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LUBRICATING OF LEATHER

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3 Claims. (Cl. 149—6)

This invention relates to the fatliquoring and stuffing of leather, and more particularly to the use of new classes of lubricants for this purpose. The invention includes the lubricants themselves, processes wherein they are applied to the leather and lubricated skins and leather containing them.

The lubrication of leather with fats, oils and similar materials has been practiced for many years on both vegetable tanned and mineral tanned leather. Heavier leathers such as sole leather, belting leather and the like are frequently impregnated with oils and fats, which are usually applied as such or dissolved in an organic solvent such as naphtha. This method of application is usually referred to as "stuffing", "burning in" or "oiling off" and is characterized by the fact that the lubricant is applied to the leather either without any solvent at all or in a non-aqueous medium such as an organic solvent. It is customary to use raw oils and fats in this type of leather finishing.

Another standard method of leather lubrication is known as fatliquoring. This method is more frequently applied to splits and other cheaper grades of upper shoe leather as well as to the finer grades of light leather such as calf skins and kid skins. It is distinguished from the stuffing processes referred to above by the fact that the skins or leather are treated with oils, fats or other lubricants in the form of an aqueous emulsion, usually by agitation in a rotating drum, and it is customary to employ at least a substantial quantity of the lubricant in sulfonated form. It is therefore proper to distinguish between stuffing and fatliquoring processes both by the method of applying the lubricant to the leather and by the fact that in one case the lubricant is unsulfonated while in the other case it is usually employed in at least a partially sulfonated form.

Satisfactory lubricating compositions for stuffing and fatliquoring processes must possess certain characteristics not found in all oils and fats. A satisfactory lubricating agent for this purpose should be stable and not subject to rancidity, and should be capable of ready absorption by the leather without leaving a greasy surface. A further requirement, which is particularly important in lubricants for light-colored leathers such as white glove leather, chrome tanned upper leather and the like is that the oil should possess and retain a light color during the expected life of the leather.

Sperm oil is one of the most satisfactory of the large number of lubricants that have previously been used for stuffing and fatliquoring leather. This oil is stable and possesses a fairly light color in raw and sulfonated form, and its greatest objection has been its pronounced fishy odor. Unfortunately the supply of sperm oil is rapidly diminishing for the sperm whale, from which it is obtained, is rapidly becoming extinct. For this reason there is an increasing demand among leather finishers for a satisfactory substitute for both raw and sulfonated sperm oil.

I have found that the oil expressed from the seeds or nut kernels of the jojoba bush is an excellent leather lubricant, both in its raw state and after sulfonation, and that its lubricating characteristics for leather resemble those of sperm oil very closely. The jojoba bush is a shrub which is found in the more arid parts of Arizona, Mexico and southern California. It reaches maturity in about two years, can be readily cultivated on land that will support few other plants and produces several crops of seeds a year, depending on the rainfall. Accordingly, the supply of oil obtainable from the seeds of this plant is unlimited, whereas the available supply of sperm oil is rapidly diminishing. For this reason, I regard the raw and sulfonated jojoba seed oils as being of great potential importance to the leather industry, for they provide an improved substitute for classes of leather finishing materials that are becoming increasingly difficult to obtain.

I have found that both raw and sulfonated jojoba seed oil can be applied to skins and leather by any of the methods of impregnation used by leather finishers, including the methods known as stuffing and fatliquoring. The raw oil is quite similar to sperm oil in its physical and chemical characteristics but it is lighter in color and possesses none of the fishy odor that is so characteristic of the sperm oil. The following table sets forth the more important physical and chemical characteristics of this oil, and the corresponding figures for sperm oil have been inserted for purposes of comparison.

	Jojoba seed oil	Sperm oil
Refractive index at 25° C	1.4648	1.4573
Specific gravity 25°/25°	0.8642	0.8799
Iodine value	81.7	81–90
Saponification value	92.2	125.2–132.6
Unsaponifiable matter	48.3	37–41
Acetyl value of unsaponifiable matter	171.8	161–190
Iodine value of unsaponifiable matter	77.2	65
Iodine value of fatty acids	76.1	83.2–85.6
Neutralization value of fatty acids	172.0	190–199
Congelation temperature, °C	10–12	−5 to 16
Glycerol, percent	0.0	0.0–5.5
Saturated acids, percent	1.64	10.0

From the above table it will be seen that jojoba seed oil can be easily distinguished from sperm oil. It differs from the latter by its higher specific gravity, higher content of unsaponifiable matter and lower content of saturated fatty acids. It contains no glycerides, although in this

respect it probably does not differ from some sperm oils. The fatty acids of jojoba seed oil have longer carbon chains than those of sperm oil, as may be seen from their respective neutralization values. The iodine value of these fatty acids is lower than those of sperm oils, but the iodine value of the unsaponifiables is higher.

The raw jojoba seed oil is especially well adapted for use in stuffing processes, either as such or in admixture with heavier oils or greases such as Moellon Degras, olein and the like. The oil may be impregnated into the leather in a rotary drum as in drum stuffing, or it may be rubbed into the surface of the leather as in hand stuffing or "oiling off". In either case a soft and well lubricated piece of leather is obtained.

The sulfonation of jojoba seed oil presents no serious technical difficulties, for I have found that the sulfonated oil can be easily prepared by the ordinary methods of sulfonation. Sulfonated joboba seed oil is a clear yellowish-white oil at 40° C. which slowly settles out fine particles of waxy material upon standing at room temperatures. This characteristic is extremely important in fatliquoring and stuffing leather, for the finely divided waxy particles serve to give skins and leather treated with this oil a softer surface than those treated with other fatliquoring agents. During the fatliquoring or stuffing process the waxy particles are apparently lodged in the surface of the leather or skin and give it a characteristic emollient or unctuous feel that cannot be duplicated by any other leather lubricant of which I am aware. For this reason the present invention is especially well suited for finishing glove leather, doeskins for jackets, and other leather wearing apparel that is worn in contact with the human skin.

The sulfonated jojoba seed oil may be used in the preparation of stuffing compositions, but it is especially well adapted for use in fatliquoring. I have found that the oil is easily emulsified with water, either with or without the addition of emulsifying agents, and that good exhaustion of the fatliquoring bath is easily obtained. Preferably such a fatliquoring bath contains from 5–15% of the sulfonated oil, based on the weight of the leather, together with 60–300% of water. Of course, the amounts of oil and water can be varied through a much wider range in fatliquoring leathers of different characteristics, and it should be understood that the invention in its broader aspects is not limited to any specific concentrations or ratios of sulfonated oil to leather.

The advantages of the present invention can also be obtained, at least in part, when sulfonated jojoba seed oil is used as a stuffing or fatliquoring agent in admixture with other lubricating materials. For example, it is quite evident that sulfonated sperm oil can be used as a diluent for sulfonated jojoba seed oil in fatliquoring processes if desired. It is also possible, of course, to employ the sulfonated jojoba seed oil as an emulsifying agent in fatliquoring baths or in stuffing compositions which also contain unsulfonated fats, oils and the like, such as are frequently employed in lubricating calf leather, chrome tanned upper leather and other heavier leathers. These and similar fields of application will readily suggest themselves to skilled leather finishers, and are included in the invention.

The invention will be described in greater detail by the following specific examples. It should be understood, however, that these examples are given primarily by way of illustration, and that the invention in its broader aspects is not limited thereto.

Example 1

100 parts of vegetable tanned calk skins are fatliquored in a rotating drum using an emulsion of 2–7% of jojoba seed oil in 100–150% of water, all based on the weight of the skins.

The fatliquoring emulsion may be prepared by stirring the jojoba seed oil into a solution of 1–3% of castile soap in 10–20% of water, based on the weight of the skins, whereby a creamy white emulsion is produced. The neutralized and washed skins are put into a rotary drum together with 80–130% of their weight of water and the emulsion is added, after which rotation of the drum is started.

Additional emulsifying agents such as egg yolk, lecithin, sulfonated castor oil or sulfonated jojoba seed oil may be used in preparing the aqueous emulsion of jojoba seed oil instead of or in addition to the castile soap if desired. Alternatively the soap may be formed in situ by dissolving oleic acid in the raw jojoba seed oil and pouring the mixture with agitation into a water solution of sodium hydroxide. In either case, the heavy emulsion which is formed may be used as a stock solution for addition in relatively small quantities to the fatliquoring drum which contains the hides or skins together with additional water.

Upon rotation of the fatliquoring drum for 30–45 minutes with emulsions of raw jojoba seed oil prepared in the above manner, a well lubricated leather is obtained. The emulsion exhausts well and there is no evidence of greasiness or fat stains on the surface of the leather.

Example 2

110 parts of jojoba seed oil were cooled to 14° C. and 27.5 parts of concentrated sulfuric acid were slowly added with continuous agitation, the temperature of the mixture being maintained below 30° C. at all times. When the reaction was complete the sulfonation mix was poured into an excess of 20% sodium hydroxide at temperatures of 40–80° C. and the brine was allowed to separate from the oil. The brine was drawn off and the sulfonated oil was finished by adding a small amount of a dilute sodium hydroxide solution. A light, pale straw colored and practically odorless oil was obtained.

For purposes of comparison 400 parts of 45° natural winter sperm oil were sulfonated with 100 parts of concentrated sulfuric acid at 11–24° C. by the same procedure. The resulting oil was much darker in color than was the sulfonated jojoba seed oil and its fishy odor still persisted after sulfonation.

Chrome tanned amritsars of a weight suitable for glove leather were well washed for 20 minutes at 40–50° C. in two rotating fatliquoring drums. After the skins were washed, the drums were drained and charged with 150% of water based on the weight of the skins. 10% of the sulfonated jojoba seed oil, also based on the weight of the skins, was dissolved in several times its weight of water and added to one of the drums. 10% of the sulfonated sperm oil in the form of a similar aqueous solution was added to the other drum.

The drums were rotated for 30 minutes at about 50° C., after which the skins were removed and dried at room temperatures. The skins were then broken over a dull knife and examined.

It was found that the skin lubricated with sulfonated jojoba seed oil was much softer and more glossy than the skin treated with sulfonated sperm oil. Its light color was unimpaired, and there was no objectionable odor. Both skins showed equally good properties as to stretch or "let-out" and both were entirely free from fat stain.

What I claim is:

1. A method of lubricating skins and leather which comprises impregnating them with a lubricating composition containing a lubricant selected from the group consisting of jojoba seed lubricant comprising jojoba seed oil.

2. A method of stuffing skins and leather which comprises impregnating them with a non-aqueous lubricant comprising jojoba seed oil.

3. A method of fatliquoring skins and leather which comprises applying thereto an aqueous emulsion containing sulfonated jojoba seed oil.

JOSEPH G. NIEDERCORN.

CERTIFICATE OF CORRECTION.

Patent No. 2,176,434. October 17, 1939.

JOSEPH GEORGE NIEDERCORN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 6, for the word "calk" read calf; page 3, second column, line 3, claim 1, for "lubricant comprising" read oil and sulfonated; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of November, A. D. 1939.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

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2. A method of stuffing skins and leather which comprises impregnating them with a non-aqueous lubricant comprising jojoba seed oil.

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