

UNITED STATES PATENT OFFICE.

ALBERT L. CLAPP, OF BRAINTREE, MASSACHUSETTS, ASSIGNOR TO HIDEITE LEATHER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

METHOD OF PRODUCING STOCK FOR MAKING LEATHER-BOARD.

1,046,555.

Specification of Letters Patent.

Patented Dec. 10, 1912.

No Drawing.

Application filed May 17, 1911. Serial No. 627,777.

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 Method of Producing Stock for Making Leather-Board, of which the following is a specification.

My present invention pertains to a method of preparing stock for use in the manufacture of leather-fiber board, and has for one of its objects the production of stock in which there will be present and distributed throughout the mass tannin, tannates and stuffing materials in a quantity substantially equal to that which would be found in tanned leather of a quantity equal to that which was employed to produce the stock.

A further object of the invention is to utilize the waste water or liquid with its contained materials or substances which pass from the wet machine or machines upon which the board is preferably produced, such liquid material being returned to the beater engine, where it is employed in beating up the leather scrap into pulp in place of water which is usually added to the scrap leather in the beater engine.

The resultant product is a leather-board in which the fibers are surrounded by the gelatinous or colloidal materials, and the tannin, tannates and stuffing material commonly used in tanning and preparing the natural hide. The presence of such materials greatly improves the board and gives it strength of fiber which is not commonly present in the ordinary leather-fiber board.

Scrap leather when introduced into a beater engine together with a considerable quantity of water, usually undergoes a beating operation for a period of from six to eight hours, such beating being necessary to obtain the desired pulpy consistency. During the beating, the leather fibers receive a severe and complete washing and by this continued beating and extreme hydration the fibers become swollen, soft and somewhat broken down, and the tannin and stuffing material which are carried by and surround the fibers are gradually loosened therefrom. There is also a tendency, to a greater or less extent, to soften and render soluble the com-

bined tannin and gelatin which are present in the leather in a colloidal condition.

When the leather pulp so treated is run on a wet machine, which is generally used to form the desired sheets of board, the soluble compounds are carried off to a greater or less extent with the waste water and commonly lost to further use. The amount of tannin and gelatinous material dissolved out is relatively large in proportion to the scrap leather used, as in 100 parts of leather there will be a loss on an average of from 30 to 40 parts of soluble and non-fibrous matter. These proportions will vary somewhat, depending upon the nature and kind of scrap leather employed, but as this leather generally comes mixed, the percentage of loss is found to be substantially that just stated.

The material which is washed away or drained off represents a great part of the tannin and compounds used in preparing the original leather and thus the board produced from this ordinary stock is soft, rather spongy and quite absorbent, having none of the wearing qualities of real leather. This is so even when the board is pressed or rolled to make it firm, as, due to the atmospheric condition, the fibers will absorb the moisture and become loosened, thus destroying the integrity of the pressed or rolled board.

It will thus be seen that the combined beating and washing or hydration as it exists in the usual method employed of beating-out leather scrap practically detannates the stock, only the fibrous constituents of the same being retained.

As the purpose of tanning and stuffing the original hide is to give strength, firmness and pliability to the leather and to render the gelatin and other colloidal substances of the leather which are intermixed with the fibers insoluble, it is consequently desirable to retain these materials in the finished leather-fiber board, and thus impart to the product the resemblance and properties of natural tanned leather.

I have observed that by continually re-using the waste water and the matters contained therein which drain from the wet machine, for beating-out the new charge of material in the beater engine, such water will become saturated or surcharged with the tannin, gelatinous tannates and other soluble compounds, to such an extent that

the fibers in the successive charges will not be robbed of their tannin and the like so as to render them highly absorbent, but on the other hand, while the scrap is broken up the fibers will retain their tannin and gelatinous tannates to such an extent as to make them substantially waterproof.

It will be appreciated that the water which is drained from the wet machine will become saturated or surcharged with the soluble constituents of the leather to a greater or less extent, according to the number of times it is reused, and consequently it will not act to wash away the tannin, and colloidal or gelatinous substances from the fibers in the beater engine as it becomes more saturated or surcharged. The precipitating power of the tannin will also increase in this reused beater-engine water, and consequently will act upon any gelatinous matter that may be in solution or dissolved out by the continued action of the beater. Thus the gelatin is rendered insoluble and intimately surrounds the leather-fibers. The first step in the process is to load the beater engine with, say 1500 pounds of scrap leather of any tannage together with sufficient water to produce the proper consistency of the pulpy mixture when the same is beaten out. After it has been beaten out sufficiently, it is formed into sheets, preferably on a wet machine. The waste water passing from this machine contains the tannin and soluble compounds dissolved out during the operation of beating, and is collected, to be used over again. It may be placed in a suitable storage tank, with an outlet leading to the beater or stuff chest, to be reused as desired. It is not until this water has been reused several times that the full benefits are obtained therefrom, as the first three or four runs will produce the usual or ordinary leather-board, but gradually the water will become saturated or surcharged and reach a point where it no longer has a direct washing or solvent effect on the fibrous or gelatinous matter of the stock being beaten out.

It has been found in studying the condition of the water that has been used several times, that the colloidal substances and tannin in some instances would tend to decompose as the degree of concentration increased which, of course, would seriously affect the beneficial results which are obtained by the use of this process, but this could be readily prevented by the use of mercury chlorid or alum, the addition of from five to ten pounds of either of these chemicals to the beater every few days being found sufficient to prevent decomposition. Where a waterproofing process, such as is described in my Letters Patent No. 981,591, is used, the addition of such chemicals would not be necessary, as the waterproofing material contains

sufficient aluminum base to retard the decomposition.

It has been found desirable to maintain the reused water in a fairly constant surcharged condition, as it will be appreciated that by continually reusing this waste water for a considerable length of time there will be produced a liquid which will not act upon the fibers in the beater engine in the proper manner. I am able to readily overcome this by introducing into the beater engine, as occasion may require, quantities of glue stock, raw hide or paper stock, which in themselves have the power of absorbing tannin. In the case of glue stock or raw hide these would be simultaneously tanned and the hide disintegrated into the desired pulp stock. It is, however, to be understood that this will only take place in case the reused waste water is surcharged to a high degree. This tendency to oversaturation may also be offset by supplying fresh water to make up for the amount taken up in the wet sheets of fiber-board, and it is also overcome, to a greater or less extent, by the fact that the fibers will absorb more or less of the tannin which is present in the reused water. This latter fact does not, however, entirely prevent the beater-engine water from becoming oversaturated in time, as some grades of scrap leather contain considerable quantities of free tannin, but this condition may be very effectively overcome by using glue stock or raw hide, as above mentioned.

There is a further advantage in reusing this water from the beater engine, other than the retanning of the fibers and gelatin, as during the running-off of the pulp on the wet machines there is a quantity of fiber that gets by, that is, which is not picked up by the felts, and finds its way into the waste water. These fibers are collected with the waste water in the storage tank and may be reused with this waste water directly in the beater, or may be settled out and drawn off into the stuff chest and mixed with the pulp stock as it is drawn from the beaters.

The leather-board made by the above-described process retains to a remarkable degree the natural properties found in the original tanned hide, the only difference being the shorter fibers and the layer effect as formed from running the fibers on the wet machine, but even these are not so pronounced as in the case of straight leather-board produced by the ordinary processes.

Having thus described my invention, what I claim is:

1. The process of producing leather-board stock, which consists in reusing, with successive charges of material in the beater in which the stock is formed, the water and substances in solution therein which drain from the leather-stock as it is formed into

sheets; and maintaining such water at the proper degree of saturation.

2. The process of producing leather-board stock, which consists in reusing, with successive charges of material in the beater in which the stock is formed, the water and substances in solution therein which drain from the leather stock as it is formed into sheets; and adding to such water, from time to time, a substance having an affinity for the substances carried thereby, whereby oversaturation of the water will be prevented.

3. The process of producing leather-board stock, which consists in reusing, with successive charges of leather in the beater in which the stock is formed, the water and substances in solution therein which drain from the leather stock as it is formed into sheets; and adding to such water, from time to time, a gelatinous substance which has an affinity for tannic acid carried by the water.

4. The process of producing leather-board stock, which consists in reusing, with successive charges of leather in the beater in which the stock is formed, the water and substances in solution therein which drain from the leather stock as it is formed into sheets; and adding glue stock to such water, from time to time.

5. The process of producing leather-board stock, which consists in reusing, with suc-

cessive charges of leather in the beater in which the stock is formed, the water and substances in solution therein which drain from the leather stock as it is formed into sheets; adding glue stock to such water, from time to time.

6. The process of producing leather-board stock, which consists in reusing, with successive charges of leather in the beater in which the stock is formed, the water and substances in solution therein which drain from the leather stock as it is formed into sheets; and adding to such water from time to time a substance which will prevent decomposition of the materials carried by the water.

7. The process of producing leather-board stock, which consists in beating up the stock with waste water having in solution such substances as will tend to prevent decomposition and retain the free tannic acid and such water-repellant substances of the natural leather as may be present in the beaten-out fibers.

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

ALBERT L. CLAPP.

Witnesses:

GEORGE E. SAMPSON,
FLORENCE J. TIRRELL.