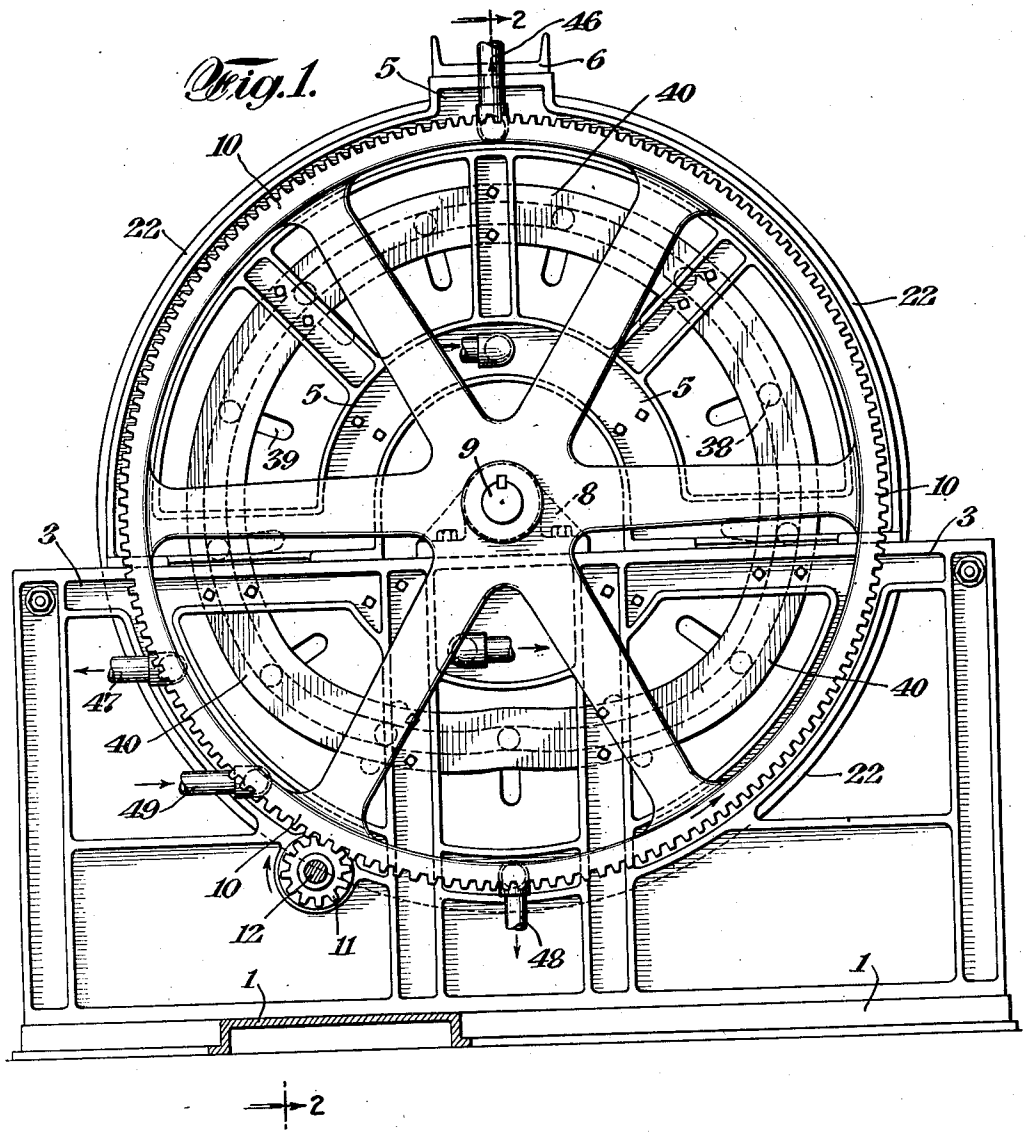
Dec. 4, 1934. G. W. SWIFT, JR 1,983,324

MACHINE FOR MAKING ARTICLES OF PULP

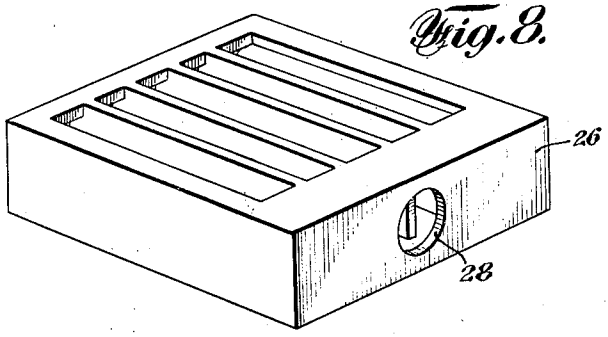
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Fig. 1.




2

Fig. 8.




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MACHINE FOR MAKING ARTICLES OF PULP

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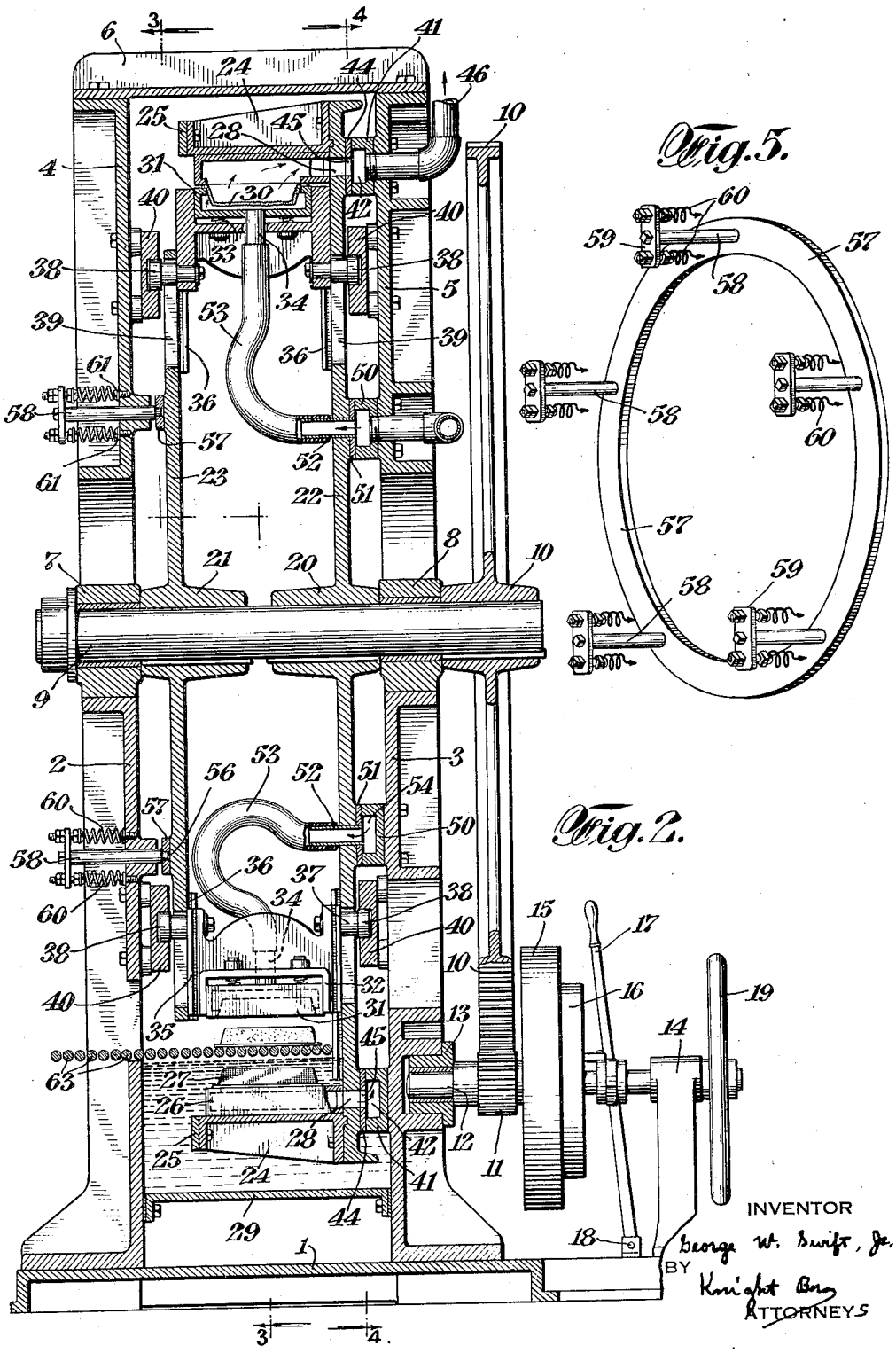


Fig. 5.



Fig. 2.

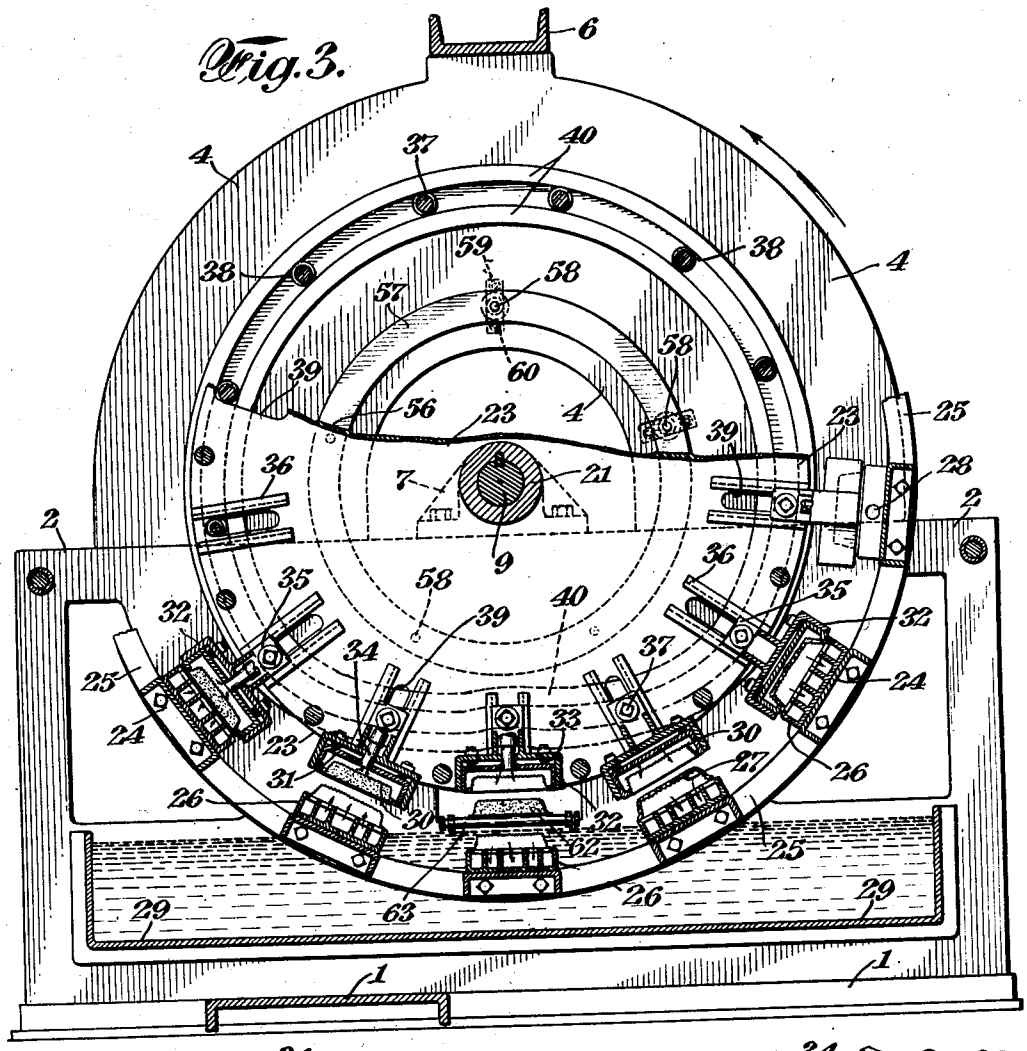
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MACHINE FOR MAKING ARTICLES OF PULP

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Fig. 3.



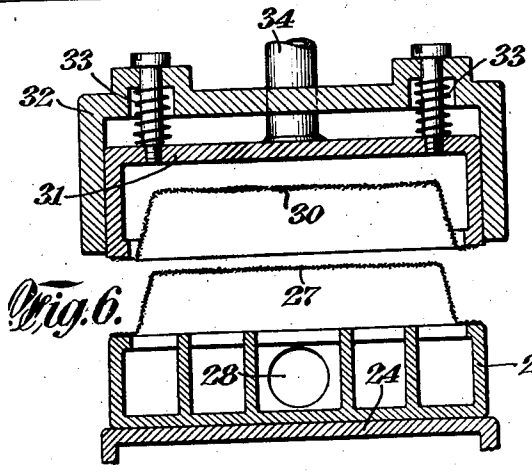
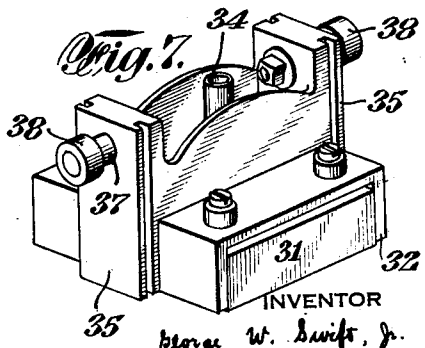




Fig. 6.

Fig. 7.




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MACHINE FOR MAKING ARTICLES OF PULP

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Fig. 4.

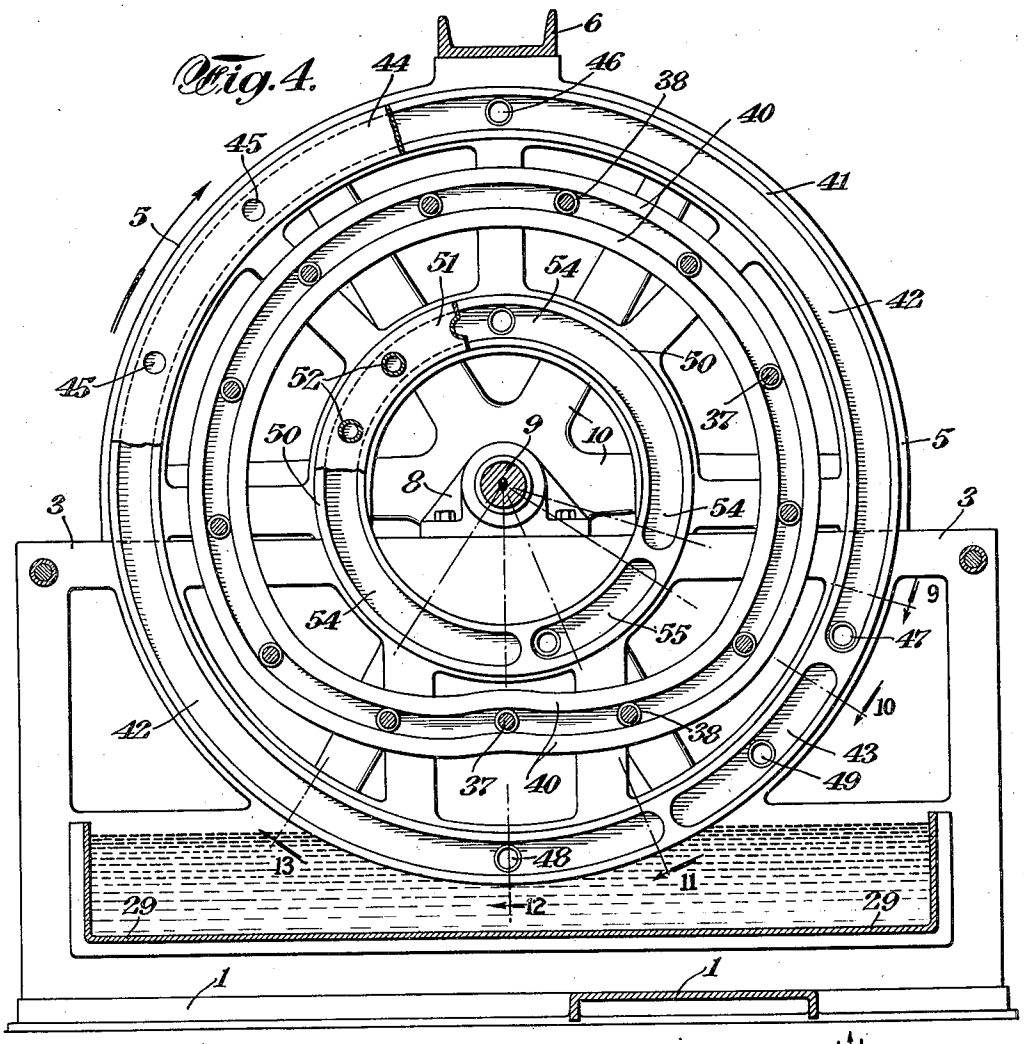



Fig. 9.

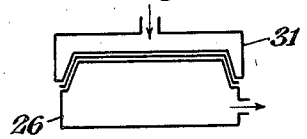
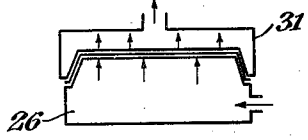



Fig. 10.



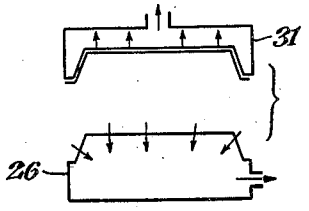




Fig. 11.

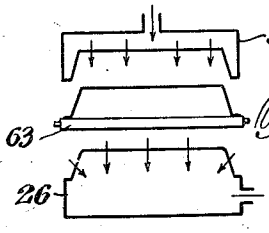



Fig. 12.

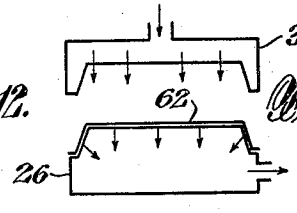



Fig. 13.

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# UNITED STATES PATENT OFFICE

1,983,324

## MACHINE FOR MAKING ARTICLES OF PULP

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Application February 25, 1933, Serial No. 658,517

16 Claims. (Cl. 92—56)

The present invention relates more especially to that type of pulp molding machines in which an endless series of suction pulp molds are passed one after another into and out of a body of pulp and subsequently brought into cooperative position with respect to corresponding forms or couches for expressing the moisture therefrom prior to the delivery of the molded pulp articles to suitable heating chambers for completing the dehydration of said articles.

The main purpose of the present invention is to provide mechanism of improved construction for producing articles of this nature more economically than is possible with present well-known machines of this character and for improving the physical properties of said articles. For this purpose, my invention contemplates the removal of a larger amount of the moisture from molded pulp articles prior to the application of heat than has heretofore been the common practice and a resultant saving in the consumption of fuel required for the drying operation. An important advantage to be derived in this connection, resides in the fact that the greater the amount of dehydration which takes place within the mold and before the application of heat thereto the lesser will be the liability of cracking or warping of the finished article.

One of the objects of my present invention is to provide an improved construction and arrangement of parts in a machine of this character in which the pulp-shaping forms or molds while moving continuously over a closed orbital path extending past or through a pulp-supply station or tank, are adapted to maintain the pulp under the combined action of compressed air and suction applied to opposite surfaces of the molded pulp for expressing the moisture from the pulp from the time the molds leave the pulp supply station or tank until said molds are about to receive a further supply of pulp preparatory to the next cycle of operations. In the preferred embodiment of my invention shown on the drawings, my invention contemplates a wheel-like carrier frame with pulp molds arranged around its periphery in such a way that the movement of the wheel carrier about its axis of rotation will move said pulp molds one after another into and out of a pulp tank at the bottom of the wheel carrier. With this arrangement, my invention preferably contemplates a delivery conveyor arranged immediately above the pulp tank and intermediately with respect to said pulp tank and the elevated position of each of a series of couches or complementary forms which cooperate respectively with the molds from the time they leave the pulp tank until they again enter said tank, said couches being separable from the molds while the latter are passing through the pulp tank and adapted to convey the dehydrated pulp articles from the molds to the delivery conveyor above referred to. In this connection, my invention further contemplates improved suction and compressed air connections whereby the molds and couches may be adapted to function in the manner alluded to.

Other and further objects of my invention reside in specific features of construction shown on the drawings and contemplated in the appended claims.

In the drawings which exemplify my invention in a preferred embodiment,

Figure 1 is a side elevation of the pulp-molding machine, parts being shown in section.

Figure 2 is a section on the broken line 2—2 of Figure 1, parts being broken away and parts shown in elevation.

Figure 3 is a vertical section on the broken line 3—3 of Figure 2, parts being broken away and parts shown in elevation.

Figure 4 is a vertical section on the line 4—4 of Figure 2, parts being broken away and parts shown in elevation.

Figure 5 is a perspective view of the pressure ring detached.

Figure 6 is an enlarged radial section of one pair of the pulp-shaping forms detached, parts being broken away and parts shown in elevation.

Figure 7 is an enlarged perspective view of one of the couches or pressure forms detached.

Figure 8 is a perspective view of the combined suction and blower box shown in the lower portion of Figure 6 with the screen omitted.

Figures 9, 10, 11, 12 and 13 are diagrammatic views of the cooperating forms in positions corresponding to radial lines 9, 10, 11, 12 and 13, of Figure 4.

According to the embodiment of my invention shown on the drawings, a bedplate 1 carries a pair of laterally spaced side frames 2 and 3. Bolted to and presented upwardly from the side frames 2 and 3 are laterally spaced half-circular frames 4 and 5 of annular form, said frames 4 and 5 being united at the top by a cross bar 6. Mounted upon the upper edges of the lower side frames 2 and 3 and within the semi-circular openings of the upper side frames 4 and 5, are axially spaced bearings 7 and 8 within which is journalled a carrying shaft 9. Keyed to one end of the shaft 9 adjacent to the bearing 8

is a large spur gear 10, said spur gear being driven by a spur pinion 11 which is keyed to a drive shaft 12, said drive shaft being journalled at its inner end in a bearing 13 mounted in the lower side frame 3 and at its outer end in a pedestal 14 which projects upwardly from the bedplate 1. A flywheel 15 is mounted on the drive shaft 12 and provided with a clutch 16 operated by a hand lever 17 which is pivoted at 18 on the bedplate 1. A hand wheel 19 which is keyed to the drive shaft 12 is adapted to turn the machine over for purposes of adjustment or inspection. Keyed to the carrying shaft 9 are the axially spaced elongated hub portions 20 and 21 of the circular plates 22 and 23 between which are mounted a circular series of coöpertating pairs of pulp-molding forms to be presently referred to. The circular plate 22 is of relatively larger diameter than the circular plate 23 and, as shown best in Figure 2 of the drawings, carries a plurality of laterally presented brackets or supports 24. Rigidly uniting the overhanging ends of the brackets or supports 24 is a circular ring 25. Presented inwardly from each of the bracket supports 24 is a suction and blower box 26 which, as shown in Figure 6, may be provided with a plurality of separate compartments for securing a proper distribution of the suction and pressure effects in respect to a pulp-molding form 27 which is represented on the drawings as a foraminous screen, said screen being adapted under suction applied through a port opening 28 in the suction and blower box 26 to collect and mold a layer of pulp during the passage of the pulp mold through a pulp bath or tank. For this purpose, a pulp tank 29 may be arranged to extend across the entire space between the lower side frames 2 and 3, said tank being supplied with pulp in any desired manner (not shown on the drawings) to maintain a suitable level to completely immerse the pulp mold during its passage therethrough by the rotation of the carrier disk 22. Cooperating with each of the foraminous screens 27 is a similarly formed foraminous screen 30 which is presented inwardly from the flanged outer edges of a couch or box 31 which is movable towards and away from the suction and blower box 26 for moving the screen 30 into and out of position to compress a layer of pulp which has been applied to the screen 27. The couch box 31 is slidably mounted in a couch head 32 under the cushioning effects of compression springs 33 which tend to press the couch 31 inwardly with respect to the couch head 32. Each of the couches 31 is provided with a tubular connection 34. As shown in Figure 7 of the drawings, each of the couch heads 32 is provided with oppositely presented slides 35, 35 which are adapted to reciprocably engage suitable guides 36, 36 mounted respectively upon the circular frames 22 and 23. Presented laterally from each of the slides 35, 35 is a stud 37 upon which is journalled a cam roller 38. As shown in Figure 2 of the drawings, the studs 37, 37 are presented through radial slots 39 in the circular plates 22 and 23 while the cam rollers 38 are arranged to travel in inwardly presented cam slots formed in two oppositely arranged cam bars 40, 40. Said cam bars extend completely around the shaft 9 and are bolted to the upper side frames 4 and 5 above said shaft and to the lower side frames 2 and 3 below said shaft. Extending completely around the shaft 9 and secured to the upper side frame 5 above said shaft and the lower side frame 3 below said shaft, is a channeled duct bar 41 (see Figure 2), said duct bar being provided with a suction channel 42 (see Figure 4), extending approximately from the section-line —11 in Figure 4 in a clockwise direction around the shaft 9 to the section-line —9 in Figure 4 and a compressed air section 43 extending approximately between the section-lines —10 and —11 in Figure 4. The inwardly presented openings of these ducts may be closed by a bronze ring 44 extending completely around the shaft 4, said bronze plate or ring being mounted upon the outer face of the circular plate 22 and provided with a port opening 45 in registry with the port opening 28 in each of the suction and pressure boxes 26 of the pulp molds. The suction duct 42 may be maintained under a partial vacuum by means of suction pipes 46, 47 and 48 while compressed air may be supplied to the compressed air duct 43 by means of a compressed air pipe 49. As shown in Figure 2, an inner duct bar 50 is bolted to the upper side frame 5 and lower side frame 3 and covered by an inner bronze ring 51 provided with suitable tubular connections 52 which may be connected by flexible hose sections 53 to the tubular connections 34 of the several couches 31. As shown in Figure 4, the duct bar 50 is provided with a compressed air channel 54 which extends in a clockwise direction around the shaft 9 from the section-line —12 to the section-line —9 of Figure 4 and a suction section 55 which extends approximately between the section-lines —10 and —11 of Figure 4.

Referring now to Figures 2 and 5 of the drawings, the circular plate 23 of the carrying wheel is provided with an outwardly presented circular boss 56 which slidably engages a friction ring 57 secured to the inner ends of a plurality of studs or rods 58. The outer end of each of the rods 58 is secured to a plate 59 intermediately of the ends of said plate, said plate 59 being adapted to impart an axial thrust to the rods 58 by means of paired tension springs 60 which are secured at opposite ends to the outer ends of the plates 59 and by screws 61 to corresponding points of the upper side frame 4 and lower side frame 2. The actual thrust thus imparted to the bearing ring 57 serves to retain the bronze rings 44 and 51 in close contact with the duct bars 41 and 50.

Referring more especially to Figures 2 and 4 in connection with the diagram shown in Figures 9 to 13 inclusive of the drawings, the operation of my improved pulp-molding machine will be understood. According to Figure 4, the rotation of the wheel is in a clockwise direction. As the pulp mold 27 passes from section-line —11 to section-line —13 of Figure 4, it passes through the pulp tank 29 and during such passage is connected up with the suction duct 42 and thus caused to accumulate a layer 62 of pulp as indicated in Figure 13. During this movement of the pulp mold through the pulp tank, the cam rollers 38 on the couch head 32 have passed over the point of nearest approach to the shaft 9 and thus caused the couch to be removed from the pulp mold. As the pulp mold leaves the pulp tank, the couch is moved downwardly until it is brought into position for compressing the pulp between the pulp mold and said couch. This position is reached shortly after the radial section-line —13 of Figure 4 is passed and during the travel of the pulp mold and couch from said

position until after these parts have passed the radial section-line —9 of Figure 4, the interposed pulp is maintained under pressure due to the compression springs 33 while at the same time compressed air is applied to one surface of the pulp while a sustained suction is maintained through the pulp mold on the other side of said pulp. It will be understood, therefore, that the pulp article is maintained under pressure while at the same time being subjected to the combined dehydrating effects of compressed air and suction from the time the pulp mold leaves the pulp tank until its near approach again to said tank preliminary to a new cycle of operations. The effect of this action is to remove a relatively large proportion of the water from the pulp article prior to its delivery to the drier. From an inspection of Figure 4, it will be seen that as the cam roller 38 leaves the section-line —10, the suction in the pulp mold 26 is replaced by a supply of compressed air while the compressed air supplied to the couch 31 is superseded by suction. This condition is indicated in Figure 10 with the result that the pulp article is loosened from the mold and gripped within the couch as indicated in Figure 11. As the cam roller 38 approaches the section-line 12, the suction in the couch is superseded by a renewed supply of compressed air which causes the downward displacement of the pulp article from the couch as indicated in Figure 12 onto a series of conveyor rolls 63 which, as shown in Figure 2 of the drawings, extend between the raised position of the couch and the upper edge of the pulp tank. It will be understood that by the recurring cycles of operation of this machine, the greater portion of each cycle is attended by an active dehydration of the molded pulp article under the combined effects of pressure, compressed air, and suction, while practically the entire movement of the carrying wheel is advantageously utilized for productive work. For these reasons, a considerable economy in the consumption of fuel for drying and power will result.

I claim:—

1. In a machine of the character described, the combination with a pulp tank, of a suction mold movable through an orbit into and out of said pulp tank, a pulp-compressing couch movable into position to compress the pulp in said mold as said suction mold leaves the pulp tank and out of said position as the suction mold approaches said pulp tank, means for supplying compressed air to said couch during its stay in pulp-compressing position with respect to said suction mold, means for momentarily applying suction to said couch during its movement away from said suction mold, for lifting the pulp article therefrom, means for momentarily supplying compressed air to said suction mold for separating the pulp article therefrom, means for supplying compressed air to said couch as it reaches a position above the pulp mold in submerged position, and a conveyor extending between said couch and mold in the submerged position of the latter.

2. In a machine of the character described, the combination with a pulp tank and a conveyor disposed above said pulp tank, of a pulp mold movable through a closed orbit into and out of said pulp tank, a couch movable into position to compress the pulp in the mold as said mold leaves the pulp tank and out of said position as the mold again approaches said pulp tank, said couch being thereby moved to a position above said conveyor, means for placing said pulp mold under suction during its passage through the pulp tank and while it is travelling from and to said pulp tank, means for supplying compressed air to said couch while it is in pulp-compressing relation to said pulp mold, means for supplying compressed air momentarily to said mold as it approaches said pulp tank, means for momentarily subjecting said couch to suction as it moves away from said pulp mold whereby said couch is adapted to lift the pulp article from the mold, and means for supplying compressed air to said couch when above said conveyor to eject the article of pulp therefrom onto said conveyor.

3. In a machine for forming articles of pulp, the combination with a pulp tank for supplying pulp to successive pulp-shaping molds passed therethrough, of a supporting wheel rotatable about a horizontal axis arranged over said pulp tank, pulp-shaping molds mounted on the periphery of said supporting wheel, said pulp-shaping molds being constructed and arranged to be successively submerged in pulp in the pulp tank by the rotation of said supporting wheel, a couch movable radially on said supporting wheel into and out of pulp-compressing position with respect to each of said pulp-shaping molds, each of said pulp-shaping molds and couches being provided with a combined compressed air and suction chamber, means for moving said couch into pulp-compressing position with respect to said mold as the latter emerges from the pulp in said pulp tank and for maintaining it in said position until shortly before the mold is again immersed in said pulp tank, means constructed and arranged for maintaining said mold under suction from the time it is submerged in pulp until shortly before its next submergence therein, means constructed and arranged for supplying compressed air to said couch from the time it is moved into pulp-compressing position with respect to said mold until shortly before the next submergence of said mold in pulp, said couch-moving means being constructed and arranged to maintain the couch in pulp-compressing position throughout a relatively longer portion of a complete rotation of said supporting wheel and to move said couch out of and into said position during a relatively shorter portion of the supporting wheel's rotation including the submergence of the mold in pulp, and means for removing the pulp article from said couch during the period of separation of the couch from said mold.

4. In a machine for forming articles of pulp, the combination with a pulp tank for supplying pulp to successive pulp-shaping molds passed therethrough, of a supporting wheel rotatable about a horizontal axis arranged over said pulp tank, a pulp-shaping mold mounted on the periphery of said supporting wheel, said pulp-shaping mold being movable through the pulp tank by the rotation of said supporting wheel, a couch movable radially on said supporting wheel into and out of pulp-compressing position with respect to said pulp-shaping mold, said pulp-shaping mold and said couch being each provided with a combined compressed air and suction chamber, means for moving said couch into pulp-compressing position with respect to said mold as the latter moves away from said pulp tank and out of said position as the mold approaches said pulp tank, concentric series of compressed air and suction ducts extending around the axis of said supporting wheel, said series of ducts being arranged for connection with said mold and couch respectively, means controlled by the rotation of said

supporting wheel for connecting the mold and couch with compressed air ducts of their respective series as the mold leaves the pulp tank, means for disconnecting said couch from said compressed air duct as said mold approaches said pulp tank and connecting it to a suction duct, and means for disconnecting said mold from its compressed air duct and connecting said mold to a suction duct after the separation of the couch therefrom.

5. In a machine for forming articles of pulp, the combination with a pulp tank for supplying pulp to successive pulp-shaping molds passed therethrough, of a rotary supporting wheel arranged over said pulp tank, a plurality of pulp-shaping molds mounted on and spaced around the periphery of said supporting wheel, yieldably mounted couches movable radially on said supporting wheel into and out of pulp-compressing positions with respect to said pulp-shaping molds, each of said pulp-shaping molds and couches being provided with a combined compressed air and suction chamber, a cam track extending around the rotary axis of said supporting wheel for moving said couches towards and away from said pulp-shaping mold, a source of compressed air, suction means, means for connecting each of the molds to said suction means while the mold is passing through said pulp tank, said couch being moved into pulp compressing position with respect to said mold as the latter leaves said pulp tank, means for connecting said compressed air source to said couch during its movement away from said pulp tank and around the rotary axis of said wheel back to said pulp tank, said couch being displaced from said mold as it approaches said pulp tank, means for momentarily connecting the compressed air source to said mold while connecting the suction means to said couch during the separation of said couch from the mold, a conveyor for the pulp articles extending between the couch and mold in separated positions, and means for breaking the suction on said couch and connecting it to said compressed air source for discharging the pulp article onto said conveyor.

6. In a machine for forming articles of pulp, the combination with a rotary supporting wheel, of a plurality of pulp molds presented radially inward around the periphery of said supporting wheel, each of said pulp molds being provided with a compressed air and suction chamber, a circular frame concentrically arranged with respect to said supporting wheel, said circular frame being provided with open annular compressed air and suction ducts arranged in circular series around the axis of said wheel, a circular bearing plate mounted on said wheel and forming a slidable closure for said annular compressed air and suction ducts, said circular bearing plate being provided with port openings connected to said compressed air and suction chambers of the respective molds, a pulp tank arranged at the bottom of said wheel for supplying pulp to successive molds passed therethrough by the rotation of said supporting wheel, couches movable radially into position for compressing the pulp articles in said molds as they leave the pulp tank and out of said position as they approach said pulp tank after passing around the rotary axis of said supporting wheel, means for supplying compressed air to said couches throughout their travel in pulp compressing position, and means for delivering the articles of pulp from said couches.

7. In a machine for forming articles of pulp, the combination with a rotary supporting wheel, of a plurality of pulp molds presented radially inward from peripherally spaced supports around the periphery of said supporting wheel, each of said pulp molds being provided with a compressed air and suction chamber, a circular frame concentrically arranged with respect to said supporting wheel, said circular frame being provided with open annular compressed air and suction ducts arranged in circular alinement around the axis of said wheel, a circular bearing plate mounted on said wheel and forming a slidable closure for said annular compressed air and suction ducts, said circular bearing plate being provided with port openings connected respectively to said compressed air and suction chambers, a pulp tank arranged at the bottom of said wheel for supplying pulp to successive molds passed therethrough by the rotation of said supporting wheel, couches reciprocable radially towards and away from the vacuum molds for compressing the pulp articles, a second series of arcuate compresed air and suction ducts arranged around the rotary axis of said rotary supporting wheel, a bearing plate covering the last-mentioned compressed air and suction ducts and provided with port openings connected respectively to said couches, a cam track extending around said rotary axis, said couches being provided with cam rolls operating on said cam track for raising said couches as they pass said pulp tank, and a conveyor for receiving the articles of pulp from said couches in raised position.

8. In a machine for forming articles of pulp, the combination with a rotary supporting wheel, of a plurality of peripherally spaced supports mounted on said supporting wheel, pulp-shaping molds presented radially inward from said peripherally spaced supports, each of said pulp-shaping molds being provided with a combined compressed air and suction chamber, a circular frame concentrically arranged with respect to said supporting wheel, said circular frame being provided with open annular compresed air and suction ducts arranged in circular series around the axis of said wheel, a circular bearing plate mounted on said supporting wheel and forming a slidable closure for said compressed air and suction ducts, said circular bearing plate being provided with port openings connected respectively to said compressed air and suction chambers of the pulp-shaping molds, a pulp tank arranged adjacent to the periphery and at the bottom of said supporting wheel, the rotation of said supporting wheel being adapted to pass the pulp-shaping molds one after the other through said pulp tank, couches reciprocable radially into and out of pulp-compressing positions with respect to said pulp-shaping molds respectively, said circular frame being provided with a second series of open arcuate compressed air and suction ducts, a bearing plate carried by said rotary supporting wheel for covering the last-mentioned compressed air and suction ducts, the last-mentioned bearing plate being provided with port openings connected respectively to said couches, a cam track extending around the rotary axis of said supporting wheel for moving said couches toward and away from said pulp-shaping molds, and a conveyor for receiving the articles of pulp from said couches when displaced from said pulp-shaping molds.

9. In a pulp-molding machine, the combination with a pulp mold revolvable about a horizontal axis into and out of a body of pulp, of a couch

movable into closed relation to said pulp mold at the termination of its period of submergence and out of closed relation therewith at the commencement of said period of submergence, means for maintaining said pulp mold continuously under suction from the commencement of its submergence to the beginning of the movement of said couch away from said pulp mold, means for continuously supplying compressed air to said couch during the interval between maximum submergence of the pulp mold and the commencement of separation between said couch and pulp mold, means for supplying compressed air to said mold during the movement of said couch from said mold, means for maintaining the couch under suction during its movement away from said mold, and means extending between said mold and couch at the point of maximum submergence of the pulp mold for conveying off the finished product.

10. In a pulp-molding machine, the combination with a pulp mold revolvable about a horizontal axis into and out of a body of pulp, of a couch movable into closed relation to said pulp mold at the termination of its period of submergence and out of closed relation therewith at the commencement of said period of submergence, means for maintaining said pulp mold continuously under suction from the commencement of its submergence to the beginning of the movement of said couch away from said pulp mold, means operating during the revolution of said mold for continuously supplying compressed air to said couch during the interval between maximum submergence of the pulp mold and the commencement of separation between said couch and pulp mold, means for supplying compressed air to said mold during the movement of said couch from said mold, the continued movement of said pulp mold about its axis of revolution being adapted to disconnect the pulp mold from the last-mentioned means for supplying compressed air thereto and to reconnect it to the first-mentioned means for maintaining said pulp mold under suction, means for maintaining the couch under suction during its movement away from said mold, the continued movement of said couch about its axis of revolution being adapted to disconnect it from the last-mentioned means for maintaining said couch under suction and to connect it to said means for supplying compressed air thereto, and means extending between said mold and couch at the point of maximum submergence of the pulp mold for conveying off the finished product.

11. In a pulp-molding machine, the combination with a rotary supporting wheel, of a pulp mold revolvable thereby into and out of a body of pulp, of a couch movable on said supporting wheel into closed relation to said pulp mold at the termination of its period of submergence and out of closed relation therewith at the commencement of said period of submergence, a series of pulp-mold suction and compressed air ducts extending around the rotary axis of said supporting wheel, means for connecting said pulp mold continuously with said suction duct from the commencement of submergence of said pulp mold to the beginning of the movement of said couch from said pulp mold, a series of couch compressed air and suction ducts extending around the axis of said supporting wheel, means for continuously connecting said couch with said compressed air duct during the interval between maximum submergence of the pulp mold and the commencement of separation between said couch and pulp mold, means for connecting said pulp mold to its compressed air duct during the movement of said couch movement from said pulp mold, means for connecting said couch to its suction duct during its movement away from said pulp mold, and means extending between said mold and couch at the point of maximum submergence of the pulp mold for conveying off the finished product.

12. In a pulp-molding machine, the combination with a pulp mold revolvable about a horizontal axis into and out of a body of pulp, of a couch movable into closed relation to said pulp mold at the termination of its period of submergence and out of closed relation therewith at the commencement of said period of submergence, a relatively longer suction duct and a relatively shorter compressed air duct for said pulp mold extending around said axis, a relatively longer compressed air duct and a relatively shorter suction duct for said couch extending around said axis, means for successively connecting said pulp mold to said pulp-mold suction and compressed air ducts during the continued movement of said pulp mold about said axis, means for successively connecting said couch with said couch compressed air and suction ducts during the continued movement of said couch about said axis, means for moving said couch into pulp-compressing position with respect to said pulp mold as the latter emerges from the body of pulp and out of said position as the pulp mold passes into the body of pulp, and means extending between said mold and couch at the point of maximum submergence of the pulp mold for conveying off the finished product.

13. In a pulp-molding machine, the combination with a pulp mold revolvable about a horizontal axis into and out of a body of pulp, of a couch movable into closed relation to said pulp mold at the termination of its period of submergence and out of closed relation therewith at the commencement of said period of submergence, means for maintaining said pulp mold continuously under suction from the commencement of its submergence to the beginning of the movement of said couch away from said pulp mold, means for continuously supplying compressed air to said couch during the interval between maximum submergence of the pulp mold and the commencement of separation between said couch and pulp mold, means for supplying compressed air to said mold during the last-mentioned couch movement, the continued movement of said pulp mold about its axis of revolution being adapted to disconnect it from the last-mentioned means for supplying compressed air and to reconnect it to the first-mentioned means for maintaining said pulp mold under suction, means for maintaining the couch under suction during its movement away from said mold, the continued movement of said couch about its axis of revolution being adapted to disconnect it from the last-mentioned means for maintaining said couch under suction and to connect it to said means for supplying compressed air thereto prior to its arrival above the point of maximum submergence of said pulp mold, and means extending between said mold and couch at the point of maximum submergence of the pulp mold for conveying off the finished product.

14. In a pulp-molding machine, the combination with a pulp mold revolvable about an axis into and out of a body of pulp, of a couch movable

into closed relation to said pulp mold at the termination of its period of submergence and out of closed relation therewith at the commencement of the next period of submergence, means for continuously retaining the couch in closed relation to said pulp mold from the time it is moved into closed relation thereto until the time it is moved out of closed relation thereto, means for maintaining said pulp mold continuously under suction throughout the period during which said couch remains in closed relation to said pulp mold, and means for continuously supplying compressed air to said couch throughout said period.

15. In a pulp-molding machine, the combination with a pulp mold member revolvable about a horizontal axis into and out of a body of pulp, of a couch member movable into and out of closed relation to said pulp mold member, means for moving said couch into and out of closed relation to said pulp mold member respectively at the end of one period of submergence and at the beginning of the next period of submergence, said means being constructed and arranged to maintain said couch member in closed relation to the pulp mold member throughout the travel of the latter from the end of one period of submergence to the beginning of the next period of submergence, and means for simultaneously and continuously applying suction and compressed air to said members respectively throughout the period of travel in closed relation.

16. In a pulp-molding machine, the combination with a pulp mold revolvable about a horizontal axis into and out of a body of pulp, of a couch movable into and out of closed relation to said pulp mold, means for moving said couch into closed relation with the ascending pulp mold below the horizontal plane through said axis and out of closed relation therewith during its descent below said plane, said means being constructed and arranged to maintain said couch in closed relation to said pulp mold during the intervening movement of ascent and descent, and means for continuously maintaining said pulp mold and couch under suction and compressed air from opposite sides of the molded pulp article during the interval of travel of said parts between the movements of said couch into and out of closed relation to said pulp mold.

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