

W. A. FREYMUTH.
TREATMENT OF LAC.
APPLICATION FILED OCT. 7, 1908.

1,005,953.

Patented Oct. 17, 1911.

3 SHEETS—SHEET 1.

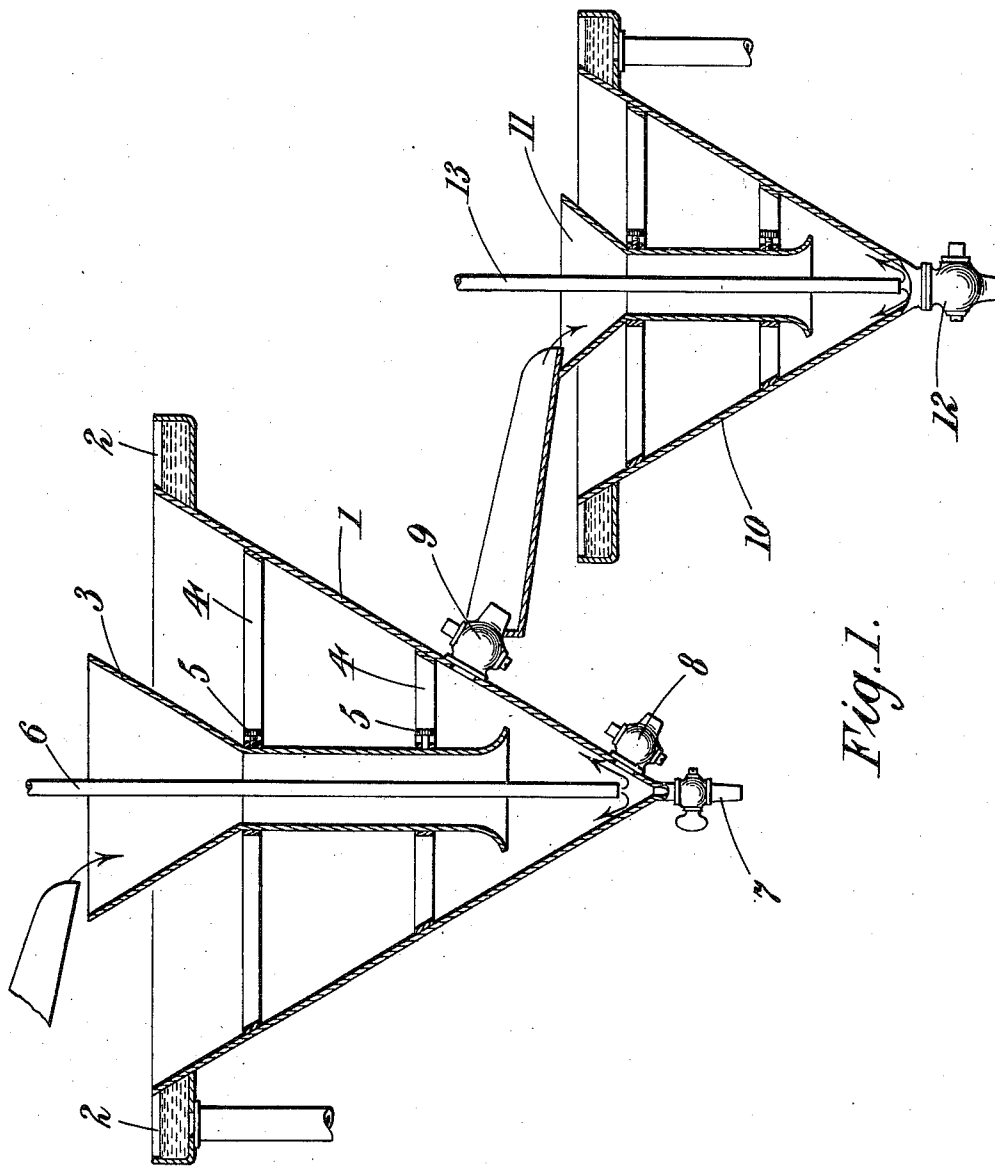


Fig. 1.

Witnesses:
Milton Ottenberg.
Lou & Robinson.

Inventor:
William A. Freymuth
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Attorneys

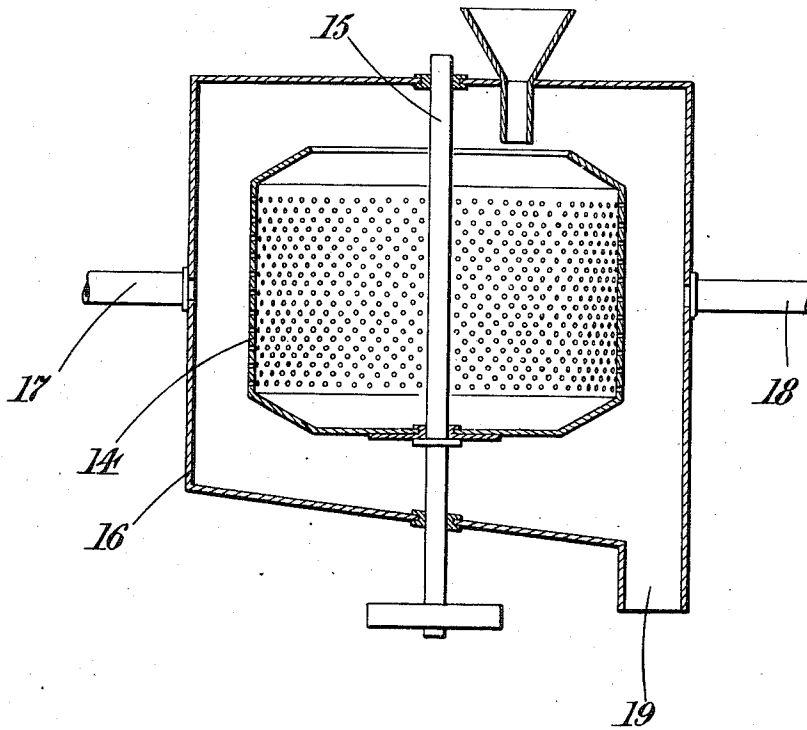
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Milton Ottenberg.
Low & Hoskinson

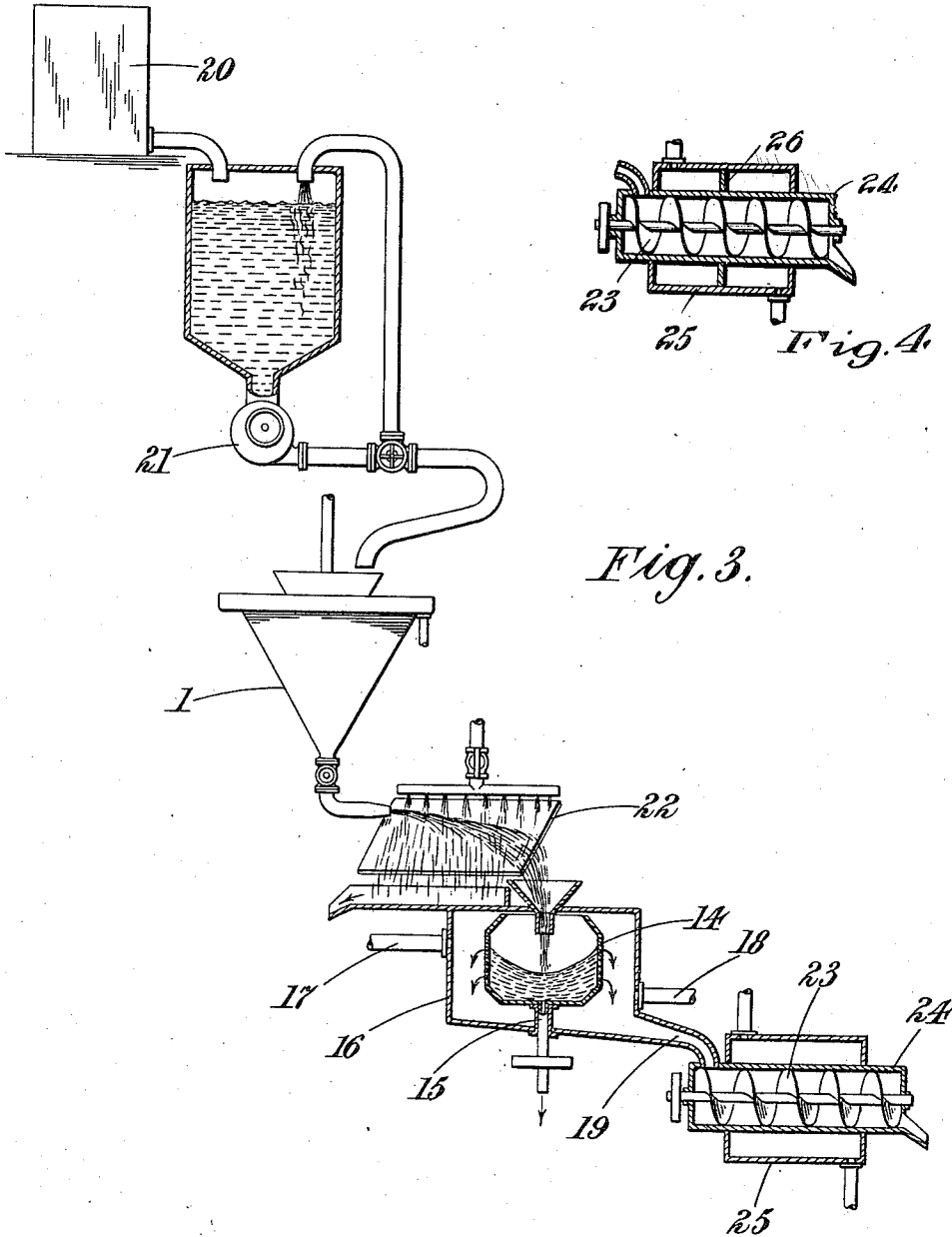
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3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM ADOLF FREYMUTH, OF LONDON, ENGLAND.

TREATMENT OF LAC.

1,005,953.

Specification of Letters Patent.

Patented Oct. 17, 1911.

Application filed October 7, 1909. Serial No. 521,474.

To all whom it may concern:

Be it known that I, WILLIAM ADOLF FREYMUTH, a subject of the King of England, residing at London, in England, have
5 invented certain new and useful Improvements in the Treatment of Lac, of which the following is a specification.

This invention relates to improvements in the treatment of lac and has for its object
10 to provide a process and apparatus for the production of seed-lac or shellac from crude sticklac, by which very little of the lac is wasted while it is entirely separated from the lac-dye albumin and other impurities.

Hitherto the refining of lac has been of the crudest description with the result that a large proportion of the lac has been lost in the various washings and hot filtrations, while the final product is often not perfectly separated from the lac-dye and other
20 impurities.

In the following description the word "lac" is used to describe the animal resin which is exuded upon the twigs of certain
25 trees by the *Tachardia* (*Carteria*) *lacca* (Kerr.) Syn: *Coccus lacca*, commonly called sticklac.

According to this invention a process for treating lac consists in crushing sticklac so
30 that all cells are opened while in admixture with water to produce a pulp, breaking up the dye and animal matter particles by trituration and partially removing the dye by washing, passing the pulp thus treated into
35 an upward current separator and thence to a vanner to remove the remainder of the dye and other impurities, introducing the cleaned lac grain rendered fluid by the application of heat into a centrifugal filter
40 and collecting the resultant lac. In some cases, for instance with phunki lac, it will not be necessary to triturate the lac or treat it in an upward current separator but after crushing both the lac and impurities
45 may be fed direct on to a vanner. The separation of the lac grains from the refuse will then be effected only on the vanner.

One method of carrying the invention into effect will now be described with reference to the accompanying drawing, in which:—

Figure 1 is a section of the spitzkasten or upward current separator preferably employed, and Fig. 2 is a section of the centrifugal filter. Fig. 3 is a diagrammatic illus-

tration of a complete apparatus according to this invention. Fig. 4 is a detail view.

The sticklac is taken at the stage when the sticks or twigs have been removed. The lac with its dye and bodies of the coccus and albuminous matter, with dust and ashes, silica, small particles of stick, etc., is mixed with water and treated in a suitable mill
20 or the like which crushes or breaks it to one definite and required size; an excess of
35 water being present. It should be crushed so that it passes through a mesh of 10 holes to the linear inch, but the size may be varied according to the lac being treated. A larger grain than this will inclose unopened cells, a
70 smaller grain will entail a loss of lac. This pulp after soaking under water for a short time is then circulated from a lower tank to an upper by means of a centrifugal pump
21 during which operation the dye and impurities are beaten loose and dissolved away from the powdered resin of the lac. It is
75 advisable to carry out this operation several times, with succeeding fresh lots of water, the latter lots to be warm water. In every
80 case each lot of water should be quickly run off the pulp. It may be advisable to add sand or another abrasive to the pulp to help the scouring effect. To remove the dye and
85 most of the other impurities now held in solution or suspension in the water, the resulting pulp is treated in a special washer. This washer consists of a spitzkasten 1 which
90 may be in the form of an inverted cone, or of other shape, being pointed at the bottom and of large horizontal sectional area at the top. This area increases gradually throughout the height, and it may be square, oblong, rectangular, triangular, oval, or circular in
95 horizontal section. The washer may receive the pulp at the top, from one side, or from more than one point behind a baffle board, or in the center through a funnel, or the
100 pulp may be introduced from the bottom. The dimensions of the spitzkasten must be arranged to suit each variety of the lac and such dimensions cannot be laid down exactly for every case. One or more pipes enter the
105 spitzkasten at the top or side or bottom and provide a jet of water under a suitable head of pressure, so that the water rises upward from the bottom.

In Fig. 1 of the accompanying drawings, a convenient form of spitzkasten is shown by way of example. In the arrangement

shown, the sides 1 of the spitzkasten are provided on their upper edge with a trough 2 for the removal of the water. Within the spitzkasten is mounted a funnel 3 which may be supported by arms such as 4 and is adjustable vertically by means of screws 5. This funnel 3 expands slightly at the bottom as shown. A vertical water supply pipe 6 passes down the center of the funnel 3 to within a few inches of the bottom, and water under suitable pressure is admitted. The spitzkasten being full, the pulp is discharged into this spitzkasten through the funnel 3. On reaching the bottom of the box the pulp is caught and thoroughly mixed with the upward stream of water thus washing out and diluting all the dye and soluble matter. The insoluble but light particles of coccus bodies, filaments, dust, fluff, etc., and the semi-soluble albuminous matter, are carried upward and over the edge of the spitzkasten and are removed by the trough 2. The heavier lac having a specific gravity of about 1.3 is lifted by the current of water until, owing to the widening of the spitzkasten, its weight overcomes the upward force of the water and brings it down again; it is caught and whirled up again, and again falls; so that the contents of the spitzkasten consist of (first) a small zone of iron sand or other impurities with a specific gravity heavier than lac which falls to the bottom, (second) a zone of clean powdered lac and water, (third) a zone of lighter particles traveling upward of both lac and impurities, and (fourth) a zone where the lac falls back and the lighter refuse flows on upward to the top where it is carried away by the water overflowing. In certain cases, owing to gases of decomposition and fermentation, a large quantity of curd or float will rise, carried upward by bubbles of gas. This in the ordinary course will flow off the top of the spitzkasten. Arrangements however can be made to skim this off and save it. A small discharge cock 7 is provided at the bottom to intermittently discharge the sand, etc. A larger discharge pipe or outlet is provided in the side or bottom of the spitzkasten by which the cleaned seed lac may be discharged as required by means of the cock or valve 8. A cock 9 may also be provided higher up, by which the lighter particles of seed-lac and coccus bodies in the third zone may be intermittently removed, such cock connecting with a second spitzkasten 10 as shown. This spitzkasten 10 has a similar adjustable funnel 11 and is provided with a cock 12 at the bottom for the removal of the smaller seed-lac, water being admitted under a suitable pressure by the pipe 13. To further remove some impurities which are discharged with the seed-lac, the latter may be fed on to a vanner 22 where the impurities,

being either lighter or heavier than lac, will be separated. Having washed the seed-lac in the spitzkasten as above described the water is next strained off and the seed-lac dried. When dry this seed-lac is ready either for sale as seed-lac or to be melted and further refined to button lac or shellac. It may be advisable to feed the dry seed-lac on to a dry vanner or separator to remove impurities. To further refine the lac it is introduced into a centrifugal filter. This filter, as shown in Fig. 2, comprises a basket 14 which may be either perforated or solid and which is fixed to and rotates with the shaft 15; the latter being driven from underneath by apparatus not shown. Surrounding the basket is an outer casing 16 provided with inlet and outlet conduits 17 and 18 respectively by which air heated to the required temperature may be circulated through the apparatus. The seed-lac is introduced into the basket of the centrifugal while the whole apparatus is maintained at a temperature of from 120° to 140° C. At this point it is found that the lac, which contains roughly:—2% impurities, animal remains and albumin, 5% wax, 93% lac resin, becomes completely fluid, that is to say, all its constituent parts are melted.

It is found that the various constituents of the lac have different melting points, for instance, the pure lac resin is fluid only at from 120°–140° C., whereas the wax remains still in a fluid condition at 80° C. By this invention the lac and the wax are both melted and filtered through the centrifugal filter at a temperature sufficient to melt both ingredients. While still in a fluid condition they are run off into a convenient agitator and allowed to cool gradually, while undergoing agitation, to about 80° C. It is found that by this means a homogeneous mass is formed which, while it is perfectly clear and a good color, is in a plastic condition and can be suitably handled for any purpose for which it may be required.

Referring to the treatment of the lac in the centrifugal, if the basket be of the porous type a filter-cloth or medium will be provided covering the perforations therein. The lac which, either before or after entering the basket, is rendered fluid by heat will be forced through the cloth by the centrifugal action, the impurities remaining behind. The lac after being forced through the cloth will impinge upon the outer casing 16 but will not solidify owing to the heat of the casing. This lac, free from impurities, will run down the walls of the casing and will flow out therefrom through the conduit 19. If a solid basket is used the liquid lac is caused by the centrifugal force to flow to the sides, driving the refuse away from the center of the basket and packing it tight against the walls. The cleaned, purified lac

is therefore forced over the edge of the basket which will be conveniently turned in, as shown in the drawing. After the purified lac leaves the centrifugal machine in its liquid form it is run into an agitator which preferably consists of a screw or blade-conveyer 23 working in a cylinder 24 having, if desired, fixed blades therein somewhat similar to the ordinary sausage machine. The cylinder is preferably entirely surrounded by an outer cylindrical chamber which is heated by steam, hot air or a suitable hot liquid thus keeping the material in the conveyer at the required temperature until it is discharged at the end. The cylinder may, however, be unheated, or have only a portion of it heated, the material being fed in hot at one end and cooling to the requisite temperature by the time it arrives at the exit. If necessary, a portion of the conveyer may be artificially cooled to regulate the temperature. Such a construction is illustrated in Fig. 4 in which the outer chamber 25 is divided into two sections by a transverse partition, each of said compartments being provided with independent supply and discharge pipes. The conveyer may be set to work level or upward or downward. After treatment the resulting plastic mixture is stretched, rolled, stamped, or manipulated into any of the marketable forms of lac.

The process may also be used for mixing additional matter to the lac resins and wax. Such additional matter may be added in a powdered solid or other form before or during the mixing. There is however a critical temperature at which if the lac and wax are heated to such temperature and filtered no separation takes place, and if suitable care is taken while cooling the mixture it will still remain in a homogeneous state.

Although the action of the centrifugal filter has been described at length in order to more fully explain the working of the whole process, it forms no part of the present invention, but forms the subject of a concurrent application.

A modification may be made in carrying this invention into effect provided the spirit of the invention is not departed from.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The herein described process of treating lac consisting in heating lac wax and lac resin together until a temperature is reached at which both are molten, and then cooling the mixture and mechanically mixing the ingredients together until the temperature is reduced below the melting point of all the ingredients and the mixture becomes plastic.

2. The herein described process of treating lac consisting in heating lac wax and lac resin together until a temperature is reached at which both are molten, adding other matter, mechanically mixing the ingredients together and cooling the mixture until the temperature is reduced below the melting point of all the ingredients and it becomes plastic.

3. The herein described apparatus for treating lac comprising a pulping vessel, an agitating and triturating vessel, an upward current separator, a vanner, a mixing apparatus in which purified lac is allowed to become plastic, and means for passing the lac through the several parts of the apparatus for the required treatment.

4. The herein described apparatus for treating lac comprising a pulping vessel, an agitating and triturating vessel, an upward current separator, a vanner, a centrifugal filter, a mixing apparatus in which the purified liquid lac is allowed to become plastic, and means for passing the lac through the several parts of the apparatus for the required treatment.

5. The herein described apparatus for treating lac comprising a mechanical mixing device, means for heating the mixing device, and means for regulating the heat so that one end may be maintained at a temperature at which the lac is molten and the other end at a temperature at which the lac is plastic.

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

WILLIAM ADOLF FREYMUTH.

Witnesses:

PERCY BRYER,
H. D. JAMESON.