E MATHER.

Paper Pulp Screen or Dresser.

No. 206,187. Patented July 23, 1878.

Fig. 1.

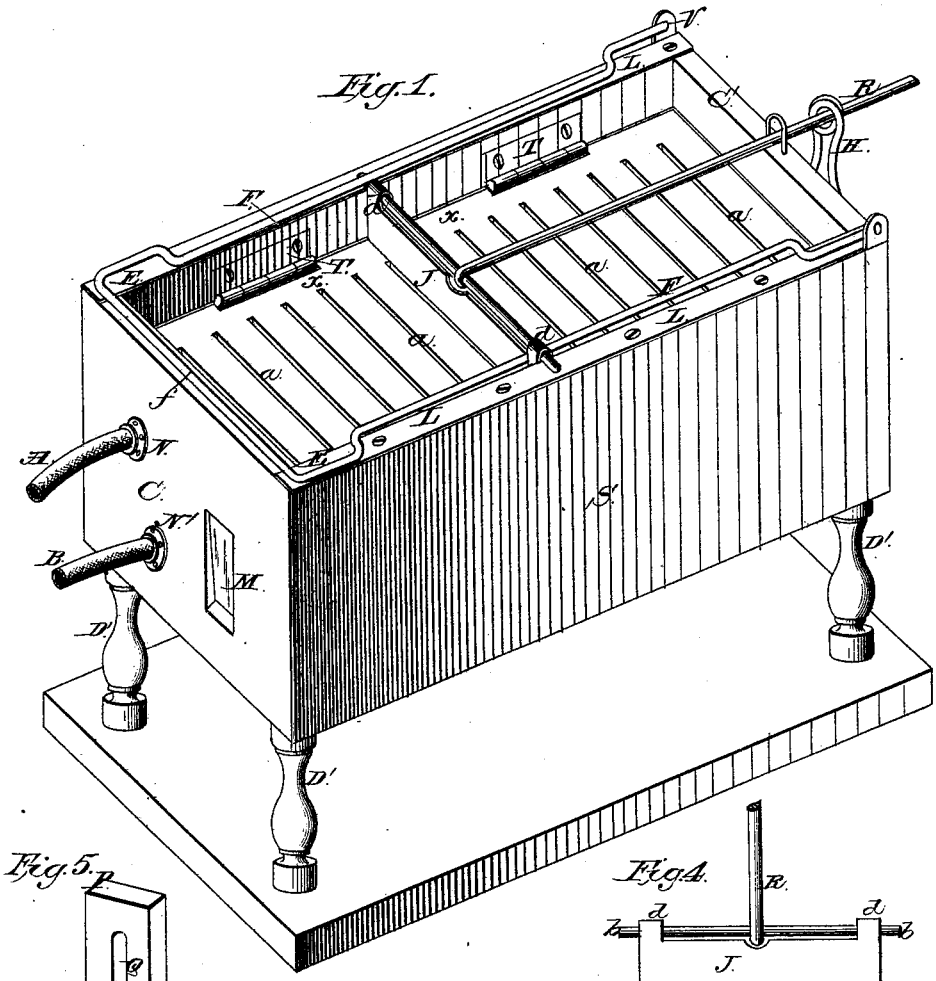


Fig. 5.

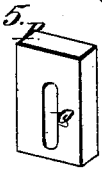


Fig. 4.

Fig. 2.

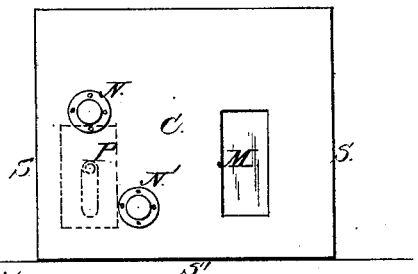
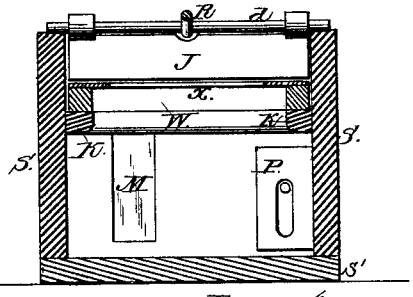


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDMUND MATHER, OF HARRISBURG, PENNSYLVANIA.

IMPROVEMENT IN PAPER-PULP SCREENS OR DRESSERS.

Specification forming part of Letters Patent No. **206,187**, dated July 23, 1878; application filed March 18, 1878.

To all whom it may concern:

Be it known that I, EDMUND MATHER, of the city of Harrisburg, county of Dauphin, and State of Pennsylvania, have invented certain Improvements in Paper-Pulp Screens or Dressers, of which the following is a full, clear, and accurate description, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a perspective view of my invention, the pumps and actuating mechanism being omitted. Fig. 2 represents an end view of the pulp-vat. Fig. 3 represents a transverse sectional view of the pulp-vat, pulp-screen, and pulp-agitator. Fig. 4 represents the pulp-agitator proper detached from its mountings; and Fig. 5 represents a perspective view of the float or automatic valve of the orifice for air in the pulp-vat.

My invention consists, mainly, in passing liquid paper-pulp through the pulp-screen or pulp-dresser proper by the agency of atmospheric pressure, created and regulated by continuous exhaustion of the air from the closed space beneath the screen either by pumps attached exteriorly to the pulp-vat and communicating with said space and with the body of the pulp therein, or, instead of a pump communicating with the pulp, an equivalent result may be attained by simply extending the ajutage-pipe leading from the pulp sufficiently far down into a cistern, keeping its lower end immersed in the dressed pulp discharged therein, to cause the requisite draft from the pulp-vat through said pipe by hydrostatic action. Moreover, to keep the openings of the pulp-screen free from clogging up by the deposit of fibrin and other matter on the interstices of the pulp above the screen-plates, a pulp-agitating device is provided, peculiarly constructed and applied, whereby said lodged particles of matter are at intervals displaced and brought properly to the openings of said plates, to be drawn through them solely by pneumatic action, created and sustained in the manner hereinafter more fully described.

The agitator referred to consists, mainly, of a hinged gravity stirrer, supported and guided on the top of the pulp-vat in such manner that the forward stroke of the stirrer nearly touches the screen-plates, and its return-stroke is more elevated therefrom, the strokes being regulated by certain switchways and by a traversing mechanism, which may be a rack and stationary pinion, for example.

In the operation of dressing pulp by my improved apparatus the screen is stationary, and the mechanism usually employed to operate it is dispensed with. It is simply inserted as a sink or partition in the vat-structure, firmly supported therein on cleats or crossties, and it divides the vat into compartments.

My improved vat is provided with outlet-orifices and attachments for the air and the pulp-pumps, which communicate with the vacuum-compartment of the vat. It is also provided with an automatic float-valve at the air-orifice, to regulate the atmospheric pressure by exhaustion, and has a window, through which to inspect the altitude of the pulp therein.

In the accompanying drawings, S and C represent, respectively, the sides and ends of the pulp-vat, and S′ the bottom thereof; and D′ D′ D′ D′ are its supports. X represents the screen-plate. *a* are openings therein; and T T are hinges, whereby it is connected to the vat; but it is evident the screen-frame W, Fig. 3, may rest on the cleats K K without the aforesaid hinges, they being employed only for convenience in handling the screen.

A and N represent a duct and coupling, respectively, at the orifice, for the extraction of air at a point on the end of the vat C below the screen-plates X; and in practice duct A is attached to an air-pump of any suitable make. B and N′ represent a duct and coupling, respectively, at an orifice on same end of vat, quite near to the bottom S′, for the extraction of the pulp from the vat. In practice the duct B is attached to any suitable suction-pump, and the orifice may preferably be made through the bottom S′ of the vat.

In Figs. 2 and 5, P represents a float, it being an oblong piece of wood, or other body lighter than water, presented sidewise to the inside of the end C of vat, and held attached thereto by a screw in a slot, Q, or by other suitable means, and guided along the wall S in such manner that it may rise and fall freely with the rise and fall of the pulp in the vat beneath the screen. The float P thus serves as an automatic valve, to open and close the air-port at N accordingly as the liquid pulp stands low or high in the vat. When the

pulp is kept drained out low by the pump at B N′, the float P will also keep low down in the vat and open the air-port at N′, and thus allow the air-pump to create vacuum beneath the screen and expedite the screening. When the vat becomes filled with pulp to a higher level, the float P will rise with the liquid and close said air-port at N, thus causing the lower orifice again to reduce the quantity of pulp in the vat, when the same operation will be repeated, the pumps meanwhile being continuously in motion.

Should the flow of pulp through the screen-plates go on unobstructedly, the lower or pulp pump will be the only one actually engaged, as the amount of pulp in the vat will be sufficient to raise the float P, and by it close the air-port, and thus shut off the draft from the air-pump. But should the flow of pulp through the screen be lessened by clogging of the screen with fibrin or other matter therein, the vat will be kept emptied of pulp below, and the float P will fall, to open the air-pump orifice, and thus apply the draft therefrom, to expedite the flow of pulp through the screen. The air-pump, though in motion constantly during the operation of screening, is thus allowed to exert draft only at the intervals when the average amount of pulp in the lower part of the vat is reduced. It is therefore an automatic pulp-regulator. Moreover, it is partly relieved of duty by the pulp-agitator device above the screen-plates, which is also employed to expedite the flow of pulp through the screen by stirring the obstructing particles from the crevices and interstices thereof.

In Fig. 4 is shown the stirrer or principal part of the agitating device, comprising a cross-head, *b b*, on stem R, and a gravitating leaf or pendant, J, hinged to said cross-head, as shown. Said leaf J, in present illustration, fills the transverse limit of the vat, and the ends *b b* of said cross-head travel on top of the vat and on switch-rails F F thereon at the forward and return strokes thereof respectively. Said stirrer J R *b* is connected in practice (not shown in drawing) with any suitable mechanism, as a rack and stationary pinion, for example, whereby an equable reciprocatory movement may be given to it to pass the gravitating leaf J at a little distance above the screen, from one extremity to the other thereof, in such manner that obstructing particles thereon may be gently displaced from their lodgments without forcing objectionable matters through the screen-crevices otherwise than by the pneumatic draft exerted toward the vacuum in the opposite compartment of the vat, as hereinbefore described.

On the vat-top are erected standards V V, to which are pivoted the switches F F, arranged parallel with and on the vat-walls at an inclination toward their forward ends, which are provided with offsets laterally at E E, and joined by cross-piece *f*, which, however, may be omitted in practice. Said switches have also offsets laterally at their rear ends, as shown. The offsets are so made that the ends of cross-head *b b* of the stirrer may change their course of travel at the end of each stroke thereof, it being passed under said switches at the forward stroke, as shown in Fig. 1, and allowed to rise on top of the switches F F on their return stroke.

I do not claim a pulp-screen cleanerw hereby the screen-plates are brushed, scraped, or otherwise cleaned on their surface by contact, as such is not new, nor is its object the same as that for which my invention or agitator device is employed.

I do not broadly claim pulp-dressers operated by atmospheric agency, as a pulp-dresser with vibratory bottom, operating as a bellows, has, long before it became an expired patent, been proved to be impracticable, and is therefore neither new nor useful.

Having thus fully and clearly described my invention, what I regard as new and useful is embraced in the following:

1. The paper-pulp dresser, substantially as described, in which the flow of the pulp through the screen is mainly effected by atmospheric pressure caused by continuous exhaustion of the air from the closed space beneath the screen, mounted stationary in a stationary pulp-vat, and wherein the exhaustion of air from the aforesaid space is effected by any well-known device for such purpose placed exterior to the pulp-vat.

2. A stationary screen and vat adapted for dressing paper-pulp by atmospheric pressure, in combination with a paper-pulp agitator, whereby the pulp is stirred properly without contact of the stirrer with the screen-plates, in the manner as and for the purpose set forth.

3. A pneumatic paper-pulp dresser in which the air-port is opened and closed automatically by a float-valve, R, to regulate solely the air-current, substantially as and for the purpose set forth.

4. A stationary paper-pulp screen, X W, and pulp-vat S C A B N′, in combination with the stirrer R J *b b* and switches F F, whereby the pulp is properly agitated without contact of said stirrer with said screen, in the manner set forth.

In testimony that I claim the foregoing as my invention I have hereunto set my hand and seal this 14th day of March, 1878.

EDMUND MATHER. [L. S.]

Witnesses:
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