Jan. 12, 1943. M. L. DODGE 2,308,271

METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

Filed June 27, 1939 6 Sheets-Sheet 1

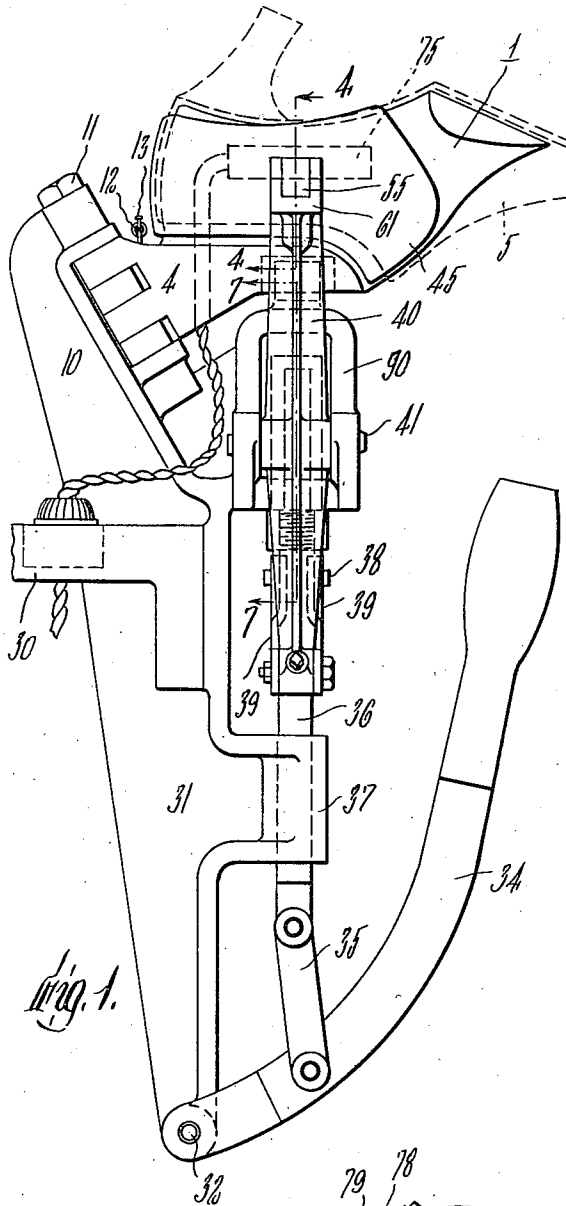


Fig. 1.

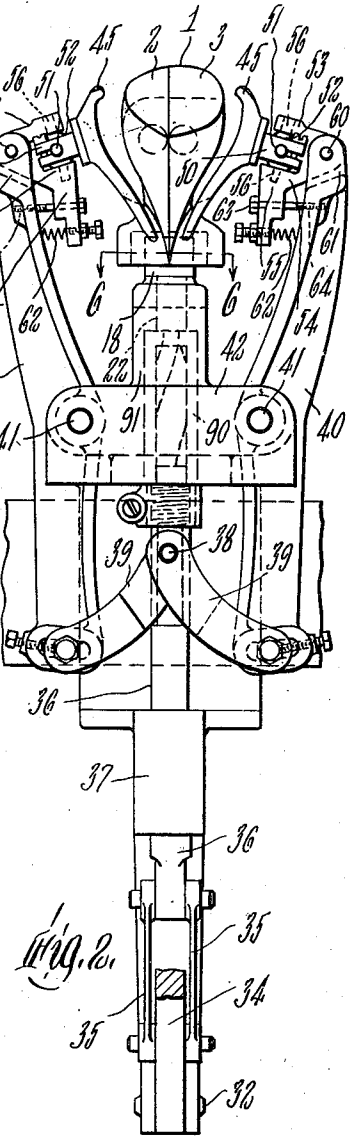


Fig. 2.

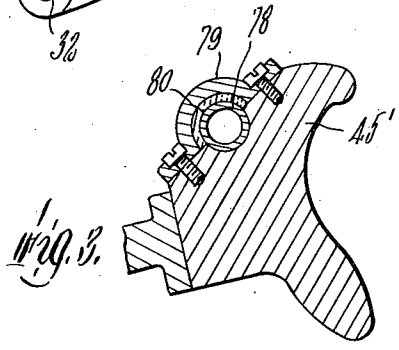


Fig. 3.

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METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

Filed June 27, 1939 6 Sheets-Sheet 2

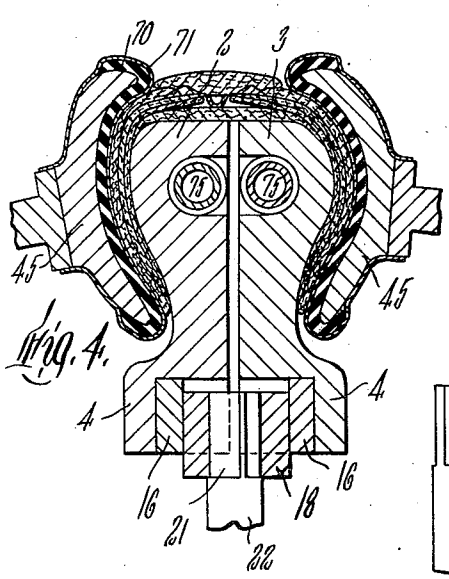


Fig. 4.

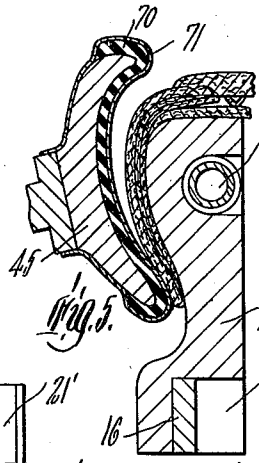


Fig. 5.

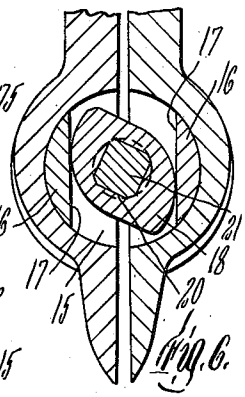


Fig. 6.



Fig. 8.

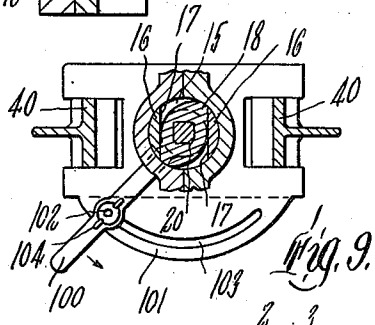


Fig. 9.

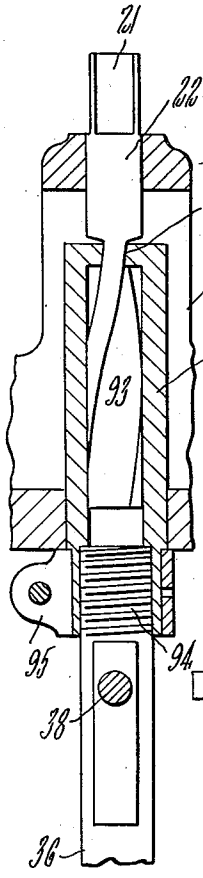


Fig. 7.

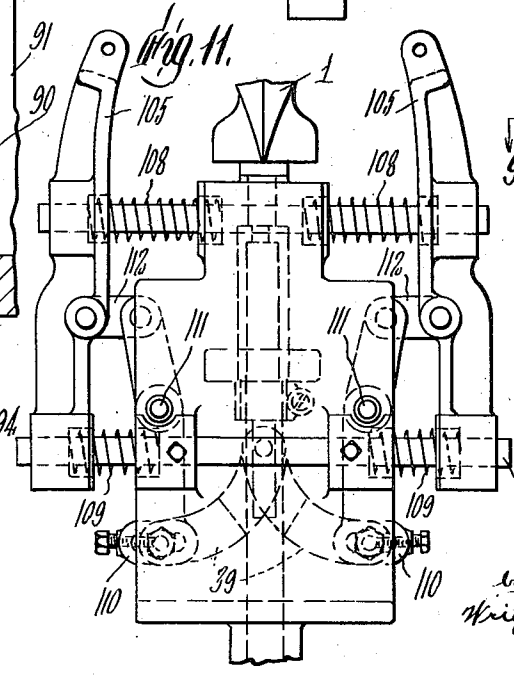


Fig. 11.

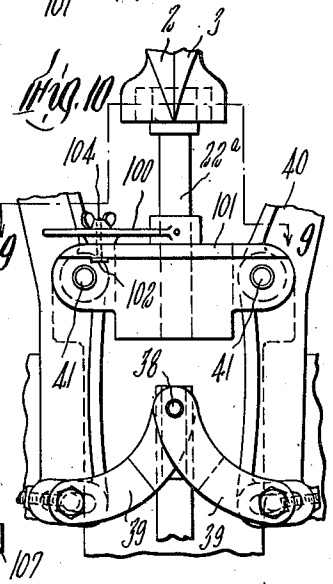


Fig. 10.

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METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

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Fig. 12.

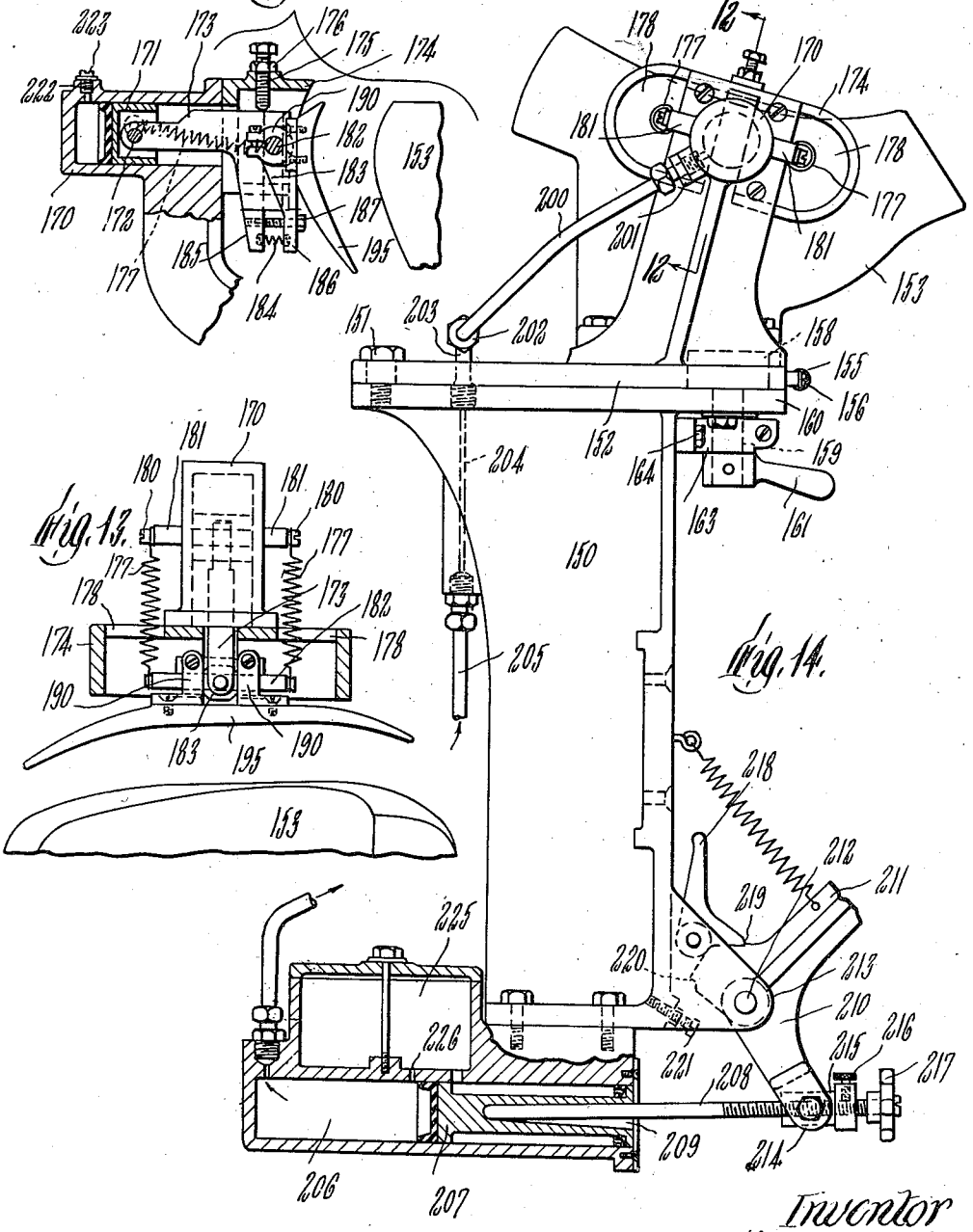


Fig. 13.

Fig. 14.

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METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

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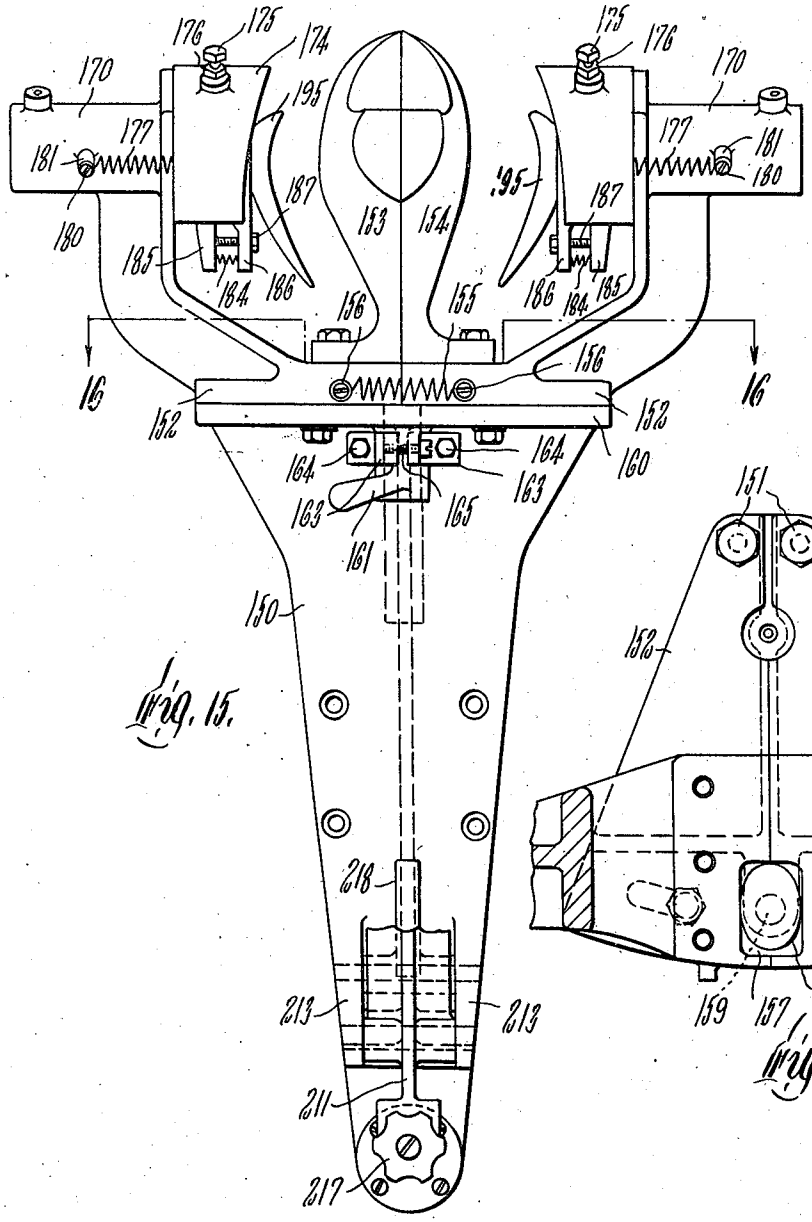


Fig. 15.

Fig. 16.

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Jan. 12, 1943. M. L. DODGE 2,308,271

METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

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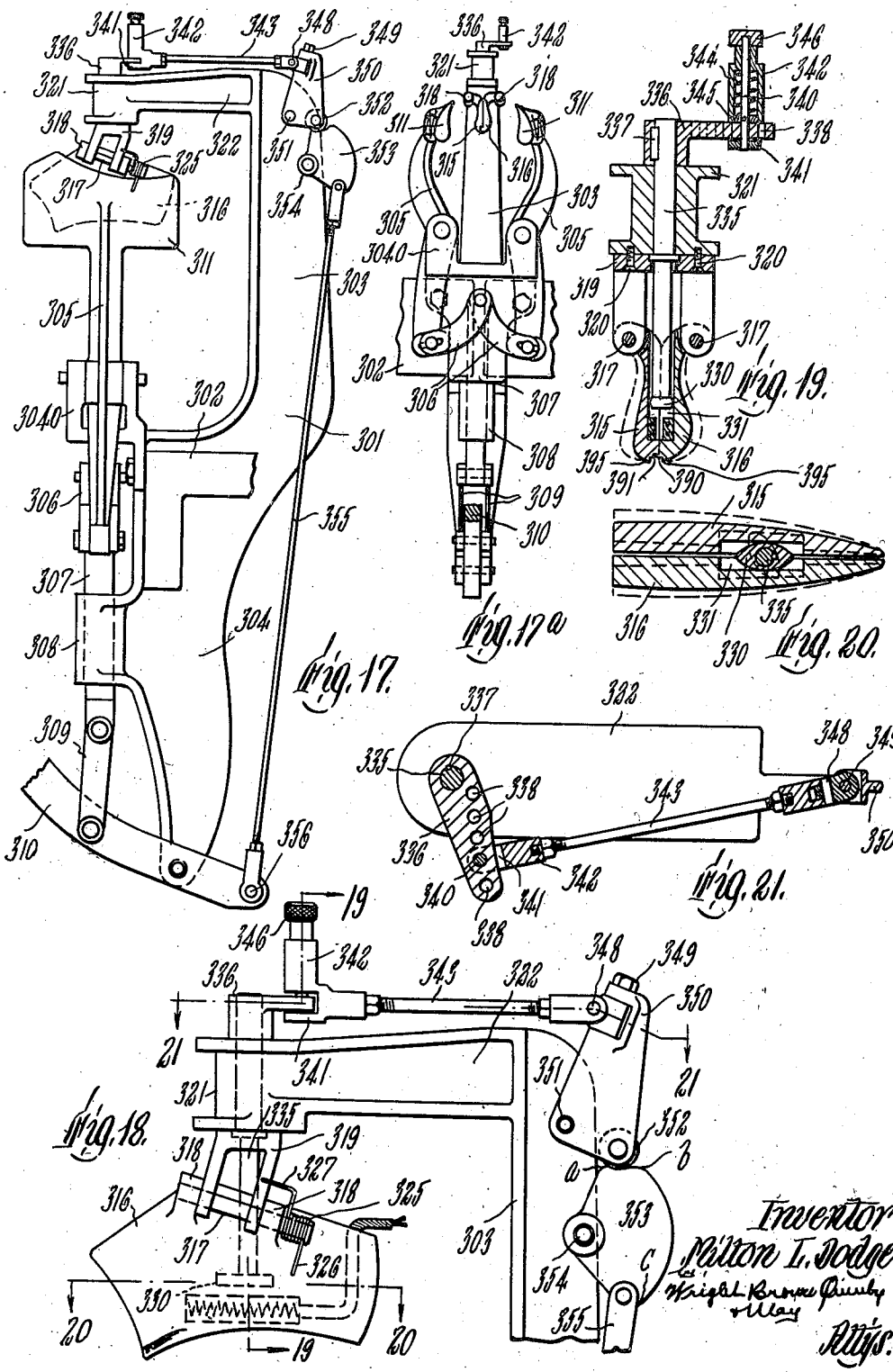


Fig. 17.

Fig. 17a

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 18.

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METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

Filed June 27, 1939 6 Sheets-Sheet 6

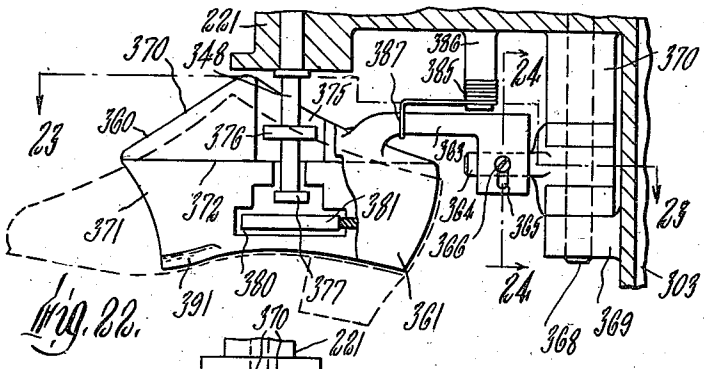


Fig. 22.

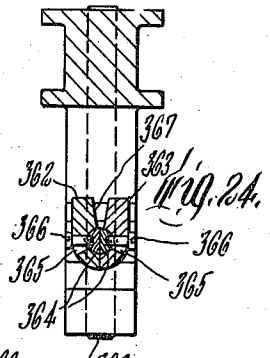


Fig. 24.

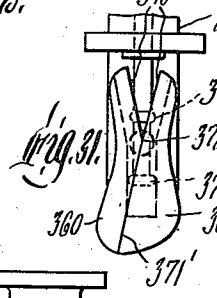


Fig. 31.

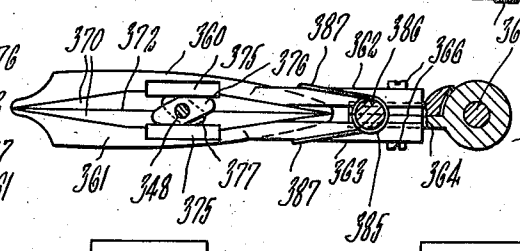


Fig. 23.

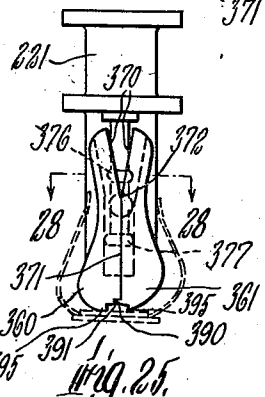


Fig. 25.

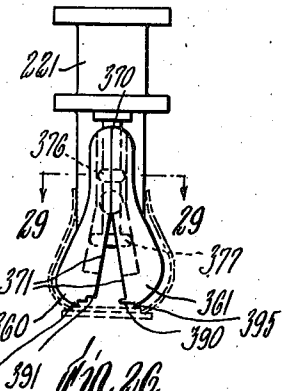


Fig. 26.

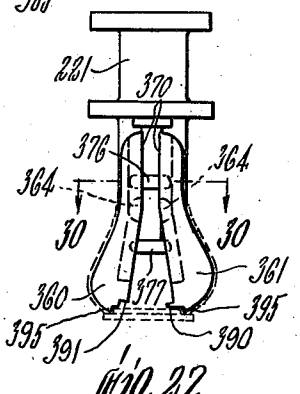


Fig. 27.

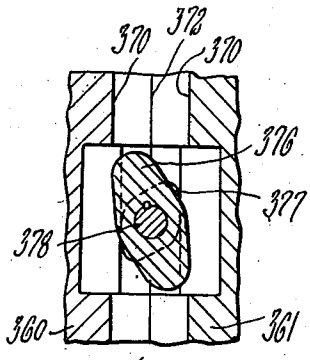


Fig. 28.

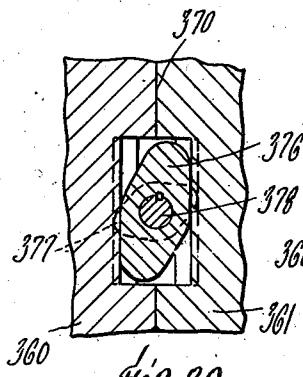


Fig. 29.

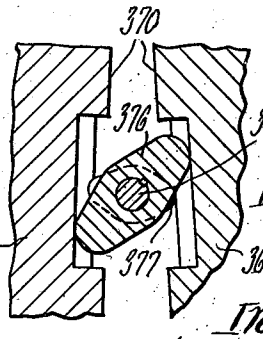


Fig. 30.

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Patented Jan. 12, 1943 2,308,271

UNITED STATES PATENT OFFICE

2,308,271

METHOD OF AND MEANS FOR SHAPING AND SMOOTHING SHOE UPPERS

Milton L. Dodge, Newburyport, Mass.

Application June 27, 1939, Serial No. 281,427

73 Claims. (Cl. 12—51)

In the manufacture of shoes, particularly during the lasting operations, there is a tendency to introduce wrinkles, especially longitudinally and diagonally in the shoe upper, particularly in the quarter lining and since the shoe is then on the last the presence of these wrinkles is not apparent to the shoemaker. These wrinkles usually are not wholly removed even when the shoemaker attempts to do so by pulling the upper margins heightwise of the shoe and the lining and outer of the shoe toward the sole when lasting, especially in the shank and heel portions, nor is it easily possible for him to maintain the conformed condition of the parts until the upper has been secured in the lasting operation. Later operations are also liable to more or less distort the shoe upper, as, for example, pulling the last and heeling the shoe. Likewise the treeing operation during which the upper is smoothed with a heated iron causes shrinkage of the outer without causing a corresponding shrinkage of the lining so that fullness of the lining, causing more or less wrinkles to be produced, may then appear. Furthermore, the outer and lining have been merely top-stitched together and no close conformity of each to the other, except that which is incompletely effected during lasting, has been produced.

An object of the present invention, therefore, is to so treat the outer and lining, more especially in an otherwise completed shoe, in such a manner that the outer and lining are smoothed, conformed to each other, and pressed together at least throughout substantially the entire areas of the waist and side heel portions of the shoe where the wrinkling is most liable to occur. To this end the shoe to be treated is placed over a form, preferably heated, which may be expanded to provide the desired contact with the lining of the shoe, and mating jaws are brought in to clamp the shoe upper against the expanded form in such a manner as to smooth the upper over the form and to remove wrinkles in either or both lining and outer.

A further object is to provide for expansion of the form to a greater extent toward its forward end and toward the sole face than at the top heel end, so as to cause the form to fill out the side portions of the shoe to substantially the heel end when the form is expanded, while retaining that portion of the form extending through the foot opening, and particularly adjacent to the heel end, relatively narrow.

A further object is to provide means for adjusting the extent of wiping action on the shoe and also the amount of pressure over different portions of the area of the shoe upper.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figures 1 and 2 are side and front elevations, respectively, of a machine embodying this invention.

Figure 3 is a central transverse section through a modified form of pressing jaw.

Figure 4 is a detail section on line 4—4 of Figure 1.

Figure 5 is a view similar to a portion of Figure 4, but showing a jaw partly open.

Figure 6 is a detail section on line 6—6 of Figure 2.

Figure 7 is a detail section on line 7—7 of Figure 1.

Figure 8 is an elevation of a cam actuator showing a modification.

Figure 9 is a detail section on line 9—9 of Figure 10.

Figures 10 and 11 are fragmentary front elevations somewhat similar to a portion of Figure 2, but showing modified constructions.

Figure 12 is a detail section on line 12—12 of Figure 14 showing a modified construction of machine embodying this invention.

Figure 13 is a fragmentary top plan of the parts shown in Figure 12.

Figure 14 is a side elevation of a hydraulically actuated machine.

Figure 15 is a front elevation of the same.

Figure 16 is a detail section on line 16—16 of Figure 15.

Figure 17 is a fragmentary side elevation of a shoe pressing mechanism embodying the invention.

Figure 17*a* is a front elevation to a smaller scale of the same.

Figure 18 is a view similar to a portion of Figure 1, but to a larger scale.

Figures 19, 20 and 21 are detail sections on the correspondingly numbered section lines of Figure 18.

Figure 22 is a view somewhat similar to a portion of Figure 18, but partly broken away and showing a modification.

Figures 23 and 24 are detail sections on lines 23—23 and 24—24, respectively, of Figure 22.

Figures 25, 26, and 27 are fragmentary front elevations of the inside form and support of Figures 22 to 24 showing the form in various stages of expansion.

Figures 28, 29 and 30 are detail sections on

the correspondingly numbered section lines of Figures 25, 26 and 27.

Figure 31 is a view similar to Figure 25 but showing a modification.

Referring first to Figures 1, 2, 4, 5 and 6, at 1 is shown a form over which a shoe may be placed, this form comprising two side portions 2 and 3 which may be separated or brought together to expand or contract the form. This form is made in rights and lefts, a form for a right shoe being shown. Thus the two parts 2 and 3 are unsymmetrical. Each of these portions 2 and 3 of the form is provided with an extension such as 4 (see Figure 1) which projects outside of the shoe shown in dotted lines at 5 in this figure, these two extensions 4 of the two parts of the form being hinged together and to a supporting bracket 10, as by a hinge pintle having a head shown at 11, so that by swinging the two parts 2 and 3 toward and from each other the form may be expanded and contracted laterally. They are normally held closed together by a spring 12 secured at opposite ends to screws 13 each threaded into one of these parts.

It will be noted that the hinge axes of the side portions are near to the heel end of the form and so inclined to the form, and to the lengthwise axis of a shoe held thereon, that the amount of motion, when the portions are swung relatively, is greatest remote from the heel end of the shoe and toward the sole, and least at the back of the heel at the foot opening. This allows the form to be expanded to the full width of the shoe near the sole without the same amount of increase of the width at the foot opening where the form when collapsed is inserted and removed with respect to the shoe.

The extensions 4 of the parts 2 and 3 are shown as recessed so as together to form a socket 15 and on opposite sides of this socket are wear pieces 16 with flat opposed faces 17 as shown in Figure 9. These faces 17 cooperate with faces of a cam member 18 positioned between the blocks 16, this cam member having a squared central opening 20 within which may extend the mating squared extremity 21 of an actuating rock shaft 22 (see Figure 7), so that by rocking this shaft the cam element 18 may be turned from the position shown in Figure 9 to force the extensions 4 apart, thus to expand the form over which the shoe is placed. Rocking of the shaft 22 may be effected by means which will later be described. The bracket 10 is shown as secured to a suitable table or support 30 and may be provided with a downward extension 31, to the lower end of which is fulcrumed, as at 32, an actuating handle lever 34. This handle lever 34 is connected through a pair of links 35, pivoted at their lower ends to the lever 34 to the lower end of a bar 36 to which their upper ends are pivoted. This bar 36 is axially slidable through a guide 37 of the bracket extension 31. Above the guide 37, the bar 36 has pivoted thereto, as at 38, links 39, which, in turn, are adjustably pivoted at their outer ends to the lower ends of a pair of arms 40. These arms are shown as fulcrumed at 41 to a cross frame member 42 and at their upper ends they have secured thereto in a manner which will later be described, outer presser members 45 which are arranged to press the shoe placed over the form 1 into contact with the sides of the form. In order that such pressure may be applied in a manner to remove wrinkles in the upper, these forms are so mounted that as they apply the pressure they effect a heightwise wiping or pulling action on the upper such that the upper, including the outer and lining, and usually an interposed counter stiffener, are pressed upwardly relative to the shoe, so as to remove the wrinkles.

The manner of mounting of these presser elements 45 to produce this wiping action is shown more particularly in Figure 2. Each of these presser elements 45 is shown as provided with a split shank portion 50 so as to permit it to be clamped to laterally extending pins 51 which form trunnions extending from opposite sides of a hub member 52. This hub, in turn, is pivoted between a pair of jaws 53 and 54 of a block 55, the pivot of the hub being shown at 56 and being at right angles to the axis of the trunnions 51 and heightwise of the shoe on the form. This allows the presser elements 45 to adjust themselves angularly to the lengthwise contour of the form 1. The split shank portion 50 permits each presser element to be secured in a desired angular relationship to the pins 51 for a purpose which will later appear. The block 55, in turn, is pivoted at 60 to a suitable support 61 shown as the upper portion of one of the arms 40 and it is normally held in one angular position about its pivot by means of a spring 62 reacting between it and a portion of the support 61, this spring holding the block against a stop which is shown as the head of a screw 63 threaded into the support as at 64 and passing through a suitable slot in the block 55. The portion of the arm 40 beneath the block 55 acts as a stop to limit the pivotal motion of the block 55 in the opposite direction. The hinge axis 60 is arranged substantially lengthwise of a shoe placed on the form and at a substantial distance back of the pressing face of the element 45, so that the pivotal motion of this element about this axis results in a bodily motion of the pressing face heightwise of a shoe on the form. The extent of the wiping action is determined by the amount of pivotal motion about the axis 60 permitted between the position of first and final contact of the presser element 45 on the shoe. The pressure exerted by the element 45 during this wiping action is determined by the strength of the spring 62. By proper selection of these, the best operating conditions for the particular work in hand may be employed. For example, where the counter portion is a strap without substantial support against up and down motion, wipe might not be desirable as it would tend to displace the strap. Where there are substantial horizontal wrinkles in the upper near the top margin, considerable wipe might be desirable, and where there are wrinkles near the sole a considerable pressure at this part of the shoe might be desirable, requiring the use of a relatively heavy spring 62. The shank portion of each of the presser elements 45 is secured in such angular relationship on the trunnions 51, as shown in Figure 2, that when the supports 61 are moved toward each other to bring the presser elements toward the form, the lower portion of each presser element first engages the shoe upper remote from its sole edge, as shown best in Figure 5, and as the presser elements 45 are brought further toward each other, the carrying block 55 for each member rocks against the action of the spring 62 until the presser members are in substantially complete engagement with the shoe upper from the sole of the shoe to its top edge throughout the full height of the quarter. This rocking motion of each presser element as it comes into final pressing position acts to wipe or pull the upper heightwise

of the shoe tending to stretch it and pull out any wrinkles or fullness therein, so that the shoe upper is effectively smoothed and ironed out by the time the presser elements are in close pressing engagement therewith.

As shown in Figures 4 and 5, each of these presser elements may have a facing of rubber or other like deformable material 70 overlaid with a layer such as 71 of leather or other suitable material which will make a good contact with the outer face of the upper and through which the stretching action may be imparted thereto without damaging the face of the upper.

The form members against which the presser elements press the shoe are preferably heated, as shown there being an electric heating unit 75 positioned lengthwise in each portion 2 and 3. In some cases it may be found desirable, also, to heat the presser members. Where this is desired they may be formed as shown in Figure 3 unprovided with any yielding or resilient facing so that the heat may be effective on the outside of the shoe upper. As shown in Figure 3, the presser member 45' may have a socket lengthwise thereof to receive the electric heating unit 78 which is preferably held in position by a cap 79 which may be lined with asbestos or other heat-insulating material as at 80, so that the heat of the unit may be directed to heating the presser member 45'.

Means may be provided by which the inner form members are expanded simultaneously with the bringing in of the presser members into pressing relation to a shoe upper placed over the form. Where this is desired the upper end of the bar 36 may be connected to the lower end of a hollow guide member or casing 90 (see Figure 7) which is slidable within a stationary housing 91. The upper end of the casing 90 is shown as provided with a slot 92 through which is slidably guided a fin portion 93 at the lower end of the rock shaft 22. This fin 93 is shown as twisted so that as the casing member 90 is moved up and down, the engagement of the sides of the slot 92 with the fin portion produces a rocking or turning motion of the shaft 22. The amount of this may be adjusted by means of the threaded connection between the bar 36 and the casing 90 at 94, the adjustment being retained by tightening of a clamp collar 95.

In some cases it may be desired to provide for the expansion of the form prior to the pressing of the presser members against the shoe upper. Where this is desired the shaft, such as shown at 22' (Fig. 8) may be employed having a fin 93' similar to the fin 93 of shaft 22 with the exception that the entire twist in this fin is in the upper portion thereof as shown in Figure 8, so that the entire rocking effect to cam the two parts of the form away from each other is fully produced in the initial motion of the handle 34, the final motion which causes the presser members to be brought into their final pressing position being effected after the slot 92 has passed below the twisted portion of the fin and where it is in engagement with the untwisted lower portion where motion of the member 90 is ineffective to turn the rock shaft. If it is desired to produce this expansion of the form before any closing movement of the presser members, sufficient lost motion may be provided in the toggle mechanism for this to be done.

In other cases it may be desired to expand the inner form members quite independently of the actuator for the presser members. Where this is desired a cam shaft 22a such as shown in Figure 10 may be employed unprovided with any fin such as 93, and to which may be secured by any suitable means a hand lever 100. This lever may slide along an arcuate and slotted guide portion 101 to which it may be clamped in any desired angular position by means of the screw clamp 102, this screw extending through the slot 103 of the guide member and having a wing nut 104 threaded on its upper end where it passes through an opening in the hand lever 100. The form may be adjusted for a given size and style of shoe and there remain as long as shoes of that style and size are being treated.

Contraction of the form after the pressing action facilitates removal of the treated shoe from the form without distortion which might otherwise be produced when pulling the top edge portion of the shoe over the normally wider cuboid bone part of the form. It also aids in placing a shoe to be treated over the form.

In some cases it may be desired that the presser members be brought in in straight line arrangement instead of about pivots. Such an arrangement is illustrated in Figure 11 in which the supports for the presser members are formed as arms 105 which are slidably guided on parallel guide bars 106 and 107 and are shown as normally pressed away from each other as by means of the pairs of springs 108 and 109. These arms 105 are arranged to be brought toward each other by the rocking of levers 110 fulcrumed at 111 and having their upper ends pivotally connected through the links 112 with portions of the arms 105 between the guide bars 106 and 107. The lower ends of the levers 110 are connected to the toggle links 39, which, in the construction shown in Figure 2, are pivoted to the lower ends of the rocking arms 40.

In Figures 12 to 16 is illustrated a machine of a somewhat different type from that shown in the remaining figures, this machine being arranged for operation by hydraulic pressure. It comprises a bracket member 150 for securing to a table or other support, and to the upper face of which is pivoted, as on the pivot screws 151, a pair of bracket members 152. Each of these bracket members has secured to its upper face one side section of a shoe-receiving form, such sections being indicated at 153 and 154. These may be similar in side contour to the parts 2 and 3 shown in Figure 2, being formed for rights and lefts, so that as the members 152 are swung away from each other, these form parts 153 and 154 are similarly swung away from each other to expand the form laterally. The two bracket members 152 are normally urged toward closed position, as by means of a spring 155, engaging at opposite ends on screws 156 threaded into the forward faces of these brackets. Back of these forward faces the brackets are recessed to form a chamber 157 (see Figure 16) within which extends a cam head 158 at the upper end of a rock shaft 159. This rock shaft extends down through the top flange 160 of the bracket 150 and has secured on its lower end a handle 161 by which the rock shaft 159 may be turned, thus turning the cam 158 and forcing the forward ends of the brackets 152 apart to the desired extent to expand the shoe form. A pair of clamping jaws 163 secured to the forward face of the bracket 150, as by screws 164, may be clamped against the rock shaft 159 to hold it in adjusted angular position as by adjusting the clamping screw 165.

At the outer ends of the brackets 152 are arranged hydraulic cylinders 170. In each of these

cylinders is slidable a piston 171, as shown in Figure 12, and to this piston is pivoted, as at 172, a supporting arm 173. To the inner end of each cylinder 170 is secured a hood member 174 through the upper wall of which extends an adjusting screw 175 provided with a check nut 176. This screw 175 forms an abutment against which the upper face of the arm 173 engages, this arm being held against the lower end of this screw as by means of a pair of coil springs 177, which pass through openings 178 in the back of the hood 174 and engage at their rear ends screws 180 threaded into lugs 181 projecting from each cylinder 170. The forward ends of these springs engage the ends of a pivot pin 182 extending from opposite sides of a block 183. This pin 182 is journaled through the forward end of the arm 173 so that the block 183 is pivoted thereto and this block is normally held in one angular position relative to the arm 173 as by a spring 184 reacting between extensions 185 of the arm 173 and 186 of the block 183 and holding these extensions 185 and 186 separated as far as is permitted by the head of a stop screw 187 which extends through an opening in the extension 186 and is threaded into the extension 185. To this pin 182 is adjustably clamped, as by means of the slit clamping rings 190, the presser members 195 similar to the members 45 or 45' and which are arranged to cooperate with opposite side portions 153 and 154 of the shoe-receiving form. The presser members 195 are adjusted angularly similarly to the presser members 45 of the construction shown in Figures 1 and 2, so that the lower portions of these presser members first engage the upper of a shoe placed on the form and as the pressed members are brought into close engagement, this pressure progressively widens toward the sole of the shoe as previously described.

It will be noted that expansion or contraction of the form also correspondingly adjusts the cylinders for the presser members so that such adjusting of the form produces no effect to vary the pressure of the presser members toward the form.

Means is provided for producing hydraulic pressure back of the pistons 171 in each of the cylinders 170. For this purpose a pressure pipe 200 is connected to the interior of each of these cylinders through a perforated boss 201, the pipes 200 being connected by a Y or T fitting 202 to a pipe connection 203 secured in the upper end of the bracket 150. A passage 204 extends through this bracket and is connected at its lower end to a pipe 205 which is in communication with the interior of a pressure cylinder 206. Within this pressure cylinder is movable a pressure piston 207 which is actuated by a rod 208, the inner end of which engages at the base of a conical recess 209 in the outer end of the piston 207. This rod 208 is actuated to move the piston 207 inwardly as by means of arm 210 of a hand lever 211 fulcrumed at 212 between ears 213 extending forwardly from the lower portion of the bracket 150. This arm 210 has a forked extremity 214 which takes about a block or nut 215 adjustably secured as by a set screw 216 to a threaded portion of the rod 208. This rod 208 is shown as provided with a handle member 217 at its outer end by which it may be turned to adjust the block 12 therealong by hand. The handle 211 may be held in either of two angular positions by the pivoted dog 218 engaging in either of a pair of notches 219 and 220 in a part of the lever 211.

In the position shown in Figure 14, the piston 207 is retracted so that pressure is relieved from the cylinders 170 and the presser members 195 are retracted from the form as by means of the springs 177. In this position of the piston 207, a supply of fluid to maintain the hydraulic system full may be drawn from a reservoir 225 through a feed port 226. On depression of the handle 211, this port 226 is closed off and oil is forced from the cylinder 206 into the cylinders 170 so as to move the pistons 171 outwardly to bring the presser members into pressing relation to a shoe on the form. When the handle 211 has been depressed until the dog 218 engages in the notch 220, the presser members are in fully closed position against the shoe upper placed over the form and the amount of pressure applied may be determined by the adjustment of the block 215 along the rod 208. A stop 221 serves to limit the downward movement of the handle 211 and this should be adjusted so as to stop this movement just after the locking dog 218 engages in the notch 220. Each of the cylinders 170 is shown as provided with a threaded opening 222 normally closed by a threaded plug 223, this being for the purpose of permitting venting of air from the interiors of the cylinders 170 from time to time as may be necessary or when filling the hydraulic apparatus with the liquid such as oil, which serves as the hydraulic medium.

Figures 17 to 31, inclusive, illustrate further modifications in which the inside form is designed to still further restrict the amount of expansion at the heel end of the foot opening of the shoe, so that the form can be inserted and removed without widening or otherwise distorting the relatively narrow portion of the foot opening at the heel end, and yet permit of the expansion of the form at its forward end and near to the shoe sole to properly fill the shoe for the upper smoothing and pressing operation.

These figures show, also, improved operative mechanism by which the inside form is automatically expanded to a predetermined degree, dependent on the width of the shoe, after the shoe has been placed thereon, after which the outside forms are brought into pressing positions.

Referring to the construction shown in Figures 17 to 21, inclusive, at 301 is shown a bracket arranged to be supported from the edge of a stand or table 302 and having an arm 303 extending above the table, and an arm 304 extending below the table. Intermediate between the ends of this bracket it is provided with a pair of forwardly extended bearing portions 3040, on each of which is pivoted an arm 305. The lower ends of these arms are connected together by toggle links 306, the adjacent ends of which are pivoted to the upper end of a bar 307 slidable in a vertical bearing 308 of the bracket 301. The lower end of the bar 307 is connected, as by the links 309, to a hand lever 310 by depression of which the toggle links 306 may be brought into alinement and the lower ends of the arms 305 swung outwardly. At the upper ends of the arms 305 are outside shoe presser forms 311, which by this swinging action are brought inwardly into cooperative relation to the inside form with which this invention is more particularly concerned.

The inside form is expansible and contractible and as shown comprises a pair of sections 315 and 316. Each of these sections is shaped to

the general contour of the heel and waist portion of a shoe to be treated and presents a side shaping surface continuous substantially to the heel end of the shoe, and each is pivoted on a fulcrum pin 317 which passes through ears 318 at its upper edge to a bracket member 319, which in turn is secured as by the screws 320 to the lower end of a spool shaped portion 321 at the forward end of an arm 322 which extends forwardly from the upper end of the bracket portion 303.

It will be noted that the exis of each of the fulcrum pins 317 is inclined to the horizontal downwardly and rearwardly and is likewise inclined to the length of a shoe which is placed on the inside form for the pressing operation. The axis of each of the pivots 317 lies approximately at the upper rear or heel end of a shoe supported on the form. This position for the upper rear end of the shoe varies but little as between all the shoes which would be treated on any one particular form, though of course the forms themselves might extend more or less above the shoe top as might be desired, or found convenient. These sections 315 and 316 are yieldingly swung toward each other, as by a torsion spring 325, coiled around each pin 317 and having one end as 326 bearing on the outer face of the form section, and the other arm as 327 bearing against the outer face of the bracket 319. With the axes of the pivot pins 317 thus arranged, it will be evident that as the sections are swung outwardly, they are separated a minimum amount at the rear upper corners, and a maximum amount at the lower front corners which are further removed from these axes. Thus the upper rear portion of the form which extends through the foot opening of the shoe adjacent to the heel end of the shoe is expanded comparatively little so as not to unduly widen the foot opening at that point, while within the shoe and toward the sole end thereof, the form is expanded a much greater amount, so that the inside form will engage the inside walls of the shoe when expanded over substantially the entire areas of the outer faces of the form sections. By this construction the portion of the form which must be passed through the foot opening at the top of the shoe upper is rendered so narrow when the form is collapsed that the shoe is not distorted in removing it from the form after the pressing operation.

Means for expanding the form may comprise a cam 330 riding in a recess 331 in the confronting faces of the form sections and which is carried at the lower end of a rock shaft 335 journaled in the portion 321 of the arm 322.

Means are provided by which the inside form is expanded to an extent determined by the width and style of the shoe and is held in such position during the pressing operation when the outside forms 311 are brought inwardly to engage the shoe upper and press it against the inside form. This means may comprise a rock arm 336 secured as by a key 337 to the upper end of the rock shaft 335. This arm 336 is provided with a series of perforations 338 therethrough at different distances from the axis of the rock shaft 335, for the selective reception of a pivot pin 340 which is normally projected through the bifurcated portion 341 of the block 342 secured to the forward end of a thrust rod 343. This pin 340 is housed within a cylindrical casing 342 and carries at its upper end a knob 346. It is normally pressed downwardly through the portion 341 and through any of the selected perforations 338 as by the spring 344, enclosed within the casing 342 and reacting between the upper wall of this casing and a collar 345 secured to the pivot pin 340. Thus the effective lever arm of the arm 336 may be adjusted as desired so as to determine the degree of expansion of the form in accordance with the size of shoe to be treated. The rear end of the thrust rod 343 has a double pivotal connection about the pivot pins 348 and 349 with a rock arm 350 fulcrumed at 351 and having a cam roll 352 which rides on a rocker cam 353. This rocker cam 353 is fulcrumed at 354 and has pivotally secured thereto the upper end of a thrust rod 355, the lower end of which is pivoted as at 356 to the rear end of the lever arm 310.

As shown best in Figure 18, the rocker cam 353 has a rising cam surface from the point *a* to the point *b* so that as the rocker cam 353 is moved upwardly the arm 350 is rocked upwardly which swings the arm 336 in a direction to expand the inside form, the cam 330 moving from full to dotted line position in Figure 20. From the point *b* to the point *c* the rocker cam 353 has a surface concentric with its fulcrum 354 so that no further rocking motion of the arm 350 is produced after the high point *b* of the rocker 353 has been reached. Further motion of the lever 310 is thus expended in moving the outside forms 311 toward the inside form to produce the pressing operation.

In Figures 22 to 30 a modified construction is shown, but having for its object the same general purpose, that is, to reduce the expansion of the form at the heel end of the foot opening of the shoe while sufficiently expanding the remaining portion of the form so as to properly engage the inside of the shoe upper, but also to maintain the form narrow along the line of the top opening for the foot when expanded to a certain point, further expansion resulting in a greater expansion of the form at its forward than at its rear end. Thus, the one manner of the expansion might be more suitable for women's style shoes, and the other for other types of shoes, and these two motions of expansion can be made more or less simultaneous as desired, depending on the form, shapes and relative positions of the elements which produce these two motions. In the construction illustrated in each of these figures, each of the form sections is movable about a pair of angularly related axes. The form sections are shown at 360 and 361. Each section is carried by an arm 362, 363 and is secured with capability of a limited angular motion to a half shaft section 364. As shown best in Figures 22 and 24, each of the arms 362 and 363 is provided with a slot 365 through which passes a securing screw 366 threaded into its respective half shaft section 364. This permits each of the arms 362 and 363 a limited rocking motion about the axis of the complete shaft 364. The adjacent faces of the arms 362 and 363 are cut away as at 367 to permit this as shown best in Figure 24. The shaft sections 364 are extended rearwardly from the form, where each is pivoted on a vertical stub shaft 368, supported in ears 369 and 370 extending from the supporting frame. As shown best in Figure 23, each of these shaft sections 364 is extended completely around the pivot shaft 368, the extension of one of these arms being positioned above the extension of the other in hinge fashion. Thus each of the shaft sections is capable of independent swinging motion about the pivot shaft 368 so

that the arms 362 and 363 and the inside form sections may be moved from and toward each other, and the form sections 360 and 361 may be rocked relative to each other about the axis of the complete shaft 364. It will be noted that the axis of these shaft sections is arranged substantially in the upper heel end portion of the form comprising the sections 360 and 361, and that the adjacent faces of these sections 360 and 361 are formed with angularly related upper and lower portions 370 and 371, the juncture of which forming an edge 372 is in substantial alinement with the axis of the shaft sections 364 when they are closed together. Thus the sections 360 and 361 may be rocked about the edges 372 between the positions shown in Figures 25 and 26. In the position shown in Figure 25 where the faces 371 of the form sections are in contact, the lower portion of the form below the lines 372 is collapsed, while in Figure 26 where the faces 370 are in contact and the faces 371 diverge downwardly from each other, the lower portion of the form is somewhat expanded, so that it is substantially wider than the top opening of the shoe. The form sections may then be separated by swinging about the axis of the pivot shaft 368 into the position shown in Figure 27, in which the rear ends of the form sections are separated to some extent, but since the forward ends of the form sections are much further removed from the axis of the pivot shaft 368, these forward ends are much more widely separated, so that the forward end of the form is expanded to a much greater extent than the rear end.

In order to expand the form sections in this manner, their confronting faces are provided with recesses 375 within which are positioned above and below the edges 372 cams 376 and 377, respectively, fixed to a vertical rock shaft 378. This rock shaft is journaled in the forward end of the bracket arm 521 similarly to the mounting of the shaft 335 shown in Figures 17 to 21, and this shaft may be connected for rocking movement between contracted position and the desired expanded position by means the same as illustrated in Figures 17 to 21. Beneath the recesses 375 may be further recesses 380 for the reception of suitable heating units as 381 which may be electrical units.

The details of the cams 376 and 377 have been illustrated in Figures 28 to 30. Thus in Figure 28 it will be noted that the cam 377 is so angularly positioned as to engage on the bases of the recesses 375 and permit the form sections to be in the position shown in Figure 25 with the faces 371 in contact and the faces 370 out of contact. The weight of the parts and the distribution of this weight about the axis of the split shaft 364 will hold them in this position. This is the normal contracted condition of the form in position for the placing of a shoe thereover. After the shoe has been placed on the form and the actuating lever moved downwardly, the shaft 378 is rocked from the position shown in Figure 28 to that shown in Figure 29. This causes the cam 377 to be turned in a manner to wedge apart the lower portions of the sections 360 and 361, thus partially expanding this lower portion while retaining the angular ridges 372 in contact. Further turning of the shaft 378 then brings the cam 376 into action, wedging the sections apart bodily against the action of the torsion spring 385 which is coiled about the post 386 and provided with down-turned ends 387 engaging outwardly of the arms 362 and 363. The extent of this separation of the form sections, each swinging about the axis of the pivot shaft 368, the shaft sections 364 separating from each other, gives the final expanded condition of the form, the extent of such expansion being regulated by the adjustment of the effective length of the lever arm of the member 336 as shown in Figure 21. It will be noted that the horizontal axis of the shaft section 364 is arranged substantially lengthwise of the shoe on the form, the shoe being shown in dotted lines in Figure 22, and that it passes in close proximity to the top edge of the shoe at the heel end, while the separation of the form sections from each other is about an axis substantially heightwise of the shoe and angularly related to the rocking axis of the shaft section 364. It will be noted in both constructions that there is a fullness on the inside wall of the foot at the shank which is not present on the outside wall and in order that the form shall engage the shoe upper from substantially the innersole to its top edge, the inside section is shown as provided with an extension 390 which engages in a recess 391 in the outside form section when the form is collapsed as shown in Figures 19 and 25.

In the cheaper grades of shoes the innersoles are not skived at their edges, and in order that such a shoe may be properly shaped by the machine adjacent to the sole, the form may be provided with a downwardly extending rim or lip 395 which extends outside of the edge of the innersole and supports the shoe upper substantially to the sole during the pressing operation against the pressure of the outer pressing member. With this form, the upward pull exerted on the shoe upper by the wiping action of the pressing mechanism draws the upper into close engagement with the rim or lip. This is highly desirable and would materially aid in properly shaping the shoe upper and removing the wrinkles from the lining in close proximity to and along the edge of the inside of the upper of the shoe where it contacts the innersole or its substitute even in the absence of inwardly directed pressure by the outer pressing members against said rim or lip. In shoe manufacture shoes of some types provide innersoles, others rands or narrow strips of leather, and still others merely lips or channels of the outersoles themselves to aid in the securement of the upper to the sole.

In Figure 31 a modification is shown in which the extension 390 and recess 391 are eliminated by changing the angles of the confronting side faces 371' of the form sections at the shank portions.

This application is a continuation in part of my applications Serial No. 56,609, filed December 30, 1935, for Method of and means for shaping and smoothing shoe uppers, and Serial No. 249,239, filed January 4, 1939, for Shoe pressing and re-forming mechanism.

From the foregoing description of certain embodiments of this invention, it will be evident to those skilled in the art that various further changes and modifications might be made without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:

1. The method of smoothing the upper of a shoe, which comprises placing the shoe over a form against which the lining may be engaged, and then pressing the outer and lining toward said form and heightwise of the shoe by pressure applied toward the upper edge of said upper and progressively widening toward the shoe sole and

through substantially the full height of the quarter of the shoe.

2. The method of smoothing the upper of a shoe, which comprises placing the shoe over a form against which the lining may be engaged, and then pressing the outer and lining toward said form and heightwise of the shoe by pressure applied toward the upper edge of said upper and progressively widening toward the shoe sole and through substantially the full height of the vamp of the shoe, said pressure being applied in an upward direction relative to the shoe to tend to stretch the upper in a direction away from the shoe sole.

3. The method which comprises exerting simultaneous smoothing pressure to a shoe upper from opposite faces over substantially the entire side from the heel end forwardly throughout the waist portion of the shoe.

4. The method which comprises subjecting the side wall of a shoe upper substantially to the sole and from the heel end forwardly through the waist to simultaneous pressure between opposing forms.

5. The method of smoothing the upper of a shoe, which comprises placing the shoe over a form against which the lining may be engaged, expanding the form, and applying pressure to the outside of the upper simultaneously throughout substantially the entire side portion from the heel end forwardly throughout the waist portion of the shoe to press and smooth the upper against the form.

6. A machine comprising an expansible inner form over which a shoe may be placed, means actuable with the shoe in position on said form to expand said form, and means engageable with the outside of the shoe upper on said form and simultaneously over substantially the entire side portion of the upper from the heel end forwardly throughout the waist portion to press said upper against said form.

7. In combination, a laterally expansible and contractible form over which a shoe may be placed, means for adjustably fixing the limit of expansion of said form, and means actuable to expand and contract said form to and from the limit set.

8. In combination, an expansible and contractible form over which a shoe may be placed, means actuable to press the upper of a shoe on said form against said form, a lever, operative connections between said lever and pressing means, means actuable to expand said form, and operative connections between said lever and said expanding means.

9. In a machine having a shoe-holding form and a presser member for pressing a shoe against said form, the combination of an arm for carrying said presser member, a block pivoted to said arm about an axis substantially parallel to the longitudinal axis of a shoe on said form, and pivotally supporting said member on an axis substantially perpendicular to said substantially parallel block axis, a spring acting on said block to press it in one angular direction about its axis, and stops for limiting the pivotal motion of said block in both directions.

10. In combination, an expansible and contractible form over which a shoe may be placed, means for adjustably fixing the limit of expansion of said form, means movable from and toward said form to press the upper of a shoe on said form against the surface of said form, and means actuable to move said pressing means to and from said form and to expand and contract said form to and from the limit set.

11. In combination, a support, a form over which a shoe may be placed, said form comprising side sections pivoted together and to said support to expand and contract said form, a rocking cam between said sections shaped to swing said sections apart or to permit them to approach each other as said cam is rocked, yielding means holding said sections swung toward each other as far as permitted by said cam, a pair of side presser members, one on each side of said form, pivoted arms carrying said side presser members to swing said members from and toward said form as said arms are swung, a lever, operative connections between said lever and arms to cause rocking of said lever to swing said arms, and means actuated by the rocking of said lever for rocking said cam.

12. In combination, an expansible and contractible form over which a shoe may be placed, cam means for expanding said form, means for adjustably limiting the extent of expansion of said form, means for actuating said cam means between form-contracted condition and the expended condition determined by the adjustment of said limiting means, and means actuable to press the upper of a shoe on said form while said form is so expanded.

13. A machine comprising an expansible inner form over which a shoe may be placed, means actuable with the shoe in position on said form to expand said form, and means engageable with the outside of the shoe upper on said form to press said upper against said form throughout substantially the full height of the quarter and from the heel end forwardly.

14. A machine comprising an expansible inner form over which a shoe may be placed, means actuable with the shoe in position on said form to expand said form, and means engageable with the outside of the shoe upper on said form to press said upper against said form throughout substantially the full height of the quarter and from the heel end forwardly throughout the waist of the shoe.

15. A machine comprising a form over which a shoe may be placed, said form being laterally expansible into contact with the inside of the shoe upper, means actuable while the shoe is on said form to expand said form, and means engageable with the outside of the shoe upper on opposite sides simultaneously substantially throughout from the heel end forwardly and throughout the waist of the shoe to press said upper against the sides of said form.

16. A machine comprising an expansible inner form over which a shoe may be placed, presser members for engaging the outside of the shoe upper placed over said form, and means acting simultaneously to expand said form and to move said presser elements toward said form.

17. A machine comprising an expansible and contractible inner form over which a shoe may be placed, outer side pressing means movable toward and from said form, means for moving said pressing means, and means actuated by said member-moving means for expanding and contracting said form.

18. A machine comprising a contractible form over which a shoe may be placed, pressing means for engaging the outside of a shoe upper placed over said form and pressing the shoe upper against said form, and means acting simultaneously to move said pressing means away from said

form and to contract said form to facilitate removal of a shoe from said form without distortion thereof after a pressing operation.

19. A machine comprising a contractible form over which a shoe may be placed, pressing means movable for engaging the outside of a shoe upper placed over said form to press the upper against said form, means for moving said pressing means away from said form, and means actuated by said moving means to contract said form to facilitate removal of a shoe therefrom without distortion after a pressing operation.

20. A machine comprising a form comprising two longitudinally extending parts and over which a shoe may be placed, means securing said two parts together with capability of expanding and contracting laterally, a rocking cam positioned between said parts with its axis intersecting said form and provided with surfaces cooperating therewith to expand said parts or to permit said parts to contract on moving of said cam relative to said parts, and means for producing such relative motion.

21. A machine comprising a form comprising two longitudinally extending parts and over which a shoe may be placed, means securing said two parts together with capability of expanding and contracting laterally, a cam rockable between said parts on an axis extending toward the sole of a shoe on said form and having faces coacting therewith to cause said cam when rocking in one direction from a predetermined angular position to separate said parts and said cam when rocking back toward said position to permit said parts to close together, and means for rocking said cam.

22. A machine comprising a two-part form over which a shoe may be placed, means securing said two parts together with capability of expanding and contracting, a cam positioned between said parts and provided with surfaces cooperating therewith to expand said parts or to permit said parts to contract on moving of said cam relative to said parts, outer presser members for pressing the upper of a shoe on said form against said form, and means for simultaneously pressing said presser members toward said form and for actuating said cam to expand said form.

23. A machine comprising a form for engagement with the inner face of a shoe upper, a presser member movable from and toward said form, said presser member having a pivotal mounting on an axis substantially lengthwise of said shoe, means yieldingly holding said member in an angular position about said pivot such that as said member is moved toward said form it contacts with a shoe upper thereon first remote from the lower edge of said upper and progressively contacts with said upper nearer said lower edge and tends to stretch said upper heightwise as said members continues to approach said form, and means for moving said member toward or away from said form.

24. A machine comprising a form over which a shoe may be placed, a pair of presser members movable from and toward opposite sides of said form, each of said presser members having a pivotal mounting on an axis substantially lengthwise of the shoe, means yieldingly holding each member in an angular position about said pivot such that as said members move toward said form they contact with a shoe upper first remote from the sole of the shoe and then progressively nearer to said sole and tend to stretch said upper heightwise as said members continue to approach said form, and means for moving said members toward or away from said form.

25. A machine comprising a form over which a shoe may be placed, a presser member movable toward and from a side of said form, said form and presser member being mounted for relative motion heightwise of a shoe on said form while both form and member are in engagement with the upper of the shoe to wipe said upper heightwise as they approach fully pressed condition, and means yieldingly opposing such relative wiping motion determining the wiping pressure.

26. A machine comprising a form over which a shoe may be placed, a presser member movable toward and from a side of said form, said form and presser member being mounted for relative motion heightwise of a shoe on said form while both form and member are in engagement with the upper of the shoe to wipe said upper heightwise as they approach fully pressed condition, and means for adjusting the amount of such relative wiping motion.

27. A machine comprising a form over which a shoe may be placed, a presser member movable toward and from a side of said form, said form and presser member being mounted for relative motion heightwise of a shoe on said form while both form and member are in engagement with the upper of the shoe to wipe said upper heightwise as they approach fully pressed condition, means yieldingly opposing such relative wiping motion determining the wiping pressure, and means for adjusting the amount of such relative wiping motion.

28. A machine comprising a form over which a shoe may be placed, said form comprising a pair of side portions hinged together, a presser member movable toward and from each side of said form, each presser member having a pivotal mounting on a pivot extending substantially heightwise of said shoe and being free to swing about said pivot to conform to the angular position of its mating side form portion in any hinged position, and means for moving said presser members toward or from said form.

29. A machine comprising a form over which a shoe may be placed, said form comprising a pair of side portions hinged together, a presser member movable toward and from each side of said form, each presser member having a pivotal mounting on a pivot extending substantially heightwise of said shoe and being free to swing about said pivot to conform to the angular position of its mating side form portion in any hinged position and on a second pivot having its axis substantially lengthwise of said shoe, means yieldingly holding each of said members in an angular position about its second pivot such that as said members are moved toward said form they contact with the shoe upper first remote from the sole of the shoe and then progressively nearer to said sole and tend to stretch said upper heightwise away from said sole as said members continue to approach said form, and means for moving said presser members toward or from said form.

30. A machine comprising a form over which a shoe may be placed, said form comprising a pair of side portions hinged together, a presser member movable toward and from each side of said form, each presser member having a pivotal mounting on a pivot extending substantially heightwise of said shoe and being free to swing about said pivot to conform to the angular position of its mating side form portion in any hinged

position, and on a second pivot having its axis substantially lengthwise of said shoe, means yieldingly holding each of said members in an angular position about its second pivot such that as said members are moved toward said form they contact with the shoe upper first remote from the sole of the shoe and then progressively nearer to said sole and tend to stretch said upper heightwise away from said sole as said members continue to approach said form, and means for moving said presser members toward or from said form, said form and members when closed together engaging substantially the full height of the shoe upper from the heel portion forwardly to the forward end of the waist of the shoe.

31. A machine comprising a form for engagement with the interior of a shoe upper, a presser member for pressing said shoe upper against said form, said presser member having a shank, a hub member having oppositely extending trunnions, means for clamping said shank to said trunnions in adjustable angular relation, a support, a block pivoted to said support about an axis generally longitudinally to said shoe upper, means pivotally connecting said hub to said block about an axis substantially perpendicular to said block and support pivot and said trunnion axis, means for yieldingly holding said block in one angular position such that said member first engages said upper remote from its lower edge as said support is moved toward said form and progressively increases the contact with said upper toward said lower edge, and means for moving said support toward or from said form.

32. A machine comprising a form over which a shoe may be placed, a pair of cylinders arranged on opposite sides of said form, pistons in said cylinders movable toward and from said form, presser members located opposite to the sides of the upper of a shoe on said form and operatively connected to said pistons to be moved thereby toward and from said form, and means for applying pressure to the interiors of said cylinders back of said pistons to move said presser members to press a shoe upper on said form thereagainst.

33. A machine comprising a form over which a shoe may be placed, an outer presser member, and means for so relatively moving said form and member as to press the shoe upper therebetween first toward the upper edge of the upper and progressively approaching the shoe sole until the pressure is applied through substantially the full height of the quarter of the shoe.

34. In combination, a shoe form comprising a plurality of parts extending longitudinally thereof and having shoe engaging surfaces extending from the heel end forwardly, means supporting said parts for relative expansion and contraction, means for expanding said parts simultaneously throughout the length of their shoe supporting portions and to a greater extent at the forward than at the rearward ends of said portions, and presser means mounted with freedom of motion to conform to any degree of expansion of said form to press the upper of a shoe on said form against said form.

35. An inside shoe pressing form comprising a plurality of sections together presenting side surfaces continuous to substantially the heel end of a shoe on said form, means supporting said sections for relative motions from and toward each other and with said sections at the upper rear portion of said form movable substantially less than elsewhere, and means actuable to move said sections relatively as so supported to expand and contract said form.

36. An inside shoe pressing form having a plurality of sections together presenting side surfaces continuous to substantially the heel end of a shoe supported on said form, means supporting said sections pivotally about axes extending in proximity to the upper rear corner of a shoe on said form, and means for expanding said sections about said axes.

37. An inside shoe pressing form comprising a pair of side sections extending to the heel end of a shoe supported on said form, means supporting each section for pivotal motion about an axis oblique to the longitudinal axis of a shoe placed on said form.

38. An inside shoe pressing form comprising a pair of side sections extending to the heel end of a shoe supported on said form, means supporting each section for pivotal motion about an axis oblique to the longitudinal axis of a shoe placed on said form and located approximately through the upper edge at the back of the upper of said shoe.

39. An inside shoe pressing form comprising a pair of side sections extending to the heel end of a shoe supported on said form, means supporting each section for pivotal motion about an axis oblique to the longitudinal axis of a shoe placed on said form, and means for swinging said sections about said axes to expand and contract said form.

40. An inside shoe pressing form comprising a pair of side sections extending to the heel end of a shoe supported on said form, means supporting each section for pivotal motion about an axis oblique to the longitudinal axis of a shoe placed on said form and located approximately through the upper edge at the back of the upper of said shoe, and means for swinging said sections about said axes to expand and contract said form.

41. An inside shoe form comprising side sections extending to substantially the heel end of a shoe supported on said form and each hinged on an axis located in the upper portion of said form remote from the sole of a shoe placed thereover.

42. An inside shoe form comprising a plurality of relatively movable sections, and means for expanding said sections in a plurality of manners, one manner of such expansion acting to expand the form adjacent to the sole of a shoe placed thereon and to the heel end to a greater extent than portions further removed from said sole, and another manner of said expansion acting to expand the forward portion of said form toward the toe end of a shoe placed thereover to a greater extent than the heel end of said form.

43. An inside shoe form comprising a pair of side sections each pivoted to swing on a pair of angularly related axes, and means actuable to swing said sections about each of said axes to expand and contract said form.

44. An inside shoe form comprising a pair of side sections, each pivoted about an axis heightwise of a shoe on said form and about an axis angularly related to said heightwise axis, and means for swinging said sections about both axes to expand and contract said form.

45. An inside shoe form comprising a pair of side sections, each pivoted about an axis heightwise of a shoe on said form and rearwardly of said form and about an axis angularly related to said heightwise axis, and means for swinging said sections about both axes to expand and con-

tract said form and to an extent to cause maximum expansion of said form at its forward lower portion and minimum expansion at its rear upper portion.

46. An inside shaping shoe form having a pair of side sections provided with heightwise angularly disposed engaging surfaces forming edges about which said sections may rock relatively and having their confronting faces recessed, a pair of arms each pivoted on a heightwise axis back of said sections and extending forwardly and on which said sections are pivotally mounted, a rock shaft substantially heightwise of and extending between said sections, a pair of cams on said shaft located in said recesses, one of said cams engaging the lower portions of said sections and tending to rock said sections relatively to separate their lower portions and bring their upper portions together, and the upper of said cams engaging the upper portions of said sections and tending to swing said sections apart about the heightwise axis of said arms, yielding means opposing said cams, and means for rocking said rock shaft.

47. An inside shaping shoe form having a pair of side sections provided with heightwise angularly disposed engaging surfaces forming edges about which said sections may rock relatively and having their confronting faces recessed, a pair of arms each pivoted on a heightwise axis back of said sections and extending forwardly and on which said sections are pivotally mounted, a rock shaft substantially heightwise of and extending between said sections, a pair of cams on said shaft located in said recesses, one of said cams engaging the lower portions of said sections and tending to rock said sections relatively to separate their lower portions and bring their upper portions together, and the upper of said cams engaging the upper portions of said sections and tending to swing said sections apart about the heightwise axis of said arms, yielding means opposing said cams, and means for rocking said rock shaft, that section engaging with the inside wall of the shoe upper having a bottom extension, and the other of said sections having a recess to receive said extension when said form is collapsed.

48. An inside shaping form comprising a pair of sections each having a side contour shaped to the desired contour of the corresponding side of the upper of a shoe supported on said form and movable laterally from and toward each other to contract or expand said form, that section engaging with the inside wall of the shoe upper having a bottom extension and the other of said sections having a recess to receive said extension when said form is collapsed, said extension reaching substantially to the top face of the sole of the shoe when said form is expanded, and means for expanding and contracting said form.

49. An inside shoe form comprising a pair of side sections each pivoted to swing on a pair of angularly related axes, one of which lies in proximity to the top rear portion of a shoe on said form, and means actuable to swing said sections about both of said axes to expand and contract said form.

50. In combination with an expansible and contractible inside form over which a shoe may be placed, a rock shaft turntable in one direction to expand said form, an arm on said rock shaft, a member movable in a path of constant amplitude for turning said rock shaft, and a connection from said member to said crank engageable with said crank at any selected of a plurality of positions at definite distances from the axis of said shaft, each distance corresponding to a shoe size.

51. In combination with an expansible and contractible inside form over which a shoe may be placed, means for engagement with the outside of the upper of a shoe on said form and movable toward and from said form, means for expanding said form with a shoe in place thereon, means for moving said engaging means toward and from said form, and means connecting said expanding and moving means causing expansion of said form by engaging motion of said moving means and including means holding said form in expanded condition before said engaging means engages and presses said shoe upper against said form.

52. In combination with an expansible and contractible inside form over which a shoe may be placed, means for engagement with the outside of the upper of a shoe on said form and movable toward and from said form, means for expanding said form with a shoe in place thereon, means for moving said engaging means toward and from said form, a lever connected to actuate by its swinging said expanding means and having a cam follower, and a cam engaging said follower and connected for motion by actuation of said moving means, said cam having a cam portion shaped to move said lever to expand said form during the initial motion of said engaging means toward clamping position, and a cam portion positioned to hold said lever in form-expanded position during the remainder of the motion of said engaging means to shoe upper pressing position.

53. An inside shoe form comprising a pair of side sections pivoted to swing toward and away from each other at their lower ends to contract and expand said form, each of said sections having an outer face shaped to substantially the desired contour of the corresponding side of the upper of a shoe supported on said form, each of said faces when said form is expanded extending substantially to the inside face of the shoe sole.

54. A machine comprising a form over which a shoe may be placed, a presser member, movable means supporting said presser member for motion of said presser member by motion of said supporting means toward and from said form, means mounting said presser member on said supporting means for adjustment to regulate the angle at which contact with a shoe on said form is made by said member when moved toward said form, and means for moving said supporting means to bring said member toward and from said form.

55. A machine comprising a form over which a shoe may be placed, a presser member, and a movable element supporting said member for motion toward and from said form on motion of said element, the support of said member by said element including means for adjusting the angle at which contact with a shoe on said form is made by said member when said element is moved in a direction to move said member toward said form.

56. A machine comprising a form over which a shoe may be placed, a presser member, and a pivoted arm supporting said member for motion toward and from said form on swinging of said arm, the support of said member by said arm including means for adjusting the angle at which contact with a shoe on said form is made by said

member when said arm is swung in a direction to move said member toward said form.

57. A machine comprising a form over which a shoe may be placed, a presser member, and a movable element supporting said member for motion toward and from said form on motion of said element, the support of said member by said element including means for adjusting the angle at which contact with a shoe on said form is made by said member when said element is moved in a direction to move said member toward said form, said support also including means permitting a change of said angle after said contact has been made by pressure between said member and a shoe on said form.

58. A machine comprising a form over which a shoe may be placed, a presser member, and a pivoted arm supporting said member for motion toward and from said form on swinging of said arm, the support of said member by said arm including means for adjusting the angle at which contact with a shoe on said form is made by said member when said arm is swung in a direction to move said member toward said form, said support also including means permitting a change of said angle after said contact has been made by pressure between said member and a shoe on said form.

59. A machine comprising a form over which a shoe may be placed, a presser member, and a movable element supporting said member for motion toward and from said form on motion of said element, the support of said member by said element including means for adjusting the angle at which contact with a shoe on said form is made by said member when said element is moved in a direction to move said member toward said form, said support also including means permitting a chaneg of said angle after said contact has been made by pressure between said member and a shoe on said form, and yielding means resisting such change of angle.

60. A machine comprising a form over which a shoe may be placed, a presser member, and a pivoted arm supporting said member for motion toward and from said form on swinging of said arm, the support of said member by said arm including means for adjusting the angle at which contact with a shoe on said form is made by said member when said arm is swung in a direction to move said member toward said form, said support also including means permitting a change of said angle after said contact has been made by pressure between said member and a shoe on said form, and yielding means resisting such change of angle.

61. A machine comprising a form over which a shoe may be placed, and means including a presser member movable toward and from a side of said form, said means including a pivot for mounting said presser member, and means for adjustably limiting the free rocking of said presser member on said pivot to a predetermined angular extent and position.

62. A machine comprising a form over which a shoe may be placed, a presser member movable toward and from a side of said form, said member being mounted for pivotal motion about an axis back of its pressing face, means for adjustably regulating the angular position of said member about said axis as said member first contacts a shoe on said form when moved toward said form, and yielding means permitting said member to tilt about said axis from said angular position under pressure as said member is moved to full pressing position with relation to said shoe and form.

63. A machine of the class described, comprising a form over which a shoe may be placed, a presser member movable toward and from a side of said form, said form and presser member being relatively adjustably mounted for selective cooperation for relative motion while in contact with the upper of a shoe on said form to wipe said upper heightwise as they approach fully pressed condition and for predetermining pressure distribution over various areas with or without wipe.

64. In combination, a shoe form on which a shoe having an inner sole may be placed, said form having a portion projecting toward the shoe sole outwardly of the margin of said innersole when the shoe is placed thereover, and means for pressing the upper of a shoe placed on said form against the face of said form adjacent to said projecting portion.

65. In combination, a form over which a shoe with an innersole may be placed for an upper pressing operation, said form having a downwardly extending lip along a portion of its bottom edge, said lip lying outwardly of the margin of the innersole of a shoe on said form during the pressing operation, and means for pressing the upper of a shoe on said form against the face of said form adjacent to said lip.

66. A shoe form on which a shoe having an innersole may be placed, said form having a portion projecting toward the shoe sole outwardly of the margin of said innersole when the shoe is placed thereover, and means for pressing the upper of a shoe placed on said form against the face of said form including that of said projecting portion.

67. A form over which a shoe with an innersole may be placed for an upper pressing operation, said form having a lip along a portion of its bottom edge, said lip lying outwardly of the margin of the innersole of a shoe placed on said form during the pressing operation, and means for pressing the upper of a shoe placed on said form against the face of said form including that of said projecting portion.

68. A machine comprising a form over which a shoe may be placed, slides guided for motion in rectilinear direction toward and from opposite sides of said form, outer shoe pressing members carried by said slides, and means for actuating said slides to move said pressing members toward and from said form.

69. A machine comprising a pair of members hinged together, a shoe supporting form part carried by each of said members and together defining a laterally expansible and contractible form over which a shoe may be placed, and outer shoe pressing parts carried by said members and moved relative to said members to and from positions to press a shoe on said form against said form.

70. In combination, a shoe form over which a shoe may be placed, said form having a portion on its lower outer margin projecting toward the shoe sole, shoe upper engaging means, and means for actuating said engaging means to press the upper of a shoe placed on said form against the face of said form adjacent to said projecting portion.

71. A machine comprising side presser jaws and a shoe form over which a shoe may be placed, said form having a portion on its lower outer margin projecting toward the shoe sole when the

shoe is on said form, and means for moving said side presser jaws to press the upper of a shoe on said form against the face of said form adjacent to said projecting portion.

72. In combination, a shoe form over which a shoe may be placed, said form having a portion on its margin projecting toward the shoe sole, means engaging the shoe upper, and means to actuate said engaging means to pull the shoe upper away from the shoe sole about said projecting portion.

73. In combination, a shoe form over which a shoe may be placed, said form having a portion on its margin projecting toward the shoe sole, means engaging the outside of the shoe upper, and means for pressing said engaging means toward the face of said form with a component of wiping pressure away from the shoe sole tending to pull the shoe upper against said projecting portion.

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