May 22, 1928. 1,670,811

G. A. JONES

SHOE

Filed Dec. 24, 1926

Fig. 1

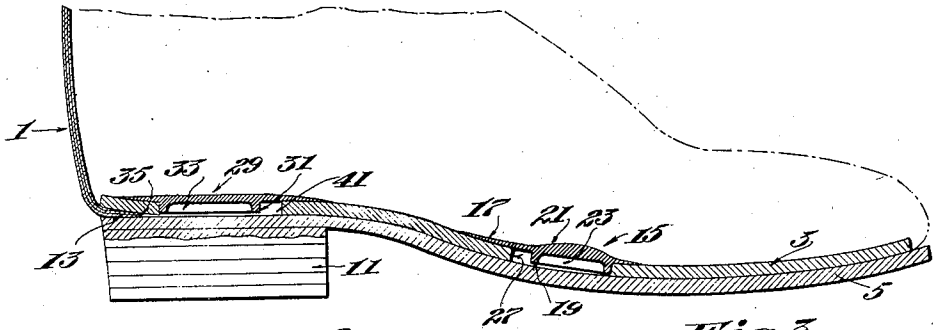


Fig. 2

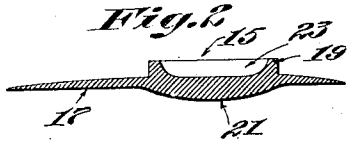


Fig. 3



Fig. 4

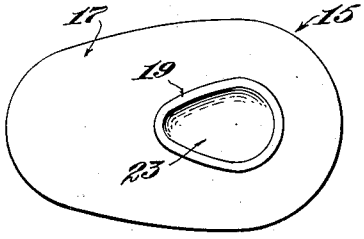


Fig. 5

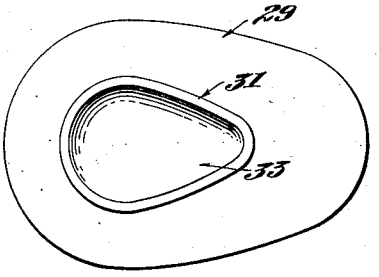


Fig. 6

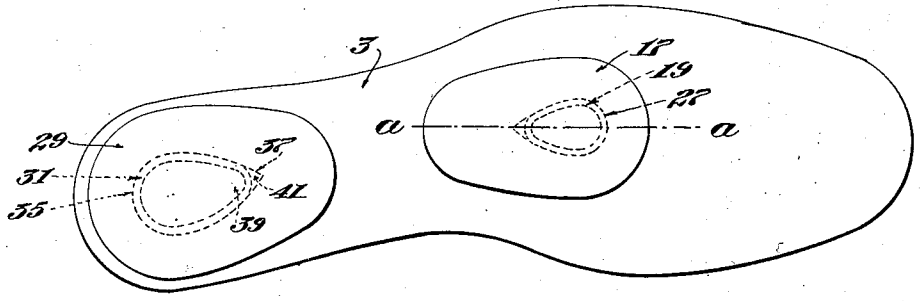


Fig. 7



Inventor:
George A. Jones

by Henry T. Williams,
his Atty.

Patented May 22, 1928. 1,670,811

UNITED STATES PATENT OFFICE.

GEORGE A. JONES, OF LYNN, MASSACHUSETTS, ASSIGNOR TO SHOE PRODUCTS, INC., OF LYNN, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SHOE.

Application filed December 24, 1926. Serial No. 156,927.

The invention to be hereinafter described relates to shoes and among other objects provides a simple, effective support for the metatarsal arch of the foot of the wearer of the shoe.

Heretofore, various supports for this arch have been provided, but usually they have been built into a specially constructed shoe in the course of the process of manufacturing the shoe. By the present invention a support is provided which can be quickly and easily applied to any ordinary completed shoe and can be located and maintained in proper position to furnish the required support for the arch.

The previous metatarsal arch supports usually have been made of felt or other material which will mat down, flatten or become distorted after the shoes have been worn for a time, with consequent loss of their usefulness as arch supports. In fact they frequently get into a condition such that they are a detriment rather than a benefit to the foot. By the present invention these objections have been overcome. The support will retain its original shape for the life of the shoe and always remain in condition to hold the arch up properly.

This support is believed to involve a new principle in a shoe. It is so constructed and arranged that when the wearer of the shoe is walking the support will have a pulsatile or breathing action which will exercise and strengthen the muscles of the metatarsal arch and tend to restore the arch to normal healthful condition.

Various supports have been placed in shoes for the purpose of supporting the longitudinal arch of the foot. These are usually of steel or other material having a hard, stiff character and often are injurious rather than beneficial to the foot. By the present invention a heel cushion is provided which cooperates with the metatarsal arch support in holding the heel and ball of the foot in proper place and thereby prevents falling of the longitudinal arch. By analogy, the heel cushion and metatarsal arch support may be considered to be the piers of a bridge and the arch of the foot may be considered to be the span of the bridge which is mounted on the piers and by them prevented from flattening and breaking down. If the longitudinal arch is thus held up there is no necessity for putting supporting devices beneath it in the shoe.

The character of the invention may be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:

Fig. 1 is a longitudinal section through a shoe embodying the invention;

Fig. 2 on an enlarged scale is a longitudinal section through the metatarsal arch support in inverted position;

Fig. 3 is a transverse section through said support in inverted position;

Fig. 4 is a view showing the bottom of the support;

Fig. 5 on an enlarged scale is a view of the bottom of the heel cushion;

Fig. 6 is a plan of the insole of the shoe showing the heel cushion and the metatarsal arch support applied thereto; and

Fig. 7 is a view of the slug which is punched from the insole.

Referring to the drawing, 1 designates a portion of a shoe having an insole 3, an outsole 5 and a heel 11. Marginal portions 13 of the counter, upper and lining are turned in and lie between the insole and outsole.

The metatarsal arch support and cushion 15 comprises a thin diaphragm 17 having a collar 19 integral with and projecting from the bottom of the diaphragm. A protuberance 21 projects up from the diaphragm and has a dome or other suitable form to furnish appropriate support for the metatarsal arch of the foot of the wearer. The diaphragm 17 has a margin projecting a substantial distance beyond the collar 19. Within the collar is a cavity 23, and the inner wall of the collar may have a curvature meeting the bottom of the cavity. Such supports or cushions may be formed of high grade elastic rubber in suitably shaped molds.

To prepare the shoe to receive the metatarsal arch support, a slug 25 (Fig. 7) may be died out of the insole by a suitable punch and leave a hole 27 (Figs. 1 and 6) shaped substantially to conform to the contour of the outer wall of the collar. Then the cushion may be introduced into the shoe, the col-

lar inserted into the hole and the diaphragm placed upon the upper surface of the insole. Preferably the collar projects downward toward but not to the upper surface of the outsole, the diaphragm being relied upon properly to support the cushion. The diaphragm, collar and hole in the insole may be of general oval form, the construction being such that the cushion is prevented from shifting longitudinally or laterally of the shoe, and the longitudinal axis *a—a* (Fig. 6) of the diaphragm is maintained in proper relation with respect to the length of the shoe. The protuberances of the supports for the right and left shoes of a pair of shoes will be suitably formed to conform to the contours of the metatarsal arches of the right and left feet.

As stated, this cushion or metatarsal arch support may be applied to an ordinary completed shoe. To accomplish this, after a shoe of proper size and fit for the wearer has been selected, a chalk mark may be made on the sole of the stocking on the foot directly beneath the metatarsal arch. The shoe is then placed on the foot and the foot pressed down therein so that when the shoe is removed the chalk mark will be transferred onto the insole and definitely determine the proper location of the support. Then the punch is introduced into the shoe and the slug is died out and removed therefrom, thereby leaving the hole for receiving the collar of the cushion. The hole for receiving the collar will be punched in the insole so that the longitudinal axis *a—a* of the diaphragm will be substantially perpendicular to the line of the metatarsal arch.

The protuberance on the cushion will raise and maintain the metatarsal arch in normal position. When the wearer is walking, the diaphragm will flex up and down and exercise and strengthen the muscles of the metatarsal arch, and tend to restore the arch to normal healthful condition. This pulsatile action of the diaphragm causes contraction and expansion of the rubber and keeps it in elastic, efficient condition and assists the support in maintaining its original normal shape as required for proper support of the arch.

The heel cushion which cooperates with the metatarsal arch support in holding the heel and ball of the foot in proper position comprises a diaphragm 29 (Fig. 1) having a collar 31 projecting down therefrom. A substantial margin of the diaphragm extends beyond the collar. Within the collar is a cavity 33, and the inner wall of the collar has a curvature meeting the bottom of the cavity.

In preparing the shoe to receive this heel cushion a slug similar to, but preferably larger than the slug 25 referred to, is died out of the insole above the heel of the shoe, and leaves a hole 35 within the boundaries of the inturned margins 13 of the counter, upper and lining which are interposed between the insole and outsole. The hole in the insole projects through the insole, but not into the outsole and does not pass through any seams or parts so as to weaken the construction of the shoe.

The heel cushion is introduced into the shoe, the collar inserted in the hole over the heel and the margin of the diaphragm is placed upon and supported by the upper surface of the insole. The diaphragm, collar and hole preferably are of general oval form. The fore end 37 of the hole is made sharper than the fore end 39 of the collar, thereby leaving a space 41 which will allow the collar to expand therein and prevent a hard spot beneath the sensitive portion of the heel of the foot which is directly in front of the heel bone. These cushions may be formed of high grade rubber in suitably shaped molds.

When the wearer of the shoe is walking, his weight will come on the heel cushion when his heel strikes the ground, and when his weight is transferred from the heel to the ball of the foot, his weight will be removed from the cushion. This will cause frequent flexion and pulsatile action of the cushion which will keep the rubber in elastic, efficient condition.

When the weight of the wearer is on the heel cushion, the upper surface of the diaphragm will be cupped down and curved to conform to the contour of the base of the heel. Thus the cushion will tend to hold the heel in proper position in the shoe. The metatarsal arch support will tend to hold the ball of the foot in proper position in the shoe. The two cushions will cooperate to prevent the longitudinal arch of the foot from falling and breaking down, and as stated, by analogy the two cushions may be considered to be piers of a bridge, and the arch of the foot may be considered the span of the bridge which is mounted on the piers and by them prevented from flattening and breaking down.

The metatarsal arch supporting cushion may be applied to Goodyear welt, McKay and other types of shoes.

It will be understood that the term "sole" used in the claim is to be regarded as generic to any sole which is suitable to receive the cushions.

The heel cushion may be similar to that disclosed in my copending application Serial No. 156,928, filed December 24, 1926. A sole prepared to receive cushions similar to those of the present application is disclosed in my copending application Serial No. 164,465, filed January 29, 1927.

The invention is not limited to the specific embodiment shown, and various devia-

tions may be made therefrom without departing from the spirit and scope of the appended claim.

I claim:

In a shoe, the combination of a sole having a hole in the fore portion thereof, and a rubber support for the metatarsal arch comprising a diaphragm having a collar projecting into the hole in the sole and cooperating therewith to prevent displacement of the cushion on the sole, said diaphragm having a margin surrounding the collar and resting upon the upper surface of the sole, and a pulsatile protuberance projecting above the margin of the diaphragm and located to support the metatarsal arch of the foot of the wearer of the shoe, said protuberance being adapted to pulsate over the hole in the sole, thereby to exercise and strengthen the arch when the wearer is walking.

GEORGE A. JONES.