Dec. 9, 1947. E. ROLLMANN 2,432,174

APPARATUS AND PROCESS FOR THE MANUFACTURE OF FOOTWEAR

Filed Sept. 2, 1944

Fig. 1

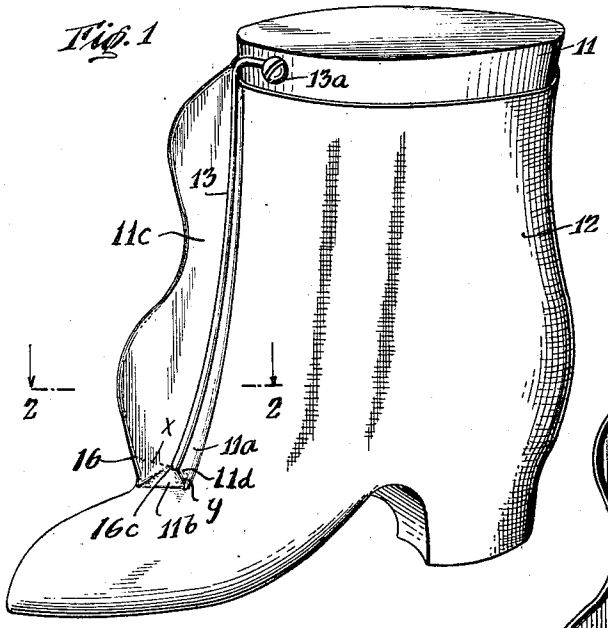


Fig. 2

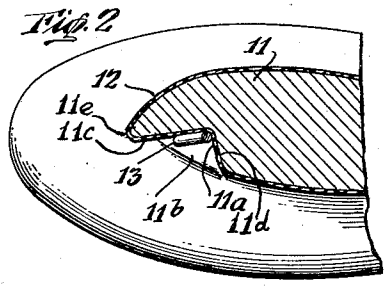


Fig. 3

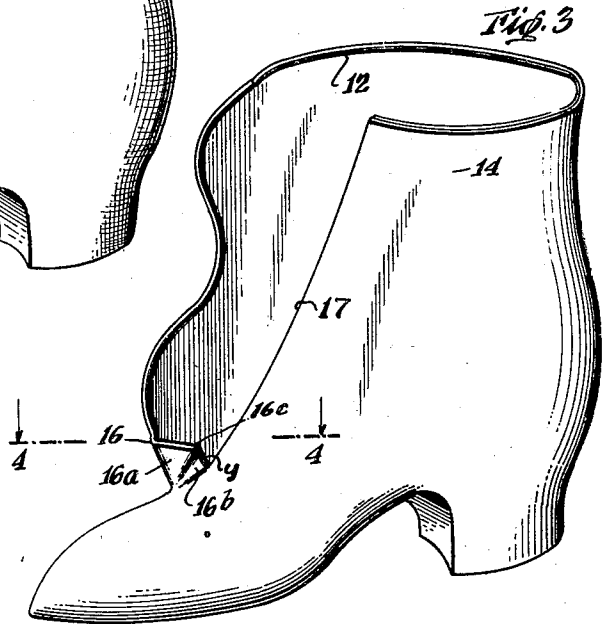
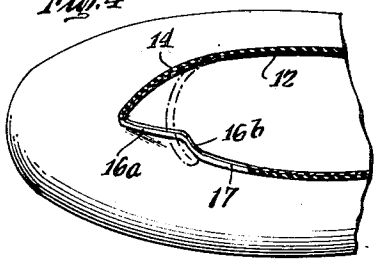


Fig. 4



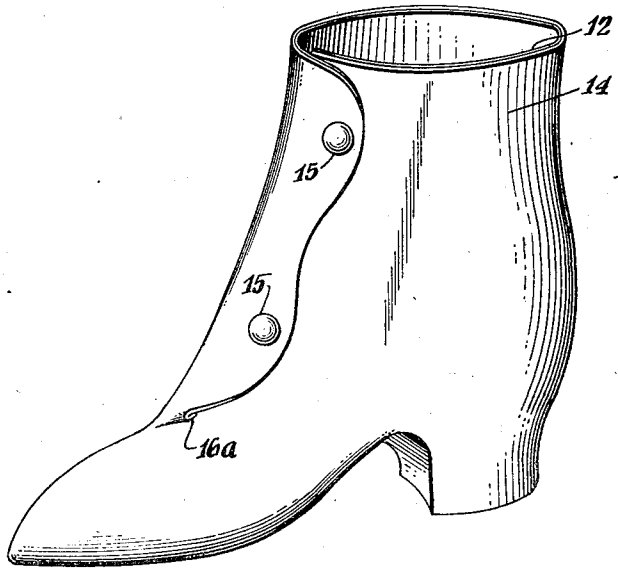


Fig. 5

INVENTOR.
Ernst Rollmann
BY A. A. Klicka
L. C. Krazinski
ATTORNEYS

Patented Dec. 9, 1947

2,432,174

UNITED STATES PATENT OFFICE

2,432,174

APPARATUS AND PROCESS FOR THE MANUFACTURE OF FOOTWEAR

Ernst Rollmann, Philadelphia, Pa.

Application September 2, 1944, Serial No. 552,469

9 Claims. (Cl. 18—58.7)

1

This invention relates to footwear and the apparatus and process for the manufacture thereof, and has for an object to provide new apparatus and process for the manufacture of footwear by the application of plastic material, such as rubber, in a liquid or semi-liquid state, as by dipping or spraying, in the formation of footwear having a flap overlapping a part of the upper of such footwear.

This application relates to the general subject matter of my co-pending application Serial Number 300,761, filed October 23, 1939, now Patent Number 2,357,360. Prior to my work in this field, footwear, such as galoshes, arctics, or the like, in which a flap overlaps the upper, was most commonly made by the "confection" process, i. e., by the application of strips of unvulcanized rubber to a last over which a lining sock had been drawn and the rubber subsequently vulcanized. In my application mentioned above, apparatus and method were disclosed for the manufacture of such shoes by the moulding process. In said application, reference was made to the manufacture of such footwear by dipping, thus enabling the formation in one operation of the upper and the overlapping flap.

Another object of the present invention is to provide an apparatus comprising a last the forward part of which above the toe is enlarged sufficiently to provide for the formation of a flap which may overlie the upper when the shoe is in use.

Another object is to provide such a last formed with a depression at the front thereof above the toe which will serve to provide for the formation of a gusset or fold at the bottom of the flap to assure complete overlapping and to prevent entry of water or snow near the bottom of the flap.

Another object is to provide a method of footwear manufacture producing the stated results.

Another object is to provide sprayed or dipped footwear formed with an integral flap overlapping the upper, which flap is continuous with the portion of the upper which it overlaps while in use.

Further objects and advantages of this invention will be apparent from consideration of the specification as illustrated by the accompanying drawings of an illustrative embodiment of the invention, in which drawings:

Fig. 1 is a perspective view of a last embodying the invention with a sock applied thereto before the application of rubber or the like;

Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1;

2

Fig. 3 is a perspective view of the shoe after removal from the last and trimming, the parts being shown in the same position they occupy while on the last;

Fig. 4 is a cross-sectional view on the line 4—4 of Fig. 3, but showing in dotted lines the position of certain parts when the flap is folded over the upper and fastened; and

Fig. 5 is a perspective view of the finished shoe, the flap being fastened in place.

Referring to said drawings, 11 indicates a last made of suitable material formed as to its lower and rear portions and the toe forwardly of the instep to correspond to the form of shoe desired, its forward portion above the toe however being deformed somewhat as shown. This deformation comprises a depression, such as 11*a*, formed to one side of the longitudinal, vertical center plane of the last and extending from a point adjacent the toe partly or entirely upwardly to its top. The depression is provided with a lower or end wall 11*b* and side walls 11*c* and 11*d*. The end wall 11*b* is preferably triangular in shape with one of the indented sides being longer than the other, as best shown in Fig. 2. The side wall 11*c* preferably tapers outwardly as it approaches the top of the last and the outer forward wall 11*e* narrows down so that the top ends of the two walls merge into and become flush with the outer face of the last adjacent the top thereof, as indicated in Fig. 1. The extreme forward edge of the last is shown as formed with a scalloped edge which is desirable if a corresponding edge on the flap is desired. It is to be understood, however, that this forward edge may be straight or curved in some other manner as the edge of the flap may be trimmed to any desired shape.

The numeral 12 indicates an elastic sock, preferably of knitted textile material, shown drawn over the last. This sock ultimately will form the lining for the shoe including the flap.

13 indicates a sock-holding element attached to any suitable support, as a screw 13*a*, threaded into the last. Such a holding element is necessary to force the sock into the depression 11*a* because the sock being elastic and drawn tightly over the last would otherwise take the shortest path across the depression 11*a*. The lower end of the holding element 13 also assures contact of the sock with the lower wall 11*b* of the depression.

With the parts in the position shown in Figs. 1 and 2, the rubber or other suitable plastic material is applied to the sock 12 by dipping the last

into the desired solution of latex, or other similar material, sufficiently far to entirely immerse the sock therein. The plastic material may be applied, if desired, by other methods, such as spraying or painting it thereon. The plastic is now treated in any suitable manner to cause it to set and solidify, forming an external layer 14. In the case of latex or a rubber solution, vulcanization may be accomplished by the application of heat or suitable chemicals which may be in the form of a gas.

After solidification, the coating 14 and liner 12 is preferably cut along both sides of the holding element 13, the screw 13a and holding element 13 removed, and the shoe stripped from the last. It is thereupon suitably trimmed, preferably by hand or a suitable trimming die, to a conformation for example like that shown in Figs. 3 and 4. In this operation the portion of the flap formed by the wall 11c of the last is cut away along the shaped edge of the last wall 11e, which is shaped to provide the desired configuration to the flap edge, such, for example, as is illustrated in Figs. 1 and 3, the cutting being preferably from the top of said shaped edge down to about the point 16, and then along the dotted line x to approximately the point 16c, as will appear more clearly from Fig. 3. The material of the shoe which is formed along the last wall 11d is trimmed away along the outer edge of said wall 11d substantially to the portion 11b, to form the edge 17, and then along a line y to the point 16c. This forms a gusset comprising the two gusset sections 18a and 18b. Suitable fastening elements, such as snap buttons 15, are applied and the shoe is ready for use.

It will be noted that the trimming is done in such a manner as to leave a web consisting of the sections 16a and 16b which together serve to form a gusset. It will be apparent from Figs. 1 and 2 that the walls 11c and 11b are substantially perpendicular to each other. Inasmuch as the gusset section 16a is formed along the lower portion of the wall 11c, it is substantially perpendicular to the gusset section 16b, which is formed along the wall 11b. As a result, a fold line is formed between the two gusset sections, see Fig. 3. As the flap is folded over the upper, the portion 16a will be folded tightly against the portion 16b, and the outer portion of the flap will be folded tightly against the portion 16a, as is shown more clearly in the dotted line position of the parts in Fig. 4. Since the upper edge of the section 16a of the gusset is longer than the upper edge of the section 16b, the section 16a will extend beyond the edge of the opening in the upper and serve to completely close said opening, preventing the entry of water and snow.

It will be noted that by the apparatus and method illustrated above, it is possible to form by dipping or spraying process a shoe having a flap overlapping the upper formed with a gusset, all of the material for said upper, flap, and gusset being formed upon the surface of a deformed last, resulting in an entirely new article of footwear.

Instead of applying the solidifiable plastic material by spraying or dipping, as described above, it would of course be possible to form the plastic covering by a moulding process. In that event, the last would be surrounded by a separable mould which may be of the general construction of the mould disclosed in my said application Serial Number 300,761, now Patent Number 2,357,360, it being understood that the internal conformation of the mould would correspond with the external conformation of the last, sufficient space being left between the mould and the last to accommodate the material of the shoe or other article. If a mould is used, the holding element, such as 13, would be dispensed with as the pressure of the mould upon the material will be sufficient to force the lining-forming sock (if used) against the last at all points.

It is also to be understood that, whether the material is applied by dipping, spraying, or by moulding in an enclosed mould, the lining-forming sock may be omitted, in which event the plastic material will be formed directly upon the last. In this case, the holding element such as 13 would not be used. Such shoes could either be used without a lining or a lining could be inserted therein at a later time than by any known or suitable method and means.

In some cases it may also be desirable to form the shoe or other article in reverse, i. e., inverted from the form in which it is to be used. This has the advantage that if the outside surfaces are to be decorated the reverse of the desired decoration may be engraved upon the last or other core so as to form the decoration on the inside of the shoe or other article. This is desirable because it is usually simpler to engrave the exterior of a last or other core than to engrave the interior of a mould. It also permits the formation of external decoration even in those cases where no enclosing mould is present, as when the spraying or dipping process is used. It is to be understood that where the shoe or other article is formed in reverse, the last would have to be correspondingly formed.

The invention is not intended to be limited to the form shown, which is understood to be illustrative only and not limiting, as various changes in construction and arrangement may be made, all coming within the scope of the claims which follow.

I claim:

1. Apparatus for manufacturing shoes of solidifiable plastic material having an upper formed with an opening at its front and a flap integrally attached to the upper at one side of said opening and adapted to overlie said opening and to overlap and to be temporarily attached to the upper at the other side of said opening, comprising a last having an external surface conformation at the toe, the bottom, and the rear portions thereof which has approximately the desired internal conformation of those portions of the shoe, the forward part of said last above the toe portion being, however, deformed by extending it forwardly beyond the desired internal conformation of the shoe to be made thereon, a depression being formed in the forward part of said last to one side of the vertical central plane of the last, and extending upwardly from the toe portion to the upper portion thereof, and a holding member adapted to depress into said depression a lining-forming sock drawn over said last, whereby, when a lining-forming sock is in place upon said last and held within said depression by said holding element and a plastic compound coating is applied to the exterior of said sock and solidified, a shoe is formed in which, when a portion of the front thereof is cut away to form an opening, a flap attached to one side of said upper is left, which flap is adapted to overlap and to be attached to the upper at the other side of said opening.

2. Apparatus according to claim 1 in which the forward edge of the last above the toe is curved

in accordance with the desired shape of the edge of the flap.

3. Apparatus for manufacturing a shoe of solidifiable plastic material having a resilient lining comprising a last having an external surface conformation of generally convex form but being provided with a depression formed in the front thereof and extending upwardly from the toe portion to the upper portion of the last, a holding member adapted to extend into said depression whereby when a lining-forming sock is placed upon said form and held within said depression by said holding element and a plastic compound coating is applied to the exterior of said sock and solidified a shoe is formed having an external surface of generally convex form but provided with a depressed section extending from a point above the toe to the upper part thereof.

4. Apparatus for manufacturing shoes of solidifiable plastic material having an upper formed with an opening at its front and a flap integrally attached to the upper at one side of said opening and adapted to overlie said opening and to overlap and to be temporarily attached to the upper at the other side of said opening, comprising a last having an external surface conformation at the toe, the bottom, and the rear portions thereof which has approximately the desired internal conformation of those portions of the shoe, the forward part of said last above the toe portion, however, being deformed by extending it forwardly beyond the desired internal conformation of the shoe to be made thereon, a depression being formed in the forward part of said last to one side of the central plane of the last, and extending upwardly from the toe portion to the upper portion thereof, whereby when a plastic coating is applied to the exterior of said last and solidified a shoe is formed in which when a portion of the front thereof is cut away to form an opening, a flap attached to one side of said upper is left which flap may be caused to overlap and to be attached to the upper at the other side of said opening.

5. Apparatus according to claim 4 in which the forward edge of the last above the toe is curved in accordance with the desired shape of the edge of the flap.

6. Apparatus for manufacturing shoes of rubber or the like having an upper formed with an opening at its front and a flap integrally attached to the upper at one side of said opening and adapted to overlie said opening and to overlap and to be temporarily attached to the upper at the other side of said opening, comprising a last having an external surface conformation at the toe, the bottom, and the rear portions thereof which has approximately the desired internal conformation of those portions of the shoe, the forward part of said last above the toe portion, however, being formed with a depression in the forward part extending from the tie portion to the upper portion thereof, a holding member adapted to depress into said depression a lining-forming sock to be drawn over said last, whereby when a lining-forming sock is placed upon said last and held within said depression by said holding element and a plastic compound coating is applied to the exterior of said sock and solidified, a shoe is formed in which, when a portion of the front thereof is cut away to form an opening, a flap is formed unitary with one side of said upper and adapted to overlap and to be attached to the upper at the other side of said opening.

7. Apparatus for manufacturing shoes of rubber or the like having an upper formed with an opening at its front and a flap unitary with the upper at one side of said opening and adapted to overlie said opening and to overlap and to be temporarily attached to the upper at the other side of said opening, comprising a last having an external surface conformation at the toe, the bottom, and the rear portions thereof of approximately the desired internal conformation of those portions of the shoe, the forward part of said last above the toe portion, however, being formed with a depression extending upwardly from the toe portion to the upper portion thereof, whereby when a plastic material is applied to said last and solidified a shoe is formed in which, when a portion of the front thereof is cut away to form an opening, a flap is formed, the flap being unitary with one side of said upper and adapted to overlap and to be attached to the upper at the other side of said opening.

8. Apparatus, according to claim 1, in which the depression formed in the forward part of the last terminates at its lower end in a wall of triangular shape.

9. Method for manufacturing shoes of solidifiable plastic material having an upper formed with an opening at its front and a flap unitary with the upper at one side of said opening and adapted to overlie said opening and to overlap and to be temporarily attached to the upper at the other side of said opening, comprising the steps of applying a coating of solidifiable plastic material upon a last having an external surface conformation at the toe, the bottom, and the rear portions thereof which has approximately the desired internal conformation of that portion of the shoe to be formed, the forward part of said last above the toe portion, however, being formed with a depression extending longitudinally and upwardly from the toe portion to the top portion of the last, solidifying said plastic material, cutting the solidified coating along the sides of the depression and along the edges of the end wall of the depression to form an opening, and removing said material from the last, whereby a shoe is formed having a flap attached to one side of said upper which may be caused to overlap and to be attached to the upper at the other side of said opening.

ERNST ROLLMANN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,907,856	Murphy	May 9, 1933
1,972,976	Burnham et al.	Sept. 11, 1934
2,035,731	Vance	Mar. 31, 1936
1,991,386	Gerencser	Feb. 19, 1935
1,894,610	Joy	Jan. 17, 1933
1,739,821	Bott et al.	Dec. 17, 1929
1,758,706	Kelnhofer	May 13, 1930
131,200	Williams	Sept. 10, 1872
1,604,954	Artz	Nov. 2, 1926
1,756,474	Raymond	Apr. 29, 1930
1,820,149	Mecklenburg	Aug. 25, 1931

FOREIGN PATENTS

Number	Country	Date
297,708	Great Britain	Sept. 25, 1928
734,512	France	Apr. 1, 1932
130,138	Switzerland	Jan. 16, 1929