July 15, 1958 E. L. SHULTZ 2,842,872

SAFETY SHOE

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Fig. 1

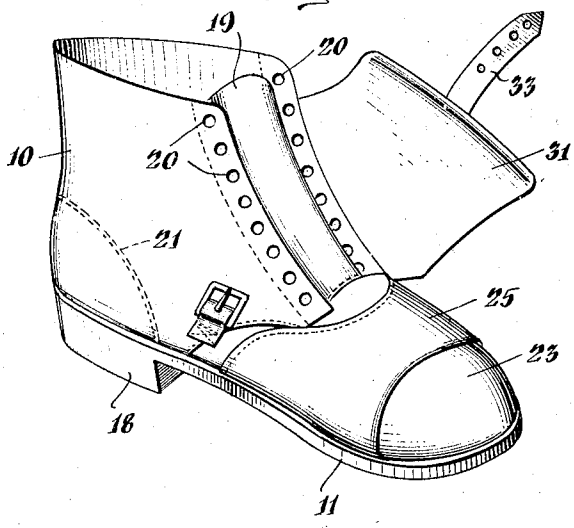


Fig. 2

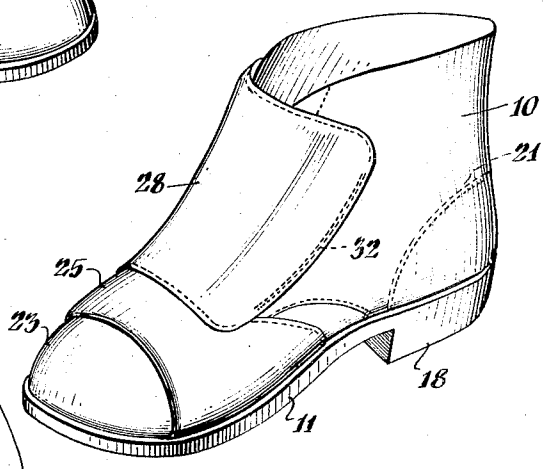
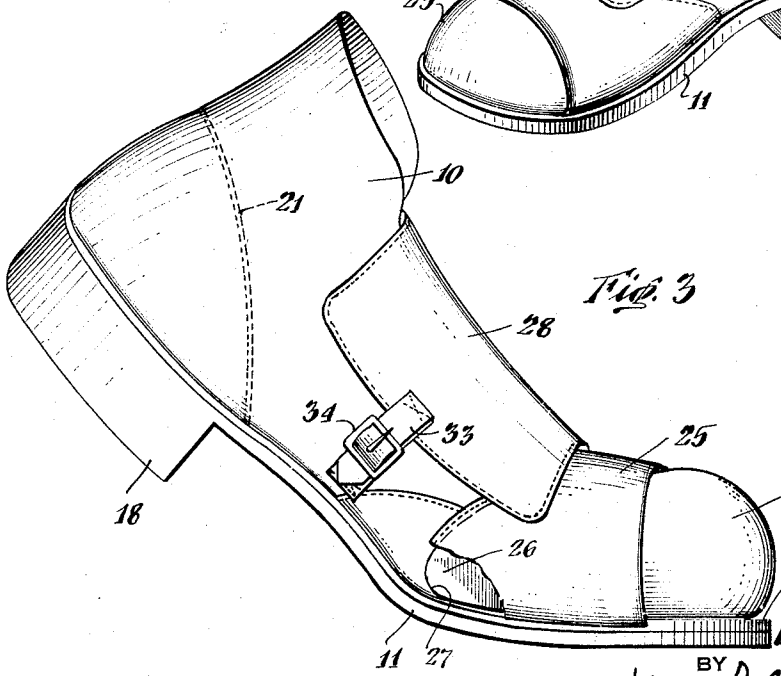


Fig. 3



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Fig. 4

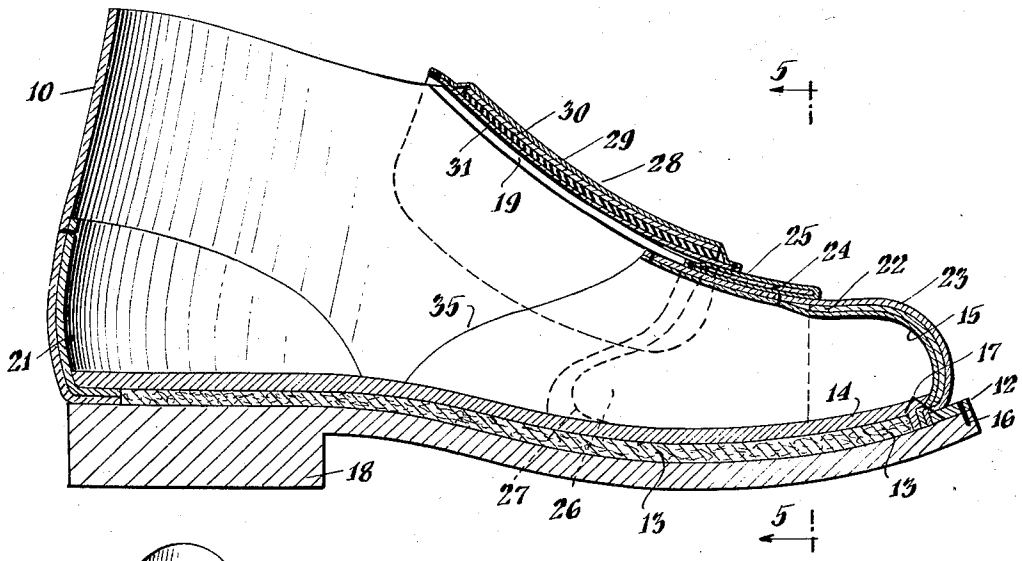


Fig. 5

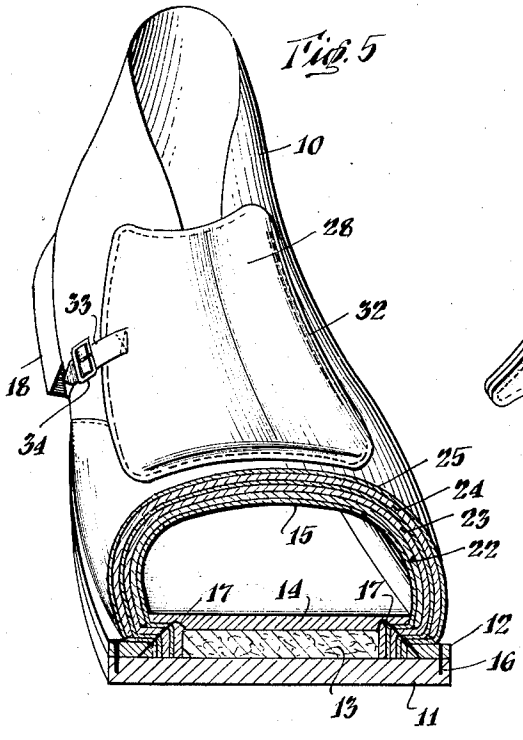
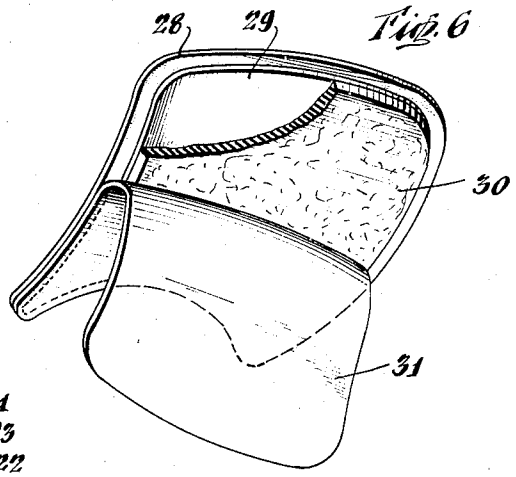


Fig. 6



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SAFETY SHOE

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Application December 7, 1956, Serial No. 626,980

11 Claims. (Cl. 36—72)

This invention relates to footwear and serves to provide a functionally and structurally improved safety shoe.

Safety shoes in common use today are provided with metallic safety toes which afford protection only to the toe portion of the foot leaving the remainder of the foot substantially unprotected. It has been found that workmen sustain a number of injuries to the metatarsal and instep portions of the foot and attempts have been made to provide protection for those portions of the foot. The protectors heretofore available, however, have been inadequate for that purpose or they have been unduly cumbersome or they have interfered with the free movement of the foot.

It is a primary object of the invention to furnish a shoe which may be worn with comfort and which will protect the entire forward portion of the wearer's foot including the toe, metatarsal and instep portions but which will not in any manner impede the movements of the user.

A further object is that of furnishing a shoe which may be worn with comfort and which may be constructed with relative economy to furnish a unit capable of being used for long periods of time and during those periods serving to adequately protect the foot which it is covering.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating one practical embodiment of the invention and in which:

Fig. 1 is a perspective view of the outer side of a shoe with the instep protector in opened position;

Fig. 2 is a perspective view of the assembly taken from the inner side of the shoe and with the instep protector in applied position;

Fig. 3 is a side elevation of the shoe and showing the position which the parts assume when the sole of the latter is flexed;

Fig. 4 is a sectional side view of the assembly in its normal position;

Fig. 5 is a transverse sectional view taken along the line 5—5 in the direction of the arrows as indicated in Fig. 4; and

Fig. 6 is a bottom perspective view of the assembly of the instep protector or guard with the components of the same shown partially separated and in section.

In the drawings, I have shown one form of shoe to which my invention is applicable but it should be understood that the specific construction may be varied. The numeral **10** indicates generally the upper of the shoe which is provided with an outsole **11** above which is disposed a welt **12**. A filler **13** is arranged above the outsole and in turn supports an insole **14**. A lining **15** is also preferably provided as part of the shoe. A series of lock stiches **16** secures the welt to the outsole and a row of lock stiches **17** serves to unite the insole, upper, lining and welt of the shoe. Heel **18** is secured to the sole in the usual manner.

The upper **10** is formed with an opening in its forward face and in line with the same a tongue **19** is provided. Adjacent the edge zones defining this opening, the shoe is furnished with two series of apertures **20** through which the laces (not shown) may be threaded for the purpose of constricting the shoe around the wearer's foot and ankle. A suitable counter **21** is included in the quarter portion of the shoe. The foregoing is illustrative of one group of components and structures which may be embraced in the shoe. It is apparent that with a different design of shoe, a different construction might be present. Therefore, this portion of the illustration and description is to be construed in an illustrative rather than a limiting sense.

The toe of the shoe includes a toe protector in the form of cap **22** preferably made of metal or similar strong relatively rigid material. The covering layer **23** of the shoe extends over this cap and thence rearwardly of the same.

The metatarsal portion of the shoe includes a metatarsal protector in the form of an arch **24** preferably made of metal and preferably covered with a layer of leather **25** suitably secured in place as by an adhesive and by stitching along the trailing edge thereof. Both the toe protector and the metatarsal protector are supported by the base portion or the sole assembly of the shoe which may consist of an outsole alone, or an outsole and insole or of an outsole and/or an insole and a welt. The illustrated shoe is of Goodyear welt construction and accordingly the toe protector and the opposite sides of the metatarsal protector rest on the welt of the shoe. If desired, the metatarsal protector may be incorporated in the shoe upper but it is preferably disposed outside thereof bridging over the metatarsal portion. The forward edge of the metatarsal protector overlaps the trailing edge of the toe protector and may have limited shift movement with respect thereto to permit flexing of the shoe as shown in Fig. 3. The metatarsal protector is provided with a pair of rearwardly projecting guards on the two sides of the shoe upper so as to provide protection to the foot through these areas. The metal guards **26** are integral portions of the arch-shaped plate **24** and they curve upwardly in a rearward direction as shown at **27** in Figs. 3 and 4 and are spaced above the sole so as to permit the sole to readily flex as shown in Fig. 3.

I also provide an instep protector over the instep portion of the shoe and this preferably takes the form of a flap **28** having a protector plate **29** incorporated therein. The protector plate is transversely concave and longitudinally convex on its undersurface so as to conform to the shape of the instep portion of the foot. The flap preferably has a layer of insulating and padding material **30** on its undersurface which may be made of foam rubber, plastic or the like. A lining layer **31** encases the undersurface of the flap and a suitable layer of leather is secured over the outer surface. The flap is hingedly secured in place to the inner side of the shoe along one of its side edges by suitable fastenings such as rivets or stitching **32** and the opposite edge of the flap has a releasable fastening connection with the outer side of the shoe. This may take the form of a buckle **34** secured to the shoe upper and a strap **33** secured to the instep protector flap and engageable with the buckle. The forward edge of the instep protector overlaps the trailing edge of the metatarsal protector and has limited movement with respect thereto so as to permit ready flexing of the shoe.

In using the shoe the instep protector flap is open to permit insertion of the foot and thereafter the shoe is laced in the usual manner and the flap is closed. The foot will be protected throughout the toe, metatarsal and instep portions. Any blow or force applied to the toe

or metatarsal portions will be transmitted directly to the sole assembly or base portion of the shoe due to the fact that these protectors are supported directly thereby. In addition, any blow to the metatarsal portion will be in part transmitted to the toe protector due to the overlapping arrangement of the metatarsal and toe protectors, thereby insuring a wider distribution of the stresses. Any blow delivered to the instep portion of the shoe will be distributed over a wider area by the instep protector flap and also will be transmitted to the metatarsal protector and thence to the sole due to the overlapping arrangement of the parts. The foot protectors incorporated in the shoe will not interfere in any way with flexing of the shoe or with walking since the metatarsal protector has limited shift movement with respect to the toe protector and the instep protector has limited shift movement with respect to the metatarsal protector due to the overlapping arrangement of the parts. While the metatarsal protector has the rearwardly extending guard portions to afford protection to the sides of the foot, these guards likewise will not interfere with the flexing of the shoe due to the fact that they curve upwardly in a rearward direction and are spaced upwardly from the sole. The provision of the yielding padding 30 under the instep protector assures comfort to the wearer and prevents the instep protector from exerting a binding action on the foot of the wearer.

It should be understood that various changes may be made in the illustrated and described embodiment of the invention without departing from the invention as set forth in the accompanying claims. Thus, as an example, I have illustrated my invention as applied to a Goodyear welt type of shoe but it may also be applied to shoes of different construction such as a McKay type or a stitchdown type of shoe.

I claim:

1. A safety shoe comprising: a base or sole assembly; an upper secured to the base and having a toe portion, a metatarsal portion and an instep portion; a toe protector in the form of a relatively rigid cap located at the toe portion of the upper and permanently secured therein and supported directly on the base; a metatarsal protector in the form of a relatively rigid arch extending across the metatarsal portion of the upper and permanently secured to the shoe with opposite side portions resting on and supported by the base and with its forward edge overlapping the trailing edge of the toe protector but being free from direct connection to the toe protector; and an instep protector in the form of a relatively stiff member curved to conform to the shape of the instep disposed at the instep portion with its forward edge overlapping the trailing edge of the metatarsal protector, the overlapping portion of the metatarsal protector being shiftable relative to the toe protector and the overlapping portion of the instep protector being shiftable relative to the metatarsal protector to permit flexing of the shoe.

2. A safety shoe as set forth in claim 1 in which the metatarsal protector is disposed outside of the upper and bridged over the metatarsal portion thereof.

3. A safety shoe as set forth in claim 1 in which the metatarsal protector has a rearwardly extending guard at the side of the shoe which is curved upwardly in a rearward direction and is spaced from the base or sole assembly so that the base may flex with respect thereto.

4. A safety shoe as set forth in claim 1 in which the metatarsal protector has rearwardly extending guards at both sides of the shoe which are curved upwardly in a rearward direction and are spaced from the base or sole assembly so that the base may flex with respect thereto.

5. A safety shoe set forth in claim 1 in which the metatarsal protector is made of an arch-shaped metal plate covered with leather and is disposed outside of the upper bridging over the metatarsal portion thereof.

6. A safety shoe as set forth in claim 1 in which the instep protector is in the form of a flap extending over the instep portion of the upper and is provided with fastening means for hingedly attaching one edge to the upper at one side of the instep portion and releasable means for attaching the other edge to the upper at the opposite side of the instep portion.

7. A safety shoe as set forth in claim 1 in which the instep protector is in the form of a flap having a metal plate therein which is transversely concave and longitudinally convex on its undersurface and is provided with a padding over the undersurface thereof.

8. A safety shoe comprising: a base or sole assembly; an upper secured to the base and having a toe portion, a metatarsal portion and an instep portion; a toe protector in the form of a relatively rigid cap located at the toe portion of the upper and permanently secured therein and supported on the base; a metatarsal protector in the form of a relatively rigid arch extending across the metatarsal portion of the upper and permanently secured to the shoe with opposite side portions resting on and supported by the base and with its forward edge overlapping the trailing edge of the toe protector but being free from direct connection to the toe protector; and an instep protector in the form of a relatively stiff member curved to conform to the shape of the instep and disposed at the instep portion of the shoe with its forward edge engaging the metatarsal protector, the instep protector being in the form of a flap hingedly attached adjacent one edge to a portion of the shoe and having releasable means adjacent its opposite edge for attaching it to another portion of the shoe and at least one transverse edge portion of said metatarsal and instep protectors being shiftable with respect to adjacent portions of the shoe to permit flexing of the shoe.

9. A safety shoe comprising a base or sole assembly having a peripheral flange portion extending around the marginal edges of the shoe; an upper secured to the base; and a foot protector including a relatively rigid arch portion extending across the metatarsal portion of the shoe with its opposite side edges resting on and permanently secured to the base, said foot protector including a guard portion integral with the arch portion and projecting rearwardly at one side of the upper adjacent the metatarsal portion thereof and being curved upwardly from the flange portion of the base in a rearward direction so as to be spaced progressively above the flange portion of the base so that the shoe can be flexed without interference between the flange portion of the base and the guard portion of the foot protector.

10. A safety shoe comprising a base or sole assembly having a peripheral flange portion extending around the marginal edges of the shoe; an upper secured to the base; and a foot protector including a relatively rigid arch portion extending across the metatarsal portion of the shoe with its opposite side edges resting on and permanently secured to the base, said foot protector including a pair of guard portions integral with the arch portion and projecting rearwardly at both sides of the upper adjacent the metatarsal portion thereof and being curved upwardly from the flange portion of the base in a rearward direction so as to be spaced progressively above the flange portion of the base so that the shoe can be flexed without interference between the flange portion of the base and the guard portions of the foot protector.

11. A safety shoe comprising: a base or sole assembly; an upper secured to the base and having a toe portion, a metatarsal portion and an instep portion; a toe protector in the form of a relatively rigid cap located at the toe portion of the upper and supported directly on the base; a metatarsal protector in the form of a relatively rigid arch extending across the metatarsal portion with opposite side portions supported on the base and with its forward edge overlapping the trailing edge of the toe protector; and an instep protector in the form of a relatively stiff flap curved to conform to the shape of the instep disposed at the instep portion with its forward

edge overlapping the trailing edge of the metatarsal protector, said flap being formed to extend over the instep portion of the upper and being hingedly attached adjacent one edge to the upper at one side of the instep portion and having releasable means adjacent its other edge for attaching it to the upper at the opposite side of the instep portion and the overlapping portion of the metatarsal protector being shiftable relative to the toe protector and the overlapping portion of the instep protector being shiftable relative to the metatarsal protector to permit flexing of the shoe.

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