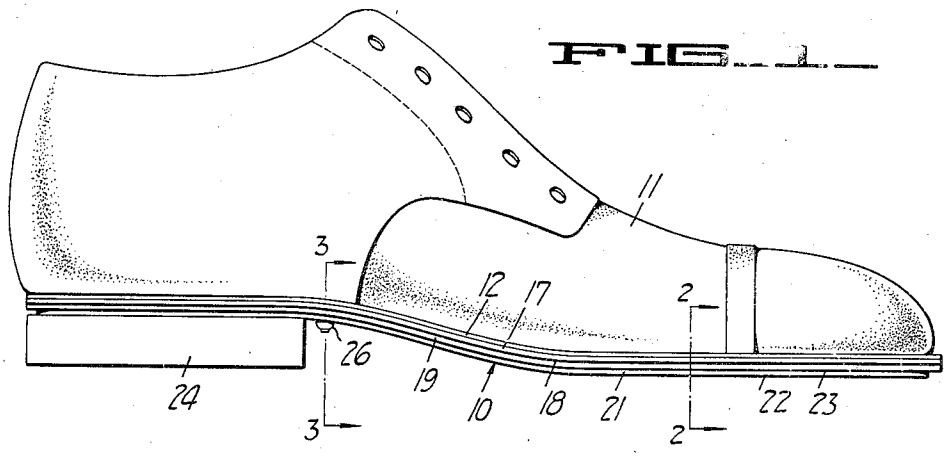
Feb. 22, 1938. M. MOHUN 2,109,180

SHOE CONSTRUCTION

Filed March 30, 1936

FIG. 1



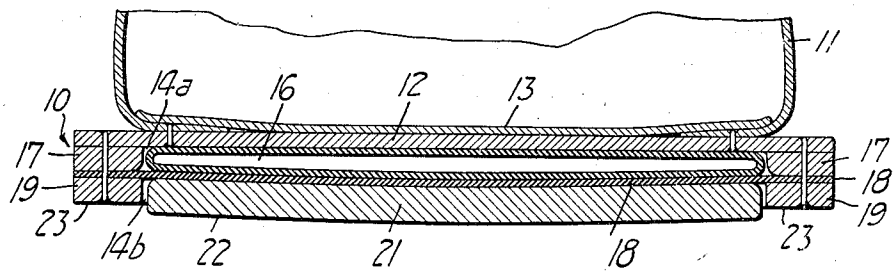


FIG. 2

FIG. 3

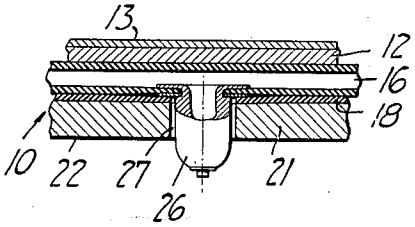
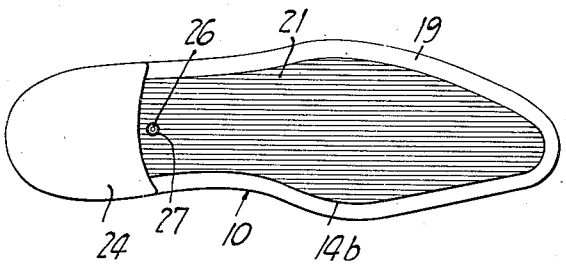


FIG. 4



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Patented Feb. 22, 1938 2,109,180

UNITED STATES PATENT OFFICE

2,109,180

SHOE CONSTRUCTION

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Application March 30, 1936, Serial No. 71,717

5 Claims. (Cl. 36—29)

This invention relates generally to the construction of shoes. In the past, authorities have recognized that shocks transmitted to the feet by shoes of standard construction, contribute to fatigue and may be detrimental to general health. Some relief is afforded by the use of rubber heels, but irrespective of the amount of cushioning which such heels may provide, shocks transmitted to the ball of the foot are not minimized to any material degree. Rubber soles are not acceptable for general wear, and are generally uncomfortable even though the rubber may be covered with a leather insole.

It is an object of the present invention to provide a shoe which will afford a high degree of cushioning action for the feet, and which at the same time will retain all of the desirable properties of standard leather soles. In place of merely using a thickness of rubber or like resilient material, my invention makes use of an inflatable pneumatic cushion, which is incorporated in the construction of the sole.

Further objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Fig. 1 is a side elevational view, illustrating a shoe incorporating the present invention.

Fig. 2 is a cross-sectional detail taken along the line 2—2 of Fig. 1, on an enlarged scale.

Fig. 3 is a cross-sectional detail taken along the line 3—3 of Fig. 1, and also on an enlarged scale.

Fig. 4 is a bottom plane view of the shoe shown in Fig. 1.

My invention makes use of a tread sole portion, which can be made of leather or like material, and which has a latitude of movement with respect to the remainder of the sole. Overlying this tread sole portion, but incorporated in the general sole construction, there is an inflatable pneumatic cushion, through which a substantial part of the foot pressure is transmitted.

The shoe illustrated in the drawing consists generally of a composite sole construction 10, secured to the uppers 11. The uppers can be made of various materials, such as leather or fabric, in accordance with the style of shoe desired. Referring to Fig. 2, the composite sole construction consists of a sheet of relatively stiff sole leather 12, to which the uppers 11 are secured. The usual insole or liner 13 can be provided, to engage the bottom of the foot.

Below the sheet of leather 12, there is a cavity 14*a*, which serves to accommodate an inflatable bladder 16. This bladder 16, or cushion, can be formed of suitable material such as resilient vulcanized rubber, and is adapted to receive air under pressure, as will be presently explained. The sides of the cavity 14*a* are defined by strips 17, which can be formed of suitable material such as sole leather, and which are secured to the marginal edges of the leather 12.

Extending across the lower face of the bladder 16, there is a flexible retaining sheet 18, formed of suitable material, such as fabric reinforced rubber. The marginal edges of sheet 18, are shown gripped between the strips 17, and similarly formed strips 19. Strips 19 serve to form a cavity 14*b*, which in turn accommodates a sheet 21 of sole leather or like relatively stiff material, and which can be termed a tread sole portion. The leather 21 substantially completely fills the cavity 14*b*, but it is of such thickness that its lower face 22 is normally spaced a substantial distance below the lower faces 23 of the leather strips 19. The upper face of leather 21 is suitably secured to the retaining sheet 18, as by means of a suitable cement, or by vulcanizing these parts together.

While it is feasible in many instances to limit the longitudinal extent of the construction described above, in that form of the invention illustrated it extends substantially the entire length of the shoe, and above the top face of the heel 24. The heel is made of leather or rubber, and its upper face is suitably secured to the adjacent lower face of the leather 21.

Adjacent the forward end face of the heel 24, a suitable fitting 26 is provided, to facilitate introducing air under pressure into the bladder 16. This fitting is provided with a suitable check valve, and in Fig. 3 is shown extending through an opening 27 in the leather 21.

The shoe described above operates as follows:—A suitable amount of air under pressure is maintained in the bladder 16, and can be replaced from time to time, by applying a small pump or like inflating means to the fitting 26. This air pressure is distributed throughout the length of the bladder, and may cause a slight downward bulging of the leather 21. When the weight of the foot is applied to the sole, the leather 21 is forced inwardly with respect to the cavity 14*b* and against the trapped air under pressure. For portions of the sole upon which considerable force is being applied, the bottom face 22 of the leather 21 is brought into a plane substantially coincident to the bottom faces 23,

whereby these relatively unyielding faces can afford proper stability. A considerable part of the weight applied to the heel is also carried by the rear end portion of the bladder, because as previously explained, the heel is attached to the leather 21.

It will be evident from the foregoing that a high degree of cushioning action is afforded by my construction, to effectively prevent transmission of jars or shocks to the feet of the wearer, and to afford utmost comfort irrespective of the hardness of the surface upon which one may be walking or standing. Except for the relatively small portion of weight carried by the marginal faces 23, one is virtually supported upon a cushion of compressed air. An additional characteristic is that surface irregularities, as for example stones or pebbles, are not transmitted to the foot, but are absorbed by the pneumatic cushion.

It will be understood that my invention is capable of various modifications. For example, if desired the instep can be provided with a supplemental reinforcement, or with special arch supporting means. Likewise the heel construction can be modified to suit various requirements.

In explanation of the appended claims, it may be stated that cavities 14*a* and 14*b* can be considered as portions of a single cavity or recess, for receiving the inflatable pneumatic cushioning and the tread sole portion.

I claim:

1. In a shoe construction, sole members secured to uppers, said sole members affording a cavity in substantially the entire shoe bottom and below the insole, said cavity having a contour similar to that of the sole members but having its sides spaced from the side edges of the sole members, a bladder of resilient vulcanized rubber disposed within said cavity, a retaining sheet of flexible material extending over the lower face of the bladder and having its marginal edge portions secured to said first named sole members, and a tread sole of substantial thickness disposed within said cavity and having its upper face secured to the bottom face of said sheet of flexible material, the lower face of said tread sole normally projecting below the lower marginal faces of said first named sole members.

2. In a shoe construction, sole members secured to uppers, said sole members affording a cavity in the shoe bottom and below the insole, the cavity extending at least under the ball of the foot and having a contour similar to that of the sole members, but having its sides spaced from the side edges of the sole members, a bladder of resilient vulcanized rubber disposed within said cavity, a tread sole of substantial thickness disposed within said cavity, and means forming a flexible connection between said tread sole and said first named sole members, the lower face of said tread sole normally projecting below the lower marginal faces of said first named sole members.

3. In a shoe construction, sole members secured to uppers, said sole members affording a cavity in the shoe bottom and below the insole, the cavity extending at least under the ball of the foot and having a contour similar to that of the sole members, but having its sides spaced from the side edges of the sole members, a bladder of resilient vulcanized rubber disposed within said cavity, a tread sole of substantial thickness disposed within said cavity, and means forming a flexible connection between said tread sole and said first named sole members, said means including flexible material attached to said tread sole and extending laterally from the side edges of the same.

4. In a shoe construction, sole members secured to uppers, said sole members affording a cavity in the shoe bottom and below the insole, said cavity having a contour similar to that of the sole members but having its sides spaced from the side edges of the sole members, a bladder of resilient vulcanized rubber disposed within said cavity, a retaining sheet of flexible material extending over the lower face of the bladder and having its marginal edge portions secured to said first named sole members, and a tread sole portion of substantial thickness disposed within said cavity and having its upper face secured to the bottom face of said sheet of flexible material, the lower face of said tread sole normally projecting below the lower marginal faces of said first named sole members.

5. In a shoe construction, sole members secured to uppers, said sole members affording a cavity in substantially the entire shoe bottom and below the insole, the cavity extending entirely beneath the foot and having a contour similar to that of the sole members but having its side spaced from the side edges of the sole members, a bladder of resilient vulcanized rubber disposed within said cavity, a tread sole of substantial thickness disposed within said cavity, means forming a flexible connection between said tread sole and said first named sole members, the lower face of said tread sole normally projecting below the lower marginal faces of said first named sole members, and a heel mounted upon one end portion of said tread sole.

MEADE MOHUN.