Aug. 2, 1949. G. H. DUMM 2,477,588

HYDRAULIC INSOLE

Filed Feb. 8, 1946

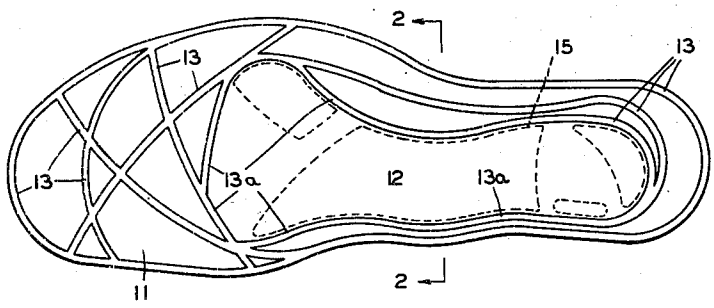


FIG.-1

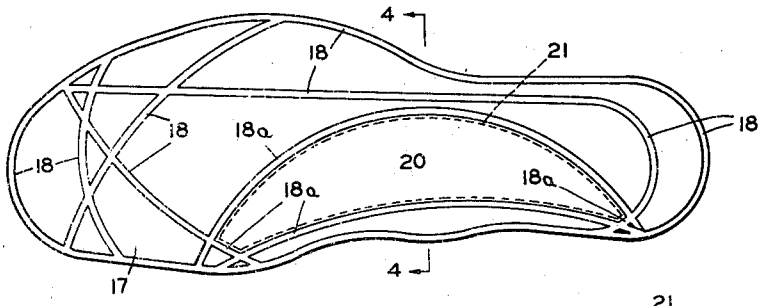


FIG.-3

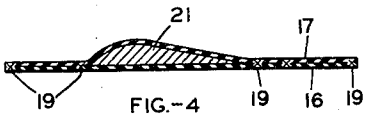


FIG.-4

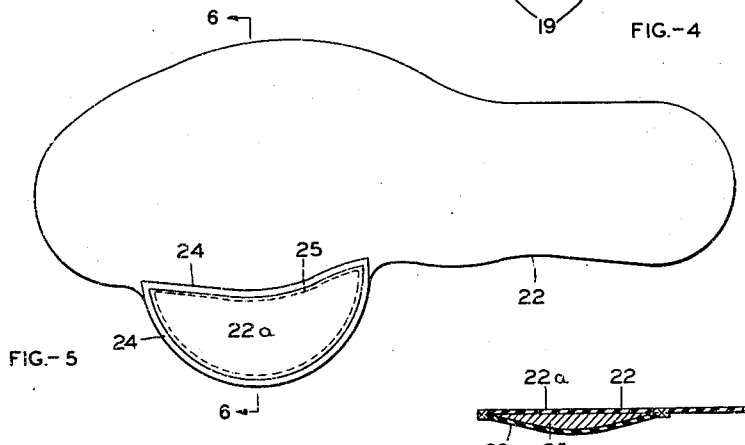


FIG.-5

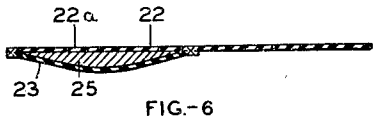


FIG.-6

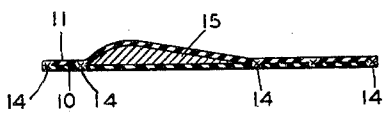


FIG.-2

INVENTOR
GEORGE H. DUMM

BY Hyde, Mayer, Baldwin and Doran
ATTORNEYS

Patented Aug. 2, 1949 2,477,588

UNITED STATES PATENT OFFICE

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HYDRAULIC INSOLE

George H. Dumm, Kent, Ohio

Application February 8, 1946, Serial No. 646,400

1 Claim. (Cl. 36—71)

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This invention relates to improvements in a device of the nature of an hydraulic insole adapted to be worn inside footwear.

An object of the present invention is to provide a flexible pocket and means to retain the same in a predetermined position relative to the foot of the wearer, together with flowable material inside the pocket which adapts itself to inequalities of the wearer's foot when in use, so as to provide foot support at desired places.

Other objects of the present invention are to provide novel arrangements of pockets of flowable material adjacent specified portions of the foot together with cheap but efficient means for holding these pockets in predetermined position relative to the foot of the wearer.

Another object of the present invention is to provide closed flexible pockets in predetermined positions relative to the foot of the wearer, and a novel filling material for such pockets which flows with difficulty at body temperatures.

Other objects and advantages of the present invention will be apparent from the accompanying drawings and specification, and the essential features thereof will be set forth in the appended claims.

In the drawings,

Fig. 1 is a top plan view of one form of my device;

Fig. 2 is a transverse sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a top plan view showing a modified form of my device;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a top plan view of a further modification of my invention; while,

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5.

It is well known that support or protection is needed for certain parts of the human foot and this has been provided heretofore in some cases, by devices of fixed contour, which, of course, were never of exactly the right shape to conform to the individual wearer's foot. Other supporting devices for the entire foot filled with fluid have been known to me but these did not provide the specific support for predetermined portions of the foot. The present invention provides specific support where needed of such a nature that it accommodates itself to the exact needs of the foot of the wearer.

One form of my device, as best seen in Figs. 1 and 2, comprises two generally parallel flexible sheets 10 and 11 cut to the outline of the insole

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of the footwear with which it is intended to be used. The size and shape illustrated is for a man's shoe of medium size but obviously the outer perimeter of sheets 10 and 11 may be cut to any desired size and shape so as to fit the shoes of women and children as well as men, and in a complete range of sizes. The sheets 10 and 11 may be of rubber or synthetic rubber-like material or any similar material having flexible characteristics and adapted to be readily cemented together.

As best seen in Figs. 1 and 2, the sheets 10 and 11 are sealed together over the greater part of their area in any suitable manner, so that they act satisfactorily as a one-piece insole, while at the same time, defining a pocket 12 of desired shape and extent. In the case of the synthetic material illustrated, heated wheels are passed over the material with the application of pressure so as to seal the sheets 10 and 11 together along the lines indicated at 13. The position of these lines in the sectional view of Fig. 2, is illustrated by the crosses 14. It will be noted that the lines marked 13a in Fig. 1 define a central pocket 12 which lies beneath the heel, the arch, and the metatarsal joint of the wearer's foot.

Before the pocket 12 is completely closed, it is partially filled with a flowable material 15 after which the sides of the pocket are completely closed in a liquid-tight manner. Various materials may be used in the pocket 12, but I prefer to use material which flows with difficulty at body temperature. I have found about the right consistency in homogenized honey. This is an intimate mixture of the entire honey included the comb.

It results from the above construction that when the device of Figs. 1 and 2 is placed as an insole between the wall of the shoe and the foot of the wearer, the flowable material 15 is squeezed out of parts of the pocket into other parts where it provides a support for the foot, which would otherwise be unsupported because of inequalities existing between the sole of the shoe and the foot of the wearer. Obviously, the pattern formed by the material 15 will in each case vary with the individual using it. In Fig. 1, I have indicated in dotted lines the position of this material taken in one instance. This shows a slight amount of material at the back and sides of the heel, another slight amount at one side of the metatarsal joint, but the bulk of the material is in the center of the pocket beneath the arch of the foot. In fact, the portions of material at the back and sides of the heel and at the metatarsal joint were of

much less thickness than the portion beneath the arch of the foot. In a normal foot this will always be true and the bulk of the material will be squeezed up beneath the arch of the foot, giving it a necessary support along natural lines and accommodated to the exact needs of the foot of the wearer.

In Figs. 3 and 4, I have shown a modification arranged more specifically for the support of the arch without reference to other parts of the foot. Here the sheet members 16 and 17 are secured together over the greater portion of their extent by seams made by pressure and heat, as previously described, and extending along the lines 18. Where these seam lines appear in Fig. 4, their positions are indicated by the crosses 19. Some of these seam lines, as indicated at 18*a*, define a pocket 20 which is fluid-tight and in which is placed the required amount of flowable material 21. Because this material is approximately in the place where it is needed to support the arch of a normal foot, the material 21 will be fairly well distributed over the pocket 20, as indicated in Fig. 3.

In Figs. 5 and 6, I have shown a further modification for use in protecting a bunion or the like. In this device a single sheet 22 of material, cut to fit the insole of a shoe, has connected to it at the proper place, a smaller sheet of flexible material 23 which together with the portion 22*a* of the sheet 22 provides a pocket which extends laterally outside of the normal periphery of an insole. This pocket is closed by uniting the layers 23 and 22 along the lines 24 making a fluid-tight pocket which is partially filled with flowable material 25. It is obvious that when the device of Figs. 5 and 6 is placed in the shoe of a wearer, the pocket portion will fold up alongside the great toe and the material 25 will be moved toward the front and rear ends of the pocket so as to provide a cushion around the bunion.

Obviously, my teachings may be utilized to provide liquid-tight pockets any place desired around the foot, and the portions of the insole connected with the pocket serve to hold the pocket in a predetermined position relative to the foot of the wearer.

The shape and material used in connection with a given pocket together with the amount and

nature of the filling material in said pocket, is calculated to achieve the result desired. Obviously, to take the case of Figs. 1 and 2, if the pocket 12 were of too great a thickness and completely filled with the material 15 before the device was placed in use, then when the weight of the wearer pushed the material from the front and rear ends of the pocket beneath the arch, there might well be too much material at that point and the wearer would be uncomfortable.

In any case, the filler material, such as homogenized honey, is sufficiently flowable to conform to the shape of the foot of the wearer, but it also has sufficient body or consistency to exert a massaging action on the foot as the filler material moves about in the pocket due to foot movements.

What I claim is:

A device to be worn inside footwear comprising means providing a closed flexible pocket adapted to engage the lower part of the foot of the wearer, permanently fluid difficultly flowable material in said pocket of less quantity than the capacity of said pocket, said material in said pocket having approximately the flowability of homogenized honey, and means operatively connected with said pocket adapted to hold said pocket in predetermined position relative to the foot.

GEORGE H. DUMM.

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