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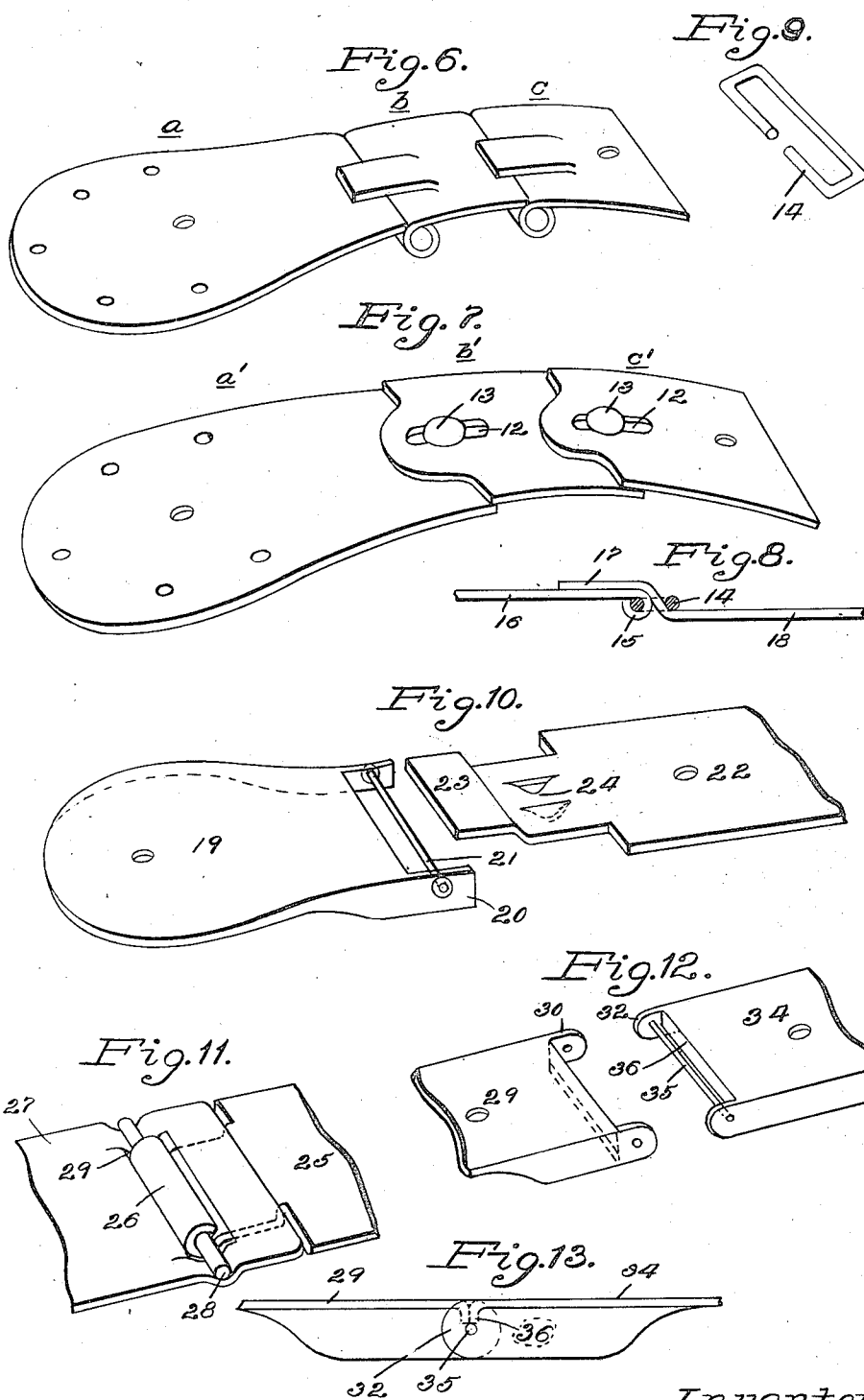
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W. N. SECHLER

ARCH SUPPORT

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

WILL N. SECHLER, OF FORT SCOTT, KANSAS.

ARCH SUPPORT.

Application filed April 24, 1922. Serial No. 556,163.

To all whom it may concern:

Be it known that I, WILL N. SECHLER, a citizen of the United States, residing at Fort Scott, county of Bourbon, and State of Kansas, have invented a certain new and useful Improvement in Arch Supports, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 is a sectional view of a shoe showing my arch support in position therein.

Figure 2 is a detail view of my improved arch support secured in position on the outer sole of the shoe.

Figure 3 is a plan view of a modified form of hinge.

Figure 4 is a sectional view on line 4—4 of Figure 3.

Figure 5 is a detail view of another modified form of hinge.

Figures 6 to 13 are detail views of other modified forms.

This invention relates to an improvement in arch supports, and is designed particularly as an improvement upon that type of arch support shown in U. S. Letters Patent No. 1,391,584, granted to me September 20, 1921.

The objects of this present invention are to simplify the construction of arch supports, cheapen the cost of manufacture, and to provide same with means whereby it becomes attached to and forms a part of the finished shoe.

In my present invention, as in the patent referred to, the main shank portion of the arch support while possessing flexibility to a certain extent is practically rigid, while the forward hinged portion forms an extension of the main shank portion and is likewise practically rigid when supporting a superposed load, but which forward extension is capable of being flexed or bent downwardly by the peculiar construction of the hinge. This hinge is practically in the form of an elbow or rule joint, whereby the hinged parts are capable of relative movement only in one direction, movement in the opposite direction being arrested when the parts of the hinge co-act in such manner as to provide abutting shoulders which lend

rigidity to the structure and enable the hinge to support a superposed load.

In the drawings, 1 indicates the heel portion of a shoe upper, 2 the insole, 3 the outer sole and 4 the heel riser.

5 indicates a metal plate, preferably, stamped from sheet metal and formed slightly concave on its upper surface, said plate having perforations in its rear end whereby it may be nailed in position to the heel seat by means of nails or brads 6.

7 indicates a rivet which secures the forward end of this main shank portion 5 to the outer sole at a point preferably slightly in advance of the heel.

8 indicates the forward extension of the shank which is secured to the outer sole by means of a rivet 9 near the ball of the foot. This shank extension is provided with rearwardly extending tongues 10 which are staggered with relation to each other, and are preferably flared as shown in Figure 1. With no weight on the arch the parts are unstressed or in normal position. When the wearer is standing and the arch is weighted between the arrows *c* and *d*, the points of reaction being at arrows *a* and *b*, the arch sections are under compression between the anchorage points 7 and 9, and the outer sole under tension between these points. The forward free end of the main shank portion 5 is received between the tongues 10 and abuts against the wall formed by the junction of said tongues and the body portion of the forward extension 8. When the shank portions 5 and 8 are secured in position to the outer sole, and the parts are in the position shown in Figure 1, it is possible, on account of the flaring position of the tongues, to bend the heel portion of the outer sole downwardly in the zone of the point indicated by arrow *e*, and, as represented by the dot and dash lines in Figure 1, the flaring lower tongue permitting this slight downward movement of said heel portion. However, when the heel of the shoe is lifted, as in walking, as indicated by dotted lines in Figure 1, the upper tongues 10 contact with the upper surface of the free forward edge of the main shank portion 5, at which time the forward edge of said main shank portion engages in the socket formed by the tongues, thereby placing the arch sections in compression between their anchoring points



7 and 9 (the outer sole being under tension between these points at this time) thus providing a practically rigid arch structure in which the forward extension 8 constitutes a practically rigid extension of the main shank portion 5; but the entire shoe is, of course, flexible at all times forward of the front edge of the arch section 8. In walking, the shoe bends at or forward of the arrow *a*, as indicated by the dotted lines in Figure 1. It will be observed that the rigidity of the arch is secured because the shank portions 5 and 8 are rigidly anchored to the outer sole of the shoe, and that this anchorage permits the portions 5 and 8 to separate when the outer sole of the shoe is bent at the hinged joint (arrow *e*) between said shank portions, as indicated by the dot and dash lines in Figure 1. However, when load is imposed upon the shank portions 5 and 8, say at or near the hinge joint (between arrows *c* and *d*) the anchorage of the shank portions places the outer sole of the shoe under tension between the points of anchorage and the shank portions 5 and 8 under compression between said anchorage points. Hence, substantial rigidity is obtained between the anchorage points. Furthermore, by nailing or anchoring the rear end of the main shank to the heel seat, a firm or rigid support for the arch is provided substantially throughout the length of the shank of the shoe when weight is imposed thereon. From the above, it will be observed that the sole of the shoe is flexible at and in front of arrow *a*, i. e., can be bent both upwardly and downwardly, as permitted by the upper; but that the shank of the shoe can only be flexed at one point, in the zone of the arrow *e*, and in one direction only (upwardly) at this point, the shank being rigid to support a superposed load tending to flex it downwardly, or in the opposite direction.

By covering the metal arch support with the insole, said insole serves to hold the parts in proper relation to the shoe and to each other, and there is a smooth surface for the wearer's foot.

In Figures 3 and 4, I have shown a modified form of hinge in which the main shank portion 5^a is formed with a hinge eye 5^b substantially at its central point, the metal being cutaway on each side of this hinge eye. The shank extension 8^a is formed with eyes 8^b and a tongue 10^a, the latter resting upon the upper surface of the main shank portion 5^a. This hinged joint permits the forward extension 8^a to be flexed downwardly but the tongue 10^a by engaging the upper surface of the main shank portion 5^a prevents vertical movement of said forward shank extension. 11 indicates the hinged pintle passing through the hinge tongues 5^b and 8^b.

In Figure 5 I have shown another modified form in which the main shank 5^c is pro-

vided with an opening 5^d on its forward end while the shank extension 8^c is provided with a tongue 10^c designed to be passed through the opening 5^d and form an elbow joint possessing the functions above described.

In the forms shown in Figures 1, 2 and 5 when the outer sole of the shoe is flexed opposite the hinge joint of the shank, there is a relative longitudinal movement between the parts of the metal shank constituting the arch support.

In Figure 6, I have shown a modified form corresponding substantially to the form shown in Figures 3 and 4 in which the support is made up of three sections *a*, *b*, and *c*, connected together in such a manner that the two forward sections can be flexed downwardly but are substantially rigid when a load is imposed thereon at a point between the ends of the arch support.

In Figure 7, I have shown an arch support composed of three sections *a'*, *b'* and *c'*, sections *b'* and *c'* having tongues on their forward edges and being provided with slots 12 through which pass rivets 13. These rivets permit a longitudinal and lateral movement of the forward sections and also a slight hinging action of the forward sections relative to the heel section on account of the play between the heads of the rivets 13 and the parts which they connect together.

In Figure 8, I have shown a hinge formed by means of a loop 14, see Figure 9, which loop has its ends received in an eye 15 on the front section 16 of the arch support, there being a bent tongue 17 provided with a jog or bend, which passes through the loop. In this form, 18 is the forward extension of the support.

In Figure 10, I have shown the heel section 19 of the arch support provided with downturned flanges 20 for receiving the hinged pintle 21. The forward extension 22 is provided with an overlapping tongue 23 and a depressed portion 24, the latter cooperating with the hinge pintle.

In Figure 11, I have shown a construction in which the forward portion 25 is formed with an eye 26 at the end of the tongue which lies under the heel portion 27 of the support, said heel portion being provided with a depressed portion 28 on each side of the slot 29.

In Figures 12 and 13, I have shown the forward portion 29 as having hinged lugs 30 designed to co-operate with the hinge lugs 32 on the rear portion 34. A hinge pintle 35 passes through the hinge lugs and serves to hold the parts in position while flanges 36 on the contiguous edges of the parts, by contacting with each other above the hinge pintle, prevent the forward portion from being flexed upwardly.

What I claim is:

1. An arch support for shoes composed of a plurality of parts hingedly connected

together, said parts being anchored and rigidly secured to a part of the shoe on each side of said hinge connection.

2. A sectional metal arch support, the sections of which are designed to be separately secured in position between the inner and outer soles of a shoe, and means for connecting said sections together for flexing movement in one direction only.

3. A metal arch support for shoes comprising a main shank portion and a forward extension connected together for relative longitudinal movement, and means for securing said parts respectively to the outer sole of the shoe.

4. A metal arch support for shoes comprising a main shank portion and a forwardly extending portion, said parts being connected together for relative longitudinal movement, and means for anchoring each of said parts to the outer sole of the shoe, said means being located on each side of the joint between the parts.

5. A metal arch support for shoes comprising a plurality of shank portions designed to be fastened respectively to the outer sole of the shoe, said shank portions being designed to engage each other when the outer sole of the shoe is bent upwardly and placed under tension, thereby placing said shank portions under compression, and said shank portions separating when the outer sole is bent so as to be placed under compression.

6. A metal arch support for shoes comprising two members, one of which is designed to be anchored to the heel seat of the

shoe and the other of which is designed to be anchored to the ball of the sole, said last mentioned portion being capable of movement in one direction only with respect to said anchored portion.

7. In an arch support for shoes, the combination of a shoe, its outer sole, inner sole and heel, said arch support being composed of a plurality of sections one of which is anchored to the shoe at the heel portion thereof, and another of which is anchored to the ball of the shoe, said last mentioned section being movable in one direction only with respect to the heel anchored portion of the support, and both portions of said arch support being located between the inner and outer soles of the shoe.

8. In combination with a shoe, an arch support secured in position in the shank portion thereof, and provided with means whereby said shank portion can be flexed only in an upward direction.

9. In combination with a shoe, a sectional arch support secured to the outer sole and extending from the heel portion to the ball of the shoe, and a joint between the sections of said arch support which permits flexing in one direction only.

10. The combination of an outer sole for shoes, of an arch support composed of sections, each of which is anchored to said outer sole, and a joint between the sections which permits flexing of said arch support in one direction only.

In testimony whereof I hereunto affix my signature this 10th day of March, 1922.

WILL N. SECHLER.