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M. JACOBS

2,303,744

FOOTGEAR

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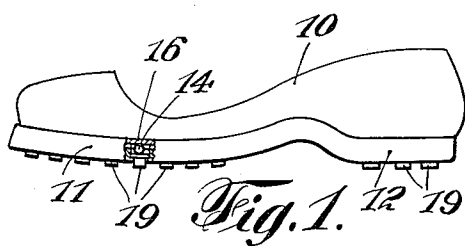


Fig. 1.

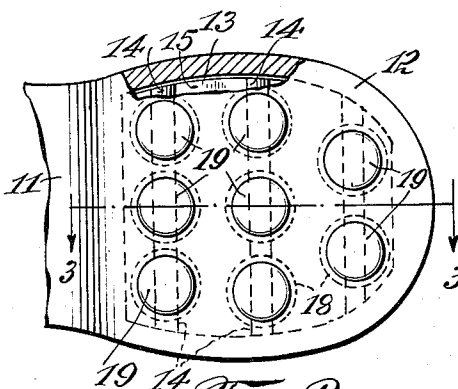


Fig. 2.

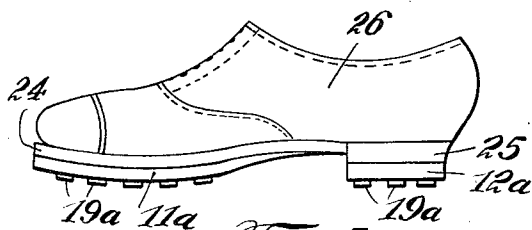


Fig. 5.

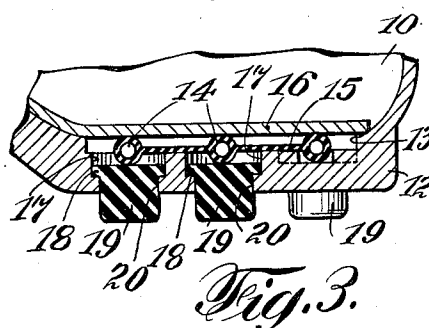


Fig. 3.

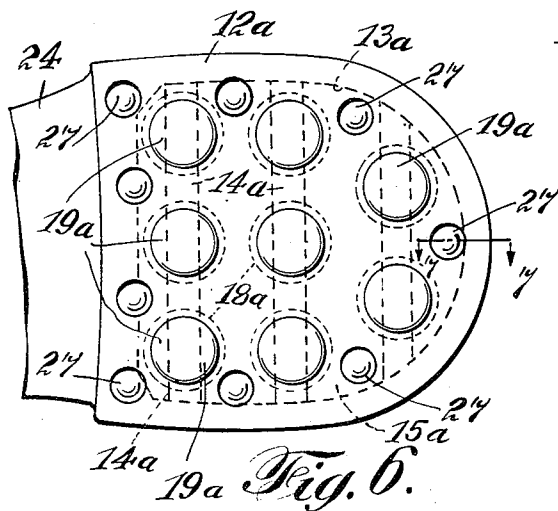


Fig. 6.

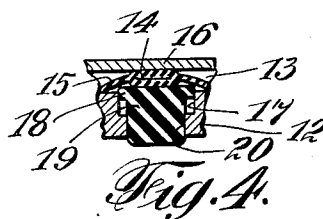


Fig. 4.

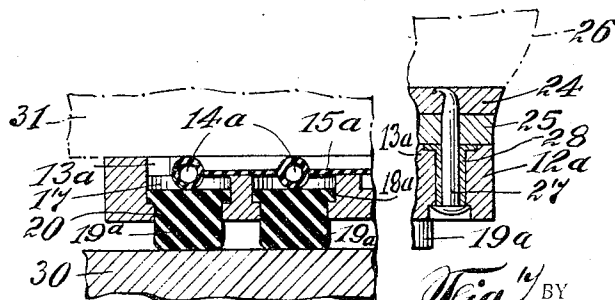


Fig. 9.

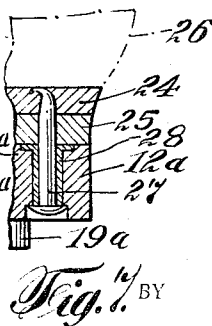


Fig. 7.

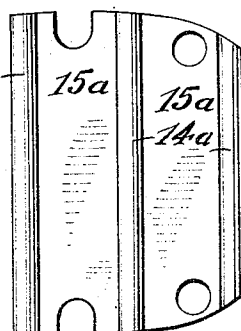


Fig. 8. INVENTOR.

Maurice Jacobs
C. P. Joepel
his ATTORNEY

UNITED STATES PATENT OFFICE

2,303,744

FOOTGEAR

Maurice Jacobs, Jersey City, N. J.

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6 Claims. (Cl. 36—29)

This invention relates to new and useful improvements in footgear and more particularly to the sole and heel structure thereof, having for its object to provide a footgear which is highly resilient and shock absorbing.

It is well known that the rate of foot injuries to parachutists is relatively high due to the fact that the shock resulting from landing after jumping from a plane or dirigible, or in training, is quite severe, and, in order to prevent or reduce such injuries, various types of footgear have been developed to take up the shock occasioned by the impact. However, due to the overall weight limitations required for footgear, especially for use in connection with parachute troops, the footgear heretofore developed has not proven successful in materially reducing the rate of injuries. One of the main reasons for the failure of such footgear has been that the cushioning or shock-absorbing properties of the footgear were dependent entirely upon the resiliency of the treading members or contacting surfaces of the footgear.

It is therefore one of the primary objects of the invention to overcome the deficiencies in footgear heretofore employed and to provide a footgear in which the resiliency of the treading members or contacting surfaces of the same is only an incidental factor in the shock-absorbing action or cushioning properties of the footgear.

Another object of the invention is to provide footgear of this character in which the resilient contacting surface thereof is composed of a plurality of individually movable rubber cleats projecting outwardly from the under side of the footgear and cooperating at their inner ends with members which absorb the shock by being flexed or collapsed by the inward movement of the rubber cleats.

The invention consists in a cushioning assembly embodying resilient means forming the contacting surface of the assembly, and adapted to receive the impact, said resilient means being movable as a result of impact and cooperating with collapsible means within the assembly to take up the shock created by the impact.

The invention consists also in any other novel features hereinafter set forth in detail in the following description, illustrated by way of examples in the accompanying drawing and more particularly pointed out in the appended claims.

Referring to the drawing in which numerals of like character designate similar parts throughout the several views,

Fig. 1 is a view in side elevation of a footgear embodying the present invention;

Fig. 2 is a bottom view of the heel portion of the footgear illustrated in Fig. 1, with certain parts broken away and in section;

Fig. 3 is a sectional view taken on lines 3—3 of Fig. 2;

Fig. 4 is a detail view of one of the resilient members and its associated collapsible tube shown in Fig. 3 but showing said parts when subjected to an impact;

Fig. 5 is a view in side elevation of a shoe including an auxiliary sole and heel, each embodying the cushioning assembly of the present invention;

Fig. 6 is a bottom view of the heel portion of the shoe illustrated in Fig. 5;

Fig. 7 is a fragmentary sectional view taken on lines 7—7 of Fig. 6;

Fig. 8 is a detail plan view of the collapsible means, and

Fig. 9 is a sectional detail of a portion of the cushioning assembly in accordance with the invention forming a resilient support or bearing.

In the drawing, referring more particularly to Fig. 1, the footgear therein illustrated consists of a slipper or overshoe 10 adapted to be worn over an ordinary boot or shoe and embodies a separate cushioning assembly in the sole portion 11 and heel portion 12 thereof. For this purpose, the sole and heel portions are each provided with a cavity 13 to accommodate the collapsible members 14 of the cushioning assembly, which members are in the form of cylinders or tubes of rubber or other suitable material arranged in spaced relation to one another and joined together by webs 15 to form a unitary structure. The upper portion of each cavity 13 is closed by the usual inner-sole or innerlining 16 which extends across the top face of the sole and heel portions of the footgear 10.

As clearly shown in Fig. 3, the bottom of each cavity 13 is provided with a plurality of recesses 17 arranged in rows in alignment with the collapsible members 14 to accommodate the enlarged heads 18 of bearing members 19 whose shanks project outwardly through reduced openings 20 in the bottom of the sole and heel portions 11 and 12, respectively, and form the actual ground-engaging surface of the footgear. The bearing members 19 are composed of rubber or other suitable resilient material and are movable axially in their respective openings 20 to cooperate with the collapsible members 14.

It will thus be seen from the foregoing that the footgear is rendered highly resilient and shock-absorbing in that the resilient bearing

members 19 of each cushioning assembly receive the impact and the resulting shock is absorbed through the collapsible members 14 which are flexed by the bearing members moving inwardly as a result of the impact. By forming the collapsible members 14 of suitable materials having different degrees of resiliency or flexibility, or closing the ends of said members and providing check valves therein, the rate of collapse of said members can be varied to suit different conditions.

In other words, for footgear employed for ordinary purposes, the collapsible members 14 may be composed of relatively soft rubber so that the members 14 will collapse when the bearing members 19 are subjected to a relatively small impact.

On the other hand, where the footgear is to be used by soldiers, more particularly parachute troops, the collapsible members 14 may be composed of relatively hard rubber or other material possessing relatively low resiliency or any known means may be provided for reducing the rate of collapse of the collapsible members to take care of the heavier burden.

It will also be observed that by reason of the fact that the bearing members 19 are individually movable axially in their respective openings 20, they will adapt themselves to any unevenness or irregularities on the surface with which the footgear comes in contact so that there is always a balanced footing regardless of any projections or depressions in the walking or landing surface. In other words, on a flat surface, the bearing members 19 coming in contact therewith will be subjected to the same impact and each will be moved inwardly an equal extent so that all will bear with the same amount of pressure against the associated collapsible members 14. For an uneven surface, such for example as one having bulges or depressions therein, the bearing members of that portion or of those portions of the footgear first coming in contact with the highest point or points of said uneven surface will be moved inwardly a greater extent than the remaining bearing members so that the former will exert a greater pressure and flex their associated collapsible members a greater degree than the latter bearing members.

Instead of being embodied in the footgear as above described, cushioning assemblies may be formed as an auxiliary sole and heel 11a and 12a, respectively, as shown in Figs. 5 to 8, adapted to be secured to the sole 24 and heel 25, respectively, of an ordinary shoe 26, and for this purpose, the cushioning assemblies are provided with holes fitted with bushings 28 through which the nails 27 employed to secure the assemblies to the shoe are adapted to extend, one end of the bushings forming a limiting shoulder for the head of the nails and the other end being flanged and forming an abutment for engagement with the under side of the shoe 26. Thus, when the cushioning assemblies are nailed in place, the bushings 28 will prevent compression of the material in the auxiliary sole and heel into the cavities 13a thereof, which otherwise would flex or partly collapse the collapsible members 14 therein.

While I have shown and described the invention in connection with footgear, obviously the same may be applied to other uses such for example as a resilient support illustrated as an example in Fig. 9, in which the cushioning assembly is interposed between a base member 30

and a member 31 being supported. In this installation any vibrations occurring in either the base member 30 or the member 31 being supported will be taken up or absorbed by the tubular members 14a of the cushioning assembly by virtue of the fact that such vibrations will be translated into axial movement of the bearing members 19a which axial movement will act on the collapsible members 14a in the manner previously described.

From the foregoing it is believed that the construction and advantages of my invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of the invention as set out in the following claims.

What I claim is:

1. The combination with a member presenting a plane surface adapted to be subjected to an impact; of longitudinally extending tubular collapsible means in said member parallel to the plane surface of the latter for absorbing the shock created by an impact, and resilient means slidably mounted in said member and projecting outwardly therefrom to form an impact receiving surface, said resilient means being movable inwardly in said member upon receiving an impact and cooperating with said collapsible means to collapse the latter, whereby the shock created by the impact is taken up by said collapsible means.

2. A footgear comprising in combination, sole and heel portions, each provided with a cavity conforming substantially to the contour thereof, a plurality of tubular collapsible members in each cavity, said sole and heel portions having openings extending from the bottom of the respective cavity to the undersurfaces of said portions and arranged in rows in alignment with said tubular collapsible members, and a plurality of resilient members slidably mounted in said openings and normally projecting outwardly a predetermined distance from the undersurface of said sole and heel portions to form impact receiving faces, said resilient members cooperating with said tubular collapsible members, whereby when said resilient members are subjected to impact and are moved inwardly, they will collapse said tubular collapsible members to absorb the shock created by the impact.

3. A cushioning assembly for footgear or the like comprising a body member on the underside of the footgear provided with a recessed portion along its inner surface forming a cavity, said body member being provided with a plurality of openings extending from the outer surface thereof to the bottom of said cavity, a plurality of resilient tread members extending through said openings and projecting outwardly from the underside of said body member, said tread members being movable axially in said openings, and a plurality of tubular collapsible members in said cavity in alignment with said tread members and adapted to be collapsed by said tread members upon inward movement of the latter occasioned by impact, to absorb the shock created by the impact against said tread members.

4. A cushioning assembly comprising in combination, a body member provided with a cavity, a plurality of tubular collapsible members in said cavity arranged in spaced relation to one another, a webbing of flexible material connecting said members together to form a unitary struc-

ture conforming substantially to the shape of the cavity, said body member being provided with a plurality of openings extending from the outer surface thereof to said cavity, the inner ends of said openings terminating in enlarged recesses 5 countersunk in one side of said cavity, a plurality of resilient bearing members having enlarged heads disposed in said enlarged recesses and having shanks extending through said openings and projecting outwardly a predetermined 10 distance beyond the outer surface of said body member to form impact receiving surfaces, said bearing members being individually movable in their respective openings and the enlarged heads thereof cooperating with said collapsible mem- 15 bers to collapse the latter upon inward movement of said bearing members.

5. A cushioning assembly for footgear and the like, comprising an auxiliary sole member adapted to be secured to the sole of the footgear and provided with a cavity recessed inwardly from 20 the top surface thereof, said cavity conforming substantially to the contour of said auxiliary sole member, a plurality of tubular collapsible rubber members in said cavity arranged in spaced rela- 25 tion to one another, a flat webbing of rubber joining said collapsible rubber members together, said auxiliary sole member being provided with a series of openings extending from the bottom of said cavity to the undersurface of said sole mem- 30 ber, said openings being arranged in rows in alignment with said collapsible rubber members,

and solid rubber members extending upwardly through said openings and projecting a predetermined distance beyond the undersurface of said auxiliary sole member to form impact receiving surfaces, said solid rubber members being movable axially in said openings and being moved inwardly upon receiving an impact to cooperate with said collapsible members to collapse the latter, whereby the shock is absorbed by said 10 collapsible members.

6. A heel structure for footgear comprising a body member adapted to be secured to the heel base of the footgear, said body member being provided with a cavity recessed inwardly from the 15 top surface thereof and with a series of openings extending from said cavity to the undersurface of said body member, collapsible tubular members in said cavity arranged in spaced relation to one another, a flat webbing of rubber 20 joining said tubular members together, said series of openings being arranged in rows in alignment with said tubular members, and solid rubber members slidably mounted in said openings and projecting a predetermined distance beyond 25 the undersurface of said body member to form impact receiving faces, said solid rubber members being movable inwardly upon receiving an impact and cooperating at their inner ends with said collapsible members, whereby the shock is 30 absorbed by said latter members.

MAURICE JACOBS.