

SECRET

Protonen

M. C. CLARK.

2 SHEETS—SHEET 1.



Inventor
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By his Attorneys Clifford & Lee

No. 823,924.

PATENTED JUNE 19, 1906.

M. C. CLARK.
MANUFACTURE OF FOOTWEAR.
APPLICATION FILED JAN. 31, 1905.

2 SHEETS-SHEET 2.

Fig. 2

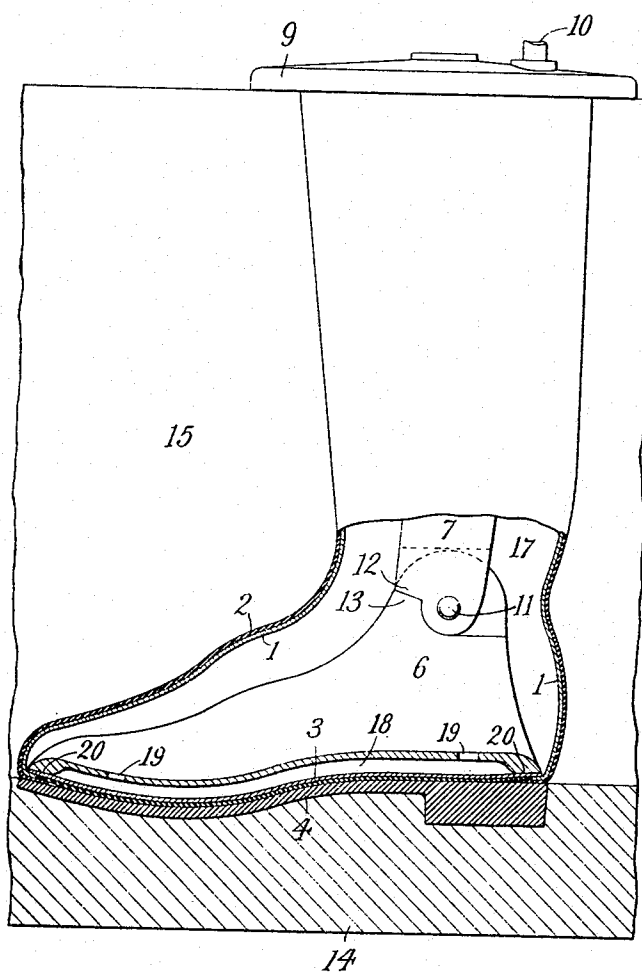
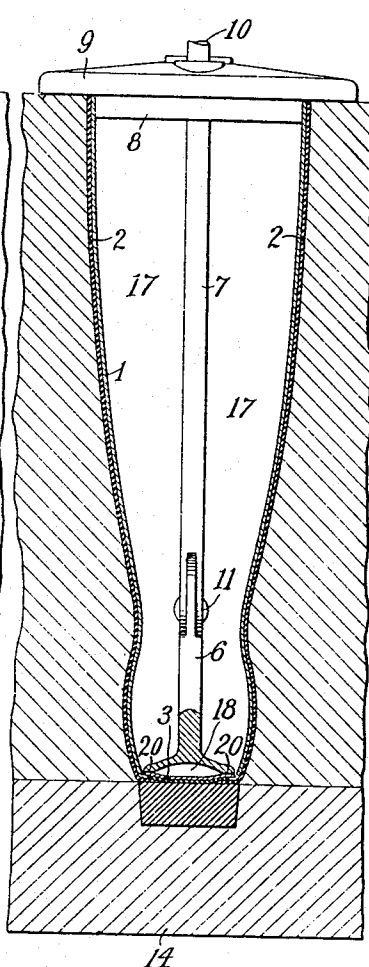


Fig. 3



Witnesses

Raphael Ketter
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UNITED STATES PATENT OFFICE.

MAURICE C. CLARK, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO
MARVEL RUBBER COMPANY, A CORPORATION OF RHODE ISLAND.

MANUFACTURE OF FOOTWEAR.

No. 823,924.

Specification of Letters Patent.

Patented June 19, 1906.

Application filed January 31, 1905. Serial No. 243,541.

To all whom it may concern:

Be it known that I, MAURICE C. CLARK, a citizen of the United States, and a resident of Providence, county of Providence, and State of Rhode Island, have invented a new and useful Improvement in the Manufacture of Footwear, of which the following is a specification.

In the manufacture of footwear under gaseous pressure according to the general method described in Letters Patent of the United States to Weeks, No. 233,385, and to Weeks and Russell, No. 233,386, difficulty has been experienced due to the leakage of the air through the material of the boot or shoe undergoing vulcanization. Attempts have been made to obviate this difficulty by interposing between the boot or shoe and the air-pressure an air-tight sack or bag, of flexible material, to act as a retainer of the air, while permitting it to exert its pressure upon the material of the boot or shoe outward against the mold.

By my present invention I obviate the above difficulty in a much more efficient and expeditious manner.

In the accompanying drawings, Figure 1 is a longitudinal section of a boot in the vulcanizing-mold. Fig. 2 is a modification, and Fig. 3 is a cross-section of such modification.

In the ordinary construction of a rubber boot or shoe the upper is made of a ply 1 of textile fabric, coated outside with rubber compound, and a ply 2 of rubber compound on the outer surface thereof. This upper is joined to the sole by being turned in, as shown in the figure, between the insole 3 and the outsole 4. A filling-sole 5 is interposed, and there are of course other parts employed in practice, but the above will be sufficient for the description of my present invention. In some shoes the ply 2 of rubber is applied as a separate sheet to the textile lining 1. In others it is applied simply as a coating; but in all cases so far as I know when the internal air-pressure was applied the rubber contained in the upper was unvulcanized. In carrying out my invention I may proceed as follows: In building the boot or shoe preparatory to introducing into the mold for vulcanization under an inflating pressure I preliminarily subject the material that is to form the lining to a vulcanization which is preferably only partial. This lin-

ing material, which may be stock composed of any textile fabric, is preferably composed of textile fabric having a very light outside coating of rubber compound which is applied to the fabric or stock and is partially vulcanized before building up the shoe. Outside of this partially-vulcanized lining material I place, either by coating or as a separately-rolled sheet, a ply of covering of unvulcanized rubber compound. The insole 3 is composed of textile material coated underneath with rubber compound and may be also partially vulcanized or may be unvulcanized. The outsole is unvulcanized rubber compound. The preliminary partial vulcanization of the lining to which I have above referred may be performed by subjecting the lining to a lower degree of heat (say 15° lower) or a shorter length of time than would ordinarily be used for the vulcanization of a compound of the composition employed. This boot or shoe is then removed from the last upon which it is built, and into it is inserted the sole-plate 5, connected by the jointed uprights 6 and 7 to a top plate 8 9. The portion 8 is adapted to enter the top of the boot or shoe and clamp the upper margin of the same mechanically against the surrounding mold. The part 9 extends over the top of the boot or shoe and overlaps the upper surface of the surrounding mold. A channel 10 is provided for the admission of compressed air through the top plate 8 9. The uprights 6 7 are pivotally connected at 11 and are provided with opposed projections 12 and 13, which stop the pivotal movement at such a point as to permit the insertion of the sole-plate 5 into the boot or shoe, but after its insertion to cause a pressure on the upright 7 to be communicated by the sole-plate 5 to all parts of the sole equably.

14 is the base mold part, and 15 is one of the two side mold parts, all of which will be provided with suitable means for producing a vulcanizing heat. The division-line between the base mold part and the side mold parts occurs substantially at the sole-line, and the division-line between the two side mold parts will occur substantially at the central longitudinal line of the boot or shoe. A suitable valve 16 is provided in the channel 10 to retain the air forced into the boot or shoe for inflation.

It will now be seen that in the construc-

tion shown in Fig. 1 the sole of the boot or shoe, as well as the joints between it and the upper, are subjected to a mechanical pressure between the sole-plate 5 and the lower mold part 14; also, that the upper margin of the boot or shoe is subjected to mechanical pressure between the slightly-conical edge of the plate 8 and the side mold part; also, that all intermediate parts of the boot or shoe are subjected to the inflating pressure of the compressed air in the space 17 against the side mold parts. It will also be observed that the preliminary vulcanization of the lining of the walls surrounding the space 17 will prevent the leakage of the air through said walls and that the leakage of the air at the bottom of said walls is prevented by the mechanical pressure of the sole-plate 5 against the joint of the lining, with the sole acting as a packing; also, that the leakage of the air at the top of the lining is prevented by the pressure of the plate 8 upon said lining, which acts as a packing. The inflating pressure of the air will be different for different conditions; but I have found that under ordinary conditions a pressure of about sixty-five pounds to the square inch will answer.

In the modification shown in Fig. 2 the sole-plate is constructed in arch form, so as to produce mechanical pressure only upon the joint at the lower edge of the upper, leaving a space 18 adjacent to the insole to which the pressure of the compressed air in the space 17 is communicated through perforations 19 in said sole-plate. The compressing-surfaces 20 of the sole-plate will extend all around the boot or shoe.

In my copending applications, Serial No. 252,666, filed March 29, 1905, and Serial No. 283,199, filed October 18, 1905, I have shown and described machines adapted particularly for making rubber footwear of the character herein described. In such machines the lasts are shown as rigid instead of inflatable; but this is immaterial as concerns the present invention, which is equally applicable to footwear constructed on inflatable or rigid lasts.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in the art of vulcanizing footwear, which consists in forming the

shoe of material which has been previously, partially vulcanized, applying unvulcanized material to the shoe so formed and then completing the vulcanization, while the shoe is under pressure between mold members and a last.

2. The improvement in the art of vulcanizing footwear, which consists in preliminarily vulcanizing a thinly-coated lining material forming a shoe from the material so treated, then applying thereto additional unvulcanized rubber compound, then completing the vulcanization, while the footwear is under pressure between mold members and a last.

3. The improvement in the art of vulcanizing footwear under inflating pressure, which consists in preliminarily vulcanizing the lining and completing the vulcanization while the lining is under pressure of vulcanizing and the joint between the lining and sole is under mechanical pressure.

4. The improvement in the art of vulcanizing footwear under inflating pressure, which consists in preliminarily vulcanizing the lining and insole and completing the vulcanization while the joint between lining and insole is under mechanical pressure.

5. An improvement in the art of vulcanizing footwear under inflating pressure, which consists in preliminarily vulcanizing the material of such footwear, applying thereto an additional unvulcanized rubber compound and then completing the vulcanization while the major portion of the footwear is under inflation and a portion is under mechanical pressure.

6. An improvement in the art of vulcanizing footwear under inflating pressure, which consists in preliminarily partially vulcanizing the lining of the footwear, applying unvulcanized material thereto, and subjecting a portion of the footwear to mechanical pressure while the lining is under the pressure of inflation.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

MAURICE C. CLARK.

Witnesses:

GEO. A. ROEDER,
W. A. PAULING.