

Jan. 31, 1933.

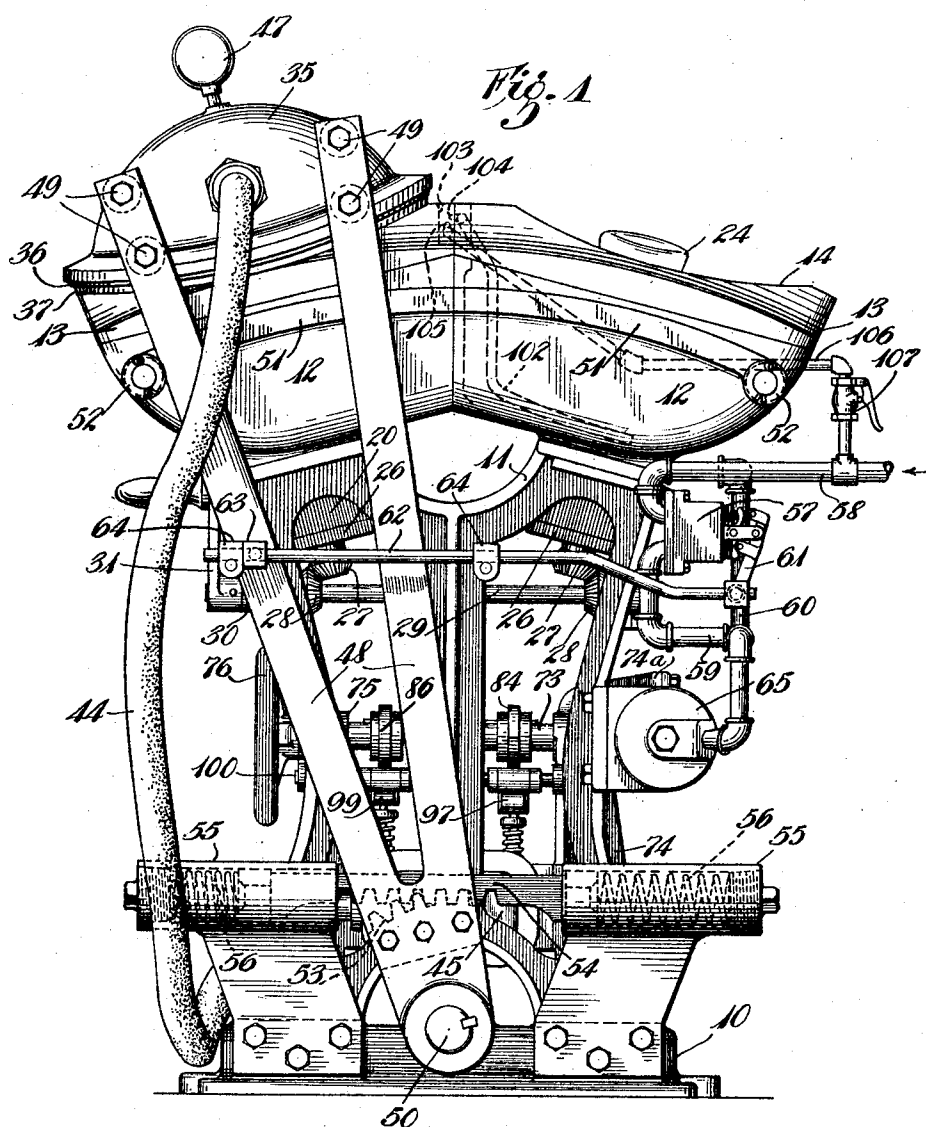
R. V. RITCHEY

1,895,941

SHOE PRESSING APPARATUS

Filed Nov. 5, 1929

4 Sheets-Sheet 1



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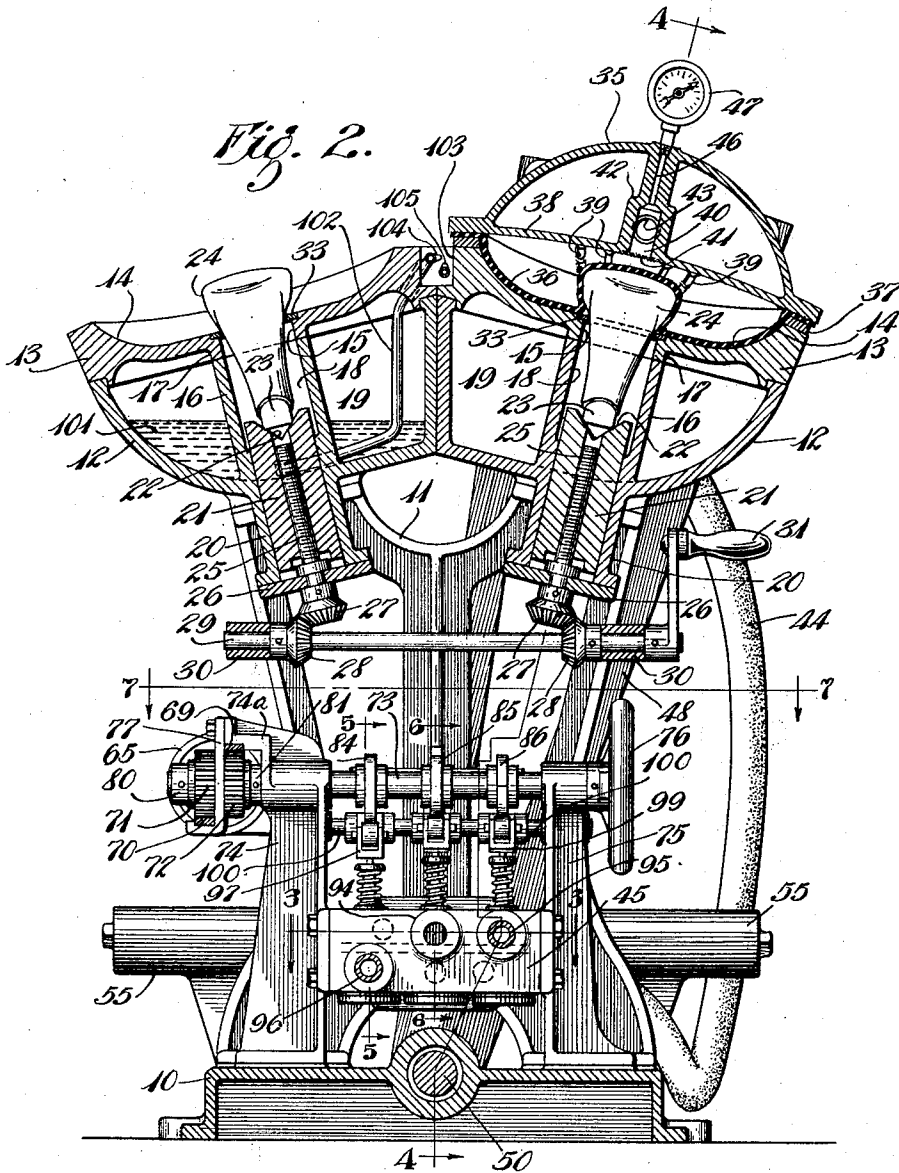
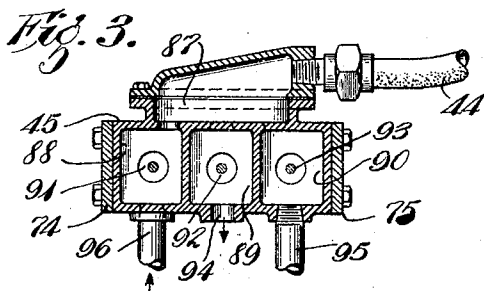
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4 Sheets-Sheet 2



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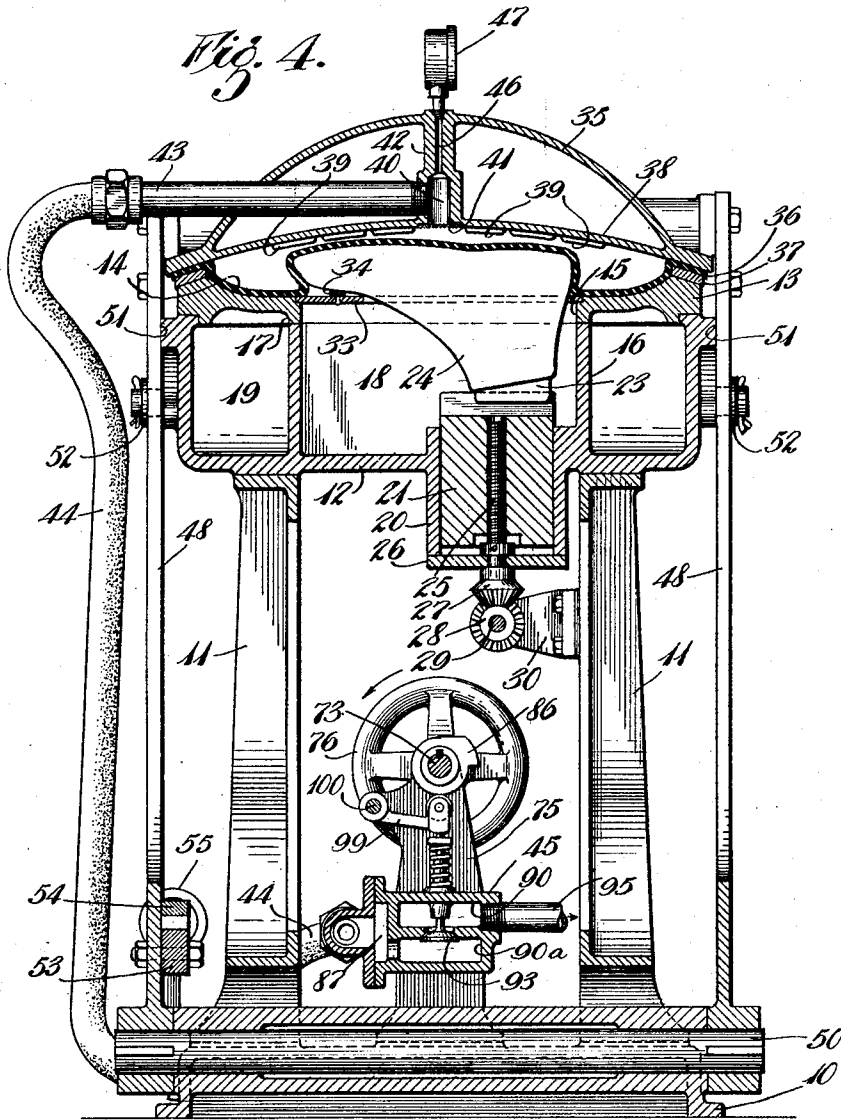
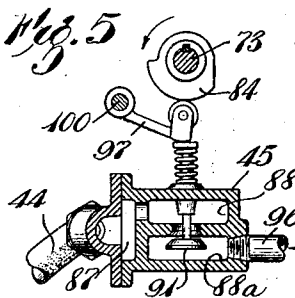
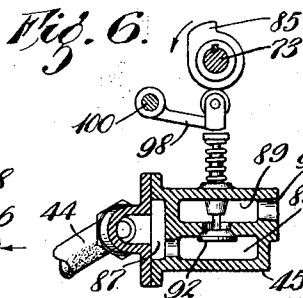
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4 Sheets-Sheet 3



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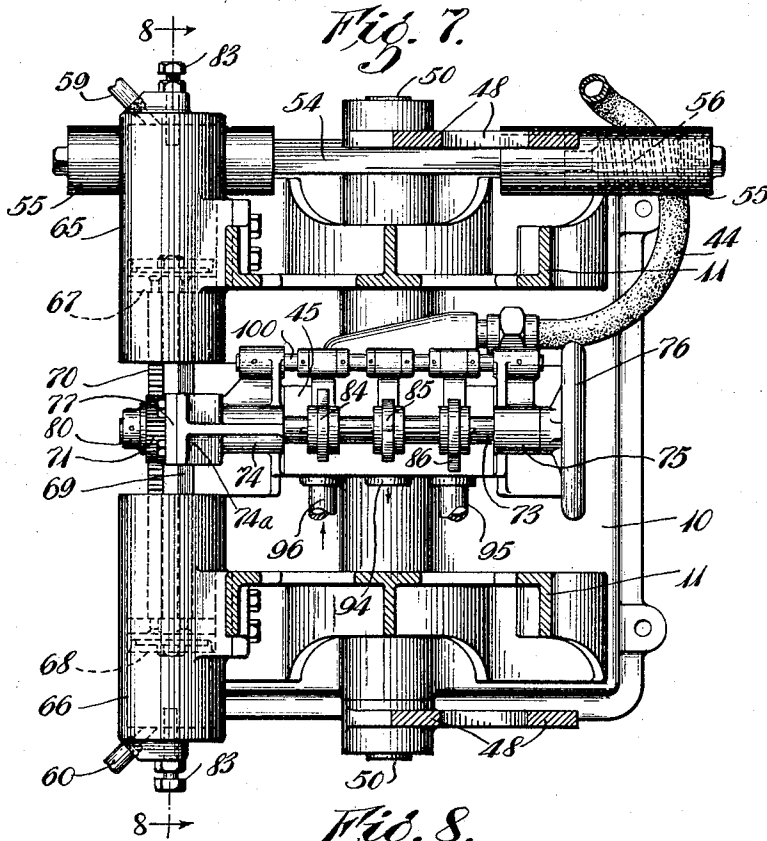
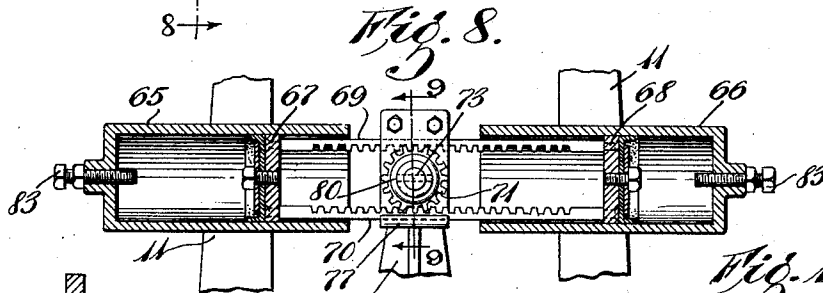
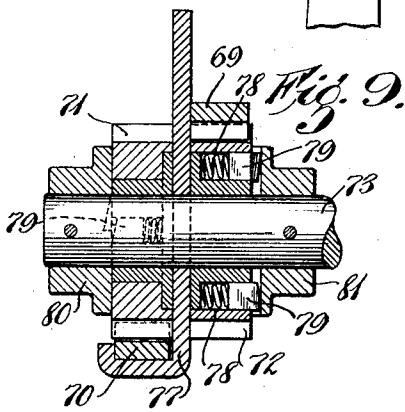
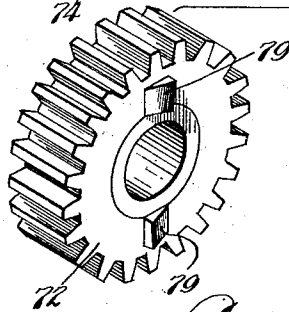
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SHOE PRESSING APPARATUS

Filed Nov. 5, 1929

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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SHOE PRESSING APPARATUS

Application filed November 5, 1929. Serial No. 404,969.

This invention relates to shoe pressing apparatus, and more especially to apparatus for applying mechanical pressure to the sole and adjacent portions of a lasted shoe to press the outsole thereagainst and to fold the marginal portions of the sole onto the shoe upper to adhesively attach it thereto.

The chief objects of the invention are to save time in the pressing of footwear, whereby the output of the operator is increased, and to provide improved apparatus for so doing. More specific objects are to provide shoe pressing apparatus of the diaphragm type in which the diaphragm will have longer life; which will operate uniformly on shoes of all sizes; which will be capable of operating under relatively high pressure and thus improve the adhesion of the parts pressed; and which will not distort or displace parts of the shoe being pressed.

Of the accompanying drawings:

Fig. 1 is a rear elevation of apparatus embodying my invention in its preferred form.

Fig. 2 is a vertical section through the apparatus, viewed from the front thereof.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a section on line 5—5 of Fig. 2.

Fig. 6 is a section on line 6—6 of Fig. 2.

Fig. 7 is a section on line 7—7 of Fig. 2.

Fig. 8 is a section on line 8—8 of Fig. 7.

Fig. 9 is a section on line 9—9 of Fig. 8.

Fig. 10 is a perspective view of a driving pinion, and clutch mechanism associated therewith.

Broadly my invention comprises a plurality of supports, herein shown as two, for footwear such as lasted shoes, and a pressing device adapted to be brought into operative association with said shoe supports, in alternation, to press the shoes supported thereby.

Referring to the drawings, the apparatus comprises a base member 10 from the opposite ends of which rise frame members 11, 11 which support between them upon their upper ends a pair of pots 12, 12, the latter being positioned side by side and secured to said frame members 11 and to each other. The upper side of each pot 12 is provided with

an inwardly dished closure member 13, the top edge face of which is of spherical form, and the two closures 13 are so positioned with relation to each other that their top edge faces represent parts of the same spherical figure.

The dished form of each closure 13 provides a recess 14 and each closure 13 is formed with a central aperture 15 in the form of an elongate slot having rounded ends. In plan, the recess 14 is substantially elliptical. The pot 12 is formed interiorly with an elongate, annular flange or wall 16 which rises from its bottom wall to a plane substantially flush with the upper margin of the pot, and is engaged by a complementary flange 17 extending downwardly from the closure 13 about the margin of its central aperture 15. The wall 16 thus provides support for the central region of the closure 13, and divides the pot 12 into an inner chamber 18 and an outer chamber 19.

Extending downwardly from each pot 12 is a rectangular boss or guideway 20 in which is slidably mounted a last-support 21 the upper end of which extends into the chamber 18 and is notched as at 22 to receive the shank of a last 23, having a shoe 24 thereon, and to support the last for the pressing operation. The notch 22 in the last-support 21 is disposed parallel to the side walls of the chamber 18 and is of such length as to engage the shanks of all lasts, from the smallest to the largest, when said lasts are positioned centrally of the cover-aperture 15.

The last-support 21 is mounted upon the upper end of a supporting and adjusting screw 25 which is swiveled in a plate 26 constituting a bottom closure for the boss 20. The lower end of the screw 25, outside the boss 20, is provided with a bevel gear 27 meshed with a bevel gear 28 mounted upon a shaft 29 which is journaled in brackets 30, 30 mounted upon one of the frame members 11. The shaft 29 extends to one side of the machine and is there provided with a hand crank 31 whereby both screws 25 may be concurrently rotated to raise or lower the last-supports 21 within the pots 12. The arrangement of the last-supports is such that both are disposed radially with relation to the

spherical surface of the closure members 13.

An annular plate 33 having the same outside contour as the aperture 15 in the cover member 13 is mounted with its marginal portion set in a rabbet formed at the upper margin of said aperture, the plate being provided on its upper surface with a rubber cushion member 34, Fig. 4, adapted to afford a rest for the toe portion of the shoe 24 without damage to the latter when said shoe is mounted upon the shoe support 21.

The plate 33 and the floor of the dished cover 13 are adapted to afford a stop for a sole pressing diaphragm, the said plate extending entirely about the shoe at a substantial distance from the sole of the latter but in close proximity to the adjacent surface of the shoe, so that a diaphragm distended by fluid pressure into the angle formed by the plate and the shoe will not be required of its own strength to bridge such a gap between the two as to be subjected to excessive strain by the fluid pressure. The plate 33 is easily removable from its seat in the cover-member 13, and various plates are provided having different sized openings therein to accommodate shoes of different sizes. In every plate the shoe-receiving opening is so positioned that a shoe mounted therein has its longitudinal extremities disposed substantially equidistant from the margins of the diaphragm with the result that uniform distension of the latter obtains during a shoe-pressing operation. The vertical adjustment of the shoe support 21 and the length of the notch 22 in its upper face enable it to engage and support the shank portions of lasts of any size, and hold it with the sole-face of the shoes below the extended spherical top surface of the closure 13.

An upper presser-head adapted to coact in alternation with the lower shoe supporting and positioning structures just described comprises a dome-like supporting structure 35 having an elastic diaphragm 36 mounted in the manner of a drum head upon its margin, the margin of the diaphragm 36 being clamped to the margin of the dome by means of an annular clamping plate 37. The marginal face of the dome 35, to which the plate 37 is secured, is concentric with the spherical surface of the closures 13 so as to permit it to be positioned closely adjacent thereto with but little clearance. The dome 35 in plan has the contour of an ellipse, so that the diaphragm mounted thereon is concave along its long axis and chordal in a transverse direction. The arrangement is such that in normal unstretched condition the diaphragm will lightly rest upon the sole of a shoe mounted in the recess 14.

Behind the diaphragm 36 is a concave backing plate 38 which is secured to or formed integral with the dome adjacent the lower margin of the latter, and said plate is formed on

its surface next to the diaphragm with spaced apart, disconnected ribs or lugs 39, 39 which hold the diaphragm out of complete surface contact with the plate 38 in the region over the work to be pressed. The space between the diaphragm 36 and backing plate 38 is sealed except for a port 40 opening into said space through the backing plate in a central region surrounded by the lugs 39, and the open end of said port is provided with a pervious screen 41 to prevent the diaphragm being sucked thereinto when suction is applied to the diaphragm, upon occasion, during a shoe-pressing cycle of operations.

The port 40 connects with a passage 46 formed in a post or column 42 extending from the plate 38 to the dome 35 to reinforce the plate 38, and a pipe 43 having communication with the port 40 extends through the dome to a point at the rear of the apparatus and is there connected with a flexible pipe or conduit 44 extending to a valve structure 45 mounted on brackets 74, 75 and adapted to supply fluid pressure or suction to the diaphragm 36, through the conduit 44 as presently will be described. The passage 46 formed in the column 42 is provided with a pressure gauge 47 on top of the dome.

The presser-head is mounted upon the upper ends of a pair of bifurcated rocker-arms 48, 48 which are secured to the dome 35 by bolts 49, 49 or the like at the front and rear thereof, and said rocker-arms are secured at their lower ends to the respective end portions of a rock-shaft 50 journalled in suitable bearings formed on the base-casting 10. The spherical surface of the closure members 13, transversely of the apparatus, is concentric with the axis of the rock-shaft 50, so that the presser-head may be oscillated back and forth and thereby positioned over one or the other of the shoe-mounting positions.

Smooth, arcuate, guide surfaces 51, 51 are formed on opposite ends of the pots 12 and make contact with the inner lateral faces of the respective rocker-arms 48 to hold the same against lateral deflection. Abutments or stops 52, 52 are positioned at the opposite ends of the respective guide surfaces 51 for engaging the rocker-arms thereat to define the operative positions of the presser-head at either end of its path of travel.

One of the rocker-arms 48 has secured thereto adjacent its pivoted end a gear-segment 53 meshed with a rack 54, the end portions of the latter being slidably mounted in cylinders 55, 55 secured to the base-casting 10, and backed by compression springs 56, 56 mounted in said cylinders. The springs 56, being opposed to each other, serve to balance the rocker-arms 48 and permit the presser-head to be manually swung easily, quickly and without jar from one operative position to the other.

Associated with the presser-head support-

ing structure is mechanism adapted to be automatically set in motion by the oscillation of the said structure to effect a cycle of operations upon the work, said cycle comprising the breaking of a vacuum between the backing-plate 38 and diaphragm 36 which has held the latter against the backing-plate during the oscillation of the presser-head, the admission of fluid pressure behind the diaphragm to distend the same and force it to the positions shown in Figs. 2 and 4 to press an outsole onto the shoe 24 and fold the margin of said sole onto the side faces of the shoe, the venting of the space back of the diaphragm to relieve the same, and the re-establishment of the vacuum to retract the diaphragm to its original position against the backing plate 38.

The aforesaid cycle of operations is controlled primarily by a four-way valve 57 mounted upon a frame member 11, and having a fluid inlet-pipe 58, a fluid outlet-pipe 59, a second fluid outlet-pipe 60, and an exhaust port (not shown), said valve being adapted to admit fluid to the outlet pipes 59, 60 in alternation, and to discharge the fluid from one pipe, through the exhaust port, as the other pipe is charged. The valve 57 is provided with the usual operating lever 61 to the free end of which is pivotally connected one end of a link or rod 62, the other end of the rod passing freely through an apertured stud 63 swiveled on the outer face of one of the rocker-arms 48. Collars 64, 64 are clamped upon the rod 62 at suitable positions where they are engaged, alternatively, by the stud 63 as the presser-head is oscillated from one position to the other, to push or pull the rod 62 and thus to operate the valve 57.

Mounted upon the respective frame members 11 are opposed fluid pressure cylinders 65, 66, positioned horizontally in axial alignment and having their adjacent ends open, the pistons 67, 68 of said cylinders being interconnected by a pair of gear racks 69, 70 which are reciprocated by the charging and discharging of the cylinders 65, 66, in alternation. The fluid pressure pipes 59, 60 from the valve 57 communicate with the closed ends of the cylinders 65, 66 for so actuating them.

The racks 69, 70 are positioned at different elevations in different vertical planes and mesh with respective pinions 71, 72 on their upper and lower sides respectively. The pinions 71, 72 are journaled upon one end of a cam-shaft 73 which is journaled in a pair of brackets 74, 75 rising from the base-casting 10, the other end of said shaft being provided with a hand wheel 76. The bracket 74 is formed at its upper extremity with an overhanging portion 74a which includes a slideway for the rack 69, and has an L-shaped plate 77 secured to its outer face, which plate is positioned between the pinions 71, 72 and

under the rack 70 to provide a slideway for the latter and to prevent angular movement of the piston and rack assembly.

Each of the pinions 71, 72 is formed at diametrically opposite points with a pair of square recesses, such as the recesses 78, 78, Fig. 9, which recesses open onto the plane face of the pinion remote from the plate 77, and seated in said recesses are individual spring-backed teeth 79, 79 which have their outer faces beveled, as is clearly shown in Fig. 10.

Fixed upon the shaft 73, in laterally abutting relation to the pinions 71, 72 are respective collars 80, 81, and the face of each collar, adjacent the pinion, is formed with oppositely disposed recesses 82, 82 complementary in shape to the beveled ends of the teeth 79. The arrangement is such that rotation of either pinion will drive its companion collar, in one direction only, by reason of the engagement of the teeth 79 with the recesses 82 of the collar, the teeth moving inwardly, against the force of their backing springs, when the pinion is rotated in reverse direction. The arrangement of teeth in the pinions 71, 72 and recesses in the collars 80, 81 is such that said collars are rotated only in one direction although the pinions have a forward and backward movement due to reciprocation of the racks 69, 70. The length of stroke of said racks is sufficient to impart one complete revolution to each pinion 71, 72, and consequently to the shaft 73, at each charging of either cylinder 65, 66, and adjustable stop-bolts 83, 83 are threaded into the closed ends of said cylinders to define accurately the extent of each piston's movement.

Keyed to the cam-shaft 73 are a plurality of cams 84, 85, and 86, which cams control respectively the fluid-pressure inlet, the exhaust port, and the suction outlet of the valve structure 45, as is shown most clearly in Figs. 4, 5, and 6. Referring to said figures it will be seen that the valve structure 45 is interiorly formed with seven chambers, namely, an elongate chamber 87 extending along one side of the structure, a series of three upper chambers 88, 89, 90 arranged beside the chamber 87, and a series of three chambers 88a, 89a, 90a disposed beside the chamber 87 and below the respective chambers 88, 89, and 90, and having access to the latter through ports provided with respective tappet valves 91, 92 and 93. The chamber 88 is in communication with the chamber 87, the chamber 89 is provided with an exhaust port 94, and the chamber 90 is in communication with a source of suction, (not shown) through a pipe 95. The chamber 88a is in communication with a source of fluid pressure (not shown) through a pipe 96, the chamber 89a is in communication with chamber 87, the chamber 90a is in communication with the

chamber 87, and the chamber 87 has communication with the presser head through the pipe 44.

The valves 91, 92, 93 are arranged to open their respective ports upon being depressed, and are normally urged upwardly to close said ports by respective compression springs mounted upon their stems, said stems extending upwardly through the wall of the valve structure 45 and having their upper ends provided with flat heads or caps, the springs being disposed between said caps and the top of said valve structure.

The valve 91, 92, and 93 are depressed by respective tappets 97, 98 and 99 which are pivotally mounted on a tappet-rod 100 which is supported by the brackets 74, 75. The free ends of the tappets rest upon the heads of the valves 91, 92, 93, and are provided with respective cam rollers which engage the peripheral faces of the cams 84, 85, and 86. The cams are so arranged on the shaft 73 that one revolution of the latter effects a complete cycle of pressure conditions within the presser head.

To prevent the diaphragm 36 from adhering to the shoe 24 during the pressing thereof, the diaphragm is sprayed with a soapy fluid from time to time at the discretion of the operator. A supply 101 of the soapy fluid is contained in the chamber 19 of one of the pots 12, and a hose or pipe 102 extends from the bottom thereof to a recess 103, opening onto the upper faces of the closure members 13 at their abutting margins and is there provided with a plurality of nozzles such as the nozzle 104 disposed parallel to said upper faces. Fluid pressure nozzles 105 mounted in the recess 103 and directed across the ends of the respective nozzles 104 toward the open side thereof, are connected by a pipe 106 to the fluid pressure line 58, and a hand-operated valve 107 is mounted in the pipe 106 at a point accessible to the operator. The device operates on the principle of the ejector, to spray soapy fluid from the nozzles 104 onto the diaphragm 36 when pressure fluid is delivered from the nozzles 105, the presser-head being moved slowly over the recess 103 during the spraying operation.

In the operation of the apparatus, the presser-head will be normally positioned over one of the pot-closure members 13, and the cam 86 on the shaft 73 will be depressing the valve 93 so that suction in the pipe 95 is transmitted through the chambers 90, 90a and 87 of the valve structure 45, and the flexible conduit 44, to the presser-head and holds the elastic diaphragm 36 therein against the arcuate backing plate 38, the lugs 39 of the latter assuring the application of suction substantially to the entire surface of the diaphragm. The other pot-closure 13 being uncovered, a lasted shoe is mounted therein with its shank portion resting upon the support 21 and its

toe portion resting upon the cushion member 34 of the plate 33. The presser-head is then manually oscillated or swung to its alternative position, over the unpressed shoe, which movement of the presser-head automatically actuates mechanism for effecting a complete cycle of pressing conditions within the presser-head.

The immediate result of the movement of the presser-head is to cause the lug 63 thereon to engage one or the other of the collars 64 on the rod 62, and, by actuating the valve 57, to admit pressure fluid, preferably air, to the cylinder 65 or 66. Charging of either cylinder results in rectilinear movement of the racks 69, 70 and by the mechanism comprising the pinions 71, 72 and clutch-collars 80, 81, effects one complete revolution of the cam-shaft 73.

Initial angular movement of the cam-shaft moves the cam 86 to release the valve 93 and permits the latter to close and thus shut off the suction exerted upon the diaphragm 36. Continued angular movement of the cam shaft puts the respective elements of the apparatus in the relative positions shown in the several drawings, the cam 84 being brought into operative position, as shown in Fig. 5, to depress the valve 91 and thereby to open the port between chambers 88, 88a of the valve structure 45. This permits fluid pressure from the pipe 96 to pass into the pipe 44 and thence to the space back of the diaphragm 36, with the result that the latter is distended and forced closely into engagement with those portions of the shoe 24 disposed above the plate 33 within the recess 14 of the pot-closure 13.

As the rotation of the cam-shaft proceeds, the cam 84 releases the valve 91 permitting it to close off the pressure fluid supply, and the cam 85 functions to depress the valve 92, thus permitting the pressure fluid in the presser-head to escape therefrom through the exhaust port 94 of the valve structure 45. Next, the cam 86 moves into position to depress the valve 93 and again establish suction back of the diaphragm 36 to draw the same taut against its backing plate 38.

This completes a cycle of operations, which is automatically repeated as often as the presser-head is moved from one shoe-pressing position to the other. When the presser-head is moved into shoe-pressing position, the finished shoe in the alternate position is removed and an unpressed shoe mounted in its place. This operation requires about the same length of time as the shoe-pressing cycle so that the operator is continuously employed.

The spherical contour of the closure members 13 makes it possible to so position the diaphragm 36 with relation to the work that the stretch of the diaphragm in the pressing of the work, is materially reduced. Thus

it will be observed that the anchorage of the diaphragm at the front and rear of the work is substantially below the sole-face thereof, (see Fig. 4) and at the sides is substantially at the same level (see Fig. 2). The result is that the diaphragm is not excessively stretched in being distended to embrace the portions of the shoe adjacent the sole, and consequently there is little relative movement between the diaphragm and shoe-sole such as otherwise would displace or distort the latter.

The provision for mounting shoes of various sizes substantially in the middle of the recess 14 makes for uniformity of stretch in the various regions of the diaphragm and avoids excessive strains thereon. Thus the diaphragm will have longer life than diaphragms used with other devices of this same general character, and higher fluid pressure safely may be utilized, with resulting improvement of the product due to better adhesion of the component parts thereof.

The invention is susceptible of modification within the scope of the appended claims.

I claim:

1. Shoe-pressing apparatus comprising a shoe-supporting structure having a spherical top face formed with a shallow recess in which the sole and adjacent portions of the shoe are disposed, means for positioning an elastic diaphragm over said recess, and means for distending the diaphragm to cause it to envelop those portions of the shoe within the recess.

2. Shoe-pressing apparatus comprising a plurality of shoe-supports, a presser-head adapted to be positioned selectively over said shoe-supports solely by edgewise movement of translation, and means for so positioning the presser-head.

3. Shoe-pressing apparatus comprising a pair of adjacent shoe supports, a presser-head adapted to be positioned, in alternation, over said supports, and means automatically actuated by the positioning of the presser-head for effecting a cycle of pressure conditions therein.

4. Shoe-pressing apparatus comprising adjacent shoe-supporting stations, an elastic diaphragm adapted to be positioned selectively over said stations, and means for so positioning said diaphragm solely by an edgewise movement of translation.

5. Shoe-pressing apparatus comprising a pair of adjacent shoe supports having an arcuate top surface, a presser-head positionable in alternation over said shoe supports, and means for so positioning said presser-head by a movement of translation along the said arcuate surface.

6. Shoe-pressing apparatus comprising a pair of adjacent shoe-supporting stations having a spherical top face, a presser-head, having a lower margin of complemental con-

tour, positionable in alternation over said stations, and means for so positioning said presser-head by oscillation coaxial with said spherical top-face of the stations.

7. Shoe-pressing apparatus as defined in claim 8 including means automatically actuated upon the positioning of the presser-head for effecting a cycle of pressure conditions therein.

8. Shoe-pressing apparatus comprising a plurality of shoe supports, a presser-head selectively positionable thereupon, and means for concurrently adjusting said shoe supports with relation to said presser-head.

9. Shoe-pressing apparatus comprising a structure having an arcuate top-face, a pair of shoe supports mounted therein and disposed radially with relation to said top-face, a presser-head positionable selectively over said shoe-supports, and means for concurrently adjusting said shoe-supports with relation to said presser-head.

10. Shoe-pressing apparatus comprising a pair of adjacent shoe-supports, a presser-head including an elastic diaphragm positionable in alternation over said shoe-supports, and means intermediate said shoe-supports for lubricating said diaphragm as the presser-head is moved from one position to the other.

11. Shoe-pressing apparatus comprising a pair of pots positioned adjacent each other, shoe-supports within the respective pots, a presser-head including an elastic diaphragm selectively positionable over said shoe-supports, a supply of lubricant in solution in one of said pots, and means for spraying said lubricant onto said diaphragm at a position intermediate said shoe supports.

12. Shoe-pressing apparatus comprising means for supporting a shoe in a determinate position, a member surrounding at least a portion of a shoe supported in the said position and terminating, in the direction of the sole of the shoe, in an annular surface, a presser-head having an annular surface which is substantially complementary to the said annular surface, said presser-head including a fluid backed diaphragm and a mounting for said presser-head pivotally arranged for movement of the latter solely by edgewise movement of translation to a position overlying the supported shoe and to position offset therefrom.

13. Shoe-pressing apparatus comprising means for supporting a shoe in a determinate position, a member surrounding a shoe supported in the said position and terminating, in the direction of the sole of the shoe, in an annular surface to which the shank-to-sole axis of the shoe is approximately normal, a presser-head having an annular surface which is substantially complementary to the first said annular surface, said presser-head including a fluid-backed diaphragm, and a mounting for said presser-head pivoted on an

axis so close to the said axis of the shoe extended that the presser-head may be swung about the said axis to a position such that the two said annular, substantially complementary surfaces are closely presented to each other without substantial lateral displacing force resulting from distending of the said diaphragm against the shoe and to a position off-set from the position in which the shoe is supported.

14. Shoe-pressing apparatus comprising means for supporting a shoe in a determinate position, a member surrounding at least a portion of a shoe supported in the said position and terminating, in the direction of the sole of the shoe, in an annular surface, a presser-head having an annular surface which is substantially complementary to the said annular surface, and supporting means for said presser-head constituting therewith a stirrup-like structure pivoted to swing into and out of association with the first said member.

In witness whereof I have hereunto set my hand this 23rd day of October, 1929.

ROSCOE V. RITCHEY.

CERTIFICATE OF CORRECTION.

Patent No. 1,895,941.

January 31, 1933.

ROSCOE V. RITCHEY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, line 71, claim 7, for claim number "8" read "6"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of June, A. D. 1933.

M. J. Moore.

Acting Commissioner of Patents.

(Seal)