June 4, 1946. W. M. SCHOLL 2,401,514

PLASTIC ARCH SUPPORT

Filed Dec. 19, 1941

Fig. 1.

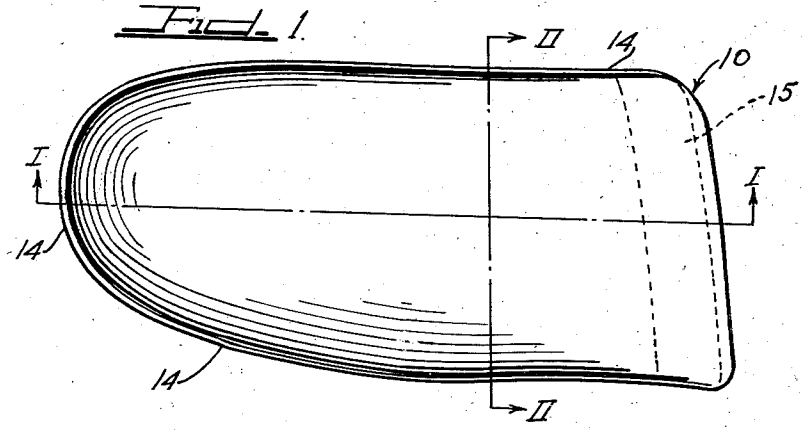


Fig. 2.

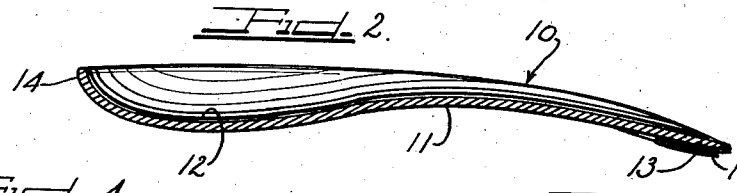


Fig. 3.

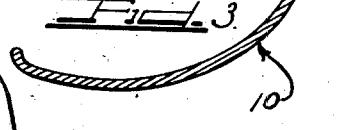


Fig. 4.

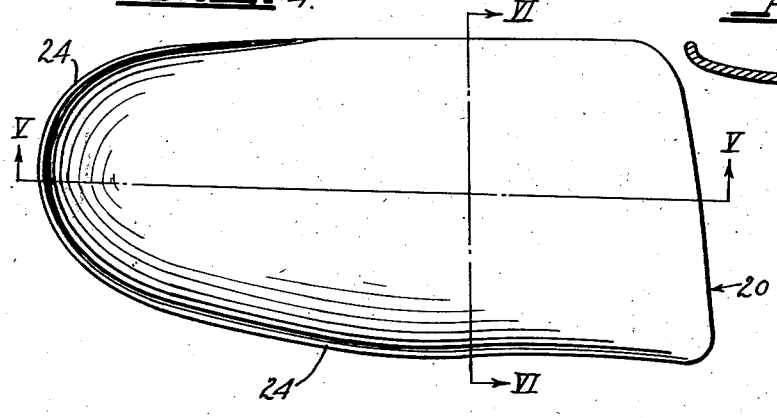


Fig. 5.

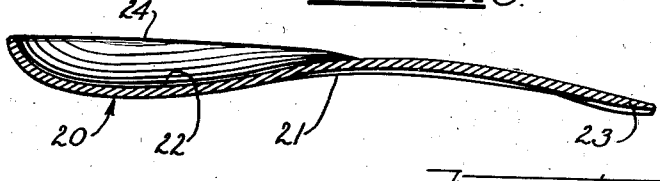
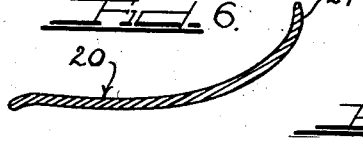


Fig. 6.



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Atty.

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UNITED STATES PATENT OFFICE

2,401,514

PLASTIC ARCH SUPPORT

William M. Scholl, Chicago, Ill.

Application December 19, 1941, Serial No. 423,578

1 Claim. (Cl. 36—71)

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This invention relates to improvements in arch supports of the character inserted in a shoe or other article of footwear on top of the insole and beneath the foot of the wearer to aid in the correction of deformities, injuries, or weakness of the foot, although the invention may have other uses and purposes as will be apparent to one skilled in the art.

In the past, arch supports for disposition beneath the plantar surface of a foot have as a rule embodied a resilient metallic plate or the like of such a configuration as to give the desired or needed corrective support in the proper region of the foot. Such arch supports have been fabricated to predetermined shapes and sizes, and fitting of individual feet has been accomplished by selecting from stock the arch support having the shape and size closest to that desired. Since weakened or deformed feet vary in shape much more than normal feet, and since deformed feet may need support in any one or several of a number of localities, it is evident that even when fitting may be done from a large stock, thoroughly satisfactory fitting of an individual foot is not often accomplished. Fitting of conventional arch supports is further complicated by the fact that the opaqueness of conventional arch supports limits the fitter to whatever guidance is furnished by the tactile sense of the wearer which often is quite dull.

The present invention provides arch supports fabricated from thermoplastic material that can be molded or otherwise formed to fit individual feet. More particularly, the invention provides what may be called "arch support blanks" shaped generally as conventional arch supports that may be heated gently at any desired locality to make possible further molding or forming as required by the needs of each individual foot. The present invention additionally provides transparent arch supports, so that fitting may be guided by visual observation.

It is therefore an important object of the present invention to provide arch supports that may be fitted to individual feet more perfectly and with greater ease than are conventional arch supports.

A specific object of the invention is to provide transparent arch supports that may be molded or formed to the form of the foot being fitted at the retail store where the arch supports are fitted to individual customers.

Other and further objects of the invention will become apparent to those skilled in the art from

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the appended drawing and the following description and claim.

Among the thermoplastic and optionally transparent materials that may be used in fabricating the arch supports of this invention may be mentioned, in particular, thermoplastic resins such as polymerized vinyl acetates, chlorides, and other vinyl esters softening at between 140° to 150° F.; vinylidene chloride resins softening at 150° to 200° F.; acrylic resins on the order of methyl methacrylate resins softening at 125° to 160° F.; styrene resins softening at 170° to 180° F.; ethyl and other ethers of cellulose softening at 130° to 150° F.; cellulose acetate softening at 122° to 200° F.; and cellulose acetate butyrate softening at 136° to 200° F.

Illustrative examples of arch supports according to this invention are shown in the appended drawing, in which:

Figure 1 shows a plan view of one arch support according to this invention;

Figure 2 is a vertical longitudinal section along the line I—I of Figure 1;

Figure 3 is a vertical transverse section along the line II—II of Figure 1;

Figure 4 shows a plan view of another arch support according to this invention;

Figure 5 is a vertical longitudinal section along the line V—V of Figure 4; and

Figure 6 is a vertical transverse section along the line VI—VI of Figure 4.

In Figures 1 to 3, the reference numeral 10 indicates generally a transparent arch support fashioned from cellulose acetate butyrate. The arch support 10 takes the form of sheet bowed longitudinally at 11 to lend support to the longitudinal arch of the foot. At its rear portion, the arch support 10 is provided with a hollow or indentation 12 for the reception of the heel of the foot and the arch support is transversely bowed or arched in the forward portion thereof, as indicated at 13, to lend support to the metatarsal arch of the foot. An upturned margin 14 runs around all but the forward edge of the arch support. This support, on being inserted in a shoe or other article of footwear beneath the plantar region of the foot, will support both the metatarsal and the longitudinal arches of the foot, as well as the soft tissues thereabout and around the heel accommodated in the rear hollow of the arch support. Supporting the soft tissues is the special function of the upturned margin 14. At the same time, the upturned margin adds considerable strength and rigidity to the arch support.

Translucent or opaque cellulose acetate butyr-

ate may also be employed to form the arch support.

A strip of fabric 15 may be attached to the under side of the front margin to eliminate squeaking and forward displacement of the arch support by slipping or otherwise.

The arch support 20 of Figures 4 to 6 is generally similar to that of Figures 1 to 3, being formed with a longitudinal arch 21, a heel depression 22, and a transverse arch 23.

However, the upturned margin 24 of the arch support of Figures 4 to 6 extends, on the outside only, along the heel portion of the arch support up to the middle portion of the longitudinal arch. Elimination of the outside fore portion of the upturned margin prevents irritation of especially sensitive feet.

Such arch supports may be fabricated by molding sheets of thermoplastic material, by injection molding in permanent molds, or by other methods well known in the art.

While the arch supports of this invention preferably are transparent, opaque and optionally tinted arch supports made from thermo-plastic material are within the scope of the invention.

When the arch supports of this invention are fitted to individual feet, non-conformities in shape may readily be detected by visual observation through the transparent arch supports and corrected by gently heating and then forming the locations needing correction in form. Such heating may be effected by directing a current of warm or hot air against the area on the arch suport to be formed, for instance, by means of an open-ended hollow cylinder or tube containing a heating element and covered at one end by a replaceable mask with an aperture matching the area to be heated. Such a tube may be supported vertically above a flat surface by means of a stand or legs attached to the tube, to allow air free ingress at the bottom of the tube, the top being covered by said mask over which the arch support is laid. A mask having any desired form and size of aperture can be provided to permit heating and softening of any desired area of the arch support.

Radiant heat can also be utilized for accomplishing this end. Suitable electrical devices

capable of generating radiant heat or infra-red heating rays may be disposed within a tube having an open-ended top covered with an apertured mask, as explained hereinabove. Forming or molding of heated and softened areas can be effected manually or by means of suitable tools.

The articles of this invention may be denominated arch support blanks, being configured to general conformity with a human foot and adapted for forming into fitting relationship with any individual foot. Since gentle heating suffices to soften the blanks for localized forming when fitting, such fitting may be done in retail stores. The present invention thus makes generally available for the first time, as far as applicant knows, an arch support that is exactly shaped to the requirements of any inidvidual foot.

Rapid fitting of individual feet may be effected by providing a stock of arch support blanks including arch support blanks having, say, three different elevations and three different widths in each size. A blank can be selected from such a stock that will only require relatively minor form fitting adjustments as compared with the case when it is attempted to fit any and all feet from a single standard arch support blank. Final adjustment in the form of the arch support for the peculiar abnormalities in the form of individual feet can be usually made without changing the general form or shape of the arch support.

Many details of form and structure may be varied within a wide range without departing from the principles of this invention, and it is therefore not my purpose to limit the patent granted on this invention otherwise than necessitated by the scope of the appended claim.

I claim as my invention:

In an arch support fabricated from a thermoplastic resin with a transverse leading margin back of the phalanges of the foot to be supported and normally tending to squeak and to slide when worn inside a shoe, the improvement comprising a strip of fabric attached to the under side of said leading transverse margin, whereby sliding and squeaking is prevented.

WILLIAM M. SCHOLL.