(No Model.)

E. F. MILLARD.

MACHINE FOR SEPARATING GROUND WOOD PULP INTO DIFFERENT GRADES.

No. 457,089. Patented Aug. 4, 1891.

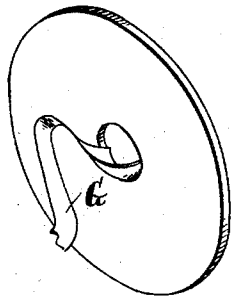
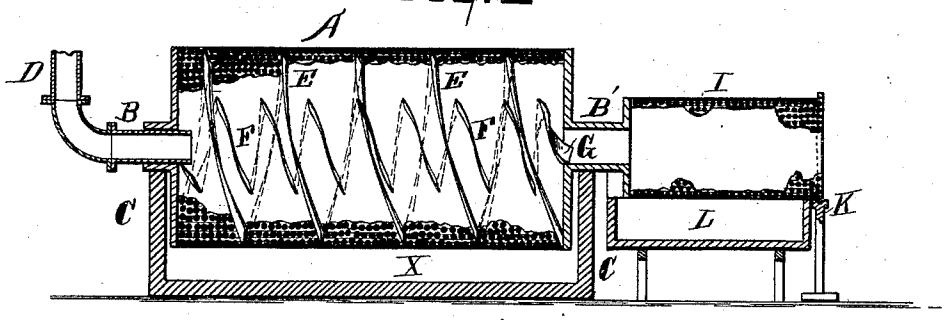


Fig. 2.

Fig. 1



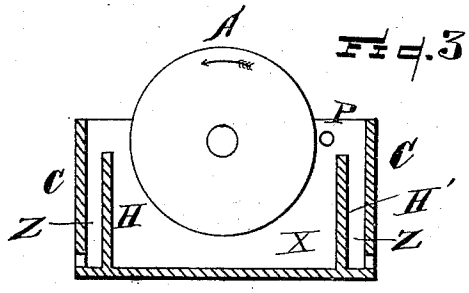


Fig. 3.

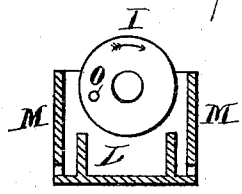


Fig. 4.

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UNITED STATES PATENT OFFICE.

EDWARD F. MILLARD, OF JACKSON, MICHIGAN.

MACHINE FOR SEPARATING GROUND WOOD PULP INTO DIFFERENT GRADES.

SPECIFICATION forming part of Letters Patent No. 457,089, dated August 4, 1891.

Application filed October 11, 1890. Serial No. 367,847. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. MILLARD, of Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Machine for Separating Ground Wood Pulp into Different Grades, of which the following is a specification.

In the drawings hereto attached and made a part of this specification, Figure 1 is a longitudinal section of the screening-machine. Fig. 2 is a detached perspective view of the head at the discharge end of the screen and a dipper attached thereto. Fig. 3 is a vertical section of the separating-screen and the box in which it runs. Fig. 4 is a similar view of the washing-screen.

The same letters are employed in all of the figures in the indication of identical parts.

A is a cylinder or polygon covered, preferably, with perforated sheet metal. It is hung upon hollow trunnions B and B′, carried on the ends of the box C. The pulp-liquor is introduced through the pipe D and hollow trunnion B into the interior of the screen. That screen is revolved by any suitable and convenient driving belt or gearing, and it has in its interior a conveyer, preferably a worm E, formed by a spiral flange projecting inwardly from the periphery of the screen and so formed that by the revolution of the screen the spiral flange acting on the material in the liquor will cause it to pass from the head slowly toward the tail of the machine, carrying along toward the tail slivers and other particles which do not go through the screen. It will be observed that the effect of this conveyer is to cause the body of the pulp inside of the screen to be moved toward the tail with a gentle motion, the prime object of my invention being to avoid any throwing or dashing of the pulp-liquor against the screen, as has been heretofore practiced in other machines, my object being to avoid any violent force which would cause the coarser particles of the pulp to be driven through the meshes of the screen. Another conveyer F of smaller diameter is attached inside of the conveyer E, as shown in the drawings, Fig. 1. At its lower end is the dipper G, which in revolving gathers up the water and solid particles contained in it at the tail end of the screen and lifts it up and pours it into the opening in the interior of the hollow trunnion B′. Both the conveyers are formed of spiral strips, one attached at the periphery of the cylinder, internally, to act upon material near the screen and move it toward the tail of the screen, the other merely skimming the surface and acting upon material floating on the surface. This internal conveyer F is suspended at the ends at the inlet and outlet openings and both revolve with the screen. The conveyer F extends into the discharge-opening and is formed concave in cross-section, and curved so as to form a scoop or dipper for gathering the splinters and delivering them into the outlet. If necessary, a similar dipper may be formed on the tail end of the outer conveyer to similarly discharge into the outlet.

Other devices in use may be substituted for elevating solid matter at the tail end, delivering it into the outlet. As that feature is old, no claim is made upon it separately, and it need not be more particularly described.

The level of the liquor in the interior of the screen is determined by the dams H H′, forming a trough or vat within the box C. The dams H, of which there may be two, as shown, or only one, if preferred, are extended up to about the level of the bottom of the eduction-pipe B′, so that the lower half (nearly) of the screen will run in the liquor which contains the fine particles of pulp, and as fresh liquor is supplied through the pipe D the water together with the fine pulp will flow out through the perforation of the screen and into the trough or vat formed by the dams H H′, or H alone if only one is used. The other side of the trough in that case would be formed in the side of the external box C. As the water continues to pour in, after passing through the perforations in the screen and into the trough below it, it will flow over the dams H H′, or the single dam if only one is used, into a discharge-trough formed between the dam H and wall C, whence it will flow away to the place where it is to be used.

The portion in which the cylinder wallows, between the dams H H′, Fig. 3, I shall designate the "vat" and indicate it by the letter X. The portion into which the overflow is dis-

charged, between the dam or dams and the side C of the box, I will designate as the "trough" and indicate it by the letter Z, it being understood that there may be one or two of these, according to the number of dams. The liquor, therefore, being maintained at the level of the hollow trunnions, nearly half of the periphery of the screen will be continually submerged, and the worm E will of course extend as deep as the screen, while the worm F will only dip a few inches into the top of the liquor. The function of the worm E is to engage the slivers and coarse impurities which may be floating on the surface of the liquor and move them steadily toward the tail of the screen, where they will be caught up by the dipper G, lifted, and brought into the hollow trunnion B'. As there will be some fine pulp remaining and adhering to the surfaces of these slivers, they should be subjected to a washing operation, which is carried on in another screen, which may be either directly attached to the eduction-pipe of the screen or may be more remote, a pipe leading from one to the other.

I is the washer, which, as illustrated, is a rotating screen attached to one end of the hollow trunnion B' and at the other resting on a standard K, and below the screen I is a trough L, the top of which is at a level with the bottom of the screen, and it is inclosed in the walls of a vat M, which extends up above the water-level. Within the washer-screen I is placed one or more perforated pipes O, through which water under pressure is discharged inside of the screen I for the purpose of washing off whatever fine pulp may be adhering to the surface of the slivers, which it drives off through the interstices of the screen into the trough L, overflowing which, it escapes into the trough between L and M, and thence is discharged into the same place to which the fine pulp taken out through the screen E is delivered. A pipe P, perforated with fine holes, is also arranged along the outer surface of the screen A, driving the jets of water against its surface for the purpose of pressing back any particles that might stick in the interstices of the screen A.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a rotary screen carried upon tubular journals, a conveyer which gives forward impulse to the pulp-liquor within the screen toward the tail, a vat in which the screen is partially submerged, a trough into which the fine pulp overflows after passing through the screen, and an elevator which lifts the tailings from the interior of the screen and delivers them into the discharge-opening, substantially as set forth.

2. The combination of a rotary screen, a tank in which it is partially submerged, an exterior receptacle for the overflow, an inlet and a discharge, with a second screen into which the tailings are discharged, and means for further washing the tailings for separating the adhering fine pulp from the coarse slivers, substantially as set forth.

3. In combination with a rotary and partially-submerged screen, axially-located inlet and outlet openings and a centrally-suspended spiral conveyer F, skimming the floating slivers toward and elevating them into the outlet-opening, substantially as set forth.

4. In combination with a partially-submerged screen, an outer worm E and an inner worm F, substantially as set forth.

In testimony whereof I have hereunto subscribed my name in the presence of two attesting witnesses.

EDWARD F. MILLARD.

Witnesses:
AUGUSTUS GOODALE,
S. S. TROWBRIDGE.