Sept. 30, 1952 W. H. JOYCE, JR 2,611,978

SHOE WITH TAPERED ROCKER TYPE MIDSOLE

Filed Dec. 2, 1950 2 SHEETS—SHEET 1

Fig. 1.

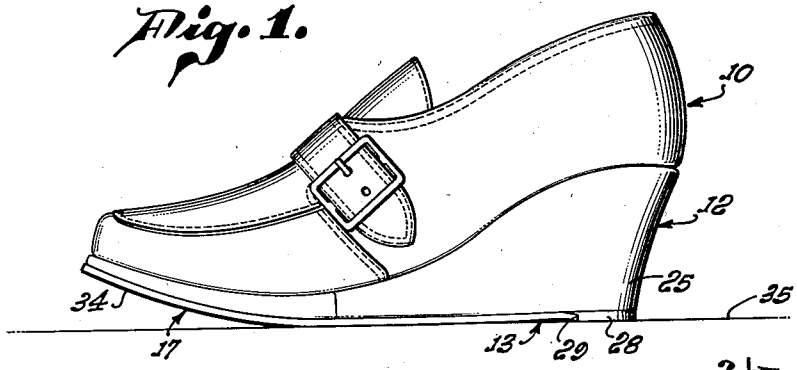


Fig. 2.

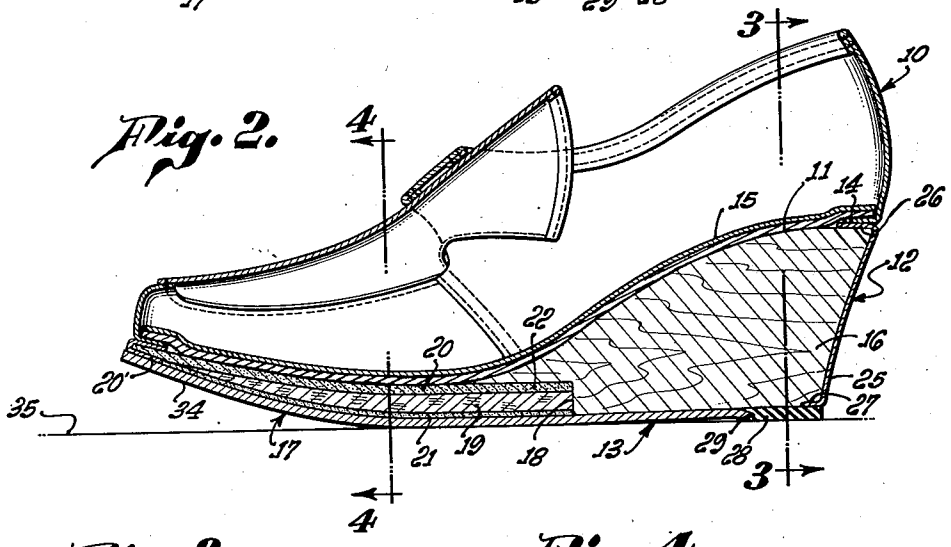


Fig. 3.

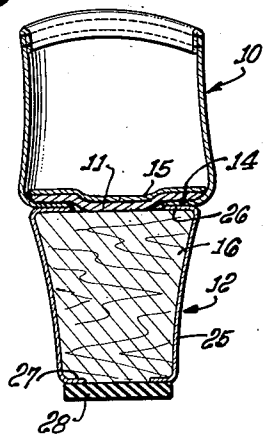
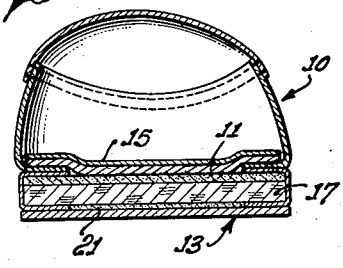


Fig. 4.



WILLIAM H. JOYCE, JR.
INVENTOR.

HUEBNER, BEEHLER, WORREL and HERZIG,
ATTORNEYS.

BY
Herbert A. Huebner

Sept. 30, 1952 W. H. JOYCE, JR 2,611,978

SHOE WITH TAPERED ROCKER TYPE MIDSOLE

Filed Dec. 2, 1950 2 SHEETS—SHEET 2

Fig. 5.

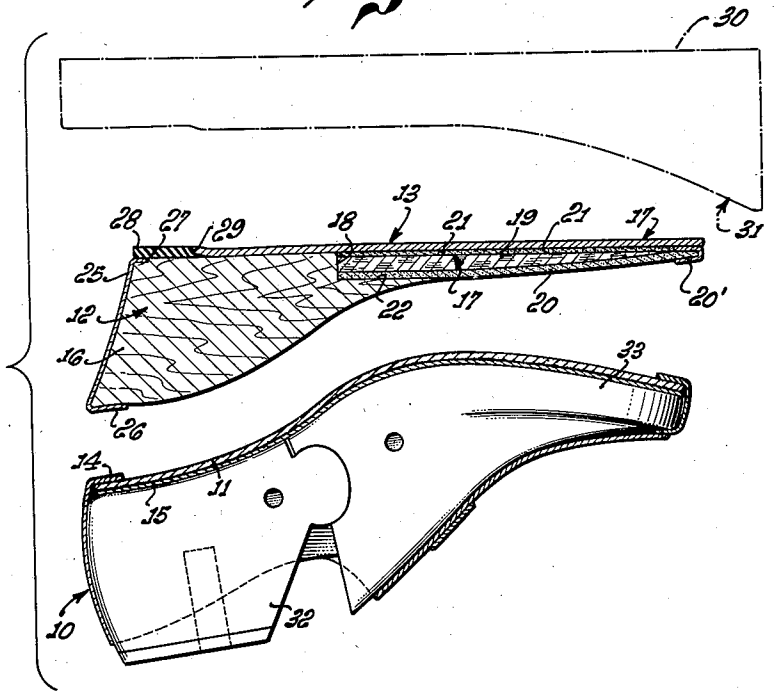
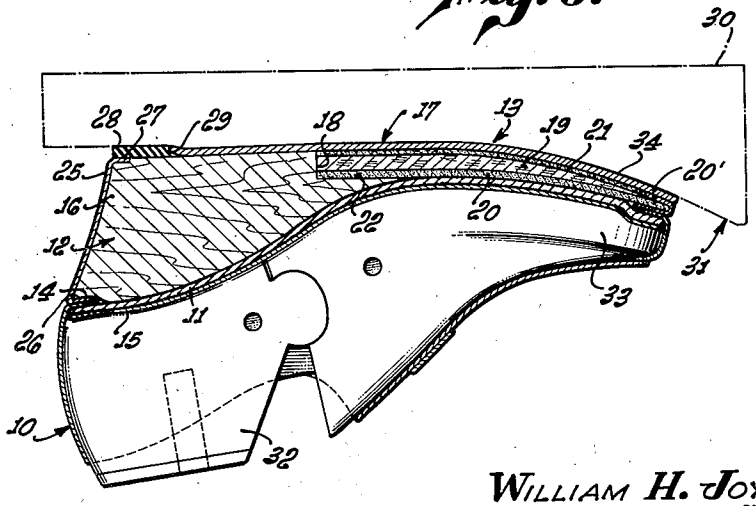


Fig. 6.



WILLIAM H. JOYCE, JR.
INVENTOR.

HUEBNER, BEEHLER,
WORREL and HERZIG,
ATTORNEYS.

By Herbert A. Huebner

Patented Sept. 30, 1952 2,611,978

UNITED STATES PATENT OFFICE

2,611,978

SHOE WITH TAPERED ROCKER TYPE MIDSOLE

William H. Joyce, Jr., Pasadena, Calif., assignor to Joyce, Inc., Pasadena, Calif., a corporation of California

Application December 2, 1950, Serial No. 198,866

3 Claims. (Cl. 36—19.5)

1

This invention relates to footwear construction, and particularly to an improvement over my United States Patent No. 2,067,963, granted January 19, 1937, for Footwear, the present construction embodying a tapered rocker type midsole.

In shoes of the character shown in my prior patent above referred to the midsole, sometimes referred to as a platform, provides a taper only in the wedge heel or heel lift area, and the sole portion extending from the shank of the shoe to the toe is of substantially constant thickness. This prior construction also involves a substantially flat bottom on the midsole and a correspondingly flat outsole. The toe area, and particularly the extreme end of the toe, is the most pronounced point of wear on a pair of platform shoes. There is an unusual amount of scuffing at this point and it presents a problem. In such shoe construction the outsole is relatively thin and has approximately the same outline as the midsole or platform, the latter being covered all around the edge with a relatively thin material, such as fabric or leather, usually corresponding to the material of the upper, and when the toe portion of the edge covering is scuffed the ornamental appearance of the shoe is impaired and its life shortened.

An object of the present invention is to eliminate, or at least materially reduce, the scuffing at this critical area, thereby developing a longer wearing product, by tapering the midsole or platform from the ball region of the shoe forward to the toe. The taper is preferably also utilized in the lasting operation to impart an up-curve or toe spring toward the toe so that a natural rocker effect results when walking, and when the foot is moved forward a very slight lifting brings the toe of the shoe out of contact with the ground and avoids any tendency of the toe to drag on the ground.

A further object of the invention has to do with the comfort of the wearer. In the flat bottom platform type shoe, it is necessary that the midsole or platform as well as the outsole flex considerably when the wearer is walking. While this is tolerated in order for the shoe to be durable, materials must be employed which are sufficiently firm and unyielding to afford strong construction, as the result of which flexibility is sacrificed to some extent and certain energy of the wearer is necessarily consumed in the flexing of the shoe when walking. Moreover, the heel of the wearer tends to pull out of the shoe when raised in walking, and consequently the shoe must be made to fit with reasonable tightness around the heel and over the instep in order to retain the shoe on the foot.

2

The object of the invention in that respect is to utilize a rocker bottom principle by tapering the platform or midsole, as mentioned above, and lasting the associated midsole and outsole with an exaggerated toe spring so that the rocker area of the bottom of the shoe rocks with the forward motion of the wearer. This reduces the degree of flexibility needed, reduces the requirement for a tight fit around the heel and over the instep and gives the wearer materially increased comfort. In effect the sole portion of the shoe becomes complementary to the ball of the foot and rocks with it with a minimum of opposing force between the foot and the shoe.

I am aware that rocker type solid wooden soled shoes have been known to the art, as are wooden soled shoes wherein the soles are made up of small rigid wooden sections with articulated joints. Also the use of tapered insoles or fillers in conventional shoes is known. None of these prior shoes, however, bear structural resemblance to my covered midsole rocker type construction, as will appear from a consideration of the detailed description which follows, taken in conjunction with the drawing.

In the drawing:

Figure 1 is a side elevation of a shoe embodying the present invention.

Figure 2 is a somewhat enlarged vertical cross section of the shoe shown in Figure 1.

Figure 3 is a cross section taken on the line 3—3 of Figure 2.

Figure 4 is a cross section taken on line 4—4 of Figure 2.

Figure 5 is an exploded view in vertical section of the shoe parts in their relation to a last and pressure pad.

Figure 6 is a view of the same parts as shown in Figure 5 but with the shoe parts assembled and the pressure pad against the outsole.

The shoe comprises in general an upper 10, insole 11, midsole 12, and outsole 13.

The upper may be lasted with its lower edges 14 turned under and cemented or stitched to the insole 11. The exact manner of attachment is not critical in the present invention as the relationship of the upper and insole may be as illustrated, being secured together on the last, or the upper and a sock lining insole may be stitched together first and then put on the last. In the shoe illustrated I show a regular type of insole covered by a sock lining 15.

The midsole or platform illustrated comprises

a heel wedge 16 and a sole portion 17. The heel wedge may be made of a cushioning material such as cork, rubber or composition or it may be made of wood or other relatively non-yielding material. I have shown it as designed with a notch 18 to receive the thickest portion of a pad which forms the sole portion 17.

The sole portion 17 is preferably formed of a relatively soft cushioning material such as felt, cork, cork and rubber composition, sisal, or any other suitable material. In the illustration I have shown a wedge of cork and rubber composition 19 overlying which is a pad 20 of felt. This pad is preferably beveled at the toe as illustrated at 20'. It is also sometimes desirable to interpose a very thin packing of soft felt between the cork and the upper surface of the outsole, as illustrated at 21.

The upper surface of the felt pad 20 is cemented to the under surface 22 of the heel wedge notch and it is preferable also that the felt pad 20 be cemented to the cork-rubber wedge 19, and that the cork and thin felt padding 21 be cemented together.

This composite make up of the platform structure is by way of illustration only. The heel portion and the sole portion may be formed from a single piece of material, or a cushioning pad extending the entire length of the platform may overlie a heel wedge, as illustrated in Figure 2 of my United States Patent No. 2,067,963, or the pad if it is the full length of the platform may extend under the heel wedge. The height of the heel wedge may be reduced accordingly depending upon the details of the platform.

The important thing is that a platform construction be employed which involves a heel portion tapering toward the shank of the shoe where it is joined to or merges with a sole portion which itself is tapered from the region of the ball to the toe.

The platform structure is entirely enclosed around the edge by an edge covering 25 of relatively thin material, an example of which would be the leather or fabric of which the upper is made. This edge covering is of the character illustrated and described in my prior patent referred to above and is formed with marginal edges 26 and 27 turned in over the upper and lower marginal surfaces, respectively, of the platform structure and secured thereto by cementing or stitching, or both, or some other satisfactory means, as for example by stapling or tacking if the nature of the material permits.

There is thus provided a covered midsole or platform which extends the entire length of the shoe and corresponds generally in plan outline with the insole. However, it may be, if desired, somewhat larger than the insole outline. It incorporates a heel portion of sufficient thickness to provide an elevation for the heel. The tapering of the heel portion toward the shank is relatively abrupt at the arch, which is in the region of the shank of the shoe, and the tapering from that region forward to the toe is more gradual. There may be a short section of constant thickness between the forward end of the heel wedge and the ball area, the taper of the sole portion commencing at the ball area.

The outsole 13 is attached by cement to the bottom of the midsole and extends the entire length of the midsole, a conventional heel being eliminated. I have found it desirable, however, to employ a rubber heel tip 28, which may be somewhat thicker than the major portion of the outsole.

The covered midsole as a unit, which may have the outsole cemented thereto, and which is originally flat, is spotted with cement to the upper and insole on the last, and pressure is applied in such a manner that a rocker form results, namely the midsole with its upper and the outsole at the bottom of the midsole curve upwardly toward the toe beginning at about the ball of the shoe. From this region rearwardly the outsole may lie in a flat plane or may be formed with an arch or a notch according to the style desired so long as the platform in substance is retained. I prefer to use a pressure pad 30 having the contour 31 illustrated, in conjunction with a last 32 which has an exaggerated toe spring as shown at 33. The spring of the last is slightly less than the corresponding curve on the pressure pad to provide for the taper of the platform in conjunction with the rocker shape. A water or air bag may be substituted for the pressure pad shown. The pressure is maintained while the cement cures naturally or by induced means, and the shoe is thus set and will remain in the shape as lasted.

By way of example only, and not of limitation, some measurements will be stated as taken from a shoe construction satisfactorily embodying the principles of the invention.

In such example of a woman's size 4, the heel wedge 16 is approximately half the length of the platform, and the sole portion 17 is slightly more than half the length in order to fill the notch 18. The cork-rubber wedge 19 is about ¼" thick throughout approximately the rear half of its length, and tapers to a fine edge terminating about ½" from the extreme toe end. The felt pad 20 is about ⅛" thick throughout except at the toe end, the last half inch or so being tapered to $\frac{1}{16}$". The rocker surface 34 on the outsole rises approximately ⅞" from the horizontal plane 35 of the heel portion, whereas the corresponding upper surface of the insole has a lesser spring due to the tapering of the wedge 19 and beveling of the pad 20. These figures would vary according to size and style, and are subject to modification even in the size referred to, so long as the principles of the invention are retained.

The differential in spring between the insole and outsole provided by the tapered platform enables the use of a full rocker bottom effect without unduly elevating the toes of the wearer.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent shoe construction and methods.

The midsole or platform may be formed in two or more layers, each having its own edge covering, and being stepped from the heel to the toe, without departing from the principle involved, so long as there is adequate cushioning in the ball region, a tapering in thickness of the composite platform toward the toe (where little or no cushioning is needed), and the shoe is lasted with a rocker bottom. Another variation within the scope of the invention involves a midsole edge covering of crepe rubber or synthetic rubber which extends around the heel lift and pad, and

instead of being turned in over the heel lift and pad at the bottom, covers the edge of the outsole.

The essence of the invention resides in a shoe or slipper construction of a covered midsole or platform type which is cushioned in at least the sole portion and in which the midsole is tapered in thickness from at least the ball to the toe and the shoe is lasted with a rocker bottom from about the ball to the toe. The method of making the shoe wherein the originally flat tapered midsole and outsole are lasted under pressure to the upper and insole and the pressure maintained while the cement cures, so that the shoe retains its rocker bottom form when removed from the last, is important from the manufacturing standpoint.

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

1. A covered midsole rocker type shoe construction comprising an upper attached to an insole, a midsole having a single circumferential lateral edge covered by an outer layer of material, said midsole being attached to the insole, and an outsole attached to the bottom of the midsole, said midsole comprising a forward midsole pad including cushioning material, the material of said pad substantially completely filling the space between said insole and said outsole forwardly of the ball region of said shoe, the forward portion of said midsole extending to the toe of said shoe and tapering in longitudinal thickness from the region of the ball toward the toe and both the upper and lower surfaces thereof being curved upwardly from the ball region forwardly, the bottom surface of said forward midsole portion curving upwardly more sharply than the upper surface thereof and sufficiently to provide exaggerated spring to said outsole.

2. In a shoe construction, a midsole having a single circumferential lateral edge covered by an outer layer of material, and an outsole attached to the bottom of the midsole, said midsole comprising a forward midsole pad including cushioning material, the material of said pad defining a body having an elongated generally rectangular transverse cross section, the forward portion of said midsole extending to the toe of said outsole and tapering in longitudinal thickness from the region of the ball toward the toe and both the upper and lower surfaces thereof extending upwardly from the region of the ball forwardly, the bottom surface of said forward midsole portion extending upwardly more steeply than the upper surface thereof and sufficiently to provide exaggerated spring to said outsole.

3. In a shoe construction, a midsole having a single circumferential lateral edge covered by an outer layer of material, and an outsole attached to the bottom of the midsole, said midsole comprising a flexible laminated forward midsole pad having at least one lamination formed as a substantially continuous layer of cushioning material, the material of said pad defining a body having an elongated generally rectangular transverse cross section, the forward portion of said midsole extending to the toe of said outsole and tapering in longitudinal thickness forwardly from the region of the ball toward the toe and both the upper and lower surfaces thereof being curved upwardly forwardly from the ball region, the bottom surface of said forward midsole portion curving upwardly more sharply than the upper surface thereof and sufficiently to provide exaggerated spring to said outsole.

WILLIAM H. JOYCE, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
670,068	Tourigny	Mar. 19, 1901
1,088,328	Cucinotta	Feb. 24, 1914
2,364,763	Sutcliffe	Dec. 12, 1944
2,422,947	Calderozzo	June 24, 1947
2,521,464	Lathan	Sept. 5, 1950
2,543,183	Maling	Feb. 27, 1951
2,565,662	McMahon	Aug. 8, 1951

FOREIGN PATENTS

Number	Country	Date
873,809	France	Apr. 7, 1942
879,115	France	Nov. 10, 1942