Feb. 9, 1926. 1,572,498

G. F. McCLAY ET AL

PAPER MAKING MACHINE

Filed May 12, 1921

Fig-1.

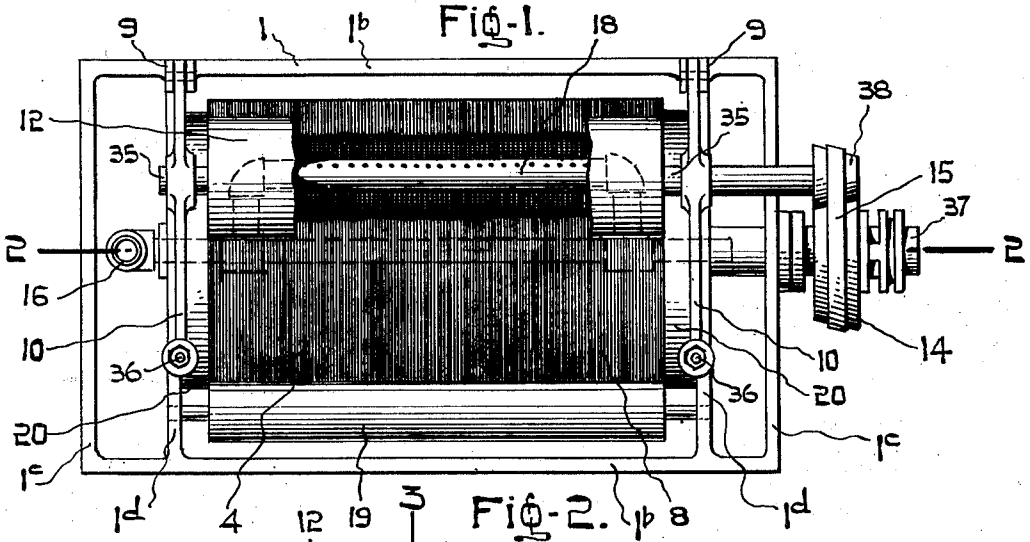
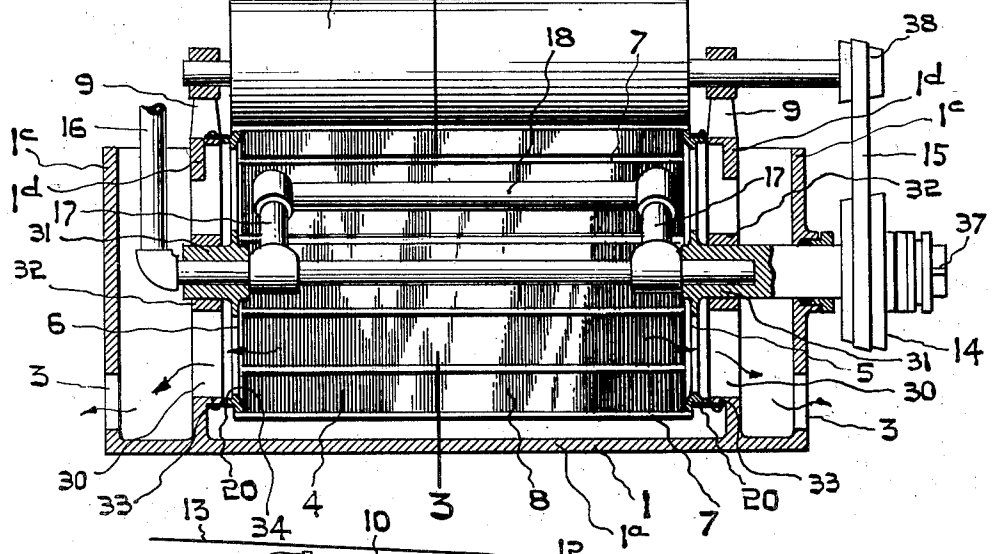


Fig-2.



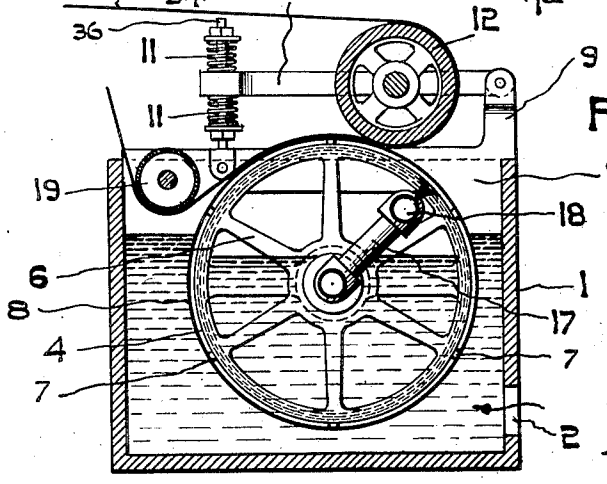


Fig-3.

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UNITED STATES PATENT OFFICE.

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PAPER-MAKING MACHINE.

Application filed May 12, 1921. Serial No. 469,080.

To all whom it may concern:

Be it known that we, GORDON FRANCIS McCLAY and HARRY VERCOE HAIGHT, both subjects of the King of Great Britain, and residents of the city of Sherbrooke, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Paper-Making Machines; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates to the type of paper making machines known as wet machines.

The invention has for its objects to provide a wet machine which will be more efficient and of a greater capacity than machines of this type heretofore in use; and in which stress and strain on parts of comparatively light construction will be avoided.

A further object of the invention is to combine with such a machine an improved means for removing the pulp which remains within the interstices of the foraminous pulp gathering member after the bulk of the pulp has been removed therefrom.

For full comprehension, however, of our invention reference must be had to the accompanying drawings in which similar reference characters indicate the same parts, and wherein:

Figure 1 is a plan view partly in section of a machine constructed according to our invention;

Figure 2 is a longtiudinal vertical sectional view taken on line 2—2 Figure 1;

Figure 3 is a transverse vertical sectional view taken on line 3—3 Figure 2.

The machine illustrated in the drawings comprises a tank to which is fed the pulp carrying water; a foraminous pulp gathering cylinder-mold rotatably mounted therein and adapted to collect the pulp upon its peripheral area; a felt conveyor adapted to convey the pulp from the cylinder-mold to the usual press rolls (not shown), a couch roll, means for driving the cylinder-mold and couch roll at the same peripheral speeds, means for adjustably supporting the couch roll, and a spray located within the cylinder-mold and adapted to remove the pulp which remains in the interstices therein after the bulk of the pulp has been transferred to the felt conveyor.

The tank or vat 1 is of rectangular form and comprises bottom 1^a, side walls 1^b, end walls 1^c and a pair of intermediate walls 1^d the latter being located at opposite ends of the tank parallel and in close proximity to the walls 1^c. The pulp carrying water enters the space within the tank or vat between the intermediate walls and exteriorly of the cylinder mold through an inlet 2 and flows into the cylinder through the foraminous periphery of the latter. The white water is discharged from the cylinder at the opposite ends thereof through openings 30 in the walls 1^d and leaves the tank through discharge outlets 3 in the end walls.

The pulp gathering cylinder mold 4 is of spiderless construction, that is to say it has no supporting spiders between its ends. It consists of a skeleton frame comprising end spiders 5 and 6 and a plurality of spaced longitudinal bars 7 secured to and extending between the spiders and a foraminous cylindrical wall 8 constituted by wire wound spirally around such frame. The spiders are provided with outwardly projecting hubs 31 which are journalled in braces 32 bridging the openings 30 and forming component parts of the walls 1^d. The openings 30 are substantially circular and of a diameter slightly less than that of the cylinder mold and they are surrounded by continuous inwardly extending flanges 33 which make butt joints with similar flanges 34 on the spiders, the flanges 33 carrying annular packing strips 20 which overlap the flanges 34 and prevent egress of the water at these points. The pulp which collects on the periphery of the foraminous cylinder is transferred to the felt conveyor 13 which is guided into contact with the top of the cylinder mold by a comparatively small roll 19. The small roll is of a length equal to that of the cylinder and it is provided with trunnions which are journalled in the tank walls 1^d.

As the foraminous wall of the cylinder mold is supported from its ends only it is essential that adjustable means be provided for relieving the cylinder mold of part or all of the weight of the couch roll 12. To this end the trunnions 35 of the couch roll are journalled in lever arms 10 at a point a short distance from one end thereof and such ends are fulcrumed in brackets 9 on the tank the opposite ends of the levers

being supported by pairs of helical springs 11 encircling vertically disposed bolts 36 pivotally supported at their lower ends upon the tank. The springs are arranged to bear between nuts at the top and bottom ends of the bolts and the top and bottom sides of the levers and by screwing the nuts up or down on their respective bolts a minute adjustment of the pressure of the couch roll on the cylinder mold may be obtained. Although this adjustable couch roll supporting means is described and illustrated as the preferred embodiment in our new and improved combination it is to be distinctly understood that the construction may be modified without departing from the spirit of the invention as for instance by employing an adjustable counterweight.

In order to drive the couch roll and cylinder mold at the same peripheral speed one of the trunnions of the couch roll is extended axially in the form of a shaft which is provided with a comparatively small conical pulley 38 and the hub 31 on the adjacent cylinder end is extended in a similar manner through a stuffing box in the adjacent end wall of the tank and provided with a conical pulley 14, the two pulleys being connected by a belt 15 and the pulley 14 to shaft 37 by any preferred form of clutch.

Upon moving out of contact with the felt conveyor the periphery of the cylinder mold is subjected to an internal water spray for the purpose of dislodging pulp remaining in the interstices of the foraminous cylinder wall. This spray is readily accommodated by the clear space within the cylinder mold and consists of a longitudinal spray pipe 18 located in fixed position within the cylinder mold adjacent the wall 8 thereof and perforated at its outer side for the purpose projecting the water issuing therefrom against such wall. The opposite ends of the pipe 18 are connected to a supply pipe 16 by a pair of radially extending pipes 17, the supply pipe being passed through one of the hubs 31 which is hollow and extended therefrom axially through the cylinder mold to the hub at the opposite end thereof within a socket in which the end of the supply pipe is seated.

Operation

As the pulp carrying water enters the tank and flows into the cylinder mold through the foraminous wall 8 thereof and from thence out through openings 30 to the discharge outlets 3 and as the cylinder mold which is partially submerged in the pulp carrying water is rotated the pulp fibre under the influence of the flow is caused to adhere to the peripheral area of the cylinder. As the rotation continues the fibre is carried into contact with the felt conveyor and transferred thereto and conveyed to the press rolls (not shown). After contacting with the felt the periphery of the cylinder mold passes the spray pipe 18 the multiplicity of jets from which dislodges any fibre remaining in the interstices in the periphery thereby substantially eliminating clogging and providing an uninterrupted passage for the water.

What we claim is as follows:

1. In a wet machine the combination of a rotary cylinder mold, an internal spray, a couch roll and means for adjustably supporting said couch roll independently of the cylinder mold whereby part or all of its weight may be removed from the cylinder mold.

2. In a wet machine the combination of a rotary cylinder mold presenting a clear space therein from end to end, a spray located within said space and extending throughout the length thereof, and a couch roll.

3. In a wet machine the combination of a rotary cylinder mold, an internal spray, a couch roll, means for adjustably supporting said couch roll independently of the cylinder mold whereby part or all of its weight may be removed from the cylinder mold, and means for driving the cylinder mold and couch roll at approximately the same peripheral speed.

4. In a wet machine the combination of a rotary cylinder mold, an internal spray, a couch roll and means for driving the cylinder mold and couch roll at approximately the same peripheral speed.

5. In a wet machine the combination of a rotary cylinder mold presenting a clear space therein from end to end, a spray located within said space, a couch roll, adjustable means for supporting the couch roll independently of the cylinder mold whereby part or all of its weight may be removed from the cylinder mold.

6. In a wet machine the combination of a rotary cylinder mold presenting a clear space therein from end to end, a spray located within said space, a couch roll, adjustable means for supporting the couch roll independently of the cylinder mold whereby part or all of its weight may be removed from the cylinder mold, and means for driving the cylinder mold and couch roll at approximately the same peripheral speed.

7. In a wet machine the combination with a tank adapted to receive pulp-carrying water, a cylinder mold rotatably mounted within said tank and partially submerged in the pulp-carrying water said cylinder mold consisting of a foraminous cylinder wall and a supporting frame therefor comprising end spiders and spaced longitudinal bars extending between and supported upon said

spiders at their ends thereby presenting a clear space between the spiders, a spray located within said cylinder mold and adapted to project water against the foraminous wall thereof, a couch roll in bearing relation with the cylinder mold and means for adjustably supporting the couch roll whereby a part or all of its weight may be removed from the cylinder mold.

8. In a wet machine the combination with a tank adapted to receive pulp-carrying water, a cylinder mold rotatably mounted within said tank and partially submerged in the pulp-carrying water said cylinder mold consisting of a foraminous cylinder wall and a supporting frame therefor comprising end spiders and spaced longitudinal bars extending between and supported upon said spiders at their ends thereby presenting a clear space between the spiders, a spray located within said cylinder mold and adapted to project water against the foraminous wall thereof, a couch roll in bearing relation with the cylinder mold and means for adjustably supporting the couch roll whereby a part or all of its weight may be removed from the cylinder mold, said last-mentioned means consisting of a pair of lever arms respectively supporting the opposite ends of the couch roll, brackets mounted upon said tank each of which has fulcrumed therein one end of one of said lever arms, and adjustable means for supporting the opposite ends of said lever arms.

9. In a wet machine the combination of a rotary cylinder mold presenting a clear space therein from end to end, an internal spray, a couch roll in bearing relation with the cylinder mold and means for adjustably supporting the couch roll independently of the cylinder mold whereby part or all of its weight may be removed from the cylinder mold, said means consisting of lever arms respectively supporting the opposite ends of the couch roll, brackets supporting said arms, and adjustable means adapted to counter-balance the weight of said couch roll.

10. In a wet machine the combination with a tank adapted to receive pulp-carrying water, a cylinder mold rotatably mounted within said tank and partially submerged in the pulp-carrying water said cylinder mold consisting of a foraminous cylinder wall and a supporting frame therefor comprising end spiders and spaced longitudinal bars extending between and supported upon said spiders at their ends thereby presenting a clear space between the spiders, a spray located within said cylinder mold and adapted to project water against the foraminous wall thereof, a couch roll in bearing relation with the cylinder mold and means for adjustably supporting the couch roll whereby a part or all of its weight may be removed from the cylinder mold, said last-mentioned means consisting of a pair of lever arms respectively supporting the opposite ends of the couch roll, brackets mounted upon said tank each of which has fulcrumed therein one end of one of said lever arms, adjustable means for supporting the opposite ends of said lever arms consisting of vertically disposed bolts supported upon said tank and projecting through openings in the lever arms, a nut screwed upon each bolt at each end thereof and springs encircling said bolt and bearing between each nut and the opposite sides of the lever arm.

11. A wet machine consisting of a tank comprising a bottom, side walls, end walls and intermediate transverse walls and respectively disposed in close proximity to the said end walls, the tank having an inlet opening communicating with the space between the intermediate walls and discharge openings communicating with the spaces between the intermediate walls and end walls, a cylinder mold located between said intermediate walls and of a length substantially equal to the distance therebetween, said intermediate walls having substantially circular openings of a diameter slightly less than the diameter of the cylinder mold, said openings being surrounded by continuous annular flanges carried by said intermediate walls and adapted to make butt-joints with corresponding flanges upon the adjacent ends of the cylinder mold, annular packing members overlapping said butt-joints, means bridging said openings and rotatably supporting the cylinder mold said cylinder mold presenting a clear space therein between its ends and having a foraminous cylinder wall, a spray pipe located in fixed position within said clear space and having a plurality of perforations in its outer side adapted to project water through said foraminous wall, a couch roll in bearing relation with said cylinder mold, means for adjustably supporting said couch roll whereby part or all of its weight may be removed from the cylinder mold, a second roll of comparatively small diameter rotatably mounted in said tank adjacent the periphery of said cylinder mold and a conveyer guided into contact with the periphery of said cylinder mold by the couch roll and said second roll.

12. A wet machine consisting of a tank comprising a bottom, side walls, end walls and intermediate transverse walls and respectively disposed in close proximity to the said end wall the tank having an inlet opening communicating with the space between the intermediate walls and discharge openings communicating with the spaces between the intermediate walls and end walls, a cylinder mold located between said intermediate walls and of a length substantially equal to the distance therebetween, said in-

termediate walls having substantially circular openings of a diameter slightly less than the diameter of the cylinder mold, said openings being surrounded by continuous annular flanges carried by said intermediate walls and adapted to make butt-joints with corresponding flanges upon the adjacent ends of the cylinder mold, annular packing members overlapping said butt-joints, means bridging said openings and rotatably supporting the cylinder mold said cylinder mold presenting a clear space therein between its ends and having a foraminous cylinder wall, a spray pipe located in fixed position within said clear space and having a plurality of perforations in its outer side adapted to project water through said foraminous wall, a couch roll in bearing relation with said cylinder, mold, means for adjustably supporting said couch roll whereby part or all of its weight may be removed from the cylinder mold, a second roll of comparatively small diameter rotatably mounted in said tank adjacent the periphery of said cylinder mold and a conveyer guided into contact with the periphery of said cylinder mold by the couch roll and said second roll, and means for driving the couch roll and cylinder mold at approximately the same peripheral speed.

13. A wet machine consisting of a tank comprising a bottom, side walls, end walls and intermediate transverse walls and respectively disposed in close proximity to the said end wall the tank having an inlet opening communicating with the space between the intermediate walls and discharge openings communicating with the spaces between the intermediate walls and end walls, a cylinder mold located between said intermediate walls and of a length substantially equal to the distance therebetween, said intermediate walls having substantially circular openings of a diameter slightly less than the diameter of the cylinder mold, said openings being surrounded by continuous annular flanges carried by said intermediate walls and adapted to make butt-joints with corresponding flanges upon the adjacent ends of the cylinder mold, annular packing members overlapping said butt-joints, means bridging said openings and rotatably supporting the cylinder mold said cylinder mold presenting a clear space therein between its ends and having a foraminous wall, a spray pipe located in fixed postion within said space and having a plurality of perforations in its outer side adapted to project water through said foraminous wall, a couch roll in bearing relation with said cylinder mold, means for adjustably supporting said couch roll whereby part or all of its weight may be removed from the cylinder mold, a second roll of comparatively small diameter rotatably mounted in said tank adjacent the periphery of said cylinder mold and a conveyer guided into contact with the periphery of said cylinder mold by the couch roll and said second roll, means for driving the couch roll and cylinder mold at approximately the same peripheral speed, said last-mentioned means consisting of a shaft adapted to rotate the cylinder mold, a second shaft adapted to rotate the couch roll and pulleys upon said shaft and a belt operatively connecting said pulleys.

In testimony whereof we have signed our names to this specification.

GORDON F. McCLAY.
HARRY V. HAIGHT.