Feb. 6, 1940. E. GSCHWENDER ET AL 2,189,518

PAPER MAKING MACHINE

Filed March 14, 1938 2 Sheets-Sheet 1

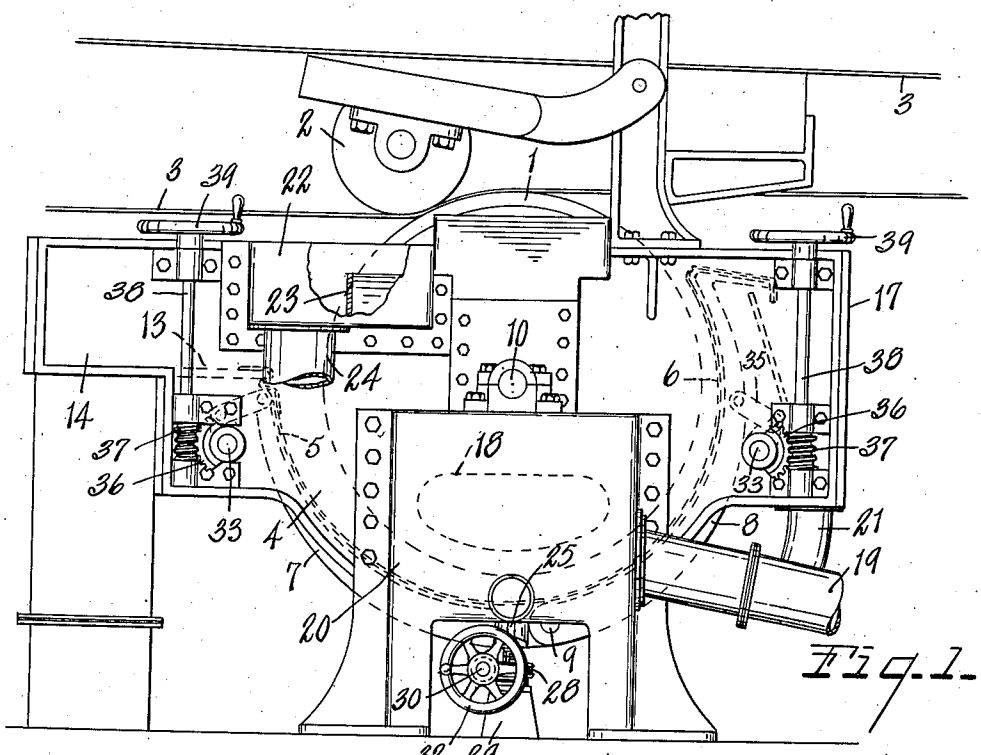



Fig. 1.

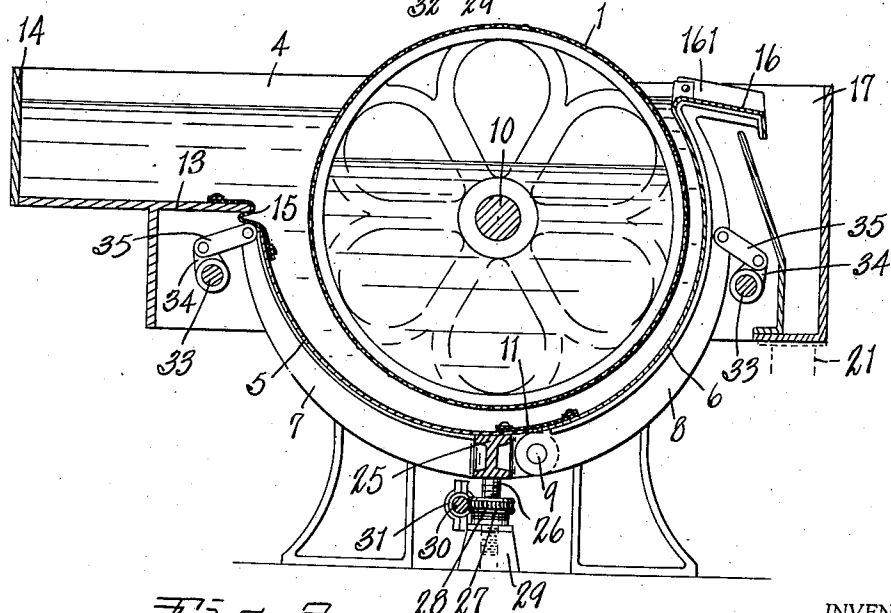



Fig. 2.

INVENTOR:
Ernst Gschwender
William C. Bigelow
BY Earl B. Shappell
ATTORNEYS

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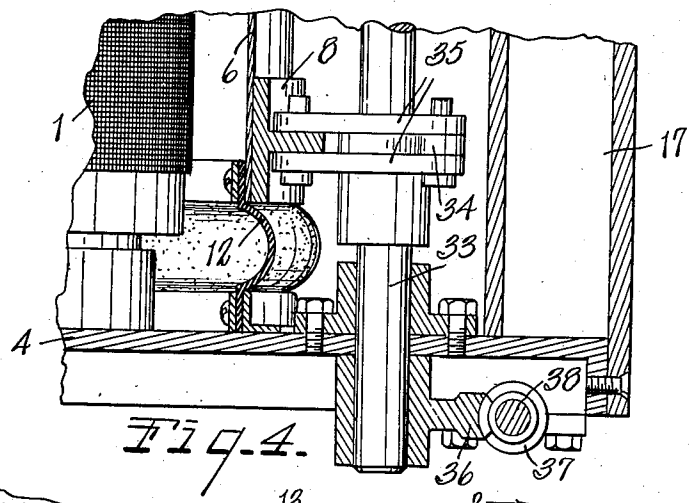



Fig. 4.

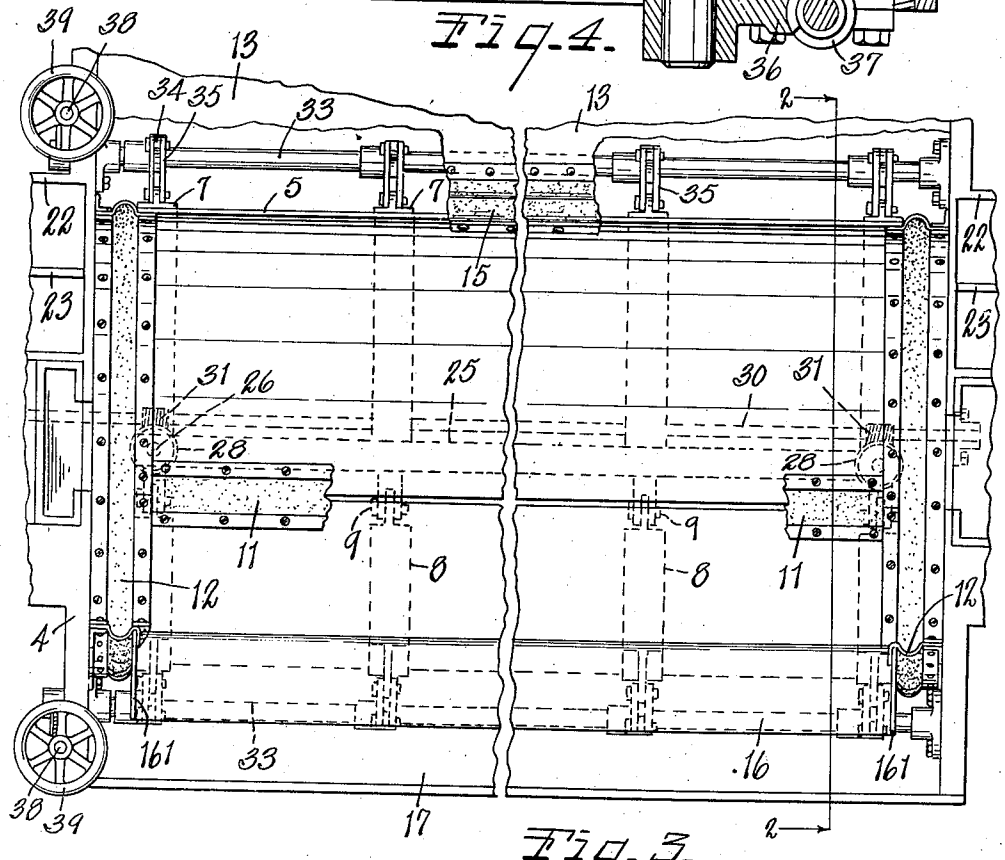



Fig. 3.

INVENTOR.
Ernst Gschwender
BY William C. Bigelow
Earl & Chappell
ATTORNEYS

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# UNITED STATES PATENT OFFICE

2,189,518

## PAPER MAKING MACHINE

Ernst Gschwender and William C. Bigelow, Detroit, Mich., assignors to Detroit Sulphite Pulp & Paper Company, Detroit, Mich., a corporation of Michigan

Application March 14, 1938, Serial No. 195,855

12 Claims. (Cl. 92—43)

This invention relates to improvements in paper making machines.

In the manufacture of paper, paper board, container board, and the like with the cylinder mold type of machines, much care is required in controlling the consistency and flow of the stock in order to secure a uniform product of suitable quality or with the fibers suitably placed.

The main objects of this invention are:

First, to provide an improved paper making machine of the rotary cylinder mold type which can be readily adjusted to any stock and at any consistency, and to meet various other conditions which are usual or at least quite commonly met in the manufacture of paper, paper board and the like.

Second, to provide a structure which may be quickly adjusted to meet varying conditions as to stock and the character and quality of the product desired.

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

A machine which embodies the features of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is an end elevation of a paper making machine of the rotary cylinder mold type embodying the features of our invention, a single unit only being illustrated. Certain parts are shown conventionally and other parts are broken away for convenience in illustration.

Fig. 2 is a vertical section on line 2—2 of Fig. 3.

Fig. 3 is a fragmentary plan view.

Fig. 4 is an enlarged fragmentary view partially in section showing details of the supporting and adjusting means for the side wall members of the pulp vat or box.

In the accompanying drawings 1 represents a rotary cylinder mold of well-known type, 2 a couch roll operatively associated therewith, and 3 the forming web. Our invention resides primarily in the pulp vat or box which is operatively associated with the forming roll. This pulp box or vat comprises stationary end walls 4 and an adjustable side wall operatively associated with the end walls and with the cylinder.

The adjustable side wall in the embodiment illustrated comprises the front side wall member 5 and the rear side wall member 6. These side wall members are mounted in cradle-like frames 7 and 8 which in effect are part of the side walls. These cradle-like frame members are pivotally connected at 9. By reference to Fig. 2 it will be noted that the pivotal connection is to one side of the vertical plane of the axis of the cylinder shaft 10. A flexible joint 11 is provided between the members 5 and 6.

The side walls are connected to the end walls by means of the flexible elements 12 which are sufficiently slack to permit the vertical adjustment of the side wall relative to the cylinder and also to permit independent tilting adjustment of the side wall members relative to the cylinder.

The bottom 13 of the inlet box 14, which extends the length of the vat, and the upper edge of the front wall member 5 are provided with a flexible joint strip 15, see Fig. 2. The rear wall member 6 is provided with a waste chute 16 at its upper edge which delivers to the waste water or stock outlet box 17. The flexible element 12 extends substantially to the upper edges of the end walls 161 of this overflow ledge or chute 16.

The end walls are provided with white water outlets indicated by the dotted lines 18, see Fig. 1, connected to the outlet 19 through the chamber 20, the waste box 17 being connected to the outlet through the pipe 21. The overflow box 22 is operatively associated with the cylinder and is provided with an adjustable dam or weir 23 and with the overflow pipe 24. It will be understood that these overflow boxes and white water outlets are ordinarily provided at each end of the machine.

To adjustably support the side wall members we provide the supporting beam 25 which is arranged in the vertical plane of the axis of the cylinder with threaded supports 26 having thereon the nuts 27 provided with worm gears 28. These nuts rest upon the pedestals 29. Disposed longitudinally below the beam is a shaft 30 having worms 31 thereon meshing with the worm gears 28. At one end at least the shaft 30 is provided with a hand wheel 32. By rotation of the shaft 30 the beam 25 is raised or lowered and consequently the side wall members are simultaneously raised or lowered relative to the cylinder.

To permit this adjustment and to provide for independent adjustment of the wall members relative to the cylinder we provide a pair of shafts 33 disposed one at each side of the side wall and having arms 34 thereon connected by the links 35 to the frame elements 7 and 8 of the side wall members. It will be noted by reference to Fig. 2 that when the member 25 is

vertically adjusted these links will swing about their shafts on the arms 34 permitting such adjustment. However, it is also desirable to adjust the side members independently and to accomplish this the shafts 33 are provided with worm segments 36 meshing with the worms 37 on the vertical shafts 38. These shafts 38 are provided with hand wheels 39 at their upper ends.

With this arrangement of parts the wall members may be adjusted to the desired relation of the forming cylinder and by such adjustment the flow may be regulated to varying stock conditions as to flow of stock in relation to the speed of the forming paper web on cylinder mold. Therefore, the speed of the stock flow can, if desired, be completely synchronized with the speed of the paper web on the cylinder mold, thus enabling operation of the paper machine at a higher speed than was ever possible without sacrificing perfect formation of the paper web. The adjustment therefore can be quickly effected for variations in stock such as are likely to occur in ordinary mill runs, and it is not necessary to adjust the paper machine speed in order to correct the conditions. Therefore, not only is a uniform product secured, but a highly satisfactory product, inasmuch as washing and floating actions which commonly result from too rapid or retarding flow of water may be minimized or eliminated.

We have illustrated and described our invention in a very satisfactory embodiment thereof. We have not attempted to illustrate or describe certain modifications and adaptations which we contemplate as we believe this disclosure will enable those skilled in the art to embody or adapt the invention as may be desired.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith comprising end walls, opposed complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of said cylinder mold, flexible webs connecting said side wall members to said end walls and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivotal connection between said side wall members disposed at one side of the vertical plane of the axis of said cylinder mold, there being a flexible joint strip connecting said side wall members, a supporting beam for said side wall members disposed in the vertical plane of the axis of said mold, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold comprising supports disposed at the ends thereof, worm gears having threaded engagement with said supports and a longitudinally disposed adjusting shaft provided with worms coacting with said worm gears, and further means for adjustably supporting said side wall members comprising a pair of longitudinally disposed shafts disposed at the outer sides of said side wall members and provided with arms and with worm segments, links connecting said arms to said wall members and vertically disposed adjusting shafts provided with worms coacting with said segments.

2. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith comprising end walls, opposed complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of said cylinder mold, flexible webs connecting said side wall members to said end walls and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivotal connection between said side wall members disposed at one side of the vertical plane of the axis of said cylinder mold, there being a flexible joint strip connecting said side wall members, a supporting beam for said side wall members disposed in the vertical plane of the axis of said mold, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold, and further means for adjustably supporting said side wall members comprising a pair of longitudinally disposed shafts disposed at the outer sides of said side wall members and provided with arms and with worm segments, links connecting said arms to said wall members and vertically disposed adjusting shafts provided with worms coacting with said segments.

3. In a paper making machine, the combination with a rotary cylinder mould, of a pulp vat operatively associated therewith comprising end walls, opposed complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of said cylinder mold, flexible webs connecting said side wall members to said end walls and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivotal connection between said side wall members disposed at one side of the vertical plane of the axis of said cylinder mold, there being a flexible joint strip connecting said side wall members, a supporting beam for said side wall members disposed in the vertical plane of the axis of said mold, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold comprising supports disposed at the ends thereof, worm gears having threaded engagement with said supports and a longitudinally disposed adjusting shaft provided with worms coacting with said worm gears, and further means for adjustably supporting said side wall members.

4. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith comprising end walls, opposed complementary segmental side wall members on opposite sides of the vertical plane of the axis of said mold, flexible webs connecting said side wall members to said end walls and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivotal connection between said side wall members disposed at one side of the vertical plane of the axis of said cylinder mold, there being a flexible joint strip connecting said side wall members, a supporting beam for said side wall members disposed in the vertical plane of the axis of said mold, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold, and further means for adjustably supporting said side wall members.

5. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith comprising end walls, opposed complementary segmental side wall members on opposite sides of the vertical plane of the axis of said mold, flexible webs connecting said side wall members to said end walls

and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivotal connection between said side wall members disposed at one side of the vertical plane of the axis of said cylinder mold, there being a flexible joint strip connecting said side wall members, a supporting beam for said side wall members disposed in the vertical plane of the axis of said mold, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold, an inlet box, a flexible connection for the bottom of said inlet box to the upper edge of one side wall member, a stock outlet box, the other side wall member being provided with an overflow ledge delivering to said stock outlet box, and further means for adjustably supporting said side wall members.

6. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith comprising complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of said cylinder mold, flexible webs connecting said side wall members to said end walls and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivot connection between said side wall members, there being a flexible joint strip connecting said side wall members, an inlet box, a flexible connection for the bottom of said inlet box to the upper edge of one side wall member, a stock outlet box, the other side wall member being provided with an overflow delivering to said stock outlet box, and adjustable supporting means for the side wall members including means for individually adjusting the same, and means for simultaneously adjusting said side wall members in their entireties relative to said cylinder mold.

7. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith, comprising end walls, complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of said cylinder mold, flexible webs connecting said side wall members to said end walls and having slack therein permitting adjustment of said side wall members relative to said cylinder mold, a pivot connection between said side wall members, there being a flexible joint strip connecting said side wall members, and adjustable supporting means for the side wall members including means for individually adjusting the same, and means for simultaneously adjusting said side wall members in their entireties relative to the cylinder mold.

8. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith, including end walls and complementary, flexibly connected segmental side wall members disposed on opposite sides of the vertical plane of the cylinder mold axis, flexible means for connecting said side wall members to said end walls, a supporting beam for said side wall members, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold comprising supports therefor, worm gears having threaded engagement with said supports and an adjusting shaft provided with worms coacting with said worm gears, an inlet box, a flexible connection for the bottom of said inlet box to the upper edge of one of the side wall members, a stock outlet box, the other side wall member being provided with an overflow ledge delivering to said stock outlet box, and means for adjustably supporting said side wall members comprising a pair of longitudinally disposed shafts disposed at the outer sides of said side wall members and provided with arms, links connecting said arms to said wall members and means for rotatably adjusting said longitudinally disposed shafts.

9. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith, including end walls and complementary flexibly connected segmental side wall members disposed on opposite sides of the vertical plane of the cylinder mold axis, flexible means for connecting said side wall members to said end walls, a supporting beam for said side wall members, means for raising and lowering said beam to adjust said side wall members in their entireties relative to the mold comprising supports therefor, worm gears having threaded engagement with said supports and an adjusting shaft provided with worms coacting said worm gears, and means for adjustably supporting said side wall members comprising a pair of longitudinally disposed shafts disposed at the outer sides of said side wall members and provided with arms, links connecting said arms to said wall members and means for rotatably adjusting said longitudinally disposed shafts.

10. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith and comprising opposed complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of the cylinder mold and having a hinge connection at their adjacent edges at one side of the vertical plane of the axis of the cylinder mold, means for supporting said side wall members disposed substantially in said vertical plane, means for simultaneously vertically adjusting said side wall members in their entireties, and means for supporting said side wall members for independent adjustment relative to said cylinder mould.

11. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith and comprising opposed complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of the cylinder mold and having hinge connection at their adjacent edges, means for simultaneously vertically adjusting said side wall members in their entireties relative to said cylinder mold, and means for independently adjusting the side wall members relative to said cylinder mold comprising rockshafts provided with arms and links connecting said arms to said side wall members.

12. In a paper making machine, the combination with a rotary cylinder mold, of a pulp vat operatively associated therewith and comprising opposed complementary segmental side wall members disposed on opposite sides of the vertical plane of the axis of the cylinder mold and having hinge connection at their adjacent edges, means for simultaneously vertically adjusting said side wall members in their entireties relative to said cylinder mold, and means for independently adjusting the side wall members relative to said cylinder mold.

ERNST GSCHWENDER.
WILLIAM C. BIGELOW.