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METHOD OF FORMING DEPOSITED LATEX ARTICLES

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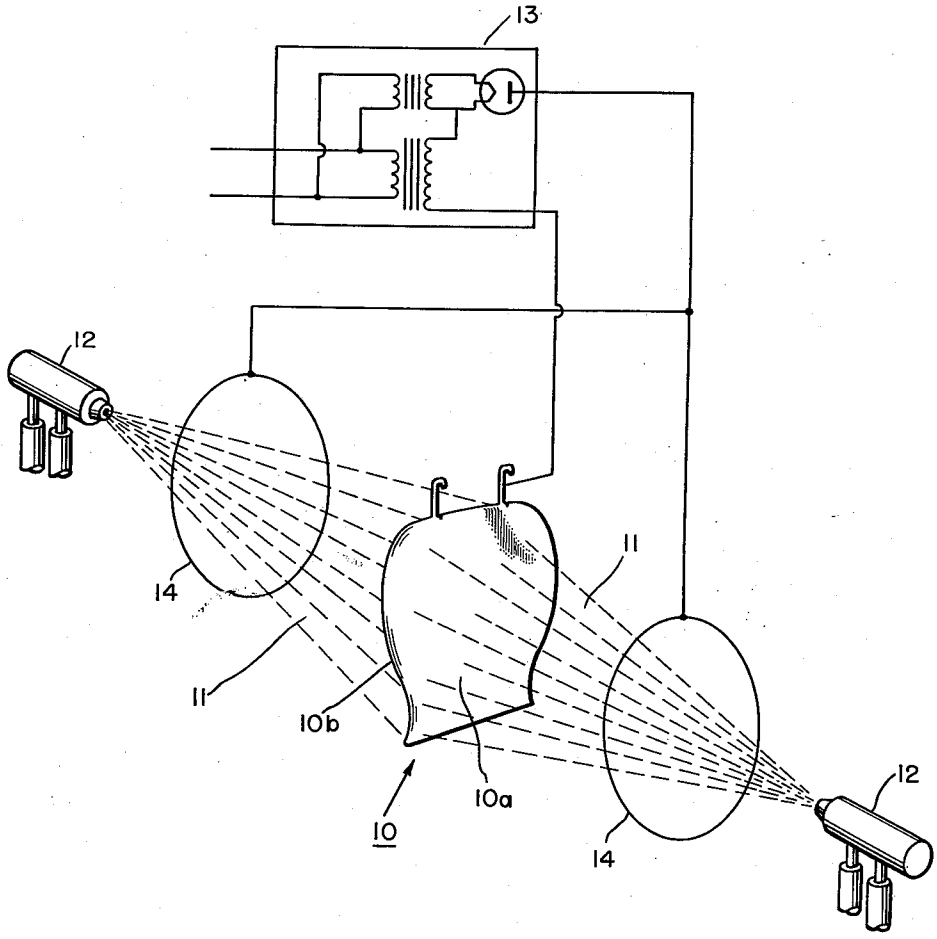

INVENTOR

PETER D. KASPAR.

BY

ATTORNEY

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METHOD OF FORMING DEPOSITED LATEX ARTICLES

Peter D. Kaspar, Dover, Del., assignor to International Latex Corporation, Dover, Del., a corporation of Delaware

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1 Claim. (Cl. 18—58.6)

This invention relates to a method of forming deposited rubber latex articles and particularly, to forming deposited rubber latex articles on so called "flat dipping forms."

The term "flat dipping forms" is used by the trade to denote forms which are relatively thin in cross section to permit a maximum number of the forms to be dipped simultaneously in the same tank of latex and therefore permit the most economical use of the latex tanks. For this reason, deposited latex articles such as girdles, bathing caps, baby pants, etc. are commonly formed on flat dipping forms although the articles will take a different shape when used. While called flat dipping forms to denote that they are thin in cross section, such forms may be transversely curved and the surfaces thereof may be embossed, engraved, fluted, grooved, knurled, etc. to provide various patterns on the articles formed thereon.

While the use of flat dipping forms does provide an economy in the use in the latex tanks, the use thereof also presents a problem of thinning of the deposited latex at the relatively thin edge portions of the form when used in the conventional manner. This thinning of the latex is apparently due to the surface tension of the latex deposited on the flat surfaces of the form drawing the latex deposited on the edges of the form away from the edges of the form when the form is withdrawn from the tank of latex. Merely dipping of the form into a latex coagulant solution prior to dipping the form into the latex does not obviate this thinning of the latex at the edges of the form in the subsequent dipping of the form into the latex. The coagulant, like the latex, also thins out at the edges of the form so that it has no substantial effect in preventing thinning of the latex at the edges of the form. Rotation of the form about its axis to hold the coagulant on the edges of the form by centrifugal force until it becomes non-fluid will help to prevent thinning of the coagulant at the edges of the form, but this requires expensive, complicated equipment which does not lend itself to automatic conveying and dipping systems.

Because of this thinning of the latex, the resulting article has thin, weak areas corresponding to the edges of the form unless two or more extra dips are made in the latex to be sure that sufficient latex is deposited at the edges of the form. While these extra dips may provided sufficient thickness of the latex at the edges they also result in an excessive thickness of latex being deposited at other areas with a resulting waste of the latex.

In accordance with the present invention, it has been found that this objectionable thinning of the latex at the edges of a flat dipping form can be avoided if, prior to dipping the form into the latex, the form is electrostatically sprayed with a liquid solution of latex coagulant which adheres to and becomes non-fluid substantially on contact with the form. This results in an extra thick layer of the coagulant being deposited on the edges of the form where the electrostatic force is the greatest.

Because the coagulant becomes substantially non-fluid on contact with the form, the coagulant is not drawn away from the edges of the form as occurs when the form is merely dipped into the coagulant. When the form is subsequently dipped into the latex, the coagulant on the edges of the form sets the latex deposited on the edges, thereby counteracting the tendency of the latex to draw away from the edges so that thin, weak areas are avoided and extra dips to build up the thickness of the latex at the edges of the form are unnecessary. By the use of the present invention, rotation of the form to hold the coagulant on the edges of the form is not necessary and the present invention therefore lends itself to automatic conveying and dipping systems.

The present invention and its advantages having been briefly described, a more detailed description of the invention is given hereafter by reference to the drawing which is a schematic showing of an apparatus for performing the method of invention.

In the drawing the reference numeral **10** denotes a typical flat dipping form, the use of which the method of the present invention is directed. It will be noted that the form **10** has comparatively flat surfaces **10***a* and relatively thin edges **10***b*.

As previously described, when a form of this type is used in the conventional manner in forming deposited latex articles, there is an objectional thinning of the latex at the edges **10***b*.

In accordance with the present invention this objectional thinning of the latex at the relatively thin edge portions **10***b* can be avoided if, prior to dipping the form into the latex, the form is electrostatically sprayed with a liquid coagulant solution which becomes non-fluid substantially on contact with the form **10**.

The form **10** is electrostatically sprayed by maintaining a high electrical potential between the form **10** and sprays of liquid coagulant solution emitted from suitable nozzles **12**.

As shown in the drawing, this difference in potential is conveniently provided by connecting one side (terminal) of a suitable source of electrical potential **13** to the form **10** and the other side (opposite terminal) of the source of electrical potential **13** to frames **14** of conductive wire through which the sprays **11** pass from the nozzles **12** to the form **10**.

Optionally, the source of electrical potential **13** may be connected to the nozzles **12** rather than to the frames **14**, but as this requires insulating electrically both the nozzles **12** and the equipment for supplying the liquid coagulant to the nozzle, such is not preferred.

As the sprays **11** pass through the frames **14**, the particles thereof take on a charge opposite to that of the form **10** and are therefore attracted to the form **10**. The greatest concentration of electrostatic force is at the thin edges **10***b* of the form and for this reason a greater thickness of coagulant is deposited on the edges **10***b*.

In accordance with the invention the liquid latex coagulant must be such that, under the particular spraying conditions, it will adhere to and become non-fluid substantially on contact with the form **10** so that the coagulant deposited on the form **10***b* will not be drawn away from the edges **10***b* and so that the coagulant will not run down the form.

Various coagulants and solvents well known to those skilled in the art may be used. Typical of such coagulants are chlorides or nitrates of magnesium, calcium, barium, and strontium and typical of such solvents for the coagulants are methyl, ethyl, isopropyl, or amyl alcohol, acetone, ether, carbon disulfide, chloroform, ethyl formate and ethyl acetate. The coagulant solutions may contain various additives such as wetting agents and stripping lubricants.

The coagulants used may be chosen to meet the particular spraying conditions, or the spraying conditions, such as the temperature of the form, the temperature of the air through which the spray passes, or the distance of the nozzle from the form may be varied to satisfy the condition that the particular coagulant adheres to and becomes non-fluid substantially on contact with the form. Good results have been obtained with calcium nitrate dissolved in water when sprayed from 8 to 15 inches from the form and the form pre-heated to approximately 150° F. The advantage of the use of water as a solvent is the cheapness thereof as compared with other solvents.

After the form **10** has been prepared as described, the form is dipped into a suitable tank of rubber latex to deposit a film of latex thereon, the form withdrawn from the tank, the latex film deposited thereon, treated and stripped from the form **10**, and any trimming and/or curing performed that is necessary to place the film in finished form. When a deposited rubber latex article is formed in accordance with the present invention, thin, weak areas corresponding to the edges of the form are avoided and expensive and time consuming extra dips to build up the thickness of the latex at the edges of the form are unnecessary.

It is to be understood that the above description is for the purpose of illustration only and that changes and modifications may be made therein without departing from the spirit and scope of the invention.

Having described my invention, I claim:

In the production of a deposited latex article on a dipping form having relatively thin curved edge portions and vertically positioned extensive flat areas adjacent said edge portions, the improvement which comprises spraying said form with a coagulant for liquid latex under conditions such that the coagulant adheres to and becomes non-fluid substantially on contact with the form, forming a deposit of non-fluid coagulant on the thin curved edge portions of the form that is at least as thick as the deposit on the flat areas thereof by maintaining an electrical potential between the spray of coagulant and the form during said spraying such that some of the particles of the spray are preferentially attracted to the thin curved edge portions of the form and the remainder of the particles of the spray are deposited on the flat areas thereof, and dipping the coagulant coated dipping form in liquid latex to deposit latex on the form and form a latex film which is at least as thick over relatively thin edge portions of the dipping form as over the flat areas thereof.

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