Dec. 3, 1929. J. E. BOND 1,737,701

AGITATOR

Filed March 5, 1928

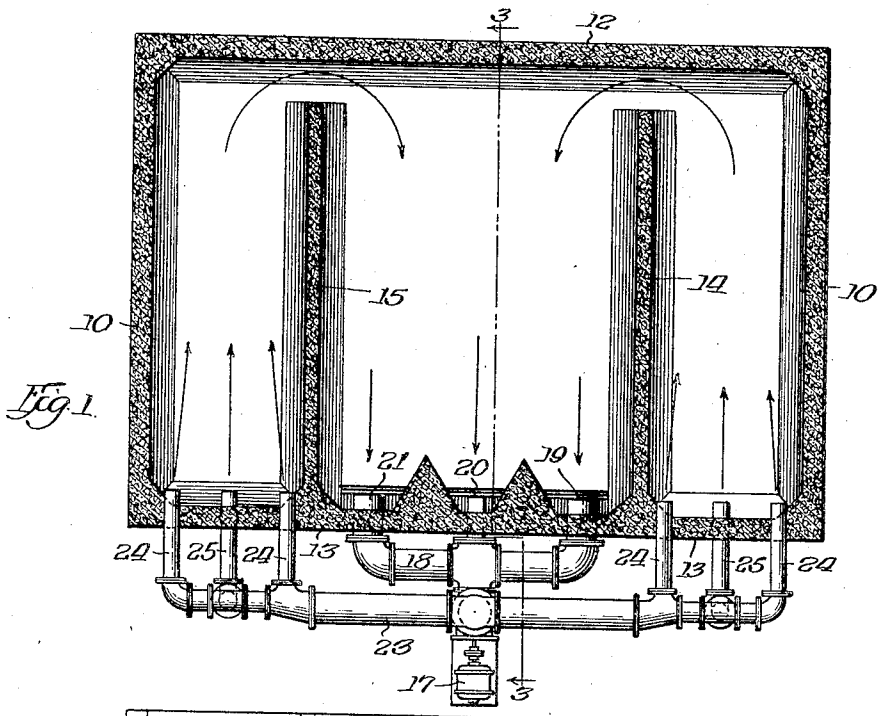


Fig. 1.

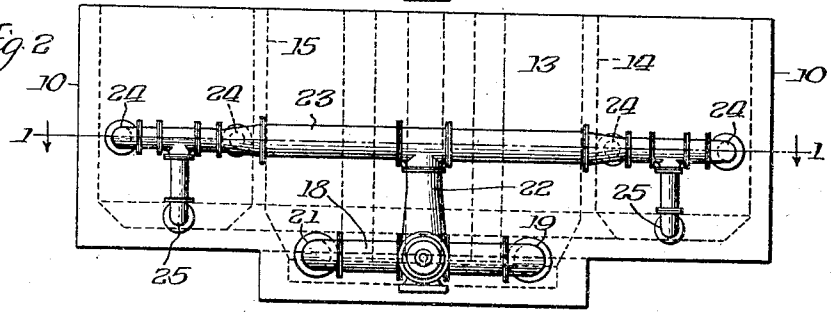


Fig. 2

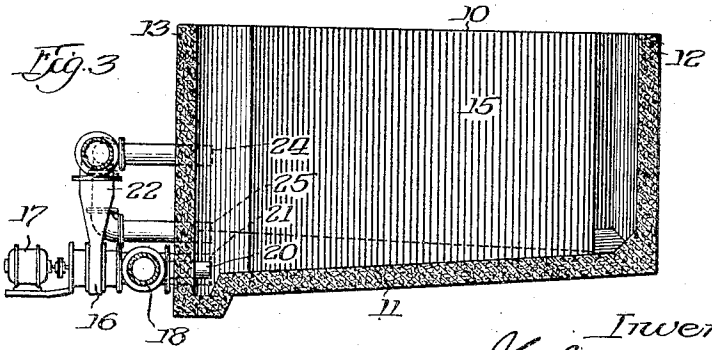


Fig. 3

Witness:

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UNITED STATES PATENT OFFICE

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AGITATOR

Application filed March 5, 1928. Serial No. 259,082.

My invention relates to the art of paper making and particularly to means for agitating paper pulp.

In the development of the art it has been found possible to greatly increase the capacity of a given equipment by increasing the density (or, in other words, lessening the fluidity) of the pulp during its treatment preceding delivery to the Fourdriniers. While in the old practice a 2½% pulp was considered proper and of the maximum density possible, it is now common to deal with 6% solutions, with correspondingly increased production capacity.

However, many difficult problems are encountered in handling pulp of this density due to its lack of fluidity and its tendency to mass or cake in the storage or treatment tanks and containers. This tendency is inherent in the nature of the material under treatment due to its fibrous character and to the physical law of attraction of solids. The liquid within which the solids are carried serves merely as a supporting medium therefor and facilitates rather than hinders the massing and intertwining of the fibers.

To avoid massing and stratifying of the pulp in the liquid and to maintain a uniform density throughout the entire body of material it must be kept in motion and the motion producing means should have a tendency to break up and tear apart any large or small masses of pulp. In the old practice the mixture was kept in motion by means of paddles or impellers in the tank, but this apparatus had very little tendency to break up masses of pulp, and was wholly ineffective with stock of increased density. Furthermore, such apparatus required an outlay of power not commensurate with the results secured.

The tanks, chests or containers which are in place and must be utilized for the new plan of operation are of many and varied forms, all of great size, some narrow and of great length, some deep and some round. The problem has been, therefore, to provide means applicable to these various forms of tanks that would insure effective circulation, the breaking up of pulp masses and the maintenance at all times of a proper consistency throughout the whole volume of material, with a minimum of power expenditure.

In general the result is accomplished by utilizing a pump having a revolving rotor, drawing stock from the tank at a single point and then discharging it at a plurality of points at a different level from that of the intake. This of necessity compels a breaking up of the solids, insures constant motion and prevents stratification.

The invention will be more readily understood by reference to the accompanying drawings, in which—

Fig. 1 is a sectional elevation of an agitator constructed in accordance with my invention;

Fig. 2 is an end elevation thereof, and

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

In the drawings I have illustrated a large rectangular tank preferably constructed of concrete and comprising side walls 10, an inclined floor 11 and end walls 12, 13. Located within the tank and extending parallel to the side walls 11 are division walls 14, 15 terminating short of the end wall 12 and connected to the end wall 13. The interior angles of the tank are filleted to facilitate the circulation of the mass of pulp therein.

Located near the end wall 13 and exteriorly thereof is a large screw pump 16, the impeller or rotor of which is operated by a motor 17. The inlet to the pump is in the form of a header 18 having a plurality of inlet pipes 19, 20, 21 which project through the wall 13 and communicate with the middle compartment of the tank at a point near the floor 11 and preferably at the lowest point thereof.

The outlet pipe 22 from the pump projects upwardly and communicates with a header 23 extending laterally in both directions and terminating in a plurality of nozzles. The nozzles 24 project through the end wall 13 at a considerable elevation above the floor of the tank, while the nozzles 25 project through said wall at a much lower elevation.

In operation a quantity of pulp being in

the tank and the motor in operation, the semi-liquid material is drawn in through the inlet pipes that communicate with the middle compartment. It is then discharged through the nozzles at various elevations into the side compartments through which it flows around the baffles 14, 15 and returns to the middle compartment. The provision of the discharge nozzle at different elevations insures a constant movement of the body of liquid without the formation of quiescent zones within which the material may stratify or become massed.

It is obvious that the number of inlet and discharge nozzles may be varied to adapt the construction to different designs and other modifications may be made in the construction shown without departure from the spirit of my invention.

I claim:

1. In an agitator, the combination of a tank, means providing a pair of longitudinal baffles therein to thereby divide the tank into three compartments that are in communication at one end of the tank, a pump exterior to the tank, means providing an inlet to the pump from the middle compartment and means providing discharge outlets from the pump into the two side compartments.

2. In an agitator, the combination of a tank, means providing a pair of longitudinal baffles therein to thereby divide the tank into three compartments that are in communication at one end of the tank, a pump exterior of the tank, means providing a plurality of inlets to the pump from the middle compartment and means providing discharge outlets from the pump into the two side compartments.

3. In an agitator, the combination of a tank, means providing a pair of longitudinal baffles therein to thereby divide the tank into three compartments that are in communication at one end of the tank, a pump exterior of the tank, means providing an inlet to the pump from the middle compartment and means providing a plurality of discharge outlets from the pump into each of the two side compartments.

4. In an agitator the combination of a tank, means therein providing a middle and a plurality of side compartments all of which are in communication at one end of the tank, a pump having an intake communicating with the middle compartment at the bottom thereof and a discharge outlet in the form of a plurality of nozzles communicating with the side compartments at a point materially above the bottoms thereof.

5. In an agitator the combination of a tank, means therein providing a middle and a plurality of side compartments all of which are in communication at one end of the tank, a pump having an intake communicating with the middle compartment at the bottom thereof and a discharge outlet in the form of a plurality of nozzles communicating with the side compartments at various points in the height thereof.

6. In combination, a tank, baffles therein providing a middle and a plurality of side compartments all in communication at one end of the tank, a single, exterior pump having a plurality of inlets from the bottom of the middle compartment and a plurality of outlets to each of the side compartments at different levels therein.

7. In an agitator, the combination of a tank means providing a pair of longitudinal baffles therein to thereby divide the tank into three compartments that are in communication at one end of the tank, a pump exterior to the tank, means providing an inlet to the pump from the middle compartment and means providing discharge outlets from the pump into the two side compartments, the middle compartment having its floor inclined downwardly toward the inlet to the pump.

In testimony whereof I have affixed my signature.

JOSEPH E. BOND.