May 5, 1931. M. P. CHAPLIN 1,804,203

PULP MOLDING MACHINE

Filed March 29, 1928 2 Sheets-Sheet 1

Fig. 1.

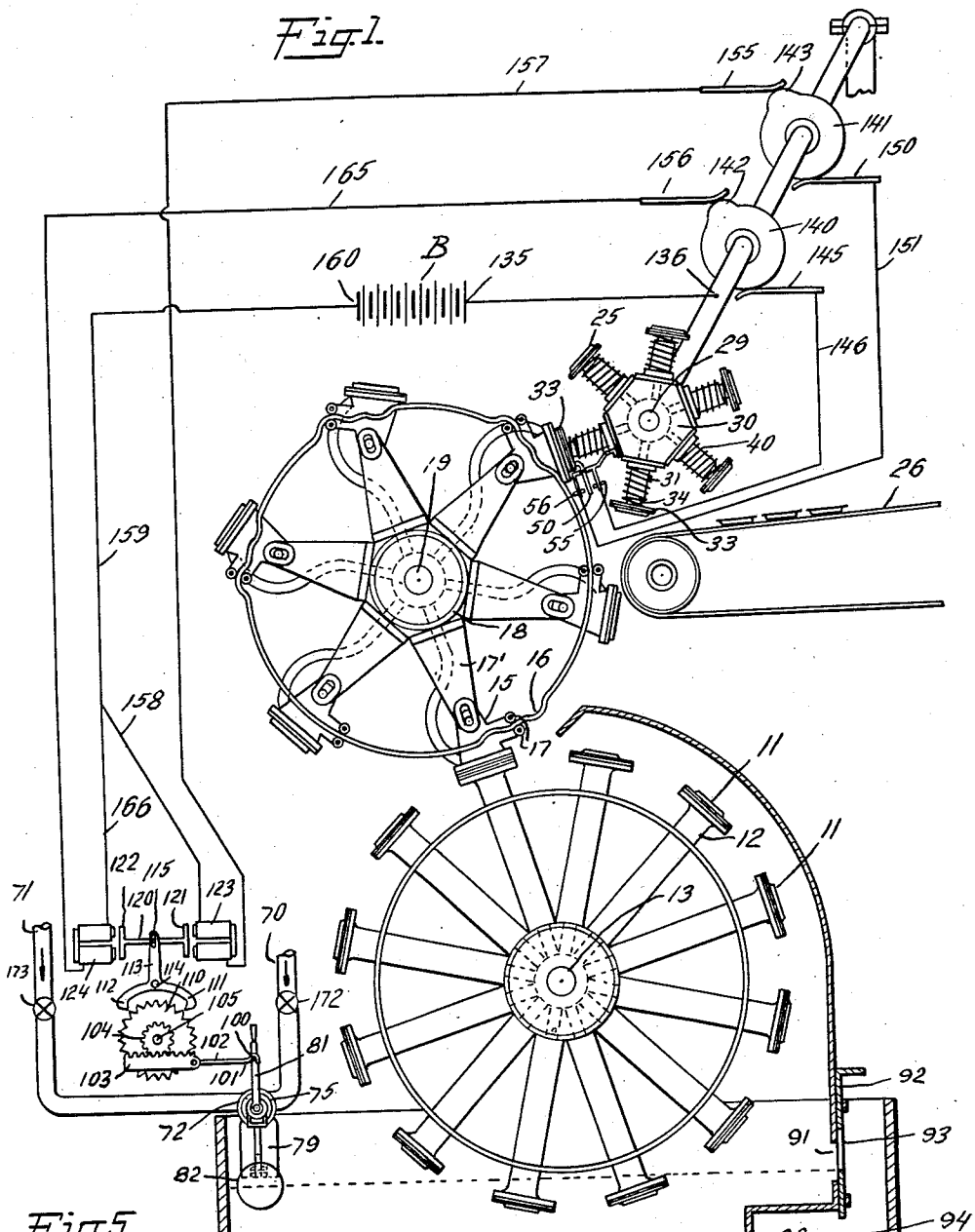
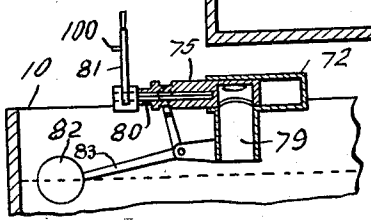


Fig. 5.



INVENTOR
Merle P. Chaplin
BY
Marshall & Hawley.
ATTORNEYS

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Fig. 2.

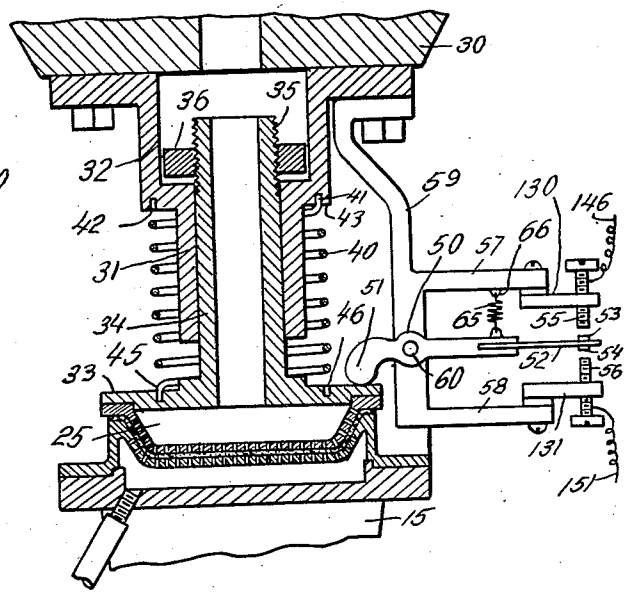


Fig. 3.

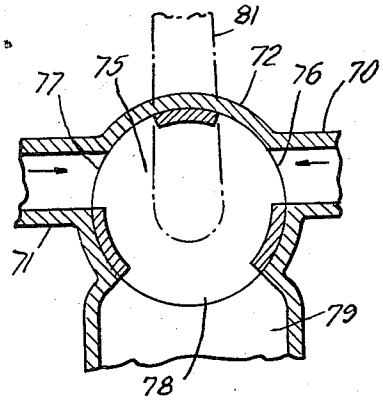
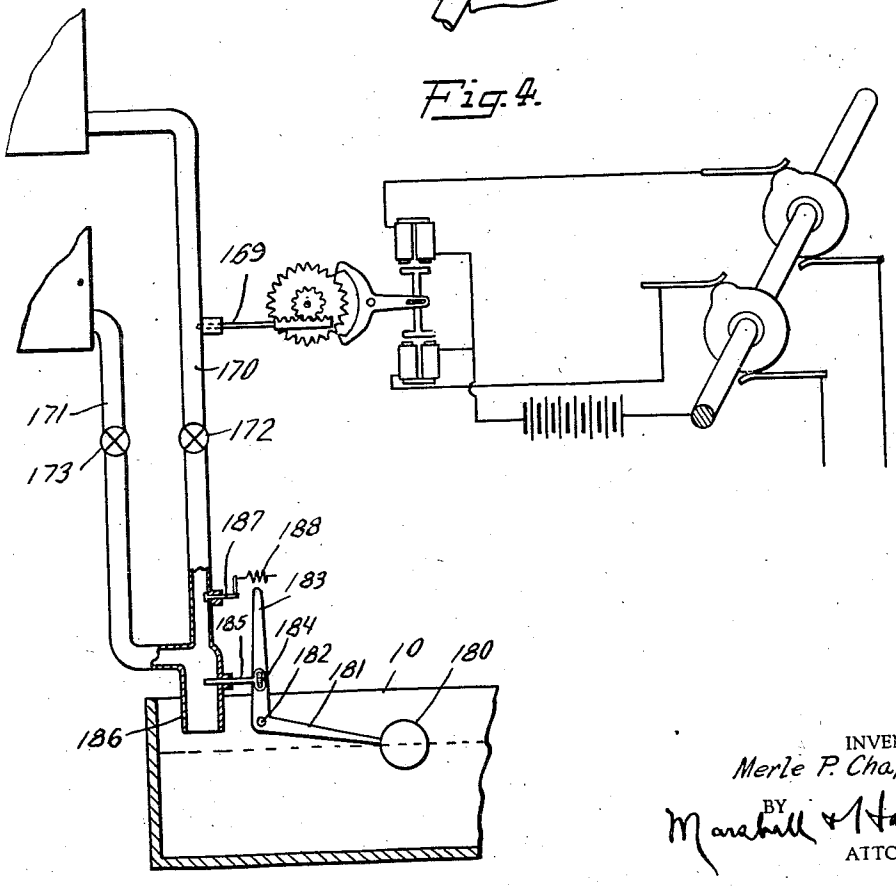


Fig. 4.



INVENTOR
Merle P. Chaplin
BY
Marshall & Hawley,
ATTORNEYS

Patented May 5, 1931 1,804,203

UNITED STATES PATENT OFFICE

MERLE P. CHAPLIN, OF WATERVILLE, MAINE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO FIDELITY TRUST COMPANY, TRUSTEE, OF PORTLAND, MAINE, A CORPORATION OF MAINE

PULP MOLDING MACHINE

Application filed March 29, 1928. Serial No. 265,550.

This invention relates to pulp molding machines and particularly to mechanism for controlling the consistency of the solution of pulp from which the molded articles are made.

In the manufacture of molded articles it is very desirable to make each article as nearly as possible of a certain specified thickness and weight in order that the product may be uniform. Articles too thin or too light are unsatisfactory and articles having unnecessary thickness or weight increase the cost of manufacture without contributing any material advantage.

If the articles vary to any material extent in thickness and weight they do not properly fit in a standard package. For instance, of the articles are too thin or too light it is either necessary to increase the number in the package to a number greater than the package is supposed to contain or else only partially fill the package, in which case the customer is apt to question either the count or the size of the package. In case articles are running too thick or too heavy it is impossible to pack them in a standard package and the customer may receive a package having less than the proper number of articles.

Various factors enter into the formation of the molded articles on pulp molding machines such, for instance, as the molding characteristics of the pulp utilized, the amount of suction on the forming dies or other means for depositing the pulp on the forming die. The main factor is, of course, the consistency of the pulp solution and in case the molded articles are too thin or too thick suitable changes in the consistency of the pulp solution will overcome these conditions.

This invention has for its salient object to provide simple, practical and efficient means for insuring the uniformity of output of a pulp molding machine.

Another object of the invention is to provide in a machine of the character specified means for automatically regulating the consistency of the pulp solution in order to insure a uniform weight and thickness of the articles produced by the machine.

Further objects of the invention will appear from the following specification taken in connection with the drawings, which form a part of this application, and in which

Fig. 1 is an elevation, somewhat diagrammatic, illustrating a machine constructed in accordance with the invention;

Fig. 2 is an enlarged sectional elevation illustrating the construction of a pair of coacting dies and the automatic regulating device cooperating therewith;

Fig. 3 is an enlarged sectional elevation showing one form of a valve for controlling the consistency of the pulp solution;

Fig. 4 is a diagrammatic view illustrating the circuit for the automatic control of the pulp solution in conjunction with a gate valve controlling the feed of the water to the solution; and

Fig. 5 is a fragmentary sectional elevation of the valve and control float shown in Fig. 1.

The invention briefly described consists of means cooperating with a pair of coacting dies in a pulp molding machine for varying or regulating the consistency of the pulp solution from which the molded articles are made in such a way as to insure the uniformity of the product made on the machine.

In the particular forms of the invention illustrated, the regulating means is controlled by the relative positions of the coacting dies. For instance, when the dies approach too close to each other and thus indicate that the molded article is too thin or too light, the regulating means operates to cut down the water supply to the pulp solution, or to decrease the water supply and increase the pulp supply, thus thickening the solution.

On the other hand, when the dies in their coacting positions are too far apart, indicating that the molded article is too thick or too heavy, the regulating means operates to thin the pulp solution by increasing the supply of water thereto or to increase the water supply and decrease the pulp supply. The invention further includes means for automatically cutting off the feeding of pulp solution and water to the tank or vat when the machine is shut down. Further details

of the invention will appear from the following description.

In the form of the invention illustrated in Figs. 1 to 3 inclusive, the pulp molding machine comprises a tank or receptacle 10 of pulp solution, a plurality of forming dies 11 carried by arms 12 and rotatable around an axis 13.

The forming dies, as shown in Fig. 1, rotate through the pulp solution and during their passage through the solution and until they reach a position coacting with the compression dies a vacuum is maintained on the forming dies to deposit and retain a layer of pulp thereon.

The forming dies 11 after receiving a deposit of pulp thereon engage successively compression dies 15 which are guided into parallel relation with and coaction with the forming dies by a cam track 16 and rollers 17 which coact with the track. After the material has been compressed between the forming and compression dies the vacuum on the forming dies is broken and atmospheric pressure or compressed air passes through the forming dies and a suction is created on the compression die, thus discharging the articles from the forming dies to the compression dies.

The compression dies 15 are mounted on arms 17′ carried by a hub 18 rotatable around an axis 19. The compression dies, after receiving the molded article, rotate about the axis 19 to a position in which they successively engage a plurality of transfer dies 25 and the molded articles are transferred from the compression dies to the transfer dies and are in turn deposited by the transfer dies on an endless conveyor 26.

The particular construction of the transfer dies is illustrated in Fig. 2. The transfer dies are mounted on a central hub or carrier 30 having a plurality of radial sleeves 31 mounted thereon. The hub 30 is mounted on a shaft 29. Each sleeve has an enlarged portion 32 having a square section. Each transfer die 25 is mounted on a head 33 formed on the outer end of a tube 34 slidably mounted in one of the sleeves 31. The inner end of each tube 34 is threaded as shown at 35 and a nut 36 is mounted on the threaded end and disposed in the square recess 32 of the sleeve 31.

A spring 40 surrounds each of the sleeves 31 and has one end 41 adapted to engage one of a plurality of circumferential apertures 42 formed in a shoulder 43 of a sleeve. The other end 45 of the spring is adapted to enter one of a plurality of circumferential apertures 46 formed in the head 33 of the tubular member 34.

It will be evident that the outward movement of the transfer die relative to the hub 30 is limited by the nut 36. This can be adjusted by removing the end 41 of the spring 40 from one of the recesses 42 by rotating the tubular member 34 and die relative to the nut, the nut being held from rotation by the square recess in which it is disposed. After the transfer die is properly positioned the end 41 of the spring will be disposed in one of the recesses 42. The spring 40 is relatively light and is much lighter than the springs actuating the compression dies. If desired, the transfer die may have the trade mark formed thereon and will thus impress the trade mark on the molded article during the transfer operation.

Automatic regulating mechanism for pulp solution

In the particular form of the invention illustrated, the consistency of the pulp solution is controlled by a lever 50 having one end 51 which engages the head 33 which forms the back of the transfer die. The end 51 of the lever acts as a feeler. The other end of the lever 50 has formed thereon or secured thereto a spring contact arm or plate 52 having a pair of contacts 53 and 54 adapted to engage respectively adjustable contact screws or members 55 and 56 carried by arms 57 and 58 formed on a bracket 59 secured to the hub 30, the lever 50 being pivoted at 60 to the bracket 59. A spring 65 is secured to the end of the lever 50 carrying the arm 52 and is also secured at 66 to the arm 57. Spring 65 operates to hold the end 51 of the lever in engagement with the head 33 which forms the back of a transfer die 25.

From the foregoing description it will be obvious that after the adjustable contact members 55 and 56 have been properly adjusted to determine the desired limitations for the thickness of the molded article, when the transfer die moves too close to the compression die the lever 50 will swing in an anti-clockwise direction, closing the circuit between the contact 53 and adjustable contact 55. On the other hand, when the transfer head or die is positioned too far away from the compression die, indicating that the article is too thick or too heavy, the lever 50 will swing about its pivot in a clockwise direction, closing the circuit between the contacts 54 and 56. As the changes in the pulp or vacuum conditions or other factors which enter into the molding of an article of the proper thickness take place very slowly only one transfer die has been provided with the contact or regulating device for measuring or regulating the consistency of the pulp solution. This die having the controlling means thereon regulates the consistency of the pulp solution once for each revolution of the transfer die. This on a normal operation of a machine of the class described will operate the regulating means often enough for all practical purposes. It will be understood, however, that regulating and controlling means may be

provided on more of the transfer dies if it is found desirable. The effect of closing the contacts in the manner above described will now be set forth.

Pulp solution regulating valve and control circuits

In the form of the invention illustrated in Figs. 1 to 3 inclusive and Fig. 5, there is shown a water supply pipe 70 and a pulp supply pipe 71. These pipes lead to a valve casing 72 having therein a 3-way valve 75 having a water intake port 75, a pulp intake port 77, and a common discharge port 78 for the pulp and water, this port leading into a discharge pipe 79 disposed above the pulp tank 10.

A spindle 80 is splined to the 3-way valve 75, the valve being slidable on the spindle, and an arm 81 is secured to and extends upwardly from the spindle. The valve 75 is slidable longitudinally in the casing 72 and on the spindle 80 and when the machine is shut down and the level of the solution in the vat 10 rises, the valve 75 will be moved into the valve casing by a float 82 and a lever 83 on which the float is mounted. When the valve is so moved communication from conduits 70 and 71 and conduit 79 through valve ports 76 and 77 is cut off and no pulp or water will be fed to the vat.

The pulp tank 10 is provided with some suitable means for maintaining a uniform level of the pulp solution therein. This may be obtained by providing a wall 90 having an over-flow opening or port 91 therein controlled by an adjustable gate valve 92. In this case a sufficient supply of pulp solution is fed to the tank to insure the over-flow thereof through the port 91 and opening 93 in the gate valve. By adjusting the gate valve the level can be changed. The pulp which overflows from the tank passes into an over-flow chamber 94 and through a discharge pipe 95 and is then fed by a suitable pump or other means to the pulp supply tank which supplies the pulp to the pipe 71.

The float control means above described for regulating the level of the pulp in the tank and the gate valve for controlling the over-flow level can be used separately and independently or, if desired, both of these level control means can be used. In the latter case the float control can be used to give an approximate level or a level which is somewhat high and the over-flow control by the gate valve can be utilized to give a more exact regulation of the level of the solution in the tank. Furthermore, when both of the level control devices are used, the gate valve regulating the over-flow may be utilized primarily for controlling the level of the pulp solution when the machine is in operation but may not have sufficient capacity to take care of the surplus stock delivered when the machine is shut down. Under these conditions the float valve will shut off the intake of the stock when the level of the solution rises to a sufficient degree to cause the float valve to operate.

The 3-way valve control arm 81 has projecting laterally therefrom a pin 100 which is engaged by one end 101 of the knob 102 carried by a rack bar 103. The bar 103 meshes with a pinion 104 carried by a spindle 105 to which there is also secured a toothed wheel or ratchet wheel 110.

The ratchet wheel 110 is adapted to be rotated in one direction or the other by pawls 111 and 112 carried by a lever 113 pivoted as shown at 114. The lever 113 is connected by a pin and slot connecting 115 to a bar 120 having formed on or secured to its opposite ends armatures 121 and 122 adapted respectively to be controlled by a pair of electro-magnets 123 and 124.

The adjustable contact posts 55 and 56 are mounted in insulating blocks 130 and 131 carried by the arms 57 and 58. The central contact 52, however, which is carried by the lever 50, is grounded to the frame of the machine and one side 135 of the battery B is also grounded to the frame, as indicated at 136. The shaft 29, on which the transfer dies are mounted, has mounted thereon but insulated therefrom a pair of cam disks 140 and 141 having cam projections 142 and 143. The cam disk 140 is engaged by a wiping contact member 145 which is connected by a wire 146 to the contact post 55. Cam 141 is engaged by a wiping contact 150 which is connected by a wire 151 to the adjustable contact post 56.

When the transfer shaft 29 is rotated to a position in which the transfer die having the automatic control means thereon is disposed in coacting relation with a compression die, the projections 142 and 143 on the cam disks 140 and 141 are so disposed as to engage respectively wiping contact members 155 and 156. The contact member 155 is connected by a wire 157 to one end of the magnet coil of magnet 123. The other end of the magnet coil is connected by a wire 158 to a wire 159 which in turn is connected to the other side 160 of the battery B.

The contact member 156 is connected by a wire 165 to one end of the magnet coil of magnet 124, the other end of the magnet coil being connected by a wire 166 to the wire 159.

Operation of mechanism shown in Figs. 1 to 3 and 5

The structure above described operates in the following manner. Assuming first that the article disposed between the transfer die and the compression die is too thick, under this condition the transfer die will rotate the lever 50 in a clockwise direction, causing the central contact member 52 and contact member 54 carried thereby to engage the contact post 56. Current will then pass from

one side of the battery B to the frame, through the lever 50, contact 52, post 56, wire 151, disk 141, projection 143, contact member 155, wire 157, magnet coil 123, wire 158 and wire 159, back to the other side of the battery. The armature 121 will be attracted by the magnet 123 when the coil is thus energized and will cause the bar 120 to move to the right, tilting the lever 113 about its pivot 114 in a clockwise direction. This will cause the pawl 111 to rotate the ratchet wheel 110 in an anti-clockwise direction. The pinion 104 will also be rotated in an anti-clockwise direction, thus moving the rack bar 103 to the right and rotating the arm 81 in a clockwise direction. From the showing in Fig. 3 it will be seen that when the arm 81 is rotated in a clock wise direction the port 76 will be opened to a greater extent, thus admitting a greater supply of water to the pulp tank. At the same time the port 77 will be partially closed, limiting the admission of pulp. The increased supply of water will thin the pulp solution and the thinner pulp solution will produce a thinner and lighter article.

When the article produced is too thin, the lever 50 will swing on its pivot in an anti-clockwise direction, thus closing the contacts 53 and 55. The circuit will then pass from one side of the battery to the frame and from the frame to the lever and contact plate 52, through contacts 53 and 55, through wire 146, contact 145, disk 140, projection 142, contact 156, wire 165, through the magnet coil of magnet 124, and thence through wire 166 to wire 159. As the coil of the magnet 124 is energized, the armature 122 will be attracted, causing the bar 120 to move to the left in Fig. 1, thus tilting the lever 113 in an anti-clockwise direction about its pivot 114. This will cause the pawl 112 to engage the ratchet wheel 110 and rotate the ratchet wheel in a clockwise direction, which will effect the movement of the rack bar 103 to the left, thus opening the port 77 to a greater degree, admitting more pulp to the pulp tank and at the same time the port 76 will be partially closed, limiting the admission of water. The pulp solution will thus be made thicker, which will result in a thicker and heavier article.

In case the machine is shut down the solution will start to rise in the tank or vat, thus causing the float 82 to rise and moving the valve 75 into the casing cutting off the supply of pulp and water.

In the form of the invention illustrated in Fig. 4, the control circuits are the same as those already described, but in this case the lever, pawls, ratchet wheel and rack bar, control a gate valve 169 mounted on the water conduit 170. Without further description it will be clear that when the molded article is too thick the gate valve will be opened by the mechanism illustrated and when the article is too thin the gate valve will be partially closed. Thus by limiting the supply of water fed to the tank the consistency of the solution is regulated.

The conduits 170 and 171 in Fig. 4 for the water and pulp and the corresponding conduits 70 and 71 in Fig. 1 are preferably provided with manually operable valves 172 and 173 in order to permit the operator to shut off the water and pulp when the machine is not operating.

In Fig. 4 the level of the pulp in the pulp tank 10 is controlled by a float 180 mounted on an arm 181 of a bell crank lever pivoted at 182. The other arm 183 of the bell crank lever has a pin and slot connection 184 to a gate valve 185 which controls the passage of the water and pulp through the conduit 186, into which the conduits 170 and 171 discharge. A separate gate valve 187 is mounted on the water conduit 170 and is normally held open by a spring 188. The upper end of the arm 183 of the bell crank lever is adapted to engage the outer end of the gate valve 187 and close this valve when the solution in the pulp tank rises to such a level that the float 180 swings the bell crank lever about its pivot. Thus, in case the machine is shut down and the operator fails to close the valves 172 and 173, the float valve will automatically cut off the supply of water and pulp when the level in the pulp tank has risen to such an extent to actuate the float valve and bell crank lever controlled thereby.

Although the control mechanism has been illustrated in connection with the compression and transfer dies it will be obvious that this mechanism could be used in conjunction with any pair of coacting dies in a pulp machine. Furthermore, it is clear that the control mechanism is not limited for use in connection with any particular construction of compression, transfer or forming dies.

From the foregoing description it will be seen that a simple and practical device has been designed for effectively and automatically controlling the consistency of the pulp solution in a pulp molding machine in such a manner as to insure the production of a uniform article or product and for automatically cutting off the feed of pulp and water in case the machine is shut down.

Although certain specific embodiments of the invention have been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of

said dies being adapted to receive a deposit of pulp thereon, and means controlled by the relative positions of said dies when the dies are in coacting relation for regulating the consistency of the pulp solution.

2. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means controlled by one of said dies when the dies are in coacting relation for regulating the consistency of the pulp solution.

3. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means controlled by the distance between said dies when the dies are in coacting relation for regulating the consistency of the pulp solution.

4. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means controlled by the relative positions of said dies when the dies are in coacting relation for regulating the consistency of the pulp solution, said means including an element operable when said dies are positioned too close together or too far apart.

5. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means controlled by one of said dies when the dies are in coacting relation for regulating the consistency of the pulp solution, said means including a member operable when said die approaches too close to or moves too far away from its coacting die.

6. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means controlled by the thickness of the material between said dies when the dies are in coacting relation for varying the consistency of said pulp solution.

7. In a pulp molding machine, a die adapted to receive a deposit of pulp thereon, a die adapted to coact therewith, and means engaging one of said dies when the dies are in coacting relation for regulating the consistency of the pulp solution.

8. In combination, a pulp solution, a pair of elements adapted to coact on a layer of pulp disposed therebetween, and means controlled by the relative positions of said elements when said elements are in coacting relation for varying the consistency of the pulp.

9. In combination, a pulp solution, a pair of elements adapted to coact on a layer of pulp disposed therebetween, and means controlled by the position of one of said elements when said elements are in coacting relation for varying the consistency of the pulp.

10. In combination, a pulp solution, a pair of elements adapted to coact on a layer of pulp disposed therebetween, and means responsive to variations in thickness of the pulp layer for regulating the consistency of the pulp.

11. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means responsive to variations in thickness of the pulp deposit between said dies for regulating the consistency of the pulp solution.

12. In a pulp molding machine, a pulp solution, a die being adapted to receive a deposit of pulp thereon, a die adapted to coact with said die, resilient means for pressing said second die toward the first die, and means responsive to variations in thickness of the pulp deposit between said dies for regulating the consistency of the pulp solution.

13. In a pulp molding machine, a pulp solution, a die being adapted to receive a deposit of pulp thereon, a die adapted to coact with said die, resilient means for pressing said second die toward the first die, and means coacting with said second die and responsive to variations in thickness of the pulp deposit between said dies for regulating the consistency of the pulp solution.

14. In a pulp molding machine, a pulp tank, a pulp feed pipe therefor, a water feed pipe therefor, a valve controlling the feed of water through said water feed pipe into the pulp tank, a forming die adapted to pass through the solution in said tank and receive a deposit of pulp thereon, a compression die adapted to coact with said forming die and compress said pulp, a transfer die adapted to coact with said compression die, and means coacting with said transfer die for regulating said water feed valve.

15. In a pulp molding machine, a pulp tank, a pulp feed pipe therefor, a water feed pipe therefor, a valve controlling the feed of water through said water feed pipe into the pulp tank, a pair of dies adapted to coact on a layer of pulp extracted from said pulp solution, and means responsive to variations in the layer of pulp between said dies for regulating the water feed valve.

16. In a pulp molding machine, a supply of pulp solution, a pair of coacting dies, one of said dies being adapted to receive a deposit of pulp thereon, and means including an electric circuit and a switch controlled by one of said dies for regulating the consistency of the pulp solution.

17. In a pulp molding machine, a pulp tank, a pulp feed pipe, a water feed pipe, a conduit communicating with said pipes and discharging into said tank, a valve control-

ling the discharge of pulp and the discharge of water into said conduit, a pair of elements adapted to coact on a deposit of pulp from said pulp tank, and means responsive to variations in thickness of said pulp deposit for regulating said valve.

18. In a pulp molding machine, a pulp tank, a pulp feed pipe, a water feed pipe, a conduit communicating with said pipes and discharging into said tank, a valve controlling the discharge of pulp and the discharge of water into said conduit, a pair of elements adapted to coact on a deposit of pulp from said pulp tank, and means controlled by one of said elements for adjusting said valve and varying the consistency of the pulp solution.

19. In a pulp molding machine, a pulp tank, a pulp feed pipe, a water feed pipe, a conduit communicating with said pipes and discharging into said tank, a valve controlling the discharge of pulp and the discharge of water into said conduit, a pair of elements adapted to coact on a deposit of pulp from said pulp tank, means controlled by one of said elements for adjusting said valve and varying the consistency of the pulp solution, and means controlled by the level of the solution in said tank for moving said valve to cut off the feed of water and pulp to said tank.

20. In a pulp molding machine, a pulp tank, a pulp feed conduit, a valve controlling the passage of the pulp from said conduit to the tank, a die adapted to receive a layer of pulp, means controlled by the thickness of a layer of pulp on said die for adjusting the valve, and means controlled by the level of the pulp solution in the tank for adjusting said valve.

21. In a pulp molding machine, a pulp tank, a pulp feed conduit, a water feed conduit, a valve controlling the passage of the pulp and water from said conduits to the tank, a die adapted to receive a layer of pulp, means controlled by the thickness of a layer of pulp on said die for adjusting the valve, and means controlled by the level of the pulp solution in the tank for adjusting said valve.

22. In a pulp molding machine, a pulp tank, a conduit for supplying pulp to said tank, a rotatably and slidably mounted valve in said conduit, a die adapted to receive a layer of pulp, means controlled by the thickness of the layer of pulp on the die for rotatably adjusting said valve, and means controlled by the level of the pulp solution in the tank for slidably adjusting said valve.

23. In a pulp molding machine, a supply of pulp solution, a die adapted to receive a layer of pulp, and means controlled by the thickness of the layer of pulp on said die for regulating the consistency of the solution of pulp.

24. In a pulp molding machine, a pulp tank, a conduit for supplying pulp to said tank, a conduit for supplying water to said tank, a valve for regulating the proportions of water and pulp entering the tank, a die adapted to receive a layer of pulp, and means controlled by the thickness of the layer of pulp on said die for adjusting said valve to vary the consistency of the solution of pulp.

25. In a pulp molding machine, a pulp tank, a conduit for supplying pulp to said tank, a conduit for supplying water to said tank, a valve for regulating the proportions of water and pulp entering the tank, a die adapted to receive a layer of pulp, means controlled by the thickness of the layer of pulp on said die for adjusting said valve to vary the consistency of the solution of pulp, and means controlled by the level of the solution of pulp in the tank for adjusting said valve.

26. In a pulp molding machine, a pulp vat, a carrier having a plurality of dies thereon adapted to receive layers of pulp, and means periodically coacting with one of said dies for regulating the consistency of the pulp in said vat.

27. In a pulp molding machine, a pulp vat, means for supplying pulp and water to said vat, a carrier having a plurality of dies, each adapted to receive a layer of pulp thereon, and means periodically coacting with one of said dies for varying the ratio between the pulp and water supplied to said tank.

28. In a pulp molding machine, a pulp vat, means for supplying pulp and water to said vat, a carrier having a plurality of dies, each adapted to receive a layer of pulp thereon, and means controlled by the thickness of the layer of pulp on one of said dies for varying the ratio between the pulp and water supplied to said tank.

29. In a pulp molding machine, a pulp supply, a plurality of dies adapted to successively receive layers of pulp, a conveyer, a plurality of transfer heads adapted to coact with said dies and to receive said pulp layers and transfer said layers to said conveyer, and means associated with said transfer heads for regulating the consistency of said pulp.

30. In a pulp molding machine, a pulp supply, a plurality of compression dies adapted to receive layers of pulp, a plurality of elements adapted to receive said layers from the compression dies, and means associated with one of said elements for regulating the consistency of said pulp.

31. In a pulp molding machine, a pulp supply, two sets of elements movable in synchronism with each other and adapted to successively and periodically coact on layers of pulp disposed therebetween, and means controlled by the thickness of a layer of pulp between coacting elements for regulating the consistency of the pulp.

32. In a pulp molding machine, a pulp

supply, two sets of coacting elements, the elements in said sets being constructed and arranged to successively coact on layers of pulp disposed therebetween, and means operatable periodically to regulate the consistency of the pulp.

33. In a pulp molding machine, a plurality of dies adapted to receive layers of pulp, and means including a member adapted to engage said layers for insuring the production of layers of uniform thickness.

34. In a pulp molding machine, a pulp supply, a plurality of compression dies adapted to receive layers of pulp, a plurality of elements adapted to receive said layers from the compression dies, and means associated with one of said elements for insuring the production of layers of uniform thickness.

35. In a pulp molding machine, a carrier having a plurality of dies, each adapted to receive a layer of pulp, and means including a member periodically coacting with one of the dies for insuring the production of layers of uniform thickness.

In witness whereof, I have hereunto set my hand this 9th day of March, 1928.

MERLE P. CHAPLIN.