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(54) **Method of forming a shoe**

Verfahren zur Herstellung eines Schuhes

Procédé de production d'une chaussure

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**WO-A-90/06067**                      **DE-C- 462 178**  
**FR-A- 1 192 785**                      **FR-A- 1 466 731**  
**FR-A- 2 102 959**                      **US-A- 4 930 175**

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## Description

**[0001]** The invention relates to a shoe, more particularly to a method of forming a boot having an upper, a lower and an outsole.

**[0002]** As illustrated in Figure 1, the conventional method of forming a boot comprises the steps of:

- (a) molding the outsole (4) integrally with the lower (3) so as to form a unitary construction from a waterproof polymeric thermosetting material;
- (b) forming an upper (1) from a relatively flexible material, the upper having a lower peripheral edge stitched to an upper peripheral edge of the lower (3) to form a seam juncture (5); and
- (c) coating the inner surface of the seam juncture with a waterproof layer.

**[0003]** Because the seam juncture (5) is spaced from the top of the boot at a considerable vertical distance, it is relatively difficult to insert the tool for coating the waterproof layer on the seam juncture through the upper portion of the boot.

**[0004]** In addition, because the lower (3) is made from the same material as that of the outsole (4), which in turn is generally made from hard and abrasive resistant rubber to be able to withstand wearing, the boot is relatively heavy, thereby easily causing fatigue to the wearer.

**[0005]** WO-A-90/06067 discloses a shoe construction with the features of the preamble of claim 1, in which a water-conductive upper is extended by a water-tight edge strip stitched to it, and the edge strip is then sealed in a water-tight manner to a waterproof lining in the region of the outsole to which the water-conductive upper is connected.

**[0006]** Therefore, an object of this invention is to provide a method of making a shoe, wherein the sole of the shoe is connected to the shoe lower after the shoe lower is connected to the shoe upper so that the waterproof layer can conveniently be provided at the seam between the shoe upper and the shoe lower through the uncovered lower opening of the shoe lower.

**[0007]** The shoe lower may be made of a material of lighter weight than that of the outsole so that the boot is relatively light in weight and is more comfortable to wear as compared to the boot produced according to the conventional method.

**[0008]** Accordingly, the method of making a boot in the present invention comprises steps of:

- (a) forming a shoe upper from a relatively flexible material, the upper having an upper end portion and a lower end portion;
- (b) joining the lower end portion of the upper, at a seam juncture, with a waterproof material defining an upper portion and a lower portion;
- (c) applying a waterproof layer onto the seam juncture

ture through the sole opening; and  
(d) then connecting a sole to the lower portion of the waterproof material in a watertight relationship to close the sole opening after step (c);

whereby the waterproof material is in the form of a molded shoe lower of unitary construction defining an enclosed toe zone which covers the toes and a heel zone; in that said lower portion of the shoe lower defines a sole opening of the shoe lower and said upper portion of the shoe lower defines an upper opening of the shoe lower of a size such that the first upper end portion of the lower can be smoothly seamed to the second lower end portion of the shoe upper; in that said waterproof material is a mouldable waterproof polymeric material.

**[0009]** A water-tight seal may be formed by providing a waterproof layer at the adjoining surfaces of the lower and the sole or by injection molding the sole in the presence of the lower to form the sole integrally with the lower.

**[0010]** Other features and advantages of this invention will become apparent in the following detailed description of the preferred embodiments of this invention, with reference to the accompanying drawings, in which:

Figure 1 is a perspective and schematic view of a boot produced according to a conventional method; Figure 2 is a perspective and schematic view of a boot which is produced according to the method of this invention;

Figure 3 is a sectional view of the boot produced according to the method of this invention;

Figure 4 is an inverted view of the boot produced according to this invention, illustrated prior to attachment of an outsole;

Figure 5 illustrates how an inner liner assembly is inserted into the boot according to this invention; Figure 6 is a cutaway view of the boot shown in Figure 5;

Figure 7 is a block diagram of the method of this invention;

Figure 8 is a sectional view of a modified embodiment according to this invention; and

Figure 9 is a sectional view of another modified embodiment according to this invention.

**[0011]** Referring to Figures 2, 3 and 4, the preferred embodiment of a boot according to this invention includes a horizontally extending outsole (50), a shell-like lower (20) disposed on the outsole (50), and an upper (10) connected to an upper section of the lower (20) so as to form the boot.

**[0012]** According to this invention, the method of making a boot includes the following steps:

- (a) A lower of unitary construction is molded from a first waterproof polymeric material, such as PU elastomer (polyurethane) or PVC elastomer (poly-

vinyl chloride) or rubber. The lower (20) defines an enclosed toe zone (22A), a metatarsal zone (22B) and a heel zone (22C). The lower (20) further has a first upper end portion (22E) defining a first upper opening and a first lower end portion (22D) defining a sole opening. In the preferred embodiment, the first upper opening of the lower (20) extends from the metatarsal zone (22B) to the heel zone (22C) while the sole opening thereof extends from the toe zone (22A) to the heel zone (22C).

(b) An upper (10) is formed from a relatively flexible material, such as waterproof leather and the like which is generally lighter compared to the lower (20). The upper (10) has a second lower end portion (10P) of a size such that the first upper end portion (22E) of the lower (20) can be smoothly seamed to the second lower end portion (10P). The upper (10) further includes two spaced eyelet tabs (10X) and a tongue (not visible) which has a lower section stitched to the shoe upper (10) and two parallel edges stitched to the eyelet tabs (10X), thereby forming a plurality of seam junctures (11).

(c) The second lower end portion (10P) of the upper (10) is stitched to the first upper end portion (22E) of the lower (20), thereby forming a seam juncture (23).

(d) The seam juncture (23) is sealed so as to be waterproof by applying a layer of waterproof material onto the seam juncture (23) through the sole opening of the lower (20). The waterproof layer may be provided by coating the seam juncture (23) with a waterproof coating or by adhesively attaching a tape of waterproof material to the seam juncture (23) so as to cover the seam juncture (23). Note that the sole opening at the first lower end portion (22D) of the lower (20) is wide enough to permit easy access to the inner surface of the seam junctures during coating of the seam junctures (11) and (23). Thereafter, an insole (30) of non-waterproof fabric is attached by a conventional method to the first lower end portion (22D) of the lower (20). A seam (31) is formed between the insole (30) and the lower (20).

(e) An outsole (50) is molded from a second waterproof polymeric material, such as an abrasion resistant rubber, which is harder when compared to the first waterproof polymeric material. The outsole (50) has a shape corresponding to but is slightly larger than the cross-section of the first lower end portion (22D) of the lower (20).

(f) A waterproof layer (40) of thermosetting material is provided between the adjoining surfaces of the peripheral portion (51) of the outsole (50) and the insole (30) and between the adjoining surfaces of the peripheral portion (51) and the lower end portion (22D) of the lower (20). The water proof layer (40) may be provided by applying a waterproof coating or by adhesively attaching or injecting and curing a

waterproof material. A waterproof seal is thus formed between the first lower end portion (22D) of the lower (20) and the end portion (51) of the outsole (50), so that water cannot seep into the interior of the boot.

[0013] As illustrated in Figures 5 and 6, a liner (60) which has a shape conforming to that of the inner surface of the combined upper (10) and lower (20) can be stitched to a second upper end portion (10Q) of the upper (10). The liner (60) is then inserted interiorly of the boot so that the liner (60) snugly fits in the boot. When desired, a foot-like padding insert (80) can be removably disposed at the bottom (70) of the liner (60).

[0014] Referring to Figure 8, in another preferred embodiment of this invention, an outsole (50') is formed by injection molding in the presence of the lower (20) so that the outsole (50') is formed integral with the lower (20). The outsole (50') has a peripheral portion (51') to surround the lower end portion of the lower (20). The injection molding may be conducted in a mold (not shown) by first mounting the lower (20) on the mold and then injection molding the outsole (50') so that the peripheral portion (51') of the outsole (50') is integrally connected to the lower end portion (22D) of the lower (20) in a water-tight relationship.

[0015] Figure 9 illustrates a still another preferred embodiment of the present invention wherein the peripheral portion (51") of the outsole (50"), which projects upwardly, is adhesively connected to the lower end portion (22D). A waterproof coating (40") is applied at the top end of the peripheral portion (51") of the outsole (50") and the adjacent surface of the lower end portion (22D) of the lower (20) to provide a water-tight sealing.

## Claims

1. A method of forming a shoe, such as a boot, **characterized by** the steps of:

- (a) forming a shoe upper (10) from a relatively flexible material, the upper having an upper end portion and a lower end portion (10P);
- (b) joining the lower end portion (10P) of the upper, at a seam juncture (23), with a waterproof polymeric material (20) defining an upper portion (22E) and a lower portion (22D);
- (c) applying a waterproof layer onto the seam juncture (23) through the sole opening; and
- (d) then connecting a sole (50) to the lower portion (22D) of the waterproof material (20) in a water-tight relationship to close the sole opening after step (c);

**characterised in that** the waterproof material (20) is in the form of a molded shoe lower of unitary construction, defining an enclosed toe zone (22A)

which covers the toes and a heel zone (22C); **in that** said lower portion (22D) of the shoe lower defines a sole opening of the shoe lower and said upper portion (22E) of the shoe lower defines an upper opening of the shoe lower of a size such that the upper portion (22E) of the lower (20) can be smoothly seamed to the lower end portion (10P) of the shoe upper.

2. A method according to Claim 1, **characterised in that** the sole includes an insole and an outsole.
3. A method according to Claim 2, **characterised in that** the insole (30) is connected to the lower portion (22D) of the shoe lower (20) before the outsole (50) is connected to said lower portion (22D).
4. A method according to Claim 1, **characterised in that** the step (d) is carried out by providing a waterproof layer (40) at the adjoining surfaces of the sole (50) and the lower portion (22D) of the shoe lower (20).
5. A method according to Claim 1, **characterised in that** the step (d) is carried out by injection molding the sole in the presence of the shoe lower (20), thereby forming the sole integral with and in a watertight relationship with the lower portion (22D) of the shoe lower (20).
6. A method according to Claim 1, further **characterised by** the steps of:
  - (f) stitching, at an upper end portion (10Q) of the shoe upper (10), a liner (60) having a shape conforming with that of the inner surface of the combined shoe upper and shoe lower; and
  - (g) inserting the liner (60) inside the interior of the combined shoe upper and shoe lower to line it.

#### Patentansprüche

1. Ein Verfahren zum Formen eines Schuhs, beispielsweise eines Stiefels, **gekennzeichnet durch** die Schritte:
  - (a) Formen eines Oberschaftes (10) aus einem relativ flexiblen Material, mit einem oberen Endstück und einem unteren Endstück (10P);
  - (b) Verbinden des unteren Endstückes (10P) des Oberschaftes an einer Nahtstelle (23) mit einem wasserundurchlässigen Polymer-Material (20), das einen Oberabschnitt (22E) und einen Unterabschnitt (22D) definiert;
  - (c) Anbringen einer wasserundurchlässigen Schicht auf die Nahtstelle (23) **durch** die Soh-

lenöffnung; und

(d) dann Verbinden der Sohle (50) mit dem Unterabschnitt (22D) des wasserundurchlässigen Materials (20) in einer wasserdichten Anordnung, um die Sohlenöffnung nach Schritt (c) zu schließen;

**dadurch** gekennzeichnet, daß das wasserundurchlässige Material (20) die Gestalt eines modellierten Unterschaftes von einheitlicher Konstruktion aufweist, eine integrierte Zeh-Zone (22A), die die Zehen abdeckt, und eine Hacken-Zone (22C) definiert, wobei der Unterabschnitt (22D) des Unterschaftes eine Sohlenöffnung des Unterschaftes beschreibt und der Oberabschnitt (22E) des Unterschaftes eine obere Öffnung des Unterschaftes von einer Größe beschreibt, so daß der Oberabschnitt (22E) des Unterschaftes (20) mit dem unteren Endstück (10P) des Oberschaftes glatt versäumt werden kann.

2. Ein Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** die Sohle eine Brandsohle und eine Laufsohle besitzt.
3. Eine Verfahren nach Anspruch 2, **dadurch gekennzeichnet, daß** die Brandsohle (30) mit dem Unterabschnitt (22D) des Unterschaftes (20) verbunden wird, bevor die Laufsohle am Unterabschnitt befestigt wird.
4. Ein Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** der Schritt (d) durchgeführt wird, indem eine wasserundurchlässige Schicht (40) an den aneinander anschließenden Flächen der Laufsohle (50) und des Unterabschnittes (22D) des Unterschaftes (20) vorgesehen wird.
5. Ein Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** der Schritt (d) durchgeführt wird, indem die Sohle in Gegenwart des Unterschaftes durch Spritzguß geformt wird, wodurch die Sohle integriert mit und in einer wasserdichten Anordnung mit dem Unterabschnitt (22D) des Unterschaftes (20) geformt wird.
6. Ein Verfahren nach Anspruch 1, desweiteren **gekennzeichnet durch** die Schritte:

(f) Annähen eines Futters (60) mit einer Form, gleich der der inneren Oberfläche des kombinierten Oberschaftes und Unterschaftes, an einem oberen Endteil (10Q) des Oberschaftes (10); und

(g) Einsetzen des Futters (60) in das Innere des kombinierten Oberschaftes und Unterschaftes, um es auszufüttern.

## Revendications

1. Procédé de production d'une chaussure, telle qu'une botte, **caractérisé par** les étapes consistant à :

(a) former un dessus de chaussure (10) à partir d'un matériau relativement flexible, le dessus ayant une partie d'extrémité supérieure et une partie d'extrémité inférieure (10P) ;

(b) assembler la partie d'extrémité inférieure (10P) du dessus, au niveau d'une jointure (23), avec un matériau polymère imperméable à l'eau (20) définissant une partie supérieure (22E) et une partie inférieure (22D) ;

(c) appliquer une couche imperméable sur la jointure (23) à travers l'ouverture de semelle ; et

(d) ensuite connecter une semelle (50) sur la partie inférieure (22D) du matériau imperméable (20) dans une relation étanche pour fermer l'ouverture de la semelle après l'étape (c) ;

**caractérisé en ce que** le matériau imperméable à l'eau (20) est sous la forme d'un dessous de chaussure moulé d'une construction unitaire, définissant une zone de doigts de pieds protégée (22A) qui couvre les doigts de pieds et une zone de talon (22C) ; **en ce que** ladite partie inférieure (22D) du dessous de chaussure définit une ouverture de semelle du dessous de la chaussure et que ledit dessus de chaussure (22E) définit une ouverture supérieure du dessous de la chaussure de dimensions telles que la partie supérieure (22E) du dessous (20) puisse être piquée régulièrement à la partie d'extrémité inférieure (10P) du dessus de chaussure.

2. Procédé selon la revendication 1, **caractérisé en ce que** la semelle comprend une semelle interne et une semelle externe.

3. Procédé selon la revendication 2, **caractérisé en ce que** la semelle interne (30) est reliée à la partie inférieure (22D) du dessous de chaussure (20) avant que la semelle externe (50) soit reliée à ladite partie inférieure (22D).

4. Procédé selon la revendication 1, **caractérisé en ce que** l'étape (d) est réalisée en fournissant une couche imperméable à l'eau (40) sur les surfaces adjacentes de la semelle (50) et la partie inférieure (22D) du dessous de chaussure (20).

5. Procédé selon la revendication 1, **caractérisé en ce que** l'étape (d) est réalisée par le moulage par injection de la semelle en présence du dessous de chaussure (20), formant ainsi la semelle de manière

intégrale avec la partie inférieure (22D) du dessous de chaussure (20) et dans une relation étanche avec celle-ci.

- 5 6. Procédé selon la revendication 1, **caractérisé en outre par** les étapes consistant à :

(f) coudre au niveau d'une partie d'extrémité supérieure (10Q) du dessus de chaussure (10), une doublure (60) ayant une forme conforme à celle de la surface interne du dessous et du dessus de chaussure combinés, et

(g) insérer la doublure (60) à l'intérieur du dessous et du dessus de chaussure combinés pour les doubler.

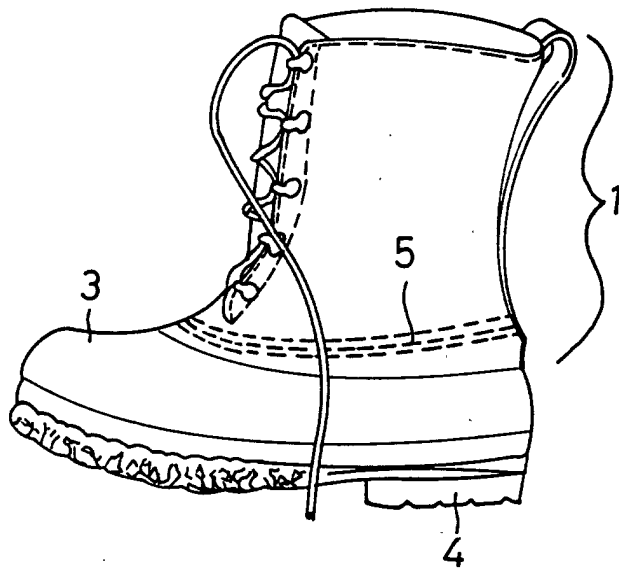


FIG. 1

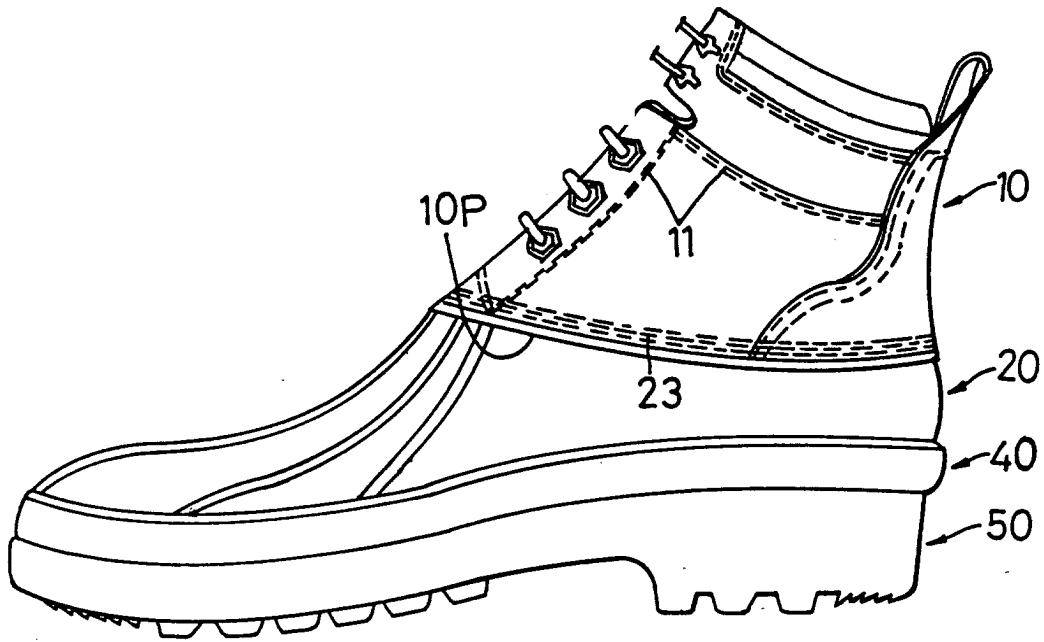


FIG. 2

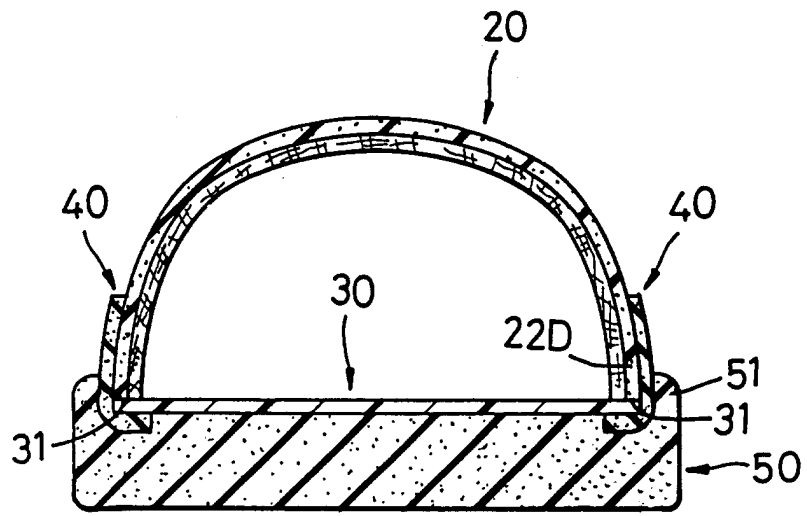


FIG. 3

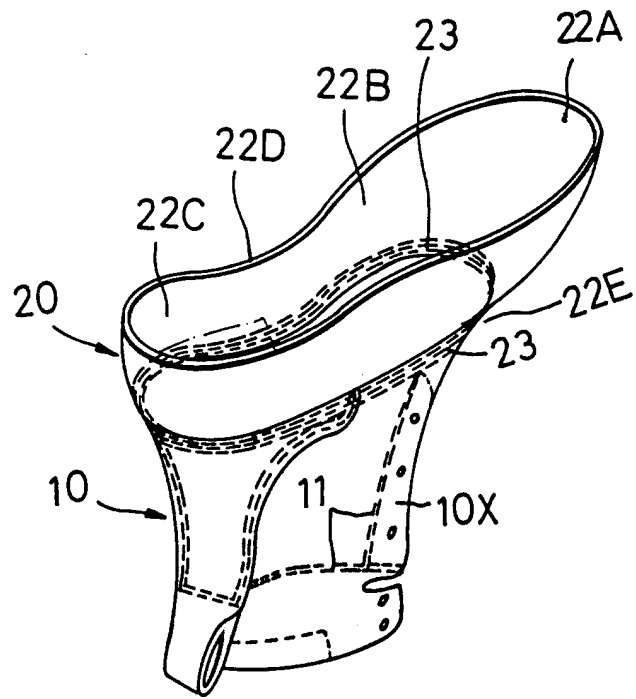


FIG. 4

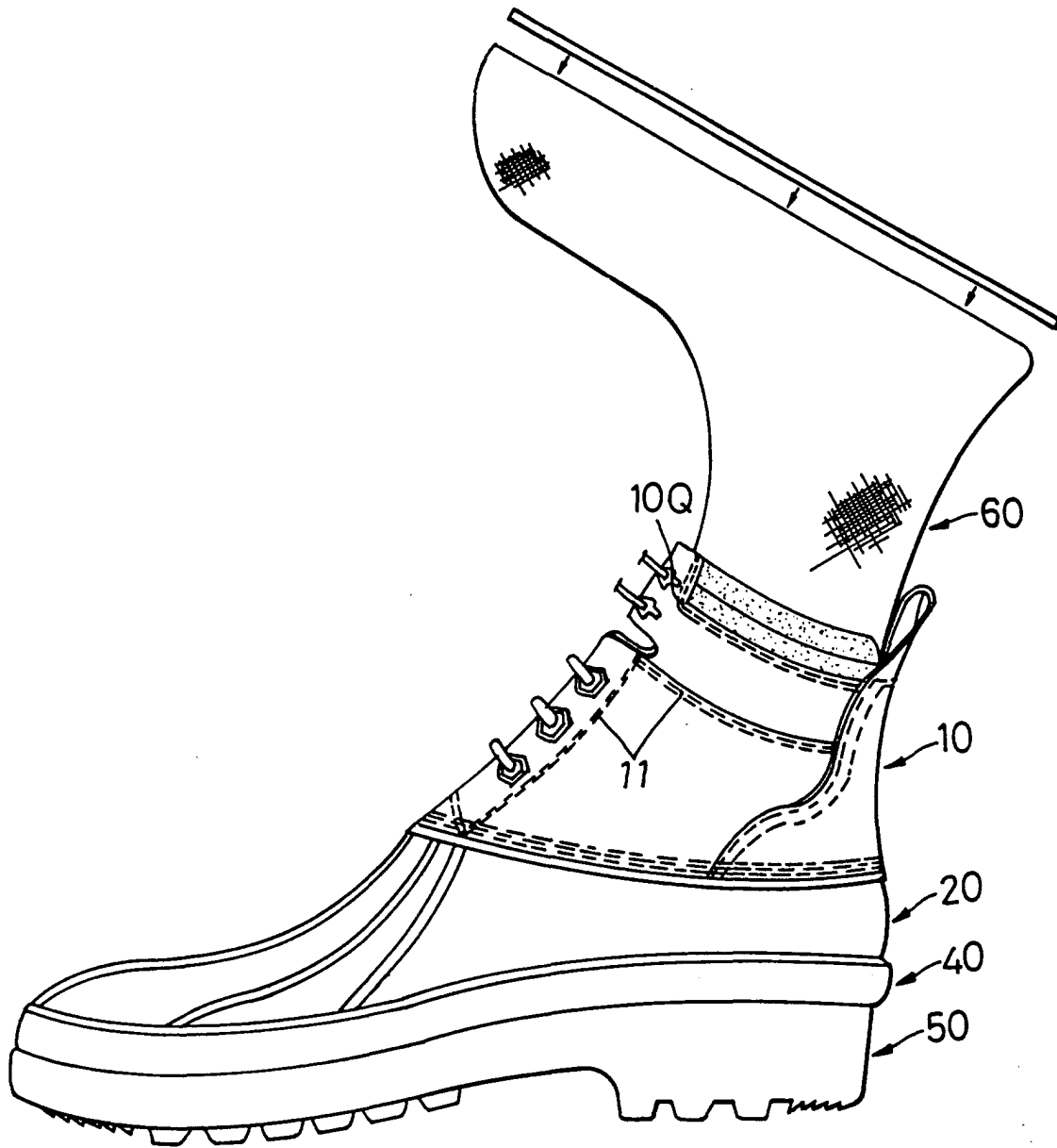


FIG. 5

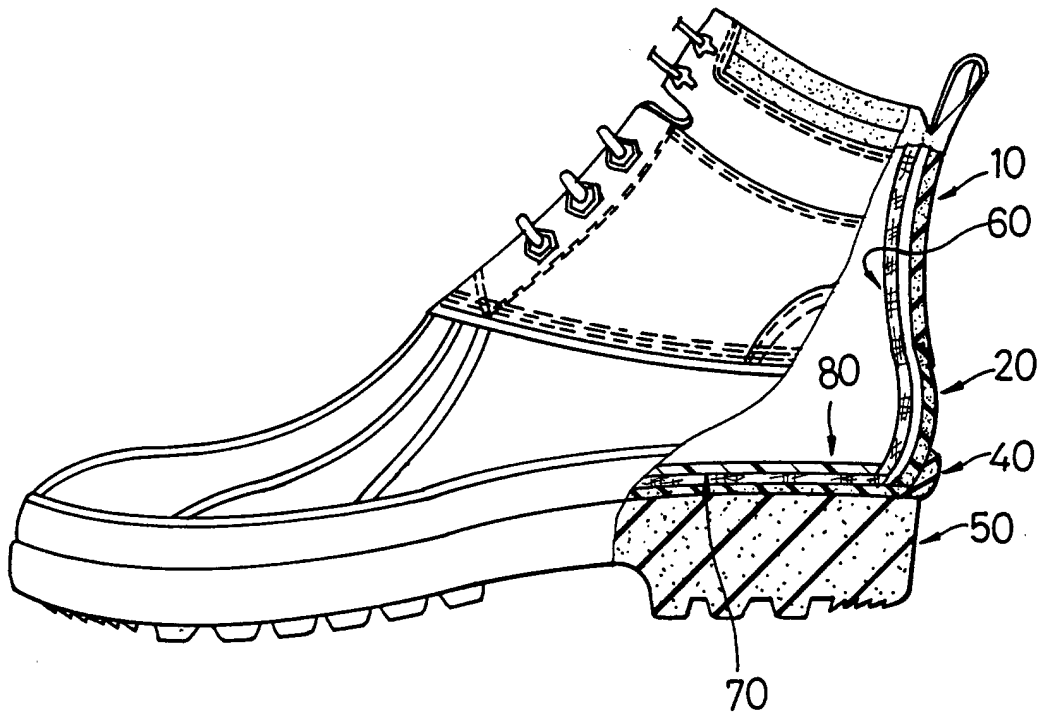


FIG. 6

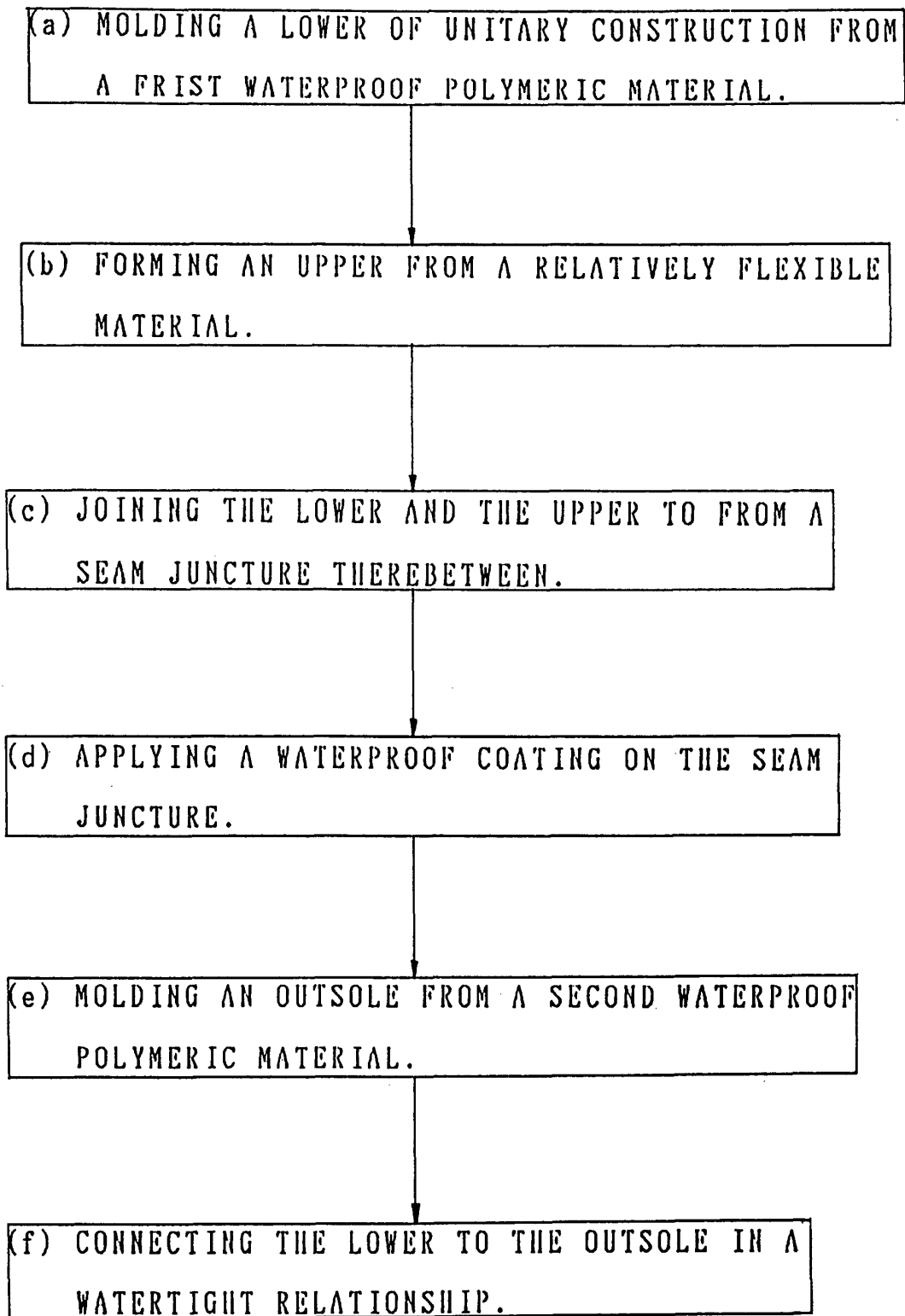


FIG. 7

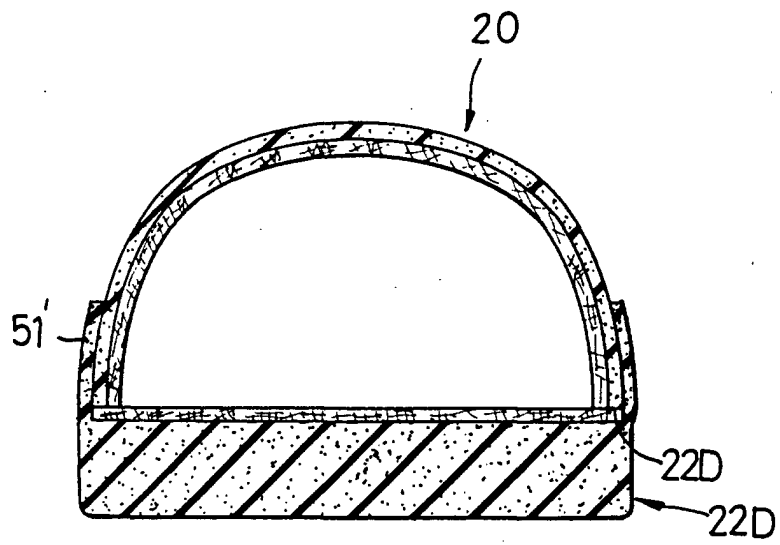


FIG. 8

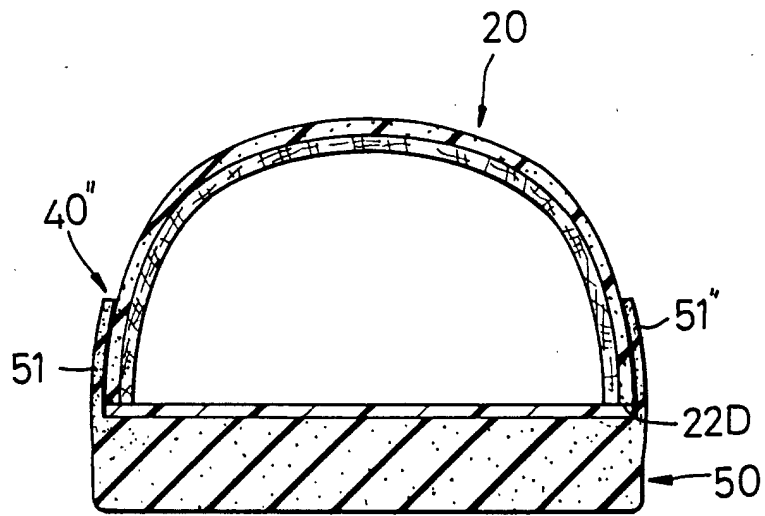


FIG. 9