Aug. 31, 1937. J. T. LANCASTER 2,091,368

SOLE ATTACHING APPARATUS

Filed Jan. 15, 1935 2 Sheets-Sheet 1

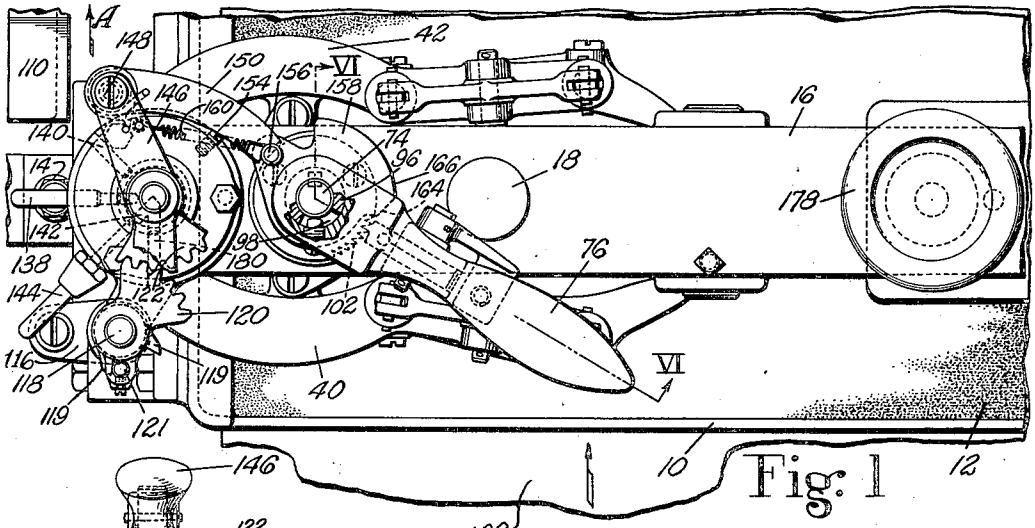


Fig. 1

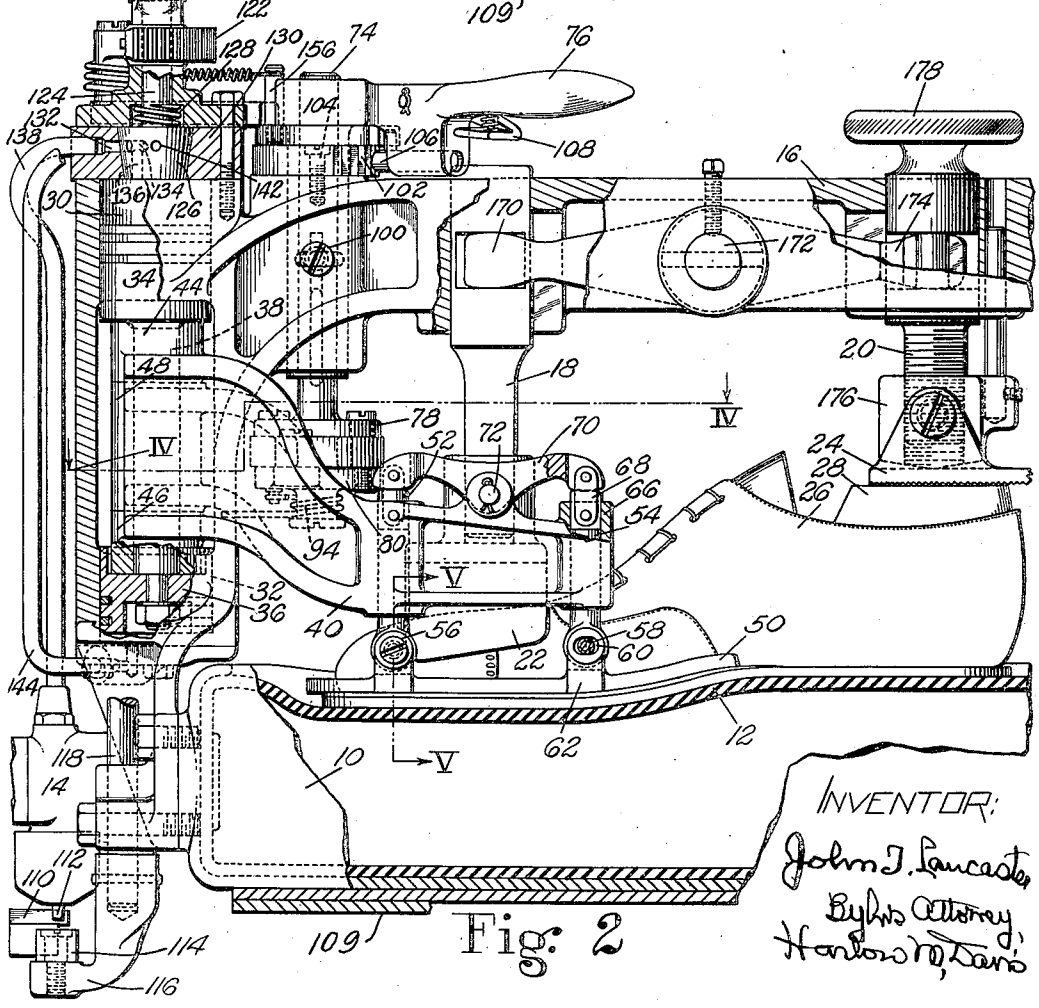


Fig. 2

INVENTOR:
John T. Lancaster
By his Attorney,
Hanlon & Hanlon

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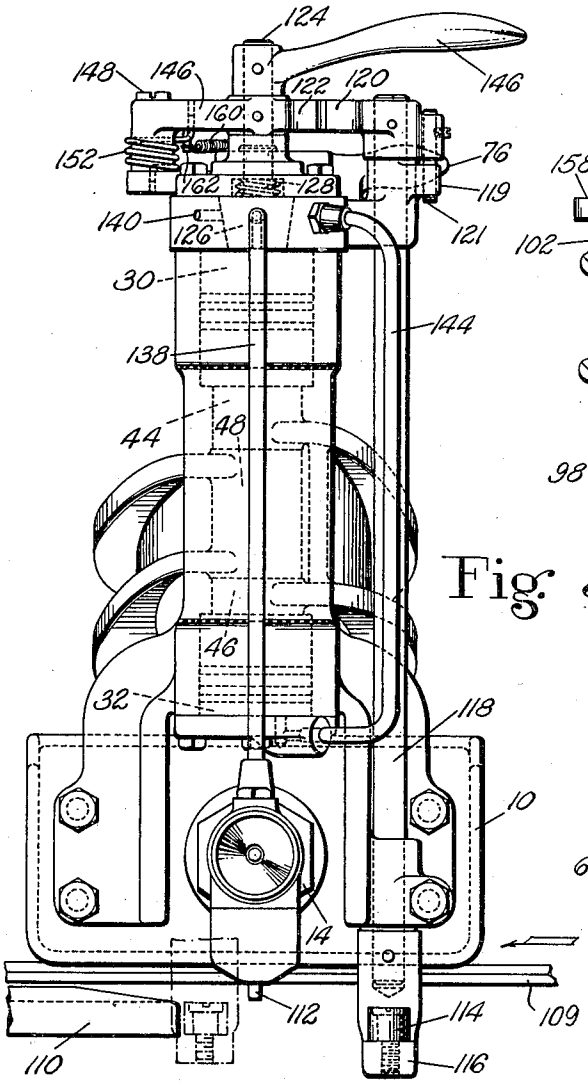


Fig. 3

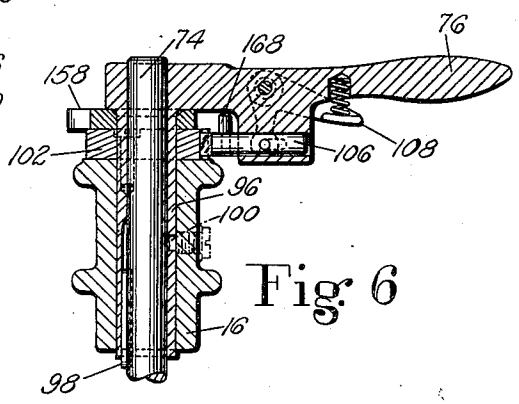


Fig. 6

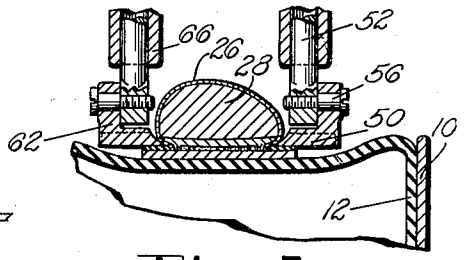


Fig. 5

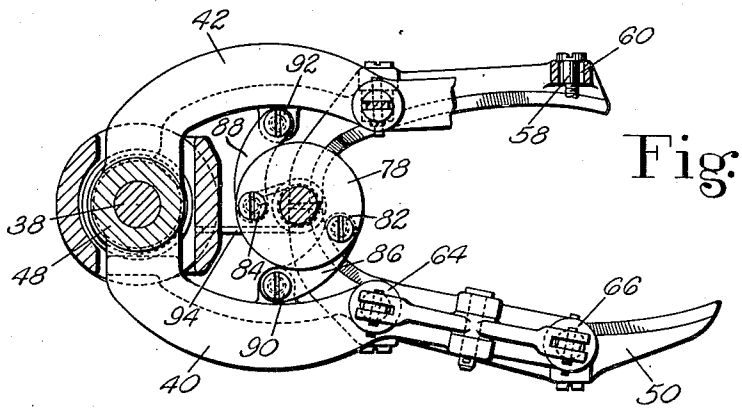


Fig. 4

INVENTOR:
John T. Lancaster
By his Attorney
Harlow W. Davis

Patented Aug. 31, 1937

2,091,368

UNITED STATES PATENT OFFICE

2,091,368

SOLE ATTACHING APPARATUS

John T. Lancaster, Newton, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application January 15, 1935, Serial No. 1,944

12 Claims. (Cl. 12—36)

This invention relates to apparatus for attaching soles to shoes and particularly to improved means for holding down the welt or sole extension of a welt or other shoe having an extension edge sole, to prevent the extension from rolling up against the side of the shoe when heavy pressure is applied to the sole, as in the process of attaching it to a shoe by the cement method.

The problem of supporting the sole extension at all times with just the right amount of pressure to keep it flat—neither bending it down nor allowing it to roll up—is made difficult by the fact that in the operation of commercial machines different shoes do not indent the pressure pad to the same extent and, consequently, the position to be assumed and the pressure to be applied by the holddown vary during operation upon a succession of shoes. It is an object of the present invention to overcome this difficulty.

With the foregoing in view, an important feature of the invention consists in the provision, in a sole attaching apparatus, of a welt holddown having means for pressing it upon the welt of a shoe with a predetermined pressure, regardless of the position of the surface of the pressure pad. This pressure is preferably only just sufficient to balance that applied to the welt through the sole and may, in case an inflatable pad is used, be determined by the inflation of the pad.

In the illustrated embodiment of the invention the pad is so connected to fluid pressure means for operating the holddown that the fluid pressure in said means and that in the pad may be balanced. As shown, the holddown is mounted upon a piston rod fixed to a piston moving vertically in a cylinder which can be placed in direct communication with the fluid chamber in the pad, and invention is to be recognized in a welt holddown operated by a fluid actuated piston, which I believe to be broadly new. Such a holddown may be described as having a floating mounting and is adapted to apply the proper amount of pressure very accurately to all work pieces.

Another feature of the invention, facilitating the use of the apparatus, resides in automatic means for causing the pressure to be released, in combination with pressure applying means which may be manually controlled, to promote accuracy in the application of the holddown to a shoe. By virtue of this, the operator does not need to give any further attention to the work after the pressure has been applied.

These and other features of the invention will best be understood and appreciated from reading the following detailed description of one practical embodiment thereof, in connection with the accompanying drawings, in which

Fig. 1 is a plan view of an apparatus embodying the invention applied to a press unit of a cement sole attaching machine;

Fig. 2 is a view of the same apparatus in front elevation with parts broken away to reveal details of internal structure;

Fig. 3 is a view of the same in end elevation;

Fig. 4 is a plan view, partly in section, upon the line IV—IV of Fig. 2, illustrating details of the welt holddown and its operating means;

Fig. 5 is a sectional detail taken upon the line V—V of Fig. 2; and

Fig. 6 is a sectional detail upon the line VI—VI of Fig. 1.

In the drawings, 10 indicates the pad box of a press unit for cement attaching extension edge soles to shoes and 12 indicates an inflatable pad, the admission of fluid under pressure to which is controlled by a valve 14. An overhead yoke 16, which is integral with the pad box 10, sustains a toe post 18 and a heel post 20, at the lower ends of which are a toe pad 22 and a plate 24, adapted respectively for engagement with the toe portion of a shoe 26 and the cone of a last 28 in the shoe. The structure thus far described is well known in the art, except the particular mountings of the toe and heel posts, which will be described in detail hereinafter.

In order to afford proper support, which will always be accurately measured to balance the amount of pressure applied in the sole attaching operation, to the projecting welt of a welt shoe or the projecting sole extension of an extension edge shoe of any type, and to apply sufficient pressure to cause the welt and sole to be securely attached to each other and any tendency of the margin of the sole to roll upward to be eliminated, the welt supporting mechanism or holddown now to be described is provided.

The toe end of the yoke 16 is formed to provide an upper cylinder 30 and a lower cylinder 32 which are in alinement with each other and in which are arranged for vertical reciprocation upper and lower pistons 34 and 36 which are secured respectively to the upper and lower ends of a single piston rod 38.

Journaled upon the piston rod for swinging movement about the vertical axis thereof are two arms 40 and 42 which are substantially alike except at the ends where they are journaled upon the piston rod 38. At these ends, the arm 40 is

provided with upper and lower bosses 44 and 46 which bear respectively against the upper and lower piston heads 34, 36. These bosses are suitably spaced apart to receive between them the single boss 48 upon the end of the arm 42. This structure constitutes, in effect, a hinge mounting upon the piston rod 38 for the arms 40, 42, permitting the arms to be swung inwardly or outwardly toward or from each other and causing them to be moved up or down as a unit when the pistons rise or descend in the cylinders. The vertical movement of the pistons is effected by the introduction of fluid under pressure into the cylinders in a manner to be described later, and the piston rod constitutes a floating mounting for the welt holddown.

The rear end of each of the arms 40, 42 carries a welt supporting plate 50 adapted to enter and conform to the welt crease of the shoe 26. The plate 50 is suspended from two vertical rods 52, 54 into the lower portion of which are screwed studs 56, 58 engaging in horizontally slightly elongated openings 60 formed in ears 62 rising from the crease plate.

The rods 52, 54 are fitted in bores formed in enlarged portions 64 and 66 respectively of the swinging arms 40, 42.

The upper ends of the rods 52 and 54 are connected by links 68 to the two ends of an equalizing lever 70 which is pivoted at 72 to the swinging arm. The purpose of this mounting for the welt supporting plates is to permit them to adjust themselves in accordance with the longitudinal tilt of the shoe upon the pad in a manner to equalize the pressure fore and aft along the welt.

In order to swing the arms 40, 42 toward or from each other, there is provided a vertical shaft 74 to the upper end of which is splined a handle 76 for turning the shaft about its vertical axis. Fixed to, or formed integrally with, the lower portion of the shaft 74 are upper and lower disks 78, 80, which are spaced apart vertically and between which are pivotally mounted upon bolts 82, 84, links 86, 88, the outer ends of which are pivotally connected respectively at 90 and 92 to the arms 40, 42 so that rotation of the shaft 74 will cause the arms to swing toward or from each other.

A torsion spring 94 surrounding the lower end of the shaft 74 tends continually to rotate the latter in a clockwise direction, as viewed in Figs. 1 and 4, and consequently to swing the arms 40, 42 apart and open the holddown unless the force of the spring is overcome by manipulating the handle 76 splined to the upper end of the shaft 74.

Integral with the handle 76 is a downwardly extending sleeve 96 so connected by a spline 98 to the shaft 74 that the shaft can move up and down freely through the handle but is constrained to rotate with the handle when the latter is turned. The sleeve 96 also has a horizontal arcuate slot 98 which engages the tip of a screw 100 threaded through a portion of the stationary yoke 16, as seen in Fig. 6. This screw serves to limit the angle through which the handle, and consequently the shaft 74, can be rotated.

In order to lock the holddown against being opened by the spring 94 when the handle is released there is provided a stationary toothed segment 102 which is secured to the top of the yoke 16 by screws 104. A sliding locking dog 106 carried by the handle 76 is adapted to engage with the teeth of the segment 102 but may be retracted at will by pressing upon the finger lever 108 to release the holddown from its clamping engagement about the shoe.

Although the illustrated apparatus is designed for manual control, provision is also made for partly automatic control of the fluid operated mechanism when the pad box is one of a plurality of similar units mounted upon an endless carrier 109 movable intermittently in the direction indicated by the arrow A upon Fig. 1. A machine so organized has a stationary cam 110 arranged to be engaged by an air releasing plunger 112 depending from the valve 14 which controls the inflation and deflation of the pad 12. A similar arrangement, operating as described, is shown in United States Patent No. 1,945,762, Weiss. When the plunger 112 rides upon the cam 110 the fluid pressure in the pad, which is normally about sixty pounds per square inch, is released until the pressure has diminished to, say, twenty pounds per square inch. Following this a cam roll 114 mounted upon a swinging arm 116 fixed to the lower end of a vertical shaft 118 is swung around in a counterclockwise direction from the position shown in Fig. 1, between limits determined by stationary lugs 119, which are engaged by a pin 121.

To the upper end of the shaft 118 is secured a gear segment 120 to which the pin 121 is affixed and which meshes with a similar gear segment 122 fixed to the stem 124 of a rotary valve 126 which controls the admission and release of the pressure fluid to and from the cylinders 30 and 32. The valve 126 as shown is frusto-conical and is pressed by a spring 128 into air tight seating engagement with a correspondingly formed seat in the cylinder head 130 of the cylinder 30.

When the arm 116 and shaft 118 are in the position shown in Fig. 1 the full fluid pressure in the pad is admitted to the cylinder 30 through a port 132 in the cylinder head and thence through connecting passages 134 and 136 through the valve member 126, the port 132 being connected by a pipe 138 to a portion of the body of the valve 14 which has communication with the interior of the pad 12. In this case the pressure in the cylinder 30 is the same as that in the pad and the holddown sustained by the piston rod 38 is pressed down to apply approximately the same pressure per unit area to the welt of the shoe as that applied upwardly to the sole by the pad, the area of the piston head being designed to be approximately the same as that of the welt engaging surface of the holddown.

When the cam roll 114 strikes the cam 110 and is swung in a counterclockwise direction as described above, rotating the shaft 118, the valve 126, which is geared to the shaft 118, is rotated in a clockwise direction, stopping with the passage 134 in communication with an exhaust port 140 which is open to the atmosphere, thus releasing the fluid pressure in the cylinder 30. At the same time a V-shaped passage 142 in the valve 126 is placed in communication with the port 132 and an air pipe 138, connecting the port 132 to a second pipe 144 which is connected to the lower cylinder 32. Consequently, fluid from the pad 12, which is now at reduced pressure, is admitted to the cylinder 32, causing the piston 36 to rise and automatically elevate the holddown.

For the purpose of permitting manual operation of the valve 126, to raise and lower the holddown at will independently of the automatic operation, a handle 146 is secured to the upper end of the valve stem 124.

In order that the holddown shall not be raised as described while it is locked in clamping engagement with the shoe, mechanism is provided whereby the rotation of the valve 126 causes the locking dog 106 to be retracted so that the spring 94 is permitted to open the holddown. To this end the gear segment 122 has an arm 146 to the outer end of which is pivoted at 148 a pawl 150 acted upon by a torsion spring 152 which tends to hold the pawl against an adjustable screw 154 threaded into the stationary cylinder head. The nose of the pawl is notched and engages a pin 156 set in a cam 158 resting upon the toothed member 102 and freely rotatable upon the sleeve 96. A spring 160 connecting the pin 156 with a pin 162 inserted in the arm 146 tends to hold the pin 156 in the notch in the end of the pawl 150 but permits the pin and the pawl to separate when occasion demands.

The cam 158 has a rise 164 and a concentric portion 166 arranged to engage a pin 168 inserted in the locking dog 106. As the pin 168 rides upon the cam the locking dog is moved outward, releasing it from the teeth 102 and permitting the holddown members 50 to move apart automatically.

From the foregoing it may be understood that when the valve 126 is turned to the position to cause the piston rod 38 to move upward the cam 158 is rotated clockwise as viewed in Fig. 1, to release the locking dog 106, permitting the welt holddown to be opened automatically by the spring 94 so that it can be lifted automatically by the piston rod.

The toe post 18 is slidable vertically in a suitable guide in the yoke 16 and is engaged by one end 170 of an equalizing lever which is centrally pivoted at 172 in the yoke. The heel post 20 is likewise guided for vertical movement through the yoke 16 and is engaged by the other end 174 of the equalizing lever. The lower end of the heel post 20 is adjustably threaded into a block 176 upon which the heel plate 24 is mounted and is provided with a knob 178 by which it may be turned to adjust the heel plate 24 heightwise. Aside from this adjustment the equalizing lever acts automatically to equalize the pressure exerted upon the toe portion of the shoe and the cone of the last by the toe pad 22 and the heel plate 24, this occurring entirely independently of the position or action of the welt holddown, which embraces the toe post but is supported independently thereof.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a sole attaching apparatus, a pressure pad having a movable sole engaging surface, a welt holddown sustained in position to engage in the welt crease of a shoe upon the pad, and means for pressing the holddown upon the welt of the shoe with a predetermined pressure regardless of the position of the surface of the pad.

2. In a sole attaching apparatus, a pressure pad, means for causing the pad to exert pressure upon the sole of a shoe positioned upon the pad, a welt holddown sustained in position to engage in the welt crease of the shoe, and means for causing the holddown to exert upon the welt of the shoe a pressure only sufficient to balance that applied to the welt through the sole.

3. In a sole attaching apparatus, an inflatable pad for pressing a sole upon a shoe, a welt holddown sustained in position to engage in the welt crease of the shoe, and means for causing the holddown to exert upon the welt of the shoe a pressure determined by the inflation of the pad.

4. In a sole attaching apparatus, an inflatable pad for pressing a sole upon a shoe, a welt holddown sustained in position to engage in the welt crease of the shoe, fluid pressure means for causing the holddown to exert pressure upon the welt of the shoe, and connections between said means and the pad whereby the fluid pressure in said means and the pad may be balanced.

5. In a sole attaching apparatus, an inflatable pad for pressing a sole upon a shoe, a welt holddown sustained in position to engage the welt of the shoe, a fluid pressure cylinder communicating with the pad, and a piston in the cylinder, the piston having approximately the same area as the portion of the welt engaged by the holddown and the holddown being supported by the piston.

6. In a sole attaching apparatus, a fluid actuated piston, a piston rod fixed to the piston, and a welt engaging holddown carried by the piston rod.

7. In a sole attaching apparatus, a pressure pad, a welt holddown, manually controlled means for causing the holddown to apply pressure to the welt of a shoe upon the pad, and automatic means for causing the pressure to be released.

8. In a sole attaching apparatus, a pressure pad, a welt holddown, manually controlled means for causing the holddown to apply pressure to the welt of a shoe upon the pad, and automatic means for causing the pressure to be released and the holddown to be moved away from the welt.

9. In a sole attaching apparatus, a pressure pad, a welt holddown movable toward and away from the pad, automatic means for causing the holddown to move away from the pad, and manual means for causing the holddown to move toward or away from the pad at the will of the operator.

10. In a sole attaching apparatus, a pressure pad, a welt holddown, manual means for closing the holddown into the welt crease of a shoe upon the pad, and automatic means for causing the holddown to open.

11. In a sole attaching apparatus, a pressure pad, a toe post and a heel post interconnected for equalizing movement relatively to the pad, a floating welt holddown embracing the toe post but supported independently thereof, and means for causing the holddown to apply a measured amount of pressure to the welt of a shoe upon the pad regardless of the relative positions of the toe post and the surface of the pad.

12. In a sole attaching apparatus, an inflatable pressure pad, and a welt holddown sustained above the pad by the same pressure fluid with which the pad is inflated.

JOHN T. LANCASTER.