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[54] ORTHOPEDIC SHOE CONSTRUCTION 3 Claims, 11 Drawing Figs.

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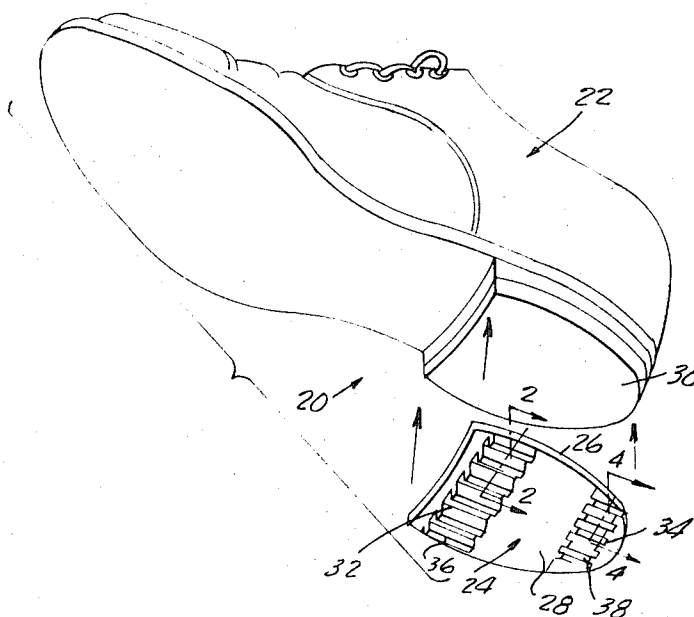
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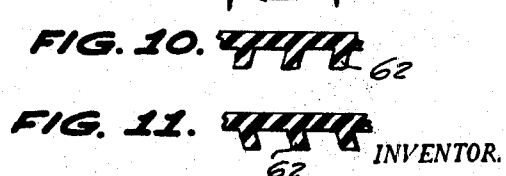
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ABSTRACT: A relatively flat orthopedic shoe member, for attachment to the bottom of a shoe, having a plurality of resilient projections extending from its upper or lower side, said projections being disposed in pairs one on each of opposite sides of a central point on said member, said projections each being formed at an acute angle with respect to the supporting side, and the projections on one side of the central point being slanted in a direction opposite to the direction of those on the other side of the central point, whereby said projections bend in response to the weight of the shoe wearer and establish a moment on said member and attached shoe to cause rotation thereof about said central point in a plane substantially parallel to the member upon ground engagement of the shoe.





ORTHOPEDIC SHOE CONSTRUCTION

This invention relates to an orthopedic shoe construction, and more specifically, an orthopedic shoe construction having an orthopedic shoe element for correcting various types of foot deformities.

The present invention has as an object the provision of an orthopedic shoe element of simple construction, which is specifically designed to correct such abnormal foot conditions as "toe-in" or "toe-out".

A further object of this invention is to provide an orthopedic shoe element of the construction indicated which can take the form of either a shoe heel, a shoe sole, or combination of a heel and sole, and thus be easily secured to a standard shoe or shoe upper.

Abnormal foot deformities of the type mentioned are generally corrected in infancy and childhood by having the child wear a special shoe with a foot clamp fastened to the shoe so as to turn the foot of the child. The shoes are worn by the child during sleeping hours, and due to the turning action provided over an extended period of time, the young bones tend to return to a normal straightened position. For walking, the present method of providing correction is to have wedges placed in the shoe in a manner to roll the ankle in an attempt to rotate the foot.

This invention provides a more effective and gentle straightening device, by utilizing a corrective walking shoe sole and/or heel to bring about a change in the mechanics of the foot, without the frequently undesirable condition of pronation or supination of the ankle.

Accordingly, a more specific object of the invention resides in the provision of an orthopedic shoe element which is designed to apply a moment, consisting of opposed forces, to the foot to correct such abnormal foot conditions as "toe-in" and "toe-out".

Yet another specific object of this invention is to provide an orthopedic shoe element for rotating the foot to correct such abnormal foot conditions as "toe-in" or "toe-out" regardless of how the element strikes the ground.

Further objects and advantages of the invention will become apparent from the following description and claims, and accompanying drawings, wherein:

FIG. 1 is an exploded perspective view of an orthopedic shoe construction of the present invention;

FIG. 2 is a partial cross-sectional view taken substantially on the plane indicated by the line 2-2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2, but illustrating the manner in which the orthopedic shoe element depicted in FIG. 2 acts under the weight of the shoe wearer to correct one of the foot abnormalities discussed above;

FIG. 4 is a partial cross-sectional view taken substantially on the plane indicated by the line 4-4 of FIG. 1;

FIG. 5 is a view similar to FIG. 4, but illustrating the manner in which the orthopedic shoe element illustrated in FIG. 4 acts under the weight of the shoe wearer to correct one of the foot abnormalities discussed above;

FIG. 6 is a bottom plan view of a pair of orthopedic heels constructed in accordance with the present invention, used to correct "toe-out" deformities;

FIG. 7 is a bottom plan view of a pair of orthopedic heels constructed in accordance with the present invention, used to correct "toe-in" deformities;

FIG. 8 is a bottom plan view of an orthopedic heel and sole combination of a modified form of the invention;

FIG. 9 is a bottom plan view of an orthopedic heel which constitutes still another modified form of the present invention;

FIG. 10 is a partial cross-sectional view taken substantially on the plane indicated by line 10-10 of FIG. 9; and

FIG. 11 is a partial cross-sectional view taken substantially on the plane indicated by the line 11-11 of FIG. 9.

Referring now to the drawing in detail, wherein like numerals indicate like parts throughout the several views, Figs. 1-6 illustrate an orthopedic shoe construction generally

designated by the numeral 20, which is specifically designed to correct "toe-out" foot deformities.

As shown in full lines in Fig. 6, the feet of the shoe wearer are normally divergent. It is desired to correct this abnormality by causing the feet to assume the position shown in the phantom lines in FIG. 6, wherein the feet are normally parallel to each other, rather than being divergent.

The shoe construction 20 is illustrated as including a standard shoe 22 having an ordinary heel and sole. However, the shoe construction 20 could include a shoe upper in lieu of standard shoe 22. The upper could then be provided with an orthopedic element in accordance with the instant invention, as will be made clear hereinafter. Wherever the word shoe appears throughout the following specification and claims, it should be understood to mean a shoe with or without a heel and sole.

In the embodiment of the invention illustrated in Figs. 1-6 the shoe construction 20 is provided with an orthopedic heel 24. The heel 24 includes a first side 26 and a second opposed side 28. The first side 26 of the heel 24 is substantially flat for flush securement to the heel 30 of the standard shoe 22.

The opposed second side 28 of the heel 24 is provided with two rows, 32 and 34, of a series of substantially parallel ribs 36 and 38, respectively. The ribs 36 and 38 have longitudinal axes which are normally parallel to each other and parallel to the longitudinal axis of the heel 24. The ribs 36 are spaced from each other by valleys 40, while the ribs 38 are spaced from each other by valleys 42. The ribs 36 and 38 are normally resilient, and the orthopedic heel 24 is of a one-piece construction composed of resilient material such as rubber, plastic, etc.

The ribs 36 and 38 are also arranged to slant at an acute angle with respect to the plane of the second side 28 of the heel 24. As clearly shown in FIGS. 2 and 4, the ribs 36 slant in a direction opposite to the ribs 38. The spacing between any two ribs 36 and any two of the ribs 38 is greater than the height of any one of said ribs.

Accordingly, when the weight of the shoe wearer is applied to the heel element, the slanted ribs 36 will fold into adjacent valleys 40 (as shown in Figs. 2 and 3), and ribs 38 will fold into adjacent valleys 42 (as shown in Figs. 4 and 5). This will cause the ground-engaging points A of the ribs 36 to shift in a direction opposite to the shifting of the ground-engaging points B of the ribs 38.

The shifting of points A and B in opposite directions, caused by opposite slant of the ribs 36 and 38, will cause the longitudinal axis of the heel 24 to undergo an angular shift with respect to its initial position. The direction of angular shifting depends upon the particular direction of slant of the ribs 36 and 38 with respect to longitudinal axis of the heel 24. The degree of angular shifting is determined exactly by the height, spacing and angle of slant of the ribs 36 and 38.

The opposite movement of the ground-engaging points A of the ribs 36 and the ground-engaging points B of the ribs 38 create a moment on the heel 30 and shoe 22 consisting of oppositely acting forces. This moment causes the heel to twist, depending upon the direction of slant of the ribs in each row 32 and 34.

As shown in Fig. 6, in order to correct a "toe-out" the ribs 36 and 38 should slant away from the longitudinal axis of the heel in the first and third quadrants of the right heel R and in the second and fourth quadrants of the left heel L. By reversing the direction of slant of the ribs 36 and 38 with respect to the longitudinal axis of the heel 24, as for example shown in Fig. 7, wherein the heel and ribs are designated by primed numerals, "toe-in" can be corrected. In this modification, the ribs 36' and 38' slant away from the longitudinal axis of the right heel R' in the second and fourth quadrants of the heel, while slanting away in the first and third quadrants of the heel L'. The angular shift of the heel in Fig. 7 is opposite to that in Fig. 6, as shown in phantom lines.

The moment applied to twist the shoe 22 will be provided to supply positive rotation regardless of how the heels 24, 24' strike the ground.

Fig. 8 illustrates a modified form of shoe construction generally designated by the numeral 50. The shoe construction 50 clearly illustrates that the parallel rows of ribs 32 and 34 need not be confined to the heel 24 exclusively. One row, such as 52, may be on the sole 54 and the other row 56 may be placed upon the heel 58 of the shoe construction 50. The modification illustrated in Fig. 8 is especially useful where the wearer walks by placing the weight of his body on the toe portion of his foot before the heel engages the ground. The desired direction of rotation is accomplished by slanting the ribs as shown in either Fig. 6 or Fig. 7.

Figs. 9 through 11 illustrate still another modified form of orthopedic shoe element. The shoe element consists of a heel 60 having a series of ribs 62 arranged in a circular array. Each rib 62 is disposed upon a radial line extending from the center of the heel.

The ribs 62 all slant in either a clockwise or counterclockwise direction. Since opposed ribs 62 on opposite ends of a diameter through the heel will slant in opposite directions, as clearly shown in Figs. 10 and 11, contact of the ribs with the ground surface will produce the desired moment, and rotation of the heel and shoe to which it is attached.

Ground-engaging points of the ribs 62 will all move in either a clockwise or counterclockwise direction when a vertical force is applied to the heel, as for example, when the shoe wearer applies pressure on the heel by walking. The direction of slant of the ribs will determine whether "toe-in" or "toe-out" is corrected. With the ribs 62 slanting in a clockwise direction, as shown in Fig. 9, the heel will cause a shoe to rotate in a clockwise direction. Slanting of the ribs 62 in op-

posite direction produces an opposite result and the heel of the other shoe of the pair worn should be so constructed.

As with the other construction noted, there is no critical sequence in which the ribs 62 must strike the ground.

While specific embodiments of my invention have been disclosed in the foregoing description, it will be understood that other various modifications within the spirit of the invention may occur to those skilled in the art. For example, the orthopedic element can be concealed by disposing it between the heel and shoe upper or by securing the second side bearing the ribs to the heel or upper. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

I claim:

1. An orthopedic shoe element adapted to be secured to the bottom of a shoe, said element comprising first and second opposed sides, said first side being substantially flat and said second side including means for establishing a moment on said element and an attached shoe to cause rotation thereof in response to ground engagement of said shoe under the weight of the shoe wearer, said means including a plurality of spaced, resilient projections depending from said second side in a circular array, said projections being slanted at an acute angle with respect to said second side in the same direction around said circle.

2. An orthopedic shoe element in accordance with claim 1 wherein the spacing between each of said projections in said circular array is greater than the height of any one of said projections.

3. An orthopedic shoe element in accordance with claim 2 wherein said shoe element is the heel element of a shoe.

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