June 29, 1948. P. BRAUNER 2,444,331

SHOE PRESS

Filed March 22, 1946 2 Sheets-Sheet 1

Fig. 1.

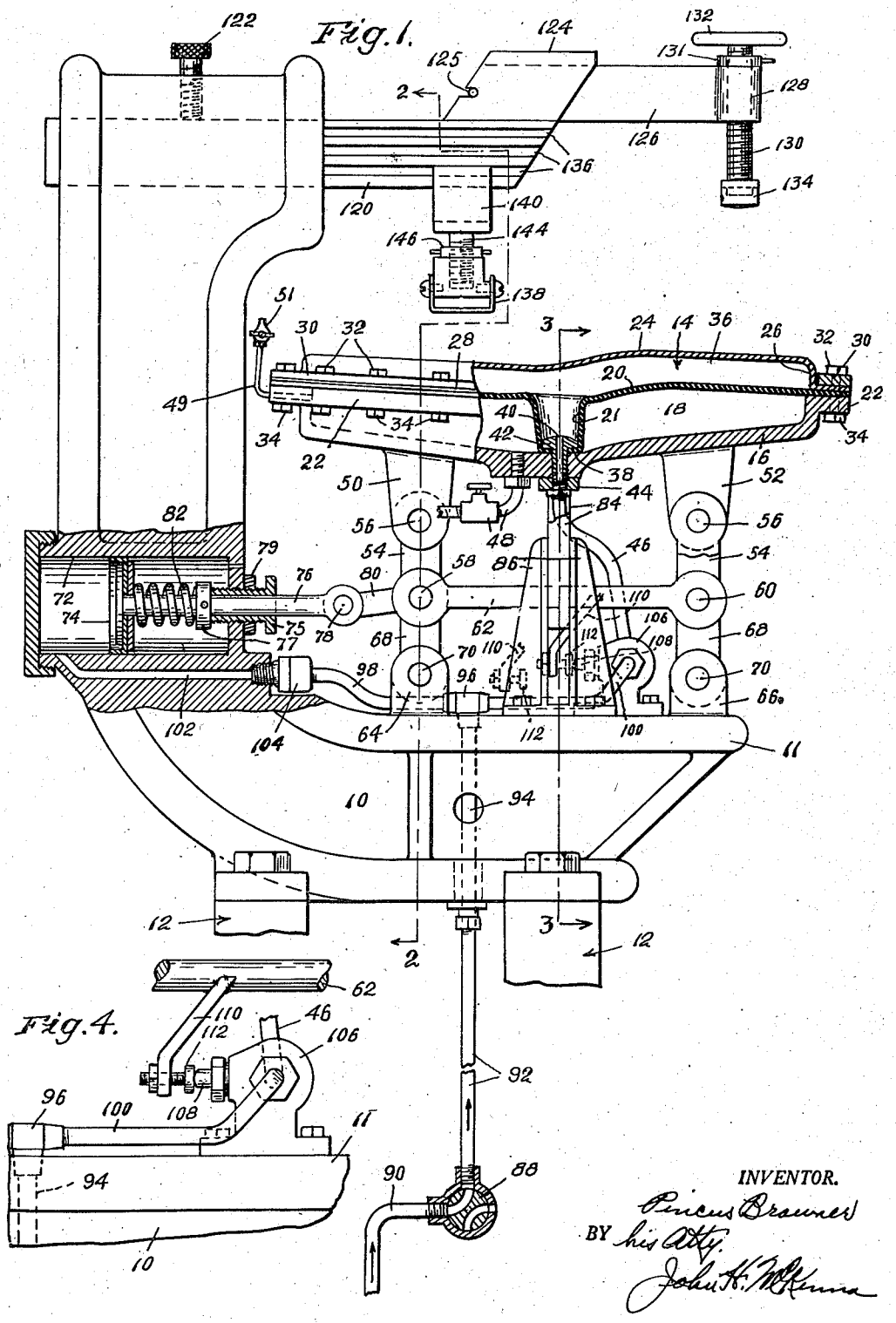


Fig. 4.

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SHOE PRESS

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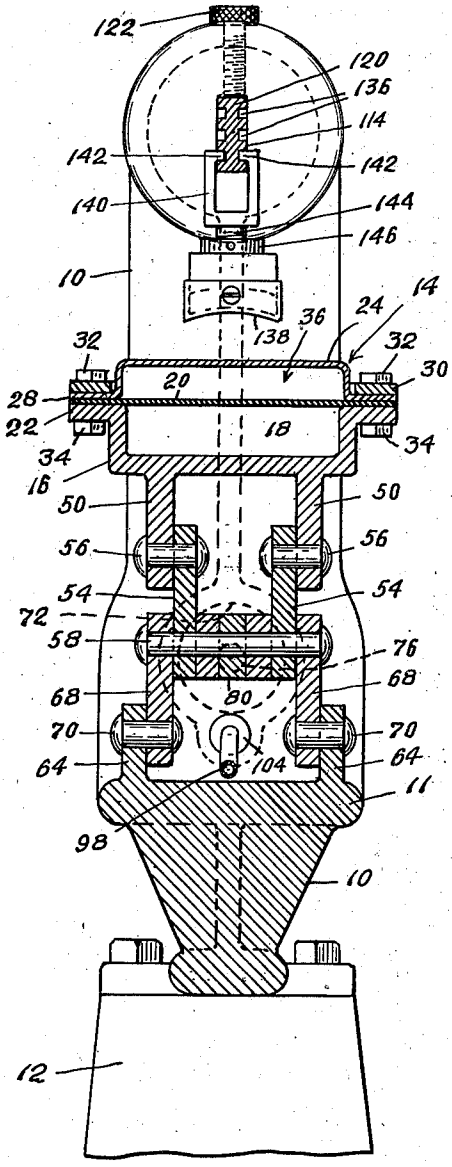
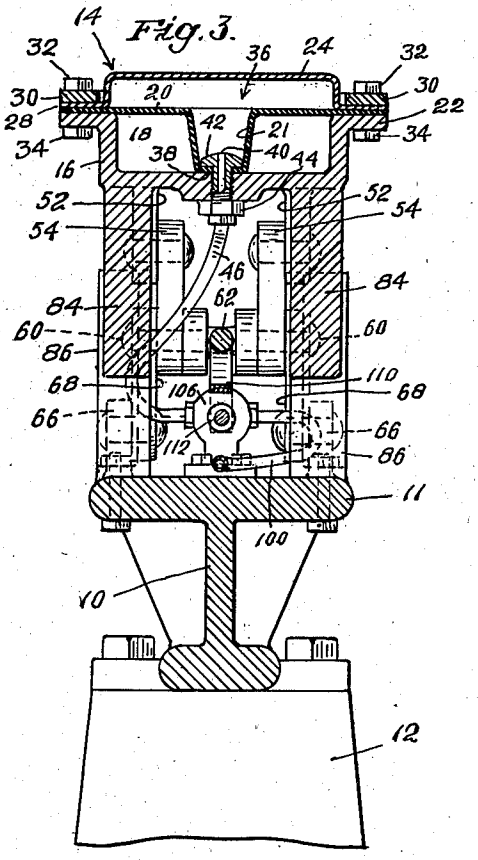


Fig. 2.

Fig. 3.



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SHOE PRESS

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12 Claims. (Cl. 12—33)

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This invention relates to improvements in shoe presses and the like. More particularly it relates to shoe presses of the general type which have a principal utility for attaching soles to shoe upper structures and which include an inflatable pad and relatively fixed abutments between which the shoe elements are inserted and subjected to sole-attaching pressure when the pad is inflated. The invention provides improvements in the inflatable pad of such a press whereby the pad is more efficient and effective in the performance of its sole-pressing functions, and provides improved mechanism for operating the pad to its elevated and retracted positions with coacting control and timing of the pad-inflating and pad-deflating operations. Also the invention improves the structure and adjustment characteristics of the relatively fixed abutments which coact with the pad during each pressing operation, whereby the press is more readily and quickly adaptable to handle various sizes and styles of shoes as compared with prior comparable presses of which I am aware.

It is among the objects of the invention to provide a shoe press comprising an inflatable pad having a plurality of fluid-tight chambers therein with a fluid-impervious flexible wall dividing the chambers, and in which inflation of the pad involves admission and exhaust of pressure fluid from one only of the chambers while the volume of fluid in another chamber of the pad continues constant.

Another object is to provide toggles for elevating and retracting the pad coacting with means for inflating the pad in response to an elevating movement thereof and means for deflating the pad prior to retraction of the pad.

A further object is to provide a toggle-actuated inflatable pad having means for fluid pressure operation of the toggles for elevating the pad and having means responsive to elevation of the pad for fluid pressure inflation of the pad, there being means for operation of the toggles for retracting the pad following deflation of the pad.

Still another object is to provide an abutment above the pad including a tongue-in-groove suspension of the abutment and a series of vertically spaced grooves any opposite pair of which may be selected for said tongue-in-groove suspension of the abutment whereby the abutment may be quickly set at selected elevations.

It is, moreover, my purpose and object generally to improve the structure and operation of shoe presses and more particularly presses having an inflatable pad for applying the pressure

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to elements engaged between the pad and one or more relatively fixed coacting abutments.

In the accompanying drawings:

Fig. 1 is a side elevation of a shoe press embodying features of my invention, portions thereof being in medial cross-section to more clearly portray interior structures;

Fig. 2 is a cross-sectional view on line 2—2 of Fig. 1;

Fig 3 is a cross-sectional view on line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary elevation of the pad-controlling valve and its operating means as shown in Fig. 1 but on a larger scale and omitting parts which partially obscure this mechanism in Fig. 1.

Referring to the drawings, a generally L-shaped frame 10 supports the press mechanism, the frame 10 being mounted on any suitable base indicated generally at 12 whereby the inflatable and deflatable pad indicated generally at 14 may be at a convenient elevation with respect to an operator standing or sitting at the press.

According to the invention, the pad 14 comprises a metal body 16 providing the bottom and side walls of a chamber 18 whose top wall is formed by a resilient diaphragm 20 which conveniently may be a sheet of rubber. The body 16 is provided with the out-turned flange 22 which extends all around the body for constituting a seat for the marginal portion of the diaphragm 20.

The sole-engaging wall 24 of the pad is made of heavy flexible material which itself is impervious to air or which is treated to render it impervious to air. Preferably it is made of relatively thick leather whose inner surface is suitably treated to make it impervious to air. The leather is molded to the general shape as illustrated including the vertical walls 26 extending all around the pad and the out-turned flange 28 also extending all around the pad.

The out-turned flanges 22 and 28 of the body 16 and leather 24 respectively, with the margin of diaphragm 20 between them, are clamped together all around the pad by means of a clamping strip 30 and the screws or bolts 32, the screws or bolts extending through the clamping strip, flange 28, diaphragm 20 and flange 22, and each having a nut 34 screwed thereon on the under side of the body flange.

It is a feature of the invention that the chamber 18 of the pad, below the diaphragm 20 may be filled with water or other liquid and the amount of liquid in chamber 18 remains con-

stant during use of the pad. However, the liquid can shift within the chamber 18 to permit diaphragm 20 to respond and adapt itself according to the pressures applied from above.

The molded leather sole-engaging member 24, as a result of its molded form, provides a second chamber 36 within the pad, and this chamber 36 is the work chamber through which inflation and deflation of the pad is effected. Air under pressure from any suitable source may be directed into chamber 36 through the rigid body wall 16 of the pad, the rubber diaphragm 20 being provided with a depending cup or well portion 21 which extends down to the body wall 16 with the bottom of the cup or well clamped as at 38 to wall 16. The clamp is shown in the form of a tubular nipple 40 which extends through the bottom of cup 21 and through the rigid body wall 16, with an enlarged inner end 42 for engaging the bottom of the cup 21 between itself and wall 16. The outer end of the nipple is threaded for reception of a clamping nut 44, and also provides for connection to the nipple of a flexible conduit 46.

The lower chamber 18 of the pad may be filled with liquid through the valved inlet 48 in the bottom wall 16, and the chamber may be drained of liquid when desired by merely opening the valve 48. A vent conduit 49 having petcock 51 therein is opened for escape of air from chamber 18 when it is being filled and for inflow of air when chamber 18 is being drained of liquid.

Assuming that chamber 18 is filled with liquid, it will be obvious that the pad as a whole may be inflated by admitting air under pressure through nipple 40 into the relatively small upper chamber 36, to cause the flexible sole-engaging wall 24 to generally conform to a sole engaged therewith and to press the sole against a shoe upper structure, the liquid in chamber 18 adjusting itself so that diaphragm 20 can respond to pressure from above and shape itself accordingly. Thus the pad readily and effectively adapts itself to particular sole contours and is quickly inflatable and deflatable because of the relatively small volume of air or other fluid which is delivered to and discharged from chamber 36.

According to the invention, however, the pad 14 as a whole is elevated prior to each inflation of the pad and retracted following each deflation of the pad. This is accomplished by a toggle mount of the pad on horizontal portion 11 of frame 10. Two depending ears 50 toward the inner end of body 16 of the pad and two similar depending ears 52 toward the outer end of said body each has a toggle link 54 pivotally connected to it at 56. The lower ends of the inner links 54 have a floating pivot rod 58 extending therethrough and the lower ends of the outer links 54 have a floating pivot rod 60 extending therethrough, with a connecting rod 62 extending between and pivotally connected at its opposite ends to the pivot rods 58, 60, so that the inner and outer links 54 move in unison.

The part 11 of frame 10 has two upstanding ears 64 generally under the inner depending ears 50 of the pad body and has two similar upstanding ears 66 generally under the outer depending ears 52 of the pad body, each with the lower end of a toggle link 68 pivotally connected to it at 70. The inner toggle links 68 have their upper ends pivotally connected to the floating pivot rod 58 and the outer toggle links 68 have their upper ends pivotally connected to the floating pivot rod 60.

A cylinder 72 is provided in or on the frame 10 with a piston 74 operable therein, the piston rod 76 extending out of the cylinder and being pivotally connected at 78 to one end of a link 80 whose other end is pivotally connected to the floating pivot rod 58. A spring 82 within the cylinder constantly urges the piston 74 to the left as viewed in Fig. 1 although, in Fig. 1, the piston is shown moved to the right as when air or other fluid under pressure has been admitted to the cylinder 72 on the left hand side of piston 74 in Fig. 1 to force the piston to the right against the bias of spring 82 and to elevate the pad 14 by straightening the toggles, as shown in Fig. 1. A movement of piston 74 to the left from its position of Fig. 1 will break the toggles to retract or lower the pad.

Preferably, the inner wall of the cylinder has an adjustable bushing 75 threaded therein and the piston rod 76 extends slidably through the bushing with a stop collar 77 pinned thereto for limiting travel of the piston to the right in Fig. 1. The bushing may be adjusted in the cylinder wall to set the limit of travel of the piston to the right in Fig. 1, and may be locked in adjusted position by the lock nut 79.

In order that the movements of pad 14 may be entirely vertical, the body 16 of the pad has the depending guide members 84 which slidably engage between upstanding fixed guides 86 which permit needed vertical movements of the pad but restrain the pad against swinging movements in response to operations of the toggles. Also the depending guide members 84 may be designed to strike a fixed abutment at the limit of downward travel of the pad thereby to limit the travel of piston 74 to the left in Fig. 1.

Operation of piston 74 to the right in Fig. 1 is effected by air or other fluid under pressure delivered into the left hand end of cylinder 72 from any suitable source, and spring 82 moves piston 74 to the left in Fig. 1, when the left hand end of the cylinder is opened to atmosphere.

Conveniently, air or other fluid from a common source may operate piston 74 and also inflate the pad 14. In Fig. 1 there is represented diagrammatically an ordinary four way valve 88 for controlling pressure fluid in a supply conduit 90 leading from any suitable source. In its position of Fig. 1, the valve 88 is in position connecting supply conduit 90 with a conduit 92 which leads to a duct 94 extending vertically through the frame part 10. Duct 94 at its upper end is connected to a T-fitting 96 whose opposite T-arms are connected respectively to conduits 98, 100. Conduit 98 connects with a conduit 102 leading into the left end of cylinder 72, with a check valve 104 in conduit 98 for a purpose which will appear. Conduit 100 leads to valve casing 106 having a normally closed valve which is openable by depression of its projecting plunger 108. The lower end of flexible conduit 46 leading from the nipple 40 of the pad 14 is connected into valve casing 106 and, when the plunger 108 is depressed to open the valve, the conduit 100 is open through the valve into conduit 46.

With the parts in their positions of Fig. 1, fluid under pressure is open into cylinder 72, and piston 74 has been moved to the right, and the toggles have been moved to the right, including connecting rod 62. The pad as a whole is in its elevated position. As connecting rod 62 approaches its position of Fig. 1, a depending arm

110, having the adjustable head 112, moves with the connecting rod and the head 112 thereof engages and depresses plunger 108 to open the valve in valve casing 106. Hence, in Fig. 1, fluid under pressure is open into the upper chamber 36 of the pad for inflating the pad.

After the pad has been elevated and inflated in the elevated position to apply sole attaching pressure between a sole and a shoe upper structure, the operator, by treadle actuation, or otherwise, rotates control valve 88 through ninety degrees in counter-clockwise direction, as viewed in Fig. 1, thereby to cut off the pressure fluid supply and to open conduit 92 through the valve to atmosphere. However, the check valve 104 in conduit 98 is such that pressure fluid in cylinder 72 can escape only slowly past the check valve. Hence, when control valve 88 connects conduit 92 to atmosphere, the exhaust from cylinder 72 is relatively slow and the piston's movement to the left is correspondingly slow. Hence plunger 108 of the valve in valve casing 106 continues depressed an ample time for complete deflation of the pad before the valve at 106 closes.

When the piston and toggles have moved to the left until maximum retraction of the pad occurs, the apparatus is ready for repetition of the cycle when the operator moves the control valve 88 to its position of Fig. 1 to again connect the pressure fluid supply conduit 90 with the conduit 92.

It will be obvious that, prior to each elevation and inflation of the pad 14 as above described, a shoe upper structure and a sole will be positioned between the pad and unyielding members which support the shoe parts against the pressure applied when the pad is inflated.

According to the invention, the upper end of frame 10 has a horizontal rectangular hole 114 extending through it and a cross-head member 120 extends slidably and adjustably through the hole 114. A set screw 122 or the like holds member 120 in any selected adjusted position and ordinarily it remains fixed after once having been set in a proper operative position.

As clearly seen in Fig. 1, the cross-head member 120 has substantial extent out of the upper end of frame 10 above the pad 14, and has a socket 124 at its outer end for supporting the cross-head extension member 126 which is formed at its outer end with the interiorly threaded vertical boss 128. A vertically extending screw 130 is threaded through boss 128 having at its upper end the hand wheel 132 for manual adjustment of the screw and having at its lower end the head 134 for engaging the rear portion of a last which customarily is in each shoe upper structure which is inserted in the press. A locking collar 131 is threaded on the screw 130 above the boss 128 for locking the screw in adjusted positions. The extension 126 is slidably adjustable in socket 124 and has a pin 125 for limiting its movement in the socket to the right in Fig. 1.

It is a feature of the invention that the cross-head member 120 has its opposite faces grooved as at 136, and the toe-engaging member 138 is suspended from the cross-head member 120 by means of a yoke 140 having oppositely disposed tongues 142 (Fig. 2) for engaging slidably in any particular oppositely disposed pair of the grooves 136 in cross-head member 120. Yoke 140 has a depending screw part 144 threaded into the toe-engaging member 138 so that the latter may be adjusted vertically relative to yoke 140 and be fixed in any selected position of adjustment by the locking collar 146 on screw 144, similar to the

locking collar 131. However, substantial vertical adjustments of the position of toe-engaging member 138 may be quickly effected by sliding yoke 140 out of any particular pair of grooves 136 and sliding it back in a higher or lower pair of grooves 136. The toe-engaging member 138 may be additionally adjusted vertically by means of the screw 144 and locking collar 146.

Hence the toe-engaging member 138 and the last engaging head 134 quickly may be adjusted to accommodate any particular sizes and styles of shoes for effective coaction with my improved movable and inflatable pad.

It will be obvious that my improved pad may be used without the chamber 18 being filled with liquid, in which case the diaphragm 20 will conform itself generally to the shape of body 16 with approximately the entire space between wall 16 and wall 24 then being available for receiving air or other fluid under pressure when the pad is being inflated.

In the operation of my improved press, the raising and lowering of the pad 14 by the toggles is not relied upon to apply any of the sole-attaching pressure. Elevation of the pad merely brings the pad into holding relation to the shoe parts and the inflation of the pad in its elevated position effects the pressing. Retraction or lowering of the pad occurs while the pad is in a deflated condition and the retraction ordinarily will be only sufficient to facilitate insertion and removal of work.

While I have shown a single piston in a particular position for operating the toggles, the cylinder and piston may be otherwise arranged. Also, if desired the cylinder may be located between the pair of toggles with a separate piston for each toggle operative in opposite end portions of the cylinder, or both cylinder and piston may be mounted for movement, each connected to one of the toggles.

An essential feature of my improved pad resides in the provision of a pad having an interior chamber whose shape and fluid-holding capacity are adapted to accommodate effectively any type and style of shoe that is likely to require a sole pressing operation thereon, and which includes means for reducing the effective capacity of the chamber when handling shoes which do not require inflation and deflation of the maximum capacity of the fluid chamber of the pad. Hence, as herein represented, the pad interior may be divided by the flexible diaphragm 20 so that the lower chamber 18 may contain a body of fluid which remains constant in amount during operations of the press, so that only the upper chamber 36 needs to be filled and evacuated for inflation and deflation of the pad, with the lower chamber serving as a readily deformable cushion wherein the constant body of fluid adjusts itself under pressure from above. However, I desire it to be understood that the invention is not limited to a flexible diaphragm and a constant body of fluid for selectively varying the effective capacity of the inflatable pad. Any suitable resiliently yieldable body may be employed in the lower portion of the pad's interior. For example, a cake of resilient rubber of suitable size and contour may be arranged in the bottom of the interior chamber of the pad to serve as a fluid-displacing cushioning agent reducing the capacity of the portion of the interior of the pad which will be filled with fluid and evacuated for each inflation and deflation of the pad.

I claim as my invention:

1. In a shoe press, an inflatable pad having a body including a rigid bottom wall extending integrally throughout substantially the full area of the pad, a molded flexible top section of pad clamped to the body and providing a fluid-tight chamber between said top section and said rigid bottom wall of the pad, a rigid support, fore and aft toggles supporting the pad above said support, a cylinder with piston operable therein, said piston having connection to the toggles for straightening the toggles to elevate said pad as an entirety when the piston moves in one direction in said cylinder and for breaking the toggles to retract said pad when the piston moves in the other direction in said cylinder, means for fluid pressure propulsion of said piston in direction to straighten the toggles, and means responsive to a said fluid pressure propulsion of the piston for inflating said pad in its said elevated position.

2. In a shoe press, an inflatable pad comprising a rigid bottom wall extending integrally throughout substantially the full area of the pad and a molded flexible top section of pad clamped in spaced relation to said bottom wall to provide a fluid-tight chamber between them, a support below the pad, fore and aft toggles supporting the pad as an entirety in spaced relation above said support, fluid-pressure actuated means for straightening said toggles thereby to elevate said pad as an entirety relative to said support, and means responsive to a said straightening of the toggles for inflating said pad in its said elevated position.

3. In a shoe press, an inflatable pad comprising a rigid bottom wall extending integrally throughout substantially the full area of the pad and a molded flexible top section of pad clamped in spaced relation to said bottom wall to provide a fluid-tight chamber between them, a support below the pad, fore and aft toggles supporting the pad in its entirety in spaced relation above said support, a cylinder mounted rigidly on said support, a piston operable in the cylinder and connected to said toggles, a fluid pressure supply conduit, means in said supply conduit for admitting pressure fluid to said cylinder thereby to move said piston in direction to straighten said toggles with consequent elevation of said pad as an entirety relative to said support, a connecting conduit leading between said supply conduit and the interior chamber of the pad, a valve normally closing said connecting conduit, and means responsive to said straightening movement of the toggles for opening said valve thereby to admit pressure fluid to the interior chamber of the pad for inflating the pad in its said elevated position.

4. In a shoe press, an inflatable pad, a support below the pad, toggles connected between the pad and the support maintaining the pad as an entirety spaced above the support, fluid-pressure-responsive means connected to the toggles, and operative to straighten the toggles and to thereby elevate the entire pad, a fluid pressure supply conduit, means for admitting pressure fluid from the supply conduit to said fluid pressure-responsive means thereby to straighten the toggles and elevate the entire pad, and means responsive to a said straightening movement of the toggles for admitting pressure fluid from said supply conduit to the interior chamber of the pad for inflating the pad.

5. In a shoe press, an inflatable pad, a support below the pad, toggles connected between the pad and the support maintaining the pad

spaced above the support, fluid-pressure-responsive means connected to the toggles, and operative to straighten the toggles and to thereby elevate the pad, a fluid pressure supply conduit, means for admitting pressure fluid from the supply conduit to said fluid-pressure-responsive means thereby to straighten the toggles and elevate the pad, means responsive to a said straightening movement of the toggles for admitting pressure fluid from said supply conduit to the interior chamber of the pad for inflating the pad, means for simultaneously opening the interior chamber of the pad and said fluid-pressure-responsive means to atmosphere thereby to deflate the pad and to permit breaking of the toggles and retraction of the pad, and means retarding escape to atmosphere of the pressure fluid in said fluid-pressure-responsive means thereby to delay breaking of said toggles until the pad has been deflated.

6. In a shoe press, an inflatable pad comprising a rigid bottom wall and a molded flexible top section of pad clamped in spaced relation to said bottom wall to provide a fluid-tight chamber between them, a support below the pad, fore and aft toggles supporting the pad in spaced relation above said support, a cylinder fixed relative to said support, a piston in the cylinder connected to said toggles and operable in one direction to straighten the toggles to thereby elevate the pad, a pressure fluid supply conduit, means for admitting pressure fluid from the supply conduit to said cylinder thereby to move the piston in direction to straighten the toggles and elevate the pad, means responsive to a said toggle-straightening movement of the piston for admitting pressure fluid from said supply conduit to the interior chamber of the pad, means for opening the interior chamber of the pad and said cylinder to atmosphere thereby to deflate the pad and to condition the cylinder for movement of the piston in direction to break the toggles and to retract the pad, and means for moving the piston in said toggle-breaking direction at a slow rate thereby to permit deflation of the pad before the pad is appreciably retracted.

7. In a shoe press, an inflatable pad, fore and aft toggles operable for elevating and retracting the pad, means for operating the toggles in direction to straighten them thereby to elevate the pad, a fluid pressure supply conduit, means responsive to a said straightening of the toggles for admitting fluid under pressure to the pad for inflating the pad in its elevated position, means for opening the interior of the pad to atmosphere for deflating the pad, and means for operating the toggles in direction to break them and to retract the pad and for simultaneously closing the opening of the pad to atmosphere following deflation of the pad.

8. In a shoe press, an inflatable pad comprising a body having a rigid bottom wall with integral rigid side walls extending all around the body, a molded top section of pad made of relatively heavy flexible material and impervious to fluid, said top section being secured to said rigid body and defining therewith a substantial fluid-tight chamber within the pad, a flexible diaphragm dividing said chamber into upper and lower fluid-tight sub-chambers, means for supplying the lower sub-chamber with a fixed and unchanging volume of fluid, a pressure fluid supply conduit, means for elevating the pad and for simultaneously admitting fluid

under pressure from said supply conduit to said upper sub-chamber of the pad thereby to inflate the pad in its elevated position, means for exhausting said upper sub-chamber to deflate the pad, and means for retracting the pad after deflation thereof and for simultaneously closing said exhaust means, the fluid in said lower sub-chamber continuing of constant volume.

9. In a shoe press, an inflatable pad comprising a body having a rigid bottom wall, a fluid-impervious top wall of flexible material secured to said body and defining therewith a fluid-tight chamber between said bottom and top walls, a flexible fluid-impervious diaphragm dividing said chamber into upper and lower fluid-tight sub-chambers, means for maintaining a constant volume of fluid in said lower sub-chamber, a pressure fluid supply conduit, means for elevating the pad and for simultaneously admitting fluid under pressure from said supply conduit to said upper sub-chamber thereby to inflate the pad in its elevated position, means for exhausting said upper sub-chamber to deflate the pad, and means for lowering the pad following deflation thereof and for simultaneously closing said exhaust means, the volume of fluid in said lower sub-chamber continuing constant during inflation and deflation of the pad.

10. In a shoe press, an inflatable pad comprising a body having a rigid bottom wall, a molded top section of pad made of relatively heavy leather and having a top wall and integral depending side walls extending all around the section, means clamping the top section to the body to provide a fluid-tight chamber between said rigid bottom wall and said leather top wall, a fluid-impervious diaphragm dividing said chamber into upper and lower fluid-tight sub-chambers and including a hollow portion projecting from the general plane of the diaphragm into engagement with said rigid bottom wall, means for maintaining a constant volume of fluid in said lower sub-chamber, and means for admitting fluid under pressure to and for exhausting fluid under pressure from said upper sub-chamber through said projecting hollow portion of the diaphragm thereby to inflate and deflate the pad while the volume of fluid in said lower sub-chamber continues constant.

11. In a shoe press, an inflatable pad, a cross-head at a fixed elevation above the pad, a series of vertically spaced horizontal grooves in opposite sides of the cross-head, a shoe forepart engaging

member suspended from the cross-head and having oppositely disposed tongues for slidably engaging in selected pairs of said series of grooves in the cross-head thereby to selectively set the elevation of the forepart engaging member and to select its position relative to the pad in the selected horizontal plane, an adjustable member depending from the cross-head in position for engaging the rear part of a last in a shoe upper structure mounted in the press, fore and aft toggles operable to elevate and retract the pad, a pressure fluid supply conduit, means for operating the toggles in direction to straighten them to elevate the pad and simultaneously to admit fluid under pressure from said supply conduit to the pad for inflating the pad in its elevated position, means for exhausting the pad to deflate it, and means for retracting the pad following deflation thereof and for simultaneously closing said exhaust means.

12. In a shoe press, an inflatable pad having a body including a rigid bottom wall extending integrally throughout substantially the full area of the pad, a flexible top section of pad clamped to the body and providing a fluid-tight chamber between said top section and said rigid bottom wall of the pad, a rigid support, toggle means supporting the pad as an entirety above said support, fluid-pressure actuating means connected to said toggle means for actuating the toggle means thereby to actuate the entire pad, means for fluid-pressure propulsion of said fluid-pressure actuating means thereby to actuate the entire pad in one direction, and means responsive to a said propulsion of the fluid-pressure actuating means for changing the fluid-pressure condition within the chamber of the pad.

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