No. 649,434. Patented May 15, 1900.

G. F. BUTTERFIELD.

RUBBER SOLED BOOT OR SHOE.

(Application filed July 1, 1896.)

(No Model.)

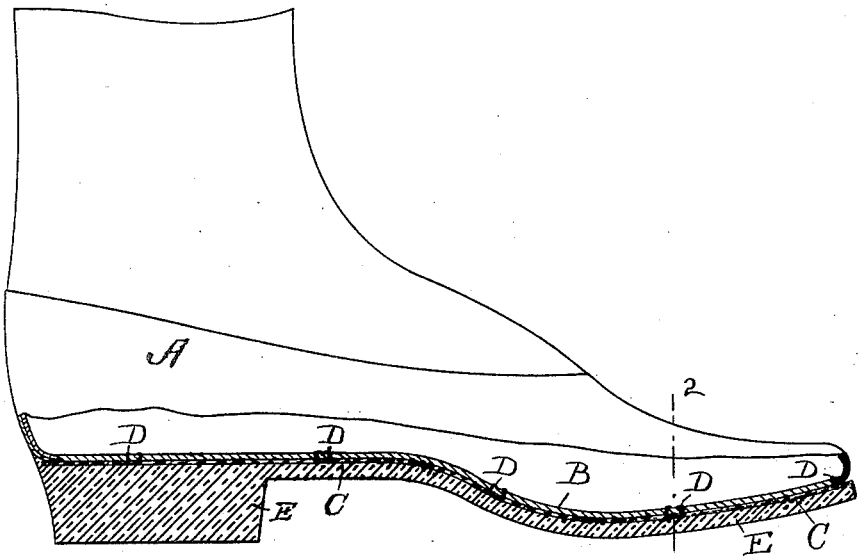

Fig. 1.

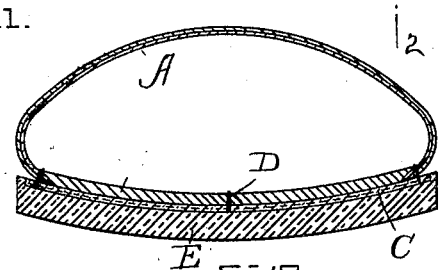

Fig. 2.

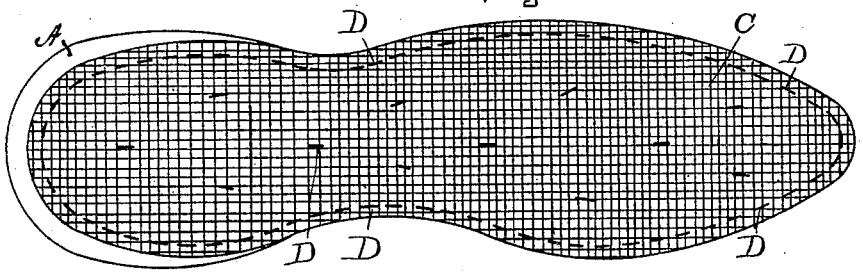

Fig. 3.

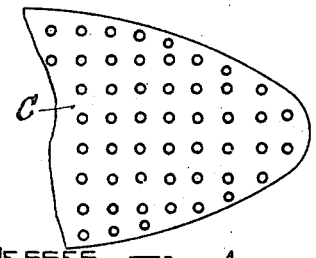

Fig. 4.

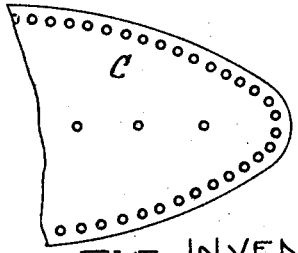

Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

GEORGE F. BUTTERFIELD, OF STONEHAM, MASSACHUSETTS.

RUBBER-SOLED BOOT OR SHOE.

SPECIFICATION forming part of Letters Patent No. 649,434, dated May 15, 1900.

Application filed July 1, 1896. Serial No. 597,689. (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 Boots or Shoes, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention is an improvement in boots and shoes and in means for permanently affixing rubber soles or soles and heels thereon. My improvement contemplates as such means the interposition of a thin flexible metallic layer between the inner sole or shoe bottom and the rubber outer sole, such metallic sheet or layer being first securely attached to the inner sole or shoe bottom, and the rubber sole or heel being afterward permanently vulcanized to the metallic layer. The layer of metal is by preference of wire-gauze cut to shape by dies, and I am able to utilize for my purpose cast-off Fourdrinier wire webs after their usefulness in paper-making is ended, as well as new gauze or woven wire. Plain or perforated sheet metal is also suitable with smooth or roughened surface, as desired. The metallic layer is secured to the shoe-bottom in any suitable way, as by stapling, sewing, or nailing, without perforating the outer rubber sole. Upon this metallic layer thus secured to the shoe-bottom the rubber compound which is to form the outer sole and heel is securely held during vulcanization by any suitable apparatus, preferably by such devices as are set forth in my two United States Letters Patent Nos. 574,238 and 574,239, dated December 29, 1896. The rubber sole and heel may be first molded to shape and vulcanized and a thin unvulcanized sheet applied over its top next to the boot or shoe, as in the last-named patent, or it may all be in the unvulcanized state, as contemplated in the former one. The heat of vulcanizing said thin sheet or the entire elastic sole and heel causes the rubber to adhere firmly to the metallic layer and when such layer is of gauze or is perforated to penetrate the meshes or perforations of the metal secured to the shoe-bottom and to cling tenaciously to its surfaces, as well as to the leather with which it comes in contact.

The words "rubber compound" and "compounded rubber" used herein are to be understood as referring to the usual compound of rubber with other substances for the purpose of vulcanizing.

In the drawings, Figure 1 represents my improved shoe, the sole and heel being in longitudinal section. Fig. 2 is an enlarged transverse section thereof on line 2 2 of Fig. 1. Fig. 3 is a bottom view of one of my shoes in process of construction, showing the gauze layer secured in place in readiness to receive the rubber outer sole. Figs. 4 and 5 show modified forms of the interposed metallic layer herein referred to.

A represents the shoe upper and B the bottom, to which the metallic layer C is first secured in any effective and convenient way. In Figs. 1, 2, and 3 the fastening shown consists of staples or double-pointed tacks D, passing through said layer and the sole above it and clenched on the inside above the insole. The fastenings will be quite thickly set around the margin of the sole and as numerous at other points as may be required.

E is the rubber sole and heel, vulcanized to the metallic layer and through it to the leather.

The metallic layer C will be shaped by pressure to fit snugly upon the shoe-bottom, being first died out to conform to it marginally, and such layer should be light and pliable enough to make the shoe comfortable to the wearer. The wire-gauze is in all these respects well adapted for my purposes, and after the rubber is cured in place upon it the wires are firmly grasped by it and retained in their positions. The edges of the metallic layer will be covered and concealed by the rubber. The modified form of this interposed layer shown in Fig. 4 is of thin perforated sheet metal, while in Fig. 5 it is plain, except where holes are formed to receive the fastenings. The surfaces may be smooth or roughened, as desired, but must be clean and free from grease, so that perfect adhesion will take place.

Before applying the rubber outer sole to the metallic layer I coat them both freely with rubber cement in order to exclude air from between them and to promote a more permanent adhesion.

It has heretofore been proposed to vulcan-

ize rubber soles with a central and an upper layer of strong canvas or wire-gauze and afterward to secure such composite sole to the shoe-bottom by stitching through the rubber and said layers. This I do not claim; but

I claim as my invention—

1. A boot or shoe having a thin metallic layer firmly secured directly to its sole-bottom by mechanical means which do not penetrate the outer or tread sole, in combination with such tread surface or sole of compounded rubber vulcanized to said metallic layer and covering its mechanical fastenings, substantially as set forth.

2. A boot or shoe having an ordinary leather inner sole, an outer sole of rubber vulcanized thereon through the meshes of a gauze layer, and an interposed sheet of wire-gauze secured mechanically to the leather sole independently of the rubber-sole fastening, the rubber penetrating the meshes of the gauze and adhering thereto and to the leather sole by being vulcanized to both, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 27th day of June, A. D. 1896.

GEORGE F. BUTTERFIELD.

Witnesses:

A. H. SPENCER,

N. K. BAKER.