

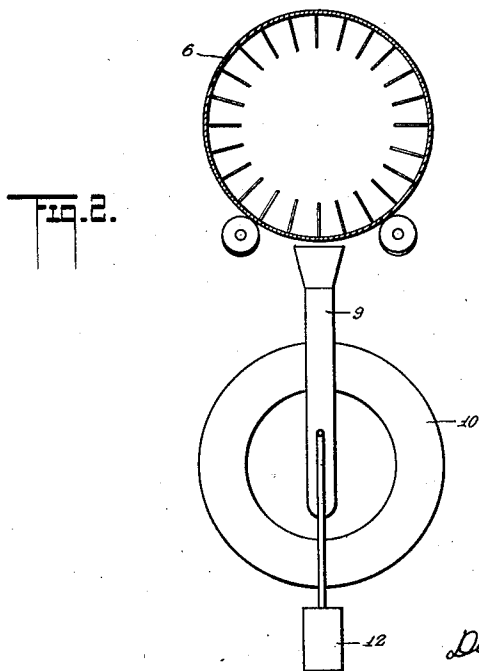
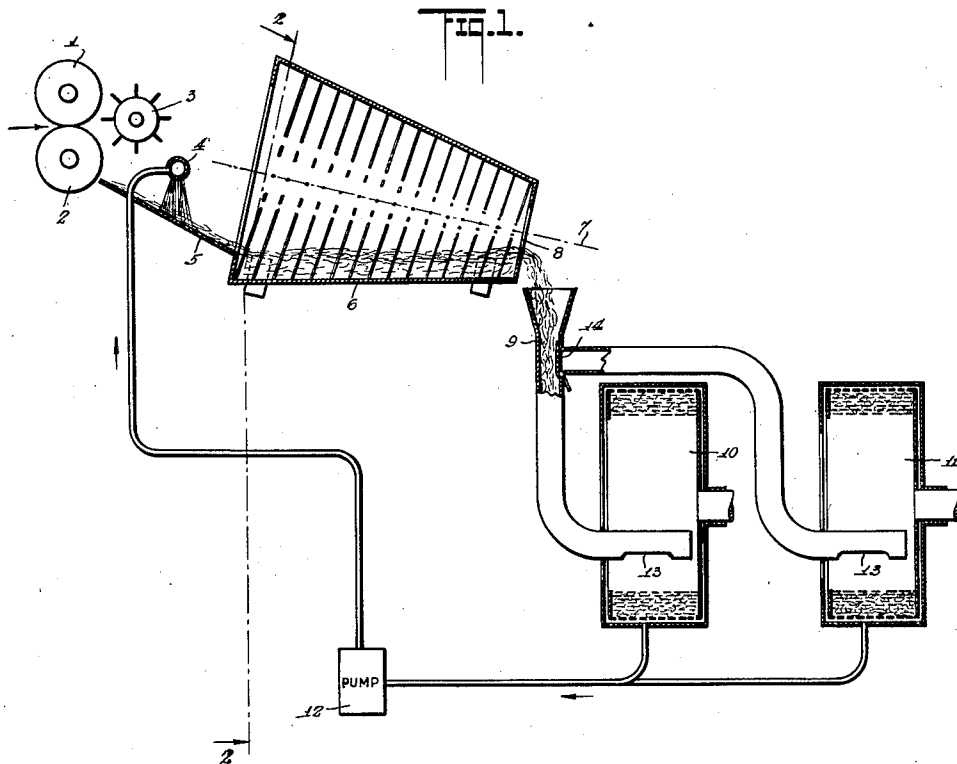
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WET PROCESS FOR TREATMENT OF FIBERS AND APPARATUS THEREFOR

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WET PROCESS FOR TREATMENT OF FIBERS AND APPARATUS THEREFOR

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This invention relates to the wet treatment of fiber masses, and provides means for the continuous delivery of the fibers through apparatus parts in which the fibers are disintegrated, washed, and then dried.

As one important feature the fibers are advanced through washing liquid continually decreasing in amount, and are then advanced together with the fluid to the drying or dehydrating mechanism. Thus, the wet treatment is effected in an even and continuous manner with the uninterrupted advance of the fiber mass in the fluid, and with the elimination of all chance of lump formation. The amount of fiber mass under treatment should be of such size that the fluid has sufficient time to be effective. The fibers and fluid progress automatically through the apparatus, the speed being optional but uniform. The fiber mass passes in a disintegrated state at a regular speed from the feeding device through the entire apparatus to the dehydrator.

In the accompanying drawing I have illustrated an apparatus which embodies important features of my invention and which may be employed for carrying out my improved process.

Fig. 1 is a somewhat diagrammatic view partly in elevation and partly in vertical longitudinal section, and

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

In carrying out my improved process in the apparatus illustrated, the fiber mass is delivered to a pair of feeding drums or rollers 1 and 2 which may be perforated if the fiber mass is wet, and may thus serve to squeeze out some of the moisture.

Beyond the feeding rollers 1 and 2 is a disintegrating device 3. This may consist of a cylindrical imperforate drum studded with pins or other projections which segregate the fiber mass coming from the feed rollers and deliver it in small flocks, short single threads, small lumps, or the like. Beyond the disintegrating device there is provided means for applying the treating liquid to the disintegrated material. This may comprise a spray nozzle 4 playing on a drain

board or chute 5 down which the disintegrated material is passed from the disintegrator 3. The drain board or chute leads to a rotatable drum 6. This has an imperforate peripheral wall and is preferably of trunco-conical form with the axis 7 so inclined that the lower side of the drum is horizontally disposed.

The feeding rollers and drain board are so disposed in respect to the drum 6 that the material is delivered at a uniform rate to an opening in the larger end of the drum 6. This washing drum 6 is provided upon its inner surface with pins or other form of projections arranged substantially helically. These projections advance the material toward the smaller end of the drum as the drum rotates, and at the same time they act to pick up fibers at the lower portion of the drum, carry them up the side of the drum, and drop them back into the drum at a point nearer the smaller end of the drum than that at which they were picked up.

At the smaller end of the drum there is a central opening 8 of such size as to leave an annular end wall determining the desired depth of liquid in the drum. This opening serves as the exit from the drum and delivers to a pipe 9.

As the drum is of larger diameter at one end than at the other, and as the lower side is substantially horizontal, it will be noted that with the liquid at the same depth at both ends of the drum there will be a larger amount of liquid at the larger end of the drum than at the smaller, and that the quantity of liquid continually decreases along the length of the drum from the inlet to the outlet end.

As the fibers are advanced at a substantially uniform rate it is apparent that they will be subjected to the action of a larger amount of liquid at one end of the drum than at the other, and that the minimum quantity of liquid will be delivered from the drum with the fibers, although there is an adequate quantity of liquid for proper treatment of the fibers at the larger end of the drum.

The conduit 9 delivers to a suitable de-

hydrator which is preferably a centrifugal. In order that the operation may be continuous there are preferably provided two of the centrifugals 10 and 11, and the pipe 9 is so constructed that it may deliver to either of them without delivering to the other. Merely to illustrate this diagrammatically, I have shown the two centrifugals in axial alignment, with the pipe 9 provided with openings 13 in each centrifugal. Any suitable means, as for instance a valve 14, may be employed for directing the liquid to either of the openings 13 in the centrifugals. Thus the two centrifugals may operate alternately and while one is being emptied of dried fiber, the liquid and fiber will be delivered to the other. Thus the delivery, disintegrating, and washing may take place continuously.

The liquid is preferably circulated in a closed cycle as long as it remains in condition for the proper treatment of the fibers. A pump 12 returns the separated liquid from the centrifugals to the spray nozzle 4.

The liquid which is used for the treatment of the fiber will of course depend upon the character of the fiber and the result desired. It may be water, chlorine solution, acid, alkali, oil, benzine, etc.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. An apparatus for the wet treatment of fibers, including a treating drum of frustro-conical form disposed with its axis inclined and its lower side substantially horizontal, and means for delivering fibers and treating liquid to the larger end of the drum and withdrawing them from the smaller end of the drum.

2. An apparatus for the wet treatment of fibers, including a treating drum of frustro-conical form disposed with its axis inclined and its lower side substantially horizontal, and means for delivering fibers and treating liquid to the larger end of the drum and withdrawing them from the smaller end of the drum, said drum having helically disposed rows of projections for advancing the fibers and for picking them out of the liquid and re-immersing them therein.

3. An apparatus for the wet treatment of fibers including a drum of frustro-conical form with its axis inclined and its lower side substantially horizontal, means within said drum for advancing the fibers and for picking fibers out of the liquid and dropping them back into it, means for delivering the fibers and treating liquid to the larger end of the drum, a fiber separator, means for delivering the liquid from the smaller end of the drum to said separator, and means for returning liquid from said separator for redelivery to the inlet end of said drum.

4. In combination, a pair of feed rollers for delivering fibrous material, a disinte-

grator, an inclined chute to which the disintegrated fibers are delivered, means for delivering a spray of treating liquid to said chute, a drum of substantially frustro-conical form, with its axis inclined and its lower side substantially horizontal, and having an inlet opening at its larger end receiving fibers and liquid from said chute, a centrifugal separator, and means for delivering fibers and liquid from the smaller end of the drum to said separator.

5. In combination, a pair of feed rollers for delivering fibrous material, a disintegrator, an inclined chute to which the disintegrated fibers are delivered, means for delivering a spray of treating liquid to said chute, a drum of substantially frustro-conical form, with its axis inclined and its lower side substantially horizontal, and having an inlet opening at its larger end receiving fibers and liquid from said chute, a centrifugal separator, means for delivering fibers and liquid from the smaller end of the drum to said separator, and means for delivering liquid from said separator to said spray-delivering means.

6. A process for the continuous wet treatment of fibers, which includes causing the treating liquid to flow in a predetermined direction, and advancing the fibers in the same direction and at a faster rate than said rate of flow by repeatedly lifting the fibers from the liquid, and returning them to the liquid at a point farther along in the direction of flow, whereby the ratio of fibers to liquid is increased along the course of the treating liquid.

Signed at New York, in the county of New York and State of New York, this 20th day of April, A. D. 1926.

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