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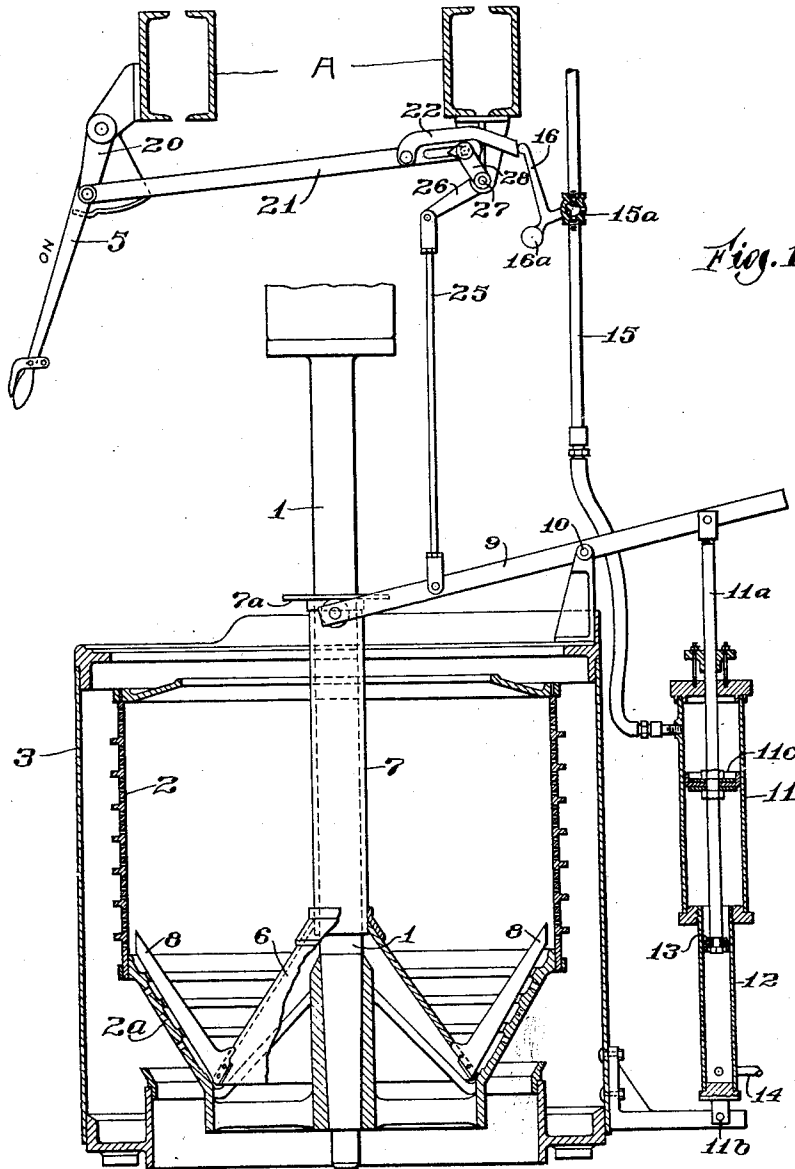
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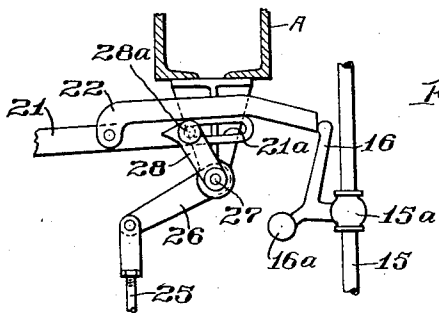
CENTRIFUGAL MACHINE

Filed July 26, 1929

2 Sheets-Sheet 1



*Fig. 1.*



*Fig. 3.*

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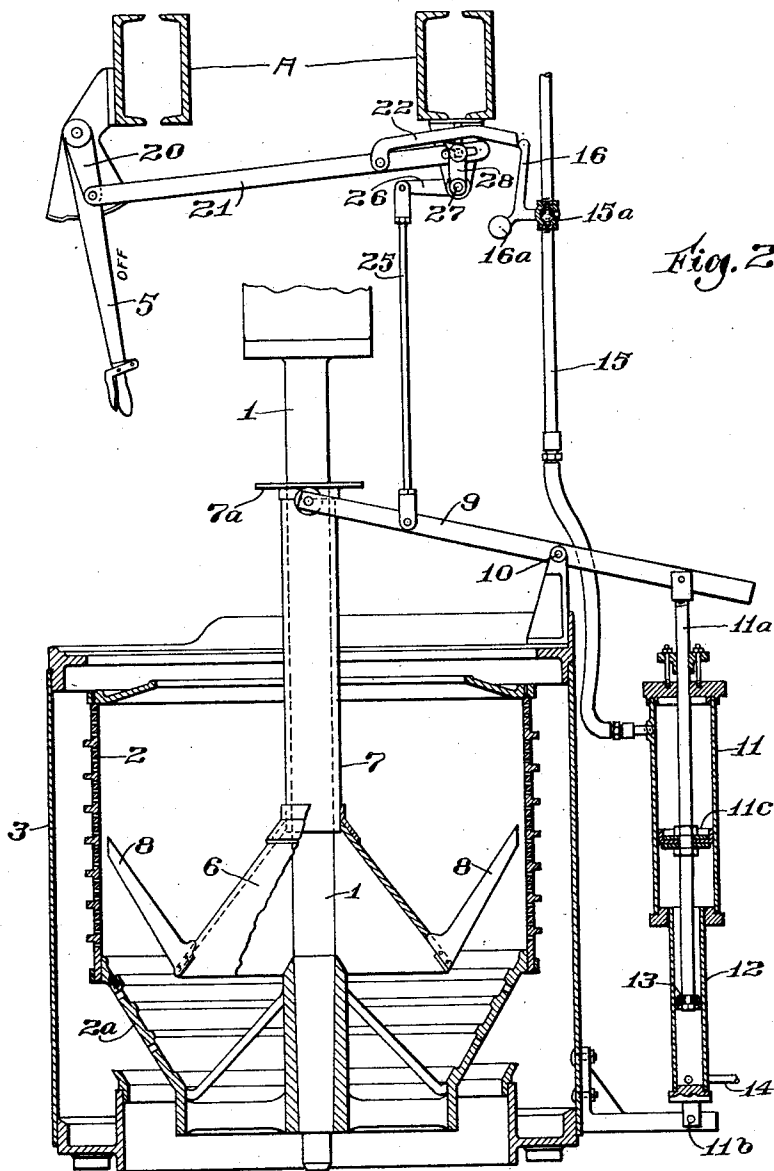
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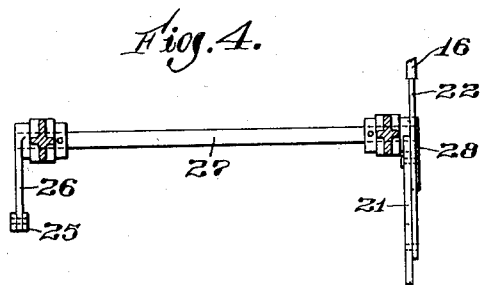
CENTRIFUGAL MACHINE

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2 Sheets-Sheet 2



*Fig. 2.*



*Fig. 4.*

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# UNITED STATES PATENT OFFICE

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CENTRIFUGAL MACHINE

Application filed July 26, 1929. Serial No. 381,171.

This invention relates to the operation of centrifugal machines of the type commonly used in sugar mills for the separation of the liquid content from the solid grains of sugar and is intended to provide means for automatically discharging the sugar or other solid material from the basket after the operations of centrifugal purging, washing and drying have been completed.

The present invention is in the nature of an improvement on my earlier pending application, Serial No. 268,925, and embraces in general the combination with a centrifugal basket, having an inclined bottom with central discharge opening, of a closure valve for said discharge opening, the operation of which is controlled by the slowing down or stopping of the machine at the end of its cycle of operations, said valve being provided with means for disrupting the walled up solid inside the same as the valve is raised from its seat to open position. Another feature resides in the associated means for actuating said closure valve to effect the breaking down and discharging of the walled up solid. These and other features of the invention will be particularly described in the following specification and will be defined in the claims annexed.

In the drawings

Fig. 1 is a side elevation showing so much of a sugar centrifugal and its control mechanism as is necessary to an understanding of the invention equipped with my improved discharging apparatus, the parts being shown in normal operative position while the machine is running.

Fig. 2 is a similar view showing the parts in position when the machine is at rest and the centrifugal load discharged therefrom.

Fig. 3 is a detail view in side elevation showing the air line valve in open position before its actuating dog has been tripped.

Fig. 4 is a plan view showing the rock shaft for controlling the air line valve.

As illustrated in the drawings, the discharge apparatus is shown applied to a well known type of suspended gyratory sugar centrifugal embracing a rotary gyratory suspension shaft 1, a centrifugal basket 2 having a frusto-conical or inclined bottom 2<sup>a</sup> provided with a central discharge opening in which is located a skeleton spider for securing the basket to the basket shaft, according to usual practice.

The operation of the basket and its stopping is controlled by the lever 5 as it is moved to on or to off position as indicated in the drawings.

A conical valve 6 is secured to a slidable sleeve 7 surrounding the basket shaft and is proportioned so that its lower edge seats against the rim or edge of the bottom discharge opening to prevent the escape of the basket contents through said opening. Secured to this vertically slidable basket valve are plural arms or blades 8 which project outwardly toward the wall of the basket and which serve, when the valve is raised, to break down or disrupt the sugar wall so as to facilitate the fall of the sugar through its own weight into and through the bottom of the basket. With disrupting blades of this type forced upward through the sugar wall, grades of sugar, that would be too densely packed to slide through the bottom of the basket of their own weight, will be sufficiently broken down to cause discharge when the basket comes to rest, which otherwise would not take place.

The resistance of the sugar wall to the forcing upward of the blades 8 requires a greater application of power than would be furnished by the actuating weight in my aforesaid earlier application and accordingly provision is made for exerting a strong upward lift on the valve with this object in view.

To this end the valve lifting or actuating lever 9, which, at its inner end, is provided

with anti-friction rollers to engage an annular flange 7<sup>a</sup> on the sleeve 7, is connected at its outer end beyond its fulcrum 10 with a piston rod 11<sup>a</sup> whose piston moves downward in a cylinder 11 under pressure of a fluid medium, preferably compressed air, that is introduced through the supply pipe 15 and a three-way valve 15<sup>a</sup>. At its lower end the piston rod 11<sup>a</sup> moves in a dash pot chamber 12 to whose lower end water from a suitably elevated supply is introduced beneath the dash pot piston 13 by means of the water supply pipe 14. The piston cylinder 11 is pivotally supported at 11<sup>b</sup> to permit it to swing in order to accommodate itself to the different positions of the connection with the lever 9.

The means for controlling the air line valve for actuating the discharge valve of the basket is similar to that shown in my aforesaid earlier application. It comprises a valve actuating lever 16 carrying a weight 16<sup>a</sup> which normally tends to close the valve and cut off the supply of compressed air, or other medium, to the piston cylinder 11.

It will be understood that while the basket is rotating at considerable speed there will be a clutching engagement between the sleeve 7 and the basket shaft 1, which makes it difficult to shift the valve. Consequently the tendency of the valve is to remain closed both on account of its weight and because of counterbalancing pressure of the liquid beneath the piston 13.

When the starting lever 5 has been thrown to rearward or off position to cut off the centrifugal drive and to apply the brake, it actuates an arm 20 and link 21 to which is pivotally mounted a dog 22 arranged to thrust against the cut-off valve lever 16 to open the valve and thereby admit pressure into the cylinder 11 to force the piston 11<sup>c</sup> downward, thereby tending to lift the basket valve 7 to open position as the centrifugal slows down under the retarding action of the braking and of the disrupting plow. As the inner or valve engaging arm of the lever 9 moves upward it raises connecting rod 25, which is connected with the rock shaft 27, by an arm 26 so that a trip finger 28, secured to the rock shaft 27 by its engagement with the underside of the dog 22, tends to lift the rear or free end of the dog out of engagement with the cut-off valve lever 16. This action, however, does not take place until the rock shaft and trip 28 has moved through a substantial arc of rotation by which time the basket valve has been raised to open position giving the blades opportunity to disrupt the sugar wall. Lost motion between the link 21 and the trip finger 28 secured to the rock shaft 27 is secured by providing the rear end of the link 21 with a horizontal slot which receives a lateral pin 28<sup>a</sup> of the trip finger 28.

As soon as the trip finger 28 has moved

to its extreme rearward position to elevate the latch or dog 22 out of engagement with the air line valve lever 16, the valve lever 16 automatically closes the valve 15<sup>a</sup> and in closed position a vent in the three-way valve fitting 15<sup>a</sup> is open to allow the compressed air above the piston 11<sup>c</sup> to escape. The water pressure below the piston 13 serves to restore the basket valve to closed position ready to receive another load. Owing to the lost motion due to the slot and pin engagement between the trip 28 and the link 21, this action can take place while the starting lever is in rear or off position.

When the centrifugal is started by throwing forward the starting lever 5, the basket valve would necessarily be lowered if it had not already been lowered, as previously described, because in the raised position of the basket valve the trip finger 28 would have its pin engaged with the rear end of the slot in link 21 so that when the starting lever is moved forward the trigger and the rock shaft must necessarily move forward also, if they had not previously done so, as will be apparent from an inspection of Fig. 2. In other words, the starting lever is so interlocked or interconnected with the basket valve that the machine cannot be started when the valve is in open or raised position. On the other hand, when the starting lever is locked in advanced or on position the accidental cessation of driving, whether by the breakage of a belt or the interruption of current to a driving motor in either the belt driven or the electrically driven type of machine, there will be no dumping of the load because the starting lever, locked in its advanced position, will prevent the opening of the cut-off valve as well as the opening of the basket valve, whether the machine is entirely hand controlled or whether it be an automatically controlled centrifugal in which the centrifugal is automatically stopped after the complete performance of its prescribed cycle of operations. It will therefore be seen that the premature dumping of partly purified sugar into the conveyor that is used to conduct the purified sugar to the granulator is absolutely prevented in either the hand controlled or the automatically controlled type of centrifugal, with consequent avoidance of the injurious consequences resulting from such mishap.

Furthermore, by reason of the sugar disrupting blades the conical bottom self-discharging basket may be used for white sugars as well as brown sugar so as to permit automatic discharging of both kinds of sugar. In case this attachment be applied to the automatically controlled machine, such as shown in my pending application soon to be issued as Patent No. 1,719,132, the only work required of the operator would be the starting and loading of the machine.

While in the present form of the invention I have shown the valve actuating means in the form of a pressure operated piston that is energized through the drive controlling means of the centrifugal, it will be understood that other suitable actuating means coordinated with the drive control may be employed for this purpose.

What I claim is:

1. In a centrifugal, the combination with a centrifugal basket having a frusto-conical bottom with a central discharge opening, a gyratory basket suspending shaft, a slidable bottom closing valve mounted on said shaft, means for raising said valve from the bottom, and means secured to the valve to disrupt the walled up material when the valve is raised.
2. In a gyratory centrifugal provided with brake setting mechanism, the combination with a suspended gyratory basket shaft, a basket secured thereto and having a discharge opening in its bottom, a closure valve for said opening slidably mounted on the shaft, means projecting from said valve for disrupting the walled up solid inside the basket when the valve is raised, and valve lifting means interconnected with the brake setting means whereby when the brake is set the valve is lifted and the solid is discharged.
3. The combination with a gyratory centrifugal comprising a basket shaft, basket, and drive controlling means, of a bottom closing valve mounted inside the basket, means for raising the valve, said raising means being cooperatively associated with the drive control to cause the raising of the valve when the centrifugal is stopped, and means secured to the valve to disrupt the walled up solid in the basket when the valve is raised.
4. In a centrifugal, the combination with a gyratory basket suspending shaft and its basket having an inclined bottom provided with a central discharge opening; of a bottom closing valve slidably mounted on the basket, shaft and valve raising means embracing a pressure operated piston operatively connected with the valve to raise the valve from the bottom.
5. The combination with a suspended centrifugal, whose basket is provided with a bottom discharge opening, of a valve slidably mounted on the suspension shaft of the centrifugal; normally closing said opening, and valve raising means embracing, a pivoted lever, a pressure operated piston operatively connected with the lever to raise the valve from its seat to open position for the discharge of the material through the bottom discharge opening.
6. The combination with a suspended centrifugal, whose basket is provided with a central discharge opening in its bottom and having drive controlling means, of a valve for normally closing said discharge opening, a pressure actuated piston connected

with said valve to lift it from its seat by the application of a fluid pressure medium, and means coordinated with the centrifugal drive control for applying pressure to said piston to lift the valve as the centrifugal speed is reduced.

7. The combination with a suspended centrifugal having a basket provided with a central discharge opening and having drive controlling means, of a valve normally closing said opening when the centrifugal is operating, means secured to the valve for disrupting the walled up material inside the basket, and means coordinated with the centrifugal drive control to lift the valve to open position and disrupt the walled up material, thereby facilitating discharge of the material through the basket bottom.

8. The combination with a suspended centrifugal and its drive controlling means, the basket of said centrifugal being provided with a central discharge opening in its bottom, of means for lifting said valve to open position to permit the discharge of material, said lifting means being energized through the action of the drive controlling means when the latter is moved to non-driving position.

9. The combination with a suspended centrifugal and its driving control means, the basket of said centrifugal being provided with a central discharge opening in its bottom, of a valve normally closing said opening, valve actuating means coordinated with the centrifugal drive control to lift said valve to open position after the drive control has moved to centrifugal stopping position and to insure maintenance of said valve in closed position while the drive control is in driving position.

10. The combination with a gyratory centrifugal provided with driving and with braking means and with means for controlling the driving and the braking means, the basket of the centrifugal being provided with a central discharge opening in its bottom, of a discharger means for disrupting the solid material walled up inside the basket to facilitate its discharge through said bottom opening embracing a sleeve slidably mounted on the centrifugal shaft, disrupting blades carried thereby and vertically movable therewith in the basket, power-actuated means for lifting said sleeve with its blades to disrupt the walled up material as the blades are moved toward the top of the basket, means coordinated with the brake control means to cause the lifting of the sleeve when the brake is applied and thereby cause the discharging of the material as the basket slows down.

11. The combination with a gyratory centrifugal provided with driving and with braking means and means for controlling the driving and the braking means, the cen-

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trifugal basket being provided with a central discharge opening in its bottom, of a discharging plow mounted inside the basket and rotatable therewith, power-actuated  
5 plow for lifting said discharger means toward the top of the basket to disrupt the walled up sugar and cause the discharge of the solid contents through the bottom, said  
10 lifting means being controlled by the brake controlling means to cause the lifting of the discharging plow after the brake is applied.

In witness whereof, I have subscribed the above specification.

EUGENE ROBERTS.

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