United States Patent [19]

Smith

[11] **3,765,422**

[45] **Oct. 16, 1973**

[54] **FLUID CUSHION PODIATRIC INSOLE**

[76] Inventor: **Henry M. Smith,** 8575 Main St., Williamsville, N.Y. 14221

[22] Filed: **Dec. 27, 1971**

[21] Appl. No.: **211,945**

[52] **U.S. Cl.** **128/594,** 36/29

[51] **Int. Cl.** **A61f 5/14**

[58] **Field of Search** 128/594, 595; 36/2.5, 3, 71, 29

[56] **References Cited**

UNITED STATES PATENTS

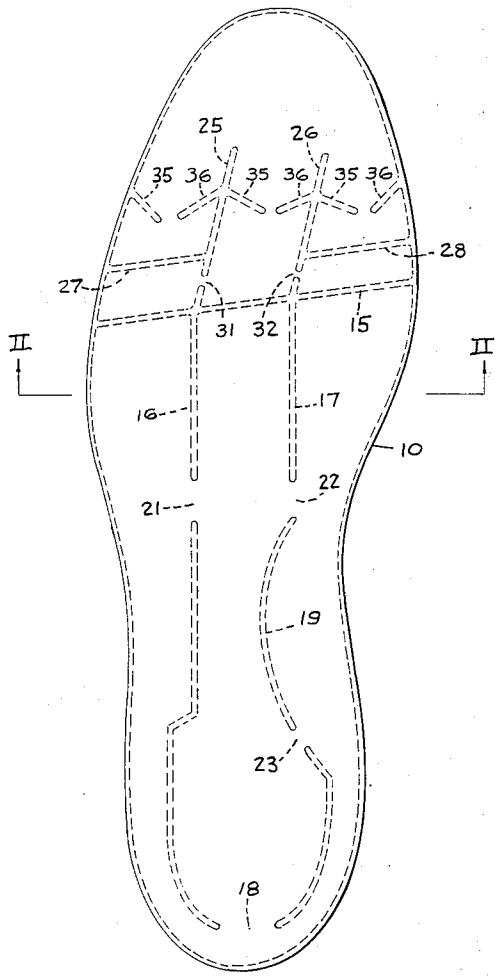
1,145,533	7/1915	Wetmore	128/594
2,477,588	8/1949	Dumm	128/594
3,469,576	9/1969	Smith et al	128/595
2,641,066	6/1953	Filardo	128/594

Primary Examiner—Aldrich F. Medbery
Attorney—Conrad Christel et al.

[57] **ABSTRACT**

A podiatric insole in the form of a flat flexible envelope of the outline of a wearer's foot and containing a liquid or semi-liquid flowable cushioning medium. A transverse wall divides the interior of the insole into front and rear chambers, the transverse wall extending along the forward edges of the metatarsal pressure points of the foot of the wearer. The rear chamber has longitudinal walls directing the flowable medium forwardly and rearwardly in such chamber and the front chamber may also have such flow-directing longitudinal wall formations.

8 Claims, 3 Drawing Figures



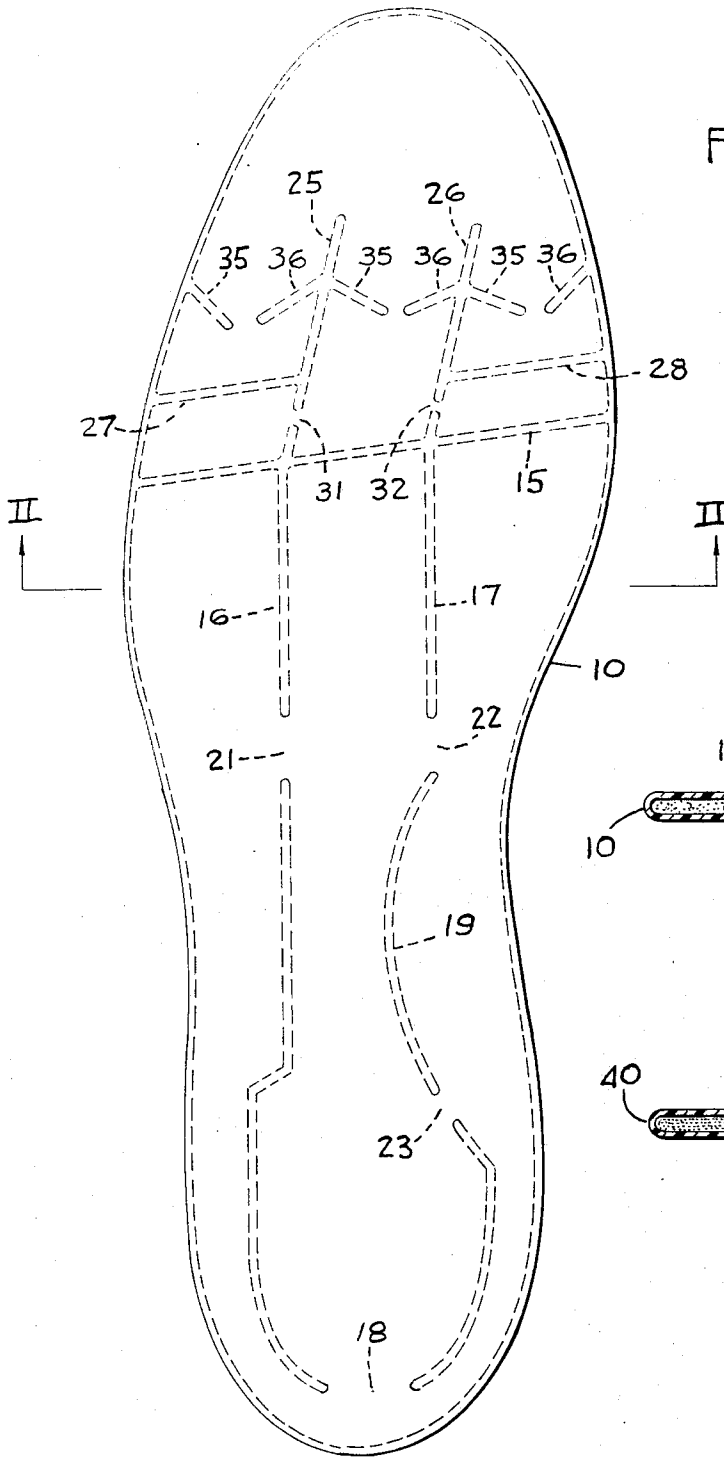


FIG. 1.

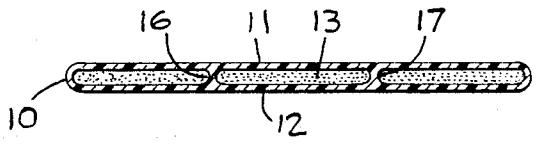


FIG. 2.

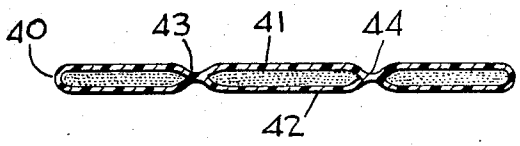


FIG. 3.

INVENTOR.
HENRY M. SMITH
BY
Christel & Bean
ATTORNEYS

FLUID CUSHION PODIATRIC INSOLE

BACKGROUND OF THE INVENTION

This invention relates to podiatric devices and particularly to an insole structure which may comprise a separate insole disposable in an article of footwear or may be incorporated in the footwear structure.

In the prior art various cushioning devices have been proposed for use between the bottom of a user's foot and the sole and heel structure of a shoe. Among these proposals are some in which a flowable substance is contained within a relatively flat envelope, the flowable substance being displaced by pressure of portions of the user's foot thereon.

One form of prior art device is exemplified in U.S. Pat. No. 3,469,576, dated Sept. 30, 1969, in which I am a coinventor. In this prior device the cushioning medium is a flowable liquid or semi-liquid material and the device is provided with longitudinal channels disposed and proportioned to direct and to some extent restrict longitudinal flow of the cushioning material. I have found that in use devices of this type are subject to the objection that the flowable material tends to be displaced forwardly in the device and to a considerable extent trapped in such forward portion by the major downward pressure exerted at the metartarsals of the foot of the user.

SUMMARY OF THE INVENTION

The podiatric device of the present invention provides an insole structure in the form of a relatively flat envelope containing a flowable fluid or semi-fluid material wherein a transverse wall is provided along a line defined by forward portions of the metatarsals of the foot of the user. By this means trapping of the fluent cushioning material in the forward portion of the insole is obviated and a very significantly better cushioning action is provided.

In a normal stride the foot of the user exerts a forward rocking action; the first pressure is at the heel of the user and this pressure application to the insole moves forwardly thereof as the forward portion of the user's foot comes down. In the present device the forward limits of the envelope portion beginning at the rear of the insole lie at the front edge of the metatarsals which exert the greatest downward pressure in a normal stride. However, because of the transverse wall of the present combination fluid displaced by the pressure of the metatarsals must move rearwardly of the insole and cannot be crowded into and trapped in the forward portion.

In addition to this transverse wall, the portion of the insole of the present invention rearwardly of the transverse wall is preferably, but not necessarily, provided with generally longitudinally extending flow directing walls which provide longitudinal channels with limited lateral flow between the channels thus formed. The portion of the insole forwardly of the transverse wall may also be provided with flow directing walls although the necessity for such walls is less imperative forwardly of the transverse wall due to the limited longitudinal extent thereof and the laterally more uniformly distributed pressure in such forward portion.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of one form of the insole of the present invention;

FIG. 2 is a transverse cross-sectional view on the line II—II of FIG. 1; and

FIG. 3 is a view similar to FIG. 2 but showing a modified interior structure of the insole.

DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

In FIG. 1 the numeral **10** designates an insole which comprises a flat envelope having the outline of the interior bottom portion of an article of footwear, that is, of substantially the outline of the user's foot. Envelope **10** has upper and lower walls **11** and **12** and is generally hermetically sealed. A flowable medium is indicated at **13** in FIG. **2** and this medium may comprise a liquid or semi-liquid substance. In order to reduce the weight of the device the liquid or semi-liquid substance may contain what are known in the pertinent arts as phenolic beads or micro-balloons which are hollow spheroidal plastic bodies of very light weight.

In the manufacture of the articles of the present invention suitable openings will be formed for introducing the flowable material and such openings may be sealed off after filling.

As shown in FIG. **1** a transverse wall **15** extends across the interior of the envelope **10** so that there is no fluid communication between the interior of the envelope rearwardly of such wall and the interior of the envelope forwardly of the wall.

In the embodiment set forth herein by way of example, a pair of longitudinal wall formations **16** and **17** are provided which form channels extending from transverse wall **15** rearwardly where the walls curve toward each other and are spaced to provide an opening designated **18.** Wall **17** is curved as shown at **19** to follow the arch portion of the user's foot and openings are provided in the walls **16** and **17** to permit limited lateral flow between the three longitudinal channels formed by the wall formations **16** and **17.** In FIG. **1** such openings are designated **21, 22** and **23.**

The interior of the portion of the insole forwardly of transverse wall **15** may be provided with longitudinal wall formations **25** and **26** and in the illustrated instance is further provided with partial wall formations **27** and **28.** Relatively free lateral flow rearwardly of the walls **27** and **28,** that is, between transverse wall **15** and walls **27** and **28,** is established by virtue of openings **31** and **32** in longitudinal wall formations **25** and **26.**

Each of the three longitudinal channels formed by walls **25** and **26** is provided with a pair of rearwardly converging walls **35** and **36** by reason of which forward flow in this forward portion of the envelope **10** is somewhat more restricted than rearward or return flow of the flowable medium, thus further avoiding crowding and trapping of the flowable medium forwardly of the maximum pressure area in the region of the metatarsals.

FIG. **3** shows an embodiment wherein an envelope **40** is of the same general outline as the envelope **10** of FIG. **1** and in which the various transverse and longitudinal wall formations described in connection with the embodiment of FIGS. **1** and **2** are achieved by merely heat-sealing the upper and lower walls **41** and **42** of envelope **40** to each other along lines which form wall portions as in the previously described embodiment. In FIG. **3** the heat-sealed portions **43** and **44** correspond to the wall formations **16** and **17** of FIG. **1.** A transverse wall effected by heat-sealing corresponds to the trans-

verse wall **15** of the embodiment of FIGS. **1** and **2**. Apart from the manner of achievement of the wall formations, the distribution and arrangement thereof in the embodiment of FIG. **3** may be the same as illustrated in FIG. **1**.

For convenience of illustration, the insole embodiments illustrated and described herein are disclosed as shoe inserts but it is to be understood that the principles of the present invention apply equally to insoles fabricated integrally with footwear in which case the lower wall may be permanently attached to or integrated with the sole structure of an article of footwear and the term "insole" as used herein embraces both the separable and integrated types.

Preferred embodiments have been described herein and shown in the accompanying drawing to illustrate the underlying principles of the invention but it is to be understood that numerous modifications may be made without departing from the broad spirit and scope of the invention.

I claim:

1. A podiatric insole comprising a flexible envelope conforming generally in outline to and extending substantially the full length of a wearer's foot and having an upper wall adapted to engage against the underside of such wearer's foot and a lower wall coextensive with and connected along its side edges to the upper wall to form a closed envelope, a continuous transverse wall dividing the interior of said envelope into non-communicating front and rear chamber portions, said wall being located on a portion of the insole corresponding to the forward margins of the metatarsal pressure points of the wearer, both chamber portions containing a flowable at least semi-liquid cushioning material.

2. A podiatric insole according to claim **1** wherein said rear chamber portion includes longitudinal wall formations providing longitudinal channels for said flowable material.

3. A podiatric device according to claim **2** wherein said rear chamber portion wall formations include openings providing limited lateral flow of said flowable material between the longitudinal channels.

4. A podiatric device according to claim **1** wherein said flowable material comprises solid particles disposed in a liquid medium.

5. A podiatric device according to claim **2** wherein said flowable material comprises solid particles disposed in a liquid medium.

6. A podiatric device according to claim **1** wherein said front chamber portion includes generally longitudinal wall formations providing longitudinal channels for said flowable material.

7. A podiatric device according to claim **3** wherein said front chamber portion includes generally longitudinal wall formations providing longitudinal channels for said flowable material.

8. A podiatric device according to claim **6** wherein said flowable material comprises solid particles disposed in a liquid medium.

* * * * *