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AGITATING TANK FOR CELLULOSE PULP AND SIMILAR SUBSTANCES

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Fig. 1

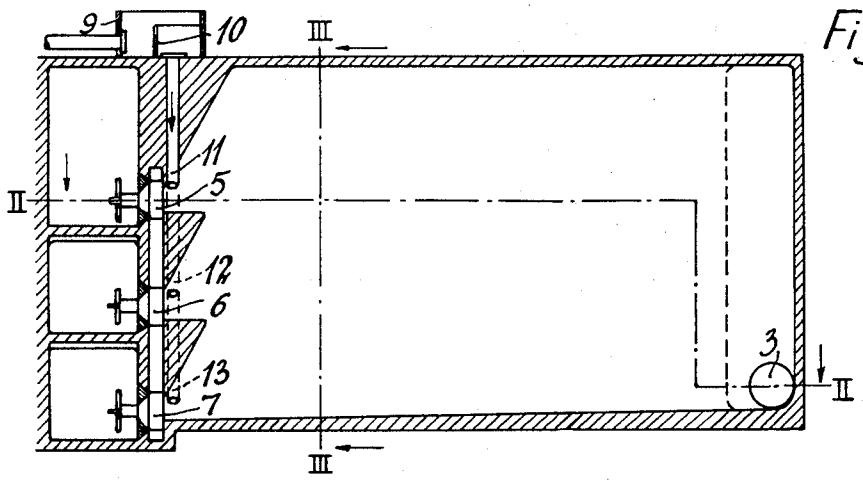
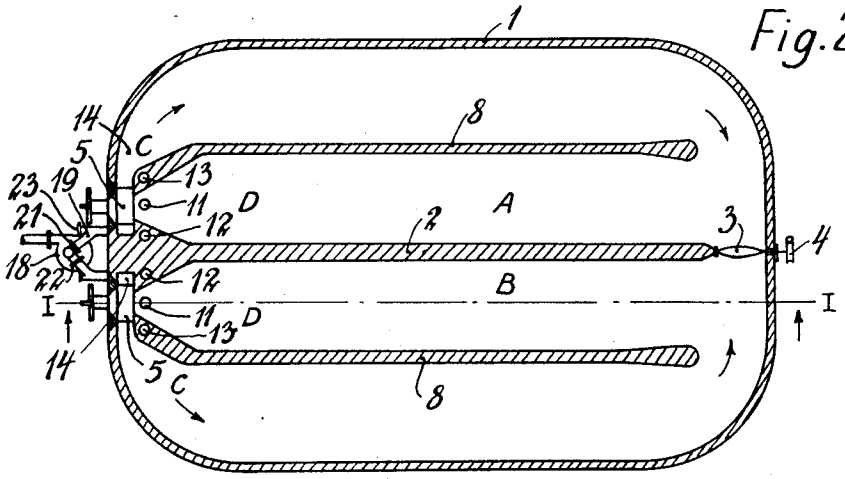


Fig. 2



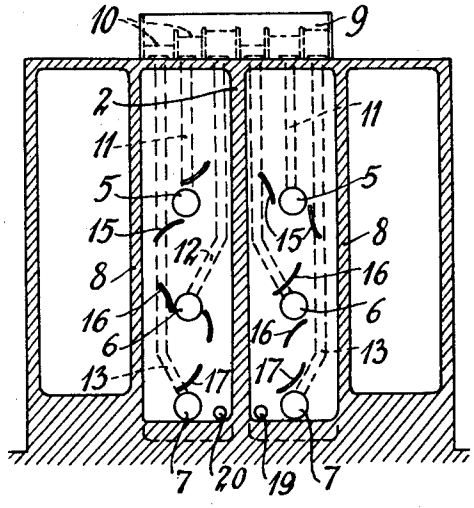


Fig. 3

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AGITATING TANK FOR CELLULOSE PULP AND SIMILAR SUBSTANCES

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7 Claims. (Cl. 92—37)

In the cellulose industry the requirements as to uniformity of the finished product have increased considerably of late. In order to satisfy these requirements the differences between the pulps resulting from the different digestors must be removed, and for this purpose large tanks are built, wherein a great number of digestor contents are mixed or agitated together and wherein the pulp is maintained in an energetic circulation. Also the supply of new pulp and the drawing off of ready-mixed pulp take place continuously. The tanks serve simultaneously as compensators during the production.

It has been proposed to provide agitating tanks for paper pulp with two pumps, the two suction pipes of which are both connected to the tank bottom, whereas the pressure pipes are introduced at different levels into the tank. Further the pump elevating the pulp to the highest level is provided with a regulating device operated by a float so as to stop and start the pump according as the pulp reaches below or above a certain level, whereby the pulp is maintained in a constant motion in the tank and massing or stratifyings are avoided. However, such tanks were not provided with devices, whereby a uniform pulp might be obtained in case new quantities were constantly supplied and mixed pulp were constantly withdrawn.

According to the present invention pumps are arranged in different tank levels, the suction and pressure or delivering apertures of each pump being located at the same level in the tank proper, whereby each pump without interposed pipe conduits is adapted to circulate the pulp in the tank level in question.

Thereby the areas of circulation are great anywhere. The plant may operate with high velocities and consequently the energy at disposal for each pump may be completely utilized to agitate the pulp. No power is lost to overcome pipe resistances.

If now new pulp is constantly supplied to the tank, the same is most quickly, preferably by a distribution to the several pumps, mixed with the pulp already present in the tank. At the same time a definite pulp quantity is at any time withdrawn from the tank at the bottom. The whole tank contents thereby is set in a slow and uniform motion downwards, so that the pulp moves down on a sort of a helical line to the pulp outlet. Further there are arranged deflecting plates in the places around the pump outlets so as to alter the direction of the pulp current just after its entrance into the tank from the different pump outlets, such altering in direction taking place approximately vertically, thus upwards and downwards in relation to the natural horizontal current direction. Thereby it is possible to regulate the circulating pulp quantities mutually at the different places in the tank.

The accompanying drawing illustrates an embodiment of the invention.

Fig. 1 is an elevation in longitudinal section on the line I—I of Fig. 2.

Fig. 2 is a plan view in section on the broken line II—II of Fig. 1.

Fig. 3 is a vertical section of the tank on the line III—III of Fig. 1.

By a partition 2 the tank 1 is divided into two quite separated compartments A and B. In certain cases these two compartments A and B may be interconnected by a throttle valve 3 mounted in the partition 2. The valve may be operated outside the tank by a suitable device, for instance as indicated at 4. At a suitable level above one another for instance three pumps 5, 6, 7 are arranged in each tank half. Each tank half is divided by a baffle wall 8 into a pressure compartment C and a suction compartment D. The supply of new pulp takes place from a common distributing box 9 with controllable overflows 10 above the tank. By means of vertical enamelled supply pipes 11, 12 and 13 the pulp is distributed to each pump in quantities suitable according to experience.

In the drawing pumps 5, 6, 7 are shown having axial suction inlets (at the right hand side of Fig. 2) and peripherical pressure outlets (adjacent the channel spaces 14 in Fig. 2). But circulating devices of other construction may also be used. The supply pipes 11, 12, 13 disembogue just before their respective inlets of the pumps, whereby the pulp supplied through the pipe from the box 9 is at once mixed with the pulp quantity circulating at any time in the tank and is placed in circulation with this quantity.

Usually the pumps 5, 6, 7 are maintaining the pulp in motion in horizontal directions. But at each pump outlet stationary or adjustable deflecting plates 15, 16 and 17 are mounted as indicated in Fig. 3. According to their position said plates will force the pulp delivered from the periphery of the pumps to move more or less inclined upwards or downwards.

In order to convey the ready mixed pulp out from the tank 1 a pressure pump 18 is arranged outside the tank. To its suction side short pipes 19, 20 pass from the lowermost point of each tank A and B. Outside the tank closing and

regulating slides 21 and 22 respectively are arranged in these pipes and may at any time be adjusted and controlled. Adjacent the slides manometers of special construction (not shown) are arranged to show the pulp level in each tank half.

The tank halves A and B may be operated in combination or each of them separately, according as the valve 3 and the slides 21, 22 are adjusted. Consequently each tank half may be cleaned and washed during the operation. For instance if the tank half A is to be cleaned, the valve 3 and the slide 19 are closed, and the blind flange 23 for a cleaning port is removed, whereby washing water may pass directly to the drain.

But if the tank 1 is filled with a uniform pulp and the throttle 3 is opened, a certain quantity of finished pulp is withdrawn through the pressure pump each unit of time. From the sorters or from large pulp vessels the pulp passes as a continuous current to the distributing box 9 at the top of tank 1, and through the separate supply pumps 11, 12, 13 the pulp is distributed to the different pumps 5, 6, 7. The new pulp quantity supplied each unit of time is consequently distributed to the several pumps and each of the supplied separate quantities will thus be only a very small fraction of the total quantity passing each unit of time through each pump 5, 6, 7. By adjusting the deflectors 15, 16, 17 differently at the outlet 14 of each pump a mixing and agitation of vertical and horizontal currents may be obtained in the tank. The outlets 21, 22 to the pressure pump 18 are arranged where the agitation has taken place most energically, thus at the lowermost pump 7.

In any particular case a calculation may be made on the basis of exact values regarding the capacity of the tank and the energy of the pump, the number of cellulose digestings per day and night and their volume and finally the pulp concentration and energy of the pressure pump, and this calculation gives an estimate as to the mixing degree of the pulp and the obtainable compensation of the different quality of the separate digestor contents.

The tank shown in the drawing is of a longish shape differing more or less from an oval or an ellipse. However, this shape may obviously be differently chosen according to the prevailing circumstances. Thus in many cases a tank of cylindric shape may be used.

I claim:

1. In agitating tanks for cellulose pulp and similar substances, circulation pumps arranged at different levels in the tank to maintain the pulp therein in a constant motion, the suction and pressure apertures of each pump being arranged at the same level in the tank itself.

2. In agitating tanks for cellulose pulp and similar substances, circulation pumps arranged at different levels in the tank to maintain the pulp therein in a constant motion, the suction and pressure apertures of each pump being arranged at the same level in the tank itself, and supply means for new pulp being arranged to deliver the new pulp in proximity to the suction aperture of each pump.

3. In agitating tanks for cellulose pulp and similar substances, circulation pumps arranged at different levels in the tank to maintain the pulp therein in a constant motion, the suction and pressure apertures of each pump being arranged at the same level in the tank itself, and adjustable deflecting plates being arranged in proximity to each pump to deflect the pulp directly upon its entering the tank.

4. In agitating tanks for cellulose pulp and similar substances, circulation pumps arranged at different levels in the tank to maintain the pulp therein in a constant motion, the suction and pressure apertures of each pump being arranged at the same level in the tank itself, and supply means for new pulp being arranged to deliver the new pulp in proximity to the suction aperture of each pump, and adjustable deflecting plates being arranged in proximity to each pump to deflect the pulp directly upon its entering the tank.

5. An agitating tank as set forth in claim 2, wherein a common distributing box is arranged at the top portion of the tank, a connection from the box to the suction aperture of each pump, and an adjustable overflow in the box for each of the said connections.

6. In agitating tanks for cellulose pulp and similar substances, circulation pumps arranged at different levels in the tank to maintain the pulp therein in constant motion, the suction and pressure apertures of each pump being arranged at the same level in the tank itself, and an outlet arranged at the tank bottom to remove quantities of the mixed pulp at desired time.

7. In agitating tanks for cellulose pulp and similar substances, means for supplying pulp to be mixed at the top portion of the tank, circulation pumps arranged at different levels in the tank to maintain the pulp therein in a constant motion, the suction and pressure apertures of each pump being arranged at the same level in the tank itself, and an outlet arranged at the tank bottom to remove quantities of the mixed pulp at desired time.

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