

Aug. 27, 1963

R. A. SMITH

3,101,559

SAFETY SHOE WITH INSTEP GUARD

Filed Oct. 12, 1962

2 Sheets-Sheet 1

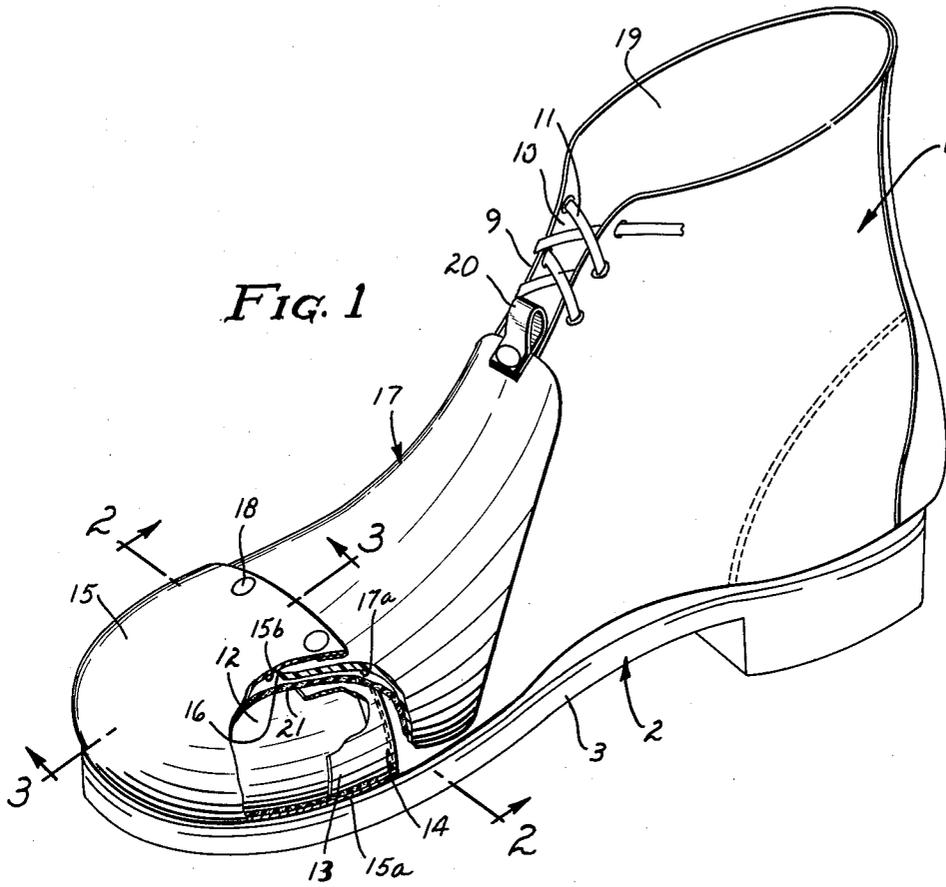


FIG. 1

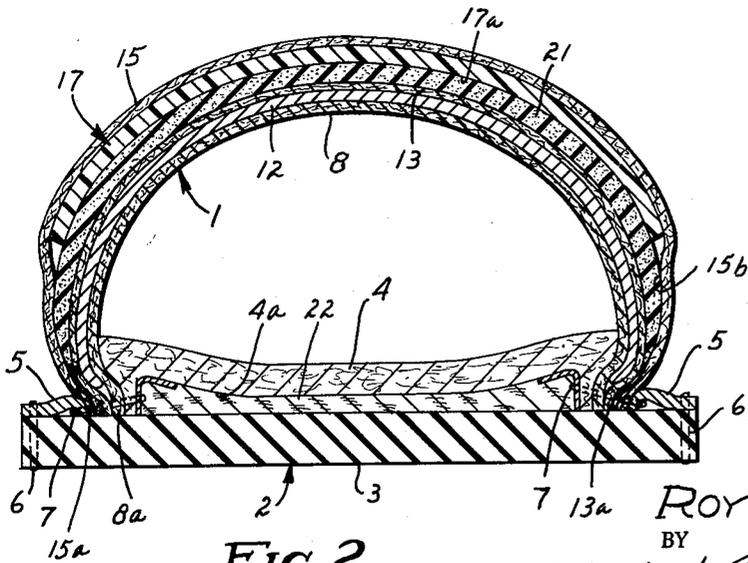


FIG. 2

INVENTOR

ROY A. SMITH

BY

Merchant, Merchant & Gould
ATTORNEYS

Aug. 27, 1963

R. A. SMITH

3,101,559

SAFETY SHOE WITH INSTEP GUARD

Filed Oct. 12, 1962

2 Sheets-Sheet 2

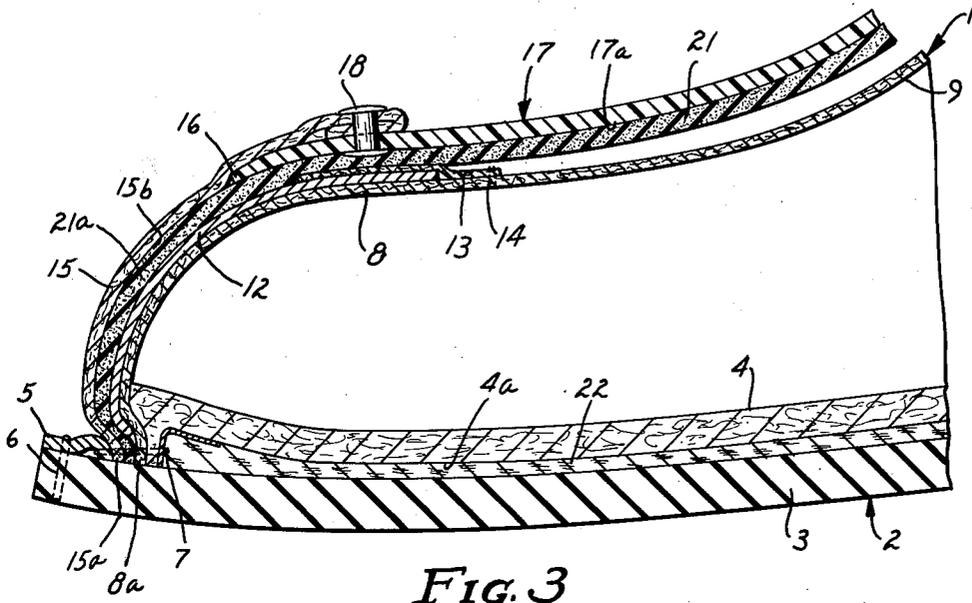


FIG. 3

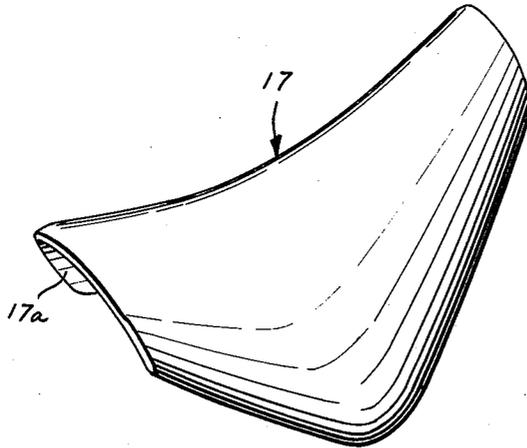


FIG. 4

INVENTOR
ROY A. SMITH
BY
Merchant, Merchant & Gould
ATTORNEYS

1

3,101,559

SAFETY SHOE WITH INSTEP GUARD

Roy A. Smith, Red Wing, Minn., assignor to Red Wing Shoe Company, Inc., Red Wing, Minn., a corporation of Minnesota

Filed Oct. 12, 1962, Ser. No. 230,112
3 Claims. (Cl. 36-72)

My invention relates generally to the shoe art and more particularly to safety work shoes for use in industry.

Still more specifically, my invention relates to safety shoes of the type wherein not only the toe portion is provided with a metal cap for protection of the toes of the wearer, but also the metatarsal-arch portion of the foot of the wearer is protected by an overlying shield or guard.

The primary object of my invention is the provision of a novel combination and arrangement of parts whereby a shoe with more safety features than any heretofore produced, is made possible.

A further object of my invention is the provision of a device of the class described which is relatively light in weight and completely comfortable to the wearer.

A further object of my invention is the provision of a safety shoe of the type above described which is inexpensive to produce and which is completely sanitary and easy to maintain in a cleanly condition.

A further object of my invention is the provision of a shoe of the type above described, the safety features of which are not deteriorated materially by use.

The above and further objects of my invention will become apparent from the following detailed specification, appended claims and attached drawings.

Referring to the drawings, wherein like characters indicate like parts throughout the several views:

FIG. 1 is a perspective view of a shoe constructed in accordance with my invention;

FIG. 2 is an enlarged sectional view taken on the line 2-2 of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view taken on the line 3-3 of FIG. 1; and

FIG. 4 is a view in perspective of the metatarsal-instep as initially formed and prior to its installation into the shoe proper.

Referring with greater particularity to the drawings, the numeral 1 indicates in its entirety the upper of a shoe, whereas the numeral 2 indicates in its entirety the base or sole assembly. The sole assembly comprises an outer sole 3 and an inner sole 4 which, as shown, are suitably adhered or stitched together through a welt 5, the stitching of the outer sole to the welt 5 being indicated at 6, whereas the stitching of the welt 5 to the inner sole is indicated by 7.

At its forward end the shoe upper 1, which is formed from flexible leather, includes a toe portion 8 and an upwardly and rearwardly extending metatarsal-instep portion 9 which, in conventional manner, is shown as being slit as indicated at 10 and provided with conventional lacing means 11. It will be noted that the lower edges 8a of the toe portion 8 rest upon and are supported by the outer sole 3.

Likewise resting upon the outer sole 3 and closely overlying the toe portion 8 of the upper 1 is a forwardly converging cap 12 preferably formed from steel or other metal which will afford maximum protection of the toes of the wearer from impact.

As shown in FIG. 1, a flexible band 13 of leather or the like extends transversely across the toe portion 8 and has its opposite ends secured to the base assembly, as indicated at 13a. The rear edge of the band 13 is stitched to the toe portion 8 in spaced relation to the rear edge of the steel cap 12, as indicated at 14. The

2

forward portion of the band 13, however, is stretched taut over a substantial portion of the forwardly converging cap 12, as shown particularly on FIGS. 1 and 3. This feature is of importance in that it serves two important functions, namely, the band 13 restricts movement of the steel cap 12 relative to its associated parts and also prevents dirt and other foreign matter from becoming lodged between the toe portion 8 of the shoe and the overlying cap 12.

A flexible cover element 15, preferably formed from suitable leather, is shown as overlying the cap 12 and toe portion 8 and is secured along its lower edge 15a to the inner sole 4 by the stitching 7. The rear edge of the cover element loosely overlies the band 13 whereby to permit insertion therebetween and said band 13 of the leading edge 16 of a metatarsal-instep shield or guard plate 17. The shield 17 may be formed from any suitable high impact resistant, slow-burning plastic material such as copolymer of polystyrene, butadiene rubber and acrylonitrile. Attachment of said forward edge portion 16 to the cover element 15 is accomplished through the medium of a plurality of transversely spaced rivets or the like 18. This arrangement obviously permits rocking movements to be imparted to the shield 17 about the fulcrum of the forward edge 16 whereby to facilitate insertion of the foot of the wearer into the open upper end 19 of the shoe. In conventional manner a tie-down loop 20 is provided at the upper edge of the shield 17. The upper surface of the shield 17 is, of necessity, smooth and slick so as to encourage glancing off of any heavy object which may come in contact therewith. A further advantage of this type of surface is that it may be readily cleaned so as to detect fractures which might otherwise impair the protective quality of the shield 17. Further, there being no stitches associated with the shield 17 there is nothing to be burned away by welding sparks or the like. Finally, the material being of plastic, the shoe is relatively lightweight so as not to add to the overall burden to the wearer.

In conventional manner the under surface 17a of the shield 17 has adhered thereto a layer of compressible porous sheeting 21 of sponge rubber or the like for the purpose of absorbing impact. However, the forward end portion of the sheeting 21 extends forwardly beyond the forward edge 16 to define an apron 21a which is secured to the under surface 15b of the cover element 15. This arrangement is important for several reasons. First of all, it provides a relatively wide area of attachment of the shield 17 to the cover element 15 while permitting limited rocking movements about the axis of the forward edge 16 thereof. This arrangement also further insures that no dirt or other foreign matter be permitted to enter between the cover element and the underlying layers. Finally, of course, the impact resistance of the apron 21a is of value in protecting both the cover element 15 and the steel cap 12.

It may be noted that a void space between the outer sole 3 and the inner sole 4 is caused by the particular contour of the surface 4a of the inner sole 4. As shown, this space is conventionally filled with a filler material in the nature of ground cork 22 mixed with an adhesive, not shown.

My invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the above objects, and while I have shown a preferred embodiment thereof, I wish it to be understood that same may be capable of modification without departure from the scope and spirit of the appended claims.

What is claimed is:

1. A safety shoe comprising,
 - (a) a base or sole assembly,

3

4

- (b) a relatively flexible upper carried by said base assembly and defining a toe portion and a metatarsal-instep portion,
- (c) a rigid forwardly converging cap closely overlying said toe portion and supported along its lower edge by said base assembly, 5
- (d) a relatively narrow flexible band extending transversely across the rear end only of said toe portion and having its opposite ends secured to said base assembly, 10
- (e) the rear edge of said band being stitched to said toe portion in closely spaced relation to the rear edge of said cap,
- (f) the forward portion of said band being stretched taut over the rear portion only of said forwardly converging cap and restricting movements of said cap with respect to said toe portion and base assembly, 15
- (g) a flexible cover element overlying said cap and toe portion and secured along its lower edge to said base assembly, 20
- (h) the rear edge of said cover element loosely overlying said band,
- (i) and a rigid metatarsal-instep shield overlying the metatarsal-instep portion of said upper and conforming substantially to the contour thereof. 25

- (j) the forward end portion of said shield being interposed between said band and the rear end portion of said cover element and secured to said rear end portion of said shield overlying and being supported by the intermediate portion of said cap.
- 2. The structure defined in claim 1 in which the upper surface of said shield is smooth and slick.
- 3. The structure defined in claim 1 in which said shield is undercoated with a layer of compressible porous sheeting,
- (k) said sheeting extending forwardly of said shield and being secured to and completely underlying said cover element.

References Cited in the file of this patent

UNITED STATES PATENTS

2,972,824	Schlecht -----	Feb. 28, 1961
-----------	----------------	---------------

FOREIGN PATENTS

892,180	France -----	Jan. 3, 1944
722,803	Great Britain -----	Feb. 2, 1955
1,103,811	Germany -----	Mar. 30, 1961