(No Model.)

D. M. WESTON.

CENTRIFUGAL MACHINE.

No. 302,612. Patented July 29, 1884.

Fig. 1.

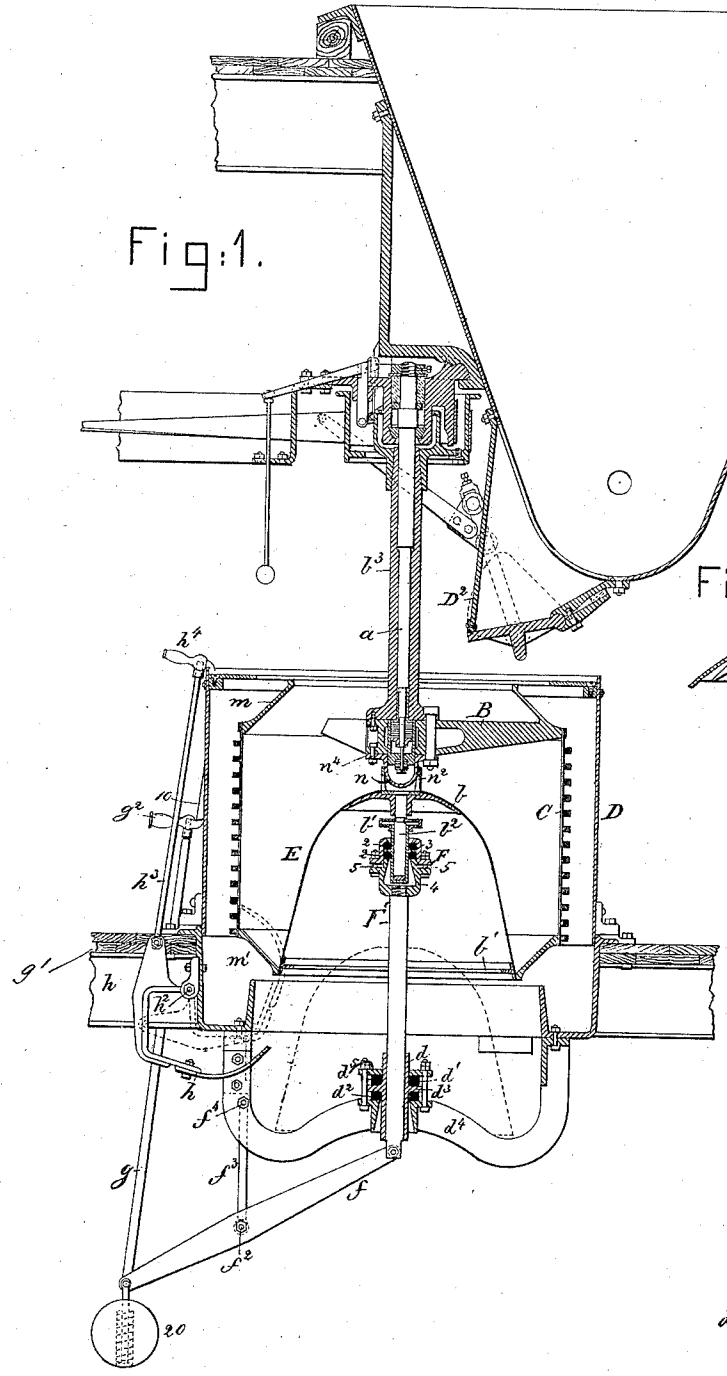
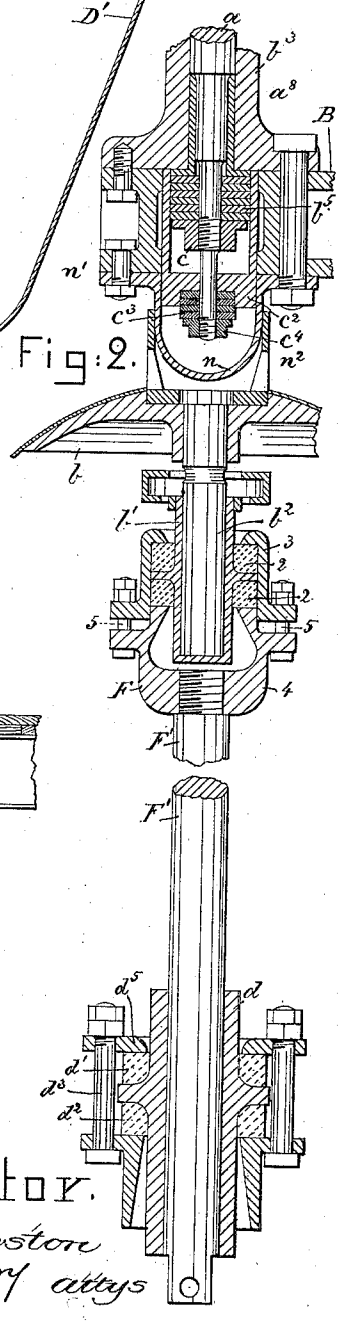


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

DAVID M. WESTON, OF BOSTON, MASSACHUSETTS.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 302,612, dated July 29, 1884.

Application filed February 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID M. WESTON, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Centrifugal Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to that class of centrifugal machines in which the reticulated cylinder or basket is suspended from above, and the unobstructed lower end of the flange thereof is closed by a vertically-movable valve.

Patent of the United States No. 275,875, granted to me April 17, 1883, shows a vertically-movable valve; but the same is made to rise and fall within the cylinder and to descend or drop down to close the lower end of the cylinder by the weight of material upon it, or by slight downward pressure of the hand of the attendant thereon or on the sleeve of the valve. An application filed by me October 8, 1883, shows a vertically-movable valve which always remains within and rotates with the cylinder, and is moved by a lever located below the lower end of the cylinder, and the valve, when moved to open the lower end of the cylinder, has to be lifted thereon, where it remains while the contents of the cylinder or the sugar wall is being discharged, and while the cylinder has its lower end uncovered or opened to permit its inner wall to be scraped down or cleaned by the attendant, as is frequently necessary. As the said valve always remains within the cylinder, there must be left between its edge and the inner wall of the cylinder sufficient space to permit the cylinder to be readily scraped and cleaned by the operator, and hence the valve is necessarily made of comparatively small diameter, and, as the said valve is lowered to close the lower end of the cylinder, it follows that the center of the cylinder is least obstructed by the valve when the machine is first started in motion to separate its contents and form a wall of material against the inner side of the cylinder by centrifugal action. When the valve is lifted within the cylinder to uncover its lower end, the lower flange of the cylinder must be considerably wider than the upper flange, thus making it much more laborious to remove the contents of the cylinder. I have by experiment discovered that the lower flange of the cylinder may be made narrower than the upper flange, provided the valve, when moved to uncover the lower end of the cylinder, be lowered or moved bodily downward away from the said lower end, and so, also, I have discovered that by moving the valve from the lower end of the cylinder outward, the valve may be made of larger diameter and that the entire inner space of the cylinder may be left entirely free or unobstructed when the valve is open for the discharge of the sugar wall or other contents of the cylinder, and this method of operating the valve also enables the valve to be made of such length and diameter, or of such shape and size, as to occupy a very considerable portion of the center space of the cylinder while the same is at rest and receiving its charge, and while the latter is being separated or thrown centrifugally to form a wall against the inner side of the cylinder, which is of very material importance, for thereby the sirup-like contents of the cylinder, even before the machine is started, is held high up against the inner wall of the cylinder, so that after the machine is started the sugar wall may be more easily and quickly formed upon the inner wall of the cylinder, and be formed uniformly to a higher level than heretofore, and the contents of the cylinder or the sugar wall, when to be discharged, is found to be more evenly distributed than in the machine herein referred to, and also by holding up the sirup-like material by the large central valve, so constructed and operated with relation to the cylinder as to occupy greatest space in the cylinder when the valve is acting to close the cylinder, and leaving the interior of the cylinder entirely free from the valve when the valve is opened for the discharge of its contents, it is practicable to make the cylinder very much longer than heretofore and to lay a more perfect wall over its entire inner face, and at the same time the machine may be started and moved to its maximum speed more slowly and safely than heretofore, and consequently with a less expenditure of power and less strain upon the belting and other parts. In this my improved machine the weight of the valve is not added to that of the running parts of the cylinder,

and when the sugar wall is being finished the valve does not even rotate with the cylinder. The valve has an independent pintle of its own, which is fitted to a suitable foot step or bearing located upon a spindle or slide-rod, which is maintained in vertical position by means of a suitable stationary guide, the mechanism for operating the said valve being located below, and being moved by devices outside of the cylinder.

Figure 1 represents in vertical section a centrifugal machine embodying my improvements, and Fig. 2 is an enlarged vertical section of the spindle and part of the valve and its supporting devices.

The spindle *a*, its surrounding hollow shaft b^3, and the parts marked *c*, c^2, c^3, c^4, a^3, and b^5, employed between the spindle *a* and hollow shaft b^3, in order that the spindle may sustain the entire weight of the said shaft, the spider B, the cylinder C, attached to it, and its contents, are all substantially as in my United States Patent No. 275,874, dated April 17, 1883.

The yielding bearings for the spindle, the means for revolving the hollow shaft, the stationary curb D, the mixer D′, and sugar-spout D^2 are and may be all as usual, and so need not be herein further described.

The cylinder C in practice will be made, as usual, of perforated sheet metal, and will have an upper flange, *m*, and a lower flange, *m′;* but, as herein shown, the lower is narrower than the upper flange, which thus enables the contents of the cylinder or the sugar wall to be more easily removed through the central unobstructed portion of the bottom flange than were the said flange wider.

The spider B supports the cylinder from its interior between its open ends substantially as in my application referred to. The lower end of the spider B is provided with a valve-centering device, *n*, connected therewith by a suitable bolt or bolts, *n′*. The valve E, made, as herein shown, of cone shape, is of sufficient diameter and length to fill up a very considerable portion of the interior of the cylinder when its lower end is closed by the said valve, the latter, when it acts to close the cylinder, occupying a greater space within the same than when the cylinder is open.

The valve E is composed, preferably, of a light sheet-metal shell of copper, shaped to resemble part of a dome, and is connected at its small or upper end with a thicker metallic top piece, *b*, and at its large or lower end with a bottom piece or annulus, *b′*, the latter and the lower end of the valve-shell co-operating with the inner edge of the lower flange, *m′*, to close the cylinder at the bottom. This valve E has an attached pintle, b^2, which is inserted within a bolster, *b′*, or step-piece held in a yielding manner in a case, F, attached to a vertically-movable rod or standard, F′. The yielding material which it is preferred to use consists of two india-rubber rings, 2 2, placed each side of a suitable flange on the outer side of the said bolster or step; and the case F is composed of two parts, 3 4, suitably joined together by bolts 5, the part 4 being attached to the rod F′ by a screw-thread. The top piece, *b*, has an attached cap or socket, n^2, which co-operates with the valve-centering device *n*, as shown in full lines, Fig. 1, to center the valve when the same is lifted from below into position to close the lower end of the cylinder C. The rod F′ is extended through a flanged bolster, *d*, or guide provided externally with two india-rubber rings or yielding washers, *d′* d^2, the one, *d′*, being acted upon by a metal washer, d^5, held down by bolts d^3, extended through the brace or cross-arm d^4, bolted at its end to the curb D. The lower end of the rod F′ is jointed or pivoted to a lever or valve-mover, *f*, having its fulcrum f^2 upon a link, f^3, pivoted at its upper end to the cross-bar d^4 by a pivot or bolt, f^4, so that the said valve-mover may move in a right line. The outer end of the valve-mover *f* has connected with it a rod, *g*, which is extended up through the floor *g′*, and provided with a combined handle and dog, g^2, adapted to engage a lug or projection, 10, of the curb, to keep the valve up to close the lower end of and partially fill the interior of the cylinder, as shown in full lines, that being the position of the said valve when the machine is receiving the sirup-like mass or charge from the mixer, and for a short time after the cylinder has been started.

It will be readily seen and understood that a valve shaped as shown, when elevated to close the cylinder preparatory to partially filling and starting the same in motion, will act to displace much of the material from the center of the cylinder, and will cause the material to stand higher up against the inner wall of the cylinder than were the bottom of the cylinder closed by means of a valve of the shape shown in the other machines herein referred to, so that the sugar wall will be forced up and formed more readily than heretofore, and will be sooner spread over the inner wall of the cylinder, and will be more uniformly spread thereon, which is a matter of very great importance; and this more uniform distribution of material also enables the cylinder to be made very considerably longer than heretofore, thus greatly increasing the capacity of the machine.

When the machine is in motion, the valve rotates with it; but as the weight of the latter is not sustained by the cylinder, but by the step *b′* below it, the friction exerted between the spindle, the hollow shaft, and their connecting devices is very much diminished.

The plow *h*—a curved piece of metal pivoted at h^2 upon the curb D—has an operating-rod, h^3, extended through the floor *g′*, and is provided with a suitable handle to engage the upper end of the curb D, to thus keep the plow normally in its full-line position.

The valve will occupy its full-line position when the material is fed into the cylinder from the mixer D′, and it will remain in such

position for a sufficient time after the machine has been started to enable a wall to be formed from the said material against the interior of the cylinder by centrifugal action, and the wall having been formed, the handle part g^2 will be withdrawn from its holding-projection 10, thus liberating the valve and permitting it to descend by its own weight into its dotted-line position, after which the rotation of the machine will be continued, in the case of sugar, until the sugar wall is finished to the required dryness, when the machine will be stopped for the removal of its contents. In this condition—with the valve lowered and the lower end of the cylinder uncovered—the interior of the cylinder below the spider will be entirely unobstructed, except by the narrow flange m', and the attendant (the speed of the cylinder having been first partially reduced) will release the catch h^4 and turn the plow h up from its full into its dotted line position over the edge of the flange and into the interior of the cylinder, where the plow will be held to act, as usual, upon and cut away the lower part of the sugar wall, which done, the said wall will usually fall as soon as the machine has been fully stopped, the plow by its action upon the sugar wall assisting in stopping the machine.

The inner wall of the cylinder has frequently to be scraped down or cleaned by hand-work and with the valve open, as in dotted-line position, and outside of and below the cylinder the interior of the latter is entirely unobstructed for free access by the attendant.

The weight of the valve E is substantially counterbalanced by the weight 20.

I claim—

1. In a centrifugal machine, a suspended rotating cylinder having an open bottom forming the discharge, combined with a bottom-closing valve adapted to move outwardly from the cylinder to open or uncover its lower end and leave the said cylinder unobstructed for the discharge of its contents, substantially as described.

2. In a centrifugal machine, the suspended cylinder having an open bottom constituting the discharge, combined with a vertically-movable bottom-closing valve adapted to be moved up into the cylinder from below the same, and to partially fill the central space of the cylinder only when closed, to assist in throwing the charge up against the inner side of the cylinder toward its upper flange, the said valve when moved to uncover the lower end of the cylinder being withdrawn from the said central part of the cylinder, leaving its interior unobstructed, substantially as described.

3. In a centrifugal machine, the combination, with the cylinder, of a valve to close its lower end, the said valve having a pintle fitted into and adapted to rotate on a step placed to support the valve and independent of the cylinder, substantially as described.

4. In a centrifugal machine, a rotating suspended cylinder and a valve adapted to be lifted up into and to be drawn down or out from the said cylinder, combined with a vertically-movable stem or rod, and a guide for the same, to insure its movement in a line coincident with the center line of the spindle which supports the cylinder, substantially as described.

5. In a centrifugal machine, a suspended rotary cylinder having an open bottom constituting the discharge, and a vertically-movable valve to be moved up into the same to close the lower end of the cylinder, combined with a stem or rod, and with a valve-mover located below the lower end of the cylinder, substantially as described.

6. In a centrifugal machine, a suspended rotating cylinder, and a vertically-movable valve, and means to lift it from below into and to close the lower end of the cylinder, combined with a plow adapted to be turned up from below about and over the edge of the lower flange to attack the sugar wall, substantially as described.

7. In a centrifugal machine, a suspended rotating cylinder provided below its spider with a valve-centering device, combined with a vertically-movable valve provided with a cap to engage the said centering device, and with means outside to close its lower end, the valve being retracted or moved outward from the lower end of the said cylinder to open its lower end and for the discharge of the contents of the said cylinder, substantially as and for the purpose described.

8. In a centrifugal machine, a suspended rotating cylinder and a valve to close its lower end, provided with a pintle, combined with a step for the said pintle, and an elastic packing external to and to permit the said step to move in the case which supports it, substantially as described.

9. In a centrifugal machine, a suspended rotating cylinder, a vertically-movable bottom-closing valve having a pintle supported in a step independently of the cylinder of the machine, combined with a stem or rod to support the said step, and a yielding bolster, d, to guide the said stem or rod, and with a valve-moving device located outside of and below the said cylinder, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID M. WESTON.

Witnesses:

G. W. GREGORY,

B. J. NOYES.