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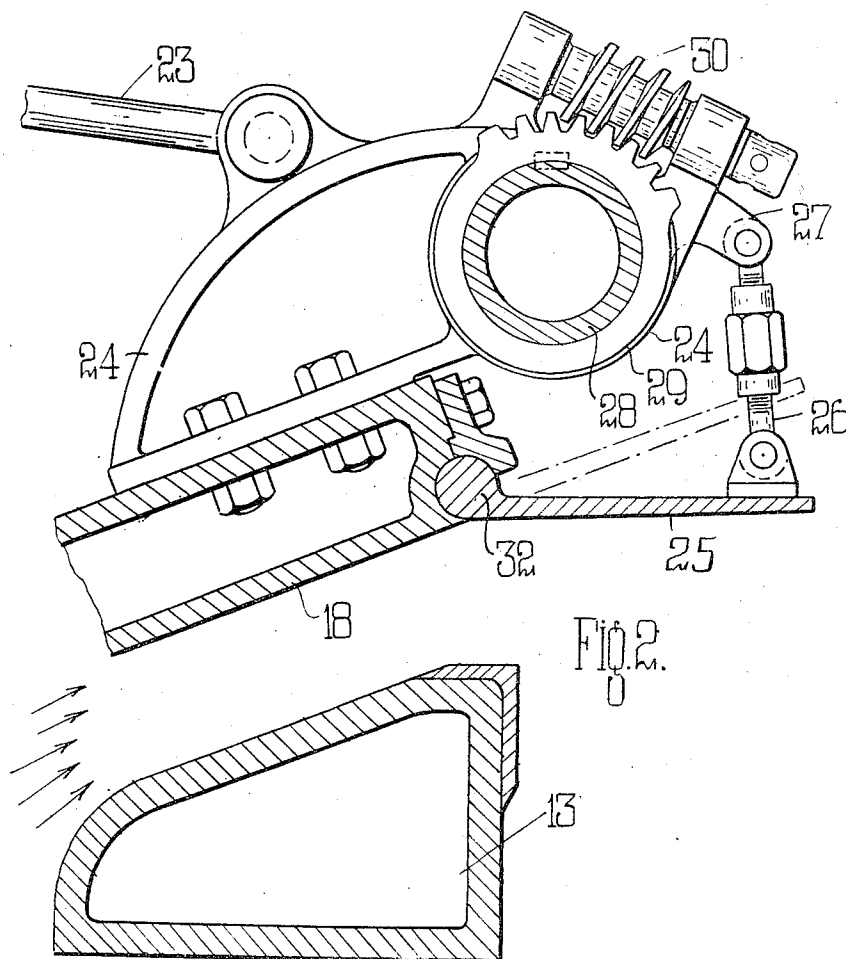
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PAPERMAKING MACHINERY

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PAPERMAKING MACHINERY

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The present invention relates to machinery for making paper, paper board, pulp board, straw-board, asbestos board, leather board or the like products of the type wherein a mould comprising a cylindrical frame work covered with a fine mesh wire is rotatable in a vat to which the stock comprising cellulose or other fibre and water is fed, the fibre being deposited on the mould and withdrawn therefrom by contact with a conveyor at a part of the mould above the level of the stock in the vat.

In machines of the above type it is usual to feed the stock, i. e., the cellulose fibre and water along a conduit to an inlet compartment of the vat, said inlet compartment being vertically disposed between the conduit and the top of the vat and in its travel between the compartment and the vat passes over a dam separating the outlet end of the compartment from the vat.

The known inlet compartments are so constructed that they are of fixed dimensions incapable of being widened or narrowed without structural alteration, except in so far that it is known to provide an adjustable throttle in said compartment.

It will be appreciated that with an inlet compartment having fixed walls the velocity of the incoming stock is governed by the quantity which is admitted with the result that it is impossible to control the thickness of the paper or board thus produced.

This defect will be appreciated when it is realized that the volume of stock passing through the inlet compartment is variable dependent on the speed of the machine whilst the consistency of the stock may also vary, for example, the percentage of fibre in the stock may vary between 0.15% and 0.6% or more, from which it follows that for the production of paper or board of a predetermined thickness when a stock of 0.15% is being used, it is necessary that the volume of stock passing through the inlet compartment within a predetermined period of time shall be four times as great as that when a stock of 0.6% consistency is being used.

Again, even when a throttle in the inlet compartment is provided the velocity of the stock passing therethrough cannot be controlled at all points of its cross section of flow as by virtue of the throttle the stock in passing this must traverse a passage between the throttle and the fixed walls of the inlet compartment with the result that when taking up the complete cross section of the compartment in rear of the throttle there is no certainty that the fibre in the

stock shall be evenly distributed across said cross section. Admittedly in addition to adjustable throttles, efforts have been made to ensure homogeneity by gradually opening out the inlet compartment where this is connected to the common conduit by way of a V-connection between the compartment and the conduit and also by the use of adjustable weir plates or slices in the region of the dam between each inlet compartment and its corresponding vat, but these efforts have not produced the required results.

In the case of slices for example, which consist of rigid plates formed in two or more sections across the width of the dam only a direct vertical adjustment or a movement at right angles to the direction normal to the flow of the stock is possible.

According to the present invention either or both longitudinal walls of the inlet compartment are adjustably mounted on the supporting structure so as to vary the width of the inlet compartment to suit particular requirements. Preferably the top of outlet end only of the walls of the inlet compartment is adjustable, said wall or walls being curved to facilitate a streamline flow.

From this it will be seen that where stock having a relatively small proportion of fibre is employed, the width of the inlet compartment may be enlarged without difficulty as compared with that which is utilized when stock having a larger percentage of fibre is employed, and as a result, the velocity of flow of the stock is increased to maintain a predetermined depth of paper or board to be produced.

Again, in machinery of the type set forth difficulties are encountered in regulating the flow of the cellulose or other material and water through and from the inlet compartment or compartments to ensure an even deposit on the surface of the mould from one end of this to the other, and to so dispose the fibres on the mould as to give the best possible formation of the sheet.

A further object of the present invention, therefore, is to provide a means of regulating the flow on to the mould and of directing and controlling the angle of flow on to the mould to improve formation.

Accordingly the outlet end of an inlet compartment in the region of the usual dam between said compartment and the mould, has a flexible plate extending over the entire length of the vat, said flexible plate being hinged to the outer wall of the compartment and being provided at

spaced intervals with adjusting screws to vary its height at any desired position transversely of the compartment or longitudinally of the mould above said dam.

As a result, the exit opening of said compartment leading to said mould is variable longitudinally of the vat so that if, during operation of the machine it is found that the paper produced is of varying thickness across its width the flexible plate may be distorted to increase or decrease the width of the opening between the weir plate of the dam and the flexible plate and so allow more or less stock to flow on to the mould at any desired portion of its surface, which will have a corresponding increase or decrease in the thickness of the paper or board enabling an equal thickness to be produced across the whole width.

Further, by means of raising or lowering the flexible member as a whole the angle of projection of the stock flowing on to the mould can be altered and so influence the nature of the formation of the sheet.

The invention is more particularly described with reference to the accompanying drawings, in which—

Figure 1 is a vertical and lateral section through an inlet compartment and vat of a papermaking machine according to the present invention.

Figure 2 is a corresponding but enlarged view showing a flexible plate and its adjusting mechanism, with the former pivotally mounted on the upper end of an adjustable wall of the inlet compartment, the said upper end being shown in a position of the wall which is adjusted relatively to that position shown in Figure 1.

Figure 3 is a side elevational view of a slightly modified form of construction showing the worm adjustment means of the flexible plate in a horizontal instead of a slightly inclined position.

In the construction according to the drawings the cylindrical mould is shown at 10, the substantially semi-cylindrical wall of the vat at 11, the inlet compartment at 12 and the dam at 13. The inlet compartment has a length equal to that of the vat while the construction illustrated is of the unflow type and the overflow of the vat is shown at 14. Should the drum 10 rotate in a clockwise direction, however, to constitute a contraflow type of machine, the overflow 14 is eliminated.

Adjacent the inlet end of the inlet compartment 12 is provided an adjustable throttle 15 adapted for angular displacement about its axis to vary the width of the inlet compartment between the outer wall 16 which is remote from the vat, and the inner wall 17 of said compartment, without in any way interfering with the length of the compartment which corresponds to the axial length of the mould 10.

A curved wall 18 extending longitudinally of the vat over the entire length thereof is hinged at 19 to the lower outer wall part 16 and at its free end overhangs the dam 13 this wall 18 is provided with means for maintaining it in any desired position of adjustment to regulate the cross sectional area of the outlet end of the inlet compartment available to flow of stock and also to regulate the cross sectional passage available to said flow over the dam 13 when the stock is projected from the inlet compartment into surface contact with the rotating cylinder 10 and the vat 11.

The means for displacing the curved wall 18 consists of a shaft 20 which passes longitudinally

of the machine and one end of which is rigidly connected with a handle 21. A lever arm 22 at either or each end of the shaft 20 which forms a bell crank with the handle 21 is connected to telescopic linkage 23 pivotally mounted to bracket 24 at the upper and free end of the curved wall 18.

It will be seen that on angular rotation of the handle 21, shown in chain dotted lines in Fig. 1, the shaft 20 and the lever arm or arms 22 is or are rotated about the axis of the shaft to raise the free end of the wall 18 and thus permit of relatively coarse adjustment of the wall 18 to increase the width of the inlet compartment at all parts above the throttle 15 and also to increase the height of the curved wall 18 above the dam 13 uniformly over the entire length of the wall, considered in the axial direction of the vat. By virtue of the curvature of the wall 18 a streamline flow of stock through the upper end of the inlet compartment and over the dam is obtained.

In order to provide for vernier adjustment of the wall 18 the handle 21 is maintained in its fixed position of adjustment and an internally threaded collar 31, being one part of the telescopic linkage 23, is rotated to vary the length of a co-operating threaded rod constituting the other part of the linkage 23. Thus, if it is desired to effect the same vernier adjustment at both ends of the wall 18, both internally threaded collars 31 are rotated by a similar amount.

In order to compensate for any irregularity in the depth of the stock deposited at spaced intervals longitudinally of the drum 10 the cross sectional area of flow of stock is variable longitudinally of the drum by means of a flexible plate 25 which is hinged at 32 to the upper end of the curved wall 18, said flexible plate at intervals throughout its length longitudinally of the vat being provided with adjusting screws 26, each of which is pivotally mounted at its opposite end to a lever 27 attached to a main longitudinal member 28 constituted by a tube, said member 28 at one end thereof, being keyed to a quadrant gear 29 engaged by a worm 30 which is manually operable to rotate the quadrant gear 29 and the member 28 to cause the flexible plate 25 and the screws 26 as a unit to be angularly displaced about the hinge 32 on the upper end of the wall 18 to adjust the height of the resilient plate as a whole.

Should it be found that stock flowing through the inlet compartment 12 and over the dam 13 into contact with the mould 10 is thinner at certain points longitudinally of the mould than at the ends of the mould, then the adjusting screws adjacent said positions are shortened to distort the flexible plate in the region of said positions and thus increase the cross sectional area at said positions longitudinally of the mould with respect to the end portions of the mould.

It will be appreciated, of course, that the flexible plate 25 may be hinged to a fixed part of the machine structure such as a rigid part of the outer wall 16 of the inlet compartment where a pivotal wall 18 is not provided. In other words, in machines where it is merely desired to eliminate the possibility of a varying depth of stock being deposited longitudinally of the mould 10, the plate 25 is hinged directly to the rear wall 16 of the inlet compartment or to any other fixed part of the structure of the machine, means being provided, such as for example of the type shown in the drawings, for varying the position

of the plate 25 as a whole and also for varying its height differentially at any desired position longitudinally of the mould.

I declare that what I claim is:

1. A papermaking machine comprising a substantially semi-cylindrical vat, a cylindrical mould rotatable in said vat, an inlet compartment through which stock is fed to said mould, a dam at the upper and outlet end of said inlet compartment and over which the stock is projected into said vat and into contact with said mould, a flexible plate extending over the entire length of the vat above said dam and angularly adjustably displaceable to vary its height above the top of said dam so as to vary the opening for the projection of said stock into said vat, and means for varying the height of said flexible plate differentially along its length whereby to vary the depth of said opening at different positions longitudinally of said plate and said vat.

2. A papermaking machine comprising a substantially semi-cylindrical vat, a cylindrical mould rotatable in said vat, an inlet compartment from which stock is fed into said vat, a dam at the outlet end of said inlet compartment over which said stock is projected from said inlet compartment into contact with said mould in said vat, a flexible plate extending over the entire length of the vat above said dam and an-

gularly adjustably displaceable as a whole with respect to the outlet of said inlet compartment to vary the width of opening therethrough consistently throughout its length for the projection of said stock over said dam, means for effecting said angular displacement and separate means for distorting said plate so as to separately adjust the height of said plate at relatively longitudinally spaced positions thereof.

3. A papermaking machine comprising a substantially semicylindrical vat, a cylindrical mould rotatable in said vat, an inlet compartment through which stock is fed into said vat and having a pivotal wall part, a dam at the outlet end of said inlet compartment over which said stock is projected from said inlet compartment into contact with said mould in said vat, flexible plate means pivotally connected to the free end of said pivotal wall part, means for angularly displacing said pivotal wall part to adjust the height of its free end above and relatively to said dam and thus control the exit opening of said inlet compartment above said dam, and means for distorting said flexible plate means to vary the height of the plate with respect to the dam at any position longitudinally of the vat independently of the height of the ends of the plate.

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