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FLOW BOX FOR PAPER MACHINES

Filed June 30, 1923

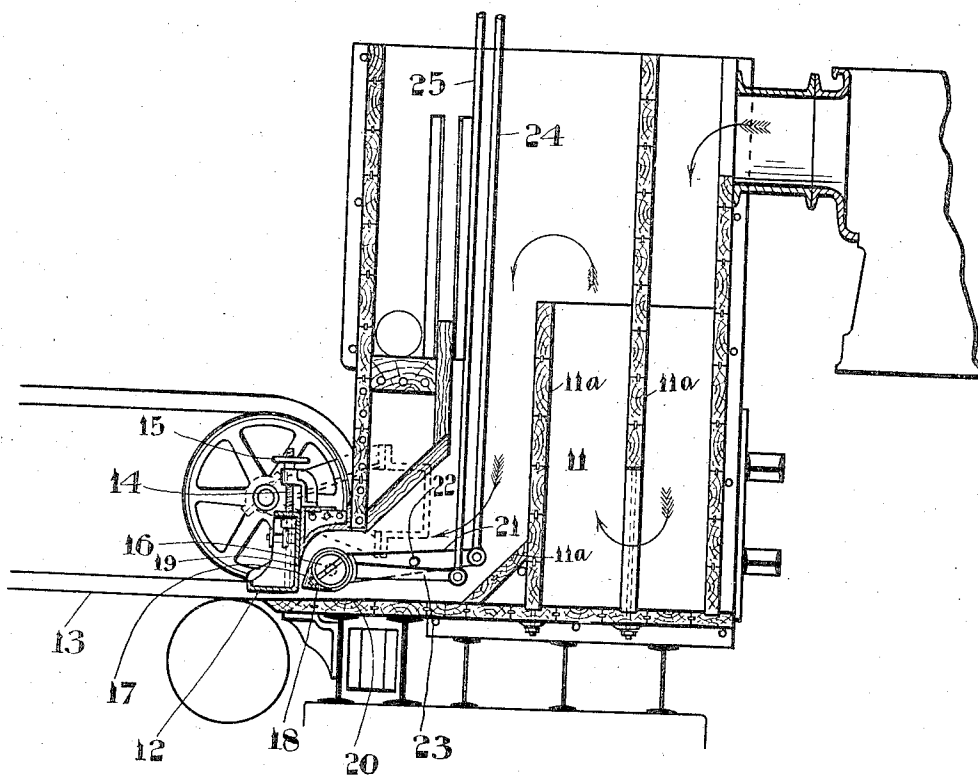


FIG. 1

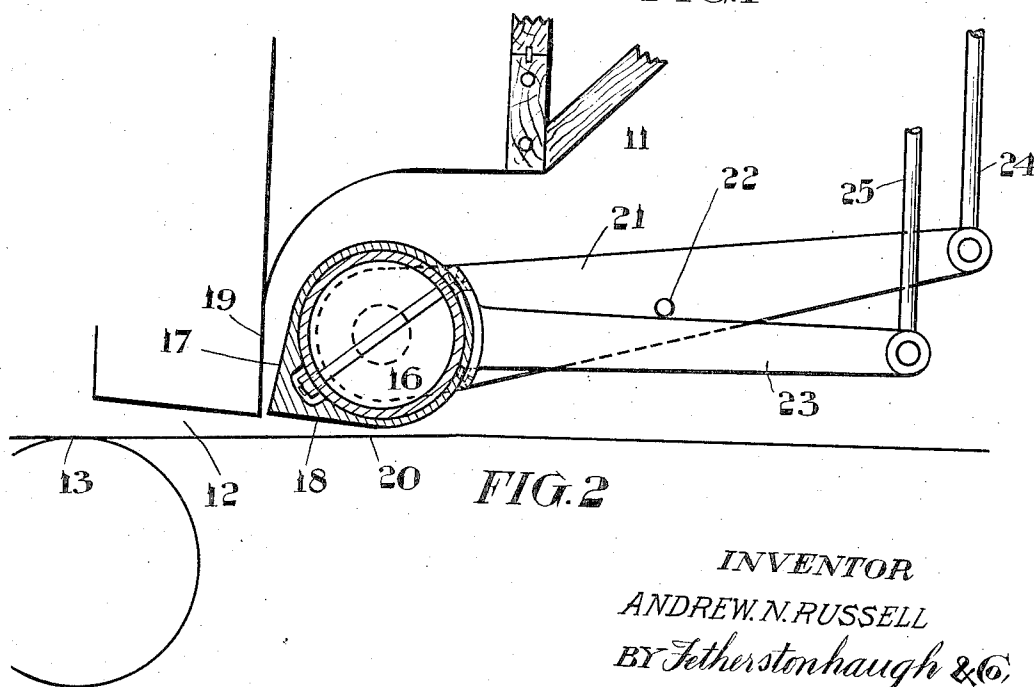


FIG. 2

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FLOW BOX FOR PAPER MACHINES.

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To all whom it may concern:

Be it known that I, ANDREW N. RUSSELL, a citizen of the United States of America, and resident of the city of Lachine, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Flow Boxes for Paper Machines, of which the following is a full, clear, and exact description.

This invention relates to new and useful improvements in flow boxes for paper machines, and the object of the invention is to provide a device which will deliver the stock mixture on to the travelling wire at the same velocity as that of the travelling wire.

Another object is to provide a device which will deliver the stock mixture on to the travelling wire with the fibre of stock properly distributed and mixed to form a strong sheet.

A further object is to provide a simple device which will be readily adjustable to suit the stock mixture and feed of same.

Nozzle arrangements have been used for delivering the stock on to the travelling wire, but as far as I am aware, means have not been provided to prevent the fibres in the pulp from assuming stream lines, the effect of which is to materially weaken the sheet of paper in one direction. In my invention I provide a deflecting member, which extends across from side to side of the flow box and is supported by levers at each end, which in turn are pivotally mounted to allow the member to be adjusted in the vertical plane. The deflecting member is pivotally mounted on the supporting levers. A second lever is secured to one end of the cross members to transmit to it a rotary movement. The deflecting member is so positioned and formed as to provide nozzles between the sides and bottom of the flow box. The effect of the several movements of the deflecting member is to produce a variation in the shape of the nozzles and to split up the stream of stock into two streams, one of which flows under said member and the other over the top of the member. The two streams, when they meet, produce a disturbance in the stock mixture and therefore a disturbance in the fibres of that mixture. A final nozzle is

provided for delivering the stock to the travelling wire. Rods are connected to the levers for operating same.

In the drawings which illustrate the invention:—

Figure 1 is a cross sectional elevation of a flow box, showing the arrangement of the deflecting member and its operating mechanism.

Figure 2 is an enlarged view of the deflecting member, showing the operating levers.

Referring more particularly to the drawings, 11 designates a flow box with baffles 11^a and with the flow of the pulp indicated by arrows. The box is provided with a diverging nozzle 12, which delivers the pulp to a travelling wire 13. The delivery nozzle can be adjusted by means of the adjusting screw 14 and the handle 15 which is positioned at the delivery end of the flow box. To prevent the fibre in the pulp from assuming stream lines, a diverting member 16 is placed within the feed box adjacent the delivery end thereof. The diverting member is provided with flat surfaces 17 and 18, so constructed as to form a vertical nozzle between the floor box sides 19 and the flat surface 17 and a horizontal nozzle between the bottom of the flow box 20 and the flat surface 18. The other sides of the diverting member may be curved, as shown, or any other desired shape. The member 16 is pivotally mounted on the levers 21, which in turn are mounted on the pivots 22 at each side of the flow box. This will allow vertical adjustment of the device to regulate the flow of the mixture under the member. A turning lever 23 is secured to one end of the member 16 and is so arranged as to impart rotary movement to the member. Connecting rods 24 and 25 are attached to the ends of the levers 21 and 23 respectively and to a control point outside the flow box.

The operation of the device is as follows:

Pulp is delivered into the flow box and flows in the direction indicated by the arrows in Figure 1. The diverting member which extends across the flow box, forms a vertical nozzle with the front of the box and a horizontal nozzle with the bottom of the box. The flow of pulp is broken into two streams, one passing under the diverting

member and attaining its maximum velocity at a point directly under the centre of the said member. This horizontal stream after passing the centre is somewhat reduced in velocity and at its point of least velocity it is met and penetrated by the stream coming over the top, through the vertical nozzle. The effect produced by these two streams coming together is to create a disturbance in the stock and therefore a disturbance of the fibres in that mixture. It also retards the flow of the horizontal stream to allow the proper mixing of the fibres of the stock, which knit and cross one another during this retardation of the flow. The mixed stock then passes through a final diverging nozzle to the travelling wire. The stock in passing through this nozzle is slightly retarded in order that the pulp fibres will remain in their mixed condition. This final nozzle can be adjusted to deliver the mixed streams to the travelling wire at a velocity approximately the same as the wire. The flow of the two streams of stock is controlled by the various adjustments which can be made as to the position and shape of the vertical and horizontal nozzles formed by the diverting member. This member being oscillatably mounted on pivoted levers 21 can be adjusted vertically by moving said pivoted levers through the medium of the connecting rods 24, and it also can be rotated about its own axis through the levers 23 operated by the connecting rod 25, thus giving an almost unlimited number of adjustments.

In the foregoing part of this specification I have described my preferred embodiment of the invention, but I do not wish to confine the design of the diverting member to any particular construction. This member may consist of a substantially flat sheet extending across the flow box, thus breaking the flow into two streams and bringing the streams together again to thoroughly mix the fibres in the stock. Adjusting means can also be fitted to the sheet to adjust the flow of the streams to give the desired result. In this specification I include all construction of diverting means which split the flow of stock into a plurality of streams of different angles and bring the streams together

again, said means being adjacent the delivery end of the flow box.

Having thus described my invention, what I claim is:—

1. In a flow box for paper making machines, means for diverting the flow of the pulp into two streams, means for rotatably adjusting the diverting means, means for imparting vertical movement to the diverting means, means to bring the streams together, and adjustable means to control the flow of the mixture to a travelling wire.

2. In a flow box for paper making machines, an adjustable diverging delivery nozzle, means for diverting the flow of the pulp into a plurality of streams of different direction, said means being adjacent the delivery nozzle, and means for controlling and mixing the fibrous material in said streams.

3. In a flow box for paper making machines, an adjustable nozzle for delivering pulp to a screen, a diverting member for temporarily breaking the flow of pulp into two streams of different directions, means for imparting rotary movement to the diverting member, means for imparting vertical movement to the diverting member, and means for bringing the streams together at a point adjacent the delivery nozzle.

4. In a flow box for paper making machines, an adjustable delivery nozzle, a diverting member adjacent the delivery nozzle and within the flow box, adapted to break the flow of the pulp into vertical and horizontal streams, means secured to the diverting member to form diverging vertical and horizontal nozzles with the sides and bottom of the box respectively and adjacent the delivery nozzle, and means to control the said vertical and horizontal nozzles.

5. In a flow box, a member crossing the box adjacent the delivery nozzle and provided with angularly related faces cooperating with opposing portions of the box to provide intersecting vertical and horizontal nozzles through which the pulp is caused to flow in separate streams meeting at the intersection of the nozzles.

In witness whereof, I have hereunto set my hand.

ANDREW N. RUSSELL.