No. 654,603. Patented July 31, 1900.

W. BURKE & W. H. THOMPSON.

APPARATUS FOR MAKING HOLLOW WARE FROM PULP.

(Application filed Nov. 20, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

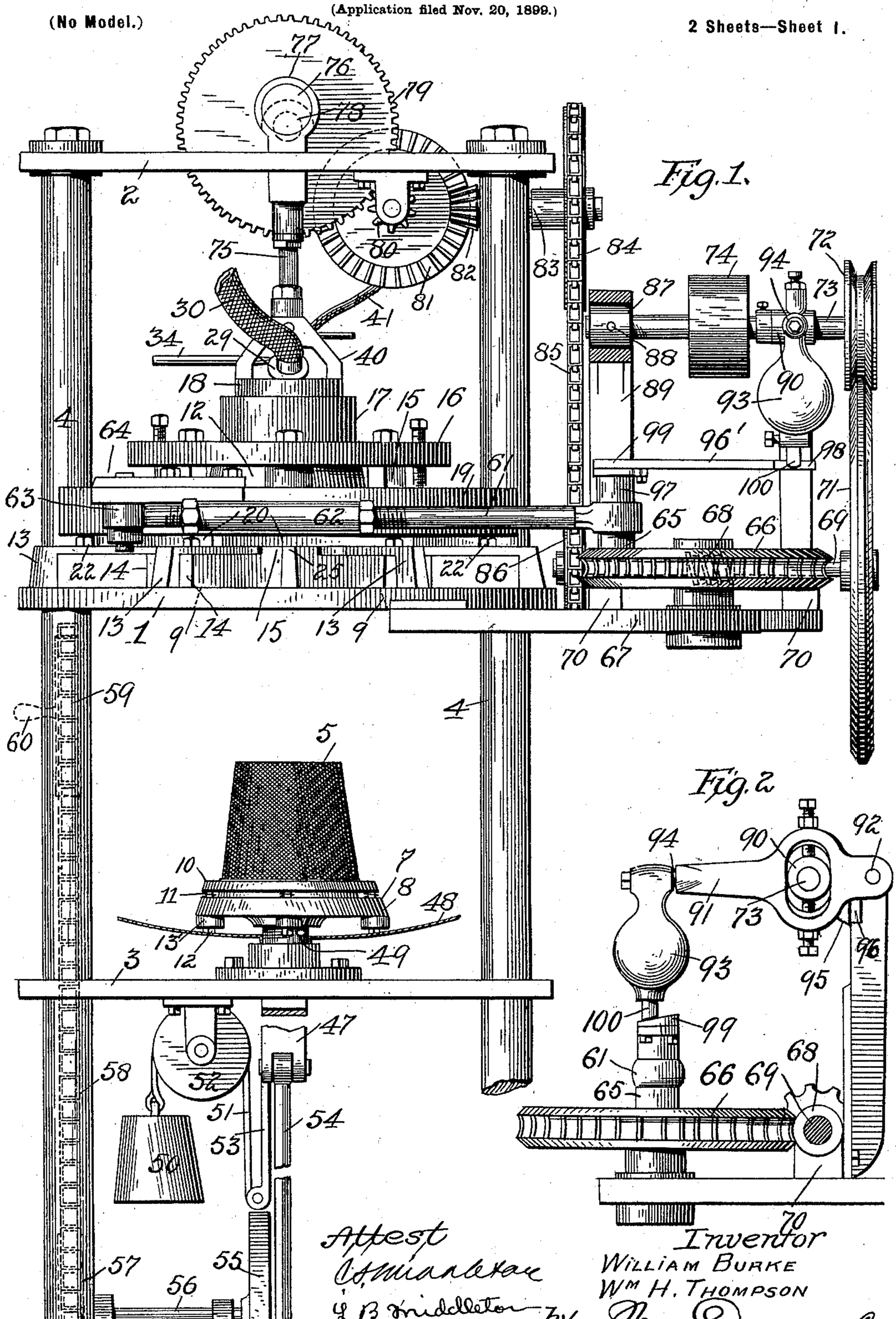

Fig. 2.

Attest
C. Middleton
L. B. Middleton

Inventor
William Burke
Wm H. Thompson
by Miller Donaldson & Co Attys

No. 654,603. Patented July 31, 1900.

W. BURKE & W. H. THOMPSON.

APPARATUS FOR MAKING HOLLOW WARE FROM PULP.

(Application filed Nov. 20, 1899.)

(No Model.) 2 Sheets—Sheet 2.

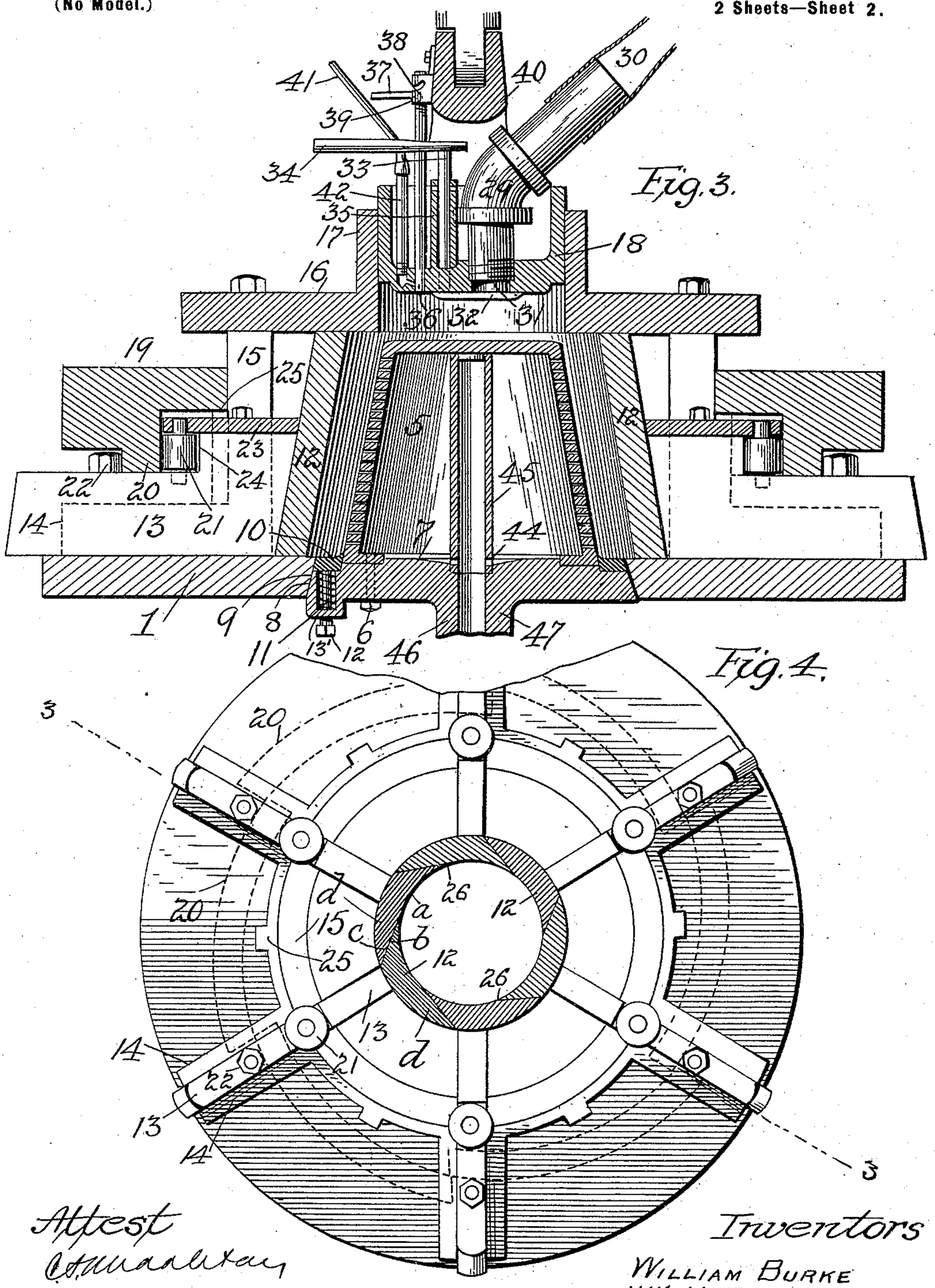

Fig. 3.

Fig. 4.

Attest
C. Middleton
L. B. Middleton

Inventors
WILLIAM BURKE
WM H. THOMPSON
By Miller Thompson & Co
Attys

UNITED STATES PATENT OFFICE.

WILLIAM BURKE AND WILLIAM HENRY THOMPSON, OF EAST STROUDSBURG, PENNSYLVANIA.

APPARATUS FOR MAKING HOLLOW WARE FROM PULP.

SPECIFICATION forming part of Letters Patent No. 654,603, dated July 31, 1900.

Application filed November 20, 1899. Serial No. 737,623. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM BURKE and WILLIAM HENRY THOMPSON, citizens of the United States, residing at East Stroudsburg, Monroe county, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Making Hollow Ware from Pulp, of which the following is a specification.

Our invention relates to machines for making hollow ware, such as pails or jars, from wood-pulp, paper-pulp, or other like material.

Our improvements consist, among other features, in the combination, with the pressing elements for forming the article, of an air-valve for introducing air between the said elements and the article formed, so that the retraction of the elements after the pail or other article is formed will not rupture the sides or bottom thereof.

Another feature of improvement consists in the arrangement of the supply for the paper-pulp in connection with a turning-disk cut-off valve for controlling the same.

A further feature of improvement consists in a spring-ring surrounding the former at its lower end and arranged to be pressed down when the former is in position for molding and to be raised along the sides of the former when it is withdrawn from the compressing elements, said ring then acting to loosen the formed article from the sides of the former to permit its ready removal.

Other features of improvement reside in the general arrangement of parts and in the means for driving the machine.

In the drawings, Figure 1 is a front view of the machine. Fig. 2 is a side elevation of part of the driving and stop-motion mechanism. Fig. 3 is a sectional view showing the form, the press elements, and the valve, said section being taken on line 3 3 of Fig. 4. Fig. 4 is a plan view showing the pressing-jaws in section, some of the parts being omitted.

The main frame of the machine comprises the table 1, an upper plate 2, and a base-plate 3, said parts being connected and supported by standards 4.

The former 5, upon which the article is pressed and formed, consists of a hollow shell in the shape of a frustum of a cone and adapted to the tapered shape of the bucket or pail. The shell is attached by bolts or screws 6 to a head 7, having a beveled edge 8, which fits an opening 9 in the table 1, said opening tapering upwardly. The head 7 is of greater diameter than the lower end of the form, so that it provides a rim extending circumferentially about the lower end of the form. A ring 10 is arranged above this rim and is pressed upwardly, as shown in Fig. 1, by means of spring 11, surrounding bolts 12 and extending through the head 7 to rest upon the bottoms of hollow bosses 13′ on the said head. When the former is up in the position shown in Fig. 3, the ring engaging the wall of the tapered opening in the table 1 is pressed downwardly upon the rim of the head 7, so that its upper face is flush with the upper surface of the table.

The jaws 12 for pressing the pulp about the former are carried upon stems 13, which move between guide walls or flanges 14, cast with the table 1. These guide-walls at their inner ends are continued upwardly, forming posts or standards 15, and these at their upper ends support a cap-plate 16, having a central cylindrical portion 17, in which the plunger 18 reciprocates, said plunger being adapted to form the bottom of the pail or other article. The pressing-jaws extend in inclined position from the table 1 to the cap-plate 16, and they move toward and from the former between these two parts—namely, the cap-plate and table—moving along the lower and upper surfaces, respectively, thereof. The pressing-jaws are moved toward and from the former by means of the cam-rim 19, having a plurality of cam-ribs 20 (shown in dotted lines in Fig. 4) working between antifriction-rollers 21 and bolt-heads 22 on the stems 13 of the pressing-jaws. The rollers 21 are journaled in the stems and in plates 23, secured to the upper edge of the upward extension 24 of the stems. The cam-ring is held in operative relation with the pressing-jaws and their stems by the posts or standards 15, which form bearings for the inner edge of the cam-ring and which have shoulders 25, upon which the inner edge of the cam-ring rests. These shoulders support the cam-ring, while the posts 15 prevent lateral

displacement thereof. From this construction it will be seen that the cap-plate 16 serves the purpose of guiding the plunger 18 by having the cylindrical portion 17 projecting up therefrom, and this cap-plate also serves to guide the press-jaws 12 by furnishing an upper bearing-surface therefor. The posts 15 serve a double purpose of supporting the cap-plate and supporting and holding in proper position the cam-ring. The cam-ring is rotated by means hereinafter described. The press-jaws 12 have bevel-joints 26 between them, so that as the jaws move in and out the edge of one jaw will slide over the surface of the adjacent jaw, and thus an unbroken surface or circle will be presented by the inner faces of the jaws without regard to their position in or out.

The pulp is introduced through the upper plunger 18 by means of a coupling 29, connected by a flexible pipe 30 with the supply. The coupling 29 communicates with an opening 31 through the bottom of the plunger 18, which is in the form of a shell, and this opening is controlled by a disk-shaped cut-off valve 32, which is turned by means of a shaft 33, to which a handle 34 is connected. The shaft passes through an elongated bearing 35, formed on the plunger. This valve has a beveled edge, which gives a knife cut to the pulp when the valve is turned to cut off the supply. The disk valve turns in a horizontal plane and works close against the lower face of the plunger. It is formed comparatively thin, so that it occupies but a small space at the bottom of the plunger, and this is of advantage, as the valve can be operated to cut off at any point in the stroke of the plunger and the movement of the plunger need not be so great as would be the case were other forms of valves used. The disk valve has beveled or curved edges, and as it lies centrally of the plunger a slight depression will be formed by it in the bottom of the pail, making a convenient place for a name and giving the bottom of the pail a finished appearance.

We provide an air-valve 36, consisting of a rod extending vertically and having a handle or pin 37 working in a cam-slot 38 in a bearing 39, attached to the yoke 40 of the plunger. When the handle 37 is turned, the air-valve is raised, so as to allow air to flow in from any suitable reservoir containing compressed air through a flexible pipe 41 and a tube 42, screwed into the plunger and communicating with an air-port extending through the bottom of the plunger. This air-valve is brought into use immediately after the pressing action has been accomplished, and by it the air is introduced to destroy any vacuum which might be formed between the pressing parts and the article formed, and the pressure of the air forcibly loosens the article from the pressing parts.

It will be seen from the above that the plunger 18 serves to carry the pulp-supply connection, the disk valve controlling the same and the air-valve. The water squeezed out of the pulp passes through openings in the shell of the former 5 and is discharged through ports 44, formed in a bracing-tube 45 within the former, and through a channel 46, formed in the rod 47, which supports and operates the former. A tray or plate 48 surrounds the said rod below the former, so as to catch any waste pulp or drip, and this tray conducts any such matter to an opening 49, communicating with the channel in the rod 47.

In Fig. 1 the former is shown in the position to which it is lowered for the purpose of removing the pail or other article therefrom. The weight of the former is counterbalanced by a weight 50, the strap 51 of which passes over a pulley 52 and is connected with a depending arm 53 of the rod 47. The arm is raised and lowered by means of a pitman 54, pivoted to the rod 47 and to a crank-disk 55 on a shaft 56, which shaft may be operated in any suitable manner. In the present instance we have indicated a chain-wheel 57, operated from a chain-wheel 59 through a chain 58, the wheel 59 being turned by a handle 60. We do not wish to limit ourselves to this means for controlling the former.

The cam-ring 19 is operated by a pitman 61, having an adjustable turnbuckle 62 for adjustment, said pitman being pivoted at 63 to a lug 64, secured to the cam-ring. The other end of the pitman or link is pivoted at 65 to a worm-wheel 66, journaled in a bracket 67, secured to the table 1 and operated by a worm 68 on the shaft 69, having bearings at 70 on the bracket 67, said shaft being driven through friction-disks 71 72 from a shaft 73, which carries a driving-pulley 74. As the worm-wheel is turned the cam-ring 19 is given a rotary reciprocation to advance and retract the pressing-jaws.

For reciprocating the plunger 18 we provide a plunger-rod 75, having an eccentric-strap 77 at its upper end operated by an eccentric 76 on a shaft 78, journaled in bearings on the upper plate 2. This shaft carries a gear-wheel 79, driven by a pinion 80 and bevel-gears 81 82 from a shaft 83, journaled at the upper part of the machine, the said shaft having a chain-wheel 84 thereon connected by a chain 85 with the chain-wheel 86 on the shaft 69. The machine is adapted to be stopped automatically in either an open or closed position, or both, and for this purpose the shaft 73 bears in a block 87, pivoted at 88 in a standard 89. The outer end of this shaft turns in a bearing 90, carried adjustably in a lever 91, pivoted at 92 in a standard and having a weight 93 on its free end pivoted thereto at 94 to have lateral movement in relation to the lever. A stop 95, engaging a stop 96, limits the downward movement of the lever, and when the lever is down the friction driving-wheels 72 and 71 are in engagement and the machine is driven thereby; but when the lever 91 is raised the shaft 73

and friction driving-wheel 72 are lifted and the machine is stopped.

For lifting the stop-lever 91 we provide an arm 96′, secured to the stud 97 of the worm-gear, the said arm having its end beveled laterally at 98 99. As the arm turns with the worm-gear these beveled surface are brought at the end of the stroke into engagement with the pin 100, depending from the weight 93, and said weight is thereby lifted, together with the stop-lever 91, to stop the machine. In order to start the machine again, it is simply necessary to swing the weight laterally on its pivot out of engagement with the inclined surface of the stop-arm, when the stop-lever will fall to make the friction-wheels engage.

It will be noticed that the air-valve for controlling the air-supply is arranged with its face flush with the face of the plunger when the air-valve is closed and the plunger is pressing the pulp. This will prevent the formation of any indentation or projection on the bottom of the pail.

In the operation of the machine the former is raised to the position shown in Fig. 3, so that the head 7 seats itself in the conical opening of the table 1. The spring-ring 10 by this action is forced downwardly, so that its upper face is flush with that of the table. This spring-ring serves to make a tight joint between the head and the wall of the opening in the table. When the former is up in the position shown in Fig. 3, the pressing-jaws 12 and the plunger 18 stand retracted, the valve 32 is turned to open the inlet 31, and the liquid pulp then fills the space about the former. The disk valve 30 is then turned to cut off the supply and the pressing organs are advanced to press the pulp upon the former and press out the water, which runs through the openings in the former and is discharged through the hollow rod. The pressing-jaws and plunger now retract; but just previous to their retraction the air-valve is opened to admit air, which will destroy any vacuum and allow the parts to retract without damage to the newly-pressed pulp. The former is then lowered through the mechanism described, it being understood that when the former is up the crank-pin is on the dead-center of the disk 55. The operation of the crank-disk will lower the former, and as it lowers the spring-ring 10 automatically rises from the head 7 alongside the former, and thus the article is loosened and lifted slightly from the former, so that it may be readily removed when the former is down in position shown in Fig. 1. The machine may be made to stop at each end of the stroke, up or down, of the former or at only one end, as desired.

It will be noticed that the pressing-jaws are curved at *a* on their inner faces to conform to the desired curve to be given the article. This curve extends across the main or central portion of the jaw, and this curved surface merges into a straight surface *b*, which is tangential to the curved surface and which forms a beveled bearing-face for the beveled back face *c* of the adjacent jaw, this face *c* forming a beveled edge to its jaw. All the jaws are similarly formed, the part *d* being in effect a lateral wing with a beveled or slanting front face and a curved back face. The slanting edges or faces extend from front to rear of the jaws.

We claim as our invention—

1. In combination, a table having an opening therein, a cap-plate above the table having an opening therein, a former and a plunger movable to and from operating position in the openings of the table and cap-plate respectively, and contacting with the walls thereof, pressing-jaws, moving between the table and the cap-plate, and a cam-plate surrounding the pressing-jaws and arranged in a plane intermediate of the table and the cap-plate with means for giving the cam a rotary movement about the pressing-jaws, the said former having a flat upper surface and the plunger having an opposing surface parallel therewith, substantially as described.

2. In combination, a table having an opening therein, a cap-plate above the table and having an opening, a plunger and a former movable in the opening of the cap-plate and table respectively, pressing-jaws movable between the table and plate, standards supporting the cap-plate from the table, and a cam-plate surrounding the pressing-jaws and held in position relative to said jaws by the standards with means for operating the cam-plate, said standards serving also as guides for the pressing-jaws, substantially as described.

3. In combination, a table having an opening, a former projecting through said opening above the table, a cap-plate above the table, pressing-jaws extending from the table to the cap-plate and movable between them, said jaws having stems extending substantially at right angles thereto over the surface of the table, standards extending from the table and a cam-ring overlying the radial stems of the jaws and held in position by the said standards, said standards serving also to guide the jaws in their movements, substantially as described.

4. In combination, a table, a cap-plate, each having an opening, a former and plunger movable therein, the standards extending from the table to the cap-plate, pressing-jaws movable between the table and plate and having stems extending substantially at right angles thereto and a cam-ring arranged in a plane between the table and the cap-plate and surrounding the pressing-jaws and standards and held in position by the latter, substantially as described.

5. In combination, with a former, pressing-jaws with means for operating them, a plunger, a supply-opening through the plunger and a rotary-disk cut-off valve for controlling the said opening, substantially as described.

6. In combination, a former, pressing-jaws, a plunger with means for moving said parts, a supply-opening extending through the plun-

ger, a disk valve rotating against the lower face of the plunger and means for operating the valve, substantially as described.

7. In combination, a former, pressing-jaws, the plunger in the form of a shell, a coupling arranged within the shell and communicating with the supply-opening through the plunger, a disk valve to rotate over the opening against the lower face of the plunger, a shaft for said valve, a bearing for said shaft within said plunger and means for operating the shaft, substantially as described.

8. In combination, a plunger, pressing-jaws, a former and means for introducing air to destroy vacuum between the article formed and the movable parts, said means operating in rear of the pressing-surface to leave the same free from projecting parts, substantially as described.

9. In combination, a former, pressing-jaws, a plunger, means for operating said parts and an air-valve carried by the plunger for introducing air between the same and the article formed, said valve operating back from the pressing-face, substantially as described.

10. In combination, a former, pressing-jaws, a plunger, an air-tube leading to an air-port opening to the bottom of said plunger and a valve controlling said air-port, said valve being adapted to present a face flush with that of the plunger when in closed position and operating back from said flush face, substantially as described.

11. In combination, a former, pressing-jaws, a plunger, means for operating said parts, an air-port extending through the plunger and a vertical rod 36 for controlling the air-port, the end of said rod presenting a face flush with the bottom of said plunger when the valve is closed and operating back from said face in opening the port, substantially as described.

12. In combination, a table having the opening, a former movable therethrough, a cap-plate, pressing-jaws having radial stems arranged between the table and cap-plate, guides 14 on the table, standards 15 projecting up from said guides and shouldered at 25, and a cam-ring supported on the said shoulder and overlying the jaw-stems, substantially as described.

13. In combination, the former, means for pressing the material thereon, the counterbalance for the former and means for raising and lowering the former, the said counterbalance and said means being each connected with the stem of the former, substantially as described.

14. In combination, the former, pressing-jaws, a cam-ring for operating the jaws, means for operating the cam-ring consisting of the link, the worm-wheel and worm, the friction driving-wheels and the stop-motion consisting of the pivotal weighted shaft and the arm 96 having a beveled portion to operate the weight, substantially as described.

15. In combination, the form, the pressing-jaws, the cam-ring for operating them, a worm-shaft, the worm having a pitman connection with the cam-ring, the plunger and the driving connections between the worm-shaft and the plunger, substantially as described.

16. In combination, a former, and a press-jaw having the curved front face, the lateral wing with the tangential flat face, and the slanting face to bear on the tangential face of the adjacent jaw, said lateral wing with its tangential face and the slanting face forming parts of the jaw, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM BURKE.
WILLIAM HENRY THOMPSON.

Witnesses:
V. S. LODER,
W. H. LODER.