Nov. 16, 1937. M. S. SILVER 2,099,577

ARCH SUPPORT PAD

Filed July 30, 1936 2 Sheets-Sheet 1

Fig. 1.

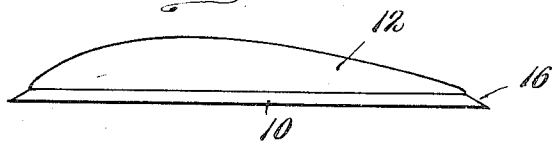


Fig. 2.

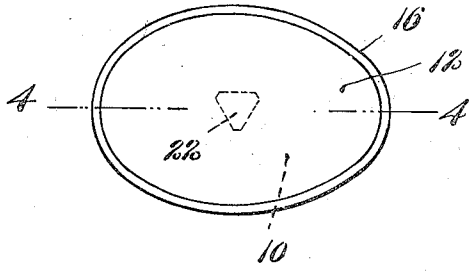


Fig. 3.

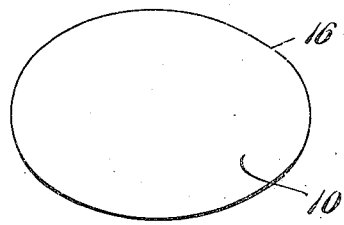


Fig. 4.

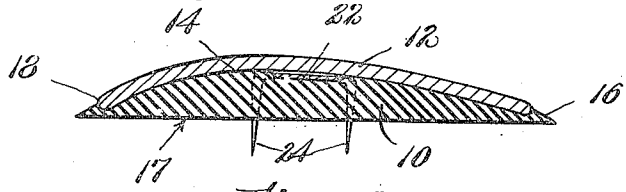


Fig. 5.

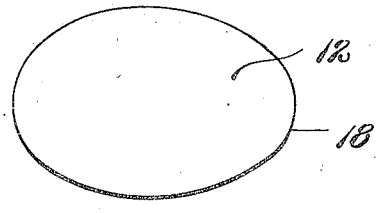


Fig. 7.

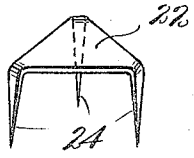
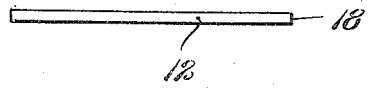


Fig. 6.



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Nov. 16, 1937. M. S. SILVER 2,099,577

ARCH SUPPORT PAD

Filed July 30, 1936 2 Sheets-Sheet 2

Fig. 8.

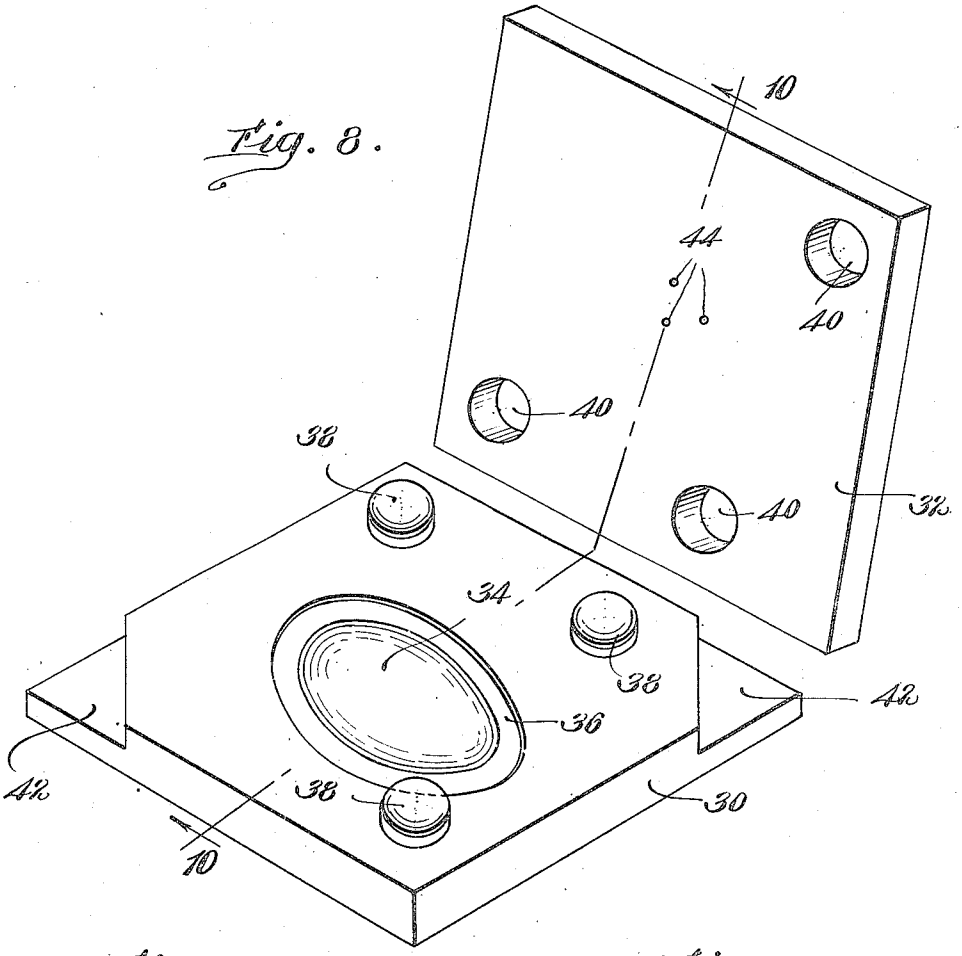


Fig. 9.

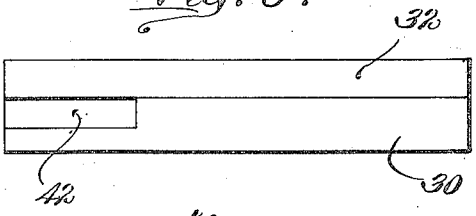


Fig. 11

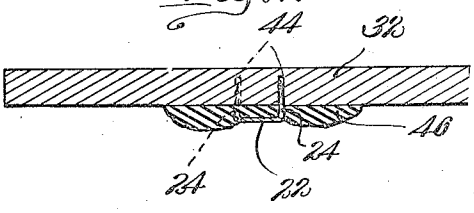
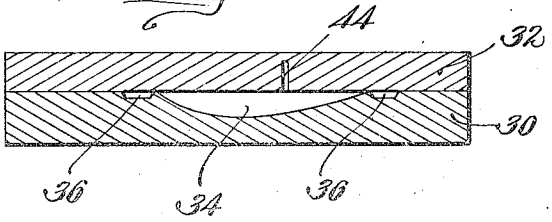


Fig. 10.



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UNITED STATES PATENT OFFICE

2,099,577

ARCH SUPPORT PAD

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Application July 30, 1936, Serial No. 93,455

5 Claims. (Cl. 36—71)

This invention relates to arch support pads and is exemplified herein in a support pad for the metatarsal arch.

Heretofore, arch supports have generally been made of materials such as sponge rubber or felt but these structures have all been objectionable in certain respects. Sponge rubber pads have been open to the objection which generally exists to having rubber in contact with the foot. Covering the sponge rubber with leather is not entirely satisfactory because the leather is deleteriously affected by the natural perspiration of the foot.

The use of felt material generally gives the best results because felt absorbs the perspiration of the foot but felt pads are very expensive to manufacture. The proper shaping of the pads requires costly skiving and buffing operations especially in metatarsal pads in which bevelled thin edges are necessary. The cost of these operations is largely due to the fact that each pad must be separately treated. Pads made entirely of felt, however, are apt to lose their shape, and therefore, their effectiveness, through condensation due to continued pressure.

The principal object of my invention is the provision of an arch support pad which comprises a combination of felt and rubber in which the desirable qualities of the materials are fully utilized to the exclusion of the objectionable features.

Another object is to produce an arch support which is efficient, durable, and which can be made at a very low cost.

Other objects of the invention will be described hereinafter.

My invention contemplates an arch support pad having a permanently resilient body portion provided with a top surface of fibrous material such as felt or similar material. The body portion is of rubber or rubber composition, preferably sponge rubber, which imparts to the support the necessary resiliency and the covering of felt affords a smooth surface for engaging the sole of the foot and at the same time absorbs any perspiration exuding from the foot.

Preferably, the body portion conforms in shape and contour to the shape and contour desired in the finished pad and the top layer is of uniform thickness but of slightly less area than the area of the top surface of the body portion so that the latter projects a slight distance beyond the peripheral edge of the former. This permits the body portion being formed with a thin peripheral edge and in order that the pad may have an approximately smooth continuous top surface, the peripheral edge of the top layer is embedded within the marginal portion of the body portion.

It will be observed that by the combination of the two materials, an arch support pad constructed in accordance with my invention presents to the foot a felt surface and thereby possesses all the advantages of a pad made entirely of felt, yet at a much lower cost. Since the body portion is of rubber or rubber composition, the pad has the permanent resiliency of one made entirely of that material without its objectionable features.

In the accompanying drawings for the purpose of illustrating the principle of my invention, there is shown a support pad for the metatarsal arch constructed in accordance with my invention, in which Figure 1 is a side elevation of the pad; Fig. 2 is a top plan view of the same; Fig. 3 is a bottom plan view; Fig. 4 is a central longitudinal sectional view of the same; Fig. 5 is a plan view of the felt blank forming the top layer of the pad; Fig. 6 is a side elevation of the same; Fig. 7 is a view in perspective of one form of staple for fastening the pad in a shoe; Fig. 8 is a view in perspective of one form of mold and cover suitable for making the circular pad of Figs. 1 to 7 inclusive, the parts being shown in open position; Fig. 9 is a side elevation of the same, the parts being shown in closed position; Fig. 10 is a sectional view of the mold closed on lines 10—10 in Fig. 8; and Fig. 11 is a similar cross sectional view of the cover having a mass of uncured rubber fastened to its inner surface by a staple illustrating the method of embedding a staple in the body portion of the arch support.

Referring to the drawings showing my invention embodied in a support pad for the metatarsal arch, the preferred form of pad comprises a body portion 10 and a top layer 12. The body portion may be made of any suitable permanently resilient material such as rubber composition, preferably sponge rubber, and the top layer of a fibrous moisture-absorbing material, such as felt or similar material.

The body portion 10 is of the contour and shape desired for the contour and shape of the support and the top layer is preferably of uniform thickness but of slightly smaller area than the area of the top surface of the body portion. As shown, the body portion in plan is somewhat oblate and is generally in the form of a knoll 14 with the thickest portion off-center, the top

surface merging gradually into a thin peripheral edge 16. The bottom surface 17 of the pad is flat for engaging the inner sole of a shoe. The marginal portions of the body 10 are, however, built up to enclose the peripheral edge 18 of the top layer 12, so that the top surface of the support is approximately smooth and continuous from its highest point to its thin edge 16.

For fastening the arch support to the inner sole of a shoe, it may, if desired, be provided with a staple of any suitable form, the head of which is preferably embedded in the upper part of the body 10 adjacent the top layer, with the prongs of the staple projecting out the bottom face of the support. In the drawings (Fig. 7), there is shown a staple suitable for this purpose having a triangular head 22 and three prongs 24, which is shown in Fig. 4 embedded in the body portion 10.

The arch support of my invention may be made in a mold which may be of any suitable construction, and one such as shown in Fig. 8 of the drawings, comprising a mold 30 and a cover 32. Both parts are in the form of plates of steel or other suitable material. In its top face, the mold is provided with a depression or cavity 34, of a shape corresponding to the shape of the arch support in reverse position. Surrounding the cavity is a channel 36 adapted to receive during the molding process the overflow from the cavity of rubber composition. The top face of the mold is also provided with a plurality, preferably three, of projecting round lugs 38 adapted to fit into circular holes 40 in the cover 32 for registering the cover in proper position upon the plate. To permit the insertion of a tool for forcing the cover off the mold at the end of a molding operation, the latter may have cut-out portions 42 at one or more corners.

In forming the arch support a blank 12 is first cut from the fibrous sheet material which is to be used for the top layer of the pad. This blank is then positioned centrally on the floor of the cavity 34 in the mold and since it is of slightly smaller area than the area of the cavity, there is a narrow marginal space between the peripheral edges of the blank and the cavity. The cavity is then filled with uncured rubber composition, which may be of any composition which will produce, when vulcanized, a permanently soft and resilient body. Preferably, however, I use a composition which will produce, when vulcanized, sponge rubber of fine grain, that is, having small, minute interstices. This composition, when uncured, is generally more or less plastic and is easily handled. A sufficient amount is placed in the cavity to insure the complete filling of the cavity when it is compressed. The cover 32 is then placed in position on the mold 30 and the parts are subjected to pressure and heat in any suitable steam vulcanizing press. With the ordinary rubber compound, a heat treatment of approximately five minutes will generally be found sufficient, but where the composition is adapted to produce a sponge rubber, this period will have to be increased to approximately twenty minutes.

In the vulcanizing step, the heat and pressure cause the composition to flow in the mold around the peripheral edge of the top layer and to unite with the inner face of the said layer so that it and the body portion are bonded together into a unitary integral structure. Since the peripheral edge of the body portion extends beyond the edge of the top layer, it is possible to get a sharp feather edge on the pad, and the embedding of the top layer in the body portion results in the pad having a top surface which is approximately smooth and continuous over its entire surface.

When the support pad is to be provided with a fastening staple, the foregoing method is modified by using the staple to fasten the uncured composition which is to be molded to form the body portion of the pad, to the inner face of the cover instead of placing it in the cavity. The inner face of the cover is provided with a series of holes 44 for receiving the prongs of the staple. These holes 44 are of such diameter that the prongs of the staple fit snugly therein and they are approximately equal in depth to the length of the projecting portions of the prongs of the staple in the finished pad. The uncured rubber composition is fastened to the inner face of the cover 32, as shown in Fig. 11, by passing the prongs through the composition and then inserting them in the holes 44 in the cover. These holes are positioned accurately so that when the cover is placed upon the mold, the head of the rivet will lie in its proper position in the cavity adjacent the top layer 12. When the pad is vulcanized, the staple is firmly embedded therein and cannot be separated therefrom.

In use, the pad may be fastened in any desired position to the inner sole of a shoe by pressing the projecting prongs of the staple into the inner sole, or by cementing the bottom face of the pad to the inner sole if it is not provided with a staple.

It will be observed that the arch support of my invention is of simple construction and that the method of making it conduces to rapid production at a low cost. Although I have shown the mold as being one adapted for making a single arch support at a time, it will be understood that in practice a larger mold will be used with a multiplicity of cavities for producing a large number on each operation.

Although I have described my invention as embodied in a pad for support of the metatarsal arch, it is to be understood that this is merely illustrative and that my invention may be embodied in various other forms of arch support such as longitudinal supports, all within the purview of the following claims.

What I claim is:

1. An arch support pad comprising a body portion of resilient, soft sponge rubber having a thin peripheral edge and a top layer of felt material of uniform thickness, said top layer being of slightly less area than the area of the top surface of said body portion and having its peripheral edge enclosed by the marginal portion of said body portion.

2. An arch support pad comprising a knolled body portion of soft, resilient sponge rubber composition having a thin peripheral edge and a top layer of fibrous moisture absorbing material such as felt of approximately uniform thickness, said layer being of slightly less area than the area of the top surface of said body portion and its peripheral edge being embedded in the marginal portion of said body portion to provide the pad with an approximately smooth top surface.

3. An arch support pad comprising a body portion of soft, resilient sponge rubber and a top layer of fibrous moisture absorbing material, said body portion being of variable thickness and having a flat bottom and a thin peripheral edge and said top layer being of slightly less area than the area of the top surface of said body portion and having its peripheral edge embedded in said body

portion for providing said pad with an approximately smooth top surface.

4. An arch support pad comprising a body portion of soft, resilient rubber composition having a thin peripheral edge, a top layer of fibrous moisture absorbing material of approximately uniform thickness, said layer being of slightly less area than the area of the top surface of said body portion and its peripheral edge being embedded in the marginal portion of said body portion to provide the pad with an approximately smooth top surface, and a staple for fastening said pad in a shoe, the head of said staple being embedded in said body portion with its prongs projecting out the bottom face thereof.

5. A metatarsal pad comprising a body portion of soft resilient sponge rubber, said body portion being oval in outline and of knoll form with a flat bottom face and a thin peripheral edge and a top layer of uniform thickness of fibrous moisture absorbing material such as felt, said top layer being of slightly less area than the area of the top surface of said body portion and having its peripheral edge embedded in the marginal portion of said body portion for providing said pad with an approximately smooth top surface.

MYER S. SILVER.