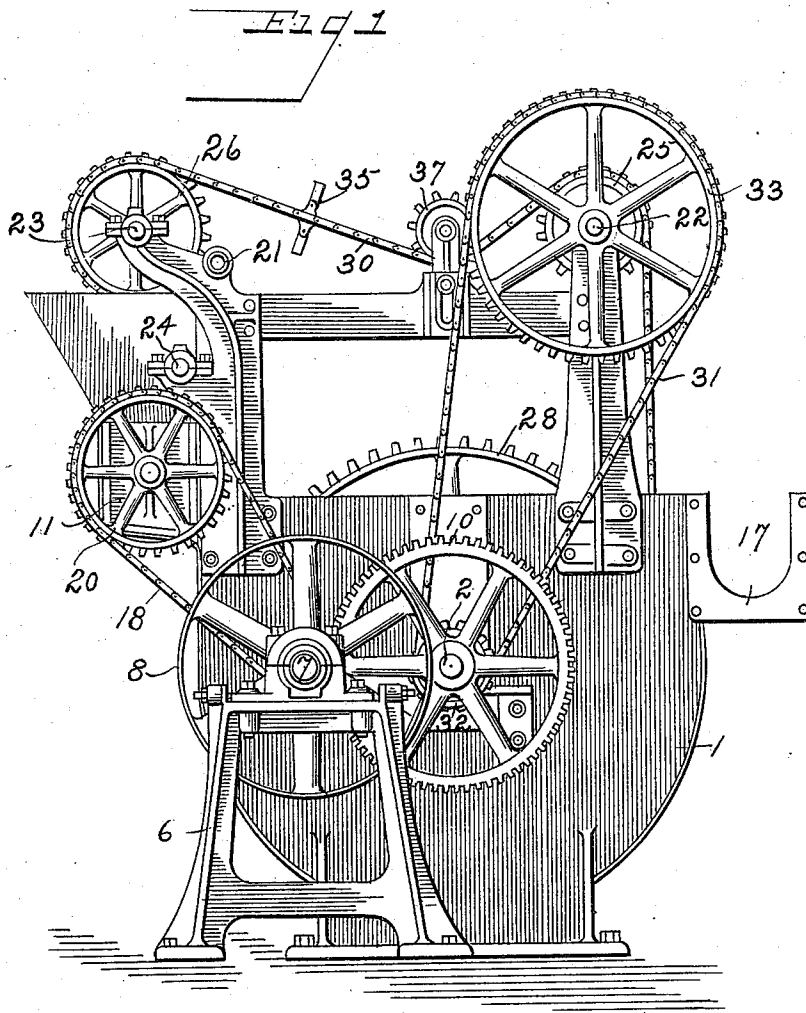


H. L. ORRMAN.
PAPER MAKING MACHINERY.
APPLICATION FILED SEPT. 5, 1908.

965,319.

Patented July 26, 1910.

4 SHEETS—SHEET 1.



Witnesses
Henry F. Nolan
Mabel B. Carr

384

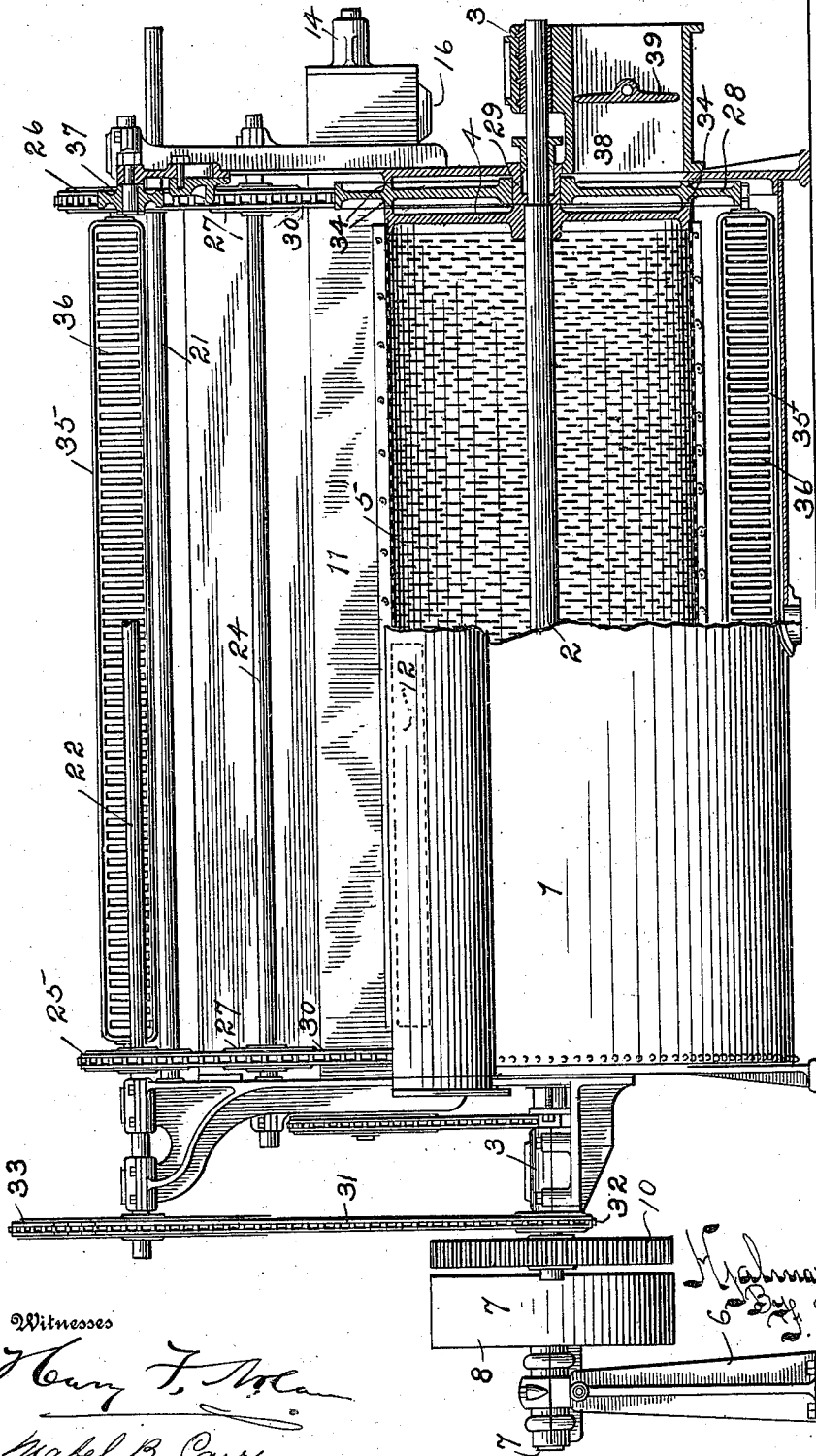
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4 SHEETS—SHEET 2.



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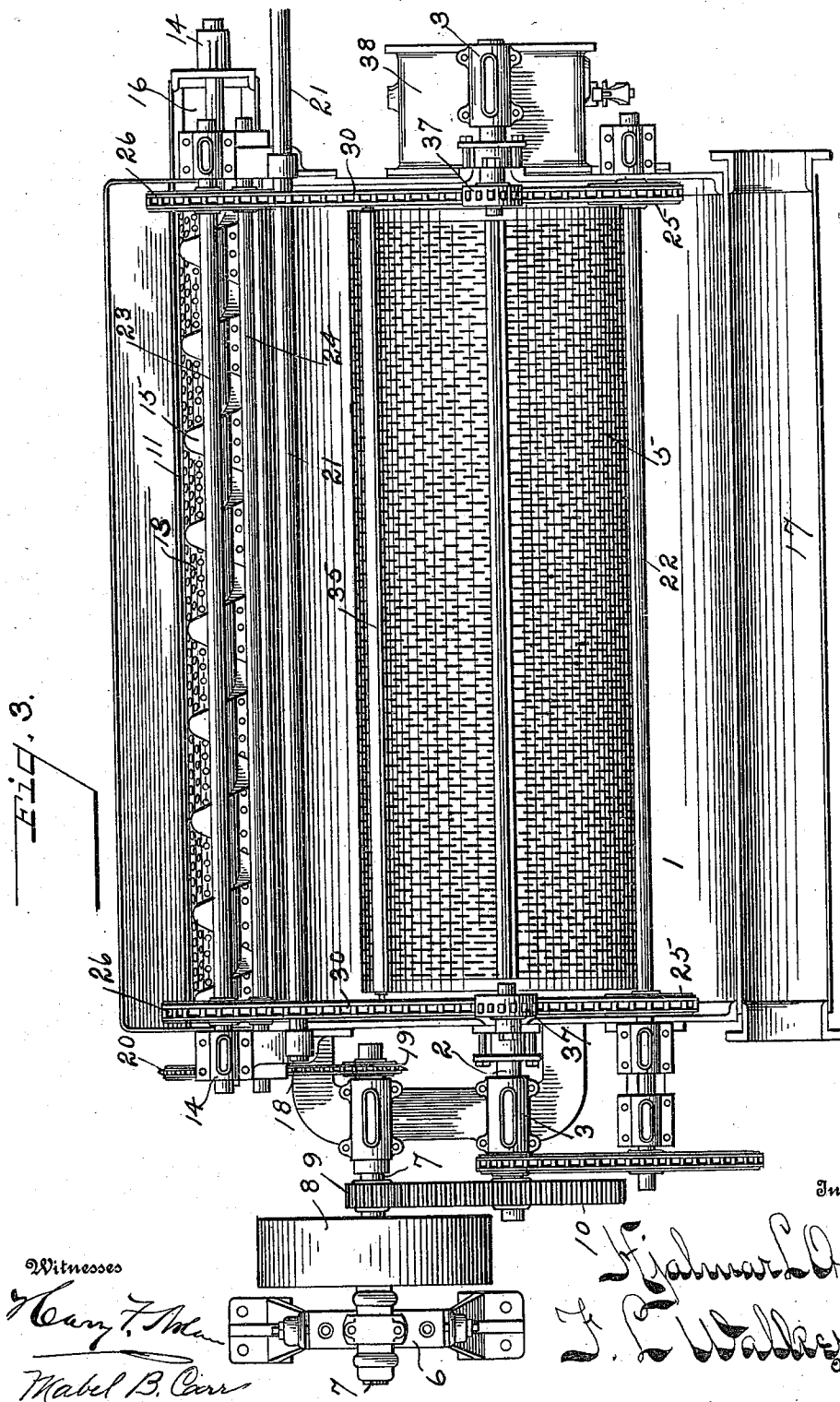
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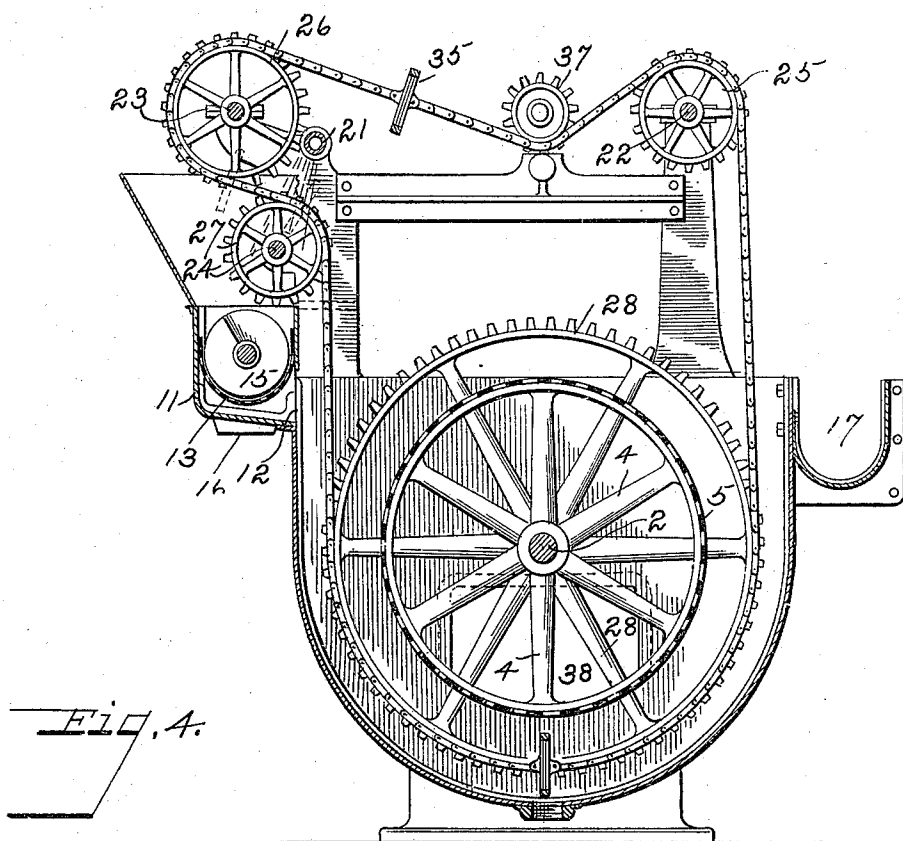


Fig. 4.

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UNITED STATES PATENT OFFICE.

HJALMAR L. ORRMAN, OF DAYTON, OHIO.

PAPER-MAKING MACHINERY.

965,319.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed September 5, 1908. Serial No. 451,790.

To all whom it may concern:

Be it known that I, HJALMAR LUDWIG ORRMAN, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Paper-Making Machinery, of which the following is a specification.

My invention relates to paper making machinery, and particularly to a forescreening machine adapted to remove from the paper pulp knots lumps and coarse foreign matter prior to the final screening and other washing operations.

The object of the invention is to greatly simplify the construction as well as the means and mode of operation of such machines whereby they will not only be cheapened in construction, but will be substantially automatic in operation, more efficient in service, easily operated, and unlikely to get out of repair.

With the above primary and other incidental objects in view as will more fully appear from the specification, the invention consists of the means, mechanism, construction, and mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the drawings, Figure 1 is an end elevation of the machine showing the sundry driving connections for the various operating parts. Fig. 2 is a side elevation partly in section of the assembled machine. Fig. 3 is a plan view of same. Fig. 4 is a transverse sectional view, viewed toward the discharge end of the machine.

Like parts are indicated by similar characters of reference throughout the several views.

By whatever processes paper may be manufactured the fibers or pulp usually contain more or less lumps or undissolved parts, such as knots and uncooked masses in the sulfite and soda processes, and sticks and slivers in the unscreened ground wood processes. By removing as many of such coarser portions as possible before the actual screening takes place, the efficiency of the screens will be materially increased, the wear and tear on the screen plates and incidental parts greatly reduced and the quality of the screened pulp or fiber very much improved.

Briefly stated the primary objects are attained in the following manner. The di-

lute fiber or pulp is fed into a vat containing a revolving cylinder having therein slotted openings or perforations of shape and size in accordance with the quality of the material to be screened. The desirable pulp passes through said perforations from the outside to the interior of the cylinder and is discharged through an outlet at the end of the vat, the undesirable coarse parts remaining outside the cylinder immersed in the fluid of the vat. As the surface of the revolving screen cylinder is substantially smooth, no rubbing, shaving or breaking of the coarse parts can occur. Supported on endless chains are scrapers which pass slowly through the liquid pulp in the vat and about the screen cylinder, and gently collect the coarse parts, removing them from the vat and dumping them in a spiral conveyer, by which they are discharged from the machine. The spiral conveyer is provided with a false perforated bottom; should any good fiber be discharged with the refuse, a spray pipe which plays on the conveyer will wash the fine material through the false bottom and back to the vat.

Referring in detail to the drawings, the machine comprises a vat 1 substantially semi-circular in cross section, and suitably supported, through which extends a revoluble shaft 2 journaled in bearings 3 at either end of the vat 1. Supported on the shaft 2 by a plurality of spiders 4 is a revoluble cylinder 5 composed of perforated plates or screens. The perforations of the screen cylinder may be of any suitable shape or size, according to the character of the stock to be screened. Journaled in bearings in a pedestal 6 or other suitable support or bracket is a drive shaft 7, carrying a drive pulley 8 and a spur pinion 9, meshing with a corresponding gear 10 on the cylinder shaft 2, by which the cylinder is caused to slowly revolve within the vat 1. Extending longitudinally along one edge of the vat 1 is a compartment 11, opening at 12 into the vat 1, and provided with a semicircular, perforated false bottom, 13. Mounted in suitable bearings 14 at each end of the compartment 11 and within the semicircular false bottom 13 is a helical conveyer 15, adapted to convey material longitudinally within said compartment and discharge same through a discharge orifice 16 in the bottom of the compartment adjacent to one end thereof. Located along the opposite edge of the vat 1 is an overflow

trough 17, the dividing wall between said trough and vat being substantially on level with the bottom of the spiral conveyer, whereby any surplus or over supply of pulp will not flow into the conveyer, but will overflow from the vat 1 into the trough 17 and will be returned by suitable conduits to the "stuff chest" or other supply reservoir. The conveyer 15 is driven by a sprocket chain 18 from a sprocket 19 on the drive shaft 7 to a sprocket 20 on the shaft of the conveyer. Extending longitudinally above the compartment 11 and adapted to discharge upon the helical conveyer 15 is a water spray pipe, 21.

Journalled in bearings in standards projecting upward from the vat 1 are longitudinal shafts 22, 23, and 24, each carrying a pair of sprocket wheels 25, 26, and 27 located on the respective shafts adjacent to the opposite ends of the vat. Mounted in the vat 1 at each end thereof and concentric with the screen cylinder is a pair of sprocket wheels 28, of a diameter larger than that of the screen cylinder.

In the drawings, Fig. 2, the sprocket 28 is shown as journaled on the inward projecting stuffing box 29 formed in the vat head, and through which the cylinder shaft 2 projects. It is obvious however, that the sprocket 28 might be journaled on the shaft 2, or on a special support otherwise provided within the vat 1.

About the sprockets 25, 26, 27, and 28 at each end of the machine is arranged an endless chain belt 30, best shown in Fig. 4, the chain and various shafts and sprockets being driven by a sprocket chain 31 from a sprocket 32 on the cylinder shaft 2, to a sprocket 33 on the shaft 25. The sprocket wheels 28 are provided with flanges 34 adjacent to the periphery thereof, which flanges register with the screen cylinder 5 and close the space between the ends of the cylinder and the heads of the vat 1, to prevent the intermingling of the screened and unscreened pulp, in the cylinder and vat. It will be noted that while the flange 34 of the sprocket 28 coöperates with the cylinder in separating the screened from the unscreened pulp, the sprocket 28 and cylinder are entirely independent in their movements, and by the system of gearing described they are driven at different rates of speed. Connecting the respective chain belts 30 at each end of the machine are a plurality of scraper blades 35, carried by said chain belts throughout their course of travel.

The scraper blades are preferably perforated, those of the drawings being shown as provided with slotted openings 36. The perforations of the blades may be of any desired size and shape, according to the character of the pulp. An idler sprocket 37 is provided for taking up slack in the chain belts 30.

In one end of the vat 1 is provided a discharge orifice 38, the lower edge of which registers with the lower portion of the screen cylinder 5, whereby the screened material is discharged from the interior of the cylinder. The discharge of the screened pulp is controlled by a damper or valve 39.

In operation the unscreened pulp is fed into the vat 1 from any suitable supply reservoir. The machine is driven through the drive shaft 6 and pulley 7. The cylinder 5 is caused to revolve within the vat 1 through medium of the gears 9 and 10. The pulp being in a semifluid state the softer and finer fibers will pass through the perforations of the screen cylinder 5 to the interior thereof, and is discharged from the machine through the orifice 38. At all times while the cylinder revolves the chain belts 30 are being driven over the sprockets 25, 26, 27, and 28, carrying the scraper blades 35 downward into the vat 1 at one side of the cylinder 5, the scraper blades passing under the cylinder and out of the vat at the opposite side. During their passage through the vat, the scraper blades not only agitate the pulp in the vat to assist the fine fibers through the screen cylinder, and prevent the clogging of the screen, but during their passage through the vat they strain or scoop the hard masses of material, knots, slivers etc., from the liquid mass of pulp in the vat, carrying such portions upward out of the vat and discharging them into the helical conveyer 15. The scraper blades 35 in their passage through the vat and around the screen cylinder maintain a position radial to the axis of the screen cylinder; they emerge from the pulp in a substantially horizontal position, carrying the coarse material strained from the pulp. As the supporting portion of the chains 30 pass over the sprockets 27 the blades are upturned as shown in dotted lines in Fig. 4, to dump the material carried thereby into the conveyer 15. Usually all good fiber will have separated from the knots, etc., before leaving the vat, and very little desirable pulp will be carried to the conveyer. However any fiber which clings to the coarse material will be removed and washed back to the vat by the spray of water which constantly plays on the conveyer 15 from the water supply pipe 21, the fine fiber being washed through the perforated false bottom 12 and thence through the open side of the compartment 11 to the vat 1.

While the scraper blades 35 may be of any suitable construction, they preferably comprise a rectangular frame, provided with a plurality of transverse bars.

From the above description it will be apparent that there is thus produced a machine of the character described, possessing the particular features of advantage before

enumerated as desirable, but which is susceptible of modification in its form, proportion, detail construction, and arrangement of parts without departing from the principles involved or sacrificing any of its advantages.

Having thus described my invention, I claim:

1. In a machine as described, a vat, a revoluble pulp screen, located within the vat, traveling screen members passing through the pulp intermediate the revolving screen and the walls of the vat, the path of travel of said screen members while within the vat being substantially concentric with the revoluble screen and the individual screen members occupying positions radial to their curved path of travel while within the vat, substantially as specified.

2. In a machine as described, a vat, a substantially circular pulp screen therein, traveling perforated members passing through the vat in an arcuate path and maintaining during their passage through the vat, a position radial in relation to their arcuate path.

3. In a machine as described, a vat, substantially more circular in cross section, a revoluble cylindrical pulp screen within said vat and concentric therewith, a pulp discharge conduit leading from the interior of said cylinder, traveling strainer members passing through said vat in a path substantially concentric with said cylinder and in proximity to the lower half of the periphery thereof and adapted to agitate the pulp within the vat and remove therefrom particles too coarse to pass through the screen, substantially as specified.

4. In a machine as described, a vat, a revoluble perforated cylinder within said vat, perforated scraper blades passing through said vat and about said cylinder in a path concentric with and adjacent to the periphery of said cylinder and adapted to strain from the pulp particles too coarse to pass through the perforations of the cylinder, substantially as and for the purpose specified.

5. In a machine as described, a vat, a main shaft extending through said vat, a revoluble perforated cylinder mounted on said shaft, a pulp outlet leading from the interior of said cylinder, pulleys mounted within said vat and concentric with said cylinder, endless belts passing over said pulleys, blades carried by said endless belts adapted to pass through the pulp in said vat about the exterior of said cylinder, a means for driving said cylinder and endless belts at different rates of speed, substantially as specified.

6. In a machine as described, the combination of a vat, a main shaft, a revoluble perforated cylinder on said shaft, pulleys

mounted within said vat and concentric with said cylinder, flanges on said pulleys registering with said cylinder and cooperating therewith to form a dividing wall to separate the screened pulp within said cylinder from the unscreened pulp in the vat outside said cylinder, substantially as specified.

7. In a machine as described, a vat, a revoluble perforated cylinder within said vat, pulleys mounted within said vat and concentric with said cylinder, endless belts passing over said pulleys, blades carried by said belts through the pulp within said vat and about said cylinder and adapted to remove from said vat coarse portions of the pulp, and a conveyer into which such coarse portions are discharged from said belts, substantially as specified.

8. In a machine as described, a vat, a compartment adjacent to said vat, a conveyer within said compartment, said compartment being provided with a perforated false bottom below said conveyer, means for removing from said vat certain portions of the pulp and discharging same into said conveyer, a water supply also discharging into said conveyer whereby the fine portions of said pulp will be washed through the perforated bottom of the compartment and returned to the vat, substantially as specified.

9. In a machine as described, the combination of a vat, perforated blades, means for passing said blades through the body of the pulp within said vat in a predetermined path of travel, said blades entering the vat in a substantially horizontal position and traveling through an arc of 180 degrees, maintaining a position radial to said arc and emerging from said vat in a horizontal position, means for causing said blades to assume a vertical position after leaving said vat whereby the material collected by the blades will be discharged therefrom, a compartment into which the material is discharged, a perforated false bottom in said compartment, and a means of communication between said compartment and vat whereby a portion of the material will be returned to the vat through said perforated bottom, substantially as specified.

10. In a machine as described, the combination of a vat, a revoluble perforated cylinder in said vat, a pulp discharge conduit located in the end of said vat and communicating with the interior of said cylinder and registering with the lowest portion of the periphery thereof, an overflow trough located at the side of said vat and above the level of the bottom of the vat, a dividing wall between said vat and overflow trough of less height than the remaining sides of said vat, substantially as specified.

11. In a machine as described, the combination of a vat, a pulp screen within said vat, members passing through the pulp with-

in said vat and adjacent to said pulp screen in a predetermined path of travel, and adapted to remove from the pulp coarse material and foreign matter and carry the same
5 from said vat, a conveyer adjacent to said vat into which such material is discharged, perforated bottom for the conveyer compartment, a water supply discharging into the said conveyer compartment, and a means
10 for returning the material washed through the perforated bottom of said compartment to said vat, substantially as specified.

12. In a machine as described, a semi-circular vat, a shaft extending through
15 said vat, and concentric with the lower portion thereof, a cylindrical revoluble pulp screen within said vat, members adapted to pass through the vat intermediate the pulp screen and the concentric walls of the vat,
20 and to remove from said vat the portions of the pulp too coarse to pass through said screen, a means for actuating said pulp screen and said members at different rates of speed, substantially as specified.

13. In a machine as described, a vat, a
25 revoluble perforated cylinder within said vat, a pulp outlet conduit communicating with the interior of said cylinder, pulleys located at each end of said cylinder and concentric therewith, flanges on said pulleys
30 registering with the said perforated cylinder and coöperating therewith to form a continuous wall between the respective heads of the vat separating the interior of said
35 cylinder from the exterior, endless belts carried by the respective pulleys, blades connecting the respective endless belts and adapted to enter the vat adjacent to one side thereof, passing beneath said cylinder and
40 emerge from the vat adjacent to the opposite side thereof, said blades being adapted to remove from the pulp within the vat coarse portions and foreign substances and

discharge the same beyond the walls of the vat, substantially as specified. 45

14. In a machine as described, the combination of a vat, a shaft extending through
said vat, a revoluble perforated cylinder mounted on said shaft, bosses projecting inward from the respective heads of said vat,
50 pulleys mounted on said bosses between the ends of said cylinder and the heads of the vat, endless belts passing over said pulleys, blades connecting the respective endless belts and adapted to pass through the pulp within
55 the vat agitating said pulp to assist its passage through the perforations of said cylinder, and adapted to remove from said vat coarse particles and foreign substances, substantially as specified. 60

15. In a machine as described, the combination of a vat, a pulp screen therein, blades adapted to pass through the pulp in said
vat in a predetermined path of travel, a compartment adjacent to said vat, and concentric therewith, a spiral conveyer in said
65 compartment, a perforated false bottom below said conveyer, a water supply discharging into said compartment, said blades being adapted to discharge material collected
70 from the pulp in said vat into said spiral conveyer, wherein the fine particles of pulp will be separated from the coarse material and returned to the vat through the perforated false bottom, while the coarse particles
75 are discharged from the machine by the action of said conveyer, substantially as specified.

In testimony whereof, I have hereunto set my hand this 1st day of September A. D. 80 1908.

HJALMAR L. ORRMAN.

Witnesses:

HARRY F. NOLAN,
F. L. WALKER.