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Patented Dec. 5, 1899.

E. P. EASTWICK, JR.

APPARATUS FOR CRYSTALLIZING SUGAR IN MOTION.

(Application filed June 18, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

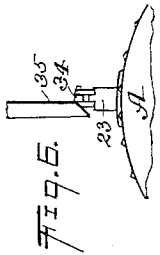
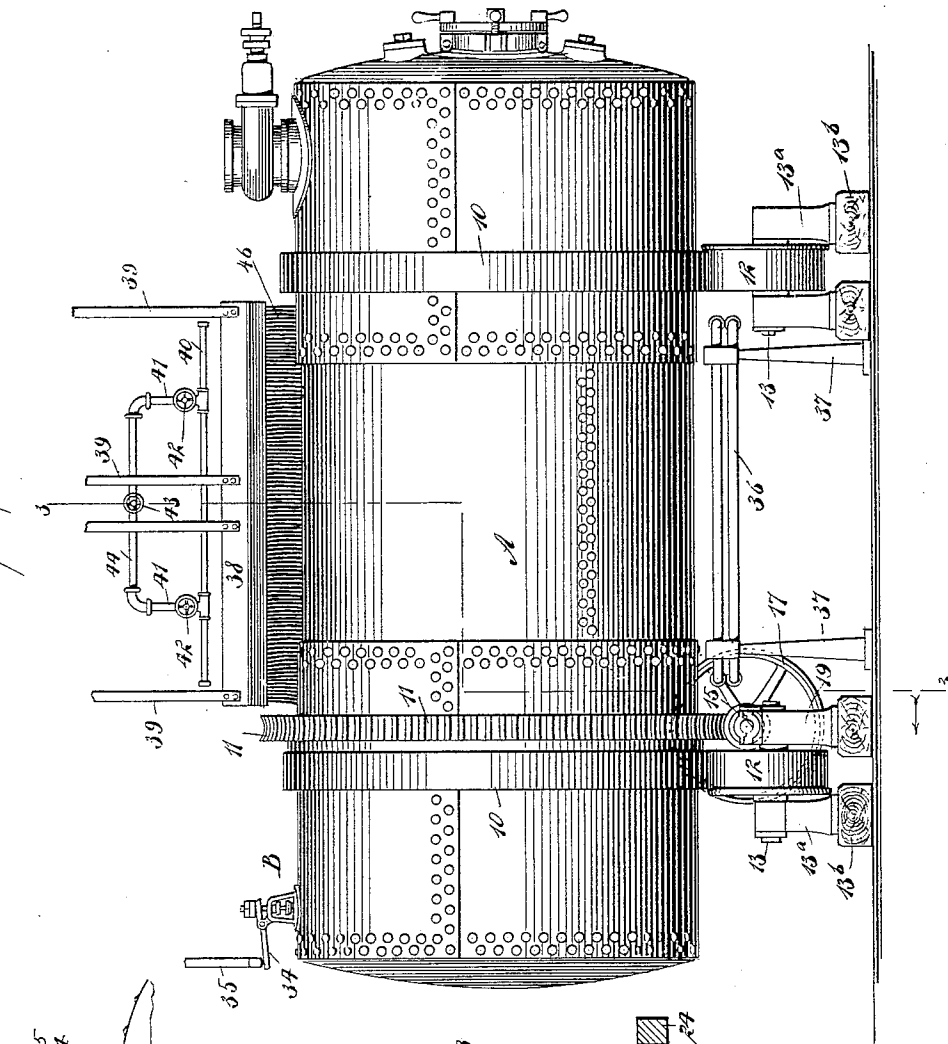
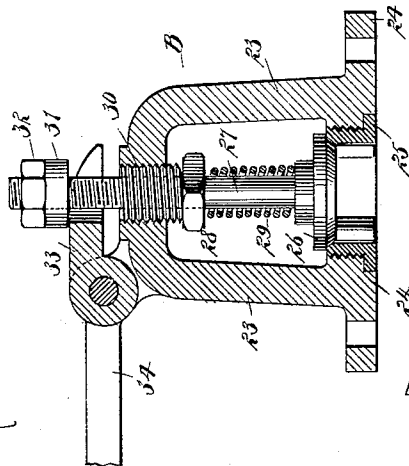


Fig. 2.



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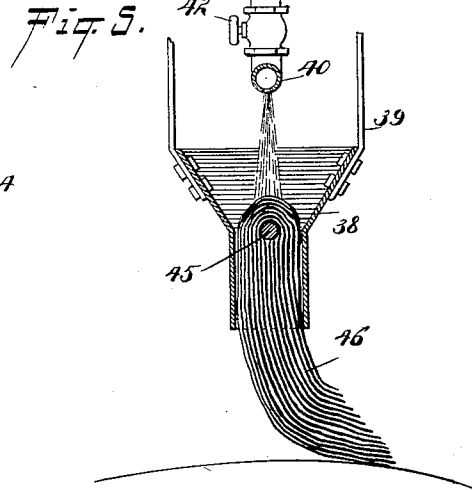
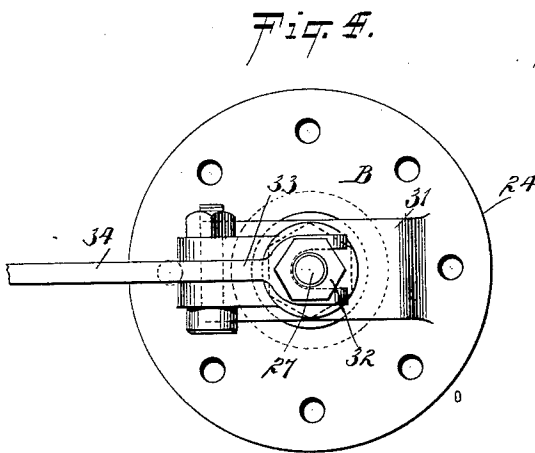
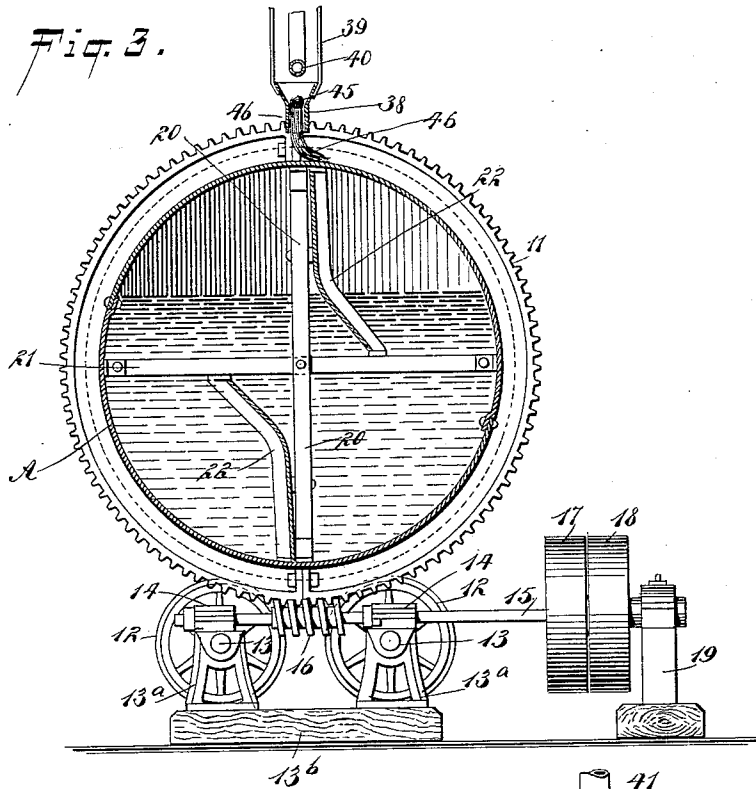
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(Application filed June 18, 1898.)

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2 Sheets—Sheet 2.



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APPARATUS FOR CRYSTALLIZING SUGAR IN MOTION.

SPECIFICATION forming part of Letters Patent No. 638,568, dated December 5, 1899.

Application filed June 18, 1898. Serial No. 683,821. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. EASTWICK, Jr., of New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and Improved Apparatus for Crystallizing Sugar in Motion, of which the following is a full, clear, and exact description.

The object of the invention is to improve upon the construction of a like apparatus for which a patent was granted to me August 2, 1898, No. 608,446.

The principal improvements sought to be obtained consist in the construction of an air-valve provided for the crystallizing-cylinder and capable of being operated automatically or by hand. When the valve is operated automatically, an excess of pressure or a vacuum is prevented from occurring inside of the crystallizing-cylinder, and when the valve is operated by hand the opening uncovered can be utilized to take from the cylinder samples of the masse-cuite in process of crystallization.

Another improvement consists in providing a more simple and effective cooling apparatus, a better driving mechanism for the crystallizing-cylinder, a preferred construction for the interior of the cylinder, and a heating device for the cylinder, all of which devices are simple, durable, and economic in construction and exceedingly effective in operation.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved apparatus. Fig. 2 is a vertical section through the exterior valve of the same. Fig. 3 is a transverse section taken practically on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the exterior valve shown in Figs. 1 and 2. Fig. 5 is a transverse section through the cooling apparatus employed in connection with the crystallizing-cylinder, and Fig. 6 is a detail view of the trip mechanism for operating the valve of the cylinder.

A represents a cylinder especially adapted

for the crystallization of sugar in motion, and to that effect the cylinder is provided with exterior bands 10 and a worm-gear 11, which is exteriorly produced thereon, being ordinarily located adjacent to one of the bands 10, as illustrated in Fig. 1. Each band 10 is adapted to engage with a set of supporting-wheels 12, and each set usually comprises two wheels. These wheels are secured upon shafts 13, as shown in Fig. 3, the said shafts being supported in pedestals 13^a, and the pedestals in their turn are sustained by a block 13^b or an equivalent support or supports. The caps 14 of the shaft-bearings of the pedestals 13^a are further utilized as bearings for a shaft 15, upon which a worm 16 is produced, engaging with the worm-wheel 11 of the cylinder. The caps 14 therefore have a dual function. The shaft 15 is provided with a fast and a loose pulley 17 and 18 and is journaled at its outer end in a suitable bearing or pedestal 19. In place of the fast and the loose pulley a friction pulley or clutch may be substituted.

In the interior of the cylinder A, as shown in Fig. 3, a spider-frame is erected and attached to the cylinder. The said spider-frame is comprised of cross-arms 20 and 21, to which agitating-plates 22 are secured, mainly to the arms 20 of the spider, the said agitating-plates being deflected from the arms 20 and extended to the cross arm or arms 21 of said spider in opposite directions, the said agitating-plates being diametrically opposite, as shown in Fig. 3. Under this construction the shaft which was described in the previous application referred to in the preamble is dispensed with and has substituted therefor the spider, to which is attached the agitating-plates which extend from end to end, turning with the cylinder.

It has been found from practical experience that often a pressure is generated inside of the cylinder when the apparatus is first started, owing to the liberation of latent heat of liquefaction in the progress of crystallization, as the crystals build rapidly. It is therefore necessary to have a valve (designated as B) which will act as a relief and safety valve. Later on, as the masse-cuite in the crystallizer or cylinder cools, a vacuum is produced within the cylinder. In order to break this vacuum, it is necessary to let in air, which is accom-

plished through the medium of the said valve B. When the valve of the cylinder is in its lower position beneath the surface of the masse-cuite, the valve may be opened by hand for the purpose of taking out samples of the masse-cuite. At other times the valve is opened automatically when it reaches an upper position at least once in the revolution of the crystallizer or cylinder. The valve B is shown particularly in Fig. 2, in which it will be observed that a yoke 23 is secured to a plate 24, the plate being adapted for attachment to the cylinder or crystallizer A, and the said yoke is usually provided with a thimble and valve-seat 25, located over an opening in the cylinder or crystallizer. A valve 26, provided with a valve-stem 27, is normally seated on the thimble and valve-seat 25 and held down by means of a spring 29, which is coiled around the valve-stem, bearing directly on the valve and against a nut 28, screwed on the stem within the yoke. Thus through the medium of the nut 28 more or less pressure may be exerted upon the valve to seat it. The nut 28 is loose upon the valve-stem and is provided with an attached threaded sleeve 30, which is screwed into the top portion of the yoke 23. The valve-stem is therefore free to have vertical movement when drawn against the tension of the spring 29. The valve-stem extends beyond the upper surface of the yoke, the upper end of the extension being provided with a lock-nut 31 and a jam-nut 32. A forked lever 33 is fulcrumed upon the yoke, and the bifurcated end of the said lever receives the upper end of the valve-stem engaging with the nut 31. The lever 33 is provided with an extension-arm 34, which is adapted for engagement with a trip 35, having a beveled end, and so located that when the cylinder or crystallizer A has reached a predetermined point in its revolution the trip will press the extension-arm 34 of the lever 33 downward, and thus cause an unseating of the valve 26 and cause an escape of air from the cylinder or the admission of air thereto.

In the operation of the machine above described it sometimes happens that the masse-cuite becomes too cool and it is necessary to heat it again. Such reheating is accomplished, preferably, by placing a coil or coils 36 of pipe between the pedestals 13^a, as shown in Fig. 1, the said coil or coils 36 being connected with a source of steam-supply or a source of supply of heated air or water, as may be found most convenient, and the coils are sustained by standards or brackets 37.

It is also necessary that the cylinder should be provided with a cooling apparatus, which may be brought into action whenever desired. The preferred form of such apparatus is illustrated particularly in Figs. 1 and 5. The apparatus consists of a trough 38, which is sustained fixedly or adjustably, as desired, from an overhead support by means of hangers 39. A water-distributing pipe 40 extends

longitudinally along the upper portion of the trough, being connected with branch pipes 41, each branch pipe having a valve 42 applied, and the branch pipes are connected with the source of water-supply by pipes 44, a single valve 43 being usually employed to control the flow of water from the source of supply to the connecting-pipes 44 of the branch pipes 41. A fabric 46 of an absorbent material of any description is supported in the lower end of the trough, usually by means of a rod 45, and the fabric 46, which is the conductor for the water, is of such length that it will trail or impinge upon the peripheral surface of the cylinder or crystallizer A, it being understood that the distributing-pipe 40 is provided with apertures, as shown in Fig. 3, which will serve not only to supply the trough 38 with water, but direct a stream of water directly on the moisture-conveying material 46.

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

1. In an apparatus for the crystallization of sugar in motion, a receptacle, means for rotating the same, a spring-pressed valve carried by the cylinder and located at the exterior thereof, the said valve normally closing an opening in the periphery of the receptacle, a pivoted lever carried by the receptacle and arranged to open the said valve, and a trip located adjacent to the receptacle and in the path of the said lever and adapted to engage the lever to open the valve when the latter is in an upper position, substantially as shown and described.

2. The combination with a cylinder mounted to revolve and provided with an opening, a yoke located on the exterior of the cylinder at said opening, a valve-stem mounted in said yoke and carrying a valve adapted to close said opening, a spring normally closing said valve, and means for regulating the tension of said spring, of a lever pivoted to the yoke and engaging the valve-stem, and a trip for engaging the lever, substantially as shown and described.

3. The combination with a rotatable cylinder provided with an opening in its periphery, a yoke having a valve-seat located over the said opening, a valve normally seated on said seat to close the opening in the cylinder, the said valve having a valve-stem extending through the upper part of the yoke and provided at its upper end with a nut, a nut held loosely on the valve-stem and provided with a threaded sleeve adapted to screw into the upper portion of the yoke, and a spring coiled around the valve-stem and bearing on the valve and against the nut having the threaded sleeve, of a forked lever fulcrumed upon the yoke and engaging the nut on the upper end of the valve-stem, and a trip arranged within the path of the said lever, for the purpose set forth.

4. The combination, with a rotatable recep-

5 tacle provided with an opening, a casing surrounding the said opening, a valve within the said casing, adapted to normally close the opening in the receptacle, a spring normally exerting pressure to close the said valve, and a regulating device for the said spring, of a lever arranged to open the said valve, and a trip device within the path of the said lever, for the purpose set forth.

10 5. In an apparatus for the crystallization of sugar in motion, a cylinder provided with means for agitating the masse-cuite and mounted to rotate the said cylinder having bearing-surfaces located near its ends, a relief-valve located on the periphery of the cylinder near one end thereof and at the outer side of one of the bearing-surfaces, and a trip arranged above the end of the cylinder carrying the valve and in the path of the said valve, substantially as shown and described.

20 6. In an apparatus for the crystallization of sugar in motion and in similar machines, a revolving cylinder, a trough supported above said cylinder, an absorbent material supported on a rod within the trough and arranged

for engagement with the said cylinder, a water-distributing pipe provided with apertures and extending longitudinally above the upper portion of the trough at the longitudinal center thereof, and branch pipes each provided with a valve and connecting said water-distributing pipe with a source of water-supply, for the purpose specified.

7. In an apparatus for the crystallization of sugar in motion, the combination with a revoluble cylinder having bearing-surfaces located near its ends, and means for rotating the same, of an exteriorly-located cooling device for the cylinder extending longitudinally between the bearing-surfaces, a valve for the cylinder located near one end at the outer side of one of the bearing-surfaces, and means for automatically operating the valve, when it reaches an upper position in the revolution of the cylinder, substantially as described.

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