

C. F. POWERS.
MACHINE FOR THICKENING PAPER PULP.
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1,046,108.

Patented Dec. 3, 1912.

Fig. 1,

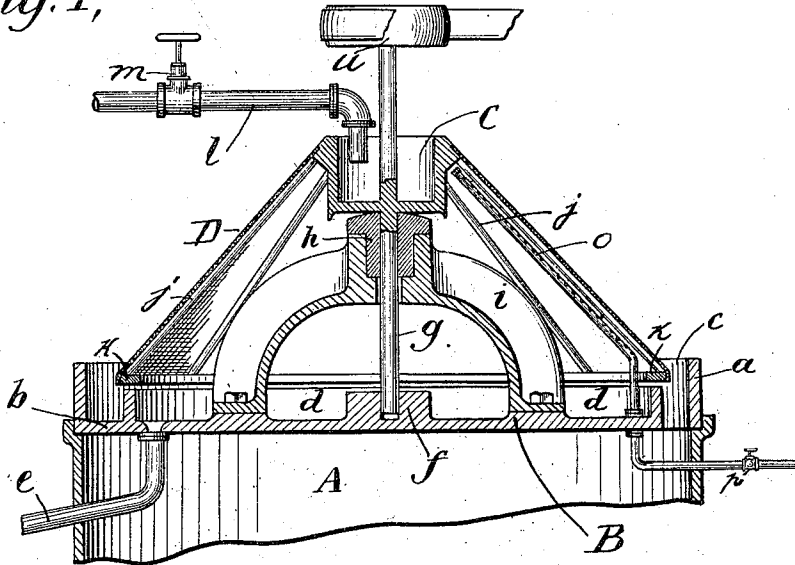
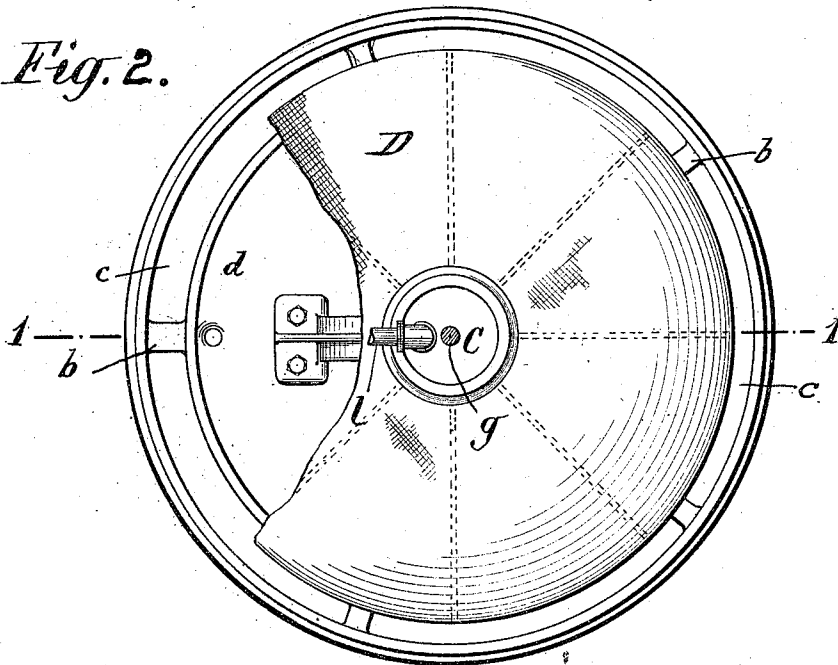


Fig. 2.



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MACHINE FOR THICKENING PAPER-PULP.

1,046,108.

Specification of Letters Patent.

Patented Dec. 3, 1912.

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To all whom it may concern:

Be it known that I, CHARLES F. POWERS, a citizen of the United States, residing at Thomson, county of Washington, State of New York, have invented certain new and useful Improvements in Machines for Thickening Paper-Pulp; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to produce an improved machine for thickening paper pulp, at times during the manufacture of paper when an undesirable quantity of water is present with the fiber, by removing a part of the water from the excessively thinned pulp. Such a machine can be used advantageously after screening to thicken the stock before it goes to the beaters, and is well adapted to recover the stock present in the white water, that is, the water from which the stock has been separated, but in which, nevertheless, a quantity of fine fiber is suspended, the loss of which in the long run is considerable.

In accordance with the invention there is provided a rotatable conical stock collector comprising a screen the truncated upper end of which is occupied by a circular vessel into which the white water or thin pulp is directed from a pipe, and over the brim of which it quietly flows onto and down the screen while the screen is rotated. The water falls through the screen, and the fiber accumulates upon and flows down and off its surface. The meshes of the screen are kept clean by a stationary spray directed upwardly through the screen upon a radial line from top to bottom. The fiber, relieved from most of the water by the screen finds its way into a stock receptacle which is preferably a pump well.

I have illustrated an embodiment of this invention in the machine pictured in the accompanying drawing in which—

Figure 1 is a section on line 1, 1, of Fig. 2, which is a plan.

Referring to the drawing, the machine is shown mounted upon a pump well A into which the thickened pulp is allowed to fall

and from which it may be pumped to a container or to apparatus in which it is next to be treated or manipulated. The base B of the machine proper which rests upon the well A is provided with an upturned peripheral curb *a* from which arms *b* extend inwardly bridging an annular orifice *c* through which the thickened pulp is to flow into the well A. The arms *b* support a central circular trough *d* which is to receive the water removed from the mixture and a drain pipe *e* affords means of escape at all times for the water collected in the trough *d*.

A step bearing *f* is provided in the center of the bottom of the trough *d* for a vertical shaft *g*, a second bearing *h* for said shaft *g* being located in an arched support *i* which is secured to and extends upwardly from the floor of the trough *d*. A circular vessel *C* is concentrically mounted fast on the shaft *g* above the bearing *h* and forms the hub of a conical screen frame which further comprises radially and downwardly extended spokes *j* and a peripheral ring *k*. A conical screen *D* is supported upon the screen frame extending from the brim of the vessel *C* to the peripheral ring *k* overhanging the annular orifice *c* in such a way that material sliding or flowing down the screen will fall through the orifice *c* into the well A, the curb *a* preventing its passage over the edge and outside the walls of the well. The white water or thin pulp is led into the vessel *C* through a pipe *l* and its rate of flow is governed by a valve *m* in pipe *l*. A driving pulley *u* is mounted upon the upper end of the shaft *g* and a belt passing around this pulley imparts rotation to said shaft and the vessel *C* and screen *D* carried thereby.

A stationary spray pipe *o* extends upwardly through the trough *d* and extends radially across the screen *D*, lying close to its inner surface. This pipe *o* is perforated to project jets of water outwardly through the screen to keep the wire faces of the screen clean and prevent them from becoming clogged. A valve *p* is placed in the pipe *o* and serves as a means for governing the spray therefrom.

In practice the diameter of the machine is usually about ten feet, and the screen is disposed at an angle of about 45° but both the diameter and the angle of the screen may be varied to meet the particular conditions under which the machine is required to work.

The operation of the device is as follows: The screen is slowly rotated we will say at a speed of from six to twelve revolutions per minute with a machine of the size given above and a regular flow of the white water is established through the pipe *b* into the vessel C. The white water flows quietly over the brim of the vessel C onto the screen D gradually percolating through the screen in its passage downwardly and leaving the fibers, which were in suspension, in a thickened pulp which flows down and off the surface of the screen. The water which passes through the screen and which is freed of fiber collects in the trough *d* eventually draining off through the pipe *e*. The fibers are usually so fine that the ordinary passing of the white water through a fine screen is insufficient to separate them from the liquid, as the rush of the water through the meshes will carry the fibers through even with extremely fine mesh screens. Therefore, in addition to the quiet overflow feed, I make use of the centrifugal action of the rotating screen to counteract in a measure the action of gravity upon the liquid, so that its normal tendency to rush through the screen apertures is correspondingly diminished. This permits the fine fiber to remain above the surface of the screen. The film of liquid quietly overflowing the brim of the vessel C in a thin sheet is constantly distributed over a wider area as it flows down the conical surface of the screen D. The flow over the surface decreases, and the weight of the water is counteracted to a constantly increasing extent as the lower edge of the screen is approached, and it is readily feasible to so regulate the speed and flow that practically all of the useful fiber is recovered in the form of a thicker pulp available to be added to the main body of pulp in the stock-chest, while the waste water passing through the screen D is substantially clear.

Having thus described my invention what I claim is:

1. In a machine for separating water from paper stock, the combination of a rotatable screen having the form of a truncated cone and a feed vessel located within the truncated end of said screen with its brim flush with said screen; substantially as described.

2. In a machine for separating water from fibrous stock, the combination of a rotatable screen having the form of an upright cone and mounted to rotate upon its axis, and means for feeding the stock-carrying water

onto said screen, said means causing an overflow of said stock-carrying water onto the outer surface of said screen at a high point thereon without appreciable head whereby the pressure of the stock against the screen is minimized, substantially as described.

3. In a machine for separating water from paper stock, a rotatable stock collector comprising an upright conical screen mounted to rotate upon its axis, and a feed vessel located in the truncated upper end of said screen and adapted to overflow onto said screen; substantially as described.

4. In a machine for separating water from paper stock, the combination of a rotatable screen having the form of an upright cone mounted to rotate upon its axis and means for feeding the stock carrying water without appreciable hydraulic head onto the surface of said screen adjacent its apex; substantially as described.

5. In a machine for separating water from paper stock; the combination of a rotatable screen having the form of an upright truncated cone mounted to rotate upon its axis, a feed vessel occupying the truncate upper end of and adapted to overflow upon said screen, and a feed pipe discharging within and below the brim of said vessel; substantially as described.

6. In a machine for separating water from paper stock, the combination of a rotatable screen having the form of an upright truncated cone mounted to rotate upon its axis, a feed vessel occupying the truncate upper end of said screen, a feed pipe discharging within and below the brim of said vessel, a drain trough underlying the base of said screen to receive water passed through the screen and a pulp receptacle underlying the edge of said screen to receive the paper stock; substantially as described.

7. In a machine for separating water from paper stock, the combination of a rotatable screen having the form of an upright cone mounted to rotate upon its axis of a stationary spray projector arranged radially across and adjacent the inner surface of said screen to direct a spray through said screen; substantially as described.

8. In a machine for separating water from paper stock, the combination of a rotatable screen having the form of an upright truncated cone mounted to rotate upon its axis, a feed vessel occupying the truncate upper end of said screen, and a stationary spray projector arranged radially across and adjacent the inner surface of said screen to direct a spray through said screen; substantially as described.

9. In a machine for separating water from paper stock, the combination of a rotatable screen having the form of an upright truncated cone mounted to rotate upon its axis, a feed vessel occupying the truncate upper

end of said screen, a feed pipe discharging
within and below the brim of said vessel, a
drain trough underlying the base of said
screen to receive water passed through the
5 screen, a pulp receptacle underlying the edge
of said screen to receive the paper stock and
a stationary spray projector arranged ra-
dially across and adjacent the inner surface

of said screen to direct a spray through said
screen; substantially as described. 10

In testimony whereof I affix my signature,
in presence of two witnesses.

CHARLES F. POWERS.

Witnesses:

E. SIMPSON,

GEO. W. HUBBELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."