United States Patent

Brunner

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[54] **SANDALS AND METHODS AND MACHINES FOR THEIR MANUFACTURE**

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[30] **Foreign Application Priority Data**

March 6, 1969 Austria ..... A 2198

[52] **U.S. Cl.** **36/11.5**

[51] **Int. Cl.** **A43b 3/12**

[58] **Field of Search** ..... 36/2.5 R, 11.5, 14

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Primary Examiner—Patrick D. Lawson

Attorney—Ernest F. Marmorek

[57] **ABSTRACT**

The sandal is made of a foam rubber or a foam plastic sole within which a central portion of a single-piece fastening strip of a non-moldable material is embedded. The sole is manufactured in a mold having lateral recesses for insertion of the fastening strip prior to the molding process.

10 Claims, 10 Drawing Figures

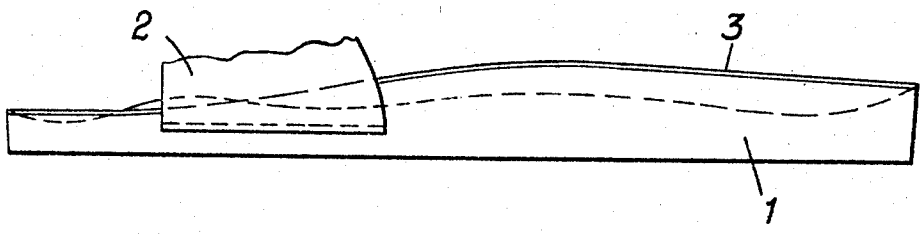


FIG. 1

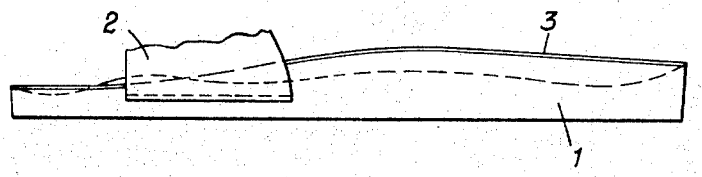


FIG. 2

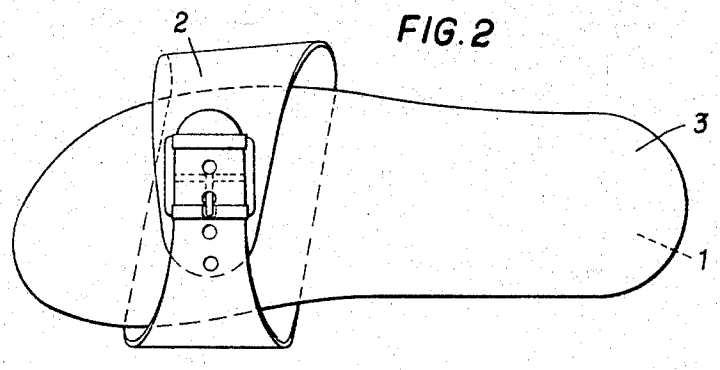


FIG. 3

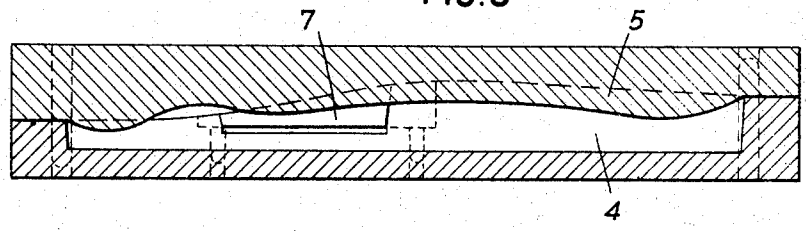


FIG. 4

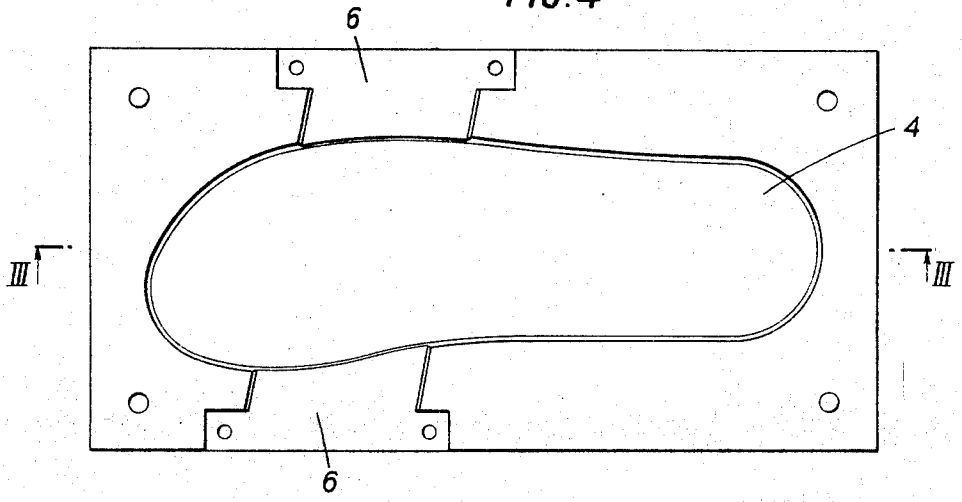


FIG. 5

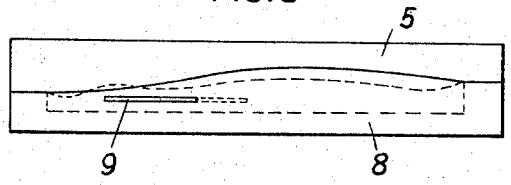


FIG. 6

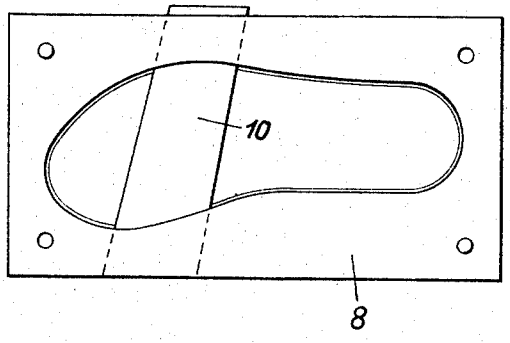


FIG. 7

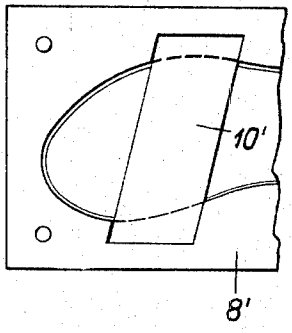


FIG. 8

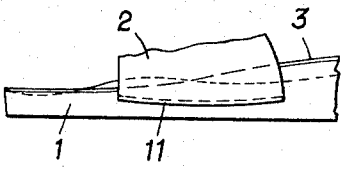


FIG. 9

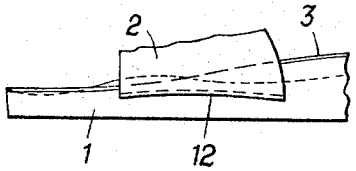
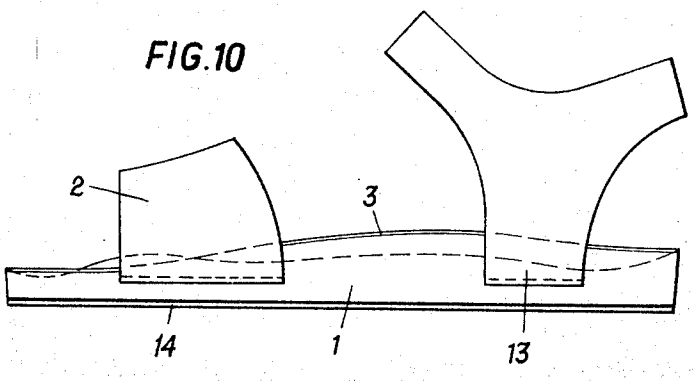


FIG. 10



SANDALS AND METHODS AND MACHINES FOR THEIR MANUFACTURE

This invention relates generally to sandals, and to the methods of and machines for their production.

More particularly, this invention relates to a sandal having a sole of a moldable material such as foam rubber or plastic, preferably polyurethane, and a fastening member of a non-moldable material in the form of a leather belt, textile strip or latchet, for example.

Known sandals of this type are made of a single or multilayer sole to which a fastening belt or a heel supporting member is stiched or cemented. The disadvantage of such sandals resides in that the fastening member gets loose or even completely torn off after a certain time of use.

There are also known sandals having a two-layer sole and a fastening member attached therebetween. This embodiment has the disadvantage that due to the repeated tension stress occuring particularly in the area of the fastening member, the individual layers of the sole frequently get apart or disintegrate. When manufacturing sandals of this kind, fastening means must be first stitched or cemented to one layer of the sole and, subsequently, the second layer is attached to the first one.

Furthermore, there are known sandals made of a plastic material such as polyvinylchloride (PVC) where the sole together with the fastening strip are formed as a single piece. The disadvantage of this molded sandal is in that the fastening members of plastic material are susceptible to damage and cannot be restored.

It is, accordingly, one of the objects of this invention to provide a sandal which will avoid the above mentioned drawbacks of the prior art.

In particular, it is an object of the invention to provide a sandal which is secure against tearing off the fastening member.

It is also an object of this invention to provide a sandal that is easy to manufacture.

A further object of this invention is to provide a method of and a device for the manufacture of sandals.

According to this invention, the above objects are attained by providing a single-layer sole of a moldable material in which an intermediate portion of a single-piece fastening member is embedded. The moldable material of the sole is preferably foam rubber or foam plastic, whereas the fastening member is made of a non-moldable material, such as leather, textile and the like. In a further development of this invention, the top and bottom surfaces of the sole may be provided with a protective coating such as a layer of leather, artificial leather, etc.

Due to the embedding of the fastening member simultaneously with the molding of the sole, the process of stitching or cementing of the fastening means as well as of respective layers of the sole can now be avoided. To improve the anchorage of the intermediate portion of the fastening member within the body of the sole, this portion can be provided with holes or with projections, or simply roughened.

In another modification of this invention, the sole and the fastening member are manufactured and assembled separately. For this purpose, the sole is provided with a transverse slit through which the fastening belt is drawn and secured in place by means of rivets, screws and the like. The intermediate portion of the fastening belt can be also anchored by a plastic seal introduced into the slit. The position of the embedded intermediate portion defined the configuration of the projecting portions of the fastening member. For example, if the embedded portion of the fastening belt in its breadth is arched or bulged downwards, the marginal portions of the free ends of the belt become bent upwardly with respect to their center line area and, consequently, at walking the edges of the fastening belt do not cut into the foot. If the embedded portion, on the other hand, is arched upwardly, the fastening belt will better counteract the tension stress in the body of the sole. Such a countertension is advantageous especially in very flexible soles.

The sandals according to this invention are manufactured preferably in the manner that the fastening member is first inserted into a transverse recess that is provided in the bottom mold unit, and sealed by means of lateral blocks that are profiled according to the contour of the adjacent portion of the sole. Subsequently, the bottom mold unit is filled up with the mixture of the material to be molded, and the top mold unit is seated on the bottom mold unit. It is also possible first to close the mold and then fill it up by injecting the plastic material. As a result, the intermediate portion of the fastening member becomes integrally embedded approximately in the middle of the vertical dimension of the sole.

To make variations in the types of the manufactured sandals, it may be advantageous to produce the soles separately from the fastening members. In this case the soles are manufactured with a transverse slit or passage for the additional insertion of the fastening member. The removable insert, the recess as well as the inside walls of the mold, must be, of course, painted with a separating means. After the completion of the molding process, the insert is removed from the finished sole and the fastening member can be introduced into the resulting slit. If the soles are manufactured from polyurethane, it is possible to make the insert from polytetrafluorethylene, for example. If the sole is to be provided with a protective coating, a foil of the protective coating material is clamped prior to the molding process between the top and bottom mold units.

As mentioned above, the mold for manufacturing the sandals of this invention has a top and a bottom unit. The bottom unit is provided with a transverse recess in the area of the fastening strip. Each side of this recess is closed by a removable sealing block which is profiled according to the corresponding outline section of the sole. The sealing blocks may have a tapering, wedge-like configuration, and may be integral with the top mold unit.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWING:

For a better understanding of the invention, reference is made to the following description of several exemplary embodiments, taken in conjunction with the figures of the accompanying drawing, in which:

FIG. 1 is a fragmentary side elevational view of the sandal of this invention;

FIG. 2 is a plan view of the sandal of FIG. 1;

FIG. 3 is a sectional view of a mold for the manufacture of sandals of this invention;

FIG. 4 is a plan view of the bottom part of the mold of FIG. 3;

FIG. 5 is a side elevational view of a mold for manufacturing soles of the sandals according to the invention;

FIG. 6 is a plan view of the bottom mold unit of the mold of FIG. 5;

FIG. 7 is a fragmentary plan view of a modified bottom mold unit;

FIG. 8 is a fragmentary side elevational view of a modification in the anchorage of the fastening member within the sole;

FIG. 9 is a fragmentary side elevational view of another modification of the anchorage of the fastening member, and

FIG. 10 is a side elevational view of another embodiment of the sandal according to this invention.

DETAILED DESCRIPTION

Referring now to FIGS. 1 and 2, the sandal according to the invention comprises a sole 1 and a fastening belt 2. The sole 1 can be made of foam rubber or a suitable plastic material such as foam-like polyurethane, for example. The upper surface of the sole 1 is covered by a protective coating 3 which may be a layer of a material that is comfortable for the foot, such as leather, textile, artificial leather and the like. According to one feature of this invention, the fastening member is a single-piece fastening belt 2 the intermediate portion of which is embedded within the body of the sole 1. The free end portions of the fastening belt 2 are conducted around the foot and can be coupled one to another in a conventional manner by an adjustable catch or buckle, for instance. As seen in FIG. 2, the fastening belt 2 passes transversely through the middle of the height of the sole 1 in the area of the forepart of the foot. The single-piece fastening member is not limited, of course, to the form of the leather belt 2, but it can have the form of a textile strap, latchet or another suitable supporting means.

The mold for the manufacture of the sandals of this invention, as shown in FIGS. 3 and 4, comprises a bottom mold unit 4, and a top mold unit 5. At the region of the fastening belt 2, the bottom mold unit 4 has lateral recess 6 provided for receiving sealing blocks 7. In manufacturing the sandals, the intermediate portion of the fastening belt 2 is first inserted across the bottom mold unit 4 to pass through the recesses 6, and the removable sealing blocks 7 are placed in position against the projecting portions of the fastening belt 2. At the same time it is necessary to check that the fastening belt 2 does not protrude into the contact with the inside surface of the mold. In a subsequent step, a measured quantity of filling material such as a moldable foam rubber, polyurethane or similar foam-like plastic material, is introduced into the bottom mold unit 4, and covered by the top mold unit 5. If the sandals are to be produced by an injection molding process, the mold must be provided with an injection channel, and the mold is assembled of the bottom and top mold units 4 and 5 prior to the introduction of the molding material. In order to insure a slip-proof adherence of the fastening belt 2 to the body of the sole 1 even if non-adhesive material is employed, it is advisable that a plurality of holes be created in the intermediate portion of the belt 2 so that the molded material passing through the holes will produce bridges reinforcing the anchorage.

As illustrated in FIGS. 5 and 6, the mold can be modified for the manufacture of soles 1 separately from the manufacture of the entire sandal. For this purpose, the sole 1 is first provided with a transverse slit or channel into which the fastening belt can be additionally inserted. The modified bottom mold unit 8 is, therefore, provided with a transverse channel 9 passing through the lateral sides of the mold 8 in the area of the fastening means. Prior to the injection of the molding material, a strip-like removable insert 10 is placed into the channel 9 to cross the bottom mold unit 8. The insert 10 preferably has a tapering configuration so that a sufficient sealing of the channel 9 might be attained. Moreover, to prevent the insert 10 and all inside surfaces of the mold from sticking to the sole, they must be dressed by a separating means.

With reference to FIG. 7, the bottom mold unit 8' is provided in the area of the fastening member with laterally closed recesses into which a removable strip-like insert 10' is placed from above to cross the bottom mold unit 8', thereby facilitating the assembly and disassembly of the mold. In this case, however, the top mold unit must be provided with profiled bosses or blocks to define the contour of the sole in the area of the recesses above the top surface of the insert 10'.

To avoid cutting of the edges of the fastening belt 2 into the foot, the embedded intermediate portion 11 of the fastening belt 2 is arched downwardly in its breadth so that the edges of the free portions of the fastening belt 2 will become bent upwardly (FIG. 8).

In another modification, as illustrated in FIG. 9, the embedded intermediate portion 12 of the fastening belt 2 is arched upwardly in its breadth. As a consequence, the most stressed end regions of the intermediate belt portion 12 are counteracted by an increased thickness of the sole body so that even an extremely flexible material for the sole 1 can be employed.

FIG. 10 illustrates a modification of the sandal of this invention, in which an additional fastening member 13 for supporting the heel is provided. This single piece fastening member 13 is attached to the sole 1 in the same manner as the fastening belt 2 at the fore of the foot. In addition to the protective coating 3, the bottom surface of the sole 1 can also be provided with protective layer 14 of a wear resistant material, such as hard rubber, for example.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus described the invention, what I claim as new and desire to be secured by Letters Patent, is as follows:

1. A sandal, especially health sandal, including

a sole comprising a single layer of molded elastic material, and

an upper of non-moldable material including portions interconnected within said layer, and embedded in, and thereby held slip-proof in, said layer and reaching from side to side through said layer.

2. A sandal according to claim 1 further comprising a layer disposed on the top surface of said sole.

3. A sandal according to claim 1 wherein said interconnected portions of said upper within said sole are provided with holes.

4. A sandal according to claim 1 wherein said interconnected portions of said upper within said sole are provided with projections.

5. A sandal according to claim 1 further comprising additional fastening means securing said sole to said interconnected portions of said upper embedded within said sole.

6. A sandal according to claim 1 wherein said upper is introduced into the side surfaces of said sole.

7. A sandal according to claim 6 wherein said upper is directed to said side surfaces of said sole substantially parallel to the bottom surface of said sole and the transverse cross-section of said upper at least near said sole surfaces has an arched shape.

8. A sandal according to claim 1 wherein said interconnected portions of said upper are anchored in said sole by shaping.

9. A sandal as claimed in claim 1 wherein said portions are integrally interconnected within said sole.

10. A sandal as claimed in claim 9 wherein said upper is a belt.

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