HEADBOX OVERFLOW AND RECIRCULATION SYSTEM

Louis E. Dennis, Clinton, and Edward D. Beachler, Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis., a corporation of Wisconsin    
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ABSTRACT OF THE DISCLOSURE

A headbox for a paper making machine which includes an overflow control device which is mounted in the cross machine direction and cooperative with a trough positioned in the headbox and adjacent the slice. The slice is formed by a movable wall portion of the headbox. Movement of the wall also moves the trough, a portion of which engages a pivotally mounted foil. The foil serves to maintain a uniform overflow characteristic of the stock flowing into the trough while movement of the slice varies the flow characteristic of the stock onto a forming surface. Also, a recirculating system is employed to maintain stock flow through the headbox at a desired rate.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to an overflow system for a headbox and more particularly to an overflow device which serves to improve the flow characteristics of the stock within the headbox.

Description of the prior art

Overflow systems for headboxes are old in the art, per se, for removing the top layer of pulp stock. The top layers of the pulp stock must be removed because of the foam and bumps which tend to form on and near the surface of the headbox suspensions. It is, of course, desirable to remove the lumps since they may be carried out the headbox outlet and onto the Fourdrinier wire, thereby causing unwanted irregularities in the web formation.

Previous overflow systems employ a trough attached to or constructed as an integral part of the front wall of a headbox to allow the top layers of slurry to be removed. The amount of overflow within the headbox would change when raising or lowering the slice opening; however, the stock level within the headbox would remain constant by a level control such as a bung hole. This change in overflow rate has an effect on the total pressure head of the headbox because more water is required to discharge the stock out of a given slice opening.

Some of the prior overflow systems known in the art employ a gravity type removal of the overflow stock. That is, a trough is provided into which the top layers of the pulp stock flow and in which a level is maintained somewhat below the level in the headbox and this separated pulp stock runs off through appropriate piping by gravity. Sizing devices have been employed to maintain this level above the point at which the overflow conduit connects thereto so that pressure within the headbox will not be lost by the passage of air through the conduit. Therefore, these prior art systems are not adapted for removing large quantities of pulp stock from the headbox.

Since the velocity of the discharged slurry at the outlet of the headbox is dependent on the pressure head of the stock in the headbox, and since the velocity of the discharged stock must be approximately equal to the velocity of the Fourdrinier wire, a constant pressure head must be maintained. However, if the slicebody is adjusted to alter the height of the discharge opening, the overflow rate of the stock will also change and a corresponding change in pressure will be noticed at the slice opening. As a result, the headbox is more difficult to operate and optimum use of the rectifier rolls is not obtained. Therefore, a need exists for an overflow system which will maintain the same stock pressure in a headbox at different slice openings.

Although it is necessary to maintain a constant stock level and pressure in a headbox, it is also necessary to provide means for varying the discharge flow rate while maintaining a relatively constant inlet flow rate. The inlet and outlet piping, ducts, etc. of a headbox are designed to operate effectively and efficiently at a certain flow rate. For example, the inlet is designed to pass a quantity of stock at a velocity equal to the maximum stock velocity which can be obtained at the outlet of the headbox. Therefore, the stock will not flowcirculate or bunch up through the inlet due to a slow stock velocity. It is important to maintain the inlet stock flow rate within a certain range. Different grades of paper, however, such as kraft and newsmast, require a wide range of discharge flow rates. Therefore, in a headbox having a relatively constant inlet stock velocity and stock level, it is desirable to vary the outlet stock velocity without changing either the inlet velocity or stock level within the headbox.

Because the pulp stock is refined and beaten with turbulence and friction-type devices, and because steam is also added to the white water to heat the stock and improve drainage, the stock is elevated to a higher temperature, for example, as high as 140° F. The heated stock comes in contact with one side of the inside edge of the overflow trough more than the other. As a result, headboxes having conventional slice openings will tend to bend or warp. The bending and warping causes the slice opening height to vary across the machine; and this variance causes an undesirable variance in basis weight across the paper web. Therefore, it is necessary to provide an overflow system within the movable slicebody to eliminate or lessen the effect of temperature differentials caused by heated stock.

Vorticing occurs when the stock moves at high velocities around or past an obstruction. This vorticing causes the stock to carry a large amount of air which results in an air bleed or leak from the headbox. Therefore, it is necessary that low overflow velocities be maintained in the overflow system to prevent bleeding of air from the headbox. Because these high velocities occur in the ducts which carry the slurry through the pondsides, an overflow system is required which eliminates high velocities in the presence of air. Therefore, a need exists for an overflow system which allows the removal of large quantities of water at moderate velocities while maintaining a constant level in the headbox.

Summary of the invention

It is, therefore, an object of this invention to provide an improved overflow system which will not affect the level of the pulp stock in a headbox.

It is another object of the present invention to provide an overflow system within a headbox such that the stock level maintained in the headbox will not be lost by the passage of air through the conduit while the stock outlet characteristics are variable.

Still another object of the present invention is to provide an overflow system which will lessen the bending and warping which occurs because of temperature differentials across the slicebody.

A further object of the present invention is to provide an overflow system which allows the removal of large quantities of water at moderate velocities.

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These and other objects, features and advantages of the present invention will be more fully realized and understood from the following detailed description when taken in conjunction with the accompanying drawings.

Brief description of the drawings

FIG. 1 is a side elevational view in section of a headbox which employs one embodiment of the overflow and recirculation system of the present invention;

FIG. 2 is a side elevational view in section of a headbox which employs another embodiment of the overflow and recirculation system of the present invention wherein the overflow is removed through the slicebody;

FIG. 3 is a side elevational view in section of a headbox which employs still another embodiment of the overflow and recirculation system of the present invention;

FIG. 4 is a broken-out and partial view of the overflow and recirculation conduits illustrated in FIG. 3;

FIG. 5 is a side elevational view in section of a headbox employing still another and preferred embodiment of the overflow and recirculation system of the present invention;

FIG. 6 is a detailed view partially broken away of a foil employed in conjunction with the overflow system illustrated in FIGS. 5, 8, 9 and 10 which is particularly useful for high recirculation systems;

FIG. 7 is a partial side elevational view of a mechanism for maintaining the foil of the overflow system of either FIGS. 2 or 5 at a fixed vertical position while following the movement of the slicebody during changes in the slice opening;

FIG. 8 shows a somewhat diagrammatic representation of an alternate embodiment of the overflow device of the present invention;

FIG. 9 shows a somewhat diagrammatic representation of still another alternate embodiment of the overflow device of the present invention and

FIG. 10 is a somewhat diagrammatic representation of yet another alternate embodiment of the overflow device of the present invention.

Like reference numerals throughout the various views of the drawings are intended to designate the same or similar structures.

Description of the preferred embodiments

With reference to the drawings in detail and in particular to FIG. 1, there is shown a headbox, generally designated with the reference numeral 10, which includes a front wall 12 and a bottom wall 14. The front wall 12 is mounted substantially horizontally and vertically and defines a variable slice opening or headbox outlet 16 with the bottom wall 14.

The headbox 10 includes an inlet conduit 18 which supplies pulp stock generally indicated with the reference numeral 20 through the bottom wall 14. An inlet roll 22 is provided in the inlet conduit 18. The headbox 10 also includes a pair of rectifier rolls 24 and 26. A breast roll 28 is positioned directly below the slice opening 16 and carries a travelling Fourdrinier wire 30 thereon for receiving the pulp stock in the formation of a paper web.

The front wall 12 includes an overflow baffle 32 which forms a chamber 34 into which the top layer of the pulp stock including foam and lumps flows. An opening 36 in the pondside of the headbox 10 removes the separated pulp stock including the foam and lumps may be transported either to the wire pit, the suction side of the fan pump at the inlet to the headbox 10, or to a silo.

A recirculation conduit 38 extends through the bottom wall 14 at a point between the rectifier roll 24 and the rectifier roll 26. Pulp stock is recirculated through the recirculating conduit 38 to the suction roll 28. The flow rate through the recirculating conduit 38 is varied in accordance with variations in the slice opening 16. Therefore, a constant flow may be maintained at the inlet 18 with variations in the slice opening 16. The difference between the stock fed to the headbox 10 and that discharged at the slice opening 16 is recirculated through the conduit 38.

It can be readily appreciated that this recirculation system illustrated in FIG. 1 together with a level control (not shown) maintains a substantially constant level of the pulp stock 20 in the head box 10 and a constant pressure head for maintaining the characteristics of the exiting jet of stock at the slice opening 16 substantially constant. The headbox 10, therefore, has the capability of discharging a wide range of flow rates from the slice opening 16 while maintaining the same inlet flow rate for all grades of paper being produced.

Although the overflow and recirculation system illustrated in FIG. 1 exhibits many advantages over the prior art, the amount of overflow into the opening 36 cannot be maintained constant since the baffle 32 is movable with the front wall 12 and with variations in the slice opening 16. This difficulty, however, is eliminated with the other forms of the present invention which are described hereinbelow.

With reference to FIG. 2, there is shown a headbox generally designated with the reference numeral 39 which includes a front wall 41 having a slice lip 43 mounted thereon and movable vertically as indicated by the double-headed arrow 45. Mounted on a back wall 40 of the housing 39 is a jack 42 which is connected to and imparts movement to a tie rod 44 which is pivotally mounted on the front wall 41. The front wall 41 is pivotally mounted with respect to a top wall 46 at a point 48.

The headbox 39 includes an inlet conduit 50 having an inlet roll 52 therein for supplying pulp stock as indicated by the reference numeral 54 to the headbox. A pair of rectifier rolls 56 and 58 are mounted for rotation within the headbox 39.

The slice lip 43 forms a slice opening 60 with a bottom wall 62 of the headbox 39. A breast roll 64 is pivotally mounted below the slice opening 60 and supports a travelling Fourdrinier wire 66 thereon.

The jet of pulp stock which is emitted from the slice opening 60 onto the Fourdrinier wire 66 is controlled both by the vertical position of the slice lip 43 and by the horizontal position of the front wall 41. The jack 42 through the tie rod 44 imparts horizontal movement to the front wall 41 to position the same for adjusting the spot at which the jet of pulp stock is disposed onto the Fourdrinier wire 66. However, the jet of pulp stock is also controlled by the level of the pulp stock 54 within the headbox 39 and the pressure head created thereby. Since it is desirable to maintain a constant flow through the inlet conduit 50, changes in the type of paper to be made by changing the position of the slice lip 43 or the front wall 41 will result in a change in the pressure head within the headbox 39. This change in the pressure head will alter the flow characteristics at the slice opening 60. As is well known in the art, it is preferable that the jet of pulp stock engage the Fourdrinier wire 66 at a particular point for optimum results. Therefore, any change in the characteristics of the jet of pulp stock, such as a change in the velocity thereof, will alter the resulting characteristics of the finished paper web.

In addition, it is preferable to maintain the operating conditions of the headbox 39 constant regardless of the type of paper being produced. These conditions will provide optimum results as mentioned hereinabove. Furthermore, as also mentioned hereinabove, foam and lumps accumulate in the top layers of the pulp stock 54, which foam and lumps may pass through the slice opening 60 and cause undesired irregularities in the resulting paper web.
A foil 72 is pivotally mounted by means of a shaft 74 to the front wall 41 and the free end thereof extends through the nozzle 68. The front wall 41 may be pivoted toward and away from the nozzle 68 by rotation of the shaft 74 to control the clearance therebetween as indicated by the reference numeral 76.

The chamber 70 accumulates pulp stock which flows over the top of the foil 72 and through the space 76 between the foil 72 and the nozzle 68. As shown, pivot movement of the foil 72 does not change the level of the pulp stock 54 in the headbox 39. An aperture 78 extends across the width of the front wall 41 to which a conduit 80 is connected for removal of the pulp stock from the chamber 70 to appropriate piping (not shown) on opposite sides of the headbox 39. Removal of the overflow pulp stock in this manner eliminates the existence of high velocity currents in the pulp stock in the region of pressurized air within the headbox 39. Therefore, any vortexing which may occur will result at ends of the conduit 80, which ends are substantially removed from the pressurized air in the headbox 39. It can be readily appreciated, therefore, that the pulp stock will exit from the chamber 70 through the aperture 78 at a moderate velocity and that vortexing will not occur in the pulp stock within the chamber 70.

With changes in the vertical position of the slice lip 43, the foil 72 may be rotated to change the clearance 76 between the foil 72 and the nozzle 68. In this manner, a constant input may be supplied to the headbox 39 and any changes at the outlet 60 are compensated by changing the flow through the space 76 to the overflow conduit 80. The overflow conduit 80 may be connected to the suction side of the inlet 50, or to a silo, as desired. If the conduit 80 is connected to the suction side of the inlet 50, the stock is recirculated into the headbox 39.

It may be appreciated that the slice opening 60 may be adjusted by vertical movement of the front wall 41, rather than by the slice lip 43. In such a form of the present invention, the foil 72 may be fixedly mounted to the ponsides of the headbox 39 and, since the nozzle 68 is secured to the front wall 41, the space 76 will change with changes in the slice opening 60. Therefore, if the discharged pulp stock is decreased by lowering the front wall 41, the flow through the space 76 will be increased to increase the recirculation through the conduit 80.

Still another embodiment of the present invention is illustrated in FIG. 3 wherein a headbox is generally designated with the reference numeral 82. A front wall 84 of the headbox 82 supports a bearing plate 86 at its lower edge. A slice lip 88 is mounted on the lower portion of the bearing plate 86 and is movable in a vertical direction as indicated by the arrow 90. A bottom wall 92 of the headbox 82, together with the slice lip 88, form a slice opening 94 for discharge of pulp stock from the headbox 82. A breast roll 96 is positioned beneath the slice opening 94 and supports a travelling Fourdriner wire 98 thereon.

An inlet conduit 100 supplies pulp stock to the headbox 82 and an inlet roll 102 is disposed in the circuit 100. The head box 82 also includes rectifier rolls 104, 106, 108 and 110. A breast roll 112 is secured to the bearing plate 86 and together support a shaft 114 for pivotal movement thereof. A baffle 116 is secured to the shaft 114 and is pivotally mounted therewith. Pivotal movement of the baffle 116 is controlled by a jack 118 having a shaft 120 secured to the baffle 116 by means of a linkage 122. Therefore, actuation of the jack 118 extends or retracts the shaft 120 to position the baffle 116 within the headbox 82. A pair of such jacks 118 may be provided at either end of the headbox 82, as desired. The baffle 116 forms a chamber with the front wall 84 and the bearing plate 86 for collection of pulp stock therein.

An overflow foil 124 is immovably mounted within the headbox 82 immediately adjacent the rectifier roll 110. The top edge of the foil 124 is disposed slightly below the level of the pulp stock, which is indicated with the reference numeral 126. Therefore, the top layers of the pulp stock overflow into the chamber formed by the baffle 116. The baffle 116 is disposed for movement toward and away from the foil 124 such that pulp stock may flow therebetween, which flow of pulp stock can be controlled by the baffle 116.

Overflow conduits 128 extend through a top wall of the headbox 82 and into the chamber formed by the baffle 116. The conduits 128 are connected to a vacuum source 130 for removing pulp stock from the chamber. Therefore, the level of the pulp stock can be accurately controlled by movement of the baffle 116 in accordance with changes in the position of the slice lip 88.

As shown in FIG. 3, the headbox 82 may be operated at a much lower level by lowering the baffle 116 to a position such as that indicated by the dashed line position indicated with the reference numeral 116a. In this position of the baffle 116, the foil 124 would not perform any function within the headbox 82. The level of the pulp stock, therefore, would be determined entirely by the position of the baffle 116. In such an arrangement, the headbox 82 would be operated as a one-roll deep headbox.

FIG. 4 illustrates the conduits 128 as viewed from the interior of the headbox 82. As shown, each of the conduits 128 includes a flared portion 132 which joins with one another at their lower ends. The lower ends of the flared portions 132 extend into the chamber formed between the baffle 116 and the front wall 84. In this manner, pulp stock is removed from the chamber along the entire length thereof at a moderate velocity so as to reduce vortexing of the pulp stock in the presence of air.

Another embodiment of the present invention is illustrated in FIG. 5 wherein a headbox 134 includes a front wall 136 which defines a slicebody at a lower portion thereof. Pulp stock is supplied to the headbox 134 through a bottom wall 138 of a rectangular body 134. An inlet roll 142 is positioned in the inlet 140 and rectifier rolls 144, 146, 148 and 150 are positioned within the body of the headbox 134. The front wall 136 and the bottom wall 138 are positioned with respect to one another to define a slice opening or headbox outlet 152. The top roll 154 is a breast roll which carries a travelling Fourdriner wire 156 thereon.

The front wall 136 of the headbox 134 is slantily mounted with respect to a top wall 158 thereof by means of a seal 160 therebetween. A jack 162 provides a means for moving the front wall 136 in a vertical direction for changing the size of the slice opening 152. A second jack 164 is mounted on a back wall of the headbox 134 and includes an extensible shaft 166 secured to the front wall 136 by means of a pivot mount 168. The jack 164 provides a means for moving the front wall 136 in a horizontal direction to alter the characteristics of the jet of pulp stock exiting from the outlet 152.

A baffle 170 is secured to the bottom portion of the front wall 136 and defines a chamber 172 therewith for the collection of pulp stock therein. A foil 174 is mounted on a shaft 175 which extends through the ponsides of the headbox 134. A bumper or spacer 176 is provided at each end of the foil 174 for maintaining the free end of the foil 174 a fixed distance away from the baffle 170.

The foil 174 is better illustrated in FIG. 6a as having a plurality of spaced apart fingers 178 which define openings 180 theretwixt for the passage of pulp stock therethrough. The openings 180 in the foil 174 decrease the overflow velocities and provide a means for maintaining a constant stock level within the headbox 134. The foil 174 with the openings 180 therein allow the removal of
large quantities of water at moderate velocities while maintaining a constant level within the headbox 134. Therefore, the headbox 134 has the capability of discharging a wide range of flow rates. The purpose of the spacer 176 is to eliminate the accumulation of pulp stock fibers at those points where the foil 174 engages the baffle 170. That is, the spacer 176 maintains the ends of the fingers 178 a fixed distance away from the baffle 170 and eliminates the possibility of pulp stock fibers accumulating at those points.

A plurality of recirculation conduits 182 extend from the overflow chamber 172 to a pump 184 which is supported on a stand 186 above the headbox 134. An outlet 188 from the pump 184 may be connected either to the wire pit, the suction side of the inlet 140, or to a silo, as desired.

In addition, an overflow aperture 190 extends across the length of the overflow chamber 172 through the front wall 156 for carrying pulp stock to a conduit 192. The overflow conduit 192 is similar to that illustrated in FIG. 2. Suitable valve means may be connected to the overflow conduit 192 so that overflow may be taken therefrom when desired. That is, the overflow conduit 192 may be employed to remove overflow pulp stock from the chamber 172 at the same time that pulp stock is being removed by the recirculation conduits 182. Alternatively, pulp stock may be removed by one or the other of the recirculation conduits 182 or the overflow conduit 192. Therefore, a wide range of overflow rates and recirculation rates may be obtained.

FIG. 7 illustrates a mechanism for maintaining the foil 174 in contact with the baffle 170 during movement of the front wall 156 in a vertical direction to 200, as shown therein, a pondside 194 of the headbox 134 includes a window 196 therein for viewing the level of the pulp stock within the headbox 134, which level is indicated with the reference numeral 197. An arm or lever 198 is connected to the shaft 175 on which the foil 174 is mounted. A bracket 200 is secured to the pondside 194 and a spring 202 extends between the bracket 200 and the arm 198 for biasing the foil 174 against the baffle 170. Vertical movement of the baffle 170, as indicated by the arrow 204, changes the position of the foil 174. When the baffle 170 is moved downwardly, the arm 198 moves to a position as indicated by the dotted line outline thereof, indicated with the reference numeral 198. When the baffle 170 moves in an upward direction, the foil 174 is rotated and the arm 198 moves to a position as indicated by a dotted line outline, indicated with the reference numeral 198. It can be readily appreciated that as the baffle 170 is moved in a downward direction, the slice opening 152 is reduced in size to reduce the flow of pulp stock therethrough. However, movement of the baffle 170 in a downward direction allows additional pulp stock to flow through the openings 180 in the foil 174. On the other hand, movement of the baffle 170 in an upward direction increases the size of the slice opening 152 but decreases the amount of pulp stock flowing through the openings 180 in the foil 174. That is, the openings 180 are covered by the baffle 170 as it moves in an upward direction. Movement of the front wall 156 (FIG. 5) in a horizontal direction, however, changes neither the size of the slice opening 152 nor the amount of pulp stock which is allowed to pass through the openings 180 in the foil 174. Therefore, a constant level of pulp stock is maintained within the headbox 134 with changes in the size of the slice opening 152.

Furthermore, this level can be regulated by the amount of pulp stock removed through either the recirculation conduits 182 or the overflow conduit 192.

Seen in FIG. 8 is an alternate embodiment of the overflow device of the present invention. A movable wall 200 together with a stationary bottom wall 201 form a slice opening 202 through which stock flows onto a forming surface. A nozzle portion 203 of the wall 200 forms the slice opening 202 extends from the slice inwardly into the headbox. The nozzle portion extends upwardly to form a trough 204 which is in fluid communication with an outlet drain 206.

The headbox shown in FIG. 8 may be of the type incorporating a pair of rolls 207 and 208 positioned one above the other, and a second pair of rolls 209 and 210 in a somewhat staggered position, as seen on the drawings. A level control drain 211 is provided in the side of the headbox to maintain the level of the stock therein at a predetermined level.

A foil 212 is pivotally mounted by a rod 213 which extends in the cross machine direction. The foil 212 has the arcuate surface 212a and a diameter portion 212b. The enlarged diameter portion 212c is positioned in close proximity to the roll 210 so as to allow a minimum of stock to flow between the roll and the foil. This close clearance is indicated by reference numeral 214. A portion of the foil 212 extends into the trough 204 and has the extreme end thereof engageable with the nozzle portion 203. A spacer 216 is mounted on the end of the foil and provides a sufficient open area in the region of the foil 211 and the nozzle surface portion 203 to allow stock to flow through the open area and maintain the region clear. The spacer 216 may have a series of notches therein in the cross machine direction to provide the necessary open area.

In the structure shown in FIGS. 7 and 8, the foil in the headbox will follow the position of the slice nozzle. That is, the forward wall 200 may be adjusted both horizontally and vertically without affecting the flow characteristic of the stock overflowing the foil 212 into the trough 204. The nozzle portion 203 is positioned a sufficient distance from the roll 210 to allow the forward wall 200 to be moved horizontally toward and away from the roll 210 without interfering with the roll 210. Movement of the forward wall 200 will also move the nozzle portion 203 which, in turn, will rotate the foil 212 about the rod 213 in such a manner as to maintain the spacer 216 always in contact with the nozzle portion 203.

In FIG. 9 is another alternate arrangement of the overflow device of the present invention. An adjustable nozzle portion 217 is secured to the forward wall 200 by a pivot 218. Also connected to the nozzle portion 217 is a rod 219 having one end thereof connected to the nozzle by a pin 220. This arrangement allows the nozzle configuration of the slice to be varied as desired. Furthermore, variation of nozzle configuration will vary the position of the foil 212 to maintain the end of the foil in contact with the nozzle portion 217 thereby maintaining the open area in this region relatively constant. Therefore, variations in nozzle configuration will not change the overflow characteristic of the stock flowing over the foil 212. This arrangement may have particular utility in headboxes having a single forward roll, such as the roll 221.

In FIG. 10 is yet another alternate arrangement of an overflow device constructed in accordance with the principles of this invention. The nozzle portion 203 has an upward turn at segment 203a which is positioned in close proximity to a forward roll 222. The forward roll 222 may be larger than either of the rolls 207 or 208. The port or opening 211, of FIG. 8, is formed by an adjustable pipe 211a which has opening positions at 211b and 211c. Therefore, the level of the stock within the headbox can be varied between a maximum level, indicated by the port 211b, and a minimum level indicated by the port 211c. Therefore, variation of stock level will require a variation in the position of the foil 212. Therefore, the rod 213 of the foil 212 may be mounted on adjustable end plates so that the rod and the foil can be positioned in accordance with the level of the stock in the headbox. The arrangement shown in FIG. 10 provides for vertical adjustment of the forward wall 200. Also,
a relatively small amount of horizontal adjustment of the forward wall 200 may be obtained. However, this is limited since the turned-up portion 203a of the nozzle 203 is positioned relatively close to the roll 222.

The principles of the invention explained in connection with the specific exemplifications thereon will suggest many other applications and modifications of the same. It is accordingly desired that, in construing the breadth of the appended claims, they shall not be limited to the specific details shown and described in connection with the exemplifications thereof.

What is claimed is:

1. In a headbox having an inlet with a constant flow of pulp stock and a front wall with a variable opening therein, an overflow and recirculation system comprising means for separating a top layer of the pulp stock in the headbox from the remaining pulp stock and means for removing the separated pulp stock from said separating means at a rate in accordance with variations in the slice opening to maintain a constant stock level of pulp stock in the headbox, said separating means including baffle means secured to the front wall above the slice opening and forming a chamber with the front wall for separating and collecting pulp stock within the chamber, an overflow conduit in fluid communication with said chamber for removing a portion of the pulp stock from the chamber and means for removing additional pulp stock from the headbox for maintaining a constant fluid level in the headbox with variations in the slice opening, said baffle means comprising a baffle fixed to said front wall, and said removing means including a recirculation conduit in fluid communication with the headbox at a station removed from the chamber, said headbox including a pair of horizontally spaced rectifier rolls and said recirculation conduit being in fluid communication with the headbox at a station between the rectifier rolls.

2. In a headbox having an inlet with a constant flow of pulp stock therethrough and a front wall with a variable slice opening therein, an overflow and recirculation system comprising means for separating a top layer of the pulp stock in the headbox from the remaining pulp stock, and means for removing additional pulp stock from the headbox at a rate dependent upon variations in the slice opening, said separating means including a foil having a top surface thereof at a fixed vertical position over which the top layer of pulp stock flows, said removing means including a baffle secured to the front wall over the slice opening, said foil being mounted above said baffle and spaced therefrom to permit the flow of pulp stock therebetween, said baffle forming a collection chamber with the front wall into which the pulp stock is accumulated, conduit means for removing the pulp stock accumulated in said chamber, said baffle being pivotally mounted on said front wall, and means for moving said baffle with respect to said foil to adjust the flow of pulp stock therebetween.

3. A headbox comprising: a front wall having means forming a variable slice opening therein, a baffle extending across the headbox and forming with said front wall an overflow chamber above said slice opening, conduit means for removing stock from said chamber, and a foil extending across said headbox in parallel relation to said baffle and adjustable vertically with respect thereto to provide a space therebetween whereby overflow stock can flow into said chamber over said foil and through said variable space.

4. The overflow and recirculation system as defined in claim 3 wherein said conduit means includes a vacuum source and a conduit connected between said vacuum source and said chamber.

5. The invention as defined in claim 3 including means mounting said foil on said headbox for pivotal movement about a horizontal axis, said foil having a top surface remaining at a substantially constant vertical position throughout the operating range of adjustability of said foil.

6. A headbox for a paper making machine including: an inlet connectible to a supply of stock for receiving stock flow therefrom to at least partially fill said headbox; a slice formed in one wall of said headbox for ejecting the stock in said headbox onto a forming surface, said one wall being adjustably movable to vary the opening of said slice; the improvement therein comprising, an overflow device, said device including a nozzle portion extending from said one wall of said headbox to the interior of said headbox, said nozzle portion and said one wall forming a trough above said slice in the cross machine direction; a foil pivotally mounted in said headbox along an axis in the cross machine direction, a portion of said foil extending into said trough and one edge of said foil including a spacer which is in contact with said nozzle portion, said foil having an arcuate surface over which stock flows into said trough and open areas near said one edge whereby movement of said one wall will cause said foil to rotate about its pivot point to maintain a substantially uniform flow characteristic over said arcuate surface and through said open areas while the flow characteristic through said slice is changed.

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REUBEN FRIEDMAN, Primary Examiner
T. A. GRANGER, Assistant Examiner

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