May 25, 1943. H. L. PIERSON 2,319,879

SHOE AND ITS METHOD OF MANUFACTURE

Filed April 29, 1942

Fig. 1

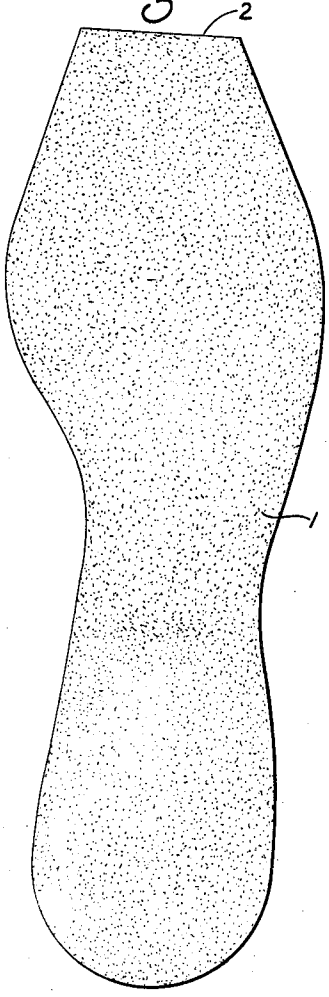


Fig. 2

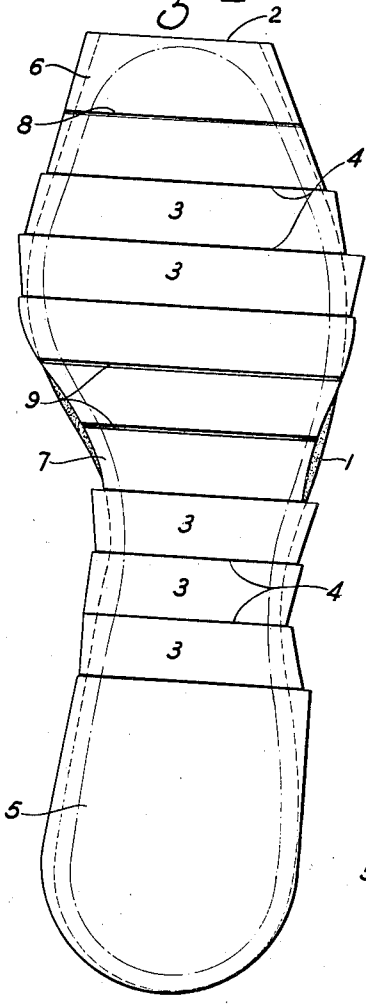


Fig. 3

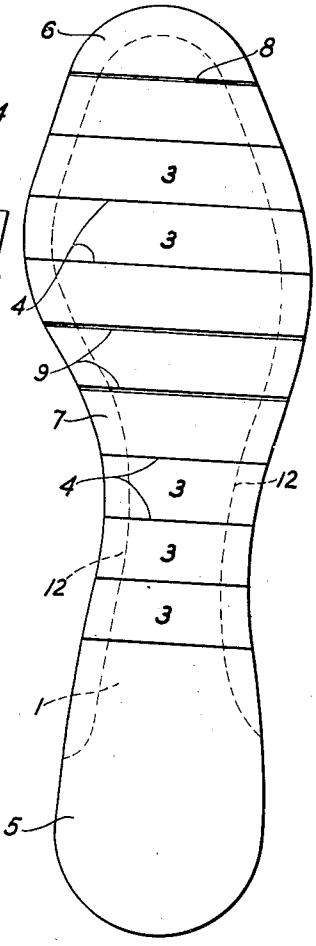


Fig. 5

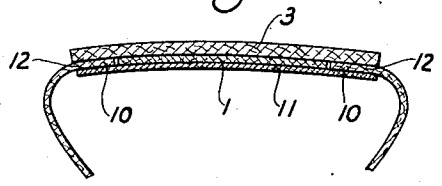
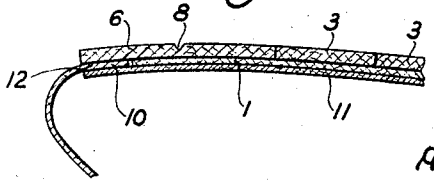


Fig. 4



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SHOE AND ITS METHOD OF MANUFACTURE

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Application April 29, 1942, Serial No. 441,003

5 Claims. (Cl. 12—146)

This invention relates to a shoe and its method of manufacture, and has for a purpose to afford a shoe structure that is commercially practical, more economical to produce than shoes as manufactured heretofore, and which is characterized by greater flexibility than previous methods of manufacture and therefore permits the use of a heavy or thicker outer sole and imparts longer wear and greater durability.

With present day methods of manufacture, it is customary practice to employ a comparatively thin outer sole in making ladies' shoes because of the excessive stiffness that a thick sole gives to the shoe, and it is a purpose of the invention to enable using an outer sole of greater thickness than heretofore without affecting the flexibility of the shoe, the construction being such that the outer sole readily yields with the upper to any flexing movements of the foot, thus adding materially to the comfort of the wearer and greatly enhancing the durability of the shoe.

Another object of the invention is to produce a shoe with an outer sole formed of a series of separate cross strips or pieces securely attached to a supporting layer instead of forming the outer sole from a single piece of leather as heretofore, and to accomplish this in such a way as to increase the flexibility and wearing qualities of the shoe.

A further purpose of the invention is to afford a shoe structure that permits making the outer sole from what is now generally regarded as waste leather, by utilizing a series of short pieces or narrow strips cut from waste portions of sole leather or other suitable material, and affixing them in a practical manner to a supporting layer that is united to the upper and inner sole.

Still a further object of the invention is to provide a shoe that is particularly adapted to cementing processes and enables attaching a series of separate pieces or narrow strips by cement to a supporting layer so as to constitute an outer sole and attaching such outer sole by cement to the upper and inner sole, while at the same time permitting the desired flexibility of the outer sole by relative movement between its several strips or pieces as the upper is flexed.

Another purpose of the invention is to afford a method of manufacturing a shoe such as described above so as to reduce its cost to a minimum, to simplify and speed the procedure, to insure the proper crosswise arrangement on the outer sole of the several separate strips or pieces, and to enable fastening these in place securely and economically.

To these and other ends, the invention consists in the construction and method that will appear clearly from the following description when read in conjunction with the accompanying drawing, the novel features being pointed out in the claims following the specification.

In the drawing:

Fig. 1 is a plan view of the supporting layer blank to which the separate cross pieces or strips are attached to form the outer sole;

Fig. 2 is a similar view of the supporting layer blank after the separate cross strips or pieces constituting the outer sole are attached;

Fig. 3 is a plan view of the outer sole after it has been cut from the blank shown in Fig. 2, the dotted line indicating the outer edge of the supporting layer on the inner surface of the sole after it has been marginally cut away to expose the inner surfaces of the end portions of the cross strips for attachment to the upper;

Fig. 4 is a central longitudinal sectional view showing the outer sole, supporting layer, upper, and inner sole, and

Fig. 5 is a transverse sectional view of the same.

In carrying out the invention, a supporting layer blank 1 is cut from a split from the flesh side of a leather block outsole or from any suitable relatively thin piece of waste leather, or from any other thin material of a character to afford a flexible support for maintaining the separate strips or pieces of the outer sole in proper relationship during the attachment of the sole and after the shoe is completed. The supporting layer blank 1 is cut somewhat larger than and of the same contour as the finished outer sole, preferably about ⅛" larger all around, and at its forward end is provided with a straight edge 2 connecting the side edges and arranged at a predetermined angle with relation to the longitudinal axis of the supporting layer, which angle determines the angular positioning of the narrow strips when attached to the supporting layer. It will be understood that the blank is cut from the selected stock by means of a pattern in which said forward straight edge is formed at the predetermined angle, and where the blank is cut from a split from the flesh side of leather, either the cut side or the flesh side of the blank possesses sufficient roughness to retain cement for attaching it to the adjacent surfaces, as will appear presently.

To the supporting layer thus formed are secured a series of separate pieces or narrow strips 3 having parallel opposite side edges 4. The

narrow strips or pieces 3 are cut with the parallel side edges 4 from waste pieces of sole leather or other suitable material, the first piece at the front end of the supporting layer being positioned with its front edge coinciding or alined with the forward edge 2 of the blank 1 and secured thereto in such position by means of rubber cement or other suitable cementing medium.

Following this the next adjacent narrow strip or piece 3 is located on the supporting layer with one edge against the strip 3 already affixed to the supporting layer, and is cemented thereto in such position. The separate pieces or narrow cross strips are successively cemented to the supporting layer in this fashion, the heel portion being covered by a heel piece 5 that is also cut from suitable waste leather or other material, and it will be understood that each of the narrow cross pieces is cut or selected of such length that its ends extend to or slightly beyond the edges of the supporting layer blank.

While narrow pieces 3 of uniform width may be used throughout the length of the shoe, it is preferable to employ a toe portion 6 and a ball portion 7 of greater width than the other strips, and these wider portions are grooved or indented at 8 and 9 to give the same exterior appearance or effect as though separate narrow strips were employed. These wider pieces may be used to advantage at the toe and ball portion of the shoe because the area is somewhat smaller at the toe and there is therefore less cement-attaching surface for the narrower strips, while at the ball portion there is greater flexing or bending of the sole, and if narrow strips were employed, an excessive gap may occur between the strips as they move relatively to each other upon the flexing of the upper and sole.

After the narrow strips 3 and heel portion 5 are attached to the supporting layer in the manner described, the entire assembly is suitably cut by means of a pattern to the desired shape of the finished outer sole, as shown in Fig. 3, after which the supporting layer, which is on the inner surface of the sole, is cut or ground away marginally to expose the inner surfaces 12 of the end portions of the cross strips, see Fig. 3. These inner surfaces 12 of the end portions of the cross pieces are then roughened in any convenient way and covered with pyroxylin or other suitable cement which serves as the attaching means for securing the outer sole to the upper and inner sole.

The sole is then pressed or shaped to conform to the last, as usual in shoe construction, and is then pressed against the edge portions 10 of the upper overlying the inner sole 11, as customary in shoe cementing processes.

The outer sole is thus securely cemented or may be otherwise attached to the upper and inner sole by means of the union between the end portions of the individual pieces or narrow cross strips and the upper. It is preferable also to unite the supporting layer to the inner sole 11, to prevent looseness or separation of the parts, and this may be accomplished by providing rubber cement or other suitable cementing medium on the inner exposed surface of the supporting layer 1, causing it to adhere to the inner sole 11 when pressure is applied to the outer sole for attaching it to the upper.

With this arrangement, each cross strip or separate piece is attached at its ends or outer edges to the upper while attached to each other through the supporting layer 1, so that when the upper and inner sole are flexed in walking, each cross piece is permitted movement relatively to the adjacent cross pieces while maintaining a firm bond with the upper and the supporting layer and through it with the inner sole.

The upper and inner sole are sufficiently flexible to yield readily to movements of the foot, and the outer sole is equally flexible owing to its being constituted of separate relatively movable pieces which are held together by a flexible supporting layer, while the cement bond between the upper and cross strips and between the supporting layer, cross strips, and inner sole serves to bring about permanent attachment between these parts that is quite as effective and durable as where an integral, one-piece sole is employed.

The structure thus afforded is strong and lasting, while considerably more flexible than a one-piece sole of the same thickness owing to the outer sole being formed of independent pieces which can move with the inner sole and upper relatively independently of each other, thus permitting the use of thicker leather stock than would usually be employed for a one-piece outer sole while obtaining the pliability or flexibility that normally comes only from a very thin outer sole.

While the method and structure have been described with reference to a specific embodiment, the invention is not limited to the specific disclosure herein, and this application is intended to cover such changes or departures as may come within the purposes of the improvement or the scope of the following claims.

I claim:

1. The method of making a shoe sole which consists in forming a supporting layer somewhat larger than the completed sole and with a straight edge at its front end connecting the opposite side edges at a predetermined angle, cementing to the outer surface of the supporting layer a series of cross pieces extending transversely thereof, each of said cross pieces having parallel opposite edges arranged in parallelism to said straight front edge of the supporting layer and in juxtarelation to the edges of adjacent cross pieces, cutting away the edge of the supporting layer and the ends of the cross pieces to form an outer sole, and cutting away the supporting layer at its edges to expose the inner surfaces of the end portions of the cross pieces whereby the said inner surfaces of the end portions of the cross pieces may be cemented to the upper.

2. The method of making a shoe sole which consists in forming a supporting layer somewhat larger than the completed sole, cementing to the outer surface of the supporting layer a series of cross pieces extending transversely thereof, each of said cross pieces having parallel edges in juxtarelation to the edges of adjacent cross pieces, cutting away the edge of the supporting layer and the ends of the cross pieces to form an outer sole, and cutting away the supporting layer at its edges to expose the inner surfaces of the end portions of the cross pieces, whereby the said inner surfaces of the end portions of the cross pieces may be cemented to a shoe upper.

3. A shoe including an inner sole, an upper having its edges extending over the outer surface of the inner sole and attached thereto, and a full length outer sole extending from the toe to the heel of the shoe including a thin readily flexible supporting layer extending from the toe through the shank portion constructed of material that

conforms easily to bending movements of the upper, said supporting layer being cemented to the outer surface of the inner sole between the edges of the upper, and a series of separate cross-pieces arranged in juxtarelation to each other having their end portions extending beyond the supporting layer and cemented to the adjacent surfaces of the upper and their central portions cemented to the supporting layer from the toe through the shank portion.

4. The method of making a shoe sole which consists in forming a supporting layer somewhat larger than the completed sole and with a straight edge at its front end connecting the opposite side edges at a predetermined angle, cementing to the outer surface of the supporting layer a series of cross-pieces extending transversely thereof, the cross-piece at the front end having a straight forward edge coinciding with the aforesaid straight edge of the supporting layer and the cross-pieces being arranged in juxtarelation to the edges of adjacent cross-pieces, cutting away the edge of the supporting layer and the ends of the cross-pieces to form an outer sole, and cutting away the supporting layer at its edges to expose the inner surfaces of the end portions of the cross-pieces whereby the said inner surfaces of the end portions of the cross-pieces may be cemented to the upper.

5. The method of making a shoe sole which consists in forming a supporting layer somewhat larger than the completed sole, cementing to the outer surface of the supporting layer a series of cross-pieces extending transversely thereof, each of said cross-pieces having edges in juxtarelation to the edges of adjacent cross-pieces, cutting away the edge of the supporting layer and the ends of the cross-pieces to form an outer sole, and cutting away the supporting layer at its edges to expose the inner surfaces of the end portions of the cross-pieces whereby the said inner surfaces of the end portions of the cross-pieces may be cemented to a shoe upper.

HAROLD L. PIERSON.