June 15, 1948. E. J. WORDEN 2,443,366

PAPER MAKING MACHINE

Filed March 6, 1944

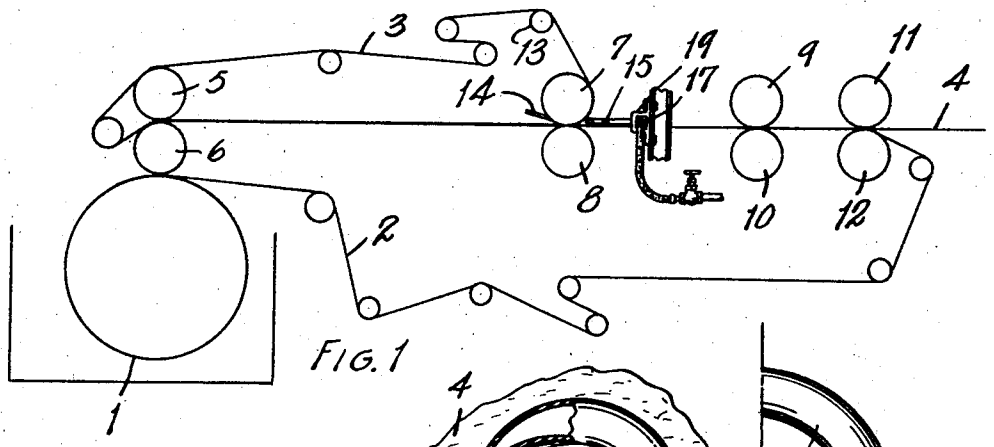


FIG. 1

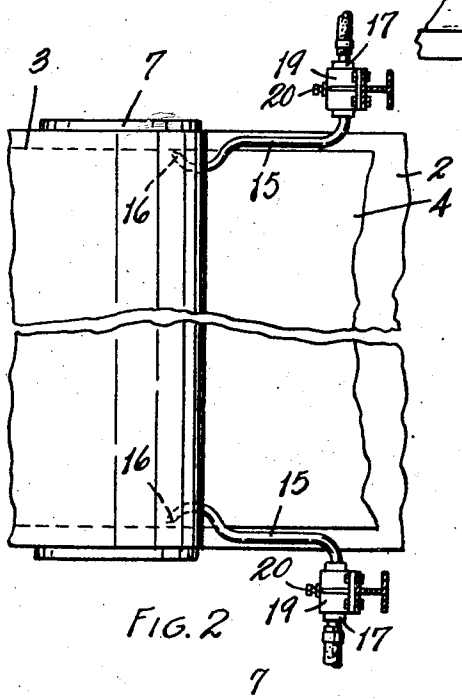


FIG. 2

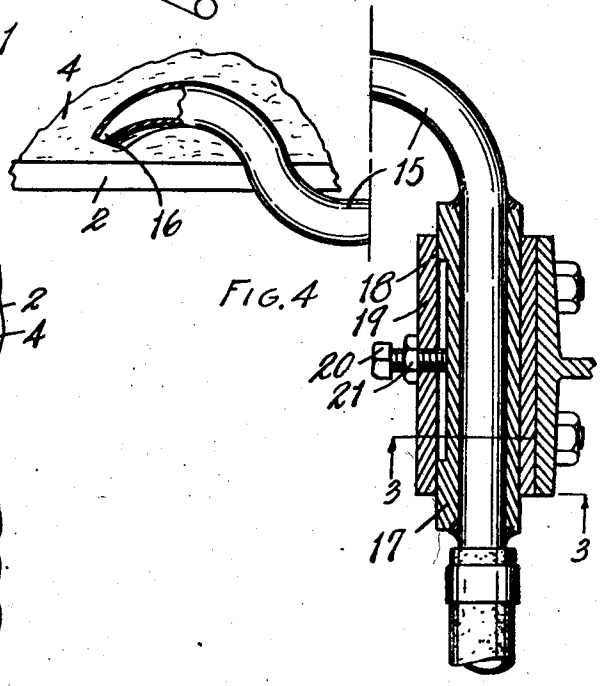


FIG. 4

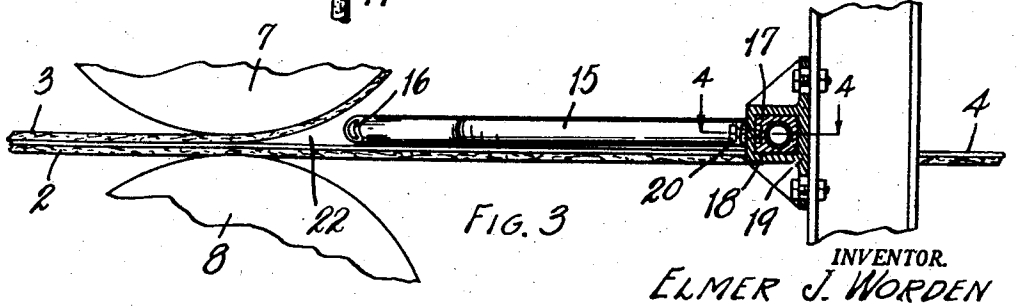


FIG. 3

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PAPERMAKING MACHINE

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7 Claims. (Cl. 92—49)

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This invention relates to improvements in paper making machines.

The main objects of this invention are:

First, to provide a paper making machine particularly for making heavy paper or paper board which results in an increasing uniformity of product as compared to similar machines and with a minimum of defective product.

Second, to provide an attachment for paper making machines which can be applied to paper making machines or types now extensively used, particularly machines of the board or heavy paper type.

Third, to provide a structure having these advantages which can be readily installed and adjusted by a machine tender of ordinary skill.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a side view of a paper making machine of the cylinder type embodying the features of my invention, parts being shown mainly conventionally and diagrammatically.

Fig. 2 is a fragmentary plan view.

Fig. 3 is an enlarged fragmentary side elevation partially in section on line 3—3 of Fig. 4.

Fig. 4 is an enlarged fragmentary plan view partially in longitudinal section on line 4—4 of Fig. 3.

In the embodiment of my invention illustrated in the accompanying drawing, 1 represents the cylinder of a paper making machine, 2 the bottom felt, and 3 the top felt and 4 the web of paper or paper board. I have illustrated only one cylinder but it will be understood that it is common practice to vary the number of cylinders according to the particular material to be produced.

The structure illustrated comprises coacting pairs of press rolls 5 and 6, 7 and 8, 9 and 10, and 11 and 12. Additionally, suitable guide rolls 13 are provided, certain however of the press rolls also serving as guide rolls, the top roll of the press rolls 7 and 8 serving as a guide roll for the rear end of the top felt.

The rolls 7 and 8 are so positioned that normally there is a considerable amount of water pressed from the web by these rolls. For instance, in a web ninety-five inches wide running at a speed of two hundred feet per minute the amount of water discharged at these press rolls may amount to approximately fifteen

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quarts per minute. A sluice bar 14 is preferably provided, arranged to coact with the upper roll 7 of the coacting pair 7 and 8, the sluice bar engaging the periphery of the roll quite close to the nip of the rolls. The result is that commonly a considerable quantity of water is discharged from the end of the roll and also, as a result of the pressure of the rolls, a considerable amount of water is squeezed out of the rolls and this sometimes accumulates in considerable volume adjacent the edges of the felt and results in injury to or displacement of the fibers at the edges of the web and in the unevenly distributed moisture content of the web as it passes to the next set of rollers which is an undesirable feature.

To eliminate or remove this water, I provide nozzle members 15 which are positioned above the bottom felt and closely adjacent thereto with their tips 16 positioned at the rear of and closely adjacent to the nip of the rollers 7 and 8 so that water accumulating at the rear of these rolls, which is commonly at the ends thereof, is discharged or removed by the jets or blasts of air issuing from the nozzles. These jets of air directed by the nozzles as above set forth also facilitate separation of the edge portions of the paper web 4 from the top felt 3 as said web and felt leave the press rolls to thereby assist in the prevention of tearing or breakage of said edge portions.

The nozzle members have non-circular supporting portions 17 which are slidably received in the non-circular sockets 18 of the brackets 19. Set screws 20 provided with lock nuts 21 secure the nozzles in their adjusted position. The non-circular supporting portions of the non-circular sockets effectively prevent twisting and hold the nozzle members in a horizontal position above the bottom felt of the web and enable the positioning of the nozzle in proper relation to the web and the edges of the felt.

It will be noted by reference to Figs. 2 and 4 that the nozzle is preferably adjusted so that its tip is closely adjacent to the edge of the web and discharges across the edge of the bottom felt. The water it is desired to remove tends to accumulate in the zone indicated by the numeral 22 at the ends of the rolls, particularly in the edge portions of the upper and lower felts 2 and 3 projecting laterally outwardly beyond the edges of the paper web 4, as shown in Fig. 2. where the felt is subject to little or no pressure from the press rolls particularly if the web of paper is relatively thick, as board paper. The

nozzles effectively remove this water and this results in an increased efficiency in the machine and an improved product in the sense that it is more uniform and improves the quality of the edges of the web so that there is less waste in trimming and resulting losses in time and materials. Also the excess water removed by the jets of air issuing from the nozzles, outwardly across the edges of the felt, closely adjacent the nip of the rolls and at the rear thereof prevents said excess water from being thrown onto the web of the paper at the rear of said rolls after passing between the same. Also the excess moisture thus removed from the edges of the felt facilitates longer wear thereof, reduces the formation of ravelings at said edges and reduces trimming thereof to a minimum. It also permits of running a wider web of paper on the felts and of running narrower felts so that it is not necessary that the edges of the felts hang over the ends of the press rolls which causes the same to wear out.

I have illustrated a practical embodiment or adaptation of my invention to a paper making machine of the cylinder type. I have not attempted to illustrate various adaptations and modifications in structure as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination in a paper making machine including top and bottom felts and coacting upper and lower press rolls, of a pair of nozzle members having outwardly directing tips overhanging the edge portions of the bottom felt and disposed closely adjacent thereto and at the rear of and closely adjacent the nip of the rolls and between the top and bottom felts and between the rearward portions of the upper and lower press rolls for directing jets of air above and laterally of the bottom felt adjacent the edges thereof and the edges of a web thereon for discharging laterally and outwardly beyond the edges of the top and bottom felts and the ends of the rolls excess water accumulating at the rear of the rolls and preventing such excess water being thrown by centrifugal force onto the web of the paper at the rear of the rolls, supporting brackets for said nozzle members having elongated and non-circular sockets therein disposed substantially parallel to the axes of the press rolls, said nozzle members being provided with elongated and non-circular supporting portions longitudinally slidably disposed in said sockets for adjustment of the nozzle tips in a direction parallel to the plane of the bottom felt and towards and from the edges thereof, and means for securing said supporting portions of said nozzle members in their adjusted positions within said sockets whereby the discharge of the nozzles relative to the edges of the felt may be regulated.

2. The combination in a paper making machine including top and bottom felts and coacting upper and lower press rolls, of a pair of nozzle members having outwardly directing tips overhanging the edge portions of the bottom felt and disposed closely adjacent thereto and at the rear of and closely adjacent the nip of the rolls and between the top and bottom felts and between the rearward portions of the upper and lower press rolls for directing jets of air above and laterally of the bottom felt adjacent the edges thereof and the edges of a web thereon for discharging laterally and outwardly beyond the edges of the top and bottom felts and the ends of the rolls excess water accumulating at the rear of the rolls and preventing such excess water being thrown by centrifugal force onto the web of the paper at the rear of the rolls.

3. The combination in a paper making machine including top and bottom felts and coacting upper and lower press rolls, of nozzle members disposed with their tips overhanging and closely adjacent to the bottom felt and the web thereon and at the rear of and closely adjacent to the nip of the rollers and between the top and bottom felts and between the rearward portions of the upper and lower press rolls for directing jets of air laterally for discharging laterally and outwardly excess water accumulating at the rear of the rolls, said nozzle members being provided with elongated and non-circular supporting portions, supporting brackets for said nozzle members having elongated and non-circular sockets for said supporting portions disposed for adjustment of the nozzle tips in a direction substantially parallel to the plane of the bottom felt and towards and from the edges thereof, and means for securing said supporting portions of said nozzle members in their adjusted positions within said sockets whereby the discharge of the nozzles relative to the edges of the felt may be regulated.

4. The combination in a paper making machine including top and bottom felts and coacting upper and lower press rolls, of nozzle members disposed with their tips overhanging and closely adjacent to the bottom felt and the web thereon and at the rear of and closely adjacent the nip of the rollers and between the top and bottom felts and between the rearward portions of the upper and lower press rolls for directing jets of air laterally for discharging laterally and outwardly excess water accumulating at the rear of the rolls, and preventing such excess water from being thrown onto the web of paper at the rear of the rolls, and supports for the nozzle members having means for adjustment of the nozzle members relative to the edges of the bottom felt.

5. The combination in a paper making machine including a felt and a coacting pair of upper and lower press rolls, of nozzle members having discharge tips positioned to overhang said felt after passage from between and to the rear of said press rolls, said discharge tips being positioned to discharge jets of air at the rear of and closely adjacent the nips of the rolls and between the rearward portions of the rolls and outwardly and laterally of the felt and the web thereon adjacent the edges thereof for discharging therefrom water accumulated at the rear of the rolls and adjacent the nip thereof and preventing the water from being thrown onto the web at the rear of the rolls, and supports for the nozzle members for adjustment of the nozzle tips relative to the edges of the felt.

6. The combination in a paper making machine including a felt and coacting upper and lower press rolls, of nozzle members having discharge tips positioned to overhang said felt after passage from between and to the rear of said press rolls, said discharge tips being positioned to discharge jets of air at the rear of and closely adjacent the nips of the rolls and between the rearward portions of the rolls and outwardly and laterally across edge portions of the felt at the

rear of and adjacent the rolls for discharging accumulating water from the felt discharged thereto by the rollers, and preventing such water from being thrown onto the web of paper at the rear of the rolls.

7. The combination in a paper making machine including a felt and coacting upper and lower press rolls, of a nozzle member having a discharge tip positioned to overhang said felt after passage from between and to the rear of said press rolls, said discharge tip being positioned to discharge a jet of air at the rear of and closely adjacent the nip of the rolls and between the rearward portions of the rolls and outwardly and laterally across an edge portion of the felt at the rear of and adjacent the rolls for discharging accumulating water from the felt, and preventing

such water from being thrown onto the web of paper at the rear of the rolls.

ELMER J. WORDEN.

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