Sept. 8, 1925. 1,552,629

J. O. MASON ET AL

FLOW BOX RECTIFIER FOR PAPER MACHINES

Filed June 2 1923 2 Sheets-Sheet 1

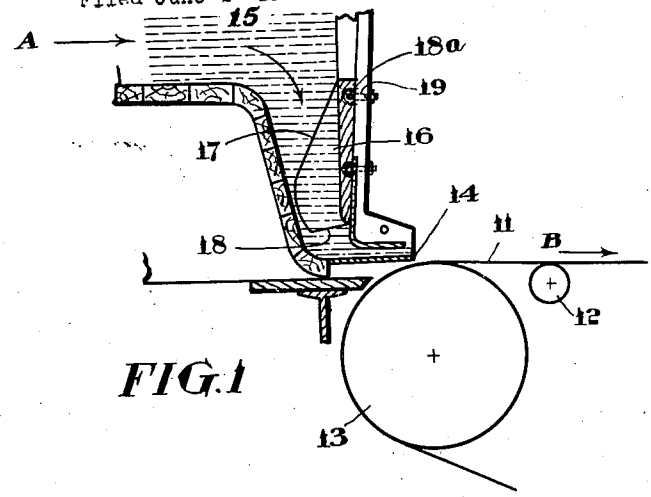

FIG. 1

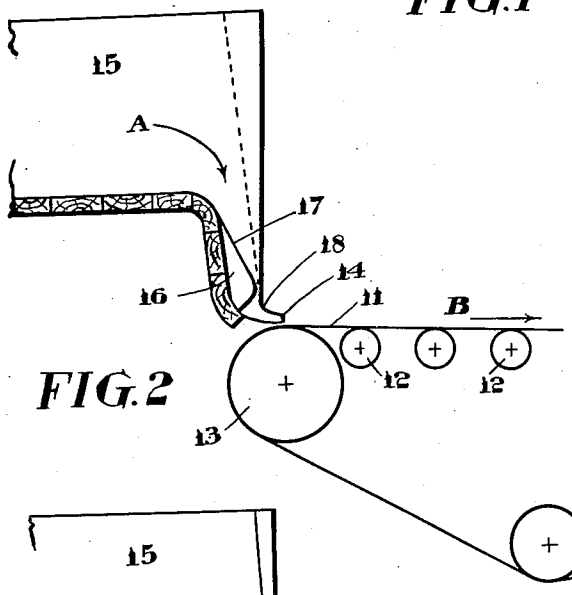

FIG. 2

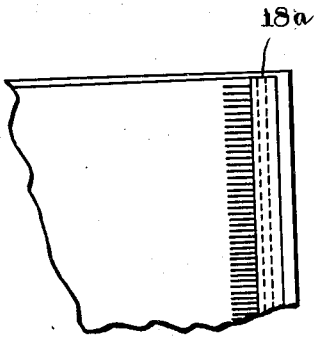

FIG. 4

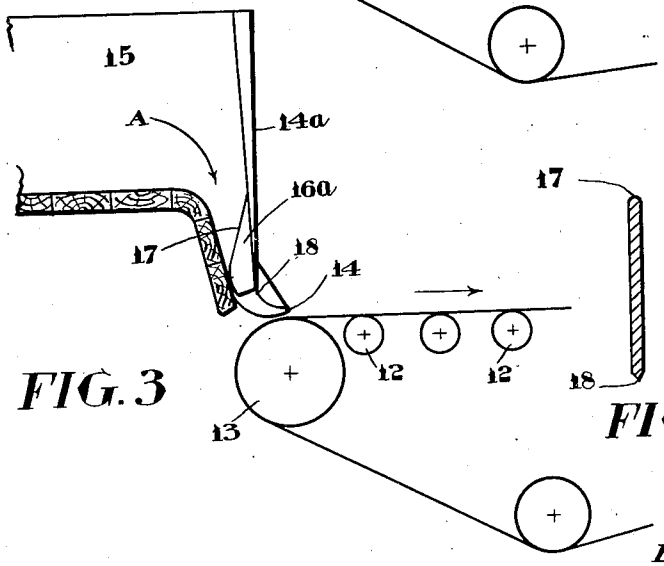

FIG. 3

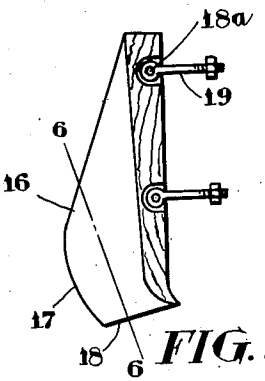

FIG. 5

FIG. 6

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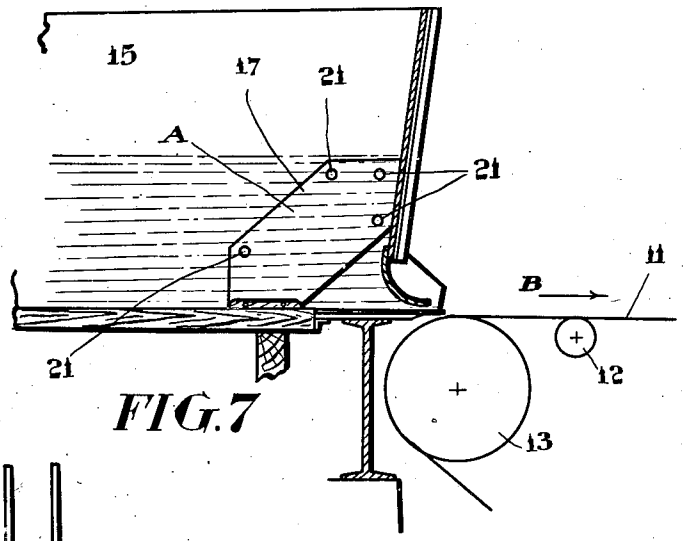

FIG. 7

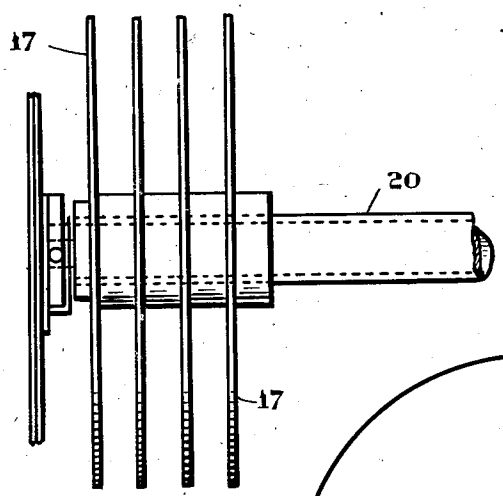

FIG. 8

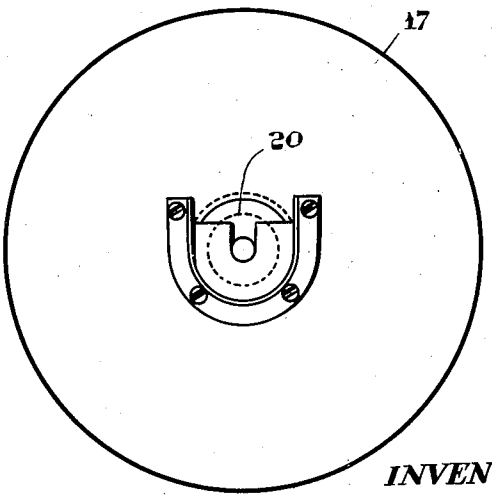

FIG. 9

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UNITED STATES PATENT OFFICE.

JAMES ORLEY MASON AND EDWARD B. WARDLE, OF GRAND MERE, QUEBEC, CANADA, ASSIGNORS TO LAURENTIDE COMPANY LIMITED, OF GRAND MERE, QUEBEC, CANADA.

FLOW-BOX RECTIFIER FOR PAPER MACHINES.

Application filed June 2, 1923. Serial No. 643,104.

To all whom it may concern:

Be it known that we, JAMES ORLEY MASON and EDWARD B. WARDLE, both citizens of the United States, and residents of Grand Mere, Quebec, Canada, have invented certain new and useful Improvements in Flow-Box Rectifiers for Paper Machines, of which the following is a full, clear, and exact description.

This invention relates to new and useful improvements in flow box rectifiers which are placed within the flow box and adjacent the outlet or spout thereof, for the purpose of rectifying the flow of stock on to the travelling wire of a paper machine.

The object of the invention is to provide a simple, inexpensive and efficient device which will be easily and simply fitted to the flow box and which will be efficient under all conditions, whether on high or low speeds of wire.

Another object of the invention is to provide a device in which there will be no obstruction to the flow and therefore an even feed of stock to the wire.

A further object is to provide a device in which the flow will be rectified and guided to the outlet of the flow box, said rectifying taking place a considerable distance within the flow box.

Considerable difficulty has been encountered in regulating the flow and producing paper of a good quality on high speed production. Rectifiers have been attached to some machines but these have been unable to give good results, owing to back eddying, which occurs on the type of rectifier known as the rake rectifier, consisting of bars placed within the flow box. Pulp gathers on the one side of these bars and slips off in thickened quantities, thereby spoiling the sheet. Also owing to a small air space on the opposite side of the bar, eddies are set up and a very uneven flow is produced.

In this invention, a plurality of plates are placed within the flow box adjacent the spout or outlet of the box. The length of the plate is in the direction of the flow to provide a long surface for steadying and regulating the flow of stock on to the wire. The plates are made of thin material and are spaced at even intervals across the box. The edges of the plates nearest the source of the flow are rounded off to prevent any of the stock adhering to this edge and the edges nearest the delivery end of the box are bevelled or reduced to prevent eddying of the flow. The plates are held in position by means of concealed attachments and may be attached to the front or rear of the spout or delivery end. The plates are mounted on round bars with suitable spacers, the whole being securely fixed to the front or back of the spout, so that the rectifier may be easily removed for cleaning, repairing or any other similar operation. The attaching bars and bolts being concealed allow the flow to be easy and steady, there being no exposed fixings which will retard the flow, cause eddying, or any such interference.

In the drawings which illustrate our invention:—

Figure 1 shows a sectional elevation of the preferred form of the invention, i. e., attached to the front part of the box or to the slicer.

Figure 2 is a diagrammatic view of the device shown in Figure 1.

Figure 3 is a diagrammatic view of one modification of the device attached to the back plate of the flow box spout.

Figure 4 is a partial plan view of the device showing the arrangement of plates.

Figure 5 is a detail view of the plate fixing.

Figure 6 is a cross section of the plate taken on the line 6—6, Figure 5.

Figure 7 is a sectional elevation of one modification of the device.

Figure 8 is a partial elevation of a circular plate rectifier.

Figure 9 is an end view of Figure 8.

Referring more particularly to the drawings, 11 designates the travelling wire of a paper machine, which is mounted on the guide rollers 12 and passes around the breast roll 13, said roll being situated underneath and in close proximity to the delivery end 14 of the flow box 15. In the drawing we have shown a spout or nozzle, which may be made adjustable to regulate the flow of the stock or pulp. In some cases, a sliding gate or slicer may be used to regulate the flow of stock. In our preferred arrangement the plates 16 are securely attached to the slicer, spout or the like, so that in dismantling the device for repairs, cleaning or the like, the

whole front of the box may be dismantled easily, the plates being attached thereto. In Figure 3 we have shown the plates 16ª securely attached to the back of the spout 14ª. This construction entails slightly more work but the result in the operation of rectifying remains the same. The edge 17 of the plate nearest the source of the flow is curved to prevent any of the stock fibres from adhering thereto. To prevent the pulp from eddying when being delivered, the edges 18 are knife edged to bring the flow gradually to fill up the space occupied by the plate thicknesses before delivering the said pulp to the travelling wire. The plates may be mounted on the rods 18ª, which extend from side to side of the flow box and held in position by means of the eye bolts 19 passing through the wall of the flow box. The plates are spaced at close intervals across the feed box, as shown in Figure 4 with packers between them to hold them in position and spaced from one another. The plates are made of considerable length in the direction of the flow of the stock, so that the stock may be evenly fed on to the travelling wire of the paper machine. The plates may be curved, as shown in Figures 1, 2, 3 and 5 and designated 17 to allow the plate to accommodate itself to the curvature of the box, and also to allow a smooth and even flow to the delivery end or spout.

The operation of the device is as follows: The flow of the stock is indicated by the arrow A and the direction of travel of the wire is indicated by the arrow B. Stock in flowing through the box is more or less disturbed and irregular, and a swirling action takes place within the box, which may be regulated before flowing through the spout on to the wire of the paper machine. The spout may be provided with an adjusting means for regulating the feed on to the wire. The rectifier is placed within the box and adjacent the outlet thereof. The plates, which constitute the rectifying means, are long in the direction of the flow and thus steady and regulate the disturbed stock before it is delivered through the delivery end of the flow box. There is no obstruction in the rectifier shown in Figures 1 to 7 to cause a holding up of the flow at any point, the edges of the plates being rounded off to prevent this. The plates are also provided with bevelled or reduced edges towards the delivery end of the box, so that the space taken up by the plates is gradually filled and the flow undisturbed in direction. The device is very efficient under all speeds, working equally as well under a head of thirty-six inches or more as with a head of ten inches. The shape of the plates and also the manner of attaching same may be slightly modified without departing from the spirit of the invention. Such modifications as those shown in Figures 7, 8, and 9 may be made. In Figures 8 and 9 the plates 17 are mounted on a revoluble axle 20, said rotating plates balancing and controlling the disturbed stock before delivery. In Figure 7 the plates 17 are shown mounted on the bolts 21 which pass through the plates and through the sides of the box. The plates are positioned inside the flow box and adjacent the delivery end thereof and rectify the flow of stock before delivery of the stock to the wire.

The plates may be oscillatably mounted or they may be rotatably mounted, as shown in Figures 8 and 9. A plurality of the rectifiers may also be placed within the box and spaced from one another and from the delivery end of the flow box without departing from the spirit of the invention.

Having thus described our invention, what we claim is:—

1. In a flow box, a rectifier comprising a plurality of plates mounted within, extending across, and adjacent the delivery end of the flow box, said plates being spaced from each other with their side surfaces paralleling the normal line of flow through the outlet.

2. In a flow box rectifier, a plurality of plates placed within the flow box, said plates being spaced from one another and extending at spaced intervals across the flow box adjacent the delivery end of same with the side surfaces of the plate paralleling the normal line of flow thru said delivery end, said plates being held in position by bolts passing through the same and through the edges of the flow box, the edges of the plates being against the flow.

3. A rectifier comprising a series of plates a plurality of rods passing through the plates, distance pieces between the plates and mounted on the rods, and bolts embracing the rods and passing through the box.

4. In a flow box, a rectifier comprising a plurality of plates spaced from each other and extending across the flow box adjacent the delivery end thereof, the side surfaces of the plate being disposed parallel with the normal line of flow through the said delivery end, and concealed means for attaching the plate to the box.

5. In a flow box, a rectifier comprising a plurality of plates spaced from each other and extending across the flow box adjacent the delivery end thereof, the side surfaces of the plates being disposed parallel with the normal line of pulp flow through said delivery end, the edges of the plates nearest the source of the flow being rounded to facilitate the flow, and means for attaching the plates to the flow box.

6. In a flow box, a rectifier comprising a plurality of plates, the length of the plates being in the direction of the flow and their

edges against the flow, said edges nearest the source of the flow being rounded and the edges furthest from the source of the flow being reduced to prevent eddying, a series of rods passing through said plates and extending transversely of the box, distance pieces between said plates, and bolts for attaching the plates in position adjacent the delivery end of the flow.

7. In a flow box, a rectifier comprising a plurality of plates mounted within and extending across the flow box, said plates being spaced from each other with their side surfaces paralleling the normal line of flow through the outlet of the box.

In witness whereof, we have hereunto set our hands.

JAMES ORLEY MASON.
EDWARD B. WARDLE.