Oct. 24, 1939. M. PERSICHINO 2,177,116

PNEUMATIC FOOT SUPPORTER

Filed July 26, 1937

Fig. 1.

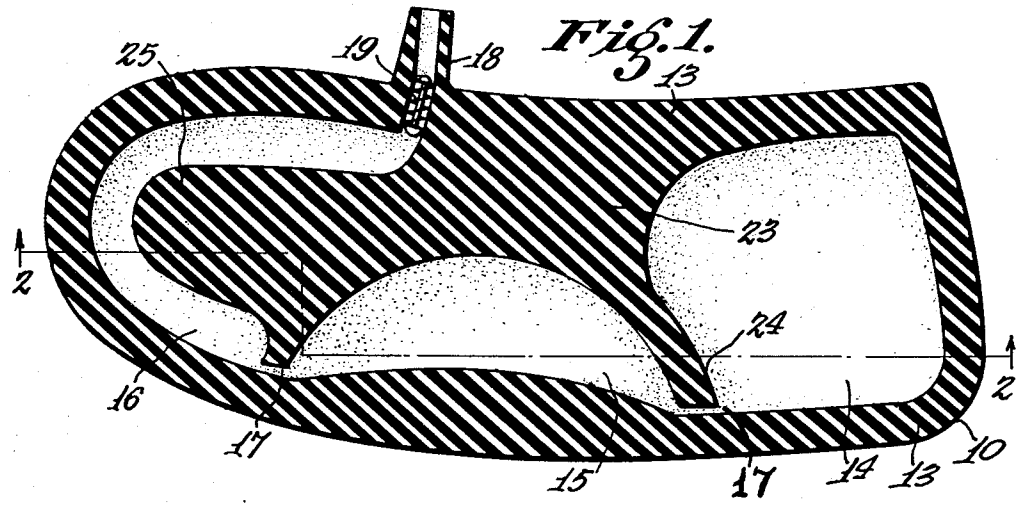


Fig. 2.

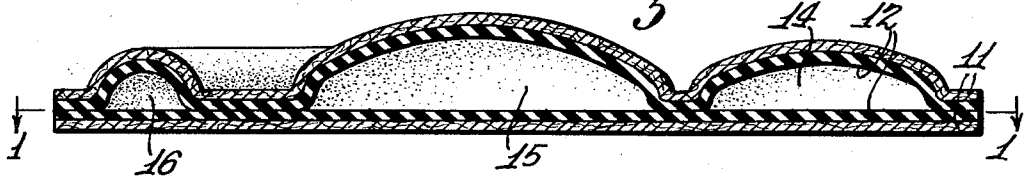


Fig. 3.

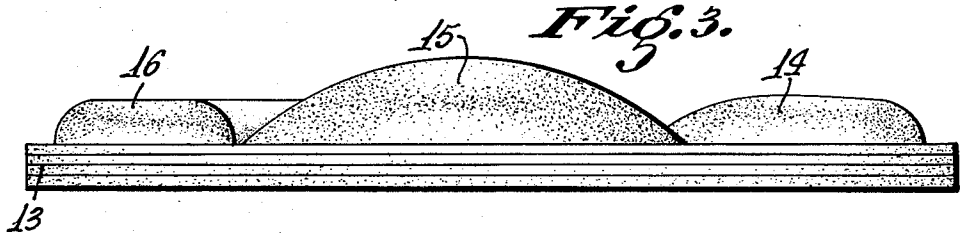
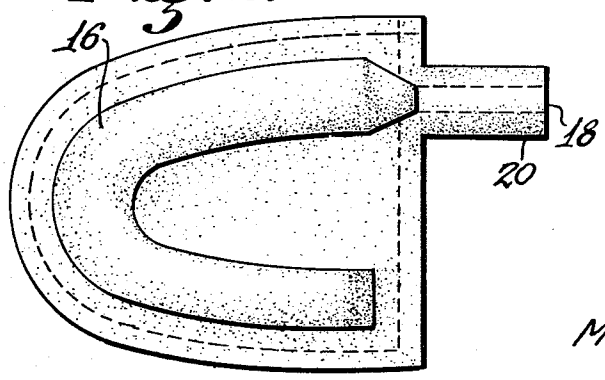


Fig. 4.



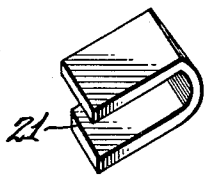


Fig. 5.

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PNEUMATIC FOOT SUPPORTER

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Application July 26, 1937, Serial No. 155,658

2 Claims. (Cl. 36—71)

This invention relates to new and useful improvements in pneumatic foot supporters.

An object of the present invention is to provide a foot supporter for the various weak portions of the foot such as the longitudinal and metatarsal arches, wherein the supporting portion is air-inflated, and which can be worn in the shoe.

A further object is the provision of a foot supporter for relieving pressure from the heel bone to cure such maladies as "spur" due to calloused tissue formed directly beneath the heel bone of the foot.

These and other objects will be apparent from the specification and claims, it being understood that minor changes may be made in the described embodiment of the invention without departing from the spirit and scope of the invention as claimed.

In the drawing

Fig. 1 is a horizontal plan view in section of the lower half of the left foot supporter taken along the broken line 1—1 of Fig. 2 showing the vulcanized rubber portions in section and one type of inflating valve applicable for inflating the supporting air chambers.

Fig. 2 is a vertical plan view in section of the foot supporter for the left foot taken along the broken line 2—2 of Fig. 1 with the top half included.

Fig. 3 is a side elevation of the supporter illustrated in Fig. 2.

Fig. 4 is a top plan view of a supporter for the heel portion of the foot only.

Fig. 5 is a perspective view of a spring clamp adapted for pinching the inflating tube of the supporters shown for preventing escape of the inflating air of the air chambers.

Referring more in detail to the accompanying drawing, the supporter 10 is preferably shaped generally to conform to the sole of the foot vertically and horizontally and may be described as being composed of a leather outer sheath 11 and an internal rubber bladder 12, the two being preferably stitched or cemented together around their marginal edges. The rubber bladder 12 is preferably made with a sufficiently broad vulcanized border 13 so that in stitching through both leather and rubber, no air leaks will develop in the pneumatic air chambers, which may be designated as the metatarsal arch air chamber 14, the longitudinal arch air chamber 15, and the U shaped heel bone air chamber 16. There is also provided preferably a small intercommunicating air passage 17 between each air chamber so as to allow air to pass slowly from one chamber to the other. An inflating stem 18 may be provided with any type of inflating valve 19 which may be of any form, or inflation may be done as illustrated in Fig. 4 through a length of soft rubber tubing 20 which, after inflation of the bladder of the supporter 12 may be pinched and held closed by a steel spring clamp 21. After inflation and clamping the tube may be bent under the supporter 10 and positioned between the bottom of the supporter and the shoe.

As will be noted in Fig. 1 the longitudinal arch air chamber 15, is made of a width less than the width of the supporter 10 and is provided on the inner side of the foot. The remainder of the width 23 of the supporter 10 is built up with solid material such as rubber having a comfortable degree of resilience, but of such a nature as to be less resilient than the air inflated portion 15. A peninsular-like formation 24 of this solid portion 23 extends diagonally of the length of the foot to separate the longitudinal arch air chamber 15 from the metatarsal arch air chamber 14, and a small air passage 17 is provided at the point where this peninsular portion meets the outer vulcanized border 13. The rear portion of the longitudinal arch air chamber is also progressively constricted to the point where it merges with the U shaped heel air chamber 16, and another air passage 17 is provided at this point. The general shape of the longitudinal arch may be described as of a crescent on the outer side of the foot, while it is made to conform to the vulcanized border 13 on the inside of the foot. The widest portion of the air chamber 15 being substantially centrally disposed, there will result the highest elevation of the air chamber at this point so as to support the longitudinal arch where it is most needed.

The metatarsal arch support air chamber 14 is generally circular in shape, being defined by the border 13 of the supporter on each side and the front end, and by the built up portion 23 and its peninsular extension 24 on the rear side. This contour provides an air sack with a spherical top surface, which is the shape generally required for a metatarsal arch support.

The heel supporter air chamber 16 is generally U shaped and extends around the marginal edges of the heel of the foot on the bottom of the shoe, the sides of the U being separated by a rearward extension 25 of the built up section 23, and the inflating valve 19 is preferably provided at the extremity of the U shaped air sack 16 opposite the intercommunicating air passage 17, so that,

as the U shaped air chamber 16 is inflated, the air, after filling this chamber progressively fills the longitudinal air chamber 15 and the metatarsal air chamber 14, and pressure is equalized in all three chambers.

When the supporter 10 is placed within the shoe, the equalized air pressure in all three air chambers is not disturbed until the wearer steps on the shoe as in walking. In so doing, the portion of the foot bearing the greatest burden of the weight of the body presses hardest on the supporter. This causes air within whichever chamber is thus compressed to be under a higher pressure than the air in the other chambers. The intercommunicating air passages 17 then allow the pressure to become equalized in the three chambers again, but not with the same speed as the pressure is built up. The resulting action is a cushioned action on the foot which cannot be obtained in supporters not provided with such pressure equalizing vents.

Depending on the particular foot ailment to be treated with such a foot supporter, any of the various air chambers may be omitted Especially is this true in cases of heel ailments known as "spur", wherein the heel bone of the foot has become tender and sore due to a calloused condition of the flesh underneath, necessitating in many cases surgical cautery to remove this calloused tissue. Experiments have demonstrated that by using a U shaped air supporter for the heel of the foot only, the calloused condition disappears in a short time without the need for any surgical operation. In such a case the U shaped air chamber creates a pressure around the heel bone and removes pressure from beneath the heel bone, thereby distributing the pressure on the heel over a larger area, which it is believed, is the reason for the successful cures of such "spur" ailments when using a supporter as herein described.

Having thus described the invention, what is claimed is:

1 In a pneumatic foot supporter an air inflated sack shaped generally to conform to the sole of the foot, and having an air chamber for supporting the longitudinal arch, a U shaped air chamber of tubular cross section in its inflated portion about the outer contour of the heel portion of the supporter for pneumatically supporting the outer edges of the heel of the foot, a small air-communicating passage between said chambers, and means permitting inflation of said sack.

2 In a pneumatic foot supporter an air inflated sack shaped generally to conform to the sole of the foot, and having a bulbous air chamber for supporting the metatarsal arch, an air chamber for supporting the longitudinal arch, a U shaped air chamber of tubular cross section in its inflated portion about the outer contour of the heel portion of the supporter for pneumatically supporting the outer edges of the heel of the foot, means permitting inflation of said sack, and small air-communicating passages between said respective air chambers.

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