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F. J. TIMMERMAN

1,926,319

PAPER MAKING MACHINE

Filed Dec. 10, 1929

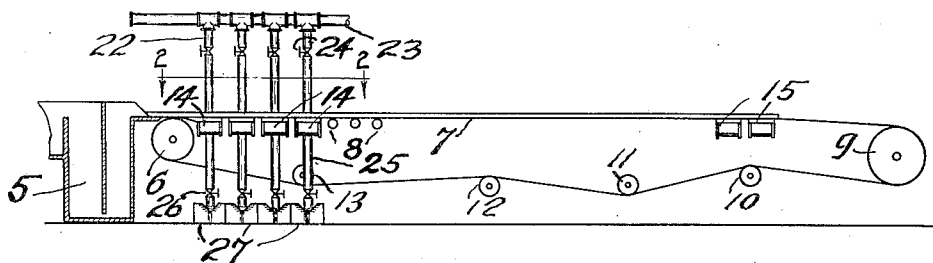


Fig 1.

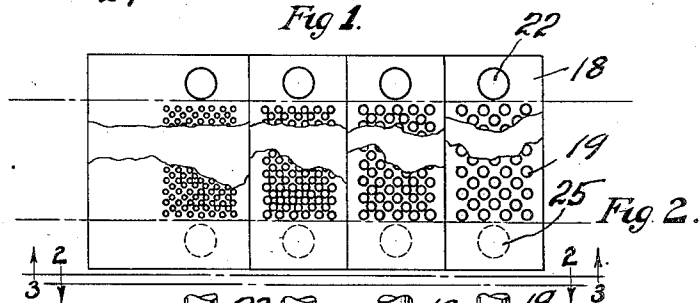


Fig 2.

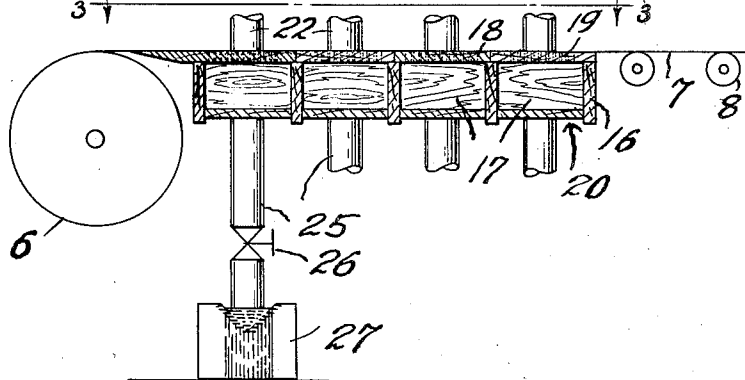


Fig 3.

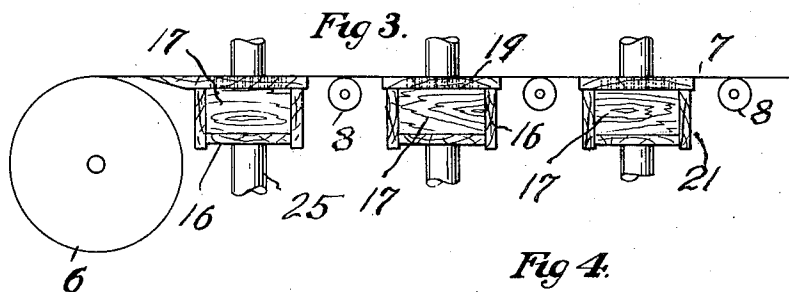


Fig 4.

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PAPER MAKING MACHINE

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Application December 10, 1929

Serial No. 413,002

7 Claims. (Cl. 92—51)

The invention relates to paper making machines, and more especially to mechanism for regulating the removal of water of the required amount from the mixture for different grades of paper in the process of manufacture of the same, during the operation of the paper making machine of the Fourdrinier type.

In the forming of a web or sheet of different grades of paper the required amount of water varies considerably according to the thickness of the sheet and to either the freeness or the density of the sheet. A long fibre sheet requires more water than a short fibre sheet, and with the same kind of fibre it will require more water for a thin sheet. There are times when water should not be removed too fast or before the sheet is formed properly in order to make the best sheet of paper. The freer the stock or the longer the fibre the more water will seep through the wire or belt and the table rolls of the paper making machine of the Fourdrinier type or other machines or methods used must be sufficient to handle this seepage. The table rolls which are most generally used, on a short or slow fibre stock will not remove enough water at the proper time and on a long fibre or free stock the rolls remove too much water too soon and do not give the sheet time to form properly. At the breast roll land of the Fourdrinier machine is mechanism for shaking the wire or belt, and the rolls in a motion across the flow of the paper tends to cross the fibre in order to get strength in both directions of a sheet of paper.

An aim of the present invention is by the use of the suction boxes at the breast roll end of the Fourdrinier machine the sheet can be formed from bottom up, while the shaker mechanism is laying the fibres crosswise which tends to make a stronger sheet of paper.

The table rolls generally used in supporting the wire or belt of a Fourdrinier machine have a tendency of straightening out the fibre due to the action of these rolls with the wire or belt and there is a film of water hanging to the underside of said wire or belt which when coming in contact with said table rolls will be forced back through the wire or belt, lifting the partially formed sheet along with it and as the sheet passes the table rolls the water is again pulled back through the wire or belt by capillary action and suction due to the action of the rolls turning away from the wire or belt. This happens at each table roll of the series and tends to open the fibre weakening the sheet through not allowing

same to form as it is laid at the breast roll from the flow box.

Another aim of the present invention is the provision of means for regulating the required amount of suction in the suction boxes, so as to take up or out the required amount of water. Paper machines are operated by a low grade of labor and each operator has his own notion relating to making paper, but by the use of the present invention, a foreman who is skilled can designate how much water is to be removed by each suction box, and how much water is used originally, and also how much pulp stock to be added, thus keeping the process of forming the paper web uniform and not in accordance with the notion of different operators.

A further aim of the present invention is the provision of the mechanism of the kind described and the positioning of the suction boxes to serve a two-fold purpose, one being to speed up the machine and the other is to control the formation of the sheet or web in the process of manufacturing paper.

A still further aim of the present invention is the provision of mechanism of the kind described to generally improve the working of the paper making machine of the Fourdrinier type in the process of manufacturing paper.

With the above and other objects in view the invention consists in the features of construction, combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawing showing the preferred embodiments of the invention, and pointed out in the claims hereunto appended.

In the accompanying drawing:

Figure 1, is a side elevation, partly diagrammatic of a paper making machine of the Fourdrinier type showing the mechanism constructed in accordance with the invention in association therewith.

Figure 2, is a plan view of the suction boxes, the dot and dash lines appearing therein being indicative of the zone of the wire screen or belt, and this plan is viewed from the line 2—2 of Fig. 1, looking in the direction of the arrows.

Figure 3, is a fragmentary elevation of a modified form or arrangement of the invention.

Figure 4, is a fragmentary elevation of a further modified arrangement of the suction boxes.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring to the drawing in detail, particularly Figure 1, there is shown a paper making

machine comprising a stock supply box or delivery chest 5, which may be of any approved form of construction, and a breast roll 6, for supporting a Fourdrinier wire 7, at one end of the machine. Said wire passes over a plurality of table-rolls 8, and a couch roll 9, the latter being at the other end of the machine. And thence this wire 7, in the reverse direction is in contact with wire carrying and stretching rolls 10, 11, 12, and 13.

Located beneath the upper stretch of the wire 7, next to the breast roll 6, and slightly removed from the couch roll 9, are series of suction boxes 14 and 15, respectively. Each of these suction boxes is comprised of a housing 16, provided with a vacuum chamber 17, therein and top covers 18, having holes 19, formed therein.

In Figure 1, of the drawing the suction boxes of the series 14, are arranged slightly spaced apart, while in Figure 2, of said drawing, which discloses a slightly modified arrangement, the suction boxes 20, are disposed in contacting relation to each other or grouped together, and in Figure 4, of the drawing the suction boxes 21, have located therebetween the table rolls 8, as will be apparent.

Communicating with the suction boxes 14, near one end of the series thereof and projecting above the plane of the wire 7, are vacuum pipes 22, these being joined in a common header 23, and said vacuum pipes 22 are fitted with hand actuated valves 24, for regulating under fine adjustment the vacuum in said pipes created in the header 23.

Depending from the other ends of the series of suction boxes 14, and leading therefrom are water outlet pipes 25, these being provided with hand operated valves 26, to control the flow of water from these pipes to containers or the like 27, which are preferably fitted with Weir dams or other means of measuring water (not shown) as such water flows out of the suction boxes. It is of course understood that vacuum is created in the header 23, in any suitable manner.

The vacuum pipes 22 joining the header 23, are the pipes in which just enough vacuum is created to take out the required amount of water from the mixture of the sheet or web upon the wire 7, and this water received in the suction boxes 14, flows by gravity through the outlet pipes 25, into the containers or the like 27. The valves 24, and 26, in the pipes 22 and 25, respectively, control the amount of water to be taken out of the mixture by each suction box as will be obvious.

It will be apparent that by arranging the series of suction boxes 14, at the front end of the Fourdrinier type of paper making machine and the control of the water extraction, serve two purposes, one being to speed up the operation of the machine, and the other is a method of controlling the formation of the sheet or web of the paper.

It is to be understood of course that the number of suction boxes used may be varied according to the speed of the machine.

What is claimed is:

1. In paper making machines, the combination with a Fourdrinier wire and breast roll over which the latter travels at one end of said machine, of suction boxes arranged next to the breast roll and beneath the wire, vacuum regulating mechanism above and associated with the suction boxes, said boxes being arranged one after the other

in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, and water delivery means leading from the boxes beneath the same.

2. The combination with a Fourdrinier type of paper making machine having a wire screen and suction boxes, of mechanism above the wire for taking the required amount of water from a mixture upon the wire at the front end of said machine into the suction boxes, said boxes being arranged one after the other in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, and means for discharging water from the boxes at a point below the same.

3. The combination with a Fourdrinier type of paper making machine having a wire screen and suction boxes, of mechanism above the screen for taking the required amount of water from a mixture upon the wire at the front end of said machine into the suction boxes, said boxes being arranged one after the other in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, means for discharging water from the boxes at a point below the same, and means for regulating said mechanism to vary the suction in said boxes.

4. The combination with a Fourdrinier type of paper making machine having a wire screen and suction boxes, of mechanism above the screen for taking the required amount of water from a mixture upon the wire at the front end of said machine into the suction boxes, said boxes being arranged one after the other in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, means for regulating said mechanism to vary the suction in said boxes, and means for discharging the water in predetermined quantity from said boxes at a point below the latter.

5. The combination of a Fourdrinier wire and suction boxes, vacuum creating mechanism for said boxes, means for regulating the vacuum in the respective boxes to vary the quantity of water removed from the stock into said boxes, said boxes being arranged one after the other in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, and means for conveying water from the boxes and delivering it below the same.

6. The combination of a Fourdrinier wire and suction boxes, vacuum creating mechanism for said boxes above the same, said boxes being arranged one after the other in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, means for regulating the vacuum in the respective boxes independently of each other, to vary quantity of water removed from stock upon the wire into the boxes, and means for delivering the water from the boxes into containers at a point below the boxes.

7. The combination of a Fourdrinier wire and

suction boxes, vacuum creating mechanism for said boxes and above the same, said boxes being arranged one after the other in the direction of travel of the wire and each having a series of perforations, the respective series of perforations being successively increased in size from one end box to the other end box, means for regulating the vacuum in the respective boxes independently

of each other, to vary the quantity of water removed from stock upon the wire into the boxes, means for delivering the water from the boxes into containers at a point below the boxes, and means for controlling the discharge of water from the last named means.

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10	35
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	
75	150