Nov. 10, 1936. S. J. FINN 2,060,061

SOLE LAYING MACHINE

Filed Sept. 12, 1934 2 Sheets-Sheet 1

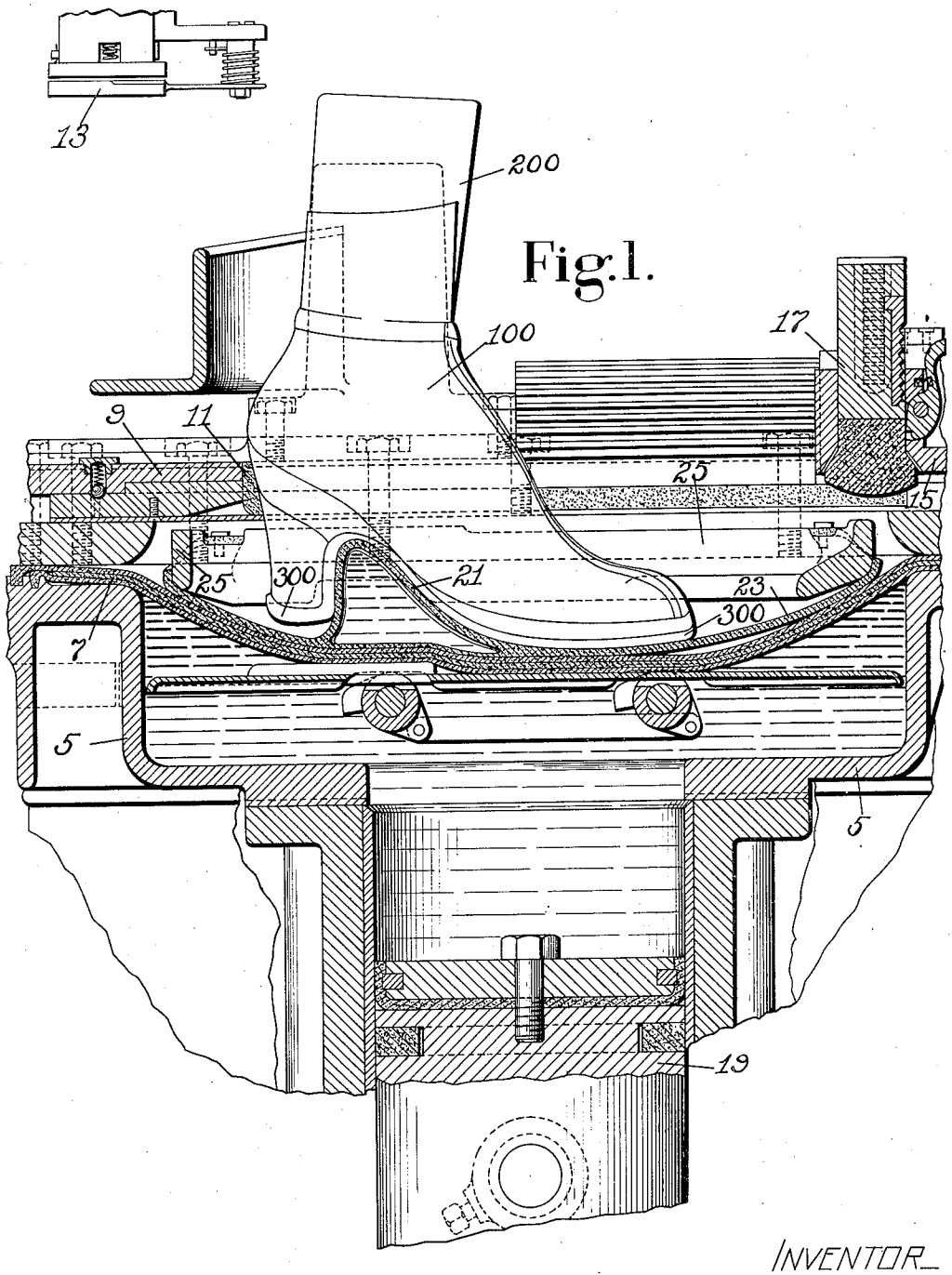


Fig. 1.

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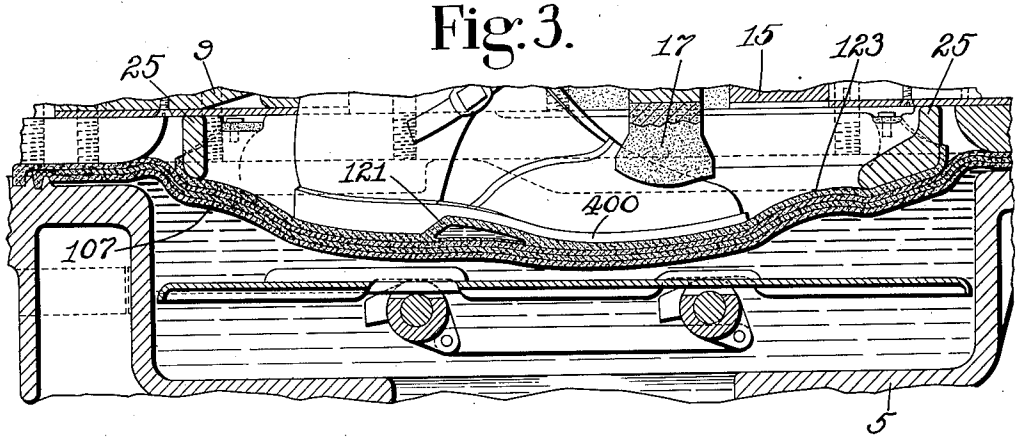
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SOLE LAYING MACHINE

Filed Sept. 12, 1934 2 Sheets-Sheet 2

Fig. 3.



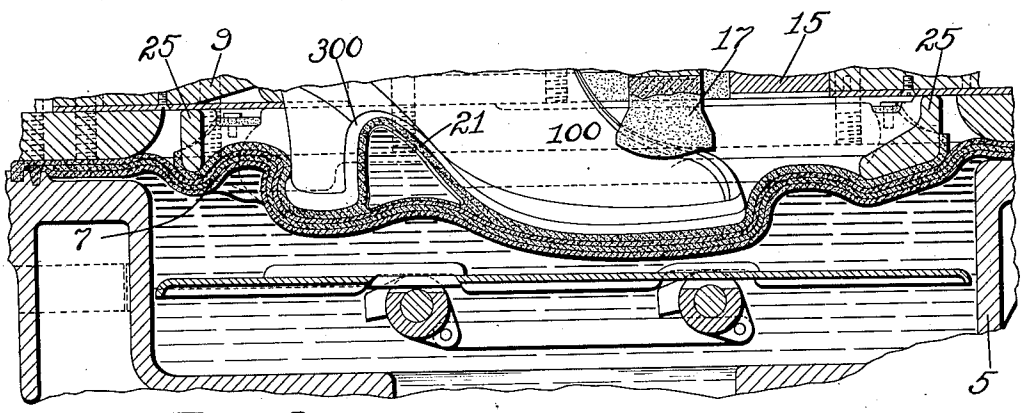


Fig. 2.

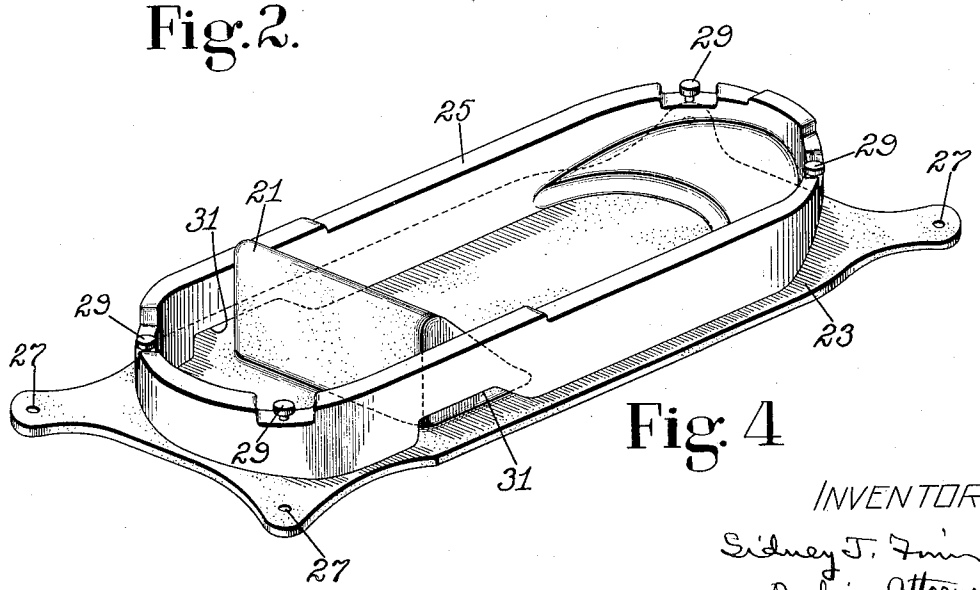


Fig. 4

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UNITED STATES PATENT OFFICE

2,060,061

SOLE LAYING MACHINE

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Application September 12, 1934, Serial No. 743,641

13 Claims. (Cl. 12—33)

This invention relates to sole laying or pressing machines and is herein illustrated as embodied in a machine particularly adapted to lay a sole of unvulcanized rubber upon the bottom of a shoe to which the sole is to be vulcanized.

After the lasted shoe is otherwise substantially complete, except for the sole laying and vulcanizing steps, a sole of unvulcanized rubber is properly located on the bottom of the shoe and is laid or pressed into place. Commonly this sole laying operation is performed by a machine comprising a pressure box having a flexible diaphragm upon which the shoe, with the sole lightly adhering to its bottom, is placed, the shoe being supported against pressure which is exerted through the diaphragm by means of a suitable support which comprises a jack for engaging the top of the last and a toe rest for engaging the top of the forepart of the shoe. A machine of this general type, and specifically a machine in which fluid is forced into the pressure box beneath the diaphragm, is disclosed in United States Letters Patent No. 1,920,977, granted August 8, 1933, on an application filed in my name.

Unvulcanized rubber soles commonly extend over the heels of the shoes to which they are attached and, when shoes having high arches are encountered, it is difficult to cause the diaphragm to be forced up properly into the recess between the shank and the heel breast of the shoe so as to press the sole firmly into place at this locality. In order to overcome this difficulty, there is provided, in accordance with one feature of the present invention, a deformable member adapted to be received in the recess so that, when pressure is applied through the diaphragm, this member forces the shank and the heel breast portions of the sole firmly into place. In the illustrated construction, this deformable member is a hollow chamber which is integral with a pad, said chamber being filled with water. The pad is carried by a frame or holder so that it may readily be removed from and replaced upon the diaphragm; and the pad is detachably attached to the holder so that it may be readily replaced by another pad which may have a different degree of stiffness or a deformable projection or a different shape, or both. This frame or holder also serves the further purpose of permitting the pad to be held in place and of limiting the flexing of the pad and the diaphragm around the edges of the sole when certain kinds of shoes are being operated upon.

These and other features of the invention, including certain details of construction and combinations of parts, will be described as embodied in an illustrated machine and pointed out in the appended claims.

Referring to the accompanying drawings:

Fig. 1 is a vertical cross section of a portion of a machine in which the present invention is embodied, a high arched shoe being shown in the position it occupies before pressure is applied to lay the sole;

Fig. 2 is a section similar to Fig. 1 showing the same shoe while pressure is being applied;

Fig. 3 is a section similar to Fig. 2 but showing a shoe the sole of which has an extension edge; and

Fig. 4 is a perspective of the pad with its deformable projection and the frame or holder upon which it is mounted.

The machine, aside from the pad and its holder, may be the same as that of the patent identified above and will be only briefly described, it being understood that any suitable machine provided with a flexible support which may be deformed to apply pressure to the sole may be employed. Referring to Fig. 1, the illustrated machine comprises a pressure box **5** the upper wall of which consists of a flexible diaphragm **7**, herein shown as comprising three layers of sheet rubber. Disregarding for the moment the pad and its holder which will be described later, the operation of the machine is briefly as follows: A lasted shoe **100**, with a sole **300** properly located thereon, is placed on the diaphragm **7** with its heel end against a heel plate **9** having a piece of yielding material **11**, such as rubber, on its edge. Thereafter, a jack post **13** is swung over into position above the top of the last **200**, two side plates and a toe plate **15** are slid horizontally so that their edges contact with the shoe, and a toe rest **17** carried by the toe plate is brought down upon the toe portion of the shoe in the manner shown in Fig. 2. Water is now forced under pressure into the pressure box by a piston **19** to press the sole. After the sole has thus been pressed or laid, the parts return to the position shown in Fig. 1 to permit the removal of the shoe. No further description of the construction and mode of operation of the machine, as thus far described, will be given since any suitable machine may be employed, reference being made to the patent for details of construction of the machine herein shown.

The shoe shown in Figs. 1 and 2 has a high arch which results in a recess of considerable height and width between the shank and the heel breast; and with shoes of this kind, considerable difficulty is experienced in pressing the

sole firmly into place against the walls of the recess. In order to obviate this difficulty, a deformable member is provided, herein shown as a closed chamber 21 filled with water and projecting upwardly from a pad 23 with which it is integral. In order to facilitate the handling of the pad 23, as well as for other reasons which will appear below, the pad is detachably fastened to a skeleton holder 25 (Fig. 4). To this end, the pad is provided with four tabs each having a hole 27 which may be slipped respectively over buttons 29 located in depressions formed in the top of the wall of the holder 25. The illustrated holder has two substantially straight side walls and curved end walls, there being formed in the bottoms of the side walls, substantially in line with the projection 21, two recesses 31 so that, when the pad is pressed against the bottom of a shoe, the pad 23 may readily be flexed at this locality, as shown in Fig. 2, to permit the projection 21 to be forced firmly into the recess in the bottom of the shoe. It will be understood that pads having projections of different shapes and dimensions will be provided so as to take care of shoes having arches of different shapes and extents. It will also be understood that the invention, as will appear later, may be used with advantage in laying the soles of certain shoes which may have low arches.

In the operation of the machine, the pad holder 25 with its pad 23 is placed on the diaphragm in proper position; and the shoe 100, with the sole 300 properly located thereon, is placed on the pad with the projection 21 extending into the recess between the shank and the heel breast. The treadle of the machine is then depressed, whereupon the jack swings over into a position just above the top of the last, the side and toe plates close above the shoe, and the toe rest 17 descends upon the toe portion of the shoe. A fluid, such for example as water, is then forced into the pressure box 5 to distend the diaphragm and produce the effect shown in Fig. 2 wherein the margin of the forepart of the sole is rolled up about the sides and toe end of the shoe, the heel end of the sole is rolled up about the base of the heel, and the deformable projection 21 is forced up firmly into the recess between the shank and the heel breast of the shoe. It will be noted that when water is forced into the pressure box, the frame or holder 25 is held from any considerable upward movement by contact with the plates of the illustrated machine which enclose the shoe (the heel plate 9 and the toe plate 15 being clearly shown in Fig. 2) and remains so held while the diaphragm is distorted into the position shown. In the illustrated machine, the plates which close about the sides of the shoe are utilized to hold the pad holder 25 rigidly in contact with the diaphragm during the sole-pressing operation. In other machines, for example those in which the shoe is pushed down into a pressure box which holds a constant volume of fluid, other suitable means may be employed. The pressing operation is now complete and the parts of the machine return to the positions shown in Fig. 1. Water is withdrawn from the box, and the shoe is removed and replaced by another one.

The shoe shown in Figs. 1 and 2 is a high-arched shoe with a sole having a rolled edge around its forepart and at its heel. In Fig. 3 is shown a different kind of shoe having a different kind of arch and a low heel which is integral with the sole. The recess between the shank and the heel breast is small, and the sole has an extension edge which should not be bent up at all. When such a shoe is to be operated upon another pad 123, having a differently shaped projection 121, and preferably another diaphragm 107 which is somewhat stiffer than the diaphragm 7, are employed. Due to the fact that the diaphragm 107 is comparatively stiff and that the space between the edge of the sole and the frame or holder 25 is of comparatively small extent, the diaphragm bulges only slightly, if at all, into this space and the extension edge of the sole of the shoe is not bent up. Instead of using a comparatively stiff diaphragm 107, the same result may be secured by using a comparatively stiff pad 123 or by having the combined stiffness of the two members of a suitable degree.

Although the invention has been set forth as embodied in a construction in which pressure is applied through a flexible member by forcing a fluid into a pressure box and in which the deformable projection is integral with a pad which is separate from and rests upon the flexible member, it should be understood that the invention is not limited in the scope of its application to the construction which has been shown and described.

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

1. A machine of the class described having, in combination, a pressure box one wall of which comprises a flexible member, a closed chamber containing a fluid projecting from one side thereof, means for supporting a lasted shoe with the chamber located in the recess formed by the heel breast and the shank of the shoe against pressure exerted upon the bottom of the shoe, and means for causing pressure to be exerted through the flexible member against said bottom.

2. A machine of the class described having, in combination, a pressure box one wall of which comprises a flexible diaphragm, means for supporting a shoe against pressure exerted through said diaphragm, a pad located on the diaphragm, said pad having a hollow projection containing a fluid arranged to extend into the recess formed by the heel breast and the shank of the shoe, and means for causing the diaphragm to exert pressure through the pad against the bottom of the shoe.

3. A machine of the class described having, in combination, a pressure box one wall of which comprises a flexible diaphragm, means for supporting a shoe against pressure exerted through said diaphragm, a pad located on the diaphragm, said pad having a hollow projection containing a substantially incompressible fluid arranged to extend into the recess formed by the heel breast and the shank of the shoe, and means for causing the diaphragm to exert pressure through the pad against the bottom of the shoe and to be wrapped about lower side portions of the shoe.

4. A machine of the class described having, in combination, a pressure box one wall of which comprises a flexible diaphragm, means for supporting a shoe against pressure exerted through the diaphragm, a device for increasing the pressure applied to the arch of the shoe comprising a hollow frame having an opening of an area greater than that of the bottom of the shoe, a flexible pad extending across the opening and having a deformable projection within the hollow of the frame adapted to extend into the recess formed by the shank and heel breast of the shoe,

means for engaging the frame and holding it down on the diaphragm, and means for causing pressure to be exerted through the diaphragm, the pad and its projection upon the bottom of the shoe.

5. A machine of the class described having, in combination, a pressure box one wall of which comprises a flexible diaphragm, means for supporting a shoe against pressure exerted through said diaphragm, a pad located on the diaphragm, said pad having a hollow projection containing a fluid arranged to extend into the recess formed by the heel breast and the shank of the shoe, and means for forcing fluid into the pressure box to distend the diaphragm.

6. A machine of the class described having, in combination, a pressure box one wall of which comprises a flexible diaphragm, means for supporting a shoe against pressure exerted through said diaphragm, a rigid hollow pad holder and a flexible pad attached thereto located on the diaphragm, said pad having a deformable projection located within hollow of the pad holder and adapted to extend into the recess formed by the shank and heel breast of the shoe, means engaging the pad holder and preventing upward movement thereof, and means for forcing fluid under pressure into the pressure box to distend the diaphragm.

7. A device for use with a sole laying machine comprising a holder consisting of an endless wall, and a flexible pad extending across the base of said wall and having a projection adapted to be received in the recess formed by the heel breast and shank of a shoe.

8. A device for use with a sole laying machine comprising a holder consisting of an endless wall, and a flexible pad extending across the base of said wall and having a hollow projection containing a fluid.

9. A device for use with a sole laying machine comprising a holder consisting of an endless wall, and a flexible pad extending across the base of said wall and having a hollow projection containing a substantially incompressible fluid.

10. A device for use with a sole laying machine comprising a holder consisting of an endless wall, and a flexible pad fastened to the holder and having a projection adapted to be received in the recess formed by the heel breast and shank of a shoe, there being formed in the base of the wall at opposite localities recesses to permit that portion of the pad which carries the projection to be bent up.

11. A device for use with a sole laying machine comprising a rigid holder, and a flexible sheet detachably fastened thereto, said sheet having a deformable projection adapted to be received in the recess formed by the heel breast and shank of a shoe.

12. A device for use with a sole laying machine comprising a holder consisting of a frame provided with an opening, and a flexible pad extending across and attached to the frame and having located in the opening a projection adapted to be received in the recess formed by the heel breast and shank of a shoe.

13. A device for use with a sole laying machine comprising a holder consisting of a frame provided with an opening, and a flexible pad extending across and attached to the frame and having located in the opening a hollow projection containing fluid adapted to be received in the recess formed by the heel breast and shank of a shoe.

SIDNEY J. FINN.