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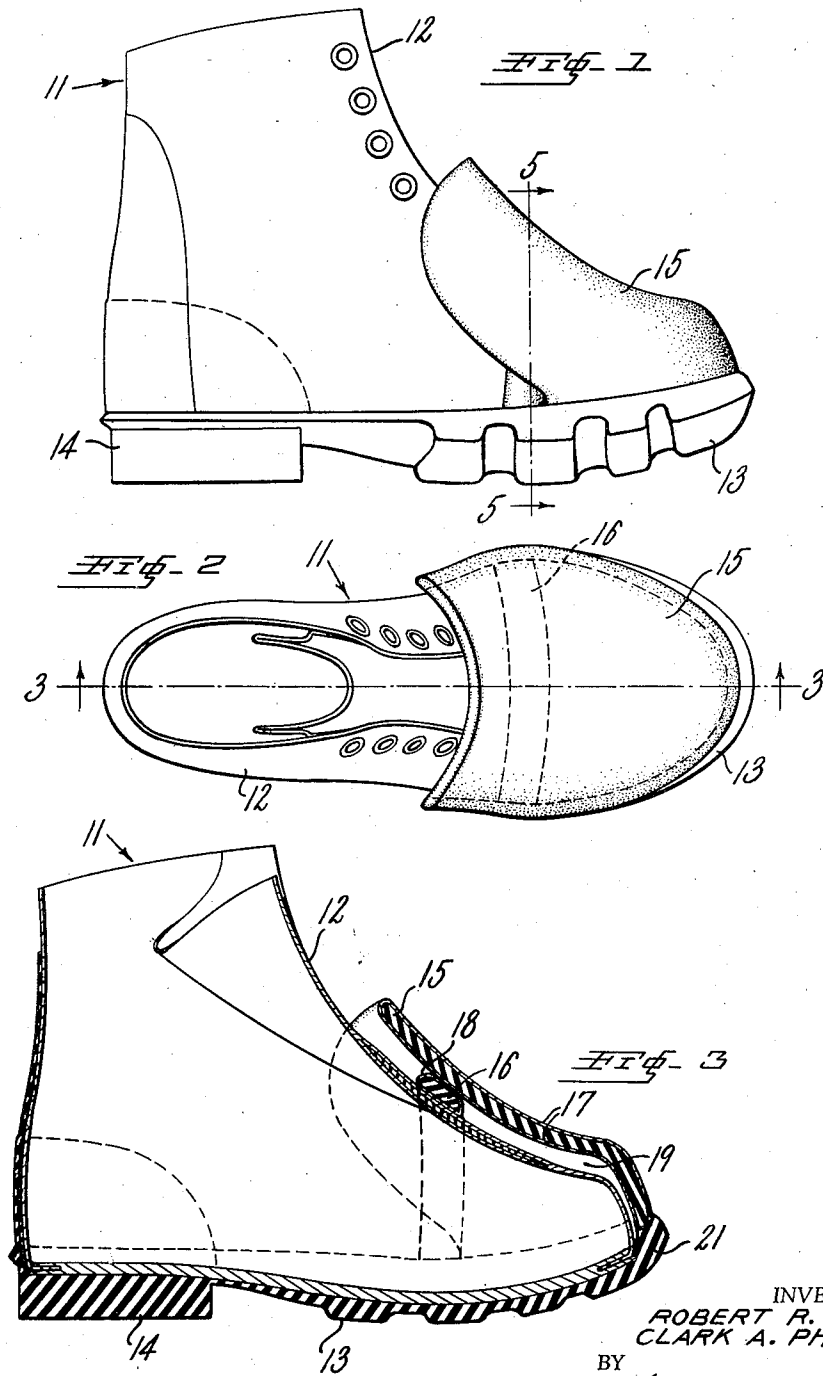
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SAFETY BOOT WITH METATARSAL ARCH PROTECTION

Filed Dec. 11, 1957

2 Sheets-Sheet 1



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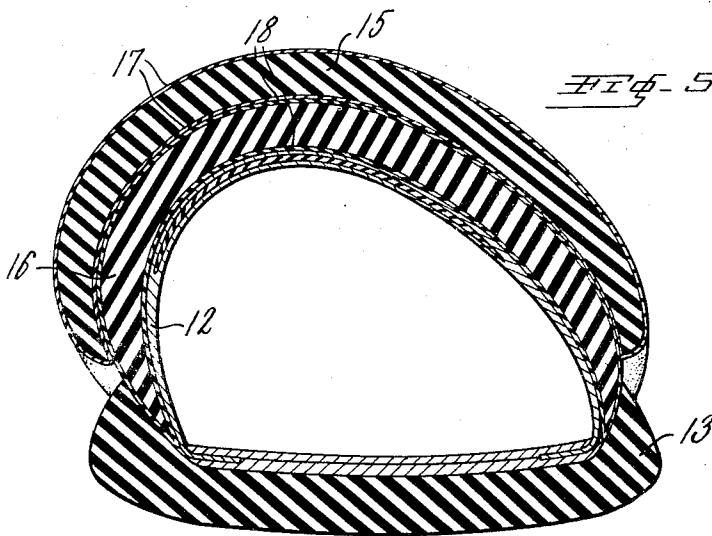
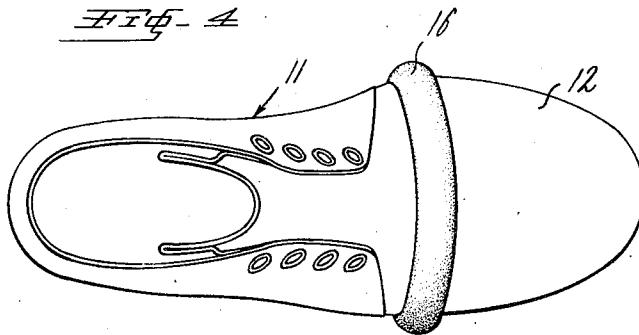
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SAFETY BOOT WITH METATARSAL ARCH PROTECTION

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7 Claims. (Cl. 36—4)

The present invention relates to safety boots and more particularly to such boots which are adapted to protect the instep and metatarsal arch as well as the toe of the wearer.

Safety boots with hard toes have been very beneficial in protecting the feet of men employed in heavy industry from accidental injury. However, serious injury to the metatarsal arch or instep is often suffered and is not prevented by the conventional hard-toe safety boot. Boots have been devised in which one or more rigid transverse ribs were arranged over the instep of the boot in an attempt to provide protection to the vulnerable instep portion of the wearer's foot. Such arrangements have not performed satisfactorily for a number of reasons among which are the fact that the space between the transverse ribs remains vulnerable to tools or other objects having corners or points such as a rock drill stand utilized in mining operations, for example.

It is obviously impractical to extend the conventional integral hard toe of a safety boot to cover the instep of metatarsal arch since the flexibility of the boot would be impaired to an unacceptable degree.

The present invention overcomes the disadvantages of previously known safety boots and provides protection for the instep or metatarsal arch without substantially impairing the flexibility of the boot and without causing the boot to be unduly large and cumbersome.

It is accordingly an object of the present invention to provide a safety boot having a shield extending over the toe and instep of the boot and supported in space relation from the upper of the boot.

It is another object of the present invention to provide a shielded boot of the foregoing type having an arcuate brace extending over the instep of the boot and supporting the shield of the boot.

It is still another object of the present invention to provide a safety boot having a shield of hard rubber or a like material which conforms generally to the shape of the toe portion of the boot but which is supported in spaced relation therefrom by an arcuate brace member extending over the instep of the boot.

It is a further object of the present invention to provide a hard rubber shield extending over and spaced from the toe of a safety boot, which shield is covered with a layer of soft rubber.

Other objects and advantages will be apparent from a consideration of the following description in conjunction with the appended drawings, in which:

Fig. 1 is a side elevational view of a safety boot constructed according to the present invention;

Fig. 2 is a top plan view of the boot of Fig. 1;

Fig. 3 is a vertical sectional view of the boot of Figs. 1 and 2 taken along the line 3—3 in Fig. 2;

Fig. 4 is a top plan view of the boot of Figs. 1 through 3 with the shield portion of the boot removed to show the arrangement of the brace;

Fig. 5 is a vertical sectional view of the boot of Figs. 1 through 3 taken along the line 5—5 in Fig. 1.

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Referring to the drawings, Fig. 1 shows a safety boot 11 having an upper portion 12 and a sole 13. The upper 12 and the sole 13 shown illustratively in Fig. 1 are formed separately and bounded together to form a boot.

In some instances the boot might be integrally formed and in any case the particular design of the boot apart from the protective shield does not form an essential part of the present invention. Protective shields according to the present invention may be applied to various types of boots.

A heel 14 may be provided for the boot 11 and may either be attached to the sole 13 or formed integrally therewith. In the particular preferred embodiment of the invention illustrated in the drawings, the boot upper 12 is formed of rubberized fabric while the sole 13 and heel 14 are formed of solid rubber. It will be appreciated that the term "rubber" is intended in the present specification and claims to include both natural and synthetic rubber or any other material having similar properties.

The rubber sole 13 of the boot 11 is preferably designed to provide substantial flexibility of the sole of the boot. The sole should preferably be made with a large degree of toe spring on the order of 1½" or more. It should be appreciated that although materials for the construction of the boot upper 12, sole 13 and heel 14 have been specified by way of illustration, leather, synthetics or other materials might alternatively be used.

At the toe of the safety boot 11 there is affixed a shield 15 which has a shape generally similar to the toe portion of the boot. Across the instep of the safety boot 11 there is provided a brace 16. The brace 16 serves to protect the metatarsal arch and instep of the wearer's foot and to support the shield 15.

Both the shield 15 and the brace 16 may be formed of any material having a substantial amount of rigidity. A particularly suitable material for this purpose is hard rubber or semi-ebonite. A suitable composition has been found to be as follows:

	Percent
Natural rubber -----	32.0
Carbon black -----	6.8
Calcium carbonate -----	11.0
Clay -----	26.0
45 Accelerators -----	1.2
Retarder -----	1.0
Sulphur -----	6.0
Softener -----	7.0
Zinc oxide -----	7.0
50 Magnesium oxide -----	2.0

The ease of manufacture and the utility of the boot may be enhanced by providing a layer of soft rubber 17 over the shield 15 and a similar layer 18 over the brace 16. If the boot upper 12 is then constructed of rubberized fabric, the various parts of the completed safety boot may be bounded together by utilizing one of many well known rubber-to-rubber bonding methods. The rubber covered semi-ebonite shield 15 together with the rubber covered semi-ebonite brace 16 are well adapted to absorbing heavy blows without allowing injury to the foot of the person wearing the boots. The semi-ebonite has a high degree of rigidity and the soft rubber contributes to the impact absorption capabilities of the shield 15. It will also be noted that the saddle like shape of the shield 15 provides a structure of greater rigidity than a structure which is flat or which is curved in only one direction.

The hard rubber shield is desirable because it is readily formable into a saddle shape such as that illustrated and is also preferable in that once its ultimate strength has been exceeded, it shatters rather than tearing or bending.

A metal shield, for example, which might tear on impact, could cause an aggravation of injury to the wearer of a safety boot having such a shield due to cuts which might be suffered from ragged edges of the torn metal shield.

In Fig. 3 it will be noted that the shield 15 is supported in spaced relation to the boot upper 12 leaving a space 19 between the shield 15 and the upper 12. The separation of the shield 15 from the boot upper 12 may be preserved by securing the shield 15 to an extended edge 21 of the boot sole 13. The safety boot 11 is therefore substantially as comfortable with the addition of the shield 15 as it would be without the shield except for a slight additional weight. The brace 18 as shown in Fig. 5 is shaped to conform to the cross-section of the wearer's foot and furthermore is placed across the instep of the foot where it does not substantially restrict freedom of movement.

The brace also prevents dirt or debris from accumulating between the toe of the boot and the shield 15, and thus preserves the flexibility of the toe of the upper and avoids the necessity of cleaning out the space 19.

From the foregoing description and explanation it will be seen that a safety boot is provided which furnishes protection for both the toe and the instep of the wearer's foot, and is exceptionally well suited to mining and other heavy industrial operations. Many variations and modifications could be made to the particular embodiment of the invention shown by way of illustration, all without exceeding the scope of the present invention. The scope of the present invention is accordingly not to be construed to be limited by the particular embodiment shown and described but is rather to be limited solely by the appended claims.

Having thus described our invention, what we claim and desire to protect by Letters Patent is:

1. A safety boot comprising a sole, an upper and a rigid member forming a shield extending upward over the toe and instep of said boot, said member being formed in a shape generally similar to the shape of the toe portion of said boot, an arcuate brace extending over the instep of said boot for supporting said shield in spaced relation to said upper, and the lower ends of said brace being attached to the sole of said boot at about the ball portion thereof.

2. A safety boot comprising a sole, an upper and a saddle shaped member attached to said sole and forming a shield extending upward over the toe and instep of said boot to a point about one inch higher than the ankle joint portion of said boot, an arcuated brace extending over the instep of said boot for supporting said shield in spaced relation to said upper, and the lower ends of said brace being attached to the sole of said boot at about the ball portion thereof.

3. A safety boot comprising a sole, an upper, a rigid member forming a shield extending upward over the toe and instep of said boot, said member being formed in a shape generally similar to the shape of the toe portion of said boot but located in spaced relation thereto, and an arcuate brace attached to the sole of said boot at about the ball portion thereof and extending over the instep of said boot, said brace being affixed to said shield

member thereby supporting and lending strength to said member.

4. A safety boot comprising a sole, an upper attached to said sole, a rigid member bonded to the toe of said sole and forming a shield extending upward over the toe and instep of said boot, said member being formed in a shape generally similar to the shape of the toe portion of said boot but located in spaced relation thereto, and an arcuate brace attached to the sole of said boot at about the ball portion thereof and extending over the instep of said boot, said brace being bonded to the under-surface of said shield member thereby supporting and lending strength to said member.

5. A safety boot comprising a sole, an upper attached to said sole, a rigid member bonded to the toe of said sole and forming a shield extending upward over the toe and instep of said boot to a point about one inch higher than the ankle joint portion of said boot, said member being formed in a shape generally similar to the shape of the toe portion of said boot but in spaced relation thereto, and an arcuate brace attached to the sole of said boot at about the ball portion thereof and extending over the instep of said boot, said brace being affixed under said shield member thereby supporting and lending strength to said member.

6. A safety boot comprising a rubber sole, a rubber covered upper attached to said sole, a hard rubber member having a soft rubber cover, said member being bonded to the toe of said sole and forming a shield extending upward over the toe and instep of said boot, said member being formed in a shape generally similar to the shape of the toe portion of said boot but in spaced relation thereto, and an arcuate hard rubber brace having a soft rubber cover, said brace being bonded to and extending over the instep of said boot, said brace further being bonded to the under surface of said shield member thereby supporting and lending strength to said member.

7. A safety boot comprising a rubber sole, a rubber covered upper attached to said sole, a hard rubber member having a soft rubber cover, said member being attached at the toe of said sole and forming a shield extending upward over the toe and instep of said boot to a point about one inch higher than the ankle joint portion of said boot, said member being formed in a shape generally similar to the shape of the toe portion of said boot but supported in spaced relation therefrom and an arcuate hard rubber brace having a soft rubber cover and attached to the sole of said boot at about the ball portion thereof and extending over the instep of said boot, said brace being bonded to the under-surface of said shield member thereby supporting and lending strength to said member.

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