

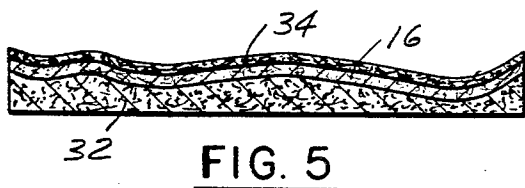
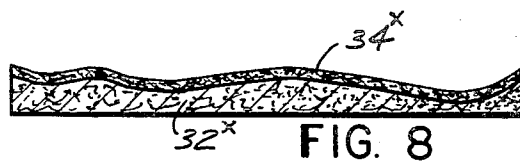
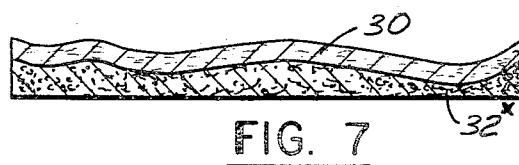
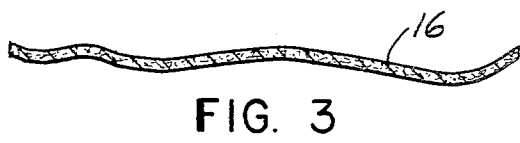
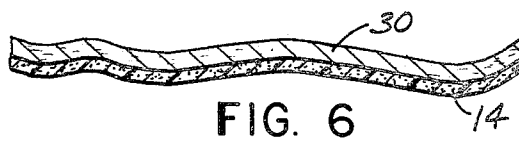
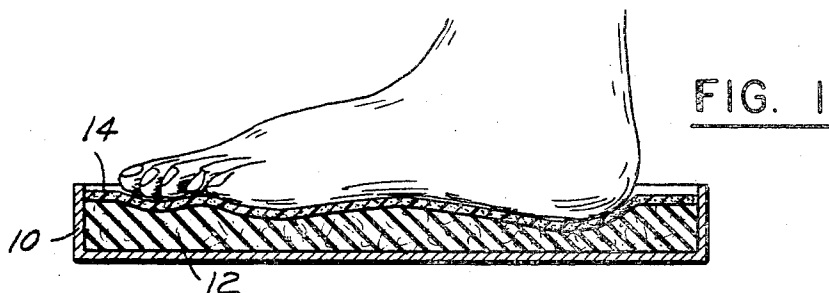
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3,398,221

METHOD OF PRODUCING SHOE INSERTS

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3,398,221

METHOD OF PRODUCING SHOE INSERTS

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ABSTRACT OF THE DISCLOSURE

There is disclosed a method of producing a foot-conforming shoe insert according to which an impression of the bottom of the foot is first formed by pressing the foot into a softened sheet of wax placed on a resilient support. The sheet of wax thus constitutes a negative mold which is used to form a positive mold by applying to the wax sheet a suitable hardening layer such as a resin-containing fabric layer. After separating the wax from the positive mold, a coating of a pasty composition is then applied to the positive mold and this composition after hardening constitutes the desired foot-conforming and foot-supporting insert.

This invention relates to foot supports for insertion into stock or custom-made footwear; such supports being shaped to conform to the bottom of the foot, and if desired, these supports can include a portion of the sides of the foot.

As is well known, stock shoes do not generally conform to the configuration of an individual foot. They are built on lasts in accordance with standard patterns. As is also well known, there is such substantial variation in the shapes of the human foot that shoes available ordinarily are oft-times imperfect approximations of the requirements of the individual wearer.

Many proposals have been advanced for structures that can be inserted into a ready-made shoe, or even a custom-made shoe, which assertedly will provide configurations to give the wearer the comfort and usefulness which is available only if the shoe be manufactured in conformity with the shape of the individual foot. In short, as if the shoe had resulted from manufacture based on a pattern or mold which duplicates the shape of the foot.

The instant invention is directed more particularly to improvements upon the proposals heretofore advanced for the preparation or manufacture of such inserts.

Consequently, it is among the principal objects of this invention to provide:

A structure of the class described constituting an improved body for insertion in a shoe; and the method of producing such improved insert;

An insert for a conventional shoe which serves to individualize the shoe to the requirements of the wearer but which does not effect alteration in the external appearance of the shoe;

Marked diminution of the cost of producing an insert of the class described so as to make possible, at reasonable cost, an adequate number of inserts for all the shoes in a person's wardrobe.

Broadly speaking, the instant invention provides for the building up of an insert by a series of steps. The basic step in such build-up consists in making an impression of the foot in a sheet of wax, e.g., a dental wax, suitably softened, while the sheet is disposed on a resilient support. In succeeding steps, there is built up, using the wax impression as a mold, a structure whereof the principal component is a light-weight body which is sufficiently rigid to support the foot but which at the same time is easy on the foot. Such a body is a foot conforming member in the nature of a cork-like material. There can be

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desirably, adhered to that cork-like body a sheet of leather.

In view of the above mentioned basic and subsequent steps, the instant insert can be prepared by persons who may acquire requisite proficiency without the need for extended instruction.

A fuller understanding of this invention, its advantages and the attainment of the foregoing objects, as well as other objects, will become apparent from the more detailed description thereof taken in connection with the accompanying drawings wherein:

FIG. 1 is a vertical section showing the first step (formation of an impression in a sheet of wax) in one method of manufacturing the insert of this invention;

FIG. 2 is a vertical section of an intermediate structure formed in the course of building-up the insert;

FIG. 3 is a vertical section of a further intermediate structure in building-up the insert;

FIG. 4 is a vertical section of a still further intermediate structure produced in building-up the insert;

FIG. 5 is a vertical section of a finished insert;

FIG. 6 is a vertical section of an intermediate structure formed in another method of building-up an insert, starting with the wax impression illustrated in FIG. 1;

FIG. 7 is a vertical section of an intermediate structure developed in building-up an insert on the structure illustrated in FIG. 6; and

FIG. 8 is a vertical section of a finished insert built-up from the intermediate structure illustrated in FIG. 7.

The following are examples in accordance with this invention.

EXAMPLE 1 (FIGS. 1 THROUGH 5)

Step 1

Box 10 contains a resilient "sponge-like" material upon the upper surface of which is placed a sheet of softened wax 14. The foot is placed on the softened wax sheet so as to effect an indentation thereof, thus leaving an impression of the bottom of the foot, which constitutes, when cooled, a mold thereof.

A suitable wax for such use is a dental impression wax having a thickness of about $\frac{1}{16}$ of an inch, which readily softens upon gentle heating. Dental waxes are readily obtainable from dental supply houses. We have found that the resilient material 12 can be constituted of any resilient material, e.g., foam rubber sponge. It is sufficient if the thickness of 12 be about one inch.

Step 2

We remove the mold 14 and place thereon a softened fabric which contains a resin that is softenable by an organic solvent. The softened fabric takes on the configuration of the wax mold 14. The solvent is allowed to volatilize; and as a result becomes rigid and constitutes the shape 16 (FIG. 2).

A fabric suitable for such use is available commercially under the trademark "Celastic," manufactured by the Celastic Corporation, Kearny, N.J. It is referred to in the trade as a colloid-treated fabric. The Celastic when immersed in acetone, for example, readily softens so that it can be easily manipulated and made to conform to the shape of the wax impression.

Step 3

We then separate the rigidified fabric shape 16 from the wax mold 14, leaving that shape (FIG. 3) in readiness for the next step.

Step 4

We apply to the underside, i.e., the bottom side, of shape 16 a coating of a pasty or flowable composition 18 (FIG. 4) which composition can be developed into a

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lightweight body (in the nature of a molded synthetic or artificial core-like member) having sufficient rigidity, but possessed of adequate cushioning to support the foot. We call the composition 18 a "corking composition".

We have found that a suitable composition for use in making the coating 18 consists of about $\frac{1}{3}$ part of sawdust and $\frac{2}{3}$ part of a latex which may be entirely natural latex or a mixture of $\frac{1}{3}$ to $\frac{2}{3}$ part of natural latex and $\frac{2}{3}$ to $\frac{1}{3}$ part of a latex of neoprene (chloroprene rubber which is resistant to oils, heat and oxidation). In lieu of the sawdust component of composition 18 we can use wood shavings, wood flour, granulated rubber, plastics, etc. These materials may be admixed with the liquid substances; and thus constitute fluid compositions which can be coated out and which ultimately can develop into the "cork-like" body.

Step 5

The intermediate form (FIG. 4) consisting of shape 16 coated with composition 18 may be dried for about 24 hours at 180° F. During that drying the composition 18 solidifies and results in the formation of the foot conforming "corklike" body 32. We then adhere to the top side of the composite structure constituted of shape 16 and 32, shoemaker's glue, and then adhere thereto a sheet of leather, or leather-like material. The structure thus formed (FIG. 5), a currently preferred embodiment of this invention which is constituted of the foot conforming "cork-like" body 32, shape 16 and leather 34, when inserted in a shoe provides a support for the foot having the shape and configuration which conforms with the bottom of the foot.

EXAMPLE 2 (FIGS. 1, 6, 7 and 8)

Step 1

Step 1 is carried out in the same way as Step 1 Example 1.

Step 2

The wax pattern prepared by Step 1 is coated with plaster of Paris 30 as illustrated in FIG. 6. This results in the formation of a positive mold of the bottom and a portion of the sides of the foot. The plaster mold is then separated from the wax pattern.

Step 3

To the inside of the plaster mold 30 we apply the composition we have described above, i.e., the composition 18.

Step 4

We dry the composite structure constituted of the plaster mold and the corking composition as described in Step 5 of Example 1 with the resultant formation of the structure illustrated in FIG 7 wherein 32^x is akin to 32 of FIG. 5.

Step 5

After separating 32^x from 30, we coat the top of 32^x with shoemaker's cement and adhere thereto a sheet of leather or leather-like material 34^x. The finished insert thus formed is then trimmed for insertion into the shoes.

It will be understood that the foregoing description of the invention and the examples thereof are merely illustrative of the principles thereof. Accordingly, the appended claims are to be construed as defining the invention within the full spirit and scope thereof.

We claim:

1. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a resilient support, a sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax;
- (c) effecting the formation on the impression bearing wax of a positive mold of the bottom of the foot;
- (d) separating the wax from the positive mold;
- (e) applying to the positive mold a coating of a pasty

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composition which can be developed into a foot-conforming, foot-supporting body; and

(f) effecting solidification of said composition into a foot-conforming, foot-supporting body.

2. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a resilient support, a sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax;
- (c) effecting the formation on the impression bearing wax of a positive mold of the bottom of the foot;
- (d) separating the wax from the positive mold;
- (e) applying to the positive mold a coating of a pasty composition which can be developed into a material of "cork-like" texture; and
- (f) effecting solidification of said composition into a foot-conforming body of "cork-like" texture.

3. In a method in accordance with claim 2, the further step of adhering to the structure a sheet of leather.

4. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a resilient support, a sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax;
- (c) applying to the impression-bearing wax a resin-containing fabric softened with an organic solvent;
- (d) allowing the solvent to volatilize thereby leaving the fabric in rigidified condition and thus constituting a positive mold of the bottom of the foot;
- (e) separating the wax from the positive mold;
- (f) applying to the positive mold a coating of a pasty composition which can be developed into a foot-conforming, foot-supporting body; and
- (g) effecting solidification of said composition into a foot-conforming, foot-supporting body.

5. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a resilient support, a sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax;
- (c) applying to the impression-bearing wax a resin-containing fabric softened with an organic solvent;
- (d) allowing the solvent to volatilize thereby leaving the fabric in rigidified condition and thus constituting a positive mold of the bottom of the foot;
- (e) separating the wax from the positive mold;
- (f) applying to the positive mold a coating of a pasty composition which can be developed into a material of "cork-like" texture; and
- (g) effecting solidification of said composition into a foot-conforming body of "cork-like" texture.

6. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a resilient support, a sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax;
- (c) applying to the impression-bearing wax a resin-containing fabric softened with an organic solvent;
- (d) allowing the solvent to volatilize thereby leaving the fabric in rigidified condition and thus constituting a positive mold of the bottom of the foot;
- (e) separating the wax from the positive mold;
- (f) applying to the positive mold a coating of a pasty composition comprising sawdust and latex; and
- (g) effecting solidification of said composition into a foot-conforming body of "cork-like" texture.

7. In a method in accordance with claim 5, the further step of adhering to the structure a sheet of leather.

8. In a method in accordance with claim 6, the further step of adhering to the structure a sheet of leather.

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9. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a dry resilient support, a heat softened sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax and hardening the formed sheet by cooling;
- (c) applying to the hardened formed wax sheet a coating of plaster of Paris which develops into a positive mold of the bottom of the foot;
- (d) separating the wax from that positive mold;
- (e) applying to that positive mold a form fitting coating of a pasty composition which can be developed into a foot-conforming, foot-supporting body; and
- (f) effecting solidification of said composition into a foot-conforming, foot-supporting body.

10. In a method of producing a foot-conforming shoe insert, the steps comprising

- (a) placing on a dry resilient support, a heat softened sheet of impression receiving wax;
- (b) placing the foot thereon to effect an impression of the bottom of the foot in said sheet of wax and hardening the formed sheet by cooling;
- (c) applying to the impression bearing wax a coating of plaster of Paris which develops into a positive mold of the bottom of the foot;

(d) separating the wax from that positive mold;

(e) applying to that positive mold a form fitting coating of a pasty composition which can be developed into a material of "cork-like" texture; and

(f) effecting solidification of said composition into a foot-conforming body of "cork-like" texture.

11. In a method according to claim 10 the steps of applying to the positive mold a pasty composition comprising a mixture of sawdust and latex, and effecting solidification of said composition into a foot-conforming body having a "cork-like" texture.

12. In a method in accordance with claim 10, the further step of adhering to the structure a sheet of leather.

13. In a method in accordance with claim 9, the further step of adhering to the structure a sheet of leather.

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