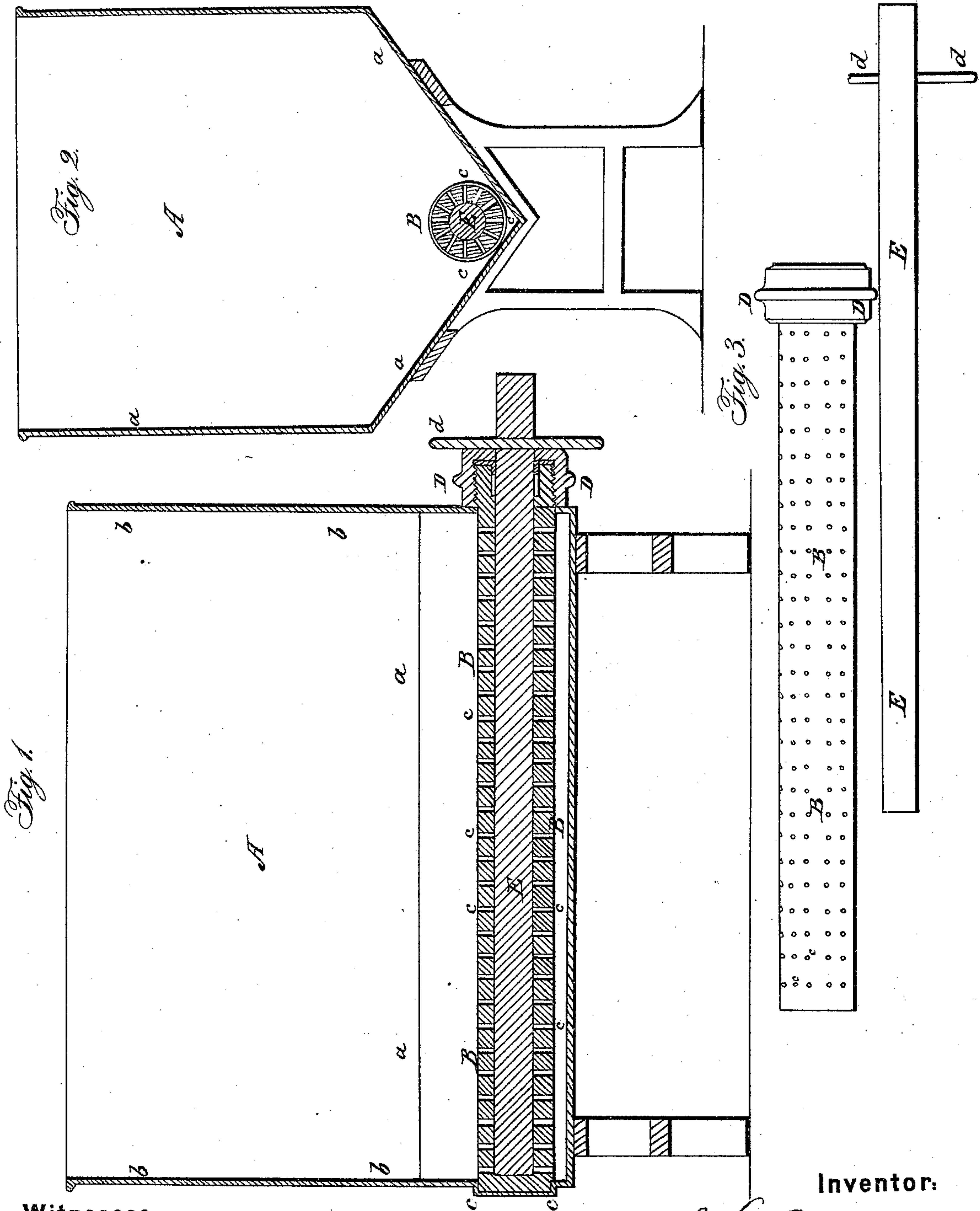


C. E. BERTRAND.

Making Sugar.

No. 30,951.

Patented Dec. 18. 1860.



Witnesses:

James
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Inventor:

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UNITED STATES PATENT OFFICE.

CHARLES E. BERTRAND, OF NEW YORK, N. Y.

IMPROVEMENT IN TANKS FOR CRYSTALLIZING SUGAR.

Specification forming part of Letters Patent No. 30,951, dated December 18, 1860.

To all whom it may concern:

Be it known that I, CHARLES E. BERTRAND, of New York, in the county and State of New York, have invented a new and useful Improvement in Crystallizing-Tanks Applicable to the Manufacture and Refining of Sugar; and I do hereby declare that the following, taken in connection with the accompanying drawings, which form part of this specification, is such a full and clear description as to enable others skilled in the art to which this my invention pertains to make and use my improvement.

My invention consists in the construction or construction and arrangement of parts of crystallizing-tanks and the mode of operating them, applicable, mainly, in the manufacture and refining of sugar, to the treatment of after or secondary products—*i. e.*, to the extraction of the still-remaining crystalline sugar from the mother-liquor or solution, often called "green sirup," obtained from the drainings of ordinary sugar-molds, which served to produce the primary loaf-sugar.

It has been the constant endeavor with all intelligent sugar-refiners to reduce to a minimum the quantity of crystalline sugar in molasses, or to exhaust as perfectly as possible the sirup from sugar that can be obtained in solid or crystalline form, of which the value is so much greater. This has heretofore been effected or accomplished in part principally by either of the two following methods: first, by boiling and running the saccharine juice into bastard molds, which, being comparatively larger than the ordinary molds, contain a larger bulk of sirup, and are consequently slower of cooling. Thus the crystallization is effected at a higher temperature, which is a condition favorable to the formation of regular and large crystals. The other or second method is by expelling mechanically the molasses from between the crystals. This is effected by the employment of revolving drums lined or covered at their peripheries with wiregauze, which retains the crystals, while the molasses is projected by the action of the centrifugal force through the meshes of the drums. Both of these methods are seriously defective. Thus the former, on account of the too rapid cooling of the mass in the molds, fails to afford sufficient time for the formation of large crystals, and the sirup is consequently

formed in a finely-granulated mass, which does not allow of the perfect separation of the non-crystalline portion of the sugar from the crystalline portion thereof; hence there is a great loss of granulated sugar, which is carried off with the molasses upon the molds being tapped. The other mentioned method which employs centrifugal machinery is, on the other hand, very expensive, for not only is there but a very small proportion of crystals extracted from the liquid mass—the smaller crystals being all thrown out together with the molasses—but a large amount of power is required to drive the machinery.

The object of my invention is to overcome these objections; and my improvement consists in the peculiar construction and arrangement of crystallizing-tanks, whereby I am enabled to give the tanks the requisite volume for containing such a large bulk of the liquid mass as to enable slow cooling, and consequently the formation of large crystals, from which the molasses or non-crystalline mass may be separated in the manner hereinafter described.

In the accompanying drawings, Figures 1 and 2 represent longitudinal and transverse vertical sections of a crystallizing-tank constructed and provided or furnished according to this my improvement, and Figs. 3 and 4 represent longitudinal views of certain details thereof detached.

A is the crystallizing-tank, made of any suitable material, lined or otherwise, and of square or oblong form, with two of its opposite sides, *a a*, at any suitable distance from the top bent or inclined so as to converge toward each other at the bottom, or, in other words, to form a wedge-shaped bottom, the ends *b b* to which may be vertical or straight. This configuration of the tank gives a better settling action for the sirup or molasses at the bottom and favors the formation of crystals, also provides in an advantageous manner for certain means hereinafter described, which are arranged at the bottom of the tank for tapping or running off the molasses therefrom. The size of the tank may vary, but its volume is invariably large in contradistinction to the bastard molds now in use, the aggregate capacity of many of which it is made to exceed, so as to insure a much slower cooling action for the liquor, and consequently increased tendency to the formation of crystals; and the

means with which I provide the tank for tapping it and for preventing obstructing incrustation, which latter is a bar to the employment of very large bastard molds, enable me to use a tank of great volume. These means may be thus described: In or near the bottom of the tank, and running longitudinally with it, I arrange a tube, B, made closed at its one end, which is covered by and rests in a cap or lid bearing box, C, but made open at its other end, that should be provided with a gland or stuffing-box and tightening collar or nut D. This tube B is interspersed throughout its length and around it with a series of perforations, *c*, which establish communication between its interior and that of the tank. Within this perforated tube B is fitted a long cylindrical plug, E, of diameter and length so as to closely fit the tube and stop or close the orifices *c* in it, and projecting externally through the open end of the tube, where it may be provided with a handle, *d*.

The operation of this apparatus will readily be discerned from the above description, the plug being withdrawn from the perforated tube after the crystallization in the tank shall have been completed, and the perforations of the tube serving as branch conduits to the interior of the latter. Now it will readily be seen that by turning the plug E from time to time it will be kept free from sticking or any locking and choking action consequent upon incrustation, and the interior of the tube, which is the outlet for the molasses when the plug is withdrawn, also kept free; while every opportunity is afforded on withdrawing the plug for cleaning the interior of the tube by means of hot water and a long brush or other suitable means. Likewise to clean the perfo-

rations *c* in the tube and remove incrustated matter from out of them and around them on the outside of the tube, hot water may be injected into the tube and out through the perforations, so as to keep the latter clear for tapping the tank, or the plug E may be hollow or of cylindrical construction, and provided at its external end with a coupling to unite it with a steam-pipe from a boiler, and by thus heating the hollow plug and its surrounding perforated tube cause all obstructing incrustation to melt. The freedom of discharge will also be greatly facilitated by turning the perforated tube from time to time, or when found necessary, so as to change the position of its perforations relatively to the bottom of the tank, and so as to free the outside of the tube from incrustation adhering to it.

Having thus fully described my improvement, I shall state my claim as follows:

In the manufacture and refining of sugar, the method herein described of extracting the crystallizable sugar from the secondary products or drainings of ordinary sugar-molds by the employment of a capacious tank having combined with it a perforated discharge-tube and plug or stopper, both or either capable of rotation, the whole being constructed and arranged substantially as herein set forth, and operated in the manner and for the purposes specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

C. E. BERTRAND.

Witnesses:

AARON FRANK,
A. THEUKAUP.