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4 Sheets-Sheet 1



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4 Sheets-Sheet 2

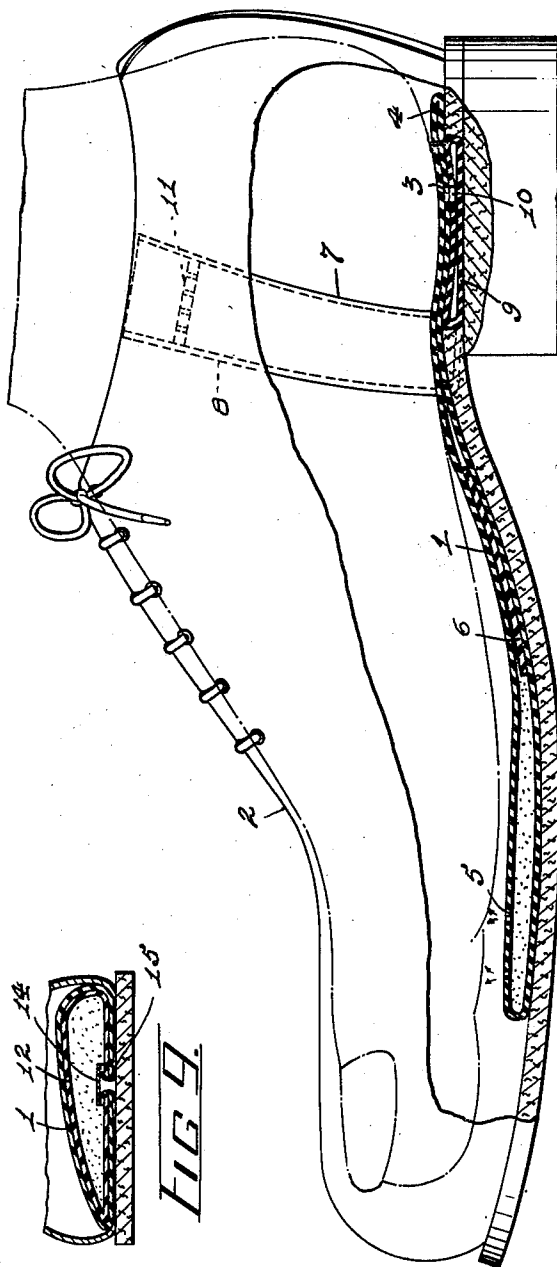


FIG. 2.

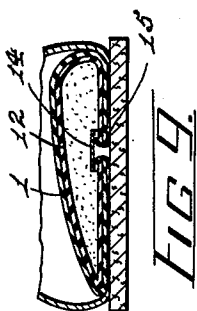


FIG. 9.

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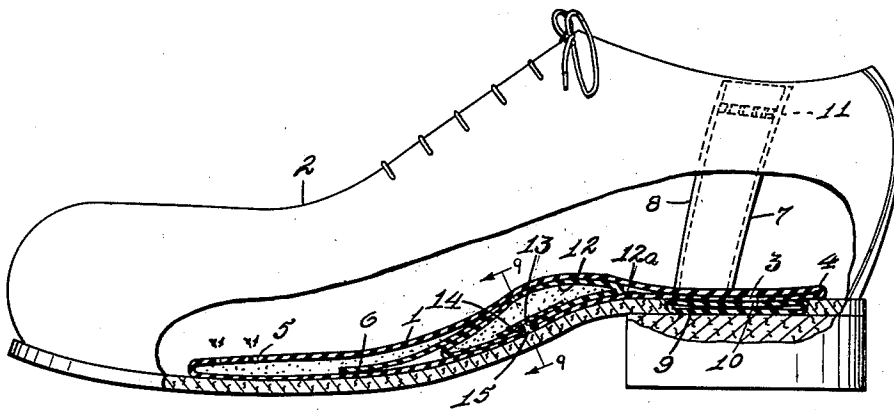


FIG. 4.

FIG. 7.

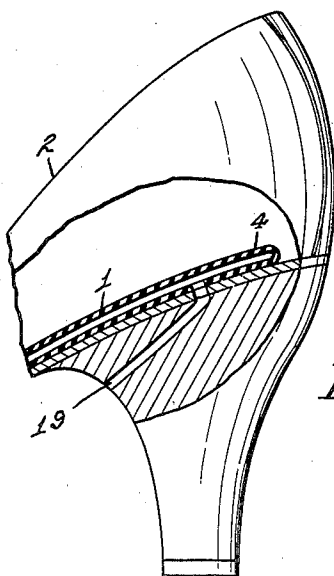
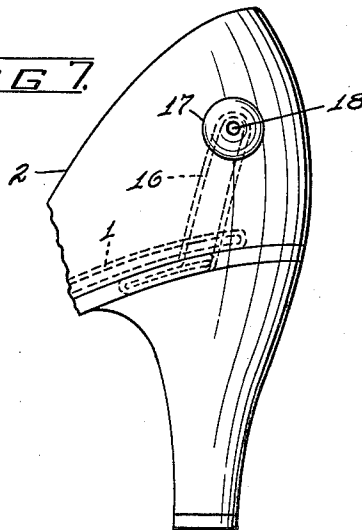


FIG. 8.

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UNITED STATES PATENT OFFICE

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Application January 16, 1950, Serial No. 138,733

1 Claim. (Cl. 36—3)

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The invention relates to improvements in shoe soles as described in the present specification and shown in the accompanying drawings that form a part of the same.

A main object of the invention is to provide for the continuous circulation of fresh air through the shoe during the walking process so that the foot will be kept cool and dry and will at the same time be fluid cushioned whereby the body weight will be evenly distributed over the entire surface of the foot, with the result that the natural condition of the foot structure will be maintained.

Another object of the invention is to provide means whereby circulation of air taken in at the heel is accomplished through the natural movement of the foot in the walking process, without conscious effort.

A further object of the invention is the provision of means whereby a suitable medicament may readily be introduced into the air stream.

A still further object of the invention is the novel construction of the air sole which will permit of, without structural variation or modification, the embodiment therewith of a pneumatic arch support where the need of same is indicated.

And generally the objects of the invention are to provide a device of the character described which will promote the health and comfort of the wearer; which may take the form of a separate integer for removable insertion in a shoe or may be built into the shoe as a permanent part thereof, and which may be produced at reasonable cost.

With the above and other objects in view the invention consists in the novel features of construction, arrangements and combinations of parts set out in the present specification and more particularly pointed out in the claims for novelty following.

In describing the invention reference will be made to the accompanying drawings, in which:

Figure 1 is a perspective view of a shoe embodying my invention, a portion of the shoe upper and the air sole being in section.

Figure 2 is a side elevation of a shoe on a foot, the upper and the air inlet tube being broken away and the sole being shown in longitudinal section to show the position of the sole when heel pressure alone is applied thereto.

Figure 3 is a view similar to Figure 2, showing the position assumed by the sole when foot pressure is applied to the front end only.

Figure 4 is a partially broken side elevation of

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a shoe, showing in longitudinal section an air sole embodying an arch support.

Figure 5 is a sectional view through the arch support, taken on the line 5—5 of Figure 6.

Figure 6 is a bottom plan view of the arch support.

Figure 7 is a side elevation of a portion of a high-heeled shoe, showing a modified form of air inlet.

Figure 8 is a side elevation of a portion of a high-heeled shoe embodying another form of air inlet.

Figure 9 is a vertical sectional view taken on the line 9—9 of Figure 4.

Like numerals of reference indicate corresponding parts in the various figures.

Referring to the drawings and particularly first to Figures 1 to 6 inclusive, in which a complete embodiment of the invention as constructed for removal adaptation to a shoe is shown, 1 is the air sole comprising an envelope shaped substantially to the insole of a shoe and being made of rubber, synthetic rubber, fabric, plastic, or any other suitable material, and being adapted to lie within the shoe, indicated at 2.

The air sole 1 is provided with an inlet 3 located centrally of the lower wall of the heel portion 4, whereby air may be fed to the interior of the sole, and is also provided with a number of apertures 5 in the upper wall of the toe portion, through which apertures the air entering the sole by way of the inlet 3 is forced against the sole of the wearer's foot by the natural action of the foot in the walking process, as will be described in greater detail hereinafter.

6 is a one-way valve positioned within the air sole between the inlet 3 and the outlets 5, and being for the purpose of preventing the return of air towards the heel once it has reached the outlet area, so that the air must pass from the interior of the air sole into the shoe, from which latter it escapes into the outside atmosphere between the foot and the upper after having been forced to circulate around the foot of the wearer, during which period of circulation it has accomplished its cooling, drying and scavenging function, and its medicating or deodorising function, in the event that a medicament or deodoriser has been previously introduced into the air stream.

The valve 6 preferably is in the form of a flexible flap secured transversely of its one end to the top wall of the air sole, as indicated at 6a, and extending otherwise unsupported in a forward direction so that its free end will lie loosely on the lower wall of the sole to be readily influenced

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to an open position by air pressure from the rear and in absence of pressure of air against its rear side, as after the complete collapse of the heel portion of the sole and the consequent closing of the inlet 3 due to heel pressure applied by the wearer, will lie in sealing engagement with the lower wall of the sole, as shown in Figure 2, and will in the latter position operate to trap the air in the outlet area and prevent its return rearwardly.

7 is the inlet tube by means of which air from the outside is admitted to the interior of the air sole through the opening 3 in the heel of the device.

The inlet tube 7 is preferably of substantially L-shape in side elevation and has its arm 8 extended down the instep side of the shoe upper from the top edge of the latter and onto the heel of the shoe beneath the air sole, and has its arm 9 extended rearwardly and terminating slightly short of the rear end of the air sole and being provided with an outlet 10 through its top wall registering with the inlet 3 in the lower wall of the air sole so that air entering the exposed mouth of the tube 7 will be fed to the interior of the sole when the heel portion of the air sole is not under pressure of the heel of the wearer.

The inlet tube 7 may be held in proper position relative to the shoe upper and the inlet 3 in the air sole in any suitable manner, one method being by lightly cementing the side wall of the upright portion 8 of the tube to the shoe upper and by cementing together the upper face of the horizontal part of the tube and the contacting portion of the lower wall of the air sole.

The tube 7 is provided, at a point preferably not far removed from its inlet end, with a screen 11, on which may be placed a small piece of cotton or other material saturated with a suitable medicament, or deodorant, which will mix with the air and pass into the air sole in the form of vapor. In this manner, where a medicament is used, certain ailments particularly responsive to medicine applied through the pores of the foot may be treated.

The operation of the invention thus far described is as follows:

In the process of walking, as one takes a step forward and pressure is brought to bear by the heel of the wearer on the heel part of the air sole said heel part is collapsed, causing the valve opening provided by the registering openings 3 and 10 to be closed temporarily to the further supply of air to the air sole, and at the same time causing the air in the sole to be forced forwardly into the then temporarily uncompressed toe portion of the sole beyond the valve 6, from which it is forced out of the air sole through the apertures 5 in the top wall of the sole, and into the shoe beneath the foot of the wearer. This air eventually escapes into the atmosphere through the space between the foot and the shoe upper and in progress some passes through the sock, or stocking, of the wearer into contact with the foot and thence to the point of escape, while some circulates around the foot and through the interior of the shoe, the whole serving to scavenge the foot covering and shoe and cool and dry the foot.

As the foot pressure is in process of transference from the heel to the toe downward pressure is brought to bear on the valve 6 causing same to be forced tightly against the lower wall of the air sole and thereby prevent the rearward flow of air

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which has passed to the outlet area, so that all air must pass through the apertures 5.

As the heel rises in the last referred to phase of the walking process the toe pressure increases to the extent that the forward portion of the air sole is collapsed causing forcible ejection of all air therein through the apertures 5. Meanwhile the valve in the heel portion of the air sole has been allowed to open and thus permit air to flow through the tube 7 into the heel part of the air sole for subsequent forcible forward expulsion on the next downward movement of the heel of the wearer, which serves to again close the inlet to the sole during the period of ejection of the air while the forward part of the foot is raised. This cycle of operations continues throughout the whole walking process, with fresh air being taken into the heel of the air sole on each upward movement of the wearer's heel and such air being forced to the front of the sole and expelled as the result of each downward movement of the wearer's heel, so that a continuous circulation of air obtains during the walking process.

In Figure 4 an air-filled arch support 12 is shown positioned within the air sole 1 and this arch support is provided with an air inlet 13 adapted to be closed by a valve 14 whereby the pressure within the support may be varied according to requirements.

Where the arch support is positioned within the air sole the latter may be provided with a suitable opening 15 in its lower wall in register with the inlet 13 of the arch support. Gummed tabs 12a securing the arch support to the sole prevent the arch support from moving forwardly.

Figure 7 shows a modified method of admitting air to the tube 7 where the device is incorporated with a woman's high-heeled shoe, in which case it is not practical to run the tube to the top edge of the upper between the foot and the upper. In this modification the counter heel support may be cut to receive the intake tube, as shown at 16, in dotted lines, and an inlet provided through the shoe upper adapted to be concealed behind a suitable button or other ornament 17, which latter has an opening 18 therethrough registering with said inlet.

In Figure 8 a further modification is shown adaptable particularly to high-heeled shoes.

In this latter modification the air is admitted to the interior of the air sole through a duct 19 leading through the heel of the shoe, from the front of the latter, and through the sole of the shoe into register with the inlet of the air sole.

While I have illustrated and described the present preferred forms of construction for carrying out my invention, these are capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claim.

What I claim is:

In a ventilated insole, a wholly flexible air bag shaped in substantial conformity with a shoe sole for positioning thereon, said air bag including upper and lower heel and sole portions, said air bag having an inlet for air through the lower heel portion, the upper heel portion constituting the means for opening and closing said inlet through the influence of the heel of the user, an air tube leading to said inlet beneath said lower heel portion and being collapsible under the influence of the user's heel, said air bag having a plurality of

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air outlets in the upper sole portion adapted to be closed by the forward part of the user's foot in downward movement, and one-way valve means between said heel and sole portions permitting the passage of air forwardly during downward movement of the user's heel and during the period in which the said outlets are closed by the foot of the user preventing the passage of air therepast in either direction and thereby providing a fluid body support during the said period.

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