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54 **Protective toe cap.**

57 A toe cap for safety footwear is moulded from fibre reinforced plastics material and incorporates a thickened forward part (12) which tapers gradually and merges smoothly with the main part of the toe cap. The rear edge (14) of the toe cap is further tapered. An integral flange (15) strengthens the lower edge of the toe cap.

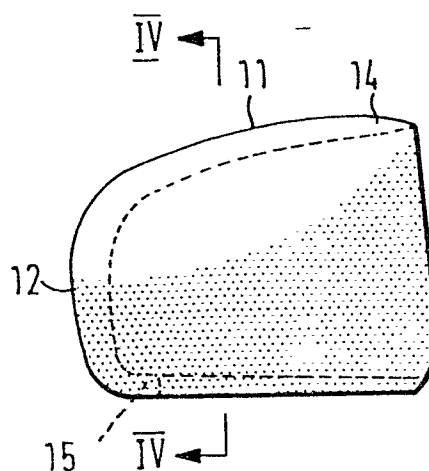


FIG. 1.

EP 0 021 612 A1

79.028/ABC

Protective Toe Cap

The invention relates to protective toe caps for use in footwear for protecting the toes of the wearer against injury.

Conventional protective footwear incorporates a pressed
5 steel toe cap which is built in to an article of footwear in
such a way that it is adapted to lie over the toes of the
wearer and extend down to the sole portion of the article of
footwear around the sides and the front of the toe area. The
toe cap then protects the toes of the wearer against being
10 crushed when the front portion of the footwear is subjected
to a heavy load or a hard blow. Protective footwear incor-
porating steel toe caps can be cumbersome and heavy and this
disadvantage is particularly relevant in the case of safety
footwear for ladies. It has already been proposed in U.K.
15 Patent Specification 1,284,736 to form a toe cap for pro-
tective footwear from a plastics material but to achieve a
useful degree of protection it was found necessary to provide
the toe cap with a thick solid body of plastics material
which was in use loaded purely in compression and so acted
20 more as a spacer between the load and the ground than as a
bridge protecting the toes. This known toe cap of plastics
material was also cumbersome because it required an increased
length to the article of footwear and it was of limited value
because it gave little or no protection against localised
25 loads applied immediately behind the protective block.

An object of the present invention is to provide an
improved toe cap moulded from plastics material.

According to the present invention there is provided a
protective toe cap for use in footwear for protecting the
30 toes of the wearer against injury, comprising a curved member
adapted to lie over the toes of the wearer and extend down to

a lower edge at the sole portion of the footwear around the sides and the front of the toe area of the foot, the member being moulded from fibre reinforced plastics material and having a thickened area around the lower front part thereof and the forward part of the sides thereof, the thickened portion tapering in an upward and rearward direction and merging smoothly with the main thinner part of the toe cap.

Preferably the rear edge of the toe cap tapers smoothly from the main part of the toe cap to facilitate merging of the rear edge of the toe cap with the upper of the article of footwear.

Preferably the lower edge is reinforced by an inwardly directed integrally moulded flange.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawing in which:

Figure 1 is a diagrammatic side elevation of a toe cap according to the invention

Figure 2 is a corresponding plan view of the toe cap.

Figure 3 is a longitudinal cross section of the toe cap on line III-III of Figure 2; and

Figure 4 is a transverse section on line IV-IV of Figure 2.

The drawing shows a toe cap with a generally curved shape for conforming to the toe part of a safety boot or safety shoe so that in use it would bridge the toes of the wearer and extend down to the sole of the shoe or boot in front of and to the side of the toes. The toe cap is in the form of a single continuous curve in three dimensions.

The toe cap is moulded from a high strength fibre reinforced plastics material and in a typical example, the fibre is glass fibre. The fibre is incorporated into the plastics material matrix in such a way as to form a composite which can be moulded without laying up individual layers of fibres.

The main area of the toe cap 11 is of substantially uniform thickness. The front part 12 of the toe cap and the forward part 13 of the sides of the toe cap are of increased thickness compared with the main area 11 and this increased thickness tapers gradually and merges smoothly with the main part 11 of substantially uniform thickness.

It has been found that this gradual merging and tapering of the thickness around the front end of the toe cap helps to strengthen the whole of the toe cap and thereby allows an acceptably thin main portion 12 to be used. It is essential to avoid excessive thickness in the main area 11 because this would adversely affect the appearance of the boot or shoe which may well be a fashion product as well as a safety product. The limited thickening and gradual taper of the front part of the footwear merely adds a requirement for a small increase in length and does not detract significantly from the appearance of the footwear.

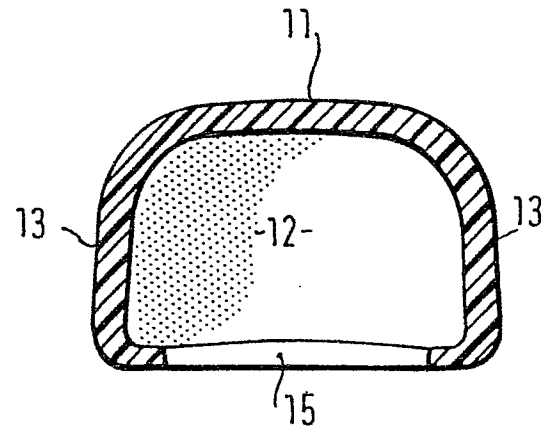
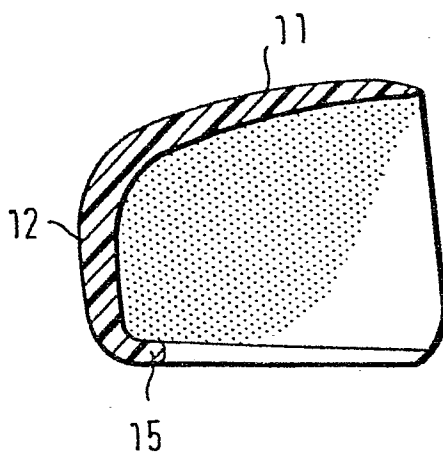
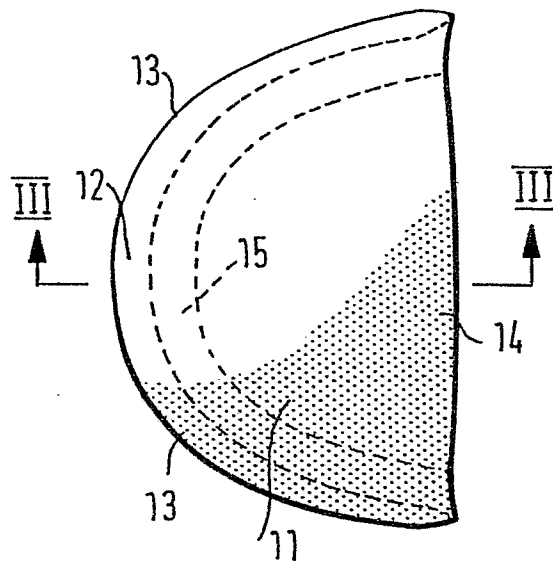
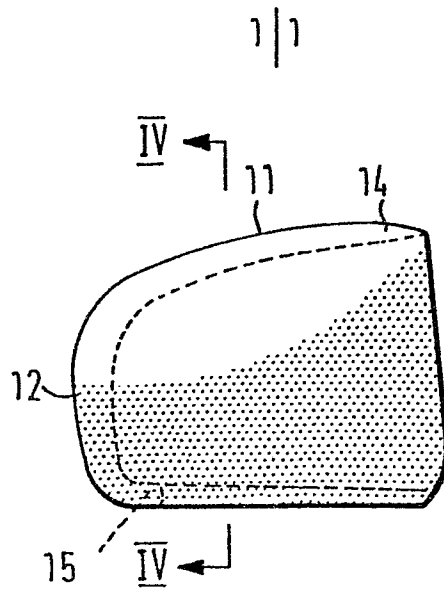
To provide further strengthening, the lower edge of the toe cap is provided with an inwardly directed integrally moulded flange 15.

A further feature which assists the appearance of the boot or shoe is that the rear edge portion 14 of the toe cap is tapered in thickness to facilitate merging of the toe cap with the remainder of the boot or shoe. The decreased thickness in this area does not significantly affect the strength of the toe cap as a whole and allows a slight

increase in the general thickness of the main area 11 without introducing an unsightly appearance.

CLAIMS

1. A protective toe cap for use in footwear for protecting the toes of the wearer against injury comprising a curved member adapted to lie over the toes of the wearer and extend down to a lower edge at the sole portion of the footwear around the sides and the front of the toe area of the foot, the member being moulded from fibre reinforced plastics material and having a thickened area around the lower front part thereof and the forward part of the sides thereof, the thickened portion tapering in an upward and rearward direction and merging smoothly with the main thinner part of the toe cap.
2. A protective toe cap as claimed in Claim 1 wherein the rear edge of the upper part of the toe cap tapers smoothly from the main part of the toe cap to facilitate merging of the rear edge of the toe cap with the upper of the article of footwear.
3. A protective toe cap as claimed in Claim 1 or Claim 2 wherein the lower edge is reinforced by an inwardly directed integrally moulded flange.





European Patent
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EUROPEAN SEARCH REPORT

Application number

EP 80 30 1743

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>US - A - 1 726 198</u> (E. STAHL) * Entirely * --	1,2,3	A 43 B 23/08 A 43 C 13/14 A 43 B 7/32
	<u>US - A - 2 151 554</u> (H. JOSEPHSON) * Entirely * --	1,2,3	
	<u>US - A - 2 747 303</u> (L. ABRAHAMS) * Entirely * --	1	TECHNICAL FIELDS SEARCHED (Int.Cl. 3)
	<u>GB - A - 1 220 846</u> (M. ELKINS) * Entirely * ----	1	A 43 B A 43 C
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	11-09-1980	DECLERCK	