Nov. 5, 1935. H. G. McMURRAY ET AL 2,020,037

SAFETY SHOE

Filed May 1, 1933

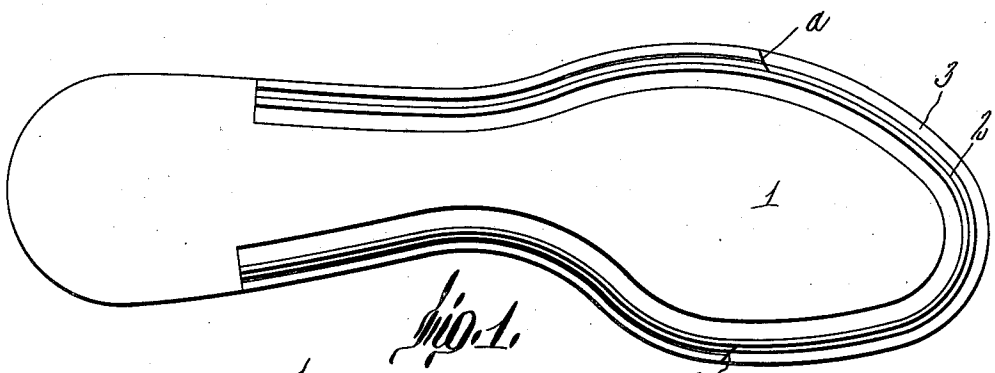


Fig. 1.

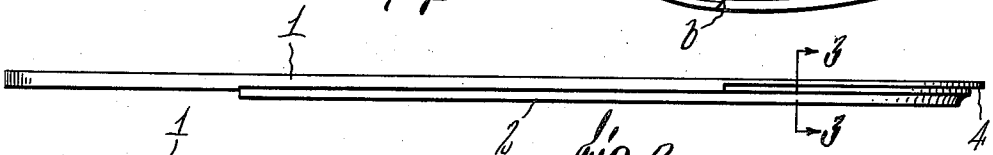


Fig. 2.



Fig. 3.

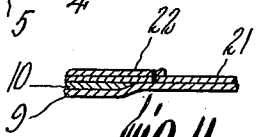


Fig. 11.

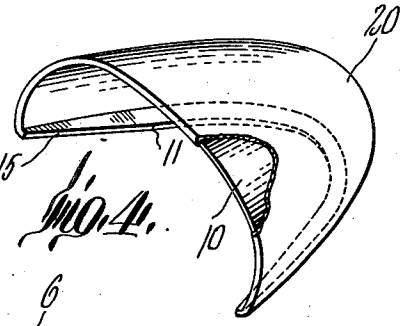


Fig. 4.

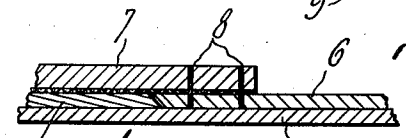


Fig. 6.

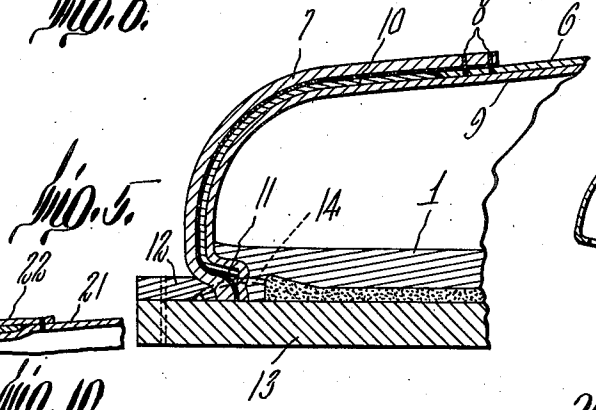


Fig. 5.

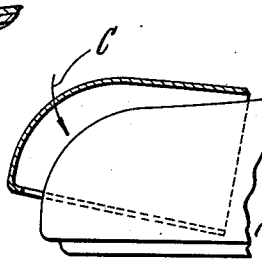


Fig. 7.

Fig. 10.

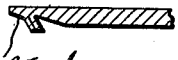


Fig. 8.

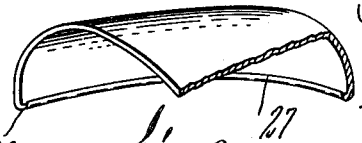


Fig. 9.

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SAFETY SHOE

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Application May 1, 1933, Serial No. 668,698

11 Claims. (Cl. 36—77)

This invention relates to shoes provided with toe stiffeners of the so-called "safety" type which are capable of withstanding unusually severe service conditions tending to break them down and thus to protect the feet of the wearer from injury. Commonly such toe stiffeners are formed of metal, though other materials are sometimes used.

One object of the present invention is to provide a construction wherein, if desired, metal stiffeners may be used but in which the stiffener is covered and is not liable to cause electrical short circuits by contact of the shoe, particularly when wet, with live parts, and to provide a construction whereby the wearer's foot is protected from extremes of heat or cold, the wearer's foot, as well as the external surface of the shoe, being separated from the metal stiffener by heat insulating material.

A further object is to provide a construction wherein the stiffener will present no obstruction to usual methods of securing the upper and sole together, as, for example, by stitching.

For a more complete understanding of this invention, reference may be had to the accompanying drawing in which

Figure 1 is a bottom plan of a welt innersole prepared for use in a shoe embodying this invention, although it should be understood that in its broader aspects the invention is not limited to shoes of any particular type.

Figure 2 is an edge view of the same.

Figure 3 is a section on line 3—3 of Figure 2.

Figure 4 is a perspective of the toe stiffener.

Figure 5 is a fragmentary section through the toe portion of the completed shoe.

Figure 6 is similar to a portion of Figure 5 but shown to a larger scale.

Figure 7 is a somewhat diagrammatic view showing the manner in which the stiffener is placed in position.

Figure 8 is a fragmentary view similar to a portion of Figure 3, but showing a modification.

Figure 9 is a fragmentary perspective of a stiffener for use with the innersole of Figure 8.

Figures 10 and 11 are views similar to Figure 6 but showing further modifications.

The application is a continuation in part of our application Serial No. 625,887 filed July 29, 1932 for Safety shoes.

Referring to the drawing, Figure 1 shows a welt innersole 1 provided with a stitch-receiving rib 2 of any suitable or usual construction, but shown as formed by oppositely channelling the innersole and bringing the channel lips together. This stitch-receiving rib is spaced inwardly from the edge of the innersole, this edge outwardly of the rib, and, if desired also, as shown, the outer lip of the rib, being cut away about the toe portion of the shoe as at 3 between the points *a* and *b* so that the lower face of the cut away portion as at 4 is somewhat above the root of the inner channel 5 within the inner rib lip. This innersole is secured to the last for the lasting operation in accordance with the usual practice and the upper is lasted thereover. This upper, however, at its toe portion comprises a plurality of laminations. For example, as shown in Figures 5 and 6 it may comprise a short vamp 6 to which a tip 7 is secured as by lines of stitching 8. Inwardly of these parts is shown positioned a lining 9 which preferably is unattached to the vamp 6 except possibly by some adhesive such as latex or the like placed well back from the lines of stitching 8 and it may be entirely unattached if desired. A preformed toe stiffener as at 10, shown detached in Figure 4, and preferably of metal, is employed, this being placed between the lining 9 and the tip 7 and forwardly of the forward edge of the vamp 6. As shown the rear edge of the stiffener 10 and the forward edge of the short vamp 6 are complementally beveled and substantially butt together, so that the stiffener forms in effect a forward continuation of the vamp, the lining 9 being extended forwardly within the stiffener 10 and forming an inner lining therefor. The beveling of these parts aids in forming a smooth connection therebetween.

About the lower edge of the preformed stiffener 10 it is provided with a flange 11, this being inturned and conforming to the cut away portion 3 of the innersole. This flange is of substantially the same length as this cut away portion at the toe so that when the stiffener is inserted between certain of the laminations of the upper, as shown in Figure 5, these being the lining and the tip, these laminations may be brought together beyond the inner edge of the flange 11 and lasted in over the innersole in the usual manner, the cut away portion 3 of the innersole providing room for the reception of the flange of the stiffener which, however, is spaced from the innersole by one or more of the upper laminations, as shown, there being one such lamination which comprises the lining 9. The cut-away portion 3 provides room for the flange 11 and the layer of upper material above it, which in the construction just described is the tip, so that these layers of upper material are in position to be secured

to the innersole rib in the same manner that the upper materials are commonly secured when no such flange 11 is present, and with the outer lamination of the upper materials substantially at the level of the root 8 of the rib 2 but on its outer face. It will be noted from an inspection of Figure 5 that this flange 11 overlies the welt 12 and the outersole 13 which are secured to the shoe in any usual or suitable manner, and presents a face of substantial width on its underside which acts to prevent downward pressure exerted on the toe from causing the stiffener 10 to cut into the materials below it. Likewise it will be noted that this flange underlies the outer margin of the innersole to an extent sufficient to offer great resistance to lifting of the toe portion of the upper materials and stiffener away from the outersole. Thus the lower edge of the stiffener 10 is securely locked in position between the inner and outersoles and effectually resists forces which may be exerted thereon tending either to force it into the outersole or to tear it away therefrom. It will be also noted that the edge of this flange 11 terminates outwardly of the line of securement of the upper laminations to the sole members, as shown this securement being the line of inseam stitches at 14. Thus the stiffener itself presents no obstruction to the passage of the needle laying the stitches, or in case of securement by other means as in other types of shoes, to such securement.

As shown best in Figure 4 the rear edges of the flange 11 are cut away as at 15 so as to facilitate assembly of the stiffener in the shoe. As shown for example in Figure 7, this may be done by engaging the rear edge portions of the flange 11 against the outer face of the inner upper lamination, herein shown as the lining, where it extends over the last to which it has previously been lasted, and then forcing the stiffener rearwardly and downwardly substantially in the direction shown by the arrow *c* until the flange is firmly seated beneath the inturned portions of the lining on the underside of the innersole. For example, the stiffener may be driven home into its proper position by blows from a hammer. The cut-away portions 15 facilitate this action, and the engagement thereof on the lining as the stiffener is driven home produces a wiping action thereon which helps to lay the lining to the last. The stiffener being thus in its proper position, the outer upper lamination, which as before described may be the tip, is then lasted in over the stiffener.

Particularly when a pre-formed metal toe stiffener is used one or both faces of the stiffener are coated with a suitable cement as at 20 for bonding it firmly to the adjacent upper laminations. This cement may also be of an electro and heat insulating character such as one containing rubber or similar material. Preferably this coating is an aqueous colloidal clay dispersion of rubber or rubber composition, which is applied to the stiffener when wet and allowed or caused to harden thereon to a normally non-tacky condition, and prior to assembling the stiffener in the shoe this surface may be suitably treated with a rubber solvent to render it tacky so that when in position it will be firmly secured to the adjacent shoe parts. One of the great advantages of of the aqueous colloidal clay dispersion resides in the fact that this effects a very strong bond with the metal stiffener which, however, should be of some metal which is not adversely affected by rubber. Where a rubber cement provided with a volatile solvent vehicle is employed, it is found that the rubber does not adhere to the metal with very great tenacity, it being possible to peel off the rubber coating from the metal after the coating has hardened. This, however, is not possible when aqueous colloidal clay dispersion is employed, it being almost impossible to remove the coating clean from the metal. Not only is such a coating electro-insulating but it is also a good non-conductor of heat, so that it acts to retard the passage of heat through the toe of the shoe so as to afford increased protection to the wearer's feet from severe temperature conditions to which the shoe may be subjected in service.

Of course, it is possible to position the pre-formed stiffener between upper laminations different from those illustrated in Figure 5. For example, as shown in Figure 10, the stiffener may be positioned between the upper face of a full vamp 21 and the lower face of a tip 22 secured thereto, in a manner similar to the usual positioning of other types of toe stiffeners when used with shoes having full vamp and tip, or it may be positioned between a full vamp and the lining as shown in Figure 11.

In Figures 8 and 9 a modified construction is illustrated in which less of the innersole margin is cut away than in the construction previously described, and preferably it is cut on a bevel as shown at 25 in Figure 8. The stiffener is provided with a corresponding beveled inturned flange 26 as shown in Figure 9, the inner edge of which is preferably upturned at 27 to engage the inner upper lamination and help to prevent the flange 12 from being sprung out of engagement therewith should a heavy blow be struck on the top of the toe of the shoe in service. Where the flange is so narrow as in this construction its rear edges will not need to be cut away to aid in assembly of the stiffener in the shoe.

It will be understood that the foregoing description is merely illustrative of the invention, which may be embodied in various other constructions without departing from the spirit or scope of this invention as defined in the appended claims.

We claim:

1. The method which comprises lasting a toe portion of an upper lamination, inserting in position over said lamination a metal toe stiffener having a hardened cement coating rendered surface-tacky previous to such insertion, and then lasting an upper lamination over said stiffener.

2. A shoe having an innersole, the margin of said innersole about the toe portion being cut away on its outer face, an upper having a laminated tip portion lasted in over and secured to said innersole, and a metal toe stiffener between certain of the laminations of said tip portion and having an in-turned flange of the full thickness of said stiffener underlying the cut away portion of said innersole in the finished shoe and free from the upper and innersole-securing means.

3. A shoe having an innersole, the margin of said innersole about the toe portion being cut away on its outer face, an upper having a laminated tip portion lasted in over and secured to said innersole, and a metal toe stiffener between certain of the laminations of said tip portion and having an in-turned flange of the full thickness of said stiffener underlynig the cut away portion of said innersole in the finished shoe and free from the upper and innersole-securing means and cemented in facial contact to adjacent laminations.

4. A shoe having an innersole, the margin of said innersole about the toe portion being cut away on its outer face, an upper having a laminated toe portion lasted in over said innersole and secured thereto inwardly of said cut away portion, and a metal toe stiffener cemented to and between certain of said laminations and having an in-turned flange of the full thickness of said stiffener underlying said cut away portion in the finished shoe and terminating outwardly of the securement of said upper to said innersole and having its margin bent toward said innersole.

5. A shoe having an innersole, the margin of said innersole about the toe portion being cut away on its outer face, an upper having a short vamp, a tip secured to the forward edge of said vamp, a lining within said vamp and tip, said lining and tip being lasted in over said innersole and secured thereto inwardly of said cut away portion, and a pre-formed metal toe stiffener of substantially uniform thickness throughout between said tip and lining and the forward edge of said vamp and cemented to said tip and lining and having an in-turned flange of the full thickness of said stiffener underlying said cut away portion, the rear edge of said stiffener and the forward edge of said vamp being complementally beveled.

6. A shoe having an innersole provided with a rib on its lower face inwardly of a marginal feather, upper materials presenting a plurality of laminations lasted over the toe of the shoe and secured to said rib, and a pre-molded toe stiffener positioned between certain of said laminations and having a marginal flange underlying said feather and terminating outwardly of the securement between said upper materials and said innersole.

7. A shoe having an innersole provided with a rib on its lower face inwardly of a marginal feather, upper materials presenting a plurality of laminations lasted over the toe of the shoe and secured to said rib, and a pre-molded toe stiffener positioned between certain of said laminations and having a marginal flange underlying said feather and spaced from said innersole by one of said laminations and terminating outwardly of the securement between said upper materials and said innersole.

8. A shoe having an innersole provided with a rib on its lower face inwardly of a marginal feather, upper materials presenting a plurality of laminations lasted over the toe of the shoe and secured to said rib, and a pre-molded metallic toe stiffener of uniform thickness throughout positioned between certain of said laminations and having a marginal flange underlying said feather and terminating outwardly of the securement between said upper materials and said innersole.

9. A shoe having an innersole provided with a rib on its lower face inwardly of a marginal feather, upper materials presenting a plurality of laminations lasted over the toe of the shoe and secured to said rib, and a pre-molded toe stiffener positioned between certain of said laminations and having an in-turned lower margin of the full thickness of said stiffener underlying said feather and terminating outwardly of the securement of said laminations to said rib.

10. A shoe having an innersole provided with a rib on its lower face inwardly of a marginal feather, upper materials presenting a plurality of laminations lasted over the toe of the shoe and secured to said rib, and a pre-molded toe stiffener positioned between certain of said laminations and having an in-turned lower margin of the full thickness of said stiffener underlying said feather and terminating outwardly of the securement of said laminations to said rib, said margin being secured to said upper materials beneath said feather solely by cement.

11. An article of manufacture consisting of a metal toe stiffener having a hardened rubber coating thereon containing colloidal clay and capable of becoming tacky on its surface by treatment with a rubber solvent.

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