Jan. 8, 1952 G. C. FORD 2,581,524

METHOD OF MAKING MIDSOLE-OUTSOLE ASSEMBLIES FOR SHOES

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Fig. 1.

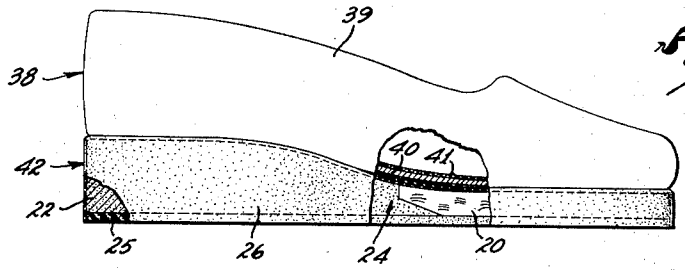


Fig. 3.

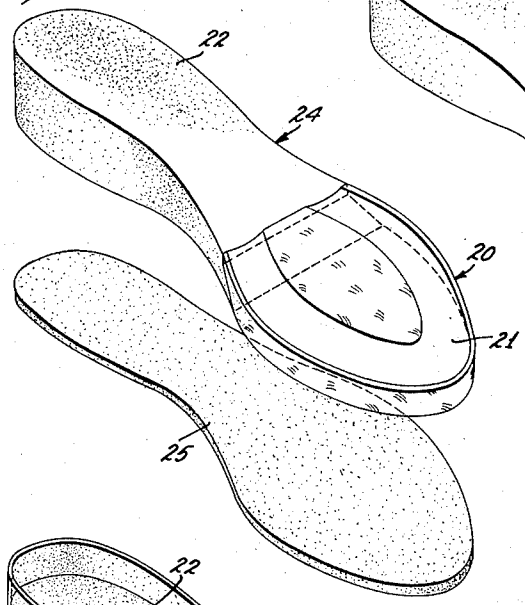


Fig. 2.

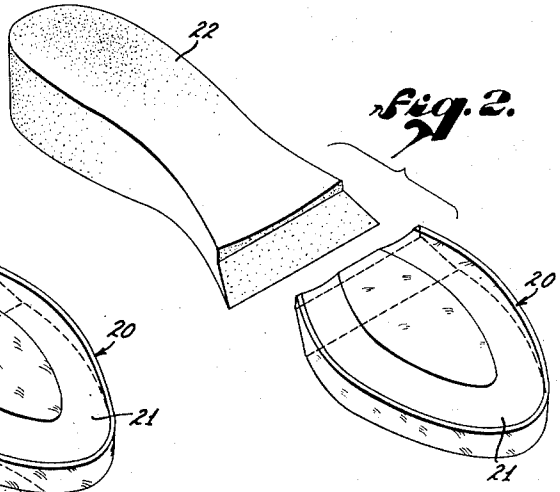


Fig. 5.

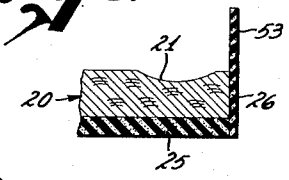


Fig. 6.

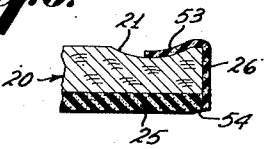
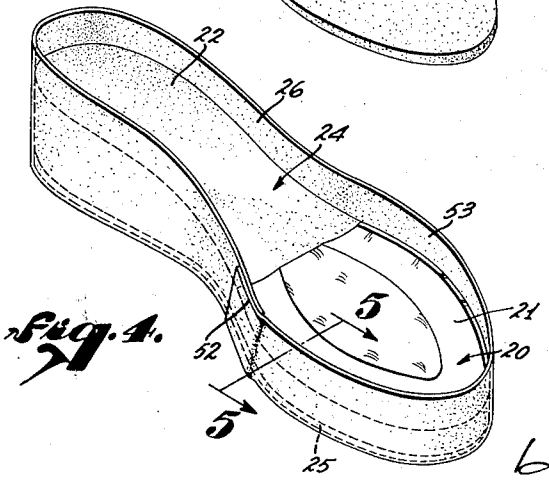


Fig. 4.



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METHOD OF MAKING MIDSOLE-OUTSOLE ASSEMBLIES FOR SHOES

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Fig. 7.

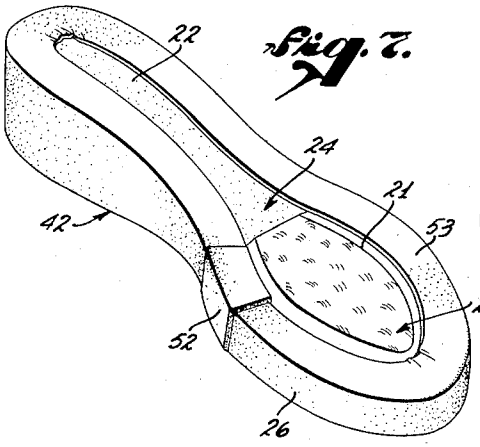


Fig. 8.

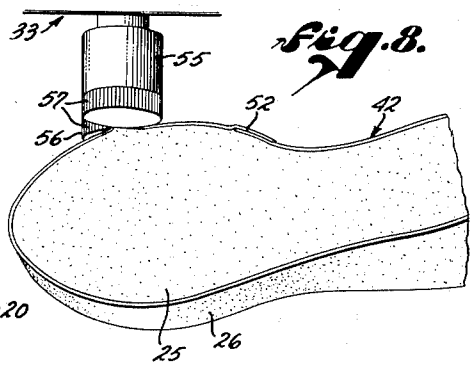


Fig. 9.

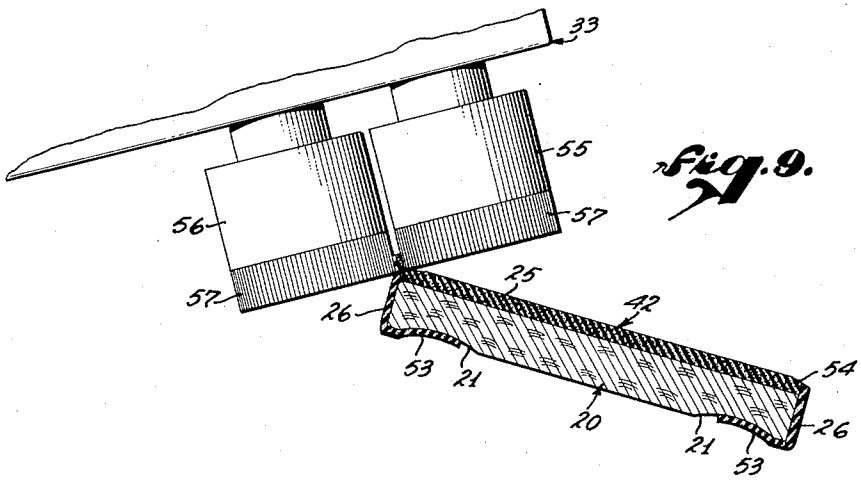
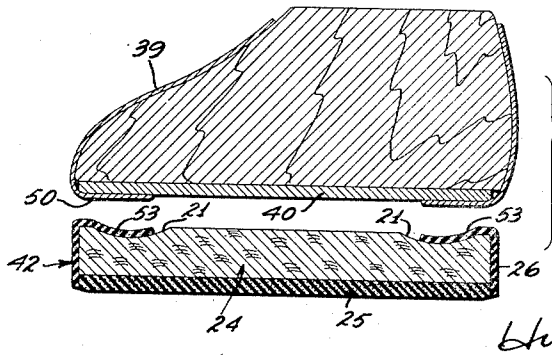


Fig. 10.



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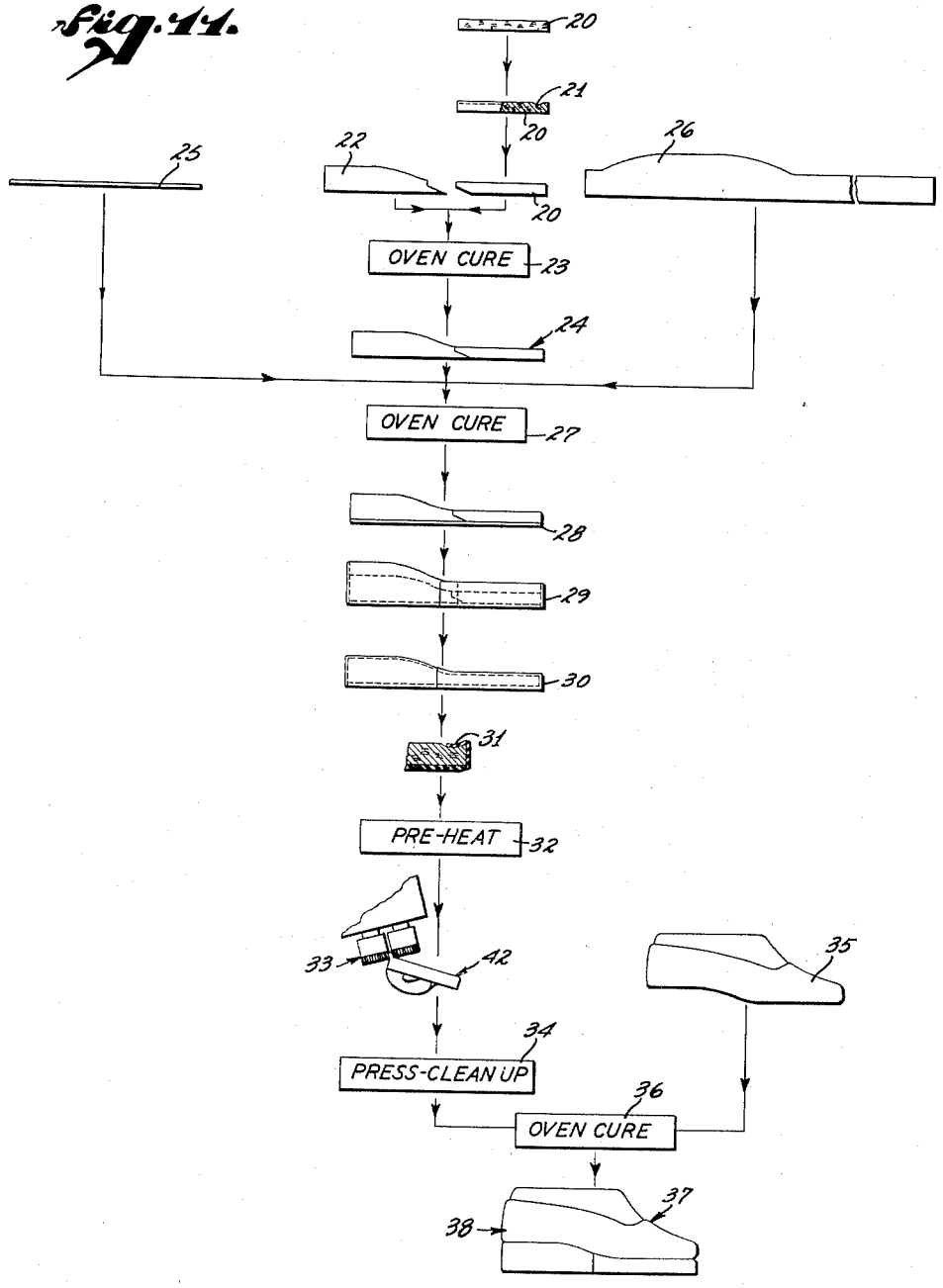
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Fig. 11.



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METHOD OF MAKING MIDSOLE-OUTSOLE ASSEMBLIES FOR SHOES

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Application June 25, 1948, Serial No. 35,200

1 Claim. (Cl. 12—146)

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This invention relates to the art of making shoes and has particular reference to a new and novel shoe construction and method which is an improvement over the subject matter disclosed and claimed in Patent No. 2,067,963, granted January 19, 1937 on an application of William H. Joyce. In order to more readily understand the improvement, I will advert briefly to the Joyce construction. In that shoe an upper has the lower edges turned under and secured to an insole. A cushioning midsole embodying a pad of cushioning material, as for example felt, is associated with a heel lift, and the two parts are enclosed entirely around the exposed edge by an edge covering of relatively thin material which is turned over the upper and lower surfaces, respectively, of the platform so that a covered midsole is created. This midsole is secured to the upper and insole, and a substantially flat outsole is secured to the bottom surface of the midsole.

Certain modifications of this essential construction have been described and claimed in another Joyce Patent No. 2,351,818, but the characteristic features of the Joyce construction reside in the visible covered midsole incorporating a heel lift for the associated upper, and a separate and visible outsole.

Such a construction has proved to be wholly satisfactory and commercially popular.

In adopting the joyce construction to a shoe in which the midsole is covered by crepe rubber and has the appearance of crepe rubber which is desirable for certain styles of footwear, I have found it advantageous to modify the construction in certain respects.

A shoe having the appearance of a thick tapered crepe sole is desirable for a certain market, and in such a shoe it is preferable that the thick sole has the appearance of being a homogeneous single slab of crepe rubber. A sole formed entirely of crepe rubber is relatively heavy, hot on the feet, becomes deformed after wearing for a while, and tends to wear round on the corners.

A general object of this invention is to provide a shoe having the appearance of a crepe sole construction which eliminates the objections mentioned above.

More particularly an object of the invention is to employ in a shoe, light weight resilient materials for a cushioning midsole, the edges of which are covered by sheet crepe rubber, preferably neoprene crepe, and which edge cover encloses the outsole, the latter also being preferably of crepe rubber. The teaching of the Joyce Patent No. 2,067,963 may be followed, with a difference in the relationship and joining of the midsole edge cover and the outsole. This results in a shoe with a cushioning midsole, substantially flat outsole, and both midsole and outsole combined and edge covered so that the whole has the appearance of a thick tapered rubber crepe sole.

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While the invention was inspired by the objects pointed out above, and was realized by a technique to be described, the general construction and method may be utilized to manufacture a shoe wherein the edge covering for the midsole and outsole is not roughened like crepe rubber, but may be sheet natural or synthetic rubber, or other suitable composition, having any surface finish desired, the characteristic of the shoe being that the edge cover for the midsole extends down over the edge of the outsole.

The foregoing objects and advantages, and others, will become further apparent from a consideration of the detailed description which follows, and reference to the drawings.

In the drawings:

Figure 1 is a side elevation, with parts in section, of a shoe illustrating the invention.

Figure 2 is a perspective of two parts forming the midsole platform.

Figure 3 is a perspective of the midsole platform and outsole.

Figure 4 is a perspective of the midsole platform, the outsole, and the edge covering.

Figure 5 is a fragmentary vertical section taken on the line 5—5 of Figure 4.

Figure 6 is a view similar to Figure 5 with the edge cover turned down and the outsole and edge cover junction bevelled.

Figure 7 is a perspective of the assembled parts shown in Figure 4 with the edge cover cemented down.

Figure 8 is a perspective illustrating the method of pressing the edges of the outsole and edge cover together.

Figure 9 is an enlarged view, partly in section, of the same operation.

Figure 10 is an exploded cross section of the shoe parts, lasted upper, and sole assembly.

Figure 11 is a flow sheet illustrating successive steps in the method which may be used.

Referring to Figure 11, the steps which may be employed in fabricating the shoe may be briefly outlined as follows:

A toe pad 20 is grooved as shown at 21, and is joined by cement to a heel lift 22. The joined parts are oven cured at 23 to dry the cement and then comprise a platform 24. An outsole 25 which is to be cemented to the bottom of the

platform 24, and an edge cover 26 which is to be wrapped around the platform and outsole with the lower edge of the cover flush with the bottom of the outsole. These parts, after having cement applied, are heated together in an oven at 27, and while the parts are heated, the outsole is applied at 28, the edge cover is put on at 29, and the upper marginal edges of the cover are turned in at 30 and cemented down as shown at 31.

This sole assembly is pre-heated at 32, and while the elements remain heated, the outsole and edge cover are mechanically pressed together at 33. At 34, the outsole, platform, and edge cover are pressed together, and any clean up attended to.

The lasted upper and insole assembly 35 is oven cured with the sole assembly at 36, and the two major elements, having cement on the contiguous surfaces, pressed together at 37 to complete the shoe 38.

This is but a sketch of the manufacturing steps, and is illustrative only, being subject to many variations.

Referring now to Figures 1 et seq., the shoe 38 comprises essentially an upper 39 secured to an insole 40 over which is optionally secured a sock lining 41, and a sole unit 42 which comprises the platform 24, outsole 25 and edge cover 26, the upper edges of which are turned in over the upper surface of the platform, and the lower edge of which covers and is flush with the bottom of the outsole.

In the illustration, the upper is constructed according to known art, particularly the Joyce Patent No. 2,067,963, with the lower edges 50 of the upper turned under and secured to the lower marginal surface of the insole 40.

In the illustration, also, the sole unit 42 is made separately, and in the relationship shown in Figure 10, the major parts are cemented together.

The toe pad 20 is preferably made of cushion cork composition, and is bevelled and cut as shown, to join neatly with the heel lift 22. It is of generally uniform thickness, but is provided with the groove 21 in the upper surface to receive the turned in part of the edge covering. This is desirable, although not essential, to assure a smoother toe surface under the insole.

The heel lift 22 is desirably made of a harder material than the toe pad, as for example a composition of cork, sawdust, synthetic resin, and latex, and is cut and tapered as shown complementary to the toe pad so that when the two parts are joined, the platform thus made is substantially smooth on both upper and lower surfaces, the bottom is flat, and the top rises with an arch effect.

As an equivalent, the toe pad and heel lift may be formed in one piece of any suitable material, so long as the toe portion is flexible and offers some resiliency. It is not essential that the heel lift be of a cushioning material. Or the relative sizes and shapes of the toe pad and heel lift may be mutually altered, and the toe pad extended up over the heel lift, as illustrated in the Joyce Patent No. 2,067,963, or it may extend back under the heel lift; or the platform may be laminated. The greatest benefits are obtained, however, if the material is lighter than solid crepe rubber, if the toe portion is flexible, and some cushioning effect is obtained over the entire platform.

The outsole 25 exactly coincides in outline with the shape of the platform. In the illustration it is made of sheet crepe rubber (preferably neoprene), and is relatively thin, the toe pad being relatively thick.

The edge cover 26, as illustrated, is also made of sheet crepe rubber (preferably neoprene), and may be thinner than the outsole. It is fashioned so that it will entirely encircle the platform (see Figure 4) and is preferably overlapped as shown at 52, the lower edge covers and is flush with the bottom edge of the outsole (see Figure 5), and there is marginal material 53 to turn in and cement down to the upper surface of the platform, as illustrated in Figure 7.

The shoe could be made, although I believe less efficiently, by first attaching the edge cover to the upper and insole to form a pocket, and then inserting the platform, and attaching the outsole, but the method first described is considered superior.

The groove 21 accommodates the thickness of the edge cover, and while not absolutely necessary, imparts a desirable feature of comfort to the shoe.

It is desirable to bevel the joined edge of the outsole and cover as shown at 54 by an abrasive machine or other means.

An important contribution to the art of shoe making lies in the method of bonding the butt joint between the edge cover and outsole.

The edge of the outsole is cut as vertically sharp as possible, but with crepe rubber there is always some irregularity and the sole is relatively thin. The contiguous surface of the edge cover is definitely rough. For the sake of appearance, as well as to insure a flatness to the outsole, I do not desire to turn the edge cover under the platform.

There are two important steps in the bonding operation, after a suitable cement, as for example, neoprene, latex, or other compatible adhesive or solvent has been applied to the edge of the outsole and the contacting surface of the cover, and the two surfaces initially pressed together.

The first step is to heat the assembled parts, as at station 32, Figure 11, which can be conveniently done in an oven. With neoprene crepe rubber as the material used, I have found in practice that a heating from 170° F. to 185° F. for about 7 to 8 minutes is adequate.

The second step is, immediately out of the oven and while the materials are hot, the corner edges are rolled as at station 33.

The essential parts of a machine suitable for practicing my method comprise heated rollers 55 and 56 (Figure 9) which are heated by means not shown and maintained at a temperature ranging from 100° F. to 125° F. They are power driven by means not shown, turning at 24 R. P. M. to 36 R. P. M. The rollers are spaced apart a distance less than the combined thickness of the outsole and edge cover, and preferably are grooved or knurled as illustrated at 57.

The preferred operation is to feed the sole unit edge between the rollers, all around the sole unit. If properly done one revolution is sufficient. The sole unit is held so that the bottom of the outsole is at an angle of about 30° to the plane of the ends of the rollers and about ⅛" of the joined crepe is fed between the rollers.

This rolling pressure under heat results in a bond which is as strong, or stronger, than the crepe itself. The material is 100% returnable to original form, and when released from the rollers, the butt joint is neat and permanent, the sides of the sole unit are straight and unmarred, and the outsole is flat.

The sole unit thus fabricated is light weight, flexible and soft, and attractive, having the appearance of a homogeneous unit, and imparting overall height, and cushioning to the shoe.

Various modifications in the details of fabrication, and the shoe construction, will be apparent to anyone skilled in the art. Instead of neoprene crepe, any other suitable material may be employed for the outsole and edge cover, so long as they are amenable to the treatment prescribed, and possess, either inherently or in conjunction with an adhesive or solvent, the ability to bond together in a butt joint of the character shown and described, and are not permanently deformed or marred beyond repair in the physical treatment which may be employed to aid in the bonding. It is also apparent, of course, that the material of the edge cover be durable enough to withstand wear on the exposed lower edge.

The heel lift may be omitted, if desired, and the cushioning pad of substantially constant thickness extend the full length of the shoe.

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 claim so as to embrace any and all equivalent shoe construction and method of manufacture.

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

In the art of making edge covered outsoles and midsoles assemblies, the novel step of providing

a midsole, an outsole of rough surfaced crepe rubber material and a cover for the outsole and midsole of rough crepe rubber material, said crepe rubber material being amenable to cement and pressure bonding, applying cement to said cover and to the portions of the midsole and outsole to be covered, pressing said cover onto said soles with the lower edge of the cover flush with the bottom of the outsole, heating said joined cover and outsole, deforming the material at the juncture of cover and outsole by stretching and pinching together the material all around the outsole to establish substantially full area contact and adhesion between the edge of said outsole and the contiguous surface of said cover, and releasing the stretched and pinched materials permitting the same to return to substantially normal shape.

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