

UNITED STATES PATENT OFFICE

JOSEPH V. CHAPOT, OF HILLSIDE, AND RALPH E. PORTER, OF NEWARK, NEW JERSEY,
ASSIGNORS TO NATIONAL OIL PRODUCTS COMPANY, OF HARRISON, NEW JERSEY, A
CORPORATION OF NEW JERSEY

TANNING PROCESS

No Drawing.

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Our invention relates to processes for tanning leather and refers particularly to oil tanning processes.

Among the objectionable features of the present employed processes for the oil tanning of leather, may be mentioned the length of time necessary for proper tanning; excessive oxidation of the skin surface compared with the oxidation of the interior, resulting in "glazing"; the large amount of oil required; the many operations; the extensive equipment and the many repeated handlings of the skins.

Our invention overcomes all of the above mentioned and other, objectionable features of the present employed methods for oil tanning leather and presents a new and useful method whereby the tanning process can be accomplished in a greatly reduced period of time while producing more uniform and more completely penetrated oxidizing effects.

We have found that superior results can be obtained in a greatly reduced period of time over the present employed oil tanning methods by using a tanning liquor containing a fish oil and a sulphonated fish oil especially in the presence of an oxidizing agent and an oxygen carrier, the addition of a mineral oil and formaldehyde being at times advantageous.

The sulphonated fish oil has greater penetrating properties than has the raw fish oil and thus carries some of the fish oil into the hide, or skin, producing a more uniform treatment and causing a correspondingly more uniform tanning effect upon both the surface and the interior, than can be produced in the absence of a sulphonated oil, or other penetrating carrier of the fish oil employed.

We have found that the time employed in the tanning process can be very materially reduced if a suitable oxidizing agent be used in the tanning liquor, such oxidizing agent being one which is in solution during the operation and is carried into the hide or skin thus presenting both the surface and the interior of the hide, or skin, to a similar oxidizing effect.

We have further found that still more valuable results can be obtained if there be employed an oxygen carrier which will penetrate

the hide, or skin, during the tanning process.

We have further found that improved results can be obtained by the employment of mineral oils or formaldehyde in the tanning bath.

It will be noted that the value of all of the above mentioned chemicals is based upon the increased penetration of the tanning materials, in order that the interior and the exterior of the hides, or skins may be subjected to practically the same tanning action at the same time, thus reducing the period of tanning operation, and producing a practically uniform tanning effect upon both the surface and interior of the tanned materials.

Our process is adaptable for tanning all kinds of skins, but is particularly suitable and advantageous in the tanning of wool skins; full grain goat, sheep, calf and cabretta skins; flesh splits for chamois, and all types of fur skins.

Among the sulphonated oils which we have found particularly suitable in our process are sulphonated sperm oil, sulphonated cod oil, and sulphonated sardine oil, but we do not limit ourselves to these particularly mentioned sulphated oils.

Fish oils, having a tanning effect may be employed, among which are cod, sardine, sperm and menhaden.

Both water soluble and oil soluble oxidizing agents may be employed among which are sodium bichromate, potassium bichromate, sodium perborate, ammonium salts of bichromates and perborates, sodium nitrate, nitric acid, benzoyl peroxide, peroxides and acetic peroxide.

Among the oxygen carriers suitable in our process are turpentine and kerosene, particularly the crude forms of those products.

Many skins contain difficultly oxidizable oils and fats, and as hydrocarbon oils or mineral oils, such as paraffin oil and white mineral oil dissolves these difficultly oxidizable oils and fats, and distributes them uniformly through the skin, the use of mineral oils is at times advisable and advantageous.

The employment of formaldehyde is at times advantageous as it increases the whiteness of the leather, gives additional resistance

to higher temperatures and is particularly useful for grain leather tanning.

The following are given as examples of our process.

- 5 *Example 1.*—The skins are pickled, washed and dehydrated in any well known manner and then introduced into a drum containing a tanning liquor containing
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|---------------------------|----------|----|
| 10 Sodium bichromate..... | Per cent | 2 |
| Water..... | | 1 |
| Formaldehyde..... | | 6 |
| Kerosene..... | | 25 |
| Sulphonated cod oil..... | | 30 |
| 15 Cod oil..... | | 36 |

and the drum is run for from 1½ to 2 hours. Skins must be examined after 1½ hours to determine if excessive heating has developed, or if knotting or balling up has taken place.

20 Dump skins on floor or throw on truck and let lay for remainder of day and overnight. Next morning throw skins back in drum and run ½ hour. Then run into drum the following mixture:—

- 25 2 oz. mixture of above ingredients, 1 oz. 30° Bé. soda ash (24% Na₂CO₃) and run for 1 hour longer. If no heat has developed, run skins 15 minutes more, or longer, and until all skins have absorbed oil uniformly.
- 30 Dump skins and horse up in small piles, and let lay for remainder of day and overnight. Hang up in hot rooms or drying tunnel for oxidation. Raise heat slowly to not less than 100° F. and not more than 115° F. Even as high as 100% relative humidity will produce excellent results. Proper control of heat and humidity is very important. Under ideal conditions a minimum of about 5 hours is necessary for complete oxidation, which can only be judged by examination of skins. The skins should be apparently dry and no appreciable wet oil spots should be visible at the time the skins are taken down from the hot rooms or tunnels. Put skins in drum and start running; then run in soda ash solution made up as follows:—

- For each dozen of average weight skins use 3 gals of water in which is dissolved 1/3 lb. of soda ash (58%) at about 105° F. temperature. Run drum for 20 minutes then run in soap solution made up as follows:—

- 50 For each dozen of average weight skins use 3 gals of water in which is dissolved 1/2 lb. of soap (50%). Run drum for 20 min. longer. Then put on screen door and run drum until most of soap and soda solution has been removed. Then start flow of lukewarm water through gudgeon and rinse thoroughly. Dump skins and horse up.

Example 2.—Same as Example 1, except substitute sodium nitrate for sodium bichromate.

Example 3.—Same as Example 1, except substitute glycerine for formaldehyde.

Example 4.—Same as Example 1, except substitute paraffin oil for kerosene.

Example 5.—Same as Example 1, except substitute sulphonated sperm oil for sulphonated cod oil.

Example 6.—Same as Example 1, except substitute menhaden oil for cod oil.

Example 7.—The following treating solution is employed:—

Raw fish oil.....	Per cent	46	75
Sulphonated cod oil.....		50	
Oleic acid.....		4	

Example 8.—The following treating solution is employed:—

Raw fish oil.....	Per cent	42	80
Sulphonated cod oil.....		50	
Red oil.....		4	
Sodium bichromate.....		2	85
Water.....		2	

It will be noted that our process presents means whereby skins and hides can be tanned in a most thorough and economical manner with the production of uniform results.

We do not limit ourselves to the particular materials, chemicals, quantities, proportions, temperatures or steps of procedure specifically mentioned as these are given simply as a means for clearly describing our invention.

What we claim is:—

1. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil and a sulphonated fish oil. 100
2. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil and an oxidizing agent. 100
3. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil, an oxidizing agent and an oxygen carrier. 105
4. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil, an oxidizing agent, an oxygen carrier and a mineral oil. 110
5. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil, an oxidizing agent, an oxygen carrier, a mineral oil and formaldehyde. 115
6. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil and an oxygen carrier. 120
7. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil and mineral oil. 125
8. A process for tanning leather which consists in treating leather with a tanning liquor of a fish oil, a sulphonated fish oil and formaldehyde. 130

9. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil, an oxidizing agent and an oxygen carrier.

5 10. A process for tanning leather which consists in treating leather with a tanning liquor of fish oil, a sulphonated fish oil, an oxidizing agent and a mineral oil.

10 11. A process for tanning leather which consists in treating leather with a tanning liquor of a fish oil, a sulphonated fish oil, an oxygen carrier and a mineral oil.

15 12. A process for tanning leather which consists in treating leather with a tanning liquor of a fish oil, a sulphonated fish oil, an oxygen carrier and formaldehyde.

20 13. A process for tanning leather which consists in treating leather with a tanning liquor of a fish oil, a sulphonated fish oil, a mineral oil and formaldehyde.

Signed at Harrison, in the county of Hudson and State of New Jersey this 3rd day of March, 1932.

25 JOSEPH V. CHAPOT.
 RALPH E. PORTER.

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