No. 821,336. PATENTED MAY 22, 1906.

G. F. BUTTERFIELD.

SHOE SOLE VULCANIZING AND APPLYING APPARATUS.

APPLICATION FILED MAY 29, 1905.

2 SHEETS—SHEET 1.

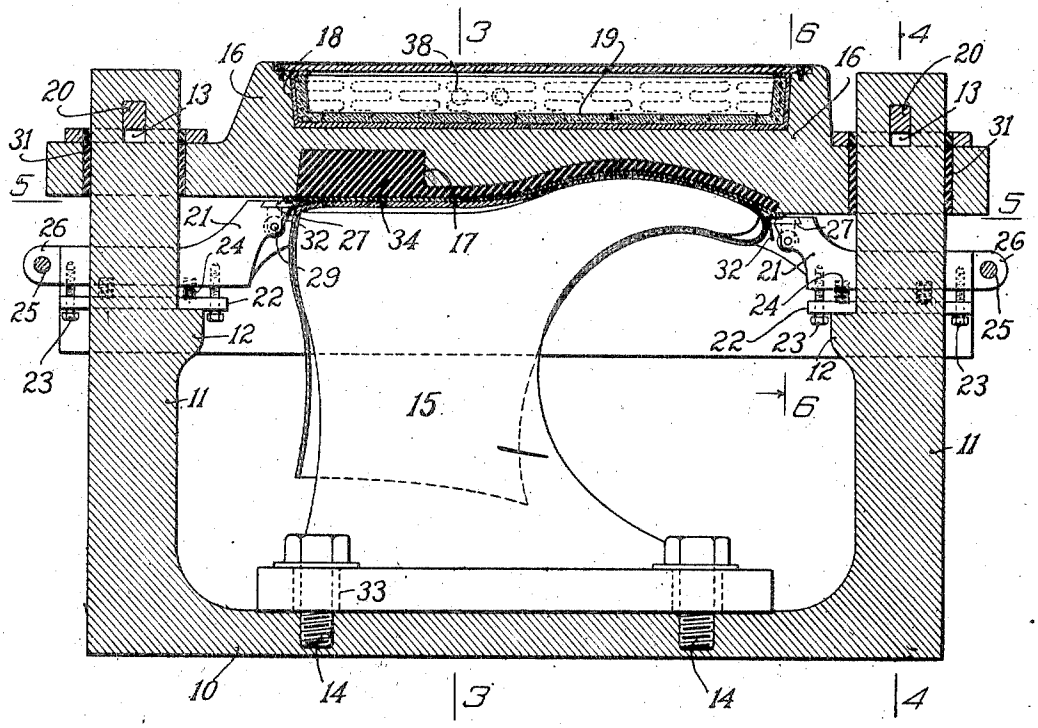


FIG. 1.

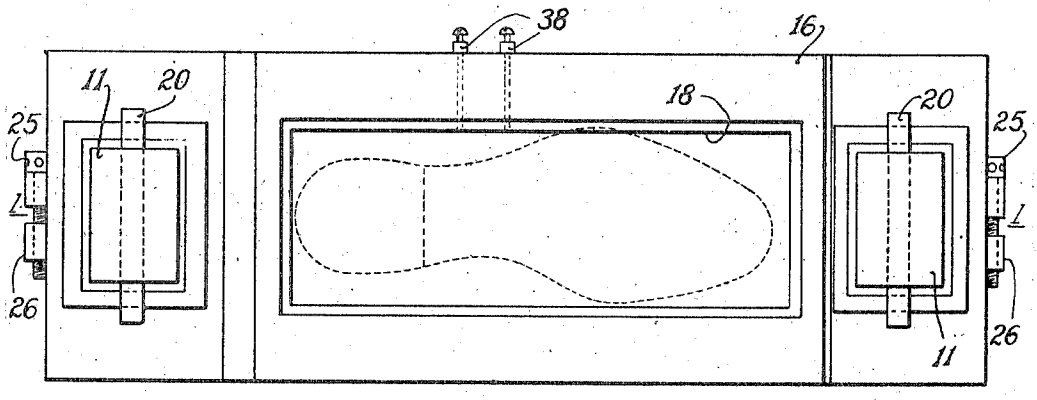


FIG. 2.

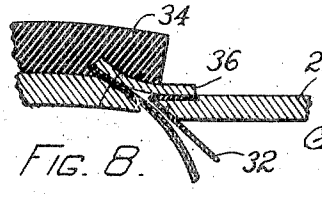


FIG. 8.

WITNESSES

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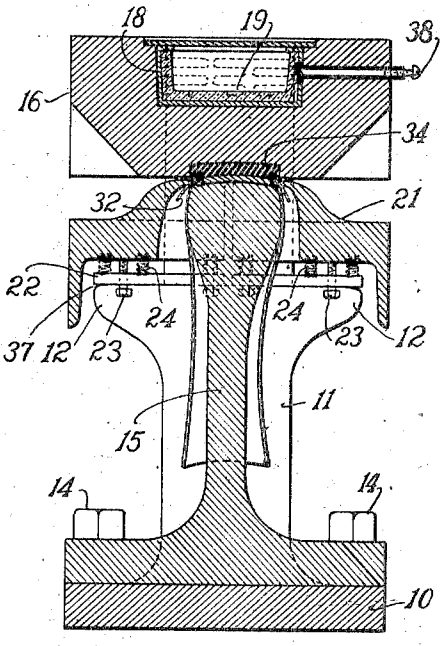


FIG. 3.

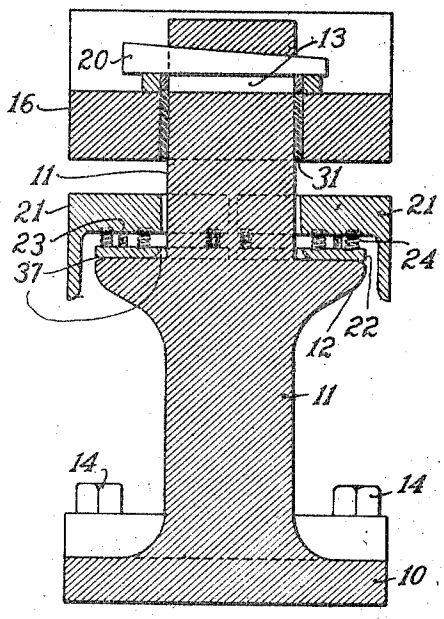


FIG. 4.

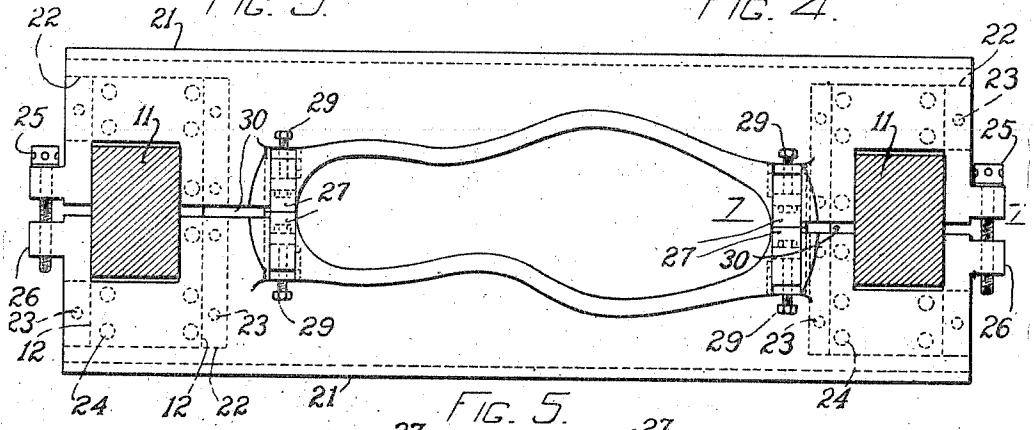


FIG. 5.

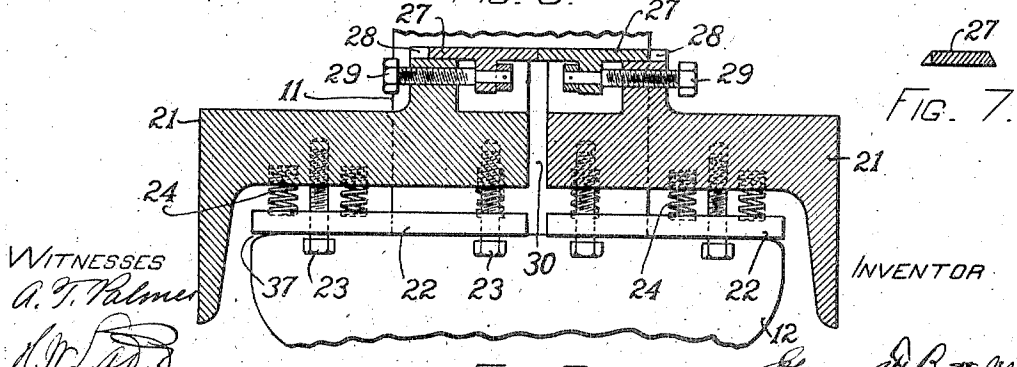


FIG. 6.

FIG. 7.

WITNESSES

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SHOE-SOLE VULCANIZING AND APPLYING APPARATUS.

No. 821,336. Specification of Letters Patent. Patented May 22, 1906.

Application filed May 29, 1905. Serial No. 262,721.

To all whom it may concern:

Be it known that I, GEORGE F. BUTTERFIELD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Shoe-Sole Vulcanizing and Applying Apparatus, of which the following is a specification.

This invention relates to vulcanizing apparatus adapted to securely unite rubber surfaces to leather bodies or the like, and has in view the economizing of time necessary to handle the product, in this case rubber-soled boots and shoes.

The especial object of my invention is to produce a vulcanizing-frame for attaching rubber soles to leather boots and shoes, such frame being practically self-contained as regards pressure and heat. To accomplish this result, I provide in my frame means for maintaining such pressure as is imparted to it by an ordinary press or other extraneous source of power, the construction being such that after the pressure is once applied further assistance from the press is unnecessary. I also provide my frame with an efficient heating device so constructed and arranged that the process of vulcanization is uninterrupted when the frame is removed from the press.

In the drawings, Figure 1 is a vertical central section of the frame; Fig. 2, a top plan thereof, the heating device being removed. Figs. 3 and 4 are transverse sections, respectively, on lines 3 3 and 4 4 of Fig. 1. Fig. 5 is a plan of the clamps or presser-plates, the end posts being shown in horizontal section on line 5 5, Fig. 1. Fig. 6 is a partial section, enlarged, taken on vertical line 6 6 of Fig. 1. Fig. 7 is a cross-section of the dovetailed slide-bar seen in plan in Fig. 5. Fig. 8 is an enlarged sectional detail of the insulated clamp and sole edge.

The frame-base 10 has integral with it at each end an upright post 11, provided with a shelf or ledge 12 and keyway 13. The base is drilled and tapped to receive the adjusting-bolts 14, which secure the last or foot-form 15 in the desired position.

16 is the mold-plate, recessed at each end to receive the upper end of the upright posts 11 and having formed on its lower surface a mold or recess 17, which conforms to the desired shape of the sole and heel of the shoe. On the upper surface of mold-plate 16 is provided a chamber 18 for receiving a steam heating current or a heating device 19, which in the drawings is represented as of electrical construction. Keys or wedges 20 serve to hold the mold-plate 16 and the rubber therein against the shoe-bottom on the last or foot-form 15.

21 21 are two marginal clamps or presser-plates, the pressing edges of which conform to the outline of the shoe along each side thereof and are adapted to hold the welt 36 firmly against the marginal surface of the rubber and mold-plate 16. These clamps or presser-plates are yieldingly held in place on ledges 12 through the agency of abutment-plates 22, mounted on bolts 23, affixed to said presser-plates 21 and normally held against the heads of said bolts 23 by springs 24. These presser-plates 21 are drawn toward each other and held together by means of screw-bolts or threaded rods 25, mounted in lugs 26 on said plates. It is very desirable that these presser-plates 21 be made adjustable to suit slight variations in width of any given size of shoe. I accomplish this and prevent escape of the rubber from the mold at the heel and toe by means of the sliding bars 27 27, Figs. 5, 6, and 7, which are shown in Figs. 1 and 5 as mounted in dovetailed grooves 28 in the presser-plates 21 and can be operated by screws 29, so as to bridge the spaces 30 between plates 21 21 and form a continuation of the edge walls thereof when said plates are separated, such wall being vertical at the line of such separation.

For the process of vulcanizing a sufficient amount of heat is required to make it desirable to protect the upper of the shoe from such heat. For this purpose I provide insulating-bushings 31, Figs. 1 and 4, in mold-plate 16 around posts 11 and also insulating-strips 32 around the tips of presser-plates 21. (See Fig. 8.)

The operation of the apparatus is as follows: The shoe which is to receive the rubber sole is placed on the last or foot-form 15, which is held by means of bolts 14 and holes 33 in the flange of the foot-form and is adjusted so as to properly receive the rubber sole 34. Then the mold-plate 16, with the rubber compound in the unvulcanized or partially-vulcanized condition filling the mold 17, is brought into position and secured, by means of wedges or keys 20, against the shoe-bottom. It is of course impossible to secure

by hand the full pressure required, so these keys or wedges 20 merely serve to hold the parts together until greatly-increased pressure can be applied, when the frames are introduced for a time into the press. Before this, however, I bring together the clamps or presser-plates 21 against the sides of the shoe at the under side (in the drawings) of the welt 36. To facilitate this, the edges of abutment-plates 22 and ledges 12 are slightly beveled, as shown at 37, Fig. 4, and again in Fig. 6. Springs 24 are normally under considerable compression, and a further slight compression is necessary to place plates 21 properly in position. Threaded rods or bolts 25 serve to bring clamps 21 together as far as the shoe will permit, and the adjustable bars 27 will close any remaining aperture. The parts being thus assembled, the frame is ready to receive heat and pressure and is placed in a suitable press, and current is then applied to the heater 19 by means of binding-posts 38. As pressure is applied any yielding of mold-plate 16 is taken up by keys 20, and presser-plates 21 yield against the action of springs 24, so as not to in any way limit the amount of pressure against the foot-form 15. When sufficient pressure has been applied and the yielding of the parts has been taken up by keys or wedges 20, the press is no longer needed, and my frame is then removed to a suitable platform and subjected to a continuance of heat under the requisite pressure until proper vulcanization has taken place.

It will thus be observed that my frame in no way depends upon the pressing agency for heat, and such agency can be freed for other use as soon as my wedges 20 have taken up the pressure so applied.

It is of course understood that the specific form of frame here shown can be varied without departing from the spirit of my invention. The whole apparatus may be inverted, so that the relative positions of the base and mold-plate (shown in Fig. 1) will be reversed, the heating-chamber being at the bottom instead of the top of the frame. If steam is employed as a heating medium, this reversed position will be preferable unless the connections are through flexible pipes.

I claim as my invention—

1. In a vulcanizing apparatus, a holding-frame having a body or base portion and terminal uprights and an intermediate supporting device erected on said base for the article under treatment, in combination with a mold-plate to receive the rubber and apply it to said article, and formed with a chamber or space adapted to receive the heating means for vulcanizing the rubber, and with pressure mechanism for holding the parts in close contact during the operation, such combined mold-plate and heating-chamber and such article and pressure mechanism being together removable in said frame from the press, without interrupting the vulcanizing operation, substantially as set forth.

2. In a vulcanizing apparatus, a shoe-holding frame having a base, terminal uprights and an intermediate last or foot-form erected on said base for the shoe under treatment, in combination with a relatively movable section comprising a mold-plate and heating device formed integral, made removable from the end posts but connected thereto by pressure devices, and with marginal clamps fitting the outlines of the shoe and transverse sliding bars at the mold ends to prevent the escape of rubber, substantially as set forth.

3. In a vulcanizing apparatus, a shoe-holding frame having a base, terminal uprights and an intermediate last or foot-form secured thereon, in combination with a top section comprising an inverted mold-plate and a heating-chamber above and adjacent thereto, and with marginal clamps for the shoe edges arranged for lateral adjustment, the heated air rising from such elevated chamber producing no injurious effect upon the leather of the shoe-body during vulcanization, substantially as set forth.

4. In a vulcanizing apparatus, a shoe-holding frame having a base, vertical end posts provided with transverse keyways and an intermediate last or foot-form secured to said base, in combination with a removable top section recessed to admit the upper ends of the end posts and comprising a sole-shaped mold and a heating device formed integral, such top section extending normally somewhat above the end posts, secured thereto by keys in said keyways, and adapted to be pressed downwardly by the platens of a press in which said frame may be placed for additional pressure when required, substantially as set forth.

5. In a vulcanizing apparatus, a shoe-holding frame having a base, a last or foot-form erected thereon, vertical end posts with terminal pressure devices and projecting ledges at an intermediate point, in combination with marginal clamps for the shoe edges yieldingly supported upon said ledges, a removable top section comprising a mold-plate to receive the rubber and a heating device for vulcanizing it, such section having a limited vertical movement with relation to the foot-form and clamps, varying according to the amount and nature of the pressure exerted, substantially as set forth.

6. In a vulcanizing apparatus, a shoe-holding frame having a base, a last or foot-form erected thereon, vertical end posts with terminal pressure devices, projecting ledges at an intermediate point, and abutment-plates resting on such ledges, in combination with an integral mold-plate and heating device, marginal clamps for the sole edges, springs interposed between such clamps and the

abutment-plates and adjusting-screws holding said springs to the clamps in proper position, substantially as set forth.

7. In a vulcanizing apparatus, a shoe-holding frame having vertical end posts and an intermediate last or foot-form erected on the base thereof, in combination with a removable top section comprising an inverted mold-plate to receive the rubber and a heating device for vulcanizing it, said section being recessed to admit the end posts to which it is applied vertically, a pair of marginal clamps conforming to the outlines of the shoe and recessed edgewise to fit around the end posts to which they are applied laterally, and with pressure mechanism serving to hold the mold, clamps and shoe in firm contact during the entire vulcanizing operation while the shoe is free from exposure to undue heat, substantially as set forth.

8. A shoe-sole vulcanizing and applying apparatus comprising a sole-shaped mold adapted to receive a body of vulcanizable or semivulcanized rubber compound, a shoe-holding frame connected thereto and comprising a foot-form and marginal clamps to secure the shoe in position and control the rubber during treatment, in combination with vulcanizing apparatus actuated by an electric heating-current, and with efficient pressure mechanism, serving to hold the shoe-bottom firmly upon the rubber in the mold with the clamps in proper marginal position during the vulcanizing operation, substantially as set forth.

9. In a vulcanizing apparatus, a shoe-holding frame having a last or foot-form and vertical end posts erected on its base portion, in combination with a mold-plate, heating means and pressure mechanism for applying and vulcanizing the rubber sole, and marginal clamps to aid in confining the rubber in the mold, and with insulating material interposed between the marginal clamps and the shoe and between the heated mold-plate and the frame-posts, to limit the conduction of heat to the shoe, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE F. BUTTERFIELD.

Witnesses:
A. H. SPENCER,
H. W. LADD.