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METHOD OF MAKING SHOES.
APPLICATION FILED JAN. 28, 1918.

1,356,539.

Patented Oct. 26, 1920.

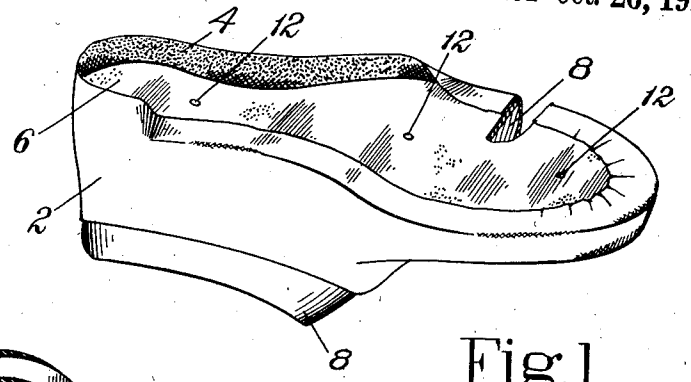


Fig. 1.

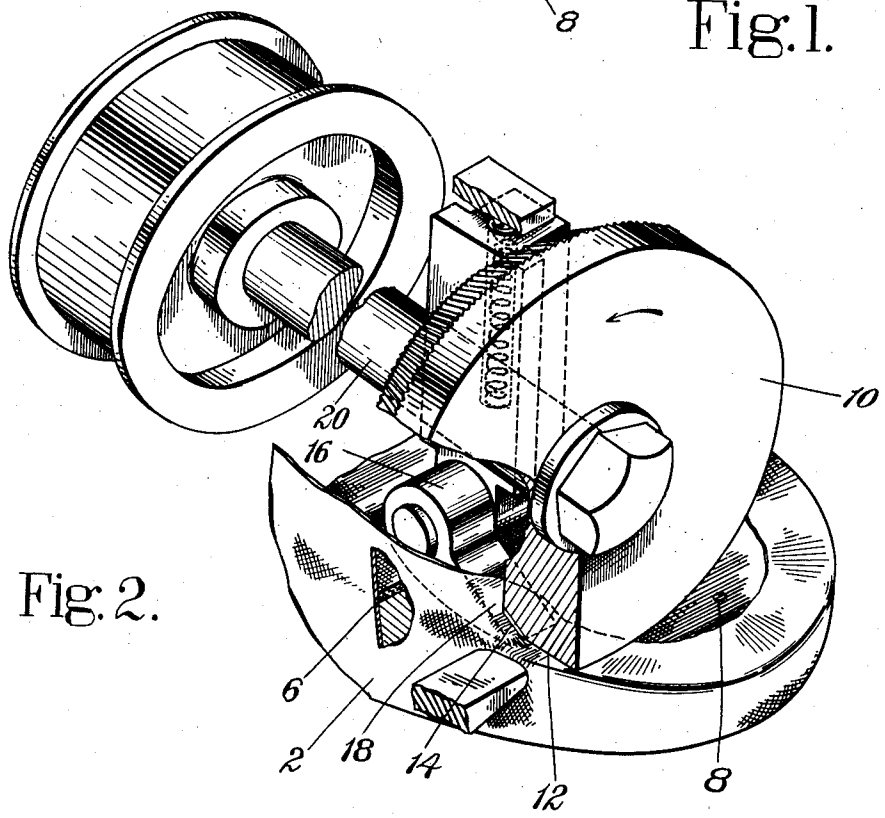


Fig. 2.

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RONALD F. McFEELY, DECEASED, LATE OF BEVERLY, MASSACHUSETTS, BY E. MARK SULLIVAN, ADMINISTRATOR, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

METHOD OF MAKING SHOES.

1,356,539. Specification of Letters Patent. Patented Oct. 26, 1920.

Application filed January 28, 1918. Serial No. 214,162.

To all whom it may concern:

Be it known that RONALD F. McFEELY, deceased, late of Beverly, in the county of Essex and State of Massachusetts, invented certain Improvements in Methods of Making Shoes, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to the manufacture of shoes and more particularly to a novel method of conforming and fitting a shoe upper to a last. The invention is herein shown by way of illustration as practised in connection with the manufacture of shoes of the type in which the upper is secured to the bottom portion of the shoe in the lasting operation by the use of cement applied in any suitable manner such as practised, for example, in the manufacture of vulcanized rubber sole shoes.

In the manufacture of vulcanized rubber sole shoes, in accordance with the usual practice, the operation of lasting the shoe, which consists in drafting and tensioning the upper about the last and temporarily securing the margin of the upper to an innersole, is performed entirely by hand, the operator using his fingers to work the upper into lasted position on the innersole and to press it into firm adhesion thereon. With this manner of lasting shoes it is extremely difficult to draft the shoe upper about the last, both to secure the desired neat appearance of the resulting shoe and a satisfactory preparation of the shoe for subsequent shoe making operations. Moreover, this operation on the shoe is exceedingly laborious work and, unless it is very carefully performed, the shoes are so lasted by reason of the varying quality of the lasting as to produce a large number of so-called "reject" shoes which have a defective vulcanization.

An important object of the present invention is to provide a novel method of lasting shoes with cement as an upper fastening medium, by the practice of which the lasting operation may be performed more advantageously and uniformly than is possible by the hand method of lasting shoes now in use and the preparation of the shoe for subsequent shoe operations more satisfactorily performed. To this end the invention provides a method of lasting shoes of the type above mentioned in which the shoe upper is drafted about the last by the application of a pinching frictional pull upon the margin of the upper and then the said margin subjected to a rubbing force directed inwardly from the edge of the shoe and on to the innersole to effect an adhesion between the margin of the upper and the innersole before the tension of the upper is relaxed. To aid in carrying out this invention power is preferably used to exert a frictional pull upon the margin of the upper and, as herein illustrated, it is effected by relatively movable, coöperating members between which the margin of the upper may be disposed for pinching operation thereon and which are so arranged that the application of the frictional pull is directed from the outer edge of the shoe angularly across the margin of the upper. By reason of this the overlaying margin of the upper, when carried over on to the shoe bottom may, in effect, be plaited so as to dispose the surplus upper materials on the shoe bottom most satisfactorily for the subsequent operations on the shoe. The angular application of the frictional pull upon the margin of the upper constitutes what may be termed a distortion of the upper out of the plane which it is finally to assume on the shoe bottom and consequently greater upper tensioning action may be applied with a less amount of power. The pinching frictional pull created in this manner on the margin of the upper acts effectively to draft the upper about the last and fit it to the shape of the last accurately and with a minimum amount of labor.

In another of its aspects the invention contemplates the use of power to subject the margin of the tensioned upper to a wiping action directed inwardly from the outer edge of the shoe and downwardly to effect adhesion between the margin of the tensioned upper and the innersole. Preferably this wiping action is performed immediately following the drafting of the upper about the last and the positioning of the margin of the upper over the innersole so as to prevent any reaction of the upper before it has become attached to the innersole. Also, the upper is forced into adhesion with the innersole while the adjacent margin is

being subjected to the upper tensioning operation, whereby the margin is so placed as to be wiped into lasted position with accuracy and uniformity.

The invention in its various aspects will now be more particularly described in connection with the accompanying drawings which illustrate the different steps and will then be pointed out in the claims.

Figure 1 is a perspective view showing the shoe in the process of being lasted in accordance with the method of the present invention; and

Fig. 2 is a detail in perspective illustrating the operation of mechanism such as may be used to practise the present invention.

In carrying out the method of the present invention in one manner in which it has been successfully practised, the assembled shoe upper 2 is preferably first prepared for lasting by applying an adhesive coating such as rubber cement to the inner marginal surface of the upper, as indicated at 4 in Fig. 1. The innersole 6, as is usual in shoes of this type, consists of a "green" or unvulcanized rubber compound, known generally as rag stock. The upper surface of the innersole presents an adhesively coated sticky surface to assist in causing the marginal portion of the upper to adhere to it. The prepared upper 2 and the innersole 6 are assembled on the last 8 in the usual manner, the innersole being temporarily secured on the last by fastenings 12 located at the heel and forepart.

After the shoe has been properly assembled, as described, it is presented to a machine for drafting the upper about the last and conforming it to the general contour of the last, the margin of the upper being laid over into lasted position on the innersole and adhered thereto.

One machine which may be successfully used to carry out the method of this invention is shown and described in a co-pending application Serial No. 214,163 filed Jan. 28, 1918 and comprises a continuously rotating means in the form of a wheel 10 having two shoe upper engaging faces 12 and 14, respectively, the surface 12 of which is substantially smooth and constitutes the edge surface of the wheel 10, and the other surface 14 being beveled at approximately 45 degrees to the surface 12 and provided with radially disposed ribs. The beveled surface 14 of the wheel 10, when the machine is in use, coöperates with a yielding finger 16 located directly beneath the wheel 10 and provided with an acting surface 18 extending substantially parallel to the beveled acting face 14 of the wheel.

As herein illustrated, the wheel is mounted upon a shaft 20 and is continuously rotated while the finger 16 is stationary except for vertical movement relatively to the wheel 10. In the use of the machine the margin of the shoe upper is disposed between the beveled surface 14 and the finger 16, and by pressing the shoe against the finger the margin is pinched between the finger and the wheel. The rotation of the wheel relatively to the finger acts to subject the margin of the upper to a frictional drag, the degree of force of which may be varied according to the force used by the operator in thrusting the shoe against the finger support which engages the shoe bottom. Owing to the fact that the surface 14 of the wheel which acts upon the margin of the upper is at an angle to the axis of rotation of the wheel and that the coöperating surface 18 of the finger 16 is substantially parallel thereto, the frictional drag applied to the margin of the upper while said margin is pinched is directed angularly across the margin from the outer edge of the shoe, whereby the relatively movable members do not draft the upper at substantially right angles to the sides of the last, but, on the contrary, draft the upper and position the margin over on to the shoe bottom at an angle. This has the effect of working the fullness of the upper in a forward direction and, by the proper manipulation of the shoe so that the machine operates alternately on the opposite sides of the shoe, enables the operator to dispose the excess fullness of the shoe upper most advantageously on the shoe bottom, that is, without creating a fullness of the upper at the toe and heel, for example, which would be disadvantageous to the subsequent application of shoe bottoming material. This plaiting effect obtainable by the operation of the machine on opposed portions of the shoe also prevents displacement of the upper on the last. It is to be noted that the angularly directed application of treatment serves an important function in that it maintains the margin of the upper in advance of the portion being treated removed from the surface of the innersole so that no difficulty is experienced with the margin of the upper being pressed into improper lasted position to the innersole, which, of course, causes considerable time to be lost in pulling the two pieces apart and recementing them. Inasmuch as the outer edge or side faces of the shoe are held in substantially parallel relation to the axis of rotation of the disk and, therefore, at an angle to the direction of the frictional drag upon the margin, the distorted position in which the margin is disposed when being acted upon by the relatively movable members tends to create in itself a holding force in addition to the frictional drag upon the upper, and, inasmuch as the inner portion of the beveled surface 14 is traveling at a somewhat higher speed than the outer portion of the surface,

a progressively increasing tension is applied to the shoe upper.

As the margin of the shoe upper is fed along between the relatively movable members 10, 16, the periphery or outer surface 12 of the wheel is substantially parallel to the outer edge of the shoe and the plane of the shoe bottom, and it is so arranged relatively to the tensioning means that it acts to wipe the margin of the tensioned upper inwardly from the edge of the shoe and on to the innersole to effect adhesion between the margin of the upper and innersole.

Owing to the fact that the laying surface 12, which acts to overlay the margin of the upper into adhesion on the innersole is in such close proximity to the surface 14 which acts upon the margin in advance of the surface 12, the action of the surface 12 is, in effect, a continuation of the action of the surface 14 in which case the margin of the upper is supported for the action of the surface 12 of the wheel, thus insuring that the margin will be forced into adhesion on the innersole before it relaxes from its tensioned condition and, further, forced into adhesion with accuracy. The rubbing or wiping action of the surface 12 of the wheel 10 effects a more perfect and stronger adhesion of the upper to the innersole than it is possible for an operator to apply with his fingers and it eliminates the necessity of hand rolling the overlasted margin of the upper with a hand roller, which was heretofore necessary to prevent defective vulcanization of the shoe. Ordinarily the single progressive application of the rubbing pressure in lasting the shoe will be found sufficient properly to adhere the margin of the upper to the innersole, since it is possible by manipulation of the shoe to distribute the excess fullness of upper material on the shoe bottom to the best advantage. However, several applications of the rubbing pressure may conveniently be applied if it is found necessary after the shoe has been lasted.

It will be seen that by the practice of this invention the shoe upper is snugly conformed to the last to better advantage and with greater facility than with the hand method heretofore practised. Moreover, the method of lasting vulcanized rubber sole shoes as herein disclosed adds appreciably in preparing the shoe upper for subsequent operations which heretofore were more or less unsatisfactorily performed owing to the varying quality of the work as it was received for this operation to be performed. These results are due to the fact that the margin of the upper is subjected to a combined pinching and frictional pull which is continued progressively along the margin of the upper, which latter is then immediately secured to the shoe bottom.

Having described the invention, what is desired to be secured by Letters Patent of the United States is:

1. That improvement in methods of making shoes which consists in tensioning the upper of an unlasted shoe about a last by uninterrupted engagement with adjacent portions successively and closely following said tensioning with a continuous laying down action immediately after each portion of the upper is tensioned, and applying force thereto to lay that portion of the upper down upon the shoe bottom.

2. That improvement in methods of making shoes which consists in pinching the margin of the upper of an unlasted shoe and exerting a frictional pull on said margin in a direction inwardly from the edge of the shoe, continuing said pinching and frictional pull uninterruptedly and progressively along said margin, and securing said margin to the shoe bottom.

3. That improvement in methods of making shoes which consists in pinching the margin of the upper of an unlasted shoe and exerting a frictional pull on said margin in a direction inwardly from the edge of the shoe, continuing said pinching and frictional pull uninterruptedly and progressively along said margin, and adhesively securing said margin to the shoe bottom.

4. That improvement in methods of making shoes which consists in pinching the margin of the upper of an unlasted shoe, exerting a frictional pull on said margin in a direction inwardly from the edge of the shoe, continuing said pinching and frictional pull uninterruptedly and progressively along said margin, and rubbing said margin of the upper into contact with the innersole.

5. That improvement in the method of making shoes which consists in progressively tensioning the upper of an unlasted shoe about a last by the application of a continuous frictional drag upon the margin of the upper in a direction to draw the margin toward lasted position over the innersole and removed therefrom, and then laying the margin of the upper in adhesion with the insole by the application of a continuous rubbing pressure directed inwardly from the edge of the shoe across the margin of the upper and downwardly against the innersole before the tension of the upper is relaxed.

6. That improvement in methods of lasting shoes which consists in exerting an uninterrupted frictional drag or pull progressively along the margin of the upper, and immediately laying said portions upon the shoe bottom.

7. That improvement in methods of lasting shoes which consists in applying cement to the margin of one of the shoe parts, exert-

ing an uninterrupted frictional drag or pull progressively along the margin of the upper, and immediately laying said margin in adhesively connected position.

8. That improvement in methods of lasting shoes which consists in applying cement to the marginal portion of the innersole, exerting an uninterrupted frictional drag or pull progressively along the margin of the upper while holding the margin of the upper separated from the cement-coated portion of the innersole, and immediately laying the margin of the upper upon the cement-coated portion of the innersole.

9. That improvement in methods of making shoes which consists in assembling an upper and an innersole upon a last, applying cement to the margin of one of said shoe parts, pinching the margin of the upper and exerting a frictional pull on said margin in a direction inwardly from the edge of the shoe, continuing said pinching and frictional pull progressively along said margin, and then causing said margin to adhere to the innersole by the application of a rubbing pressure exerted on said margin.

In testimony whereof I have signed my name to this specification.

E. MARK SULLIVAN,
Administrator of Ronald F. McFeely, deceased.