Dec. 3, 1929. J. E. BOND 1,737,699

AGITATOR

Filed March 5, 1928

Fig. 1.

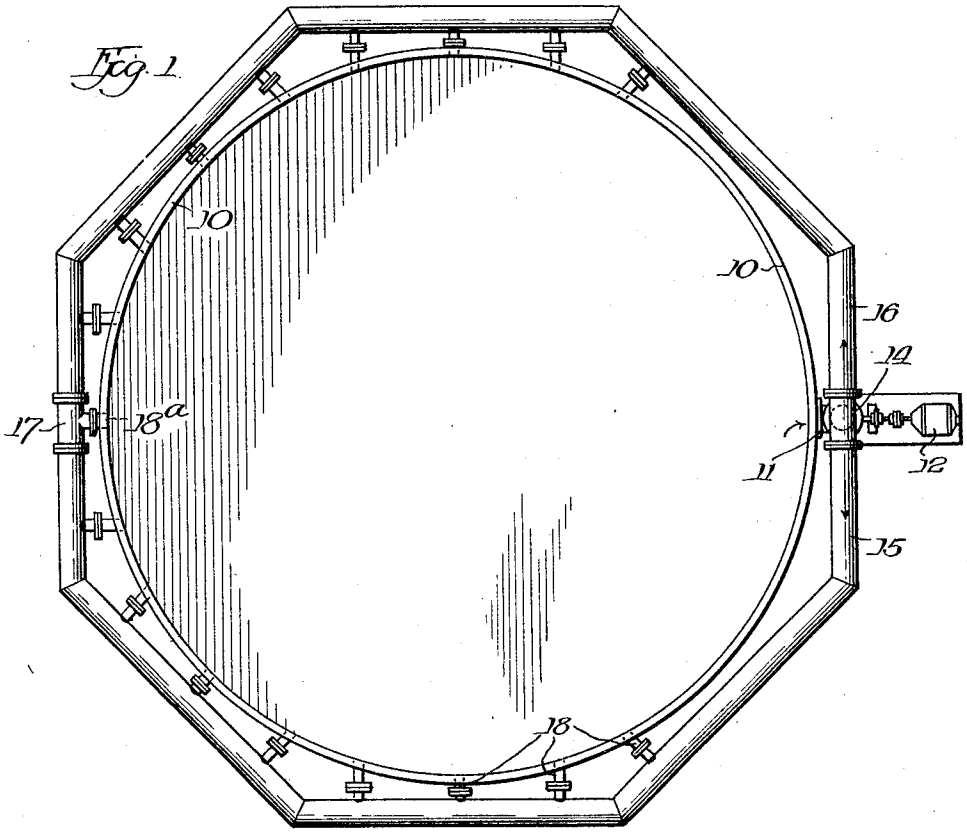
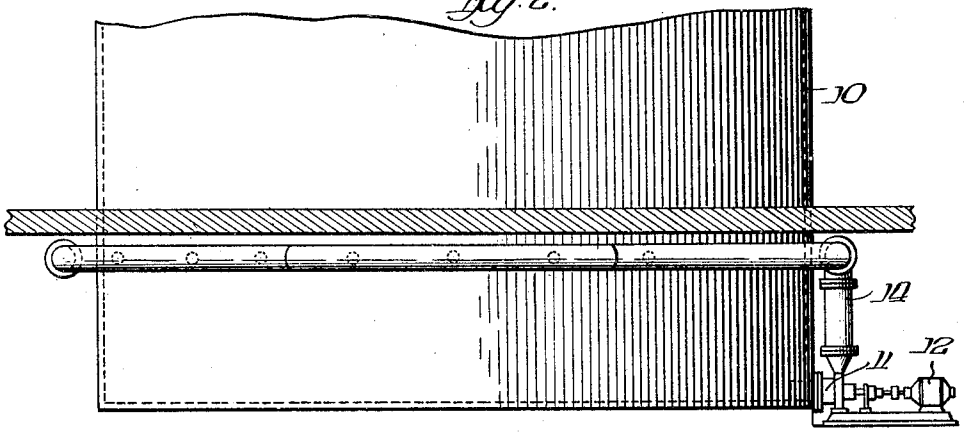


Fig. 2.



Witness:

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UNITED STATES PATENT OFFICE

JOSEPH E. BOND, OF APPLETON, WISCONSIN

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 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 herein claimed will be better understood by reference to the accompanying drawings, in which—

Fig. 1 is a plan view of a tank and agitator arrangement constructed in accordance with my invention, and

Fig. 2 is an elevation thereof.

In the drawings I have illustrated a circular tank or container 10 which may be and usually is of considerable depth and of relatively great size, being adapted to contain 20,000 to 40,000 gallons of stock.

Located at one side and near the bottom of the tank is a pump 11 having a revolving rotor operated by a motor 12. The inlet for the pump is indicated at 13 which is at a low point in the tank and at one side thereof. The discharge pipe 14 extends vertically upward from the pump and at a point a substantial distance vertically above the inlet. The pipe is provided with lateral branches 15, 16 which extend around the outside of the tank and meet at a section 17 directly opposite the pump. At spaced intervals around the tank, I provide discharge nozzles 18 projecting substantially radially of the tank and, as noted, of somewhat varying size. The nozzle 18^a which is preferably of the greatest size is connected to the section 17 and is located diametrically opposite the inlet 13 to the pump.

With the pump in operation and a quantity of stock in the tank, the material is drawn into the pump carried through the headers 15, 16 and discharged through the nozzles toward the center of the tank and generally toward the inlet and at a different level therefrom. By this means the stock is broken up and kept in motion with a relatively low power

expenditure. The apparatus is readily adaptable to tanks already in service and is relatively inexpensive as to installation and operating cost.

Modifications may be made in the construction shown within the scope of the appended claims, all without departure from the spirit of my invention.

I claim:

1. In an agitator for paper pulp the combination of a tank or container, a pump, a pump discharge pipe extending around the outside of the tank and a plurality of discharge nozzles connected to the pipe at spaced intervals, said nozzle projecting through the walls of the tank and directed to discharge the pulp laterally toward the center of the tank.

2. In an agitator for semi-fluid substances the combination with a relatively large container, of a pump having an inlet at the bottom and at one side of said container, a pump outlet pipe extending around the outside of the container and a plurality of discharge nozzles connected to the pipe and projecting through the wall of the container at a point substantially above the level and at the side opposite to the inlet to the pump.

3. In an agitator for semi-fluid substances the combination with a relatively large container, of a pump having an inlet at the bottom and at one side of said container, a pump outlet pipe extending around the outside of the container and a plurality of discharge nozzles connected to the pipe and projecting through the wall of the container at a point diametrically opposite to and materially above the point of inlet to the pump.

4. An agitator for pulp comprising in combination a substantially circular tank, a pump exteriorly thereof the inlet to the pump being connected to the tank near the bottom and at one side thereof, a pump discharge pipe extending in both directions around said tank, and nozzles extending from said pipe through the wall of the tank at a point above and opposite to the inlet to the pump.

5. An agitator for pulp comprising in combination a substantially circular tank, a pump exteriorly thereof the inlet to the pump being connected to the tank near the bottom and at one side thereof, a pump discharge pipe extending around said tank and nozzles of varying discharge capacity, extending from said pipe through the wall of the tank at a point above and opposite to the inlet to the pump.

6. An agitator for pulp comprising in combination a substantially circular tank, a pump exteriorly thereof the inlet to the pump being connected to the tank near the bottom and at one side thereof, a pump discharge pipe extending around said tank, and nozzles of varying discharge capacity, extending from said pipe through the wall of the tank at a point above and opposite to the inlet to the pump, the nozzle of greatest discharge capacity being substantially diametrically opposite to the pump inlet.

In testimony whereof I have affixed my signature.

JOSEPH E. BOND.