Oct. 3, 1933. S. LE R. SPICER ET AL 1,928,634

ARCH SUPPORT

Filed Aug. 31, 1932

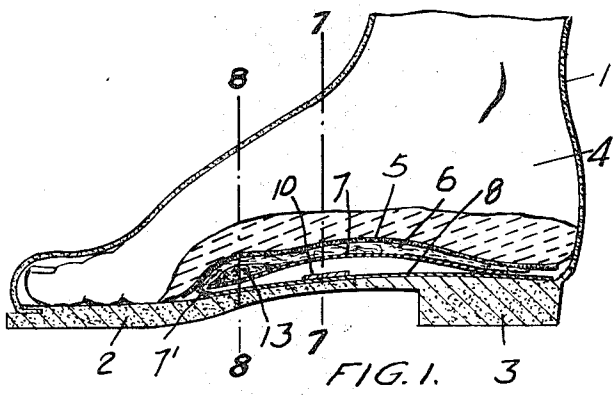


FIG. 1.

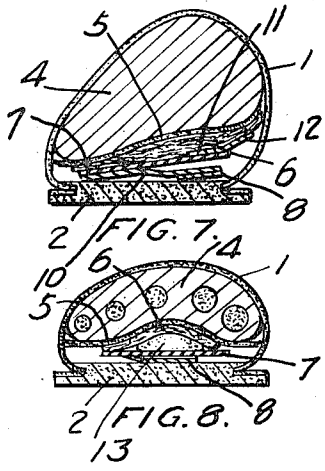


FIG. 7.

FIG. 8.

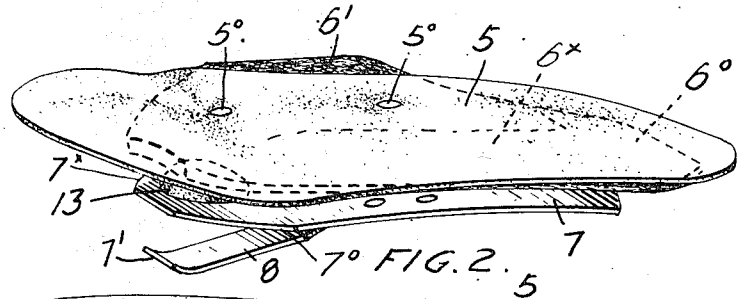


FIG. 2.

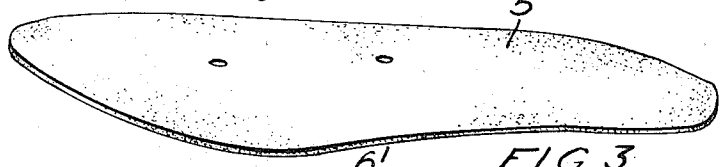


FIG. 3.

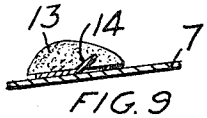


FIG. 9.


FIG. 10.


FIG. 11.

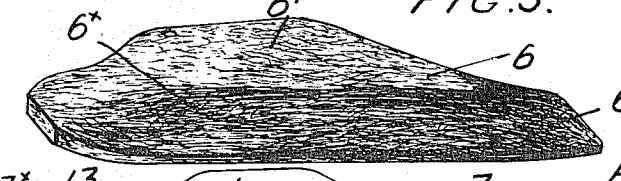


FIG. 4.

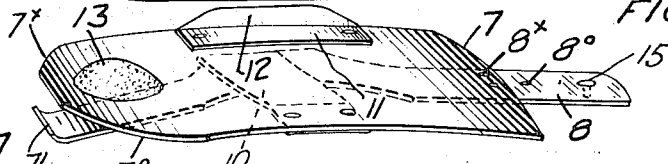


FIG. 5.

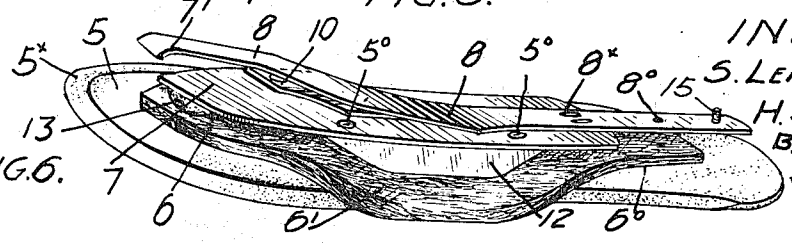


FIG. 6.

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Patented Oct. 3, 1933 1,928,634

# UNITED STATES PATENT OFFICE

1,928,634

## ARCH SUPPORT

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Application August 31, 1932. Serial No. 631,244

4 Claims. (Cl. 36—71)

Our invention relates to improvements in arch supports, and the object of the invention is to provide an arch support which will give a maximum amount of relief to persons suffering from arch trouble and kindred ailments and, at the same time, permit of normal circulation of the blood in the feet and provide a maximum degree of comfort in walking and permit of the re-establishment of normal muscular functions, together with the re-adjustment of the ligaments of the feet, and it consists essentially of the arrangement and construction of parts all as hereinafter more particularly described and illustrated in the accompanying drawing.

Fig. 1 represents a longitudinal sectional view through a boot showing a foot and our arch support therein, the arch support and adjacent portions of the foot being in section.

Fig. 2 is an enlarged perspective view of our arch support built for the left foot.

Fig. 3 is a perspective detail of the leather sole piece forming the top of the support and upon which the foot directly rests.

Fig. 4 is an enlarged perspective detail of the felt pad which is located directly beneath the sole piece illustrated in Fig. 3.

Fig. 5 is a perspective detail of the metallic parts forming the resilient support for the foot located directly beneath the pad illustrated in Fig. 4 and showing the metatarsal or transverse arch support carried thereby.

Fig. 6 is a perspective view of our arch support similar to the view illustrated in Fig. 2 in the inverted position.

Fig. 7 is a transverse sectional view through Fig. 1 on line 7—7.

Fig. 8 is a transverse sectional view through Fig. 1 on line 8—8.

Fig. 9 is a sectional detail through the metatarsal or transverse arch support and a fragment of the main plate upon which it is carried.

Fig. 10 is a perspective detail of the metatarsal arch support, and

Fig. 11 is a fragmentary portion of the main plate showing the means for adjustably connecting the metatarsal arch support thereto.

In the drawing like letters of reference indicate corresponding parts in each figure.

1 indicates a boot or shoe provided with the usual sole and heel 2 and 3. 4 indicates a foot fitting within the boot or shoe, the lower portion of the foot extending from the ball of the big toe to the heel being broken away in section. 5 is a leather piece shaped to fit the foot to extend between the rear portion of the ball of the foot to adjacent the rear of the heel so as to extend over the waist of the foot and upon which the foot is directly supported.

The edges of the leather piece 5, on the underside are bevelled or skived off as indicated at $5^x$ so as to give a smooth and even contact between the sole of the shoe and the wearer's foot, preventing irritation and the formation of callouses.

6 indicates a felt pad which is placed on the upper side of the main metallic plate 7 which is arched longitudinally so as to fit beneath the waist of the foot, the inner side and rear end of the pad 6 being bevelled off as indicated at $6^x$ and $6^o$. The felt pad 6 partially fills in the hollow below what is known as the waist of the foot and is extended somewhat beyond the back or heel end of the main plate 7, the bevelled portions of the pad providing a gentle slope to complete the support where it rests on the wearer's heel. The bevelled portion of the pad $6^x$ is for the purpose of easing the wearer's foot slightly lower on the offside or outer side of the foot. The pad 6 and leather sole piece 5 are secured to the main plate by rivets $5^o$.

8 is a metallic strip secured to the under side of the main plate 7 adjacent the rear or heel end thereof as indicated by the rivets $8^x$. The strip 8 is tempered from the rivets $8^x$ forward of that portion extending between the plate 7 and the foot of the wearer, the remaining portion of the strip extending rearward beneath the heel being untempered and therefore readily bendable.

The strip 8 intermediately of the length of the tempered portion is offset laterally towards the outside of the foot, the remaining portions of the strip being substantially located centrally of the foot so that when the pressure of the foot bears upon the arch support there is a tendency for the support to become more compressed towards the inner side of the foot than at the outer side as indicated in Fig. 7 following the natural transverse slant of the lower surface of the foot.

A further spring support is formed by a transverse spring plate or strip 10 which is riveted to the main plate 7 adjacent its inner edge. The front end of the main plate 7 is cut off at the corners so as to form a short, rounded, curved portion $7^x$ at the inner side of the foot and a gradual long curved portion $7^o$ at the outer side of the foot. By this means a clearance is formed for the balls of the foot at each side so that they rest directly upon the insole of the boot and do not come in contact with any hard substance and prevents wear on the insole of the boot. The outer longitudinal edge of the pad 6 is extended outward as

indicated at $6^1$ so as to extend slightly beyond the top leather piece 5 being supported in a slightly upwardly curved position by a metal plate 11 which is secured to the upper face of the main plate 7, the lip 12 thereof inclining upward so as to support the pad extension $6^1$ snugly beneath the waist of the foot at the outer side edge thereof and give a saddle like support thereto.

The strip 8 is arched so that the front end thereof extends downward in an inclined direction and bears upon the sole of the boot, the extremity thereof being slightly up-curved as indicated at $7^1$ so as to obviate any danger of it cutting into the sole of the boot.

The main plate 7, together with the strip 8 and transverse strip 10, serves to support the longitudinal arch of the foot and keep it well raised behind the metatarsal or transverse arch; and in order to support the transverse arch, we provide a supplemental pad 13 between the front end of the main plate 7 and the felt pad 6, such pad being placed directly behind the centre of the wearer's metatarsal arch consisting preferably of a piece of sponge rubber molded in the form of a half acorn, the flat face thereof resting upon the face of the main plate and engaged therewith by means of suitably arranged spicular projections 14 which extend upward from the main plate in an inclined direction, being forced into the pad 13 by manual pressure, thereby enabling the adjustment of the pad in a longitudinal direction to fit the requirement of any particular foot with which it is used.

The pad 13, when in position, will force the central portion of the foot upward as indicated in Fig. 8 so as to form the transverse arch holding the foot in a comfortable natural position.

In some cases it has been found that there is a tendency for some feet, in walking, to rise clear of the boot at the heel and thereby permitting the support to rise up and down at that end rendering the support uncomfortable. In order to prevent this the untempered flexible portion of the strip 8 is provided with holes $8^0$ in which is inserted, in one hole or the other, a screw 15 which is screwed into the heel of the shoe thereby holding the rear end of the support firmly in position. In cases where this screw is not necessary, the rear end of the strip 8 bears against the counter portion of the shoe, thus preventing any tendency to longitudinal rearward movement.

It will be readily understood that the natural pressure of the foot upon the arch support would tend to force it rearwardly and, therefore, there will be no tendency to any forward movement of the support within the shoe. It may be also stated that the felt pad 6 serves also as an insulator preventing the temperature of the ground or pavement affecting the foot to an uncomfortable degree.

From this description it will be seen that we have devised a very simple form of arch support which will have a maximum resilience permitting of a maximum freedom of the foot so that there will be no hard unyielding pressure against any part thereof and therefore allow of normal muscular ligamentary and osseous action and proper circulation of the blood through the feet and of replacement of the ligaments, all the muscles of the feet functioning freely and naturally thereby producing a maximum degree of comfort and preventing other injuries to the foot.

What we claim as our invention is:

1. In an arch support, the combination with the main plate, of a longitudinal spring strip secured centrally of the heel end of the main plate and inclined downwardly from the main plate at its opposite end, and a transverse spring strip secured to the main plate adjacent its inner edge and resiliently bearing at its opposite end upon the longitudinal strip adjacent to the transverse arch of the foot.

2. In an arch support, the combination with the main plate, of a longitudinal spring strip secured centrally of the heel end of the main plate and inclined downwardly from its point of attachment to the main plate to form a single resilient bearing support at the forward end of the shoe and offset intermediately of its length towards the inner edge of the plate, and a transverse spring strip secured to the main plate adjacent its outer edge and resiliently bearing at its opposite end upon the longitudinal strip adjacent to the transverse arch of the foot and resiliently bearing at its opposite end upon the offset portion of the longitudinal strip.

3. In an arch support, the combination with the main plate and cushion pad secured to the main plate, of a small resilient metatarsal pad secured beneath the front end portion of the plate and the corresponding portion of the cushion pad, and spicular projections extending from the main plate on which the metatarsal pad is impaled.

4. In an arch support, the combination with the main plate, of a felt pad supported on the main plate and skived off towards the outer longitudinal and rear edges thereof and having an extension at its inner longitudinal edge extending beyond the corresponding edge of the main plate, a plate secured to the edge of the main plate beneath the pad extension and provided with an upwardly inclined lip supporting the pad extension against the inner side of the waist or foot instep, and a resilient support for the main plate.

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