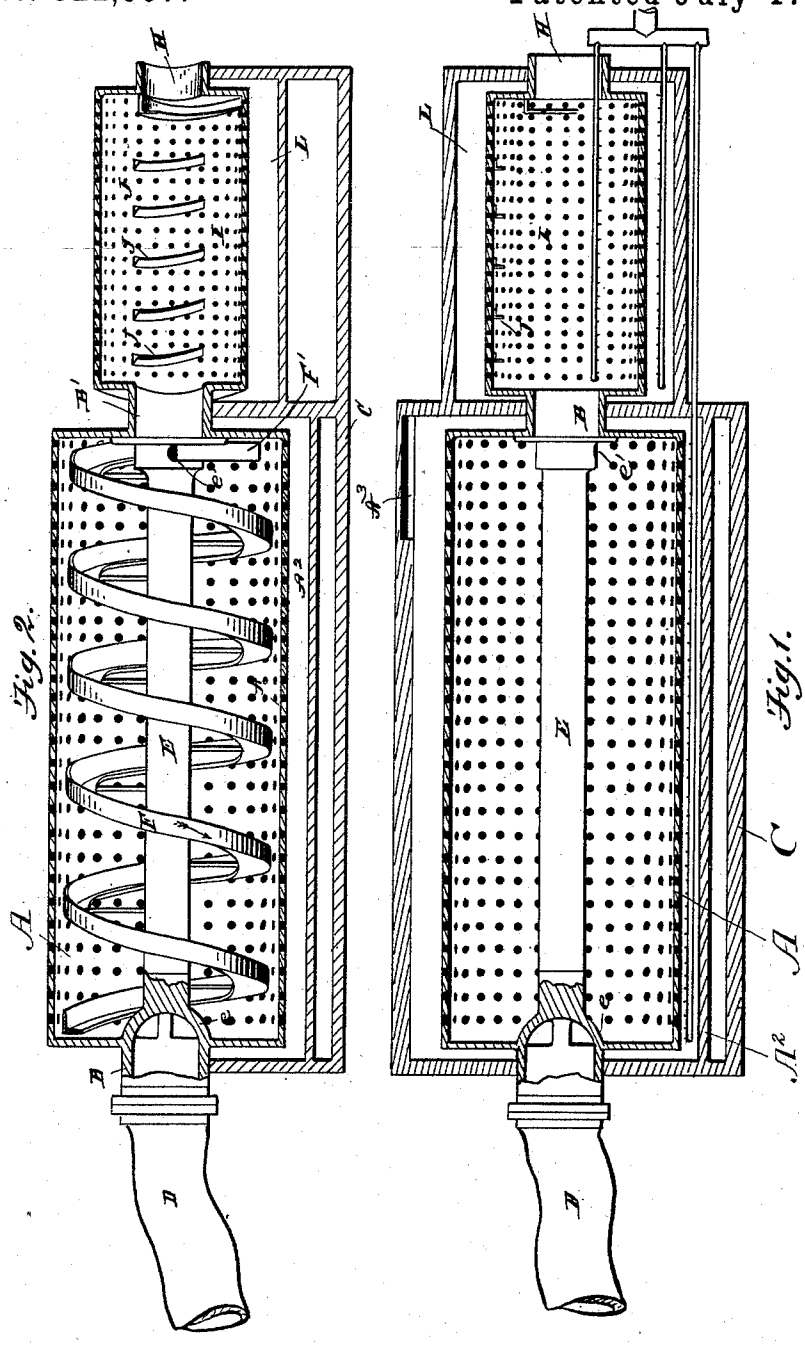
(No Model.) 2 Sheets—Sheet 1.

E. F. MILLARD.

WOOD PULP SEPARATOR.

No. 522,997. Patented July 17, 1894.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

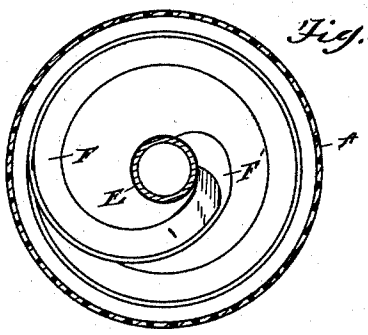
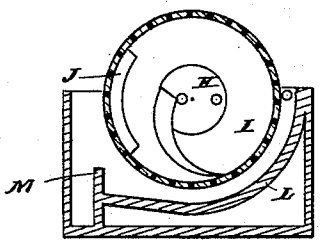


Fig. 5.



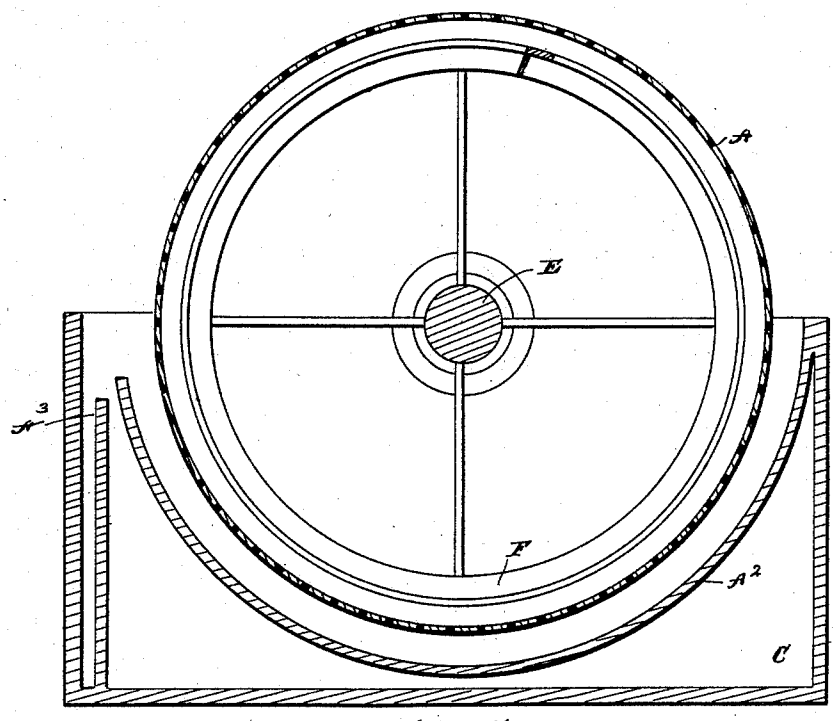


Fig. 4.

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UNITED STATES PATENT OFFICE.

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WOOD-PULP SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 522,997, dated July 17, 1894.

Application filed July 18, 1893. Serial No. 480,813. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. MILLARD, a citizen of the United States, residing at Jackson, county of Jackson, State of Michigan, have invented a certain new and useful Improvement in Wood-Pulp Separators; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The machine herein described is an improvement upon one patented by me August 4, 1891, No. 457,089, and the invention herein described consists in certain modifications in the details thereof, but operating upon the same general system.

In the drawings, Figure 1 is a horizontal section of the machine without the worm. Fig. 2 is a partial vertical sectional view, showing the worm. Fig. 3 is a section of the discharge end of the screen and a dipper attached thereto. Fig. 4 is a sectional view of the separating screen and the trough or casing in which it runs. Fig. 5 is a similar view of the washing machine.

In the drawings, the same letters represent the same parts.

A is a cylinder, covered preferably with perforated sheet metal, and hung upon hollow trunnions B and B′ journaled on the ends of the vat C.

D is an inlet pipe through which the pulp liquor is introduced into the hollow trunnion B, and from thence into the interior of the screen. The screen is revolved by any suitable or convenient means.

E is an axle suspended at either end by means of a spider to the heads of the screen, the spiders being shown at *e* and *e′*. The spider at *e′* has only one opening into which the dipper enters that is hereinafter described. To this axle is attached, by means of suitable spokes, a worm F, preferably of angle iron, one flange of the angle iron extending radially from the inner surface of the screen, and the other flange extending from the outer edge of the first described, forming the outer surface of the worm. This surface is preferably placed at about one inch from the periphery of the screen and is concentric with it. At F′ it is formed in the shape of a cycloid, and brought to the opening in the spider *e′*, and forms a dipper at the discharge end of the screen, as shown in Fig. 2, by means of which material is brought up and carried out of the screen A into the hollow trunnion B′. The revolution is in such direction that the perpendicular flange of the worm compels inclosed material to travel from the head to the tail of the machine. The horizontal flange of the worm picks up the heavier and coarser particles and slivers and engages them in its angle, from whence they are carried forward by the successive revolutions as they continually drop to the lowest point, until they are ultimately carried out by the dipper through the hollow trunnion B′. The fine material is gently worked through the perforations in the screen into a trough or concave A^2, and which is located an inch or so from, but concentric with, the screen A.

A ledge or dam is formed upon the interior of the casing at A^3, which holds the water and pulp at the level of its upper edge, but which takes the fine material from off the surface and carries it over into any material passage way for disposing of it, the operation of this dam being substantially the same as those shown in Patent No. 457,089, hereinbefore mentioned, one only, however, being employed, instead of two as shown therein. As there will be some fine pulp remaining, adhering to the surfaces of the slivers, and also being held in suspension in the water accompanying the slivers, the overflow through the trunnion B′ is subjected to a second treatment or washing operation in another screen, which I have shown directly attached to the trunnion B′. This screen, marked I, has perforations in its periphery, preferably smaller than in the screen A. It has formed upon its interior surface a series of flanges of the section of a screw, J, J, J, and so disposed that, as the screen rotates these flanges are carried down into the pulp held upon its interior, and it forces the same along toward the tail of the machine, where there is a second dipper taking off the coarse material and depositing it out through an axial opening of

less diameter than the diameter of the screen at K. This screen also revolves in a vat or trough, marked L, and the surplus of water with the fine material is carried over a dam M, substantially in the same manner as the operation described in my Patent No. 457,089. A washing device is provided substantially as therein described.

It will be observed that the essential features of difference between the device herein described and my former patent, are that the worm has a different cross section; that it is supported upon a central axle, leaving a free, clear space between it and the screen, and that but one worm is employed. It has been found in practice that the described form is more efficient in separating slivers and coarse particles from the pulp than the form shown in my previous patent, although they both operate upon the same general principle of avoiding any violent force tending to drive the coarser particles through the meshes of the screen.

In this device, the chief element of its efficiency resides in the concave nature as shown by cross section of the internal worm, the concavity being directed toward the tail and axis of the machine. This concavity scoops up and carries along with it, as hereinbefore stated, the coarser particles. It is obvious, therefore, that it is not necessary to make it exactly in the form of an angle, or of angle iron, but that a half of a tube, properly disposed, would answer the purpose.

What I claim is—

1. The combination of a rotary screen carried upon tubular journals, one of which is an inlet opening therein, and the other is a concentric discharge opening therefrom, a conveyer located in, and rotating with, but detached from the periphery of the screen, said conveyer being constructed with two flanged edges, one of which is substantially radial to the axis of the screen, and the other substantially parallel and concentric to the periphery of the screen, the end of the conveyer adjacent to the discharge opening being of cycloidal form and forming an elevating dipper adapted to discharge in said opening, substantially as described.

2. In combination with a rotary screen carried upon tubular journals, one of which constitutes an inlet into said screen, and the other constituting a concentric discharge opening therefrom, a conveyer located in said screen and rotating simultaneously therewith, but detached from the periphery of the screen, said conveyer having two flanged edges, one substantially parallel to and concentric with the periphery of the screen, and the other substantially radial to the axis of the screen, the end adjacent to the discharge opening being cycloidal in form and constituting an elevating dipper, a tank in which said screen is partially submerged, and an exterior receptacle for the overflow, substantially as described.

3. In combination with a rotary screen carried upon tubular journals which respectively constitute inlet and outlet openings therein and therefrom, a conveyer located in and rotating with said screen, but detached from its periphery, said conveyer having two flanged edges, one substantially radial to the axis of the screen, and the other substantially parallel and concentric to its periphery, an elevating dipper adjacent to the discharge opening, a tank in which said screen is partially submerged, an exterior receptacle for the overflow, a second screen into which the tailings are deposited, said second screen having tubular journals respectively constituting an inlet and a discharge opening, and means for further washing the tailings, substantially as described.

4. In combination with a rotary screen carried upon tubular journals constituting inlet and outlet openings therein and therefrom, a conveyer located in and rotating with said screen, but detached from its periphery, said conveyer having two flanged edges, one substantially radial to the axis of the screen, and the other substantially parallel and concentric to its periphery, an elevating dipper adjacent to the discharge opening, a tank in which said screen is partially submerged, an exterior receptacle for the overflow, a second screen into which the tailings are deposited, said second screen having tubular journals respectively constituting an inlet and a discharge opening, means located therein for conveying the tailings to the discharge end of said second screen, and a dipper located at said discharge end and rotating with the said screen, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

EDWARD F. MILLARD.

Witnesses:

W. J. WILLITS,

E. H. HENDERSON.