(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 085 657**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **83830018.4**

(51) Int. Cl.³: **A 43 B 7/28**

(22) Date of filing: **28.01.83**

(30) Priority: **01.02.82 IT 210382**

(43) Date of publication of application:
10.08.83 Bulletin 83/32

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI NL SE

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(54) **A self-modelling footwear inner sole to individual foot size.**

(57) This invention resides in a footwear insole or inner sole (10) comprising or completable with modellable semi-fluid material (19), curable to a rubber state so that, when inserted in a shoe (18), the insole or inner sole takes anatomic shape and perfectly fits to the wearer's foot, so as to convert a simple footwear to anatomic type of footwear.

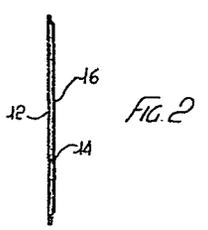

FIG. 2

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"A SELF-MODELLING FOOTWEAR INNER SOLE TO INDIVIDUAL FOOT SIZE"

This invention resides in a footwear insole or inner sole comprising or completable with modellable semi-fluid material, curable to a rubbery state so that, when inserted in a shoe, the insole or inner sole takes anatomic shape and perfectly fits to the wearer's foot, so as to convert a simple footwear to anatomic type of footwear.

As well known, shoes with anatomic plantar have gained wide

spread use, such shoes having the basic property of less fatiguing foot in people obliged for work to walk long. It is also well known that by being made to standard shapes and sizes such plantars often do not fit to the personal configuration of the individual person's foot.

On the other hand, this invention provides that the plantar actually takes the shape of an individual foot, with considerable increase in resting function thereof. This may occur since the inventive insole of inner sole comprises or may be completed with a layer of material that initially, or when a shoe is first worn, is at a gelatinous semi-fluid state or the like, capable by little effort to take an impressed shape, and then cure after few hours, taking the foot shape as a cast. Such a material layer is carried on a flexible sheet support and lined with a protection, generally made of cloth. Thus a plantar is obtained which perfectly adheres to a foot, whatever is the individual configuration thereof. Thus, the body weight is evenly distributed on the entire surface of the foot sole and not only, as usually is the case, on the heel and forefoot, thereby reducing the possibility of weariness and pain at such locations.

In an embodiment, an anatomic inner sole will be provided by spreading with silicones rubber or other similar product a thin cardboard insole, which will then be covered with cloth. The whole will then be inserted in an aluminium envelope (or the like), which will be vacuum closed, so that such an inner sole is not brought in contact with air and silicone rubber remains at fluid state.

In another embodiment, the silicone cement will be supplied in a separate container. At the time of use, the inner sole will be taken from the envelope, or the cement will be injected therein, and the insole inserted in the shoe, the latter being at once worn. After some minutes, the insole will have already taken the foot shape, as the fluid will insert in the voids thereof, such as plantar arc and so on. After some hours the silicone will cure, taking a rubbery consistency and thus an anatomic plantar will be provided to foot size, while being flexible to movement.

For silicone rubber, a compound or product is meant based on silicone of the type commercially marketed and ordinarily used as sealing agents for gutters, hydraulic pipelines and so on. In any case, any compound will fit, provided that it can be maintained at an initial semi-fluid state for readily take a shape by impression and is solid, rubbery, flexible at cured state, and that it has the property of passing from initial semi-fluid state to cured state within a reasonably limited time.

The schematic figures of the accompanying drawing show unrestrictive exemplary embodiments of the invention, in which:

Fig. 1 is a plan view with broken away portion, showing an insole or inner sole according to the invention prior to insertion in a shoe;

Fig. 2 is a sectional view taken along lines 2-2 of Fig. 1;

Fig. 3 is a vertical sectional view through a footwear provided with the insole and shaped to the foot;

Fig. 4 is a plan view of an insole according to another embodiment;

Fig. 5 is a longitudinal sectional view taken along the insole shown in Fig. 4; and

Fig. 6 is a side view of a spout for injection of material into the insole.

According to this invention, an inner sole 10 generally but not necessarily has, as shown in Fig. 1, a flat shape and is outlined as a common insole of a size fit to shoe. It comprises a layer of thin flexible material, generally a layer of cardboard 12,having one face spread with a light layer 14 of a material maintained at plastic or semi-fluid state and coated with a protective material 16, generally cloth. The semi-fluid material at present preferred is a silicone rubber. For silicone rubber a product is meant based on silicone of a type commercially marketed and ordinarily used as sealing agents for gutters, hydraulic pipelines and so on. However, any product will fit, provided that it can be maintained at an initial semi-fluid state for readily take a shape by impression, and is solid, rubbery, flexible at cured state, and has the property of passing from the initial semi-fluid state to cured state within a reasonably limited time.

The cardboard performs the function of supporting the semi-fluid layer and preventing the insole from initially moving in the shoe. The cloth performs the function of containing the silicone product when the latter is still semi-fluid.

In order to retain plasticity of layer 14, an insole 10 will be generally sold in a vacuum covering, or anyhow otherwise conditioned to maintain the layer plasticity to the opening time

thereof. Upon covering opening, the insole will be taken out and placed in the footwear, which will be immediately worn. After some minutes, the insole will have taken the anatomic shape perfectly fitted to the wearing foot.

Fig. 3 shows an insole 10 inserted in shoe 18 and already shaped to the shoe wearer's foot.

Although said insole 10 is shown with layer 14 extended on the entire layer 12, within the scope of this invention insoles can be however embodied in which said layer 14 only partially extends on the foot sole.

According to a modified embodiment (Figs. 4 through 6), an insole or inner sole 10a is made and sold with only two protective supporting sheets or layers 12a and 16a, respectively, integral to each other, and defining a space 20 therebetween intended to receive a semi-fluid, formable and curable rubber material. This space 20 is accessible through a sealable opening 21. The semi-fluid material is supplied in separate tube and at the time of use it is introduced into said space 20, in the case by means of a suitable spout shown in Fig. 6, applied to the tube. The insole 10a is then used as above described in connection with insole 10.

As the subject invention has been described and shown only by way of indicative unrestrictive example, it should be understood that many changes and modifications can be constructively made thereto depending on the specific conveniences and requirements of industrial productions, uses and so on, the whole without departing from the scope of the present invention.

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C L A I M S

1. A footwear inner sole characterized by comprising a supporting layer and a protective layer defining therebetween a containing space for a semi-fluid modellable material.

2. An inner sole according to Claim 1, characterized by comprising in said space a filling of material maintained at a semi-fluid modellable state, said material being curable under ambient conditions to such a rubbery state as to indefinitely maintain a shape as impressed to the material when at semi-fluid state.

3. An inner sole according to Claim 1, characterized by comprising in combination a preparation of material maintained at a semi-fluid modellable state, said material being curable to a rubbery state under ambient conditions; and means for injecting said material into said space.

4. An inner sole according to Claim 1, characterized by the

fact that said supporting layer comprises cardboard.

5. An inner sole according to Claim 1, characterized by the fact that said protective layer comprises cloth.

6. An inner sole according to Claim 2 or 3, characterized by the fact that said material comprises a monocomponent silicone rubber.

7. An inner sole according to Claim 2, characterized by being inserted in an air and humidity impervious envelope and vacuum closed.

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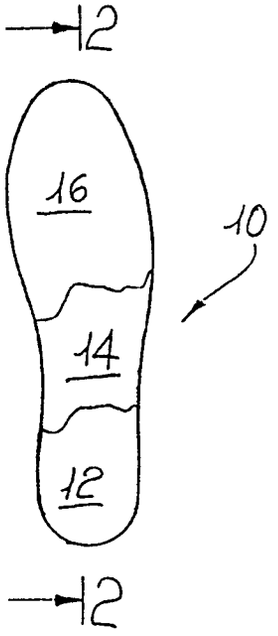

FIG. 1

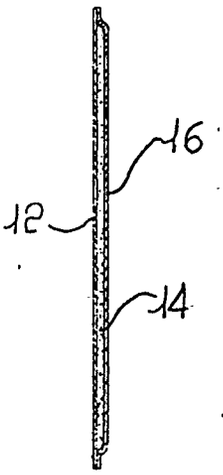

FIG. 2

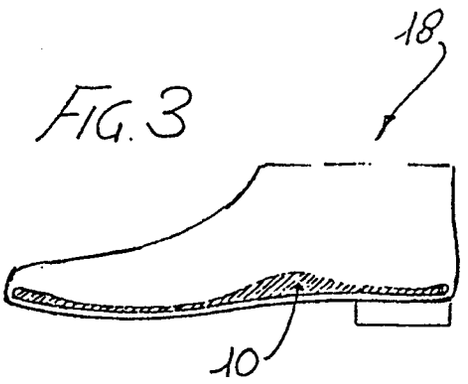

FIG. 3

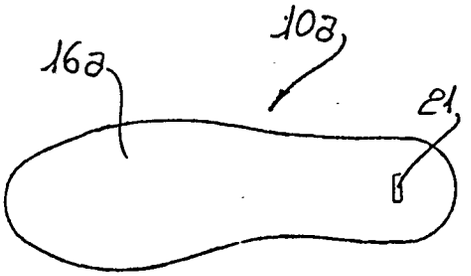

FIG. 4

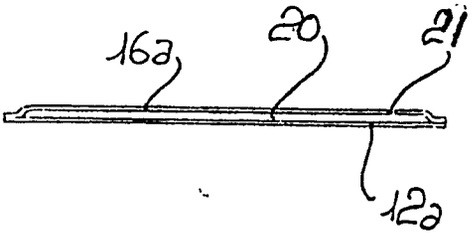

FIG. 5

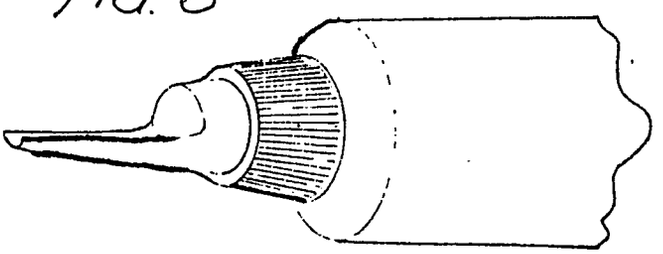

FIG. 6

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EUROPEAN SEARCH REPORT

0085657
Application number

EP 83 83 0018

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	AT-B- 342 456 (R. BINDER) * Claims 1,2 *	1-7	A 43 B 7/28
X	DE-A-2 926 246 (STEFAN SPORTSCHUHE) * Claim 1; page 10, lines 18-22; figure *	1-5	
X	US-A-4 128 951 (H.A. TANSILL) * Abstract; figures 1-14 *	1-3	
X	US-A-4 211 019 (D.F. McCAFFERTY) * Abstract; figures 1-9 *	1-3	
A	US-A-2 973 529 (J.J. SILVERMAN) * Column 2, lines 64-66; figure 3 *	4	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) A 43 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27-04-1983	MALIC K.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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