No. 850,862. PATENTED APR. 16, 1907.

H. C. WELCH.

ARCH SUPPORTING SHOE.

APPLICATION FILED APR. 11, 1906.

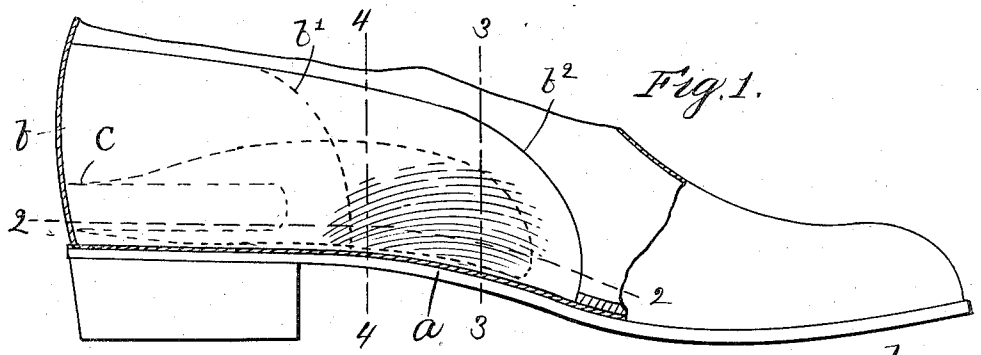


Fig. 1.

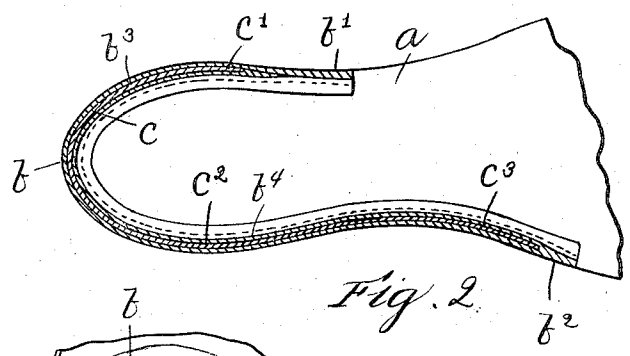


Fig. 2.

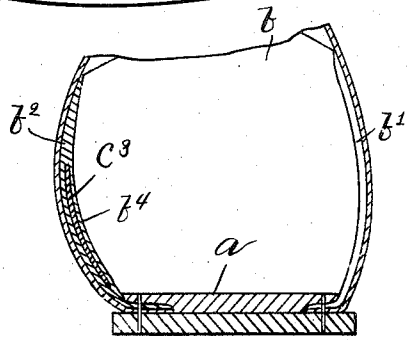


Fig. 3.

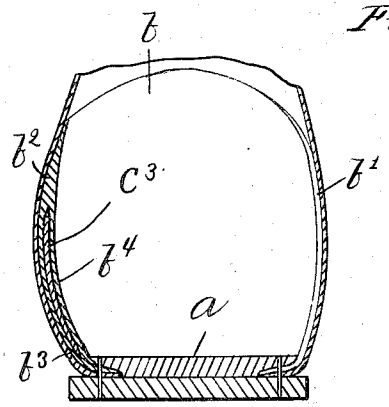


Fig. 4.

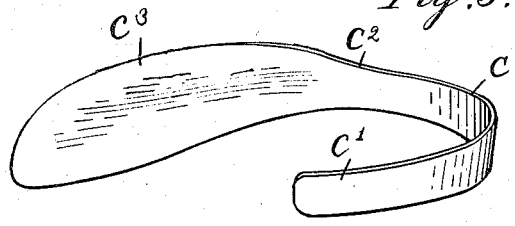


Fig. 5.

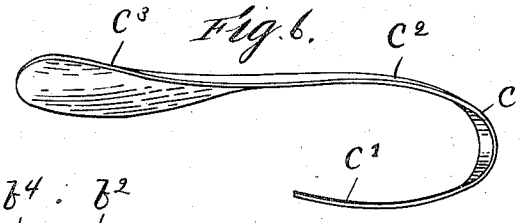


Fig. 6.

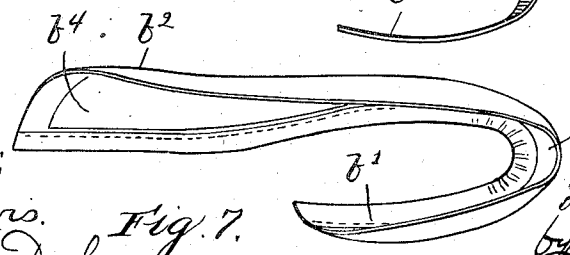


Fig. 7.

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UNITED STATES PATENT OFFICE.

HEZEKIAH C. WELCH, OF HAVERHILL, MASSACHUSETTS.

ARCH-SUPPORTING SHOE.

No. 850,862. Specification of Letters Patent. Patented April 16, 1907.

Application filed April 11, 1906. Serial No. 311,090.

To all whom it may concern:

Be it known that I, HEZEKIAH C. WELCH, of Haverhill, county of Essex, State of Massachusetts, have invented an Improvement in Arch-Supporting Shoes, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a form of shoe which is especially designed for use by persons having what is known as "flat foot" or weak or broken-down arches. For the relief of persons thus afflicted it is customary to provide a stiff metal plate in the bottom of their shoes, which generally extends the length of the shank and up against the arch. These plates are objectionable for various reasons. The shoes which must be worn when these plates are used must be of a larger size than those which would otherwise be worn on account of the space taken up by the plate. They are expensive and very materially increase the weight of the shoe. They are practically unsuitable in cases where there is only a comparatively slight tendency for the arch to break down or where but little pressure upon the arch is necessary to keep it in place, for the reason that they are stiff and unyielding and cause much discomfort to the wearer.

The object of my invention is to provide a form of shoe which will afford a yielding support for the arch of the foot and perform substantially all the useful functions of the arch-supporting plates now commonly employed without discomfort to the wearer, which may fit the foot as perfectly as if such support were not present, which will cost but little more to manufacture than an ordinary shoe and will not appreciably increase its weight, and which will be especially suitable for those having merely weak arches or incipient cases of flat foot.

I accomplish this object by providing the shoe with a counter which extends forwardly on the inner side of the foot over the shank to or nearly to the ball, said counter being reinforced by a spring which is molded with the counter in a shape which corresponds to the arch of a normal foot and is held so that a yielding support is provided for the arch of the foot which presses it upwardly and inwardly into its normal form in case it tends to become displaced.

For an understanding of my invention reference is made to the accompanying drawings, in which—

Figure 1 is a side elevation, partly broken away, of a shoe provided with my invention. Fig. 2 is a sectional view on the line 2 2 of Fig. 1. Fig. 3 is a cross-sectional view on the line 3 3 of Fig. 1. Fig. 4 is a similar view on the line 4 4 of Fig. 1. Fig. 5 is a perspective view, and Fig. 6 is a plan view, of the reinforcing-spring. Fig. 7 is a plan view of the counter.

Inasmuch as the outward appearance of a shoe provided with my invention is the same as that of any ordinary shoe, only such parts of the shoe are shown as are deemed necessary to illustrate my invention.

The bottom *a* of the shoe is designed to be stiffened in the shank by the ordinary shank-piece or other well-known means, said shank being suitably raised or curved to afford a suitable support for the portion of the shank of the foot which bears directly on the shoe-bottom.

My invention has special reference to the form of counter *b* illustrated. This counter is provided with an outer section b', which is of the same shape as that of an ordinary shoe-counter. The inner section b^2 of the counter is, however, extended forwardly approximately twice as far as the section b' past the shank or arch of the foot to or nearly to the ball. The front end of the section b^2 is tapered down to the sole, and the skived lower edge of the counter is secured to the inner sole between the upper and lining in the usual manner. A pocket b^3 is formed in the counter by splitting the same from a point adjacent its lower edge upwardly, forming a flap b^4, and a reinforcing-spring *c*, of the same shape as said counter, is secured in said pocket, with its lower edge as close to the sole *a* as practicable. The outer section c' of said spring *c* is of about half the length of the inner section c^2 c^3, each section being somewhat shorter than the corresponding section of the counter in which it is located, so that the ends of the spring both terminate a short distance from the ends of the counter. The outer section c' and the rear portion c^2 of the inner section of said spring are preferably of approximately the same width, while the front portion c^3 of the inner section is approximately twice the width of the section c', as illustrated in Fig. 5 and in dotted outline in

Fig. 1. Said spring *c* is preferably of steel which is slightly tempered, so that it will act as a spring, and is also capable of being molded into the desired shape.

In practice the spring is died out of flat sheet-steel and then is placed in the pocket b^3 of the counter, and the flap b^4 on its inner side is cemented down over the spring, so that the latter is securely held therein. The counter, with spring *c* therein, is then molded in a counter-molding machine, so that the counter and plate are molded into the shape shown in practically one operation. This molding operation is performed just as the cement is ready to set and while the counter is in temper.

The front portion c^3 of the spring is molded or shaped so that it is transversely concave on its inner side and is twisted or set with reference to the plane or position of its heel portion c' c^2 so that it extends obliquely upward from the edge of the sole in a curve. Said portion c^3 is also curved so that it is longitudinally convex on its inner side and approximately follows the curve of the edge of the sole at the shank, as shown in Figs. 2, 6, and 7. The portion of the inner counter-section b^2 above the sole has the same shape as the front portion c^3 of the spring, except that it extends upwardly and forwardly in the same general direction beyond the edges of the spring. This shape of section b^2 corresponds as nearly as practicable to the shape of the arch of a normal foot, and said section is so held by its inherent stiffness and by the reinforcing-spring *c* that when the foot is in the shoe it will fit against the inner side thereof over the entire arch to the ball and from the sole upward. As the spring extends about the heel and its heel portion c' c^2 is securely held in a fixed position by the counter and as the counter has a strong tendency to retain the shape into which it has been molded and is held in this shape by the spring and by the stitches which secure it to the sole, it follows that a strong though yielding vertical and horizontal support is provided for the arch of the foot—that is, an effective support is thus provided against any tendency to crowd the arch down or out on the inner side of the foot, said support tending to press the arch upwardly and inwardly.

The principal support for the arch-supporting portion of the spring and counter is the heel portion of the spring, which is firmly held in place by reason of the fact that its lower edge is held close to the sole or point where the counter is sewed thereto. The pressure of the heel of the wearer against said portion also tends to resist the tendency which downward pressure on the arch-supporting portion would have to swing forwardly said heel portion. A spring of considerable length is thus provided between the portion of said spring *c* which is most firmly held and the portion where the greatest strain is placed thereon, so that the strain on the spring is well distributed, reducing the liability of its becoming weakened or broken to a minimum. In this way the necessity of using a spring too stiff to be comfortable is also avoided. As the spring is much narrower than the counter about the heel portion and it is wholly located in the lower half, or below the inwardly-extending portion thereof, it does not in the least detract from the flexibilty of the counter in those portions in which a counter needs to be flexible in order that it may be comfortable. Obviously excess stiffening in the upper part of the counter will cause much discomfort. By transversely extending the arch-engaging portion of the spring the transverse configuration of the corresponding portion b^2 of the counter is maintained, so that said portion is at all times held to fit closely against practically the entire surface of the arch of the foot, distributing the pressure thereon evenly and preventing excessive pressure thereon at any point, as would soon occur if the spring were narrow at this point, so that the leather could yield. As the counter-section b^2 is not held rigidly in this position, but is capable of yielding to some extent, the support thus provided is not uncomfortable to the wearer, as it otherwise would be; but in the more advanced stages of a case of broken-down arch or flat foot it tends gradually to restore the parts to the normal condition, while in cases of simple weakness of the muscles at this point this support relieves the strain thereon, and in incipient cases of flat foot it prevents advancement of the trouble. In many instances a support of this sort is only needed on occasions; but as this support is not a cause of discomfort under ordinary conditions a shoe provided with my invention is well adapted for constant wear, even though an arch-support is needed only occasionally. The lower edge portion of the counter is also molded to conform to the curve of the sole at the shank, so that said edge portion may be readily stitched to the sole, and the lower side portion of said spring is correspondingly shaped to some extent. (See Figs. 1 and 5.)

Aside from the slightly-increased cost of the counter, the increase in the cost of constructing a shoe provided with my invention as compared with an ordinary shoe is immaterial.

While a counter of leather only, formed in the shape shown, would be effective to an extent in accomplishing the purposes of my invention, its effectiveness would to a great extent be lost after the shoe had been worn for a short time if it were subjected to much strain, as the leather would lose its stiffness and become pressed out of the shape into which it was molded. The reinforcing-spring, however, will maintain its shape in-

definitely and will therefore prevent the counter from becoming misshaped, besides very materially strengthening the counter.

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

1. An arch-supporting shoe having a counter, a spring-metal strip having a heel portion, corresponding in shape to the counter and firmly secured thereto, and having an arch-supporting portion extending forwardly adjacent the shank on the inner side of the shoe adapted to be held in yielding engagement with the arch of the foot by said heel portion, substantially as described.

2. An arch-supporting shoe having a spring-metal strip therein extending about the heel and forwardly on the inner side of the shoe in position to support the arch of the foot, the heel portion of said strip being secured to the adjacent portion of the shoe to hold the arch-supporting portion thereof in yielding engagement with the arch of the foot, substantially as described.

3. An arch-supporting shoe having a counter the inner side section of which extends forwardly over the shank, said extended portion extending outwardly and upwardly from the sole in position to provide a vertical and horizontal support for the arch of the foot, and a correspondingly-shaped reinforcing-spring connected to said counter for yieldingly holding said support in position, substantially as described.

4. An arch-supporting shoe having a counter, the inner side section of which extends forwardly over the shank, said extended portion extending outwardly and upwardly from the sole to provide a vertical and horizontal arch-supporting portion, a spring extending longitudinally of the shoe and rigidly held at its rear end by the heel portion of the counter, said spring having a relatively broad reinforcing-plate at its front end shaped to correspond to the supporting portion of the counter and connected thereto to maintain the transverse shape thereof and hold the same in yielding engagement with the arch of the foot, substantially as described.

5. An arch-supporting shoe having a counter and a spring-metal strip firmly secured thereto and extending about the heel and forwardly adjacent the shank portion of the shoe on its inner side with its lower edge closely adjacent the sole, the heel portion of the strip being relatively narrow and so disposed that the main portion of the heel portion of the counter extends thereabove, and the shank portion of the strip extending outwardly and upwardly from the sole to support the arch of the foot, substantially as described.

6. An arch-supporting shoe having a counter and a spring-metal strip firmly secured thereto and extending about the heel forwardly adjacent the shank portion of the shoe on its inner side with its lower edge closely adjacent the sole, the heel portion of the strip being relatively narrow so that the main portion of the heel portion of the counter extends thereabove, and the shank portion of the strip extending outwardly and upwardly from the sole to support the arch of the foot and being of materially greater width than the heel portion, substantially as described.

7. An arch-supporting shoe provided with a counter having the inner side section thereof extending over the shank portion of the sole and outwardly and upwardly from said shank portion, in position to provide a vertical and horizontal arch-supporting portion, a relatively narrow strip of spring metal of corresponding shape embedded in said counter and having a portion extending about the heel and forwardly to a point adjacent the front inner end of the counter, said heel portion of said strip being rigidly held and adapted to act as a support to hold the forwardly-extended portion thereof and of the counter in yielding engagement with the arch of the foot, said forwardly-extended portion of said strip being extended transversely to maintain the transverse shape of the corresponding counter portion, substantially as described.

8. A shoe-counter having its inner side section extended beyond its outer side section to provide an arch-engaging portion, a sheet-metal spring extending longitudinally of the counter about the heel portion and forwardly along the arch-engaging portion thereof, said spring being secured to the counter throughout its length, and the forwardly-extending portion thereof being obliquely disposed to its heel portion to permit said heel portion yieldingly to resist downward and outward force on its forwardly-extending portion and on the arch-engaging portion of the counter, substantially as described.

9. A shoe-counter having its inner side section extended to provide an arch-supporting portion, said extended portion being shaped and disposed to fit against the arch of the foot, and a sheet-metal spring extending approximately the entire length of the counter, firmly secured thereto, and shaped to correspond to the shape of the corresponding portions of the counter which it engages, the heel portion of said spring being relatively narrow with relation to the counter, and located adjacent the lower edge thereof, substantially as described.

10. A shoe-counter having its inner side section extended to provide an arch-supporting portion, said extended portion being shaped and disposed to fit against the arch of the foot, and a sheet-metal spring extending approximately the entire length of the coun-

ter, firmly secured thereto, and shaped to correspond to the shape of the corresponding portions of the counter which it engages, the heel portion of said spring being relatively narrow with relation to the counter, and the forwardly-extended portion of said spring being extended transversely to greater width than its heel portion to maintain the transverse configuration of the corresponding portion of the counter, substantially as described.

11. A shoe-counter having its inner side section extended beyond its outer side section to provide an arch-engaging portion, a sheet-metal spring extending longitudinally of the counter from the heel portion forwardly along the arch-engaging portion thereof, said spring being secured to the counter throughout its length, and the forwardly-extending portion thereof being disposed to permit its heel portion yieldingly to resist downward and outward force on its forwardly-extending portion and the arch-engaging portion of the counter, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEZEKIAH C. WELCH.

Witnesses:
L. H. HARRIMAN,
CYNTHIA DOYLE.