A shoe last having an insole securing member with cutting edges projecting from the forepart of the last bottom, extending lengthwise of the last and being spaced widthwise to cut into an insole to hold the insole on the last bottom. A method for temporarily securing an insole on a last bottom in which the insole material is compressed between the cutting edges for frictionally holding the insole.
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SHOE LAST AND METHOD FOR INSOLE ATTACHMENT MEANS

BACKGROUND AND OBJECTS OF THE INVENTION

In U.S. Pat. No. 3,744,074 there is disclosed a method of temporarily attaching insoles to the bottoms of lasts as a preliminary step in a sequence of shoe making operations. The method avoids the use of tacks, adhesive tape and the like, or the need for accurately providing apertures in the insoles for attachment to the lasts by placing the apertures over locating pins up-standing from the bottoms of the lasts in appropriate locations. As disclosed, the method involves the use of lasts each having at least one locating member having a cutting edge up-standing from the forepart of the last bottom. The cutting edge is capable of penetrating an insole positioned on the last bottom to form a tab in the insole and is so orientated with respect to the last that end portions of the cutting edge are positioned heelwardly of the remaining portions of the cutting edge. The insoles are impaled on the locating members by the application of percussive force to the appropriate portions of the insoles. Preferably, a last for use in the method disclosed in said patent is also provided with a locating member up-standing from a heel seat portion of the last upon which heelward locating member a heel seat portion of the insole may be impaled so as to assist in locating the insole in the desired position on the last bottom. As is explained in said patent, the heelward locating member may be of a simple form, e.g., a pin provided with a point or a chisel-shaped end.

The use of lasts having such locating members has provided a very satisfactory method of temporarily attaching insoles to last bottoms while upper assembling and lasting operations are carried out during the manufacture of shoes. The use of such locating members is found to provide for adequate retention of the insoles on the last bottoms during subsequent assembling and lasting operations. However, the operation of slipping the last from a completed shoe is facilitated by the fact that, on the breaking of the last in a shoe, the heelward locating member is readily withdrawn from the insole and, as the forepart of the last is withdrawn from the upper, the tab portion, formed by the forepart locating member, in the insole is able to fold over under the influence of heelward movement of the forepart locating member. This tends to lift the insole off the forepart locating member, so that the shoe can be removed from the last without undue effort or the likelihood of damage being done to the insole. The tab portion can, if it does not spring back into its original position, be easily pushed down into a "flat" position. The tab portion and the slit defining it may be covered in the completed shoe by the insertion of a sock as is common practice in the manufacture of many shoes.

I have found that many of the advantages of a method of temporarily attaching insoles to last bottoms by impaling the insoles on locating members up-standing from forepart portions of the last bottoms may be obtained by the use of lasts having forepart locating means modified to avoid forming a displaceable tab which at times may be undesirable. To this end, the forepart locating means is provided with a discontinuous cutting edge, e.g., one having two separate portions upon which forepart portions of an insole can be impaled. In accordance with one of its several features, the invention provides a method of securing an insole temporarily on a last including the steps of providing a forepart region of a last with locating means having two separate widthwise spaced cutting edge portions up-standing from the last bottom and extending generally lengthwise thereof, placing an insole against the last bottom in correct alignment with edge portions thereof, and applying pressure to the insole so that the insole is penetrated by the cutting edge portions and thereby frictionally retained on the locating means.

The invention also provides, in accordance with another feature, a last for use in the manufacture of shoes having insoles, said last being provided with locating means fixed to the last bottom in a forepart region thereof by which an insole may temporarily be secured to the last bottom. The locating means comprises two separate cutting edge portions upstanding from the surface of the last bottom which cutting edge portions are capable of penetrating an insole positioned on the last bottom and thereby frictionally retain the insole on the locating means. The cutting edge portions are so orientated as to extend generally lengthwise of the last at localities spaced widthwise of the last bottom.

Preferably, the two cutting edge portions are arranged to be upstanding from a single base portion by which the locating means is secured to the last bottom but the two cutting edge portions may be separately secured to the last bottom if desired. Preferably, the two cutting edge portions extend generally lengthwise of the bottom of the last in arcuate shape to provide increased rigidity of the cutting edge portions as compared with straight portions. However, they may be straight if desired. Preferably, the cutting edge portions are positioned so as to lie side by side and are spaced widthwise of the last bottom to such an extent that, when an insole is impaled thereon, a portion of the insole lying between the cutting edge portions experiences a degree of compression which assists in retaining the insole upon the locating means. With a view to facilitating the last slipping operation heelward end portions of the cutting edge portions are preferably inclined with respect to the last bottom in such a manner that, as the last is withdrawn heelwardly from the shoe upper, the inclined portions, as they move heelward, tend to lift the insole off the forepart locating means and minimize any tendency for the locating means to mark the insole surface.

There will now be given, with reference to the accompanying drawings, a more detailed description of the illustrative method and two illustrative lasts. It is, however, to be clearly understood that the illustrative method and the illustrative lasts are selected for description merely by way of exemplification of the invention and not by way of limitation thereof.

In the accompanying drawings:

FIG. 1 is a perspective view of a first illustrative last fitted with a first form of forepart insole locating means and a heel seat insole locating member;

FIG. 2 is a view showing, in perspective, the toe portion of a second illustrative last fitted with a second form of forepart insole locating means;

FIG. 3 is a perspective view of the forepart locating means of the first illustrative last;

FIG. 4 is a section on the line IV—IV in FIG. 1 showing a toe portion of the first illustrative last and its forepart locating means; and
FIG. 5 is a section, on the line V—V in FIG. 2 showing a toe portion of the second illustrative last and its forepart locating means.

Each of the illustrative lasts may be formed in two parts with a forepart portion 2 hinged to a heel part 3 so that the last may be moved between an extended condition shown in FIG. 1 and a broken condition to facilitate removal of the last from a lasted shoe. Each of the illustrative lasts is provided with a two-part bottom plate comprising portions 4, 5 secured to the forepart and heel part respectively. The first illustrative last shown in FIGS. 1 and 4 is provided with a forepart locating means indicated generally by the reference numeral 6, upon which a forepart portion of an insole to be secured to the bottom of a last may be impaled. To assist in retaining the insole in the desired position on the last bottom, the last shown in FIG. 1 is provided with a heel seat locating member 7. The member 7 is provided by a chisel pointed pin 8 which extends upwardly beyond the plate portion 5 of the last bottom in a more or less central position with respect to the heel seat portion. The pin 8 is so orientated that the chisel edge extends generally lengthwise of the heel seat portion of the last. The pin 8 is secured in the last in a stem portion (not shown) which is driven into the last through a hole in the plate portion 5, a washer 9 on the pin determining the extent to which the pin is driven into the last.

The forepart locating means 6 is arranged to occupy a position near the toe end of the last and approximately on the centerline of the forepart. The forepart locating means 6 comprises two cutting edge portions 10 (FIG. 3) upstanding from a single base portion 11 which has a depending stem portion 12 by which it is secured in the last with the base portion 11 against the bottom plate 4 and the two cutting edge portions 10 upstanding from the bottom of the last. As is seen from FIGS. 1 and 3, the cutting edge portions 10 are arcuate, being in fact, formed as arcs of a circle which is concentric with the stem portion 12. Conveniently the diameter of the circle may be of the order of 5/16 inch.

As is shown in FIGS. 1 and 4 the forepart locating means 6 is so orientated that the cutting edge portions 10 extend generally lengthwise of the last. A gap 13, of some 1/8 inch to 3/16 inch is formed between the adjacent toe end portions of the cutting edge portions 10 and the cutting edge portions extend sufficiently far heelward for the heelward end portions to lie at least substantially upon a common diameter of the circle above referred to. As is shown in the drawings the heelward end portions 14 of the cutting edge portions are inclined at an angle of some 35° to the last bottom for a purpose hereinafter referred to. The gap 13 provides a discontinuity in the cutting edge portions so that, when a forepart portion of an insole is impaled upon the locating means the cutting edge portions penetrate the insole but do not form a complete tab portion as is the case of the forepart locating means of the illustrative last described in said patent. As shown in the drawings the cutting edge portions may be relatively blunt and are not therefore likely to be readily damaged during the handling of the lasts. Conveniently, the thickness of the cutting edge portions may be some 0.025 inch to 0.030 inch. However, the application of percussive force, as by a hand held hammer of a power operated machine such as described in copending application Ser. No. 323,892, filed Jan. 15, 1973, to a forepart portion of the insole may readily cause penetration of the insole by the cutting edge portions. Preferably, the height of the upstanding edge portions is at least approximately commensurate with the forepart portion of the insole, e.g., some 0.070 inch (for womens shoes) or some 0.120 inch (for mens).

The second illustrative last (see FIGS. 2 and 5) is generally similar to the first illustrative last except in so far as it has forepart locating means 19, which comprises two cutting edge portions 20. Each portion upstands from a forepart locating means secured to the last with a washer 23 below the cutting edge portion against the bottom plate portion 4. The stem portions extend through suitable holes in the plate portion and being driven into the forepart portion of the last. The two cutting edge portions 20 are straight and are so orientated that they extend generally lengthwise of the last and lie at least substantially parallel to each other but are separated widthwise of the last by a distance of some 1/4 inch. As is shown in the drawings heelward end portions 24 are inclined at an angle of some 35° to the last bottom for a purpose hereinafter described. The toeward end portions of the cutting edge portions 20 are at least substantially vertical and the cutting edge portions are relatively blunt (being made of steel strip some 0.025 inch to 0.030 inch thick) as is the case of the cutting edge portions of the first illustrative last. Conveniently the overall length of the cutting edge portions is effectively some 1/4 inch. The second illustrative last may also be provided with a heel seat locating member like the heel seat locating member 7 of the first illustrative last.

In following the illustrative method of temporarily securing an insole, a last is provided with locating means fixed to the last bottom in the forepart region thereof. The forepart locating means may be of either of the two illustrative types described above. The last also is provided with a locating member provided by a chisel pointed pin upstanding from the seat portion of the last bottom. An insole, preferably pre-molded to a shape corresponding to (or exaggerated as compared with) that of the bottom of the last, is positioned against the last bottom accurately with respect to the featherline of the last, i.e., in correct alignment with the edge portions thereof. Pressure is then applied to portions of the insole opposite the forepart locating means and the heel seat locating member to impale the insole thereon, the insole being penetrated by the cutting edge portions of the forepart locating means and the chisel point of the heel seat locating member. The pressure preferably is applied as a percussive force either by the use of a hand held hammer or by the use of a machine like that disclosed in said application. As the cutting edge portions of the forepart locating means penetrate the insole, a portion of the insole lying between the cutting edge portions is compressed widthwise to some extent thereby enhancing the frictional grip of the locating means on the insole so that it becomes frictionally held thereon in a manner such that inadvertent displacement of the insole from the locating means during the following shoemaking operations is unlikely to take place.

After the insole has been assembled on the last bottom an upper is placed over the last and the usual shoe making operations are performed, such as lasting and bottoming with a sole member. When it is desired to
slip the completed shoe from the last, the last is broken and the heel end portions of the upper raised from the last bottom, lifting the seat portion of the insole from the chisel-pointed pin 8. The forepart portion of the shoe is then drawn toewardly off the last, and as the forepart portion of the last is thereby withdrawn from the shoe the inclined heelward end portions 14 or 24 of the cutting edge portion of the forepart locating means lift the forepart of the insole off the cutting edge portions of the forepart locating means so that no undue scoring of the insole is likely to take place as the shoe is removed from the last.

Having thus described my invention and what I claim as new and desired to secure as Letter Patent of the United States is:

1. A shoe last having at least one insole securing member provided with spaced elongate members having cutting edges and projecting from the last bottom for cutting into an insole forceably applied to the last bottom, said members extending lengthwise of the last and being spaced widthwise for holding the insole.

2. A shoe last according to claim 1 in which said securing member is located in the forepart of the last bottom and the cutting edges are so spaced widthwise as to compress insole material between the edges for frictionally retaining the insole on the last bottom.

3. A shoe last according to claim 1 in which the cutting edges are arcuate.

4. A shoe last according to claim 1 in which the heelward ends of the cutting edges are inclined to facilitate removal of the last from a completed shoe.

5. A shoe last according to claim 1 in which the cutting edges are formed on two members extending lengthwise of the last each provided with stem portions embedded in the last.

6. A method of temporarily securing an insole to a last bottom without fasteners driven through the insole into the last including the steps of providing a last with an insole securing member having elongate spaced cutting edges and projecting from the forepart of the last bottom, registering an insole with the last bottom; and forcing the insole against the last bottom causing the edges to cut into the insole and compress the insole material between the edges to frictionally hold the insole on the last bottom.

7. A method of lasting shoes including the steps of providing a last with elongate members having spaced cutting edges and projecting from the forepart of the last bottom; providing heelward ends of said edges with inclined surfaces; registering an insole with the last bottom, forcing the insole against the last bottom causing the edges to cut into the insole and compress the insole material between said members to frictionally hold the insole on the last bottom, lasting a shoe upper on the last and insole; and removing the last from the completed shoe by sliding the shoe toewardly whereby said inclined surfaces lift the insole from the last bottom as the shoe is removed from the last.