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VEHICLE TOP FABRIC

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The invention relates to a treated water-proof and weather resisting fabric particularly adapted for use in the covering of the tops of buses, trucks, trailers and other motor vehicles as automobiles, railway vehicles and the like as well as horse drawn vehicles and to the method of preparing and applying the same. This fabric has also been used for connecting the cars of streamline trains.

The majority of top coverings which have been treated to make them shed water and resist weather conditions are relatively inelastic and not only difficult to stretch and fit to the top frame of the vehicle so that they are inclined to kink and wrinkle and bulge when applied but on account of their lack of sufficient elasticity are subject to injury by cracking and breaking of the surface in application and when applied they are unsightly and when thus injured are not wholly waterproof even when new.

The object of the invention is to provide a treated fabric for this purpose which is shrunk in the course of treatment and being impregnated with an elastic material which is vulcanized therein whereby the fabric is held in the shrunken dimension and when applied stretches to conform without injury to the top frame and being elastic fits smoothly without any tendency to wrinkle and is also highly waterproof being stretched and applied without injury to the coating or consequent loss of the waterproof properties. This fabric further resists deterioration for long periods of exposure to the weather, presents a pleasing appearance in use and in the preferred form is highly reflective of the sun's rays so that it does not become heated or transmit heat to the inside of the vehicle. This also further contributes to the resistance of the fabric to weather conditions.

In the practice of the method of the invention, the base fabric to be treated which is cotton duck or the equivalent or other cotton fabric which is highly absorbent of water and water solutions, is dipped in latex mixed with suitable vulcanizing agents and vulcanized. Application of latex in other ways may be substituted for dipping, as spraying, and so forth.

While the treatment of fabrics by dipping or impregnating with rubber solutions and vulcanizing is well known in the manufacture of vehicle top coverings, this treatment is to be distinguished from the method and the product of the present invention, particularly as to the property of elasticity which best adapts it to use for vehicle top coverings as the rubber solvents contained in such solutions do not have the effect of shrinking cotton or similar fabrics so that the resulting fabric is inelastic and does not have the important functions of the invention as already pointed out.

It is also of importance in the practice of applicant's invention that while latex can be preserved for a long period and almost indefinitely in relatively pure form or in certain mixtures, latex mixed with the ingredients which are used therewith for purposes of filling deteriorates rapidly. In the practice of this invention, the latex liquid with which the fabric is treated in the practice of this invention is preferably mixed with the aluminum or aluminous filler immediately prior to using so that when the fabric is vulcanized to complete the process, it is highly elastic and also highly waterproof when stretched.

In accordance with the preferred practice of the invention, it being understood that considerable variation in the constituents of the various agencies and in the selection of these agencies themselves, may be practiced without departure from the spirit of the invention or sacrifice of a satisfactory result though the quality of the product may be changed, the latex used may be the natural product as it comes from the rubber tree in which form it contains from 38 to 40% rubber or it may be a concentrated form of latex which as available commercially for this purpose is found to contain about 60% of rubber. In these various forms of latex, the remainder of the liquid is water or water with a small percentage of other constituents. While both forms of latex and different proportions of rubber may be used with satisfactory results the concentrated form of latex described is found to be generally more uniform and dependable because in the process of condensing the natural latex, the irregularities are removed. In the practice of the process of the invention up to the present time preferably using a solution which is concentrated to 60% of rubber, satisfactory results have been obtained by mixing with the latex the various known vulcanizing agents in the proportions known to be satisfactory in the vulcanization of latex. As a coloring matter or filler and reflecting agent 20% of powdered aluminum has been mixed with the liquid. It has also been found desirable to mix with the liquid 5% soap chips to aid the emulsification of the liquid. All of these proportions are based on the rubber content of the solution. Generally speaking, when latex with a 60% rubber content is used, it is diluted with approximately the same volume of water. All these proportions and ingredients are subject to change and variation, omission of some ingredients, also the substitution of equivalents.

The above-described latex liquid contains approximately 140 parts of water to 60 parts of rubber.

The above data are merely descriptive of the practice to date, any accelerators and vulcanizing agents adapted for use in the vulcanization of latex being available to greater or less ad-

vantage in the process of the invention. The formula given is at present regarded as the preferred formula.

While aluminum powder or paste, which consists of powder mixed with liquid, is regarded as the preferred filler for the purposes of the invention as it gives a most satisfactory effect in the radiation of the sun's rays and is not subject to deterioration from the action of the weather, it is also possible to use other pigments as clays of various colors in the place of aluminum. It is important in order to avoid deterioration that these ingredients be free of copper and manganese. A pigment having definite particle size is desirable as it is thus more uniformly suspended in the emulsion which contributes to a uniform color in the finished product. It has also been found feasible when desired to apply certain coatings to this fabric after it has been affixed to the top frame of a vehicle. This dressing may be one of several varieties such as the various synthetic compositions which contain small amounts of tung oil or of the varnish type. They should not contain any considerable quantity of linseed oil. The various so-called "dirigible dopes" are helpful but not necessary to a satisfactory result.

In the practice of the process, the vulcanizing agents, accelerator and filler, are preferably mixed with the concentrated latex, water being preferably also mixed therewith and thereafter applied by dipping the cotton fabric as duck or the like in the liquid mixture. While the latex with the vulcanizing agent enters the fabric and coats it, the filler coats the surface only. The fabric when thus dipped is in accordance with the preferred process dried in a hot air chamber and finished by passing over drying cans which are heated by steam contained therein and supplied continuously to maintain a vulcanizing temperature. The latex in the dip tank is cold or near atmospheric temperature and the vulcanizing temperatures used are the temperatures used in other vulcanizing processes. The higher vulcanizing temperatures give quicker action without injuring the fabric. It is an important incident to the process that in dipping, the cloth is wet and saturated by the water contained in the latex liquid which is a colloidal rubber solution and in drying the cloth shrinks and is held in the shrunken dimension by the vulcanized latex, this shrinkage provides for stretching of the cloth and of the rubber coating thereon in the application of the fabric to the top frame of a vehicle giving a smooth flexible covering which is not injured in any way by stretching and which is easily applied and due to its elasticity has no tendency to bag or bulge. It is also of pleasing appearance and durable, sheds water, retains its shape and resists sun and deterioration from the action of weather in every way through an extremely long period of use. In this connection, the aluminum filler is preferable on account of its action in reflecting the sun's rays, both the light and the heat rays, so that heating of the interior of the vehicle as well as the top covering itself is avoided with consequent deterioration which results from prolonged and excessive heating.

I have thus described in detail a fabric for vehicle tops and the method of preparing and applying the same in accordance with my invention in the preferred form, it being understood however that a considerable variation in temperatures of vulcanization, portions and identity of vulcanizing ingredients and proportions of rubber in the liquid and other variations in the process may be practiced without departure from the spirit of the invention and further that the specific terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A fabric covering for vehicle tops, the same consisting of a cotton base fabric of shrunken dimension, coated and impregnated with latex vulcanized therein, the coating containing a solid reflecting filler which is free of copper and manganese and embodied in the vulcanized material the fabric being highly elastic and capable of local stretching and distortion to conform to the curvature of vehicle tops without injury and without wrinkling, being held yieldingly in its shrunken dimension by the vulcanized material.

2. The method of treating cotton fabric which consists in preparing a liquid mixture containing latex, vulcanizing agents and an aluminum filler, coating and impregnating the fabric with the mixture immediately after the filler is added, which treatment causes the fabric to shrink, vulcanizing the latex, the vulcanized material holding the fabric yieldingly in its shrunken condition producing a fabric which is elastic, waterproof and which possesses a high degree of resistance to the action of the weather.

3. The process of making elastic vehicle top covering material which comprises wetting cotton fabric with a liquid latex containing vulcanizing agent and sufficient water to saturate the fabric, the latex liquid having powdered aluminum mixed therein immediately before application to the fabric, the wetted fabric being dried and vulcanized whereby it is shrunk by the action of the water which is evaporated, and coated and impregnated with the rubber content of the latex, which rubber gives the fabric waterproof properties, the aluminum being embodied in the coating and providing a reflecting surface to protect the rubber and the fabric, the rubber in the liquid being sufficient to hold and serving when vulcanized to hold the fabric yieldingly in its shrunken dimension, providing increased elasticity of the fabric which adapts it for stretching over a vehicle top without wrinkling.

4. As an article of manufacture, an elastic top covering for vehicles, the same having a reflecting surface and consisting of a cotton fabric impregnated and coated with a liquid latex containing vulcanizing agent and sufficient water to saturate the fabric, the latex having powdered aluminum mixed therein and deposited on the surface of the fabric, the solids contained in the latex being vulcanized in and on the fabric and the fabric being of a shrunken dimension due to the action of the water, the vulcanized rubber serving to hold the fabric yieldingly in the shrunken dimension.

5. An elastic top covering for vehicles consisting of a cotton base fabric coated and impregnated with solids in the form of a dispersion from a latex solution containing a vulcanizing agent, approximately 20% of powdered aluminum, and sufficient water to saturate the fabric the rubber in the latex solution being vulcanized and the fabric having a shrunken dimension resulting from the action of the water, in which shrunken dimension the fabric is held yieldingly by the vulcanized material.

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