

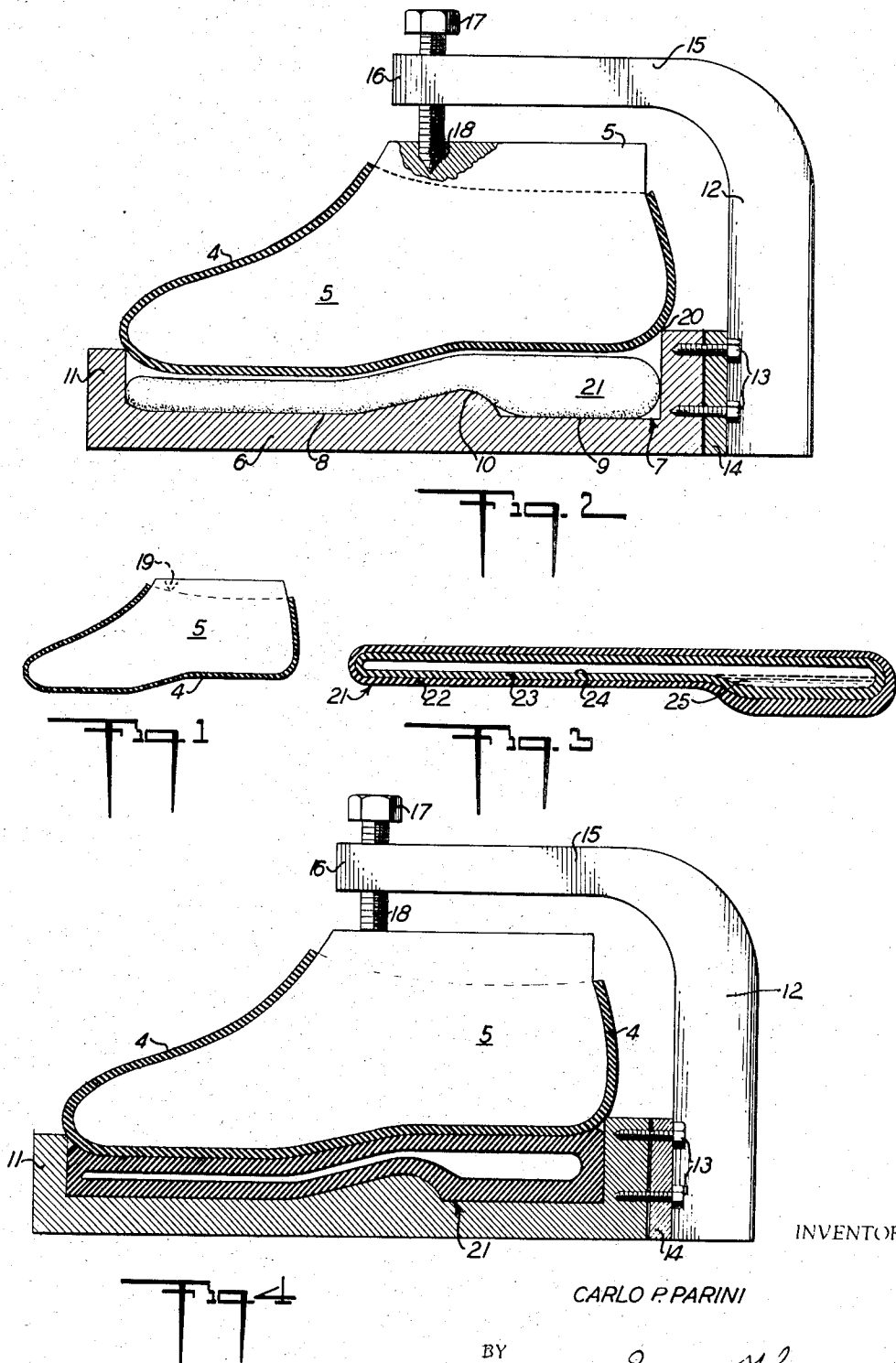
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METHOD FOR PRODUCING RUBBER SOLED SHOES

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METHOD FOR PRODUCING RUBBER SOLED SHOES

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4 Claims. (Cl. 18—59)

This invention relates to a process for making a shoe with a rubber sole and to the shoe produced thereby.

It is an object of the invention to provide a process for making a boot or shoe which includes the step to apply a rubber sole to the upper part of a shoe while on a shoemaker's last. A further object of the invention is to apply a mold to the upper part of the shoe on the last, with a cavity in the mold corresponding to the sole and heel to be applied to the shoe. A still further object of the invention is to produce a shoe having a pneumatic cushion composed of the sole and heel portions and made with a portion in the form of a bag or unit which latter during manufacture is distended by a gas or steam to exactly fit into the mold while it is secured to the upper part of the shoe.

Another object of the invention resides in the provision of a method for securing the heel and sole portions of a rubber shoe to the upper part thereof by means of an integral two part sole and heel portion having a vulcanized bag of rubber surrounded by a layer of unvulcanized rubber.

Further objects will be apparent from the following description when considered in connection with the accompanying drawing in which:

Figure 1 is a side elevation of the upper part of the shoe in a last, the upper part being shown in section;

Fig. 2 is a side elevation on an enlarged scale and partly in section of the last and upper part secured on a mold with the sole and heel bag;

Fig. 3 is a longitudinal sectional view of the sole and heel portions as a unit or bag before being applied and molded to shape and to the shoe, and

Fig. 4 is a side elevation partly in section showing the sole and heel portions vulcanized to the upper part of the shoe.

As shown on the drawing an upper part 4 of the shoe is composed of various pieces of rubber, canvas, leather, synthetic materials or any other suitable materials which are preferably assembled on a shoemaker's last 5. The upper part 4 may of course be composed of various layers of materials as a laminated fabric preferably composed of rubber and canvas. The assembled last 5 and upper part 4 are then placed on a mold 6 made of metal or any other suitable material and having an internal cavity 7 in the exact shape of the sole 8 and heel 9 as well as the instep portion 10 of the bottom of the shoe. A peripheral rim 11 extends around the upper edge of the mold.

A curved arm 12 is secured by any suitable means such as bolts 13 to the mold 6 through the medium of an intermediary piece 14. At the top part 15 on the end 16 thereof there is provided a bolt 17 in threaded engagement with the end part 16. The bolt 17 has a pointed end 18 which is cone-shaped and which fits into a cone-shaped depression 19 in the last 5. By screwing down the bolt 17 the last 5 and thereby the upper part 4 is forced down on the upper and inner edge 20 of the mold 6.

The assembly which will finally form the sole and heel is shown in Figs. 2 and 3 which shows a flat bag 21 of

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rubber preferably composed of an outer layer 22 of unvulcanized rubber and an inner layer 23 of vulcanized rubber, with a space 24 in the layer 23. A small quantity of water or other fluid 25 is placed in the inner layer of the bag. Thus assembled the bag 21 is ready to be placed in the mold cavity 7 for treatment to secure it to the upper part 4 and to form the heel and sole of the shoe. It is of course understood that the inside of the bag contains a substance capable of producing steam or gas by the action of heat.

The part shown in Fig. 3 has as nearly as possible the external form of the sole to be applied and is placed in the cavity 7 of the mold and after the mold is then covered by the upper part of the shoe it is held tight on the mold by the screw 17. The apparatus, so assembled, is now heated to a temperature of approximately 130° C. whereby the water 25 contained in the bag 21 changes into steam which expands the bag and forces the rubber layers to fill the cavity 7 in the mold and also causes the outer layer 22 to adhere to the upper part 4 of the shoe, Fig. 4. At the same time, by the action of the heat, the unvulcanized rubber 22 vulcanizes and is permanently secured to the upper part 4. Thus there is produced a shoe with a rubber sole having the exact external form of the cavity of the mold and adheres to the upper part of the shoe and thus a rubber shoe is produced having a cushion sole and heel.

If it is necessary to extract the shoe from the apparatus when it is warm, a puncture in the sole will evacuate the steam or gas. This puncture, after the shoe is cool, may be again closed after introducing some air so that a comfortable pneumatic cushion is produced in the insole.

As clearly shown in the drawing the method to follow to produce the cushion sole and heel shoe is to prepare the upper part of the shoe of suitable materials as fabric and rubber built on the last 5. Then a previously prepared sole and heel unit is placed in the mold 6 and then the upper part with its last is placed on the mold as shown in Fig. 2 with the bolt 17 forcing the two parts together. Fig. 2 also shows the sole and heel unit in the mold but before the application of heat. Now when heat is applied to the mold in any suitable manner the fluid such as water in the sole and heel unit will be converted into steam to not only force the part 21 against the bottom of the upper part of the shoe but also to fill the mold and thus impart the correct shape to the sole and heel. During this heat treatment the rubber will be vulcanized and the parts will adhere together to form a shoe as shown in Fig. 4. After the vulcanized shoe has been removed from the mold and the last removed from the shoe the steam or liquid may be removed from the cavity in the sole and heel to be replaced by air or other gas so that thereby a cushion sole and heel is created and maintained.

It is of course obvious that any type or kind of shoe may be produced regardless of shape or style and including not only shoes for sports wear but also shoes for all occasions.

I claim as my invention:

1. A method for producing a rubber base shoe, which comprises forming a rubber sole with an external layer of unvulcanized rubber, and bonding the sole to an upper part of a shoe in one operation by producing an internal pressure by the expansion of a substance contained in the interior of the sole and vulcanizing the layer of unvulcanized rubber thereby bonding the sole to the upper part of the shoe.

2. A method of producing a rubber base shoe after preparing the upper part of the shoe and placing it on a last, comprising inserting a hollow sole and heel portion into a cavity in a mold which latter has the configuration of the sole and heel of the finished shoe, said hollow

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sole and heel portion consisting of a bag of previously vulcanized rubber and containing in its interior a substance capable of generating a fluid by the action of heat and having a covering of a layer of unvulcanized rubber, and applying heat to the mold to vulcanize the external layer of unvulcanized rubber together with an expansion of the fluid in the internal bag of vulcanized rubber to thereby fill the cavity of the mold and to bond the layer to the upper part of the shoe. 5

3. A method according to the claim 1, in which the sole and heel portion is prepared as a unit comprising an internal bag of previously vulcanized rubber containing in its interior the substance capable of generating a fluid and consequently to be expanded by the action of the heat, said bag being entirely covered by a layer of unvulcanized rubber prepared for vulcanization by the action of the heat. 10 15

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4. A method according to the claim 1, in which the substance contained in the interior of the bag of previously vulcanized rubber is water.

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