Dec. 1, 1953 J. J. RITCHEY 2,660,814

ORTHOPEDIC DEVICE

Filed Nov. 3, 1951 2 Sheets-Sheet 1

FIG. 1.

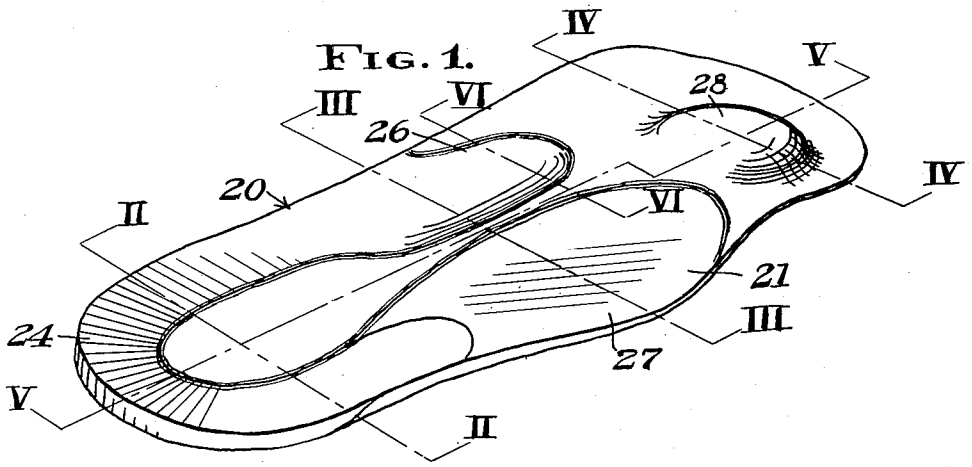


FIG. 3.

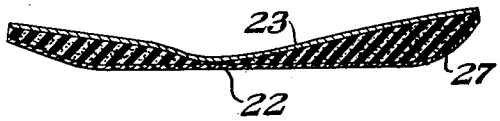


FIG. 2.

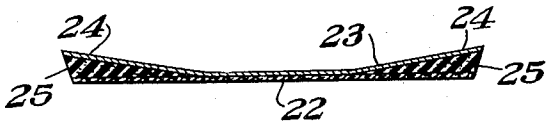


FIG. 4.



FIG. 5.

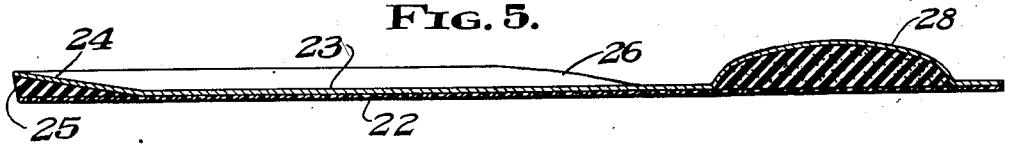
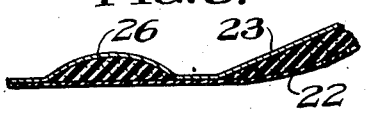


FIG. 6.



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Dec. 1, 1953 J. J. RITCHEY 2,660,814

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Filed Nov. 3, 1951 2 Sheets-Sheet 2

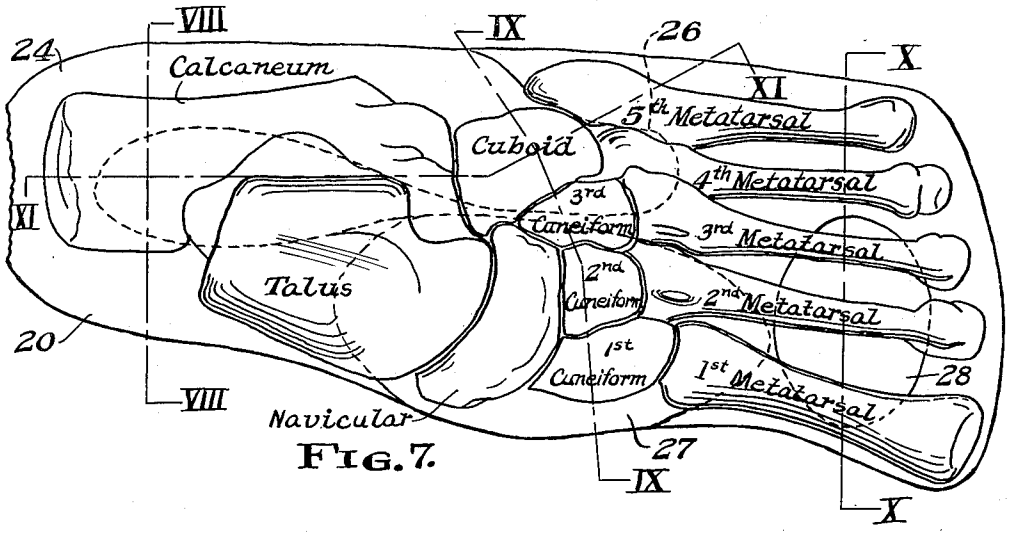


FIG. 7.

FIG. 8.

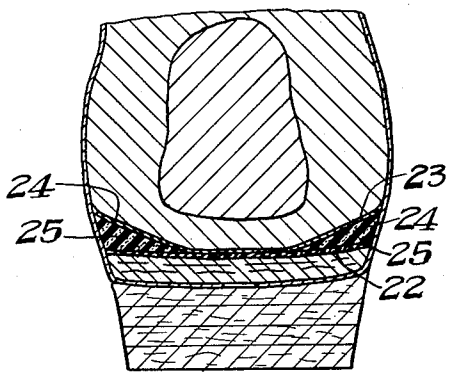


FIG. 9.

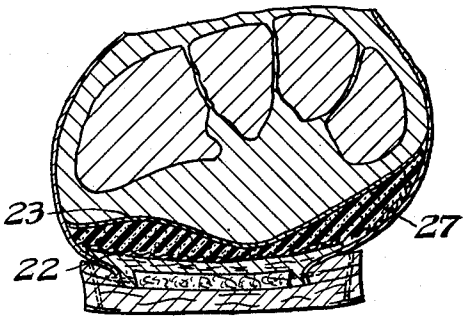
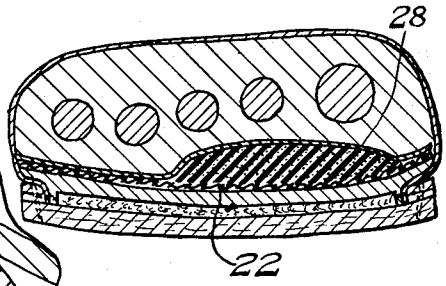


FIG. 10.



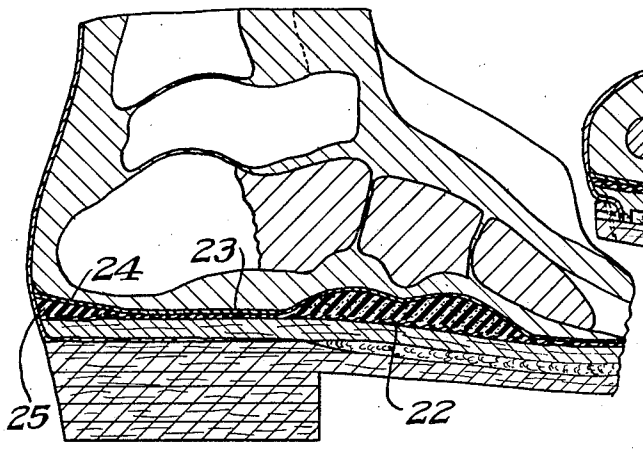


FIG. 11.

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ORTHOPEDIC DEVICE

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3 Claims. (Cl. 36—71)

1

This invention relates generally to orthopedic devices and is particularly directed to devices to be worn in shoes for the prevention and/or correction of mal-adjustments of the feet and resulting body discomforts and disorders.

One of the objects of this invention is to provide an orthopedic device to be worn in a shoe to tend to urge the bones of the foot into predetermined positions in which the body weight applied thereto is distributed throughout the foot thus relieving strain and other discomfort.

Another object of the invention is to provide an orthopedic device to be worn in a shoe, the device having means for locating the heel portion of the foot and other means for applying forces to the foot to tend to shift the weight from the inner side to the outer side of the foot, the outer bones of the foot being the natural weight supporting members.

A further object of the invention is to provide an insert for a shoe, such insert being shaped generally like a shoe insole without the part disposed forwardly of the ball portion and modified by a rounded projection at the inside of the instep portion, the insert being provided with pads or cushions of spongy material of varying compressibility and thickness, the pads being so located as to urge parts of the foot frame structure into certain positions in which joint constriction will be eliminated.

A still further object of the invention is to provide an insert of the type mentioned in the preceding paragraph in which one of the pads is disposed around the edge of the heel portion of the shoe and shaped to provide a seat-like recess, another of the pads being disposed to underlie the cuboid bone and composed of such a consistency and thickness of resilient material as to tend to urge the cuboid bone upwardly and rearwardly toward the calcaneum whereby the heel portion of the foot will be held against undue movement.

Also an object of the invention is to provide an insert of the type mentioned in the two preceding paragraphs with other pads or cushions one of which is disposed at the rounded projection so that it will be located beneath the navicular bone, the first and second cuneiform bones, and the posterior ends of the first, second and third metatarsal bones, this pad tending to hold the bones mentioned in slightly elevated positions whereby the weight applied thereto will be shifted to the bones at the outerside of the foot; a cushion also is provided near the forward end of the insert and toward the inner side thereof, this cushion being disposed beneath the anterior ends of the first, second, and third metatarsals also

2

to hold these bones slightly elevated for the same purpose, i. e. to shift the weight applied to the bones at the outerside of the foot; this cushion also helps to absorb the weight and thus assist the metatarsal bones in propelling the weight forward when the user is walking.

It is an object also to dispose the pad or cushion which lies beneath the cuboid bone and the posterior end of the fourth metatarsal in spaced relation from the outer edge of the insert so that the rear end of the fifth metatarsal will be permitted to occupy its normal position and assume the load which is shifted to the outer side of the foot by the elevation of the bones at the inner portion thereof.

Other objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of embodiment of the invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of an insert formed in accordance with the present invention.

Figs. 2, 3, and 4 are vertical transverse sectional views taken through the insert on the planes indicated by the lines II—II, III—III and IV—IV respectively of Fig. 1.

Fig. 5 is a vertical longitudinal sectional view taken through the insert on the staggered planes indicated by the lines V—V of Fig. 1.

Fig. 6 is a fragmentary vertical transverse sectional view taken through the insert on the plane indicated by the line VI—VI of Fig. 1.

Fig. 7 is a plan view of the insert with a plan view of a portion of a skeleton of a foot superimposed thereon to show the relative positions of the pads or cushions and various bones of the foot.

Figs. 8, 9, 10, and 11 are detailed sectional views taken through a shoe with an insert and a foot positioned therein, the sections being taken on the lines VIII—VIII, IX—IX, X—X and XI—XI, respectively, of Fig. 7.

Referring more particularly to the drawings, the numeral **20** designates generally, an insert formed in accordance with the present invention. This insert **20** has an external configuration conforming substantially to a shoe insole but terminating short of the forward end thereof. The insert varies slightly also at the inner side where it is provided with a rounded projection **21** the purpose of which will hereinafter be made apparent.

In the form of insert selected for illustration, the member **20** is composed of a bottom piece **22**

made from suitable fabric sheeting and a top piece 23 made from relatively thin, soft, flexible leather or kid. Both of these pieces are cut to give the member 20 the contour previously specified. The upper surface of the piece 23 is smoothly finished to permit the wearer's hose to slip readily over the insert.

As mentioned in the objects, the member 20 is formed to include a plurality of pads or cushions placed in predetermined locations to give the desired results. One of these pads, which shall hereinafter be termed the heel pad 24, is somewhat horseshoe-shaped and is located at the heel portion of the insert. This pad 24 is formed by disposing a suitably shaped piece 25 or series of pieces of slightly compressible rubber between the top and bottom pieces 22 and 23. The rubber piece 25 is wedge-shaped in cross-section at the heel portion and extends completely around the edge thereof. The upper surface is skived off so that the pad slopes downwardly and inwardly. It provides a somewhat dish-shaped seat for the wearer's heel.

The piece 25 also extends forwardly a considerable distance at the outer side of the insert 20 and terminates in a pad extension 26, the forward end of which is spaced inwardly from the outer edge of the body. As shown in Fig. 6, the pad extension 26 provides a raised cushion which is only compressible a slight extent. This cushion is spaced inwardly from the edge of the insert; the reason for this location will be set forth hereinafter.

At its inner end the horseshoe-shaped insert 25 merges into an oval-shaped sponge rubber pad or cushion 27 which is disposed between the top and bottom pieces at the rounded projection 21. The oval cushion 27 has its longitudinal axis extending substantially lengthwise of the insert; it is of such size that it will lie beneath the inner forward end of the talus bone of the foot, the navicular bone and the first and second cuneiform bones. The forward end of this pad or cushion also extends beneath the posterior ends of the first and second metatarsal bones. Cushion 27 is somewhat thicker than the first-mentioned cushion and is approximately twice as readily compressed. Due to the location of this cushion and the provision of the rounded projection, the disposition of the insert in a shoe provides an upwardly sloping, resilient bump which pushes the first cuneiform bone upwardly and outwardly. This action is transmitted to the second cuneiform and by it to the third. Excessive movement toward the outer side is opposed by the pad beneith the cuboid bone. The combination of both cushions or pads tends to raise the foot bones at the arch and thus relieve the joints of constriction. Since the inner pad is thicker there will still be a tendency to shift some of the weight to the bones at the outer side of the foot.

This weight shifting action is further secured by another rounded oval pad 28 located near the forward end of the insert and toward the inner side of the longitudinal center thereof. This pad 28 is composed of foam or sponge rubber and like pad 27 is disposed between the top and bottom pieces 23 and 22, respectively. This pad 28 is so located that it will be disposed beneath the forward ends of the first three metatarsal bones and will, as shown in Fig. 10, hold them slightly elevated thus shifting some of the weight applied thereto to the fourth and fifth metatarsal bones through the fleshy part of the foot. Because pad 28 is composed of foam or spongy rubber, it will impart a spring-like action to the foot as the foot is flexed during walking.

It will be noted from Figs. 7 and 11, that due to the spacing of the pad 26 from the outer edge of the insert, the fifth metatarsal bone will be permitted to assume its natural position to absorb the weight which is shifted thereto from the rest of the foot.

By permitting the fifth metatarsal bone to assume its natural position while the cuboid bone is urged upwardly by pad 26, all tendency toward constricting the joint between these bones is eliminated. It will also be noted from Fig. 7 that the posterior end of the fourth metatarsal is supported by the pad 26 while the forward end is permitted to assume its natural position. This arrangement also eliminates any binding effect at the joint between the fourth metatarsal and the cuboid.

The insert has been shown in detail in Figs. 1 to 6, inclusive; it has been shown in use in Figs. 7 to 11, inclusive, from which the principles of the invention can best be understood.

Figs. 7, 8 and 11 show that the heel bone or calcaneum is positioned directly over the heel seat formed by the pad 24. Fig. 11 shows that the forward end of the heel bone is confined to this seat by pad 26 which lies beneath the forward end of the calcaneum and urges the cuboid bone upward and slightly backward. There is a tendency for this pad 26 to cause the calcaneum, the cuboid, and the third, fourth and fifth metatarsals to separate from one another and thus relieve constrictions at the joints between these bones.

Figs. 7 and 9 show that the pads 25 and 26 lie beneath the navicular, the cuboid and the first, second and third cuneiform bones and thus hold these bones elevated slightly which permits them to tend to separate and likewise reduce or eliminate constriction and attendant discomfort.

Figs. 7 and 10 show that the first three metatarsals are supported at both front and rear ends by the sponge rubber pads so that weight applied thereto will be partially shifted outwardly and during locomotion the weight of the wearer of the shoe will be propelled forwardly with a smooth rhythmic motion due to the recoil action inherent in these bones supplemented by the resiliency of the pads.

I claim:

1. An orthopedic device to be worn in a shoe comprising a body conforming in outline to the heel and ball sections of a shoe insole and having a rounded projection at the inner side between the heel and ball portions; a substantially oval padded portion on said body, one side of such padded portion coinciding with said rounded projection, said padded portion being disposed at the inner side of the longitudinal axis of said body to lie under the navicular, the first and second cuneiform and the rear ends of the first and second metatarsal bones of the wearer's foot, said padded portion being thickest at its center and tapering toward both sides and ends; a second oval shaped padded portion extending transversely of said body beyond the forward end of the first padded portion, said second padded portion being disposed at the inner side of the longitudinal axis of the body to lie under the forward portions of the first, second and third metatarsal bones of the wearer's foot; said second padded portion being convex on its upper surface; and a third padded portion on the opposite side of the longitudinal axis of said body from the

first padded portion, said third padded portion tapering from its center toward both sides and being disposed to lie under the cuboid, the third cuneiform and the rear portions of the third and fourth metatarsal bones of the wearer's foot.

2. An orthopedic device to be worn in a shoe comprising a body conforming in outline to the heel and ball sections of a shoe insole and having a rounded projection at the inner side between the heel and ball sections; a padded portion of oval contour on said body, one side of the oval coinciding with the edge of said projection, said padded portion being thickest at a point registering with the joint between the first and second cuneiform and navicular bones of the wearer's foot and tapering toward both sides and ends, said padded portion extending forwardly to lie beneath the joints between the first and second cuneiform and the first and second matatarsal bones of the wearer's foot; a second padded portion of oval contour extending transversely of said body at the forward portion, said second padded portion being convex on its upper surface and disposed to lie beneath the first, second and third metatarsal bones of the wearer's foot immediately behind the forward ends thereof; and a third padded portion on the opposite side of the longitudinal axis of the body from said first padded portion, said third padded portion being disposed to locate the thickest portion beneath the joint between the cuboid, the third cuneiform and the third and fourth metatarsal bones of the wearer's foot.

3. An orthopedic device to be worn in a shoe

comprising upper and lower sheet members conforming generally in outline to the heel and ball sections of a shoe insole and having a rounded projection at the inner side between the heel and ball sections; padding means between said sheet members forming a raised pad extending continuously from a region disposed inwardly from the outer edge of the device and registering substantially with the posterior head of the fourth metatarsal and cuboid bones of a foot disposed in a shoe provided with the device, rearwardly and outwardly to the outer edge of the device, around the heel portion and forwardly along the inner edge of said heel portion to a region registering with the navicular, first and second cuneiforms and the heads of the first and second metatarsal bones of the foot, the pad in the last mentioned region sloping from the center toward the side and front edges and additional pad means disposed forwardly of said last mentioned region to form a transversely extending oval button registering with the shank portions of the first, second and third metatarsals at the rear of the forward heads thereof.

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