This invention relates to improvements in insoles for shoes and it has for an object to provide a pneumatic cushion for the ball and for the heel of the foot which can be conveniently inflated.

Another object of the invention is to provide an insole made from two sheets of rubber formed to the contour of the insole, reinforced on the outside and adhesively secured together on their opposing faces except where the pneumatic cushion is provided; another object of the invention is to provide an insole with a pneumatic cushion extending substantially across the insole and having the opposing faces connected at intervals so that when inflated the device will remain substantially flat.

The other objects of the invention will appear from the following specification and the accompanying drawings illustrating one form of the invention, in which:

Figure 1 is a plan view of the insole with the pneumatic cushion outlined thereon;

Figure 2 is a sectional elevation on the line 2—2, Figure 1;

Figure 3 is a sectional elevation on line 3—3, Figure 2;

Figure 4 is a sectional elevation on line 4—4, Figure 1;

Figure 5 shows a shoe with part of the upper removed and the insole in place; and

Figure 6 is a cross section on the line 6—6, Figure 1.

In the present invention, the construction provides a removable insole with a pneumatic cushion under the ball of the foot and it may be provided also with a pneumatic cushion under the heel. These pneumatic cushions are obtained by constructing a rubber pocket within the device connected to a rubber tube with a valve, whereby these pockets may be inflated. When more than one pocket is provided, a common air connection is made for inflating each at the same time. In order to prevent the air pockets from becoming globular when inflated and thereby disturbing the shape of the device, the opposing walls of the pockets are connected at intervals so that the inflated area between these connections is comparatively small and does not change the shape of the insole under inflation.

The preferable form of construction comprises a pair of sheets of elastic rubber blanked to the shape of the insole and the projecting inflation tube. These two sheets are placed opposite each other and are secured together by an adhesive or by a solvent used in the process of working rubber, whereby they adhere throughout their engaging surfaces except where the air pockets are provided, forming substantially a rubber bladder of the shape desired, that provides the pneumatic cushion on the portion of the insole desired. The rubber sheets are reinforced top and bottom by a fabric or friction member secured by an adhesive to take up the wear that the article is subject to in use. The invention may be applied to a removable insole as shown in the drawing and it may also be applied as an integral part of the sole of the shoe. The construction used to illustrate the invention shows three pneumatic cushions, one on the ball or metatarsal arch, one on the heel and one under the longitudinal arch or arch proper. The chambers forming these cushions are connected by restricted air passages and the inflation tube with a suitable valve is taken off at the middle chamber whereby the device is inflated.

In the drawing, 11 is the insole which is provided with a fabric 12 on top and with a fabric or leather covering 13 on the bottom and between these coverings the sheets 14 and 15 of rubber are provided with their opposing faces secured together except at the pockets 17 and 21. In these pockets the rubber sheets are also secured together at 22 and 23. This makes a solid construction throughout except at the pneumatic pockets and when inflated the pockets are arched between the adhering surfaces 22 as indicated at 24 in Figure 2.

The device is inflated through the air tube 19, Figure 3, and through valve 20 to the middle chamber 18 at the arch proper of the foot which connects with the pocket 17 and the pocket 21 by the restricted air passages 17a and 21a respectively. The end of the tube 19 is readily accessible for inflation purposes. When the device is constructed integral with the shoe, the end of the inflation tube may be brought out through an eyelet in the shoe upper as indicated at 18a, Figure 5.

In use, the wearer steps on the ball of the foot which forces the air from chamber 17 into the central chamber 18 and into the heel pad 21. When the weight is changed to the heel the chamber 21 is compressed and the air is forced into the central chamber 18 to support the arch proper. When the foot is lifted from the ground the air pressure is equalized in all three chambers to establish working conditions for the next step. It should be noted that instead of maintaining a constant pressure at the arch proper it is in-
creased and decreased alternately and the motion of the air between the chambers has the effect of a stimulating massage for the foot.

What is claimed is:

1. As an article of manufacture, a foot cushioning appliance including a pair of rubber sheets blanked to the form desired and placed one on top of the other, an adhesive securing said sheets on their opposing faces except for an interior portion of said faces forming an air pocket between said sheets and extending across the foot, but including elongated areas within the air pocket secured by adhesive to hold the appliance substantially flat when the air pocket is inflated.

2. As an article of manufacture, a foot cushioning appliance including a pair of air impervious members secured together face to face except for an interior portion of said faces forming an air pocket between the members, said members being secured flatly together at spaced intervals inside said air pocket to provide narrow elongated non-inflatable areas of considerable less thickness than the air pocket when inflated.

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