

May 31, 1966

L. L. MENKEN

3,253,355

CUSHIONED SHOE

Filed Nov. 20, 1964

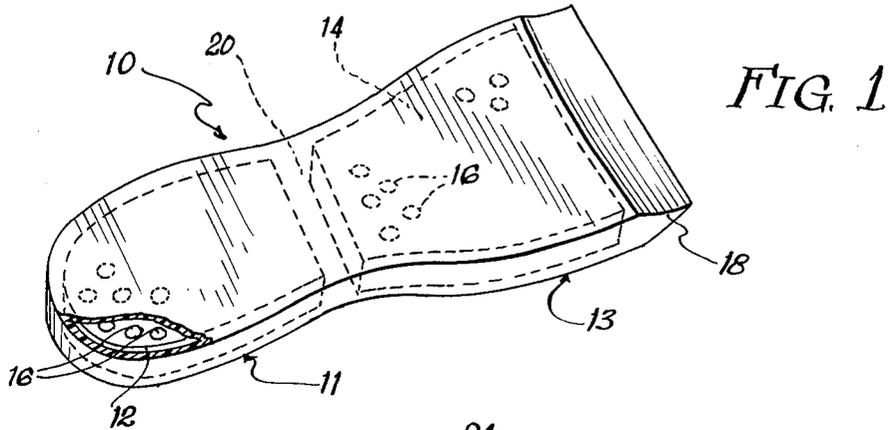


FIG. 1

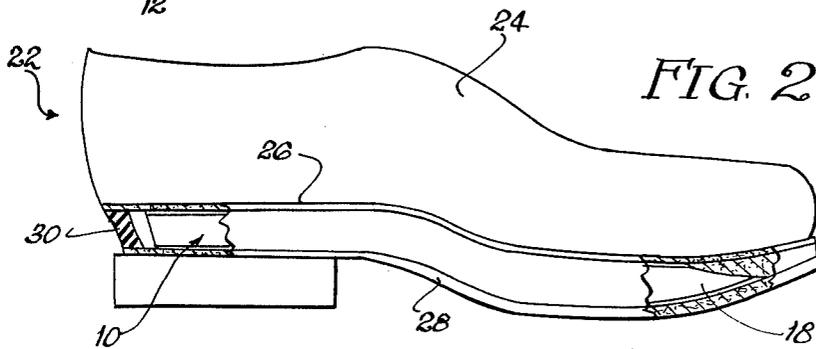


FIG. 2

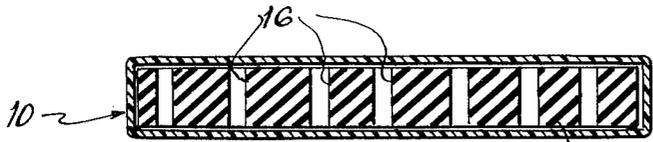


FIG. 3

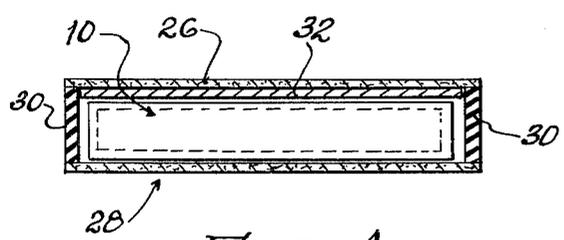


FIG. 4

INVENTOR
Lester L. Menken

By
McDougall, Herch & Scott
Attys

1

3,253,355

CUSHIONED SHOE

Lester L. Menken, 7709 Niles Center Road, Skokie, Ill.

Filed Nov. 20, 1964, Ser. No. 412,636

13 Claims. (Cl. 36-29)

This invention relates to a shoe construction which is particularly designed for comfort even after long periods of standing, walking or other extended use. The invention is particularly directed to a shoe construction which embodies unique cushioning means.

It is well-known that severe discomfort can result when persons must be on their feet for extended periods of time, and it is also established that in some instances physical impairment can result due to such activities. Furthermore, existing physical defects can be aggravated by extending use of certain shoes even where use of the shoes is held to a minimum. It is also well established that the efficiency, temperament, and health of an individual can be greatly affected when improper shoes are worn.

In many cases, shoe manufacturers can produce tailor-made shoes designed to overcome the deficiencies of conventional shoe designs. This is a generally unsatisfactory situation however since the cost of such shoes is extreme, and, therefore, the availability of such shoes will not provide a satisfactory solution to the aforementioned problems.

Manufacturers have in the past provided various padding materials such as foam rubber in shoe constructions. Shoes designed in this way were intended to provide a fit which would tend to adapt to the contour of an individual's feet while at the same time providing a soft comfortable material for standing. In many instances such shoes initially provided relief from discomfort; however, it was found that the advantageous effects of the padding depreciated within a relatively short period of time. This situation resulted since padding normally tends to assume a harder nature in areas of more extreme pressure after a given period, and, furthermore, no satisfactory means were provided which prevented displacement of the padding in the constructions in response to forces exerted by the wearer.

Shoe manufacturers have also contemplated the construction of shoes with an air space therein, with or without means for preserving air pressure therein. Such pneumatic type shoe constructions are considered advantageous since there is a desirable resiliency provided by the air cushion, and the air pressure therein could be maintained at a relatively constant value.

To date, no one has successfully made or marketed a pneumatic shoe construction. There are believed to be several reasons for this situation. In some instances, after a short period of wear, certain areas of a shoe would tend to "give" in preference to other areas in response to forces exerted by the wearer's foot. The leather or composition materials employed in the shoes tend to become distorted in such areas, and, therefore, despite the build-up of fluid pressure beneath these areas, non-uniformity occurred within the construction. This resulted in non-uniformity of stress distribution, and aggravation and discomfort, therefore, were not completely eliminated.

It has also been found that the previous designs of pneumatic shoes have been characterized by severe problems relative to properly holding the shoe in place during use. These previous designs have the pneumatic bladder or air space extending appreciably beyond the ball of the foot to almost the tip of the shoe, necessitating substantially the same sole thickness at the toe section as at the ball of the foot. This design causes uncomfortable heel

2

pull-out, particularly when, in the ball-of-foot-to-toe action of normal walking, the weight of the body is on the toe of the shoe.

It is an object of this invention to provide a novel shoe construction designed to overcome the difficulties experienced with the various shoe designs now available.

It is a more specific object of this invention to provide a shoe construction which includes internal cushion means whereby the construction tends to decrease the likelihood of physical impairment and whereby general aggravation occasioned by periods of extended use can be overcome.

It is an additional object of this invention to provide a shoe construction which includes a novel bladder means for insertion in the shoe, this bladder means being designed whereby the shoe can be fitted and worn in accordance with conventional practice.

These and other objects of this invention will appear hereinafter and for purposes of illustration but not of limitation, specific embodiments of this invention are shown in the accompanying drawings in which:

FIGURE 1 is a perspective view of a bladder means for use in a shoe construction designed in accordance with the techniques of this invention;

FIGURE 2 is a side elevational view of the shoe construction of this invention;

FIGURE 3 is a cross-sectional view of the bladder means; and,

FIGURE 4 is a cross-sectional view of the sole portion of a shoe construction embodying an alternative form of the instant invention.

The construction of this invention generally comprises a conventional shoe arrangement including an inner sole and an outer sole. A peripheral wall is employed for holding these soles in a spaced-apart arrangement with an open space being defined therebetween. One or more air bladders are disposed in this space, and these bladders are substantially filled with resilient material. The resilient material in turn defines openings whereby air can be readily retained within the bladder. Although the bladders are preferably air-impervious, it will be understood that the members defining the space between the soles could be manufactured whereby they will serve to retain air within the construction. It will also be understood that in referring to a bladder, a lining of the members defining the space is contemplated.

In the preferred form of the instant invention, a bladder is provided which effectively comprises two separate bladder portions, one for the heel portion of the shoe, and one for the portion of the shoe forward of the instep. The bladder portions may actually comprise two independent members separated at the instep by resilient material that joins the peripheral wall and preferably forming an integral, one-piece construction with this outer wall. It is vitally important to this invention that the bladder portion for the portion of the shoe forward of the instep should not extend appreciably beyond the ball of the foot to permit curving of the outer sole gradually upward from the ball of the foot to the forward tip of the shoe. This upward curving design ideally conforms to the natural ball-of-the-foot-to-toe action of the foot in normal walking and thus substantially eliminates heel pull-out that would otherwise occur.

The accompanying drawings illustrate the shoe construction in its preferred form. In FIGURE 1, there is shown a bladder 10 divided into portions 11 and 13 which may be formed of a thermoplastic material. Within the bladder, there is provided a relatively stiff resilient material forming sections 12 and 14. This material may comprise rubber or other resilient plastic material, and each section defines a plurality of vertical bores 16 which can be formed in regular or random patterns throughout the

extent of the respective sections. The leading end 18 of the forward bladder portion 13 is preferably tapered in the manner shown to permit formation of the toe portion of the shoe in the preferred manner to be described. A heat sealable material is desirable for use as the bladder since the end 18 can be readily formed with such material. Furthermore with such material the central section of the bladder can be sealed as at 20 for holding the sections 12 and 14 in specific positions within the bladder. Obviously, where the portions 11 and 13 are independent, a dividing strip can be attached to the peripheral wall.

FIGURE 2 illustrates a shoe construction 22 which includes an upper 24 and inner sole 26 and an outer sole 28. A peripheral wall 30 holds the soles in spaced-apart relationship whereby an open space can be defined between the soles. The bladder 10 is inserted in this open space.

In the toe portion of the shoe, it will be noted that the outer sole 28 tapers upwardly whereby the end of the shoe is substantially narrower than the rearward portions thereof. The formation of a tapered end in the bladder portion 13 permits this arrangement, and it has been found that this design of the shoe substantially eliminates the condition which can best be described as heel pull-out. Thus, with constructions which embody a thick sole throughout their entire length, there is a substantial tendency for the rear of the shoe to pull down relative to the heel portion of the foot when weight is placed on the toe end of the shoe. Naturally this rubbing could lead to blisters and other discomforts. Such pull-out has not been found to occur when a narrow end portion is formed in a shoe and for this reason, the bladder 10 is cut short. It is pointed out, however, that this does not detract from the beneficial effects of the bladder since there is little pressure in the toe portion of the shoe requiring the presence of the bladder in this area.

FIGURE 3 illustrates the bladder 10 in cross section. As shown, the holes 16 comprise a plurality of vertical bores in the section 14. By providing these bores, a substantial amount of air can be retained in the construction and they can also be employed for controlling the resistance of the bladder; thus, where more holes are provided, the resistance can be decreased. It will be understood that the section 12 in the bladder provides a corresponding design.

In FIGURE 4 there is illustrated a shoe construction including inner sole 26, outer sole 28 and peripheral wall 30 in the manner described. The bladder 10 inserted within the construction may also be of the same design as that previously described. However, this construction is unique in that a plate 32 is located over the bladder for support thereby. This plate is formed of a stiff material such as metal or having the characteristics of metal whereby pressure exerted by a person wearing the shoes of this invention will be transmitted through the plate 32 to the bladder means described. It will be noted that this plate is located immediately beneath the inner sole so that pressure exerted by the wearer will be transmitted first to the plate.

The use of a plate of the type illustrated is described in applicant's United States Patent No. 3,120,712, issued February 11, 1964, and entitled "Shoe Construction." As explained in this patent, the plate 32 is of the floating variety whereby it is disconnected with respect to the shoe construction. By providing the bladder beneath the plate in the manner shown, stress can be distributed to the bladder in a highly effective and uniform manner whereby long periods of comfortable wear can be realized. The plate member is to be formed of a relatively stiff material capable of assuming a contour approximately corresponding to the contour of the inner sole when the shoe is new. By reason of the stiffness of the plate, it is adapted to restore its shape to its original configuration even after long periods of use. This provides for a "new shoe" fit irrespective of the length of time that the shoe construction is employed.

The bladder construction is preferably completely sealed before use, and there is no need to provide a valve means for maintaining air pressure. It is contemplated, however, that a pressure above atmospheric could be formed within the bladder before sealing and that this pressure would then be maintained for the life of the shoe.

The provision of the relatively solid rubber or like members 12 and 14 is intended to eliminate problems which have been found to exist in strictly pneumatic prior art constructions. In such constructions, there is a clear tendency for the air mass to be moved forwardly and rearwardly in an alternating fashion as the pressure on the shoe alternates during walking. This creates an undesirable rocking movement which is eliminated by the present invention since resilient sections are solid enough to support weight even when the majority of the weight is on one or the other of the sections.

The various elements which comprise the illustrated construction are inexpensive and, accordingly, the instant arrangement can be introduced into conventional shoe designs without undue expense. In view of the improvements in comfort during use which characterize the instant invention, it will be obvious that the advantages of the instant construction will clearly out-weigh any increase in cost which might be occasioned by its manufacture.

It will be understood that various changes and modifications may be made in the shoe construction described which provide the characteristics of this invention without departing from the spirit thereof particularly as defined in the following claims.

That which is claimed is:

1. In a shoe construction including an inner sole and an outer sole, the improvement comprising a peripheral wall holding said soles in spaced-apart relationship and defining an open space therebetween, and a bladder disposed in said space between said soles, said bladder being substantially filled with a resilient material and said material defining a plurality of openings for holding air within the bladder.
2. A construction in accordance with claim 1 wherein said resilient material is formed in two sections including a first section extending beneath the heel of said construction and a second section extending forwardly of said first section.
3. A construction in accordance with claim 2 wherein said second section extends from a point adjacent said first section to approximately the ball of the foot.
4. A construction in accordance with claim 1 wherein said resilient material is air-impervious and wherein said openings comprise a plurality of vertical bores.
5. In a shoe construction including an inner sole and an outer sole, the improvement comprising a peripheral wall holding said soles in spaced-apart relationship and defining an open space therebetween, and a bladder disposed in said space between said soles, said bladder being substantially filled with a resilient material, said material being formed in a pair of sections including a first section extending beneath the heel, and a second section extending forwardly of said first section.
6. A construction in accordance with claim 5 wherein said second section extends from a point adjacent said first section to approximately the ball of the foot.
7. A construction in accordance with claim 5 wherein said resilient material is air-impervious and defines a plurality of vertical bores for retaining air within said bladder.
8. A construction in accordance with claim 6 wherein relatively soft foam material is inserted in said space forwardly of said second section in the area of the toe portion of the shoe.
9. A construction in accordance with claim 1 including a stiff plate member positioned in said space on top of said bladder, said plate member being disconnected with respect to said shoe and being wholly supported by said bladder.

5

10. A construction in accordance with claim 5 including a stiff plate member positioned in said space on top of said bladder, said plate member being disconnected with respect to said shoe and being wholly supported by said bladder.

11. In a shoe construction including an inner sole and an outer sole, the improvement comprising a peripheral wall holding said soles in spaced-apart relationship and defining an open space therebetween, and a bladder disposed in said space between said soles, said bladder being substantially filled with a relatively stiff resilient material, said material being divided into two sections including a first section extending beneath the heel portion of said construction to a point approximately adjacent the instep, a second section extending forwardly of said first section to a point approximately adjacent the ball of the foot and including relatively soft foam material forwardly of said second section and filling the toe portion of said space.

12. A construction in accordance with claim 1 wherein the bladder is formed in two independent portions com-

6

prising a first portion extending beneath the heel of the construction to a point approximately adjacent the instep, and a second portion extending forwardly of the first portion to a point approximately adjacent the ball of the foot, separate sections of resilient material substantially filling each of said bladder portions, and a resilient strip extending across said open space between the peripheral side walls for maintaining said bladder portions in position.

13. A construction in accordance with claim 2 wherein said bladder is formed of a heat sealable material and including a heat sealed line extending laterally across said bladder for dividing said first and second sections.

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FRANK J. COHEN, Primary Examiner.