(No Model.) 2 Sheets—Sheet 1.

G. F. BUTTERFIELD.

APPARATUS FOR VULCANIZING RUBBER SOLES TO SHOES.

No. 574,238. Patented Dec. 29, 1896.

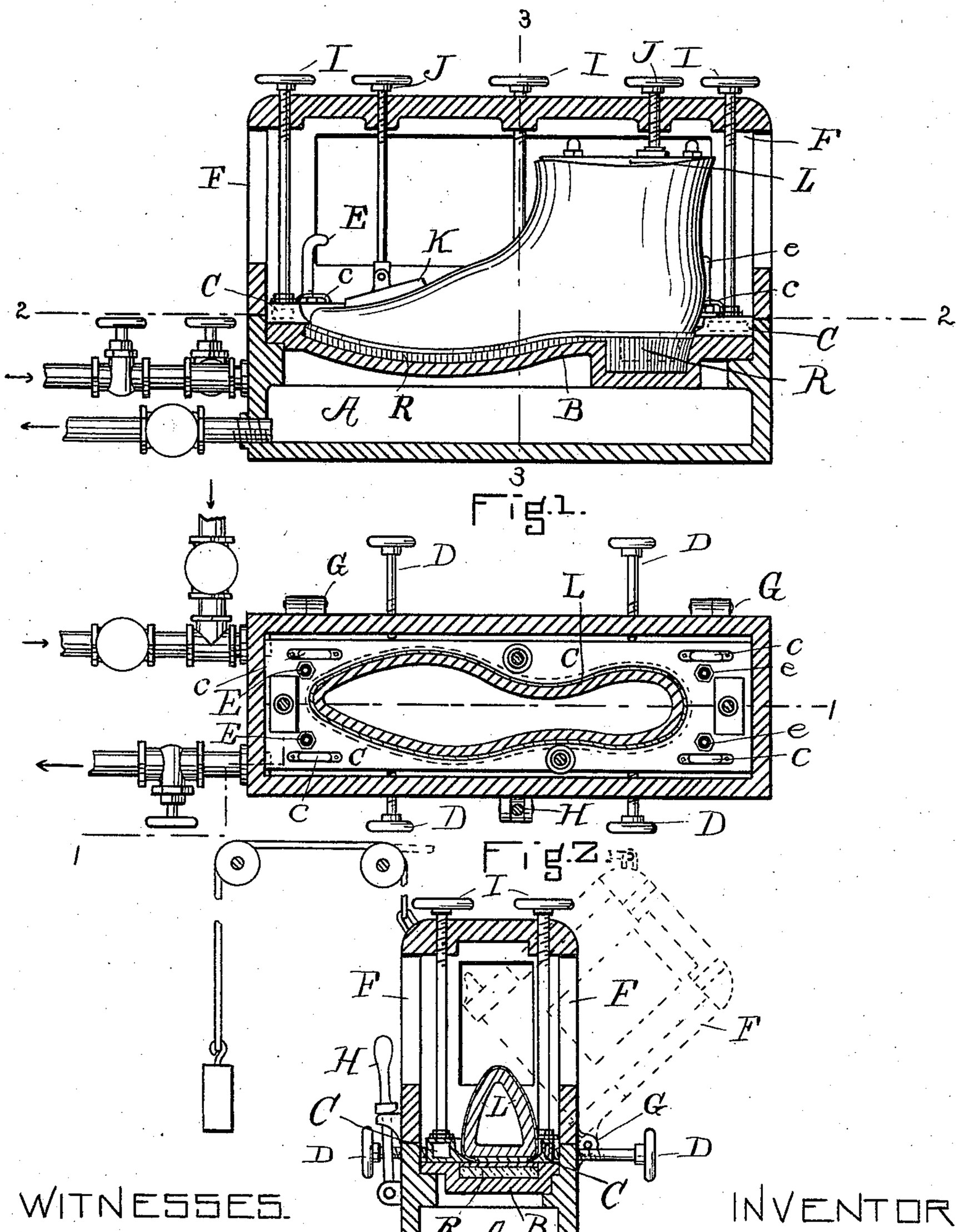

Fig. 1.

Fig. 2.

Fig. 3.

WITNESSES.
Matthew M. Blunt.
Nelson T. Baker.

INVENTOR:
George F. Butterfield.
By A. A. Brewer
ATT'Y.

(No Model.) 2 Sheets—Sheet 2.

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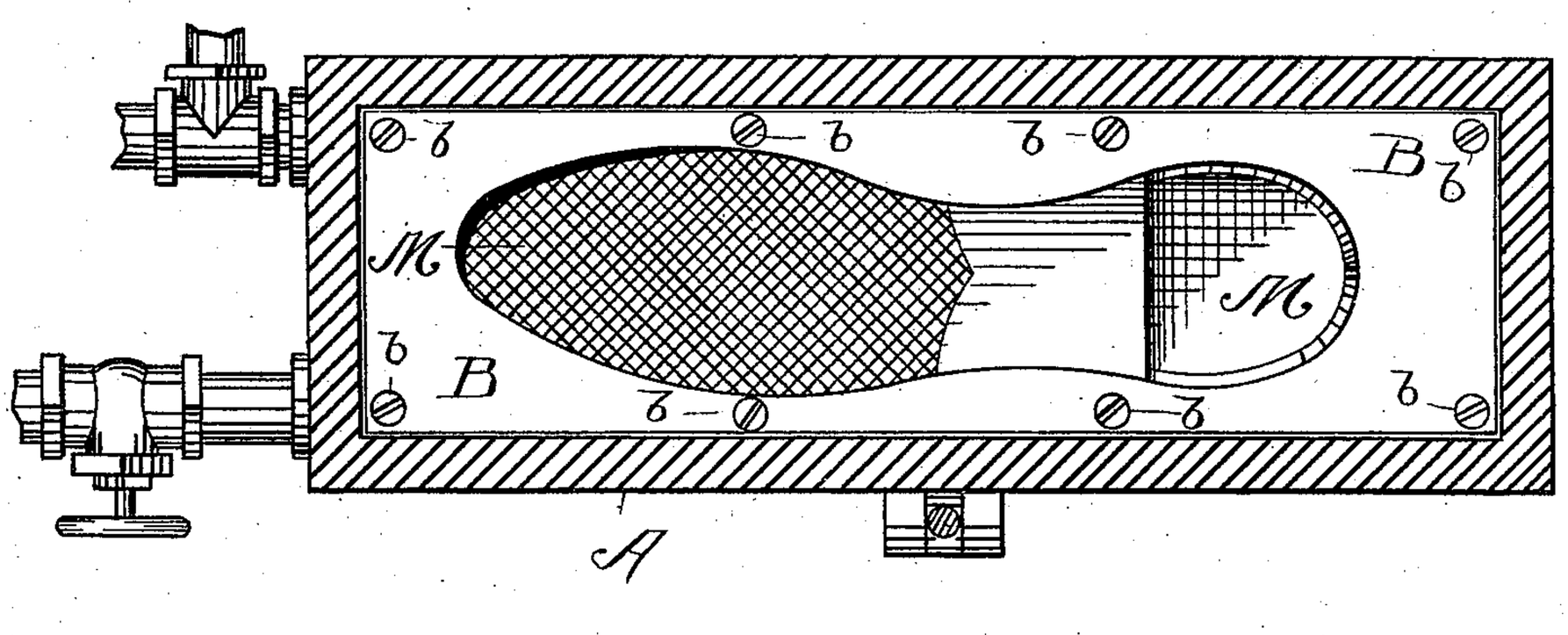

Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE F. BUTTERFIELD, OF STONEHAM, MASSACHUSETTS.

APPARATUS FOR VULCANIZING RUBBER SOLES TO SHOES.

SPECIFICATION forming part of Letters Patent No. 574,238, dated December 29, 1896.

Application filed February 18, 1896. Serial No. 579,724. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. BUTTERFIELD, of Stoneham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Vulcanizing Rubber Soles to Shoes, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to provide improved apparatus for applying rubber soles, or soles and heels, to the bottoms of leather or like shoes, and securing them permanently thereon by vulcanization of the rubber.

My invention is in the nature of an improvement upon that set forth in my Letters Patent No. 349,690, granted September 28, 1886, for improved mold for vulcanizing rubber to leather. In that apparatus the mold-block having the sole-shaped recess in which the rubber sole was formed and cured was hollow and of one integral piece with the steam-chamber beneath it, and the shoe was held down upon the mold-block by concave mold-caps covering the upper-leather and secured by nuts threaded upon guide-pins.

By my present improvement the mold-block is a separate plate forming a removable cover or one of a series of removable covers over a steam-chamber having inlet and outlet pipes for the vulcanizing-current of steam, the flat margins of these individual mold-plates fitting, with or without packing, upon the adjacent portions of the hollow base or steam-chamber and secured thereto by screws. I omit the mold-caps of my former apparatus and substitute a skeleton frame carrying pressure-screws, thus leaving the upper-leather fully exposed to the air, except where the small pad at the screw-tip rests on it, and avoiding undue heating and consequent injury to the stock.

I hold the shoe firmly in place over and upon the rubber contained in the recess in the mold-plate by screws or equivalent adjustable clamps engaging in the skeleton frame above the shoe and bearing downwardly upon the heel portion of the last and by a yielding pad upon the shoe-upper. The shoe is held to the mold-plate also by adjustable marginal plates conforming to the contour of the shoe and fitting in edgewise at the inseam over the welt and sole edge, so as to prevent the rubber escaping upwardly when expanded in vulcanizing. These marginal plates have lateral adjusting-screws to locate them properly on the mold-plate, and they may be made hollow and connected with water-pipes for conducting cold water through them. These adjustable plates are also pressed downwardly and held firmly by screws extending through the skeleton frame and bearing upon them.

The skeleton frame and its pressure-screws may be lifted bodily or swung back on a hinge with a counterbalance to support it when the fastenings which held it during the vulcanizing operation are released. By then slackening the lateral adjusting devices of the marginal plates said plates and the shoe, with its rubber sole complete, may be removed from the mold.

Another mold-plate may at any time be substituted for the first by removing and replacing its marginal screws.

In the drawings, Figure 1 is a vertical section through my apparatus on line 1 1 of Fig. 2, showing in elevation a shoe in position to be rubber-soled. Fig. 2 is a horizontal section on line 2 2 of Fig. 1, and Fig. 3 a transverse section on line 3 3 of Fig. 1. Fig. 4 is a plan showing the top of the mold-plate with mold therein and the marginal fastening-screws.

A is the steam-chamber, open at its top, and B is the mold-plate forming a cover therefor and resting marginally thereon, as in Figs. 1 and 3. This mold-plate has in its upper surface a shallow recess M, Fig. 4, conforming to the shoe-sole or the sole and heel to receive the rubber compound R, which, by vulcanization, is to be affixed to the bottom of the shoe, as recited in my said patent of September 28, 1886, and in my patent of March 5, 1889, No. 399,130, on "boot or shoe." Said mold-plate is removably secured upon said chamber by marginal screws *b*. (See Fig. 4.) By making the plates B independent of the chambers A and uniting them by screws *b* I am enabled to change said plates at will and thus to vary the pattern or size of the mold M without multiplying the chambers or disturbing their connections.

Adjustable side plates C rest upon the margins of the mold-plate and conform at

their inner edges to the outlines of the shoe at the inseam. These plates are beveled edgewise, so as to fit in closely above the sole and welt and keep the rubber from working upwardly along the upper-leather without having the leather covered by and heated from such plates. Knobs or handles *c* on said plates facilitate handling them, and screws D through the extended sides of the chamber serve to press them into working position. These side plates may be cast hollow and fitted with couplings for connecting flexible pipes E *e*, for the purpose of running a current of cold water through the plates to prevent undue heating. Similar couplings and pipes connected to the hollow lasts carry a cooling-current through them, if desired. The tendency of this is to semi-vulcanize the rubber next to the sole, which is desirable.

Above the mold-plate and the shoe is a skeleton frame F, which may be wholly removable, but is shown in Fig. 3 as hinged at G so as to tip out of the way in introducing the shoe, as indicated in dotted lines. It is furnished on the opposite side with a suitable fastening, preferably a swinging lever H, having shoulders slightly beveled to fit over fixed lugs on the frame and hold it down firmly.

The frame F has a series of hand-screws I extending downwardly through it to press down the adjustable plates C and other like screws J, resting at foot upon the last L and by a pad K bearing upon the shoe-front. By these screws the plates and shoe are held in proper position during vulcanization, but all are released simultaneously when the frame is raised, and they are in position to give the proper pressure on the next shoe when the frame is again lowered.

I claim as my invention—

1. The steam-chamber A having an opening in its top, and provided with steam connections, in combination with the removable mold-plate B recessed to receive the rubber soling, and adapted to fit over and close said opening, and with suitable clamping means to secure said plate upon the chamber and the shoe upon the plate, over its recess, substantially as set forth.

2. The steam-chamber A open at its top and provided with steam connections, and the mold-plate B fitting over said opening, secured by screws *b*, and having a sole-shaped recess in its upper surface, in combination with a skeleton frame above said plate and the shoe held thereon, the laterally-adaptable plates C, C, and screws D, D, and with clamp-screws through said frame, serving to secure said plates and shoe in place, above the mold-plate, substantially as set forth.

3. The steam-chamber A open at its top, the removable mold-plate B having a sole-shaped recess in its upper surface and fitting marginally as a cover for said opening, and clamping means to hold said plate firmly in position, in combination with laterally-adjustable plates fitting along the inseam of the shoe to confine it and the rubber, and with the movable frame carrying pressure-screws for said plates and shoe, substantially as set forth.

4. In a vulcanizing apparatus, a steam-chamber, a mold-plate having a rubber-containing mold in its outer face, in combination with a skeleton frame hinged to the chamber and provided with fastenings for securing a shoe over and upon the rubber inclosed in said mold, leaving the upper-leather of the shoe practically uncovered and exposed to the open air during vulcanizing of the rubber, whereby injury to the upper by heating is obviated, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 7th day of February, A. D. 1896.

GEORGE F. BUTTERFIELD.

Witnesses:

A. H. SPENCER,

FRED L. WHITE.