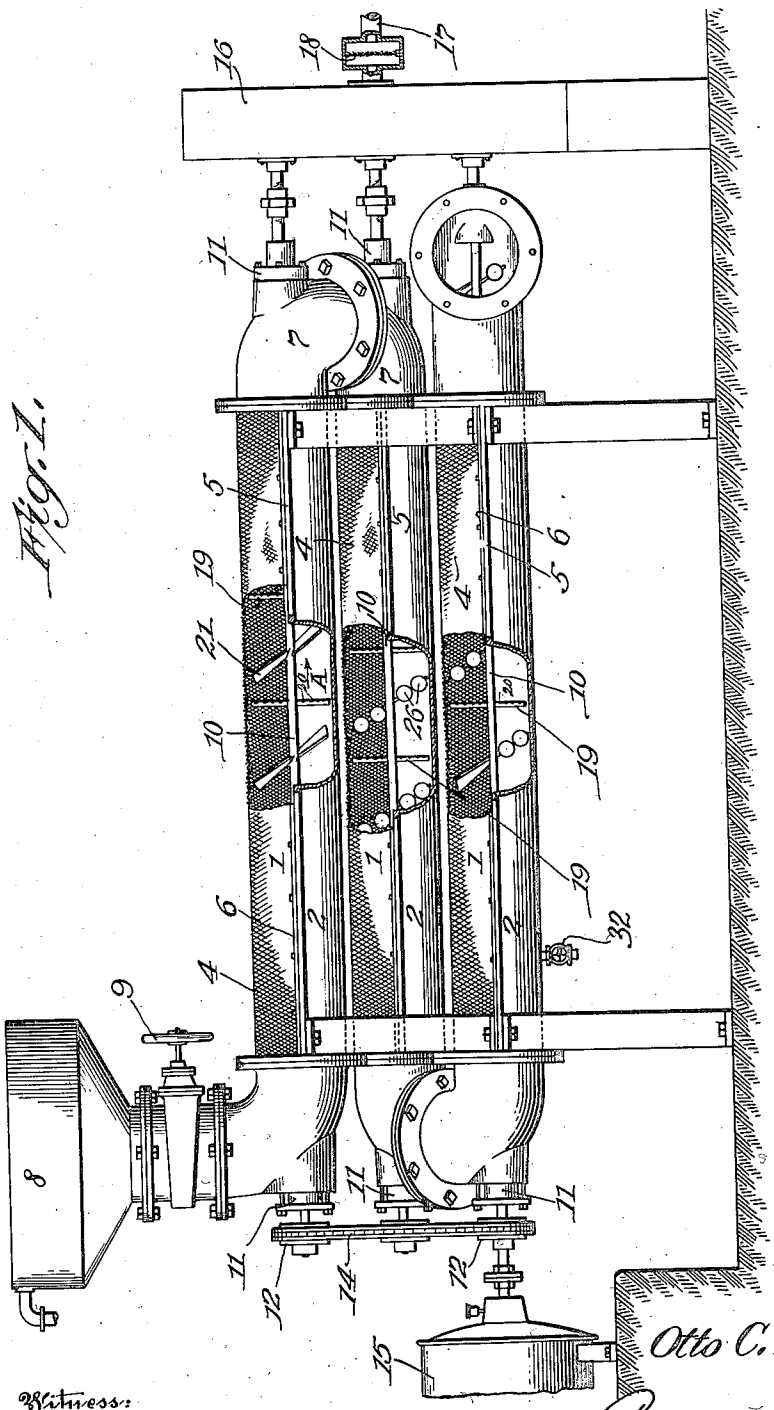
Sept. 18, 1923. 1,468,337

O. C. WINESTOCK

METHOD FOR WASHING PULP

Original Filed Sept. 17, 1917 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

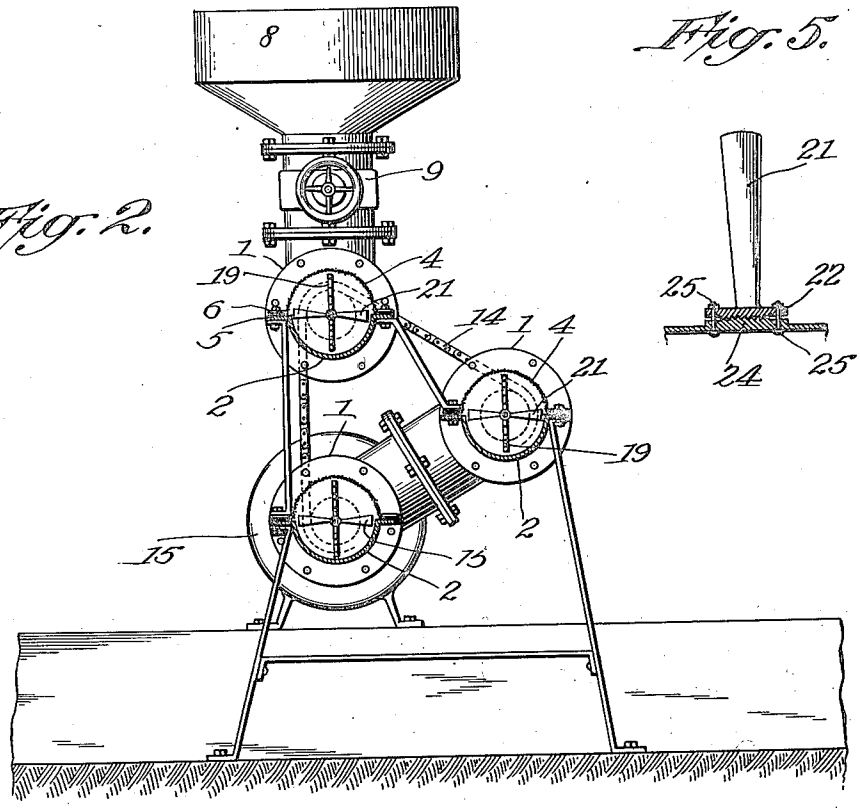


Fig. 5.

Fig. 3.

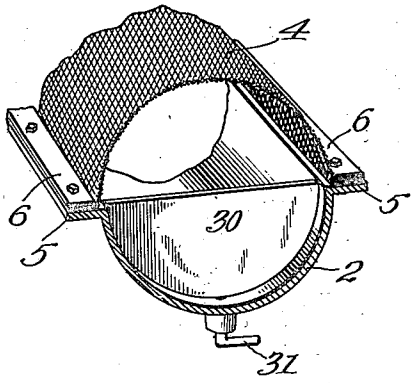
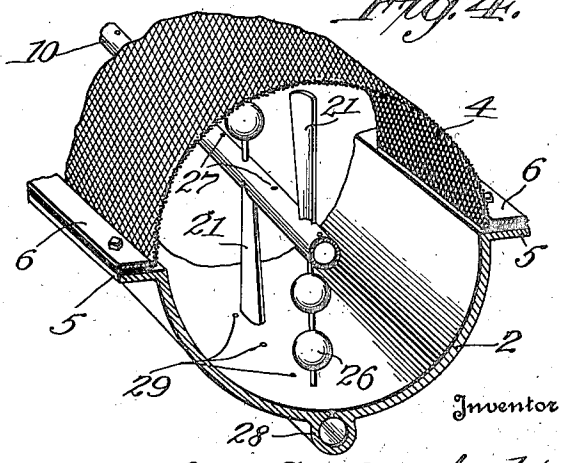


Fig. 4.



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UNITED STATES PATENT OFFICE.

OTTO C. WINESTOCK, OF PERKINSVILLE, VERMONT.

METHOD FOR WASHING PULP.

Application filed September 17, 1917, Serial No. 191,842. Renewed July 28, 1923.

To all whom it may concern:

Be it known that I, OTTO C. WINESTOCK, a citizen of the United States, and a resident of Perkinsville, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Methods for Washing Pulp, of which the following is a specification.

This invention relates broadly to washing apparatus, and more specifically to a pulp washing device adapted particularly for the use of paper manufacturers in rendering used or inked paper suitable for re-use.

The principal object of the present invention is to provide an improved method and apparatus for washing pulp, which apparatus may be operated continuously, the waste or dirty water used in washing being gradually thrown off so that it is not ground into the paper fibers.

A further object of the present invention is to provide a washing apparatus comprising a series of tubular washers through which the pulp is continuously passed, and so constructing the same that a considerable quantity of water may be kept therein to assist in the agitating, washing and flowing of the pulp.

Still another object of the present invention is to provide a series of tubes of the above nature having therein means for continuously agitating, washing and feeding the pulp.

A still further object of the present invention is to provide in such a washer means for regulating the amount of pulp contained therein.

These and other objects, together with their attendant advantages will be apparent as the invention becomes better understood by reference to the accompanying specification, and drawings forming a part thereof, throughout the several views of which like characters of reference have been used to indicate like parts.

In the drawings, Figure 1 is a side view of my improved washing apparatus.

Figure 2 is a cross sectional view illustrating the relative positions of the tubular washers.

Figure 3 is a detail view showing the adjustable dam or gate for regulating the quantity of pulp in the washer.

Figure 4 is an enlarged view of a modified form of washer.

Figure 5 is a detail view of an adjustable mounting for the agitating or propelling blades.

With machines and processes heretofore employed for washing paper pulp it has been difficult to obtain a washed pulp suitable for many uses for the reason that the ink and the like loosened from the used pulp has been ground or beat back into the fibers by the action of the washer. This results in a discoloration of the fibers which renders them objectionable for many purposes. With the present invention this objection is almost entirely eliminated inasmuch as the waste water is thrown off as it becomes dirty so that the fibers are continually subjected to the action of clean washing fluid.

Referring more particularly to the drawings, my improved washer preferably comprises a plurality of tubular members 1 which may be of any desired length depending upon the type of pulp to be washed, and the number of which may be varied at will depending upon the particular use of the machine. Each of the tubes preferably comprises an imperforate lower portion 2 in the form of a half tube, and an upper perforate portion 4 secured to the imperforate portion by means of the flanges 5 formed thereon, and the co-operating locking plates 6. The perforate portion of the tube may be constructed of ordinary heavy screening, or of sheet metal having a plurality of openings suitably punched therethrough. In order to construct the apparatus so that the smallest possible amount of room is utilized in installing the same, the tubes are preferably constructed in comparatively short sections which may be connected by elbows 7 so that they occupy the desired positions. While the elbows are indicated as being of solid material throughout, they may be constructed with a perforate portion in the same manner as the main body of the tubes in case such a construction is deemed advisable. The pulp to be washed is fed to a chest 8 having the usual overflow connection, and in communication with the tubes through a regulating valve 9 of any desired construction.

Extending longitudinally of the tubes, and projecting beyond the connecting elbows is a plurality of hollow shafts 10 journalled in suitable stuffing boxes 11 secured to the elbows. The shafts are adapted to be rotated by means of gears or the like 12 splined thereto in any well known manner, and

driven in unison by means of a connecting sprocket or the like 14 receiving power from any desired source 15. The shafts at their opposite ends are in communication with an equalizing water reservoir 16 connected with a suitable source of water supply 17 through a filtering or draining connection 18 so that a supply of clean water to the washer is insured. At desired intervals throughout the length of the shafts is a plurality of water fingers 19, secured on, or threaded into the shafts so as to extend radially thereof. The water fingers have formed therein a plurality of openings 20 which are preferably formed only on one side so that water issuing therefrom will assist the pulp in its travel through the apparatus as indicated by the arrows A. Obviously the arrangement of openings may, however, be changed so that jets may be projected therefrom in all directions. Secured to the shafts intermediate the water fingers, are propelling or conveying blades 21 having a suitable pitch to produce the desired feed of pulp through the apparatus as the shafts are rotated. In some instances the blades 21 may be mounted for adjustment so that the pitch may be varied at will by providing plates 22 having serrated or roughened surfaces adapted to interlock with the plates 24 on the shafts, the blades being secured thereto in adjusted position by means of locking bolts or the like 25.

It has been found by actual experiment that it is sometimes necessary to provide means in addition to the jets of water and the propelling blades for agitating the pulp during its passage through the washer. This may be accomplished by the use of agitators 26 which may be arranged to alternate with the conveying blades, or which may displace the same entirely throughout portions of the washer, so that the apparatus will function in the desired manner. The agitators, together with the propelling blades and the issuing jets of water, keep the pulp in the washer in a continual state of agitation, so that an intimate contact of the water with the individual fibers is insured. As the water, or other washing fluid, becomes soiled it is thrown off together with the solid particles or dirt which it may contain through the perforate upper portion of the tubular members. This feature is highly essential as it prevents the ink and grit freed from the pulp from being ground and beat back into the fibers by the continued action of the machine.

Instead of the arrangement shown more particularly in Figure 1, and just described, I may eliminate the water fingers 19 and place water openings 27 directly in the shafts 10. With such a construction additional supply pipes 28 may be disposed beneath the tubes, and provided with a series of openings 29 causing a plurality of upwardly moving jets to pass through the body of pulp for agitating and washing the same, and at the same time producing a lifting action which assists in the movement of the pulp through the washer. It will be apparent that this construction may be employed either independently of, or in connection with, the construction disclosed in Figure 1.

In order to keep at all times a body of pulp within the washer, I may provide an adjustable dam or gate 30 secured in the outlet end of one of the tubes and adapted to be moved to the desired position by means of an operating or controlling handle 31. This dam or gate is preferably so constructed that in its normal position of operation it closes the solid or imperforate portion of the tubes so that the apparatus is approximately half filled with pulp during operation.

Drain valves 32 may be positioned at desired intervals to permit cleaning the apparatus after it has been run for a considerable period of time. To assist in the cleaning, the shafts may be rotated and jets of water sprayed from the water fingers or openings to effect a thorough cleansing of the entire machine.

Actual use has demonstrated that a speed of from 300 to 400 revolutions a minute of the shafts 10 produces a successful washing of the pulp as it is continuously fed through the apparatus. It will be apparent, however, that the speed of the shafts is dependent to a considerable extent upon the pitch of the conveying blades and upon the number and length of the washing tubes. While I have shown and described the preferred embodiment of my invention for the continuous washing of pulp, it will be apparent that changes may be made therein within the scope of the appended claims without departing from the spirit thereof.

What I claim is—

1. The process of washing pulp, which consists in continuously feeding the pulp to a washing apparatus, maintaining a predetermined level of pulp therein, gradually moving the pulp through said apparatus without rolling the pulp washing said pulp during the movement thereof, and withdrawing the wash water from the upper portion of the pulp.

2. The process of washing pulp, which consists in continuously feeding the pulp to a washing apparatus, maintaining a predetermined level of pulp therein, gradually moving the pulp through said apparatus, and injecting a plurality of jets of washing fluid into the pulp from beneath the surface thereof for washing the same during movement thereof by upward moving washing currents.

3. The process of washing pulp, which

consists in continuously feeding the pulp to a washing apparatus, maintaining a predetermined level of pulp therein, agitating said pulp to produce a gradual movement thereof through the apparatus, without rolling the pulp adding water to said pulp to assist in the movement thereof and effect a washing of the same, and causing the water to be removed from adjacent the surface of the pulp.

4. The process of washing pulp, which consists in continuously feeding the pulp to a washing apparatus, maintaining a predetermined level of pulp therein, gradually moving the pulp through said apparatus, adding water thereto for washing the same during the movement thereof, and gradually throwing off the water in an upward direction from the upper portion of the pulp as it becomes dirty, with the direction of movement of the dirty water being at substantially right-angles to the travel of the pulp.

5. The process of washing pulp which consists in continuously feeding the pulp to a washing apparatus, maintaining a predetermined level of pulp therein, adding a washing fluid to cause feeding movement of the pulp, and to cause the dirt to rise through the pulp agitating said pulp and fluid without rolling to produce intimate association thereof, and removing the pulp at the same rate at which it is fed.

6. The process of washing pulp, which consists in continuously feeding the pulp to a washing apparatus, maintaining a predetermined level of pulp therein, adding a washing fluid to cause a feeding movement of the pulp, agitating said pulp and fluid without rolling to produce an intimate association thereof, and gradually throwing off the fluid in an upward direction as it becomes dirty, by lifting the pulp and fluid and throwing the fluid outwardly away from the pulp.

7. The continuous process of washing pulp which consists in supporting and transporting the pulp to be washed, then subjecting the pulp to a washing fluid in such manner that the fluid flows upwardly through the pulp at substantially right-angles to the travel of the pulp and escapes from the upper portion of the pulp mass whereby deleterious matter is removed from the pulp mass at that portion of the mass which is under the least hydrostatic pressure.

OTTO C. WINESTOCK.