

# UNITED STATES PATENT OFFICE.

PHILIP MAGNUS, OF NORTHCOTE, AND TIMOTHY JOSEPH DAVIS, OF NORTH FITZROY, VICTORIA, AUSTRALIA, ASSIGNORS TO THE RUBBERIZED LEATHER AND TYRE COMPANY LIMITED, OF MELBOURNE, AUSTRALIA.

## PROCESS OF PREPARING LEATHER.

No. 837,859.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed September 19, 1905. Serial No. 279,155. (Specimens.)

*To all whom it may concern:*

Be it known that we, PHILIP MAGNUS, collector, a resident of 103 Union street, Northcote, and TIMOTHY JOSEPH DAVIS, artist and photographer, a resident of 8 Grant street, North Fitzroy, in the county of Bourke, State of Victoria, and Commonwealth of Australia, subjects of the King of Great Britain and Ireland, have invented a certain new and useful Process of Preparing Leather, of which the following is a specification.

Our invention relates to improvements in the invention the subject of prior United States Letters Patent granted to Philip Magnus, numbered 775,839 and dated November 22, 1904; and the object is to so treat leather that a material is produced which is more durable and waterproof and less affected by exposure to the sun and rain or weather. The product, while it retains its pliancy is yet waterproof, and, in addition, it acquires a resisting power which renders it much less liable to puncture and rupture. It is also of much more resiliency.

Our invention includes leather of any ordinary character. The leather is preferably taken directly from the tanning or preserving pits in its wet state and is softened in any well-known way, the object being to prevent cracking or hardening and to preserve a softened article when the following treatment—drying—is gone through. After having been softened it is well stretched and dried, either artificially or naturally. In either case it is dried slowly, so that the pores or cells in the leather are not impaired. After having been dried the leather is well “buffed up” or chafed on the flesh side, the object being to open the pores of the leather as much as possible. The leather is then treated with a clarifying solution, the object being to eradicate all original fatty matter still remaining in the leather or from what may have been absorbed when the leather was being treated for softening, as above described. This softening solution is made up as follows: About four (4) parts, more or less, of chlorid of sulfur are dissolved in ninety-six (96) parts, more or less, of carbon bisulfid. The mixture is well agitated and allowed to remain for twenty-four (24) hours, more or less. The liquid is then poured off into a receptacle. The residue is discarded. By “residue” we

refer to any powdered sulfur that has not been dissolved in the carbon bisulfid. The mixture, as said, should be as clear a liquid as possible.

To about ten (10) parts, more or less, of the mixture is added about ten ounces of benzol, about four ounces of ether sulfuric, about three ounces of rectified benzin, about eight ounces of naphtha, about two and one-half ounces of rectified spirits of turpentine, and about two and one-half ounces of kerosene. The above amounts are approximate, as the proportions may vary according to the amount of sulfur that may “settle” to the bottom of the receptacle. If when the above amounts are added the said sulfur should show a tendency to rise or “cloud,” the parts will have to be reduced proportionately, as it is essential that the mixture used to clarify be perfectly clear, so as not to impair the pores of the leather. By the word “settle” is meant precipitation—that is to say, although the bisulfid of carbon which has absorbed the chlorid of sulfur is apparently clear, yet when the benzol, ether sulfuric, rectified benzin, naphtha, rectified spirits of turpentine, and kerosene are added a further precipitation is liable to ensue, and the quantities may be varied so as to prevent this. The exact quantity rests with the operator. The mixture requires to be as strong as possible and have as much sulfur as possible; but this sulfur must be, as said, absorbed in the mixture.

By using the chlorid of sulfur we find that not only does it assist to render the leather easier to impregnate with the rubber, as hereinafter described, but it also preserves the said rubber when introduced into the pores of the leather. The chlorid of sulfur, which is introduced into the leather before the rubber, tends to “preserve” the said rubber after it has been impregnated into the leather, sulfur being the best known preservative of rubber. The mixture is such that it will not injure the fibers of the leather, nor, which is more important still, will it fill up or close the said cells or pores of the leather. If the mixture clouds or is not perfectly clear, it will at once be apparent that the powder will seal the pores of the leather and prevent the entrance of the rubber.

A pint, more or less, of the mixture is taken from the receptacle, and to it is added



four (4) gallons, more or less, of benzin. This constitutes the solution to clarify the leather. The clarifying mixture is a strong one, and if the leather were permitted to be  
 5 immersed in the mixture for any length of time it would ruin the fibers of the leather or it must damage it considerably. The mixture must be strong, so as to thoroughly remove all fatty matter or impurities from the  
 10 leather. We find in operation that it is sufficient to spray the mixture upon the leather, or, if the leather is introduced into the mixture, it should only be just in and out again. The operator must necessarily use his good  
 15 judgment according to the nature of the leather.

The clarifying solution is either sprayed or sprinkled onto the leather, or the leather may be bathed therein for a few minutes, more or  
 20 less. After having been so treated the leather is taken out and thoroughly dried. It is essential that the leather be dried until it is "bone" or "warm" dry. It is then ready for treatment with the first of the rubber solutions.

The leather is now placed in what is termed the "first" rubber solution. This is the thinnest of the baths, the object being to get the rubber into the smallest and inner-  
 30 most pores and those nearest the outer or "hair" side. The following operations are all conducted in a room or chamber the temperature of which is kept at about one hundred (100°) degrees Fahrenheit. It must be  
 35 understood that the following proportions are based upon the use of the best pararubber. If inferior pararubber is employed, the quantity of naphtha used to dissolve the rubber may be lessened. This first rubber solution contains about six parts of pararubber,  
 40 about sixty-eight parts of naphtha, about twenty-four parts of benzin, and about two parts of benzol.

In some cases the quantity of benzol may  
 45 be diminished, dependent upon the strength of the naphtha employed. "Naphtha" is commercially more expensive than "benzin." Naphtha by itself may be used and benzin dispensed with. The reason benzin  
 50 is employed is because it is cheaper than naphtha, and once the rubber has been dissolved by the naphtha it can be thinned by benzin. We find that the strength of naphtha varies considerably. Whether it is dependent upon the age or the manufacture we  
 55 do not know. If the naphtha is of the best quality, the quantity of benzol may be diminished. Should the naphtha be a poorer quality, then more benzol is desirable.

60 The solution is made up as follows: The pararubber is dissolved by the naphtha and the mixture thinned by adding the benzin. It is then further thinned by adding benzol.

The above solution, which we will for convenience term the "first" rubber solution,

is of a consistency like unto milk. It is placed in an air-tight bath-tank. The leather is placed therein, and the tank made air-tight. The leather is allowed to remain submerged in the bath for about forty-eight  
 70 (48) hours; but the time will depend upon circumstances, the description of the leather treated, and the strength of the solution. At regular intervals of about twenty-four (24) hours the leather may be taken from the  
 75 air-tight tank, placed upon a bench, and well "worked up" by hand and put back again into the solution, or instead of the leather being taken out and worked up as described, agitators may operate within the tanks,  
 80 which agitators will automatically perform the working-up operation. At the end of about forty-eight (48) hours the leather is rendered translucent, or has a tendency to transparency when held to the light. The  
 85 effect of the immersion in this first solution of rubber is to make the leather almost transparent. The actual duration of immersion is regulated by the quality and thickness of the leather. When the leather has reached  
 90 this stage of transparency, it is lifted out of the solution and allowed to drip for five (5) or ten (10) minutes, more or less. Then it is ready for immersion in the second rubber solution. This second rubber solution consists of about six parts of pararubber, about  
 95 eighty parts of naphtha, about eleven parts of benzin, and about three parts of benzol.

In some cases the quantity of benzol may be diminished, dependent upon the strength  
 100 of the naphtha used, as above explained.

The solution is made up as follows: The pararubber is dissolved by naphtha, and the mixture thinned by adding the benzin. It is then further thinned by the benzol. This  
 105 second rubber solution is of thicker consistency than the first rubber solution, owing to the higher percentage of rubber therein, and is like unto a thin cream. The second rubber solution is also placed in an air-tight bath-  
 110 tank.

The leather in a wet but not dripping state is placed directly into the tank containing the second solution, submerged therein, and the tank made air-tight. Some descriptions  
 115 of leather may require to be taken out once or twice or worked up, as previously described. Some classes of leather may require more working up than others. The "classes" and "descriptions" referred to  
 120 means the class of leather employed. It is much easier to introduce the rubber into chrome-tanned leather; but if the leather has been bark-tanned then it must be worked up as described or repeatedly submerged. Then,  
 125 again, the animal from which the hide has come is included in this term. The ox-hide may require more treatment than kangaroo-hide, a buffalo more than an ox, and a rat-skin would not require the same length of  
 130



treatment as a horse-hide. This second rubber solution permits the larger pores toward the inner or flesh side to become filled. With a view to making the treatment more effective agitation may be here used. Agitation after any or all the baths may be used to more thoroughly permeate the leather where deemed to be necessary.

After forty-eight (48) hours' submersion in the above "second" rubber solution the leather is taken out and allowed to drip for about five (5) or ten (10) minutes, more or less, and is then ready for treatment with the third and final solutions.

The next bath consists of a solution thicker than the two previous ones, more rubber being present. It is intended in this condition to fill up the outer and more open pores on the flesh side. This third rubber solution, which is the thickest of the solutions mentioned, is of the consistency of a thick cream. It consists of about six parts of pararubber, about eighty-eight parts of naphtha, about four and one-half parts of benzin, and about one and one-half parts of benzol.

In some cases the quantity of benzol may be diminished, dependent upon the strength of the naphtha used, as above explained.

The solution is made up as follows: The pararubber is dissolved by the naphtha and the mixture thinned by adding the benzin. Benzol is added to still further thin the solution to the desired consistency, which is, as said, like unto a thick cream. The solution is placed in an air-tight revolving drum, which is provided within its interior with paddles, beaters, agitators, or the like and has a gas-escape valve therein. The leather in a wet, but not dripping, state is placed in the solution in this drum, which is rotated by suitable means. This "drumming" serves a twofold purpose—viz., to assist in driving or injecting into the leather the thicker solution of rubber where any pores have not completely filled and to effect a softening of the leather. The leather remains in the said drum for from twenty-four (24) to forty-eight (48) hours, more or less, after which it is taken out and allowed to gradually become semidry. It is then put through rollers for the purpose of better cementing the parts. After this it is dried, and the operations are complete.

Having thus fully described the invention, what we claim is—

1. The herein-described process of treating previously tanned and softened leather, consisting in first subjecting it to a cleansing or clarifying solution to eliminate all fatty matters; second immersing it in a solution containing a small percentage of rubber to fill the smallest and innermost pores and those nearest the outer or hair side; third, immersing it in a second bath containing a larger percentage of rubber to fill the larger pores toward

the inner or flesh side of the leather; fourth, immersing it in a third solution containing a still greater proportion of rubber to fill up the outer and most open pores on the flesh side; and finally drying it substantially as and for the purpose set forth.

2. The herein-described process of treating previously tanned softened and dried leather, consisting in—first, subjecting it to a clarifying solution containing chlorid of sulfur to facilitate impregnation of the leather with rubber and to preserve the rubber; then drying the leather; second—immersing it in a solution composed of hydrocarbon solvents and a small percentage of rubber until the leather is substantially transparent; third, immersing the leather in a second bath composed of hydrocarbon solvents and a larger percentage of rubber; fourth, immersing the leather in a third bath composed of solvents and a larger percentage of rubber and agitating it while so immersed; and finally drying the leather, substantially as described.

3. The herein-described process of rubberizing leather, consisting in taking leather previously dried and softened, treating it with a clarifying solution to remove any remaining fatty matters; second, treating the leather in an air-tight tank with a solution composed of hydrocarbon solvents and rubber; third, placing the leather in a second air-tight tank containing a similar solution containing a larger percentage of rubber and treating it therein; fourth, placing the leather in an air-tight receptacle containing a similar solution having a greater percentage of rubber; and stirring or drumming the leather therein; and finally removing and drying the leather, substantially as described.

4. The herein-described process of making rubberized leather consisting in taking previously softened and dried leather, buffing it on the flesh side, then subjecting it to the action of a clarifying solution containing chlorid of sulfur and carbon bisulfid, then drying the leather; then immersing the leather in an air-tight tank in a bath composed of pararubber, naphtha, benzin and benzol, and working the mixture into the leather; then removing the leather from such first rubber solution, letting it drip, and placing it in a wet state in a second air-tight tank containing a similar rubber solution in which there is a greater percentage of rubber; then removing the leather and letting it drip, and placing it in a wet state in an air-tight receptacle containing a similar rubber solution having a still greater percentage of rubber, and working or stirring the leather in such solution; then removing the leather, partly drying it, and finally running it between rollers and drying it, as set forth.

5. An improved leather, and the herein-described process of preparing the same, consisting of leather which is softened, stretched,



and then dried either artificially or naturally; then buffed up on the flesh side, and then sprayed or sprinkled with or bathed in a clarifying solution composed of chlorid of sulfur dissolved in carbon bisulfid, prepared and treated as described, and allowed to remain for twenty-four (24) hours, more or less, when there is added to a proportion of it, benzol, ether sulfuric, rectified benzin, naphtha, rectified spirits of turpentine, and kerosene, which mixture, in the parts mentioned, is added to a further amount of benzin as prescribed; then thoroughly dried, then in a room or chamber of the temperature of 100°, more or less, Fahrenheit, immersed for forty-eight (48) hours, more or less, in an air-tight tank containing a solution of the consistency like unto milk, and made up of the herein-mentioned proportions of pararubber, naphtha, benzin, and benzol, which mixture is worked into the leather in the manner described until the said leather is rendered transparent or has a tendency to transparency; then taken out and allowed to drip, then in a wet state, and in a room or chamber of the temperature mentioned, immersed for about forty-eight (48)

hours, more or less, in a second air-tight tank containing a solution of a consistency like unto a thin cream, and composed of the herein-mentioned proportions of pararubber, naphtha, benzin or benzol; then taken out, and if necessary worked or treated in the manner described; then allowed to drip; then in a wet state, and in a room or chamber of the temperature mentioned placing into a revolving drum of the character described containing a solution of a consistency like unto a thick cream, and composed of pararubber, naphtha, benzin, and benzol; immersed therein for a period of from twenty-four (24) to forty-eight (48) hours, more or less; then taken out and semidried; then put through rollers, and finally dried, all as and for the purposes hereinbefore described.

In testimony whereof we affix our signatures in the presence of two subscribing witnesses.

PHILIP MAGNUS.  
TIMOTHY JOSEPH DAVIS.

Witnesses:

CECIL McSLASTRIEL,  
GEORGE A. McREN.