No. 790,035. PATENTED MAY 16, 1905.

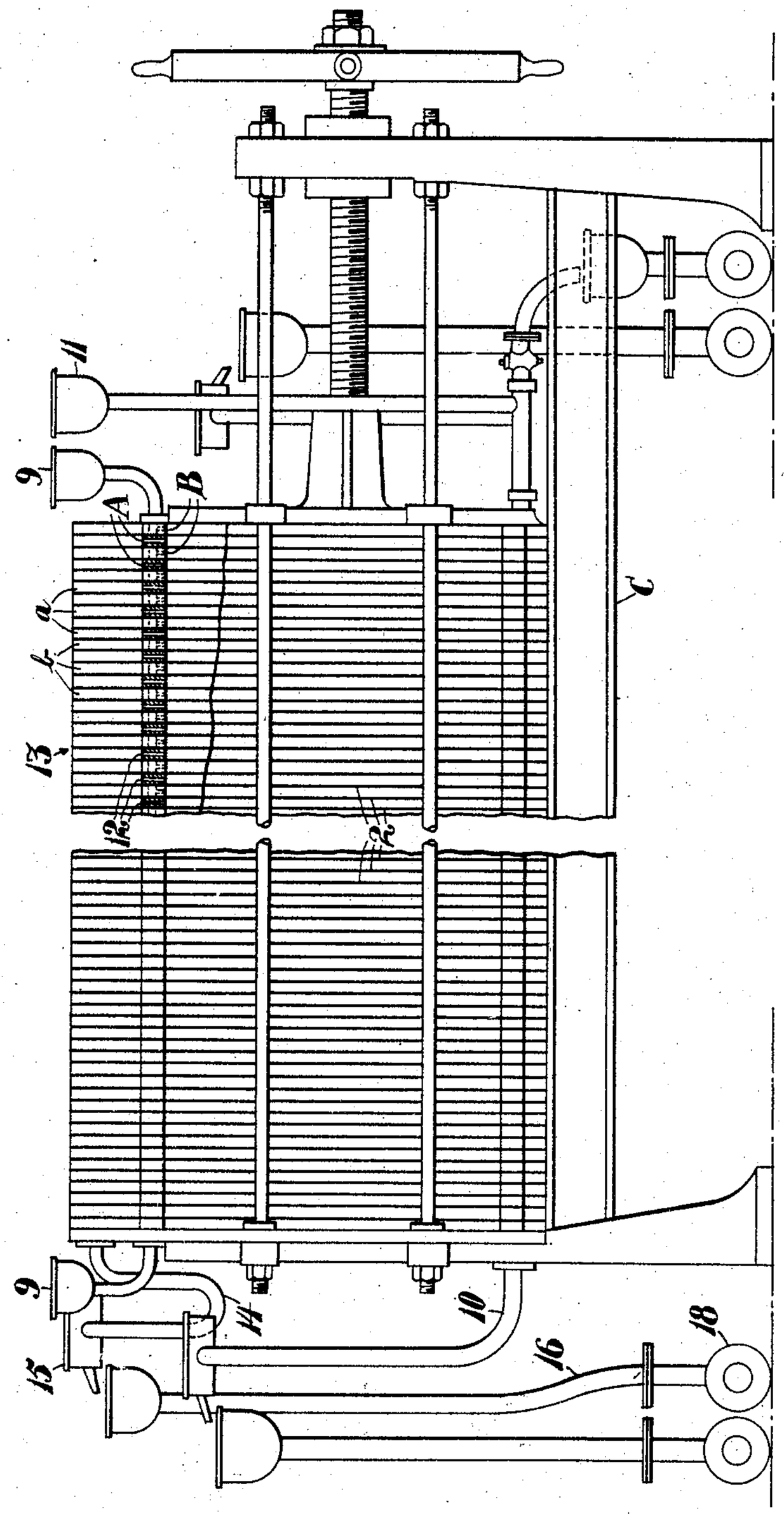
F. DEUSY.

PROCESS OF TREATING MOLASSES.

APPLICATION FILED JULY 6, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:-
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2 SHEETS—SHEET 2.

Fig. 2.

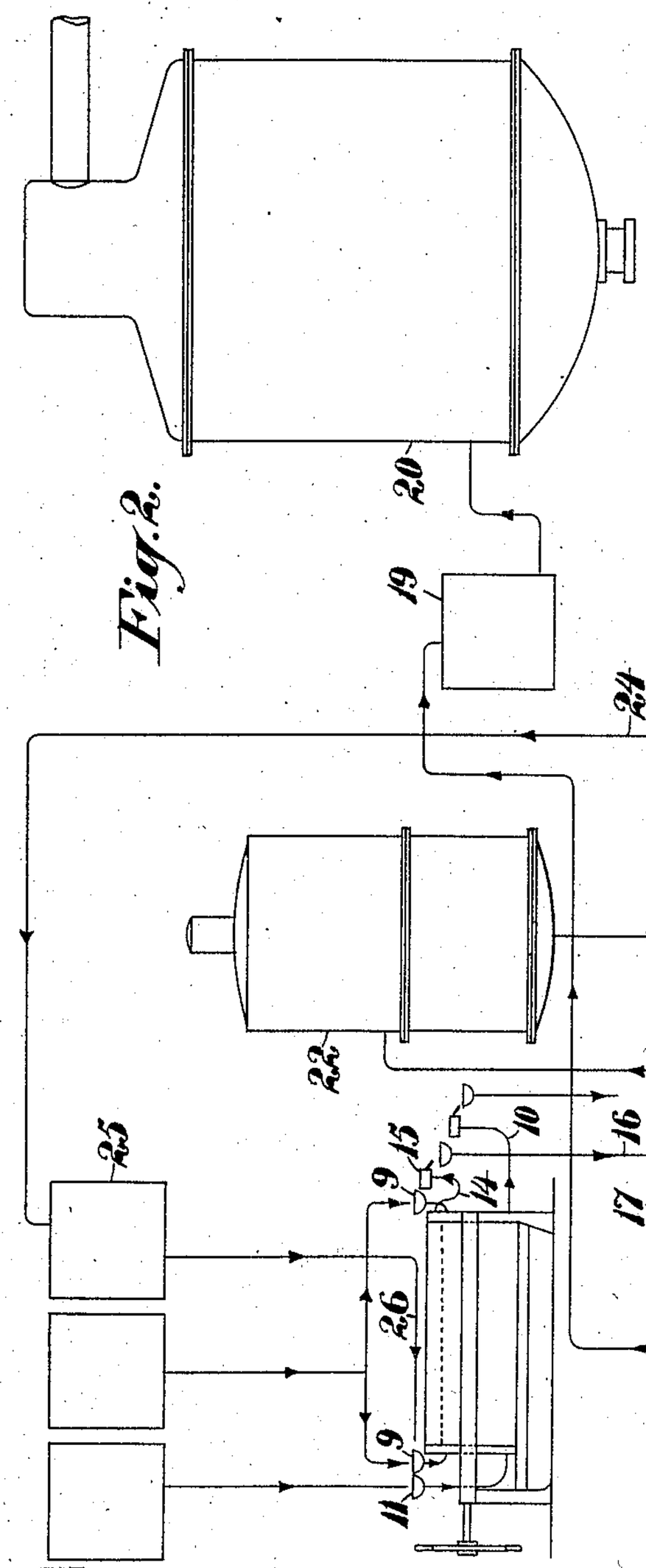


Fig. 4.

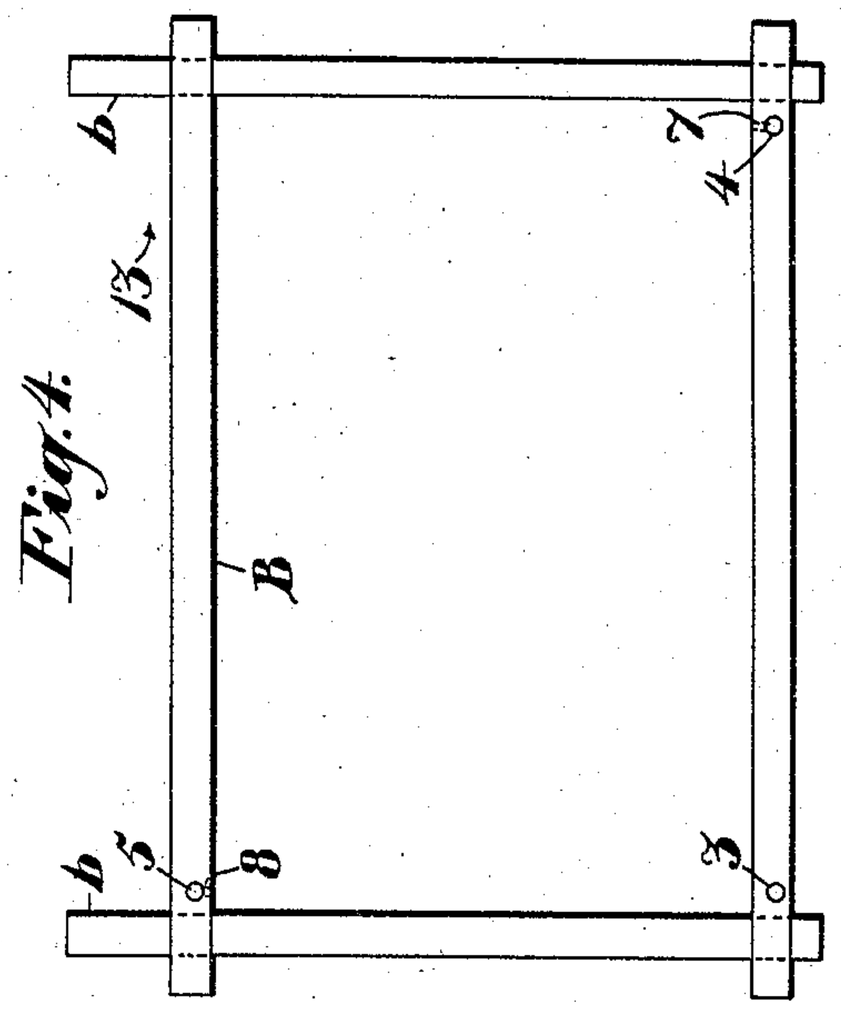
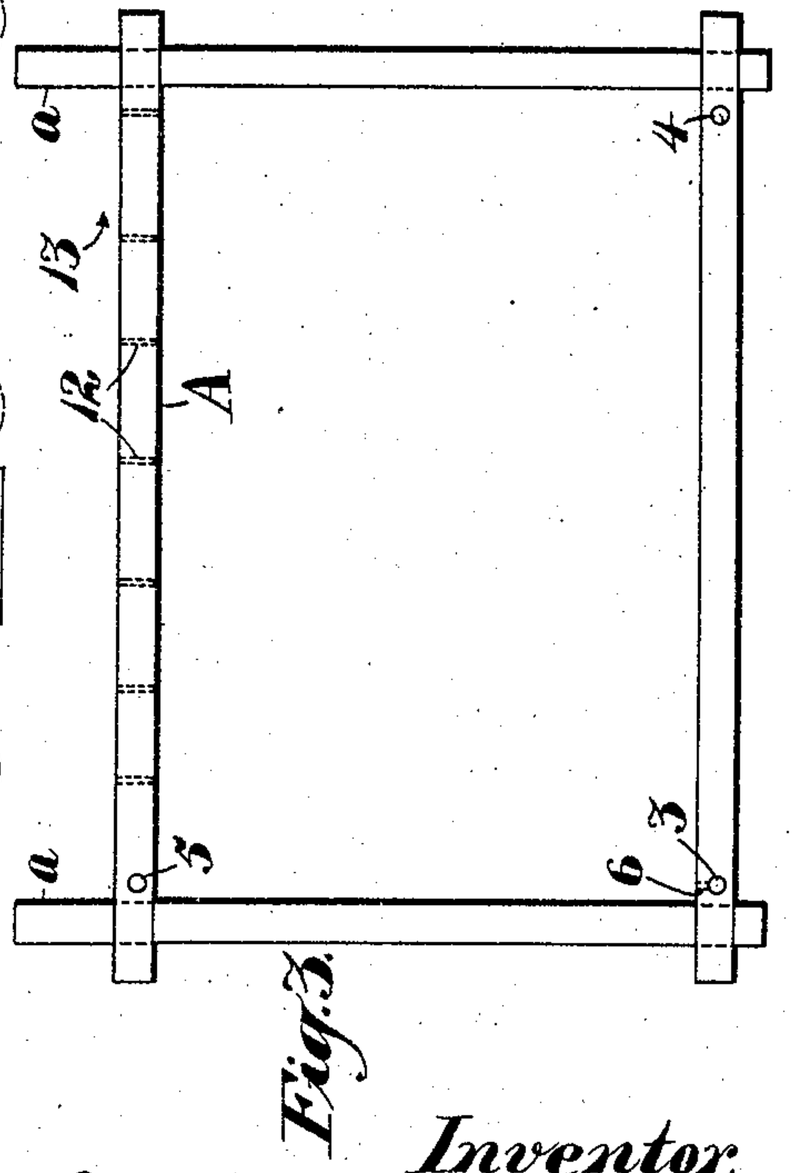


Fig. 3.



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UNITED STATES PATENT OFFICE.

FELIX DEUSY, OF SAN FRANCISCO, CALIFORNIA.

PROCESS OF TREATING MOLASSES.

SPECIFICATION forming part of Letters Patent No. 790,035, dated May 16, 1905.

Application filed July 5, 1904. Serial No. 215,422.

To all whom it may concern:

Be it known that I, FELIX DEUSY, a citizen of France, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Processes of Treating Molasses, of which the following is a specification.

My invention relates to the treatment of molasses by the osmose process.

In the ordinary osmogenes used in sugar factories the molasses is introduced into the apparatus at about 40° Baumé. During treatment the molasses becomes considerably diluted, and when discharged the osmosed product is about 8° Baumé. Experience has demonstrated that the osmotic power in the osmogenes decreases in about the same ratio that the density of the molasses decreases.

The object of the present invention is to produce a comparatively high minimum density, and consequently a high osmose in the molasses during the osmose period, and thereby effect at a single operation the elimination of a larger quantity of salts than is possible under ordinary methods and with ordinary apparatus, increase the yield of sugar in the osmosed molasses, and decrease the quantity of sugar lost in the exosmose liquid.

Having reference to the accompanying drawings, Figure 1 is an elevation, partly in section, of my osmogene. Fig. 2 is a diagrammatic view of my apparatus for carrying out my process. Fig. 3 is a plan view of a molasses-frame. Fig. 4 is a plan view of a water-frame.

In carrying out my invention I prefer to employ an osmogene composed of a plurality of molasses-frames A and a plurality of alternately-assembled water-frames B, suitably supported in the press C. The several frames (shown in details in Figs. 3 and 4) are separated one from the other by a suitable membranous diaphragm or septum 2 into alternating molasses and water compartments.

The lower transverse bars of the several frames are coincidently perforated to form respective continuous molasses and water passages 3 4, and the upper transverse bars are coincidently perforated to form a continuous water-passage or to admit a water-pipe 5. The passage 3 opens into the molasses-chambers by the orifices 6 in the molasses-frames, and the passages or pipes 4 5 open into the water-chambers through respective orifices 7 8 in the water-frames. Fresh water is admitted at 9 to the water-induction passage 5 and to the top of the water-chambers. The exosmose water is discharged through pipes 10 and their connections from the water-eduction pipe or passage 4 at the bottom of the chambers. The initial molasses or molasses to be osmosed is admitted at 11 and caused to pass through the molasses-induction pipe or passage 3 into the bottom of the molasses-chambers. The osmosed molasses passes thence in a contrary direction to the flow of the water in the water-chambers and through orifices 12 into the reservoir 13, formed above the top rails of frames A B and by the extensions *a b* of the side rails of these frames. From this reservoir the osmosed product flows through pipe 14, a box 15, and pipe 16 into a tank 17. From this tank part of the osmosed molasses may be forced by a centrifugal pump 18 to the waiting-tank 19 on a higher level, thence to be delivered to the vacuum-pan 20, wherein the recovery of the sugar is effected. Another portion of the osmosed molasses in tank 17 is sent by any suitable means, as the pump 21, to the evaporator 22, where it is concentrated to about 40° Baumé. This concentrated osmosed molasses is intended for use in my process.

The initial molasses, or the molasses to be osmosed, has a density of about 40° Baumé when first admitted to the osmogene. In its passage through the osmogene in an opposite direction to the water-flow in the water-chambers it has a tendency to become greatly diluted. As before stated, the more dilute a liquid such as molasses becomes the less is the osmotic power or the power of giving up its salts by diffusion through the porous septa. I have found that if a portion of concentrated osmosed molasses is returned again into reservoir 13 this returned product, having a higher specific gravity than the osmosed molasses issuing from the chambers, will settle in the bottom of the reservoir and by reason of its greater density gradually work down

through the orifices 12 into the molasses-chambers and appreciably increase the average density of the contents of these chambers—that is to say, while the initial molasses will have a density of 40° Baumé ordinarily the osmosed molasses passing out through orifices 12 will be so diluted as not to have a density in excess of 8° Baumé, yet by adding a certain proportion of already osmosed molasses concentrated to about 40° Baumé the minimum density of the contents of the molasses-chambers will be found to be from 20° to 30° Baumé. This minimum density will naturally depend on the amount of concentrated osmosed molasses returned. The proportion of the amount returned to reservoir 13 to that passed on to the waiting-tank 19 and thence to the evaporating-pan 20 will vary according to the degree of refinement or percentage of sugar extraction desired. When the apparatus is first started up, all or nearly all of the osmosed molasses will be sent to the evaporator 22 to be returned to the reservoir until a proper average density is obtained. Thereafter it may be said that to produce a generally uniform density of, say, 20° Baumé in the molasses-chambers from seventy to eighty per cent. of the total amount of osmosed molasses should be concentrated and returned to reservoir 13.

By this process of avoiding or counteracting dilution during osmose I am able to remove a very much larger percentage of the salts which hinder sugar crystallization than under the old method, since the greater average density gives more uniform osmotic power in all parts of the osmogene. I find I can do much more work, save a larger proportion of the sugar contained in the molasses, and prevent any considerable loss of sugar in the exosmose water.

The return of the concentrated osmosed molasses from evaporator 22 is effected by means of a centrifugal pump 23 and a pipe 24, discharging into a tank 25. From thence the osmosed molasses may flow by gravity and be distributed over the tank 13 by a perforated pipe 26.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A process of osmose which consists in flowing the initial molasses and the osmosing-water in opposite directions to cause one to pass the other, and adding to the liquid undergoing osmose a part of said liquid which has already been osmosed and concentrated.

2. A process of osmose which consists in flowing the initial molasses and the osmosing-water in opposite directions, concentrating a portion of the osmosed liquid, and returning said concentrated portion to the liquid undergoing osmose.

3. A process of osmose which consists in imparting a travel in reverse directions to the initial molasses and the osmosing-water, collecting the osmosed molasses into a reservoir, adding concentrated osmosed molasses to the contents of the reservoir, and allow the contents of the reservoir to enter the molasses-chambers to raise the mean density of the molasses undergoing osmose therein.

4. A process of osmose which consists in subjecting, in a suitable apparatus, a body of molasses to osmose in such manner that the initial molasses enters at the bottom of the apparatus and the osmosing-water enters at the top, passing each other in vertically and oppositely flowing streams, and adding to the molasses undergoing osmose a suitable portion of concentrated osmosed molasses to increase the mean density of the osmosing molasses.

5. A process of treating molasses which consists in admitting initial molasses or molasses to be osmosed into the bottom of the molasses-chambers and admitting osmose water into the top of the water-chambers, discharging the exosmose water through the bottom of the water-chambers, and discharging the osmosed molasses through suitable passage-ways at the top of the molasses-chambers into a superincumbent osmosed-molasses reservoir, adding concentrated osmosed molasses to the contents of said reservoir and allowing such additions to percolate into the molasses-chambers to raise the mean density of the molasses undergoing osmose therein.

6. A process of treating molasses which consists in admitting initial molasses or molasses to be osmosed into the bottom of the molasses-chambers and admitting osmose water into the top of the water-chambers, discharging the exosmose water through the bottom of the water-chambers, and discharging the osmosed molasses through suitable passage-ways at the top of the molasses-chambers into a superincumbent osmosed-molasses reservoir, concentrating a portion of the dilute osmosed molasses in the reservoir and returning this concentrated portion to the reservoir to percolate into the molasses-chambers and thereby increase the mean density of the molasses therein undergoing osmose.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FELIX DEUSY.

Witnesses:
CHAS. E. TOWNSEND,
S. H. NOURSE.