Aug. 23, 1960 W. C. BURNS 2,949,685

REMOVABLE SHOE PAD CONSTRUCTION

Filed June 9, 1958

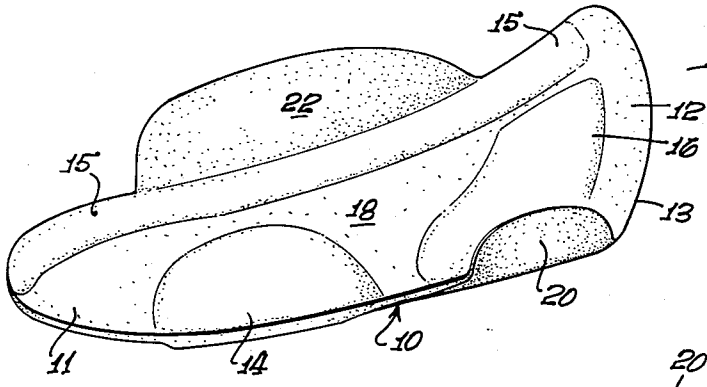


FIG. 1.

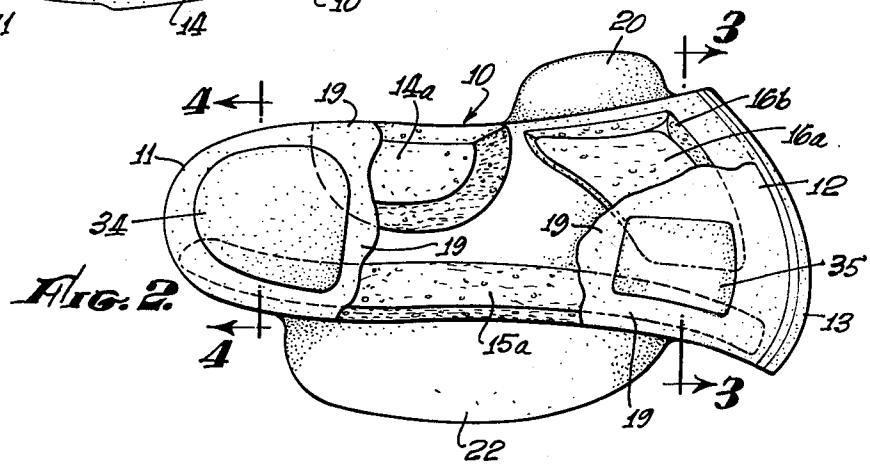


FIG. 2.

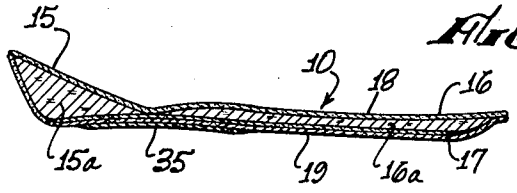


FIG. 3.

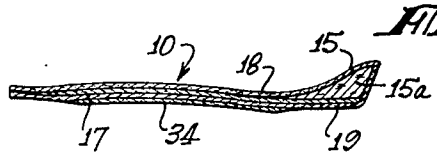


FIG. 4.

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REMOVABLE SHOE PAD CONSTRUCTION

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6 Claims. (Cl. 36—71)

The present invention relates generally to a removable shoe pad structure for use in shoes, and more particularly relates to improvements in a shoe pad structure designed to provide a weight distributing element which brings about a desired distribution of the body weight onto those portions of the foot structure which are best adapted to carry the weight.

The features of the present invention constitute improvements in the shoe pad construction disclosed and claimed in my Patent No. 2,790,254, issued April 13, 1957, for the same subject.

The structure of the human foot is such that the weight to the invention disclosed in my earlier patent referred to which is raised to avoid carrying weight at this location. The body weight should be carried along the outside of the foot with a large share of the weight upon portions of the foot just forward of the heel and immediately behind the "ball" of the foot, the "ball" being the area beneath metatarsal-phalangeal joints. When the weight is so distributed, the circulation of the blood in the foot is free and normal, the muscles of the foot function and develop in the proper manner, and there is no undue pressure upon the joints. Conversely, when the body weight is partly carried upon the metatarsal or arch area of the foot, considerable pain and discomfort are experienced and various bodily ills result. The pressure on the underside of the arch results in undue restriction of the blood circulation and often causes stretching of the ligaments in the arch with a resultant weakening of the structure of the foot.

The proper weight distribution is achieved according to the invention disclosed in my earlier patent referred to above, by providing a pad structure which underlies most of the foot and includes a plurality of elevated portions adapted to underlie specific areas of the foot to receive weight from these areas. One elevated portion is relatively narrow and elongated and extends along the inner lateral margin of the foot, alongside the metatarsal or longitudinal arch. An upwardly extending cushion member at one side of the pad is adapted to bear against the innerside of the foot. This narrow elevated portion of the underlying pad and the upwardly extending cushion combine to bring the main weight of the body upon the outside portion of the foot; and other elevated portions of the pad structure receive this weight. The result is that none of the body weight is actually carried on the raised arch portion of the foot.

Experience has shown that it is desirable to make shoe pads of this character that are as thin as possible in order to reduce the overall thickness. One reason is that this avoids making a shoe too tight after a pad has been inserted. The removable shoe pad, is, of course, thicker at the elevated portions; but where there is no elevated portion, the total thickness may consist at a minimum of only the top and bottom layers of leather. It has been found from experience that there is a tendency for a pad body consisting of only these two layers to curl after the

pad has been worn for a while, this tendency being particularly pronounced at the heel and at the inside front corner of the pad. At the elevated areas the pad is thick enough to resist any tendency to curl. The shoe pads are removable so that they can be added to any shoes or changed from one pair of shoes to another and accordingly are in no way anchored to the shoes. The result of the curling just mentioned is that the pads have a tendency to shift underneath the foot. Curling at the heel allows the pad to shift to the rear within the shoe, having the effect of shortening the pad. Curling at the front corner allows the pad to shift laterally, twisting slightly under the foot. Obviously, shifting in any direction is undesirable since it changes the position of the elevated portions relative to the foot with the result that the wearer does not get the full benefit intended from the pad.

Thus it becomes a general object of my invention to add to a removable shoe pad of the character described, means for preventing the shoe pad from shifting relative to the foot after it has been worn.

A further object of my invention is to add to a removable shoe pad of the character described, means for holding the shoe pad against turning upwardly, especially at its thinner portions, whereby the pad retains its original shape and also maintains its proper position underneath the foot of the wearer.

I achieve these objects of my invention by providing at each critical area a patch-like lamellar layer member on the underside of a pad body which is adapted to underlie the foot and has elements within the body forming elevated portions of greater thickness than the comparatively thin portions of the pad body lying between the elevated portions. Two of the critical areas are the area immediately beneath the os calcis and the area approximately under the anterior end of the first metatarsal but posteriorly of the metatarsal-phalangeal joints. Hence in a preferred embodiment of my invention I provide a patch-like lamellar layer member at each of these two locations that shapes or, in effect, may be said to pre-load the pad body to oppose upward turning or curling in areas adjacent to these locations. Such a member is preferably a thin layer of relatively non-extensible leather which is added by fixed lamination to the underside of the pad body, and both the pad body and the patch-like member are made concave as viewed from the underside of the pad. As a consequence, when the pad body is pressed against the shoe in the course of normal wear, the patch-like lamellar, pre-loading member is under tension sufficient to enable it to counteract the normal tendency of adjacent areas of the pad body to become distorted, and it thus serves to restrain the body from curling upwardly at the edges and keeps it flat within the shoe.

How the above and other objects of my invention, as well as others not specifically mentioned herein, are attained will be better understood by reference to the following description and to the attached drawing in which:

Fig. 1 is a perspective view showing the upper side of a removable pad structure embodying the present invention, the particular pad illustrated being one adapted for use under the right foot.

Fig. 2 is a bottom plan view of the pad of Fig. 1 showing two reinforcements, a portion of the bottom layer being broken away to disclose the elements forming the elevated portions.

Fig. 3 is a transverse section on line 3—3 of Fig. 2 but rotated 180 degrees so that it is right-side up.

Fig. 4 is a transverse section on line 4—4 of Fig. 3, also rotated to a right-side up position.

Referring now to the drawing, and especially to Figs. 1 and 2, the body of the removable pad structure is indi-

cated generally at 10. It comprises a posterior or heel portion 11 and an anterior or front portion 12 which tapers forwardly to a thin forward edge 13, the individual layers being beveled or tapered at the forward edges as shown in Fig. 2 to accomplish this. The length of pad 10 is established with reference to the foot of the user so that anterior portion 12 lies immediately behind the so-called "ball" of the foot, that is, the muscular pad beneath the metatarsal-phalangeal joints. Likewise the width of the removal pad is determined by reference to the user's foot to be substantially the same as the foot. It preferably conforms in size and shape to the flat insole of the shoe in order to be held against lateral shifting relative to the foot.

In accord with the teachings of my earlier patent, No. 2,790,254, mentioned above, I show pad 10 as comprising a body portion having the outline shown and which is provided with a plurality of elevated portions or areas formed by inserts in the body which are adapted to underlie certain designated zones or areas of the user's foot and to cooperate in securing the desired weight distribution. These inserts produce thickened portions of pad 10 which are referred to as elevated areas since they raise the level of the top surface of the pad after it has been worn for a while. The bottom side of the pad after being used for a time assumes a relatively flat appearance because of contact with the flat insole of the shoe; and the difference in thickness at the various portions becomes apparent on the top surface, the elevated areas at the thickened portions rising above the remainder of the pad which is relatively thin. When the pad is new, the top surface has relatively little relief and the shapes of the inserts are not seen as well on the top as on the bottom; but it will be understood that use of the pad has the effect of creating relief upon the upper face of the pad.

The numeral 14 indicates an elevated area partly in and forwardly of the heel portion 11 and upon which a large portion of the body weight is intended to be concentrated. This elevated area is located along the outer side of the foot, in a portion substantially below the cuboid and the forward portion of the os calcis, the general location being taught in my patent referred to above. On the opposite side of pad 10 from area 14 or at the innerside of the foot, I provide an elongated elevated area 15 which extends along the entire length of the pad at its innerside. Area 15 preferably, near its outer edge, rises to a greater height than area 14.

Immediately behind the anterior portion 12 of the pad, I prefer to provide an elevated area 16 which is adapted to underlie the forward end of the second, third, fourth and fifth matatarsals posteriorly of the metatarsal-phalangeal joints.

Pad 10 as a whole is constructed of at least an upper layer 18 and a lower layer 19 of sheet material, preferably leather, but fabric or similar materials may be used in place of leather if desired. There may also be added an intermediate layer 17, but this is often omitted to reduce overall thickness. The several layers are cemented together where they overlie one another, or otherwise are cemented to the inserts described below.

Between two of the layers are inserted bodies of cork or other comparatively firm or slightly yielding material, to form the elevated areas, such as those indicated at 14 and 15. Thus the elevated area 14 is formed by an insert of cork 14*a*, seen in bottom elevation in Fig. 2. This body of cork 14*a* is between top layer 18 and intermediate layer 17 of the pad body. As shown in Fig. 2, the marginal portions of cork body 14*a* are tapered toward the perimeter of the body in order to provide a gradual change in thickness at these elevated areas.

The cork insert 15*a* forming the marginal elevated area 15 is designed to taper inwardly and rearwardly. The top surface of the pad slopes upwardly to a maximum height at its outer edge. Elevated area 15 extends forwardly from the heel to terminate under the first metatarsal posteriorly of the first metatarsal-phalangeal joint. Thus there is a continuous raised portion in the pad extending along the margin of the pad at the inner side of the foot. The thickened portion 16 is formed by an insert 16*a* that tapers inwardly and rearwardly in thickness from the forward and lateral edges of pad 10. The elevated portion is of maximum thickness at the forward outside corner 16*b*. At the inner end, and along the rear curved edge, this elevated portion 16 is thinnest, preferably blending smoothly with the portion of the pad consisting only of the upper and lower layers.

At the lateral edge of the pad structure just rearwardly of the fifth metatarsal-phalangeal joint, there is an upwardly extending cushioned member 20 which is adapted to bear against the muscle structure which covers the forward end of the fifth metatarsal. Cushioned member 20 is tapered or feathered from the center outwardly toward its edges to avoid discomfort to the user and may be made of two layers of leather to obtain the desired thickness. The connection of cushion 20 to the main structure of pad 10 is preferably flexible in nature so that the cushion may easily assume a position conforming to the foot structure.

At the inner edge of the pad structure adjacent elevated portion 15, there is provided an upwardly extending cushion member 22 which is adapted to bear against the side of the foot at the upper portion of the metatarsal arch under the ankle bone. This cushion member is thickened at its central portion where the arch is normally farthest away from the shoe and then tapers to a relatively thin, feathered portion along its free edges not attached to pad 10. The preferred construction and location of the pads 20 and 22 are also described more fully in my issued Patent No. 2,790,254.

The critical areas on the pad body from the standpoint of curling are those under the heel and under the first or big toe. The pressure of the foot upon the pad depresses the pad at these areas and eventually has the result of causing the top surface to become permanently concave so that the nearby marginal portions of the pad tend to curl upwardly, unless countermeasures are taken.

To overcome and correct this tendency I attach to the underside of pad 10 one or more lamellar, patch-like members that grip the underside of layer 19 thus, in effect, to pre-load or shape the pad in localized areas. Such patch-like members are shown at 34 and 35, the first being under the heel portion of pad 10 and under the os calcis of the user, and the other being approximately under the forward end of the first metatarsal.

Each of the patch-like members 34 and 35 consists, preferably, of a thin layer of strong, tough leather that is very pliable but firm enough to resist stretching. Before such a member is attached to the pad, the underside of the pad body 10 is made concave, as viewed from such underside, over the area to which the patch-like member is to be applied, glue or cement being used to attach the member to the underside of the pad body. The added member 34 or 35 is put on under pressure that gives it a similar concave shape. After the cement hardens, the completed pad structure retains in the thus affected areas a clearly defined concave shape on the underside, as may be seen in Figs. 3 and 4. The added localized layer 34 or 35 holds the pad body in this shape and accordingly may be said to shape or pre-load the pad body for this purpose. Pressure from the foot above flattens out the pad and places the patch-like members in tension which continually pulls on contiguous area portions of the layer 19 in a direction to hold the pad against curling upwardly. It has been demonstrated in actual use that the initial shape imparted to the pad body remains effective in resisting the curling that normally occurs without my improved construction. A member 34 or 35 applies to a predetermined area of the pad body a preliminary

load that is maintained indefinitely to preserve the concave shape. When the concave area is flattened by pressure of the foot, the tension so produced in the localized layer is sufficient, due to the grip of the patch-like member to pull down the adjacent edges of the pad body, with the result that the pad body retains its desired planar contours and does not slide up the sides of the shoe but engages the shoe in such a manner as to resist any shifting away from the proper position under the user's foot.

It will be noticed from Fig. 2 that the pre-loading member 34 covers a substantial portion of the heel area of the pad. It partially overlaps both elevated portions 14 and 15 and thus grips the thin portion of the pad body lying between the thickened portions 14 and 15. In the same manner the forward member 35 partially overlaps thickened portions 15 and 16, and is located where it resists a tendency to curl upwardly in the thin portion of the pad body between these two thickened portions 15 and 16.

From the foregoing description it will be apparent that changes in the size, shape or disposition of the elements of my improved shoe pad construction may occur to persons skilled in the art, without departing from the spirit and scope of my invention. Accordingly it is to be understood that the foregoing description is considered to be illustrative of rather than limitative upon the invention as defined by the appended claims.

I claim:

1. In a removable pad structure for use in a shoe in contact with the user's foot, a pad body adapted to underlie the foot posteriorly of the metatarsal-phalangeal joints, elements within the body forming elevated portions of greater thickness than the comparatively thinner remainder of the body, and an external layer member of relatively non-extensible material adhesively affixed to the underside of the pad body and in lamellar contact with a limited area of the relatively thinner portion thereof, said external layer member being in tension when the underside of the pad is flat and thereby serving to exert tension on contiguous area portions of the body to counteract a curling tendency of the body in such area portions.

2. A removable pad structure as claimed in claim 1 in which the external layer member is a thin layer of leather.

3. A removable pad structure as claimed in claim 2 in which the pad body is concave on the underside over the area covered by the external layer member.

4. In a removable pad structure for use in a shoe in contact with the user's foot, a pad body adapted to underlie the foot posteriorly of the metatarsal-phalangeal joints, a plurality of spaced elements within the body forming a plurality of elevated portions of greater thickness than the relatively thin intervening portion of the body, and an external layer member adhesively affixed to and in lamellar contact with the underside of the body and partially overlapping two of said spaced elements and extending between them to hold contiguous area portions of the relatively thin portion of the body against curling upwardly, said layer member being a thin lamina of leather which serves to exert tension on said contiguous area portions to counteract the curling tendency.

5. A removable pad structure as claimed in claim 4 in which the external layer member is located under the os calcis.

6. A removable pad structure as claimed in claim 4 in which the external layer member is located approximately under the anterior end of the first metatarsal and posteriorly of the metatarsal-phalangeal joints.

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UNITED STATES PATENT OFFICE

CERTIFICATION OF CORRECTION

Patent No. 2,949,685 August 23, 1960

William C. Burns

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

Column 1, line 27, strike out "to the invention disclosed in my earlier patent referred to" and insert instead -- of the body should not be carried directly on the arch --.

Signed and sealed this 25th day of April 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents