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C. SPEAR

AIR CUSHION HEEL

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INVENTOR.

Cameron Spear

BY

Brinell, Wright, Hall & Beam

ATTORNEYS.
This invention relates to a shoe heel containing a cavity adapted to be filled with air to provide a resilient heel.

The general object of my invention is a heel which overcomes the defects in the previously known heels. The cavity in the heel which I have invented, has a vent which is open the majority, if not all, of the time so that the cavity is always filled with air with the result that there is always an air cushion in the heel. This obviates the necessity of pumping air into the cavity within the heel. The heel which I have invented is so made that if water happens to get into the cavity it will drain off and no water may remain in the heel. In addition, I protect the shoe above the cavity from dampness and therefore the shoe to which the heel is applied does not become damp. This is an important advance over the prior art, because one of the functions of the shoe is to keep dry the foot of the wearer and the heel must not detract from the advantages obtained by the wearing of the shoe. To give the heel an effective air cushion the air cavity should be relatively large and it is therefore desirable that the shoe be supported where it is over the cavity and the heel itself be strengthened. In the heel of my invention I make provision for this.

One of the more particular objects of the invention is a heel in which the vent is restricted so that the air can escape only very slowly from the cavity within the heel.

Another object of the invention is such a heel in which a netting in the vent prevents the entrance of solid foreign matter into the vent and into the cavity within the heel.

A further object of the invention is a heel having a cavity and a vent so formed as to permit water to be completely drained from the cavity.

Another object of the invention is such a heel in which there is a bridge across the cavity to strengthen the heel and support the shoe to which the heel is applied.

Other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

The drawings illustrate both in plan and section views several forms of the invention and embody the broad principles thereof.

In the drawings,

Fig. 1 is a plan view of a heel having a large cavity, and a vent so formed as to drain the cavity.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a plan view of the heel provided with an upper layer of water-proof material to prevent dampness within the cavity of the heel from penetrating to the shoe.

Fig. 4 is a section of a heel with a small cavity showing the means for draining the cavity and the bridge for strengthening the heel and supporting the shoe.

Fig. 5 is a section on line 5—5 of Fig. 4 indicating in dotted lines the non-elastic heel to which the elastic rubber heel is usually applied.

As illustrated on the drawings, the heel, which is made of any suitable material, preferably and usually rubber, has a bottom surface 1 and side walls 2. Holes 3 which usually extend only partially through the side walls 2 enable the heel to be fastened in place on the shoe or leather heel of the shoe, which is indicated in dotted lines as 4 on Fig. 5, and washers 5 surrounding the holes 3 assist in retaining in the holes the nails or screws by means of which the heels are attached to the shoes. All of this is the usual construction and is well understood by those skilled in the art.

The heel of the present invention is formed with a cavity 6 which may be rather large as is shown in Fig. 1 or smaller as is shown in Fig. 4. The cavity is intended to be an air reservoir to retain air and the air retained therein acts as an air cushion which adds to the resiliency of the heel. It is desired that the air be permitted to enter and escape from the cavity within the heel but the escape of the air should be slow as this adds to the shock absorbing properties of the heel. For this purpose the vent 7 of the heel is small in size so as to restrict the passage of the air into and from the cavity.

To further restrict the effective area of the opening through which the air can pass into and escape from the cavity, as well as to prevent the entrance of solid matter, which might clog up the vent, such as small sticks and particles of dirt, into the cavity and into the vent, a netting or grill 8 is preferably placed across the vent. The netting or grill is preferably placed near the exterior end of the vent so that if the netting or vent should happen to become clogged by foreign matter, the foreign matter is caught near the exterior of.
the heel where it may easily be removed. In this way the interior of the vent is prevented from ever becoming clogged. However, the netting is preferably not at the extreme exterior of the vent, but is in a little way from the outermost end of the vent so that it is somewhat protected. The vent is preferably a hollow rivet of small cross section and of a length to extend from the exterior of the heel into the cavity and both the vent 7 and the netting or grill 8 are preferably of rust proof material and may, if desired, be made integral with each other. If the vent and grill are made integral, as shown at 7, it will probably be more convenient to have the grill at the outermost end of the vent and not indented.

Although the vent has been described as a hollow rivet of non-flexible material, it may be merely an opening formed in the flexible material from which the heel is made, in which case the netting would be molded into the heel in the same way that the washers 5 are molded into the heel. In the case where the vent is merely an opening formed in the flexible material of the heel, the vent may close at each step of the person wearing the shoe to which the heel is attached, when the weight of the body is supported wholly by the heel. When the normal person walks, the weight of the body is supported on the heel for only a fraction of the period in which the foot is in contact with the ground. When a step is made the heel first comes into contact with the ground and then the ball of the foot comes into contact with the ground, but as the body moves forward to make the next step, the weight is taken off of the heel and supported almost entirely on the ball of the foot and it will thus be seen that the heel supports the weight of the body only for a very short time. Where a person is walking on one of the heels of the present invention, the air is compressed in the cavity when the heel first strikes the ground and this gives a cushion effect. As the vent is restricted, very little of the air can escape from the cavity, but some air does escape as the weight of the body is thrown on the heel and therefore there is a graduated cushioning effect. Where the vent is permanently open, as in the case where a hollow rivet forms the vent, all of the air may escape from the cavity if sufficient weight is placed on the heel for a sufficient period of time but where the vent is merely an opening formed in the flexible material, the vent may be made so small that when the weight of the body is wholly supported on the heel, the deformation of the material of the heel closes the vent, but this does not happen until after the shock of the heel coming into contact with the ground has been absorbed by the heel and therefore, in all cases, there is a graduated cushioning effect. In the case where the vent entirely closes there is an air cushion within the heel at all times but where the vent does not entirely close the air may gradually pass out of the cavity if a person remains standing on the heel. In all cases however, the air which is forced out of the cavity when the heel is in contact with the ground, is drawn into the cavity when the heel is not in contact with the ground, due to the fact that the heel returns to its uncompressed shape and, as the heel is normally out of contact with the ground for a much longer period than it is in contact with the ground, there is plenty of time for the cavity to become filled with air between each step.

In order to drain the cavity within the heel and prevent water from remaining therein, the vent 7 joins the cavity at the bottom thereof so that the cavity is thoroughly drained. The floor 9 of the heel is preferably sloped toward the vent 7 so that any water which happens to get into the cavity will run toward the vent and then run out through the vent. In order to facilitate the drainage of the heel, a gutter 10 is formed in the floor of the heel and the floor is preferably sloped so that the water will not only drain toward the vent, but will also drain toward the gutter. Although the gutter is shown in Fig. 5 as being around the periphery of the floor, it may be placed down the center of the floor as indicated in Fig. 1. The peripheral drain may conveniently be used where the side walls 2 of the heel are thick enough, as is shown in Fig. 2, to entirely enclose the washers 3 and the center drain is preferably used where the side walls 2 are thin and projections, as are shown in Fig. 1, protrude from the side walls to enclose the washers. The vent 7 may be placed to one side of the curve 11 of the heel. Where a person is walking on one of the heels of the present invention, the air is compressed in the cavity when the heel first strikes the ground and this gives a cushion effect. As the vent is restricted, very little of the air can escape from the cavity, but some air does escape as the weight of the body is thrown on the heel and therefore there is a graduated cushioning effect. Where the vent is permanently open, as in the case where a hollow rivet forms the vent, all of the air may escape from the cavity if sufficient weight is placed on the heel for a sufficient period of time but where the vent is merely an opening formed in the flexible material, the vent may be made so small that when the weight of the body is wholly supported on the heel, the deformation of the material of the heel closes the vent, but this does not happen until after the shock of the heel coming into contact with the ground has been absorbed by the heel and therefore, in all cases, there is a graduated cushioning effect. In the case where the vent entirely closes there is an air cushion within the heel at all times but where the vent does not entirely close the air may gradually pass out of the cavity if a person remains standing on the heel. In all cases however, the air which is forced out of the cavity when the heel is in contact with the ground, is drawn into the cavity when the heel is not in contact with the ground, due to the fact that the heel returns to its uncompressed shape and, as the heel is normally out of contact with the ground for a much longer period than it is in contact with the ground, there is plenty of time for the cavity to become filled with air between each step.

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of the cavity and with this position of the vent, there is always complete natural drainage of the cavity. Furthermore, when a person is walking and the weight of the body is on the ball of the foot, the heel is sloping in such a manner or position that the water naturally drains forward and the water would thus run into the well and out of the heel. If a vent 7' be placed in the back of the heel the water would run out as the foot is being brought forward to take the next step. In all cases when the weight of the body is placed on the heel and the vent or vents are at the bottom of the cavity the air, in escaping from the cavity, first drives the water out of the heel and forces any material which has collected on the netting or grill 8, to the exterior of the heel.

To prevent dampness from rising from the cavity into the shoe, a continuous layer of water-proof material 13 may be interposed between the top of the heel and the bottom of the shoe or leather heel 4 thereof, and this continuous layer of water-proof material, if it is used, forms the top of the cavity. The waterproof material 13 may be, and preferably is, a relatively thin sheet of rubber, although any suitable material, such as waterproof cloth, may be used.

To strengthen the heel and to support the shoe, a bridge 14 may be and preferably is placed across the cavity so that its upper face contacts with the shoe or leather heel 4. In the preferred form of the invention, the bridge 14 is integral with the side walls 2 of the heel and is molded in place when the heel is made. In order to permit the heel to drain as previously described, one or more openings 15 are provided in the bridge at the floor of the cavity. In the heel shown in Fig. 4 there are two such openings coincident with the gutter 10.

Although a preferred form of the invention has been described herein and has been shown on the drawings, it is recognized that many changes and modifications such as changing the positions, size or member of the vents, may be made and it is therefore to be understood that the invention is to be construed as broadly as the recitations in the claims taken in conjunction with the prior art, may allow.

I claim:

1. A rubber heel having a cavity therein and a vent providing communication from the exterior of the heel into the cavity and situated to join the cavity at the bottom thereof.

2. A rubber heel having therein a cavity with the floor of the cavity sloping toward a lowest point, a vent providing communication from the exterior of the heel to the cavity and situated to join the cavity at said lowest point of the floor.

3. A rubber heel having therein a cavity with the floor of the cavity sloping toward a lowest point, a vent providing communication from the exterior of the heel into the cavity and situated in an upwardly sloping position and joining the cavity at the highest point of the vent and at the lowest point of the floor.

4. A rubber heel having a cavity therein with a sloping floor, a well in said floor toward which the floor slopes, a vent providing communication from the exterior of the heel into the cavity and situated to join the cavity at the bottom of said well.

5. A rubber heel having therein a cavity with a floor, a well in the floor and a gutter in the floor draining into the well, the floor having a contour to cause drainage into the gutter and well, and a vent providing communication from the exterior of the heel into the cavity and situated to join the cavity at the bottom of the well.

6. A rubber heel having therein a cavity with a floor, a well in the floor and a gutter in the floor draining into the well, the floor having a contour to cause drainage into the gutter and well, and a vent providing communication from the exterior of the heel into the cavity and situated in an upwardly sloping position and joining the cavity at the highest point of the vent and at the bottom of the well.

In testimony that I claim the foregoing, I have hereunto set my hand this 3 day of February, 1928.

CAMERON SPEAR.