to be recognized.

The invention further provides novel means for applying to one or more portions of the upper greater pressure than to other portions. As illustrated, the construction is such as to apply this greater pressure to the upper near the front end of its heel portion

in locations near the edge of the bottom face of the last, where especially heavy pressure is needed in order to spring the ends of the counter inwardly over portions of the last that curve inwardly toward the shank. To apply such pressure, some of the series of members above referred to as movable to transmit the pressure of the flexible container to the heel band are so formed as to present to the container pressure-receiving surfaces of greater area in relation to their pressure-applying surfaces than is the case with other members of the series. In accordance with a further feature also there is provision for applying an especially effective pressure in a location along the back seam of the upper, so as to conform this portion of the upper closely to the contour of the last and to remove irregularities in the surface of the upper resulting from the back seam stitches, the machine including for this purpose a pressure-applying finger extending between the flexible container and the heel band and carried by one of the above-mentioned series of pressing members, the arrangement being such that the finger is pressed inwardly toward the upper both by direct contact of the container therewith and by the pressure of the container on the movable member which supports it. In addition to the greater pressure thus applied, the finger, which is preferably of metal, serves as a reinforcement for the heel band to assist in pressing out the irregularities due to the back seam.

For controlling the admission of pressure fluid to the upper-pressing means and release of the fluid therefrom, the machine herein shown is provided with valve mechanism controlled by a manually movable member which is carried by a hand lever utilized by the operator to operate the heel-lasting wipers, the construction being such that by the same hand the operator may control the wipers and also admit pressure fluid to the expansible container or release it therefrom at will. As illustrated also the construction is such that the valve mechanism is normally maintained in position to release the fluid from the container, so that such release occurs if the operator lets go of the controlling member, a device, however, being provided for securing the controlling member in position to admit the fluid if desired. The machine herein shown is constructed to utilize compressed air as the pressure fluid, although it is to be understood that the invention is not limited to the use of fluid of that character.

In accordance with still another feature of the invention there is provided means for insuring against danger of possible damage to the fluid-pressure means by excessive expansion when no work is in position to receive the pressure, the construction shown comprising work-controlled means for insuring

against the admission of pressure fluid to the fluid container at all times except when a shoe is in pressure-receiving position. More particularly, the means herein shown for the purpose in view comprises a safety valve movable either to permit or to prevent the admission of pressure fluid to the container, together with work-controlled means for maintaining the valve in position to permit the admission of the fluid only when a shoe is in position to receive the pressure and for moving it into position to prevent the admission of the fluid as the work is withdrawn from operating position.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described by reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings:

Fig. 1 is a view in front elevation of a machine in which the invention is embodied, with parts broken away and parts in section;

Fig. 2 is a view in front elevation, on an enlarged scale, of a portion of the machine shown in Fig. 1, a part of the structure being broken away;

Fig. 3 is a view of the upper portion of the structure shown in Fig. 2, partly in elevation and partly in section;

Fig. 4 is a horizontal section on the line IV—IV of Fig. 3, showing a portion of the pressure-applying mechanism;

Fig. 5 is a view in rear elevation, with parts broken away, showing the manually operated valve mechanism for controlling the pressure fluid;

Fig. 6 is a view in front elevation, with parts broken away, showing a portion of the safety valve mechanism;

Fig. 7 is a view, partly in plan and partly in section, showing portions of the pressure-applying mechanism;

Fig. 8 is a section on the line VIII—VIII of Fig. 7;

Fig. 9 is a perspective view of a portion of the pressure-applying mechanism at one side of the shoe, with a part of the structure removed and a part broken away;

Fig. 10 is an end view of the pressure fluid container detached; and

Fig. 11 is a perspective view of a portion of the means for confining the fluid container, with the parts in disassembled relation.

The invention is herein illustrated as applied to a bed-lasting machine of a well-known type, features of the general organization of which are disclosed in various prior United States Letters Patent, including especially Letters Patent No. 1,018,477, granted on February 27, 1912 and No. 1,404,188, granted on January 24, 1922, both upon applications of Matthias Brock. Only

such features, therefore, of the general organization as it is necessary to refer to for an understanding of this invention are herein shown and will be described in detail.

The machine includes means for lasting both the toe and heel ends of each shoe, but since the fluid-pressure mechanism of this invention is herein shown as arranged to operate only on the heel-end portion of the shoe, the toe-lasting means, indicated generally at 12 (Fig. 1), will not be described in detail. The heel-lasting mechanism includes a horizontal yoke 13 mounted to swing about a vertical stud 14 on the frame to adjust the mechanism properly for operation on right and left shoes, the outer end of the yoke being provided with rolls 16, only one of which is shown, supported on a track 18. The yoke is retained in adjusted position by latch mechanism not illustrated in detail. Supported on the yoke 13 for movement in directions lengthwise of the shoe is a heel head carriage 20 which occupies initially a position near the outer end of the yoke and is moved by the operator from that position to an operating position in which it is retained by a latch 22 engaging a plate 24 on the yoke. Pivoted at 26 (Fig. 2) on the carriage 20 is a heel head 28 which supports the lasting instrumentalities and is adjustable about its axis by a hand crank 30. Mounted on the head 28 is a casting 32 which supports a heel band 34 for embracing the upper about the heel end of the last and wipers 36 for wiping the margin of the upper inwardly over the bottom of the last. The casting 32 has a cylindrical extension 38 (Fig. 3) mounted in a bearing in the head 28 to turn about an axis extending lengthwise of the shoe and adjustable about this axis by means of a hand crank 40. The wipers 36, which are slidably mounted on the top of the casting 32, are advanced and closed over the heel-seat portion of the shoe by mechanism including a plunger 42 operated by a hand lever 44 pivoted at its rear end (Fig. 5) on a link 46 on the head 28. Over the wipers is a cover plate 48.

The last and shoe are supported for the lasting operation on a last pin 50 carried by a slide 52 vertically movable in one arm of a U-shaped support 54 (Fig. 1), the other arm of which has a horizontal extension 56 (Fig. 2) slidably movable in a rectilinear path in a guideway in the carriage 20. The extension 56 has rack teeth 58 engaged by a pinion 60 on a shaft 62 mounted in a bearing in the carriage 20, the shaft having fast thereon a hand wheel 63. By means of this hand wheel, after the carriage 20 has been moved to its operating position, the operator imparts to the shoe support movement to carry the shoe lengthwise into position for its heel end to be embraced by the heel band 34 and to force its heel-end face firmly against

the heel band. To hold the shoe support against return movement a latch member 64 (Fig. 1) is provided for engaging teeth (not shown) on the hand wheel 63. Before moving the shoe against the heel band the operator raises it approximately to the height required by means of a treadle 66 which acts through a rod 68 on a pivoted lever 70, this lever acting in turn on a lever 72 pivoted on the lower end of the support 54 and engaging a rod 74 which underlies and lifts the slide 52. As the shoe is moved toward and against the heel band it may be further raised yieldingly through a rod 76 which acts through a spring 78 on the lever 72, the rod 76 having on its upper end a roll 80 arranged to be engaged by a stationary cam 82 as the shoe support receives its movement.

The construction thus far briefly outlined is substantially like what has been used heretofore in machines of the well-known type illustrated, except for small modifications in detail, especially in the shape of some portions of the casting 32, and in view of the disclosure in the Letters Patent above mentioned, no further description of these parts will be required.

The heel band 34 may be made of comparatively stiff leather, such as sole leather, and in general similarity to constructions heretofore in use, it is herein shown as molded to extend around the end and along the sides of the heel-end portion of the shoe and also to conform approximately to the heightwise contour of this portion of the last, although it is sufficiently flexible to permit it both to be closed and opened widthwise of the last and to conform under pressure to variations in the contours of lasts of different sizes. For forcing the heel band firmly against the shoe all around the heel end portion of the shoe to conform the upper materials, including the comparatively stiff counter *a*, to the contour of the last, there is provided by this invention a fluid-pressure device comprising, as illustrated, a rubber fluid container 84 adapted to receive fluid under pressure and to be expanded thereby. The container 84 is mounted within a recess provided for it in the casting 32 and is supported by a cover plate 86 secured on the lower face of the casting, the casting and its cover plate thus serving as a receptacle for confining the greater portion of the container against excessive expansion. The rubber container 84 is molded substantially in U-shape to embrace the heel band 34, and it is also molded to present toward the heel band a pressing face 87 (Fig. 10) having a normal contour heightwise of the shoe generally similar to the molded contour of the heel band. Accordingly, by reason of this construction no substantial stretching or expansion of any portion of the container is necessary to conform it prelimi-

narily to the contour of the heel band, but on the contrary the fluid pressure is immediately effective upon substantially all portions of the heel band that are operated upon by the pressing face 87. This contributes effectively to uniformity of pressure over the corresponding portions of the upper.

In conforming the heel-end portion of upper materials to the contour of the last it is necessary that effective pressure be applied around the end and along the sides of the heel portion of the last in a location near the edge of the shoe bottom and accordingly near the plane of the wiping faces of the wipers 36, in order to spring the counter into place in that location and to hold the upper materials close to the edge of the last bottom during the lasting of the margin of the upper over the insole. To apply such pressure, and at the same time to avoid objectionable interference between the flexible container 84 and the wipers, the construction shown is such that the portion of the heel band which is near the wipers is not engaged directly by the container, but by movable members which transmit the pressure of the container to the heel band, these members having the further important function of confining against excessive expansion heightwise of the last portions of the container near the heel band. These members comprise a plurality of slides 88 arranged in a series around the heel band and supported on a holder 90 which is mounted within that portion of the casting 32 that serves as a receptacle for the container 84 and has a horizontal curvature similar to that of the container, the latter being molded to provide a recess into which this holder projects from above. The holder 90 is secured to the upper wall of the casting 32 by a plurality of screws 92. It will be understood that the holder 90 is formed to provide slideways along which the several slides 88 are movable horizontally in directions toward and from the shoe, portions of the slides being confined by the upper wall of the casting 32. By reference to Fig. 7 it will be seen that the four slides 88 on each side which are farthest from the heel-end face of the shoe are mounted in contiguous relation to one another, while the other slides, which are in locations where the edge of the shoe bottom presents a more pronounced curvature, extend outwardly in somewhat divergent relation to one another, portions of the holder 90 extending upwardly between these divergent slides as far as the upper wall of the casting 32. It will be observed that the inner edge 93 of the upper wall of the casting 32 terminates at a considerable distance from the heel band 34, to allow for opening and closing of the heel band and for the operation of the machine on lasts and uppers of different sizes, and the inner end portion 94 of each of the slides 88 is offset to extend upwardly into the space thus

provided and into substantially contiguous relation to the wiping face of the adjacent wiper 36, this portion of the slide extending inwardly along the face of the wiper into position for engagement with the heel band. Below these offset portions 94 of the slides are recesses in the slides into which projects a strip of leather 96 which is fastened to the heel band 34 and extends around it in overlapping relation to a portion of the container 84, the slides 88 being formed to bear against this strip as well as against the portion of the heel band which is above the strip. In this manner the heel band is supported at all times in operative relation to the other parts, with provision for its convenient removal when it is necessary to substitute one band for another, springs 98 (Fig. 7) being further provided to connect the front ends of the band yieldingly and detachably to the casting 32 and to open the band when conditions permit. Each of the slides 88, furthermore, has an outer end portion 100 formed to receive the pressure of the container 84 and extending downwardly into a recess in the holder 90, so that while there is provision for such movements of the several slides as are necessary to apply the required pressure to shoes of different sizes, these movements are limited to prevent objectionable displacement of the slides when there is no shoe in the machine. Extending around the outer ends 100 of the series of slides 88 is a thin flexible strip 102 of spring metal which transmits the pressure of the container 84 to the slides while guarding against damage to the container from direct contact with the ends of the slides. This strip is secured by a screw 104 (Fig. 3) to that slide 88 which is located directly opposite the middle of the heel-end face of the shoe.

With reference to most of the slides 88, the construction and arrangement are such that the area of the surface of each slide that presses inwardly on the heel band 34 and the strip 96 is substantially equal to the area subjected to the inward pressure of the container 84. By reference to Fig. 9, however, it will be seen that the two slides 88 there shown which are located farthest from the heel end face of the shoe are so formed that their outer end portions 100 extend downwardly farther than those of the other slides at the side of the heel band and accordingly present surfaces of greater area to the action of the container 84 than the ends of the other slides. It will be understood that this construction is the same at the opposite sides of the heel band. The pressure-receiving surfaces of the two end slides at each side are accordingly greater in relation to their pressure-applying surfaces than is the case with other slides located farther rearwardly, although the increase in the area of the pressure-receiving surface of each extreme end slide is partly

compensated for by an increase in the area of its pressure-applying surface, as hereinafter explained. By reason of this construction a greater pressure is applied to the upper portion of the heel band in locations near the wings of the counter to spring these portions of the counter inwardly and conform them as required to the contour of the last which curves somewhat inwardly in those locations. It will be seen that the ends 100 of the two end slides at each side extend downwardly as far as the holder 90 does, and to prevent damage to the container by contact with the lower faces of the ends of these slides, a flexible metal strip 106 is inserted. It will be understood that the end portions of the strip 102 previously mentioned, which is omitted from Fig. 9, are enlarged sufficiently to cover the vertical end faces of the portions 100 of the two end slides 88 at each side.

Another portion of the upper which it is necessary to subject to especially effective pressure in order to shape it properly is that portion adjacent to the back seam. To assist in applying the pressure in this location there is provided a metal strip or finger 108 (Figs. 3 and 4) which is curved similarly to the heightwise contour of the heel end face of the last and may be somewhat resilient, this finger being positioned between the heel band 34 and the rubber container 84 in a recess 109 (Fig. 10) formed in the container. The finger 108 is secured by a screw 110 to the same slide 88 in which the previously mentioned screw 104 is located, and the outer end portion of this slide is extended downwardly in the same manner as the outer ends of the two slides at each side that are located farthest from the end face of the shoe. Accordingly the finger 108 is not only subjected directly to the pressure of the container 84, but is also forced inwardly in addition by the considerable pressure applied by the container to that slide 88 which carries the finger. Furthermore, the metal finger serves as a reinforcement of the flexible heel band and thereby assists materially in removing surface irregularities in the portions of the upper where the back seam stitches are located.

From the foregoing description it will be seen that the slides 88 constructed and arranged as described provide means for transmitting the pressure of the container 84 effectively to the portions of the heel band 34 that are located near the edge of the shoe bottom, whatever may be the size or shape of the last, while at the same time avoiding any objectionable interference between the flexible container and the wipers and serving also as effective means to confine the upper portion of the container in locations near the heel band and the shoe. Although the container, as will be evident by reference to Fig. 8, exerts some upward pressure on the slides

88, these slides are effectively held against such pressure by the upper wall of the casting 32 so that they do not bear with undue pressure on the wipers 36.

5 The endmost slide 88 at each side of the pressure-applying mechanism is provided with an extension 112 (Figs. 9 and 11) to press on the strip 96 of the heel band in a location farther from the heel-end face of the shoe than the main portion of the slide, as may be desirable in operating on some sizes or styles of shoes. Below the extension 112 the slide carries a thin plate 114 arranged to enter a slot 116 in the manner 90 to confine the container 84 in this location against objectionable upward expansion. Secured on the casting 32 by one of the screws 92 adjacent to each of the end slides 88 is a plate 118 (Fig. 7) arranged to bear on the upper edge of the extension 112 and also to overlap a portion of the inner end of the slide to assist in holding the slide from being cramped by the upward pressure of the container beneath it. Below the extension 112 each end slide also has a downwardly projecting portion 120 formed to extend around the adjacent corner of the container 84 to assist in confining the container in that location.

30 With reference to Fig. 8 it will be seen that the plate 86 on the lower face of the casting 32, which serves as the lower wall of the receptacle in which the container 84 is mounted, terminates at 122 at a considerable distance from the heel band and the shoe, similarly to the upper wall of the receptacle. In order to confine the flexible container 84 against excessive downward expansion in the recess between this lower wall and the heel band, there is provided a flexible strip 124 which may be conveniently made of leather somewhat more flexible than the heel band 34 and is molded to provide a portion extending upwardly between the container and the heel band around the end and along the sides of the heel band and also to provide a portion extending horizontally outward into a recess 125 in the plate 86. At the extreme rear end of the shoe this strip is cut away to clear the metal finger 108, as indicated in Fig. 3. The outwardly extending portion of the strip 124 is secured to thin metal plates 126 which lie on the plate 86 between this plate and the container 84 and are slidable inwardly and outwardly on the plate 86. Any suitable number of plates 126 may be used for the purpose in view, including a plate at each side, as illustrated in Fig. 8, and a plurality of other plates located opposite the more sharply curved portions of the heel band. Portions of the several plates 126 may, if desired, be arranged in overlapping relation. The strip 124 is preferably not fastened either to the heel band or to the container 84, in order to facilitate the conformity of the pressure

mechanism to each last irrespective of the size or shape of the last. It will be understood that when the pressure fluid is admitted to the container 84, the latter acts through the strip 124 to force the lower portion of the heel band inwardly, and at this time the strip 124 and the plates 126 may be forced inwardly also to some extent by the expansion of the container with more or less relative slipping movement between the strip and the heel band. As the pressure increases the strip 124 is gripped firmly between the container and the heel band, and the strip and the plates 126 also are pressed hard against the plate 86, so that the portion of the container which is over the space between the heel band and the edge 122 of the plate 86 is held effectively against undue expansion. As illustrated in Figs. 7 and 11, the upwardly extending portion of the strip 124 is curved at each end to extend around the corner of the container 84 and it preferably projects far enough upwardly to overlap a portion of the projection 120 previously referred to, each end of the strip being also secured to a thin vertical plate 128 which extends inwardly between the end of the container and the end wall 129 of the casting 32. It will be understood that the action of the plates 128 is similar to that of the plates 126, and that by means of these plates and the portions of the strip 124 that are secured to them insurance is afforded against undue expansion in a horizontal direction of portions of the container located between the heel band and the upwardly extending walls 129 of the casting 32.

While the invention is not limited in respect to the kind of fluid used for expanding the container 84, the machine herein shown is constructed to utilize compressed air for this purpose. Driven by a chain 130 (Fig. 1) from a continuously running pulley 132 with which machines of the type illustrated are provided, is a shaft 134 having a crank arm 135 connected to a plunger 136 of an air pump 138, and from this pump air is conducted through a conduit 140 to a reservoir 142. Leading from this reservoir is a conduit 144, connecting with which is a branch conduit 146 which leads to an inlet pipe 148 at the lower end of a valve casing 150 mounted on the wiper-operating hand lever 44 near the point where this lever is pivoted. The conduit 146 is flexible to allow for the movements of the yoke 13 and the carriage 20 and also for the movements of the hand lever in operating the wipers. Connected to the conduit 144 is a pressure gage 152, and on the reservoir 142 is a safety valve 154. Leading from the valve casing 150 is a pipe 156 connected by a flexible conduit 158 with a pipe 160 which leads to a work-controlled safety valve 162 (Fig. 6) more particularly hereinafter described, and leading from the valve 162 to the container 84 is a pipe 164 which extends

through a recess provided in the cylindrical portion 38 of the casting 32 and also through a slot 166 (Fig. 3) in this casting. Against the inner and outer faces of the rubber container 84 around the inner end of the pipe 164 are secured metal disks 168 to prevent expansion of the container into the slot 166.

The pipe 148 is in communication with an opening 170 (Fig. 5) in the valve casing 150, and for controlling the admission of the compressed air to the container 84 a ball valve 172 is arranged to cooperate with a valve seat 174 at the upper end of the opening 170. For controlling the release of air from the container there is provided a ball valve 176 arranged to cooperate with a valve seat at the entrance to an opening 178 in a nipple 179 in the casing 150, this opening communicating with the atmosphere. The two ball valves 174 and 176 are pivotally connected to opposite ends of a lever 180 within the casing 150, and extending upwardly from the valve 176 through the opening 178 is a rod 182 which is pivotally connected at its upper end to the rear end of a lever 184 pivoted on an extension of the casing 150. The lever 184 extends forwardly along the wiper-operating lever 44 and is provided with a handle 186 arranged to be engaged by the operator with the same hand with which he manipulates the lever 44, so that while controlling the wipers the operator may at any time admit compressed air to the container or release it therefrom. A spring 188 is arranged to exert a downward pull on the rear end of the lever 184, so that normally the valve 172 is in closed position and the valve 176 in open position. When the operator depresses the handle 186, the positions of these valves are reversed, so that the exhaust outlet 178 is closed and compressed air is admitted to the container 84 through the pipe 156. To enable the operator to release the handle 186 without releasing the compressed air from the container, so that the operator may be free to use his hand for other purposes in the lasting operation while the pressure on the heel band is maintained, there is provided a latch 190 which is pivoted on the hand lever 44 and extends upwardly through a slot in the handle 186, this latch being controlled by a spring 192 which acts to swing it into latching position when the handle 186 has been depressed far enough. This latch is in such a position that it may be conveniently manipulated by the operator's fingers to release the handle 186 when desired. To enable the operator conveniently to release the compressed air from the container without the necessity of reaching for the handle 186, as may be convenient at times when he is not manipulating the lever 44, there is pivotally mounted at 194 on the head 28 a lever 196 which is arranged to engage one end of a rod 198 slidingly mounted in the casing

150 and in a lug 200 on the lever 44, this rod being shaped at its end to engage the latch 190 and move it into position to release the handle 186 when the lever 196 is moved in the proper direction. A spring 202 on the rod 198 assists in maintaining the rod normally in its idle position.

In order to guard against possible damage to the air container 84 by admission of compressed air thereto when no shoe is in position to receive the pressure, the previously mentioned valve 162 is so constructed and controlled as to close communication between the container and the manually controlled valve 172 and also to maintain the container in communication with the atmosphere at all times except when a last and shoe have been carried by the shoe support into engagement with the heel band 34. The valve 162 is rotatably mounted in a coupling member 204 (Fig. 6) which is provided with ports 206 and 208 in alinement with each other and communicating respectively with the air conduits 160 and 164. The valve 162 has a passage 210 extending through it and arranged to aline with the ports 206 and 208 when the parts are in the positions indicated in the drawings, at which time the shoe is in position to receive the pressure. At right angles to the passage 210 in the valve is another short passage 212, in communication with the passage 210 and arranged to aline with the port 208 when the valve is turned 90° in a clockwise direction from the position indicated in Fig. 6, at which time one end of the passage 210 in the valve will communicate with a port 214 in the member 204, this port leading to the atmosphere. It will, accordingly, be seen that when the valve is in this position the port 206 leading to the manually controlled valve 172 is closed and the air container 84 is open to the atmosphere, this being the condition when no shoe is in position to receive the pressure.

For controlling the valve 162 there is provided a horizontally movable yoke member 216 comprising two substantially rectangular portions spaced from each other at opposite sides of the coupling member 204 and supported upon an extension 218 of the valve 162, this member being further guided in its movements by a bar 220 which is fast on a plate 222 secured to the head 28 and has an end portion extending upwardly between the two opposite side portions of the yoke member. The yoke member 216 carries a rack bar 224 the teeth of which are in engagement with teeth 226 formed on the valve extension 218. It will thus be seen that as the member 216 is moved horizontally in one direction or the other it turns the valve to one or the other of the positions above mentioned. Springs 228 connected to the yoke member 216 and to the plate 222 tend to move the yoke member toward the left and thus to

maintain the valve 162 in the position in which the port 206 is closed and the air container is open to the atmosphere. For moving the yoke member in the opposite direction to position the valve as indicated in Fig. 6, a bar 230 extends from the yoke member through an opening in the plate 222 and through a bearing in the plate 86, this bar having at its inner end a forked member 232 (Figs. 2 and 3) which is arranged to extend through an opening provided in the heel band 34 and in the strip 124 into position to be engaged by the shoe or last as the shoe support is moved to carry the shoe into the heel band. It will thus be seen that the yoke member 216 is moved toward the right by the pressure of the work on the member 232 as the work is moved into operating position, and that it is moved toward the left by the springs 228 when the work is withdrawn from that position. By this means insurance is afforded that, regardless of any manipulation, accidental or otherwise, of the valve controlling lever 184, no compressed air will be admitted to the air container unless a shoe is in position to receive the pressure.

In the operation of the machine, briefly summarized, the operator mounts a last with its shoe materials on the heel pin 50 of the shoe support, moves the heel carriage 20 toward the shoe into position to be held by the latch 22 in engagement with the plate 24, raises the last and shoe approximately to the height required by depression of the treadle 66, and by means of the hand wheel 63 moves the shoe support 54 to carry the shoe toward the heel band 34 and to force its heel end face against the heel band. As the shoe is thus moved toward the heel band its heel-end face engages the member 232 on the end of the bar 230 and by movement of this bar and the yoke member 216 turns the valve 162 into the position illustrated in the drawings, thereby closing the communication between the air container 84 and the atmosphere through the port 214 and opening communication between the container and the pipe 160 leading to the valve casing 150 and the manually controlled valve 172. The air container 84 is, however, still maintained in communication with the atmosphere since the valve 176 in the valve casing 150 is held in open position by the action of the spring 188 on the lever 184.

Thereafter, in the lasting of the heel end of the shoe, the operator depresses the handle 186 of the lever 184 and thereby admits compressed air to the air container 84 through the valve 172 from the compressed air reservoir 142, the valve 176 being moved to its closed position simultaneously with the opening of the valve 172. As the air container is expanded by the compressed air it forces the heel band 34 inwardly all around the heel-

end portion of the shoe, acting on the upper portions of the heel band through the series of slides 88 which prevent contact of the air container with the wipers 36 and also confine portions of the container near the heel band against upward expansion. At the extreme rear end of the shoe along the back seam the pressure is applied through the metal finger 108 which is pressed against the heel band by the expansion of the air container. As the heel band is forced inwardly against the shoe, the flexible strip 124 which extends around a portion of the air container to hold it against excessive downward expansion, is forced inwardly with the heel band and is gripped between the container and the heel band and also between the container and the plate 86 to hold it effectively in operative position. After admitting compressed air to the air container the operator moves the wipers 36 to wipe the margin of the upper inwardly over the insole by moving the hand lever 44 with the same hand by which he controls the lever 184, and if desired, he may fasten the lever 184 in position to maintain the pressure of the air container on the heel band by means of the latch 190. He may also at any time release the compressed air from the container if he finds it desirable to do so in order to enable him better to manipulate or adjust portions of the upper materials. If he should desire thus to release the pressure at a time when he is not engaged in manipulating the lever 44, he may do so without the necessity of reaching for the lever 184 by movement of the lever 196 which extends into a position comparatively close to the shoe.

After the lasting of the heel end of the shoe has been completed, the operator releases the compressed air from the air container by permitting the lever 184 to be returned to its normal position by the spring 188, and thereafter the parts of the machine are returned to their starting positions. As the shoe is withdrawn from its position within the heel band, the springs 228 return the yoke member 216 to its normal idle position, and by this movement of the yoke member the valve 162 is turned to a position in which it closes the port 206 leading to the valve 172 and opens communication between the pipe 164 and the atmosphere through the port 214. If, therefore, the lever 184 should at any time be depressed, accidentally or otherwise, with no shoe in position to receive the pressure, the compressed air would nevertheless not be admitted to the air container by reason of the closing of the port 206 by the valve 162. This insures against danger of possible damage to the air container through excessive expansion.

While the invention is herein illustrated as embodied in a machine for shaping uppers over lasts, it is to be understood that

it is not limited to machines in which a last is used as the inner shaping form, and the term "form" is accordingly used in many of the claims in a generic sense to designate the member over which the upper is shaped, whether it be a last or a form of a different character.

Having described the invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the class described, a support for an upper-shaping form, and fluid-pressure means constructed and arranged to extend around an unlasted end of an upper on the form and to press the upper against the form over a substantial area extending from the bottom edge of the form heightwise of the upper, said support and fluid-pressure means being relatively movable lengthwise of the form to position the form and said means in operative relation to each other.

2. In a machine of the class described, a support for an upper-shaping form, and fluid-pressure means constructed and arranged to extend around an unlasted end of an upper on the form and to press the upper against the end and side faces of the form over a substantial area heightwise of the form, said support and fluid-pressure means being mounted for relative rectilinear movement lengthwise of the upper to position the form and said means in operative relation to each other.

3. In a machine of the class described, a support for an upper-shaping form, and a flexible fluid container arranged to extend around an end of an upper on the form for pressing the upper into conformity to the end and side faces of the form over a substantial area extending from the bottom edge of the form heightwise of the upper, said support and container being relatively movable to position the form and said container in operative relation to each other.

4. In a machine of the class described, a support for an upper-shaping form, and a flexible container constructed and arranged to extend around the heel end of an upper on the form and expansible by fluid pressure to press the upper into conformity to the contour of the form substantially throughout the height of the counter portion of the upper, said support and container being relatively movable to position the form and said container in operative relation to each other.

5. In a machine of the class described, fluid-pressure means constructed and arranged to extend around the heel end of an upper on a form and to press the upper into conformity to the contour of the form, a form carrier movable to carry the form into position to receive the pressure of said means, and means for laying the margin of the upper inwardly over the bottom of the form

while the upper is thus held under pressure.

6. In a machine of the class described, a flexible fluid container arranged to extend around the heel end of an upper on a form for pressing the upper into conformity to the contour of the form, a form carrier movable in a direction lengthwise of the upper to carry the form toward said container into position to receive the pressure, and wipers for wiping the margin of the upper inwardly over the bottom of the form while the upper is thus held under pressure.

7. In a machine of the class described, a flexible container constructed and arranged to extend around the heel end of an upper on a last and expansible by fluid pressure to press the upper into conformity to the contour of the last, a last support movable to carry a last and upper into position to receive the pressure of said container, means for admitting pressure fluid to the container, and means for laying the margin of the upper into lasted position while the upper is thus held under pressure.

8. In a machine of the class described, a heel band for embracing the heel end of an upper on a form, a flexible fluid container adjacent to said heel band for pressing the heel band against the upper, and a form carrier movable to carry a form with an upper thereon into position to receive the pressure of said heel band.

9. In a machine of the class described, a heel band for embracing an upper around the heel end of a last, a flexible container constructed and arranged to embrace said heel band and expansible by fluid pressure to press the heel band against the upper, and a last support movable to carry a last and upper lengthwise into position to be embraced by said heel band.

10. In a machine of the class described, a flexible member arranged to engage an unlasted portion of an upper on a form for pressing the upper into conformity to the contour of the form, and a flexible container separate from said member and expansible by fluid pressure to press the member against the upper.

11. In a machine of the class described, a heel band for embracing the unlasted heel end of an upper on a form, and fluid-pressure means separate from the heel band for pressing said heel band against the upper to shape the upper to the form.

12. In a machine of the class described, a heel band for embracing the unlasted heel end of an upper on a form, and a flexible fluid container constructed and arranged to embrace said heel band and to press the heel band against the upper to shape the upper to the form.

13. In a machine of the class described, a leather heel band arranged to embrace the heel end of an upper on a form and molded

in substantial conformity to the contour of the form, and a device adjacent to said heel band expansible by fluid pressure to press the heel band against the upper.

5 14. In a machine of the class described, a flexible container constructed and arranged to extend around the unlasted heel end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, the upper-pressing face of said container having a normal curved contour heightwise of the form corresponding approximately to the contour of that portion of the form against which the upper is pressed.

15 15. In a machine of the class described, a flexible member arranged to engage an upper on a form for pressing the upper into conformity to the contour of the form, said member having a normal contour corresponding approximately to the contour of that portion of the form against which the upper is pressed, and a flexible container expansible by fluid pressure to press said member against the upper, the pressing face of said container having a normal contour corresponding approximately to the contour of said member.

20 16. In a machine of the class described, a heel band for embracing the heel end of an upper on a form, said heel band having a normal contour heightwise of the form corresponding approximately to that of the form, and a flexible container arranged to embrace said heel band and expansible by fluid pressure to press the heel band against the upper, the pressing face of said container having a normal contour heightwise of the form corresponding approximately to that of the heel band.

25 17. In a machine of the class described, a heel band for embracing the heel end of an upper on a form, and a rubber container expansible by fluid pressure to press the heel band against the upper, said container being molded to embrace the heel band around the end and along the sides of the form and to present toward the heel band a face having a normal contour heightwise of the form corresponding approximately to that of the form.

30 18. In a machine of the class described, the combination with wipers for wiping the margin of the heel end of an upper inwardly over a form, of a heel band for embracing the heel end of the upper and for pressing it against the form during the wiping operation, and fluid-pressure means arranged to press on said heel band all around the heel end of the upper to press it against the upper.

35 19. In a machine of the class described, the combination with wipers for wiping the margin of the heel end of an upper inwardly over a form, of a heel band for embracing the heel end of the upper and for pressing it against

the form during the wiping operation, and a fluid container constructed and arranged to extend around said heel band and expansible by fluid pressure to press the heel band against the upper.

20. In a machine of the class described, the combination with wipers for wiping the margin of the heel end of an upper inwardly over a form, of a flexible container expansible by fluid pressure to press the heel end portion of the upper against the end and sides of the form and to hold it under pressure during the wiping operation, and a form carrier movable to carry a form into operative relation to said wipers and container.

21. In a machine of the class described, a flexible container expansible by fluid pressure to press the unlasted heel end portion of an upper into conformity to the contour of a form, said container being shaped to extend around the heel end of the upper and substantially throughout the height of the counter portion of the upper and to terminate at each side in a location spaced a substantial distance rearwardly of the forepart of the upper.

22. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and means movable toward the form in the upper-pressing operation for confining against excessive expansion a portion of the container extending outwardly from the form.

23. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and a plurality of relatively movable members arranged to extend into substantially as close relation to the form as the container for confining against excessive expansion heightwise of the form a portion of the container located near the form.

24. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form and adapted to operate on uppers and forms of different sizes, and means movable inwardly toward each form to different positions corresponding to different sizes of forms and into substantially as close relation to each form as the container for confining against excessive expansion a portion of the container extending outwardly from the form.

25. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form and adapted to operate on uppers and forms of different sizes, and movable means automatically adjustable to each size of form for confining against excessive expansion a portion of the container extending outwardly from the form.

26. In a machine of the class described, a

flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and members spaced from each other heightwise of the form for confining a portion of said container between them, said members being movable toward and from the form.

27. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form and adapted to operate on uppers and forms of different sizes, and members spaced from each other heightwise of the form for confining a portion of said container between them, said members being movable automatically to positions determined by each size of form.

28. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and flexible means arranged to extend inwardly toward the form over a portion of the container for confining that portion of the container against excessive expansion.

29. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and a flexible device arranged to extend inwardly toward the form over a portion of said container and into a position between the container and the form for confining that portion of the container against excessive expansion.

30. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a flexible device arranged to extend inwardly toward the form over a portion of said container and into a position between the container and the form for confining that portion of the container against excessive expansion, and controlling means connected to said flexible device and so mounted as to permit it to move inwardly toward the form in the upper-pressing operation while maintaining control of said device.

31. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and a flexible device arranged to extend loosely around a portion of said container near the form and into position to be gripped between the container and the form for holding that portion of the container against excessive expansion heightwise of the form.

32. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and devices spaced from each other heightwise of the form for confining between them portions of the container near the form, one of said devices comprising

a plurality of slides movable toward the form by the expansion of the container, and the other device comprising a flexible member arranged to extend inwardly toward the form around a portion of the container and also movable toward the form by the expansion of the container.

33. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, means for confining a portion of said container comparatively remote from the form, and other means movable in the upper-pressing operation for confining a portion of the container near the form.

34. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form and adapted to operate on uppers and forms of different sizes, means for confining a portion of said container comparatively remote from the form, and means movable inwardly toward each form to different positions corresponding to different sizes of forms and into substantially as close relation to each form as the container for confining a portion of the container near the form.

35. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a receptacle for said container having a wall arranged to extend inwardly toward the form over a portion of the container but terminating at a distance from the form, and means for preventing excessive expansion of the container substantially throughout the space between said wall and the form.

36. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a receptacle for said container having a wall arranged to extend inwardly toward the form over a portion of the container but terminating at a distance from the form, and means movable inwardly toward the form beyond said wall in the upper-pressing operation for confining against excessive expansion a portion of the container near the form.

37. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form and adapted to operate on uppers and forms of different sizes, a receptacle for said container having a wall arranged to extend inwardly toward the form over a portion of the container but terminating at a distance from the form, and means automatically movable toward the form beyond said wall to a position determined by each size of form for confining against excessive expansion a portion of the container near the form.

38. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a receptacle for said container having a wall arranged to extend inwardly toward the form but terminating at a distance from the form, and a plurality of slides movable in said receptacle toward and from the form and arranged to extend inwardly beyond said wall to confine a portion of the container near the form against excessive expansion heightwise of the form.

39. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a receptacle for said container having a wall arranged to extend inwardly toward the form but terminating at a distance from the form, a flexible member arranged to extend inwardly beyond said wall and into a position between the container and the form for confining a portion of the container near the form against excessive expansion heightwise of the form, and controlling means in said receptacle connected to said flexible member, said controlling means being movable inwardly toward the form in response to the pull of said member thereon while maintaining control of said member during the upper-pressing operation.

40. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a receptacle for said container having upper and lower walls extending inwardly toward the form but terminating at a distance from the form, and movable means arranged to extend inwardly beyond said walls for confining portions of the container near the form against excessive expansion heightwise of the form.

41. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, a receptacle for said container having upper and lower walls extending inwardly toward the form but terminating at a distance from the form, and devices arranged to extend inwardly beyond said walls and automatically movable to positions determined by the form for confining portions of the container near the form against excessive expansion heightwise of the form.

42. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and movable means for confining portions of said container near the form against excessive expansion heightwise and lengthwise of the form.

43. In a machine of the class described, a flexible container constructed and arranged

to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and members automatically adjustable to positions determined by the form for confining portions of said container near the form against excessive expansion heightwise and lengthwise of the form.

44. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of members arranged in a series around the form and movable toward the form in the upper-pressing operation to prevent excessive expansion heightwise of the form of a portion of the container near the form.

45. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of members arranged in a series around the form and movable to positions determined by the form for preventing excessive expansion heightwise of the form of a portion of the container near the form.

46. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a flexible device arranged to extend around the form and to overlap a portion of said container near the form for preventing excessive expansion thereof heightwise of the form.

47. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, a receptacle for said container having a wall extending inwardly around the form but terminating at a distance from the form, and a plurality of members arranged in series around the form and movable inwardly beyond said wall for confining portions of the container near the form against excessive expansion heightwise of the form.

48. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, a receptacle for said container having a wall extending inwardly around the form but terminating at a distance from the form, a flexible device arranged to extend around the form beyond said wall for confining a portion of the container near the

form against excessive expansion heightwise of the form, and means movably mounted in said receptacle for controlling said flexible device.

5 49. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace said heel band and expansible by
10 fluid pressure to press the heel band against the upper, a receptacle for said container having a wall extending inwardly around the heel band but terminating at a distance from the heel band, and a flexible device ar-
15 ranged to extend inwardly beyond said wall and into a position between the container and the heel band for confining a portion of the container near the heel band against excessive expansion heightwise of the form.

20 50. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace said heel band and ex-
25 pansible by fluid pressure to press the heel band against the upper, a receptacle for said container having a wall extending inwardly around the heel band but terminating at a distance from the heel band, a flexible mem-
30 ber extending inwardly beyond said wall around the heel band and into position to be gripped between the container and the heel band for confining a portion of the container near the heel band against excessive expan-
35 sion heightwise of the form, and means for controlling said flexible member while permitting it to be forced inwardly toward the form by the expansion of the container.

40 51. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace said heel band and ex-
45 pansible by fluid pressure to press the heel band against the upper, a receptacle for said container having a wall extending inwardly around the heel band but terminating at a distance from the heel band, a flexible mem-
50 ber extending inwardly beyond said wall around the heel band and into a position between the container and the heel band for confining a portion of the container near the heel band against excessive expansion height-
55 wise of the form, and a plurality of members slidably mounted in said receptacle and connected to said flexible member for controlling it while permitting it to be moved inwardly toward the form by the expansion of the container.

60 52. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace said heel band and expansible by
65 fluid pressure to press the heel band against

the upper, a receptacle for said container having a wall extending inwardly around the heel band but terminating at a distance from the heel band, and movable means ar-
70 ranged to bridge the space between said wall and the heel band in operating on each upper for preventing excessive expansion heightwise of the form of portions of the container near the heel band.

53. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace said heel band and expansible by
75 fluid pressure to press the heel band against the upper, a receptacle for said container having walls spaced from each other height-
80 wise of the form and extending inwardly around the form but terminating at a distance from the heel band, and means mov-
85 able toward the form by the expansion of said container and arranged to bridge the space between said walls and the heel band in operating on each upper for preventing
90 excessive expansion heightwise of the form of portions of the container near the heel band.

54. In a machine of the class described, a plurality of members movable to press an up-
95 per into conformity to the contour of the lateral surface of a form, fluid-pressure means for imparting to said members their upper-pressing movements and means for wiping the marginal portion of the upper inwardly
100 over the form.

55. In a machine of the class described, a plurality of members movable to shape an up-
105 per over a form, and a flexible container expansible by fluid pressure and arranged to act by its expansion to impart to said mem-
bers their upper-shaping movements.

56. In a machine of the class described, a plurality of slides movable in directions
110 transverse to the height of a form to press an upper into conformity to the contour of the form, and a flexible container expansible by fluid pressure and arranged to impart to said slides their upper-pressing move-
115 ments.

57. In a machine of the class described, a plurality of members movable to press an up-
120 per into conformity to the contour of the lateral surface of a form in locations near the edge of the bottom face of the form, and a flexible container expansible by fluid pres-
125 sure and arranged to act by its expansion to impart to said members their upper-pressing movements, said members being arranged to confine the container against expansion heightwise of the form.

58. In a machine of the class described, a plurality of members arranged to extend in
130 a series around an end of an upper on a form and movable to shape the upper to the form, fluid-pressure means arranged to extend

around the end of the upper and to impart to said members their upper-shaping movements, and means for wiping the marginal portion of the end of the upper inwardly over the form.

59. In a machine of the class described, a plurality of members arranged to extend in a series around an end of an upper on a form and movable to press the upper into conformity to the contour of the end and side faces of the form, and a flexible container arranged to extend around the end of the upper and expansible by fluid pressure to impart to said members their upper-pressing movements.

60. In a machine of the class described, a plurality of members arranged to extend in a series around an end of an upper on a form and movable to press the upper into conformity to the contour of the end and side faces of the form in locations near the edge of the bottom face of the form, and a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to impart to said members their upper-pressing movements, said members being arranged to confine the container against expansion heightwise of the form.

61. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of members movable by the expansion of said container to transmit to the upper a portion only of the pressure applied thereto by the container.

62. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of slides arranged to extend in a series around the end of the upper and movable by the expansion of said container to transmit the pressure of the container to a portion of the upper near the edge of the bottom face of the form, said slides being arranged to overlie a portion of the container and to confine the container against expansion heightwise of the form.

63. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace the heel band and expansible by fluid pressure to press the heel band against the upper, and a plurality of members arranged to extend in a series around the heel band and movable by the expansion of said container to transmit the pressure of the container to the heel band in locations near the edge of the bottom face of the form.

64. In a machine of the class described, the

combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace the heel band and expansible by fluid pressure to press the heel band against the upper, and a plurality of slides arranged in a series around the heel band and movable to transmit the pressure of the container to a portion of the heel band near the edge of the bottom face of the form, said slides being arranged to confine the container against expansion heightwise of the form.

65. In a machine of the class described, a heel band for embracing the heel end of an upper on a form, said heel band having a projection on its outer face, and a flexible container expansible by fluid pressure to press the heel band against the upper, said container being arranged to underlie said projection to support the heel band.

66. In a machine of the class described, a heel band for embracing the heel end of an upper on a form, said heel band having a projection extending around it on its outer face, a flexible container expansible by fluid pressure to press the heel band against the upper and arranged to underlie said projection, and a plurality of members movable to transmit the pressure of the container to said projection on the heel band, said members being arranged to confine the container against expansion heightwise of the form.

67. In a machine of the class described, a heel band for embracing the heel end of an upper on a form, said heel band having a projection extending around it on its outer face in a location spaced from its upper edge, a flexible container expansible by fluid pressure to press the heel band against the upper and arranged to underlie said projection to support the heel band, and a plurality of members movable to transmit the pressure of said container to the projection on the heel band and to the portion of the band above said projection, said members being arranged to confine the container against expansion heightwise of the form.

68. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, a receptacle for said container having a wall arranged to extend inwardly toward the form over a portion of the container but terminating at a distance from the form, and a plurality of members arranged to extend farther inwardly toward the form than said wall and movable by the expansion of said container to transmit the pressure of the container to a portion of the upper, said members being arranged to confine portions of the container near the form against expansion heightwise of the form.

69. In a machine of the class described, the combination with a heel band for embracing the heel end of an upper on a form, of a flexible container constructed and arranged to embrace the heel band and expansible by fluid pressure to press the heel band against the upper, a receptacle for said container having a wall arranged to extend inwardly toward the heel band over a portion of the container but terminating at a distance from the heel band, and a plurality of slides movable in the space between said wall and the heel band to transmit the pressure of the container to a portion of the heel band, said slides being arranged to confine portions of the container near the heel band against expansion heightwise of the form.

70. In a machine of the class described, the combination with wipers for wiping the margin of an end portion of an upper inwardly over a form, of a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to press the upper into conformity to the contour of the form, and means for preventing contact of said container with the wipers.

71. In a machine of the class described, the combination with wipers for wiping the margin of an end portion of an upper inwardly over a form, of a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to press the upper into conformity to the contour of the form, and means movable inwardly along the wipers for preventing contact of the container therewith and for also confining the container against expansion heightwise of the form.

72. In a machine of the class described, the combination with wipers for wiping the margin of an end portion of an upper inwardly over a form, of a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of members movable between the wipers and a portion of said container to transmit the pressure of the container to portions of the upper near the wipers while preventing contact of the container with the wipers.

73. In a machine of the class described, the combination with wipers for wiping the margin of an end portion of an upper inwardly over a form, of a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to press the upper into conformity to the contour of the form, and means between the wipers and the container for preventing any substantial pressure of the container upon the wipers.

74. In a machine of the class described, the combination with wipers for wiping the

margin of an end portion of an upper inwardly over a form, of a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of members arranged to extend in a series around the form and movable along the wiping faces of the wipers to transmit the pressure of the container to portions of the upper near the wipers, said members being arranged to confine portions of the container near the form against expansion heightwise of the form.

75. In a machine of the class described, the combination with wipers for wiping the margin of an end portion of an upper inwardly over a form, of a flexible container constructed and arranged to extend around the end of the upper and expansible by fluid pressure to press the upper into conformity to the contour of the form, a plurality of members movable between the wipers and said container in substantially contiguous relation to the wipers to transmit the pressure of the container to portions of the upper near the wipers while confining portions of the container near the form against expansion heightwise of the form, and guiding means for said members constructed to hold them against the pressure of the container heightwise of the form to prevent any substantial pressure of said members against the wipers.

76. In a machine of the class described, a flexible container constructed and arranged to extend around an end portion of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, a receptacle for said container having a wall arranged to extend inwardly toward the form over a portion of the container but terminating at a distance from the form, wipers movable along the outer face of said wall to wipe the margin of the upper inwardly over the form, and a plurality of members movable to transmit the pressure of the container to portions of the upper near the wipers and arranged to confine portions of the container near the form against expansion heightwise of the form, said members being guided by the inner face of said wall and having portions extending into the space between the wall and the form into substantially contiguous relation to the wipers.

77. In a machine of the class described, fluid-pressure means for pressing an upper into conformity to the contour of a form, said means being constructed to apply to a portion of the upper greater pressure per unit of area than to another portion.

78. In a machine of the class described, fluid-pressure means including a flexible fluid container arranged to extend around an end

of an upper on a form for pressing the upper into conformity to the contour of the form, said means being constructed to apply to a portion of the upper greater pressure per unit of area than to another portion.

79. In a machine of the class described, fluid-pressure means for pressing the heel end portion of an upper into conformity to the contour of a form, said means being constructed to apply to the opposite sides of the upper in locations near the front end of its heel portion greater pressure per unit of area than in locations farther rearwardly at the sides of the form.

80. In a machine of the class described, fluid-pressure means including a flexible fluid container arranged to extend around the heel end of an upper on a form for pressing the upper into conformity to the contour of the form, said means being constructed to apply to the opposite sides of the upper near the front end of its heel portion in locations near the edge of the bottom face of the form greater pressure per unit of area than in other locations at the sides of the form.

81. In a machine of the class described, fluid-pressure means for pressing the heel end portion of an upper into conformity to the contour of a form, said means being constructed to apply to portions of the upper in the vicinity of the back seam greater pressure per unit of area than to other portions located farther forwardly than the back seam.

82. In a machine of the class described, a plurality of members movable to press an upper into conformity to the contour of a form, and a flexible container expansible by fluid pressure and arranged to act by its expansion to impart to said members their upper-pressing movements, one or more of said members being so constructed as to transmit to the upper from said container a greater amount of pressure per unit of area of the upper than other members.

83. In a machine of the class described, a plurality of members movable to press an upper into conformity to the contour of a form, and a flexible container expansible by fluid pressure and arranged to press on said members to force them toward the upper, one or more of said members being constructed to present to the container a greater area of pressure-receiving service than other members.

84. In a machine of the class described, a plurality of members movable to press an end portion of an upper into conformity to the contour of the lateral surface of a form in locations near the edge of the bottom face of the form, and a flexible container expansible by fluid pressure to impart to said members their upper-pressing movements, at least one of said members at each side of the form being constructed to transmit to the

upper from said container greater pressure per unit of area of the upper than other members.

85. In a machine of the class described, a flexible container constructed and arranged to extend around the heel end of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of members movable by the expansion of said container to transmit the pressure of the container to portions of the upper near the edge of the bottom face of the form at each side of the form, at least one of said members at each side near the front end of the heel portion of the upper being constructed to transmit to the upper from said container greater pressure per unit of area of the upper than other members located farther rearwardly.

86. In a machine of the class described, a flexible container constructed and arranged to extend around the heel end of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a plurality of slides arranged in a series around the heel end of the upper to transmit the pressure of said container to the upper in locations near the edge of the bottom face of the form, one or more of said slides at each side near the front end of the heel portion of the upper being constructed to present to the container a greater area of pressure-receiving surface than other slides.

87. In a machine of the class described, a flexible fluid container for pressing the heel end of an upper into conformity to the contour of a form, and a finger arranged to extend lengthwise along the back seam of the upper to transmit the pressure of said container to the upper in the vicinity of the back seam.

88. In a machine of the class described, a rubber container expansible by fluid pressure to press the heel end of an upper into conformity to the contour of a form, and a metal member arranged to transmit the pressure of said container to the upper in a location along the back seam of the upper.

89. In a machine of the class described, a flexible container constructed and arranged to extend around the heel end of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a pressure-transmitting finger arranged to extend heightwise of the form along the back seam of the upper to transmit the pressure of the container to the upper in that location, said container being so formed as to provide a recess to receive said finger.

90. In a machine of the class described, the combination with a flexible heel band for embracing the heel end of an upper on a form, of a flexible container constructed

and arranged to embrace the heel band and expansible by fluid pressure to press the heel band against the upper, and a pressure-transmitting member between the heel band and said container in a location opposite the back seam of the upper for transmitting the pressure of the container to the heel band and upper.

91. In a machine of the class described, a flexible container constructed and arranged to extend around the heel end of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, and a member movable by the expansion of said container at the extreme rear end of the upper to transmit the pressure of the container to a portion of the upper near the edge of the bottom face of the form, said member having a finger thereon extending heightwise of the form for applying the pressure to the upper also in a location along the back seam of the upper.

92. In a machine of the class described, a flexible container constructed and arranged to extend around the heel end of an upper on a form and expansible by fluid pressure to press the upper into conformity to the contour of the form, a slide movable toward the upper by the expansion of said container and having thereon a finger arranged to extend heightwise of the form to apply the pressure to the upper along the back seam of the upper, said container being arranged to press both on said slide and on said finger to apply the pressure to the upper.

93. In a machine of the class described a fluid-pressure device for pressing an upper into conformity to the contour of a form, valve mechanism movable alternatively into position to admit pressure fluid to said device or into position to release fluid therefrom, a member for controlling said valve mechanism, spring means for normally maintaining said member in position to release the fluid from the device, and means for locking said member at the will of the operator in position to admit the fluid.

94. In a machine of the class described, the combination with wipers for wiping the margin of an upper inwardly over a form, and a member movable manually to operate said wipers, of a fluid-pressure device for pressing the upper into conformity to the contour of the form, valve mechanism for admitting pressure fluid to said device and for releasing fluid therefrom, a member movable with said wiper-operating member and arranged to control said valve mechanism, spring means for maintaining said controlling member normally in position to release the fluid from the device, and means for retaining said member at the will of the operator in position to admit fluid to the device.

95. In a machine of the class described, the combination with wipers for wiping the

margin of an upper inwardly over a form, and a hand lever for operating said wipers, of a fluid-pressure device for pressing the upper into conformity to the contour of the form, valve mechanism for admitting pressure fluid to said device and for releasing fluid from the device, a lever movable with said hand lever and arranged to control said valve mechanism, spring means for normally maintaining said controlling lever in position to release fluid from the device, and a latch for maintaining said controlling lever at the will of the operator in position to admit fluid to the device.

96. In a machine of the class described, the combination with wipers for wiping the margin of an upper inwardly over a form, and manual means for controlling said wipers, of a fluid-pressure device for pressing the upper into conformity to the contour of the form, and manual means movable with said wiper-controlling means for controlling the admission of pressure fluid to said device.

97. In a machine of the class described, the combination with wipers for wiping the margin of an upper inwardly over a form, and a hand lever for operating said wipers, of a fluid-pressure device for pressing the upper into conformity to the contour of the form, and mechanism movable with said hand lever and arranged to be engaged by the operator's hand at the same time as the hand lever for controlling the admission of pressure fluid to said device.

98. In a machine of the class described, the combination with wipers for wiping the margin of an upper inwardly over a form, and a hand lever for operating said wipers, of a fluid-pressure device for pressing the upper into conformity to the contour of the form, and another lever movable with said hand lever and arranged to control the admission of pressure fluid to said device.

99. In a machine of the class described, the combination with wipers for wiping the margin of an upper inwardly over a form, and a hand lever for operating said wipers, of a fluid-pressure device for pressing another portion of the upper into conformity to the contour of the form, and valve mechanism carried by said hand lever for controlling the admission of pressure fluid to said device.

100. In a machine of the class described, the combination with wipers for wiping the margin of the heel end of an upper into lasted position, and a hand lever for operating said wipers, of a fluid-pressure device for embracing the upper about the heel end of the last and for pressing it into conformity to the contour of the last, and mechanism movable with said hand lever and arranged to be controlled by the operator at the same time as the hand lever for admitting pressure fluid to said device or releasing it therefrom.

101. In a machine for operating on shoes, a fluid-pressure device for applying pressure to a shoe on a form, and automatic means for insuring against the admission of pressure fluid to said device when no form is positioned in such relation to the device as to receive the pressure.

102. In a machine for operating on shoes, a fluid-pressure device for applying pressure to a shoe on a form, a manually controlled valve for admitting pressure fluid to said device, and controlling means constructed to insure against the admission of fluid to the device, irrespective of the position of said valve, when no form is positioned in such relation to the device as to receive the pressure.

103. In a machine for operating on shoes, a flexible container expansible by fluid pressure to press on a shoe mounted on a form, and automatic means for insuring against the expansion of said container except when a form is positioned in such relation to the container as to receive the pressure.

104. In a machine for operating on shoes, a flexible container expansible by fluid pressure to press on a shoe mounted on a form, and form-controlled means for insuring against the admission of pressure fluid to said container except when a form is positioned in such relation to the container as to receive the pressure.

105. In a machine for operating on shoes, a flexible container expansible by fluid pressure to press on a shoe mounted on a form, a valve for admitting pressure fluid to said container, another valve movable either to prevent or to permit the admission of the fluid by said first valve, and form-controlled mechanism for maintaining said other valve in position to permit the admission of the fluid only when a form is positioned in such relation to the container as to receive the pressure.

106. In a machine for operating on shoes, a flexible container expansible by compressed air to press on a shoe mounted on a form, means for admitting compressed air to said container, and automatic means for insuring communication of said container with the atmosphere when no form is positioned in such relation to the container as to receive the pressure.

107. In a machine of the class described, a flexible container expansible by fluid pressure to press an upper into conformity to the contour of a form, and automatic means for insuring against the admission of pressure fluid to said container when no form is positioned in such relation to the container as to receive the pressure.

108. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, a manually controlled valve for admitting pressure fluid to said device, and automatic means for rendering said valve ineffective to

admit the fluid when no form is positioned in such relation to the device as to receive the pressure.

109. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, a valve for admitting pressure fluid to said device, another valve movable either to prevent or to permit the admission of the fluid by said first valve, and automatic means for maintaining said other valve in position to prevent the admission of fluid to the device when no form is positioned in such relation to the device as to receive the pressure.

110. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, and form-controlled means for insuring against the admission of pressure fluid to said device except when a form is positioned in such relation to the device as to receive the pressure.

111. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, a valve for admitting pressure fluid to said device, and mechanism arranged to be controlled by the form to open communication between the device and said valve when the form is in pressure-receiving position and to close the communication when the form is withdrawn from that position.

112. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, a valve for controlling the admission of pressure fluid to said device, valve-controlling mechanism arranged to be operated by pressure of a form thereon to move the valve into position to permit the admission of fluid when the form is presented in pressure-receiving position, and automatic means for operating said mechanism to move the valve into position to prevent the admission of the fluid when the form is withdrawn from that position.

113. In a machine of the class described, a fluid-pressure device constructed and arranged to embrace an upper about the heel end of a last and to conform the upper to the contour of the last, a shoe support movable to carry a last and its shoe materials into and out of operative relation to said device, a conduit for conducting pressure fluid to said device, a valve in said conduit, and mechanism for moving said valve into position to permit the admission of fluid in response to movement of the shoe support to carry a shoe into operative relation to said device and for moving it automatically into position to prevent the admission of the fluid as the shoe support is moved in the opposite direction.

114. In a machine of the class described, a fluid-pressure device constructed and arranged to embrace an upper about the heel

end of a last and to conform the upper to the contour of the last, a shoe support movable to carry a last and its shoe materials into and out of operative relation to said device, a manually controlled valve for admitting pressure fluid to said device, and mechanism controlled by the movement of the shoe support for rendering said valve ineffective to admit pressure fluid to the device except when a last and shoe are in pressure-receiving position.

115. In a machine of the class described, a heel band for embracing an upper about the heel end of a last, a flexible container expandable by fluid pressure to press said heel band against the upper, and mechanism arranged to be controlled by pressure of the work thereon to insure against the admission of pressure fluid to said container except when a last and shoe are in position to receive the pressure.

116. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, means for admitting compressed air to said device, and automatic means for insuring communication of said device with the atmosphere when no form is positioned in such relation to the device as to receive the pressure.

117. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, means for admitting compressed air to said device, and form-controlled means for maintaining said device in communication with the atmosphere when no form is in pressure-receiving position and for closing said communication when a form is in that position.

118. In a machine of the class described, a fluid-pressure device for pressing an upper into conformity to the contour of a form, a conduit for conducting compressed air to said device, a valve in said conduit for controlling the admission of the compressed air, and form-controlled mechanism for maintaining said device in communication with said valve when a form is in pressure-receiving position and for interrupting said communication and maintaining the device in communication with the atmosphere when no form is in that position.

In testimony whereof we have signed our names to this specification.

ALBERT A. MACLEOD.
SIDNEY J. FINN.