

UNITED STATES PATENT OFFICE.

ALBERT L. CLAPP, OF BRAINTREE, MASSACHUSETTS, ASSIGNOR TO HIDE-ITE LEATHER COMPANY, OF BROCKTON, MASSACHUSETTS, A CORPORATION OF MAINE.

COMPOSITE LEATHER OR LEATHER SUBSTITUTE AND PROCESS OF PRODUCING SAME.

1,065,028.

Specification of Letters Patent.

Patented June 17, 1913.

No Drawing.

Application filed May 15, 1912. Serial No. 697,440.

To all whom it may concern:

Be it known that I, ALBERT L. CLAPP, a citizen of the United States, residing at Braintree, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Composite Leather or Leather Substitute and Processes of Producing the Same, of which the following is a specification.

My present invention pertains to an improved composite leather or leather-substitute, and the process of producing the same.

The main object of the present invention is to produce a leather or leather-substitute which is uniform and homogeneous throughout, the same being composed of leather fibers of full natural length, as contradistinguished from leather which has been beaten up so as to disintegrate or break down the fibers, such long fibers being felted or matted so as to produce a strong sheet of composite leather.

By the treatment hereinafter set forth, the leather is made waterproof throughout, and is characterized by the fact that it may be worked like ordinary leather in the process of making shoes and the like, that is to say, it may be channeled and run through a sewing machine the same as an ordinary piece of natural hide or leather. Furthermore, the product is waterproof.

The process of producing such composite leather may be stated in broad terms as follows: The leather scrap, preferably soft skivings, is treated so that all of the pores are opened up and the gelatin, tannin, etc., are dissolved to a greater or less extent, whereby the fibers of the leather are softened so that the leather is plastic and skeletonized or sponge-like throughout. After being brought to this condition, the material is loaded with oil, which is saponified by the excess of free alkali which was initially employed to soften the leather, and such saponified oil is thoroughly beaten into the pores of the leather mass. The mass is then puddled or formed into board and preferably treated with a reagent which will render the soap insoluble.

The process may be carried out as follows: A charge of scrap leather, say 2,000 pounds, is loaded into a tumbling barrel or

rotary machine of any suitable type and to such charge is added ammonia in solution in a quantity just sufficient to thoroughly wet and cover the leather scrap. This ammonia is prepared from the ordinary commercial ammonia of about 28% to 30% strength, using about 10% to 15% thereof to the amount of leather, together with the necessary quantity of water to cover the charge of leather. While in practice I have found that ammonia produces the best result, other alkalis may be employed or mixed with the ammonia, such for instance as soda ash, ammonium carbonate, etc., it being understood, however, that the alkaline action must be such as not to destroy the fibers of the leather stock. I have also found that a small quantity of phenol added to the ammonia solution, say about 2%, aids materially in the softening of the leather, particularly where extra heavy or thick scrap is used. As soon as the barrel is loaded, the charge is gently warmed to a temperature not exceeding 110° F., and at the same time, by reason of the rotation of the vessel, it is agitated. The rotation of the barrel causes the wet mass of leather to vigorously pound and beat against the sides, and thus by constant agitation, the gelatin, tannin and other soluble constituents are loosed from the fibers and after three or four hours' treatment the entire mass becomes soft or sponge-like, and quite plastic. When the scrap is thoroughly softened by this treatment, the barrel is opened and there is introduced a quantity of oil, say, 100 to 150 pounds, such oil being preferably non-drying and capable of further softening the leather, as for instance, elain, cotton-seed, degrass, etc. The oil readily saponifies with the excess of free ammonia that still exists in the mass of leather and forms a soap. The rotation of the barrel again started, the mass warmed to say 110° F., and the agitation continued for an hour or so, or until the soap is thoroughly beaten into the pores of the mass of soft leather charge. When this operation is completed, the result is a very soft, plastic mass of leather, susceptible of being annealed or puddled and still retaining the full length of fiber. The mass is now treated with a

suitable reagent, such as aluminum sulfate, in sufficient quantity to render the soap and the soluble constituents of the leather insoluble, the reaction usually requiring from ten to fifteen minutes. The mass which is still plastic is puddled and annealed in any suitable way, spread in molds, or pressed into sheets of any desired size and thickness.

When it is desired to produce a very pliable or heavily charged product, it is necessary to use a larger amount of oil, say, 200 to even 300 pounds, and under such conditions it is advisable to partly or completely saponify the oil before adding it to the batch of leather. In any event, the oil should be fully saponified before the same is rendered insoluble in the manner just specified. Ordinarily, the free alkali in the mass will be sufficient to effect the desired result when a relatively large charge of oil is not used. As the mass is quite soft and plastic, it readily squeezes together, the fibers matting or felting and producing a uniform sheet or body, free from lumps and hard places. When dried and finished, these sheets have a remarkable resemblance to natural leather, being pliable, firm and tough, but having the advantage, however, over leather in that it is waterproof.

The process is clearly distinguished from the usual process of producing leather-board, in that the fibers are not disintegrated or torn apart, but appear in their full length in the finished product.

It is to be understood that I do not wish to limit myself to the use of the chemicals or compounds as above set forth, as there are others which might be used. Thus, for instance, sodium hydrate or potassium hydrate may be used, provided, however, that such materials, which have a destructive action on the leather, be used with care and in such quantity as not to injuriously affect the fiber. I have determined by actual use that from one to two per cent. of such chemicals, with about 10% to 15% ammonia can be employed without injury to the fibers. Ammonia is most suitable for the purposes of the present invention, as it is very penetrating and acts upon the gelatin and other matters without injury to the fibers. The addition of the other alkalis, however, reduces the cost of the process. It is still further to be understood that the warming of the mass, while being agitated with the ammonia and oil, is an important feature of my invention, as merely soaking the leather scrap without, or even with, agitation, and without heat, will not so readily effect the desired result. I have also found that the use of a tumbling barrel, or similar mode of agitation, is the most desirable, as the vigorous pounding and tumbling are very effective in reducing the leather scrap to a plastic condition, without injury to the fibers.

Having thus described my invention, what I claim is:

1. The process of producing long-fiber stock for leather-substitute, which consists in charging skeletonized scrap leather, having the fibers thereof in a substantially unbroken condition, with a waterproof soap compound.

2. The process of producing stock for leather-substitute, which consists in softening and skeletonizing leather-scrap with an alkali; and, while still maintaining it in its fibrous condition as regards the length of fiber, charging it with an insoluble soap.

3. The process of producing long-fiber stock for leather-substitute, which consists in treating leather-scrap with an alkali of such strength as to soften the fibers and dissolve the contained gelatin; and thereafter adding an oil capable of being saponified by the free alkali present in the mass.

4. The process of producing long-fiber stock for leather-substitute, which consists in treating leather-scrap with an alkali of such strength as to soften the fibers and dissolve the contained gelatin; adding an oil capable of being saponified by the free alkali present in the mass; and finally rendering the soap insoluble.

5. The process of producing stock for leather-substitute, which consists in agitating scrap leather with ammonia; thereafter, when the scrap is softened, treating it with oil in the presence of a portion of the ammonia and finally treating the soap compound, which is formed in the mass, with a substance capable of rendering such compound waterproof.

6. The process of producing stock for leather-substitute, which consists in agitating a mass of leather-scrap with a dilute solution of ammonia in the presence of heat; adding oil to the mass when it becomes softened and further agitating it; and finally rendering insoluble the soap compound which is thereby formed and distributed throughout the fibers of the mass.

7. The process of producing stock for leather-substitute, which consists in agitating a mass of leather-scrap with a dilute solution of ammonia in the presence of heat; adding oil to the mass when it becomes softened and further agitating it in the presence of heat, whereby a soap compound will be formed and distributed throughout the fibers of the mass; and finally rendering insoluble such soap compound.

8. The process of producing stock for leather-substitute, which consists in agitating a mass of leather-scrap with a solution containing an alkali and phenol in the presence of heat; adding oil to the mass when it becomes softened and further agitating it in the presence of heat, whereby a soap compound will be formed and distributed throughout the fibers of the mass; and

finally rendering insoluble the soap compound.

9. The process of producing stock for leather-substitute, which consists in agitating the mass of leather-scrap with ammonia and phenol in the presence of heat; adding a non-drying oil to the mass when it becomes softened, thereafter further agitating it in the presence of heat, whereby a soap compound will be formed and distributed throughout the fibers of the mass; and finally rendering insoluble such soap compound.

10. As a new article of manufacture, leather-substitute composed of matted or

felted relatively-long fibers of skeletonized leather having distributed throughout the same an insoluble soap compound.

11. As a new article of manufacture, compressed leather-substitute, composed of matted or felted relatively-long fibers of skeletonized leather having distributed throughout the same an insoluble compound.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT L. CLAPP.

Witnesses:

ARTHUR F. PALMER,
F. A. SMITH.