Jan. 7, 1941. R. A. DAVIS, JR 2,227,426

ARCH BRACE

Filed April 8, 1940

Fig. 1.

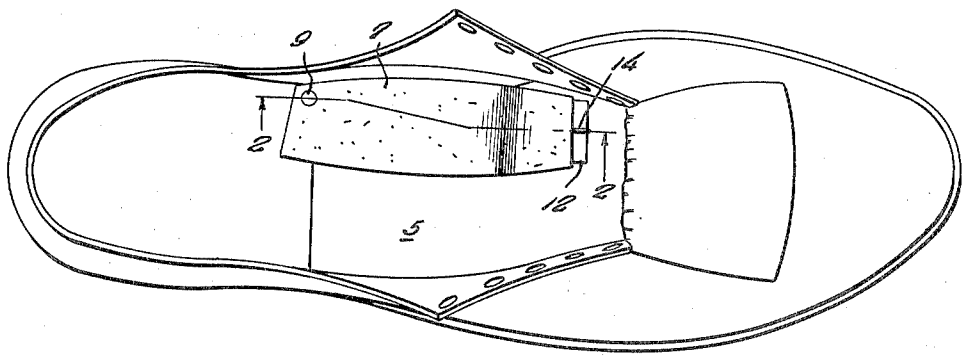



Fig. 2.

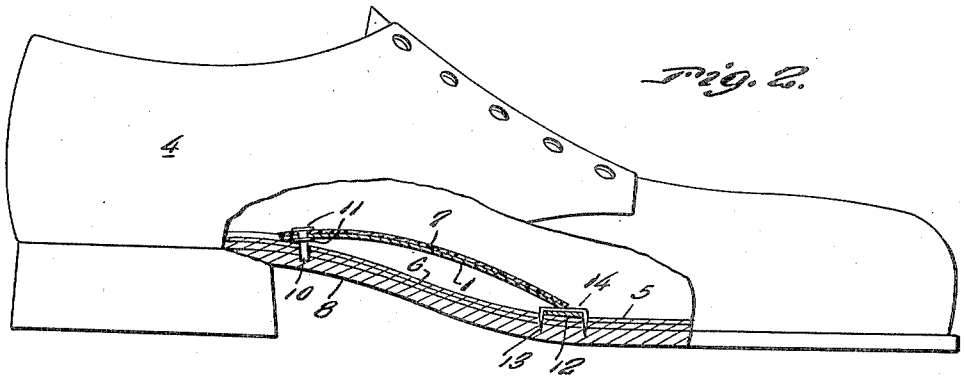



Fig. 4.

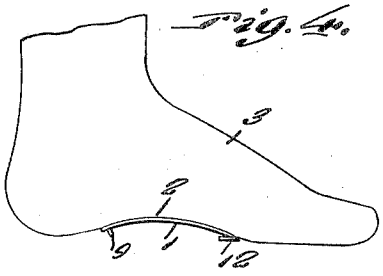



Fig. 5.

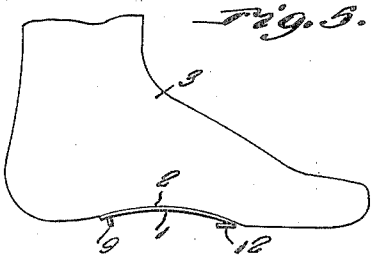



Fig. 6.

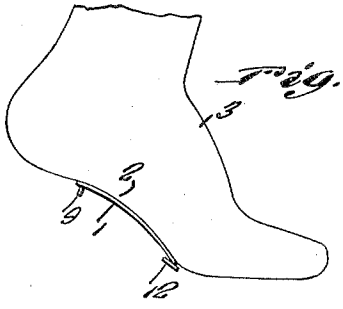
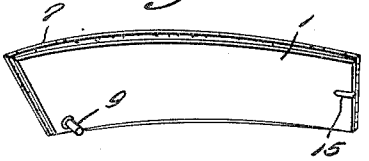



Fig. 3.




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Patented Jan. 7, 1941 2,227,426

# UNITED STATES PATENT OFFICE

2,227,426

## ARCH BRACE

Robert A. Davis, Jr., Nampa, Idaho

Application April 8, 1940, Serial No. 328,548

1 Claim. (Cl. 36—71)

My invention relates to improvements in arch braces for the feet.

Among the important objects of the invention are to provide an arch brace for a weak, or flat, foot adapted for quick and easy attachment in a shoe to function as an auxiliary support for the main arch of the foot, yieldingly bracing the arch under weight imposed on the foot in walking, and standing, and reacting when the foot is relieved of such weight to facilitate return of the arch bones to normal position, to thereby obviate sluggish action of the foot and leg bones, muscles, and ligaments, and to augment the action of the arch in springing the foot back to normal as soon as weight is removed from the foot, thus providing for momentarily resting the foot between steps.

Another object is to provide a device of the character and for the purpose above set forth which may be worn with absolute comfort and will provide for a smooth cushioned roll of the foot, in walking, off the ball of the foot and onto and off the toes.

Still another object is to provide an arch brace adapted to allow the leg to make a straight down thrust without side slip of the foot in the shoe.

To the accomplishment of the above, and subordinate objects presently appearing, a preferred embodiment of my invention has been illustrated in the accompanying drawing, set forth in detail in the succeeding description, and defined in the claim appended hereto.

In said drawing:

Figure 1 is a view in top plan illustrating the preferred embodiment of my invention applied in a shoe,

Figure 2 is a view partly in side elevation and partly in section on the line 2—2 of Figure 1,

Figure 3 is a view in perspective of the brace detached,

Figure 4 is a view in side elevation illustrating the normal position of the brace when weight is removed from the foot,

Figure 5 is a similar view illlustrating the manner in which the brace is used when weight is imposed on the foot, and

Figure 6 is another similar view illustrating the position assumed by the brace when the foot is rolled onto the ball thereof in walking.

Referring to the drawing by numerals, the arch brace of my invention comprises, as its basic element, an elongated, narrow strip-like member 1 of resilient metal, transversely flat, and normally upwardly bowed, and of the proper length to fit beneath the main arch 2 of a foot 3, it being of course, understood that different lengths of strips will be provided for feet of different sizes. The width of the member 1 will also be correspondingly proportioned with the size of the foot and arch, and the member bowed, or curved, in accordance with the type of arch, high, or low, and the degree of correction required. Preferably the strip 1 is formed of oil tempered steel. The member 1 is designed to be used in the arch side of a shoe 4, on top of the insole 5, over the instep part 6, and to extend lengthwise of the said instep part and main arch, as will be understood. The member 1 is faced with a panel 7 of leather, or the like, of slightly greater width than said member. The sides of the panel 7 may be outwardly bowed slightly, as shown, although such curvature is not essential. As will be understood, the panel 7 is also transversely flat and conforms in curvature to that of the member 1. The rear end of the member 1 and that of the panel 7 are oblique to the longitudinal axis of the same to compensate for the curvature of the sole structure 8 of the shoe 4 at the rear of the instep part 6 and in a manner such that said member 1 and panel 7 are transversely horizontal throughout the length thereof when applied in the shoe.

The described member 1 and panel 7 are attached to the sole structure 8 of the shoe 4 by means of a stud 9 depending from the rear outer corner of the member 1 and seated in a suitable socket 10 provided in said sole structure 8, said stud having a rivet-like head part 11 securing the member 1 and panel 7 together at the point indicated. The remainder of the panel 7 may be adhesively secured to the member 1 if desired. Beneath the front end of the member 1 a small metal bearing plate 12, substantially rectangular, is attached to the sole structure 8 on top of the insole 5 by a staple 13 spanning said plate 12 and having a long flat head 14 extending lengthwise under the front edge of the member 1. A guide groove 15 is provided in the under face of the member 1 centrally and longitudinally of the same to accommodate said head 14. As will be clear, the front edge of the member 1 under flexing and reaction thereof slides on the bearing plate 12 and is prevented from lateral movement by the head 14 and guide groove 15.

Referring now more particularly to the use and operation of the described brace. When the foot 3 is relieved of weight thereon, as in sitting, or between steps, the member 1 reacts sufficiently against the arch 2 of the foot 3 to maintain the same in proper normal condition, as shown in

Figure 4, it being understood that the member 1 is designed to react in accordance with the needs of the user of the brace, as regards weakness in the arch structure, i. e. bones, ligaments and muscles, so as to compensate for such weakness. When the foot 3 throughout its full length is sustaining the weight of the user, as in walking, or standing, the member 1 gives, or yields, downwardly, as shown in Figure 5, but reacts upwardly against the arch 2 of the foot so as to partially support the load on the foot and compensate for weakness in the arch structure under the load. As soon as the foot 3, in walking, is rolled onto the ball thereof and the arch structure is relieved of maximum weight or load, the member 1 reacts to assist the arch structure to reassume normal condition as illustrated in Figure 6. Under downward yielding, or flexing, and upward reaction of said member 1, the front end thereof slides on bearing plates 12 and head 14 of staple 13. The member 1 and panel 7 being flat and horizontal transversely, are thereby caused to hug the arch 2 of the foot 3 and keep the latter from slipping in the shoe 4 sideways toward the instep side thereof. The member 1 is also designed to be bent, or sprung, by hand, to preshape the same in accordance with different arch curvatures.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly the invention as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the subjoined claim.

What I claim is:

The combination with a shoe, of an arch brace comprising an elongated strip-like member of resilient metal upwardly arched and adapted to extend lengthwise in the shoe longitudinally of the same on the instep side thereof to fit in the main arch of the foot and yieldingly support said arch under weight thereon, said member tending to react upwardly against said arch, a panel of cushioning material superposed on said member and extending along the same, means to detachably secure the rear end of said member in said shoe comprising a stud depending from said rear end, said shoe being provided in the sole thereof with a socket for receiving said stud, the front end of said member being free for endwise sliding movement over said sole under yielding and reaction of the member, a bearing plate surmounting said sole beneath said front end of said member and fixed to said sole to slidably support the same, and coacting devices on said front end of the member and said plate, respectively, for guiding said end of the member over said plate and preventing lateral movement of the same, comprising a staple securing said plate to said sole and having a flat head and said front end of the plate being provided with a groove therein receiving said head.

ROBERT A. DAVIS, JR.