

Aug. 18, 1953

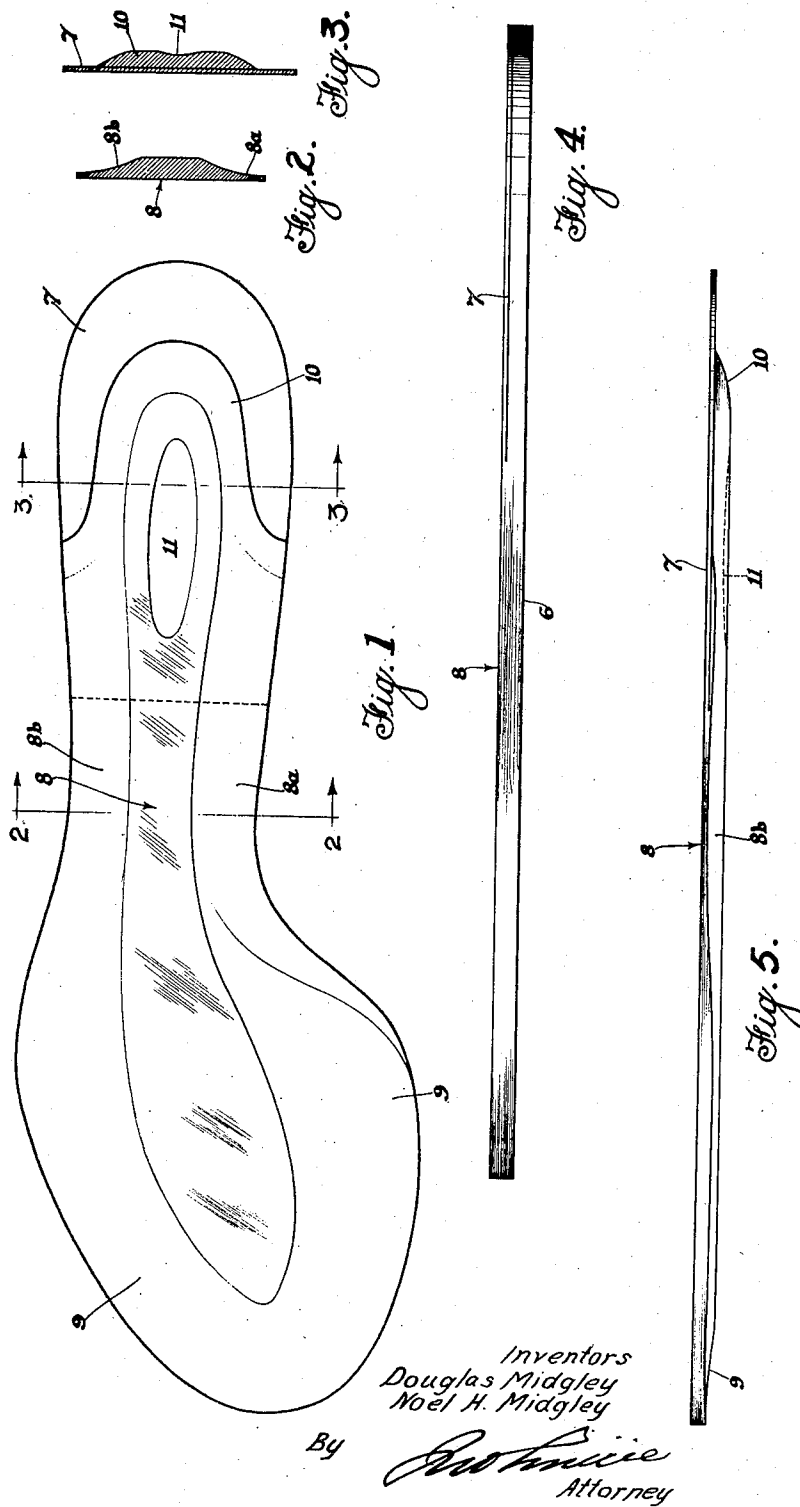
D. MIDGLEY ET AL

2,648,855

METHOD FOR AUTOMATICALLY PREPARING OUTERSOLES

Filed July 14, 1951

5 Sheets-Sheet 1



Aug. 18, 1953

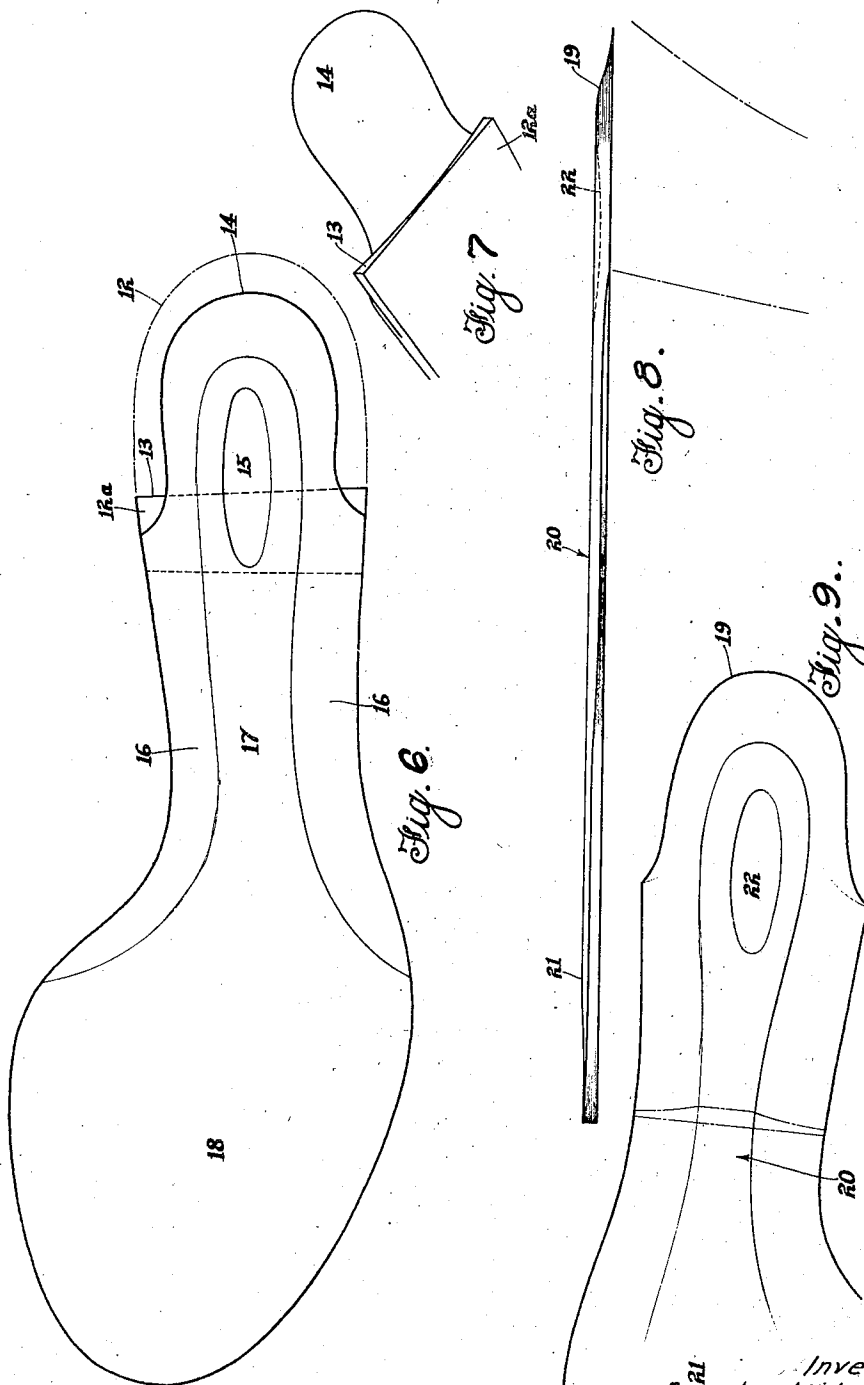
D. MIDGLEY ET AL

2,648,855

METHOD FOR AUTOMATICALLY PREPARING OUTERSOLES

Filed July 14, 1951

5 Sheets-Sheet 2



Inventors
Douglas Midgley
Noel H. Midgley
By *Pro Lucia*
Attorney

Aug. 18, 1953

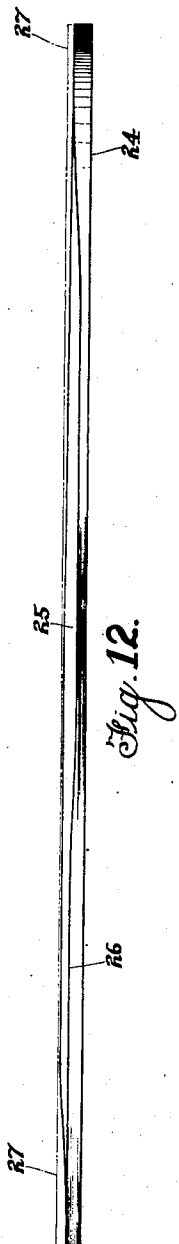
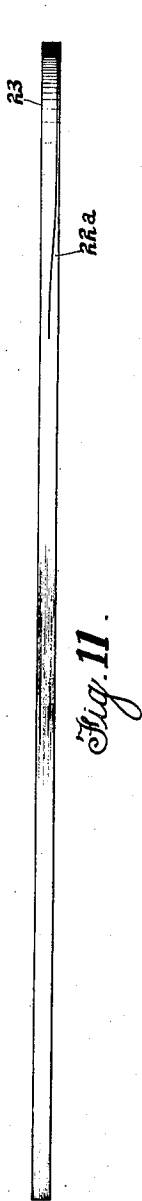
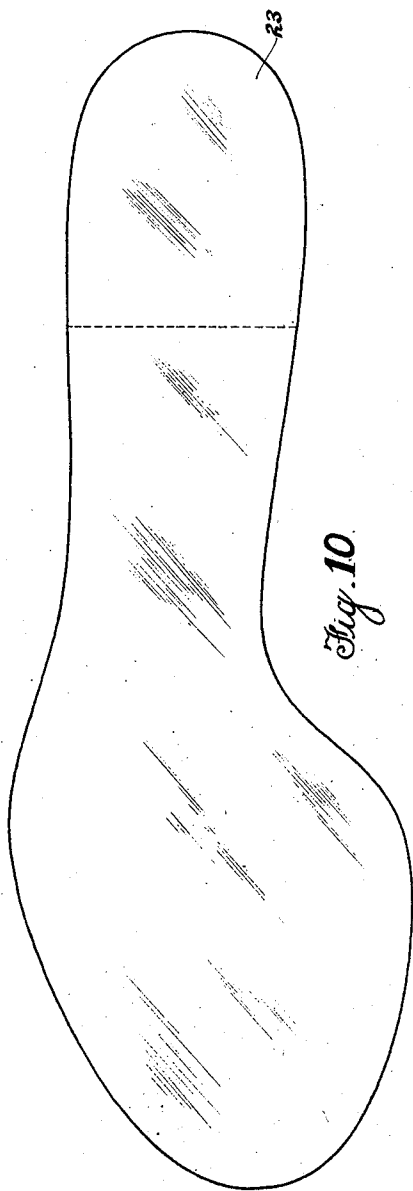
D. MIDGLEY ET AL

2,648,855

METHOD FOR AUTOMATICALLY PREPARING OUTERSOLES

Filed July 14, 1951

5 Sheets-Sheet 3



Inventors
Douglas Midgley
Noel H. Midgley
By *[Signature]*
Attorney

Aug. 18, 1953

D. MIDGLEY ET AL

2,648,855

METHOD FOR AUTOMATICALLY PREPARING OUTERSOLES

Filed July 14, 1951

5 Sheets-Sheet 4

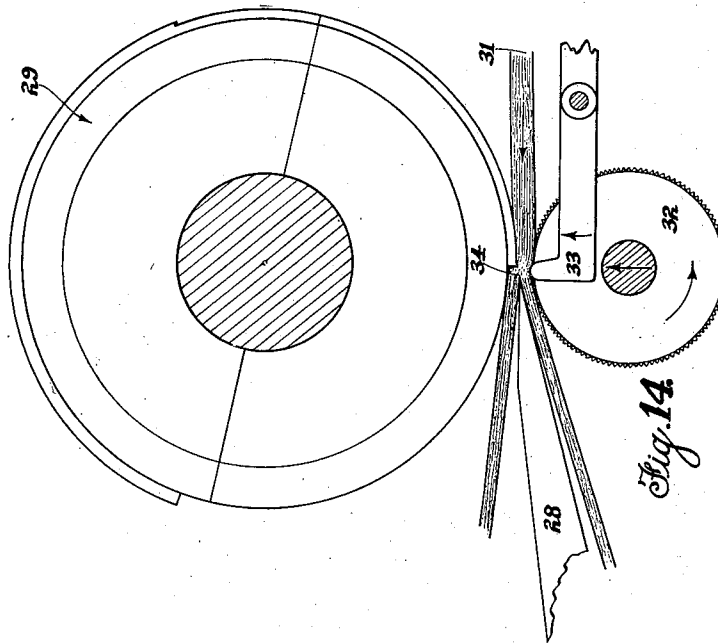


Fig. 14.

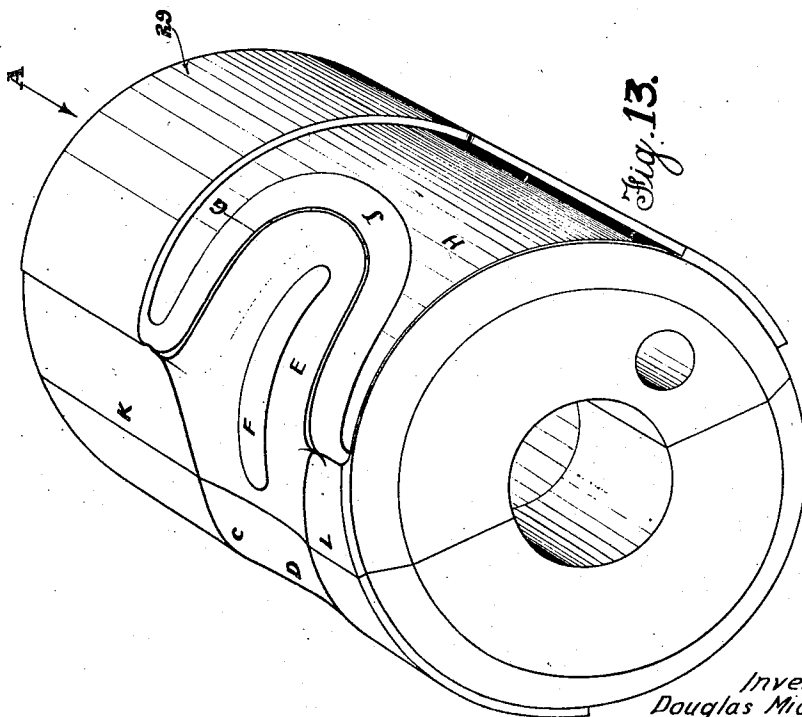


Fig. 13.

Inventors
Douglas Midgley
Noel H. Midgley

By

Proctor
Attorney

Aug. 18, 1953

D. MIDGLEY ET AL

2,648,855

METHOD FOR AUTOMATICALLY PREPARING OUTERSOLES

Filed July 14, 1951

5 Sheets-Sheet 5

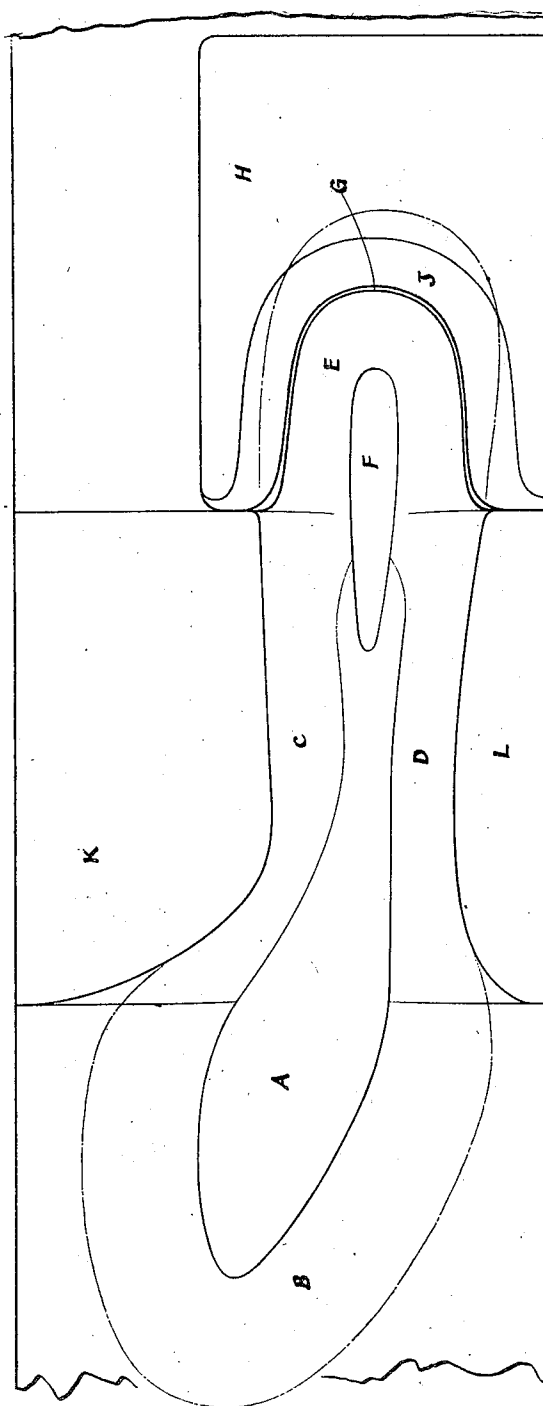


Fig. 15.

Inventors
Douglas Midgley
Noel H. Midgley

By *Prohincie*
Attorney

UNITED STATES PATENT OFFICE

2,648,855

METHOD FOR AUTOMATICALLY PREPARING
OUTERSOLESDouglas Midgley, East Malvern, Victoria, and
Noel Hetherington Midgley, South Caulfield,
Victoria, AustraliaApplication July 14, 1951, Serial No. 236,758
In Australia July 14, 1950

8 Claims. (Cl. 12-146)

1

This invention relates to the manufacture of outer soles for shoes, more particularly ladies' shoes fitted with wood, fibrous, plastic or any other type of heels used in the manufacture of footwear where sole preparation is necessary.

As is well known in the art, such outer soles should, in order fully to satisfy modern requirements, be formed to precise standards as to shape, varying thickness or substance, and so on.

The conventional current method of producing outer soles is relatively complex and lengthy in that it necessitates a considerable number of separate treatments or actions many of which depend upon the human element and a very high degree of skill if anything like a satisfactory article is to be produced.

According to our invention, manufacture is greatly simplified, expedited, cheapened and otherwise improved by carrying out all essential operations simultaneously and rapidly and in such a manner that the utmost precision and uniformity can be assured. More explicitly, we carry out the operations automatically by and during the passage of the outer sole blank through a skiving or die roll machine having an appropriately designed matrix and adapted to progressively reduce or skive the sole blank, such machine being fitted with a magazine loader or feeder so that there is practically a constant delivery of the finished outer soles.

At least one operation of the conventional manufacturing process is, in substance, eliminated by the present invention, as once the machine is set up for a given blank, the starting and finishing positions for reducing the waist and the forepart remain constant.

In every instance the progressively reduced or skived portions are accurately predetermined in thickness and tapering or graduation and can be constantly maintained under working conditions. Previously this could not be relied upon where a number of separate operations were required to make up a suitably prepared outer sole.

The points at which both sides of the waist reduced portions and the forepart reduced portion commence and finish, can definitely be predetermined to fall just forward of or near the break or joint line of the shoe. Hitherto this could not be ensured and the points of commencement and termination of the reductions were dependent upon the discretion, skill and carefulness of the operator.

It will be understood that according to our invention the relative positions of reduction in thickness for each size and shape of outersole

2

remains constant, the margins being graded up and down from the middle or model size.

Referring to the drawings which form part of this specification—

Figure 1 is a plan view of an outersole produced according to the invention and suitable for a shoe with a continental heel.

Figures 2 and 3 are cross sections on lines 2—2 and 3—3 of Figure 1.

Figure 4 is a side or edge view of a blank from which the outersole of Figures 1-3 may be produced.

Figure 5 is a side or edge view of the outersole seen in Figure 1.

Figure 6 is a plan view of an outersole produced according to the invention and suitable for a shoe having a Cuban heel.

Figure 7 is a perspective view of the heel portions of the outersole of Figure 6.

Figure 8 is a side or edge view of another form of outersole according to the invention suitable for a shoe having a Cuban heel.

Figure 9 is a plan view of a portion of the outersole seen in Figure 8.

Figure 10 is a plan view of a blank suitable for forming into an outersole for a shoe having a Cuban heel and illustrates the formation of a special leaf for such heel.

Figure 11 is a side or edge view of the blank seen in Figure 10.

Figure 12 is a side or edge view of another outersole according to the invention for a shoe having a leather or fibre heel.

Figure 13 is a perspective view of a special matrix or die roll as may be embodied in a well known machine for producing outersoles according to the invention, particularly the outersole of Figures 1-3.

Figure 14 is a side view showing parts of such a machine including the matrix of Figure 13 which is assumed to be viewed in the direction of the arrow A.

Figure 15 is a developed plan view of the periphery of the matrix seen in Figures 13 and 14.

Referring now to Figures 1-5 which illustrate one form of the invention, an outersole blank 6 (Figure 4) of the requisite contour, and of adequate thickness or substance, is first cut lengthwise from its heel end so as to form a relatively thin leaf 7 for securing to the breast of a continental heel. Such a blank is then fed into a skiving machine having a special matrix as will be hereinafter referred to, whereby the following operations are simultaneously performed.

The waist portion 8 is progressively reduced in

thickness at the inside 8a and at the outside 8b, the peripheral margin 9 of the forepart is progressively reduced in thickness, a rearwardly projecting tongue 10 for fitting to the top of a heel is formed, and a groove or depression 11 is formed in the tongue 10 for accommodating the rib of a reinforcing shank steel, in cases where the latter is employed.

Referring now to Figures 6 and 7, the outersole thereof is formed from a blank similar to Figure 4 but in the present instance the leaf 12 is cut from the blank in such a way that upon the leaf being removed by a transverse cut it leaves a shoulder 13 which progressively increases in depth from its centre to its opposite edges, as will be readily apparent from Figure 7. Thus the relatively thicker side or edge portions of the outersole adjacent the shoulder 13 will not be likely to become frayed or separated from the front face of a Cuban heel after the latter has been applied. It will be understood that the transversely cut away portion of the leaf 12 is discarded. The remaining portion 12a of the leaf may be connected to the undersurface of the tongue 14 (as by latex or other suitable adhesive or cement) which is provided in its upper surface with a groove 15 similar to groove 11 of the tongue 10 of Figure 1.

The opposite edge portions 16 of the waist portion 17 are progressively reduced in thickness as previously described but the forepart 18 of the outersole may be of uniform thickness or substance as in Figure 6.

In the case of producing outsoles for Cuban or Spanish Cuban heel production, all of the six operations previously listed for Continental heels are simultaneously performed on a blank which is provided with a special form of leaf (Figure 6). The leaf 12 can be of considerable substance at the commencing point and taper away to approximately $\frac{3}{8}$ " in substance in the center and $\frac{3}{8}$ " on the outer edges to a point approximately $\frac{1}{4}$ "- $\frac{1}{2}$ " forward of the heel breast. This facilitates the forming of the tongue 14 at the time when the six operations are being simultaneously and automatically performed. Under production conditions, a light coat of suitable adhesive is applied to the forward end of the leaf 12 before the blank is passed through the skiving machine. This enables the leaf to be bonded to the sole blank to a point approximately $\frac{3}{4}$ " in advance of the position of the heel breast, thus ensuring that the center portion of the leaf remains securely attached to the sole throughout the entire life of the shoe.

The outersole of Figures 8 and 9 is formed from a blank which is devoid of any leaf. Consequently, in this case there is no transverse shoulder (13) at the rear end of the tongue 19, as the under surface of the tongue is a continuation of the under surface of the outersole. The opposite sides or edges of the waist portion 20 and the peripheral margin of the forepart 21 may be suitably skived while the tongue 19 has a groove or depression 22.

The blank of Figures 10 and 11 will be passed through the die roll machine as previously referred but before so doing its rear part is slit so as to form a leaf 22a which when cut transversely near the blind or inner end of the slit leaves a shoulder for abutting against the breast of a Cuban heel, said shoulder being similar to the shoulder 13 of Figure 7. In the present instance the rear portion 23 of the outersole after it has been skived by passage through the die roll ma-

chine will be converted into a tongue similar in every way to the tongue 14 of Figures 6 and 7.

Figure 12 illustrates an outersole for a shoe having a heel made up of a series of leather or fibre lifts. In this case the blank is not slit to provide a leaf but it is passed through the machine in order to progressively and slightly reduce the thickness of the heel portion 24 from its rear towards the waist 25, the opposite side portions of which, as well as the peripheral margins of the forepart 26, being progressively reduced in thickness as in Figure 1. The original thickness of the blank from which the outersole of Figure 12 is provided is denoted by the chain dot line 27.

According to our invention the tongue (10, 14, 19) is graded both as to width and length to suit the size of the heel seat (between sizes), whereas with the conventional method the preparation of the tongue provided only limited assistance towards fitting of the heel used in the manufacture of shoes.

Again with our invention the skiving of the tongue is suitably tapered so as to form a close fitting and efficient filler for the concave heel or seat while the grading or tapering of the tongue renders it a simple matter to ensure that every nail for securing the tongue to the heel extends nicely through the tongue and thus ensures a most secure bonding between the heel and the shoe proper.

Our method, by providing for a groove or depression (11, 15, 22) in the central portion of the tongue assists in a snug assembly of the usual reinforcing shank steel and avoids any upsetting of the heel seat, where fluted shank steels are used. This contributes to a better constructed shoe and the utmost support, comfort and stability. Without such a feature, fracture of the heel base is likely and frequently occurs.

With our improved method, the graded, skived and grooved tongue constitute a most important improvement and a very decided advancement in heel assembly. It can be produced in the desired thickness and contour with depth of groove to accommodate the protruding rib of the reinforcing shank steel, which has been accentuated by the absence of lining, stiffener and upper materials around the seat of the insole.

Reference will now be made to Figures 13-15 which illustrate one particular form of matrix for producing outsoles for shoes to be provided with Continental heels, and co-operating parts of a known die-roll machine incorporating such matrix. Such matrix is, generally, of cylindrical form and may be in one piece or composed of longitudinally extending halves, as shown, or in more than two sections suitably fastened together. In some cases, however, the matrix could be in the form of a substantially flat plate.

In any event the matrix is provided with depressions of such areas, depths and locations as to correspond with the desired surface formation and thickness of the various portions of the outsoles to be produced. Referring now especially to Figure 15, area A represents the maximum thickness of a finished outersole, area B represents the skived margin around the periphery of the forepart of the sole, areas C and D represent the skived inside and outside edge portions of the waist, area E represents the tongue (10), area F represents the groove (11) in the tongue and is raised in relation to area E. The substantially U-shaped area G represents to tongue-forming rise or ridge which, in co-operation with the skiving blade 28 (Figure 14), forms and separates the tongue from the off-cut. Area H is a depression

for allowing the leaf (7) to be depressed so that it will not be cut by the skiving blade when the latter is skiving the tongue. Area J rises gradually from area H to the tongue-forming rise or ridge G. Areas K, L, should be higher than areas C and D but depressed slightly in relation to the maximum diameter of the matrix to ensure that the skiving blade will not damage or cut away the edges of the reduced waist portions of the outersole in the event of any particular blank being operated upon not conforming precisely to the formation of the matrix.

A typical skiving operation according to the invention is illustrated in Figure 14 wherein the matrix 29 is assumed to be rotating clockwise and the blank 31 to be moving towards the left under influence of a series of laterally spaced serrated feed rollers 32 between each pair of which a spring-loaded presser finger 33 acts to force the blank towards and into the surface depressions of the matrix. The skiving blade 28 is preferably mounted with ability for adjustment so that its cutting edge 34 may be set to impart the desired maximum thickness to the outersole.

Each matrix will be suitable for at least one full size sole and a half size sole, i. e. matrix No. 4 would accommodate sizes 4 and 4½. The usual size range will run from 2 to 7 inclusive of half sizes.

The matrix is so designed that it will cover a large variety of shapes and fittings in relation to the forepart, waist and seat.

The greatest variance occurs mainly in the forepart, usually the result of fashion changes in such things as pointed, round, snub or square toes.

Within the same size range regardless of fitting, these may all be prepared with the same matrix. In other words, a size 4 or 4½ sole regardless of fitting or variances as described above, could be produced on a No. 4 matrix.

The changes take place only when the different lengths in the size range have to be prepared i. e. size 5-5½ of the same size range would require a different matrix than that used for size 4-4½ as would size 6-6½ and so on. A different matrix is used according to whether the outersoles are for shoes with Continental, Cuban or other types of heels.

Within fairly wide limits the thickness of the edges around the periphery of the forepart and waist may be varied as desired merely by an adjustment of the skiving knife.

In some instances, it may be desirable to provide detachable sections for the matrix having different contours, depressions or the like, so that such sections can be attached at any desired positions in order to vary the surface formation of the matrix according to the particular shape to be imparted to the outersole.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. The method of producing outersoles for ladies shoes, comprising skiving a blank of minimum thickness to provide an outersole of selected thickness regardless of the original thickness and simultaneously skiving the marginal portions including skiving the inside and outside edges of the waist portion to selected thicknesses skiving the peripheral margin of the forepart to selected thicknesses and skiving from the heel portion a rearwardly projecting tongue to fit snugly within the heel seat of a heel.

2. The method of producing outersoles for ladies' shoes as claimed in claim 1, including skiving a depression in said tongue, for accommodating the rib of a reinforcing shank.

3. The method of producing outersoles according to claim 1, including skiving said tongue to progressively taper its marginal portions towards its outer edge.

4. The method of producing outersoles according to claim 1 comprising splitting the blank from its heel extremity to form a relatively thin leaf which extends forwardly beyond the forward root end of said tongue and which is destined to be secured to the breast of the heel of a shoe.

5. The method of producing outersoles according to claim 1 comprising splitting the blank from its heel extremity to form a relatively thin leaf which extends forwardly beyond the forward root end of said tongue, and transversely cutting said leaf to provide a transverse shoulder which progressively increases in depth from its centre to its opposite edges to abut against the breast of the heel at a position immediately beneath said tongue.

6. The method of producing outersoles according to claim 1 comprising splitting the blank from its heel extremity to form a relatively thin leaf which extends forwardly beyond the forward root end of said tongue with said leaf having an upper surface that is concave both lengthwise and transversely while the under surface of said tongue is convex both lengthwise and transversely to facilitate its fitting within a concave seating of the heel, and transversely cutting said leaf to provide a transverse shoulder which progressively increases in depth from its centre to its opposite edges and to abut against the breast of the heel at a position immediately beneath said tongue.

7. The method of producing outersoles for ladies shoes, comprising skiving a blank of minimum thickness to provide an outersole of selected thickness regardless of the original thickness and simultaneously skiving the marginal portions including skiving the inside and outside edges of the waist portion to selected thicknesses and skiving the peripheral margin of the forepart to selected thicknesses.

8. The method of producing outersoles for ladies shoes, comprising skiving a blank of minimum thickness to provide an outersole of selected thickness regardless of the original thickness thereof and simultaneously skiving successively the forepart and tapering the peripheral margin thereof to a selected thickness, skiving the waist portion and reducing the inside and outside edges thereof to selected thicknesses, and skiving the heel portion and tapering the margins thereof to form a rearwardly projecting tongue for fitting snugly within the heel seat of a heel.

DOUGLAS MIDGLEY.

NOEL HETHERINGTON MIDGLEY.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,527,963	Preo	Feb. 24, 1925
1,824,654	Bresnahan	Sept. 22, 1931
1,877,164	Elkin	Sept. 13, 1932
1,992,213	Johnson	Feb. 26, 1935