Oct. 5, 1926. 1,602,324

T. W. BIGONEY

SHOE HEEL

Filed May 13, 1924

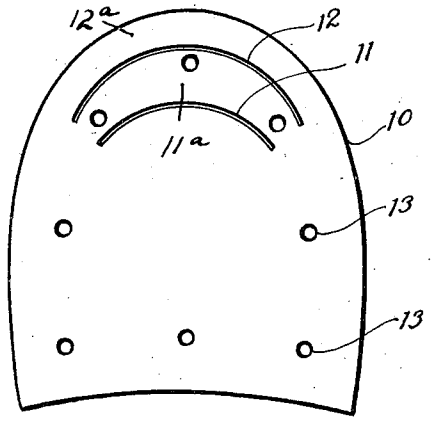


FIG. 1

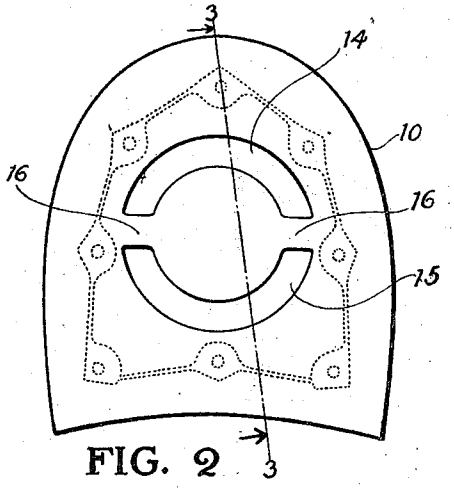


FIG. 2

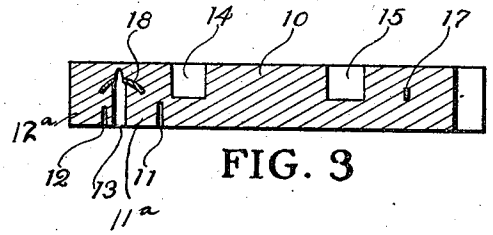


FIG. 3

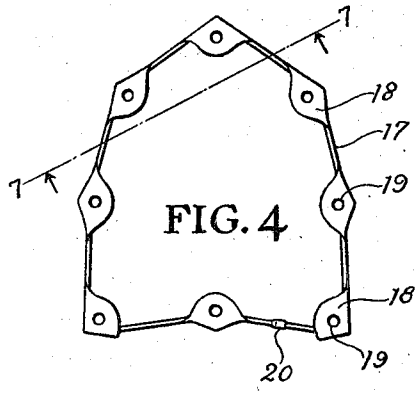


FIG. 4



FIG. 6

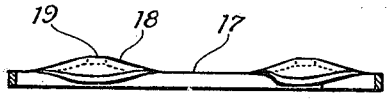


FIG. 7

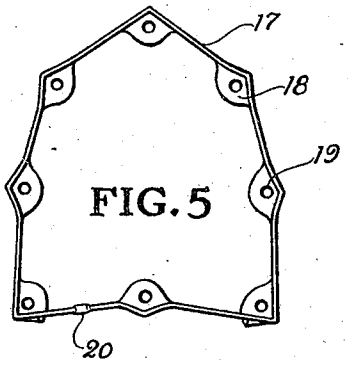


FIG. 5

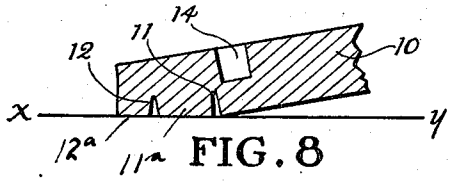


FIG. 8

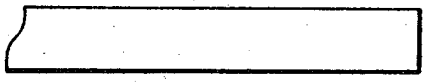


FIG. 9

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UNITED STATES PATENT OFFICE.

THOMAS W. BIGONEY, OF PHILADELPHIA, PENNSYLVANIA.

SHOE HEEL.

Application filed May 13, 1924. Serial No. 712,948.

This invention relates to improvements in that class of resilient heel lifts, commonly known as rubber heels. One of its objects is to provide improved means for increasing the cushioning or shock-absorbing effect, particularly at the time of initial impact when normally only the rear edge of the heel is in contact with the ground.

A further object of the invention is the provision of a resilient heel lift which will decrease the liability of slipping at the time of such initial contact.

A further object is to decrease the cost of manufacturing the lifts by the introduction of a construction which will considerably expedite the molding process.

With the ordinary rubber heel the cushioning effect upon the impact of its rear edge with the ground, is directly dependent upon the resistance to distortion of the entire body of the heel. With the present invention I make this cushioning effect dependent almost entirely upon the distortion of a section or of sections of the heel and independent of the cohesive resistance of the entire mass. The cushioning effect, particularly at the time of initial impact, is further augmented by the bodily bending of the rear sections.

The preferred manner of accomplishing this result is by forming one or more relatively deep and narrow grooves in the tread face of the heel and one or more approximately opposed deep and wide grooves in the rand face adjacent to and conforming in general contour to the curved rear edge of the heel. One or more curved bendable sections are thus produced which are free to bend transversely of their length and capable of independent distortion under pressure as the heel strikes the ground in the act of walking. Since the distorting pressure operates primarily only against the cohesion of the particles composing the relatively small and isolated rear sections, a greater downward movement of the heel is allowed than is the case with the ordinary rubber heel. Thus a relatively greater cushioning effect results with a considerably distended initial contact area. Due to the tendency of the distended particles in contact with the ground to contract, a gripping action ensues which militates against slipping. Obviously the edges of the grooves in the tread face when in forced contact with the ground considerably augment this anti-slipping effect so that the danger of slipping, even on wet pavements, is reduced to a minimum.

In the method of heel construction commonly employed, the heels are molded in multiple cavity molds and each cavity carries a number of pins for forming the so-called nail holes in the finished heel. Washers are manually placed upon these pins prior to the introduction of the composition plugs into the cavities so that the vulcanized product has these washers embedded therein; the function of these washers being to form seats for the heads of the nails used to attach the heel to the shoe and prevent the nails from pulling through the rubber composition. Inasmuch as each heel is generally formed with from six to eight nail holes and it is necessary to manually place as many washers on the mold pins, it will be apparent that this operation slows up manufacturing to a considerable extent and is a material factor in the cost of producing the heels. In the present invention the washer placing operation is greatly expedited and the cost of manufacture consequently reduced. To accomplish this result, I form the washers or equivalents of the washers in connected strips shaped substantially in accordance with the arrangement of the mold pins and am thus able to place a complete washer unit upon the pins by one operation.

By making the washer units of substantially conical shape apertured at their apices, their exact alignment with the pins is rendered unnecessary since they are forced into correct position by the plastic material entering the mold and orientating the washers by the engagment of their conical surfaces with the ends of the pins.

In the accompanying drawings,

Fig. 1 is a bottom plan view of a heel lift constructed in accordance with my invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a view in transverse section on the line 3—3 of Fig. 2;

Fig. 4 is a top plan view of the washer band unit;

Fig. 5 is a bottom plan view thereof;

Fig. 6 is a side view thereof;

Fig. 7 is an enlarged fragmentary detailed view thereof, representing a section on line 7—7 of Fig. 4;

Fig. 8 is a fragmentary sectional view,

showing the action resulting from the groove construction when the heel is stepped on;

Fig. 9 is a side view of a modified form of heel lift.

A heel lift 10 (Figs. 1, 2 and 3) formed with the customary nail holes 13 is grooved at 12 in its tread surface adjacent its curved rear edge. The groove 12 follows the curvature of the rear edge of the heel and may coincide with or be adjacent to the line of nail holes 13. It is of sufficient depth (Fig. 3) to define with the rear edge of the lift, what I term for convenience, an arcuate flap section 12^a connected at its ends and at its top with the body of the heel lift. A somewhat wider flap section 11^a may be formed by providing a deeper and substantially similarly curved groove 11 in the tread surface of the heel. This may be within the line of nail holes 13.

In Fig. 3 the purpose of these grooves and the function of the flap sections 12^a and 11^a defined thereby is apparent. As the rear edge of the heel strikes the ground, sections 12^a and 11^a are successively bent and bulged to cushion the shock of impact. The tread faces of these sections being pressed against the ground before the remainder of the heel comes into contact therewith form a relatively wide, grooved, anti-slip ground engaging surface. Due to the narrow width of the flap sections and their comparative freedom of movement they bend and also are compressed quite readily, whereas a solid heel would offer strenuous resistance to compression or distortion and no appreciable ground engaging surface upon impact.

The upper or rand face of the heel is semi-circularly grooved at 14, 15, leaving a central. circular section 16^a connected to the body of the heel by webs 16, 16, defining the ends of the oppositely disposed grooves. These grooves form in effect a relatively deep circular groove interrupted by the diametrically opposed webs 16, extending transversely of the heel. The grooves extend through more than half the thickness of the heel and terminate in a plane just above the top of the groove 11 (Fig. 8). Thus the approximate opposition of the grooves 11 and 14 practically separates the rear portion of the heel from the main body and allows this rear portion to be distorted under operative conditions to an extent limited by the cohesive resistance of its relatively small mass only. The grooves 14, 15 serve to increase the cushioning effect of the heel by permitting distortion strains to be taken care of by relatively small heel sections instead of being transmtted through a large and relatively non-distortable body. The arrangement of the grooves is such as to leave no solid section of the heel incapable of convenient distortion inwardly or outwardly when normal or abnormal strains occur.

I find that the grooves 11, 12 and 14 serve to distribute the wear of the heel well forward. This is due to some extent to the fact that the rear end of the heel bends freely at impact and presents a wide impact portion as opposed to the usual sharp relatively unyielding rear edge which serves as a fulcrum at each step and grinds off very rapidly.

The two features of heel construction thus far discussed, namely, the sets of grooves 11, 12 and 14, 15 in opposite faces of the heel are not necessarily interdependent and both may act at different times to provide an efficient cushioning means. The same thing is true of the means which I am about to describe for reenforcing the nail holes, since it is adaptable to various types of heels other than the one herein shown.

The nail holes 13 are formed by pins in the mold wherein the plastic material of the heel is vulcanized. The molds are not shown but the general shape of the shouldered pins may be readily understood by noting the shape of the nail hole 13 in Fig. 3. It has heretofore been customary to place a washer on the shoulder of each of these pins, so that the completed heel will have embedded therein washers surrounding each nail hole near its top. By my invention these washers are dispensed with and the time usually spent in manually positioning them prior to molding is greatly economized. I use a plurality of nail hole reenforcing members 18, which function in substantially the same manner as the washers ordinarily employed. The members 18, which may be termed washer members for descriptive convenience, are of generally conical shape and apically apertured to accommodate the ends of the mold pins. They are integral with a connecting band or strip 17, of thin bendable metal of the same general shape in outline as the series of pins in the mold. The band 17 is disposed edgewise to the path of flow of plastic material in the mold so as not to interrupt such flow and the members 18 by virtue of their conical shape offer no substantial resistance to the material as it is forced into the mold. It is to be noted in this connection, that the transverse dimension of the members 18 may be considerably less than the diameter of the individual washers commonly employed because of the additional holding power of the connecting band 17 when the heel is in use.

This washer band unit may be made in any suitable manner, preferably by punching and bending dies operating upon strip stock of as thin gauge as is consistent with the desired rigidity. The ends of the band are joined at 20 by soldering, swaging, spot-welding, or any other suitable method.

In use, the characteristic shape of the washer band unit allows it readily to be dropped in place over the ends of the pins of the mold without precise orientation. As a continuation of the same motion one or more of the pin ends may be forced through the apertures 19. Whether the other pin ends enter their respective apertures is immaterial since they will be forced into place by the pressure of the plastic material entering the mold, due to the engagement of the pin ends with the conical inner surface of the washer members and due also to the flexibility of the connecting band 17.

I am well aware that the use of metallic bands, plates, strips and other devices having nail receiving holes therein has been previously suggested, but these various devices apparently are designed to serve purposes which are outside the scope of my invention. In addition to being entirely unsuitable for my purpose their use would involve manufacturing complications which would increase instead of decrease the cost of manufacture. The washer band which I use is intended for the sole purpose of expediting and cheapening manufacture and any other value, such as structural strength, which it may possibly lend to the heel, is merely an incident of its use.

The type of heel illustrated in Fig. 9 has a rearwardly projecting flange the same as the heel disclosed in my prior Patent No. 1,482,456 dated February 5, 1924. The grooved heel construction herein described as well as the washer unit may be conveniently utilized with this type of heel.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A rubber heel lift having a flat tread surface presenting a pair of approximately parallel narrow, short curved grooves disposed adjacent to and following generally the curvature of the rear end of the heel and the sections adjacent to said groove having their tread surfaces at right angles to the sides of the groove to form a plurality of right angle edges.

2. A rubber heel lift having a narrow, short, curved groove in its flat tread surface adjacent to and following the general contour of the rear edge only of the lift and defining with said edge a bendable narrow curved section at the rear end of the lift, and having a pair of opposed semi-circular grooves in its rand face, providing a central circular section connected with the body of the lift by diametrically opposed webs.

3. A rubber heel lift having a flat tread surface provided with a pair of substantially similarly short curved grooves therein conforming generally to the curvature of the rear edge only of the lift, said lift having a series of nail holes spaced from the edges thereof, certain of which are arranged between the grooves.

4. A rubber heel lift having a flat tread surface provided with a pair of substantially similarly short curved grooves therein conforming generally to the curvature of the rear edge only of the lift, said lift having a series of nail holes spaced from the edges thereof, certain of which are arranged between the grooves, and a connected series of washer members embedded in the heel lift and encircling the nail holes to form nail head seats.

5. A washer unit adapted to be molded in a rubber heel lift and encircling the nail holes therein, including a thin band of bendable metal disposed edgewise and having its ends connected and a plurality of spaced washer members integral of the band.

6. A washer unit adapted to be molded in a rubber heel lift, including a thin band of bendable metal disposed edgewise and having its ends connected and a plurality of substantially conically shaped apically apertured washer members integral with and extending inwardly from one edge of the band.

7. A rubber heel lift having a series of nail holes spaced from the edge thereof, a flat metal band embedded within the body of the heel and edgewise in respect to the tread and rand surfaces, and a plurality of flanges formed integral with said band and extending at an angle thereto, each of said flanges being of generally conical shape with apical openings registering with said nail holes.

Signed at Philadelphia in the county of Philadelphia and State of Pennsylvania this tenth day of May A. D. 1924.

THOMAS W. BIGONEY.