May 6, 1924. 1,493,341

F. M. HANSEN

VENTILATED SHOE

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Fig. 1.

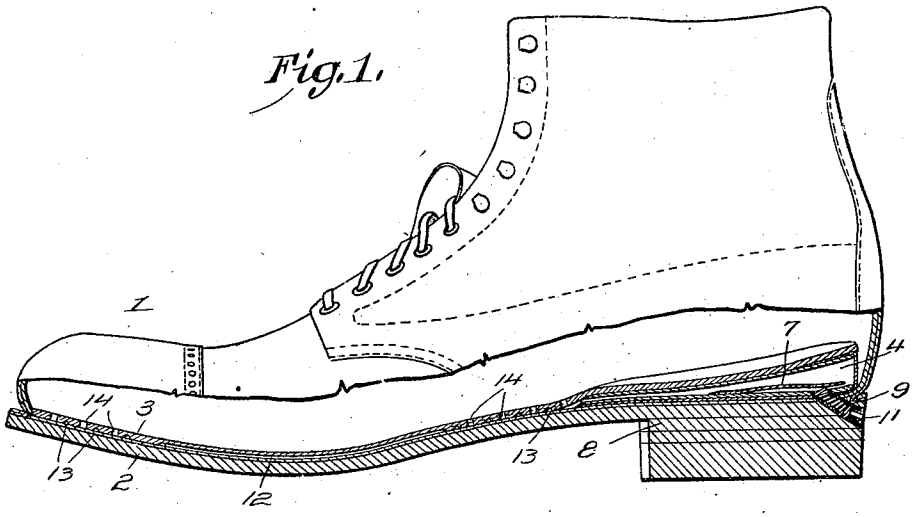


Fig. 2

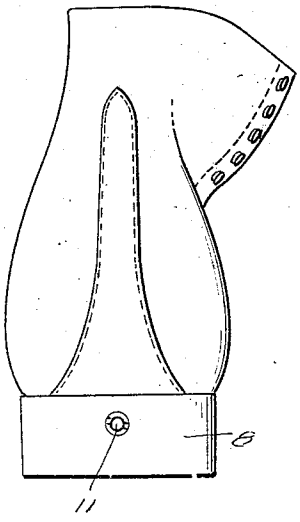
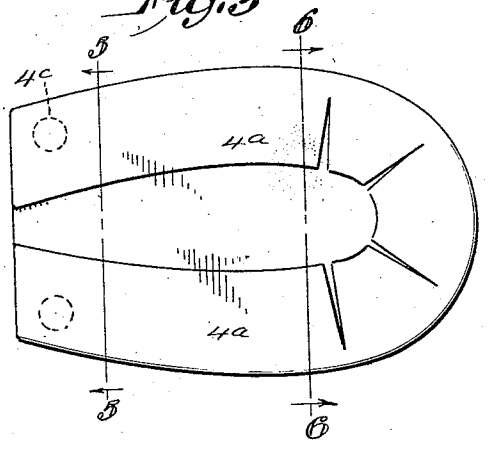


Fig. 3



Inventor

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VENTILATED SHOE

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Fig. 4.

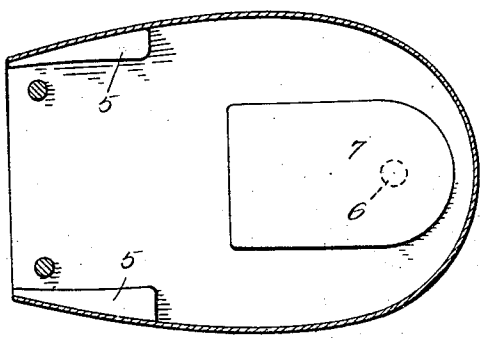


Fig. 5.

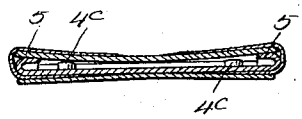


Fig. 6.

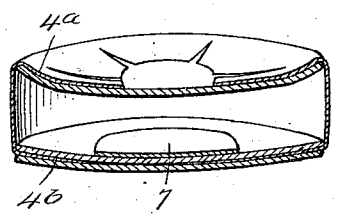


Fig. 7.

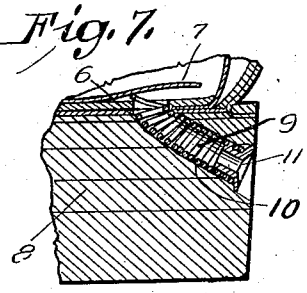
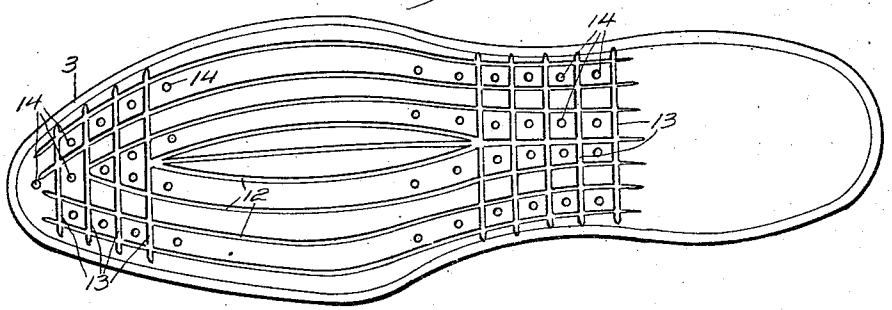


Fig. 8.



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Patented May 6, 1924. 1,493,341

UNITED STATES PATENT OFFICE.

FREDERICK M. HANSEN, OF OMAHA, NEBRASKA.

VENTILATED SHOE.

Application filed April 7, 1922. Serial No. 550,415.

To all whom it may concern:

Be it known that I, FREDERICK M. HANSEN, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Ventilated Shoes, of which the following is a specification.

This invention has reference to improvements in ventilated shoes so constructed that in the act of walking, the wearer of the shoe causes the operation of a bellows-like insole by means of which streams of air are caused to flow from the external atmosphere through the heel of the shoe, along an insole upon which the foot of the wearer rests and to be then expelled through the heel portion of the shoe again to the atmosphere, by means of which a continuous circulation of air is caused, thus thoroughly ventilating the interior of the shoe.

In accordance with the invention, the shoe is provided with an insole, formed of leather or other suitable material with the surface upon which the foot of the wearer rests provided on its under face with a series of longitudinal and cross scorings, which scorings may intercommunicate and also communicate through suitable perforations with the upper surface of the insole.

Furthermore, at the heel end of the insole, there is provided a bellows-like structure which may be made of steel or other elastic material capable of sustaining the weight of the wearer without collapse to any material extent, the steel heel section forming a bellows so arranged as to act in a manner to inhale and expel air through a reinforced duct communicating through the rear portion of the heel with the atmosphere.

That portion of the insole which comes in contact with the foot of the wearer is provided with a suitable covering, say leather, of soft and unobtrusive nature, protecting the foot of the wearer from harm.

The invention is such that the bellows-like heel portion of the insole will yield to but not be wholly collapsed by the weight of the wearer, and moreover as the wearer walks there is provided an elastic support, alternately yielding and rising, so that the elastic support acts after the manner of a bellows, inbibing and expelling air at the successive steps of the wearer.

The structure of the insole in conjunction with bellows is such that reverse currents of air are produced, serving to set up continuous currents which effectively ventilate the interior of the shoe.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding that the invention is not confined to any strict conformity to the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a side elevation, with some parts in section, showing a shoe with the invention applied.

Fig. 2 is a rear elevation of the shoe shown in Fig. 1.

Fig. 3 is a plan view of the metallic bellows case with the supplemental insole omitted.

Fig. 4 is a longitudinal section in a horizontal plane through the bellows case.

Fig. 5 is a section on the line 5—5 of Fig. 3.

Fig. 6 is a section on the line 6—6 of Fig. 3.

Fig. 7 is a longitudinal vertical section through the heel portion of the shoe showing the ventilating mechanism located at such point.

Fig. 8 is a bottom plan view of the supplementary or foot supporting insole.

Referring to the drawing, there is shown a shoe 1 which, in general, is of ordinary construction, and differs from such ordinary construction only in certain additional details.

The upper of the shoe may be considered as of usual construction and consequently needing no particular description.

Within the upper 1 and resting upon the sole 2 of the shoe is an insole 3, which may be constructed of leather of appropriate shape and extending from the toe end of the shoe to the heel end thereof where the insole 3 is underlaid by a bellows-like member 4, which is of spring construction and comprises upper and lower spring members 4^a and 4^b connected at the forward end by rivets 4^c or in other permanent fashion where the two members 4^a and 4^b are brought close together and there held by the rivets 4^c,

and from thence spread apart toward the heel end of the shoe, being held in such spread condition by short wings 5 underlying the upper section 4^a and normally holding the rear ends of the two sections 4^a and 4^b apart so that these two sections 4^a and 4^b have an elastic tendency to remain separated but will yield to the weight of the user when exerted against the upper section 4^a.

The upper and lower sections 4^a and 4^b of the bellows member located at the heel portion of the insole are hollowed or concaved to conform to the heel portion of the shoe and the heel portion of the natural foot.

The bottom member 4^b of the bellows structure 4 is provided near the rear end with a perforation 6 covered by a flap valve 7 unattached to the bottom member 4^b for an appropriate distance so as to rise and fall as needed to perform the functions of a valve.

Leading through the heel end 8 of the shoe is a passage 9 leading downwardly and rearwardly to the atmosphere and opening thereto at a sufficient height above the ground surface of the heel to avoid any liability of the entrance of water into said passage.

Located within the passage 9 is a coiled duct 10 terminating at the outer end in an eyelet 11 whereby both the eyelet 11 and the tube 10 may be firmly held in the passage 9 to conduct air toward and allow it to escape from the bellows structure 4. The upper end of the tube 10 is continued for a sufficient distance to tend to engage and lift the valve 7 except when the heel of the wearer of the shoe is bearing with sufficient force upon the upper member 4^a of the bellows structure to close the valve 7 against the action of the spring tube 10.

The insole 3 has on its under face a longitudinal series of grooves or scores 12 extending from near the toe end to near the heel end of the insole. The surface included by the grooves or scoring 12 has such grooves connected by cross grooves extending from side to side of the insole, these cross grooves being indicated at 13, and at frequent intervals over the surface defined by the grooves 12 and 13 are perforations 14 extending entirely through the insole where grooved or scored.

With a shoe equipped as indicated in the drawing, and placed upon the foot of the wearer, the bellows 4 is compressed by the weight of the wearer and as walking progresses there is caused approach of the upper and lower members of the bellows and expansion thereof, with the result that air is caused to flow through the passage 9 into the bellows to be distributed through the insole 3 and by the grooves 12 and 13 and perforations 14 to the inside of the shoe. In this manner as walking progresses there is caused a continuous circulation through the sole of the shoe, producing thorough ventilation, keeping the foot within the shoe and the shoe itself dry and cool.

Furthermore, the operation of the shoe in producing a ventilating circulation of air is entirely automatic and caused wholly by the act of walking, therefore necessitating no attention on the part of the user of the shoe at any time.

What is claimed is:—

1. A ventilating attachment for shoes comprising an insole for positioning within a shoe and having its lower face formed with longitudinal and transverse air passages and further perforated at the toe and instep portion thereof, a bellows arranged below the heel of the insole and having a discharge outlet in proximity to the rear ends of said air passages and further provided with an air inlet and a flap valve controlling said inlet and an expansible and contractile air supply conductor adapted to be positioned in the heel of the shoe and open into the atmosphere and further extending through said inlet and providing means for normally maintaining said valve in open position.

2. A ventilating attachment for shoes comprising a perforated insole positioned within said shoe and having its under surface provided with air passages, a bellows arranged below the heel of the insole and having a discharge outlet in proximity to the rear ends of said air passages and further provided with an air inlet and a flap valve controlling said inlet, and an expansible and contractile air supply conductor adapted to be positioned in the heel of the shoe and open into the atmosphere and further extending through said inlet and providing means for normally maintaining said valve in open position.

3. A ventilating attachment for shoes comprising a perforated insole positioned within said shoe and having its under surface provided with air passages, a bellows arranged below the heel of said insole and having a discharge outlet in proximity to the rear ends of said air passages and further provided with an air inlet and a flap valve controlling said inlet, and an expansible and contractile air supply conductor having one end extending through said inlet and normally maintaining said valve in open position.

In testimony whereof, I affix my signature hereto.

FREDERICK M. HANSEN.