Feb. 15, 1955 F. J. TOMAN 2,701,923

VENTILATED BOOT

Filed May 22, 1953 2 Sheets-Sheet 1

FIG. 2.

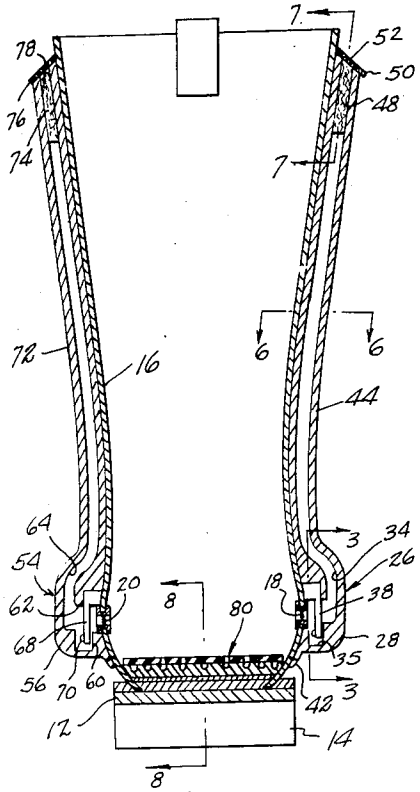


FIG. 1.

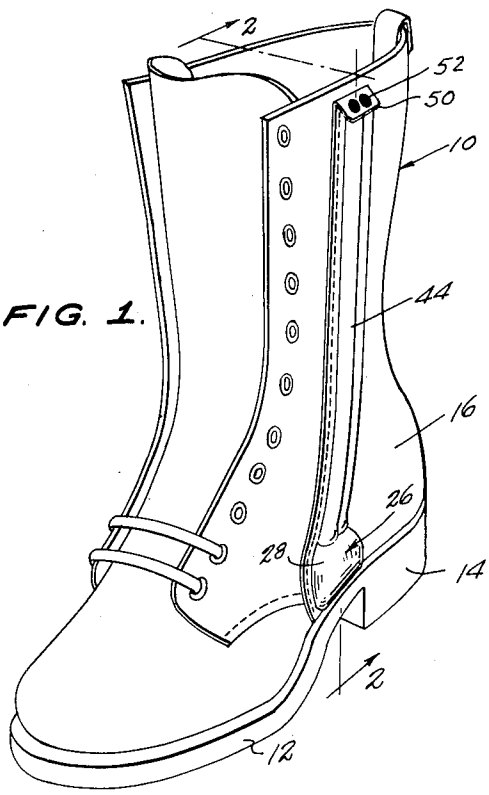


FIG. 3.

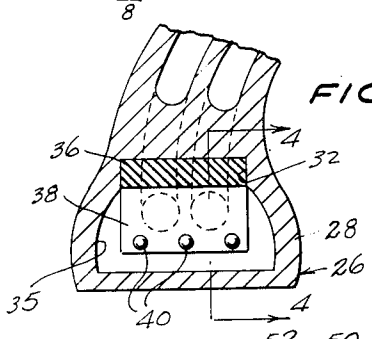


FIG. 4.

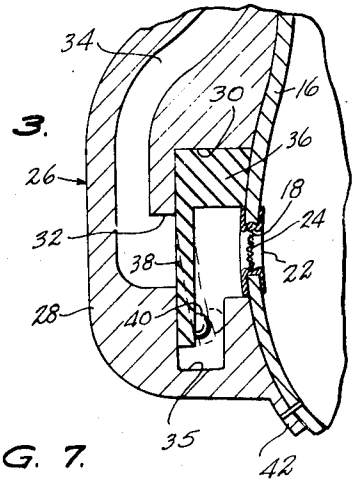
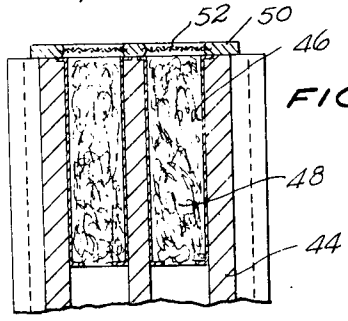


FIG. 7.



INVENTOR.
FRANK J. TOMAN,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

Feb. 15, 1955 F. J. TOMAN 2,701,923

VENTILATED BOOT

Filed May 22, 1953 2 Sheets-Sheet 2

FIG. 8.

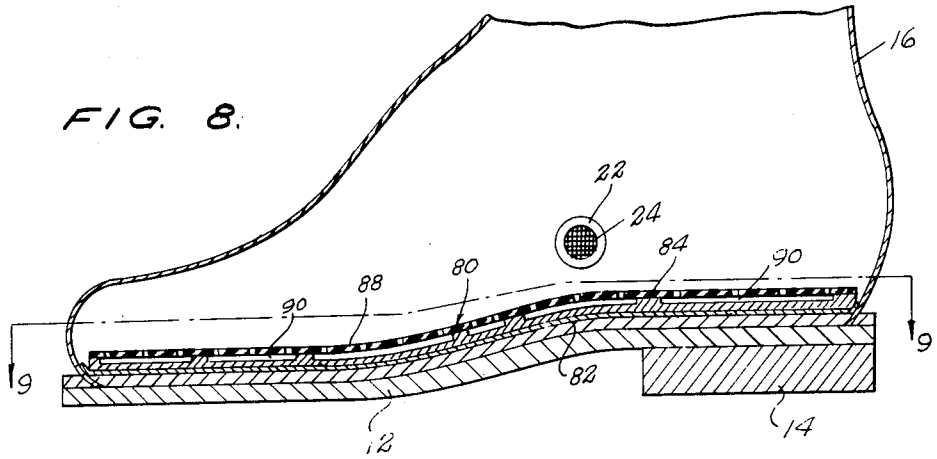


FIG. 9.

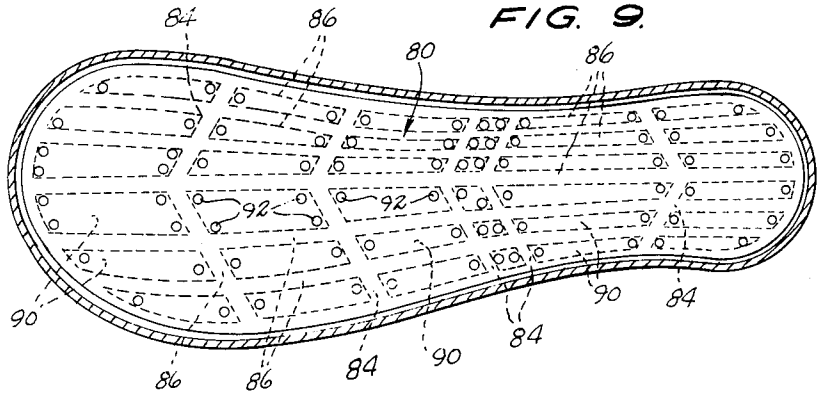


FIG. 5.

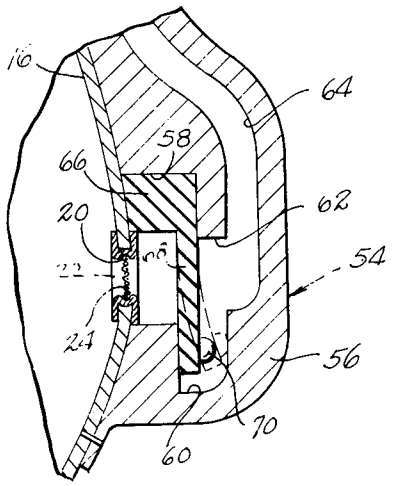
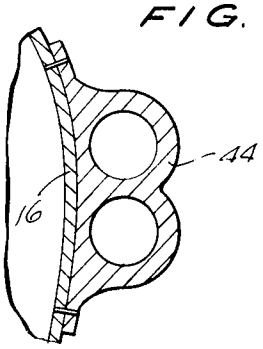


FIG. 6.



INVENTOR.
FRANK J. TOMAN,
BY

McMorrow, Berman + Davidson
ATTORNEYS

United States Patent Office 2,701,923 Patented Feb. 15, 1955

2,701,923

VENTILATED BOOT

Frank J. Toman, Binghamton, N. Y.

Application May 22, 1953, Serial No. 356,741

1 Claim. (Cl. 36—3)

This invention relates to a ventilated boot and more particularly to a boot of the type commonly used by farmers, woodsmen, service men and others whose occupation demands long periods of exposure to low temperatures.

Heretofore efforts have been made to protect the feet of persons subjected to low temperatures from frostbite through the ventilation of boots as exemplified by the patent to Powell No. 2,190,802, the patent to Lindstrom, 2,480,035 and the patent to Falkner, 426,495.

While such devices have to a certain extent met with a moderate degree of success, they have not proven entirely satisfactory owing to the fact that the moisture laden air is not wholly expelled from the interior of the boot and consequently frostbite of the feet of the users has been experienced.

The primary object of this invention is to expel moisture laden air from the interior of a boot and to replace the expelled air with fresh dry air, and to thereby preserve the foot of the wearer substantially moisture free.

Another object is to convert an ordinary boot into one from which the moisture laden air is expelled without in any way interfering with the construction of the boot.

Still another object is to facilitate the pumping action resulting from the movement of the foot within a boot during its use when walking.

A still further object is to exclude dirt and dust from the interior of the boot while at the same time so ventilating it that moist air is expelled therefrom.

The above and other objects may be attained by employing this invention which embodies among its features a boot having a sole and upper and the upper having vents extending through opposite sides thereof, and valves carried by the upper and communicating with atmosphere and with the interior of the boot through the vents for establishing a unidirectional flow of air through the boot as a foot works therein. Other features include an inlet check valve carried by the upper and communicating with atmosphere and with the interior of the boot through a vent, and an outlet check valve carried by the upper and communicating with the atmosphere and with the interior of the boot through another vent, a cushioned insole in said boot having air passages extending therethrough which open adjacent the vents, and tubes carried by the upper and connected to and extending upwardly from the valves for establishing communication between the valves and atmosphere above the vents.

Still other features include filters carried by the tubes adjacent the upper ends thereof for excluding dust and dirt from the valves and the interior of the boot.

In the drawings:

Figure 1 is a perspective view of a boot equipped with this improved ventilating system,

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1,

Figure 3 is a fragmentary enlarged sectional view taken substantially on the line 3—3 of Figure 2,

Figure 4 is a greatly enlarged fragmentary sectional view taken substantially on the line 4—4 of Figure 3,

Figure 5 is a view similar to Figure 4 showing the air outlet check valve,

Figure 6 is a fragmentary enlarged sectional view taken substantially on the line 6—6 of Figure 2,

Figure 7 is a fragmentary enlarged sectional view taken substantially on the line 7—7 of Figure 2,

Figure 8 is a fragmentary enlarged sectional view through the boot taken substantially on the line 8—8 of Figure 2, and

Figure 9 is a horizontal sectional view taken substantially on the line 9—9 of Figure 8.

Referring to the drawings in detail a boot designated generally at 10 comprises a sole 12, a heel 14 and an upper 16. The upper 16 is provided adjacent its junction with the sole 12 with vents 18 and 20 which are provided with grommets 22 carrying foraminous screens 24 which grommets and screens are preferably formed of a non-corrosive metal such as stainless steel. Fixed to the upper on the outer side thereof adjacent the vent 18 is an inlet check valve designated generally 26 which comprises a valve body 28 having a chamber 30 therein which opens through the body on the side thereof adjacent the upper 16 in registration with the opening 18 extending therethrough. The body 28 is also provided with a port 32 which opens into an air passage or duct 34 formed within the body and communicates with the recess 30 in substantial alignment with the opening 18 in the boot upper 16. Formed in the body 28 and communicating with the chamber 30 is a recess 35 which as illustrated in the drawings extends into the body 28 in perpendicular relation to the port 32.

Mounted on the chamber 30 on the side thereof remote from the recess 35 is a block 36 of a relatively soft pliable substance such as soft rubber, and carried by said block and extending across the port 32 and into the recess 35 is a flexible tongue 38 which is adapted to close and seal the port 32 except during such periods as when air is flowing inwardly through the passage or duct 34 into the interior of the boot 10 through the opening 18 in the side thereof. A lug 40 is carried by the flap or tongue 38 adjacent the end thereof remote from the block 36 for engagement with the wall of the recess 35 remote from that contacted by the tongue 38 for preventing the tongue from engaging the said remote wall and preventing the passage of air from the port 32 through the opening 18 in the boot upper 16.

In the preferred form of the invention, the body 28 is provided at its perimeter adjacent the side thereof through which the chamber 30 opens with an outwardly extending flange 42 by which the valve body 26 may be cemented, sewn or otherwise secured to the boot upper 16 in proper position over the vent 18.

Carried by and extending upwardly along the side of the boot upper 16 is a duct or tube 44 which communicates at its lower end with the passage 34 and at its upper end with atmosphere adjacent the upper end of the boot upper 16.

Carried by and extending into the upper end of the tube 44 is a cartridge shell 46 which is filled with a suitable filtering material 48 such as glass or mineral fiber or the like which will serve to exclude dust and dirt from the interior or the duct 44 and carried by the upper end of the shell 46 of the filter is an outwardly extending plate 50 having an opening extending therethrough which aligns with the passage through the filter 46 and is covered with a suitable foraminous screen 52 by which air is admitted into the interior of the duct or tube 44. Obviously, if so desired, two passages may extend through the tube or duct 44 in which event both passages will be equipped with filters adjacent their upper ends while their lower ends both communicate through similar ports with the chamber 30 previously described, substantially as shown in Figure 3.

Fixed to the opposite side of the boot upper 16 adjacent the vent 20 is an outlet check valve designated generally 54 comprising a body 56 having a chamber 58 therein which opens through the side thereof adjacent the shoe upper 16 and registers with the vent opening 20. Like the body 28, the body 56 is provided with a recess 60 which communicates with the chamber 58, and formed in the body 56 and opening into the chamber 58 in substantial alignment with the vent 20 is a port 62 which communicates with a passage 64 which extends upwardly in the body substantially as shown and which also communicates with atmosphere. Fitted into the recess 58 is a block 66 of a soft pliable material and carried by and extending outwardly from the block 66 and into the

recess 60 is a flexible tongue 68 which is adapted to extend across the junction of the chamber 58 and port 62 to prevent the flow of air from the port 62 into the boot through the vent 20. The tongue being relatively flexible may be readily unseated from its contact with the wall of the chamber 58 and the recess 60 under the influence of air flowing outwardly from the interior of the boot, and in order to prevent the tongue from contacting the wall of the recess 60 remote from the upper of the boot 16, suitable lugs or stops 70 are carried by the tongue adjacent the end thereof remote from the block 66 which when the tongue flexes a sufficient distance contact the wall of the recess 60 remote from that normally engaged by the tongue and holds the tongue in spaced relation to said wall to thereby permit the flow of moisture-laden air from the interior of the boot outwardly through the passage 64. Carried by the boot upper and extending upwardly along the side thereof above the vent 20 is a tube or duct 72 having a passage therethrough which communicates with the port 62 and opens to atmosphere adjacent the upper end of the boot. A filter cartridge 74 enters the tube 72 adjacent the upper end thereof and like the cartridge 48 is equipped with a stop plate 76 having an opening therethrough which is screened by a suitable screen wire 78.

In the preferred form of the invention an insole cushion, designated generally 80 rests on the insole of the boot and comprises a base 82 having transversely extending upstanding ridges 84 and longitudinally extending upstanding ridges 86 which define with a flexible cover 88 groups of pockets 90. The cover 88 is provided with transversely extending rows of openings 92 which communicate with the pockets 90 so that as the foot of the wearer moves within the boot against the cushion sole 80 the air within the pockets 90 will be circulated through the openings 92 to aid in expelling moisture from the sock worn by the user.

In use as the foot works in the boot, a pumping action will result so that fresh air is drawn into the interior of the boot through the inlet check valve 26 and is expelled from the interior of the boot through the outlet check valve 54. By thus producing a unidirectional flow of air through the boot, it is obvious that the moisture contained in the air in the boot will be expelled during the walking of the user and a continual unidirectional flow of air will result. As a consequence the mere recirculation

of moisture-laden air within the boot is avoided and hence danger of frostbite is materially reduced.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What is claimed is:

A boot comprising a sole, an upper, said upper having vents extending through opposite sides thereof, valve bodies carried by the boot and having chambers therein which open through the sides thereof and communicate with the vents, said valve bodies having ports therein which communicate with the chambers and with atmosphere, said bodies having recesses therein which open into the chambers between the open sides thereof and the ports, blocks of resilient flexible material seated in the chambers, flaps carried by the blocks and projecting outwardly therefrom across the chambers and into the recesses in contact with selected walls thereof for interrupting the passage of air in one direction through each chamber, and stop lugs carried by the flaps and projecting outwardly therefrom for engaging the walls of the chambers remote from those engaged by the flaps for holding the flaps spaced from the walls of the recesses when the valves are open.

References Cited in the file of this patent

UNITED STATES PATENTS

611,830	Bruck	Oct. 4, 1898
895,950	Von Bracht	Aug. 11, 1908
911,740	Montgomery	Feb. 9, 1909
1,103,874	Halley	July 14, 1914
1,134,389	Lack	Apr. 6, 1915
1,211,542	Carolin	Jan. 9, 1917
1,236,924	Golden	Aug. 14, 1917
1,260,942	Price et al.	Mar. 26, 1918
2,190,802	Powell	Feb. 20, 1940
2,397,413	Evans	Mar. 26, 1946
2,560,591	Oltrogge	July 17, 1951

FOREIGN PATENTS

640,720	Germany	Jan. 11, 1937