Feb. 5, 1929. 1,701,252

H. H. AHERN

HEEL AND ARCH SUPPORT

Filed June 14, 1928

Fig. 1.

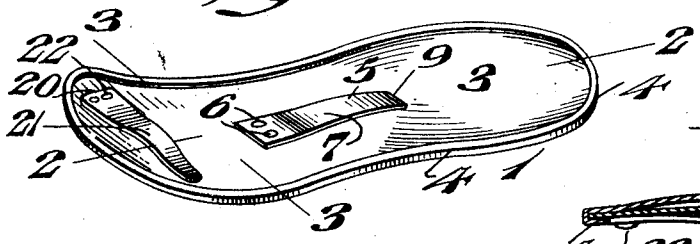


Fig. 3.

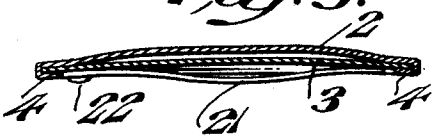


Fig. 2.

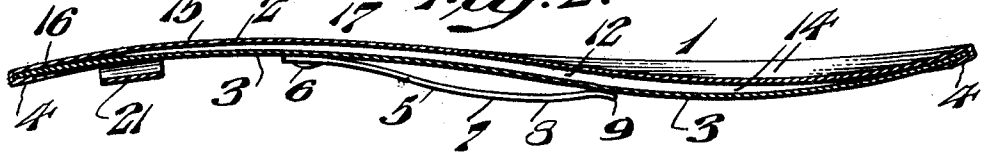


Fig. 4.

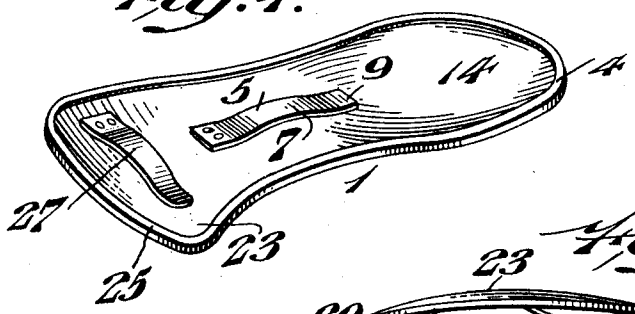


Fig. 5.

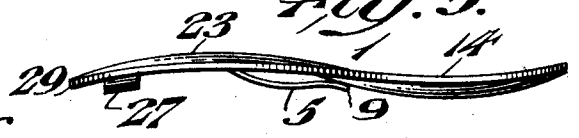
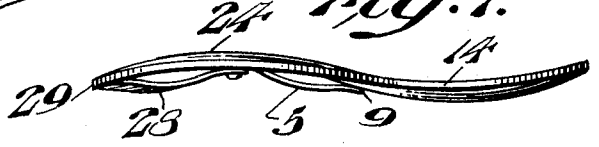


Fig. 6.



Fig. 7.



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UNITED STATES PATENT OFFICE.

HARRY H. AHERN, OF NEWPORT NEWS, VIRGINIA.

HEEL AND ARCH SUPPORT.

Application filed June 14, 1928. Serial No. 285,275.

My invention relates to a new and useful resilient heel and arch support, which is adapted to be detachably positioned within a shoe to provide resilient support for the heel, arch instep and front of the foot, and which, while giving maximum resiliency and support to various parts of the foot, is light in weight and provdes a soft tread.

My invention further relates to a heel and arch support formed of metals of different electro-static properties so that a galvanic current may be produced by the acid incident to foot perspiration.

My invention further consists of a foot support composed of upper and lower spaced flexible metal plates having a rear depressed portion for the reception of the heel, an upwardly curved portion adapted to contact with and support the arch of the foot, a forwardly and downwardly inclined front portion for supporting the instep portion of the foot, a laterally extended front portion for supporting the toe, and a plurality of bottom springs spaced in angular relation to each other to provide added resiliency and support to the arch, instep and front portions at various points.

For the purpose of illustrating my invention, I have shown in the accompanying drawings, a form thereof which is at present preferred by me, since it will give in practice, satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists, can be variously arranged and organized and that my invention of these instrumentalities is as herein shown and described.

In the accompanying drawings.

Figure 1 represents a bottom perspective view of a novel heel and arch support, embodying my invention.

Figure 2 represents, on an enlarged scale an inverted longitudinal section on line 2—2 of Figure 1.

Figure 3 represents, a transverse section on line 3—3 of Figure 1.

Figures 4 and 6 represent, bottom perspective views of modified forms of heel and arch supports.

Figures 5 and 7 represent side elevations of Figures 4 and 6 respectively.

Referring to the drawings in which like reference characters indicate like parts, 1 designates my novel heel and arch support comprising an upper flexible metal plate 2 and a lower flexible metal plate 3. The lower flexible metal plate 3 is secured to the upper flexible plate 2 by the continuous peripheral lip or flange 4 bent downwardly and inwardly to enclose and engage or clinch upon the edge of the lower plate 3, it being understood that said plates may be secured to each other in any other desirable manner. A longitudinally extending spring 5 is secured to the bottom plate 3 by means of the rivets 6 or the like, said spring being bulged outwardly as at 7, see Figure 2, and then upwardly as at 8, and terminating in the downwardly bent free end portion 9. The plates 2 and 3 are spaced apart as at 12 throughout the greater portion of their length to provide resiliency and softness of tread. The plates 2 and 3 are further provided with the aligning rear depressions 14 for the reception of the heel of the foot which as is well known from human anatomy protrudes lower than the arch and instep of the foot. The metal plates 2 and 3 are also provided with the convexed portions 17 forming a rest or support for the arch of the foot, said convexed portions terminating in the somewhat flattened portions 15 which are slightly bent downwardly at their front extremity as at 16, (see left hand portion of Figure 2) to prevent the foot or the stockings from catching with the front end of the arch support when the foot is withdrawn, that is, when the shoes are removed. The space between the upper and lower plates 2 and 3 is at its maximum at about the central portion of said plates, that is, at the point aligning with the arch of the foot, and gradually tapers or decreases as the heel and instep portions are approached, where little or no resiliency or support is needed. Similarly, the spring 5 is of greatest curvature and tension at about the point 7 corresponding to and aligning with the arch of the foot, thus giving maximum resilient support to said arch, as will be apparent from Figure 2.

By providing the space 12 between the plates 2 and 3, I provide a resiliency and softness of tread which would not be available if a single plate of sheet metal were employed. This resiliency is further enhanced by the provision of the spring 5 which is so positioned as to enhance the resiliency of the convexed portion 17 which supports the arch of the foot. Thus as the weight of the body is transferred from the heel of the foot to the instep, and as the heel is raised with respect

to the fulcrum point just behind the toes, the entire weight of the body rests momentarily upon the arch of the foot. As the weight of the body progresses forward, from the rear to the front portion of the arch of the foot, the spring 5 and the plates 2 and 3 are correspondingly and proportionally compressed, thus providing a slightly "sliding" or shifting support, corresponding with the shifting of the weight of the body, and thus keeping the arch of the foot constantly supported and reinforced.

By providing the depression 14 I not only provide a seat for the heel of the foot, but I am also enabled to use my novel arch and heel support without the aid of any auxiliary fastening devices, that is, I provide a device that will retain its proper position and which will not slide or shift within the shoe.

In order to provide support, protection and relief to other parts of the foot, which due to constant rubbing may become hardened, callous and painful, I prolong the front portion 15 forwardly and laterally and shape the outer contour 20 thereof as will be understood from Figure 1, so as to support the afflicted part of the foot, said front portion 15 being provided with the bottom transverse supporting spring 21, secured by rivets 22 or the like. The transverse spring 21 is of the same general contour as the spring 5, and serves resiliently to support the front portion of the foot, as is evident.

In Figures 4 and 6, I have shown bottom plan views of modifications of my invention, wherein I provide front lateral extensions 23 and 24, having their outer edges 25 and 26 respectively, formed to support other parts of the foot, and provided with the corresponding respective bottom springs 27 and 28, which coact therewith in the manner heretofore described, it being understood that the shape or contour of the front portions 15, 23 and 24 as well as their corresponding, coacting bottom springs 21, 27 and 28, is determined by the location of the affected or sore part of the foot to be relieved and supported and is not limited to the exact shape or form shown. The outer edges or front ends of the front extensions 23 and 24 are bent downwardly as at 29 to guard against the catching of the stocking when the foot is withdrawn as will be understood from the left hand portions of Figures 5 and 7. The spring 27 in Figure 4 is transversely arranged while the spring 28 in Figure 6 is obliquely arranged to the spring 5.

It will thus be apparent that I have devised a novel heel and arch support which provides resilient support to the foot at various points simultaneously and in proper proportion to the amount of support needed, and that in addition to providing the requisite support my novel device is also useful in relieving pain and eliminating or reducing to a minimum the formation of bunions, callous or hardened skin and similar ailments.

It will further be seen that since my novel device is detachable the same can be used continuously on successive pairs of shoes and does not have to be discarded when the shoes wear out as is the case with built-in arch supports heretofore employed. Another advantage resulting from the detachable character of my novel heel and arch support is that it need not be used unless needed, and when only a short walk is contemplated, or when through its use the feet have sufficiently recovered, it can be left out to be again used whenever occasion demands.

If desired, I may employ upper and lower plates of metals having different electrostatic properties such as zinc, and copper, thus forming an anode and a cathode or positive and negative poles which, when acted upon by the acid incident to perspiration of the feet, will generate a galvanic current which possesses admitted therapeutic advantages.

My novel heel and arch support is detachable and may be made in various standard sizes to fit various sizes of shoes and the same may be adapted for use in men's, women's and children's shoes indiscriminately.

It will further be apparent that I have devised a heel and arch support which is extremely light compared to conventional arch supports heretofore known and employed, and that my novel heel and arch support tends to cool the feet since the metals from which it is made are good heat conductors which conduct and radiate heat at a much quicker rate than leather and other materials hertofore employed, which as is well known are heat insulators or poor conductors.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a heel and arch support, upper and lower spaced apart plates of a contour to fit within a shoe, said plates being secured together at their peripheral edges, a heel depression in said plates merging into an upper convex surface for supporting the arch of the wearer, the maximum space between said plates being at said arch supporting portions, a longitudinally, extending bulged spring secured at one end to the bottom of said plates and having its free end justaposed to the front of said heel depressions, the front of said plates being deflected downwardly and later-

ally, and a front bulged spring secured to said bottom plate and extending at an angle to said first spring.

2. In a device of the character stated, an upper plate, and a lower plate of a contour to fit within a shoe, said plates being secured to each other at their periphery and spaced from each other at their intermediate portions, there being rear depressions for receiving the heel and central, aligning, inclined surfaces on said plates adapted to support the arch of the foot, a longitudinally extending bottom spring having its front end secured to said lower plate near the front of said inclined portions and its rear end freely bearing against the rear of said inclined portions, front aligning, convex surfaces on said plates adapted to support the instep of the foot and having their front edges downwardly and forwardly inclined, and a front bottom spring coacting with said front convexed portions, and having a central bulged portion, adapted to afford a resilient support to the front of the foot.

3. In a device of the character stated, an upper plate and a lower plate of a contour to fit within a shoe, said plates being secured to each other at their periphery and spaced from each other at their intermediate portions, central, aligning, inclined portions adapted to support the arch of the foot, a longitudinally extending bottom spring having its front end secured to said lower plate near the front of said inclined portions and its rear end freely bearing against the rear of said inclined portions, front aligning convex portions adapted to support the instep of the foot and having their front edges downwardly and forwardly inclined, a front bottom spring coacting with said front convexed portions and disposed at an angle to said first mentioned longitudinally extending bottom spring, and aligning rear depressions in said plates for receiving the heel of the foot, the maximum space between said plates being at points juxtaposed to the free end of said longitudinally extending spring.

HARRY H. AHERN.