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M. O. KASSON.
PULP MOLDING MACHINE.
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Fig. 1.

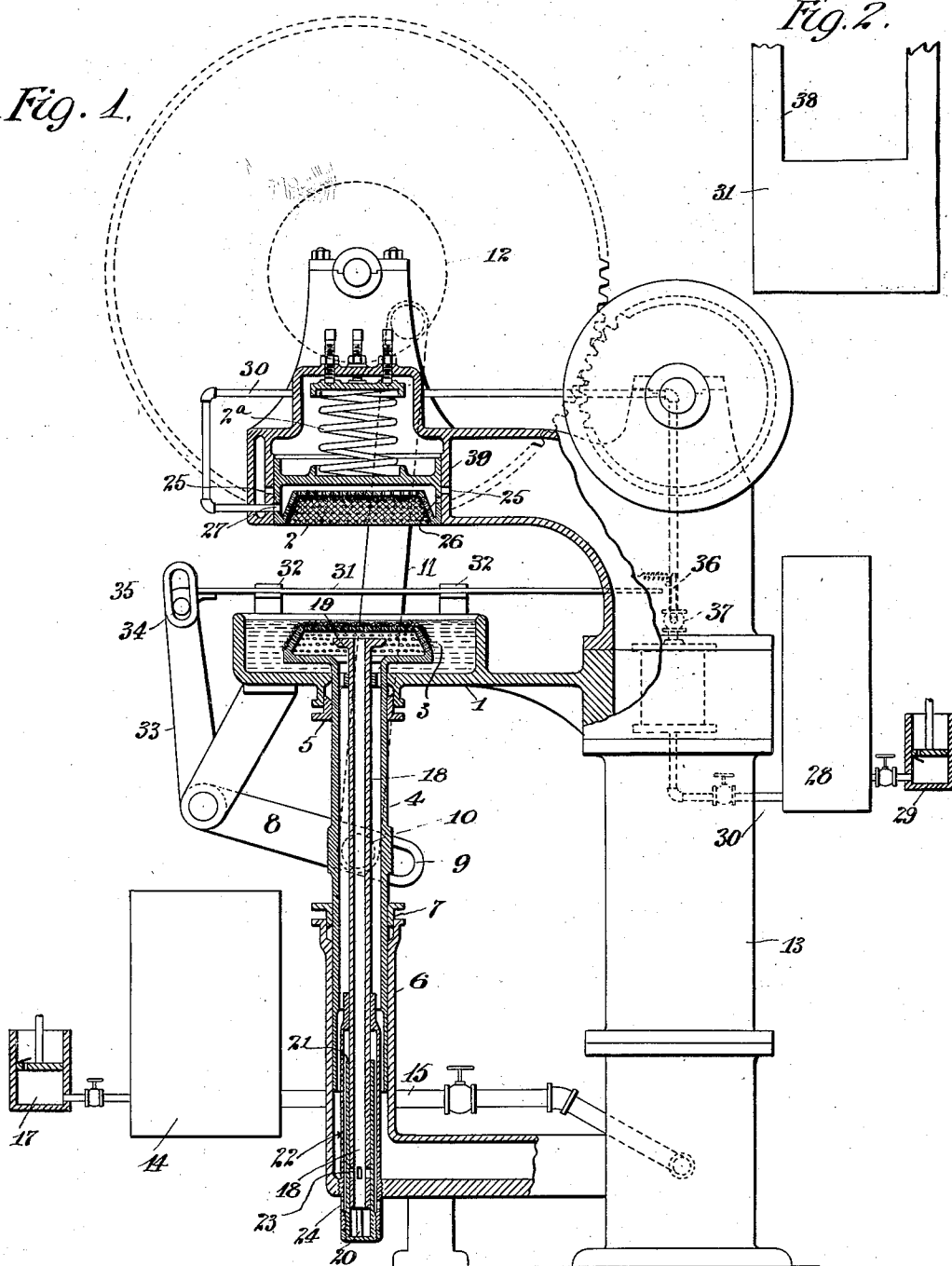


Fig. 2.

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PULP-MOLDING MACHINE.

No. 828,408.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MAHLON O. KASSON, a citizen of the United States, residing at Sandy Hill, New York, have invented certain new and useful Improvements in Pulp-Molding Machines, of which the following is a clear, full, and exact description.

My invention relates to a machine for forming articles from a suitable pulp—wood-pulp, for example; and my object is to provide an improved and simplified construction.

My invention will be defined in the claims.

In the drawings, which show the preferred embodiment of my invention, Figure 1 shows a side elevation, parts being in vertical section; and Fig. 2, a detail plan view of the reciprocating slide.

In the above embodiment 1 is a receptacle for containing pulp. This is preferably stationary, as shown.

2 is a mold-face which is preferably stationary with respect to motion horizontally of the vat and in the present embodiment is shown as fixed over the vat, so that it cannot move laterally, but may move vertically, against the action of spring 2^a.

3 is a mold-face which is adapted to dip into the pulp in the vat and receive a layer of pulp thereon. In order to deposit the pulp on the face 3, I prefer to make the face hollow and perforate it with a number of small holes similar to or to cover it with wire-gauze, as shown, and apply air-suction through them when the face is immersed in the pulp. This will cause a layer of pulp to adhere to the face, and its thickness will depend on the length of time it is so immersed. This face may then be moved out of the vat and pressed against the face 2, thus compressing the pulp and forming the article. It may not be necessary in all cases to raise the face 3 out of a stationary vat, and by the words "dip the face in the pulp" I do not limit myself to a face which is normally located in the pulp in the vat. In the present embodiment, however, the pulp-receptacle is a stationary vat, and the mold-face 3 is carried on a reciprocating plunger 4, which passes through the bottom of the vat in a suitable stuffing-box 5. The plunger is preferably made hollow, as shown, so that it forms an air-passage to and from the hollow face 3.

6 is a fixed tube provided with a second

stuffing-box 7, through which the lower end of the plunger reciprocates. The plunger may be reciprocated in many different ways; but in the present embodiment I have shown a pivoted lever 8, provided with a slot 9 therein, in which slot is located a pin 10, carried by a link 11, connected with the driving-wheel 12.

13 is a hollow standard from which the air is exhausted by a vacuum-chamber 14, connected to the standard by the pipe 15, and a vacuum-pump 17, connected to the chamber.

When the face 3 dips into the pulp by the lowering of the plunger, suction is applied through it until a layer of pulp is deposited thereon. It is then raised up and pressed against the face 2 to form the article. I preferably provide a valve mechanism by which the suction through the face 3 shall be cut off soon after the face 3 rises from the pulp in the vat, and one embodiment of said valve mechanism is shown in the accompanying drawings. In the present embodiment this is shown as a hollow tube 18 inside the plunger 4, and fixed at its upper end inside of the hollow face 3 is a valve-head 19, which fits in a suitable seat in the lower side of the face 3 to close the upper end of the hollow plunger 4. When the parts are at the position shown in the drawings, with the face in the pulp, the lower end of the tube 18 rests against a stop 20. The lower end of the tube slides and fits in a short fixed tube 21, and this tube 21 is surrounded by a second fixed tube 22, which at its upper end also closely fits the tube 18. When the plunger is lowered and the face 3 dips into the pulp, the lower end of the tube 18 strikes against stop 20 and opens the valve 19, thus opening communication between the vacuum-chamber 14 and the interior of the mold-face 3. The suction deposits a layer of pulp on the face, and when the plunger is raised the valve 19 will close and shut off the suction. There may, however, be a partial vacuum inside of the hollow mold-face until the apertures 23 and the lower end of the tube 8 rise above the end of the fixed tube 21, which will open communication between the inner end of the mold-face and the outer air through the apertures 24 at the lower end of tube 22. This will relieve whatever vacuum there may be then in the mold-face. As the mold-face is moved on upward by the plunger

the face will be brought against the face 2 and pressed against it in opposition to the force of the strong spring 2^a and compress the layer of pulp to form the article, the face 2 moving upward as the face 3 continues to rise.

The spring 2^a forms one embodiment of a resilient means for allowing one of said faces (in this case the upper face) to yield when said faces are pressed together. This is of an advantage, because if the lower face remains an unusually long time in the pulp an unusual thickness of pulp will accumulate thereon, and in such case if the face 2 were fixed in position it will be obvious that the parts would be likely to be broken or severely strained; but, as shown in the drawings, the face 2 may yield slightly against the pressure of the spring, and so compensate for said unusual thickness of pulp. The screws above the spring obviously constitute a means for adjusting the pressure of the spring.

In order to remove the article from the face 3 and transfer it to the face 2, where it will be retained, I have in this embodiment provided a valve mechanism by which the interior of the hollow perforated face 2 will be put into communication with the interior of the hollow standard 13, and consequently with the vacuum-chamber 14. In the present embodiment I have provided a plurality of ports 25 in the cylindrical portion 39, which acts as a holder and guide for the reciprocating face 2 and which will register with ports 26 and 27 in the hollow face when the face 2 is moved up to its uppermost limit. Suction will thus be applied through the face 2, and as the suction has meanwhile been relieved from the face 3 the article will be transferred to and retained by the face 2. The suction through face 2 will thus obviously be applied before the faces are entirely separated.

It will be observed that the mold-face 2 as a whole fits closely in the cylindrical guide portion 39, in which it slides up and down, and that the chamber inclosed in said portion 39 is closed. Now when the mold-face has been forced upward, so that the ports in the mold-face register with the ports 25, suction will be applied and will also tend to draw some air out of this chamber above the mold-face, and when the mold-face 3 starts to drop away from its high position the mold-face 2 will not follow it downward at once, but will move slowly downward as the outside air passes up into the chamber above the mold-face 2 through the sliding joint between the mold-face and the cylindrical portion 39. The mold-faces will therefore be entirely separated before the ports in the mold-face 2 entirely leave the ports in the cylindrical portion 39. Consequently the dish will be removed from the mold-face 3 and transferred to and retained by the mold-face 2. The above construction is only one means for ac-

complishing this result, and I am aware that other devices may be substituted therefor.

In order to remove the article from face 2, I have provided a construction by which compression is applied to the hollow face 2 to blow the article off from the face. In the present embodiment 28 is a compression-chamber, into which air is forced by a pump 29, and from the chamber 28 runs a pipe 30, whose end extends in and registers with port 27 in the face 2 when the face 2 is moved by the spring to its lowest position, as shown in the drawings. In order also to remove the article entirely from between the mold-faces, a reciprocating slide 31 is provided of the shape shown in Fig. 2, which reciprocates in guides 32 and is worked by a lever 33, connected with lever 8, which has a pin 34 engaging in a slot 35, carried by the slide. As the guide moves slightly to the right the right end of it will strike the stem 36 of a normally closed cock 37 in pipe 30 and open it, thus blowing air through the face 2 and blowing the article off from said face onto the slide 31, and as the slide moves to the left when the plunger rises the article will be removed from between the faces, and the face 3 will pass up through the cut-away portion 38 in the slide. It will be observed that the plunger 4, which carries the lower face 3, is a single device or means which both causes the said face to dip into the pulp and presses this face against the relatively stationary face 2.

I am aware that many variations from the above-described construction may be made without departing from my invention as claimed, and I therefore do not desire to be limited to the embodiments herein illustrated and described.

What I claim is—

1. In a pulp-machine in combination, a receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the pulp therein, a hollow plunger passing down through the bottom of said receptacle and carrying said mold-face at its upper end, a suction device to apply suction through said plunger and mold-face to cause a layer of pulp to be deposited thereon, a second perforated mold-face, and means to press said faces together to form said article and separate the same, and means to cause suction through said second face before said faces separate whereby said article is retained by said second face.

2. In a pulp-machine in combination, a receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the pulp therein, a suction device to apply suction through the same to cause a layer of pulp to be deposited thereon, a second perforated mold-face movable toward and away from said first face, and means to press said faces together to form said article and separate the same, a spring to resist the move-

ment of said second face away from said first face, and means to cause suction through said second face before said faces separate whereby said article is retained by said second face.

3. In a pulp-machine in combination, a receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the pulp therein, a suction device to apply suction through the same to cause a layer of pulp to be deposited thereon, a second perforated mold-face movable toward and away from said first face, and means to press said faces together to form said article and separate the same, a spring to resist the movement of said second face away from said first face, and a valve device operated by the movement of said second face and adapted to connect said second face with said suction device to cause suction through said second face before said faces separate, whereby said article is transferred to and retained by said second face.

4. In a pulp-machine in combination, a receptacle adapted to contain a suitable pulp, a perforated sloping-sided mold-face adapted to dip into the pulp therein, a hollow plunger passing down through the bottom of said receptacle and carrying said mold-face at its upper end, a suction device to apply suction through said hollow plunger and mold-face to cause a layer of pulp to be deposited on said mold-face, a second sloping-sided perforated mold-face nesting with said first face, and means to press said faces together to form said article and separate the same, and means to cause suction through said second face before said faces separate whereby said article is retained by said second face.

5. In a pulp-machine in combination, a receptacle for containing a suitable pulp, a perforated mold-face adapted to dip into the pulp therein, and a suction device acting through said face to cause a layer of pulp to be deposited thereon, a second mold-face, a reciprocating plunger passing through said receptacle and adapted to press said faces together to mold the article.

6. In a pulp-machine in combination, a receptacle for containing a suitable pulp, a perforated mold-face adapted to dip into the pulp therein, a suction device acting through said face to cause a layer of pulp to be deposited thereon, a second mold-face, and a reciprocating plunger passing through said receptacle and carrying said first face and adapted to press said faces together to mold an article.

7. In a pulp-molding machine in combination, a mold-face, a fixed receptacle adapted to contain a suitable pulp, a perforated mold-face, a plunger carrying said perforated face and reciprocating through the bottom of said receptacle, a suction device acting through said perforated face to deposit a layer of pulp

thereon, and means to move said plunger and carry said perforated face out of said pulp and press said faces together to mold an article.

8. In a pulp-molding machine in combination, a mold-face, a fixed receptacle adapted to contain a suitable pulp, a perforated mold-face, a plunger carrying said perforated face and reciprocating through the bottom of said receptacle, a suction device acting through said perforated face to deposit a layer of pulp thereon, and means to move said plunger and carry said perforated face out of said pulp and press said faces together to mold an article, and means to transfer said article to said first face.

9. In a pulp-molding machine in combination, a mold-face, a fixed receptacle adapted to contain a suitable pulp, a perforated mold-face, a plunger carrying said perforated face and reciprocating through the bottom of said receptacle, a suction device acting through said perforated face to deposit a layer of pulp thereon, and means to move said plunger and carry said perforated face out of said pulp and press said faces together to mold an article, and means to remove said article from between said faces.

10. In a pulp-molding machine in combination a perforated mold-face, a fixed receptacle adapted to contain a suitable pulp, a movable perforated mold-face, a plunger carrying said latter face and reciprocating through the bottom of said receptacle, a suction device acting through said latter face to deposit a layer of pulp thereon, and means to move said plunger and carry said movable face out of said pulp and press said faces together to mold an article, and a suction device acting through said first face to transfer said article to said first face.

11. In a pulp-molding machine in combination a perforated mold-face, a fixed receptacle adapted to contain a suitable pulp, a movable perforated mold-face, a plunger carrying said latter face and reciprocating through the bottom of said receptacle, a suction device acting through said latter face to deposit a layer of pulp thereon, and means to move said plunger and carry said movable face out of said pulp and press said faces together to mold an article, and a suction device adapted to apply suction through said first face before said faces are separated to transfer said article to said first face.

12. In a pulp-molding machine in combination, a pulp-receptacle, a mold-face adapted to dip into the same and receive a layer of pulp, a second face and means to press said faces together to form an article and separate said faces, and means to cause said article to be retained on one of said faces, and a device located below said face and adapted to receive said article and remove it from between said faces.

13. In a pulp-molding machine in combination, a pulp-receptacle, a mold-face adapted to dip into the same and receive a layer of pulp, a second face, and means to press said
5 faces together to form an article and separate said faces, means to cause suction through said second face to cause the article to adhere to the under side of said second face, and a device located below said second face and
10 adapted to receive said article and remove it from between said faces.

14. In a pulp-molding machine in combination, a pulp-receptacle, a mold-face adapted to dip into the same and receive a layer of
15 pulp, a second face and means to press said faces together to form an article and separate said faces, and a reciprocating device movable in between said faces and adapted to receive said article and remove it from be-
20 tween said faces.

15. In a pulp-machine in combination, a receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the pulp therein, a hollow plunger passing
25 down through the bottom of said receptacle and carrying said mold-face at its upper end, a suction device to apply suction through the same to cause a layer of pulp to be deposited on said mold-face, a second perforated mold-
30 face, and means to press said faces together to form said article and separate the same, and means to cause suction through said second face before and until after said faces separate whereby said article is retained by said
35 second face.

16. In a machine for molding articles from pulp, a mold having two coextensive faces between which the article is formed, a vat to contain pulp, and an actuator (that is, a single
40 device) for moving one of the faces relatively to the other, the movement of said face carrying it first into the pulp in the vat whereby it receives a layer of pulp, and then against the other face whereby said layer is compressed and the article formed.
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17. In a machine for molding articles from pulp, a mold having a plurality of separable nesting faces adapted to form said article between them, a single means to positively
50 move one of said faces so as to separate said faces and close them together, a vat to con-

tain pulp, said face only, when said faces are separated, being immersed in the pulp, and means to apply suction to said face while it is so immersed.

18. In a machine for molding articles from pulp, a mold having two faces, one of which has a fixed position with reference to a body of pulp, and a single means to cause the other face to dip into the body of pulp to receive a
60 layer thereon and to close against the fixed face, said faces when closed together acting upon and compressing all parts of the pulp-layer simultaneously.

19. In a pulp-machine in combination, a
65 receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the same, means to apply suction through said face to cause a layer of pulp to be deposited thereon, a second mold-face and
70 means to press said faces together and separate the same, and resilient means allowing one of said faces to yield when said faces are pressed together.

20. In a pulp-machine in combination, a
75 receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the same, means to apply suction through said face to cause a layer of pulp to be deposited thereon, a second mold-face and
80 means to press said faces together and separate the same, and resilient means allowing one of said faces to yield when said faces are pressed together, and means for adjusting said resilient means.
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21. In a pulp-machine in combination, a receptacle adapted to contain a suitable pulp, a perforated mold-face adapted to dip into the same, means to apply suction through
90 said face to cause a layer of pulp to be deposited thereon, a second mold-face and means to press said faces together and separate the same, and resilient means allowing said second face to yield when said faces are
95 pressed together.

Signed at Sandy Hill, New York, this 10th day of June, 1902.

MAHLON O. KASSON.

Witnesses:

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FRED E. EARLE.