July 20, 1943. C. E. OLSON 2,324,591

SHOE

Filed Feb. 21, 1942

Fig. 1

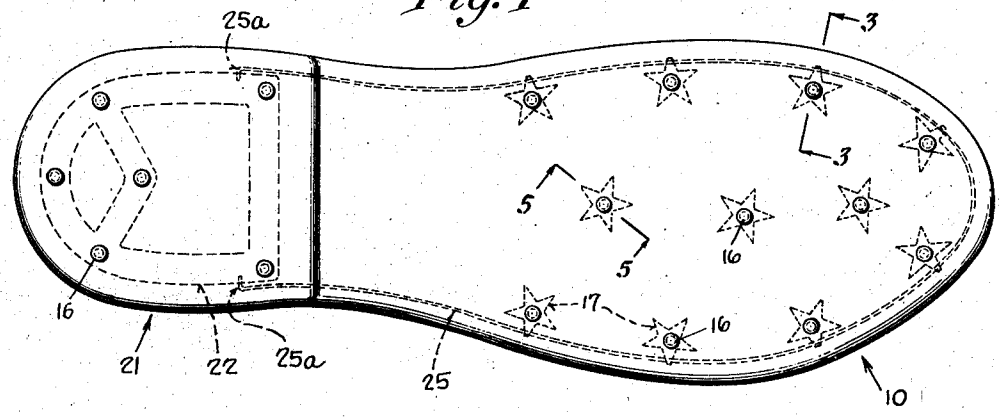
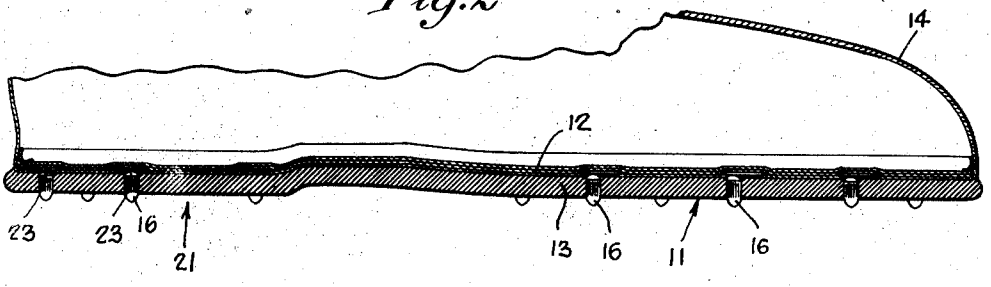


Fig. 2



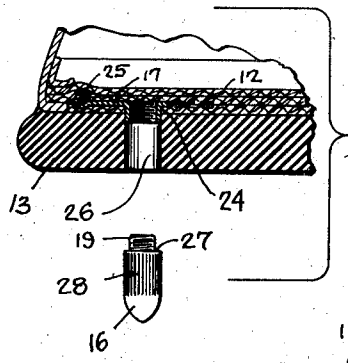


Fig. 3

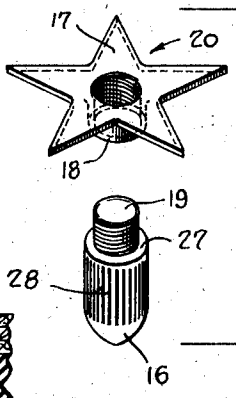


Fig. 4

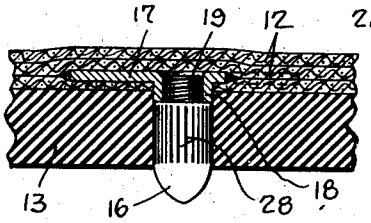


Fig. 5

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Patented July 20, 1943 2,324,591

UNITED STATES PATENT OFFICE

2,324,591

SHOE

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Application February 21, 1942, Serial No. 431,797

17 Claims. (Cl. 36—59)

This invention relates to rubber shoes, rubber boots and the like, and, more particularly, to means for increasing the traction of the same on ice or ice-covered surfaces.

For this purpose, it has been proposed heretofore to provide such footwear with studs or calks by threading them into thin, steel plates inserted in and coextensive with the sole of the shoe which greatly decreased flexibility of the sole and increased the cost of the installation, or to embed flanged, threaded sockets in the material of the outer or intermediate sole. The flanges on the sockets in this latter case were made of heavy material in order to support the studs. This decreased the flexibility of the sole and were difficult to properly anchor in position.

The present invention obviates these disadvantages in that it provides threaded sockets or nipples on small, thin plates which are mounted in the sole, which is preferably formed as a laminated structure with the plates disposed between the laminations and anchored against movement with respect to the sole so as to hold the studs or calks in position and still are readily flexible in all directions with the sole.

The plates may be of various shapes, provided they are flexible in all directions, and present sufficient abutting surfaces for holding them against rotation or displacement. This is accomplished in the herein illustrated form of the invention by making the plates star-shaped.

According to this invention, the nipples project below the plane of the plate, and provide a means for aiding in locating the plate during assembly thereof in the sole as the lower laminations can be prepunched to receive them. The ends of the nipples form an abutment to engage a shoulder on the calk and thereby form a thrust-receiving member for carrying the load on the calks and also a means for limiting the insertion of the calks to insure that they project uniformly from the face of the sole.

To prevent the calks from accidentally unscrewing so as to alter their projection from the sole or become lost, the present invention provides them with friction-increasing surfaces for engaging the walls of the aperture in the sole through which they are inserted to prevent unintentional rotation thereof.

If desired, the plates, which are disposed about the periphery of the sole, may be interconnected by a flexible wire or the like to further insure that they will be maintained in proper position with reference to the edge of the sole without interfering with the flexibility thereof.

The heel of the shoe, which does not need to be flexible, may have a plate provided with a plurality of threaded nipples drawn therefrom for receiving the calks.

Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the drawing, in which:

Figure 1 shows a bottom view of a shoe, or the like.

Fig. 2 shows a partial longitudinal sectional view thereof.

Fig. 3 shows a fragmentary sectional view, taken along line 3—3 of Figure 1, showing the calk removed.

Fig. 4 is a perspective view of the plate and calk in position to be inserted therein.

Fig. 5 is a sectional view of the sole, taken along the line 5—5 of Figure 1.

While the present invention may be applied to shoes of various types, for the purpose of illustration it is herein shown in connection with a rubber overshoe or the like 10 which is adapted to be worn over the regular leather shoe. It is to be understood that the invention is not to be limited to such application, but may be applied to any structure falling within the scope of the appended claims.

As shown in Fig. 2, the overshoe is made up of a laminated sole 11 formed from a plurality of layers 12 of rubber-impregnated fabric to which is secured a layer or tread 13 of rubber or the like material, and the whole vulcanized into a unit. The upper 14 may be of waterproofed canvas, or of a canvas material covered by a thin layer of rubber formed thereon when the tread is molded to the fabric layers.

The sole is provided with the traction-improving means of the present invention comprising a plurality of sharp or pointed studs or calks 16 carried by separate thin metal flexible plates 17 disposed between the laminations thereof.

As shown in Fig. 4, each plate has a nipple 18 drawn therefrom or otherwise secured to its center, which is internally threaded to receive the stem 19 of the calk. In order to make the plate flexible in all directions, a plurality of reentrant notches 20 have been stamped out about its periphery so that a star-shaped plate results and that no matter where the line of flexure passes through the sole a minimum resistance will be offered by the plates. While five points have been provided in the illustrated form of the invention, the number of reentrant notches may be varied as desired.

As is shown in Figure 1, the heel portion 21 is a continuation of the sole. It may have the same type of plates therein, but, since there is no requirement of flexibility in this portion of the shoe, it is preferred to employ a skeleton plate 22 of metal which is disposed between the laminations and is provided with a plurality of nipples 23 which are internally threaded to receive calks 16 similar to that used in the sole of the shoe.

The nipples projecting from the plates in addition to providing means for mounting the calks, aid in locating the plates on the sole and heel as the shoe is made.

It will be noted from Fig. 3 that the lower layer or layers 12 of fabric are punched with holes 24 so spaced that the calks will be properly distributed over the tread-area or ground-contacting portion of the sole.

When laminations of the sole are assembled, the plates 17 are disposed between the layers of fabric with the nipples extending through the holes in the fabric. This will locate and hold the plates in position, and greatly facilitate the construction of the sole of the shoe. The nipples on the heel plate will properly locate it in the heel portion.

Since the distribution of the calks on the sole need not be precise, the same cutting die may be used to punch the holes in the fabric for a number of sizes of overshoes.

In order that the plates may be retained in proper position with respect to the edge of the sole, the present invention provides a thin, steel wire 25 formed to the shape of the sole and connected at its ends 25a to the plate 22 in the heel of the shoe. The outermost point of the star-shaped plates, the one which projects toward the edge of the sole, is wrapped around the wire, as shown in Figs. 1 and 3, and locks the plates thereto to lie within the wire framework at a uniform distance from the edge of the sole.

As will be noted in Fig. 5, when the layers of the fabric on opposite sides of the plates are joined together they will extend into the reentrant notches and the plate will be held against any rotary movement with respect to the sole, the walls of the reentrant notches cooperating with the secured-together fabric to provide a large number of extensive abutting edges.

The tread on the sole is provided with calk-receiving apertures 26 communicating with the nipples so that the calk can be readily inserted in the opening and the stem 19 threaded in the nipple to be secured thereto. The calk will be screwed in until a shoulder 27 thereon abuts the end of the nipple to limit the insertion. This will insure a uniform projection of the calk from the sole, as shown in Fig. 2. The end of the nipple will also form a thrust-receiving surface for carrying the load on the calk without undue strain on the threads.

When the calks become damaged or defective, they may be readily removed and replaced by new calks. To prevent the calks from accidentally unscrewing and moving out of the abutting relation or becoming lost, the present invention provides them with friction surfaces, herein illustrated by longitudinal ribbing 28, which engages the walls of the aperture in the tread and holds the calk against casual rotation.

In the broader aspects of the present invention, the fabric can be impregnated with resins or other suitable binding and bonding agents and the tread can be made of any rubber substitute, or wear-resisting flexible composition. Also, the plates may have large apertures in place of the reentrant notches, so long as its flexibility is not impaired.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. A rubber boot or shoe having a flexible laminated sole; a plurality of flexible plate-like members, each having a perimeter including reentrant angles, located between the laminations of the sole in predetermined relation in the tread area of the sole and held in place by the bonding of the laminations together in face-to-face contact in said reentrant angles; a screw-threaded nipple carried by each of said flexible members, said nipple extending through an aperture in the laminations; and a screw-threaded stud removably secured in each nipple to project from the sole and form a traction surface.

2. A rubber boot or shoe having a laminated sole of rubber and rubber-impregnated fabric layers vulcanized together; a flexible plate-like member having a perimeter including reentrant angles located between the layers of the sole and held in place by the bonding of the layers together in face-to-face contact in said reentrant angles; a screw-threaded nipple carried by said flexible member, said nipple extending into an aperture in the outer layer of rubber; and a screw-threaded stud removably secured in said nipple and adapted to be removed therefrom through said aperture.

3. A shoe having a laminated flexible sole including a plurality of star-shaped flexible plates disposed between the laminations throughout the tread area thereof, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement with respect to the sole while permitting the sole to flex in all directions; flexible means located between the laminations and inwardly displaced from the edge of the sole, the outermost points of the star-shaped plates adjacent the edge of the sole being secured to said flexible means to be held in position thereby; and a stud releasably secured to each plate and projecting from the sole to provide a traction surface therefor.

4. A rubber boot or shoe having a flexible laminated sole including a plurality of flexible plate-like members and a skeleton heel plate member located between the laminations in predetermined relation in the tread area of the sole and heel portion respectively and secured in place thereby; means anchored to the heel plate and interconnecting the plate-like members adjacent the edge of the sole to hold said members in predetermined position with respect to said edge, each of said members being provided with threaded means; and a stud thread in each of the threaded means and projecting from the sole to provide a traction surface.

5. A rubber boot or shoe having a laminated sole of rubber and rubber-impregnated fabric layers vulcanized together; a flexible plate-like member having a perimeter including reentrant angles located between the layers of the sole and held in place by the bonding of the layers together in face-to-face contact in said reentrant angles; a screw-threaded nipple carried by said flexible member, said nipple extending into an

aperture in the outer layer of rubber; and a screw-threaded stud removably secured in said nipple and adapted to be removed therefrom through said aperture, the sides of the stud having a friction surface engaging the walls of the aperture in the layer of rubber for preventing accidental unscrewing thereof.

6. A rubber boot or shoe having a laminated sole of rubber and rubber-impregnated fabric layers vulcanized together; a plurality of flexible plate-like members, each having a perimeter including reentrant angles, located between the layers of the sole in predetermined relation in the tread area of the sole; a skeleton plate disposed between said layers in the heel portion, said plates being held in place by the bonding of the layers together in face-to-face contact in said reentrant angles and in apertures in the skeleton plate; screw-threaded nipples carried by each of said flexible members and the skeleton plate, said nipples extending into apertures in the outer layer of rubber; and a screw-threaded stud removably secured in each of said nipples and adapted to be removed therefrom through said apertures.

7. A laminated flexible sole for a shoe or the like including one or more star-shaped flexible plates disposed between the laminations, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement with respect to the sole while permitting the sole to flex in all directions; and a stud releasably secured to each plate and projecting from the sole to provide a traction surface therefor.

8. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations, each having a nipple projecting therefrom and through predeterminedly spaced apertures in the laminations below them to properly position the same in the sole, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement; and a stud releasably secured in each nipple and projecting from the sole to provide a traction surface therefor.

9. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations, each having a nipple projecting therefrom and through predeterminedly spaced apertures in the laminations below them to properly position the same in the sole, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement; means for interconnecting all of the plates located adjacent the edge of the sole for holding them in predetermined relation with respect to said edge; and a stud releasably secured in each nipple and projecting from the sole to provide a traction surface therefor.

10. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations, each having an internally threaded nipple projecting therefrom and through predeterminedly spaced apertures in the laminations below them to properly position the same in the sole, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement; and a stud threaded in each nipple and projecting from the sole to provide a traction surface therefor.

11. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations, each having an internally threaded nipple projecting therefrom and through predeterminedly spaced apertures in the laminations below them to properly position the same in the sole, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement; a stud threaded in each nipple and projecting from the sole to provide a traction surface therefor; and means for preventing accidental rotation of said studs from the nipple.

12. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations, each having a nipple projecting therefrom and through predeterminedly spaced apertures in the laminations below them to properly position the same in the sole, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement; and a stud secured in each nipple and having means cooperating with the nipple to regulate the projection of the stud from the sole to provide a uniform traction surface therefor.

13. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations, each having a nipple projecting therefrom and through predeterminedly spaced apertures in the laminations below them to properly position the same in the sole, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement; and a stud threaded in each nipple and projecting from the sole to provide a traction surface therefor, the stud having a shoulder thereon engaging the end of the nipple to carry the load on the stud and relieve the threads.

14. A laminated flexible sole for a shoe or the like comprising a plurality of layers of impregnated fabric secured together and a tread layer secured thereto; a plurality of flexible plates disposed between the layers of fabric, each having a nipple projecting therefrom through a hole in the lower layers of fabric, said plate having enlarged apertures therein and the layers above and below the plate being secured thereto and to each other through the apertures to hold the plates against relative movement with respect to the sole; and a stud secured in each nipple and projecting from the tread to provide a traction surface therefor.

15. A laminated flexible sole for a shoe or the like comprising a plurality of layers of rubber impregnated fabric and a rubber tread layer vulcanized together; a plurality of flexible plates disposed between the same layers of fabric, each having a nipple projecting therefrom through a hole in the lower layers of fabric, said plates being star-shaped and the layers above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement with respect to the sole; and a stud secured in each nipple and projecting from the tread to provide a traction surface therefor.

16. A laminated flexible sole for a shoe or the like comprising a plurality of layers of fabric secured together and a tread layer secured there-

to; a plurality of flexible plates disposed between the same layers of fabric, each having a threaded nipple projecting therefrom through a hole in the lower layers of fabric, said plate having enlarged apertures therein and the layers above and below the plate being secured thereto and to each other through the apertures to hold the plates against relative movement with respect to the sole; and a stud threaded to each nipple and projecting from the tread to provide a traction surface therefor, said stud and nipple having cooperating means for limiting the projection of the studs and for relieving the threads of the load placed on the studs.

17. A laminated flexible sole for a shoe or the like including a plurality of star-shaped flexible plates disposed between the laminations throughout the tread area thereof, the laminations above and below the plate being secured thereto and to each other between the points of the star to hold the plates against relative movement with respect to the sole while permitting the sole to flex in all directions; means interconnecting the outermost points of the star-shaped plates adjacent the edge of the sole for holding said plates in predetermined relation; and a stud releasably secured to each plate and projecting from the sole to provide a traction surface therefor.

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