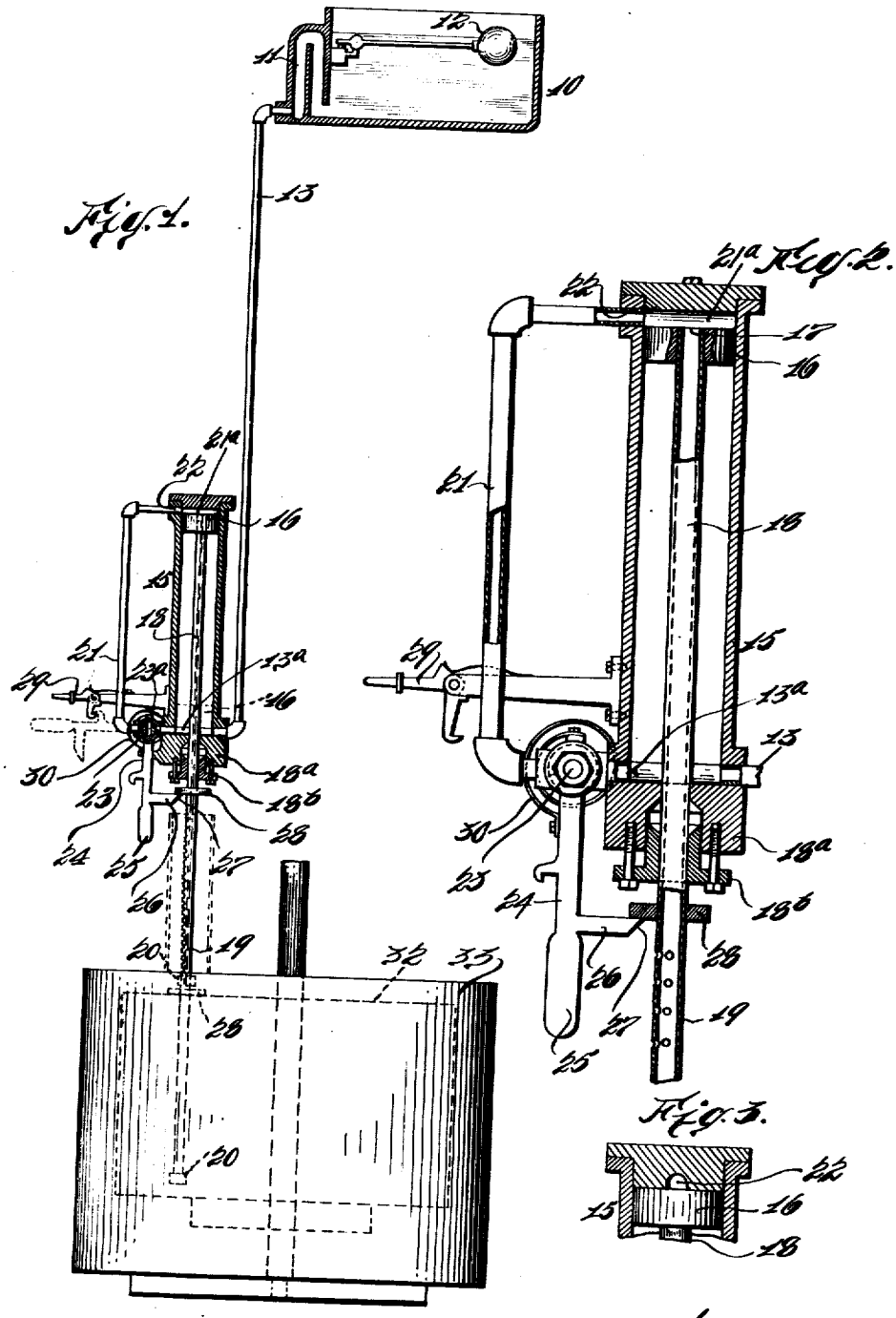
R. U. BUNKER.

APPARATUS FOR TREATING MATERIALS WITH LIQUIDS.

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1,131,675.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TREATING MATERIALS WITH LIQUIDS.

1,131,675. Specification of Letters Patent. Patented Mar. 16, 1915.

Application filed December 8, 1913. Serial No. 805,371.

To all whom it may concern:

Be it known that I, RAYMOND U. BUNKER, a citizen of the United States, residing at Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Apparatus for Treating Materials with Liquids, of which the following is a clear, full, and exact description.

This invention relates to apparatus for treating materials with liquids, and which is capable of use in various connections where materials which are being spun in a centrifugal are to be treated with a liquid, either for washing, spraying or other purposes.

The invention is well adapted for use in sugar refineries and raw sugar factories, for the purpose of washing the sugar with water when the sugar is being spun in the centrifugal.

Some of the objects of the invention are the applying of the liquid to the surface of the material to be treated, in the most direct and advantageous manner, whereby the greatest effect is obtained by a minimum of liquid or water (in the sugar-making art, a consequent saving in the finished crystals and saving of fuel by reason of less re-evaporation); the application of the liquid automatically by opening a valve; the automatic withdrawal of the washing pipe or nozzle from the centrifugal by closing the valve; the catching of any drip from the apparatus in the centrifugal, thus assuring a clean and dry floor; and, as the application of the liquid is automatic, it may be applied in an absolutely sterile state free from contamination by the use of dirty vessels or the workmen's hands.

These being among the objects of the present invention, the same consists of features of construction to be hereinafter described and then claimed with reference to the accompanying drawings showing a suitable embodiment or preferred form of the invention, and in which—

Figure 1 is a view showing the present improvement in connection with a centrifugal machine, the improved apparatus being shown in a vertical section and the centrifugal in elevation, the broken lines indicating the basket of the centrifugal; Fig. 2 is a detail view on a larger scale, showing, partly in elevation and partly in section, the means for operating the discharge pipe or nozzle and controlling the action of the admitted liquid on the same; and Fig. 3 is a detail sectional view showing a transverse channel at the upper end of the pressure chamber.

Referring now to the drawings specifically, which, as before stated, illustrate a suitable or preferred embodiment of the invention, at the top of the apparatus is a tank or receptacle 10 for the liquid, such as water, which is permitted to flow thereinto from any suitable source. Said tank is provided with an outlet passage 11 having a return bend, so as to constitute a siphon, while within the tank is a float device 12 to indicate the desired level of the liquid which is admitted to the tank. The outer leg of the siphon 11 leads to a downwardly extending pipe 13, the lower end of which is connected with the bottom of an upwardly extending liquid pressure chamber 15. This chamber 15 receives a piston 16 which is adapted to work up and down therein, said piston being provided with an aperture 17 with which is connected a pipe 18 which extends downwardly from said piston and is adapted to work in a neck 18^a located at the lower end of the chamber 15, and which is packed by a gland 18^b, so that a liquid-tight bearing is formed. The lower end of the reciprocatory pipe 18 is formed into a perforated discharge nozzle 19, the extremity of which is closed by a cap 20. The piston 16 and nozzle 19 are reciprocated through the medium of the following mechanism.

At a point opposite the point of connection of pipe 13 with cylinder 15, there is connected an upwardly extending pipe or duct 21, which at its upper end is connected at 22 with the upper end of the liquid chamber 15, thus constituting a shunt passage for the liquid. In order to permit the piston 16 to be moved from each end of its range of movement, without cutting off the supply of liquid and affecting the operation, the pipe or passage 21 connects at its lower end with a transverse channel 13^a similar to the transverse channel 21^a, shown clearly in Fig. 3, which channels are located in the lower and upper ends respectively of chamber 15. Said pipe or passage 21 is provided with a rotary valve 23 having a single port 23^a, from the stem of which valve extends an arm 24 provided at its outer end with a handle 25, by means of which handle the valve may be rotated through an angle of 90°.

From that side of the arm 24 which is adjacent the pipe 18, extends a latch or detent 26, which at its outer end is beveled at 27 so as to form an inclined face, the inclination being upwardly and toward the pipe 18. As shown, said latch is separated from the gland 18^b by a space which is adapted to receive the edge of a projection or collar 28 located on the pipe 18.

When the handle 25 is swung upwardly, it may be secured in position by means of a latch 29, in which position the valve 23 opens the passage through the pipe 21. The valve 23 is held yieldingly in closed position and the latch 26 in its operative position by means of a tension spring 30 connected with the handle 25.

It will appear hereinafter and from the drawings, that, by means of the above-described apparatus, the discharge nozzle 19 is adapted to be moved downwardly into the basket 32 of a centrifugal machine 33, which may be a machine for washing sugar or for treating other materials with liquids. A guard or apron such as indicated in broken lines at the top of the centrifugal may be used if there is a tendency to project liquid over the centrifugal.

The operation of the apparatus is as follows: Liquid is caused to flow into the tank 10 which, by reason of the float device 12, is adapted to constitute means for indicating the quantity of liquid to be used in the centrifugal machine. As soon as the liquid in the tank reaches a level above the return bend of the siphon 11, the siphon begins to work automatically in the withdrawal of the liquid from the tank. From the siphon the liquid is conducted downwardly through the pipe 13 to a point under the piston 16. Before admitting the liquid from the tank, the handle 25 is swung downwardly so as to bring the latch 27 into the path of the projection 28 on the pipe 18, and close the passage through the pipe 21. The gravity of the liquid will now act to force the piston 16 upwardly in the liquid chamber 15, thus withdrawing the discharge nozzle 19 from the basket 32 of the centrifugal. During the upward movement of the piston 16, the air in the liquid chamber 15 will escape down through the pipe 18 and nozzle 19. When the piston 16 has been moved to its upper position as shown in Fig. 1, the projection 28 on the pipe 18 will be automatically engaged with and secured by the latch 26. The force of the liquid having now through the medium of the pressure chamber raised the nozzle 19 clear of the centrifugal, the latter may now be charged and started, the material walling up as the machine comes up to speed, and said material may now be washed or otherwise treated.

To wash or treat the contents of the centrifugal, the valve 23 is opened by raising the handle 25 so as to release the latch 26 from the projection or collar 28, said handle being moved into position to be secured by the latch 29, so that the valve is kept open while so latched. Valve 23 being now open, the head of liquid in the tank 10 sends the liquid down through the pipe 13, through the lower end of chamber 15 through the port of the valve, up through shunt pipe 21 and into the upper end of the pressure chamber 15. The hydrostatic pressure in the chamber 15 is therefore substantially balanced. The weight of the piston 16 and the pipe 18 and nozzle 19, now causes the said parts to move downwardly so as to project the nozzle 19 into the basket 32 of the centrifugal. As soon as the said parts begin to move downwardly, the liquid admitted to the upper part of the chamber 15 will flow into the pipe 18 and be discharged through the perforations of the nozzle 19, the liquid emerging from said nozzle in a direction normal to the face of the material which is being spun in the basket. When the contents of the siphon tank 10 has been applied to the contents of the centrifugal, the valve 23 is closed automatically by the spring 30 when the handle 25 is released from latch 29, so that the lower latch 26 is again brought up snugly against the pipe 18 to engage the projection 28 when the discharge nozzle is again raised from the centrifugal. When the siphon tank is again filled, the liquid will again act to raise the discharge nozzle from the centrifugal basket 32. One of the functions of the latch 26 is to prevent the discharge nozzle from slipping back into the centrifugal should the liquid supply fail or the piston or gland leak badly. It will be seen that the pressure chamber and concomitant parts constitute means for operating the nozzle by the admitted quantity of liquid and controlling the action of said liquid on the nozzle.

It is obvious that the described apparatus is susceptible of a wide range of modification, as parts may be omitted, parts added and parts substituted without changing the scope of the invention.

What I claim is:—

1. In an apparatus for treating materials with liquids, when such materials are being spun in a centrifugal, the combination of means for supplying the liquid from a suitable source, means for applying the same to the face of the material which is being spun, in a direction normal to the said face and means for utilizing hydraulic power of the liquid used for treating material to discontinue the treatment.

2. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, a pressure chamber connected therewith, for receiving liquid therefrom, a discharge nozzle mounted for movement by

the liquid in said pressure chamber in one direction, and means for connecting said pressure chamber with said source of supply and the latter with said nozzle, in such way that said nozzle may move in opposite direction.

3. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, a pressure chamber connected therewith, for receiving liquid therefrom, a discharge nozzle mounted for movement by the liquid in said pressure chamber in one direction, means for connecting said pressure chamber with said source of supply and the latter with said nozzle, in such way that said nozzle may move in opposite direction, and a centrifugal machine out of and into which said nozzle is thereby movable.

4. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, a pressure chamber connected therewith, for receiving liquid therefrom, a discharge nozzle mounted for movement by the liquid in said pressure chamber in one direction, and valve-controlled liquid-shunting means for substantially establishing a hydrostatic balance in said pressure chamber, so that said nozzle may move in opposite direction.

5. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, a pressure chamber connected therewith and located thereunder for receiving liquid therefrom, a discharge nozzle mounted for movement by the liquid in said pressure chamber in upward direction, and means for connecting said pressure chamber with said source of supply and the latter with said nozzle, in such way that said nozzle may move in downward direction.

6. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, syphonic means for controlling the same, a pressure chamber connected therewith, for receiving liquid therefrom, a discharge nozzle mounted for movement by the liquid in said pressure chamber in one direction, and means for connecting said pressure chamber with said source of supply and the latter with said nozzle, in such way that said nozzle may move in opposite direction.

7. In an apparatus for treating materials with liquids, the combination of means of support, a longitudinally movable discharge nozzle thereon, means for controlling the movement of said nozzle in a direction toward said means of support, means for shifting the position of said controlling means, and means for permitting said nozzle to be moved in opposite direction when said controlling means is shifted, so that liquid will flow from said nozzle.

8. In an apparatus for treating materials with liquids, the combination of means of support, a longitudinally movable discharge nozzle thereon, haydraulic means for producing the movement of said nozzle in a direction toward said means of support, means for changing the action of said hydraulic means, so that said nozzle may move in an opposite direction, and means for permitting said nozzle to be moved in opposite direction when the action of said hydraulic means is changed, so that liquid will flow from said nozzle.

9. In an apparatus for treating materials with liquids, the combination of means of support, a longitudinally movable discharge nozzle thereon, means for controlling the movement of said nozzle in a direction toward said means of support, means for shifting the position of said controlling means, means for securing said nozzle in position at the end of said movement, and means for permitting said nozzle to be moved in opposite direction when said controlling means is shifted, so that liquid will flow from said nozzle.

10. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, a pressure chamber connected at its receiving end with said source of supply, a duct connecting opposite ends of said chamber, a nozzle slidable in the receiving end of said chamber, an apertured piston on said nozzle, the aperture of which communicates with said nozzle, said piston working in said chamber, and a valve controlling said duct.

11. In an apparatus for treating materials with liquids, the combination of a source of liquid supply, a pressure chamber connected at its receiving end with said source of supply, a duct connecting opposite ends of said chamber, a nozzle slidable in the receiving end of said chamber, an apertured piston on said nozzle, the aperture of which communicates with said nozzle, said piston working in said chamber, a valve controlling said duct, and latching means for securing said nozzle in position, when said piston is moved away from said receiving end.

12. In an apparatus for treating materials with liquids, the combination of a centrifugal machine, means for measuring and supplying a quantitv of liquid for use in said machine, a discharge nozzle for said liquid, movable into and out of said machine, and means for operating said nozzle by said quantity of liquid and controlling its action on said nozzle.

13. In an apparatus for treating materials with liquids, the combination with a centrifugal machine, of means for applying liquid to the face of the wall of material which is being spun in said machine, in a direction normal to the said face, and means for utilizing the hydraulic power of the liq-

uid used for treating material to discontinue the treatment.

14. In an apparatus for treating materials with liquids, the combination of a spray nozzle having lateral jet orifices, and mounted to be movable to a position opposite the wall of material which is being spun in a centrifugal machine, and power means for raising said nozzle from and lowering it in a direction longitudinal of said nozzle.

Signed at New York city, New York this 3rd day of December, 1913.

RAYMOND U. BUNKER.

Witnesses:
GEO. L. WHEELOCK,
BEATRICE MIRVIS.

Correction in Letters Patent No. 1,131,675.

It is hereby certified that in Letters Patent No. 1,131,675, granted March 16, 1915, upon the application of Raymond U. Bunker, of Yonkers, New York, for an improvement in "Apparatus for Treating Materials with Liquids," an error appears in the printed specification requiring correction as follows: Page 3, line 32, for the word "supplv" read *supply;* and that the said Letters Patent should be read with this corrrection therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of March, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.