Sept. 1, 1942. G. F. RYAN 2,294,481

METHOD AND APPARATUS FOR USE IN SHOEMAKING EMPLOYING HEAT

Filed July 29, 1940 2 Sheets-Sheet 1

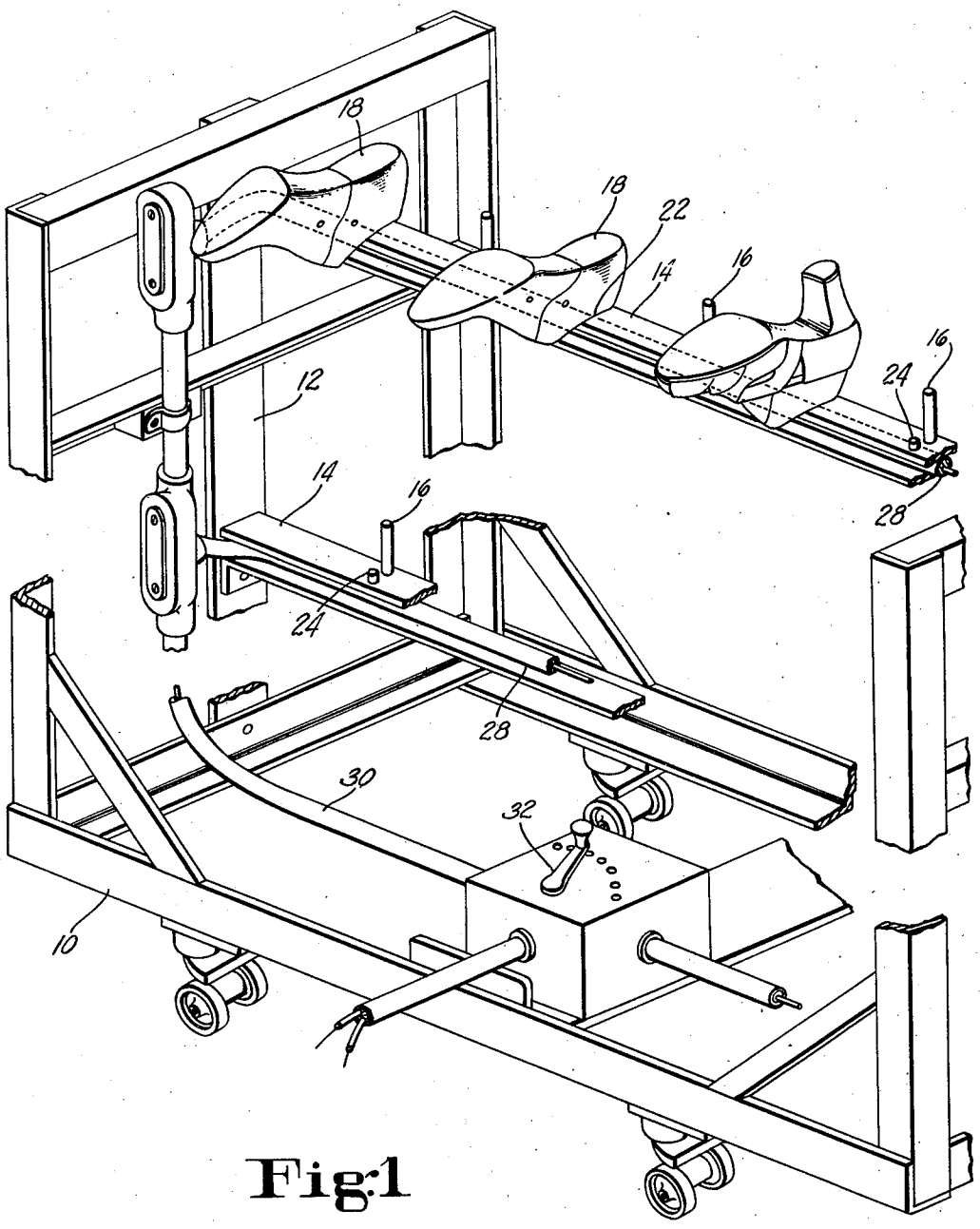


Fig. 1

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Fig. 2

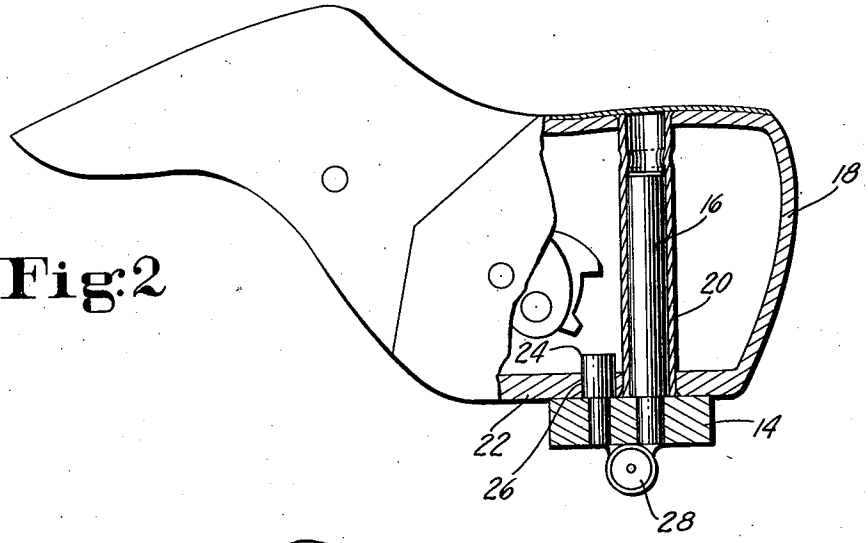
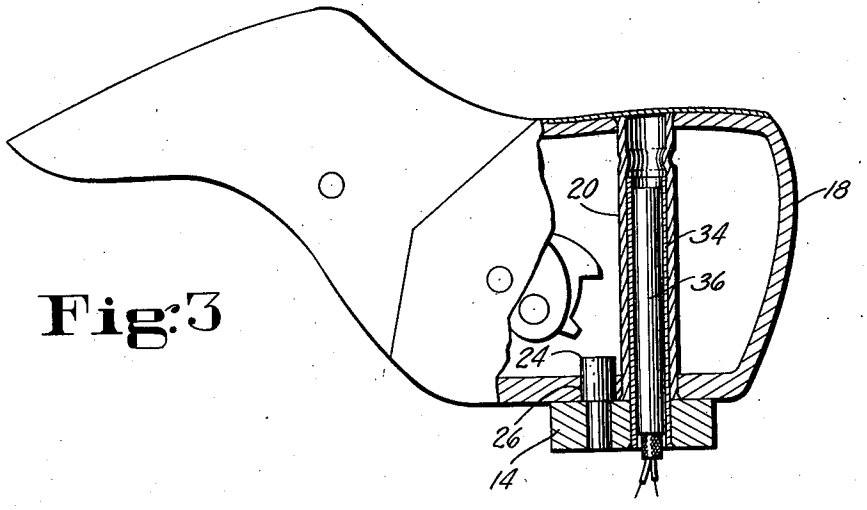


Fig. 3



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METHOD AND APPARATUS FOR USE IN SHOEMAKING EMPLOYING HEAT

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5 Claims. (Cl. 12—1)

This invention relates to improved methods and apparatus for use in shoemaking and involving the use of heat.

At many stages in the manufacture of shoes time is lost owing to the necessity for allowing the shoe or a part of it which is about to be operated upon to dry. For example, it is necessary in the use of many common types of cement for attaching the outsole to a shoe, that the cement which is applied to the shoe bottom be allowed to dry until it is tacky. The heeling operation also is delayed to permit substantial drying of the outsole in those cases where the outsole has been mulled to facilitate the sole laying and channeling operations. Similarly, further delay may occur when a breast flap is secured to the heel by the use of a cement which must have at least begun to set before the flap can be permanently secured to the heel. Then, too, sole edges and bottoms cannot be finished until the wax, paint or other liquid finishing medium which is used in connection with these operations has dried.

While the time lost per shoe at any single operation is small, the cumulative effect of such delays is material, entailing the use of more lasts and other equipment than would otherwise be necessary and causing congestion of racks of shoes to be operated upon wherever the delays occur. For these reasons, there is a general slowing down of the flow of shoes through the factory.

Moreover, the necessity for having shoes in a substantially dry condition at many different times during their manufacture discourages the use of mulling to the most effective degree; and in cases where the cost factor is more important than that of quality, mulling is often dispensed with entirely, even at those operations where its use would be most beneficial.

In view of the foregoing, an object of the invention is to reduce to a minimum the time lost due to drying of shoes or their parts throughout their manufacture and to provide a general improvement in their quality.

To this end, the invention contemplates the use of a heat retaining and conducting form or last on which the shoe is placed and provides in one aspect an improved method of shoe making characterized by heating the form between successive operations on the same shoe to maintain the temperature of the form and the shoe substantially uniform throughout the interval during which the operations are performed.

By thus maintaining the shoe at a drying temperature throughout or for a relatively long period in its manufacture, mulled shoe parts, upon being applied to the shoe, dry so quickly as not to delay any succeeding operation. Similarly, cements or finishing materials set or dry so soon after their application to the heated shoe that the corresponding attaching or finishing operations may be performed on the first shoe in even a small rack as soon as the last shoe has received its application of cement or finishing medium.

Preferably the form or last is to be heated before the assembled parts of the shoe upper are placed upon it, whereby the conditioning of the counter or box toe is begun as soon as the upper has been shaped about the form.

Another object of the invention is to provide an improved support or rack adapted for use in carrying out the above method. Accordingly, the invention includes a rack for holding one or more of the heat conducting forms or lasts referred to above, the rack having a series of pins adapted each to be slidably received in a socket in a form or last and means for heating each pin whereby the forms or lasts supported by the pins are heated also.

With a view to obtaining the most effective transfer of heat to the last, the invention provides as another feature the combination of a last pin mounted on a bar adapted to engage the top of the cone portion of the last on the pin and a heating unit mounted in heat exchange relation with respect to the bar and pin. Thus, the additional area of contact provided between the cone of the last and the bar further insures an effective transfer of heat to the last.

These and other features of the invention will be apparent from the following description of an illustrative embodiment of the invention shown in the drawings, in which

Fig. 1 is a perspective view of a support or rack constructed according to the invention;

Fig. 2 shows in side elevation a shoe form or last, the heel part of which and a pin bar on which the last is supported being shown in cross section; and

Fig. 3 is a view similar to Fig. 2 showing a different form of pin bar.

The illustrated shoe support or rack comprises a frame 10 carrying a strut 12 at each end on which are mounted a plurality of pin bars 14, the number of which depends on what capacity the rack is to have. Each pin bar has a plurality of pins 16 extending upwardly therefrom and adapted to be received in a socket in a form or last 18 provided by a thimble 20 which is attached rigidly to the heel part of the last.

The purposes of the invention are furthered, as

will be pointed out below, by the use of a last having good heat conductivity, and to this end the last 18, as illustrated herein, is made of metal, aluminum being suitable for this purpose because of its lightness, although other metals or even a non-metallic material such, for example, as moldable material, may be used to advantage.

When the last 18 is placed on the pin 16 a substantial area of the top of the cone portion 22 of the last engages the upper surface of the pin bar 14, the different lasts on the pin bar being held in parallel relation and out of contact with each other by studs 24 fixed to the pin bars 14, each stud being arranged to fit a hole 26 bored into the top surface of the cone of the last adjacent to the thimble 20.

The pin bars 14 and pins 16 also are made of heat conducting material and are heated to a temperature substantially above normal room temperature by electric resistant heating units 28, which extend throughout the length of the pin bars 14 and are fixed to the bottom surfaces thereof. Electric power is supplied to the units 28 through a conduit 30 which runs from a rheostat 32 by the use of which the amount of current flowing through the heating units may be controlled so as to maintain the temperature of the pin bars 14 and pins 16 high enough to heat the lasts thereon sufficiently to activate or dry cements used in shoemaking or to cause rapid drying of finishing medium and mulled shoe parts.

The invention also provides as illustrated in Fig. 3 a tubular or hollow type of last pin 34, in the interior recess of which is mounted an electric heating unit 36, and which may be used instead of or with the unit 28 (Fig. 2) under the pin bar 14.

It will now be understood that when the rack is connected to a source of electric power the pins 16 or 34 and the pin bars 14 will be heated to an extent depending upon the adjustment of the rheostat 32. Because of the substantial extent of contact of the last at the thimble 20 and cone portion 22 with the pins 16 or 34 and pin bar 14, respectively, the last 18 will be effectively heated by conduction. Moreover, since the last itself is made of heat conducting material, the entire last will be heated uniformly and sufficiently to expedite shoemaking operations as will now be further explained.

In carrying out the method of the present invention the illustrated rack, having thereon a number of lasts 18, will be connected to a source of electric power at a location in the factory where a succession of operations begins throughout which the last and shoe thereon is to be maintained in a heated condition. The last and shoe thereon may be heated at a stage in the manufacture of the shoe even as early as the assembling or lasting operation since the use of heat at this stage will be beneficial in forming or setting the box toe, depending upon the type of box toe being used. Similarly, the setting of cements which may be used at this stage of the manufacture of the shoe, as in connection with the box toe or counter, is also expedited. In accordance with the method of this invention the lasted shoe, during the intervals between successive operations on the shoe, will remain on the rack and hence will be kept at a substantially uniform temperature. Moreover, since individual shoemaking operations are relatively short and because of the substantial heat content of the last, no material drop in the temperature of the shoe will occur while it is being operated upon. Immediately following the end of each shoemaking operation the lasted shoe is replaced upon the rack and the rack is disconnected from the source of power only during that short interval required for the movement of the rack from the location of one operation in the factory to the next.

The use of the method and rack of the present invention materially reduces the amount of time required to manufacture a shoe because it minimizes delays which ordinarily are occasioned by waiting for mulled shoe parts, and surfaces to which liquid finishing medium has been applied to dry. For example, no time is lost after a mulled outsole has been attached to the shoe in waiting for the outsole to dry. The time required by an operator to reach any shoe because of a normal accumulation of work to be done, is sufficient when the last and shoe are heated in accordance with the invention, to dry the shoe adequately without delaying the next operation. Similarly, in connection with the operations of bottom and edge finishing, the rapidity with which finishing materials dry after being applied to the shoe in a heated condition, permits the operator to present the first shoe in a rack to the finishing machine immediately after applying the finishing medium to the last shoe in the rack.

Thus, the practice of the present invention insures against interruption in the flow of shoes through the various stages of their manufacture, and minimizes the congestion of racks of shoes awaiting operations which cannot be performed until a previously mulled or moistened shoe part has dried.

Furthermore, the final treating operation is greatly facilitated or eliminated as a result of the application of heat to the lasted shoe being extended throughout a substantial proportion of the time during which the shoe is on the last. That is, the shrinking effect produced by the heat of the last causes all parts of the upper to be drawn closely about the last with a uniform pressure and the duration of the heating period is sufficient to permit the upper to take a permanent set in the exact form of the last.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. That improvement in methods of shoemaking which consists in assembling upper and bottom parts of a shoe on and shaping them about a shoe last made of heat conducting material and having a socket adapted to receive a heated jack pin, performing a succession of different operations on the shoe on the last, placing the last on a heated jack pin between consecutive operations whereby the temperature of the last and shoe is maintained substantially constant throughout the interval during which the operations are performed, and moving the jack pin and last thereon from the site of one operation to that of the succeeding operation between said operations.

2. In a rack adapted to support heat conducting shoe lasts each having a socket in its cone portion adapted to receive a jack pin, a plurality of recessed heat conducting pins adapted to be received in the sockets of said lasts, a heat conducting member on which said pins are mounted, said member being arranged to engage the tops of the cones of lasts mounted on said pins, and means for heating said pins and member comprising electric resistance units contained in the recesses of said pins.

3. A support for a heat conducting shoe form having a thimble constructed and arranged to receive a jack pin, said support comprising a pin adapted to be received in said thimble, an electric resistance heating unit mounted in heat-exchange relation with respect to said pin to heat said pin and a form thereon, and means for controlling the temperature of said heating unit.

4. A support for a heat conducting shoe form having a socket constructed and arranged to receive a jack pin, said support comprising a recessed pin adapted to fit closely within said socket, and an electric resistance heating unit mounted in the recess of said pin for heating the latter and a form supported thereby.

5. A support for a heat conducting shoe form having a thimble in its cone portion, said support comprising a heat conducting bar having a pin mounted thereon, said bar being adapted to engage the top of the cone of the form when said pin is inserted in said thimble, and an electric resistance heating unit mounted in heat-exchange relation with respect to said bar and pin for heating the bar and pin and a shoe form supported thereby.

GEORGE F. RYAN.

CERTIFICATE OF CORRECTION.

Patent No. 2,294,481. September 1, 1942.

GEORGE F. RYAN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 37, for "treating" read --treeing--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of November, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.