

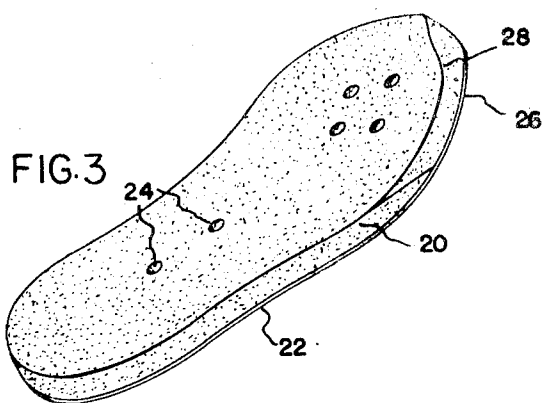
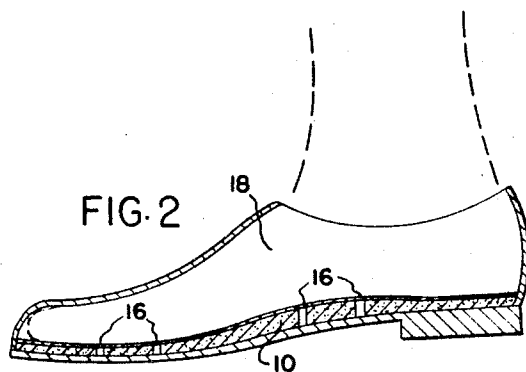
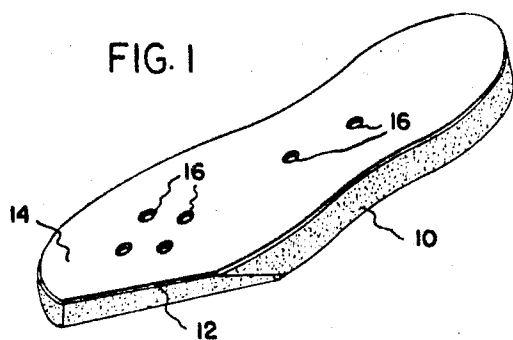
July 29, 1969

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3,457,659

RESILIENT INNERSOLE

Filed March 14, 1968



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3,457,659

RESILIENT INNERSOLE

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Filed Mar. 14, 1968, Ser. No. 713,059

Int. Cl. A43b 13/40

U.S. Cl. 36—44

7 Claims

ABSTRACT OF THE DISCLOSURE

An innersole adapted to be inserted into shoes or boots is formed of a sheet of low density open cell foamed latex having such a thickness that the innersole must be compressed in order to insert the foot into the shoe or boot. The shape of the innersole conforms to that of the shoe with the exception of an area under the small toes being removed. The upperside of the innersole is covered by relatively smooth sheet. A pattern of vertical holes are formed through the undersoles and the sheet.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to resilient innersoles for shoes or boots.

Description of the prior art

A variety of forms of resilient innersoles have been previously proposed and manufactured. Many of these innersoles have been adapted to be inserted into the shoe or boot in order to adapt the contour of the shoe to that of the wearer's foot and to thereby minimize pressure concentrations which might cause callouses or the like. These insertable innersoles have all been relatively thin so that their use in a normally well fitting shoe would not make the shoe fit too tight, and thereby defeat the purpose of the innersoles by increasing rather than decreasing the pressures on the foot. The cushioning effect which these innersoles could provide was thereby limited as it was necessary to form them of a relatively non-resilient material because a thin section of a highly resilient material would afford very little cushioning effect.

SUMMARY OF THE PRESENT INVENTION

The present invention takes the form of a relatively thick innersole for insertion into a shoe which has a sufficient thickness so that in its free state it would not normally provide a sufficient space between its top side and the underside of the shoe upper to allow a foot to be inserted. However, the present innersole is formed of a highly resilient material and its upper surface is coated with a smooth, low-friction material, allowing the innersole to be easily compressed by a foot as it is inserted into the shoe thereby creating a sufficient space between the top of the innersole and the upper, for the insertion of the foot. When the foot is fully inserted in the shoe the resilient innersole contacts the sole of the foot at all points, even when no pressure is applied to the foot. When pressure is applied as in walking, the innersole resiliently compresses, providing a full cushioning action for the foot. The innersole thus occupies the entire void which would exist between the foot and the shoe in the absence of the innersole.

As pressure is applied to and then removed from the foot, the innersole alternately compresses and then expands through a relatively large range. It is formed of an opened celled foam material so that air is expelled from the cells when the innersole is compressed and is drawn back into the cells when the pressure is removed. In order to utilize this air flow to ventilate the foot a plurality of holes are formed through the thickness of the

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innersole and otherwise non-porous surface coating. During walking this construction provides ventilation to the foot which far exceeds that which might be obtained from the use of the relatively thin, limited resiliency devices of the prior art.

I have found that if the innersole extends into the area of the small toes, in the manner of previous innersoles, these toes tend to be bent upwardly as weight is imposed on the rest of the foot, since very little of the downward pressure is exerted by the little toes. Accordingly, I have relieved the contour of the innersoles in the area of the little toes so that the toes move downward normally with the rest of the foot as weight is applied to the foot.

In order to achieve the full desired effect of the innersoles their thickness may range from $\frac{1}{2}$ " to $1\frac{1}{2}$ " in thickness. A foamed open celled latex having a weight of .8 to 1.4 pounds per cubic foot will have the necessary resiliency. Latices of a lower density will not apply sufficient pressure to the foot to achieve the desirable cushioning action, and latices having a density greater than 2 pounds per cubic foot will be so lacking in resiliency as to apply undesirable pressures to the foot.

Other objects, advantages, and applications of the present invention will be made apparent by the following detailed description of the two preferred embodiments of the invention. The descriptions make reference to the accompanying drawings in which:

FIGURE 1 is a perspective view from the upper side of an innersole representing an embodiment of the invention;

FIGURE 2 is a longitudinal cross section through the innersole of FIGURE 1 when disposed in a shoe; and

FIGURE 3 is a perspective view from the upper side of an innersole representing a second embodiment of the invention.

The embodiment of the invention disclosed in FIGURE 1 has a base 10 formed of an open cell foam rubber having a density of 1.2 pounds per cubic foot. The preferred embodiment is formed of "Kroylon," a rubber formed of a combination of natural and synthetic latices manufactured by the Uniroyal Corporation. This material has a high degree of resiliency. The base 10 is preferably $\frac{3}{4}$ " in thickness. When a weight in the range of 5 lbs. per square inch is exerted on the base, it will compress to a thickness of less than $\frac{1}{8}$ of an inch. With lesser pressures, smaller distortions of the rubber are obtained. I have found that with innersoles varying in thickness from $\frac{1}{2}$ " to $1\frac{1}{2}$ ", a latex having a weight of between .8 and 1.4 pounds per cubic foot provides the proper ratio of thickness to resiliency. While the densities of various rubber foams are not exact measure of their resiliencies, their resiliencies generally vary as a function of their densities.

The base 10 is formed in the shape of a conventional innersole with the exception that an area in the vicinity of the little toes are removed by a diagonal cut 12. This eliminates the tendency of the innersole to lift the small toes up out of the general plane of the foot as the innersole is compressed, because of the low pressure exerted on the foam by the little toes. In models of innersoles where the toe section was not modified, I found that the upper sides of the toes would be uncomfortably flexed during walking.

The top side of the innersole is covered with a sheet of smooth surfaced vinyl 14. The vinyl may have a pressure sensitive coating on its underside in order to adhere to the top of the base 10, or other forms of adhesive may be employed to secure their engagement. The smooth vinyl top allows a stockinged foot being inserted in a shoe containing the inventive innersole to slide along the top of the innersole as it is being advanced into the shoe,

progressively compressing the innersole sufficiently to make room for the foot within the shoe. Such a smooth coating would not be necessary if the innersole was not so thick in its uncompressed state as to prevent the normal insertion of the foot without compressing the innersole.

A pattern of holes 16 are formed through the thickness of the innersole and the vinyl surface 14. The hole may be approximately $\frac{3}{8}$ " in diameter and are preferably arrayed somewhat equally about the surface of the innersole.

The holes 16 act in cooperation with the high resiliency of the innersole and its open celled foam construction to actively ventilate the foot. When pressure is exerted on the upper side of the innersole by the foot the resultant compression evacuates the air from the open cells and moves it into the upper part of the shoe, through the holes 16 and around the edges of the innersole. When the pressure is removed the innersole resiliently rebounds and the air again fills the cells of the rubber.

The manner in which the innersole accommodates to the contour of the sole of the wearer's foot, evenly distributing the pressure about the foot is illustrated in FIGURE 2 which shows a foot 18 without the weight of the body imposed on it. It will be noted that the upper side of the innersole contacts the foot of the sole at all points so as to provide a very even distribution of pressure.

The second embodiment of an innersole formed in accordance with present invention is illustrated in FIGURE 3. This version also employs a foamed latex base 20 covered on its upper side by a smooth vinyl sheet 22 pierced by a pattern of holes 24. Its difference from the embodiment of FIGURE 1 is in the configuration which the area under the little toes takes. While the embodiment of FIGURE 1 is cut off at the diagonal line 12 the upper side of the innersole of FIGURE 3 has the full contour of a normal innersole. However, a section under the little toes is relieved at its underside by an inclined cut 26 which terminates at the lower side of the innersole along the line 28. Thus, the section under the toes receives some support, but substantially less than the balance of the foot, to maintain the little toes in alignment with the foot as it moves against the innersole.

Having thus described my invention I claim:

1. An innersole for insertion into a shoe or boot, formed of a planar section of resilient material having an uncompressed thickness of greater than $\frac{1}{2}$ " and less than $1\frac{1}{2}$ ", and having sufficient resiliency so that a pressure in the range of 5 pounds per square inch will compress the innersole to a thickness of no greater than $\frac{1}{8}$ of an inch, the innersole having a contour substantially approximating the outline of the sole of the foot and having a smooth, non-porous coating on its upperside.

2. The innersole of claim 1 wherein the contour is relieved in the area of the little toes.

3. The innersole of claim 2 wherein the relief consists of eliminating the section of the innersole which would normally be disposed beneath the little toes.

4. The innersole of claim 2 wherein the relief consists of removing a section of the innersole from the underside thereof beneath the area which the little toe would normally occupy.

5. The innersole of claim 1 wherein a plurality of ventilating holes are formed through the thickness of the innersole.

6. The innersole of claim 5 wherein the innersole is formed of an open celled foam latex having a density greater than .8 pounds per cubic feet and less than 1.4 pounds per cubic feet.

7. The innersole of claim 6 wherein the contour of the innersole is modified from the outline of the sole by an area being removed at the section beneath which the little toes of the foot would normally be disposed.

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