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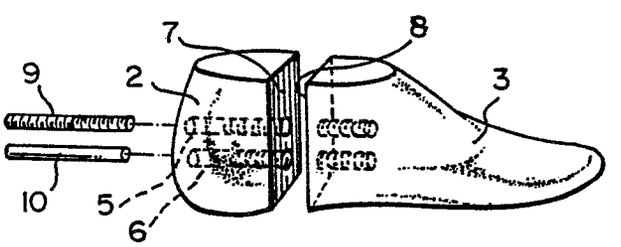
(54) Method of manufacturing footwear last.

(57) The invention disclosed relates to a method of producing a footwear last including the steps of forming rough castings of toe and heel portions (3, 2) of the last, separately maching such portions in an automatic computer operated, three-dimensional milling machine in accordance with a predetermined pattern, and connecting the toe and heel portions together. Thus, consistently accurate lasts can be produced.



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METHOD OF MANUFACTURING FOOTWEAR LAST

This invention relates to a method of manufacturing a footwear last.

In general, footwear lasts are currently formed of hard plastic such as polyolefins. The plastic is molded, i.e. rough cast to produce an article vaguely resembling a foot. The rough cast last is machined on a lathe to more closely resemble the finished product, then cut from top to bottom when a multi-piece last is being produced so that a hinge can be added. If no hinge is required, i.e. for one-piece lasts, no cut is made. In either event, the unfinshed last is left with projections at the toe and heel ends where the last was mounted in the lathe. The last is normally finished by removing the projections manually.

The conventional method tends to be inaccurate. The quality of the manual finishing step depends upon the skill of the individual last maker, and it is readily apparent that differences will occur from one last maker to the next.

The object of the present invention is to solve the above identified problem by providing a relatively simple method of producing a footwear last which results in accurately sized lasts regardless of the skill of the last maker.

Accordingly, the present invention relates to a method of manufacturing a footwear last comprising the steps of:
(a) forming rough castings of portions of a last;
(b) separately machining said last portions in accordance with a predetermined pattern to yield last portions having the final desired configuration; and (c) connecting the last portions to each other to produce a finished last.

The invention will now be described in greater detail with reference to the accompanying drawing, which illustrates a preferred embodiment of the invention, and wherein:

Figure 1 is a schematic perspective view of a casting used to produce a last;

Figure 2 is a schematic perspective view of the casting of Fig. 1 following cutting;

Figure 3 is a schematic perspective view of the casting of Fig. 1 following machining; and

Figure 4 is a schematic perspective view of a finished last.

With reference to the drawing, the first step in the method of the present invention is to produce a roughly foot-shaped casting 1. The casting 1 is formed from a polyolefin such as polyethylene. Since this step is conventional, no details of the casting procedure are given.

As mentioned above, the usual next step is to machine the casting 1. In order to mount the casting in a lathe or the like it is necessary to engage the heel and toe ends with mandrels. Machining is effected using an automatic, three-dimensional pantograph device and a manually produced, accurate last model. Obviously, the heel and toe ends cannot be machined in the areas surrounding the mandrels. At the completion of machining, it is necessary to manually finish the heel and toe portion of the last to remove such areas.

In the method of the present invention, the second step is to cut the casting 1 vertically in the ankle area to form separate heel and toe portions 2 and 3, respectively. By "vertically" is meant approximately vertical. Alternatively, toe and heel portions 2 and 3 can be cast separately, i.e. produced by casting separate portions or cut from a larger body. When producing a multi-part (usually two-part) last, the cut is inclined and not rectilinear.

The two portions 2 and 3 of the casting are mounted on a base plate (not shown), which is intended for mounting on a milling machine. Mounting is effected by tapping oppositely threaded holes 5 and 6 in the cut faces 7 and 8, respectively of the heel and toe portions 2 and 3. The

faces 7 and 8 are cut accurately, and thus provide reference surfaces to enable accurate milling. The holes 5 and 6 receive bolts (not shown) on the base plate. The milling machine is an automatic, computer operated three-dimensional machine using patterns for the heel and toe portions 2 and 3 generated by digitizing. Digitizing is a procedure involving the making of a three-dimensional pattern of a last, and storing details of such pattern in a computer memory. Because the two portions 2 and 3 of the last are held by bolts in the faces 7 and 8 of the vertical cut, the entire remaining surfaces of such portions can be machined.

Upon completion of the machining operations, the two portions 2 and 3 are connected together using a bolt 9, the ends of which are oppositely threaded, and a pin 10. The bolt 9 is inserted into one of the heel and toe portions 2 and 3, and the other portion is rotated onto the projecting end of the bolt. The pin 10 is then inserted into the heel end of the last to prevent rotation of the two portions 2 and 3. A socket for receiving an Allen key is provided in the heel end of the bolt 9. Thus, an Allen key can be used to draw the two portions 2 and 3 of the last firmly together.

It will be appreciated that the pin 10 can be replaced with a second bolt similar to the bolt 9. Following milling, the bolts are removed from both the toe and heel portions 2 and 3, and positioned between such portions. Allen keys are inserted through both holes 5 and 6 in the heel portion into sockets in the ends of the bolts, and the bolts are rotated to draw the two portions 2 and 3 together. In both cases the holes 5 and 6 are filled with plastic to complete the last.

The same procedure can be used for a multi-piece last, e.g. the conventional two-piece or split last. The holes formed in the cut faces 7 and 8 of the portions 2 and 3 to

mount the portions on the milling machine can also be used to receive the last hinge. Alternatively, the holes can be altered following machining to receive the hinge structure.

Thus, there has been described a method for accurately producing footwear lasts which ensures that each last is virtually identical to the other lasts of the same size. Human error is no longer a factor to be considered in the last production.

CLAIMS

1. A method of manufacturing a footwear last comprising the steps of:

(a) forming rough castings of portions (2,3) of a last;

(b) separately machining the last portions (2,3) in accordance with a predetermined pattern to yield last portions having the final desired configuration; and

(c) connecting the last portions (2,3) to each other to produce a finished last.

2. A method according to claim 1, wherein step (a) comprises preparing a rough casting (1) of a last and then cutting the rough casting (1) substantially vertically into portions (2,3).

3. A method according to claim 1 or claim 2, wherein the last portions include a toe portion (3) and a heel portion (2).

4. A method according to claim 3, when dependent on claim 2, wherein the rough casting (1) is cut substantially vertically in the ankle area.

5. A method according to any of the preceding claims, wherein step (c) comprises connecting a hinge to the last portions (2,3) so as to form a split last.

6. A method according to any of claims 1 to 4, wherein the heel portion (2) is connected to the toe portion (3) by bolt means to form a unitary last.

7. A method according to any of the preceding claims, wherein the predetermined pattern is obtained by digitising a last or last portions having the desired final configuration whereby a three-dimensional record of the last shape is produced.

8. A method according to claim 7, wherein the three-dimensional record is fed into an automatic, three-dimensional milling machine to mill the last portions (2,3) to the desired shape.

FIG.1

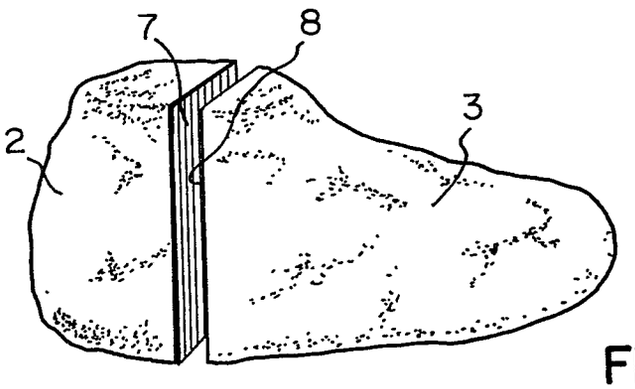

FIG. 2

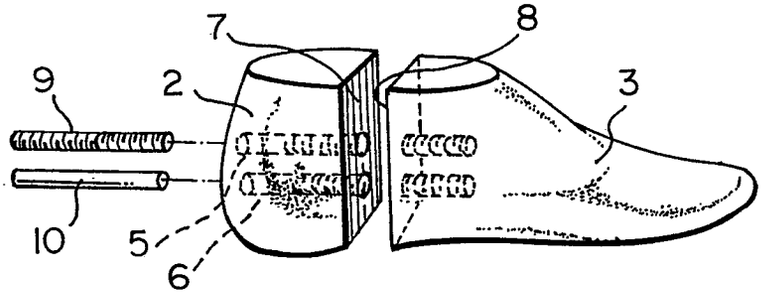

FIG. 3

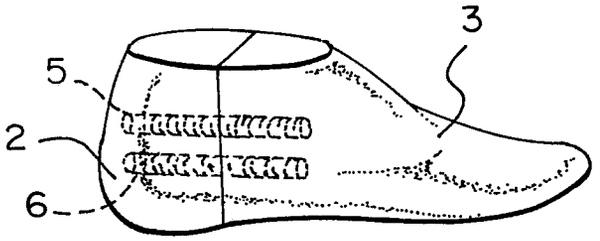

FIG.4