

Dec. 22, 1959

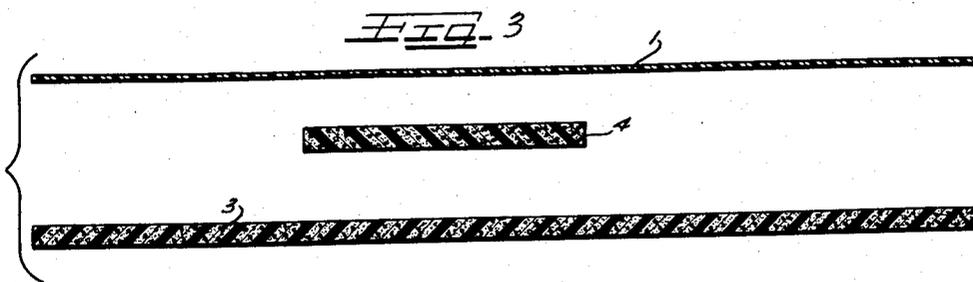
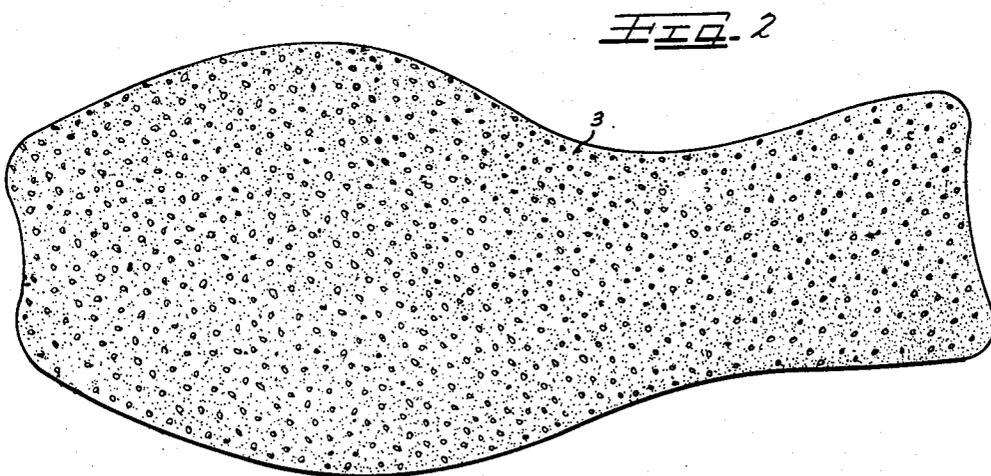
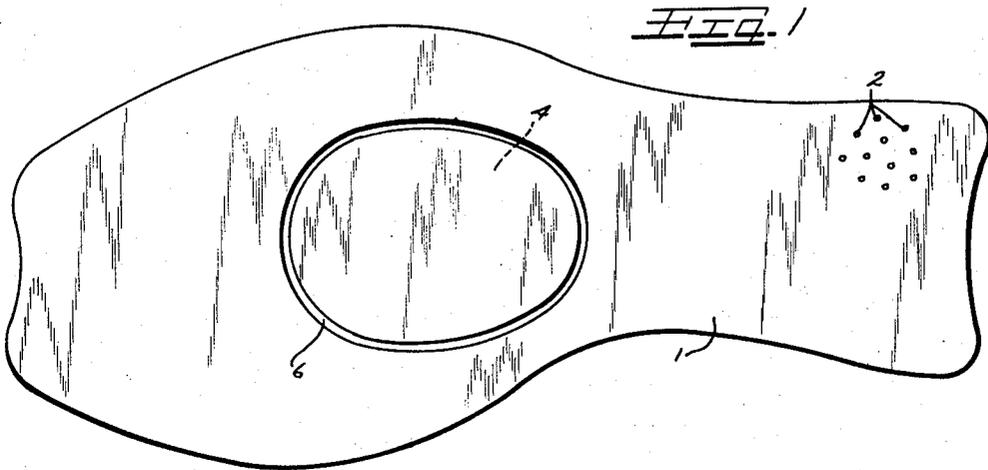
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2,917,847

FOOT CUSHIONING DEVICE WITH ADDED LIFT

Filed Feb. 14, 1957

2 Sheets-Sheet 1



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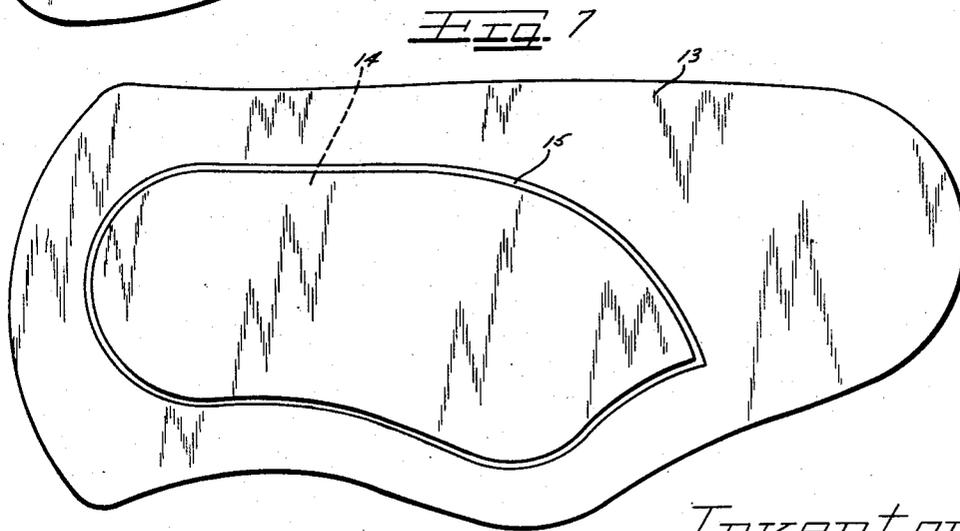
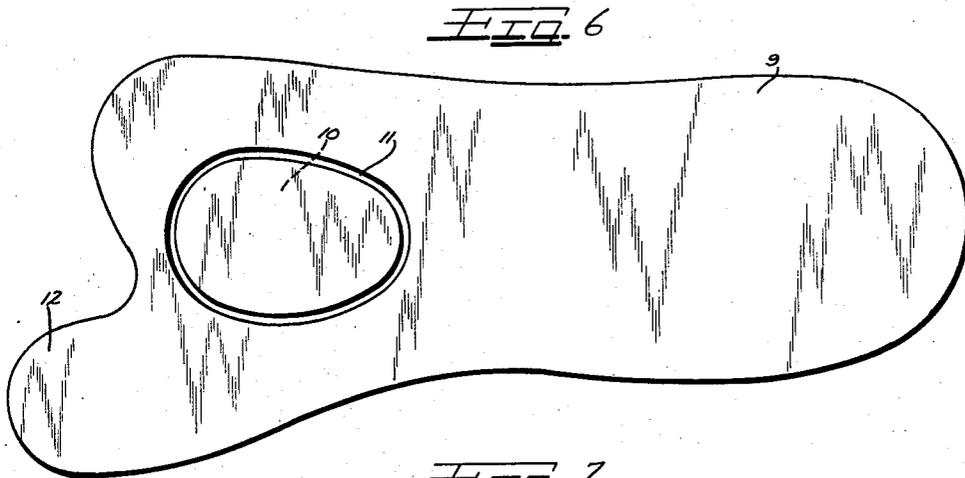
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2 Sheets-Sheet 2



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1

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FOOT CUSHIONING DEVICE WITH ADDED LIFT

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Application February 14, 1957, Serial No. 640,122

1 Claim. (Cl. 36-71)

This invention relates to improvements in a foot cushioning device with an added lift, and more particularly to a device for disposition beneath the plantar surface of the human foot and which may be shaped or sized to lend corrective aid and support to various locations of the foot dependent upon a particular patient's needs, the device being so constructed as to be readily wearable within an article of footwear and suitable for men, women, and children, although the device may have other uses and purposes which will be apparent to one skilled in the art.

Heretofore, many and various types of foot cushioning and supporting devices have been developed, but these devices have proved objectionably expensive to manufacture, owing to the added expense of providing a lift or additional supporting element in a desired or precise location during the manufacture of the device, and objectionably expensive to use, owing to their relative short life. Moreover, devices of this character heretofore known when placed freely in an article of footwear such as a shoe or the like were prone to slip or otherwise shift position. Further, these formerly known devices did not in every case provide a comfortable cushioning support of long enduring effectiveness, and at the same time exert a gentle massaging action on the foot, particularly during walking.

With the foregoing in mind, it is an important object of the instant invention to provide a foot cushioning and supporting device which may be either in the form of a full or partial insole, or even of some other construction for insertion in an article of footwear, and which is so constructed as to provide cushioning support to the foot over the entire area of the device, with an added lift built into the device at the time of manufacture and in substantially any desirable location.

Another object of the invention resides in the provision of a foot cushioning and supporting device of such construction that an added supporting lift of substantially any desired character or shape may be incorporated in the device during the manufacture of the same, with only a negligible increase in cost.

Also, a feature of this invention is the provision of a foot cushioning and supporting device embodying a layer of cushioning material, a cover layer, and with an added lift disposed in an intermediate location, and secured to the underside of the cover layer only.

It is also a feature of this invention to provide a foot cushioning and supporting device comprising a cover sheet and a thicker cushioning sheet of equal area, these sheets being heat sealed together around their bounding edges, and otherwise free from each other, the device also in-

2

corporating an added lift of any desirable shape and disposed in an intermediate location, the lift being secured to the underside of the cover sheet only.

Still another feature of the instant invention resides in the provision of a foot cushioning and supporting device for disposition beneath the plantar surface of the human foot, which device incorporates a cushioning layer of foam material capable of pumping air during variations in pressure while the user is walking, with an added lift disposed in any desired location above that foam layer, and a cover member over both the lift and the cushioning layer.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a top plan view of a foot cushioning and supporting device embodying principles of the instant invention;

Fig. 2 is a bottom plan view of the structure of Fig. 1;

Fig. 3 is an exploded view in central vertical section, illustrating the parts making up the structure of Fig. 1 prior to joining the parts together;

Fig. 4 is a central vertical sectional view illustrating two of the parts of Fig. 3 joined together;

Fig. 5 is a central vertical sectional view through the completed device, illustrating all of the parts of Fig. 3 joined together;

Fig. 6 is a top plan view of a cushioning and supporting device embodying principles of this invention, but of slightly different construction; and

Fig. 7 is a plan view of still another form of cushioning and supporting device embodying principles of the instant invention.

As shown in the drawings:

Several forms of the instant invention have been selected by way of example, and not by way of limitation, for purposes of illustrating the invention and to indicate the versatility of the same.

The first illustrated embodiment, seen in Figs. 1 to 5 inclusive, is in the form of a shortened insole highly desirable for disposition in a lady's open-heeled shoe, the insole being of such length as to permit the toes to project beyond the forward end thereof, and the rear of the device terminates beneath the heel of the user so as to be concealed when worn in an open-heeled shoe.

This form of the invention embodies a cover sheet 1 preferably relatively thin and made of a thermoplastic material, an unsupported vinyl film being satisfactory for this purpose, among other substances. The cover may be provided with numerous perforations therein, as indicated at 2, if so desired. In some cases, the cover sheet will be provided with such perforations over substantially its entire surface, while in other instances the perforations may be confined to a predetermined area of the cover, and in some cases there will be no perforations whatever.

The structure also embodies a thicker layer of cushioning material, designated 3, which is of substantially the same area as the cover sheet, and this cushioning sheet or layer 3 is preferably a thermoplastic foam material having intercommunicating cells for ventilative purposes. One satisfactory material for the cushioning sheet

3

or layer 3 is vinyl foam which may be made from a liquid composition generically known as a plastisol. Such plastisol itself may be a dispersion or suspension of polyvinyl chloride resin, or a copolymer in one or more plasticizers, such as a high boiling alcohol, for example dioctyl phthalate, dioctyl adipate, dicapryl phthalate, etc., the plastisol being expanded and then cured to provide an open cell, flexible, structural material.

The cover sheet 1 may satisfactorily be a vinyl film and have substantially the same chemical constituency as the foam sheet or layer 3, but it is made under a different process without expansion and is ultimately rolled by a calender or the like into the resulting sheet or film which has considerably more density than the foam layer.

It should also be noted that both the cover layer and the foam layer may be made in substantially any desirable colors or combinations of colors and the cover sheet 1 may be given substantially any type of finish or appearance, such as simulated leather, a mottled appearance, smooth even coloring, etc.

The first embodiment of the instant invention is provided with an added lift in the general form of a metatarsal arch support. This lift is seen in section in Fig. 3, designated by numeral 4, and may be of any desirable thickness, depending upon the amount of lift desired in a particular case. The lift 4 may be made satisfactorily of the same material as the cushion sheet or layer 3.

In the illustrated instance, both the lift 4 and cushion sheet 3 are initially flat sheets. In constructing the device, the lift 4 is first joined to the underside of the cover sheet 1, preferably by electronic heat sealing means, so constructed as to give a graduated heat sealing effect on the marginal portion of the lift and cause that margin to assume a curvate configuration, as indicated at 5 in Figs. 4 and 5. In other words, the lift curves from its central portion of maximum thickness to a fine edge at the heat seal seam 6, thereby avoiding any abrupt edges in the construction when it is in use, but giving a soft easy elevation to the lift under the foot of the user. This operation provides the structure seen in Fig. 4.

Next, the top sheet with the lift attached to the underside thereof is heat sealed to the cushion sheet 3 by heat seal seam 7 at the bounding edges of the sheets. Again, the heat sealing operation is such as to provide a smooth curvature 7a around the marginal portion of the cushion sheet 3, so that the heat seal seam is a smooth, even fine edge seam, preferably without any laterally extending flange.

Securing the lift first to the cover sheet enables the operator to place the lift readily and easily in the precise location desired, and with these parts joined, it is a simple expedient to unite the top sheet with the cushioning sheet, and the lift is automatically in the correct position. Thus, it can be seen that the manufacture of the device is extremely economical and any variance in size or location of lift would add but a negligible amount to the cost of manufacture, in view of the fact that the top sheet and the cushion sheet for the particular device are identical all through.

It will be noted from the showing in Fig. 5 particularly, outside of the two heat seal seams 6 and 7, the parts of the structure are not secured to each other. Accordingly, with the device lying free and without foot pressure thereon, there will be a space 8 between the top sheet and the cushion sheet, which space gradually lessens as the distance from the lift 4 increases. This arrangement provides added cushioning and massaging action from the device when in use. It will be recalled that the cushion sheet 3 possesses intercommunicating cells, so that when pressure is applied to the device, air is squeezed out of the space 8 and out of the cells in the layer 3, and when pressure is released, the inherent recovery action of the

4

layer 3 draws air back in. In this manner there is a constant pumping in and out of air, giving adequate ventilation and adding to the cushioning characteristics of the device, so that a gentle massaging action against the plantar surface of the foot also results.

Another significant advantage resides in the fact that if the device is disposed in a high-heeled shoe, and a bend occurs in the region of the lift 4, no wrinkling of the device results by virtue of the fact that the layers are unsecured to each other except at the heat seal seams, and are therefore free to move relatively to each other. In addition, it may be mentioned that the underside of the cushion layer 3, being naked, will have a frictional clinging action against the inside of an article of footwear, effectively preventing the device from slipping or otherwise shifting from its proper location.

In Fig. 6, I have shown a slightly different form of the invention illustrating the use of a metatarsal lift with an insole of a type highly desirable to afford comfort and aid to a patient having a first metatarsal shorter than usual. In such a case, the bearing points of the foot would be out of line, and the foot would fulcrum on the second and fifth metatarsal heads, rather than upon the first and fifth metatarsal heads, and thus the metatarsal or transverse arch would be adversely affected in a manner leading to later aggravation of perhaps a serious character. In this instance, the insole is made in the same manner as above described and embodies a top sheet 9, a metatarsal lift 10 heat sealed to the underface of the top sheet along a seam 11 around the bounding edge of the lift, all as above described, and the device also includes the bottom layer of foamlike cushioning material, not visible in the drawing. The structure also includes a projection 12 to underlie the great toe, and thus give more support beneath the great toe and the first metatarsal head in order to bring the foot back upon its proper bearing points. Of course, the device is helpful in treating other afflictions centered about the great toe or the first metatarsal head.

In Fig. 7, I have shown a still different form of insole embodying a top sheet 13, a lift 14 secured to the underface of the top sheet by heat seal seam 15, and the structure includes the foam cushioning layer, not visible in the drawings. In this instance, the lift 14 is also disposed in an intermediate location and heat sealed to the underface of the cover sheet around the bounding edge of the lift, and this lift is particularly desirable for lending support to both the longitudinal and metatarsal arches of the foot.

Both the devices of Figs. 6 and 7 embody the same type of materials mentioned above in connection with the structure of Figs. 1 to 5 inclusive. These figures are included to illustrate the fact that added lifts may be included with substantially any type of insole, and added lifts of any shape may also be utilized, depending upon the intended purposes of the resultant insoles.

From the foregoing, it is apparent that I have provided a foot cushioning and supporting device of such construction that an added lift may be included in a desired location and of a desired shape, without adding any but negligibly to the cost of manufacture of the device. It will also be noted that the device is adequately ventilated, and not only cushions and supports, but also exerts a gentle massaging action against the plantar surface of the foot. The heat sealing characteristics of the device prevent disrapture of the joined parts, and the device is extremely durable and long lived, being launderable whenever desired. Further, the device is neat in appearance, may be made in any desired color or combination of colors, and remains in proper position when inserted in an article of footwear.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

5

I claim as my invention:

A foot cushioning device comprising a relatively thin thermoplastic cover sheet, a relatively thick thermoplastic foam sheet, a heavy seal seam connecting said thermoplastic cover sheet and said thermoplastic foam sheet and defining the bounding edge of the device, a thermoplastic lift of lesser area than said cover and sheet disposed therebetween to give combined metatarsal and longitudinal arch support and a heat seal seam joining said lift to the underside of said cover sheet along the bounding edge of said lift whereby said cover, sheet and lift are unattached except for said heat seal seams.

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6

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,917,847

December 22, 1959

William M. Scholl

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, line 4, for "heavy" read -- heat ---.

Signed and sealed this 5th day of July 1960.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents