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IMPREGNATION OF LEATHER AND
PRODUCTS THEREOFPer K. Frolich, Roselle, N. J., assignor to Standard
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This invention relates to the impregnation of leather and more particularly to a method of impregnating leather with compositions containing materials obtained by polymerizing unsaturated hydrocarbons and includes methods of making and using the compositions and the products resulting from treatment with these compositions.

The materials are of 800 to 2000 or higher molecular weight (as determined by the viscosity method described in H. Staudinger's book, "Die Hochmolekularen Organischen Verbindungen", 1932, p. 56), are excellent lubricants possessing a high viscosity and are soluble in mineral oils. They are obtained by polymerizing isobutylene. The polymerization of isobutylene is conducted at temperatures below -10° C. with volatile halide catalysts such as boron fluoride and hydrogen chloride, though higher temperatures and other catalysts may also be used such as mercury chloride, tin foil, benzoyl peroxide, etc.

Prior to the tanning operation in the manufacture of leather it is necessary to thoroughly remove the natural animal fats and oils contained in the original hide. The resulting product becomes harsh and brittle on drying and in order therefore to retain the desirable properties characteristic of leather, it is impregnated in a suitable manner with oils and fats. Ordinary upper leather and other types of light flexible products are usually loaded with a certain percentage of oily material by drumming them with an emulsion containing such constituents as neat's foot oil, castor oil, fish oil, etc. with or without added mineral oil. Sole leather on the other hand is usually loaded to a much larger extent by soaking it in a molten bath of a mixture of paraffin wax and stearic acid with or without other materials added to it.

The fatty and oily materials introduced lubricate the fibre bundles of the leather structure in such a manner as to permit them to slide against each other and in between each other. This increases the flexibility of the product and at the same time "nourishes" the leather so as to prevent it from becoming harsh and brittle with time. Many attempts have been made to introduce rubber in some form or other to augment the effect of the fatty and oily constituents mentioned above but efforts in this direction have largely been unsuccessful.

An object of this invention is to impregnate the leather with a substance which will lubricate and at the same time not impart a greasy appearance and feel to the finished leather.

A further object of the invention is to impregnate the leather with a substance that will be retained by the fibre structure when once deposited on same and not give rise to the undesired "bloom" characteristic of oils and fats which on hydrolysis liberate stearic acid.

Another object of this invention is to provide a composition for waterproofing leather and the like, which composition freely penetrates and thoroughly permeates the leather and the like and is stable on exposure, has a preservative action on the leather and serves to protect it against injurious effects of wetting and drying in service and at the same time maintaining the required grade of plasticity of the compound throughout a wide range of temperatures.

Other objects will be apparent from the description of the materials used, the final product and the method of production.

These and other objects of the invention will be understood from the following examples given:

1. In the case of light colored upper leather made from calfskin, it is preferable to introduce the material mixed with other oils and greases in the form of an emulsion in the so-called fat liquoring operation. A suitable mixture of this nature may be made up of the following:

	Percent
Polymer	2-10
Oil soluble sulfonate soap	10-15
Neat's foot oil	25
Mineral oil of suitable viscosity such as 110 seconds Saybolt viscosity at 100° F.	50-63

This material readily emulsifies with ordinary agitation to give a stable emulsion.

2. Side leather (split kip and the like) is treated with a mixture of the following composition:

	Per cent
Polymer	2-10
Oil soluble sulfonate soap	10-15
Castor oil	25
Mineral oil of suitable viscosity	50-63

These give compositions of substantially the proper consistency and have high penetration characteristics. The polymers in these forms freely permeate the leather and like material without being filtered out and left on the surface. Other suitable leather conditioning oils such as neat's foot oil may be substituted for the castor oil in the above composition.

3. Sole leather is best impregnated by soaking it in a molten bath of paraffin wax, stearic acid,

etc. containing the polymer. A suitable mixture of this material is made up as follows:

	Per cent
5 Polymer.....	10
Stearic acid.....	40
15 Paraffin wax.....	50

4. In the manufacture of black upper leather it is customary to sponge the dyed material with a light mineral oil prior to the final finishing operation. The polymer is introduced by dissolving the material in the oil used for this purpose, the gravity of the original oil to be chosen so as to give a blend whose application conforms to good tannery practice.

In like manner, upholstery leather, glove leather, etc., may be impregnated in whatever manner fits best in the ordinary tannery practice. To increase the life and appearance of upholstery leather, suitcases and other articles of this general type, the polymers may be applied to the surface at intervals, preferably dissolved in a light mineral oil carrier or emulsified in known manner, which makes for thorough penetration. They may also be incorporated in the coatings applied to the surface of leather in the so-called finishing operation, in which case they act to a certain extent as plasticizers.

These polymers are effective when used in rather low concentrations, and this is important in the case of upper leather and other light products which to a large extent are colored with aniline dyes, the general experience being that such dyes do not "take" properly to leather which contains even a moderate amount of ordinary mineral, vegetable or animal oils and greases.

Tanned leather that has been treated with various salts such as sodium sulfate, barium chloride, magnesium sulfate, aluminum sulfate, etc., for "loading" or other purposes may likewise be impregnated with solutions containing polymers of unsaturated hydrocarbons. The sulfonate soaps used may be prepared by neutralizing either a mineral oil sulfonic acid or sulfonated fatty oils such as neat's foot oil, castor oil, etc.

Foaming of the impregnating emulsion where it may occur is regulated by the addition of about 2% of stearic acid or a stearate, the percentage of stearic acid or stearate added being regulated according to the amount of oil soluble soap used.

The foregoing description is merely illustrative and alternative compositions may be made within the scope of the appended claims in which it

is my intention to claim all novelty as broadly as the prior art permits.

I claim:

1. A leather impregnating composition, comprising an oil solution of a hydrocarbon polymer and an oil soluble sulfonate soap.

2. A leather impregnating composition according to claim 1, in which neat's foot oil is incorporated.

3. A leather impregnating composition according to claim 1, in which castor oil is incorporated.

4. The method of treating leather, which comprises impregnating the leather with a composition containing a polymer obtained by polymerization of unsaturated hydrocarbons.

5. Method according to claim 4, in which the polymer is of 800 to 1500 molecular weight.

6. The method of treating leather according to claim 4, in which the polymer is over 1500 molecular weight.

7. The method of treating leather, which comprises impregnating the leather with a composition containing a polymer obtained by polymerization of unsaturated hydrocarbons, oil soluble sulfonate soap, neat's foot oil and mineral oil.

8. An article of manufacture, comprising a leather and a high molecular weight polymer of an unsaturated hydrocarbon incorporated in said leather.

9. An article of manufacture, comprising a leather and a high molecular weight polymer of isobutylene incorporated in said leather.

10. The method of treating leather, which comprises impregnating the leather with a composition containing a polymer obtained by polymerization of unsaturated hydrocarbons, oil-soluble sulfonate soap, and mineral oil.

11. The method of treating leather, which comprises impregnating the leather with a composition containing a polymer obtained by polymerization of unsaturated hydrocarbons, and wax.

12. An article of manufacture, comprising a leather having incorporated therein both a high molecular weight polymer of an unsaturated hydrocarbon, and neat's foot oil.

13. An article of manufacture, comprising a leather having incorporated therein both a high molecular weight polymer of an unsaturated hydrocarbon, and castor oil.

14. An article of manufacture, comprising a leather having incorporated therein both a high molecular weight polymer of an unsaturated hydrocarbon, and a wax.

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