May 9, 1933. S. M. NICKERSON 1,907,995

ARCH SUPPORT FOR FOOTWEAR

Original Filed July 11, 1930

Fig. 1.

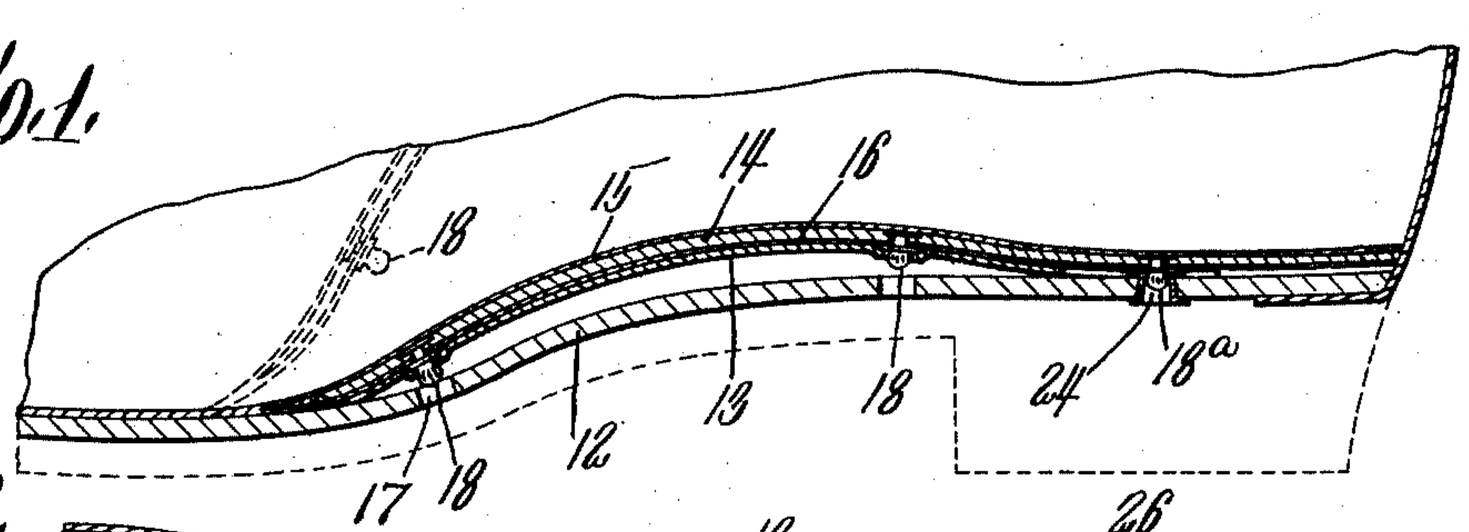


Fig. 2.

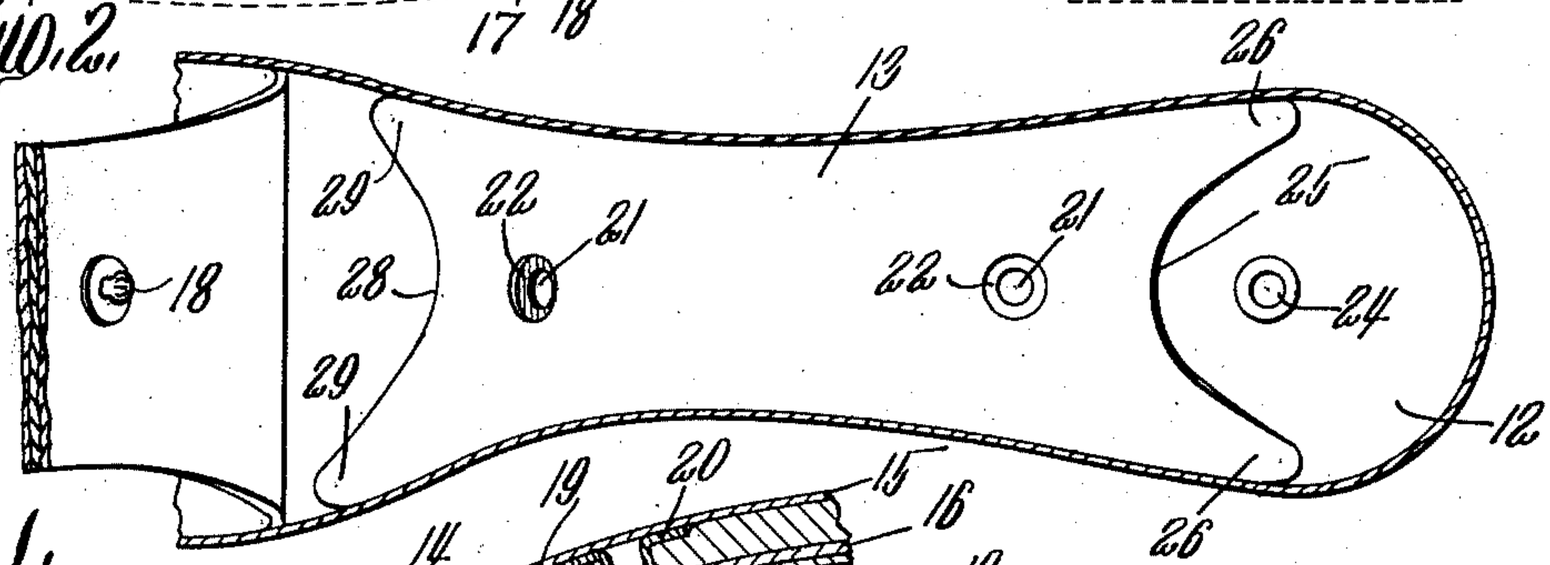


Fig. 3.

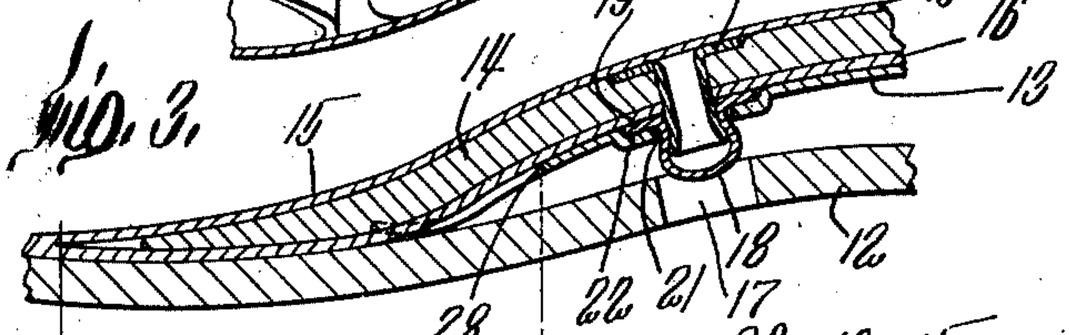


Fig. 4.

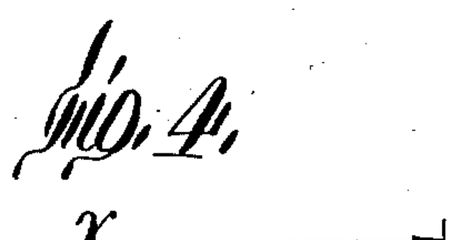
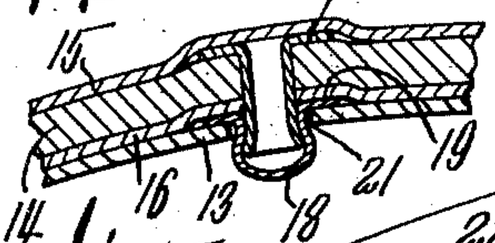


Fig. 9.



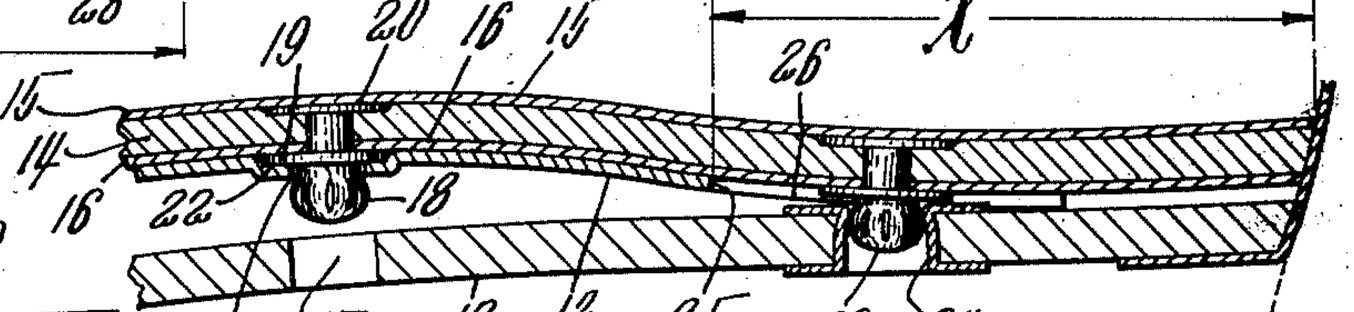
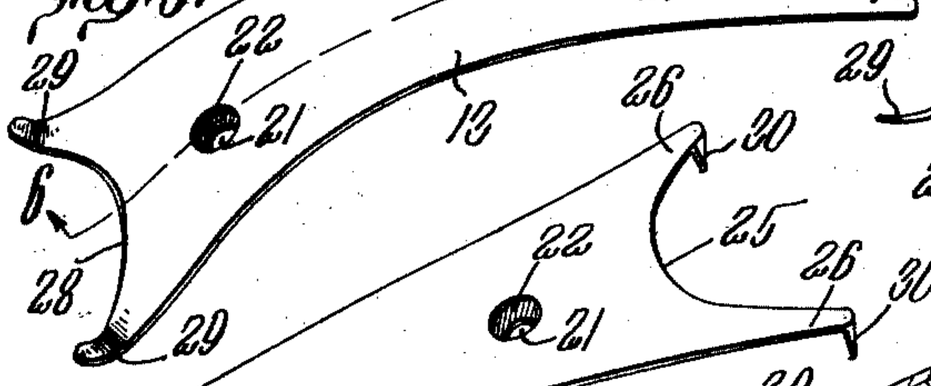


Fig. 5.



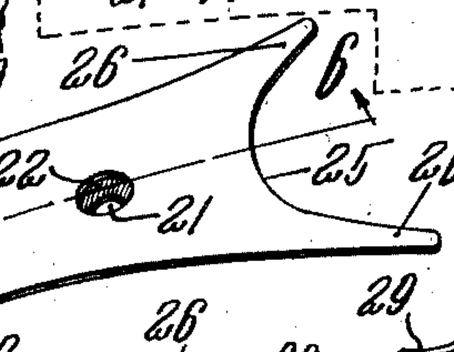


Fig. 6.

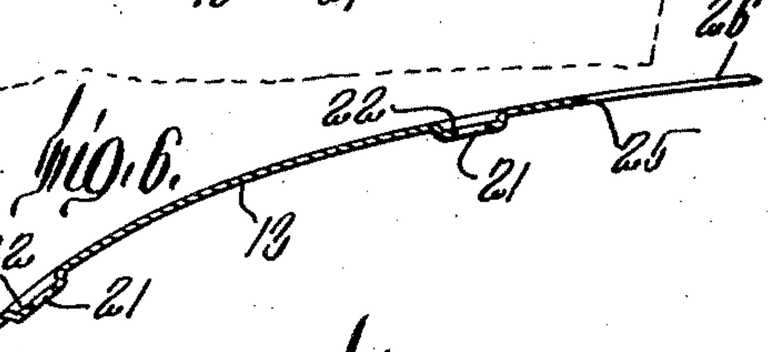


Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE

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ARCH SUPPORT FOR FOOTWEAR

Application filed July 11, 1930, Serial No. 467,228. Renewed July 20, 1932.

This invention relates to arch-supporting means useful in remedial treatment of various anatomical weaknesses or defects in the human foot, and particularly to an arch support which includes a resilient sheet metal shank piece, supported by the top surface of a portion of the insole and having a resiliently yielding top surface suitably diversified to adapt it to act as a remedial or corrective support for the shank portion of a foot bottom, means being provided for interchangeably locating differently formed and characterized shank pieces in a predetermined operative position in a shoe, so that a salesman in a shoe store, or the owner of a shoe, may combine with the shoe such forms of remedial or corrective shank piece as may be required.

Of the accompanying drawing forming a part of this specification,—

Figure 1 shows in longitudinal section a portion of a shoe having an arch support embodying the invention, said support including a resilient metal shank piece and a top or sock member.

Figure 2 is a top plan view, showing the shank piece in its operative position, and the top member displaced and the major portion thereof broken away.

Figures 3 and 4 are enlargements of portions of Figure 1.

Figure 5 is a perspective view of the shank piece shown by Figures 1, 2, 3 and 4.

Figure 6 is a section on line 6—6 of Figure 5.

Figure 7 is a perspective view of a modified shank piece.

Figure 8 is a sectional view, showing a modified top member secured to the modified shank piece shown by Figure 7.

Figure 9 is a fragmentary view hereinafter referred to.

The same reference characters indicate the same parts in all of the figures.

12 designates the portion of the insole of a shoe which extends rearwardly from the ball, said portion including the shank and the heel end.

13 designates a curved shank piece of resilient sheet metal, preferably steel, having any desired remedial or corrective form as to its top surface and a curvature more abrupt than that of the top surface of the shank portion of the insole, so that the ends of the shank piece are adapted to bear on the insole and yieldingly maintain the major portion of the shank piece spaced above the shank portion of the insole, as shown by Figure 1. Said major portion is free to yield to foot pressure, its yieldingly depending on the degree of resilience or stiffness of the shank piece.

The shank piece yieldingly supports a compressible and conformable top member, which bears on the upper surface of the shank piece and, in this instance, is composed of a relatively thick body layer 14 of cushioning material, such as felt or rubber and top and bottom layers 15 and 16, of thin and relatively tough sheet material, such as thin leather, cemented to the body layer, the bottom layer 16 bearing on the upper surface of the shank piece.

The top member is conformed by foot pressure to the shank piece and is detachably secured thereto, so that differently characterized arch supports may be provided by using differently characterized shank pieces. The top member shown by Figures 1, 2, 3 and 4, is permanently connected at its forward end to the fore part of the insole, so that the portion thereof bearing on the shank piece may be raised from the shoe, as indicated by Figure 2, and by dotted lines in Figure 1. The shank piece may therefore be connected with the top member while the latter is raised. The forward end of the top member may be cemented to the fore part of the insole, if desired.

A desirable means for detachably connecting the top member with the shank piece is shown by the drawing and includes stud members of a well known stud and socket snap fastener attached to the top member, each stud member including a slitted compressible head 18, attached to the top member by means including rigidly connected annular flanges 19 and 20, between which portions of the top member are clamped. The lower flanges 19 bear on the lower side of

the top member, and the upper flanges are spaced above the lower flanges.

The insole 12 is cut out as illustrated by the perforations 17 to provide recesses for the shank-piece-attaching heads 18.

The shank piece is provided with orifices 21, constituting sockets in which the heads 18 are insertible, said sockets compressing the heads while they are being inserted, so that when the heads are inserted they expand and yieldingly resist a pull tending to withdraw the heads. When the heads are fully inserted, the flanges 19 bear on the shank piece and support the flanges 20 raised above the shank piece and projecting upwardly in the shoe.

To limit the upward projection of the upper flanges 20, and prevent them from causing uncomfortable protuberances on the upper surface of the top member, I form the socket orifices 21 in downwardly projecting integral bosses integral with the shank piece 13, said bosses forming annular seats 22 surrounding the orifices 21 and offset downward from the upper surface of the shank piece, the diameter of said seats being such that the lower flanges 19 enter the bosses and bear on the seats, as best shown by Figures 3 and 4. The upper flanges 20 are thus so depressed that they do not cause upwardly projecting protuberances on the upper surface of the top member. Figure 9 shows a protuberance which would be formed on said top surface if the shank piece were not provided with the downwardly offset seats.

The top member and shank piece may be confined in their operative position in a shoe by any suitable means, such as the connection between the forward portion of the top member and the fore part of the insole, and complemental fastener members including a stud member constructed as above described, and secured to the heel end of the top member, the head 18*a* of said member engaging a socket member 24 in the heel end of the insole.

The rear end of the shank piece 13 is preferably provided with a forwardly extending recess 25, located between two tapered rearwardly extending arms 26, constituting the rear end of the shank piece. The recess 25 is formed to expose the forward portion of the heel end of the insole, or in other words, the forward portion of the seat for the wearer's heel located directly under the heel bones of the foot. The arms 26 do not extend to the rear end of the insole so that the exposed heel seat of the insole is approximately circular, as shown by Figure 2. The top member has a heel portion projecting over the recess 25, and bearing on and conforming to the entire exposed heel seat, as shown by Figure 1. The heel seat, defined in part by the recess 25, and the heel portion of the top member conforming to the heel seat, therefore afford a comfortable support for the heel bones of the foot, the arms 26 being sufficiently resilient to somewhat yieldingly support the portions of the heel end of the top member bearing thereon.

The forward end of the shank piece 13 may be provided with a rearwardly extending recess 28, as shown by Figures 1, 2, 3 and 4, said recess being located between two tapered forwardly extending arms 29, constituting the forward end of the shank piece.

The recess 28 is formed to expose a part of the ball portion of the insole located directly under the metatarsal bones of the foot.

A portion of the top member extends forward over the recess 28, and conforms to the margin of said recess, so that said margin and the portion of the top member bearing thereon constitute a comfortable support for the metatarsal region of the foot bottom. When such support is not required, the recess 28 may be omitted, as shown by Figure 7.

The top member and shank piece may constitute arch-supporting members adapted to be loosely inserted in and removed from the shoe, the top member having no direct or permanent attachment to the insole, and the shank piece being provided with integral spurs 30, as shown by Figures 7 and 8, adapted to indent the insole and confine the shank piece and top member in an operative position in the shoe.

The line *x* in Figure 4, indicates the maximum length of the exposed heel seat, or in other words, the distance between the extreme rear portion of the heel end of the insole 12 and the extreme forward portion of the recess 25, the recess considerably increasing said distance.

The line *y* in Figure 3, indicates the maximum length of the metatarsal supporting portion, or in other words, the distance between the extreme rear portion of the recess 28 and the portion of the top member at the forward end of the metatarsal supporting portion, this distance being considerably increased by the recess.

I claim:

1. An arch support comprising a flexible shank piece of resilient sheet metal curved or arched so that its end portions are adapted to bear on the insole of a shoe and yieldingly maintain its major portion spaced above the insole, said major portion having downwardly projecting integral bosses centrally apertured to form stud-engaging sockets surrounded by annular seats offset downward from the upper surface of the shank piece, and a compressible top or sock member conformable to and bearing on the top surface of the shank piece and provided with stud members separably engageable with said sockets, and attached to the top member by means including rigidly connected upper and lower annular clamping flanges between which material of the top member is clamped,

the lower flanges entering the bosses and bearing on said seats, to limit the upward projection of the upper flanges, and prevent the formation of protuberances on the foot-bearing surface of the top member.

2. An arch support comprising a curved shank piece of resilient sheet metal, curved or arched so that its end portions are adapted to bear on the insole of a shoe and yieldingly maintain its major portion spaced above the insole, the rear end of the shank piece being provided with a forwardly extending recess located between two tapered rearwardly extending resilient arms, constituting the rear end of the shank piece, said recess being formed to expose the forward portion of the heel end of the insole, the extremities of said arms bearing loosely on the heel end of the insole at opposite sides of the recess, so that the arms are slidable on the insole, a compressible top or sock member conformable to and bearing on the upper surface of the shank piece and having a heel portion projecting over said recess, and bearing on and conforming to the entire heel seat, means for detachably securing the top member to the shank piece, and means for locating the shank piece and top member in a predetermined operative position in a shoe, the resilient arms yieldingly supporting the portion of the heel end of the top member bearing thereon.

3. An arch support as specified by claim 2, the forward end of the shank piece being provided with forwardly projecting resilient arms whose inner edges meet and define a rearwardly extending forward recess exposing a portion of the metatarsal supporting surface of the insole, the extremities of said arms bearing loosely on the ball portion of the insole at opposite sides of said recess, so that the arms are slidable on the insole, the said top member having a fore portion projecting over the forward recess and bearing on the metatarsal supporting surface of the insole, the resilient arms yieldingly supporting the fore portion of the top member and the metatarsal region of the foot.

In testimony whereof I have affixed my signature.

STACY M. NICKERSON.