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(56) Documents Cited:
GB 1539886 A **GB 1406735 A**
AU 003585184 A

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INT CL[7] **A43B**
Other: **EPODOC, WPI**

(54) Abstract Title: **One piece upper for an article of footwear**

(57) An article of footwear (10 fig.10) which comprises an assembly of an upper 11, an insole board (12), and an outsole (13), in which:
the upper 11 is a one-piece upper having;

(a) a metatarsal portion 14 to underly a region of the foot of the wearer intermediate the heel and toe region;
(b) adjacent side portions 15a,15b foldable relative to the metatarsal portion 14 to overly the toe and instep region of the foot of the wearer;
(c) a lace-up portion 16 provided in one of said side portions 15a;
(d) a line of stitching A,A1 to join together adjacent edges 18a,18b of the side portions 15a,15b;
(e) a line of stitching B,B1 to join together rear edges 18a,18b of the side portions 15a,15b to form a heel region of the article of footwear; and
(f) openings defined in the lower surface of the one-piece upper 11;
(g) an insole board (12) adhesively secured to the metatarsal portion 14 of the upper 11 and exposed through the openings formed in the lower surface of the upper (fig. 7);
(h) an outsole (13a,13b) adhesively secured to the exposed surfaces of the underside of the upper 11 and of the insole board 12 to complete the assembly of the article of footwear.

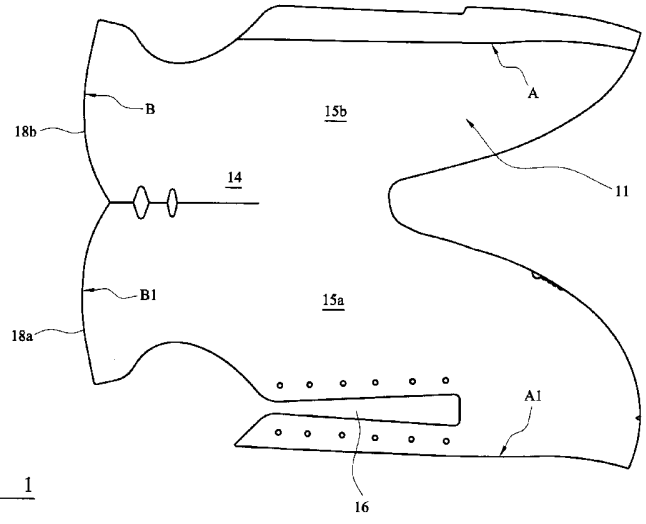


FIG. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.
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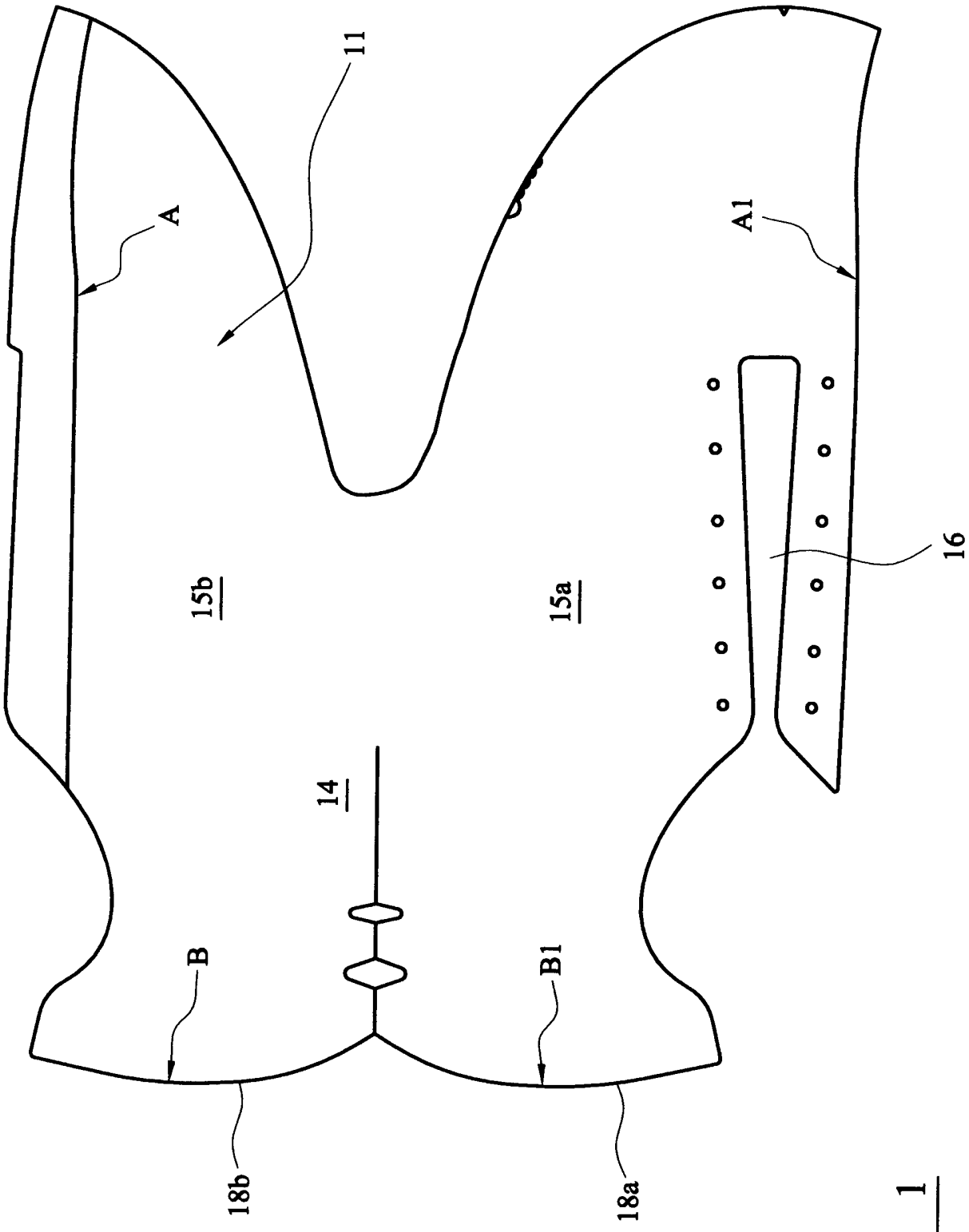


FIG. 1

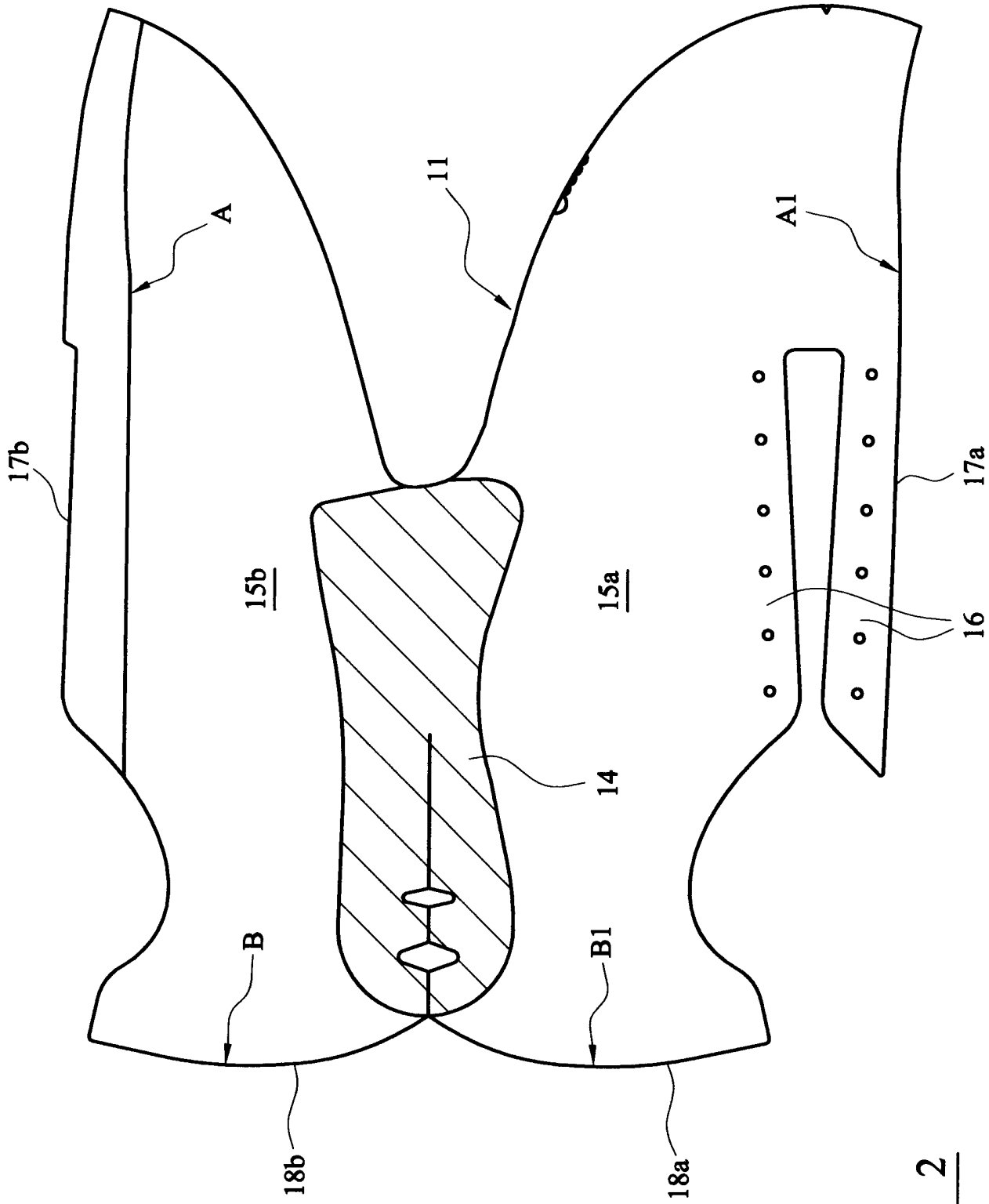


FIG. 2

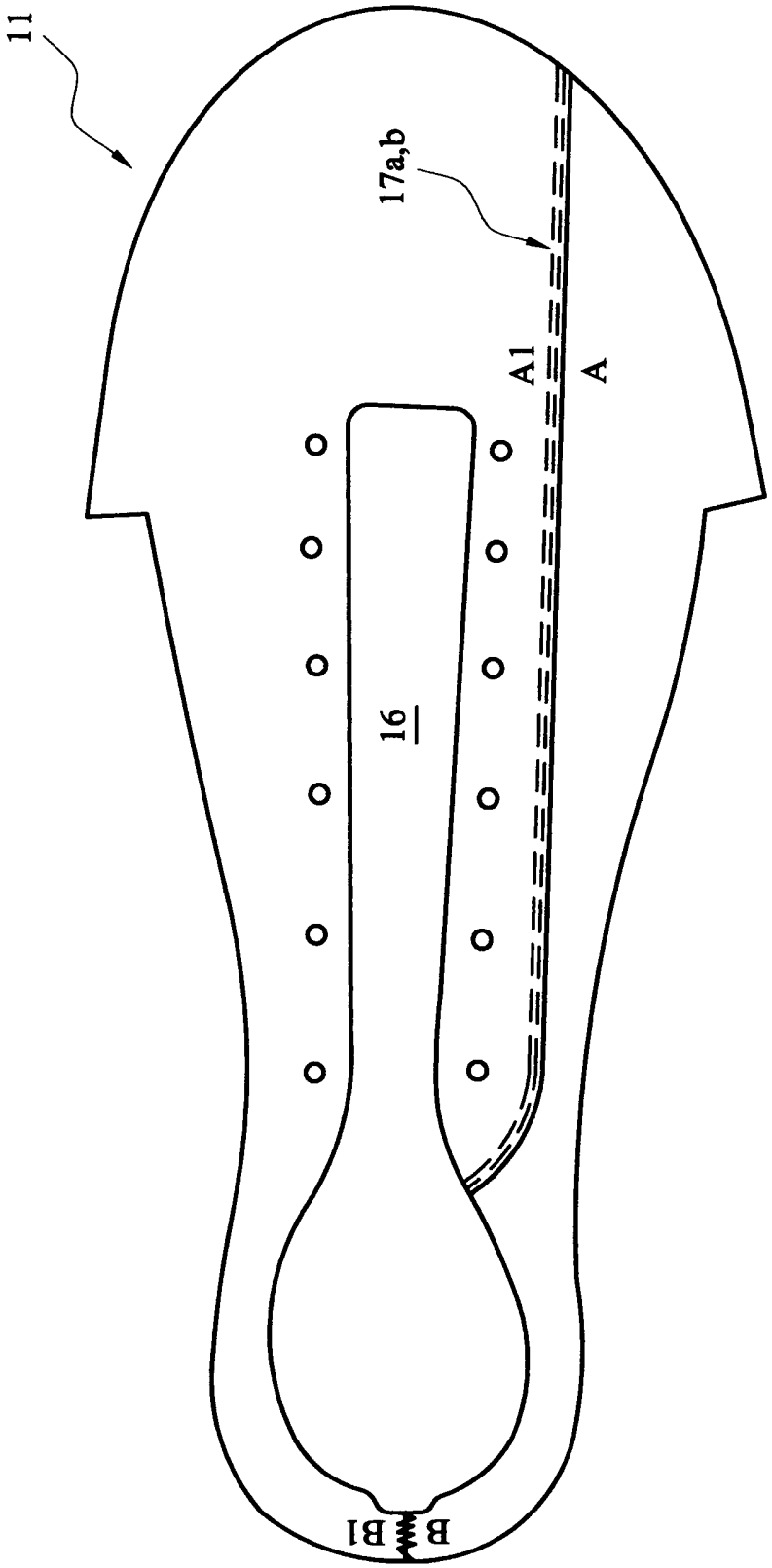


FIG. 3

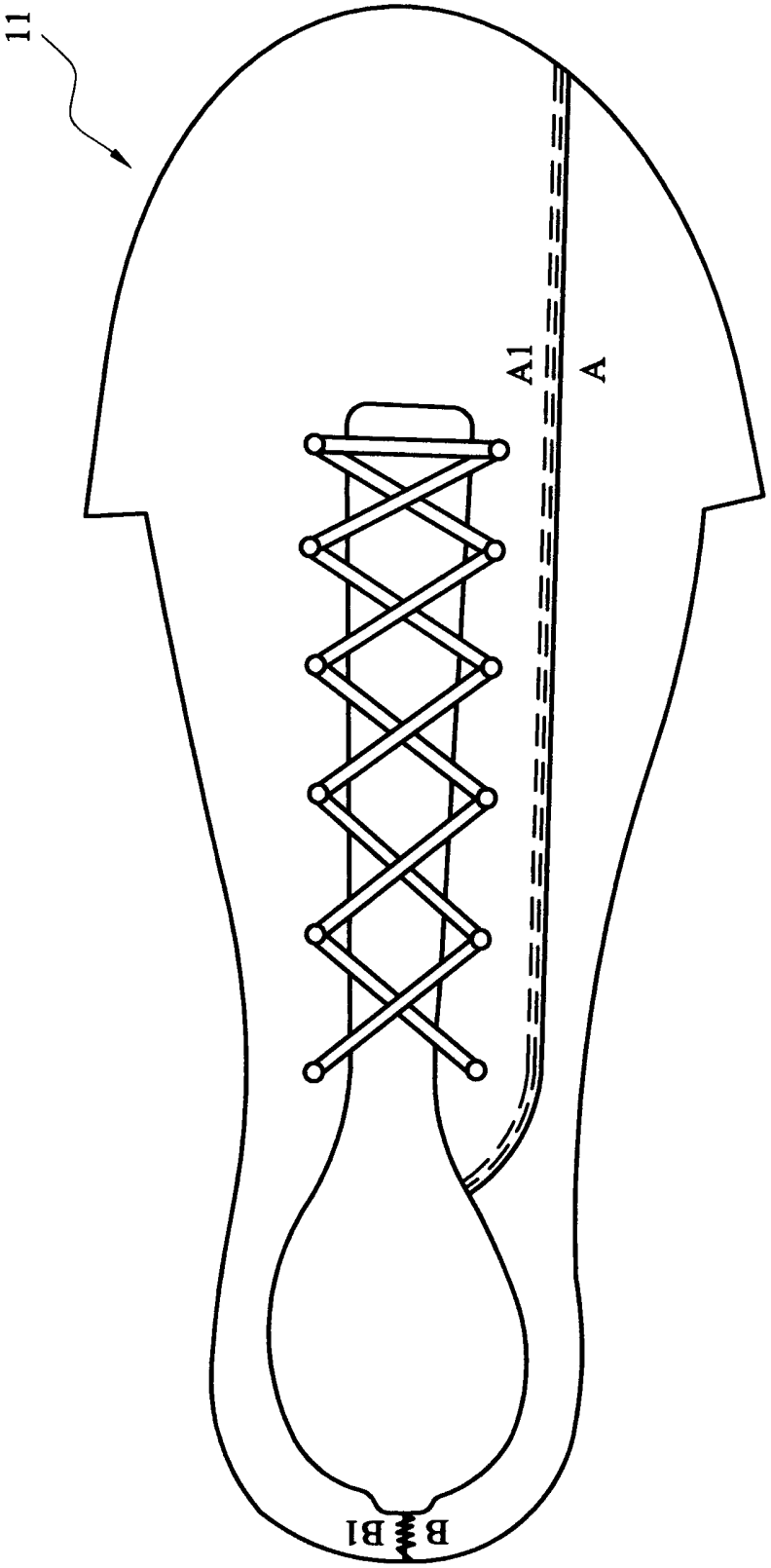


FIG. 4

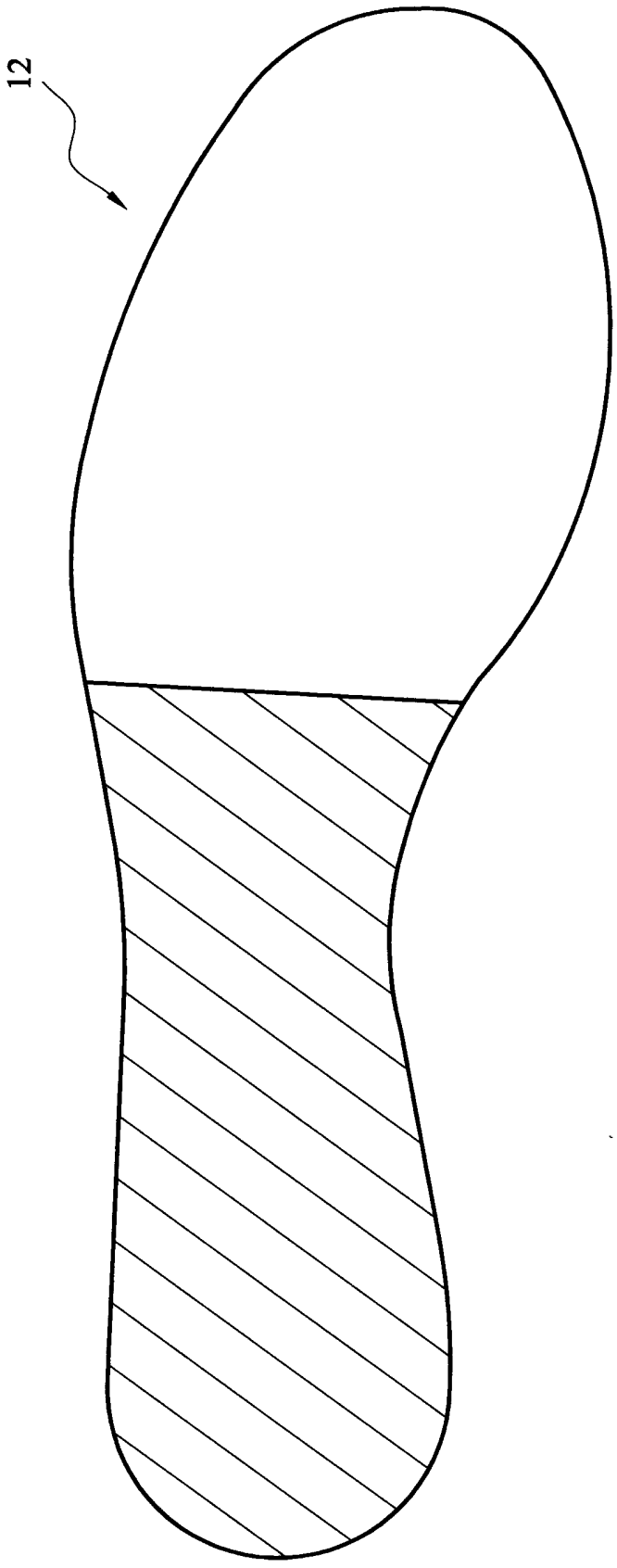


FIG. 5

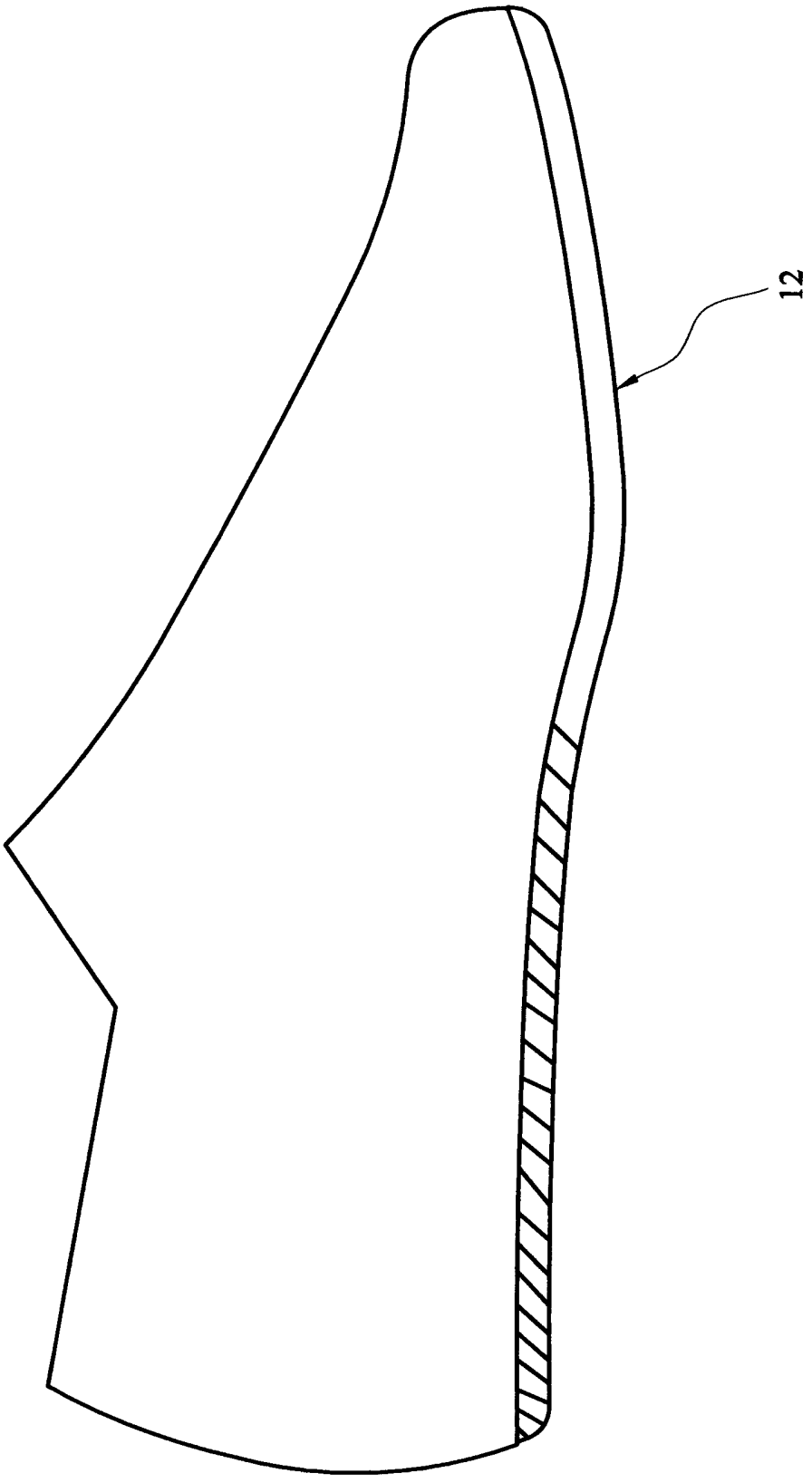


FIG. 6

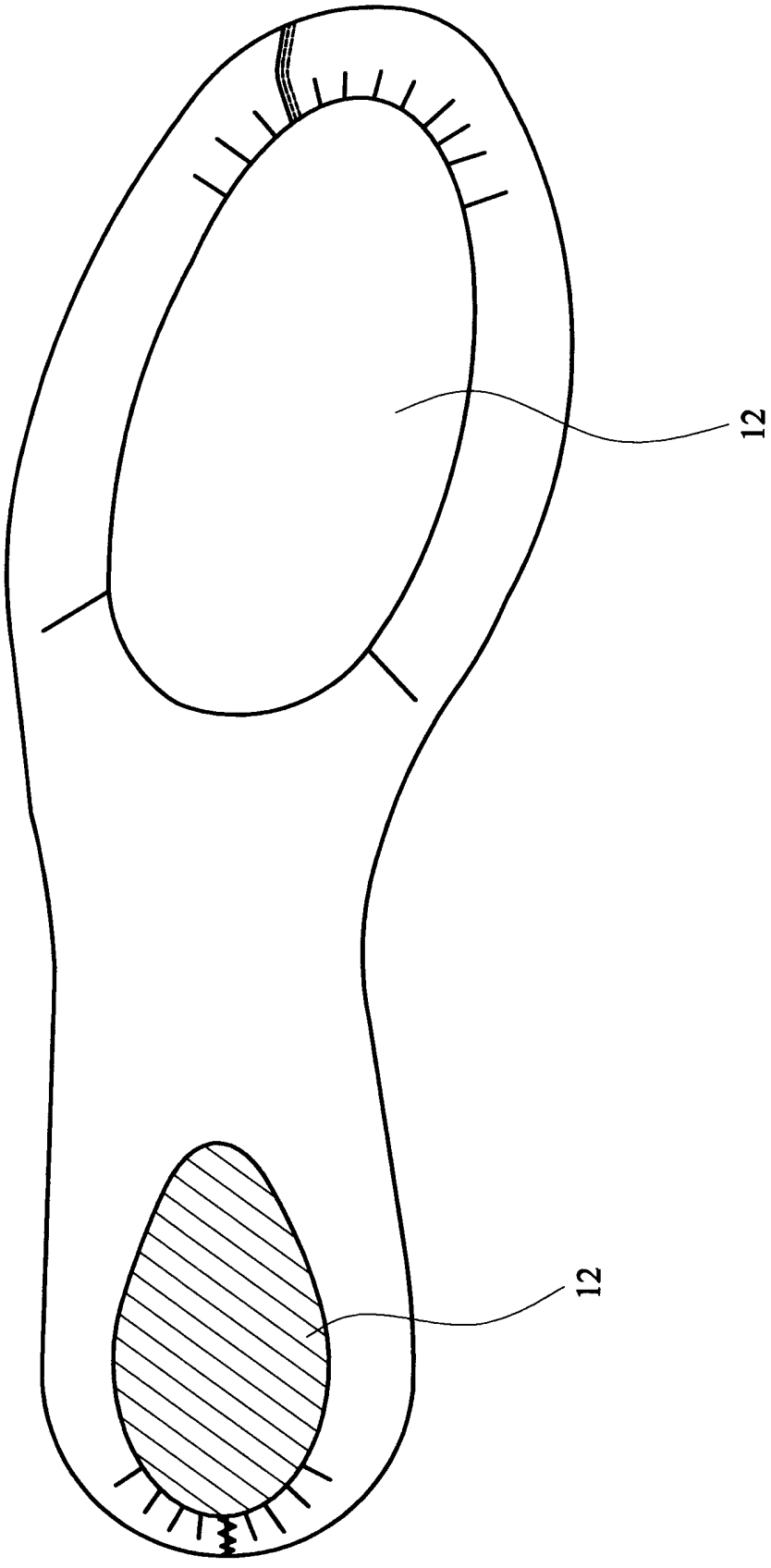


FIG. 7

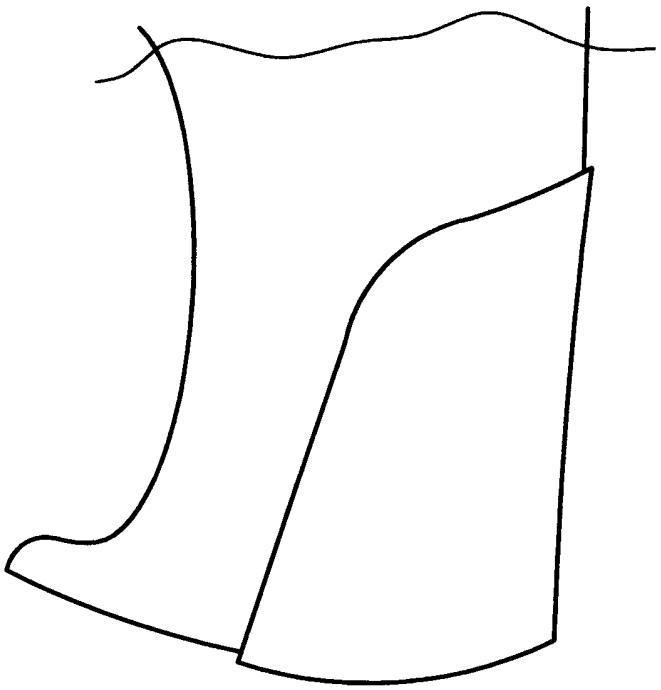
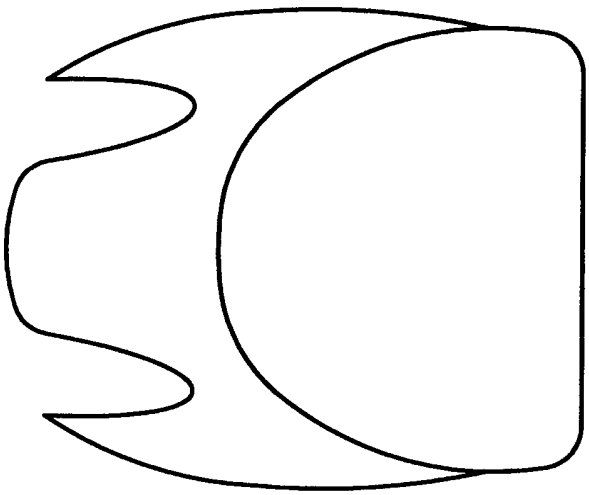


FIG. 8



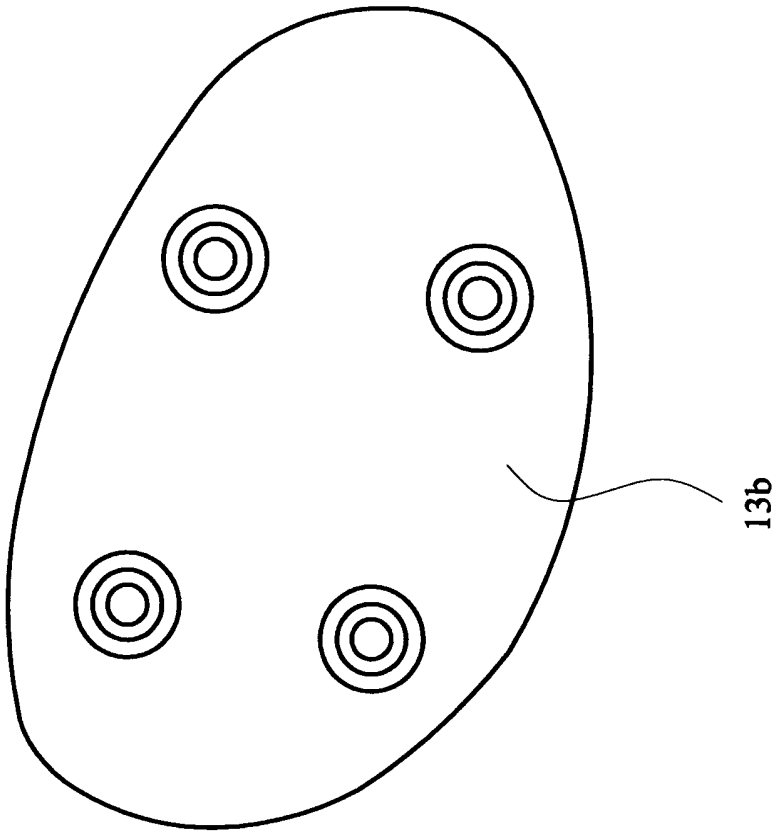
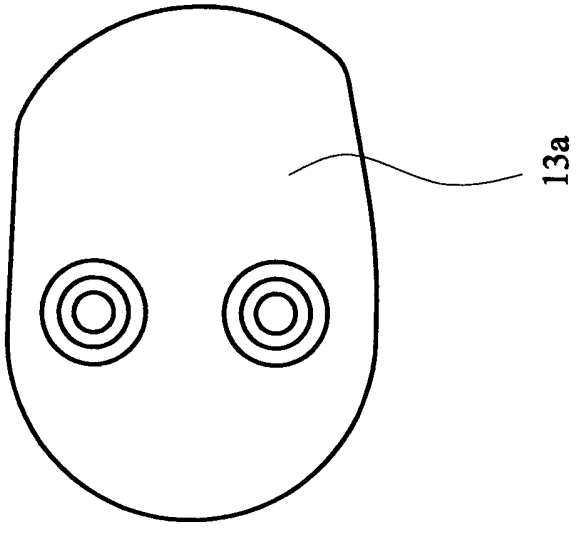


FIG. 9



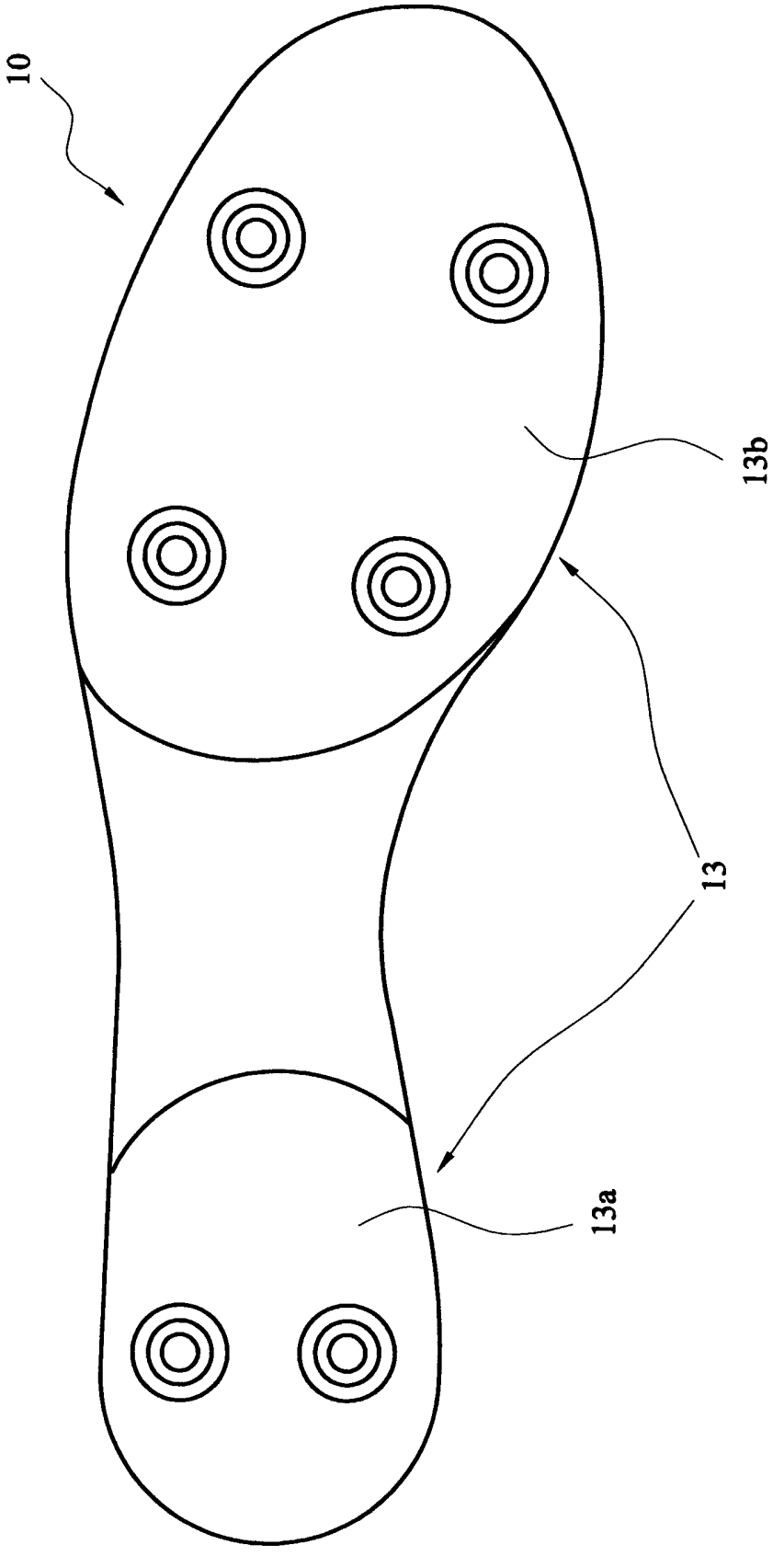


FIG. 10

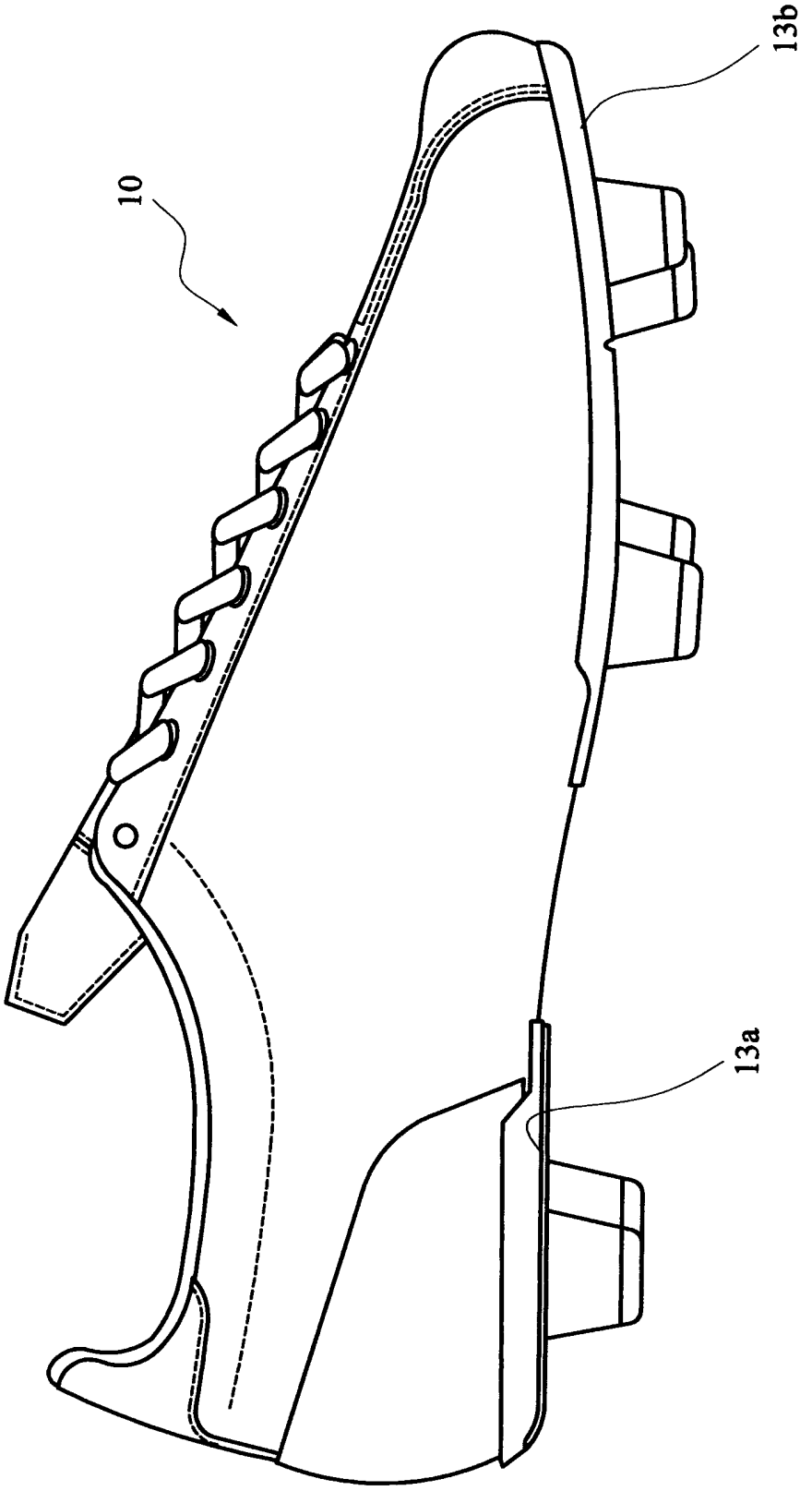


FIG. 11

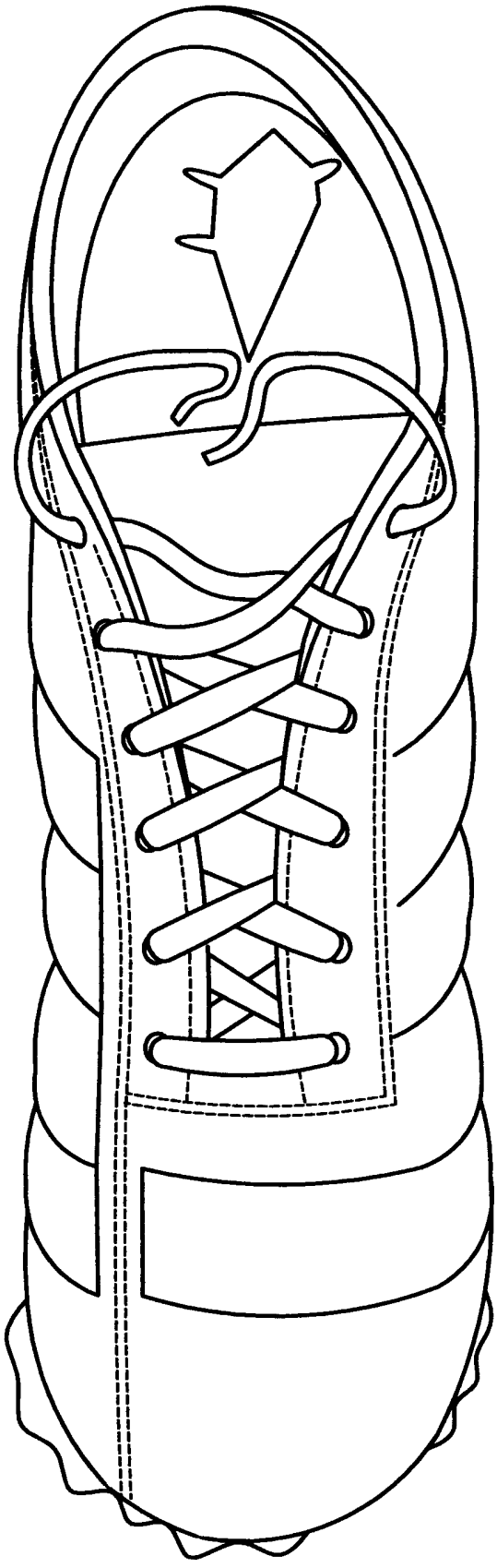


FIG. 12(a)

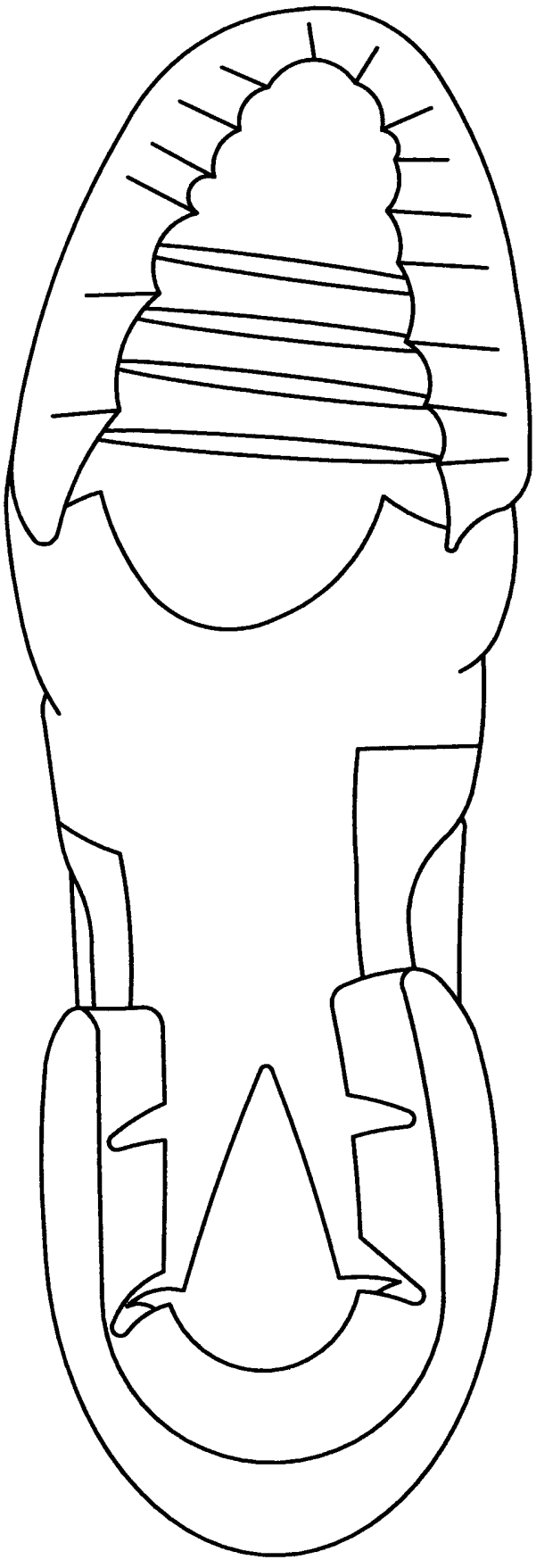


FIG. 12(b)

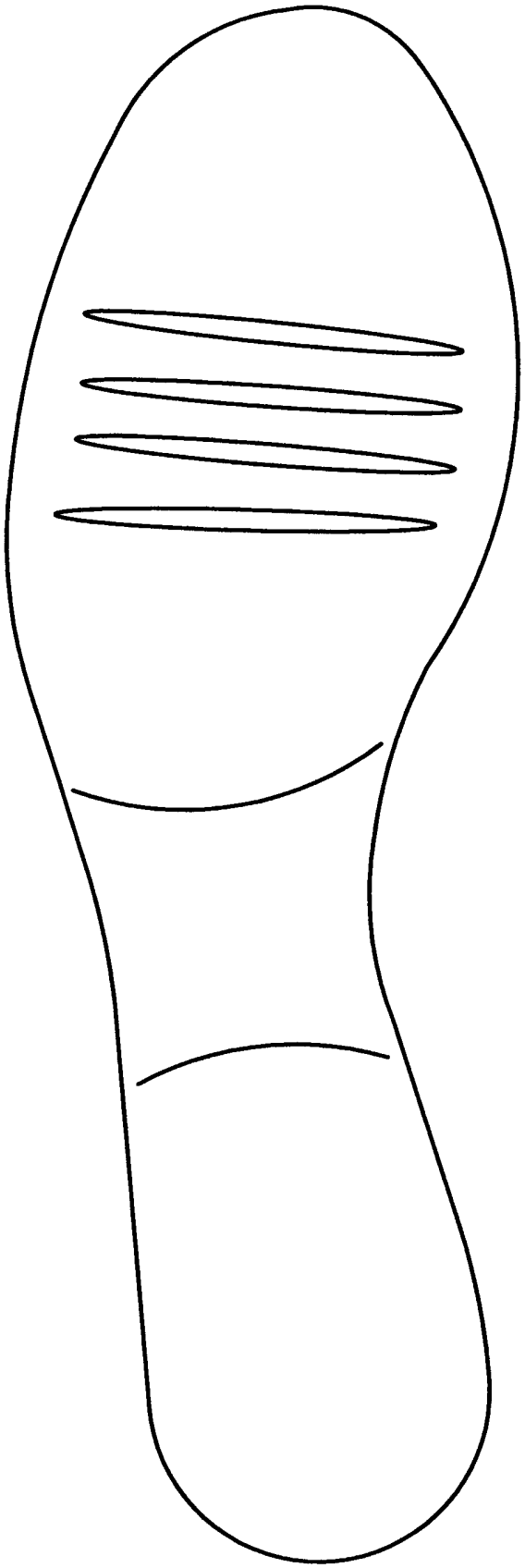


FIG. 12(c)

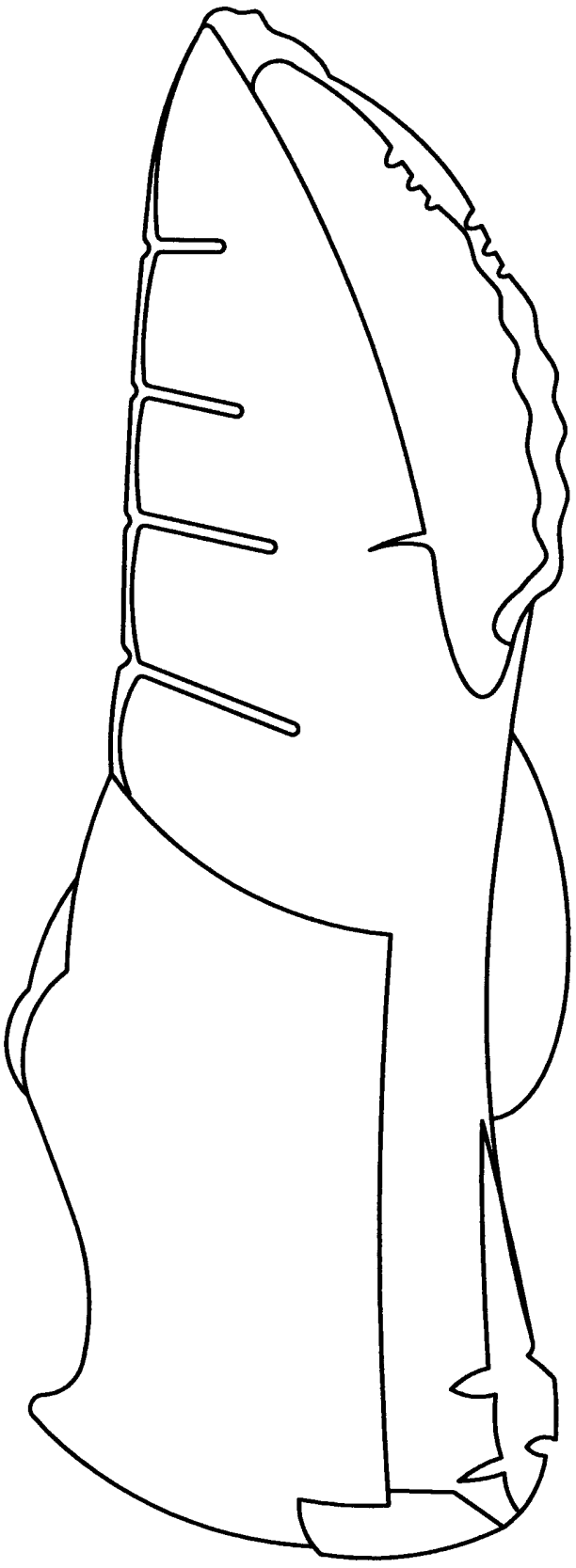


FIG. 12(d)

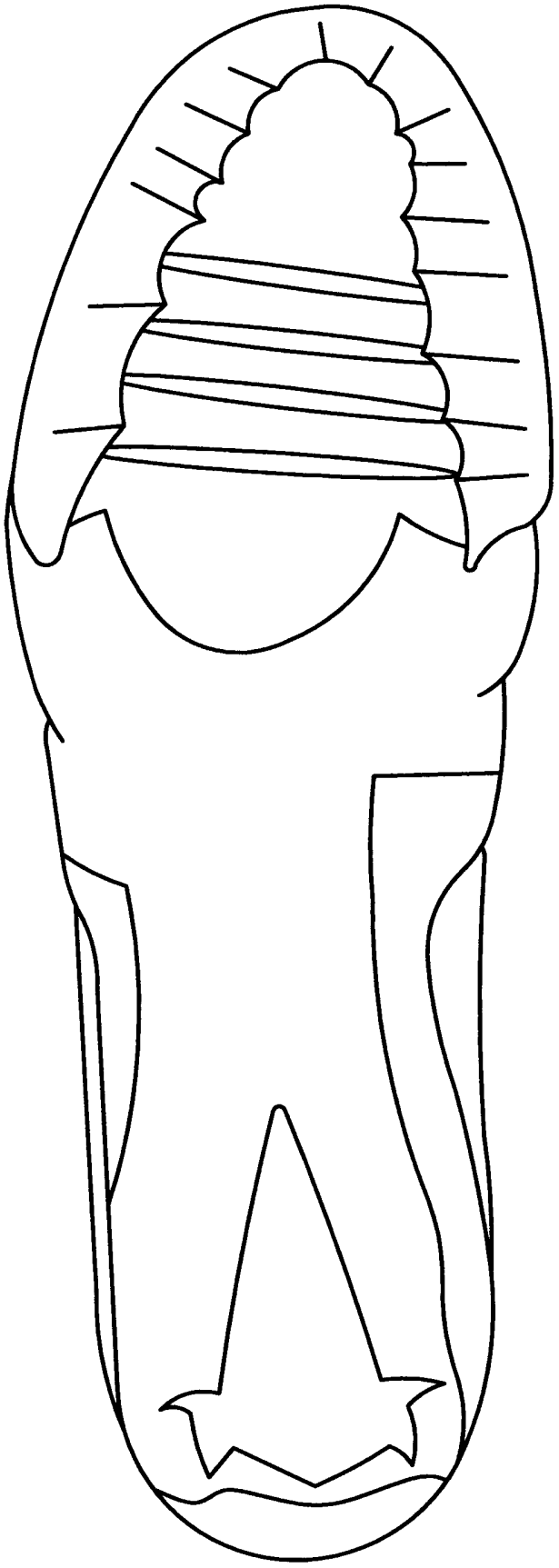


FIG. 12(e)

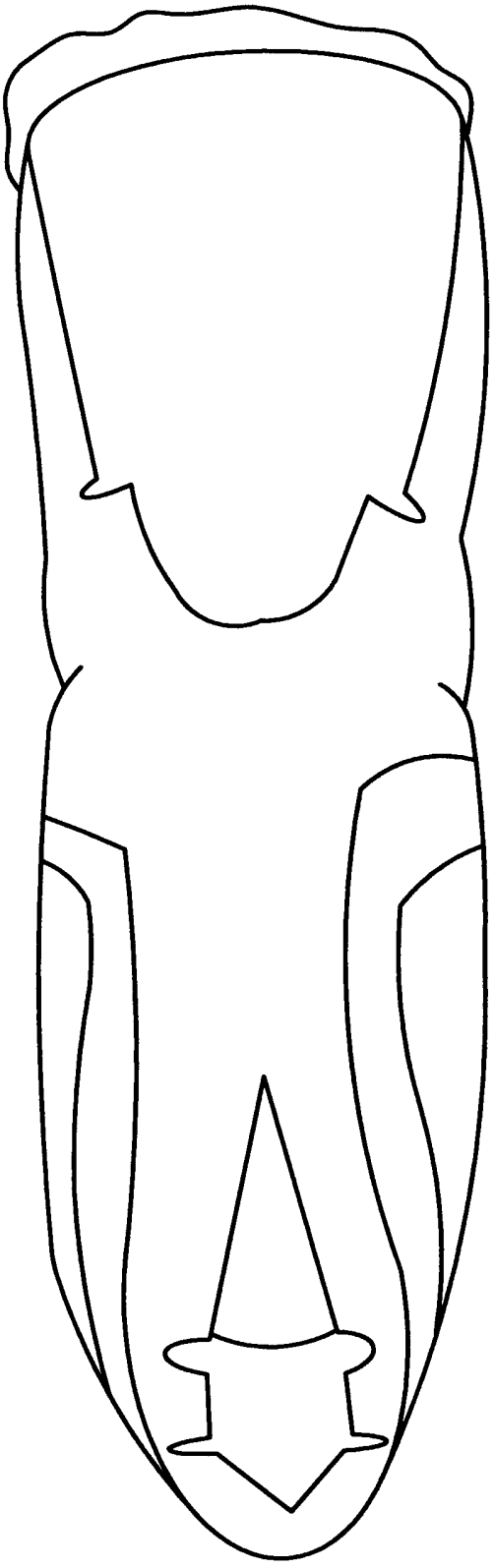


FIG. 12(f)

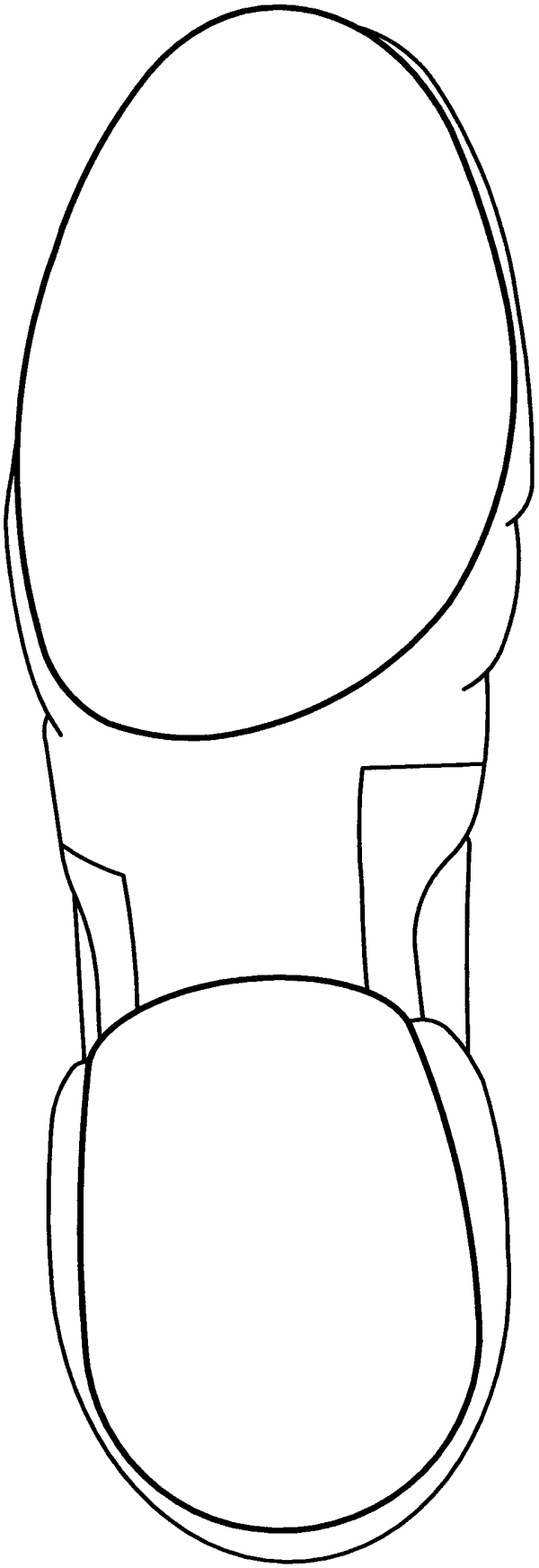


FIG. 12(g)

ONE PIECE UPPER FOR AN ARTICLE OF FOOTWEAR

This invention relates to a one piece upper for use in the manufacture of an article of footwear, particularly, though not exclusively, for a sports boot or shoe.

In the manufacture of sports boots, such as soccer or rugby boots, or a cycling shoe, it is important that the completed article is lightweight, while at the same time being sufficiently strong and durable to withstand usage in the particular sport concerned.

Traditional construction techniques use a last, an upper, an insole board, an outsole and usually also studs or spikes, and involve a number of separate manual operations which require much skill and time to complete manufacture.

The invention seeks to provide an improvement to existing techniques, resulting in an article of footwear having an innovative construction and assembly, and which is very light in weight.

According to one aspect of the invention, there is provided an article of footwear which comprises an assembly of an upper, an insole board and an outsole, in which:

the upper is a one-piece upper having (a) a metatarsal portion to underly a region of the foot of the wearer which is intermediate the heel and toe regions;

(b), adjacent side portions foldable relative to the metatarsal portion to overly the toe and instep region of the foot of the wearer;

(c) a lace-up portion provided in one of said side portions;

(d) a line of stitching to join together adjacent edges of the side portions;

(e) a line of stitching to join together rear edges of the side portions to form a heel region of the article of footwear;

(f) an opening defined between opposed edges of the side portions below the toe region;

(g) an insole board adhesively secured to the metatarsal portion of the upper and to said opposed edges of the side portions;

(h) an outsole adhesively secured to the exposed surfaces of the underside of the upper and of the insole board to complete the assembly of the article of footwear.

Preferably, the outsole is formed by two separate portions, one underlying the heel portion and the other underlying the toe portion of the article of footwear.

In a preferred application of the invention to a sports boot or shoe, the outsole has downwardly projecting studs or spikes which may be of the removable type, or moulded integrally with the outsole.

To strengthen the heel portion of the article of footwear, a separate heel insert may be adhesively secured to the upper and to the insole board.

According to a second aspect of the invention, there is provided a novel method of manufacture of an article of footwear according to one aspect of the invention, which comprises the following steps:

cutting a blank to form said one-piece upper;

applying adhesive to the metatarsal portion of the upper;

stitching said two lines of stitching to complete the formation of the upper;

applying the upper to a last;

adhesively securing the insole board to the upper, while the latter remains on the last; and

adhesively securing the outsole to the insole and to the upper.

Preferably, the adhesive assembly of the article of footwear is completed by heat curing the assembly in an oven.

A preferred embodiment of article of footwear according to the invention and a novel method of assembly thereof will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

figure 1 is a plan view of a one-piece upper which has been cut to shape, prior to application to a last;

figure 2 is a view, similar to figure 1, showing a first process step in preparing the upper ready to be applied to the last;

figure 3 is a plan view showing the shape taken up by the upper, after upward folding of two side portions adjacent to a metatarsal region of the upper;

figure 4 is a view, similar to figure 3, showing application of lacing to lacing holes provided on the instep portion of the upper;

figure 5 is a plan view of an insole board, showing application of adhesive to a heel portion and metatarsal portion of the board;

figure 6 is a side view of the insole board adhesively secured to the one piece upper;

figure 7 is an underplan view showing the upper after having been "lasted" onto a last, and with two parts of the insole board being exposed by way of openings defined therefor by the lower portion of the upper;

figure 8 is a rear view of the upper, when assembled on the last, and showing application of a heel counter to the upper;

figure 9 is a plan view of two separate outsole parts, one being a forefoot portion for application to the underside of the article of footwear, below the toe region, and the other being a heel portion to underly the heel portion of the article of footwear;

figure 10 is an underplan view of the assembled article of footwear;

figure 11 is a side view, corresponding to figure 10;

figures 12a-g show successive stages in the assembly of the article of footwear, by application of a one-piece upper insole board, and outsole to the last.

Referring now to the drawings, a preferred embodiment of an article of footwear according to the invention will now be described and taking the form of a sports show or boot. There will also be described a novel method of assembly of the article of footwear.

The fully assembled article of footwear is shown in figures 10 and 11, being designated generally by reference 10. The footwear 10 comprises a one-piece upper 11, shown particularly in figures 1-4, an insole board 12 shown in figures 5, 6 and 7, and an outsole 13 which comprises two separate outsole portions 13a and 13b, as shown in figures 9, 10 and 11.

The upper 11 is a one-piece upper which is cut from a blank to take up the shape shown in plan view in figure 1. The upper 11 comprises a number of portions having separate functions, while forming an integral part of the one-piece upper.

There is a metatarsal portion 14 which underlies a region of the foot of the wearer which is intermediate the heel and toe region. Adjacent side portions 15a and 15b are foldable relative to the metatarsal portion 14 to overly the toe and instep region of the foot of the wearer. A lace-up portion 16 is provided in the side or wing portion 15a as shown in figure 2.

The one-piece upper 11 can be folded to take up the shape shown in figures 3 and 4, in which a line of stitching A,A1 joins together adjacent edges 17a and 17b of the side or wing portions 15a and 15b respectively. A second line of stitching 18a and 18b of the side portions 15a and 15b respectively to form a heel region of the article of footwear. As shown in figure

7, the lower portion of the upper, i.e. on the side facing the underside of the foot of the wearer, defines two separate openings, through which can be seen exposed surfaces of the insole board 12.

The insole board 12 is adhesively secured to the metatarsal portion of the upper 11 and to the opposed edges of the side portions 15a,15b. The outsole is adhesively secured to the exposed surfaces of the underside of the upper 11 and the insole board 12 to complete the assembly of the article of footwear.

The preferred embodiment of article of footwear according to the invention enables a method of assembly which is different from different construction systems. The major innovation is that the upper is made out of a single piece of blank material and is cut in a particular shape, such that the upper can be built on a last, and the central area of the metatarsus remains completely assembled and wrapped to the last. The cutting operation of the blank forms the one-piece shape of upper as shown in figures 1 and 2.

After the cutting operating, and the application of internal reinforcements, glue or other adhesive is spread on the central area of the metatarsal region 14, as shown in figure 2.

The construction of the formed upper is completed in a simple manner by folding upwardly the two side or wing portions 15a,15b and which are stitched together with single line of stitching A,A1. This is shown in figure 3. At the same time, the heel portion is completed by joining together the rear edges 18a,18b of the wing portions 15a,15b by stitching together along single stitch line B,B1.

The lacing portion 16 is provided on wing portion 15a, and lacing is then applied, as shown in figure 4.

The lasting insole board 12 has glue or adhesive applied to a portion thereof, i.e. extending from the heel up to, but not including, the toe region, as shown in figure 5. The insole board 12 is then secured to the upper as shown in figure 6. The upper is then lasted on the last (not shown) and closed with adhesive on the vamp, and on the heel region, as shown in figure 7. The heel counter application is applied with adhesive on the heel side, as shown in figure 8.

The outsole is made of two separate outsole parts 13a,13b, as referred to above, namely the forefoot part and the heel part, separated from one another, as shown in figure 9..

The two-piece outsole is adhesively secured in position, and then passed into the oven, together with the upper, which is already "lasted" on the last. Afterwards, these are put

on and passed through a press. During this operation, the adhesive spread on the insole board 12 (figure 5) and on the one-piece upper (figure 2), is reactivated and the two parts are adhesively secured together to form a unitary body, as shown in figure 10. At this stage, the last is removed, and the article of footwear, namely sports boot or shoe, is ready, as shown in figure 11.

The resulting construction of shoe is an innovative constructive, and very light in weight. On the plantar arch, the intact upper can be seen without any obstruction as shown in figure 11.

Figures 12a-f show successive stages in the assembly of the article of footwear.

CLAIMS

1. An article of footwear 10 which comprises an assembly of an upper 11, an insole board 12, and an outsole 13, in which:

the upper 11 is a one-piece upper having;

(a) a metatarsal portion 14 to underly a region of the foot of the wearer intermediate the heel and toe region;

(b) adjacent side portions 15a,15b foldable relative to the metatarsal portion 14 to overly the toe and instep region of the foot of the wearer;

(c) a lace-up portion 16 provided in one of said side portions 15a;

(d) a line of stitching A,A1 to join together adjacent edges 18a,18b of the side portions 15a,15b;

(e) a line of stitching B,B1 to join together rear edges 18a,18b of the side portions 15a,15b to form a heel region of the article of footwear; and

(f) openings defined in the lower surface of the one-piece upper 11;

(g) an insole board 12 adhesively secured to the metatarsal portion 14 of the upper 11 and exposed through the openings formed in the lower surface of the upper (fig. 7);

(h) an outsole 13a,13b adhesively secured to the exposed surfaces of the underside of the upper 11 and of the insole board 12 to complete the assembly of the article of footwear.

2. An article of footwear according to claim 1, in which the outsole 13 is formed by two separate portions 13a,13b, one 13a underlying the heel portion and the other 13b underlying the toe portion of the article of footwear.

3. An article of footwear according to claim 1 or 2, and in the form of a sports boot or shoe, in which the outsole 13 has downwardly projecting studs or spikes which may be of the removeable type, or moulded integrally with the outsole.

4. An article of footwear according to any one of claims 1 to 3, in which a separate heel insert is adhesively secured to the upper 11 and to the insole board 12 (fig. 8).

5. A method of manufacture of an article of footwear according to claim 1, which comprises the following steps:

cutting a blank to form said one-piece upper 11;

applying adhesive to the metatarsal portion 14 of the upper 11;

stitching said lines of stitching A,A1 and B,B1 to complete the formation of the upper 11;

applying the upper to a last;

adhesively securing the insole board 12 to the upper 11, while the latter remains on the last; and

adhesively securing the outsole 13a,13b to the insole board 12 and to the upper 11.

6. A method according to claim 5, in which the adhesive assembly of the article of footwear is completed by heat curing the assembly in an oven.

INVESTOR IN PEOPLE

Application No: GB0508482.7 **Examiner:** Mike Walker

Claims searched: ALL **Date of search:** 18 August 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A		GB1539886 A (ASHWORTHS)
A		GB1406735 A (ALFRED MALICH)
A		AU3585184 A (WB IND)

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Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

A3B

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A43B

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI