(No Model.)

I. F. WILLIAMS.

RUBBER BOOT OR SHOE.

No. 294,174. Patented Feb. 26, 1884.

Fig. 1.

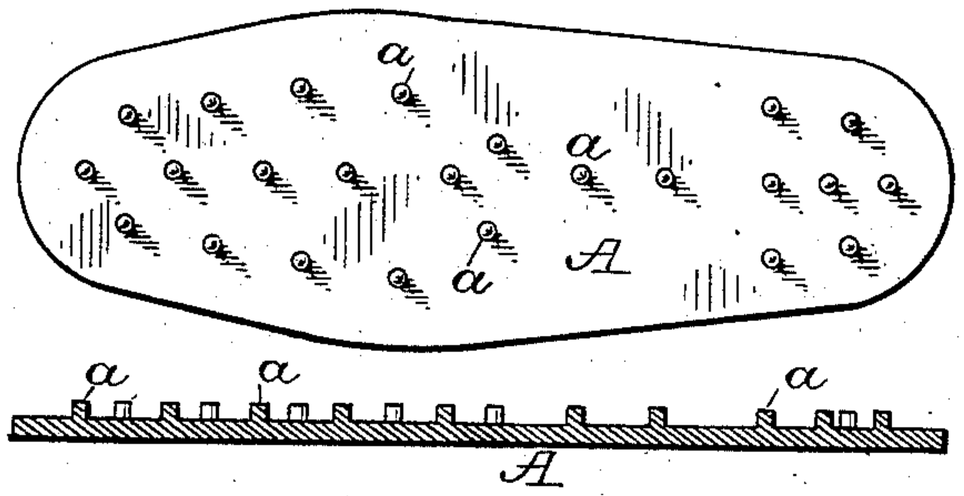


Fig. 2.

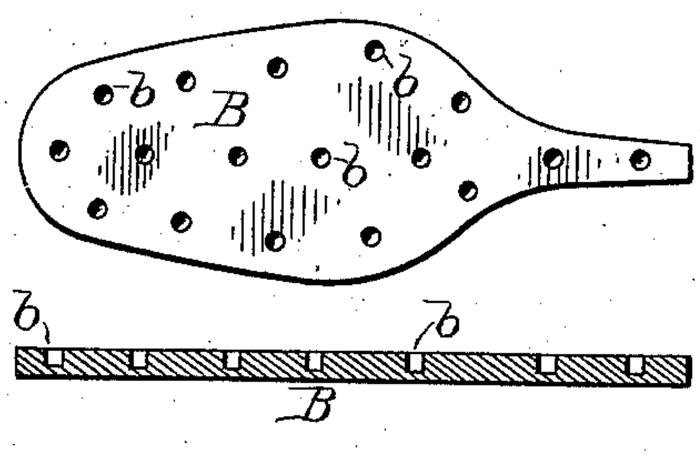


Fig. 3.

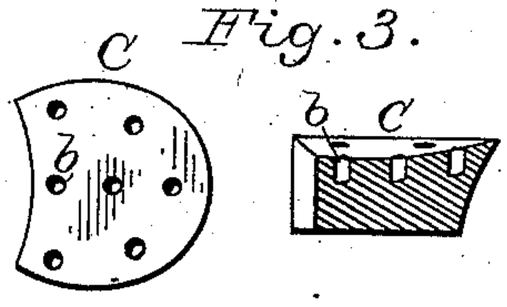


Fig. 4.

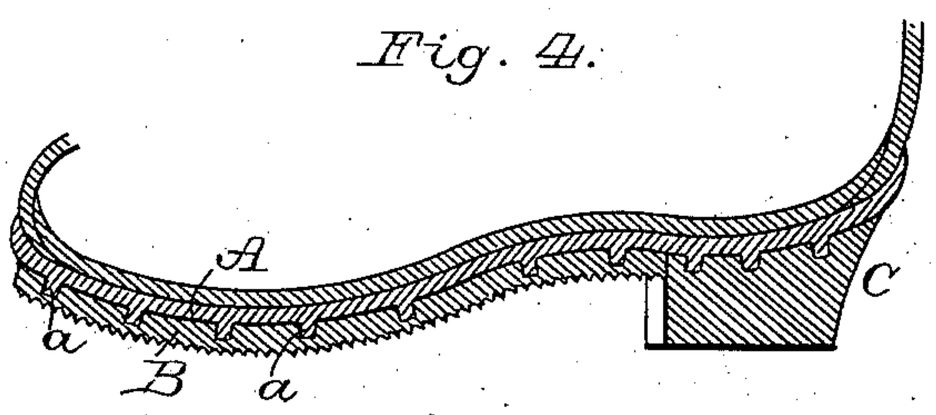
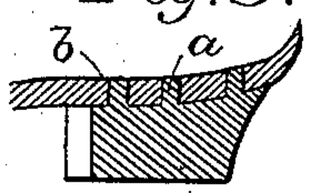


Fig. 5.



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UNITED STATES PATENT OFFICE.

ISAAC F. WILLIAMS, OF BRISTOL, RHODE ISLAND.

RUBBER BOOT OR SHOE.

SPECIFICATION forming part of Letters Patent No. 294,174, dated February 26, 1884.

Application filed August 28, 1883. (No model.)

To all whom it may concern:

Be it known that I, ISAAC F. WILLIAMS, of the town and county of Bristol, in the State of Rhode Island, have invented certain new and useful Improvements in the Manufacture of Rubber Boots or Shoes; and I do declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear, true, and complete description of my invention.

My said improvements have for their object a reliable union with the main sole in a rubber boot or shoe of separately-formed rubber tread-soles and heels; and my invention involves, in connection with the ordinary methods of cementation and vulcanization, the employment, with the main portion of a boot or shoe, of a rubber main sole provided with a series of rubber studs or with holes, and a tread-sole or a heel, or both, provided, respectively, with holes or with rubber studs, as the case may be, so that said studs shall register with and occupy the coincident holes, whereby when cemented and vulcanized as usual the tread-sole or heel, or both, will be firmly united to the main sole, not only by reason of the usual cementation and vulcanization, but also because of the interlocking studs of rubber. In their best form the rubber studs are molded integrally by me with the main sole, because in that case the latter is absolutely free from that liability to leakage by way of the joint between the main sole and the tread-sole, (or the heel,) which might occur if the main sole itself should be perforated, inasmuch as its thickness, as a rule, is insufficient to provide for the reception of the studs without cutting said holes wholly through the sole. It is to be understood that I believe it to be broadly new to employ rubber studs as a fastening medium for uniting tread-soles and heels, or either of them, to the main soles of rubber boots; and I do not therefore limit myself to the location of the perforations or holes, which serve as mortises for the studs, nor to forming said studs integrally with the main sole or with the tread-sole or with the heel, although, as before indicated, it is deemed best by me that said studs should be integrally formed upon the main sole.

To more particularly describe my invention, I will refer to the accompanying drawings, in which Figure 1 represents in bottom view and longitudinal central section a rubber main sole as employed by me. Fig. 2 represents in top view and longitudinal central section a rubber tread-sole as used by me. Fig. 3 represents in similar views a rubber heel as used by me. Fig. 4 is a longitudinal central section of a main sole, tread-sole, and heel united in accordance with my invention. Fig. 5 represents in section a rubber heel provided with rubber studs for use with a rubber main sole provided with holes for the reception of said studs.

The main sole A is composed of suitable vulcanizable compound, and, as shown in Figs. 1 and 4, it is provided on its lower surface with the integral studs *a*, arranged in series or sets respectively, for the tread-sole or tap-sole and the heel. For making such soles, I employ for the first time a mold which is provided with recesses, within which the studs are formed integrally with the sole. As said studs serve as tenons, it is immaterial whether they be square or round; but I prefer the latter, and it is obvious that they should be varied in sectional dimensions and in length according to requirements in each case. The tread-sole studs may be of a length equal to the thickness of the tread-sole B, so as to be substantially flush with the wearing-surface thereof; but as the latter is usually molded in scores or angular corrugations, it is better, as a rule, that said studs be somewhat shorter than the thickness of the tread-sole, thus leaving the wearing-surface intact. The studs for the heel C are preferably somewhat longer than those for the tread-sole, owing to the greater thickness of the heel, and they may extend wholly through the heel, but preferably should only extend about two-thirds therein, although if they be somewhat shorter they will nevertheless serve a good purpose. The tap or tread sole B is also molded in a novel mold provided with studs, which form in the sole the recesses *b*, which serve as mortises for the reception of the studs or tenons, care being taken to provide for their accurate registration. The heel C is also molded in a novel mold provided with studs, which form the accurately-located recesses or mortises *b*, for the reception of the studs or tenons on the rear portion of the main sole.

In applying the main sole to the body of the boot, I proceed precisely as heretofore, and thereafter I apply the tap or tread sole and heel, forcing the several tenons or studs into their respective recesses or mortises, the coincident surfaces of the parts being properly charged with rubber cement or otherwise, so prepared as to secure a desirable union by vulcanization. In some cases it is desirable that the tread-sole and heel be applied to the main sole prior to its application to the body of the boot.

It is to be understood that the integral rubber studs or tenons may be employed only in connection with a tap-sole on a boot having a heel otherwise joined to the main sole or made integrally therewith; also, that said tenons may be employed only in connection with a mortised heel on a boot having a tap-sole otherwise joined to the main sole or integral therewith, although I prefer to employ said studs in both connections, and especially in heavy goods. In Fig. 5 I show the main sole to be mortised, as at *b*, and the heel provided with the studs or tenons *a;* and although this converse arrangement would be within my invention, it is obviously desirable that the main sole have no perforations whatever, as a safeguard against the entrance of water by way of any opening which might possibly occur between the heel and sole. In very thick and heavy soles—as in miners' boots—or if a main sole be made extra thick at the rear, it can be safely mortised, and the heel also may be coincidently mortised for the reception of rubber studs or tenons, serving after the manner of dowels, although I deem it always preferable that said studs be integral with the main sole. The rubber studs, being elastic, can be readily molded in such form that they will serve as dovetail-tenons, if desired, the mortises being correspondingly formed to receive them.

By the use of rubber tenons it will be obvious that I obtain for the tap-sole or the heel, or both, a practical interlocking of their material with the material of the main sole, which affords a high degree of security against displacement of the parts, and adds greatly to the duribility and efficiency of the goods. I am of course aware of the prior use of metallic nails, bolts, and rivets for securing rubber heels in place; and it will be seen that by the use of my elastic rubber studs or tenons, I obviate those well-known objections incident to the use of rigid metallic fastening devices in connection with elastic and yielding bodies composed of vulcanized compounds.

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

1. Rubber boots and shoes having a tap or tread sole and a heel, or either of them, united to the main sole by the ordinary method, supplemented by rubber studs or tenons and mortises, substantially as described.

2. The combination, substantially as hereinbefore described, of the rubber main sole, the rubber heel, and the interlocking rubber studs or tenons, whereby, with the usual vulcanizing operations, the heel and sole are firmly united, as set forth.

ISAAC F. WILLIAMS.

Witnesses:

ANDREW R. TROTTER,

J. HENRY WEED.