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SUGAR-SEPARATING MACHINE.

1,217,705.


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To all whom it may concern:

Be it known that we, LOUIS M. CLAIRAIN and OCTAVE J. SUARES, citizens of the United States, and residents of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Sugar-Separating Machines, of which the following is a specification.

Our invention is an improvement in sugar separating machines, and the invention has for its object to provide a machine of the character specified wherein the sugar is separated from the solution by fluid under pressure, as for instance, air, and wherein a conveyor is provided having a screen, and having means for dragging and spreading the mixture over the screen, exhausting apparatus being arranged below the screen to draw the solution through the screen, leaving the granulated sugar on the screen.

In the drawings:

Figure 1 is a side view of the machine with parts in section; Fig. 2 is a top plan view; Fig. 3 is an enlarged end view of the separating mechanism with parts broken away; Fig. 4 is an enlarged section of the feed or inlet end of the conveyor; Fig. 5 is an enlarged detail of a portion of one of the scraper blades; Fig. 6 is a top plan view of one of the screen sections; and Fig. 7 is a detail of the conveyor and scraper.

The present embodiment of the invention comprises a casing in the form of an open trough, and consisting of side plates 1, each plate having at its lower end an angular portion 2, the said portions extending inwardly extending rib 5 on its inner surface, at the junction of the angular portion 2 therewith, the said ribs being also guide ribs, and the ribs of the two plates are in register or in the same level. This is also true of the angle plates 4, and the plates 4 are spaced above the ribs 5.

An endless conveyor is supported in the casing, the said conveyor comprising laterally spaced endless chains 6, which are connected at suitable intervals by blades or vanes to be later described, and the chains are supported by sprocket wheels 7 secured to shafts 8 and 9 arranged at the opposite ends of the casing or trough.

The blades or vanes before mentioned are scrapers, in the form of plates 10, each of which is secured to a shaft 11 at one side edge of the plate. Each plate has a longitudinally extending bearing 12 at the said side edge through which the shaft 11 is passed, and each shaft at its ends is connected with links of the chains 6.

It will be noticed from an inspection of Fig. 7, that each chain is composed of single links alternating with pairs of links, and pivotally connected thereto by rivets or the like, and where the shafts 11 occur, the ends of the shafts take the place of the rivets. A roller 13 is secured to each shaft, between the end of the blade and the adjacent chain, and a collar 14 is arranged on the shaft between each roller and the adjacent end of the adjacent blade. The ends of each blade are beveled at the free side edges thereof, as indicated at 15, and the rollers 13 before mentioned, move on the ribs 5 at the lower runs of the chain, and on the horizontal portions of the angle plates 4 at the upper runs of the chains. Thus each run of the conveyor is supported by guiding ribs at the opposite sides of the casing, and the blades or vanes are of such width that on the upper run of the chain the free edges of the blades will be near the tops of the side plates 1 when the blades are perpendicular, or approximately so.

The beveled corners of the blades 15 are beveled at the same angle as that of the angle portions 2 of the side plates, so that, when the blades are on the lower run of the conveyor, they will fit into the space between the angular portions 2. The blades or vanes 10 are held approximately perpendicular with respect to the chains, the said blades,
however, inclining a little forwardly at their free edges in the direction of movement of the conveyer, as indicated in Fig. 3. The shafts 8 and 9 before mentioned, are journaled in bearing brackets 17 depending from one floor 18 of the building in which the machine is arranged, and the syrup or mixture is fed into the trough or casing at the end adjacent to the roller 9. The discharge pipe 19 of the mixer 20 has an angular portion 19a at its lower end, which extends through an opening in the side of the casing, between the ribs 4 and 5, and as a consequence the discharge pipe from the mixer discharges between the runs of the conveyer.

Adjacent to the discharge pipe 19—19a the bottom of the casing is open for some little distance, and at the opening a series of T-bars 21 is arranged transversely of the trough at the bottom thereof. A tapering funnel-shaped collector or hopper 22 is connected with the casing directly below the opening, and the T-bars are arranged between the opposite sides of the collector. The hopper is connected to the casing by means of strips 23, each strip lapping upon the upper edge of the adjacent side of the hopper and upon the lower edge of the portion 2 of the adjacent plate 1, and each strip has an inwardly extending rib 24 passing between the adjacent edges of the hopper sides and the plates 1, and the said ribs form supporting ribs for supporting, in conjunction with the T-bars 21, the screen sections 25.

The T-bars 21 are arranged with their body portions horizontal, and with their webs or central ribs depending, and the screen sections 25 are of a size to lie end to end on the horizontal or body portions of the T-bars. The T-bars are spaced at regular intervals, and each bar supports the ends of two adjacent screens. The side edges of the screens rest upon the ribs 24, and it will be noticed from an inspection of Fig. 6, that the screens are formed from sheets of suitable material having openings or perforations.

The openings or perforations are of suitable size and spacing, and they do not extend to the ends and side edges of the sections, leaving a clear space for engaging the ribs 24 and the T-bars 21. The entire space between the opposite ends of the large end of the collector or funnel is closed by screens, and the free edges of the blades or vanes on the lower runs of the conveyer move in contact with the upper faces of the screens. A controlled water spray may be played onto the mixture covering the screen plates when desired to assist in cleansing the granules.

A pipe 27 is connected with the lower small end of the collector 22, the collector in the pipe having abutting flanges 28 which are secured together by rivets 29 or the like. An exhausting device is connected with the lower end of the pipe 27, the said pipe having a lateral extension 27a.

A discharge pipe 30 is provided for discharging the sugar, and the inlet end of this pipe is connected with the trough or casing at the end adjacent to the shaft 8. The pipe 30 extends downwardly and at its lower end is provided with an angular extension 30a, which is connected with an exhausting device of the same character as that connected with the portion 27a of the pipe 27.

These exhausting devices are in the form of suction fans arranged within the casings 31, and a motor of suitable form, in the present instance an electrical motor, indicated at 32, is arranged between the exhausting devices. The portions 27a and 30a of the discharge pipes for the syrup and sugar are connected with the casings 31 at the axis thereof, and each casing 31 is provided with a discharge pipe. The discharge pipe 33 from the casing 31 extends downwardly, delivering the syrup into the room below, the floor 34 on which the exhausting devices and the motor are supported. The discharge pipe 35 from the casing 31 which delivers the sugar extends upwardly to a room on the floor 18, or suitably elsewhere.

The exhausting devices and the motor have bases 36 which are bolted or otherwise secured to the floor 34 before mentioned, and the shaft 37 of the motor is provided with pulleys 38, which are connected by belts 39 with pulleys 40 on the respective shafts of the exhausting devices. A sprocket wheel 41 is secured to the shaft 37 of the motor, and a chain 42 connects the sprocket wheel with a wheel 43, on a counter-shaft 44, which is journaled in bearing brackets 45 depending from the floor 18.

The driving shaft 46 for the conveyer is journaled in bearing brackets 47 depending from the floor 18, and the said shaft 46 is at right angles to the shaft 44, and also to the shafts 8 and 9. Bevel gears 48 are secured to the adjacent ends of the shafts 44 and 46, and the said gears mesh with each other. A worm 49 is secured to the end of the shaft 46 adjacent to the shaft 8, and the said worm meshes with a worm wheel 50 on the shaft 8, all controlled by suitable clutch devices.

The operation of the machine is as follows. The mixture is fed from the mixer 20 by way of the pipes 19—19a to the trough, the mixture being delivered between the runs of the conveyer and above the lower run. The mixture falls upon the bottom of the trough, and is carried forward by the blades, which are scrapers as well as conveyer blades. This mixture is thoroughly spread by the blades, coming onto the screen in a
thin layer of uniform depth. The exhausting devices create a partial vacuum within the said devices and in the pipes 27 and 30, and the collector 22, and the syrup is drawn at once through the screen section, passing by way of the pipes 27 and 33 to the place of storage. The action of the conveyor is controlled so that it may move continuously or intermittently.

The sugar granules remain on the screen, and these granules are carried by the blades toward the shaft 8, being finally delivered into the upper end of the pipe 30. The exhausting device adjacent to the pipe 30 draws the sugar down the pipe 30 and delivers it by way of the pipe 35 to the place of storage. The trough is open at the top, so that the air will have free admission, and the screen is of such mesh that the sugar granules will not pass through the openings. It will be noted that the screen sections are removable, in order to permit them to be cleaned if desired, and the screen extends a distance sufficient to permit all of the syrup to be withdrawn before the sugar passes from off the screen. It will be evident that the sugar may be delivered into an elevator boot if desired, directly from the pipe 30, thus dispensing with the exhausting device at this point.

In practice, the trough and accessories will be suspended from the ceiling of the room in which they are placed, by any suitable supporting means. The discharge pipe from the mixer which discharges between the runs of the conveyor, will also be provided with a regulating valve or other device of suitable form for regulating the flow of the syrup.

A suitably controlled water spray may if desired be played onto the mixture covering the screen plates, to assist in cleansing the granules, and it will be evident that the discharge pipe 35 may deliver the sugar at any desired point. Suitable clutch mechanisms are provided for connecting the wheel 50 with the shaft 8, or for connecting the worm 49 with the shaft 48.

In practice, the conveyor will be arranged to permit the speed of the same to be controlled, in order to vary the action thereof, and to make its movement continuous or intermittent as may be desired.

We claim:

A sugar separating machine comprising a trough having near one end an opening in its bottom, a screen at the opening and a funnel shaped collector at the said opening, an exhausting device connected with the small end of the collector, an endless carrier supported for movement longitudinally of the trough and having scraper lugs arranged at spaced intervals and extending transversely of the trough, engaging the bottom of the trough to spread the mixture thereon and to carry the mixture over the screen, means for feeding the syrup at the end adjacent to the screen, and means for discharging the sugar at the opposite end.

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