Nov. 8, 1960 R. W. MORSE 2,958,880

PROCESS OF FORMING BOX TOES FROM AN AMINOPLAST COMPOUND

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Fig. 1

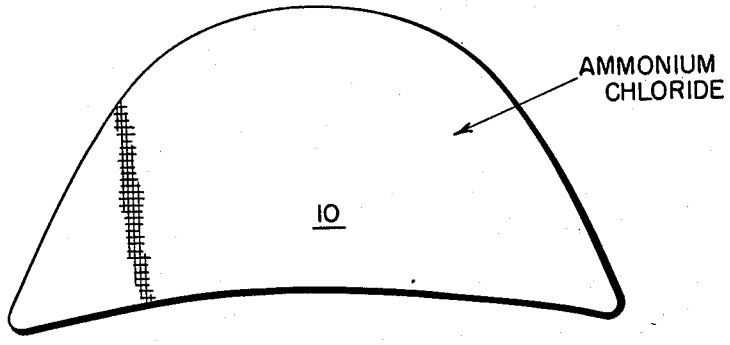


Fig. 2

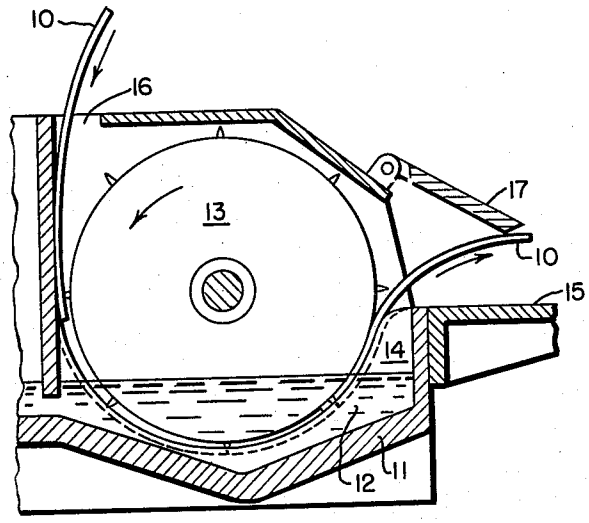
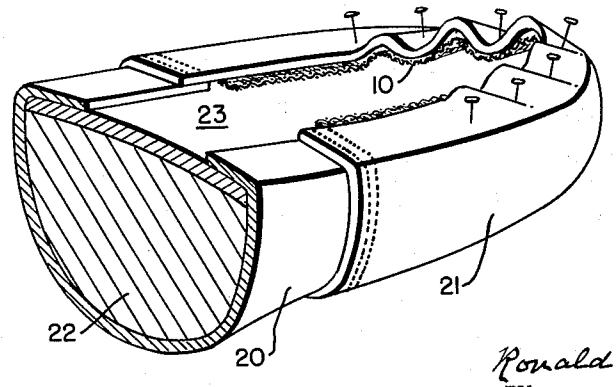


Fig. 3



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1 Claim. (Cl. 12—146)

This invention comprises a new and improved process of forming box toes in shoes by the employment in a particularly convenient manner of a cool setting condensation product of an aminoplast stiffening compound such as urea or melamine, with an aldehyde.

Many attempts have been made heretofore to take advantage of the hard water-resistant resin that results from the condensation reaction of urea formaldehyde or the like, but heretofore no process has been evolved that fits compatibly with the routine of commercial shoemaking. Shoe factory operators cannot be depended upon to spread a paste of aminoplast stiffening compound properly and uniformly upon the required part of an upper, and slight variations in humidity upset any regular schedule of the reaction. On the other hand, thermosetting compounds require special heating apparatus and often call for operating temperatures that impair the upper leather of the shoes.

The process of the present invention has the advantage that it may be carried out conveniently at ordinary room temperature without requiring special apparatus. It is characterized by the employment of a textile blank impregnated with a catalyst for inducing condensation, such as ammonium chloride. The blank may be prepared by saturating a web of yard goods with a catalyst, drying the web so that the fibers thereof are coated, and then cutting the dried web into blanks of box toe shape. These remain in flexible condition and may be handled and stored without any special attention until they are ready to be incorporated into the shoe upper. At this time they may be conveniently conditioned by being dipped into an aqueous solution of urea formaldehyde or the like. The coated blank is then placed in the upper as the catalyst begins to effect the condensation reaction but before the blank is noticeably affected thereby. In this condition the upper is pulled over and lasted. Thereupon the condensation proceeds and the blank becomes adhesively secured in the structure of the upper and hardened in situ to provide a hard but slightly flexible waterproof box.

It will be seen that the catalyst is brought to the making room of the shoe factory in dry condition on the box toe blank and that the stiffening compound is applied in liquid condition to the dry blank immediately before its introduction into the structure of the upper.

The process is illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view of a blank,

Fig. 2 is a sectional view of apparatus for applying the stiffening compound, and

Fig. 3 is a fragmentary view of the lasted upper.

The blank **10** is cut to shape from a continuous web of cloth or felt which has been run through a bath of ammonium chloride of concentration approximately 20–30% and dried by passage through a drying oven or over drying rolls. The ammonium chloride carried by the textile base will amount to three to five percent of its dry weight, depending somewhat on the concentration of the solution used and that is subject to wide variations in practice.

The catalyst-carrying blank may be prepared for introduction into the upper by being dipped in a bath of urea formaldehyde and one convenient apparatus for carrying out this step is shown in Fig. 2. A casing **11** is shaped to provide a constant-level reservoir for the liquid **12**. Within the casing is rotatably mounted a drum **13** having radial pins projecting from its circumference. Curved guide plates **14** encircle the lower part of the drum and lead to a delivery plate **15**. The casing provides an overhead inlet passage **16** and has a hinged exit flap **17** located above the delivery plate.

In practice a dry blank **10** is fed into the passage **16**, caught by the pins of the drum **13**, carried by its rotation down into and through the liquid aminoplast bath **12** and delivered in coated condition upon the plate **15**.

One satisfactory aminoplast is urea formaldehyde known as Beetle Syrup No. 7238–20 and readily available in the open market. When brought into contact with the catalyst the setting up reaction begins to take place but allows sufficient working time for the operator to place the blank in the shoe upper, pull over and last the toe portion while the blank is still damp and flexible.

In Fig. 3 a vamp **20** and tip **21** are shown as lasted upon a last **22** over an insole **23**. Marginal portions of the box toe blank **10** are shown beneath the tip. As the condensation or setting up reaction proceeds the urea formaldehyde cures and hardens into a tough stiff shell laminated and adhesively bonded to the lining and outer integument of the upper. Full strength may not be reached for a period of perhaps twenty-four hours but the last may safely be withdrawn from the shoe within four or five hours without danger to the shape of the finished box toe.

The weave of cloth or the arrangement of the fibres in felt blanks determine to a large extent the impact strength and the resiliency of the finished box toe. Accordingly the material of the carrier blank may be selected to fill the requirement of the desired box.

An important advantage flowing from the process of this invention is that the curing or condensation reaction takes place from the center toward the outer surface of the box; that is to say, the reaction starts in the fibres of the carrier blank and works outwardly through the aminoplast coating thereon. This results in more uniform and complete reaction and adhesion than has been effected heretofore.

Having thus disclosed my invention and described in detail an illustrative procedure for carrying it out I claim as new and desire to secure by Letters Patent:

The process of forming uppers with stiff resilient box toes, characterized by the steps of starting with a dry flexible fabric blank impregnated with about 3 to 5% of its dry weight of ammonium salt and otherwise free of all hardening components, coating the blank with a partially condensed urea formaldehyde resin in at least semi-liquid form at a time just prior to molding the upper, inserting the coated blank while still flexible into the upper, and molding the upper and the inserted blank under pressure while condensation reaction is induced in the urea formaldehyde by catalytic action of the ammonium salt and the blank is hardened in and bonded to the upper.

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