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3,236,725

ADJUSTABLE BAFFLE FOR PAPER STOCK INLET

Filed March 13, 1963

3 Sheets-Sheet 1

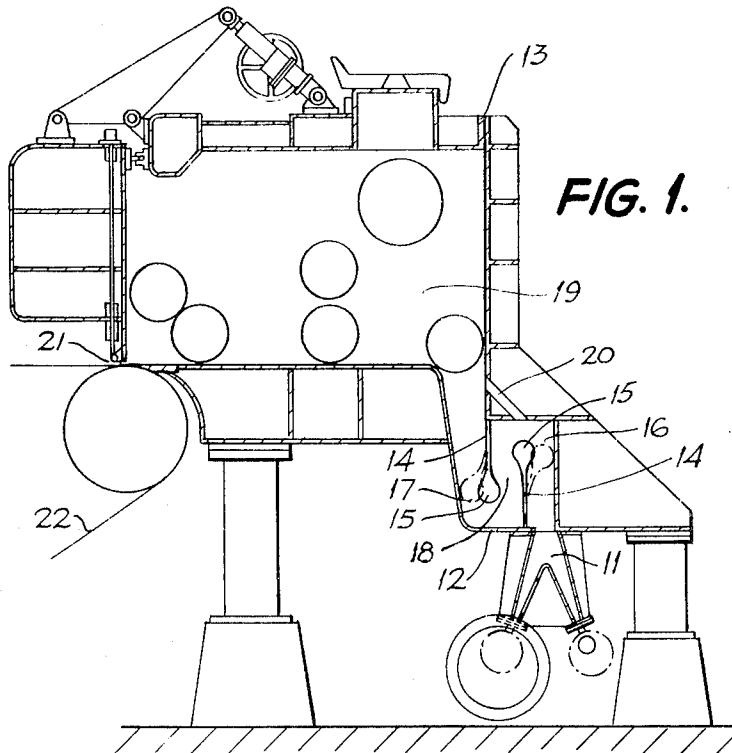


FIG. 1.

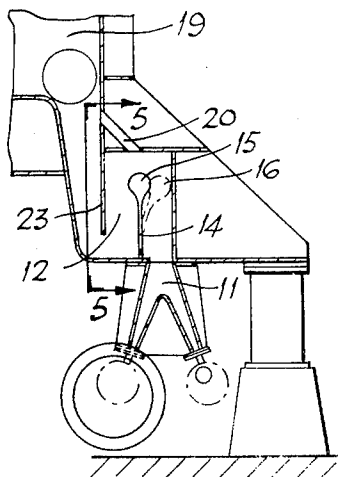


FIG. 2

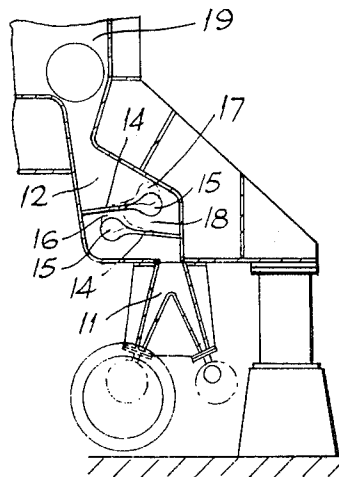


FIG. 3

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ADJUSTABLE BAFFLE FOR PAPER STOCK INLET

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3 Sheets-Sheet 3

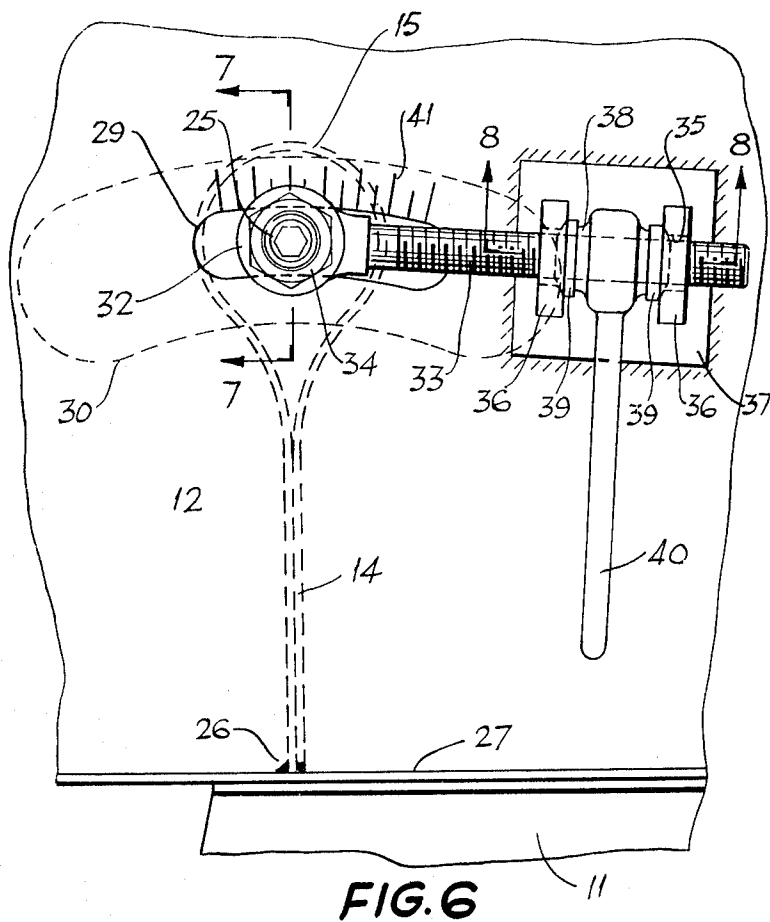


FIG. 6

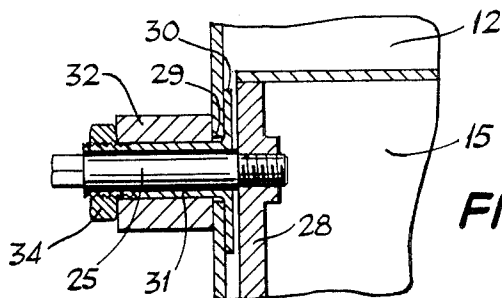


FIG. 7

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ADJUSTABLE BAFFLE FOR PAPER STOCK INLET
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868,470

6 Claims. (Cl. 162—336)

This invention relates to paper making machine stock inlets and more particularly to an adjustable flexible baffle device positioned in a stock inlet to produce a flow of paper stock, from the stock inlet, which is of stable and uniform velocity, is of uniform fibre dispersion and is free from large patterns of turbulence, on to a conventional drainage unit such as, a Fourdrinier, a cylinder paper or board machine, a thickener, etc.

To manufacture a sheet of paper of uniform weight, it is necessary that the flow of dilute paper stock, across the width of the machine, be of a stable and uniform velocity and have uniform dispersion of fibres. It is also very important that large patterns of turbulence do not occur in flow, since these disturbances will create defects in the formation of the sheet.

The essential features of this invention lie in the provision of a flexible baffle device which, positioned in a headbox stock inlet chamber between the distributor and slice or stock outlet, produces a flow of paper stock with the aforementioned desirable characteristics.

Baffles of various types have long been used in paper making machine headboxes, to suppress large patterns of turbulence and to produce a more uniform flow of stock.

In open type headboxes, rigid baffle plates, usually vertically positioned in the headboxes, are arranged in slides and adapted to be moved up and down within the slides to provide an opening, of adjustable width, through which the stock flows.

This arrangement has not proved to be too satisfactory because the mechanism rapidly becomes inoperative due to corrosion and to the collection of stock fibres in the slides. The collection of stock fibres in the slides not only causes the mechanism to become inoperative, but also results in the formation of lumps of paper stock, in the vicinity of the slides, which break loose and contaminate the stock flow to produce an unsatisfactory sheet of paper.

In high and wide open type headboxes these conventional baffles produce a further disadvantage in that the baffle plates become excessively heavy and unwieldy and provide difficulties in handling.

In inclosed pressure type headboxes, it is difficult and objectionable to incorporate adjustable rigid baffle plates, for the suppression of large patterns of turbulence.

One arrangement of pressure type headbox has provided an adjustable opening, between the stock flow distributor and the inlet chamber, by the raising and lowering of a heavy back plate which forms part of the headbox structure.

This arrangement is very inconvenient to operate, requiring that the paper machine to be shut down in order to reposition the back plate to change the width of the opening.

Another arrangement of pressure type headbox incorporates a rotary baffle positioned in the stream of stock within the headbox.

This arrangement of rotary baffle is also not too satisfactory, because two channels of stock flow are created around the baffle, resulting in a coarser pattern of turbulence.

The baffle device disclosed herein comprises one or

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more flexible baffle plates extending across the stock inlet chamber in a direction transverse to the stream of stock flowing through the inlet chamber, the baffle plates being securely anchored along one longitudinal edge to the stock inlet and adjustably flexible about the anchored edge, in the direction of stock flow, to produce a turbulence suppressing restriction in the stock flow path.

The stream of stock which flows around the baffle plate reverses its direction of flow and doubles back on itself, thus providing that stock of the same consistency, and with very little pressure difference, is present on both sides of the baffle plate. Therefore, the ends of the baffle plate do not have to be sealed to the sides of the inlet chamber and in practice, a clearance of about $\frac{3}{16}$ " can be left at each end of the baffle plate, thus eliminating all difficulties inherent in the conventional baffle plate arrangements, due to accretions of stock in the slides, etc. Thus a stream of stock will flow around each end of the baffle plate and provide a self cleaning action.

In the disclosed preferred execution, the free longitudinal edge of the baffle plate is formed as a bulbous shaped lip to provide structural edge stiffness and maintain a consistent velocity profile of the stock flow.

An additional feature of the bulbous lip is the promotion of improved stock flow characteristics around the stream-lined baffle edge, thus discouraging the development of large patterns of turbulence in the flow.

The flexible baffle plate, or plates, are adapted at their ends to be adjustably clamped to the inlet chamber sides, in a manner whereby the position of the baffle plates may be adjusted, and their positions noted, from outside the headbox.

It is, therefore, the main object of this invention to provide a flexible baffle device, positioned in an inlet chamber between a paper stock flow distributor and a conventional drainage unit, which will produce a flow of paper stock from the inlet chamber, which is of stable and uniform velocity, is of uniform fibre dispersion and is free from large patterns of turbulence.

Another object is to provide a flexible baffle device, positioned in a headbox, which is quickly adjustable from outside the headbox whilst the machine is in operation, so that the results of adjustments made may be immediately observed at various positions on the paper machine beyond the headbox, and further adjustments made where necessary to provide stock flow with the characteristics described in the aforementioned objective, for various operating conditions.

Another object is to provide a baffle device which is of flexible construction, thereby eliminating all mechanical joints.

Another object is to provide an adjustable flexible baffle device in which, a clearance is maintained between each end of the baffle device and the stock inlet chamber side walls, thus eliminating all baffle end seals, slides, etc., and providing a self-cleaning action, due to the flow of stock around the baffle ends.

Another object is to provide an adjustable flexible baffle device which may be positioned in a headbox with little or no increase in the length of the headbox in the machine length direction.

A further object is to provide a flexible baffle device, positioned in a stock inlet chamber, which is of simple construction and thus simplifies routine clean-out operations.

These and other objects of this invention will be apparent from the following specification and the accompanying figures in which similar reference numerals refer to similar parts throughout.

In the following specification:

FIG. 1 is a sectional view through a typical enclosed

pressure type headbox, embodying one execution of this invention in which two flexible baffle plates are vertically arranged in the stock inlet chamber.

FIG. 2 is a partial sectional view, similar to FIG. 1, but embodying another execution of this invention in which one flexible baffle plate is vertically arranged in the stock inlet chamber.

FIG. 3 is a partial sectional view, similar to FIG. 1, embodying another execution of this invention in which two flexible baffle plates are horizontally arranged in the stock inlet chamber.

FIG. 4 is a partial sectional view, similar to FIG. 1, embodying a further execution of this invention in which one flexible baffle plate is horizontally arranged in the stock inlet chamber.

FIG. 5 is a partial sectional view taken in the direction of 5—5 in FIG. 2.

FIG. 6 is a view, to an enlarged scale, taken in the direction of arrow 6 in FIG. 5, showing details of the means for clamping the baffle plate to the stock inlet side walls.

FIG. 7 is a section on 7—7 in FIG. 6.

FIG. 8 is a section on 8—8 in FIG. 6.

With reference now to FIG. 1, stock distributor 11 is attached to stock inlet chamber 12 of typical pressure type headbox 13 and positioned in inlet chamber 12 are flexible baffles 14 extending across inlet chamber 12 transverse to the direction of stock flow. One of the flexible baffles 14 is positioned vertically and rigidly attached at its lower edge to the lower surface of the inlet chamber 12, the upper edge having the form of a bulbous lip 15, and the other flexible baffle 14 being positioned vertically, but inverted, and rigidly attached at its upper edge to the upper surface of inlet chamber 12, the lower edge also having the form of a bulbous lip 15.

In this execution, the two baffles 14 are adjustable to form two turbulence suppressing restrictions at 16 and 17 with a turbulence chamber 18 formed therebetween. The upper part of turbulence chamber 18 is vented to the main headbox chamber 19 by vents 20, to prevent accumulation of air.

Thus stock entering the headbox will flow from distributor 11, through a double U path formed by baffle restriction 16, turbulence chamber 18 and baffle restriction 17, through the main headbox chamber 19 and out through slice 21 on to the Fourdrinier drainage wire 22.

Reference now to FIG. 2 shows another execution in which only one flexible baffle 14 used, being positioned vertically and rigidly attached to the lower surface of inlet chamber 12. In this execution, a rigid baffle plate 23 extends downwardly from the upper surface of inlet chamber 12, to provide a double U flow path for the stock to travel, similar to the flow path shown in FIG. 1. In this execution there is only one baffle restriction 18. Vents 20 are again provided to vent the upper part of inlet chamber 12 to the main headbox chamber 19, to prevent accumulation of air.

Reference to FIG. 3 now, shows another execution in which two flexible baffles 14 are positioned in inlet chamber 12, but in this execution they are positioned substantially horizontally and securely anchored to each of the side walls of inlet chamber 12, to again form a double U flow path, through which the stock will travel. In this execution, the upper surface of inlet chamber 12 is upwardly sloped to prevent any accumulation of air. Also, flexible baffles 14 have an upwardly sloped bias and are arranged to be upwardly adjustable, to again prevent accumulation of air.

Reference now to FIG. 4 shows a further execution of this invention in which only one flexible baffle 14 is positioned substantially horizontal in inlet chamber 12 and securely anchored to one of the side walls of inlet chamber 12 to form a single U flow path, through which the stock will travel. In this execution, flexible baffle 14 is biased and arranged to adjust upwardly and the upper

surface of inlet chamber 12 is upwardly sloped to prevent any accumulation of air.

FIG. 5 is a sectional view taken on 5—5 in FIG. 2 and shows an end view of flexible baffle 14, with end clearances 24 and vents 20 and showing the baffle journals 25 extending through both side walls of inlet chamber 12.

FIG. 6 is a view, to an enlarged scale, taken in the direction of arrow 6 in FIG. 5 and is typical for both ends of flexible baffle 14, showing flexible baffle 14 vertically positioned and securely attached at 26 to the lower surface 27 of inlet chamber 12.

Reference now to FIGS. 6, 7 and 8 shows details of a conventional means for adjusting and clamping flexible baffle 14 to the side walls of inlet chamber 12.

Baffle journals 25 are securely attached to the end plates 28 of flexible baffles 14, and extend through slots 29 in the side walls of inlet chamber 12. Cover plates 30 are positioned between end plates 28 and the inside surfaces of the end walls of inlet chamber 12 and arranged so that slots 29 are always covered, throughout the range of baffle adjustment, to prevent leakage of stock. Cover plate sleeves 31 are attached to cover plates 30, project through slots 29 and are bored to provide a close sliding fit on baffle journals 25.

Head ends 32, of adjusting screws 33, are bored to provide a sliding fit on sleeves 31 and are secured thereon by nuts 34, screwed to threaded portions on the ends of sleeves 31. It will be noted, in FIG. 7, that when nuts 34 are tightened, cover plates 30 are pulled up hard against the inside surfaces of the end walls of inlet chamber 12 and head ends 32 are jammed against the outside surfaces of said end walls, thus tightly sealing slots 29 and securely positioned baffle journals 25 and flexible baffle 14.

Adjusting screws 33 are located in bores 35 in supporting lugs 36. Supporting lugs 36 project at right angles from reinforcing plates 37, which are welded or otherwise attached to the outer surfaces of the end walls of inlet chamber 12.

Adjusting nuts 38 are assembled on adjusting screws 33 and are held in spaced relation to supporting lugs 36 by spherical collars 39. Spherical collars 39 have flat inner surfaces abutting flat end surfaces of adjusting nuts 38, and spherical outer surfaces located in spherical depressions on the insides of bores 35 in supporting lugs 36, thus providing for smooth rotation of adjusting nuts 38 on adjusting screws 33, throughout the range of baffle adjustment.

Ratchets 40 are provided for convenient adjustment of adjusting nuts 38.

Scales 41 are provided on slots 29, to enable each end of flexible baffle 14 to be adjusted and aligned as required.

Thus, flexible baffles 14 can be quickly adjusted by slackening nuts 34, operating ratchets 40 until the desired baffle positions are indicated on scales 41, and then retightening nuts 34.

It will be understood that, although these executions have been described as embodying separate adjusting arrangements for each end of flexible baffles 14, conventional arrangements could be utilized to permit all adjustments, to the flexible baffles, to be made from one side of the headbox. This arrangement would be especially useful when applied to flexible baffles installed in narrow headboxes.

Routine cleaning of the flexible baffles can be readily carried out through washout doors installed at each end of the inlet chamber.

It will be seen from the foregoing specification that flexible baffles, according to this invention, installed in paper machine stock inlets, provide a simple and efficient means for suppressing large patterns of turbulence and thus providing a uniform flow of stock on to a drainage unit. As will also be seen, flexible baffles, providing stock flow with the above mentioned desirable characteristics, may be installed in paper making machine head-

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boxes with little or no increase in headbox size, in the machine length direction.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a stock feeding apparatus for paper making machines comprising a headbox and a stock distributor through which stock is introduced into the headbox the improvement comprising (a) a stock inlet chamber to communicate the stock distributor with the headbox (b) at least one flexible baffle located within said inlet chamber, said baffle having two longitudinal edges one of which is rigidly attached to a wall of said inlet chamber, said baffle being flexible so as to be disposable in a plurality of positions of adjustment and (c) means for securing the baffle in any selected one of the plurality of positions of adjustment.

2. A stock feeding apparatus as in claim 1 wherein at least one said flexible baffle has along the longitudinal edge opposite said attached longitudinal edge a bulbous lip reinforcement.

3. A stock feeding apparatus as in claim 1 wherein at least one said flexible baffle is disposed in spaced opposing relation to another wall of the inlet chamber to form with the latter a restricted passage in said inlet chamber through which stock passes from distributor into the headbox, the said positions of adjustment controlling the width of said passage.

4. A stock feeding apparatus as in claim 1 wherein at

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least one said baffle is positioned vertically and rigidly attached at its lower longitudinal edge to the lower wall of the inlet chamber.

5. A stock feeding apparatus as in claim 1 wherein there are two baffles, a first flexible baffle positioned vertically and rigidly attached at its lower longitudinal edge to the lower wall of the inlet chamber and a second baffle positioned vertically and rigidly attached at its upper longitudinal edge to the upper wall of said inlet chamber so as to form a double U stock flow path.

6. A stock feeding apparatus as in claim 1 wherein at least one said flexible baffle is positioned substantially horizontally and rigidly attached at one of the longitudinal edges to a vertical wall of the inlet chamber.

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