Aug. 29, 1933. C. FERRETTIE 1,924,716

FOOTWEAR AND METHOD OF MAKING SAME

Filed Dec. 26, 1929

Fig. 1

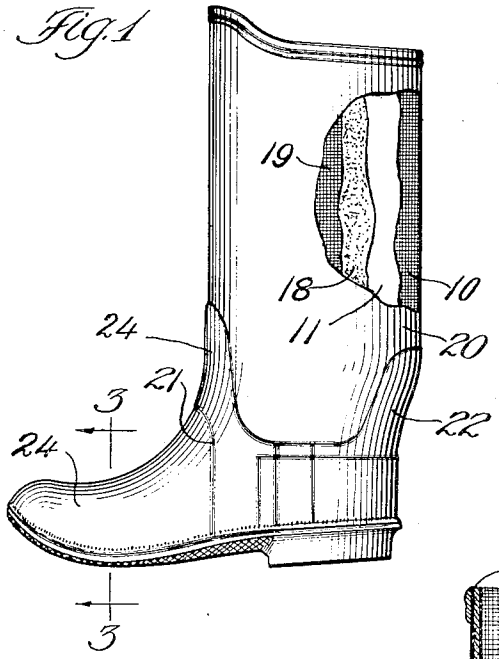


Fig. 3

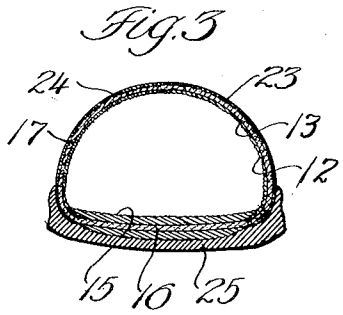


Fig. 4

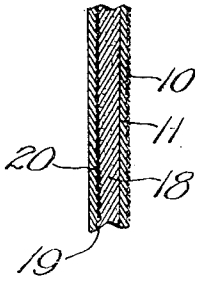


Fig. 2

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FOOTWEAR AND METHOD OF MAKING SAME

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Serial No. 416,335

2 Claims. (Cl. 36—4)

My invention relates to footwear of the character designated generally as boots and shoes and has reference more particularly to the construction thereof with a sponge rubber or cellular rubber composition wall.

The principal objects of my invention are,—to heat insulate the boot or shoe; to accomplish the insulation by incorporating a layer of cellular rubber composition or sponge rubber in the upper and sole of the boot or shoe; to obtain the cellular or sponge rubber characteristic of the layer by incorporating a leavening or sponging agent in the rubber compound from which the layer is made; to cushion the sole and the wall of the upper as well; to insure flexibility and light weight and in general to provide an improved construction which enhances the comfort and durability of the boot or shoe.

On the drawing:

Fig. 1 is a side view of a boot constructed in accordance with my invention and having a portion thereof broken away to show the successive layers of the boot upper;

Fig. 2 is an enlarged longitudinal section of the boot shown in Fig. 1;

Fig. 3 is a transverse section, slightly enlarged, through the toe of the boot taken along the line 3—3 of Fig. 1; and

Fig. 4 is an enlarged fragmentary view of a typical upper wall section.

Referring to the drawing, I have shown my invention as applied to a rubber boot although it may be used in connection with boots and shoes of other kinds. In the illustrated boot the wall of the upper is made up with conventional layers of rubber coated or rubber faced fabric with a layer of substantially uniform cellular material interposed throughout between the inner and outer conventional layers, the inner layer comprising a fabric which constitutes the lining of the boot and preferably has a coating of rubber on the outer side next to the layer of cellular material while the outer conventional layer preferably comprises a fabric which is secured to the outer side of the layer of cellular material and has a rubber facing on the outer side thereof.

In making up the illustrated boot a sheet 10 of fabric with coating 11 of rubber on the outer side is cut in the proper shape and applied on the last (not shown) with the edges overlapped at the back of the last in the usual manner. A vamp and toe piece of fabric 12 and rubber coating 13 is then applied over the toe and vamp of the last with the adjoining edges of the parts 10—11 and 12—13 abutting and secured together by an overlying tape 14. The insole 15 is placed on the last and the edges of the parts 10—11 and 12—13 are lasted thereover and secured thereto in the usual manner.

After this combined rubber and fabric layer has been applied on the last, a layer of sponge rubber compound is adhesively secured thereon said layer consisting of the sole portion 16, the toe and vamp portion 17 which is somewhat similar in shape to the rubber and fabric layer 12—13, and the upper covering 18, all of which are arranged in edgewise abutting relation.

After the layer of sponge rubber compound is applied, an outer covering preferably of fabric and rubber with the latter on the exterior, is adhesively secured to the outer surface of the sponge rubber layer of the upper. This outer layer comprises the main section of the upper consisting of the fabric 19 with a facing 20 thereon of compound such as usually used to form the exterior surface of the boot, which said fabric and rubber layer is folded around the last and joined together at the back in the usual manner, the section 19—20 being terminated substantially along the line 21 over and down the sides of the instep. The usual heel reinforcing and outer heel piece 22 is then applied after which the toe and vamp covering consisting of the fabric 23 at the inside and rubber facing 24 on the outside is applied, which said vamp and toe covering extends upwardly at the front of the boot as shown particularly in Fig. 1, down along the sides and overlaps the forwardly extending portions of the heel piece 22.

The outsole 25 and heel 26 is then applied to the boot structure after which the boot is vulcanized or cured in the usual manner.

The sponge rubber layer for this boot structure is produced by mixing with the usual rubber compound a small quantity of a sponging or leavening agent such as bicarbonate of soda which becomes active under the influence of heat. This compound with bicarbonate of soda, is then formed into relatively thin sheets, care being taken to keep the rolls cool in the process of sheeting. The boot may be made up directly with this sheeted rubber compound and the entire boot structure and last subsequently heated at a relatively low temperature for a considerable period of time, before final vulcanization or curing, to accomplish the sponging action of the rubber, but it has been found advantageous and is preferred to sponge the rubber slightly and semi-cure same before building into the boot, as for example by subjecting the sheeted

rubber containing the bicarbonate of soda to approximately ten (10) lbs. of steam at 275° F. for fifteen minutes. This produces a slight cellular or spongy formation within the layer of rubber consisting of a multiplicity of relatively minute pockets or cells and the resulting layer has a practically continuous skin surface on each side. After this partial sponging and semi-curing, the boot is made up as aforesaid with the sections 16, 17 and 18 of this semi-cured sponge rubber which in the final vulcanization of the boot, is fully cured and acquires a permanent cellular form.

Thus a substantially uniform and continuous layer of cellular material is provided throughout the sole and upper or entire wall of the boot and lying intermediate of and securely united to the inner and outer layers of non-cellular material which in the vulcanization are all consolidated into a substantially unitary structure. The skin-like surface of the sponge rubber sheet affords a continuous attachment for the adjoining layers while its cellular structure provides gas pockets which not only serve to heat insulate the boot but also afford a flexible light weight structure and cushions the sole and the rest of the boot wall as well. The cellular structure also provides a connection between the inner and outer layers of a soft and flexible character which absorbs bending strains and increases the durability of the boot.

The inner and outer layers of rubber used herein consist of rubber compound such as is usually employed in making up rubber articles of this character and in referring to same hereinafter the term "solid" rubber is employed merely to distinguish from rubber of cellular or sponge rubber character.

While I have shown and described my invention in the preferred form, I am aware that various changes and modifications may be made without departing from the principles of my invention, the scope of which is to be determined by the appended claims.

I claim:

1. A rubber boot having a rubber wall of relatively fine cellular construction with a layer of fabric on each side thereof, each layer of fabric having a layer of solid rubber thereon at the side next to the outer side of the boot.

2. A rubber boot comprising composite layers of solid rubber and fabric and an intermediate layer of sponge rubber vulcanized thereto, said layer of sponge rubber having a continuous surface for attachment to said other layers.

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