May 9, 1944. J. CALLEO 2,348,327

RIBBED INSOLE AND METHOD OF MAKING THE SAME

Filed Nov. 19, 1941

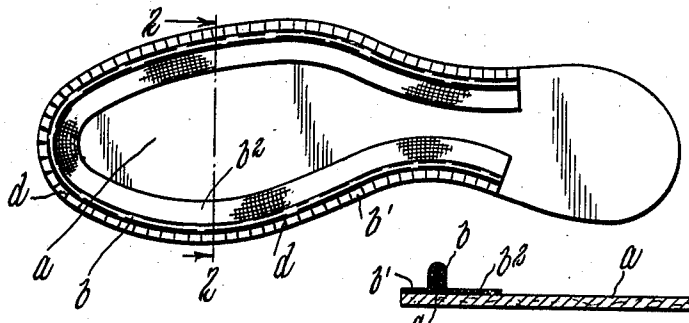


Fig. 1.

Fig. 2.

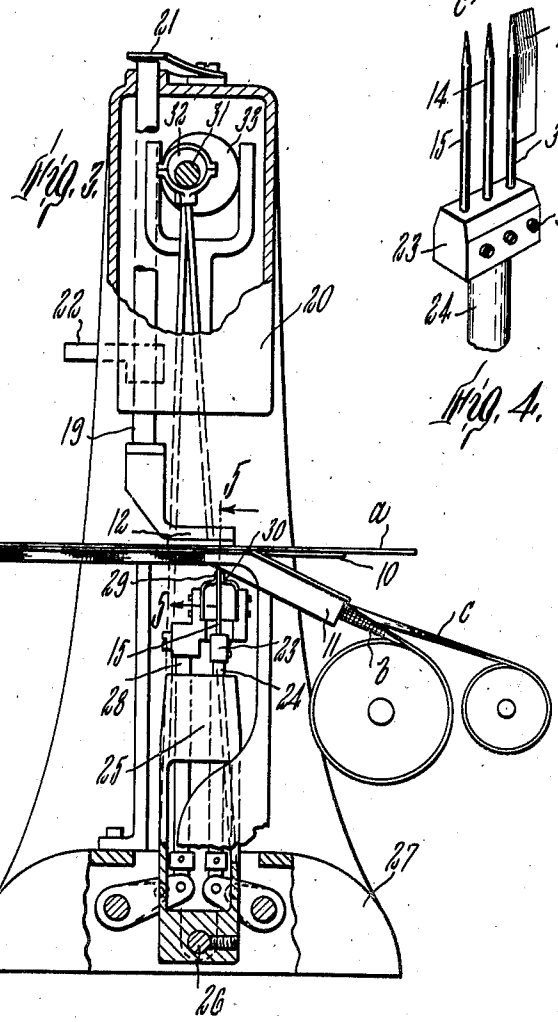


Fig. 3.

Fig. 4.

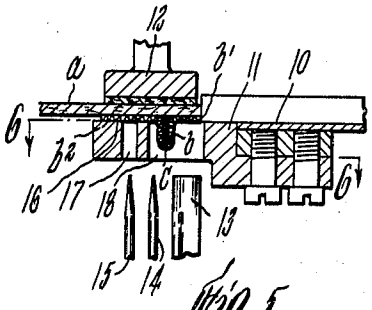


Fig. 5.

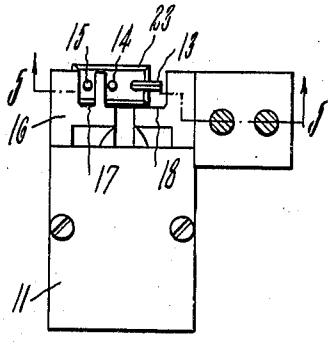


Fig. 6.

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RIBBED INSOLE AND METHOD OF MAKING THE SAME

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Application November 19, 1941, Serial No. 419,740

11 Claims. (Cl. 12—20)

This invention relates to insoles for welt shoes, and particularly to soles of the type in which a separate rib for receiving the stitches of the inseam of the shoe is applied to a flat body. Insoles of this type have long been made in which the rib is composed of a stiff core and a strip of flexible material folded to embrace the core closely and provided with flaps or flanges bent away from the core and laid flat against the body of the insole, and secured thereto by sewed seams or adhesive. Such an insole is shown in the patent of Jesse V. Poole No. 1,137,282, dated April 27, 1915.

In the commercial manufacture of such insoles it has been the practice to use as the covering material strips of plain woven duck cut on the bias so that the interwoven threads make angles of approximately 45° with the length of the strip, in order that the flanges may stretch in being carried around convex curves and lie flat against the surface of the body. The necessity of stretching is particularly marked with respect to the outer rib flange at the toe end of the sole where the curvature of the rib is sharp and embraces a large angle. If without capacity for stretching, the flange surrounding a part of such sharp and extensive curvature would be drawn strongly away from the body of the insole and could not be smoothly held flat against the body. The bias cut fabric is capable of thus stretching in sufficient degree. But the preparation of bias cut strip material in the great lengths required for economical commercial manufacture of such insoles involves considerable expense additional to the cost of the fabric itself. This is because the continuous long strips must be composed of a large number of relatively short strips cut diagonally from the woven fabric are joined together at their ends. There is also some incidental waste of material and loss of effective length in the continuous strips due to the overlap at the joined ends of the constituent bias cut strips.

One object of my invention is to eliminate such expense and waste by making possible the use of fabric covering strips which are cut lengthwise of the woven cloth and may therefore be made of any desired length, however great, in integral continuity without joints, junctions or overlaps. Another object is to enable other flexible materials than woven fabrics, which have little or no appreciable capacity for stretching, to be used in making ribs of the type described.

The invention comprises the method of applying such a rib to the body of an insole and simultaneously slitting the outer flange thereof in lines extending (preferably perpendicular to the length of the strip) from points near the outstanding rib to the outer edge of the strip; and slitting the inner flange as well if desired. It also comprises a means for thus slitting the outer flange, or both flanges, of such a rib and the combination thereof with means for applying the rib strip to the insole body. It further comprises the resulting insole provided with a flanged rib of which at least the outer flange is slit or cut through at short intervals in at least that portion which follows the outline of the toe end of the sole.

The drawings furnished herewith show an insole made in accordance with this invention and an illustrative embodiment of means for folding a rib strip, applying such strip to the body of an insole, and slitting the outer flange of the strip in the course of applying it; and in the drawing,

Fig. 1 is a plan view of the bottom of the insole referred to;

Fig. 2 is a cross section of the insole taken on line 2—2 of Fig. 1;

Fig. 3 is a front elevation, partly cut away and shown in section, of a machine for applying a rib strip to the body of an insole and slitting the outer flange thereof;

Fig. 4 is a perspective view of the tool or instrument of such machine by which the slitting of the strip and feeding of the insole is accomplished;

Fig. 5 is a fragmentary sectional view taken on line 5—5 of Figs. 3 and 6;

Fig. 6 is a plan view of the strip folding, slitting and feeding means of the machine, being the parts beneath the line 6—6 of Fig. 5.

Like reference characters designate the same parts wherever they occur in all the figures.

The insole shown in these figures, like that of the Poole patent referred to, consists of a body *a* and a rib composed of a folded strip *b* embracing a stiff reinforcing or core strip *c* and having an outwardly turned lip or flange *b'* and an inwardly turned lip or flange b^2 laid flat against the body and secured thereto. Preferably, and in accordance with the common present day practice, the strip *b* is covered with a coating of dried rubber latex and the area of the body *a* against which it is applied is likewise provided with a coating of the same substance. When these coatings are brought in

contact and firmly pressed together, they unite and create a powerful bond.

Preferably the strip *b* is made of cotton duck. Unlike that shown in the said Poole patent, and heretofore used in the manufacture of insoles by the Poole process, the strip is cut lengthwise of the warp of the woven fabric, as is indicated by the longitudinal and transverse lines applied to the strip in Fig. 1. The outer flange *b'* is cut crosswise at regular intervals forming slits *d* which spread open when the strip is fed around a convex curve. Such spreading is shown in the drawing at the toe end of the sole; and it occurs in less degree at the convex portions along the sides of the fore part. The tongues of fabric between the opened slits lie flat against the adjacent surface of the body and are firmly united thereto by the bonding material.

The strip is folded and applied progressively to the body of the insole, the work is fed step by step, and the outer flange is cut with each feeding step, by correlated means, of which an illustrative form is shown in the drawing. These means comprise a table 10 on which the body *a* is placed, a folder 11 secured to the table, a presser 12, a slitting knife 13, which is also a feeder and, preferably, one or more additional feeding points or awls 14 and 15. The knife and awls are mounted to have a reciprocating vertical movement beneath the presser 12, and also a lateral movement to right and left with respect to the position shown in Fig. 3. The folder 11 is secured to the table located in an inclined position beneath the table with its delivery end directly under the presser, and is arranged to receive the strips *b* and *c* from any suitable sources of supply, here diagrammatically represented as rolls or spools mounted conveniently near to the folder on suitable supports, not shown. The folder here shown is of well known character, not of my invention, and need not be described further than by saying that it contains a passageway for the core strip, a passage for the fabric strip, and internal formations adapted to bend the fabric strip longitudinally around the core strip and bend the flanges *b'* and b^2 away from the core strip in the same plane. The folder is so located as to deliver the strip against the under side of the inner sole body, and has a top surface 16 (Fig. 6) underlying a portion of the presser 12 and cooperating therewith to press the coated side of the rib flanges *b'* and b^2 forcibly against the coated area of the body. Openings 17 and 18 are provided in the delivery end of the folder to receive, and permit back and forth movements of, the knife and feeding awls. The presser is secured to a bar 19 which is movable endwise in the overhanging head 20 of the machine, and is pressed upon by a leaf spring 21; the spring forcing the presser toward the surface 16 of the folder. An arm 22 secured to bar 19 typifies means by which the presser may be raised to admit and release the work, and may also be considered as typifying automatic means, such as those with which sewing machines are commonly equipped, for relieving the presser in time with the work feeding steps.

The knife and feeding awls are secured to a block 23 on a bar 24 which reciprocates in a rocker 25 secured to a rock shaft 26 in the machine base 27. A second bar 28 also reciprocates in the rocker 25 and carries fingers 29 and 30 which embrace and support the knife and awls near the work. A shaft 31 carrying two eccentrics, one of which is shown at 32, and a cam 33, reciprocate the bars 24 and 28 and oscillate the rocker 25 through connections of known character, such as those illustrated in the patent to J. V. Poole No. 2,042,275 dated May 26, 1936. These connections are constructed and arranged to advance the bar 24 toward the work when the rocker is near the right hand limit of swing (with respect to Fig. 3), swing the rocker from right to left while the knife and awls extend to some extent into the work, withdraw the bar 28 at the end of this swinging movement, and swing the rocker from left to right while the knife and awls are clear of the work.

The fact is illustrated in Figs. 5 and 6 that the knife 13 is arranged to move toward and away from the plane in which the body *a* is held, at that side of the rib from which the flange *b'* projects. Its width, and the length and position of its cutting edge, are such that it will cut the flange *b'* from the outer edge thereof inward to a point near the base of the rib. It is provided with a shank 34 adjustable endwise in a socket within the block 23, and is set, and secured by a set screw 35, so that its edge will pass all the way through the thickness of flange *b'* in the course of the upward movement of bar 29. The awls 14 and 15 are similarly mounted and adjustable, and are set so that they will penetrate the insole deeply enough to propel the insole without slip during the feeding movements. The knife cooperates with the awls in feeding the work, besides performing its exclusive function of slitting the rib flange. The feeding steps are made of suitable length to space the cuts at convenient distances apart and to feed the work at a sufficiently rapid rate. Considerable latitude is possible in this regard. I may say however, by way of illustration and not limitation of the invention, that I have found three or four sixteenths of an inch to be a very suitable and convenient length for the feeding steps.

Variations from the specific disclosure here shown may be made within the scope of the invention. For example, the operation of slitting and feeding may be combined with a sewing operation so as to secure the rib by seams, as specifically shown in the before mentioned Poole Patent 1,137,282. Also it is not essential that the rib be made with an inserted core. Other known forms of rib strip which have base flanges or lips may be applied and slitted in the same way. Again, if desired, a knife similar to the knife 13, but oppositely disposed, may be substituted for the awls 14 and 15 with its shank set in the socket of the awl 14, for slitting the inner flange as well as the outer flange. But such second knife is generally unnecessary, because the inwardly convex curves of insole ribs are seldom sharp enough to cause elongation of the margin of the inner flange beyond the capacity for lengthwise stretching of cotton duck. And it goes without saying that either or both of the awls may be omitted without substitution of a knife, although it is preferable to have at least one awl to assist the operator in correctly guiding the work.

It will be readily understood that the means here shown and described, and equivalents thereof, enable the objects set forth in the introductory part of this specification to be accomplished with certainty and without difficulty. Toe curvatures of any degree of sharpness may be surrounded by base flanges slit in the manner described, and the segments of the flange between the slits will lie flat against the

surface of the insole body with no more tendency to draw away therefrom than is present in the case of bias cut fabric or straight portions of any material. And any other material, which is sufficiently flexible to be folded in the manner described and applied in a curved line to the surface of a body, may be used in place of cotton duck as the material for the rib, including such as have even less capacity for stretching than that of cotton duck in the direction of its warp.

The term "straight cut" where used in the following claims to characterize the fabric strip is defined as meaning that, in cutting wide fabrics to make the strip material, the fabric is cut along the direction of one of its sets of interwoven crossed threads or yarns so that such threads extend lengthwise of the strip. More specifically, it signifies that the strip is severed from the fabric in the direction of the warp.

What I claim and desire to secure by Letters Patent is:

1. The method of making a ribbed innersole which comprises leading a folded strip of flexible material having outwardly turned flanges to the body of an insole in such fashion that said flanges are brought against one surface of said body, feeding the strip and body step by step simultaneously in the same direction at the same speed, and slitting one of said flanges crosswise in timed relation with the feeding steps.

2. The method of making a ribbed innersole which consists in folding a straight cut strip of textile fabric to form a rib and outturned flanges at the base of such rib, applying and securing said flanges to one face of an innersole body in a manner such that the rib protrudes from the body and extends in a line generally similar to the outline of the body, and slitting one of the flanges transversely from its outer edge toward the base of the rib.

3. The method of making a ribbed innersole which consists in folding a straight cut strip of textile fabric to form a rib and outturned flanges at the base of such rib, applying and securing said flanges to one face of an innersole body in a manner such that the rib protrudes from the body and extends in a line generally similar to the outline of the body, and slitting one of said flanges at points near together and in lines extending from its outer edge transversely of the length of the strip toward the base of the rib.

4. The method of making a ribbed innersole which consists in folding a straight cut strip of textile fabric to form a rib and outturned flanges at the base of such rib, applying and securing said flanges to one face of an innersole body in a manner such that the rib protrudes from the body and extends in a line generally similar to the outline of the body, and slitting one of the flanges transversely from its outer edge toward the base of the rib simultaneously with the step of applying the rib to the insole body.

5. The method of making a ribbed insole which comprises progressively bringing an innersole body and a flanged rib strip of flexible material into contact on one of the sides of such body in a line generally similar to the outline of the body and successively cutting slits across one of the flanges of such strip during the progress of bringing the strip flanges and insole body together.

6. The method of making a ribbed insole comprising placing a flat body of such insole in position to receive a rib, leading a flanged flexible rib strip toward and into contact with one face of such body, passing the edge of a knife toward said body from a location at a distance therefrom in a path and to an extent such that the knife edge passes through one flange of the strip and enters, but without penetrating, the substance of said body and severs the said flange in a line extending from its outer edge toward the base of the rib, moving said knife transversely of its edge to feed the work, withdrawing the knife clear of said body and rib flange, moving the knife while clear of the work oppositely to the feeding movement, repeating the above described cycle of movements of the knife a number of times, and guiding the said body and rib strip so as to cause the rib strip to be applied thereto in a line conforming generally to the outline of the body.

7. An apparatus for producing ribbed insoles having an attached flanged rib with transverse slits in one flange of such rib, comprising a slitting knife, means for moving said knife in a cycle consisting of advance, edge foremost, feeding movement in a direction transverse both to its edge and to the direction of its advancing movement, withdrawal, and return to starting position; combined with an opposed abutment arranged to support an insole against the thrust of the knife in position to cause penetration of the knife edge through the flange of such rib, the knife being arrested in its advancing movement short of such abutment.

8. A machine for applying a flanged stitch receiving rib to an insole body and slitting one of the flanges of such rib comprising a guide for such a strip having a surface adapted to support the flanges of the rib, a presser cooperating with said surface to put such flanges and the body of an insole under pressure, a knife having a cutting edge on its end projecting toward said presser from the side thereof at which the strip guide is located, said knife being mounted to move toward and away from said presser and also in a direction transverse both to its edge and to the direction of its first named movement, and means for so moving said knife in a cycle consisting of advance toward the presser, displacement laterally in one direction, withdrawal from the presser, and displacement laterally in the opposite direction.

9. A machine for applying a flanged stitch receiving rib to an insole body and slitting one of the flanges of such rib comprising a guide for such a strip having a surface adapted to support the flanges of the rib, a presser cooperating with said surface to put such flanges and the body of an insole under pressure, a knife having a cutting edge on its end, a carrier for said knife holding the same with its cutting end extending toward said presser from a location at the same side thereof as the strip guide, the knife being movable back and forth on said carrier in the direction of its length, its movement toward the presser being limited to end at a distance from the presser less than the thickness of such innersole body, and the carrier being movable back and forth transversely both of the cutting edge and of the direction of the first named movement, and means for imparting their prescribed movements

to the knife and knife carrier respectively in a predetermined sequence.

10. A machine for the purpose set forth comprising a presser and a folded flanged strip guide arranged to receive an insole body and the flanges of a rib strip between and in contact with them, a carrier movable back and forth in a path substantially parallel to the coacting portions of said guide and presser, a knife holder mounted on said carrier and guided to move thereon in a path transverse to the movement of the carrier, a knife secured to said holder having an edge at one end in a line transverse to both the movement of the carrier and the movement of the knife holder, and correlated mechanism for moving said carrier and knife holder in their respective paths and in a predetermined cycle.

11. In a machine of the character described having a rock shaft, a rocker secured to said shaft and a bar movable endwise in said rocker in a path transverse to the movements of the rocker; a knife secured to said bar having a cutting edge at one end lying in a line transverse to the directions of movement of both the rocker and bar.

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