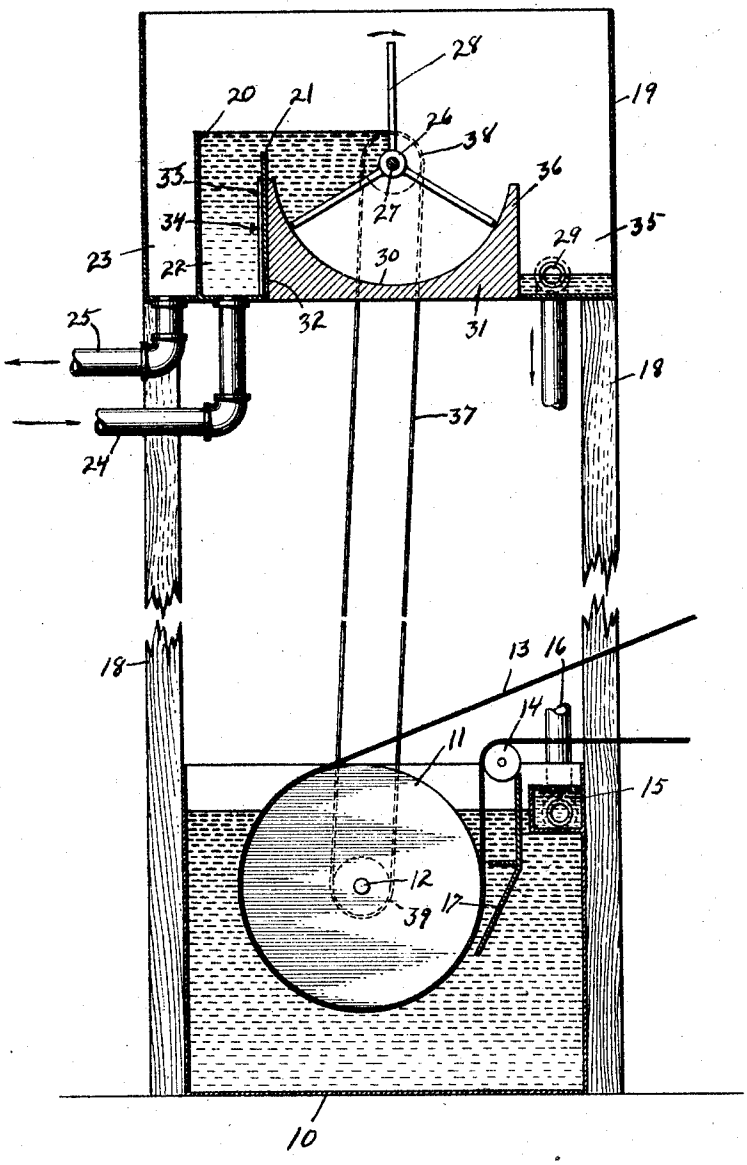
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PULP FEEDING DEVICE

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PULP-FEEDING DEVICE

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The present invention is concerned primarily with the provision of improved means for so regulating the flow of pulp stock to the pulp tank of a paper making machine that the fiber layer withdrawn from the tank by the endless moving collector web may be uniform and result in a consequent uniformity of the finished paper.

The invention is further concerned with the provision of an improved feed mechanism for delivering the pulp stock to the tank.

An object of the invention is to provide a pulp feed controlling means which will assure the presence in the pulp tank of the proper quantity of pulp at all times so that a uniform sheet of pulp may be withdrawn from the tank regardless of the speed of the collector web.

A further object of the invention is to provide a novel type of stock feeder for delivering the pulp stock to the tank, this feeder being positive in its operation and primarily intended to overcome the disadvantage of the non-positive pumping means now commonly employed for effecting such delivery.

Further objects of the invention are to provide both feeding mechanism and feed controlling mechanism of simple, practical construction, which will be rugged, durable and efficient in use and well suited to the requirements of economical manufacture, installation and operation.

In the preferred embodiment of the invention, a substantially uniform quantity of pulp stock is maintained in the pulp tank or vat by the simple expedient of synchronizing the pulp feed mechanism with the speed of the collector web. This may be accomplished by operating the feeder mechanism directly from the collector web driving means or by operating the feeder from any part of the machine which is synchronized with such driving means.

Preferably the feeder which is utilized and which represents an improvement over the non-positive pumping means at present in use, consists of a rotary measuring device delivering predetermined quantities of stock at each rotation.

By using such a device and synchronizing it with the speed of the collector web, it will be apparent that the pulp tank will always contain the proper quantity of fiber to result in the formation of a uniform fiber sheet on the travelling web regardless of variations in the speed of the latter.

The invention may be more fully understood from the following description in connection with the accompanying drawing which is a highly diagrammatic broken vertical sectional view taken through the pulp tank and its superjacent supply and feed mechanism.

In the drawing a pulp tank 10 has therein a drum 11 which is rotatable on a horizontal shaft 12. An endless web 13 of wire gauze or other suitable material passes around the drum 11, being led over suitable guiding rollers 14. The drum is for the most part immersed in the pulp stock which substantially fills the tank 10 and as the endless collector web 13 passes around the drum through the tank, certain of the fibers from the stock adhere to the web and are carried out of the tank in the form of an endless wet fiber sheet.

To avoid complexity of illustration I have not shown the suction mechanism of the drum which causes the fiber to adhere to the web nor have I illustrated the means for drying and stripping the fiber sheet from the web.

Arranged at one side of the tank 10 near the upper end thereof is a trough 15 into which the fiber stock flows through the supply pipe 16 and overflowing from the trough enters the tank 10.

A guard or deflector plate 17 is arranged within the tank 10 between the drum 11 and the trough 15 so that the inflowing pulp stock cannot come into contact with the web 13 until the stock has descended some distance into the tank and been mixed with the main body of fiber carrying liquid in the tank.

Supported at a higher level than the tank 10, as for instance on the standards 18, is a supply tank 19. This tank at one side is divided by a pair of transverse partitions 20 and 21 which together with the tank define the laterally adjacent inlet chamber 22 and overflow chamber 23. The inlet chamber is

connected to a supply pipe 24 and the overflow chamber is connected to an overflow pipe 25. The common wall 20 of the overflow and supply chambers is higher than the wall 21 of the supply chamber so that the liquid entering from the pipe 24 normally flows over the wall 21 into the body of the tank or rather flows into the tank to an extent limited by my improved liquid damming rotary feeder.

This feeder includes a hub 26 mounted on a shaft 27 extending transversely of the tank 19 at a level below the top of the partition 21. The hub 26 carries any suitable number of radial blades 28 extending the full width of the tank and cooperatively defining a series of liquid measuring pockets between them.

Means is provided for preventing the liquid from escaping directly past the feeder to the outlet 29 which connects with the pipe 16. This means consists of a curved sealing wall 30 struck from the center of the shaft 27 and against which the ends of the blades 28 snugly fit as the blades move through the lower portion of the tank 19. Preferably the wall 30 constitutes the concave upper surface of a solid block 31 resting on or forming part of the bottom of the tank 19. One vertical side wall 32 of this block may carry rails 33 in which the partition 21 is slidably vertically adjustable, a set screw being used to retain this partition in adjusted position. The outlet 29 is formed in the bottom of a pocket 35 defined by the opposite vertical end wall 36 of the block 31 and an end wall of the tank 19. The wall 36 may terminate below the top of the opposite partition of the block and somewhat below the horizontal plane of the shaft 27.

Any suitable means may be utilized for synchronizing the speed of rotation of the feeder and the speed of rotation of the web 13. For illustrative purposes, I have shown this means somewhat diagrammatically as an endless belt 37 running around pulleys 38, 39 carried by the feeder shaft 27 and the drum shaft 12 respectively.

The operation of the feeder is substantially as follows:

Assume the feeder to be rotating in a clockwise direction. When one of the blades 28 reaches a position where its free end is adjacent the upper edge of the partition 21 this blade will be inclining downwardly towards the hub, and with the blade in advance of it, will define a pocket in which a certain amount of stock will be entrapped, the exact quantity depending upon the liquid level of the stock confined between the feeder and the overflow wall 20.

By the time the advance blade of this pocket reaches a point where its free end is substantially at the level of the top of wall 36, the pocket will have moved through substantially 180° and its lower wall will incline downwardly from the shaft 27 to the partition wall 36 permitting the liquid which has been carried by the measuring pocket to spill into the pocket 35 and flow through the outlet 29 and pipe 16 into trough 15. In case the feeder is turning at a high speed the discharge of the contents of the measuring pockets into the pocket 35 will be aided by centrifugal force.

It may also be noted that the feed mechanism might be rotated in counter-clockwise direction, in which event the total feed at each revolution would be substantially equal to the full cubic capacity of the entire series of measuring spaces which would be cooperatively defined by adjacent pairs of blades and the trough wall 30, assuming the inflow to be rapid enough in proportion to the speed of the feeder. The free edge of at least one blade is always higher than the overflow partition 20, so that the liquid can never flow directly over the top of the feeder to the outlet.

The length of the wall 30 will depend primarily upon the distance between the ends of adjacent blades of the feeder, this wall being in any event longer than an arc struck from the shaft 27 and connecting the ends of two adjacent blades. By this arrangement as one blade clears the wall 32 and permits the liquid to flow into the trough formed by the block 31 the following blade will have moved into sealing engagement with the wall 31 to prevent any direct flow through this trough under the feeder blades to the outlet.

The manner in which the synchronism of the feeder and the drum assures the production of a substantially uniform sheet of fiber on the collector web 13 will be obvious. As the speed of travel of the web increases, the speed of the drum will increase. Consequently the feeder will speed up and deliver more fiber to the tank 10. As the speed of the web 30 decreases the speed of the feed mechanism is consequently reduced and I thereby avoid the formation of a fiber sheet which is unduly thick or unduly thin at certain portions as is now the case when non-positive feeding mechanism is used and inadvertent speed variations sometimes occur in the travel of the web, and there is no synchronization between web and feeder.

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

1. In a stock feeding mechanism for paper making machines, a tank, a supply chamber having an inlet in its bottom and an overflow chamber between the supply chamber and one wall of the tank having an outlet in its bottom, a pocket adjacent the opposite side wall of the tank having an opening adjacent its bottom, a rotary feeder interposed between the supply chamber and pocket, and means coacting therewith to dam free flow of

stock from the supply chamber into the pocket.

2. In a stock feeding mechanism for paper making machines, a tank, a supply chamber adjacent one side of the tank having an inlet in its bottom, a pocket adjacent the opposite side of the tank having an outlet in its bottom, a rotary feeder interposed between the supply chamber and pocket, and means coacting therewith to dam free flow of stock from the supply chamber into the pocket, said feeder including a transverse supporting shaft and a series of radial blades mounted thereon and extending the full width of the tank.

3. In a stock feeding mechanism for paper making machines, a tank, means for supplying liquid at one side of the tank, means through which the liquid flows to discharge from the opposite side of the tank, a rotary feeder interposed between supply and discharge means, and means coacting therewith to dam free flow of stock from the supply means to discharge, said feeder including a transverse supporting shaft and a series of radial blades mounted thereon, and coacting means comprising a curved sealing wall constituting part of the tank bottom and against which the free ends of the blades snugly fit as they move through the lower end of the tank.

4. In a stock feeding mechanism for paper making machines, a tank, a supply chamber having an inlet in its bottom, a pocket adjacent the opposite wall of the tank having a discharge opening in its bottom, a rotary feeder interposed between the supply chamber and pocket, and including a transverse supporting shaft and a series of radial blades mounted thereon, and a curved sealing wall constituting part of the tank bottom and against which the free ends of the blades snugly fit as they move through the lower end of the tank, said wall being lower at the end thereof near the pocket than at the end adjacent the supply chamber.

5. In a stock feeding mechanism for paper making machines, a tank, means for supplying liquid at one side of the tank, means through which the liquid flows to discharge from the opposite side of the tank, a rotary feeder interposed between supply and discharge means, and including a transverse supporting shaft and a series of radial blades mounted thereon and a curved sealing wall constituting part of the tank bottom and against which the free ends of the blades snugly fit as they move through the lower end of the tank, said wall being of greater length than an arc struck from the axis of rotation of the feeder and connecting the two adjacent blades.

6. In a stock feeding mechanism for paper making machines, a tank, means for supplying liquid at one side of the tank, means through which the liquid flows to discharge from the opposite side of the tank, a rotary feeder interposed between supply and discharge means, and including a transverse supporting shaft and a series of radial blades mounted thereon, and a curved sealing wall constituting part of the tank bottom and against which the free ends of the blades snugly fit as they move through the lower end of the tank, said wall being formed by the concave upper surface of a block arranged in the tank bottom.

7. In a stock feeding mechanism for paper making machines, a tank, means for supplying liquid at one side of the tank, means through which the liquid flows to discharge from the opposite side of the tank, a rotary feeder interposed between supply and discharge means, and including a transverse supporting shaft and a series of radial blades mounted thereon, and a curved sealing wall constituting part of the tank bottom and against which the free ends of the blade snugly fit as they move through the lower end of the tank, said wall being formed by the concave surface of a block arranged in the tank bottom, the end walls of said block being vertical, one of them cooperating with a tank wall to define the pocket.

8. In a stock feeding mechanism for paper making machines, a tank, means for supplying liquid at one side of the tank, means through which the liquid flows to discharge from the opposite side of the tank, a rotary feeder interposed between supply and discharge means, and including a transverse supporting shaft and a series of radial blades mounted thereon, and a curved sealing wall constituting part of the tank bottom and against which the free ends of the blades snugly fit as they move through the lower end of the tank, said wall being formed by the concave surface of a block arranged in the tank bottom, the end walls of said block being vertical, one of them cooperating with a tank wall to define the pocket, and the other of them guiding the vertical adjustment for partition defining one side of the supply chamber.

9. In a stock feeding mechanism for paper making machines, a tank, a supply chamber having an inlet therein, and one wall of the tank having an outlet in its bottom, a pocket adjacent the opposite side of the tank having a discharge opening therein, a rotary feeder interposed between the supply chamber and pocket, and means coacting therewith to dam free flow of stock from the supply chamber into the pocket, said feeder including a transverse supporting shaft and a series of radial blades mounted thereon and extending the full width of the tank, the axis of rotation of the feeder being above the top of the pocket and below the level of the lower wall of the supply chamber.

10. A stock feeding mechanism for paper making machines, including a tank having an upwardly facing concave wall, a rotary measuring device including a horizontal shaft coaxial with said wall and having a series of blades movable along said wall during the rotation of said shaft, separate outlets at the opposite ends of said tank, a partition between one of said outlets and said wall, and means for delivering stock between said partition and said wall.

11. A stock feeding mechanism for paper making machines, including a tank having an upwardly facing concave wall, a rotary measuring device including a horizontal shaft coaxial with said wall and having a series of blades movable along said wall during the rotation of said shaft, separate outlets at the opposite ends of said tank, a pair of partitions between said wall and one of said outlets, one of said partitions being adjustable in height, and means for delivering stock to the space between said partitions.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 22 day of May, A. D. 1928.

HARRY E. HOLCOMB.