No. 668,943. Patented Feb. 26, 1901.

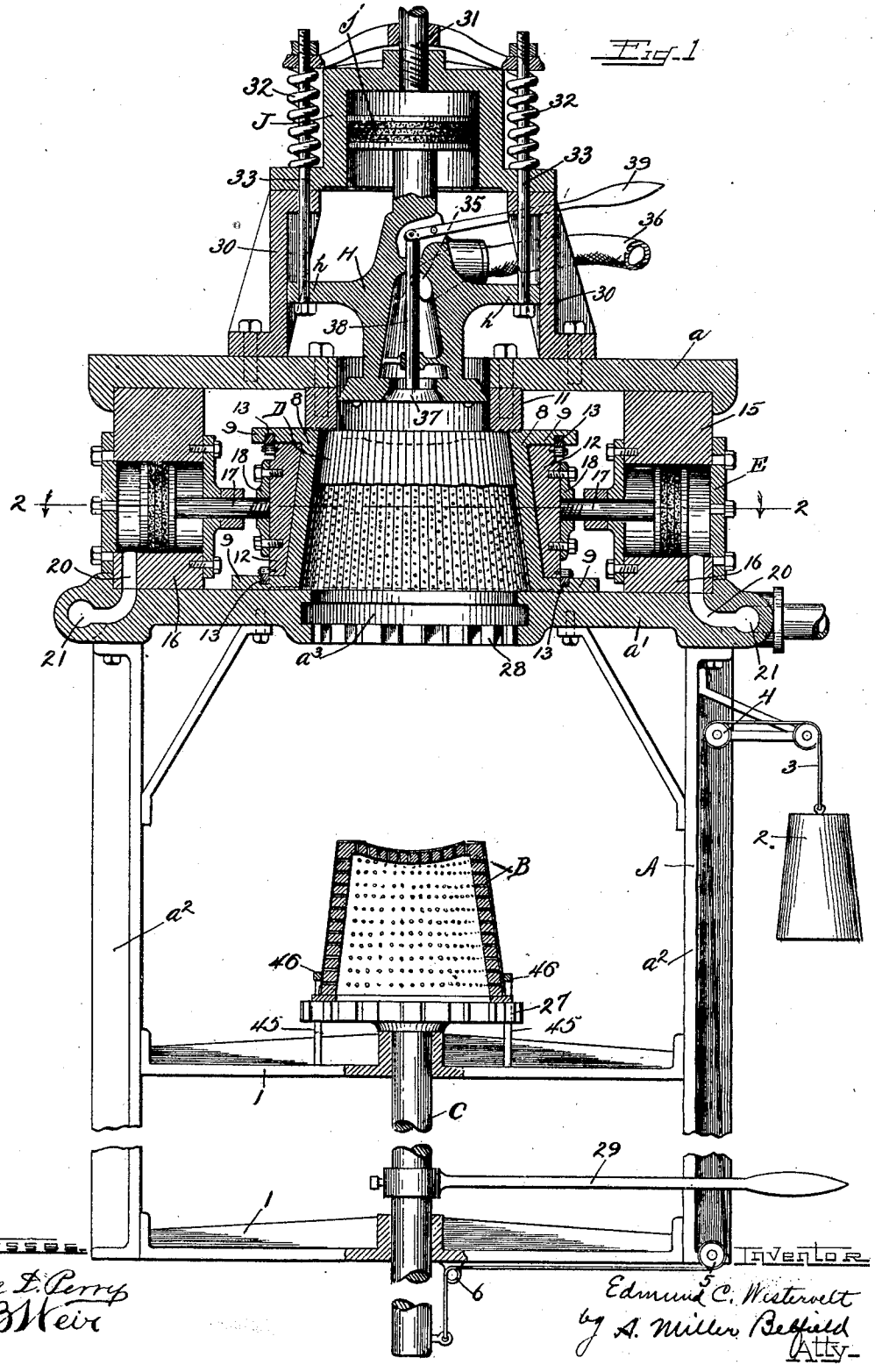
E. C. WESTERVELT.

MACHINE FOR MAKING PAPER PAILS.

(Application filed Jan. 27, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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3 Sheets—Sheet 2.

Fig. 2.

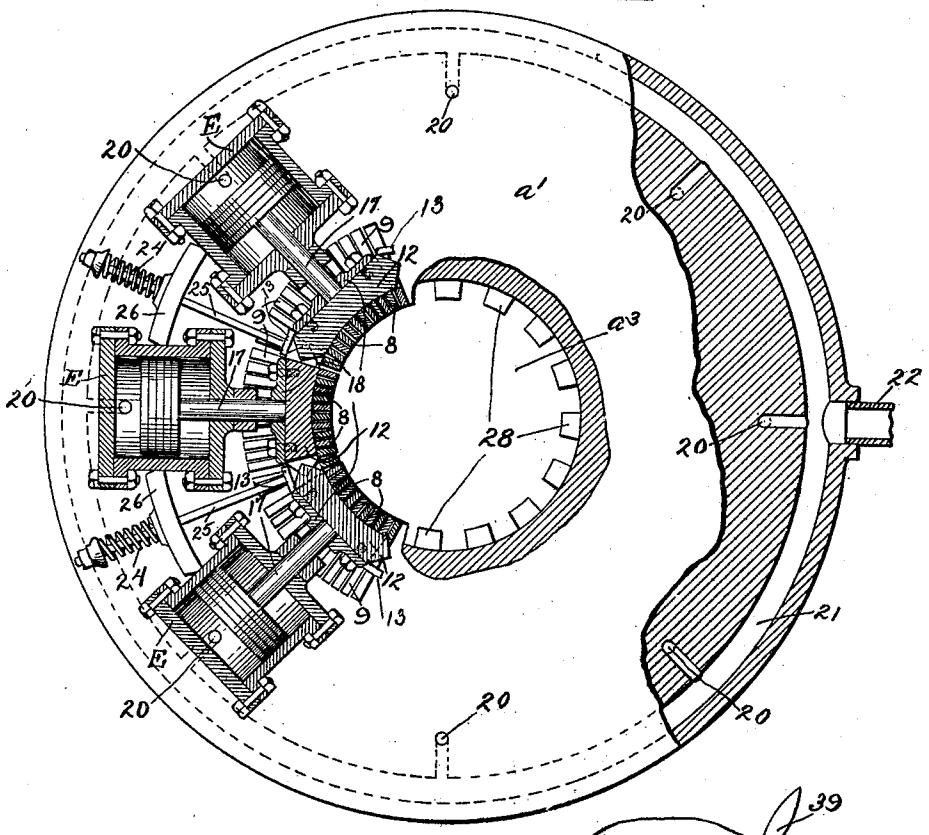


Fig. 3.

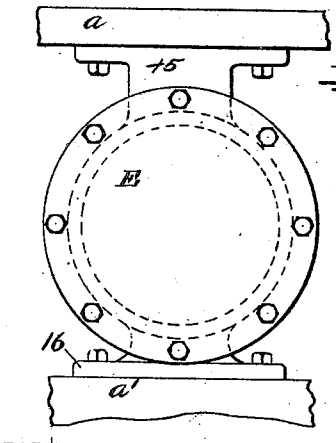
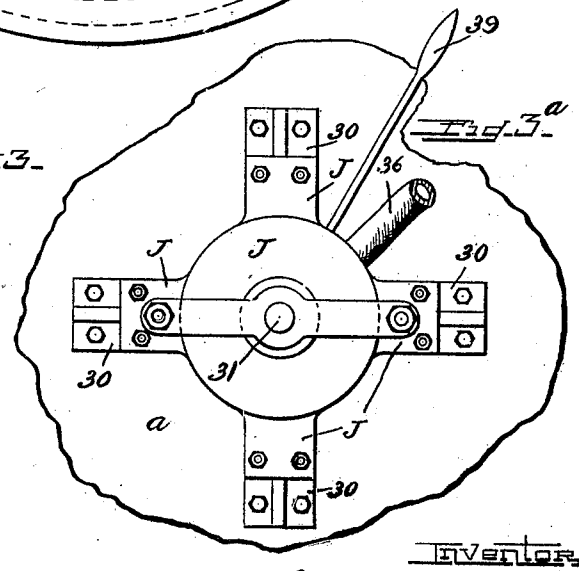


Fig. 3a.



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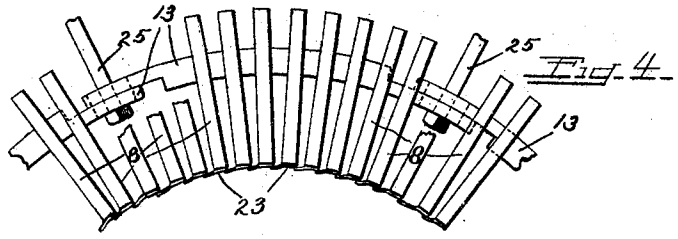


Fig. 4.

Fig. 5.

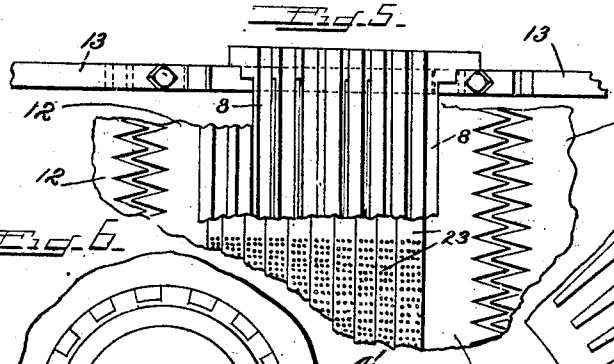


Fig. 6.

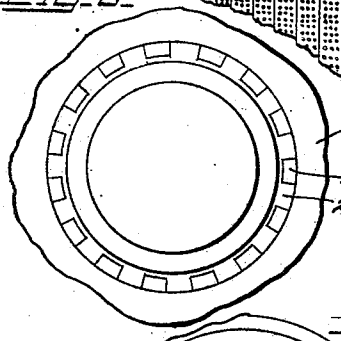


Fig. 7.

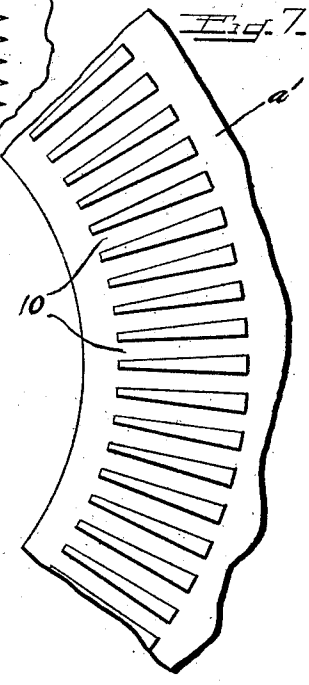


Fig. 8.

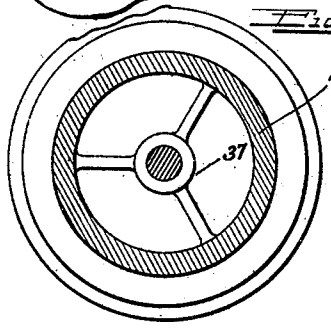
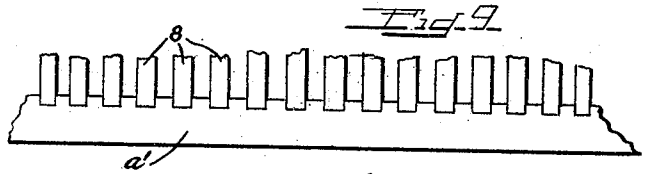


Fig. 9.



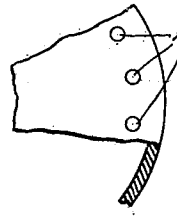


Fig. 10.

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UNITED STATES PATENT OFFICE.

EDMUND C. WESTERVELT, OF SOUTH BEND, INDIANA.

MACHINE FOR MAKING PAPER PAILS.

SPECIFICATION forming part of Letters Patent No. 668,943, dated February 26, 1901.

Application filed January 27, 1900. Serial No. 3,000. (No model.)

To all whom it may concern:

Be it known that I, EDMUND C. WESTERVELT, a citizen of the United States of America, and a resident of South Bend, county of St. Joseph, and State of Indiana, have invented certain new and useful Improvements in Machines for Making Paper Pails, of which the following is a specification.

My invention relates in general to machines for making or forming articles, such as pails, out of plastic material, such as paper or wood pulp; and it relates in particular to machines such as are set forth in my Patents No. 430,905, of June 24, 1890, and No. 613,541, of November 1, 1898. In machines of this class the pulp or like plastic material is admitted to a pulp chamber or mold containing a former whose exterior configuration corresponds to the interior configuration of the article to be made and is then compressed against this former by the inward movement or contraction of the walls of the pulp chamber or mold, which for such purpose are made inwardly movable or contractible. In the case of machines for making pails the walls of the pulp chamber or mold consist of a contractible annular wall surrounding an annular side-defining surface of the former and an inwardly-movable plunger arranged opposite the flat or substantially flat bottom-defining surface of the same.

The objects of the present invention are to provide a simple, practical, and highly efficient and effective construction of machines of this kind and to make certain improvements in the machines set forth in my said patents.

To the attainment of the foregoing and other desired ends my invention consists in matters hereinafter set forth.

In the accompanying drawings, Figure 1 is a vertical section of a paper-pail machine embodying my invention. Fig. 2 is a horizontal section taken on line 2 2 in Fig. 1. Fig. 3 is a side elevation of a portion of the machine. Fig. 3^a is a top plan of the central part of the machine. Figs. 4, 5, 6, 7, 8, and 9 are views of details of construction, and Fig. 10 is a perspective view of a portion of a pail made by the machine.

The machine shown in the drawings is provided with a framework A, consisting, essentially, of upper and lower horizontal plates a and a' and four legs a^2, supporting these plates.

The former B, whose exterior configuration is of the configuration of the article to be made, in this case a pail, consists of a hollow metallic structure, preferably brass. It is perforated and surrounded by wire-gauze, which is in turn covered with coarse muslin. By this construction the water from the pulp can readily flow through the walls of the former when the pulp is being compressed, while at the same time the structure is sufficiently strong to easily resist the pressure of compression. The former is carried by a vertically-arranged shaft C, which works in bearings formed in cross-bars 1 1, connecting the opposite legs a^2 a^2. By such arrangement the former can be elevated and lowered. The former and the shaft C are counterbalanced by a weight 2 and a cord 3, passing over pulleys 4, 5, and 6 on the frame A and connected to the shaft C, in which way the former will be balanced in any position to which it may be adjusted.

When a pail is to be made, the former B is elevated an extent to cause it to pass through a circular aperture a^3 in the lower plate a' and to come into position in the interior of the pulp-chamber D. This pulp-chamber D is formed by a series of staves 8 8, which are arranged in annular form and which converge upwardly, so as to form an upwardly-converging annular wall surrounding the former B and forming an annular space for the pulp between the same and itself. The staves 8 8 are arranged for simultaneous and corresponding forward movement, so that when the space between them and the former is filled with pulp they can be moved inwardly, so as to contract the annular wall formed by them, and thereby compress the pulp against the former. To such end the staves 8 8 are provided with laterally-disposed extensions 9 9 at their opposite ends, and these extensions 9 9 work in guideways or channels 10 10, formed in the lower plate a' and in the lower edge of a ring 11, which is secured to the upper plate a. The staves 8 8 are moved inwardly by a set of followers 12 12, each consisting of an annular section fitted in the rear of the plurality of staves 8

8, between the upper and lower extensions thereon. In the machine I have illustrated in the drawings, for example, there are eighty-eight staves 8 8 and eight followers 12 12, eleven staves being allotted to each follower. The ends of the followers 12 12 are serrated, as shown in Fig. 5, so that when they move inwardly to press the staves inwardly the serrated portions can come together and fit within one another. An outward movement of the followers 12 12 operates to withdraw the staves 8 8 by means of a ring-section 13 13, secured to the follower and arranged to work in grooves formed in the lateral extensions 9 9 thereof. The ring-sections 13 13 have their ends reduced in size, so as to overlap and slide upon each other when they move inwardly. (See Fig. 4.) It will be seen that by this arrangement of a large number of staves and a set of followers each operating the staves positively in both directions a number of advantageous results are secured. The action upon the pulp is more uniform and more easily controlled, and at the same time there is less sidewise movement of the staves.

The followers 12 12 are operated by hydraulic cylinders E E, arranged in radial position outside of the respective followers. Each of these cylinders is conveniently supported by castings 15 and 16, respectively secured to the upper and lower plates *a* and *a'*.

The piston-rods 17 17 of the cylinders E E are secured to the followers 12 12 by blocks 18 18, bolted to the followers and threaded, so that the rods 17 17 can be screwed into them.

Water is admitted into the cylinders E E by individual ports 20 20, leading from an annular port 21, formed in the lower frame-plate *a'*. Water is supplied to this port 21 by a suitable pipe 22.

The staves 8 8 and followers 12 12 are automatically withdrawn by springs 24 24, surrounding rods 25 25, which have their inner ends extending through and engaging the ring-sections 13 13, as shown in Fig. 2, and which are engaged by stationary rods 26 26, secured to the cylinders E E.

The interior edges of the staves 8 8 are desirably provided with laterally-extending flaps 23 23, which extend across the intervening space and partially overlap the adjacent stave edges. These flaps 23 23 are conveniently made of sheet-brass and are desirably perforated about two-thirds of the way up from their lower ends, as shown in Fig. 5. The perforations in the lower portions allow the water oozing from the pulp to flow out, while the solidity of the upper portions provides for the taking up of the excessive pressure which is found to exist at the upper portion of the form.

The former B is locked into position in the pulp-chamber by a suitable locking device, a convenient arrangement consisting of a toothed wheel 27 on the shaft C and a corresponding toothed ring 28, formed in the lower frame-plate *a'*. After the shaft C has been raised to place the former B in position it is turned slightly by a handle 29, so as to spring the teeth of the wheel 27 out of register with the corresponding recesses in the ring 28.

The pulp is compressed against the flat or substantially flat upper surface of the former B by a reciprocating plunger H, which is arranged to reciprocate through the ring 11 and a circular aperture in the plate *a*. The plunger H works in guideways 30 30, which are supported upon the upper frame-plate *a*. It will be understood that these guideways 30 30 are provided by four legs arranged ninety degrees apart from one another and secured to the circular plate *a* by bolts. It is operated in a downward direction to cause the compression of the pulp by a hydraulic cylinder J, whose piston *j* is secured to the upper end of the plunger H. Water is admitted into the cylinder J by a suitable inlet-pipe 31.

The plunger H is retracted by coil-springs 32 32, surrounding rods 33 33, which have their lower ends attached to projections *h h* on the plunger H.

It will be understood that water is admitted simultaneously into the radially-arranged cylinders E E and the vertically-arranged cylinder J, so that the compression of the pulp forming the sides and bottom of the pail occurs simultaneously.

Pulp is admitted into the pulp-chamber by way of a port 35, formed in the plunger H and connected with a flexible pulp-inlet 36. The lower end of the port 35 is provided with a valve 37, which when closed forms a portion of the surface of the plunger. This valve 37 is provided with a valve-stem 38, which is in turn provided with a handle 39, by which it can be operated by hand. When it is desired to admit pulp into the pulp-chamber, the valve 37 is opened by properly operating the handle 39; but when a sufficient amount of pulp has been admitted the handle 39 is released and the upward movement of the plunger automatically closes the valve 37.

The lower surface of the plunger H is desirably provided with globular projections 40 40, arranged in annular series near the outer edge of the plunger, as a result of which the bottom of the pail has an annular series of globular indentations 41 41, as shown in Fig. 10. The indentations allow the fingers of the person holding the pail to maintain a grip on the bottom thereof when emptying it.

After the pail has been formed by the proper compression of the pulp upon the former the latter is unlocked and lowered to the position shown in the drawings and the pail removed, the lowering of the shaft C being permitted to an extent to allow the removal of the pail from the former without hindrance from the overlying portion of the machine.

The upper cross-bar 1 is provided with a

couple of pins 45 45, which pass through spaces between the teeth of the wheel 27 when this wheel is lowered. Upon passing through these spaces the pins 45 45 act upon a ring 46, placed loosely upon the wheel 27 outside of the former B. As a result the pail is lifted slightly from the former, so that it can be subsequently easily removed by hand without inconvenience or having to pry below its edges.

From the foregoing it will be seen that my invention provides a simple and practical machine whose compressive action upon the pulp is exceedingly efficient, effective, and intense.

What I claim as my invention is—

1. The combination with a series of staves arranged in annular form; of a set of followers, to each of which a plurality of the staves is allotted; connections between the followers and the staves allotted thereto, whereby the inward and outward movement of the followers will cause an inward and outward movement of the staves respectively alloted thereto, and at the same time will allow the staves to move toward one another, as required by their inward movement; and means for simultaneously actuating all of the followers.

2. The combination with an annular series of staves, each provided with rearwardly-extending lateral extensions having annular grooves; guideways arranged above and below said staves and adapted to receive the lateral extensions thereof; a set of followers, each arranged in the rear of a plurality of the staves, and fitted between the lateral extensions thereof; ring-sections secured to the upper and lower edges of the followers, and arranged to work in grooves formed in the extensions on the staves; and a number of cylinders corresponding to the number of followers, and having piston-rods which are secured respectively to the followers.

3. The combination with the contractible annular wall; of a plurality of cylinders, connections between the same and the wall, whereby the operation of the cylinders contracts the wall; and a support for said cylinders, having an annular inlet-port and individual ports extending therefrom to the separate cylinders.

4. In a machine of the class specified, the staves for compressing the pulp; said staves, being provided with laterally-extending flaps, whose upper portions are unperforated, and whose lower portions are perforated.

5. A machine for making articles out of pulp, comprising a vertically-arranged cylinder having its piston connected with a plunger; a port for the pulp in the plunger; a valve for closing the port provided with an upwardly-extending valve-stem, which passes out of the pulp-port, and into a recess which is formed in the plunger above such port; a handle connected with the upper end of the valve-stem; a contractible wall for the pulp-chamber comprising a plurality of staves provided with lateral extensions; upper and lower frame-plates arranged above and below the staves, the latter being provided with ways for the lower stave extensions; a ring interposed between the upper frame-plate and the upper ends of the staves, and provided with ways for the lateral extensions on such ends; followers to each of which a plurality of the staves is allotted, each of said followers being arranged to back substantially all of the staves allotted to it; cylinders having their piston-rods connected with said followers; springs for retracting the followers; and a former arranged for insertion into and withdrawal from the pulp-chamber.

Signed by me at South Bend, Indiana, this 24th day of January, 1900.

EDMUND C. WESTERVELT.

Witnesses:
A. MILLER BELFIELD,
I. E. MELDRUM.