April 27, 1965

J. F. BURNS, JR

3,180,039

VENTILATED FOOTWEAR

Filed April 15, 1963

Fig. 1

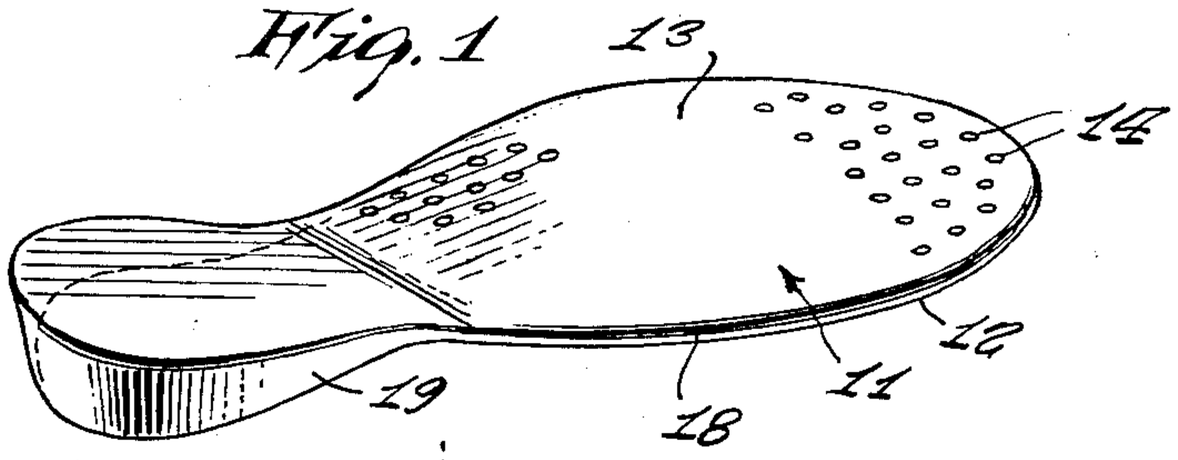

Fig. 2

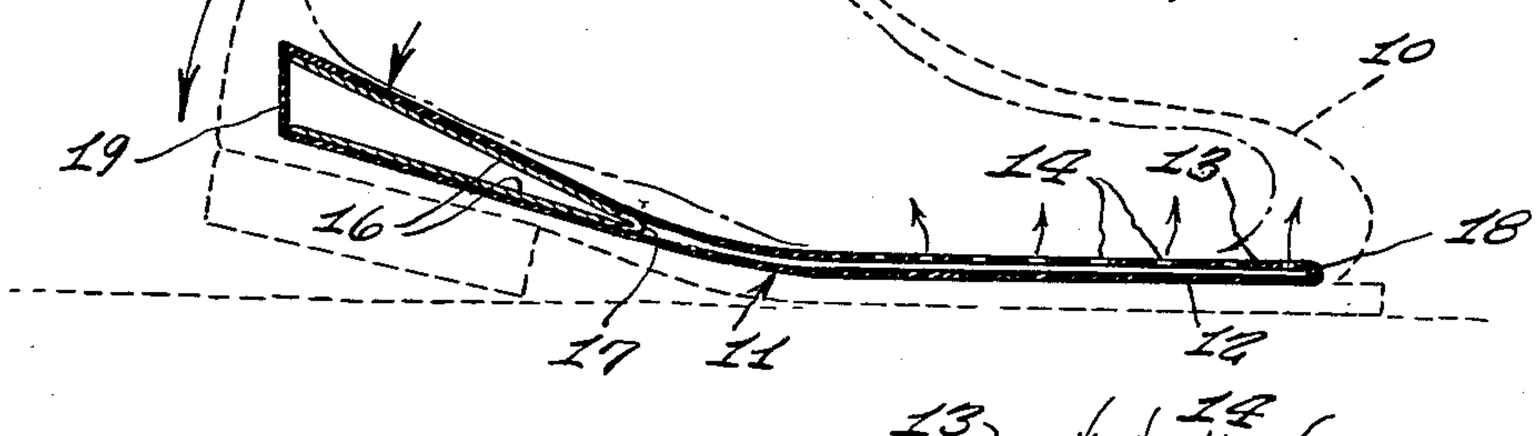

Fig. 3

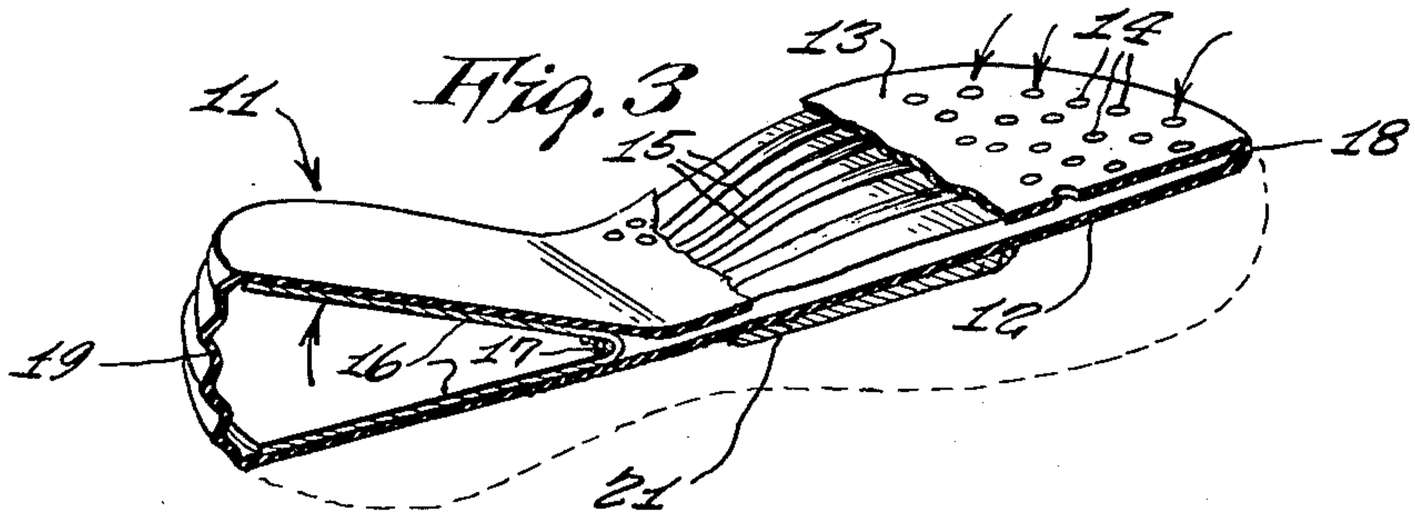

Fig. 4

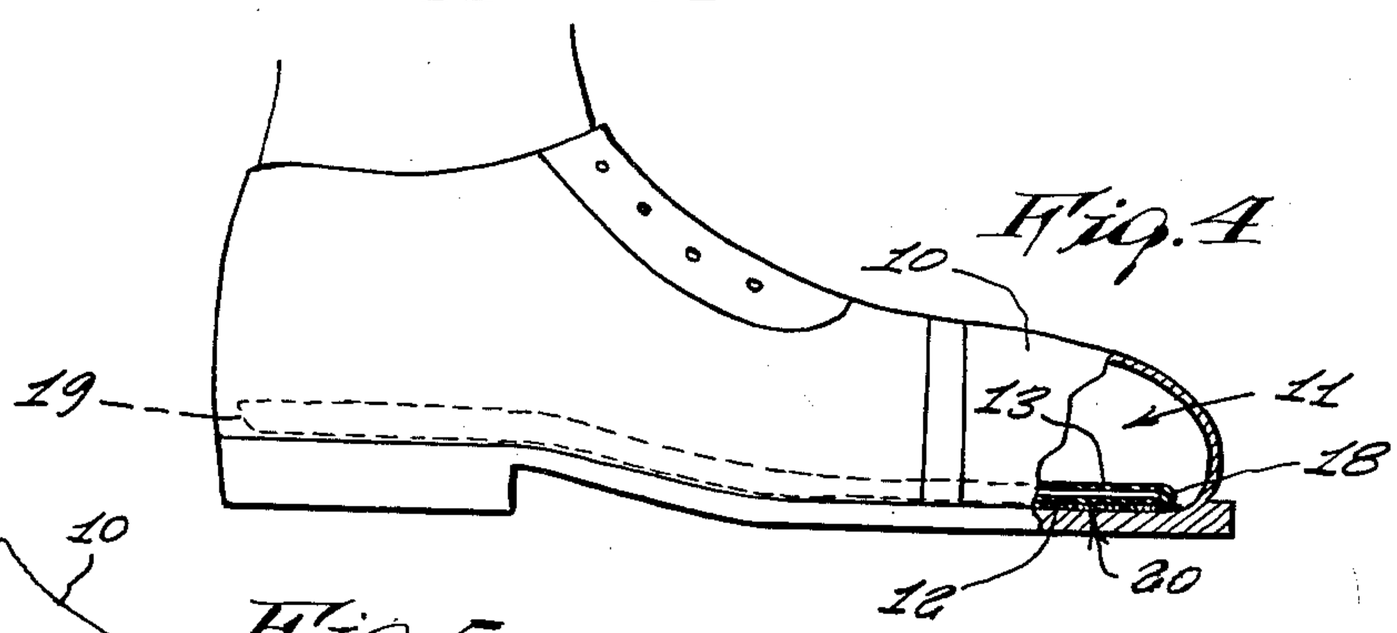

Fig. 5

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VENTILATED FOOTWEAR

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2 Claims. (Cl. 36—3)

This invention relates generally to footwear such as shoes and the like and more particularly to means for cooling or ventilating such shoes and the feet of the wearer thereof.

Although the broad concept of cooling and ventilating the shoes and feet is generally well known, previous devices which have been designed to accomplish this have been relatively complicated in construction and have had only limited success. These devices have also incorporated portions of the shoe which naturally wears and must be replaced with relative frequency. U.S. Patent 2,441,879 granted to R. R. Gantt and U.S. Patent 3,029,530 granted to C. N. Eaton are examples of the above devices.

Accordingly, an object of this invention is to provide cooling means for shoes and the feet of the wearer of such shoes which is simply and ruggedly constructed, and relatively economical to make.

Another object of this invention is to provide the aforementioned device which includes none of the shoe parts which normally wear with frequency and have to be replaced.

Another object of the invention is to provide the aforementioned device with an adequate distributed supply of cooling air.

The aforementioned and other objects and advantages will be more fully understood by referring to the following description and the accompanying drawings wherein:

FIGURE 1 is a perspective view of a device for cooling and ventilating a shoe and the foot of a wearer thereof that is made in accordance with the invention,

FIGURE 2 is an elevational view indicating a shoe with the foot of a wearer thereof, the device of FIGURE 1 being disposed in the indicated shoe and being shown in section,

FIGURE 3 is a perspective view similar to FIGURE 1 and illustrating the portion of the novel device shown in section in FIGURE 2 with a portion of the surface broken away,

FIGURE 4 is an elevational view of a shoe incorporating the novel cooling and ventilating device and having a portion of the toe box broken away,

FIGURE 5 is a side elevation view of a shoe in flexed position showing the invention therewithin.

Referring now to the drawings, a conventional shoe **10** is modified by incorporating an inner sole **11** made in accordance with the invention. Inner sole **11** formed to provide a heel portion, an arch portion and a sole portion has a bottom wall **12** held in spaced relationship to an upper wall **13** by longitudinal ribs extending from the arch portion to the tip of the sole portion, as shown in FIGURE 3, to form a plurality of longitudinal passages **15** each provided with perforations **14** in the upper wall **13**. Passages **15** and the perforations **14** are all forward of the heel portion and are in direct communication with the space in the heel portion. A flexible peripheral wall **18** encircles and connects the edges of the lower and upper inner sole walls **12** and **13**.

A V-shaped plate spring **16** is disposed in the heel portion of inner sole **11** between the lower and upper walls **12** and **13** with the apex of the V being disposed at the arch of the shoe **10** and the legs of the V diverging and terminating at the back of the heel. The apex of the spring **16** has a plurality of ports **17** each communicating with a passage **15**. The heel portion **19** of the peripheral

wall **18** progressively becomes larger towards the back of the heel as shown. Thus, the space within the heel portion of the novel inner sole **11** forms a bellows chamber that communicates with passages **15** through ports or orifices **17** in the apex of the spring **16** which biases the heel portions of the lower and upper walls **12** and **13** away from one another.

Thus, when the wearer of the shoe **10** walks, as his weight is applied to the heel, the bellows chamber collapses as the heel portion of upper wall **13** is pushed against spring **16** toward lower wall **12**. Air in the formed bellows chamber is forced through the orifices **17**, passages **15** and perforations **14** in wall **13** to the inside of the shoe **10**. As the heel of shoe **10** rises from the ground at the beginning of the next step, spring **16** will urge the heel portion of wall **13** away from wall **12** thus causing the bellows chamber to enlarge and draw air in through perforations **14**, passages **15** and orifices **17**.

A stiffening member **21** may be applied to the outside of lower wall member **12** in the area of the arch as shown in FIGURE 3. The novel inner sole **11** preferably is fixed to the bottom of shoe **10** by cement **20** as are normal inner soles, and as shown in FIGURE 4.

While certain novel features of my invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes, in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A removable inner sole for cooling and ventilating a shoe and a wearer's foot therein comprising,
   (*a*) a lower wall;
   (*b*) an upper wall;
   (*c*) each correspondingly formed to provide a heel portion, an arch portion and a sole portion;
   (*d*) spaced longitudinal ribs defining passageways formed on the upper surface of the bottom wall and extending from the arch portion to the tip of the sole portion;
   (*e*) a flexible peripheral wall connecting the upper and lower walls together in spaced parallel relation at said arch and sole portions and the space within the heel portion diverging from the arch portion to the back of the heel portion;
   (*f*) a plurality of rows of perforations in the upper wall extending forwardly of the heel portion with each row superposed over a passageway to provide for the passage of air into and out of said inner sole;
   (*g*) a V-shaped plate spring disposed between the upper and lower walls at the heel portion urging said walls at said heel portion away from one another;
   (*h*) the apex of the V-spring being positioned at the arch portion and the lip thereof terminating adjacent the peripheral wall at the back of the heel portion;
   (*i*) a plurality of orifices provided in the apex of the V-spring each in alignment with a passageway for the passage of air from and into the diverging space in said heel portion, whereby flexure of the wearer's foot in the shoe will provide for air entering the inner sole through the perforations for passage through said passageways and orifices into said heel portion space and to be discharged therefrom in a reverse direction when the same is collapsed and the V-spring deflected by the heel of the wearer to cool the wearer's foot and to ventilate the shoe.

2. The inner sole of claim 1, including

(*a*) a stiffening member secured to the under surface of the lower wall at the arch portion thereof.

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