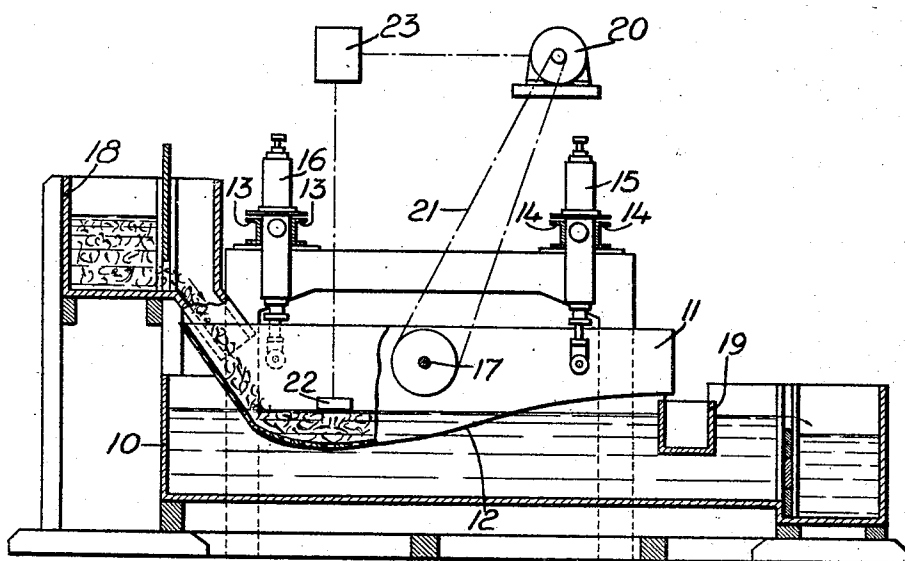


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APPARATUS FOR CONTROLLING IN GRADING, DRAINING,
OR WASHING FIBROUS SUSPENDED MATERIAL
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APPARATUS FOR CONTROLLING IN GRADING, DRAINING, OR WASHING FIBROUS SUSPENDED MATERIAL

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2 Claims. (Cl. 92—33)

The present invention relates to a controlling or regulating vibratory apparatus for grading, draining or washing suspensions of fibrous material, especially in connection with the manufacture of wood pulp or cellulose pulp, paper, cardboard, fibrous boards and like products, in which the suspension is led over a permeable member, which is exclusively carried by elastically yielding members and which is actuated in such a manner that it receives a vibrating motion, and in which apparatus said member is adapted to work with a suspension located over the member at a certain predetermined liquid level.

According to the invention the suspension located above the member is kept constantly at the level with which the apparatus is to work by causing a float, located on the liquid surface, to actuate a servo-motor, if the liquid level rises or sinks due to the change of some of the factors of working, for instance the quantity of the supplied material, said servo-motor actuating another factor of working in oppositely acting direction for obtaining a uniformly graded, drained or washed material.

The control may thus be obtained by varying the number of vibrations or the amplitude of vibrations of the permeable member. Without changing the capacity of the member it is also possible to obtain such a control by varying the supplied quantity of suspension or by varying the concentration of the supplied pulp.

In such vibratory apparatus in which a great part of the permeable member is surrounded by liquid on both sides and, consequently, the liquid that has passed the permeable member is dammed up to a certain level, the control may be obtained by adjusting the height of this level.

The control may also be obtained by varying the size of the effective surface of the permeable member, which is done by varying the position of the member or by varying the centre of gravity of the vibrating system of which the permeable member forms a part.

The control may further take place by varying the quantity of dilution water which is supplied to the pulp when the same passes along the permeable member. Of course, several of the factors of working mentioned above may be varied at the same time.

In certain cases it has proved possible to carry out a control according to the invention in such a manner that a practically quite uniformly graded, drained or washed material is obtained.

The invention also is characterised in that the vibrating member comprises a box provided in

an outer trough having an outlet, said box having a permeable bottom, and in that a float, which is adapted to rest on the liquid surface in the box, is connected to a servo-motor, which, when the float rises or sinks because of change of a factor of working actuates another certain factor of working in oppositely acting direction.

An embodiment of a device for carrying out the process according to the invention in screening fibrous material is illustrated in the accompanying drawing.

In usual factory operation of an apparatus of the kind illustrated in the drawing, for instance as a knot catcher or as a fine screen for cellulose, there are several serious drawbacks or unfavourable working conditions, for instance when pulp is supplied to the screen in varying quantities or when the concentration or the kind of the supplied pulp varies more particularly. In case too great a quantity of pulp is supplied, the other working conditions being unchanged, the liquid level in the screen trough rises to such a height that some good pulp leaves together with the graded waste pulp, which means a greater or smaller economical loss. The same happens if the concentration of the supplied pulp varies considerably from that concentration, which is most advantageous for the other working conditions. The kind of pulp influences also to a great extent the capacity of the screen, so that when passing from a pulp which is not so difficult to screen to a mass which is difficult to screen the liquid level in the trough may rise. On the other hand, in case there is a change in the opposite direction, that is, if pulp is supplied to a considerably smaller extent, or if, with regard to the capacity of screening, a more favourable concentration of the pulp is obtained or if there is a pulp which is more easily screened, it may occur that the liquid level in the screen trough sinks so far that an effective screening is jeopardized thereby. The portion of the screen plate on which the graded coarse particles are transported to the outlet channel will then be considerably longer, whereby there is a greater risk that the smallest of these particles will pass through the openings in the screening surface and follow the screened good pulp and make the same impure.

This is especially true when the openings of the screening surface are, as is usually the case, smaller in the uppermost part of said surface than in the preceding portion and the liquid level sinks below the zone between the coarse and fine perforations.

Since the vibratory apparatus works best when the liquid level in the screen trough is at a certain determined height, the liquid level should be kept substantially at this height, which according to the invention may be done in several ways. In the embodiment of the invention illustrated in the drawing the liquid level is kept at a constant height by controlling the number of vibrations.

In the drawing reference numeral 10 indicates a trough, in which the screening member, comprising a box 11, the bottom 12 of which is made as a screen, and which is mounted in such a manner that a great part of the screen will be immersed under a dammed up surface of the suspension of material which is being treated. Above the box 11 and mounted in two frames, provided laterally of the box, there are provided beams 13, 14 with which coil springs or other elastic or springy members carrying the box and enclosed in the casings 15 and 16 are united. The vibrating motion is effected in a manner already known and is described in applicant's prior Patent 2,293,978, dated August 25, 1942, by means of a shaft 17 extending all the way through and mounted in the walls of the box, said shaft being provided with eccentric weight. The material to be treated is supplied to the box 11 from the channel 18. During the screening the fine fibrous material passes through the screening member 12 out into the trough 10, the coarse material leaving above the screening surface and through the outlet channel 19. Motion is transmitted to the shaft 17 from the motor 20 by means of the belt 21. On the surface of the suspension of material in the box 11 there is located a float 22, which is connected to a servo-

motor 23 by means of a lever, the servo-motor actuating the motor 20. The rising or the sinking of the liquid level in the trough 10 will cause the servo-motor 23 to actuate the motor 20 so that the number of revolutions is changed, whereby the number of vibrations will in its turn vary, so that the capacity of the screen always corresponds to the quantity of the supplied material.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the type described including a trough having a dam at one end thereof for receiving the suspension to be treated, a screening member elastically supported within the trough and having a substantial part thereof immersed under a dammed up surface of the suspension, a motor actuating said screening member to impart vibrations thereto, a servo-motor adjacent the first mentioned motor for varying the revolutions thereof, and a float resting on the surface of the suspension and responsive to the rise and fall of the level thereof connected to the servo-motor for automatically controlling the number of vibrations imparted to the screen according to the rise and fall of the said level.

2. An apparatus as claimed in claim 1 in which the trough is provided with a curved bottom so that the middle portion of the screen is immersed beneath the surface of the liquid and the float member rests on the surface of the liquid in this middle portion of the screen.

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