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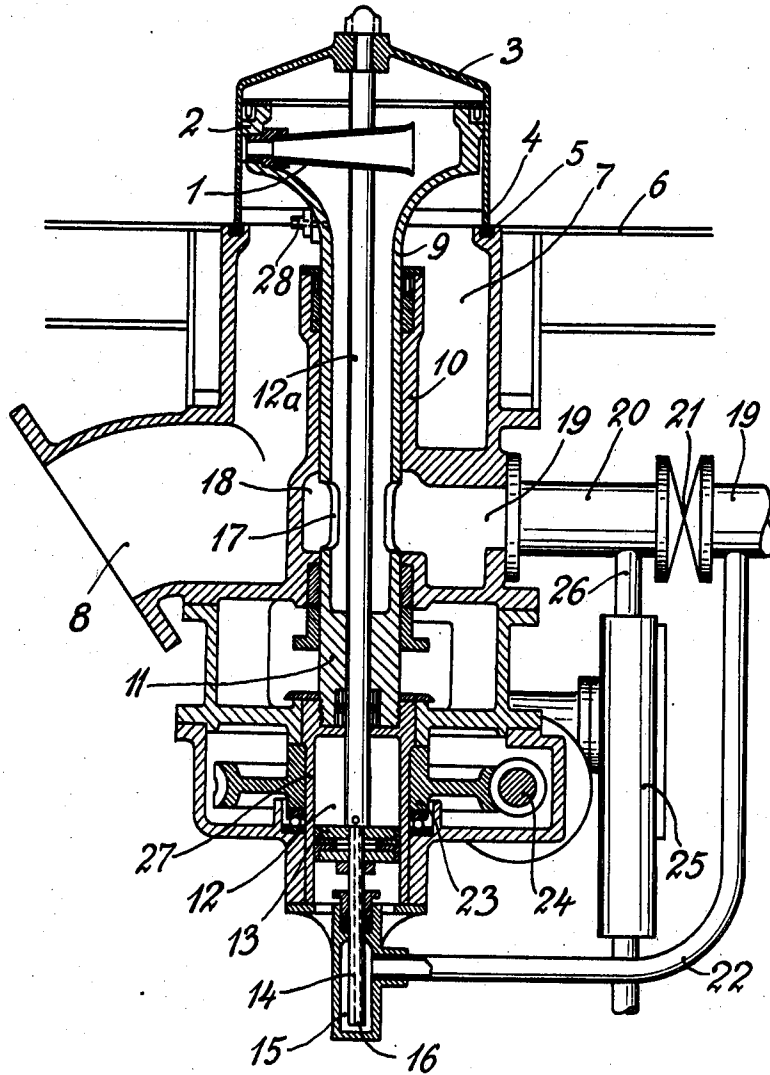
EMPTYING APPARATUS FOR DIFFUSERS, PULP BINS, AND THE LIKE

FOR THE MANUFACTURE OF CELLULOSE AND PAPER

Filed Oct. 27, 1937

2 Sheets-Sheet 1

Fig. 1.



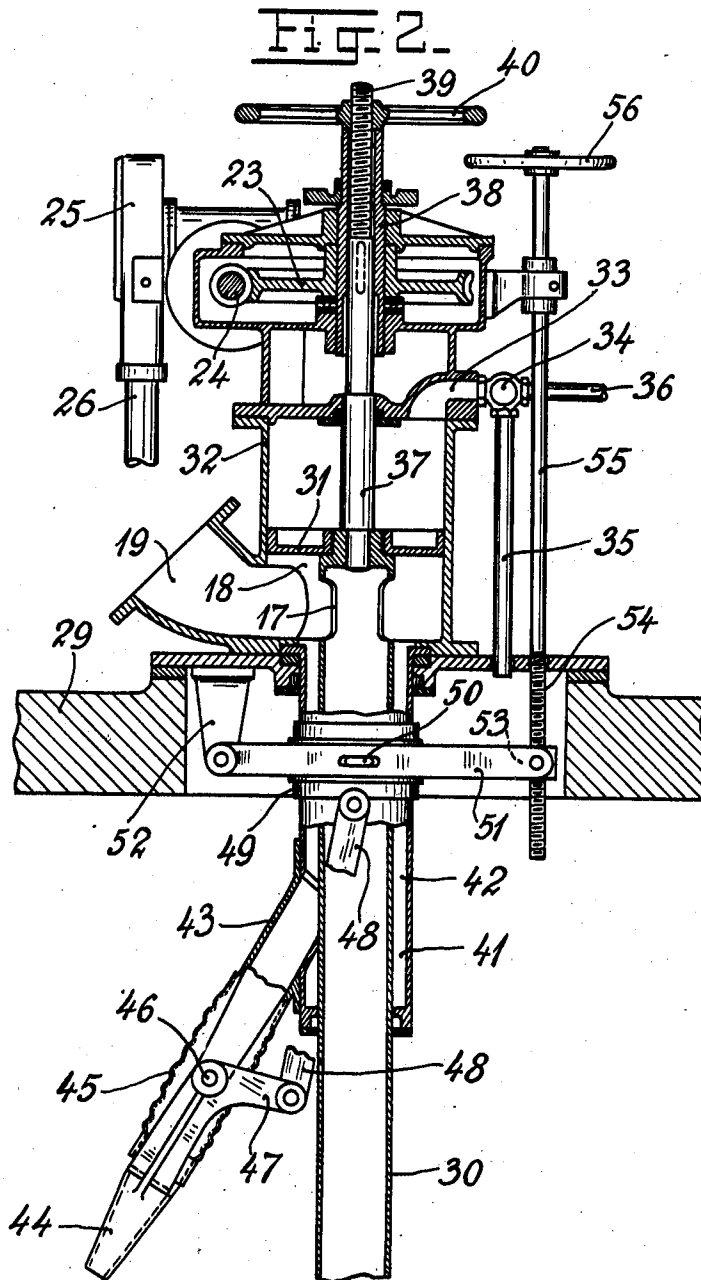
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2 Sheets-Sheet 2



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EMPTYING APPARATUS FOR DIFFUSERS,
PULP BINS, AND THE LIKE FOR THE MAN-
UFACTURE OF CELLULOSE AND PAPER

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Application October 27, 1937, Serial No. 171,396
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8 Claims. (Cl. 92-7)

This invention relates to an emptying apparatus intended to be used in connection with diffusers, pulp bins and the like in the manufacture of cellulose and paper. It was formerly known in such apparatus to use movable rinsing nozzles, some of which rinse out pulp in the container in question at its bottom immediately above a bottom valve which serves to carry away the pulp diluted by water. According to the present invention the rinsing water acts simultaneously to open the outlet for the pulp to be rinsed out, preferably in such manner that the rinsing water acts upon a piston which controls the pulp outlet. This piston can also be adapted to maintain the rinsing nozzles in a closed condition until the outlet for the pulp has been opened to a suitable degree. The outlet valve is shaped preferably as a bell which may surround a piston provided with one or more rinsing nozzles, the outlet openings of which are arranged in the periphery of the piston. The bell is connected with a piston in a cylinder for water under pressure, so that this water in the cylinder has a tendency to move the bell into closed position. The cylinder has a constant connection with the water under pressure, for instance through a conduit in front of a stop cock which controls the supply of the water under pressure to the bell opening. The diameter of the piston cylinder is made smaller than the interior diameter of the bell, whereby the opening movement of the bell is effected automatically by the difference between the forces on the bell and on the cylinder piston as soon as a cock in front of the apparatus is opened. The arrangement may be so made that the piston for opening the pulp outlet is connected with a stop device which preferably is in the form of a screw and may maintain the piston in the obtained adjustment even if the piston is leaking.

The invention is illustrated in the enclosed drawings, wherein,

Figure 1 shows a vertical section of one embodiment and

Figure 2 shows a similar section of a second embodiment.

In Figure 1 only one rinsing nozzle 1 is shown, but it will be understood that several nozzles may be used. These nozzles discharge at different points of the circumference of a piston 2 in the interior of a bell 3 which is movable downwards and co-operates with the piston and the lower edge 4 of which operates as a valve in connection with a seat 5 in the bottom 6 of the diffuser or pulp tank, from which the pulp is to be rinsed out and

and the side walls of which extend upwards from the said bottom 6. Bell 3 may be opened or closed all according to requirements. In the bottom 6 of the tank as ordinary outlet 7 is arranged which, when the bell 3 has been lifted, lets out of water or diluted pulp into a side pipe 8, which conveys the pulp away.

The piston 2 is arranged at the upper end of a pipe 9 which is journalled in a sleeve 10 arranged inside the outlet 7 and which pipe extends downwards as indicated at 11, in order to form a guide for a vertically movable bar 12a to the upper end of which the bell 3 is attached. This bar extends downwards through the member 11 and into a piston cylinder 12, wherein it is attached to a piston 13 and is provided below the same with a somewhat thinner extension 14 projecting down into a lower small cylinder 15, and this lower reduced extension 14 is provided with a central bore 16. The bore extends somewhat above the piston 13, and an open connection between the bore 16 and cylinder 15 is established by a transverse bore in bar 12a, thus providing communication between cylinder 15 and 12. The pipe 9 is provided with side openings 17 which are arranged in a housing 18.

The housing 18 is connected with a conduit 20 for water under pressure through opening 19. The conduit is provided with a stop cock 21. On the outside of the stop cock the pipe 20 is, through a smaller pipe 22, in constant connection with the cylinder 15. The member 11 which forms the extension of the pipe 9, is fixedly connected with the wall 27 of the cylinder 12, said wall being provided at the outside with a worm wheel 23. The latter is keyed upon the outside of the cylinder wall 27 and can be put in rotation by means of a worm 24 driven by means of a suitable gearing from a Pelton motor 25. This motor obtains the water under pressure through a pipe 26 from the conduit 20 at the inside of the stop cock 21. The operation is as follows:

When the cock 21 is closed, the water under pressure passes through the pipe 22 to the cylinder 15, and through the channel 16 it has an open access to the cylinder 12 and the piston 13, so that the latter by the pressure is urged downwards and thereby maintains the bell 3 down upon the seat 5, so that the bottom outlet of the container in question is closed. Moreover the motor 25 is not rotating. But when the stop cock 21 is opened, the water under pressure obtains through 20, 19 and 17 access to the interior space of the pipe 9 and acts upon the bell 3 on a considerably larger area than the area of the

piston 13. Consequently the bell 3 is lifted slowly so that it opens the outlet 7 and after the lapse of some time also uncovers the nozzles 1, so that the water under pressure passes through the latter out into the pulp enclosing the bell 3 and dilute the pulp by water, the outlet 7 having now also been opened. When the cock 21 is opened, also the motor 25 is started, so that the wheel 23 together with the cylinder 27 and pipe 9 with the piston 2 and the nozzles 1 are rotating slowly in order to effect a uniform rinsing out of the pulp.

As soon as the cock 21 is closed again, the upwardly directed pressure upon the bell 3 disappears, so that the pressure acting upon the piston 13 will again pull the bell 3 downwards against the seat 5. In order to maintain the seat in a clean condition during the outlet of the pulp, the pipe 9 is provided at a point level with the seat with a small nozzle 28 which constantly passes rinsing water over the seat and thereby maintains it clean. The construction of the emptying apparatus described above is particularly adapted for emptying sulphate cellulose from diffusers.

Figure 2 shows a somewhat altered embodiment which is particularly adapted for use in connection with sulphite cellulose. In this embodiment the apparatus is mounted upon the upper cover 29 of a pulp bin, at the bottom of which an outlet valve is arranged in similar manner as the valve 4, 5 in Figure 1. To raise and lower the valve body a central pipe 30 is used, which pipe extends from the cover just down to the bin bottom. This valve is not shown in the drawing since, per se, it is no part of the present invention. The pipe 30 is provided above the cover 29 with a piston 31 travelling in a cylinder 32. The water under pressure is passed as before to a conduit 19, 18 to the underside of the piston 31 and through openings 17 also to the interior of the pipe 30 in order to be spread out through nozzles immediately above the bottom valve in known manner.

The embodiment here shown does not close the bottom valve automatically, but may of course also be constructed for this purpose in similar manner as shown in Figure 1. The cylinder 32 is provided at its upper part with an outlet 33 passing through a three-way cock 34 and may be connected through the latter with an emptying pipe 35 and also with the conduit 36 for water under pressure.

On the upper side of the piston 31 a bar 37 is attached which passes through the housing of the apparatus and through a sleeve 38. The bar 37 has at the top threads 39 for the threaded hub of a toothed wheel 40. The sleeve 38 is keyed to a worm wheel 23 which through the worm 24 is driven from the Pelton motor 25, so that the pipe 30 and thereby also the bottom valve body with rinsing nozzles are maintained in a slow rotation during the operation of the apparatus.

The pipe 30 is surrounded by a sleeve 41 and may rotate within same. Between the pipe 30 and the sleeve 41 is arranged an annular space 42 which at the upper part is in open connection with the housing 18 and at the lower part is connected through an inclined side pipe 43 with a rinsing nozzle 44 by means of a flexible hose 45. The nozzle is turnable on a pivot 46 and provided with a side arm 47 which through a link 48 is connected with a sleeve 49 movable upon the pipe 41. Through pivot and slot 50 the sleeve may be moved up and down by means of an oscillating lever 51. This lever is at one end

mounted pivotally to a bracket 52 and at the other end provided with a threaded sleeve 53, wherein a screw works forming the lower end of a vertical bar 55 with an upper hand wheel 56.

When water under pressure is not supplied at 19, but only at 36 and when the three-way cock 34 is so adjusted as to connect 33 with 36, the water under pressure will act through 36, 34, 33 upon the upper side of the piston 31 and thereby press the pipe 30 with the bottom valve body downwards, so that the tank is closed. But when the water under pressure is supplied at 19, it acts upon the piston 31 and thereby raises the bottom valve and is simultaneously passed through the pipe 30 to the above-mentioned rinsing nozzles immediately at the bottom of the bin.

Simultaneously the water under pressure is passed through the space 42 to the nozzle 44 which by the hand wheel 56 may be adjusted to the position most suitable for the purpose, so that a complete rinsing out of the pulp from the bin may be obtained. In order to enable the piston 31 to be pressed upwards without resistance, the cock 34 may be so adjusted that the top of the cylinder 32 is connected through 33 and 34 with an emptying pipe 35. However, nothing prevents the stop cock, which is presumed to be mounted before the inlet 19 in a similar manner as the cock 21 in Figure 1, from being in mechanical connection with the three-way cock 34, so that it is moved into a position corresponding to the open and closed position of the stop cock. The pipe 36 may also be connected to the pipe for water under pressure for supplying such water in front of the stop cock in a similar manner as the pipe 22 in Figure 1. In such case the apparatus would operate quite automatically.

In the shown embodiment which is not intended to operate automatically, a hand wheel 40 is so used that, when the piston 31 has been pressed up into its upper position and has opened the bottom valve, whereby the wheel 40 has been raised correspondingly somewhat above the top of the sleeve 38, the hand wheel 40 is screwed down, so that the wheel hub engages the sleeve 38. Thereby the piston 31 will remain safely in top position with the bottom valve in an open position, even if a leakage should occur past the piston. This arrangement is also advantageous because no pressure need be used to maintain the valve in an open position. When the valve then is to be closed, it is only necessary to close the valve controlling the water under pressure at 19, and then by rotating the wheel 40 to lower the pipe 30 with the valve body.

I claim:

1. A discharge device for diffusers and the like in the manufacture of cellulose and paper, comprising a casing having an outlet, a bell forming a valve controlling the outlet, means to supply water under pressure to the inside of the bell to actuate the bell for opening the outlet, a pivotal rinsing nozzle having an inlet connected with the water under pressure supplied to the bell and having an outlet controlled by the valve so as to be opened by the same during the valve lifting motion.

2. A discharge device for diffusers and the like in the manufacture of cellulose and paper, comprising a casing having an outlet, a bell forming a valve controlling the outlet, means to supply water under pressure to the inside of the bell to actuate the bell for opening the outlet, a piston surrounded by the bell so as to close the interior

5 of the bell top from the bell edges and operating
as a valve body, a rinsing nozzle mounted in the
piston and having an inlet connected with the
water under pressure supplied to the interior of
the bell and having an outlet controlled by the
bell so as to be opened by the same during the
bell lifting motion.

10 3. A discharge device for diffusers and the like
in the manufacture of cellulose and paper, com-
prising a casing having an outlet, a bell forming
a valve controlling the outlet, means to supply
water under pressure to the inside of the bell to
actuate the bell for opening the outlet, a piston
surrounded by the bell so as to close the interior
15 of the bell top from the bell edges and operating
as a valve body, a rinsing nozzle mounted in the
piston and having an inlet connected with the
water under pressure supplied to the interior of
the bell and having an outlet at the periphery
20 of the piston controlled by the bell so as to be
opened by the bell during the bell lifting motion.

4. In a discharge device according to claim 3,
means for moving the bell to closed position,
including a cylinder for water under pressure, a
25 piston in said cylinder connected with the bell
so as to tend to move the bell to valve closing
piston by the water under pressure acting on
said piston.

5. In a discharge device according to claim 3,
and means for moving said bell to closed posi-
tion, including a cylinder, means for constantly
connecting said cylinder with water under pres-
sure, a piston in said cylinder connected with the
5 bell so as to tend to move the bell to valve closing
piston by the water under pressure acting on
said piston, said piston having a smaller diameter
than the bell, and closeable means to put the
bell top interior in connection with the said water
10 supply.

6. In a discharge device according to claim 2,
means for rotating the bell piston with the
rinsing nozzle slowly about the piston axis.

7. In a discharge device according to claim 2, 15
a motor operable by water under pressure, a gear
inserted between the motor shaft and the bell
piston to rotate same with the rinsing nozzle slow-
ly about the axis of the piston.

8. In a discharge device according to claim 1, 20
a seat for the valve, and a rotating rinsing noz-
zle directed against said valve seat so that the
water jet from the nozzle outlet sweeps and
thereby rinses said valve seat.

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