Aug. 20, 1929. G. M. RAY 1,725,103

SOLE ATTACHING PRESS

Filed Jan. 8, 1929 2 Sheets-Sheet 1

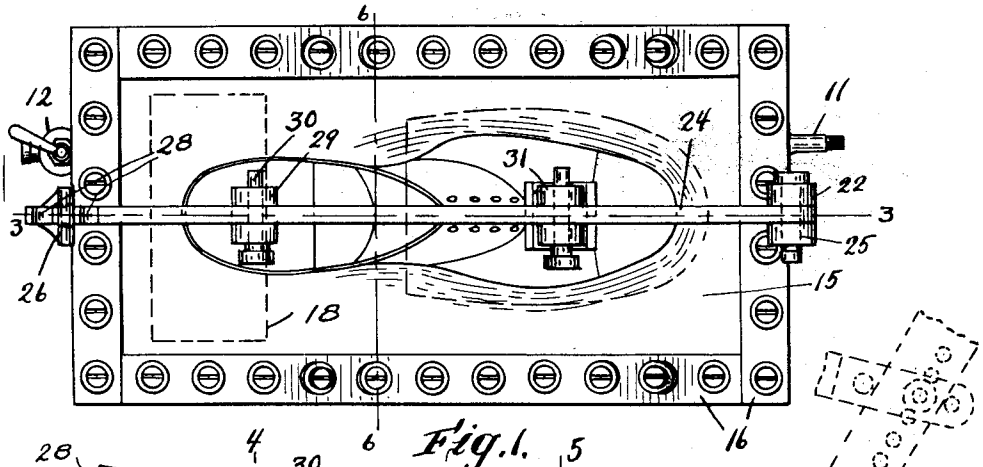


Fig. 1.

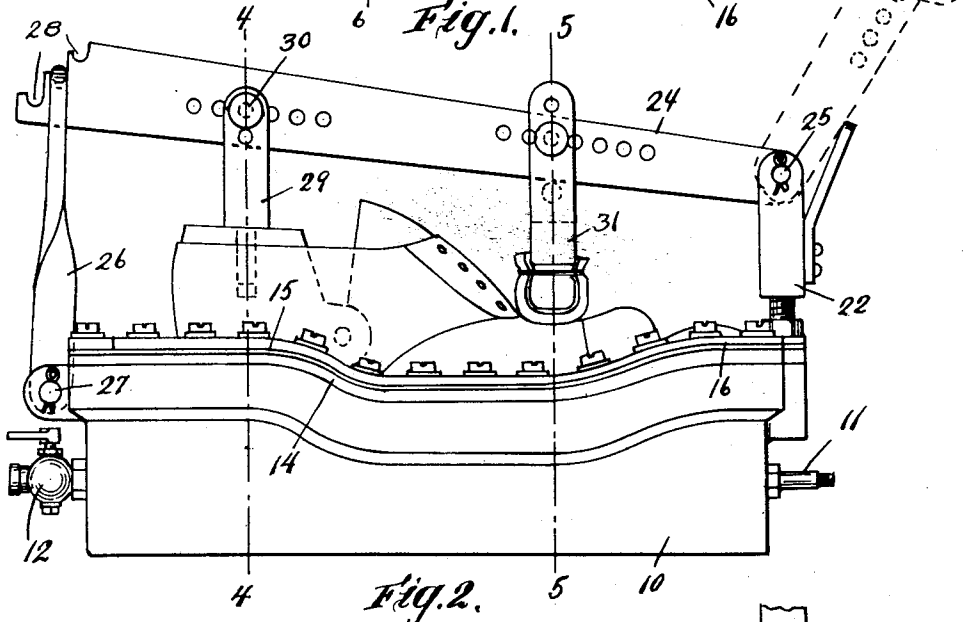


Fig. 2.

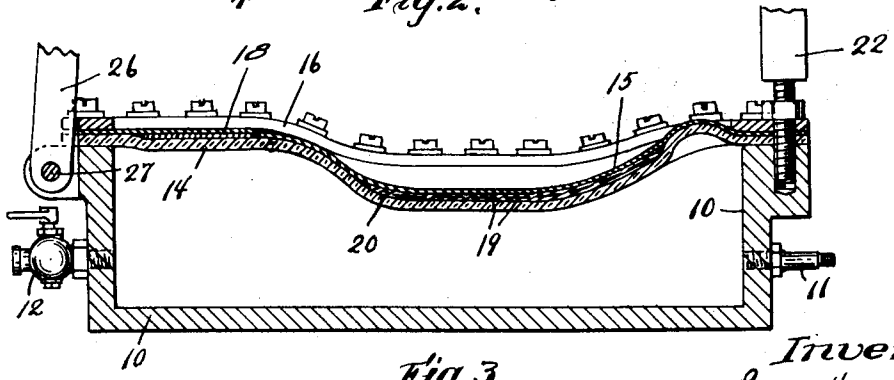


Fig. 3.

Inventor,
Geo. M. Ray,
by L. B. Kaminuan
Atty.

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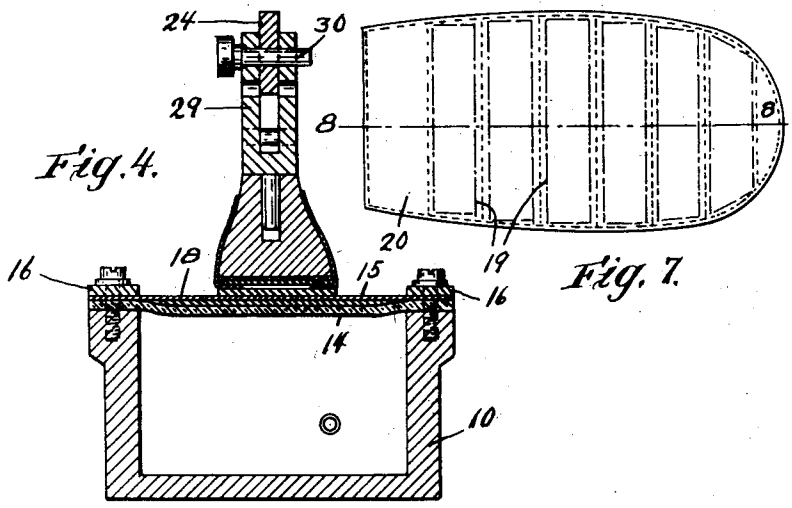


Fig. 4.

Fig. 7.

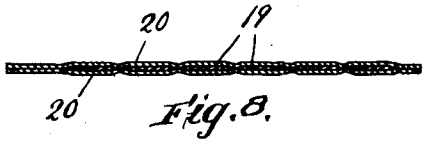


Fig. 8.

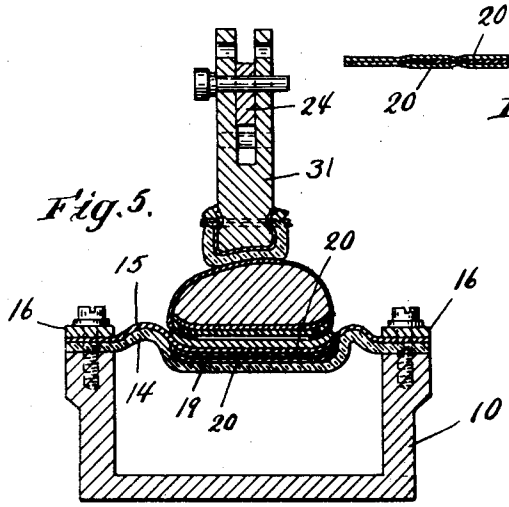


Fig. 5.

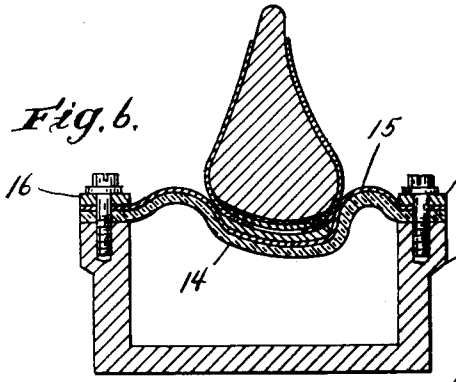


Fig. 6.

Inventor.
Geo. M. Ray
by L. L. Hammond
Atty.

Patented Aug. 20, 1929. 1,725,103

UNITED STATES PATENT OFFICE.

GEORGE M. RAY, OF NEWTON CENTER, MASSACHUSETTS, ASSIGNOR TO BANCROFT WALKER COMPANY, OF SOUTH BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SOLE-ATTACHING PRESS.

Application filed January 8, 1929. Serial No. 331,050.

This invention relates to fluid pressure presses which are primarily employed in adhesively connecting the outer soles of shoes to the uppers thereof.

In the manufacture of shoes in which leather outer soles are attached by means of an adhesive without other attaching means, it is customary to apply the adhesive to the edge portions of the upper and lining and then last the shoe onto an inner sole, the lasted in upper usually being secured by tacks or staples until the adhesive sets, after which they may be removed. By this operation, the upper portion which extends onto the inner sole is flattened, so that ordinarily it presents a nearly smooth surface. A filler of felt, or other material, the thickness of which is approximately the same as that of the upper and lining portions which are drawn onto the outer sole, is usually placed in the space within the edge of the upper, so that the surface to which the outer sole is applied may be as nearly level as possible, aside from its normal gradual curvature. Consequently, the margin portion of the outersole will ordinarily be pressed against a nearly uniform surface, permitting satisfactory adhesion thruout its entire margin.

The type of sole press generally employed for holding the outer sole against the upper while the adhesive sets comprises a flexible diaphragm, or air container, which engages the outer surface of the sole and has sufficient fullness and width to enable pressure to be applied to soles of different widths, not only throughout the entire bottom to the extreme edge of the sole, but also to a substantial extent against the side of the shoe, the edge portion of the sole being usually bent thereby slightly upward against the upper.

While this action is desirable in the forepart and shank portion of the shoe, as satisfactory adhesion at the extreme edge of the sole may thus be secured, I have ascertained that, at the heel part, this action tends to press the counter inwardly adjacent the heel seat and thus detract from, or destroy the rounded effect which is desired at this point. It is desirable that the portion of the sole to which the heel is attached be made practically level by this operation, that is either flat or slightly convex transversely.

In pressing the sole against the bottom of a lasted shoe by means of a flexible diaphragm, practically the same degree of pressure is applied to the low portions as to the higher portions of the surface, so that, if there is some unevenness in the surface against which the sole is pressed, the diaphragm does not tend to level this unevenness, so that the sole surface will be correspondingly uneven.

Moreover, the filler which is placed on the inner sole within the edge of the lasted in upper is liable to be either too thick or too thin. If it is too thick it is liable to cause a raised portion in the middle of the outer sole and if it is too thin the diaphragm is likely to press the sole inward at its middle portion, so that a concavity is formed therein, which latter result is particularly undesirable.

Also any unevenness of the surface to which the sole is adhesively connected tends to detract from the strength of the adhesion if the unevenness is sufficient to hold the adjacent portions of the sole out of contact with the shoe bottom.

The objects of my invention are to provide a sole-pressing device of the character above described, in which all tendency to distort the counter about the heel seat, by the sole pressing operation, will be prevented, and with which the action will have a strong tendency to flatten or level the heel seat.

Also to provide a device of this character with means which will neutralize the flexibility of the diaphragm at the forepart, so that increased pressure will be applied to the abnormally raised portions of the forepart surface, and decreased pressure will be applied to the abnormally low portions thereof and the effect of a filler which is too thick, or too thin, or other irregularity will be neutralized to as great an extent as possible.

I accomplish these objects in the manner hereinafter described and as illustrated in the accompanying drawing, in which:

Fig. 1 is a plan view and Fig. 2 a side elevation of a sole press embodying my invention.

Fig. 3 is a longitudinal section thereof at line 3—3 of Fig. 1.

Fig. 4 is a cross section at line 4—4 of Fig. 2.

Fig. 5 is a cross section at line 5—5 of Fig. 2.

Fig. 6 is a cross section at line 6—6 of Fig. 1.

Fig. 7 is a detail plan view and Fig. 8 is a

longitudinal sectional view of the forepart leveling means which I employ.

As shown in the drawings a cast metal box 10 is provided, having an air inlet 11 and outlet 12, and having its top edge, at each side, shaped to follow the general line of the bottom of a shoe from toe to heel. The top of the box is closed by a diaphragm 14, of sheet rubber, which is covered with a sheet 15 of stout, but flexible leather, or other suitable material, and both sheets are securely clamped to the top edge of the box by a metal strip 16, which is bolted thereto, so that an air tight connection is formed. The diaphragm thus formed is made with considerable fullness which is greatest at the toe end.

According to my invention I provide a flat sheet metal plate 18 between the rubber and the leather, said plate being of uniform thickness and nearly inflexible, though capable of being sprung, under some conditions, so that it has a slight curvature.

The width of said plate 18 is approximately as great as the average length of the heel seat of a shoe from the back end to the shank and the length thereof is somewhat less than the distance between the side surfaces interiorly of the box, so that there is a sufficient portion of the diaphragm between the ends of the plate and the point when the diaphragm is clamped to permit such up and down movement as may be necessary. The plate 18 is also located as near the end of the box, which is designed to be used as the heel end, as practicable, so that the portion of the diaphragm between the end wall of the box and the adjacent edge of the diaphragm is sufficient to permit the necessary vertical movement.

The portion of the diaphragm which is directly beneath the shoe forepart, when the shoe is placed thereon, with the heel seat resting over plate 18, is provided with a series of thin, narrow, resilient strips 19 of sheet metal, which are arranged to extend crosswise of the box with their edges in close proximity. The length and arrangement of said strips is preferably such that the ends thereof correspond in a general way to the outline of the sole forepart of a shoe of the largest size which is likely to be operated on, and the arrangement thereof on the diaphragm is made to approximate the position of the shoe thereon. To hold the resilient metal strips 19 in the relative positions desired, they are placed between two sheets 20 of thin flexible material, such as thin leather or cloth, said sheets being of sufficient size to overlap the same, and then the sheets are stitched together about each strip close to the edges thereof, so that each strip is held in a pocket. As thus prepared, the strips may then be placed either between the rubber and leather diaphragms, as shown, or on top of the latter.

The means illustrated for holding the shoe last against the pressing action of the diaphragm is a form of jack commonly employed in devices of this character, and comprises a post 22, which is connected to one end of the box and to which a heavy bar 24 is connected by a pivot 25, and an arm 26, which is connected by pivot 27 to the post and is adapted to engage the opposite end of the bar in any one of a series of notches 28. A jack post 29 is provided which is adapted to be connected by a pivot 30 to the bar 24 in any one of a series of holes, for engagement with the heel end of the last, and a toe rest 31 is connected to the bar in a similar manner for engagement with the forepart of the last.

In attaching the outer sole to a shoe which has been lasted, the surfaces which are to be connected are covered with any suitable adhesive, and the shoe, with the sole in position therebeneath, is placed on the diaphragm in such a position that the heel-seat is directly over the plate 18, and the fore part over the resilient strips 19, the shoe being preferably held in such a position that the front end of its heel seat is directly over the front edge of the plate. The jack posts are then placed in position and the bar 24 is locked down. Then a fluid under pressure is admitted to the chamber, forcing the sole against the shoe bottom and cause a firm adhesion. Under these conditions the plate 18 will prevent inward bending of the diaphragm at the points where it engages the heel seat, so that if the heel-seat is uneven at certain points, the tendency of the action will be to press the projecting portions down, inequalities in the surface against which it is pressed thus being reduced or eliminated. If, however, the heel seat is slightly convex transversely, the plate 18 may be sprung correspondingly, but the general effect is to tend to level the surface of the heel seat, or reduce any unevenness therein.

At the same time, as the plate 18 extends beyond the sides of the heel seat and is practically inflexible, or rigid, it will prevent the diaphragm from being pressed against any portion of the side of the shoe, so as to distort the curvature of the counter, or upper portion closely adjacent the heel seat.

The flexible metal strips 19 have a leveling action on the fore part of the shoe bottom which is similar in many respects to the action of plate 18 on the heel seat, as pressure will be applied with the greatest force to the portions, if any, which project above the general level of the bottom surface to which the sole is applied, thereby tending to level the same, or prevent one portion of the sole surface from being higher than another, as would be the case if the filler were too thick. In case the filler is too thin, the strips tend to minimize the tendency of the diaphragm to press the middle portion of the sole forepart inwardly beyond the normal level, by bridging the space between the edges of the inturned upper and causing excess pressure to be ap-

plied to the latter. The tendency to form a slight concavity in the middle of the sole forepart is thus minimized. The plates 19 thus have an equalizing action by tending to reduce, or eliminate inequalities in the surface of the outer sole.

As each strip 19 is relatively narrow as compared with the length of the forepart, and each strip is flexibly connected to the other at its edges, the strips readily conform to the longitudinal curvature of the sole, and, as the strips are readily flexible, they also conform to the shoe bottom transversely and do not prevent the diaphragm from acting to press upward about the sides of the shoe, so as to secure satisfactory adhesion at the edge of the sole.

As the heel seat of the shoe rests on the diaphragm directly over plate 18, and the lifting action of the diaphragm at this point is comparatively slight, the angular position of the toe portion will vary according to the height of the heel which the shoe is designed to carry, so that a shoe designed to carry a high heel will have its toe portion extend to a higher elevation than one designed to carry a low heel. For this reason extra fullness is provided in the diaphragm at the toe portion, as indicated in Fig. 3, so that a suitable pressure will be applied to the toe end of the sole, even though the shoe is designed for a particularly high heel, the press being also adapted for use in connection with a shoe designed to carry a low heel.

Under some conditions it is desirable to employ the strips 19 held in pockets between the separate sheets 20 on the top side of the diaphragm, so that they may be adjusted on the diaphragm to some extent in relation to the position of the shoe, which is not possible when the strips are secured between the rubber and leather diaphragms, but the action thereof is practically the same with either arrangement.

I claim:

1. A sole applying device comprising a fluid tight container having a flexible diaphragm at one side and means for supplying fluid pressure thereto, means for holding a lasted shoe in position to permit the diaphragm to be pressed against its bottom, and means for stiffening a section of the shoe-bottom-engaging portion of the diaphragm to increase the pressure on the elevations and reduce the pressure on the depressions of the surface of the shoe-bottom engaged thereby without reducing the flexibility of adjacent portions of the diaphragm.

2. A sole applying device comprising a fluid tight container having a flexible diaphragm at one side and means for supplying fluid pressure thereto, means for holding a lasted shoe in position to permit the diaphragm to be pressed against its bottom, and a stiffening plate on a section of the shoe-bottom-engaging portion of the diaphragm, for reducing inequalities of the surfaces with which it is engaged without impairing the flexibility of the diaphragm about the edges of the plate.

3. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and a metal plate interposed between the diaphragm and the shoe bottom and arranged to be engaged with the shoe bottom thruout the width thereof by the pressure of the diaphragm thereagainst, to reduce inequalities of the shoe bottom surface.

4. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and a flat, substantially inflexible plate disposed on the diaphragm in position to be engaged with the heel seat portion of the shoe bottom throughout its width when the diaphragm is pressed against the same.

5. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and a flat, substantially inflexible plate disposed on the diaphragm in position to be engaged with the heel seat portion of the shoe bottom throughout its area and to extend beyond said portion at each side thereof, to reduce inequalities in the heel seat surface and to prevent the application of pressure by the diaphragm to the sides of the shoe adjacent said portion.

6. A sole applying device comprising an air chamber having a flexible diaphragm forming the top wall thereof and adapted for engagement with the bottom and adjacent portion of the sides of a lasted shoe and means for holding the lasted shoe against the upward pressure of the diaphragm, and a flat, substantially inflexible plate mounted on said diaphragm directly beneath the heel seat portion of the shoe when held in position thereon, and arranged to extend transversely thereof beyond each side of the shoe at said portion and longitudinally from back to front of said portion.

7. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and flexible stiffening means on the fore-part-engaging portion of the diaphragm arranged to terminate adjacent the outline of said portion for reducing

inequalities of the surfaces of said portions of the shoe bottom.

8. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and leveling means on the forepart engaging portion of the diaphragm comprising a series of transversely extending flexible stiffening strips arranged edge to edge for angular adjustment to conform to the longitudinal curvature of the sole.

9. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and leveling means on the forepart engaging portion of the diaphragm comprising a series of flexible metal strips arranged to extend transversely of said portion with their adjacent edges in close proximity and their end portions extending beyond each side of said portion.

10. A sole applying device comprising a jack for holding a lasted shoe, a flexible diaphragm adapted and arranged to conform to the bottom of a shoe held by said jack, fluid pressure means for forcing the diaphragm against the shoe bottom, and leveling means on the fore part engaging portion of the diaphragm comprising a series of strips of flexible sheet metal, and a flexible sheet having a series of pockets for said strips arranged to hold the same with the side edges of adjacent strips in proximity and form a flexible connection between said edges.

11. A sole applying device comprising a casing having a flexible diaphragm closing one side thereof to provide a fluid tight container to which fluid under pressure may be supplied, means for holding a lasted shoe in position to permit the diaphragm to be pressed against its bottom, and stiffening means on a section of the shoe-bottom-engaging portion of the diaphragm for reducing the flexibility of said section without reducing the flexibility of the portions of the diaphragm between said section and the sides of the casing.

12. A sole applying device comprising a fluid tight container having a flexible diaphragm at one side and means for supplying fluid pressure thereto, means for holding a lasted shoe in position to permit the diaphragm to be pressed against its bottom, and a flexible stiffening means for a section of the forepart-engaging portion of the diaphragm constructed to reduce the tendency of said portion to conform to inequalities of the corresponding section of the shoe-bottom and to bend to conform to the transverse and longitudinal curvatures thereof.

13. A sole applying device comprising a fluid tight container having a flexible diaphragm at one side and means for supplying fluid pressure thereto, means for holding a lasted shoe in position to permit the diaphragm to be pressed against its bottom, a substantially inflexible stiffening means for a section of the heel-seat-engaging portion of the diaphragm, for causing the diaphragm to have a levelling action on the heel seat of the shoe, and a flexible stiffening means for a section of the forepart-engaging portion of the diaphragm constructed to reduce the tendency of said section to conform to inequalities of the shoe bottom forepart and to permit the same to conform to the curvatures thereof.

In testimony whereof, I have signed my name to this specification.

GEORGE M. RAY.