

G. OLSEN.
 PNEUMATIC CUSHION FOR SHOES.
 APPLICATION FILED JAN. 7, 1916.

1,240,153.

Patented Sept. 11, 1917.

FIG. I.

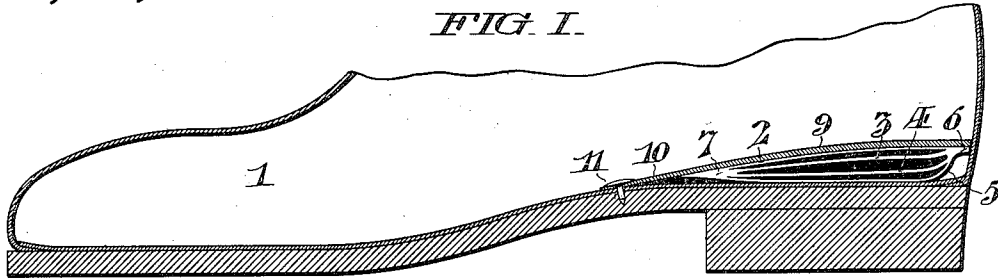


FIG. II.

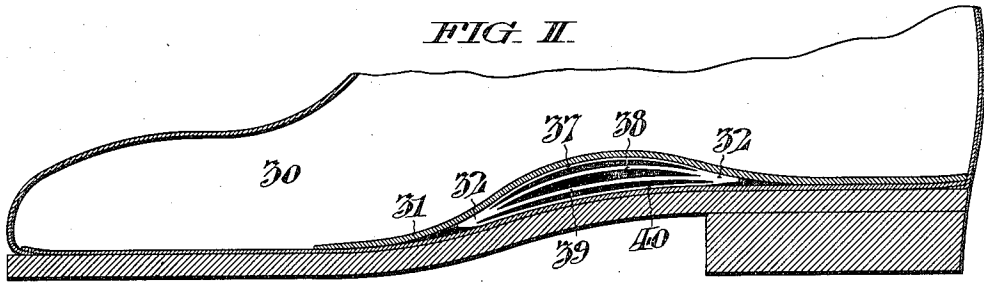


FIG. III.

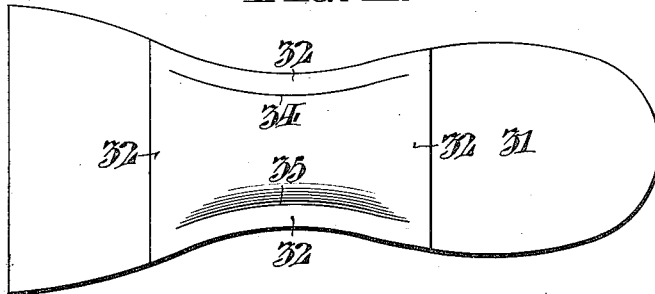


FIG. IV.

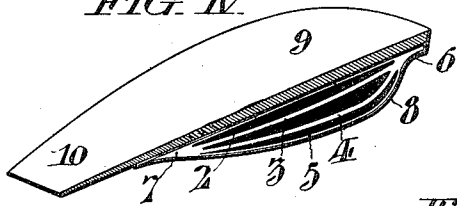


FIG. V.

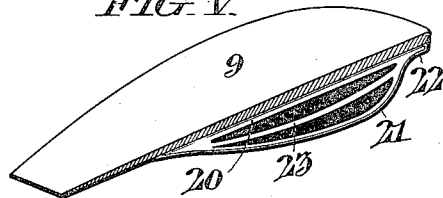
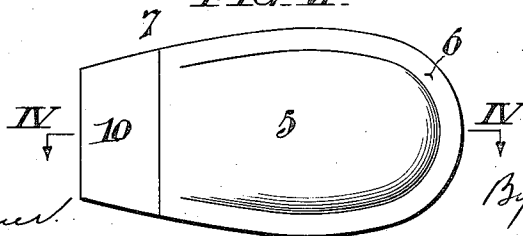


FIG. VI.



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GEORGE OLSEN, OF TRENTON, NEW JERSEY, ASSIGNOR TO KEENE SHOCK ABSORBER COMPANY, OF TRENTON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PNEUMATIC CUSHION FOR SHOES.

1,240,153.

Specification of Letters Patent. Patented Sept. 11, 1917.

Application filed January 7, 1916. Serial No. 70,709.

To all whom it may concern:

Be it known that I, GEORGE OLSEN, of Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Pneumatic Cushions for Shoes, whereof the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to provide an internal pneumatic cushion for a shoe, which can be economically manufactured, which is light in weight, and which definitely localizes the pneumatic cushioning element, so as to prevent displacement or shifting thereof under the application of unequal pressure from the foot of the wearer. The most important employment of my invention is as a heel cushion, but incidentally some of the features lend themselves to employment as an arch support and consequently the device has been illustrated in that embodiment also.

Referring to the drawings, Figure I, represents a vertical longitudinal section through the portion of a shoe containing my invention in the form of a heel cushion.

Fig. II, is a similar longitudinal section illustrating the device when employed as an arch support.

Fig. III, is an inverted plan view of the device when employed as an arch support.

Fig. IV, is a view of the heel cushion shown in Fig. I, representing the device partly in perspective and partly in longitudinal vertical section on the line IV, IV, of Fig. VI.

Fig. V, is a similar perspective and sectional view, showing a modified form of heel cushion.

Fig. VI, is an inverted plan view which applies alike to the forms shown in Figs. IV, and V.

I shall use the terms "front," and "rear," with reference to the position of the human foot, and shall also use the terms "upper" and "lower," with reference to the position of the cushion when in place within the shoe.

I will first proceed to describe the cushion in that embodiment which is adapted for heel support, within a shoe 1, the preferred form being that whose internal structure is indicated in detail in Figs. I and IV.

The device comprises a cushioning element proper, of novel construction in itself,

and also, in combination therewith, a wear-piece, the former being formed integrally of vulcanized rubber and the latter being formed preferably of leather or other relatively stiff material. The rubber element or cushioning device proper has a peculiar external configuration and internal structure, the features of which are as follows:

The uppermost wall 2, is flat, in the sense that its main body lies substantially in one general plane. Beneath this are three other walls 3, 4, and 5, respectively, all integrally connected with the upper wall and with one another, at their peripheral regions, but spaced elsewhere from one another, said walls forming distinct hermetically sealed envelops, inclosing wide and shallow chambers which are completely isolated from one another, and which are adapted to contain air or vapor, preferably under substantial pressure. The region of peripheral junction between the three lower walls and the upper wall is completely surrounded by a horizontally projecting flange or rim 6, whose upper surface is flush with the upper surface of the upper wall, said rim being of very considerable extent or depth in a horizontal direction.

The lowest wall extends downward from its region of junction with the upper wall at a relatively obtuse angle, the angle diminishing as the line of junction proceeds forward and becoming acute at the front extremity, where the line of junction with the front portion 7, of the projecting rim runs substantially straight across. The angle of downward extension of the next lower wall 4, from the upper wall at the rear region, is obtuse but somewhat less so than that of the lowermost wall 5, and the angle of extension of the next wall 3, from the uppermost wall is still less obtuse, these angles of extension also progressively lessening as the walls proceed toward the front, and becoming acute across the front extremity, where, as above stated, the line of merger into the rim 7, is practically straight across.

Thus the inclosed chambers have a maximum total depth in a vertical direction near the rear region, and taper flatwise toward the front extremity. The central chamber is preferably completely inclosed above and below by the upper and lower chambers, as indicated most clearly in Fig. IV.

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The walls of the envelopes and the rim are properly termed integral, for although they are preferably formed by building up several sheets of rubber, to which the proper configuration is given, yet the said sheets merge together along the entire peripheries, and form the rim 6, as a consequence of the vulcanizing process. The rear portion of the rim 6, is preferably of substantially vertical thickness at its edge, but the front portion 7, of said rim is preferably tapered to a vanishing edge as shown. The lower surface of the lowermost wall 5, and of the rim is preferably covered with a sheet of non-elastic fabric 8, cemented thereto or attached in the vulcanizing process, to resist wear. With the cushioning device proper, just described, I prefer to combine a wear-piece 9, which is cemented or otherwise attached to the entire upper surface of the upper wall 2, said wear piece being co-extensive with the outer edge of the rim at the rear and sides, but projecting to a substantial distance beyond the rim in a forward direction, as shown at 10. The said forwardly projecting portion 10, may be conveniently secured to the leather of the sole by means of a tack 11, having a very wide and flat head.

When applied within the shoe the operation of the structure is as follows:

The rim 6, serves to definitely localize the wide and shallow bodies of pneumatic cushioning medium, with relation to the rear and sides of the heel portion of the shoe, not only maintaining them in the region directly beneath the heel of the wearer, but preventing them from being displaced or shifted comprehensively, or as a group, under unequal pressure.

This tendency is enhanced by the configuration of the walls of the chambers themselves, which tend to maintain the greatest vertical depth of pneumatic cushioning medium toward the rear of the heel, but still at a substantial distance from the upper, and also along the median line of the foot in a fore and aft direction. The division of the pneumatic medium into a plurality of wide and shallow chambers greatly increases the uniformity and proper distribution of the cushioning function without impairing the elasticity of the group as a whole, as is the case where the subdivision of a pneumatic cushioning medium is attained by walls or ribs running in whole or in part in a substantially vertical direction. Moreover, by the use of the plurality of wide and shallow chambers characteristic of my invention, all the walls may be made relatively thin, because the inner walls 3, and 4, are supported on each side by the pneumatic medium, so that the pressure upon them is equally distributed, while the upper wall 2, and lower wall 5, are respectively reinforced by the wear-piece 9, and the ap-

plied fabric 8; hence the structure, as a whole, may be very light and yet highly resistant to wear or disruption.

Referring now to Fig. V, while the cushioning device is similar to that just described, in so far as concerns the upper wall 20, the lower wall 21, and rim 22, and the angular relation of the latter to the former, there is only one intermediate wall, viz.—23, so that there are but two inclosed wide and shallow chambers instead of three. While this structure is somewhat simpler mechanically, I consider it less advantageous than the form shown in Figs. I, and IV, because it lacks the greater advantage of the completely inclosed internal envelop above in connection with that embodiment.

Referring now to the employment of the device, shown in Figs. II, and III, as an arch support, it is arranged at the proper region within the shoe 30, and comprises a leather wear-piece 31, which extends from the extreme rear portion of the insole to a point near the ball of the foot and beneath which the cushioning element proper is attached by cement or otherwise. Said cushioning element comprises preferably four walls, 37, 38, 39, and 40, respectively, merging integrally around their edges and provided with a peripheral rim 32, of relatively deep horizontal extent. In this embodiment the position of the walls may be said to be reversed, as compared with the embodiment previously described, that is to say, the lowest wall is flat, while the upper walls extend at angles thereto, which in this instance, are acute at the front and rear extremities and obtuse at the central region. The lines of junction of the walls and the contour of the surrounding rim 32, can best be noted by reference to the inverted plan view of Fig. III, where it will be seen that the sides are inwardly curved, as indicated at 34, and 35, respectively, while at each end the line of junction is straight across and merges into the rim. The most obtuse angle of the upper walls to the lower one, is situated at the middle portion of each side and the angular relation diminishes in each direction as the walls proceed fore and aft toward the extremities.

By the arrangement above described, advantages are attained in an arch support, in many respects similar to those just described, in connection with the heel cushion, the pneumatic medium being definitely localized and retained at a distance from the sides and extremities, the region of maximum vertical depth being located at the proper point and prevented from shifting disadvantageously under pressure from above, and the subdivision of the pneumatic medium into a plurality of wide and shallow bodies being attained.

Having thus described my invention, I

state that I am aware that the use of a pneumatic cushion for shoes is old and I do not broadly claim the same. I am also aware that the use of a wear-piece in connection with a cushion is old, and I do not claim such combination broadly, but only in connection with the peculiar structural details which develop, in this combination, features substantially new as an ultimate result.

10 I claim:

1. An internal cushion for shoes comprising an external hermetically sealed wide and shallow envelop containing an elastic pneumatic medium, and a second hermetically sealed wide and shallow envelop wholly inclosed in the first envelop and in part spaced therefrom, and also containing an elastic pneumatic medium.

2. An internal cushion for shoes comprising an external hermetically sealed wide and shallow envelop containing an elastic pneumatic medium, and a second hermetically sealed elastic wide and shallow envelop wholly inclosed in the first envelop and in part spaced therefrom, and also containing an elastic pneumatic medium.

3. An internal cushion for shoes comprising an external hermetically sealed wide and shallow envelop containing a pneumatic medium; and a second hermetically sealed wide and shallow envelop wholly inclosed in the first envelop, and in part spaced therefrom, and also containing a pneumatic medium; the wall of the second envelop being secured by vulcanization to an adjoining wall of the first envelop at the peripheral region.

4. In an internal cushion for shoes, the combination of a flat wall and a plurality of walls extending from said wall, with interspaces adapted to form hermetically sealed wide, shallow chambers, the outermost of said walls extending at an obtuse angle from the flat wall throughout a portion of its periphery, said angle diminishing to an acute angle at another portion of the periphery; and a surrounding rim of relatively deep horizontal extent, the said chambers being

filled with a pneumatic medium, substantially as set forth.

5. In an internal heel cushion for shoes, the combination of a flat upper wall; and a series of three subjacent walls connected therewith, and with each other, around their peripheries, the lowermost wall extending at an obtuse angle from the uppermost wall, at the rear region of the heel and the angle diminishing as the line of junction proceeds forward, said walls being arranged at a distance from one another to form vertically a series of relatively wide and shallow hermetically sealed chambers, said chambers being filled with an elastic pneumatic medium; and a projecting rim surrounding the region of junction of said walls, said rim having substantial depth in a horizontal direction, substantially as set forth.

6. In an internal heel cushion for shoes, the combination of a flat upper wall and a series of three subjacent walls, connected therewith, and with each other, around their peripheries, the lowermost wall extending at an obtuse angle from the uppermost wall at the rear region, and the angle diminishing as the line of junction proceeds forward, said walls being arranged at a distance from one another to form a vertical series of relatively wide and shallow sealed chambers, said chambers being filled with an elastic pneumatic medium; a projecting rim surrounding the region of junction of said walls having its upper surface substantially flush with that of the uppermost wall, said rim having substantial depth in a horizontal direction; and a wear-piece of relatively rigid material conforming in contour with the rear and side edges of said rim, but extended forwardly beyond the front extremities of the rim, substantially as set forth.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this fifth day of January, 1916.

GEORGE OLSEN.

Witnesses:

JAMES H. BELL,
E. L. FULLERTON.