April 30, 1946. J. EDGE 2,399,546

APPARATUS FOR DISTRIBUTING STOCK TO THE CYLINDER OF PAPER MACHINES

Filed Aug. 20, 1942 3 Sheets-Sheet 1

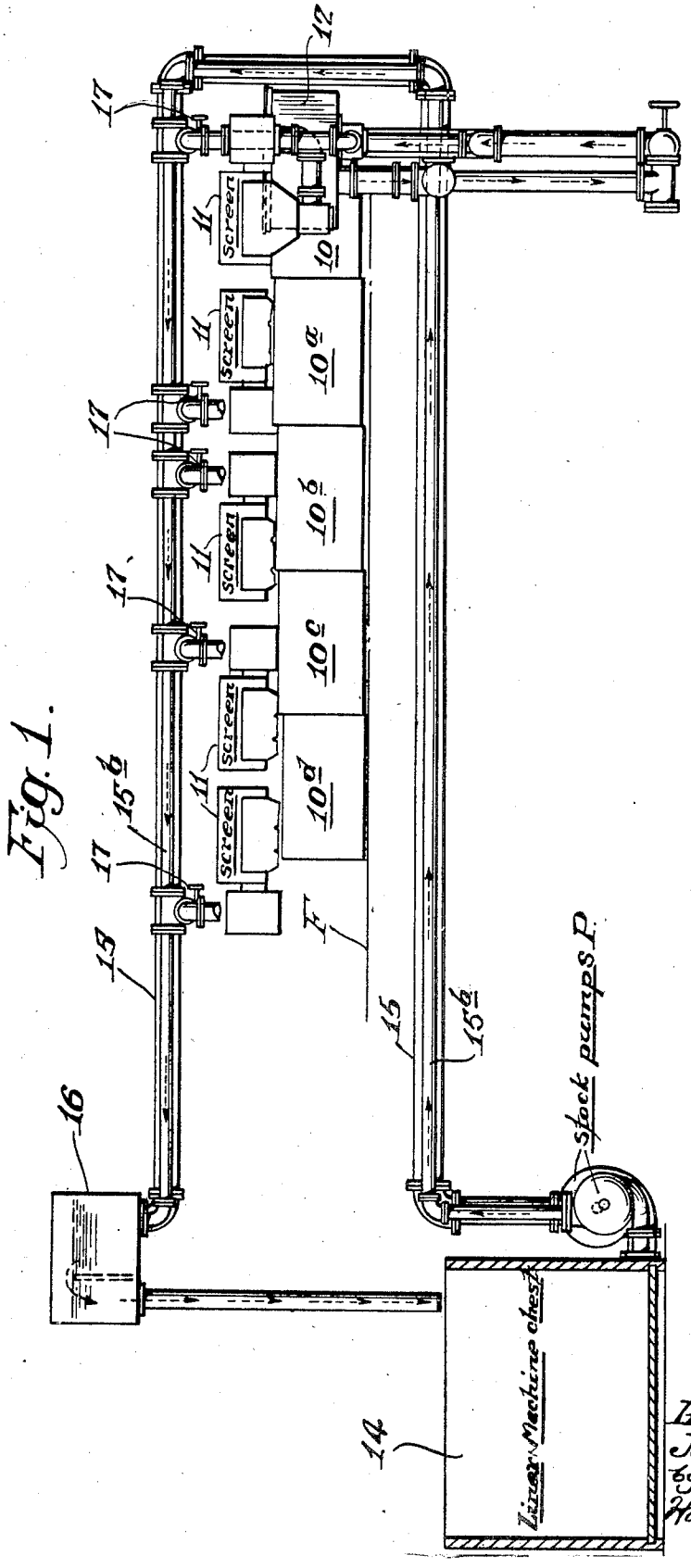


Fig. 1.

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Fig. 2.

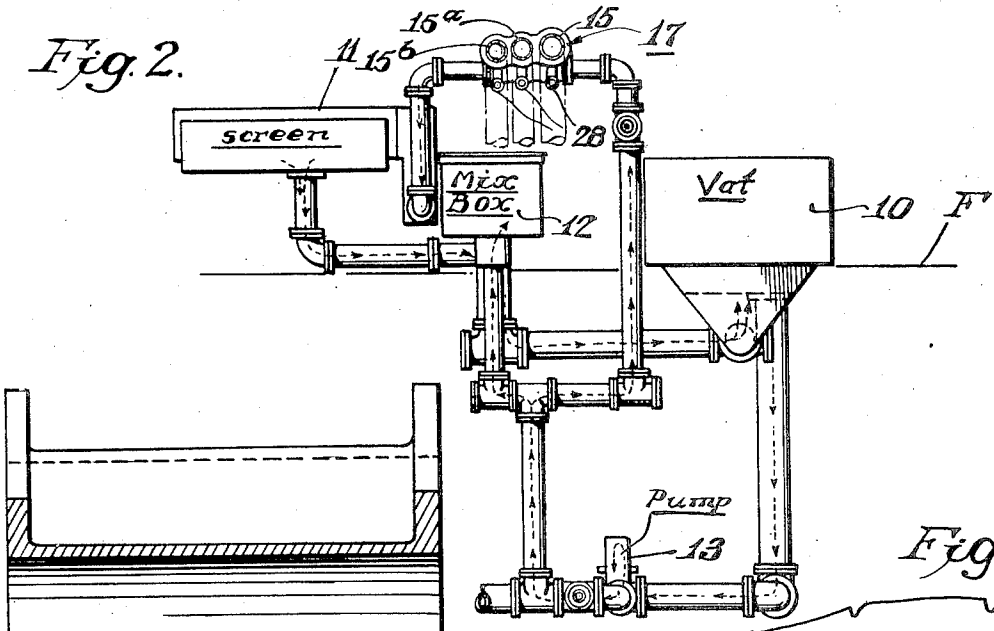


Fig. 6.

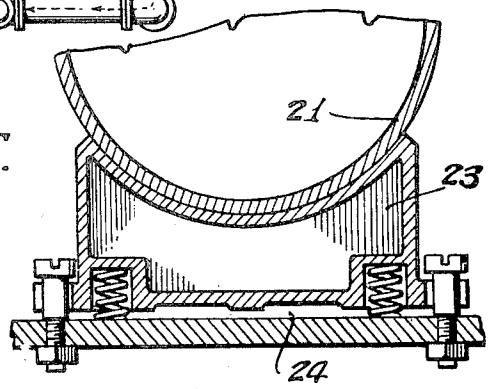


Fig. 5.

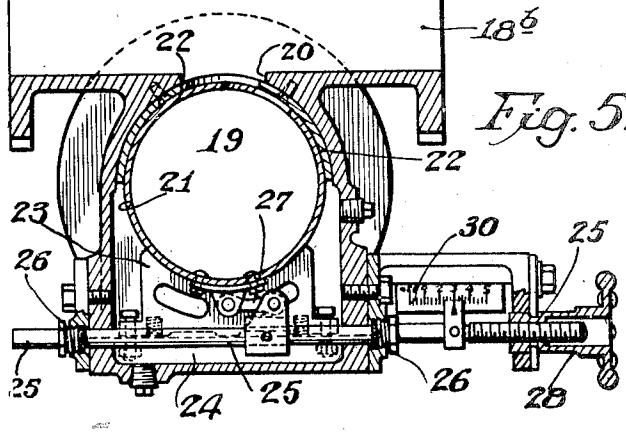
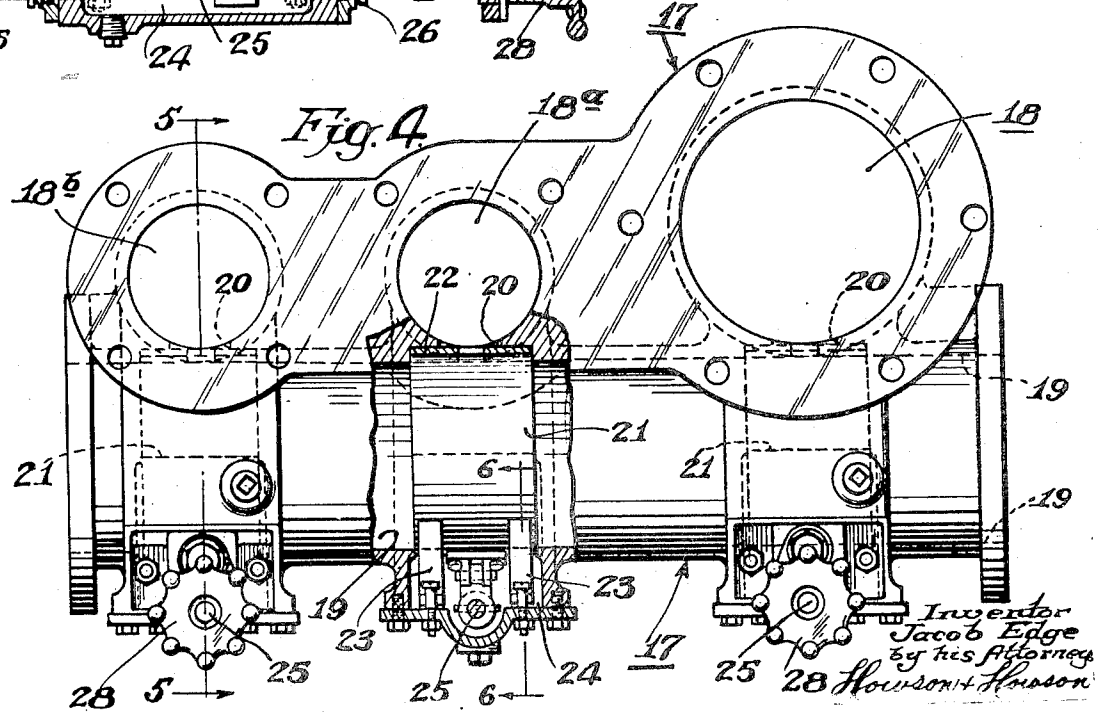


Fig. 4.

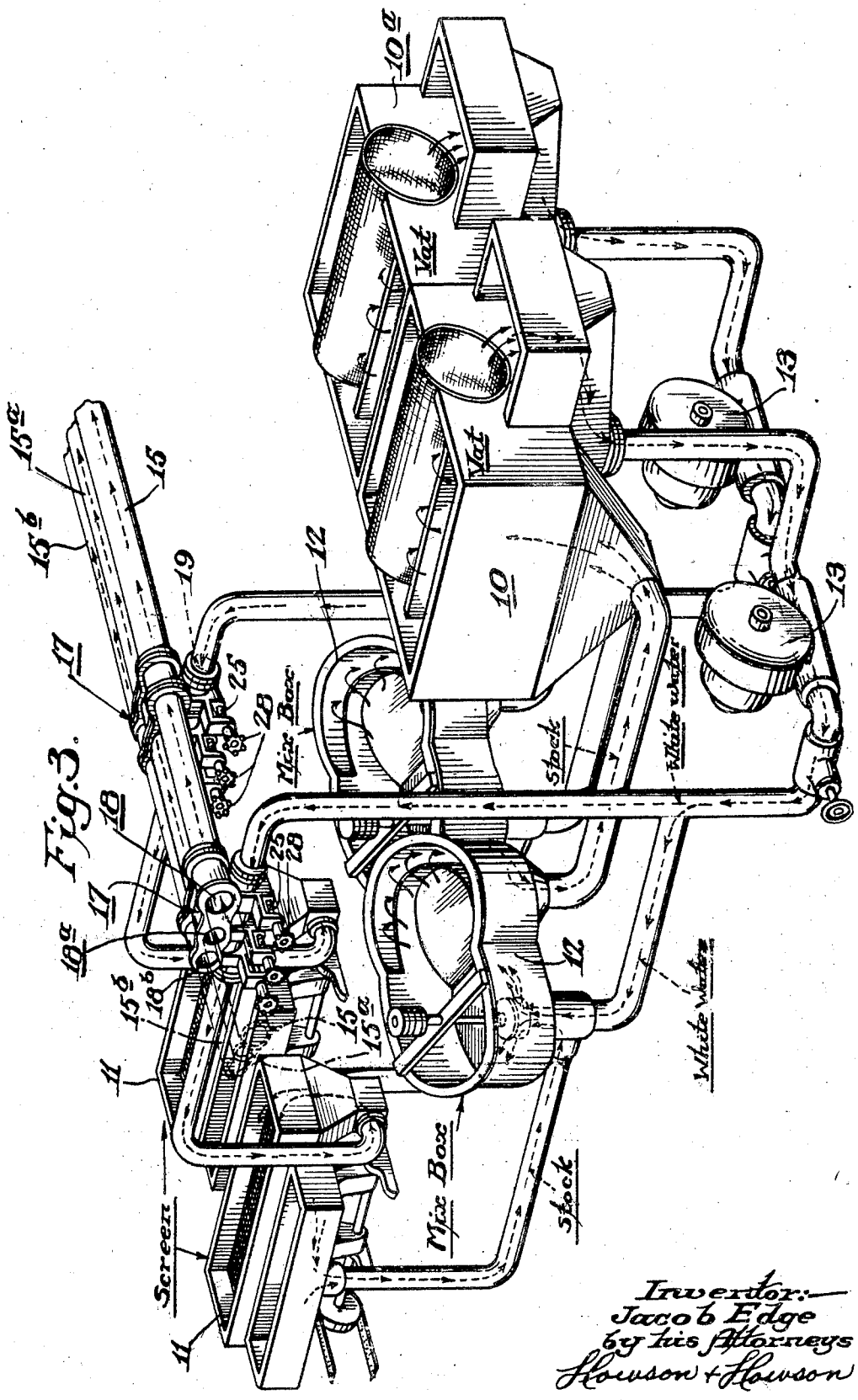


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UNITED STATES PATENT OFFICE

2,399,546

APPARATUS FOR DISTRIBUTING STOCK TO THE CYLINDER OF PAPER MACHINES

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Application August 20, 1942, Serial No. 455,500

5 Claims. (Cl. 92—46)

This invention relates to paper making apparatus and more particularly to a stock distribution system for particular use in conjunction with cylinder paper machines of the multiple vat type.

An important object of the invention is the provision of a stock distribution system materially facilitating the control of stock by the machine tender and which will, to a great extent, eliminate the passage of non-uniform stock to the screens. In the ordinary cylinder machine, the distributing box, by means of which the liner and filler are distributed by gravity to the cylinder molds, is located well above the machine in a hot and humid atmosphere. Adjustment of distribution must be effected at the distributing box requiring that the machine tender work in this atmosphere and necessitating loss of time in climbing back and forth between the vats and distributing box to determine whether the stock is being properly distributed. Additionally, such distributing boxes are open and the stock slopping over the distributing dams splashes and collects upon the sides of the box above the liquid level therein and dries, forming flakes which subsequently often fall or are knocked off into the stock which is being delivered to the screen. This system requires laborious cleansing at least on weekends.

An important object of this invention is the provision of a distribution system which will enable admixture of the stock and white water, which usually takes place in such distributing boxes, to be individually controlled for each vat at a point immediately adjacent to the vat and readily accessible from the machine floor.

Another object of the invention is to provide a sysem in which the admixture occurs in a closed system where the stock is not exposed to the air and in which, accordingly, drying and flaking of the stock, such as ordinarily occurs, is eliminated.

Another object is to provide a system fully submerged on both sides of each control gate, or orifice; all parts being under constant pressure and control and always wet, whether in use or not, so as to be instantly available for change of grade.

A further object of the invention is the provision of a relatively simple and cheaply producible control apparatus for use in such a system by means of which control it is possible to distribute any of the two or three types of stock being utilized in the machine to any selected vat, without exposure to the air.

These and other objects I attain by the construction shown in the accompanying drawings wherein, for the purpose of illustration, I have shown a preferred embodiment of my invention and wherein:

Fig. 1 is a semi-diagrammatic side elevation illustrating a stock control system constructed in accordance with my invention;

Fig. 2 is a similar elevation showing the equipment associated with each vat;

Fig. 3 is a diagrammatic perspective showing the distribution system as applied to a pair of vats;

Fig. 4 is a side elevation of the control apparatus by means of which the distribution to any particular vat is regulated;

Fig. 5 is a section on line 5—5 of Fig. 4; and

Fig. 6 is a detail section view on line 6—6 of Fig. 4.

Referring now to the drawings and more particularly to Figs. 1, 2 and 3 thereof, the numerals 10, 10a, 10b, 10c and 10d indicate the cylinder mold vats of a cylinder paper machine, each of which has associated therewith a screen 11, mix box 12 and white water pump 13. As is usual, the stock and white water are fed to the screen from which the screened stock is delivered to the mix box from which, after the addition of bypass white water, it passes to the vat.

In accordance with my invention, stock is delivered from the machine chests 14, only one of which is herein shown, by pumps P through a series of parallel conduits, preferably three in number, indicated at 15, 15a and 15b, the conduit 15 being of relatively large size and being intended for the delivery of filler stock and the smaller conduits 15a and 15b being intended for the delivery of two kinds of liner. These conduits extend longitudinally of the machine floor above and adjacent to the vats, being disposed at a convenient level for access from the machine floor F. The ends of the conduits discharge into head boxes 16, the purpose of which is to maintain against the stock a definite and predetermined head, the discharge from these head boxes being returned to the machine chests.

In the conduit adjacent each vat there is provided a multiple valve unit, generally designated at 17, this unit being more clearly shown in Figs. 4, 5 and 6. The valve unit comprises a main casting having passages at 18, 18a and 18b adapted to form continuations of the stock conduits 15, 15a and 15b respectively, and a white water channel 19 extending transversely of stock channels 18, 18a and 18b which is connected at one end to the outlet of the associated white water pump 13 and at its opposite end to the intake of the

associated screen 11. Each of the stock passages 18, 18a and 18b communicates with the white water passage 19 through an opening 20 controlled by a rotatable valve element 21 which determines the effective size of the opening 20 and is individually adjustable to suitable control mechanism. As at present shown, each of these valve elements is held against a seat 22 formed at the upper portion of the white water passage 19 adjacent the opening by spring pressed followers 23 mounted in a chamber 24 forming a portion of the lower end of the white water channel. Through the chamber 24 transversely of a passage and adjacent each valve element 21 an operating rod 25 is directed and packed to the walls of the chamber as by means of stuffing boxes 26. This operating rod is linked to the associated valve element 21 as at 27 and is provided with means as nut 28 for shifting the same longitudinally. Preferably, the rod has associated therewith an indicator pointer and a scale 30 to assist in determining the proper setting of the valve. The pressure delivered by the pump 13 will be less than that of the stock in conduits 15, 15a, 15b as determined by head boxes 16 and the stock will consequently be fed into the white water through an open valve to an extent determined by the opening of the valve and difference in heads. By manipulation of the valve element associated with each vat the machine tender can deliver the desired stock to the vat at the desired consistency and may, furthermore, effect the regulation while actually observing the vat.

It will be noted that the openings controlling the mixture of the stock and white water are continuously subjected to the action of these elements, the one (stock) being maintained at a given head by the head boxes 16, and the other (white water) by pressure of pumps 13. Accordingly, the proportioning of the stock occurs under conditions preventing the formation of lumps or aeration.

Since the arrangement herein illustrated is obviously capable of considerable modification without departing from the spirit of my invention, I do not wish to be understood as limiting myself thereto except as hereinafter claimed.

I claim:

1. An apparatus for controlling the supply of an aqueous dispersion of stock to a cylinder paper machine vat, comprising a circulating system for said dispersion including a conduit for said aqueous dispersion, and means for maintaining said conduit full of said aqueous dispersion in motion under a predetermined pressure at all times; a white water circulating system including said vat, a white water conduit disposed in laterally abutting relation to said aqueous dispersion conduit, and means for maintaining said white water conduit full of said white water with said white water in motion through said white water conduit under predetermined pressure lower than the pressure of said aqueous dispersion in said aqueous dispersion conduit at all times; said conduits being directly connected by a short passage substantially perpendicular to the axes of said conduits and affording direct intercommunication therebetween; and a plate-like valve element operable transversely of said passage and of a thickness substantially corresponding to the total axial length of said passage to cause the opposite faces of said valve element at all times to be engaged and kept in a wet condition free of accumulations of said stock constantly by said aqueous dispersion and said white water being maintained in active circulation through said conduits respectively.

2. An apparatus for controlling the supply of an aqueous dispersion of stock to a cylinder paper machine vat, comprising a circulating system for said dispersion including a conduit for said aqueous dispersion, and means for maintaining said conduit full of said aqueous dispersion in motion under a predetermined pressure at all times; a white water circulating system including said vat, a white water conduit disposed in laterally abutting relation to said aqueous dispersion conduit, and means for maintaining said white water conduit full of said white water with said white water in motion through said white water conduit under predetermined pressure lower than the pressure of said aqueous dispersion in said aqueous dispersion conduit at all times; said conduits being arranged with said aqueous dispersion conduit in superposed relation to said white water conduit and directly connected thereto by a short passage substantially perpendicular to the axes of said conduits and affording direct intercommunication therebetween; and a plate-like valve element operable transversely of said passage and of a thickness substantially corresponding to the total axial length of said passage to cause the opposite faces of said valve element at all times to be engaged and kept in a wet condition free of accumulations of said stock constantly by said aqueous dispersion and said white water being maintained in active circulation through said conduits respectively.

3. An apparatus for controlling the supply of an aqueous dispersion of stock to a cylinder paper machine vat, comprising a circulation system for said aqueous dispersion including a conduit for said aqueous dispersion, and means for maintaining said conduit full of said aqueous dispersion in motion under a predetermined pressure at all times; a white water circulating system including said vat, a white water conduit disposed in laterally abutting right angular relation to said aqueous dispersion conduit, and means for maintaining said white water conduit full of said white water with said white water in motion through said white water conduit under predetermined pressure lower than the pressure of said aqueous dispersion in said aqueous dispersion conduit at all times; said conduits being directly connected by a short passage substantially perpendicular to the axes of said conduits and affording direct intercommunication therebetween; and a plate-like valve element operable transversely of said passage and of a thickness substantially corresponding to the total axial length of said passage to cause the opposite faces of said valve element at all times to be engaged and kept in a wet condition free of accumulations of said stock constantly by said aqueous dispersion and said white water being maintained in active circulation through said conduits respectively.

4. An apparatus for controlling the supply of an aqueous dispersion of stock to a cylinder paper machine vat, comprising a circulating system for said aqueous dispersion including a conduit of substantially circular cross-section for said aqueous dispersion, and means for maintaining said conduit full of said aqueous dispersion in motion under a predetermined pressure at all times; a white water circulating system including said vat, a white water conduit of substantially circular cross-section disposed in right angular substantially tangential relation to said aqueous

dispersion conduit, and means for maintaining said white water conduit full of said white water with said white water in motion through said white water conduit under predetermined pressure lower than the pressure of said aqueous dispersion in said aqueous dispersion conduit at all times; said conduits being directly connected by a short passage having its axis disposed substantially perpendicular to the axes of said conduits and affording direct intercommunication therebetween; and a plate-like valve element operable transversely of said passage to control flow of said higher pressured aqueous dispersion into said white water system, said valve element being of a thickness substantially corresponding to the total axial length of said passage to cause the opposite faces of said valve element at all times to be engaged and kept in a wet condition free of accumulations of said stock constantly by said aqueous dispersion and said white water being maintained in active circulation through said conduits respectively.

5. An apparatus for controlling the supply of an aqueous dispersion of stock to a cylinder paper machine vat, comprising a circulating system for said aqueous dispersion including a conduit of substantially circular cross-section for said aqueous dispersion, and means for maintaining said conduit full of said aqueous dispersion in motion under a predetermined pressure at all times; a white water circulating system including said vat, a white water conduit of substantially circular cross-section disposed in laterally abutting relation to said aqueous dispersion conduit, and means for maintaining said white water conduit full of said white water with said white water in motion through said white water conduit under predetermined pressure lower than the pressure of said aqueous dispersion in said aqueous dispersion conduit at all times; said conduits being directly connected by a short passage having its axis substantially perpendicular to the axes of said conduits and affording direct intercommunication therebetween, and a tubular valve element including a cylindrical plate-like wall concentric with one of said circular conduits and operable transversely of said passage, said wall being of a thickness substantially corresponding to the total axial length of said passage to cause the opposite faces of said valve element wall at all times to be engaged and kept in a wet condition free of accumulations of said stock constantly by said aqueous dispersion and said white water being maintained in active circulation through said conduits respectively.

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