No. 610,983. Patented Sept. 20, 1898.

H. CHAPMAN.

CENTRIFUGAL FILTER.

(Application filed May 29, 1897.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 2.

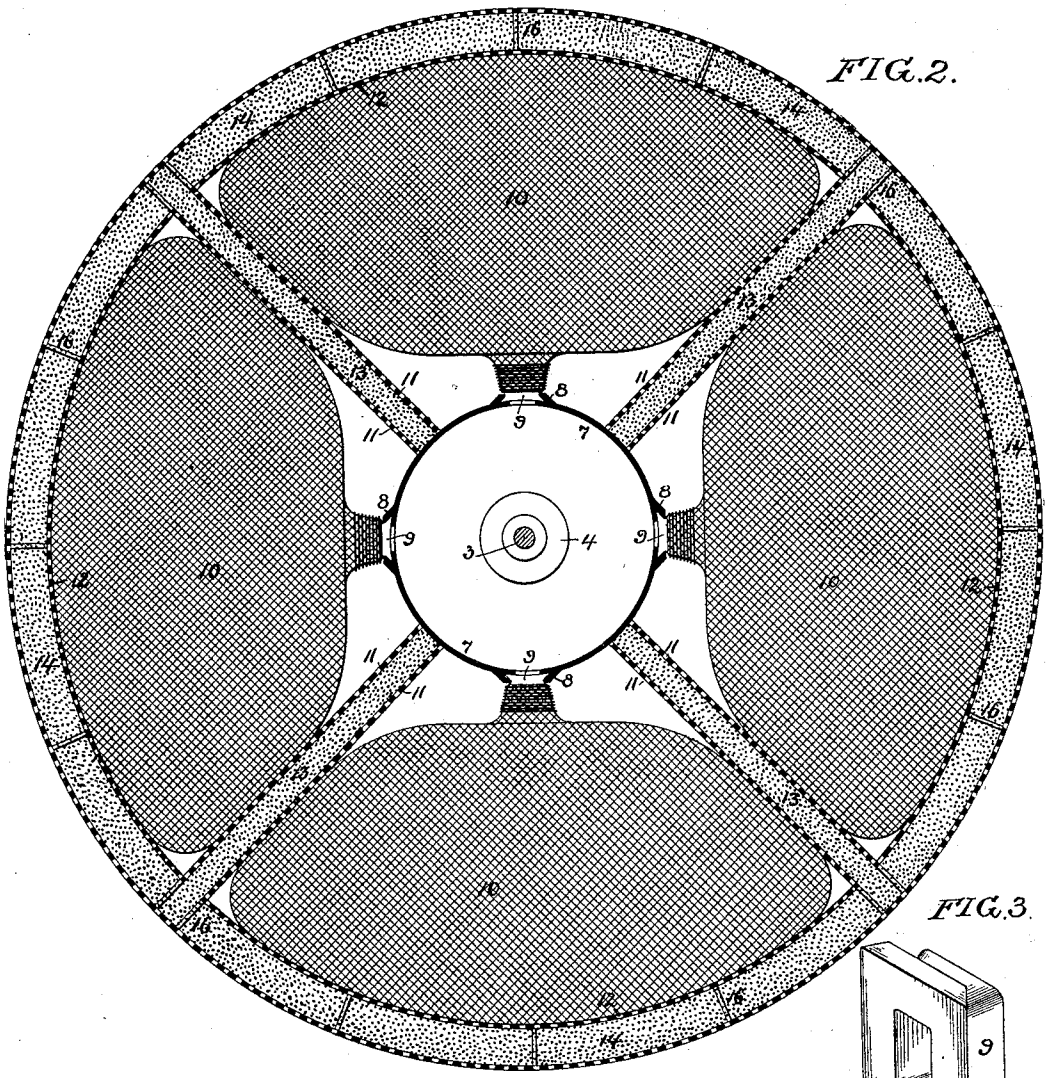
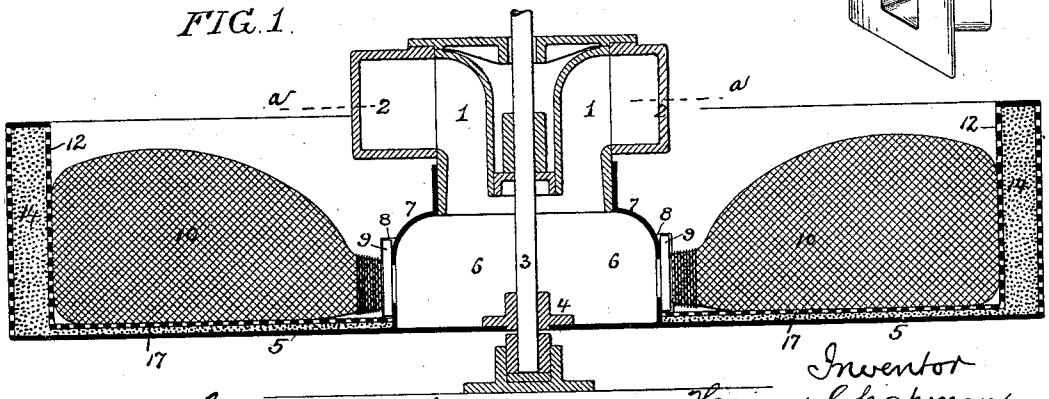


FIG. 3.

FIG. 1.



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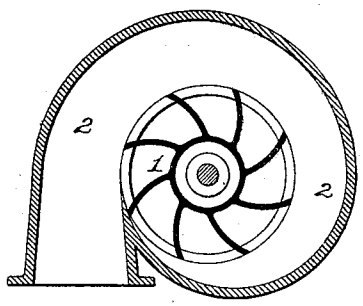
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(No Model.) 2 Sheets—Sheet 2.

FIG. 4.



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UNITED STATES PATENT OFFICE.

HENRY CHAPMAN, OF PHILADELPHIA, PENNSYLVANIA.

CENTRIFUGAL FILTER.

SPECIFICATION forming part of Letters Patent No. 610,983, dated September 20, 1898.

Application filed May 29, 1897. Serial No. 638,712. (No model.)

To all whom it may concern:

Be it known that I, HENRY CHAPMAN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Centrifugal Machines, of which the following is a specification.

The object of my invention is to so construct a centrifugal machine that it may be filled and emptied more expeditiously than usual, may be caused to filter the separated liquid, may be adapted to handle a largely-increased amount of material at each operation as compared with ordinary centrifugal machines, and may be used for filling bags or other receptacles with granular or other material. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a centrifugal machine constructed in accordance with my invention. Fig. 2 is a sectional plan view of the same. Fig. 3 is a detached perspective view of part of the machine, and Fig. 4 is a sectional plan view on the line *a a*, Fig. 1.

In Fig. 1 a turbine water-wheel of any ordinary construction having a downward discharge is represented at 1, 2 representing the gate-box surrounding said wheel, and 3 the rotating shaft of the wheel, which is mounted at the lower end in a step-bearing of any available character.

To a flange or collar 4 is secured the bottom of the drum or basket 5 of a centrifugal machine, said drum or basket having a central chamber 6 with an inclosing shell 7, which is connected to the depending portion of the water-wheel 1, so that the drum 5 is driven not only by connection with the shaft of the water-wheel, but also by direct connection with the wheel itself, the chamber 6 receiving the discharge from the wheel.

On the outside of the casing 7 are formed sockets 8, to which are adapted nozzles 9, secured to the necks of bags or like receptacles 10, composed of textile material or flexible or porous material of any desired character, the nozzles 9 having dovetailed or undercut edges and the sockets 8 being similarly shaped, so that while the nozzles are radially confined to the sockets they can be readily inserted into or withdrawn from said sockets in a vertical direction.

Each of the bags 10 is contained in a segmental chamber of the drum 5, said chamber being bounded laterally by radial walls 11 and outwardly by a segmental wall 12, the inner boundary of each of these segmental chambers being formed by part of the casing 7.

The walls 11 and 12 are perforated, and the walls 11 of each chamber are separated from the walls of the adjoining chambers, so as to form a space 13 for the reception of filtering material, and there is also a space 14, likewise filled with filtering material, between the outer walls 12 of the segmental chambers and the vertical wall of the drum 5, suitable braces 16 being interposed between said walls, so as to properly strengthen and support the walls 12.

The machine shown in the drawings is intended for filtering water or other liquid which has first been used as motive fluid for driving the centrifugal machine, the water or other fluid passing through and imparting rotative movement to the turbine wheel 1 and being then discharged into the chamber 6, from which it is thrown by centrifugal force into the bags 10, through which, owing to the porous character of the material of which these bags are composed, it readily escapes into the segmental chambers containing the bags, solid impurities, however, being caught and retained within the bags. The liquid which escapes from the bags finds its way through the perforated walls 11 and 12 into the chambers 13 and 14, containing the filtering material, and after passing through the latter it is discharged through the perforated walls of the centrifugal drum into any suitable receptacle placed to receive it. The solid matter is deposited first in the outer portions of the bags 10—that is to say, in the portions adjacent to the walls 12 of the segmental chambers in which the bags are contained—the centrifugal force tending to constantly carry the solid matter to the outer portions of the bags, which thus become slowly filled with said solid matter until the bags are almost entirely filled. The area of discharge for the liquid is thus gradually diminished; but

owing to the porosity of the material of which the bags are composed a very limited area of the same will suffice for the escape of liquid as rapidly as it can find its way through the perforated walls and filtering material of the machine. Hence the bags can be almost completely filled with the solid matter before it becomes necessary to stop the machine in order to remove the bags and insert empty bags in their places, the detaching of the filled bags and the application of the empty ones being readily effected by reason of the slip connection between the bags and the casing 7 of the machine. The separating-chambers of the centrifugal drum are by preference provided also with perforated bottoms 17, between which and the bottom of the drum 5 space is afforded for the reception of filtering material, so that the bags 10 can discharge liquid therefrom at top, bottom, both sides, and outer end, ample area of discharge being thus afforded.

It will therefore be seen that my improved centrifugal machine can be run until the solid material removed from the liquid forms a mass which almost completely fills the drum of the machine, thereby greatly increasing the capacity of the machine as compared with one of ordinary construction in which only a comparatively thin layer of solid material can be deposited against the perforated or wire screen of the machine before clogging the same so as to prevent further passage of liquid therethrough. Ordinarily, moreover, the contents of the basket of a centrifugal machine after the liquid has been discharged therefrom have to be removed by scraping or shoveling, whereas in my improved machine the separated matters are contained in receptacles, and large quantities of the same can therefore be removed in bulk, each bag being lifted from the machine by hand in case of small machines, or being hooked onto a crane or conveyer in machines of large size, said crane or conveyer serving to remove the bags and deposit them at any desired point, where they may be emptied and cleaned, so as to be again ready for use, or my invention may be used for the packing of granular material in bags, which when full may be removed from the centrifugal machine and carried by the conveyer to a storehouse or receptacle, where they are deposited for storage or shipment.

It will therefore be evident that although I have illustrated my invention as applied to the separation of solid matter from water which has first been used to operate a water-wheel whereby the centrifugal machine is driven said invention is not limited to such use, but is available for the separation of solid matter from liquid matter of any character or for packing in bags by centrifugal force any material which will flow.

I have shown in the drawings a machine having four chambers and four bags; but it will be evident that a greater or less number than this may be employed in accordance with the circumstances under which the apparatus is intended to be used.

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

1. A centrifugal machine having a central structure which first receives the material to be acted upon, bags contained within the drum of the machine, and connections between the mouths of said bags and said central structure, substantially as specified.

2. A centrifugal machine having a central structure which first receives the material to be acted upon, bags contained within the drum of the machine, and detachable connections between the mouths of said bags and the said central structure, substantially as specified.

3. The combination in a centrifugal machine, of a separating-drum having a central structure which first receives the material to be acted upon and is provided with external undercut sockets, and bags contained within said separating-drum and having nozzles fitted to said undercut sockets on the central structure of the same, substantially as specified.

4. A centrifugal machine having a separating-drum with central structure which first receives the material to be acted upon, perforated walls whereby said drum is divided into a series of independent chambers, a series of bags each adapted to one of said chambers of the separating-drum, and detachable connections between the mouths of said bags and said central structure of the drum, substantially as specified.

5. A centrifugal machine having a separating-drum with a central structure which first receives the material to be acted upon, perforated walls whereby said drum is divided into a series of independent chambers, a series of bags each adapted to one of said chambers of the separating-drum, and connections between the mouths of said bags and said central structure of the drum, substantially as specified.

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

HENRY CHAPMAN.

Witnesses:
WILL. A. BARR,
JOS. H. KLEIN.