Dec. 5, 1933. H. L. WHITMAN 1,938,127

ARCH SUPPORTER

Filed June 22, 1932

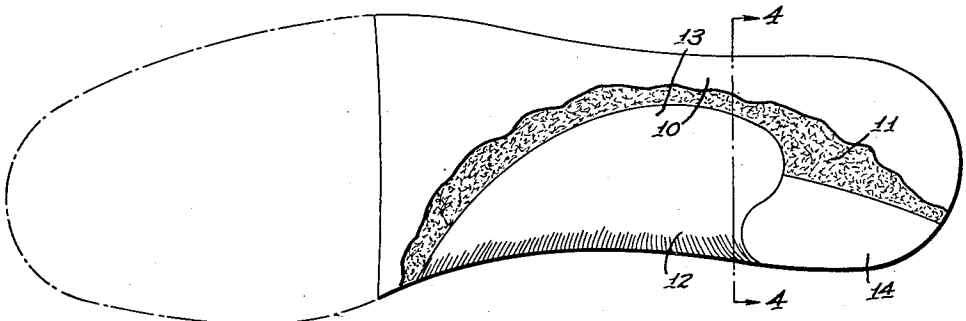


Fig. 2.

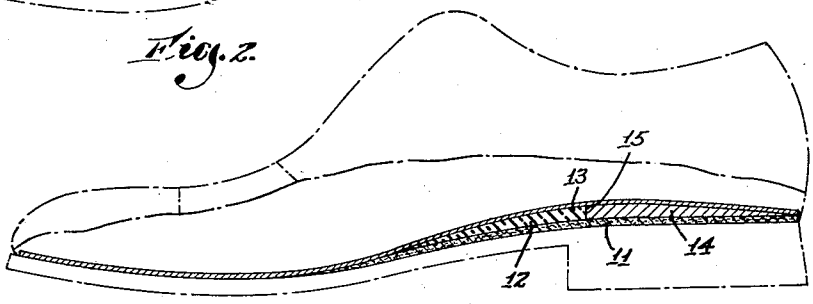


Fig. 1.

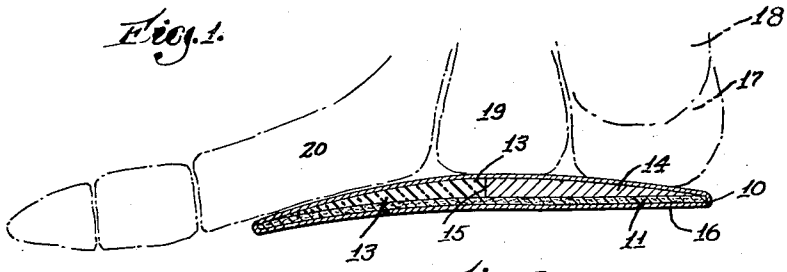


Fig. 3.

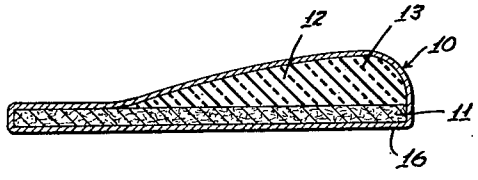


Fig. 4.

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Patented Dec. 5, 1933 1,938,127

UNITED STATES PATENT OFFICE

1,938,127

ARCH SUPPORTER

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Application June 22, 1932. Serial No. 618,640

9 Claims. (Cl. 36—71)

My present invention relates to arch supporters and more particularly to an arch support which may be used separately or in combination with an inner sole.

Hitherto it has been customary to provide a support member which would bear against the arch of the foot generally with less consideration given to the specific point of contact. A technical objection to such a disposition of the arch lies in the fact that the arch so located bears directly against the plantafascia, a tendon very sensitive to external pressure and longitudinally set across the arch of the foot. My prsesent arch is designed to adapt itself to the sensitive area referred to while still continuing to effect a supporting and rotating action upon the general arch of the foot.

The principal object of my invention is therefore an improved arch supporter for use in tennis shoes, leather shoes, and like forms of footwear.

Another object of my invention is an improved arch supporter which may be disposed in the shoe as an inner sole member.

Another object of my invention is an arch supporter having a composite supporting element.

Still another object is a supporting arch which can be constructed within the shoe sole when it is manufactured.

Other objects and novel features comprising the construction and operation of my invention will appear as the description of the same progresses.

In the drawing illustrating the preferred embodiment of my invention, Fig. 1 is a typical cross section of the inner sole and arch support, the rest of the shoe being shown in broken lines.

Fig. 2 is a plan view of the arch partially broken away showing the outline of the rest of the inner sole in dotted lines.

Fig. 3 is a cross section of the arch similar to Fig. 1 but showing a movable arch support and the application to the bones of a foot.

Fig. 4 is a cross sectional view of the arch taken on the line 4—4 of Fig. 2.

Referring more in detail to the drawing 10 indicates a supporting arch member which comprises a felt base 11 upon which is located a composite support member 12 composed of a resilient rubber segment 13 such as sponge rubber having a shape as indicated at Fig. 2 and a hard segment 14 such as leather or hard rubber likewise having its shape indicated in Fig. 2. The segments 13 and 14 are formed with a high portion adjacent the inner side of the device and abut directly below that point in the foot which is considered to be the center of gravity to form a smooth contour having its highest dimension at the point of abutment 15. The two segments 13 and 14 are also skived outwardly to provide a uniformly receding portion adjacent the outer side of the sole.

It is pointed out that the particular arrangement of the rubber and leather segments, if such a combination of materials is used, with respect to one another as shown in Fig. 2 produces a very specific result when associated with the foot of the user and this relation is maintained in a graduated fashion to conform with varying sizes and conditions met with. The composite arch structure if to be used as a separate arch supporter unit is encased in a thin leather member 16 as shown in Figs. 2, 3, and 4. By mounting such an assembly upon an inner sole base, it would be possible to utilize the arch as a combination arch and inner sole member or if preferred, the arch construction may easily be incorporated in the sole construction and Fig. 1 shows such a procedure.

The highest point of the supporting arch will be at the junction of the resilient and hard segments on the inner side with the resilient portion possibly rising very slightly above the hard surface to provide for wearing adjustment at first and this dimension may vary between one eighth and one quarter of an inch or higher depending upon the requirements encountered. The application of the arch has been resolved from a technical study of the bone structure of the foot and the tendons associated therewith. It is believed that a simple discussion of those parts of the foot which are principally affected by the arch would better show the efficacy of the device. Fig. 3 shows a very informal view of a foot skeleton with 17 representing the os calsis, 18 being the astragalus, 19 the scaphoid and 20 indicating a metatarsal. No attempt to show the muscles and tendons has been made but it may be added that longitudinally disposed on the inner side of the foot is a very sensitive tendon termed the plantafascia. The sensitivity of this tendon prevents pressure being applied thereto and pronation of the arch of the foot consists essentially of an inward rotating and flattening of the bones cited, that is the scaphoid, os calsis, and astragalus. It will be noted as was previously pointed out that the rear segment 14 of the present arch supporter is composed of a hard material such as hard rubber

or leather and abuts the resilient segment at a point directly below the center of weight distribution of the body which forms the tripod construction of the foot known as the astragalus, the scaphoid and os calsis. It is further to be pointed out that the front resilient portion of the arch supporter is fastened in such a manner as to prevent pressure on the plantafascia and is disposed to contact with the sensitive plantafascia area in a resilient manner whereby a certain amount of rotating action is obtained. By adjusting and associating the resilient and hard segment members in the specific manner as shown, a result is attained to whereby the os calsis, scaphoid, and astragalus are firmly supported, elevated, and rotated by the hard segment and the metatarsal bones tenderly held and exercised by the resilient segment with the result that the foot structure tends to become re-arranged as influenced by the sensitivity and corresponding pressure modification and there is produced a supporting and rotating effect on the os calsis, scaphoid and astragalus bones to the outer border preventing pronation to the inner border or flat feet as the condition is so commonly termed.

Upon considering the derivation and reason for the particular reverse curve formation at the abutment of the resilient and non-resilient elements, it may be stated that the plantafascia has its upper and rearward extremity located adjacent the inner side of the astragulas at a point directly above the os calsis whence it progresses forward under the scaphoid and cuneiform bones in a diagonal manner to become associated with each of the metatarsals. The sensitivity of this tendon is very materially taken into consideration in the disposition of the resilient and non-resilient portions of the arch support as there is a definite point directly under the astragalus and os calsis where the sensitivity of the plantafascia becomes practically negligible, hence the elliptical or reverse curve form of abutment is so fashioned as to prevent any pressure of the non-resilient element on the plantafascia beyond that point on this tendon at which it starts its upward movement and travels toward the back of the ankle bone, with the result that the reverse curve formation of the non-resilient element practically indicates the dividing line between the areas of sensitivity and negligible sensitivity.

The resilient element abuts the non-resilient element along the reverse curve formation for the purpose of exactly protecting this area of sensitivity and preventing undue pressure thereupon, thereby creating freedom with body weight and preventing a stagnant condition of the phalanges.

In as much as the plantafascia is the origin of the articulation of the phalanges and the resilient element acts as a direct longitudinal exerciser which stimulates correct movement along the scaphoid stream and the cuboid stream, there is achieved a compound action whereby the plantar surfaces of the lateral portions of the astragalus and os calsis are rotated to the longitudinal border and the dorsal surfaces of these bones are rotated to the lateral border and in addition the scaphoid and cuneiforms are inductively rotated to a lesser extent and elevated so that a normal alignment of the tripod construction of the foot is attained.

It is to be understood that I may use various forms of rubber in this connection and the arch principle may be incorporated in a sole, an inner sole or used as a simple supporting member for any type of shoe while still continuing to adhere to the spirit of my invention.

Having thus described my invention what I claim is:

1. A longitudinal arch supporter comprising a felt base, a leather segment located on the rear of said base member, and a rubber segment located on the front of said base member, said rubber and leather segments having raised inner portions adjacent the inner border of said supporter, said rubber and leather segments being uniformly skived towards the outer border of said supporter.

2. A longitudinal arch supporter comprising a base member, a non-yielding portion located on the rear of said base, a resilient portion located on the front of said base, said resilient and non-yielding portions skived to form a raised portion on the inner border of said supporter and a receding portion on the outer border, said resilent and non-yielding portions abutting in an elliptical line, and a leather casing surrounding the whole.

3. An arch supporter comprising a base member, a non-yielding material located on the rear of said base, and a resilient material located on the front of said base, said resilient and non-yielding portions skived to form a raised area adjacent the inner border and receding towards the outer border, said resilient and non-yielding members abutting in a reversely curved line.

4. A longitudinal arch supporter comprising a base member, a non-yielding material located on the rear of said base, a resilient material located on the front of said base, said resilient and non-yielding portions skived to form a raised area adjacent the inner border and receding towards the outer border, said resilient and non-yielding portions abutting in a reversely curved line, the forward extremity of the said non-yielding portion adapted to abut the said resilient portion at a point directly below the junction of the astragalus, the os calsis, and the plantafascia of a foot located upon said arch supporter.

5. An arch supporter comprising a felt member, a composite support member mounted thereon, and a leather member adapted to encase said felt member and said support member, said composite member comprising a solid element and a resilient element abutting in a reversely curved line, said solid element in combination with said resilient element adapted to outwardly rotate the os calsis, astragalus, and scaphoid bones of a foot resting thereupon.

6. In an arch support for a foot, a composite supporting member comprising a rearwardly disposed solid element and a forwardly disposed resilient element, said solid element and said resilient element skived to form a raised area adjacent the inner border and receding towards the outer border to a feather edge terminating inside of said outer border, said resilient and solid elements abutting in a reversely curved line, the forward extremity of the said solid element adapted to abut the said resilient portion at a point directly below the junction of the astragulus, the os calsis, and the plantafascia of a foot located upon said arch supporter, said solid element adapted to rotate the os calsis and astragalus, said resilient element adapted to lightly support the scaphoid and exercise the plantafascia and metatarsus.

7. In an arch support for a foot, a composite supporting member comprising a solid element and a resilient element, said solid and resilient elements having inner raised portions adjacent the inner border of said supporter, said solid and resilient elements being uniformly skived towards the outer border of said supporter to a feather edge, and said solid and resilient elements abutting in a reversely curved line.

8. In an arch support for a foot, a rearwardly disposed leather element and a forwardly disposed rubber element, said rubber and leather elements skived to form a raised area adjacent the inner border and receding to the outer border to a feather edge, said leather and rubber elements abutting in a reversely curved line, the forward extremity of the said leather element adapted to abut the said rubber element at a point directly below the junction of the astagalus, the os calsis, and the plantafascia of a foot located upon said arch supporter.

9. In a longitudinal arch support a rearwardly disposed solid element and a forwardly disposed resilient element, said solid and resilient elements having raised inner portions adjacent the inner border of the said supporter, said solid and resilient elements abutting and being skived uniformly towards the outer border of said supporter.

HYMAN L. WHITMAN.