Feb. 26, 1935. J. M. MILLER ET AL 1,992,386

METHOD OF MAKING FOOTWEAR

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Fig. 1

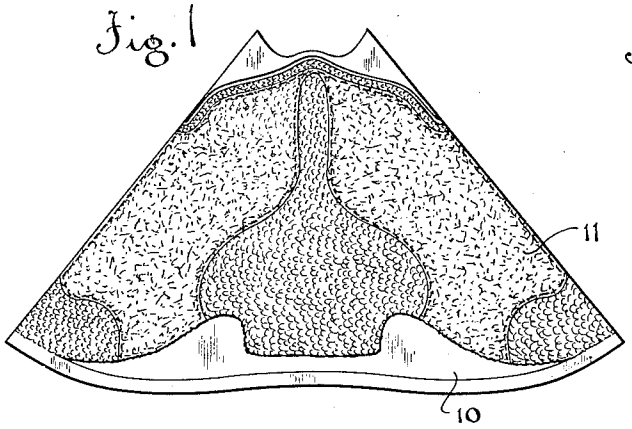


Fig. 2

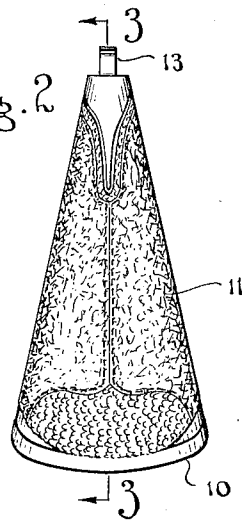


Fig. 3

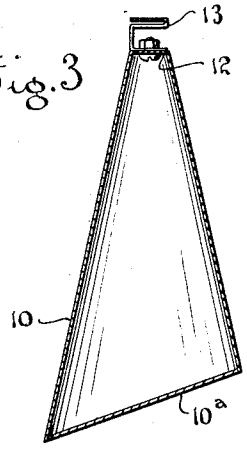


Fig. 4

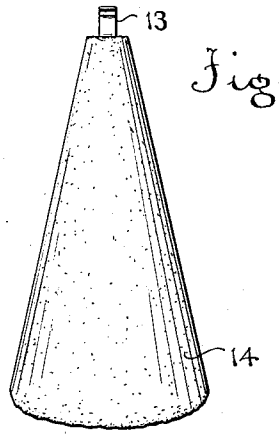
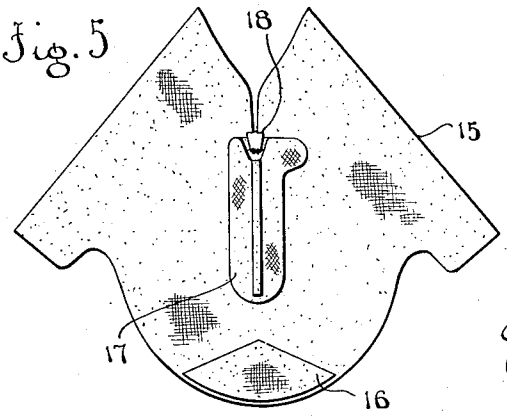


Fig. 5



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Fig. 6

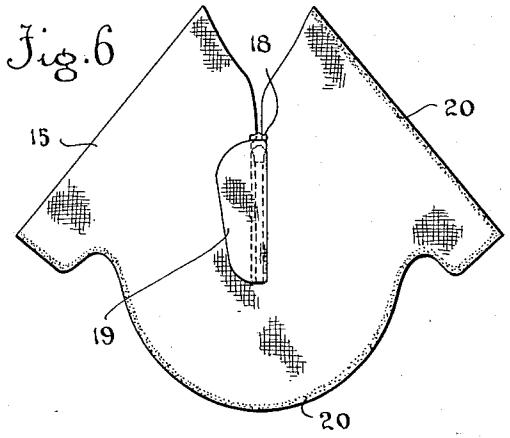


Fig. 7

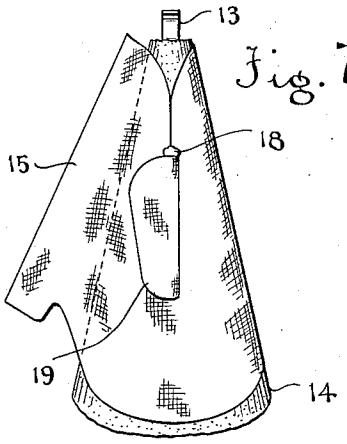


Fig. 8

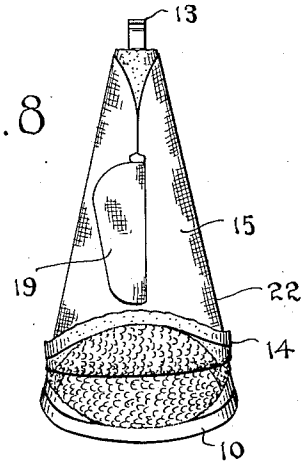


Fig. 9

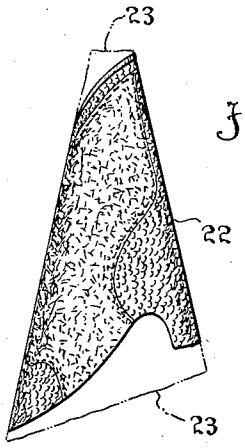
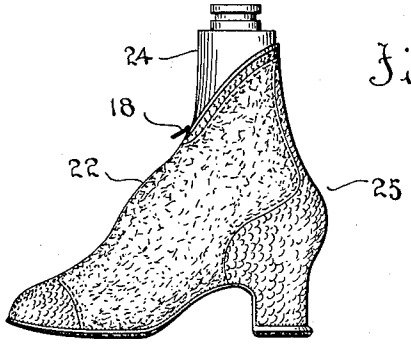


Fig. 10



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UNITED STATES PATENT OFFICE

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METHOD OF MAKING FOOTWEAR

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Application December 10, 1932, Serial No. 646,636

6 Claims. (Cl. 12—142)

This invention relates to methods and apparatus for making footwear, and more especially it relates to procedure and apparatus for making rubber footwear such as lightweight gaiters and galoshes.

The invention is of primary utility in the manufacture of footwear having an exposed surface of rubber wherein said surface is formed with a design, in relief, in simulation of natural leathers such as alligator skin, pin seal, lizard, or snake skin.

The chief objects of the invention are to provide an improved method and improved apparatus for manufacturing footwear of the character mentioned. Further objects include the obtaining of fidelity of design in the imitation of natural leathers; to provide a one-piece rubber shoe-upper without a back seam; and to effect economies whereby the cost of production of footwear is reduced.

Of the accompanying drawings:

Figure 1 is a developed plan view of a building form for a shoe or gaiter upper;

Figure 2 is a front elevation of the same in its normal, conoidal form;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a front elevation of the building form shown in Figure 2 with a coating of unvulcanized rubber composition thereon;

Figure 5 is a plan view of one side of a lining for a shoe or gaiter upper;

Figure 6 is a plan view of the opposite side thereof;

Figure 7 shows the shoe lining of Figures 5 and 6 being applied to the rubber-coated form shown in Figure 4;

Figure 8 shows the shoe-upper and lining being stripped, as a unit, from the building form;

Figure 9 is a side elevation of a completed shoe-upper; and

Figure 10 is a side elevation of a lasted overshoe comprising an upper made according to the improved method.

Referring to Figures 1 to 3 of the drawings, 10 is a conoidal metal form, and 11 is a design etched thereon by the photo-engraving method. The design is shown herein as a simulation of two different kinds of natural leathers, and in outline defines a shoe-upper including the shoe heel. Preferably the design 11 is obtained from a shoe-upper made up in the natural leathers, and the photograph thereof etched onto form 10, which preferably is of zinc, while said form is in the flat shape shown in Figure 1. The flat form subsequently is bent to conoidal form and its lateral margins joined to each other as by welding. The small end of the form has an end closure 12, and secured thereto is a hook or clip 13 by which the form may be suspended. The large end of the form is closed by plate 10a.

In the practice of the improved method, the form 10 is dipped into a natural or artificial aqueous dispersion of rubber, preferably natural latex, that includes suitable pigment, and sulphur and accelerator for subsequently effecting vulcanization. The dipping of the form in the dispersed rubber causes a film of the solution to adhere to the form. After dipping, the form is suspended by the clip 13, preferably in a warm atmosphere, to dry the deposit on the form. The dipping and drying of the form is repeated until the desired thickness of coating is obtained, at which time the surface of the deposit will be substantially smooth, and the design 11 of the form completely obscured. When the wet form is suspended after dipping, some of the rubber solution drains toward the lower end of the form, with the result that the coating at this end of the form is thicker than at the upper end thereof. This is an advantageous feature of the invention since it produces a shoe-upper that is thicker at its lower part, which part is nearest the shoe sole and subject to greatest wear. The coating on the form 10 is designated 14.

The next step of the method is the mounting of a shoe lining on the rubber deposit 14 while the latter is on the form 10. The lining, shown best in Figures 5 and 6 and generally designated 15, is a composite structure composed principally of stockinet or similar material having suitable reinforcing pieces 16, 17 adhered thereto, a slide fastener 18 mounted thereon if desired, and a flap or tongue 19 covering said slide fastener. One surface of the lining 15, that shown in Figure 5, has a skin coating of unvulcanized rubber composition thereon, and the reinforcing pieces 16, 17 are coated on both sides with unvulcanized rubber. The opposite side of the lining, shown in Figure 6, has its bottom marginal portion and one lateral marginal portion coated with unvulcanized rubber cement as shown at 20, 20.

The lining 15 is mounted upon the coated form 10 in the manner shown in Figure 7, the rubber-coated face of the lining being placed against the coating 14 on said form, and pressed into adhesive engagement therewith. The lateral marginal portions of the lining are joined in a lapped seam at the rear side of the form. When thus assembled, the coating 14 and lining 15 may be

stripped, as a unit, from the form 10, being turned inside out or reversed by the operation, as shown in Figure 8, so that the lining 15 is innermost and the coating 14 is outermost, as shown in Figure 9, the surface of the latter being embossed with the design 11 that is etched on the surface of the form 10. The assembled lining 15 and coating 14 constitute a shoe-upper that is designated 22. The surplus coating material shown in broken lines at 23 is then trimmed from the top and bottom margins of the upper 22, after which the upper may be mounted upon a last 24 and built into an overshoe 25 in the usual manner, as is shown in Figure 10. The overshoe subsequently is vulcanized in dry heat, as will be well understood by those skilled in the art.

The invention provides an economical means for producing attractive rubber footwear in faithful simulation of natural leathers, and achieves the other objects set out in the foregoing statement of objects.

Modification may be resorted to without departing from the spirit of the invention or the scope of the appended claims, which are not limited wholly to the specific construction shown or exact procedure described.

What is claimed is:

1. The method of making footwear which comprises depositing a coating of unvulcanized rubber composition upon a tapered form, applying reinforcing to the deposit on the form, stripping the deposit and reinforcing, as a unit, from the form, and utilizing the structure thus formed in the manufacture of rubber footwear on a foot-shaped last by stretching said reinforced rubber coating over said last.

2. The method of making footwear which comprises forming a complete shoe-upper of conoidal shape by depositing a coating of unvulcanized rubber composition upon a conoidal form, applying reinforcing to the coating on the form, stripping the upper from the form, and then incorporating it in an article of footwear.

3. The method of making footwear which comprises forming a complete shoe-upper of conoidal shape by depositing a coating of vulcanizable rubber composition upon a suitably shaped and engraved form, stripping the upper from the form and turning it so that the surface that lay next to the form is outermost, and then building it into an article of footwear.

4. The method of making footwear which comprises applying a coating of vulcanizable rubber composition to a tapered form, the coating being thicker at the larger end of the form than at the other, stripping the coating from the form, and incorporating it in an article of footwear with its thickest portion adjacent the sole thereof.

5. The method of making footwear which comprises dipping a tapered form in liquid rubber composition to build up a coating on said form, reinforcing the coating on the form, stripping the coating and reinforcement, as a unit, from the form, and then building it into an article of footwear on a foot-shaped last by stretching said reinforced rubber coating over said last.

6. The method of making footwear which comprises depositing a layer of vulcanizable rubber composition upon a conoidal form so as to form a seamless rubber shoe-upper that is of graduated thickness from top to bottom, applying a shoe lining and reinforcing parts exteriorly to the deposit on the form, stripping the upper from the form in a manner to turn it inside out, shaping the assembled upper over a suitable last, completing the building of the article of footwear on the last, and vulcanizing the article on the last.

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