July 9, 1940. W. SEIGLE 2,207,165

ARCH SUPPORT

Filed Jan. 6, 1939

FIG. 1

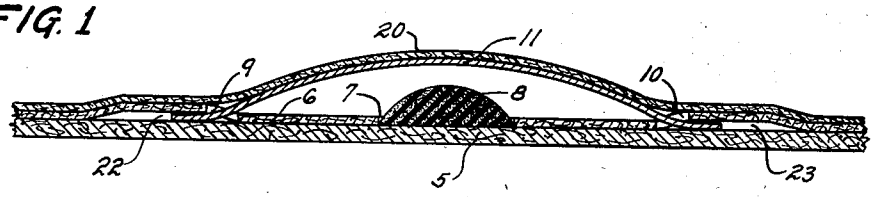
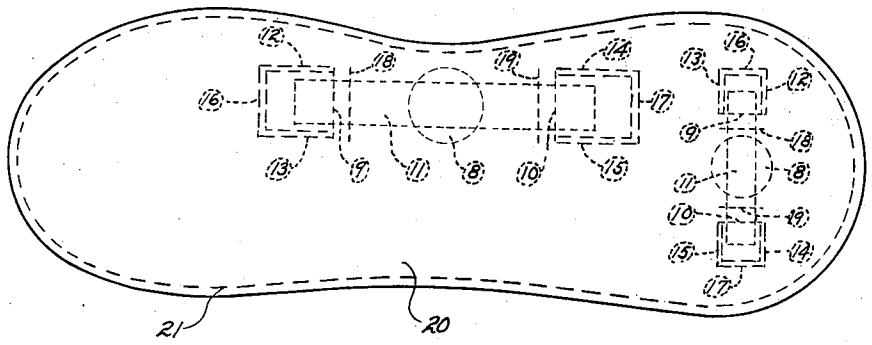


FIG. 2



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ARCH SUPPORT

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3 Claims. (Cl. 36—71)

This invention relates to arch supports and embodies a construction which may be used in supporting either the longitudinal or metatarsal arch of the foot.

My invention further relates to an improvement over the construction disclosed in my Patents No. 1,763,260 issued June 10, 1930, and No. 1,848,203 issued March 8, 1932.

The invention embodies, as the resilient means for supporting the arch, a leaf or plate spring in combination with a resilient bumper for limiting the maximum extent of collapse of said spring. It is true that leaf or plate springs have previously been used in arch support constructions but to my knowledge the combination of such a spring and a bumper therefor has not yet been conceived. As is well known to those familiar with the art, after a leaf spring has been depressed or collapsed a certain extent its resistance to further or complete collapse is decidedly less than when the collapsing pressure was first applied. Up to the present time it has been necessary to make the leaf spring used in supporting the arch comparatively heavy so that it would be strong enough to support a person's weight. In making the spring heavy the bones and muscles of the foot were not allowed full action due to the lack of sufficient resilience in the comparatively heavy spring. Also the spring was usually broken due to the flattening or straightening of the spring in use. To obviate this defect in the leaf spring I provide a resilient bumper, for limiting the extent of the collapse of the spring in use. This enables me to use a comparatively light leaf spring which has sufficient resilience to conform to and properly support the arch, which resilience will allow free action of the muscles and by gentle resilient pressure will aid in restoring the bones, ligaments and muscles of the foot to their natural position. In addition, the limiting of the extent of collapse of the leaf spring greatly aids in prolonging the life of the spring and practically eliminates breakage.

The chief object of the invention, therefore, is to provide an arch support in which only the maximum spring tension is used in supporting the arch, whether it be metatarsal or longitudinal.

The details in the construction of a preferred form of my invention, together with other objects attending its production, will be better understood from the following description when read in connection with the accompanying drawing, which is chosen for illustrative purposes only, and in which,

Figure 1 is a fragmentary sectional view through an arch support embodying a preferred form of my invention, the view being taken longitudinally through the leaf spring; and,

Figure 2 is a top plan view of an arch support embodying my invention, and illustrates the manner in which the invention supports both the longitudinal and metatarsal arches of the foot.

Like characters of reference designate like parts in both the figures.

Referring to the drawing, my invention includes a flexible base or insole 5 made preferably of leather, an intermediate layer 6, also preferabiy of leather, cemented or otherwise suitably attached to the upper surface of said insole, and provided at a suitable point with a perforation 7 which is substantially of the same size and shape as the base of a resilient bumper 8, which is preferably made of sponge rubber and which seats in said perforation. This intermediate layer 6 is provided with substantially parallel slots 9 and 10 located on opposite sides of the perforation 7 and in alignment therewith. Each of these slots is adapted to receive one end of the normally bowed leaf or plate spring 11. Along opposite sides of the ends of said spring 11, and parallel to the sides of said spring, the intermediate layer 6 is stitched to said insole, said stitching being designated by the numerals 12, 13, 14 and 15, said spaced rows of stitching definitely defining runways or guides for the ends of said spring. Rows of stitching 16 and 17, respectively joining the parallel rows 12 and 13, and 14 and 15, complete the runways or guides within which the ends of the spring 11 may move longitudinally. In addition to the stitching just mentioned, additional rows of stitching 18 and 19 are provided respectively along the inner or lowermost edges of the slots 9 and 10, and serve to firmly hold these edges to the insole regardless of the movement of the spring 11. Within the runways defined by the rows of stitching 12 to 17 inclusive, the intermediate layer 6 is not in any way attached or secured to the insole 5. As previously mentioned the layer 6 may be cemented to the insole at all points outside these runways.

A third layer 20, preferably of a flexible material such as leather, serves as a cover plate for the entire support, including the spring 11, the outer edges of said third layer 20 being preferably stitched to the insole 5, as shown by the dotted lines 21 in Figure 2. In addition, this

third layer 20 is also preferably cemented to the upper surface of the intermediate layer 6 at all points where the two actually contact.

From the Figure 1 drawing it will be seen that the bumper 8 is cemented or otherwise suitably secured within the perforation 7 of the intermediate layer 6 directly beneath the approximate center of the spring 11. The spring 11 is shaped as desired and is adapted to conform to the arch of the foot which it is desired to support. As downward pressure is applied the ends of the spring simply move outward into the runways 22 and 23, the bumper 8 serving to limit the deformation of the spring.

In marketing arch supports made according to the foregoing description I intend, of course, to provide various sizes and shapes to fit various individuals, and what is most important, I intend to furnish these various sizes and shapes of supports in varying degrees of resiliency (technically, rigidity). This is accomplished by using springs 11 having different degrees of rigidity and different factors of maximum compressional stress. As the springs 11 are varied in strength, width, length, and degree of bow, the resilient bumpers 8 will also be varied in heighth and in resiliency, it being my intention, and a definite part of my invention, to make the bumper 8 of such heighth and of such resiliency that it will meet the spring 11 and begin assuming a portion of the weight on said spring just before the spring 11 has been deformed or collapsed to such an extent that further deformation results in a decreasing tendency to resist deformation, and so that the bumper 8 will assume the major portion of the weight and thus limit further deformation of the spring 11 before the spring has been deformed to a point near its point of ultimate stress.

It will be seen, therefore, that my arch support construction utilizes only the maximum resilience of the spring 11, which results in a greater flexing of the arch supporting muscles and ligaments of the foot, and a consequent greater strengthening effect on those muscles and ligaments than is produced by an arch support of usual construction.

While I have described and illustrated a specific embodiment of my invention, I do not wish my patent protection to be limited to the details of construction illustrated, but only by the scope of the appended claims.

I claim:

1. A resilient arch support including: a base or insole; a normally bowed plate spring mounted thereon; and a bumper or shock absorber positioned between the central portion of said spring and said insole, said bumper being of such size and resilience with relation to the elasticity or rigidity of said spring that when said spring is depressed to a point near its maximum resistance to deformation, the bumper assumes the added spring deforming force and resiliently limits further deformation of said spring.

2. A resilient arch support including: a base or insole; a normally bowed plate spring mounted thereon; a bumper or shock absorber positioned between the spring and the insole, said bumper being of such size and resilience with relation to the elasticity or rigidity of said spring that when said spring is depressed toward said insole to a point near its maximum resistance to deformation, the bumper assumes any added spring deforming force and resiliently limits further deformation of said spring; and a flexible protective covering for said spring.

3. An arch support including: a base or insole; a normally bowed plate spring having its two ends slidably mounted on the upper surface of said insole; and a bumper or shock absorber mounted on said insole substantially midway between the ends of said spring and in alignment with said ends; said bumper being of such size and of such resilience with relation to the elasticity of said spring that just before said spring is depressed to the point of its maximum resistance to deformation, the bumper assumes the added spring deforming force and resiliently limits further deformation of said spring.

WILLIAM SEIGLE.