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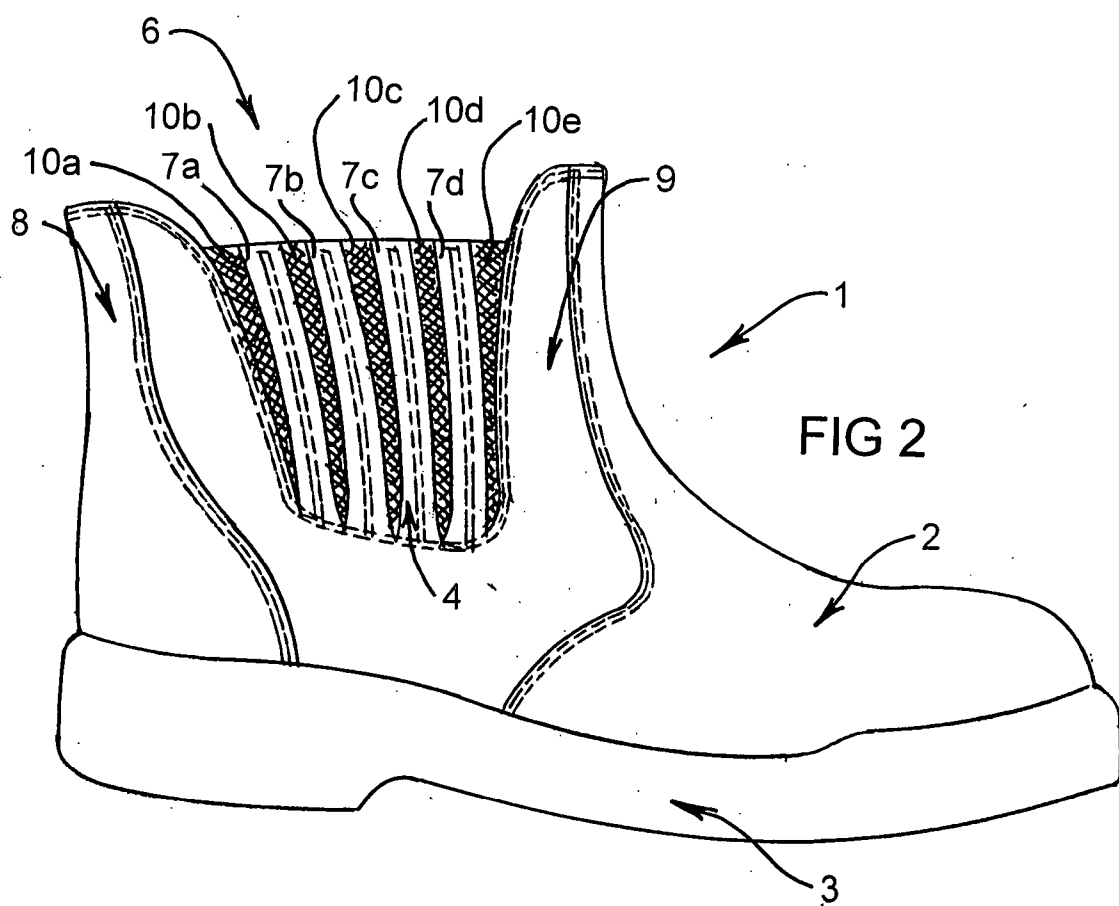
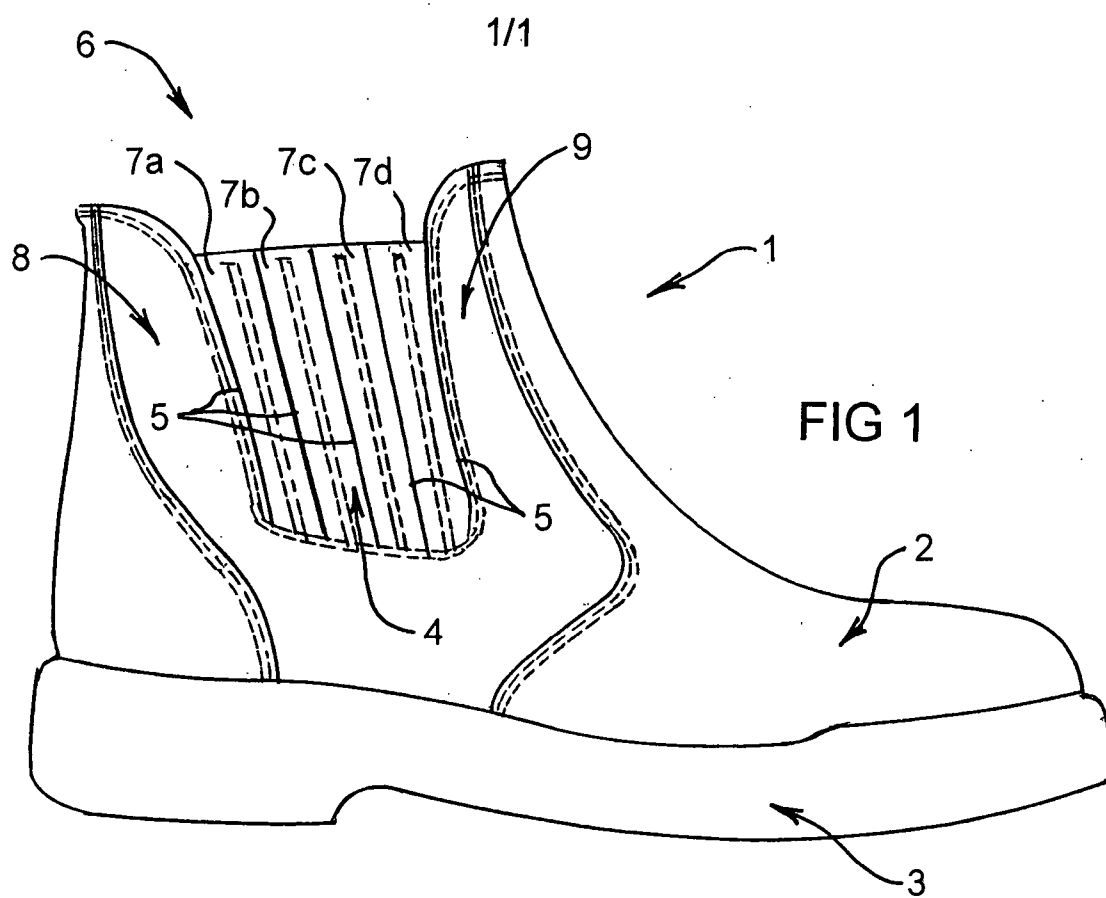
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ABSTRACT

A fire-resistant boot having a sole and an upper attached to the sole, the upper including an opening enabling the boot to be placed on a wearer's foot; wherein the upper includes fire-resistant elastic material which enables the opening of the boot to be expanded from a relaxed condition to a stretched condition to facilitate insertion of the wearer's foot through the opening.



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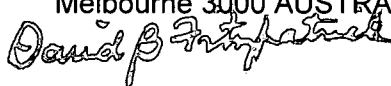
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Invention Title:

PROTECTIVE FOOTWEAR

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The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

PROTECTIVE FOOTWEAR

This invention relates to protective footwear suitable to be worn by fire-fighters or the like.

5

A variety of protective footwear is known. This has traditionally been of two types. One type is a lace-up heavy shoe or boot, which is laced at the front in the normal manner. The second type is a relatively high pull-on boot in the style of a gum boot or "Wellington" boot.

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Protective footwear traditionally worn by fire-fighters, such as lace up boots and gum boot style boots, suffers from certain disadvantages. Lace up boots, and other boots involving similar ancillary securing means such as buckles, require the manipulation of their respective securing means to enable the wearer's foot to be inserted into the boot and then to make the boot secure on the wearer's foot. Although this is normally a routine matter, it is a procedure which takes a certain amount of time, which may be of concern in emergency situations such as are on occasion faced by fire-fighters. Additionally, the tying of laces or manipulation of buckles can be difficult when the wearer is also wearing gloves, as is often the case for fire-fighters.

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Gum boot style boots also are not ideal footwear for fire-fighters as they can be difficult to fit to a wearer's foot due to the generally relatively long length. Such boots also tend to provide a relatively poor fit to the wearer.

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This invention provides an alternative to the traditional lace up or gum boot style of boot, being a boot suitable for wearing by a person exposed to high temperatures and/or fire, such as a fire-fighter.

30 **Summary of the Invention**

According to one aspect of the invention there is provided a fire-resistant boot having a sole and an upper attached to the sole, the upper including an opening enabling the boot to be placed on a wearer's foot; wherein the upper includes fire-resistant elastic material which enables the opening of the boot to be

expanded from a relaxed condition to a stretched condition to facilitate insertion of the wearer's foot through the opening.

5 According to a further aspect of the invention there is provided a fire-resistant boot having a sole and an upper attached to the sole, the upper including an opening enabling the boot to be placed on a wearer's foot; wherein the upper includes elastic material which enables the opening of the boot to be expanded from a relaxed condition to a stretched condition to facilitate insertion of the
10 wearer's foot through the opening and wherein the upper also includes a fire-resistant covering material which provides at least partial cover of the elastic material whilst the opening of the boot is in a relaxed condition, thereby protecting the covered portion of the elastic material from heat external to the boot.

15 One form of boot that is known is the "elastic-sided" boot. Such a boot usually has an elastic material insert at the top of each of two opposite sides of the boot. This elastic material enables the opening of the boot (through which a wearer's foot is inserted) to be stretched to facilitate the boot being placed onto, and removed from, the wearer's foot as appropriate. It also enables the boot to
20 be securely fitted to the wearer's foot without the need for laces, buckles or other ancillary securing means.

Although elastic-sided boots are known and have been used as protective boots in some applications, for example as safety boots with steel caps, they have not
25 previously been suitable for use by fire-fighters. This unsuitability arises because the elastic material used in such boots may burn or melt if exposed to or brought into contact with hot materials such as may be encountered in fire-fighting situations. The elastic material in conventional elastic-sided boots is located on both sides of the boot at an ankle height. The melting or burning of
30 that material when the boot is being worn presents an obvious danger to the wearer.

Typically, the fire-resistant boot of the invention will be in the general style of a conventional elastic-sided boot having a primarily leather upper and a rubber

sole. In this specification "upper" refers to that part of the boot above the sole and includes the vamp and quarters. Typically, the upper will be made up from a number of separate pieces of material stitched together in the normal manner. "Upper material" refers to material included in the upper.

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Provided the upper material and the material used for the sole otherwise meet practical requirements, including that of fire-resistance, they can be of any suitable material.

- 10 Preferably the upper of the fire-resistant boot of the invention will include elastic material on each side of the upper extending from the top of the upper (at the opening of the upper) to part way down the side of the boot. This elastic material enables the opening of the boot to be expanded to assist or facilitate the boot being placed on the foot of the wearer and avoids the need of laces,
- 15 buckles or other similar securing means to secure the boot onto the wearer's foot. Any arrangement which allows the boot to be expanded to facilitate the boot being placed on or removed from the foot of the wearer is suitable. For example, elastic material may be positioned at the back or front of the boot rather than at the sides.

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- In order for the boot to be suitable for use in fire-fighting situations it must be sufficiently fire-resistant. Throughout this specification and for the purposes of this invention "fire-resistant" means sufficiently fire-resistant to satisfy the standard for flame resistance set out in paragraph 4.5 of the Interim Australian/
- 25 New Zealand Standard AS/NZS 4821 (Int):2002 (Incorporating Amendment No.1).

- One way in which an elastic-sided boot can meet the required standard is to construct the boot from component materials, (including an elastic material) that
- 30 are sufficiently fire-resistant. An example of a suitably fire-resistant elastic material is Excalibur fireproof elastic, manufactured by Normac Trading Pty Ltd 28 Bellevue Crescent Preston Vic.

Preferably, the elastic material is, at least partially, protected by suitable covering material. The covering material may be any material that provides at least partial cover to the elastic material when the boot is being worn, whilst allowing the boot to be stretched to be placed on and removed from the wearer's foot. Preferably the covering material is relatively inelastic in comparison with the elastic material. An example of a preferred covering material is leather, although other fire-resistant material can be used. The covering material may be the same as or different from the material which comprises or constitutes other parts of the upper. The covering material may be integral with another part of the upper, or may be added to the upper. The covering material preferably covers a substantial part of the elastic material when the boot is being worn so as to provide cover and protection to the elastic material and to the wearer. However, the covering material is to be configured in such a way as to not prevent the elastic material from being stretched sufficiently far to allow the boot to be placed on a wearer's foot and removed as required.

In a preferred embodiment the boot has an upper, the external surface of which is primarily leather or some other suitably strong, fire-resistant material. At the two sides of the upper, a series of parallel cuts is made to the leather extending from the opening (top) of the boot down creating in turn a plurality of relatively narrow fingers of leather extending upwards towards the opening of the boot. An elastic material is provided behind (internal) to the leather fingers, secured in a manner which enables the elastic material to be stretched and the opening of the boot expanded as required for fitting and removal of the boot by the wearer. In such an embodiment the leather fingers provide cover to the elastic material. The leather fingers covering material is formed integrally with the leather of the upper, in the sense that it has been formed from cuts to the leather of the leather upper material rather than by adding a separate covering material. In alternative embodiments the covering material may be added separately to the upper rather than being formed integrally with the (other) upper material. In one such alternative the covering material may take the form of a flap which at least partly overlies the elastic material.

For a better understanding of the invention and to show how it may be performed, embodiments thereof will now be described, by way of non-limiting example only, with reference to the accompanying drawings.

5 Drawings

Figure 1 shows a side view of a boot of the invention (in relaxed condition).

Figure 2 shows a side view of a boot of the invention (in stretched condition).

Detailed Description

10 With reference to Figure 1 there is shown a boot (1) having a leather upper (2) and a rubber sole (3). The boot has two sides, only one of which is shown. The two sides of the boot are substantially identical. Within each side there is an expandable region (4). In the expandable region a series of approximately parallel cuts (5) have been made to the leather upper (2). Those cuts extend
15 from the top of the leather at the opening of the boot (6) down approximately one half to two thirds of the height of the boot. The cuts (5) create a plurality of fingers of leather (7a, 7b, 7c, 7d) which extend up the side of the boot to the opening of the boot (6).

20 Elastic material is attached to the leather upper material behind (internal to) the fingers of leather and extends past the back finger of leather (7a) to the back of the boot (8), to past the front finger of leather (7d) to the front of the boot (9). In the embodiment shown the elastic material is a single piece which extends from the back (8) of the boot to the front (9) of the boot and behind the fingers of
25 leather (7a, 7b, 7c, 7d). In this embodiment the fire-resistant covering material is attached to the outside facing surface of the elastic material by stitching. The elastic material is attached to the leather of the boot by stitching running around the edge of the expandable region and to the four leather fingers. Preferably the stitching is fire-resistant. The stitching securely attaches the elastic material
30 to the back (8) and front (9) of the boot and to each of the leather fingers (7a, 7b, 7c, 7d).

The stitching of the elastic material to each of the leather fingers is preferably in the form of a double row of stitching running the length of the respective finger.

However, as shown in Figs 1 and 2 the rows of stitching in this embodiment are not right at the (longitudinal) edges of the leather fingers but are positioned remote from the edges towards the midline of the fingers such that there is a distance between the rows of stitching and each side of the leather finger containing the stitching. This distance provides enough free elastic material between the rows of stitching on adjacent leather fingers to enable the elastic material to be stretched and the opening of the boot to be widened when the upper is stretched.

In order to assist the insertion of a wearer's foot into the boot, the boot is stretched to increase the size of the opening of the boot by pulling the front and back of the boot in opposite directions, in the normal manner. Fig 2 shows the boot of Fig 1 in a stretched condition. As can be seen in Fig 2, stretching of the boot in effect opens the fingers of leather at the top of the elastic region, thereby increasing the size of the opening of the boot. Fig 2 shows the elastic material (10a, 10b, 10c, 10d, 10e) between and behind the leather fingers (7a, 7b, 7c, 7d).

Upon release of the front (or back) of the boot, the elastic material contracts, causing the retraction of the opening of the boot back to its relaxed condition as shown in Fig 1, whereby the elastic material is covered by the leather fingers.

As shown in Fig 1, when the boot is in its relaxed condition the edges of the fingers of leather are closely aligned and the fingers in combination form a good cover to the elastic material behind. It is preferable that when the boot is in its relaxed condition the leather fingers and the front and back edges of the non-elastic parts of the upper are contiguous, in the sense that adjacent edges are either touching or in close proximity with each other. In such an arrangement the leather fingers provide a substantially complete cover to the elastic material whilst the boot is in its relaxed condition (as shown in Fig 1). However, acceptable fire-resistance may be able to be achieved with less than complete coverage.

5 This embodiment provides an effective cover to the elastic material when the boot is being worn. The fingers of leather close sufficiently far to provide an effective cover to the elastic material and protection against fire and heat. It further provides an improved physical barrier over the elastic material alone thereby conferring additional physical protection to the wearer.

10 The invention provides an alternative to previously known boots in the form of a securely fitting, fire-resistant boot which avoids separate securing means for the boot such as laces, buckles or the like.

15 The invention described herein is susceptible to variations, modifications and/or additions other than those specifically described and it is to be understood that the invention includes all such variations, modifications and/or additions which fall within the spirit and scope of the above description.

The claims defining the invention are as follows:

1. A fire-resistant boot having a sole and an upper attached to the sole, the upper including an opening enabling the boot to be placed on a wearer's foot; wherein the upper includes fire-resistant elastic material which enables the opening of the boot to be expanded from a relaxed condition to a stretched condition to facilitate insertion of the wearer's foot through the opening.
2. A fire-resistant boot according to claim 1 wherein the upper also includes fire-resistant covering material which provides at least partial cover of the elastic material whilst the opening of the boot is in a relaxed condition, thereby protecting the covered portion of the elastic material from heat external to the boot.
3. A fire-resistant boot having a sole and an upper attached to the sole, the upper including an opening enabling the boot to be placed on a wearer's foot; wherein the upper includes elastic material which enables the opening of the boot to be expanded from a relaxed condition to a stretched condition to facilitate insertion of the wearer's foot through the opening and wherein the upper also includes fire-resistant covering material which provides at least partial cover of the elastic material whilst the opening of the boot is in a relaxed condition, thereby protecting the covered portion of the elastic material from heat external to the boot.
4. A fire-resistant boot according to either one of claims 2 or 3 wherein the fire-resistant covering material includes material that is relatively inelastic by comparison to the elastic material.
5. A fire-resistant boot according to any one of claims 2 to 4 wherein the fire-resistant covering material includes leather.

6. A fire-resistant boot according to any one of the claims 2 to 5 wherein the fire-resistant covering material includes material integral with other upper material.
- 5 7. A fire-resistant boot according to any one of claims 2 to 6 wherein the fire-resistant covering material includes material not integral to other upper material.
- 10 8. A fire-resistant boot according to any one of claims 2 to 7 wherein the elastic material is provided by two elastic sections provided on opposite sides of the upper and each elastic section is at least partially covered by fire-resistant covering material.
- 15 9. A fire-resistant boot according to any one of claims 2 to 8 wherein the fire-resistant covering material includes a plurality of elongate strips positioned adjacent one another and extending substantially vertically.
- 20 10. A fire-resistant boot according to claim 9 wherein the fire-resistant covering material is attached to an outside facing surface of the elastic material by fire-resistant stitching.
- 25 11. A fire-resistant boot according to claim 10 wherein when the opening of the boot is in a relaxed condition edges of adjacent elongate strips are contiguous, and when the opening of the boot is expanded to a stretched condition the elongate strips separate from each other.
- 30 12. A fire-resistant boot according to any one of claims 9 to 11 wherein at least one of the elongate strips is attached to elastic material by stitching wherein the stitching is remote from the edges of the strips.
13. A fire-resistant boot according to claim 12 wherein the stitching runs substantially the length of the at least one of the strips.

14. A fire-resistant boot according to any one of claims 2 to 7 wherein the fire-resistant covering material includes a flap which at least partly overlies the elastic material.

5 15. A fire-resistant boot substantially as described herein with reference to the drawings.

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