Dec. 3, 1929. J. E. BOND 1,737,703

AGITATOR

Filed March 5, 1928

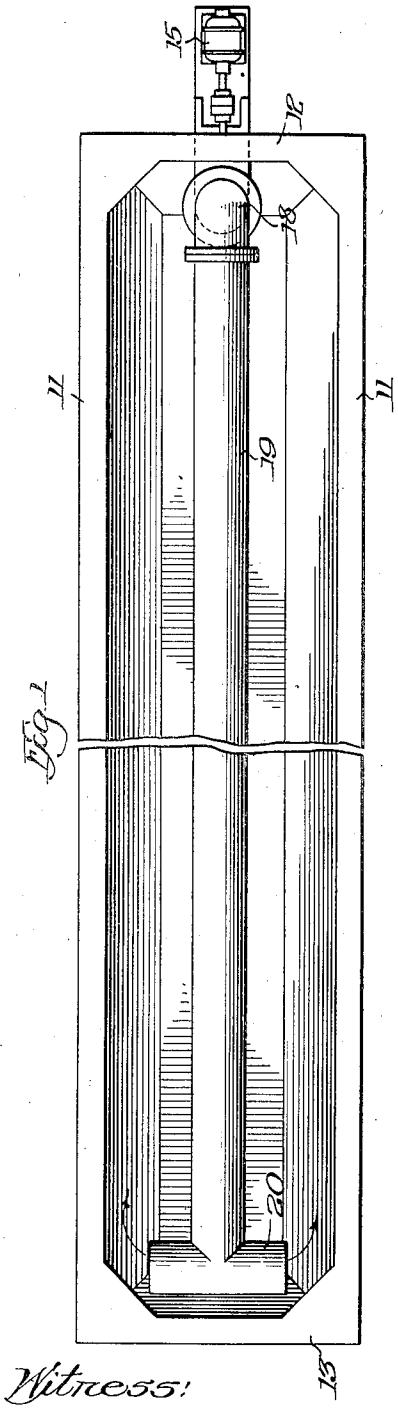


Fig. 1

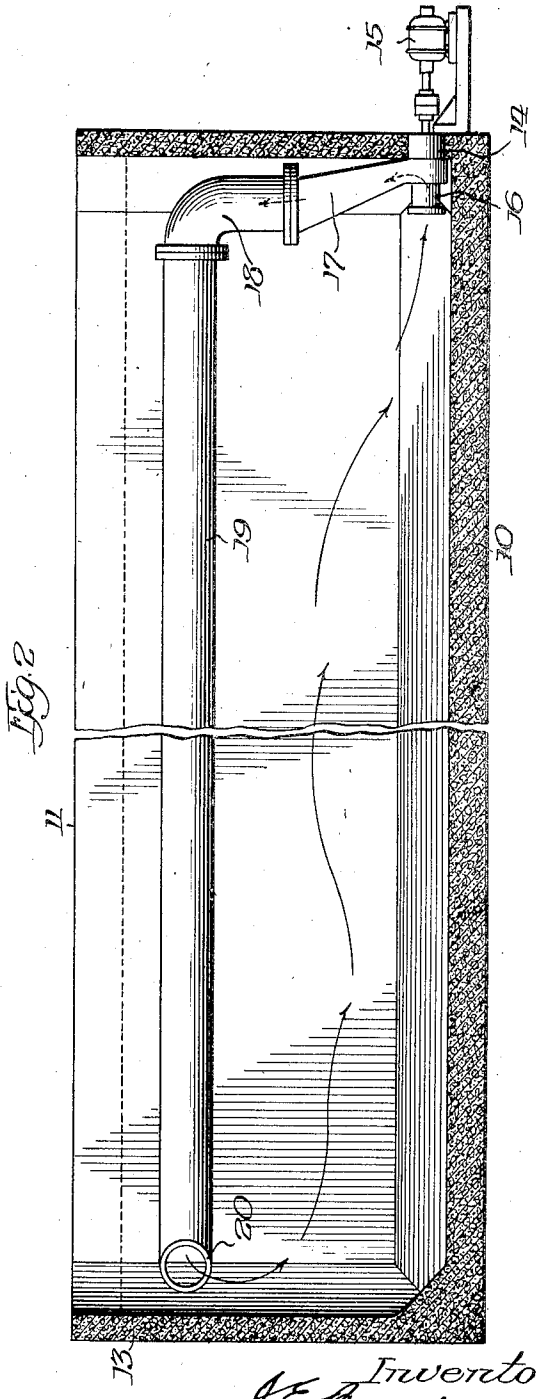


Fig. 2

Witness:
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UNITED STATES PATENT OFFICE

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AGITATOR

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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 liqud 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 drawing, in which—

Fig. 1 is a plan view of an agitator arranged in accordance with my invention, and

Fig. 2 is a longitudinal sectional view therethrough.

In the drawing, I have illustrated a tank usually about 70 feet in length, the walls of which are constructed of concrete. The tank comprises a floor, 10, side walls 11, and end walls 12, 13. At the bottom and at one end as well as at the vertical corners of the walls I provide large fillets which serve to facilitate the circulation of the liquid within the tank.

A screw pump 14 is mounted within the end wall 12, it being operated by means of a motor 15. An inlet pipe 16 is located at a point close to the floor 10, while the outlet pipe 17 projects upwardly from the pump, connects to an elbow 18 and to a long pipe 19, extending longitudinally of the tank at the middle and near the top thereof. The pipe 19 terminates in a T 20 by means of which the liquid discharged through the pipe is caused to be directed oppositely at a point near the upper level of the pulp.

The pump being in operation and a quantity of pulp being placed in the tank, it is drawn into the inlet pipe, through the pump and thence outwardly along the pipe 19 to the discharge end thereof at the extremity of the tank. This results in a continuous and effective circulation of the liquid preventing stratification and serving to prevent cohesion of the pulp articles.

One of the principal forces tending to disintegrate and prevent cohesion of the fibrous pulp particles is that of the screw pump, the

action of the blades of the propeller of which tends to agitate and disseminate the particles throughout the liquid carried. A similar action is not secured by any other form of pump.

Obviously the exact form and arrangement may be changed within limits without departure from the spirit of my invention.

I claim:

1. In combination, a relatively long and narrow horizontally disposed tank, a pump at one end thereof, said pump having an inlet at the bottom of the tank, and a pump discharge pipe extending longitudinally and substantially the entire length of the tank ending near the top of the tank.

2. In combination, a relatively long and narrow horizontally disposed tank, a pump at one end thereof, said pump having an inlet at the bottom of the tank, and a pump discharge pipe extending longitudinally and substantially the entire length of the tank ending in a plurality of lateral outlets.

3. In an agitator, the combination with a very long and narrow horizontally disposed tank, of a pump located at one end of the tank, and having an inlet at substantially the level of the bottom of the tank, and a conduit connected to the discharge from the pump, said conduit extending substantially the entire length of the tank and within the same and having its outlet at a point near the top of the tank.

4. In an agitator, the combination with a very long and narrow horizontally disposed tank, of a pump located at one end of the tank, and having an inlet at substantially the level of the bottom of the tank, and a conduit connected to the discharge from the pump, said conduit extending substantially the entire length of the tank and within the same and having a plurality of outlets at the far end of the tank near the top thereof.

In testimony whereof I have affixed my signature.

JOSEPH E. BOND.