Aug. 28, 1962 D. T. ROBBINS 3,050,875

SELF-VENTILATING SOLE

Filed May 7, 1962

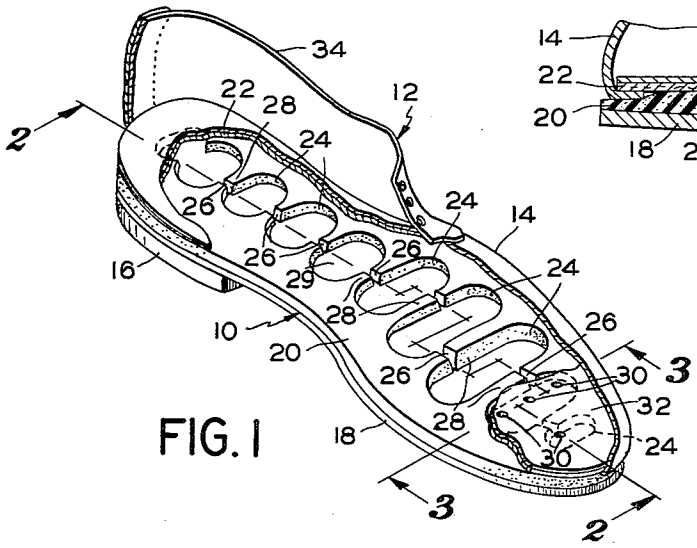


FIG. 1

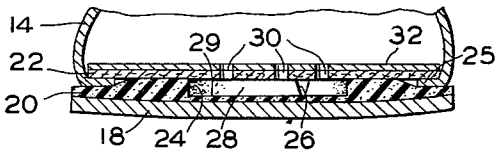


FIG. 3

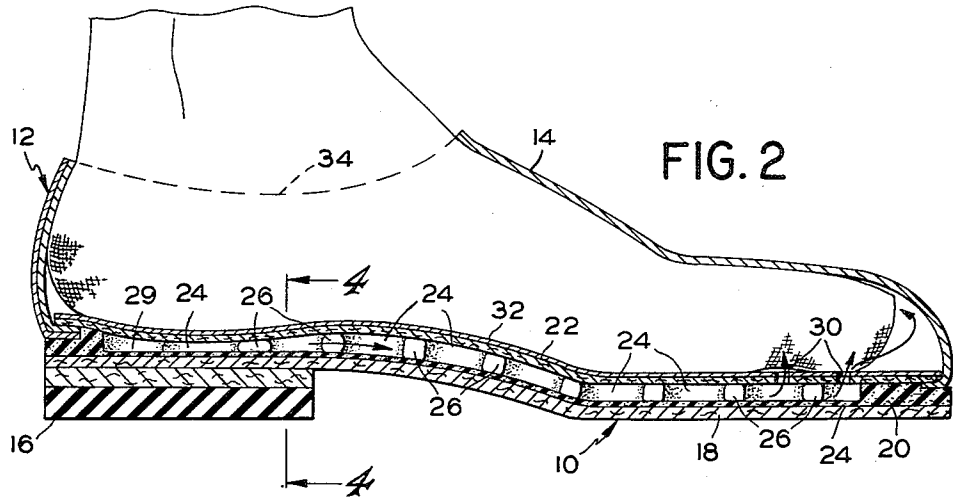


FIG. 2

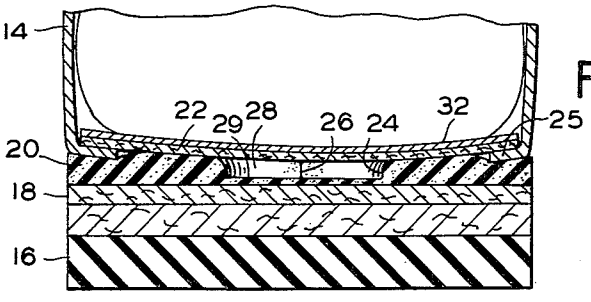


FIG. 4

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SELF-VENTILATING SOLE

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The present invention relates generally to footwear and more particularly to a self-ventilating sole for shoes, either as an integral part of a standard shoe, or that may be used as an insertable insole in a non-ventilated shoe.

It is the primary object of this invention to provide a cushion insole that will continually circulate air around the toes where the foot particularly tends to perspire.

A still further object of the invention is to provide such simplicity of design as to materially reduce the cost of construction relative to existing methods of circulating air within shoes, and insure continual circulatory operation through the life of the shoe.

Another object of this invention is to provide a shoe sole containing a resilient filler in which are interconnected cavities extending substantially the full length of the sole, air being pumped, by the rolling motion of the foot while walking, through vents in the insole beneath the toes.

Another object of this invention is to provide a self-ventilating sole in which all air passes through the vents beneath the toes, both incoming and outgoing during the pumping action.

A further object of this invention is to provide a self-ventilating sole which is adaptable to many types of shoes with only a very slight increase in sole thickness.

Finally, it is an object to provide a self-ventilating sole of the aforementioned character which is simple and convenient to manufacture and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure, and in which:

FIGURE 1 is a perspective view of a shoe incorporating the self-ventilating sole, portions being cut away to reveal the structure;

FIGURE 2 is an enlarged longitudinal sectional view taken on line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged transverse sectional view taken on line 3—3 of FIGURE 1; and

FIGURE 4 is a further enlarged transverse sectional view taken on line 4—4 of FIGURE 2.

Referring now to the drawing in which like reference characters relate to identical or similar elements throughout the different views:

The self-ventilating sole, generally indicated by the numeral 10, is incorporated into a shoe, generally indicated at 12, having an upper 14 and heel 16, the actual configuration of the shoe being variable. The sole 10 comprises an outer sole 18, an intermediate filler 20 and an insole 22, the filler being of novel construction to provide the ventilating action.

Filler 10 is made from resilient material such as foam plastic, sponge rubber, or the like and is provided with a plurality of cavities 24 spaced along the length of the sole. The specific shape of the cavities 24 may be varied, a generally oval configuration being preferred and illustrated, and the width of the cavities varying according to the overall width of the sole to utilize space effectively. All of the cavities 24 are interconnected in a continuous row by narrow passages 26 through the wall portions 28 separating the cavities. These passages 26 are slightly

V-shaped in vertical cross-section for more certain closing of the passages when said walls are depressed and deformed. The wall portions 28 can be slightly domed or raised with a substantially flat top, as indicated in FIGURES 1 and 3, to prevent sagging of the insole and compensate for the decrease in filler material caused by the cavities 24, while increasing the effective air capacity of the cavities. In normal construction, this thickening of the central portion of the filler compensates also for the extra thickness provided by the lower terminal edge portions 25 of the upper, and generally improves the comfort of wearing the shoe. To facilitate assembly the cavities 24 do not extend completely through insole 22, a bottom layer 29 being retained to hold the proper shape of the insole.

The insole 22 has a plurality of small vents 30 at the forward end communicating with one of the forwardmost cavities 24, said vents being disposed in the area which falls beneath the toes. The number and spacing of the vents 30 will depend on the size and shape of the toe portion of the shoe. Conventional methods of shoe construction will provide adequate sealing between the components 18, 20 and 22 of the sole 10. An inner sock liner 32 is secured to the insole 22, vents 30 continuing through said sock liner.

If reference be had to FIGURE 2, it will be evident that the heel bears down initially, compressing the rearmost cavities 24, the forward motion of the leg in walking causing the weight to advance with a rolling motion along the instep and ball of the foot. Thus the cavities 24 are compressed successively and the air therein is squeezed forwardly, as indicated by directional arrows, to escape through vents 30. When the wall portions 28 are compressed the narrow passages 26 tend to close, as in FIGURE 4, preventing the air from leaking back to the rear cavities. In this manner the air is virtually pumped through the successive cavities 24 and passages 26 to the front of the shoe, the vents 30 being the only outlets. Since these vents 30 are under the toes where a major portion of the perspiration occurs, the cooling effect of the air is concentrated in the most effective zone.

When the foot is raised and pressure is released, air returns through the vents 30 to refill the expanding cavities 24. Due to the high velocity expulsion of a considerable quantity of air through a limited vent area, the air circulates through the shoe rapidly with no tendency to accumulate in the toe area. Thus the major portion of the air drawn back into the cavities will be fresh air, which will have a very significant cooling effect during the inspiration or inward motion thereof; as well as a marked cooling effect during the expiration or expulsion phase. Of course, the ventilating simpliciter, as distinguished from cooling, is accomplished by reason of the actual escape of air from the top 34 of the shoe and the replacement by fresh air at virtually every step, as mentioned earlier in this paragraph.

The self-ventilating sole does not interfere with the normal construction of a shoe and is adaptable to many different shoe types. Due to the efficiency of the multiple chamber pumping action and the limited venting, the filler need not be very thick, resulting in no increase or in only a small increase in sole thickness in most shoes. With the proper material, the filler 20 could be molded as a unit with either the insole 22 or the outer sole 18, for simplified construction.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawings are to be considered as merely illustrative rather than limiting.

I claim:

1. A self-ventilating sole for a shoe, comprising:
an outer sole, an intermediate filler and an insole joined together in sealed relation;
said filler being resilient and having a plurality of interconnected cavities therein extending along a major portion of the length of said filler;
said insole having vents communicating with said cavities and disposed in the forward end portion of the insole in the area occupied by the toes of the wearer.

2. A self-ventilating sole for a shoe, comprising:
an outer sole, an intermediate filler and an insole joined together in sealed relation;
said filler being resilient and containing a plurality of cavities spaced longitudinally of the filler and having narrow wall portions therebetween with narrow passages therethrough which can be substantially closed by the pressure of a foot thereon;
said insole having vents in the forward end portion thereof communicating with at least one of said cavities and disposed in the area occupied by the toes of the wearer.

3. A sole according to claim 2 wherein said passages are V-shaped in vertical cross-section.

4. A self-ventilating sole for a shoe, comprising:
an outer sole, an intermediate filler and an insole joined together in sealed relation;
said filler being resilient and containing a plurality of longitudinally spaced cavities having wall portions therebetween;
certain of said wall portions being upwardly domed for increased depth and having substantially flat tops;
said wall portions having narrow passages interconnecting said cavities which can be substantially closed by the pressure of a foot thereon;
said insole having vents at the forward end thereof communicating with said cavities and disposed in the area occupied by the toes of the wearer.

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