July 13, 1937. J. E. BOND 2,087,015

AGITATOR

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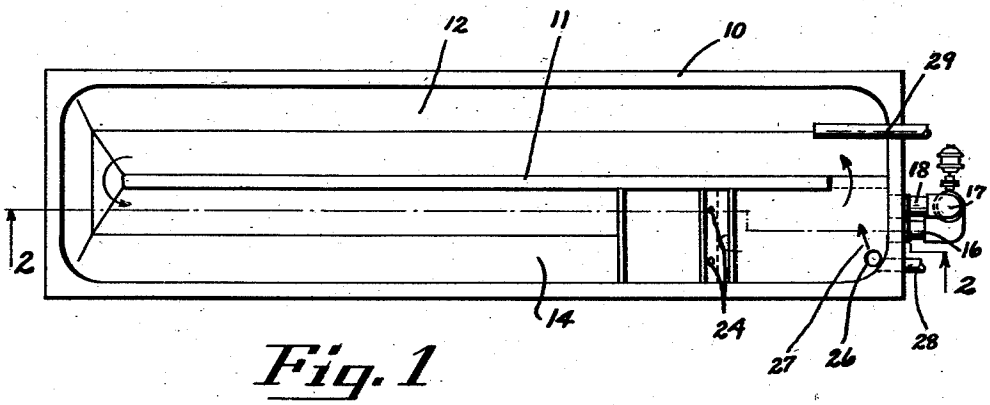

Fig. 1

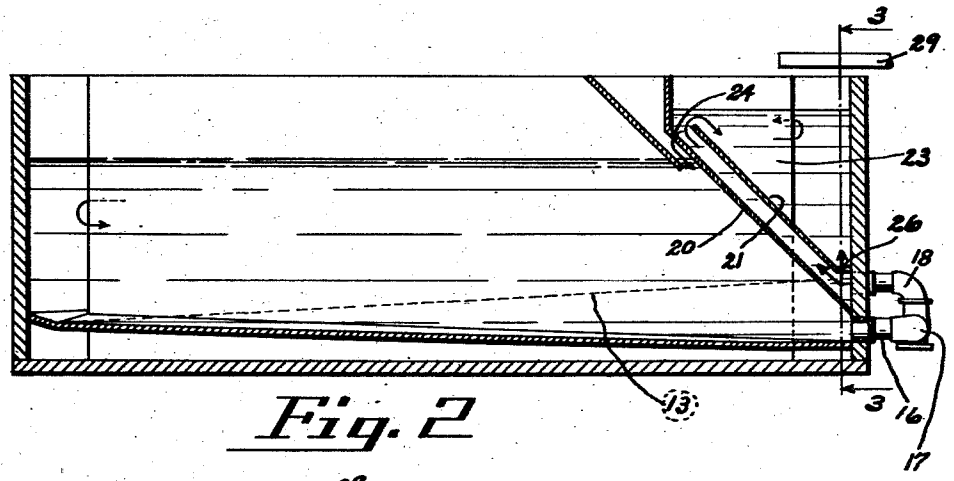

Fig. 2

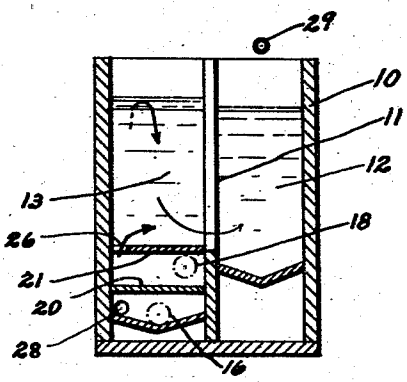

Fig. 3

INVENTOR
Joseph E. Bond
BY Marechal & Noe
ATTORNEY

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AGITATOR

Joseph E. Bond, Middletown, Ohio

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8 Claims. (Cl. 92—37)

This invention relates to the art of paper making, and more particularly to means for agitating paper pulp and the like.

One object of the invention is the provision of an agitator for paper pulp stock or the like, and comprising a tank having a pump adapted to withdraw the stock from a low point of the tank and to return the stock at a higher point, the tank having baffle walls so arranged as to provide effective intermixing and thorough agitation of the masses which circulate in the tank.

Another object of the invention is the provision of a stock agitating tank in which the stock is adapted to circulate from one point to another, an inclined baffle wall being provided so as to confine the stock in its passage towards the pump inlet so that foamy stock or stock that is not thoroughly de-aerated is carried along to the pump inlet with the other portions of the stock.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawing and the appended claims, in which,—

Fig. 1 is a top plan view of an agitator embodying the present invention;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1; and

Fig. 3 is a section taken transversely through the tank on the line 3—3 of Fig. 2.

Referring more particularly to the drawing by reference numerals, 10 generally designates a tank of suitable dimensions adapted to hold a batch of paper stock or the like. The stock is adapted to be circulated in the tank 10, which is provided with a baffle wall 11 shown in the form of a midfeather which terminates some distance from the tank ends. At one side of the midfeather or wall 11 is a side passage 12, having an inclined floor 13 down which the stock passes under the action of gravity. The stock then flows around the end of the midfeather and then along the side passage 14 which is arranged on the other side of the midfeather 11.

The stock is withdrawn from a low point of the tank by means of a pipe or passage 16 which extends to the inlet side of a motor driven pump 17 which is of such character as to produce a suitable suction on its inlet side and deliver the stock under suitable head at its outlet side. The pump outlet is connected by means of a pipe 18 to a point in the tank somewhat higher than the pump inlet, as apparent from Fig. 2.

As will be noted from Fig. 2, above one end of the side passage 14 is an inclined baffle wall 20 up which the stock passes after flowing out of the pump discharge passage 18, the pump outlet being connected to a point above the wall 20 while the pump inlet is connected to a point below that wall. Above the wall 20 is another inclined baffle wall 21 so that the stock is somewhat confined in its passage between the two walls 20 and 21 until it reaches the upper level of the wall 21, over which it flows. It then passes down along the upper side of the wall 21 in moving through the passage 23 which is in communication with the right-hand end of the side passage 12, as shown in Fig. 1. The stock received by the tank is, therefore, forced by the pressure exerted by pump 17 to a high enough level determined by the top of the baffle wall 21 so that it will flow by gravity around the midfeather and into the inlet side of the pump to be again returned and recirculated.

The wall 20 is provided with a suitable opening or openings so that some portion of the stock which passes upwardly above it is promptly returned as a fall or auxiliary circuit to a point comparatively close to the pump inlet. As shown, a plurality of holes 24 are provided for this purpose near the upper end of the wall 20. In the circulation of certain grades of stock difficulties have been encountered in its agitation owing to foamy stock or to stock that is not thoroughly de-aerated. Such stock tends to float and accumulate over a suction opening and where the suction is some distance from the upper level of the stock the floating or foamy portion is not circulated with the other portions of the stock. The baffle wall 20, however, prevents this accumulation of the foamy or other light stock portions, as it is inclined at a considerable angle and as the fall of stock through the openings 24 provides a submerging stream that breaks up any foam that happens to be present and which might tend to float even against this angle of the baffle. The stock is, therefore, thoroughly intermixed and the lighter portions are carried along with the main body of the stock.

The openings 24 in the baffle wall 20 provide for the passage of a limited amount of stock in a comparatively short circuit between the pump outlet and the pump inlet while the main portion of the stock passes through the comparatively long circuit around the midfeather 11. This auxiliary flow through the openings 24 is effective not only in breaking up any foam that might be present in the stock on the under side of the wall 20 but also in intimately mixing different bodies of the stock together. For bleaching and for mixing of colors and similar operations a more perfect blending action is provided

because some of the stock passes quickly through the circulating tank while other portions flowing into the tank at the same time require a longer time in completing its circuit.

This intermixing is also facilitated by an additional orifice or passage shown in the form of a hole 26 provided in the inclined baffle wall 21 at a point comparatively remote from the end of the midfeather and in a corner portion of the tank. The pump inlet 18 is at some distance from this corner of the tank, but any tendency for the stock to accumulate in that corner is overcome by reason of the flow produced upwardly through the hole 26 so that the stock in the corner is kept moving. The stock which passes through the hole 26 then flows across the upper side of the wall 21, thus breaking up any stock which would otherwise tend to accumulate immediately above the wall 21 adjacent the side wall of the tank. This cross flow above the wall 21 is represented by the arrow 27 in Fig. 1. The hole 26 supplements the action of the openings 24 in giving a thorough intermixing action and provides a different length of circuit for a restricted portion of the pulp by reason of its passage through the hole 26 instead of moving up along the under side of the wall 21 with the main portion of the stock. Different bodies of the stock therefore have different periods of time required in moving from the pump outlet back to the inlet through the tank so that a certain portion comes back almost immediately while another portion passes through the orifice 26 and the main portion moves up over the wall 20 and then flows over the top of the wall 21 and then around the midfeather.

The stock is withdrawn, as desired, from the stock chest or tank by means of the discharge pipe 28 after thorough mixing and agitation, or after the desired coloring or bleaching operation has been effected, and additional stock is supplied through the filling passage 29.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A stock agitator for mixing stock comprising a tank, a pump for circulating stock in the tank, said tank having a midfeather providing for circulating flow of the main body of stock in a comparatively long path from the pump outlet back to the pump inlet, and a pair of spaced baffle walls arranged one above the other and both inclined at a large angle to the vertical, the upper wall confining therebelow the stock flowing from the pump outlet and the lower wall confining therebelow the stock flowing to the pump inlet, said walls each having provision for bypassing portions of the stock at different points along said path in shorter paths in circulating from the pump outlet to the pump inlet.

2. A stock agitator for mixing stock comprising a tank, a pump for circulating stock in the tank, said tank having a midfeather providing for circulating flow of the main body of stock in a comparatively long path from the pump outlet back to the pump inlet, and baffle walls at a side of said midfeather having provision for bypassing portions of the stock in shorter paths in circulating from the pump outlet to the pump inlet, said baffle walls being spaced one above the other and inclined downwardly at an angle of the order of 45° to the vertical, one of said baffle walls being inclined downwardly toward the pump inlet and confining the stock therebelow in its movement to the pump inlet.

3. In an agitator for mixing stock, a circulating tank, a pump for circulating stock in the tank from a low point therein, a baffle wall in said tank around which the main body of stock circulates in moving from the pump outlet to the pump inlet, said baffle wall inclining downwardly toward the pump inlet and confining the stock therebelow in moving to the pump inlet, said baffle wall having means for bypassing a stream of stock onto the main body of circulating stock, and a second baffle wall around which the main body of stock circulates extending from an end wall of the tank and provided substantially parallel to and above the first mentioned baffle wall and confining the stock received from the pump outlet on its lower side.

4. In an agitator for mixing stock, a circulating tank, a pump for circulating stock in the tank from a low point therein, a baffle wall in said tank around which the main body of stock circulates in moving from the pump outlet to the pump inlet, said baffle wall inclining downwardly toward the pump inlet and confining the stock therebelow in moving to the pump inlet, said baffle wall having means for bypassing a stream of stock onto the main body of circulating stock, and a second baffle wall around which the main body of stock circulates and provided above the first mentioned baffle wall and confining the stock received from the pump outlet on its lower side, said second baffle wall having means at a distance from the pump outlet but adjacent the bottom of the wall for bypassing a portion of the stock from the main body of stock.

5. An agitator for mixing paper stock comprising a tank, a pump having its inlet connected to a low point in said tank and adapted for circulating the stock in the tank, upper and lower baffle walls both inclined downwardly at an angle of the order of 45° toward the pump inlet and confining the stock therebetween, the lower baffle wall extending below the pump outlet and confining the stock on its lower side in its movement to the pump inlet and having means for bypassing a portion of the stock received from the pump outlet for prompt return to the pump inlet.

6. An agitator for mixing paper stock comprising a tank, a pump having its inlet connected to a low point in said tank and adapted for circulating the stock in the tank, upper and lower baffle walls inclined downwardly toward the pump inlet and confining the stock received from the pump outlet therebetween, the lower baffle wall confining the stock on its lower side in its movement to the pump inlet and having means for bypassing a portion of the stock received from the pump outlet for prompt return to the pump inlet, said upper baffle wall having a passage adjacent the end of the tank and at a remote corner portion of the stock passage providing a restricted flow from a point adjacent the pump outlet to a point above said upper baffle wall for the agitation of the stock in the corner portion.

7. An agitator for mixing paper stock comprising a tank having a midfeather wall terminating at a distance from opposite ends of the tank and providing opposed side passages for the stock, a

pump having its inlet connected to a low point of the tank at one side of said midfeather, an inclined baffle wall inclining downwardly toward the pump inlet and confining the stock therebelow in its movement to the pump inlet, said baffle wall having an opening providing for stock flow onto the stock confined below said baffle wall, a second baffle wall inclined at a large angle to the vertical over which the main portion of the stock flows to a side passage and provided above said first baffle wall, said second baffle wall having an opening near its bottom portion providing for a restricted bypass flow of stock from a point spaced from the pump outlet and adjacent a wall of the tank.

8. A stock agitator for mixing stock comprising a tank, a pump for circulating the stock in the tank and having its inlet connected to a low point in the tank, said tank having a division wall around which the stock circulates from the pump outlet to the pump inlet and having an inclined baffle wall extending angularly downwardly at one side of the division wall toward and above the pump inlet and confining the stock therebelow as the stock passes to the pump inlet, and a second baffle wall over which the stock flows to the main circulating body of stock and extending downwardly above the first wall at an angle of the order of 45° inclination and confining therebelow the stock flowing from the pump outlet, said second baffle wall having an opening at a distance from the pump outlet but near the bottom of said wall and providing an upward flow through the said wall.

JOSEPH E. BOND.