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FOOTWEAR INCORPORATING A SHIN PROTECTION DEVICE

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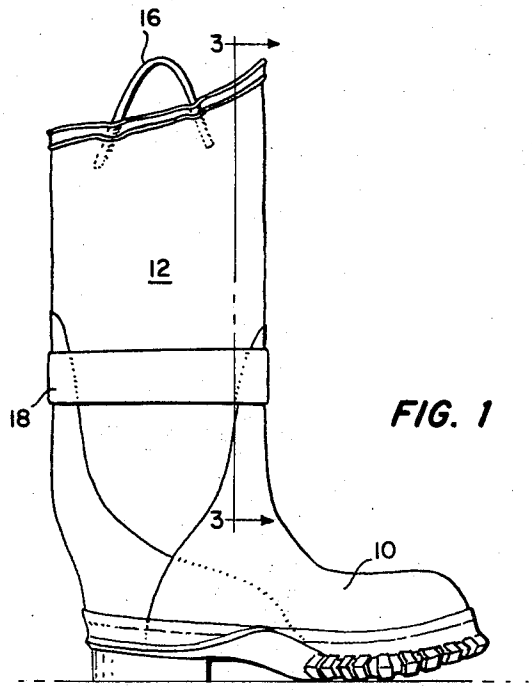


FIG. 1

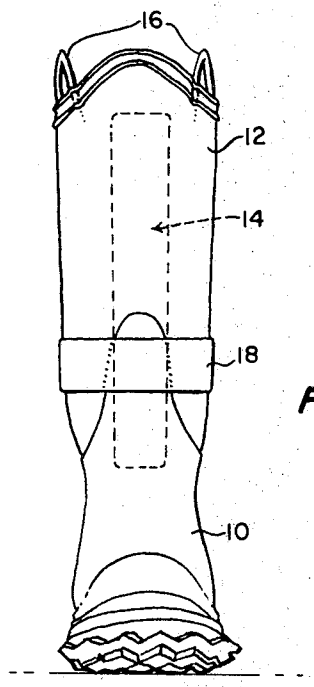


FIG. 2

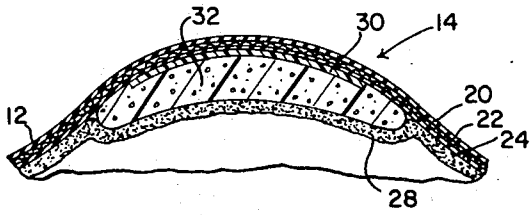


FIG. 4

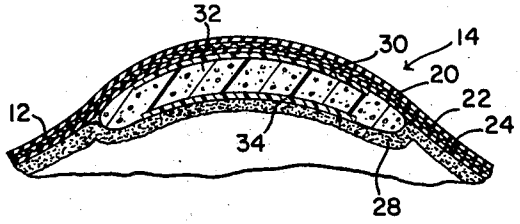


FIG. 5

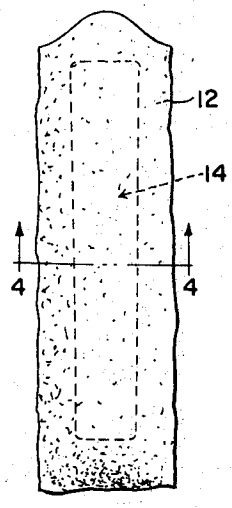


FIG. 3

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FOOTWEAR INCORPORATING A SHIN PROTECTION DEVICE

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U.S. Cl. 36—2.5 5 Claims

ABSTRACT OF THE DISCLOSURE

A fireman's boot including a built-in shin protection device comprising a firm barrier material layer to distribute shocks over a wider area of the shin and resist penetration from sharp objects and a resilient cushioning material layer to absorb the distributed shock and thereby insulate the shin from any external shock.

BACKGROUND OF THE INVENTION

This invention relates generally to improved footwear and more particularly to a boot especially useful by a fireman and including a built-in shin protection device.

In the past, various type protective devices for the lower limbs of a fireman have been developed and used with some degree of success. Steel arches have been employed to protect the toes. Metatarsal protectors constructed from steel plates, hard rubber, or impregnated nylon cloth have either been built-in or attached externally to the boots.

Safety insoles to protect the bottom of the foot and safety shanks to distribute the body weight and protect the arch of the foot have also been proposed.

Protective devices for the leg areas have consisted of specially designed penetration resistant nylon linings incorporated into the boots and removable exterior spats generally constructed of metal and adapted to be positioned around the leg. Such protective devices however have been extremely bulky and excessively heavy. Hence, in most instances they are unacceptable for usage since firemen cannot take the time required to attach externally applied devices and cannot tolerate bulky parts, as these are uncomfortable and dangerous to them particularly when climbing ladders.

As a result of the inadequacies of the prior known leg protection devices, the highly susceptible shin areas of a fireman have been subjected to injurious bumps or bruises caused by the legs striking a stationary object or being struck by a moving object, or by a leg pressing against a ladder rung while the fireman is stabilizing himself on the ladder. In addition, the shins very often have been scraped as they slide vertically against a ladder rung, for example, when the fireman's foot or toe slips off the rung on which it is resting.

Consequently, a need exists for a shin protection device which is compact, lightweight, and effective to absorb and widely distribute the shock due to bumps and impact and to resist penetration from sharp objects, thereby shielding the shin area from external shock and forces.

SUMMARY OF THE INVENTION

Accordingly, the primary object of the invention resides in the provision of a novel fireman's boot comprising a built-in shin protection device which is compact and lightweight and effective to shield the shin area from externally applied forces and shocks.

Another object resides in the provision of a novel fireman's boot including a built-in shin protection device comprising a layer of barrier material formed from a firm shock distributing and penetration resistant material and a layer of resilient cushion material positioned to absorb the widely distributed shock forces.

Still another object resides in the provision of a novel fireman's boot having a built-in shin protection device comprising a sandwich material construction inserted at the shin area, the sandwich construction having inner and outer layers of hard shock distributing and penetration resistant material and an intermediate layer of resilient cushioning material positioned between the inner and outer barrier layers. The inner and outer layers of hard barrier material function to distribute externally applied forces or shocks over a wider area of the shin thereby reducing the pressure on any unit area thereof, while the intermediate cushioning layer functions to absorb the distributed shock to thereby completely insulate or shield the shin area from the externally applied forces.

Further objects and advantages will become apparent from reading the following detailed description of the invention in conjunction with the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a fireman's boot incorporating the novel built-in shin protection device of the invention;

FIG. 2 is a front elevation of the boot of FIG. 1;

FIG. 3 is a fragmentary section view taken along line 3—3 of FIG. 1;

FIG. 4 is a section view taken along line 4—4 of FIG. 3 illustrating one embodiment of the novel shin protection device of the invention; and

FIG. 5 is a section view similar to that of FIG. 4, but illustrating a second preferred embodiment of the novel shin protection device of the invention.

DETAILED DESCRIPTION OF SEVERAL EMBODIMENTS

Referring now to FIGS. 1–3, the novel boot of the invention comprises a lower foot receiving portion **10** which may be of conventional construction and an upwardly extending leg covering portion **12**, the front part of which includes a built-in shin protection device **14** extending from adjacent the ankle area to just below the kneecap area. A pair of hand engageable straps **16** are secured to the top of the leg portion to assist a fireman in inserting his foot into the boot. A flame light reflecting band **18** encircles the leg portion **12** and provides a ready and effective safety means for indicating the location of a fireman when fighting a fire.

With reference to FIG. 4, the leg portion **12** comprises an outer vulcanized rubber layer **20**, a cloth layer **22**, an inner vulcanized rubber layer **24**, and an innermost leg covering felt layer **28**, all of which are suitably secured together to form an integral boot structure.

The shin protection device **14** is sandwiched between the inner rubber layer **24** and felt layer **28** and comprises an outer layer of firm barrier material **30**, preferably hard rubber, to distribute the shocks caused by impact of the front leg portion against external objects and to resist penetration of sharp objects. Hard rubber is preferable because it is more readily applied than an equivalent plastic in that unvulcanized hard rubber conforms to the last. However the invention is of sufficient scope to include a barrier **30** of hard plastic although the plastic may have to be heated to conform it to the last. An inner resilient cushioning material layer **32** is provided and is constructed from such materials as sponge rubber, soft solid elastomers, impregnated felt or other suitable material which will function to cushion and absorb the shocks distributed by the outer hard barrier layer **30**.

The shin protection device **14** thereby effectively insulates and shields the shin area from any external shock or forces by causing the hard barrier layer **30** to distribute

the shocks over a wider area of the shin and thereby reduce the pressure on any particular unit area, while the cushioning layer **32** absorbs the distributed shocks.

A preferred and most effective embodiment of the invention is illustrated in FIG. 5 and is, in most respects identical to that illustrated in FIG. 4, with like numerals indicating like elements. However, an additional inner barrier layer of hard rubber or equvalently functioning hard plastic material **34** is interposed between the resilient layer **32** and felt layer **28**. Hence, the hard barrier layers **30** and **34** cooperate to more widely distribute any forces caused by external impact, with this distributed load then being effectively absorbed by the cushion layer **32**. In addition, the combined but independently effective barrier layers **30** and **34** insure against penetration of sharp objects applied against the shin area with extremely high force, and if one is broken or destroyed the other remains active.

Where the barrier layers **30** and **34** are hard rubber and the cushion layer **32** is foam or sponge rubber or a suitable foam plastic these layers are integrally bonded by vulcanizing into an essentially permanent assembly.

In both embodiments of FIGS. 4 and 5, the shin protection device **14** provides a built-in, highly effective compact and lightweight safety shield for the shin areas in a fireman's boot without presenting any objectionable weight or maneuverability problems.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicted by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. Footwear, such as a fireman's boot, comprising a lower foot receiving portion and a tubular upper leg receiving portion having an outer moisture impervious elastomer layer, said leg receiving portion including an internal built-in shin protection device effective to distribute shock caused by an externally applied force and to absorb the distributed shock, thereby insulating or shielding the wearer's shin area from externally applied forces, said shin protection device being mounted inwardly of said moisture impervious layer and comprising a first barrier layer of hard material in backing relation to said outer moisture impervious layer and capable of distributing externally applied shocks over a wide area and resisting penetration from sharp objects, and a second appreciably softer layer of resilient material backing said barrier layer and functioning to cushion and absorb the widely distributed forces.

2. Footwear according to claim **1**, wherein said barrier layer is of hard rubber and said resilient material layer is of foam or sponge rubber vulcanized to said barrier layer.

3. Footwear according to claim **1**, said shin protection device also comprising a second barrier layer formed from hard shock distributing and penetration resisting material secured in backing relation to said shock absorbing and cushioning material.

4. Footwear according to claim **3**, wherein said barrier layers are relatively thin hard rubber elements vulcanized upon the front and rear sides of said cushioning material, which is made of sponge or foam rubber.

5. Footwear according to claim **1**, wherein the interior of said leg portion of the boot is lined with a felt layer extending over the inner side of said shin protection device.

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PATRICK D. LAWSON, Primary Examiner

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