J. MAY.

ORTHOPEDIC FOOTWEAR.

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1,043,331.

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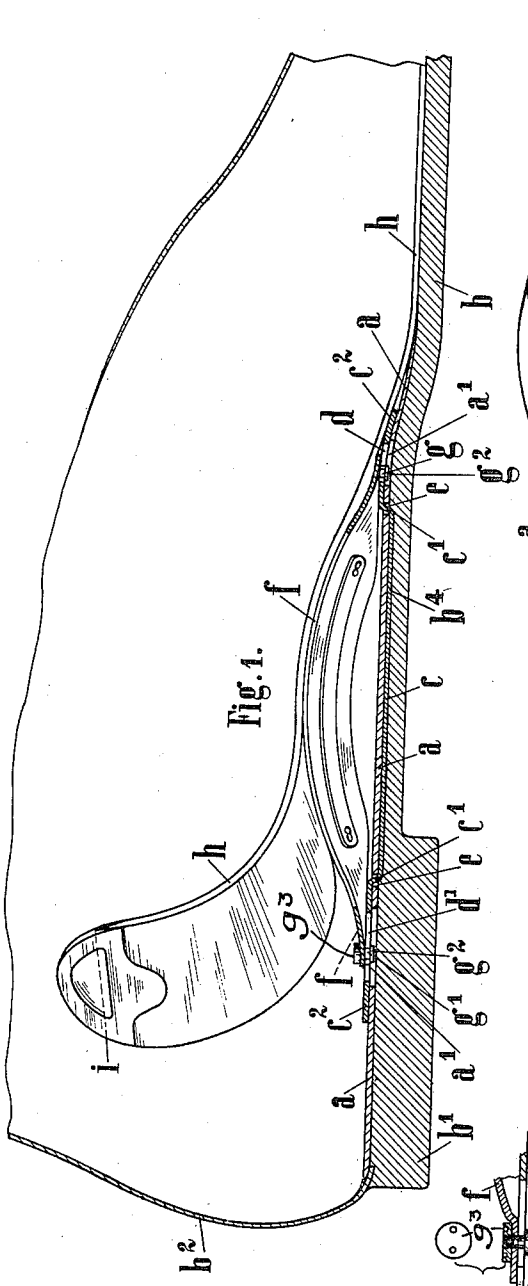


Fig. 1.

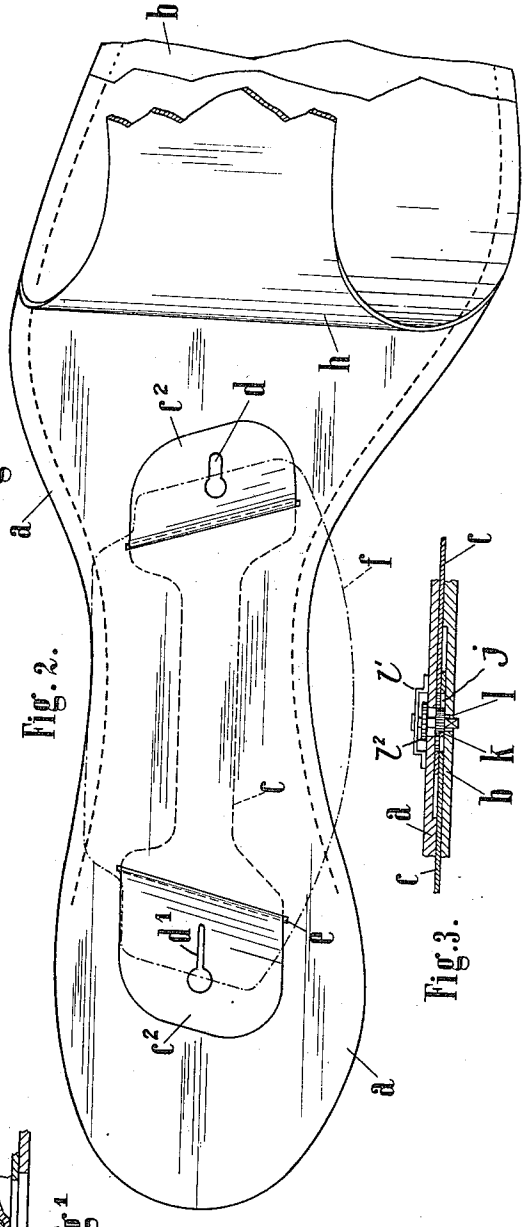


Fig. 2.

Fig. 3.

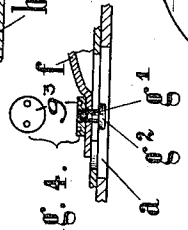


Fig. 4.

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ORTHOPEDIC FOOTWEAR.

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To all whom it may concern:

Be it known that I, JOSEPH MAY, a subject of the Emperor of Germany, and resident of Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Orthopedic Footwear, of which the following is a specification.

My invention relates to orthopedic footwear and particularly to boots and shoes intended for the relief and cure of weak arches, flat feet and other deformities of the feet and has for one of its objects to provide boots and shoes of this description with an easily removable interchangeable and firmly held support for the arch of the foot.

Another object of my invention is to construct the said arch support in such a manner that it will not wear through the shoe, and may be readily adjusted relatively to the shoe to a position to secure the best result in each individual case.

My improved construction owing to the fact that the arch support is removable from the shoe and may be fitted directly to the deformed foot and then inserted in position in the shoe, also does away with the necessity for first making a plaster cast of the deformed member and then constructing a special last for each special ailment. It is thus possible for a dealer to carry a large stock of finished shoes and arch supports of various sizes and kinds which may be combined to suit the requirements of all cases so that the expense of having boots or shoes made to order is obviated.

Other objects of my improved construction will appear from the description hereinafter.

Reference is to be had to the accompanying drawing in which—

Figure 1 is a longitudinal section of a shoe constructed according to my invention; Fig. 2 is a plan view thereof with the upper removed; Fig. 3 is a detail section of another form of my invention and Fig. 4 is a similar detail view of a portion of the arch support and parts.

In the drawing b is the outer sole of the boot or shoe to which the heel b' and upper b^2 are secured in the customary and well known manner. The outer sole b is provided with a depression or recess b^4 located at the shank of the shoe for the accommodation of a, preferably metallic, plate c. This metallic plate c fits snugly in said recess and is formed with upwardly bent portions c' and oppositely extending flanges c^2. The bent portions c' of said plate project through slits e formed in a half insole a which is provided with apertures a' and is secured in position in the shoe by stitching or otherwise. This half insole extends from the heel toward the toe between the flanges of the plate c and the outer sole and over that portion of the plate c which is located in the recess b^4. The said plate thus has a portion located between the half insole and the outer sole and also extends through the slits e to an exposed position in the shoe. The end of the half insole which is nearest the toe of the shoe is tapered or thinned down and is secured to a second full insole h which is fastened to the outer sole b in any well known manner from the point where it connects with the half insole a to a point near the toe of the shoe. The remainder of the insole h is free for the purpose to be described hereinafter so that the half insole a and the full insole h in reality form one complete insole which is split for a part of its length so as to have a loose flap as shown in Fig. 1. The free end of insole h is preferably tapered to fit into a correspondingly tapered recess in a heel cushion i in which said end is removably maintained by friction or in any well known and convenient manner. The exposed flanges c^2 of the plate c are provided with slots d, d' preferably of a bayonet or key hole type the slot d' being somewhat longer and more narrow than the slot d. These slots d and d' when the parts are assembled register with the apertures a' of the half insole a. The arch support proper comprises a plate of resilient metal bent to proper shape and having studs g and g' secured to and projecting downwardly from its opposite ends. These studs are each provided with a head g^2 which engages the inner face of the flanges c^2 and prevents displacement of the plate f.

The heads g^2 are first introduced through the enlarged ends of the slots d and d' into the apertures a' of the half insole a after which the plate f is moved toward the toe of the shoe. This causes the shanks of the studs g and g' to enter the elongated portions of the slots d, d' the walls of which are

frictionally engaged by said shanks. If desired the stud g' at the rear end of the plate f may be in the nature of a movable locking stud as shown in Figs. 1 and 4 so that the arch support may be positively locked in its adjusted position. That is, by screwing up the nut g^3, the one end of the arch support will be firmly clamped between the flange c^2 and said nut, the head g^2 being firmly drawn against the inner surface of said flange by this operation. After the arch support has been thus placed in position the loose or free portion of the insole h is folded over the said arch support to cover same and to protect the foot against actual contact with the metal of which said support is constructed. The said flap of the insole h thus forms as it were a pocket open at the sides and one end for the accommodation of said arch support. The heel pad or cushion i in this position lies over the heel of the shoe and forms a cushion for the heel of the foot of the wearer and lies back of the flange to cause the insole h to lie flush. This prevents the heel from coming into engagement with the ridges formed by the rear flange c^2 of the metal plate c and the arch support f. The exposed flanges c^2 of this plate c serve as bearing surfaces for the ends of the arch support, at least one of which is preferably movable relatively to the said plate, so that as the weight of the wearer of the shoe is placed upon said arch it will yield and form a resilient support. The position of said arch support may be adjusted to secure the best results in each individual case by moving it lengthwise of the shoe, the degree of adjustment being governed only by the length of the slots d and d'. Similarly the entire support may be removed from the shoe by simply moving it toward the heel until the heads g^2 of the studs g and g' register with the enlarged portions of the slots d and d' after which the arch support proper may be easily lifted out and a different one substituted. It is of course to be understood that the free portion of the insole h has first been folded away to uncover said arch support. This interchangeability of supports is very important as it permits the support to be fitted directly to the deformed foot and, after a proper result has been obtained, to be easily inserted in position in the shoe. The necessity for first making a plaster cast of the deformed foot and then constructing a special last for each case is thus done away with. Further by making the arch supports removable and interchangeable a support having a low arch may first be used and after the foot has become accustomed to this arch a slightly higher one may be substituted and so on until the final desired result is obtained. The cure and relief is thus a gradual and more effective one than if the extreme high arch support is introduced at once. By making the heel pad i a separate element from the flat of the insole h this pad may be removed and another of different dimensions substituted. Thus as the arch support is of a greater or less height a longer or shorter heel pad is used so that in all cases the said heel pad will be properly positioned in the shoe. The insole h also serves as a cover or protector for the arch support against emanations from the foot; however should the said support finally become rusted or otherwise affected from perspiration or moisture from the outside it is easy to replace the damaged support with a new one thus saving the remainder of the shoe, the life of which is therefore materially increased. Heretofore this has been a great drawback owing to the fact that in most cases the arch support in its entirety was incorporated in the shoe during manufacture so that if the arch support became damaged the entire shoe was rendered useless for the purpose for which it was intended.

In my improved shoe the ends of the arch support engage the flanges c^2 of the plate c which thus forms a metallic bearing against which said ends of the arch support may rub. The arch support therefore is prevented from wearing through the shoe and at the same time a smooth and hard bearing surface for the ends of said arch support is provided so that the danger of the parts binding is greatly lessened. In existing structures as the leather of which the shoe is constructed becomes soft through wearing the said leather offers very little resistance to the metallic arch support and the shoe consequently wears out very quickly.

It is to be understood that my improved shoe is readily manufactured in the customary manner by hand or by machine over the usual lasts and that the plate c is introduced during this manufacture so that my complete shoe comprises an ordinary construction in which a plate for the accommodation of an arch support has been incorporated. It will readily be seen that the cost of such shoes is thus materially less than that of orthopedic shoes which have to be specially made for each case. When the large number and variety of sizes necessary to cover all needs is taken into consideration it will be noted that this convenient and ready adaptability to each particular case is of great importance. As before stated by having the arch support adjustable relatively to the shoe, the said support may be easily placed in the position best adapted for the particular case in hand. This easy adjustability has heretofore not been possible and each instance necessitated a separate fitting and a particular construction for each different deformity. It is also possi-

ble to easily construct the arch support so that it will not only support the large inner arch of the foot but also the small outer arch thus providing a complete and proper foundation for the deformed foot to rest upon. Furthermore it is possible for a dealer to have on hand a large variety of shoes of different sizes and with differently arranged plates therein together with a large stock of differently constructed and shaped arch supports which may be combined to secure the best results in each individual instance.

In Fig. 3 I have shown the plate *c* made of two sections the adjacent ends of which overlap and are slotted as indicated at *j* one of said slots being formed with teeth or serrations arranged to be engaged by a pinion *k*. This pinion *k* is mounted on a spindle *l* having an angular free end and extending through openings in the outer sole *b* and inner sole *a*. The inner end of said spindle is journaled in a bracket *l'* secured in the shoe and a washer l^2 is provided on said spindle adjacent to the opening in the insole *a*. The free angular end extends through the outersole *b* to the outside and is arranged to be engaged by a suitable key. Thus as the key is turned the pinion *k* will also be rotated and will shift the one section of the plate *c* relatively to the other. The position of the slots *d* and *d'* may thus be adjusted to suit varying conditions. It is of course to be understood that both the insole *a* and the outersole *b* are recessed to permit the sections of the plate *c* to move as described. By this adjustment of the plate sections to which the ends of the resilient arch support are attached the bend or bow of said support may be raised by bringing said plate sections closer together and lowered by separating said sections.

Various modifications may be made without departing from the nature of my invention as defined in the claims.

I claim as my invention:

1. In footwear of the kind described, a sole provided with a recess, a plate secured in said recess and having oppositely extending flanged portions projecting from said recess so as to have exposed surfaces, and an arch support arranged to have its ends detachably secured to said flange portions and slidable lengthwise of the exposed surfaces thereof.

2. In footwear of the kind described, an outer sole provided with a recess, an inner sole extending over said recess and provided with apertures, a plate secured in the recess of the outer sole and provided with portions projecting through the apertures in said inner sole, and an arch support arranged to be removably connected with said projecting portions of the plate.

3. In footwear of the kind described, a sole, a plate mounted on said sole and having an exposed surface, and an arch support removably mounted on said plate and having a sliding engagement with the exposed surface of said plate.

4. In footwear of the kind described, an outer sole, an arch support arranged to be supported by said outer sole, an inner sole partly secured to said outer sole and having a free portion arranged to extend over said arch support, and a heel pad removably maintained on the free end of the said inner sole.

5. In footwear of the kind described, an outer sole, an inner sole secured to said outer sole throughout its length, an adjustable arch support arranged to engage said inner sole, and a second inner sole partly secured to the outer sole and also secured to the one end of the first named inner sole and being provided with a free portion arranged to extend over said arch support.

6. In footwear of the kind described, an outer sole provided with a recess, an inner sole having apertures, a plate secured in said recess having portions extending through said apertures in the inner sole, an arch support arranged to engage said plate, and another insole partly secured to the outer sole and also fastened to the one end of said first named insole and having a free portion arranged to extend over said arch support.

7. In footwear of the kind described, a sole, a plate secured to said sole and having an exposed surface and being further provided with lengthwise extending slots at its opposite ends, an arch support having sliding engagement with said exposed surface of said plate, and projections on opposite ends of said arch support arranged to enter the slots of the plate for adjustably securing the said arch support in position.

8. In footwear of the kind described a sole, a plate secured to said sole and having an exposed surface and being further provided with slots at its opposite ends, said slots being of the keyhole or bayonet type and extending lengthwise of the plate, an arch support having a sliding engagement with the exposed surface of said plate, and projections on said support at opposite ends thereof arranged to first enter the enlarged portions of said slots and to be moved into the reduced portions thereof for adjustably securing the said arch support in position on the plate.

9. In footwear of the kind described, a sole, a plate located adjacent to said sole and comprising two sections movable relatively to each other, means for moving said sections, and an arch support carried by said plate.

10. In footwear of the kind described, a sole, a plate located adjacent to said sole and

comprising two sections movable relatively to each other, one of said sections being provided with teeth, a pinion arranged to engage said teeth, means connected with said pinion for rotating the same to move said plate sections relatively to each other, and an arch support carried by said plate.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH MAY.

Witnesses:
JEAN GRUND,
CARL GRUND.