

No. 811,930.

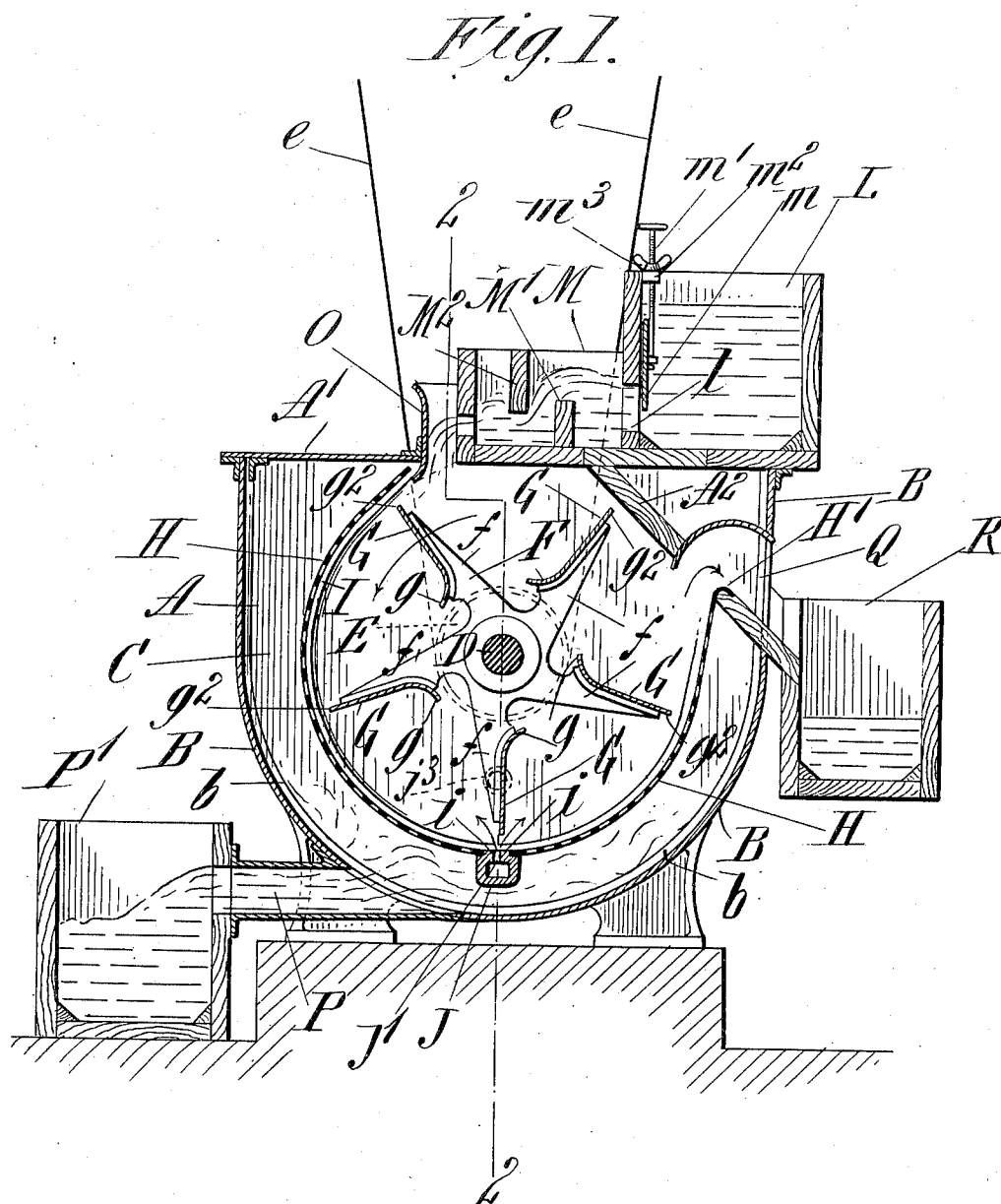
PATENTED FEB. 6, 1906.

B. KIHLGREN.

PAPER PULP ASSORTING APPARATUS.

APPLICATION FILED MAY 19, 1905.

2 SHEETS—SHEET 1.



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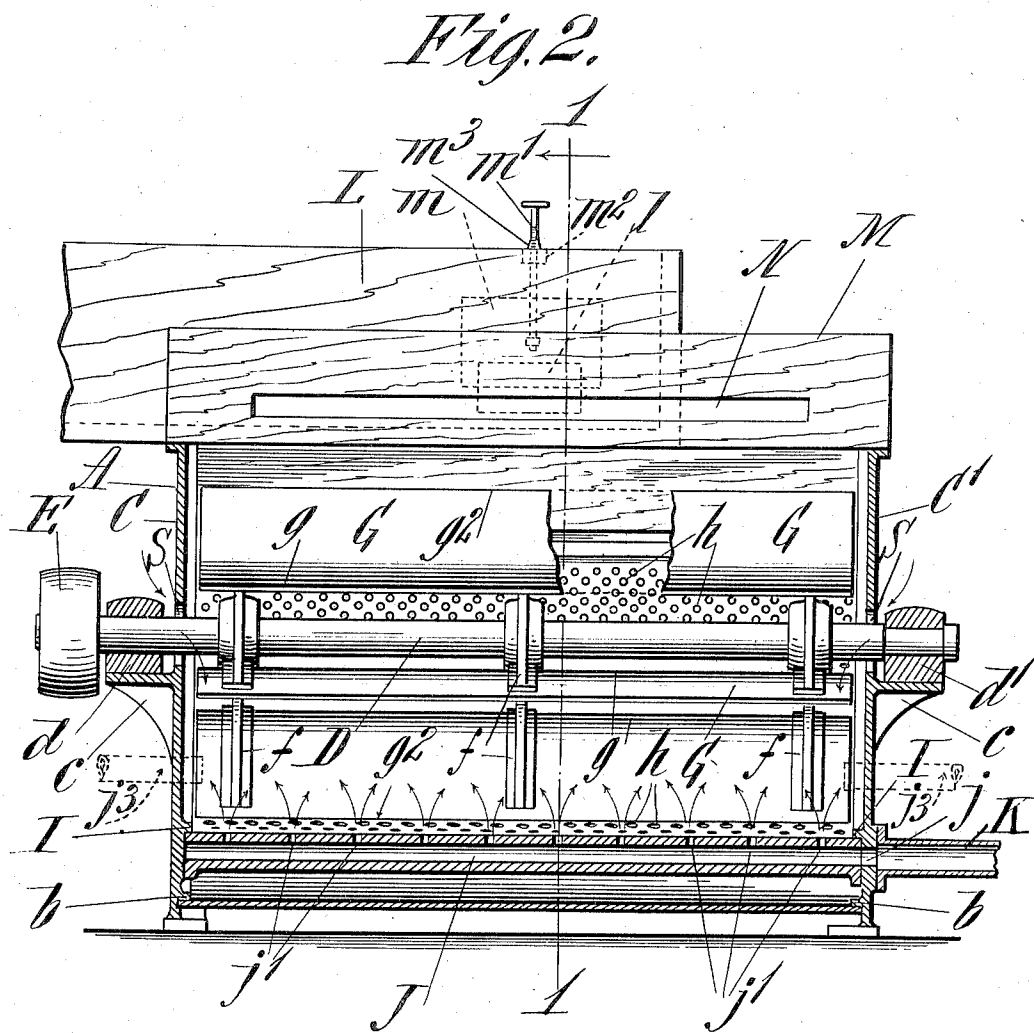
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UNITED STATES PATENT OFFICE.

BERNHARD KIHLGREN, OF HOLYOKE, MASSACHUSETTS.

PAPER-PULP-ASSORTING APPARATUS.

No. 811,930.

Specification of Letters Patent.

Patented Feb. 6, 1906.

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To all whom it may concern:

Be it known that I, BERNHARD KIHLGREN, a subject of the King of Sweden and Norway, and a resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Paper-Pulp-Assorting Apparatuses, of which the following is a full, clear, and exact description.

The subject of this invention is an improved machine or apparatus for screening paper-pulp, especially for separating and removing such portions of the pulp as it comes to the screening-machine from the flow-box as are not thoroughly comminuted or digested, the screened pulp being delivered through a head-box or otherwise to a paper-machine, and the coarse or indigested portions which have not passed through the screen are excluded from the screening-machine and reclaimed to be further worked up.

The apparatus may properly be considered one for assorting wood, chemical, or other kind of pulp for paper into two grades, one having a uniformity in fineness of fiber and texture and the other being coarser and more or less uneven or containing splinters.

With the above and other purposes in view this machine has for a principal object the provision of a powerful centrifugal device for causing the passage of the paper-pulp through the screen and obviously in a more rapid, positive, and thorough manner than is the case with the commonly-employed gravity-operated screen-boxes.

Another object of this invention is to provide, in connection with the casing of the machine, having suitable outlet-openings, improved means for regulating the ingress into said casing of the pulp supplied thereto from the flow-box or other source.

A further object is to provide, in connection with the novel form of screen employed and the wet pulp screened therethrough, an auxiliary supply of water to augment the amount of water the pulp is floated in, and especially to compensate for the more rapid initial expulsion through the screen of the pulp-carrying water relative to the pulp carried thereby.

There are other important features connected with the invention which, in addition to those alluded to, are clearly set forth in the following detailed description.

The invention includes the combination, with a casing having an outlet and a screen

of partially cylindrical form within and separated from the walls of said casing and having both an inlet for the wet pulp to be assorted and a coarse-pulp outlet, and a device for forcing the pulp introduced within the screen in radial directions against the screen-walls, whereby the pulp of suitably-fine grade passes through the screen, while the coarse and more or less uneven pulp or slivers restrained within the screen is permitted to pass through the said coarse-pulp outlet; and the invention furthermore includes, in combination with an apparatus characterized as above, means for supplying water into the lower portion of the screen-inclosed chamber for facilitating the pulp screening or assorting operation or process; and the invention furthermore includes or is constituted by certain particular combinations and arrangements of parts and all substantially as hereinafter fully described, and set forth in the claims.

My improved machine for screening pulp for paper is illustrated in the accompanying drawings, in which—

Figure 1 is a cross-sectional elevation, and Fig. 2 is a longitudinal elevation with portions in section, as taken on a line 2 2, Fig. 1. The line 1 1 on Fig. 2 indicates the plane of section on which the first view is taken.

In the drawings, A is a partially-cylindrical casing, preferably constructed of sheet metal, its sides and rounded bottom portion being of one continuous plate B, the end edge portions of which are united to the flanged portion *b* of end plates C and C'. Extending centrally of and longitudinally through this casing A is a shaft D, which revolves in bearings *d* and *d'*, which are provided at either end of the casing A and are supported slightly beyond the end plates C and C' on brackets *c c*, which are formed on said end plates. Shaft D, having pulley E, is power-driven by belt *e* and has mounted thereon within the casing A and extending longitudinally the entire length thereof the centrifugal curve-bladed wheel F. This "centrifugal wheel" F, as it will be called, consists of a plurality of radial and suitably-flanged spokes or blade-carrying arms *f*, to which are secured the blades G. These blades G, which are for a large proportion of their areas flat and radial in arrangement have their inner edge portions—that is, their portions which are the nearer to the axis of the wheel—constructed of a curved form and forwardly disposed relatively to the direction of their rotation, as seen at *g*.

Partly surrounding and inclosing this centrifugal wheel F and adjacent the outer edge portions g^2 of the blades G thereof are the partially-cylindrical screen-plates H, which together make the major portion of a cylinder. These screen-plates are preferably made of sheet metal and have distributed over their entire area the closely-arranged perforations h . The annular flanges or ribs I on the end plates C and C' form a support for the end edge portions of the said screen-plates to which they are suitably secured. The lower longitudinally-extending edges of these screen-plates are united to a rabbeted portion i of a horizontal tube J. This tube J extends lengthwise of the casing A, its end adjacent end plate C being closed, but having its other end, which abuts against end plate C', in registration with a hole j therein. A pipe K from a pump or other source of supply, conveying water therethrough under considerable pressure, has its discharge end opposite the perforation j and open end of tube J, thus having connection thereinto.

The upper or top side of the casing A is partially closed by a cover A', the remaining portion of the top of the casing being, as reference to Fig. 1 shows, covered by the closed end portion of the flow-box L. Near the closed end portion of this flow-box L and about centrally over the casing A is located the sluiceway-opening l , which communicates with the distributing-box M. A regulating gate-valve m is provided adjacent this sluiceway l within the flow-box L, and a hand-wheel-operated screw-rod m' , which has engagement with the gate m and has screw engagement with the nut m^2 on the side wall of the flow-box, serves to vertically adjust the size of the sluiceway-opening l . A thumb locking-nut m^3 serves to confine the gate m in its regulated position.

The distributing-box M, into which the pulp from the flow-box discharges through the above-described sluiceway l , has formed therein and extending longitudinally from end to end thereof the partitions M' and M². The partition M', which is nearest the sluiceway-opening l , is attached to the bottom of the distributing-box, its top edge reaching only about half-way to the top edges of the same. The partition M², however, extends from the top of the box M about half-way down to the bottom of the box M, its lower edge portion being more or less near the level of the top edge portion of the partition M'.

A broad discharge-opening N from the side of the distributing-box M opposite the sluiceway-opening l is in extent nearly equal to the length of the centrifugal wheel G. This discharge-opening N is over and a little to one side of the axis of the centrifugal wheel G, onto which wheel the pulp from the flow-box is more or less downwardly directed by the vertical deflector or guard O, which is sup-

ported on the adjacent edge portion of the casing-cover A'.

A horizontally-extending outlet P for the screened pulp is provided at the lower portion of the casing A. This outlet P may connect with the head-box of a paper-machine or, as shown in the drawings, with a tank or conveyer-trough P'. Near the upper or top portion of the apparatus opposite from the discharge-way P is a second outlet Q, which leads from the approximately cylindrical screen-inclosed chamber.

One edge portion of one of the screen-plates H terminates at the boundary of an opening H' in an inclined board or plate A² to a second trough conveyer P.

In operation the centrifugal wheel F is revolved preferably at high speed, by reason of which the unscreened pulp from the flow-box L and the distributing-box M, which is deflected downward thereonto, is more or less violently forced outward by the centrifugal force exerted by the curved portions of the blades G, whereby the pulp and water in which it is incorporated is expelled through the perforations of the plate H and is drawn off from the casing A by the outlet P. In order that the thinness of the pulp as mixed with the water in which it is floated may be maintained during its passage over the entire area of the screen-plates H, an additional supply of water to the pulp is provided through the perforated tube, to the end that the latter part of the passage of the pulp over the remaining screen area is attended with approximately the same amount of water as during the first half. By reason of this extra supply of water to the pulp during the operation of screening the same the work is not only more thoroughly done, but the reclaiming of the unscreened coarse portions of the pulp is facilitated. A resultant effect in connection with the use of a centrifugal wheel F for the purpose described is the natural blower capability or tendency of such wheel. This principle I utilize in connection with and as an adjunct to the before-described centrifugal action of the wheel F by providing shaft-openings S S in the casing ends C and C', which openings are somewhat larger than the diameter of the shaft D and which permit an ingress of air therethrough. This air is forced outward through the screen perforations h by the same centrifugal force that forces the water-saturated pulp therethrough and results in a somewhat improved screening action.

As represented by the dotted lines at $j^3 j^3$, water-supply pipes may enter the ends of the casing to deliver within the screen-inclosed chamber as a substitute for the pipe J.

It will be here explained that by making the wheel F with the portions of its blades G, which are the nearer to the center of the wheel and the axis of revolution of such

blades, forwardly inclined relatively to the direction of movement of such blades the pulp incoming into the screen-inclosed chamber is measurably prevented from flowing
5 down between the wings to the center of the wheel and so across to the lower side of the chamber, whereby it would avoid and not be subjected in a full degree to the outwardly-throwing action of the wheel.

10 I claim—

1. In a pulp-assorting apparatus, the combination with a casing having an outlet-opening, and a chamber-inclosing screen, within and separated from the walls of the casing,
15 and having a pulp-inlet opening and a pulp-outlet opening, of a centrifugal wheel within said screen, having the blades or wings thereof at their portions toward the axis of their revolution inclined forwardly relatively to the
20 direction of rotation of said wheel.

2. A pulp-assorting apparatus consisting of a casing having an outlet-opening and a chamber-inclosing screen within and separated from the walls of the casing, and having
25 a pulp-inlet opening and a pulp-outlet opening, and also having an air-entrance opening leading through the end of the casing and communicating into the interior of the chamber within the screen, of a centrifugal wheel
30 within said screen, operable to force the pulp outwardly against the said screen, and means for rotating the said wheel.

3. In a pulp-assorting apparatus, the com-

bination with an approximately cylindrical screen-shell having a pulp-entrance opening
35 at its upper portion and to one side of its axis, and having a pulp-residue-outlet opening at an upper portion thereof sidewise opposite from said entrance-opening, of a fan-wheel
40 rotatable within the screen-inclosed chamber, a chamber-inclosing casing outside of the said screen having a pulp-opening leading from a lower portion thereof, and a water-supply pipe extending longitudinally within
45 the last-named chamber and having jet-holes directed through the bottom of the screen.

4. A pulp-assorting apparatus comprising a casing having an outlet-opening, and a chamber-inclosing screen, within and separated from the walls of the casing, and hav-
50 ing pulp inlet and outlet openings leading to and from said screen-inclosed chamber, an axially horizontal centrifugal wheel within said screen, and a water-supply pipe ranging horizontally and in proximity to the screen,
55 and having jet-holes directed substantially toward the wheel-axis and for delivering water under pressure, and distributed, into the screen-inclosed chamber.

Signed by me in presence of two subscrib-
60 ing witnesses.

B. KIHLGREN.

Witnesses:

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G. R. DRISCOLL.