March 11, 1941. J. P. TAYLOR 2,234,390

SHOE HEEL CONSTRUCTION

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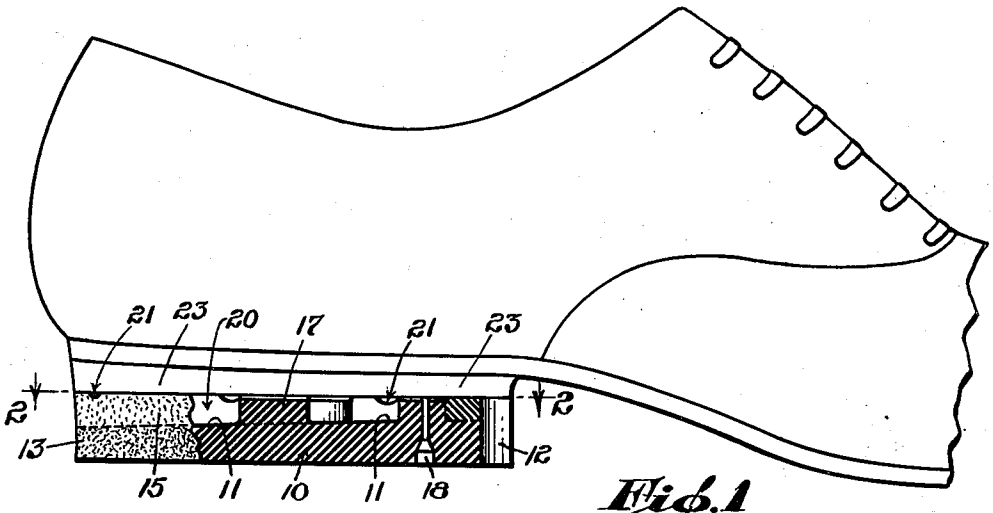



Fig. 1

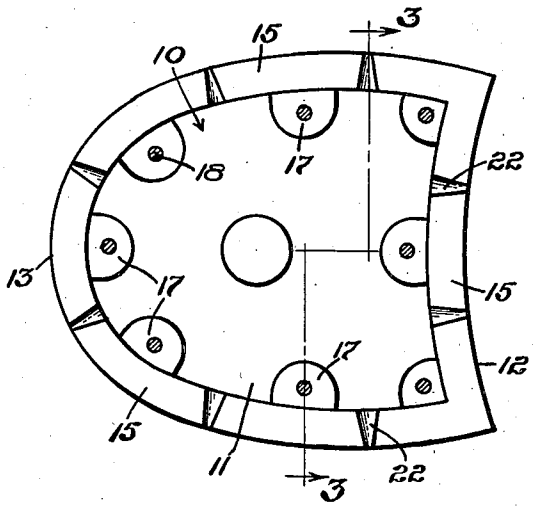



Fig. 2

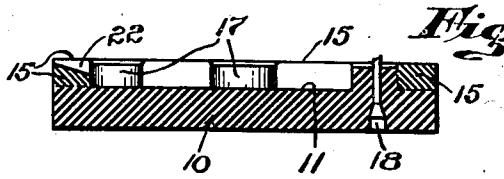



Fig. 3

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## SHOE HEEL CONSTRUCTION

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5 Claims. (Cl. 36—35)

This invention relates to shoe heel construction and more particularly to rubber heels adapted to cushion shock against transmission to the wearer.

It is an object of the invention to provide an improved heel construction adapted for attachment to a shoe.

Another object of the invention is to provide a rubber heel construction having different cushioning capacities varying over the heel in proportion to the intensity of shock loads applied to corresponding parts thereof.

Another object of the invention involves the provision of an improved flexible heel construction adapted to cooperate with a shoe to which it is attached to produce a pneumatic cushion against transmission of shocks to the wearer.

A further object of the invention is the provision of an improved flexible heel construction adapted to cooperate with a shoe to which it is attached to produce a pneumatic cushion against transmission of shocks to the wearer, the cushioning effect being determined by controlling the passage of a fluid, such as air, between the interior and exterior of the heel.

Another object of the invention contemplates a composite heel construction including a wearing portion and a cushioning portion, said cushioning portion being restrained against undue displacement by means affording attachment of the heel to a shoe.

This invention possesses many other advantages and has other objects which will be made more easily apparent from a consideration of the embodiment thereof shown in the accompanying drawing. This form, which illustrates the general principles of the invention will hereinafter be described in detail; but it is to be understood that this description is not to be taken in a limiting sense, since the scope of the invention is best defined in the appended claims.

Referring to the drawing:

Figure 1 shows a portion of a shoe having attached thereto a heel constructed in accordance with the present invention.

Figure 2 is a top plan view of the heel, taken as indicated by line 2—2 of Figure 1, and

Figure 3 is a sectional view taken as indicated by line 3—3 of Figure 2.

As illustrated in the drawing, the improved heel construction includes a base portion 10 formed of a material possessing good wearing characteristics such as hard rubber, leather or other suitable compositions. The upper surface 11 of the base portion 10 is tapered from the forward concaved edge 12 of said portion toward its rearward rounded edge portion 13. Although the entire upper surface 11 is shown as being thus tapered, it might be desirable to taper only that portion of the surface bordering the edges of the base 10, since it is along these areas that I prefer to arrange cushioning means through which shock imparted to the heel is absorbed and restrained against transmission through the heel into the foot and leg of a person employing the heel.

The cushioning means is preferably in the form of a continuous wall 15 extending upwardly from the surface 11 of the base 10 and bordering the edges of said heel base. The material forming said cushion is of such character as to yield readily in response to various kinds of forces commonly applied to a shoe heel when in use. I have found soft pliable rubber to be one material exceptionally suitable for this purpose.

Obviously, the greatest and most numerous shocks are imparted to the rearward portion of a heel during use, since in walking, the rearward edge of the heel engages the ground prior to the placement of the sole of the shoe. The transmittal of continuous shocks to the feet and legs through the rearward portion of shoe heels not only causes fatigue of the feet and leg muscles, but results in an increased wearing of the shoe heel at this location. In order to overcome these objections, I prefer to taper the lower surface of the cushioning wall 15 conversely to the tapered upper surface 11 of the base portion 10, so that said cushion is appreciably thicker at the rearward portion of the heel than at the forward portion thereof; such construction provides cushioning capacities which gradually decrease from the rear of the heel where the capacity must be sufficient to absorb shocks of maximum intensity to the front of the heel where a capacity only sufficient to absorb shocks of minimum intensity is required.

The cushioning portion 15 might be in the form of a separate piece from the base 10. However, in the present instance it is shown as being formed integrally with said base so as to provide a composite heel construction. This is accomplished by vulcanizing the hard rubber base 10 with the relatively softer rubber cushioning portion 15 along the adjacent inclined surfaces of these members.

The means employed for attaching the heel to a shoe includes a plurality of spaced lugs 17 having openings 18 therein through which nails may

be driven into the shoe for anchoring the heel thereto. I prefer to utilize these same lugs as a means of governing the extent of distortion of the cushioning means 15 caused by the application of pressures thereto in walking. As shown in the drawing these lugs are positioned adjacent the inner surface of the cushioning portion or wall 15. They may be formed of the same hard rubber as the heel base 10 and integrally with both said base and the considerably softer rubber cushioning 15. Thus, the resiliency in said lugs will permit yieldability of the cushioning and will also insure the movement of any distorted portion of the cushioning back to its normal position when pressure causing its displacement is relieved. The upper ends of the lugs 17 terminate sufficiently below the upper surface of the cushioning portion 15 when in its undistorted position, to permit yieldability of the cushioning without permitting sufficient pressure upon the lugs by the adjacent shoe portion to transmit shock into the shoe.

The cushioning effect produced through the yieldability of the cushioning material 15, is supplemented by pneumatic cushioning means. When the heel is attached to a shoe as shown in Figure 1, a closed chamber 20 is provided between the base 10 and the portion of the shoe to which the heel is attached. When the cushioning portion 15 is compressed or distorted in response to pressures on the heel, the air within the chamber is compressed, a portion thereof being forced out of the chamber through a series of ducts 21 defined by grooves 22 in the upper surface of the cushioning portion 15 and the shoe portion 23 to which the heel is attached. The ducts are sufficiently restricted at their outlet ends to impede the escape of air thus adding to the shock absorbing properties of the heel. Obviously, the entrance of air from the atmosphere into the chamber will be effected when the pressure is relieved upon the cushioning portion.

By providing the vents at the upper portion of the heel the possibility of foreign matter entering the chamber is minimized since the vents will be well away from the ground. Also, the possibility of completely closing the vents through distortion of the cushion 15 is minimized, since the portion of the vent wells defined by the shoe portion is substantially unyieldable.

I claim:

1. A heel including a wearing base portion and a flexible tapered cushioning portion cooperable with the upper surface of said wearing portion, said cushioning portion decreasing in thickness from the rear of the heel to the front thereof and being of such thickness at the front to permit bodily side tilting of the wearing base portion with respect to a shoe mounting.

2. A heel including a wearing base portion and a flexible cushioning member forming a wall completely around the marginal edges of said base portion, said wall decreasing in height from the rear to the front of the heel.

3. A heel including a wearing base portion and a flexible cushioning member forming a wall around marginal edges of said base portion, said wall decreasing in height from the rear to the front of the heel and being of such height at the front to permit bodily side tilting of the wearing base portion with respect to a shoe mounting.

4. A composite heel including a hard rubber wearing portion and a relatively softer flexible rubber cushioning portion attached to the upper surface of the wearing portion, a plurality of elements extending upwardly from said wearing portion and being integral therewith and attached to said cushioning portion, the upper ends of said elements being of such height as to be out of contact with a shoe upon attachment thereto, said elements having holes adapted to receive nails for anchoring the elements to a shoe and reenforcing said elements, whereby to govern the extent of distortion of said cushioning portion.

5. A composite heel including a hard rubber wearing portion and a relatively softer flexible rubber cushioning portion attached to the upper surface of the wearing portion, a plurality of elements extending upwardly from said wearing portion and being integral therewith and attached to said cushioning portion, said elements being of such height as to be out of contact with a shoe upon attachment thereto.

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