No. 897,114. PATENTED AUG. 25, 1908.

W. L. LA RUE.

MOLDING MACHINE.

APPLICATION FILED FEB. 6, 1907.

4 SHEETS—SHEET 1.

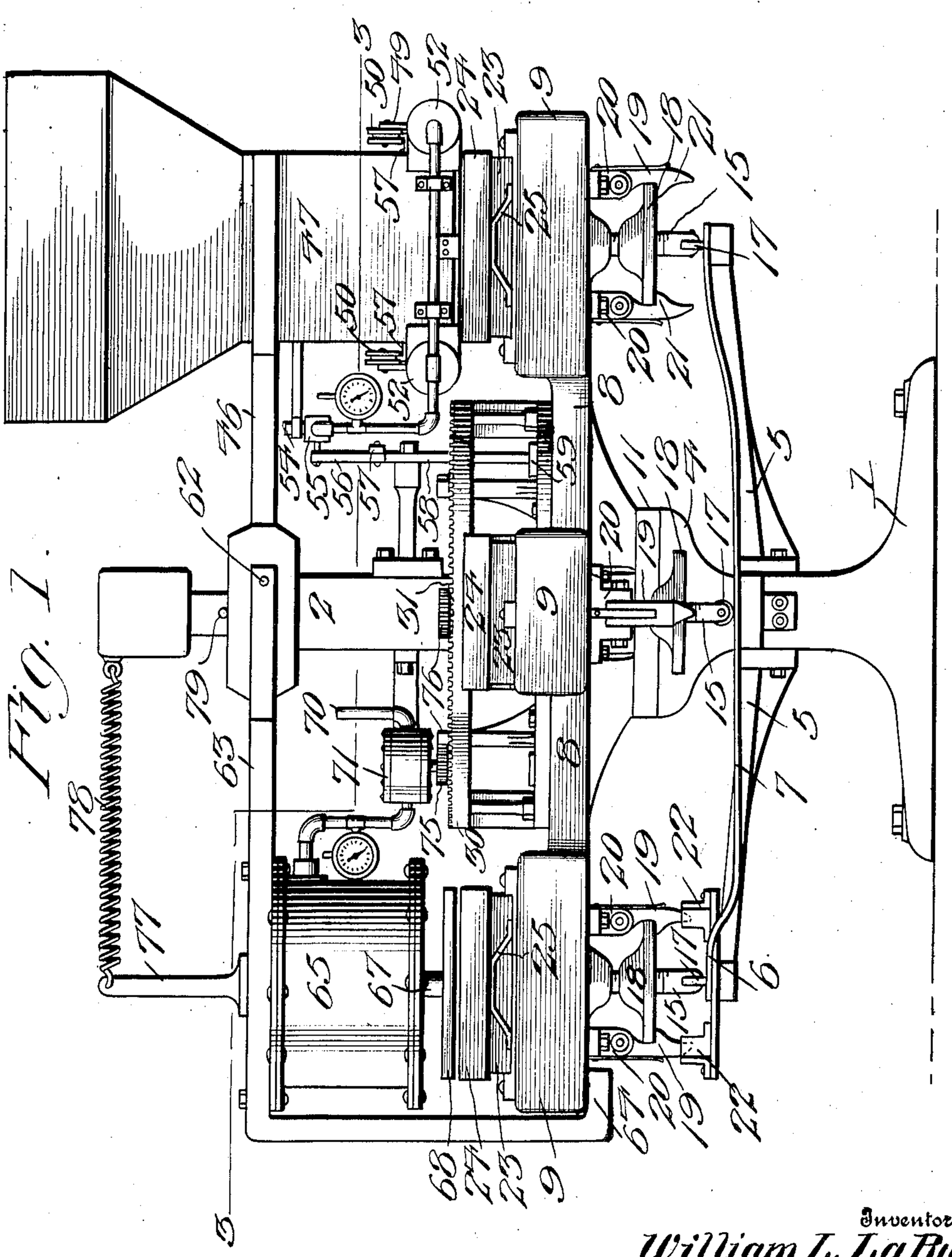

FIG. 1.

Witnesses

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4 SHEETS—SHEET 2.

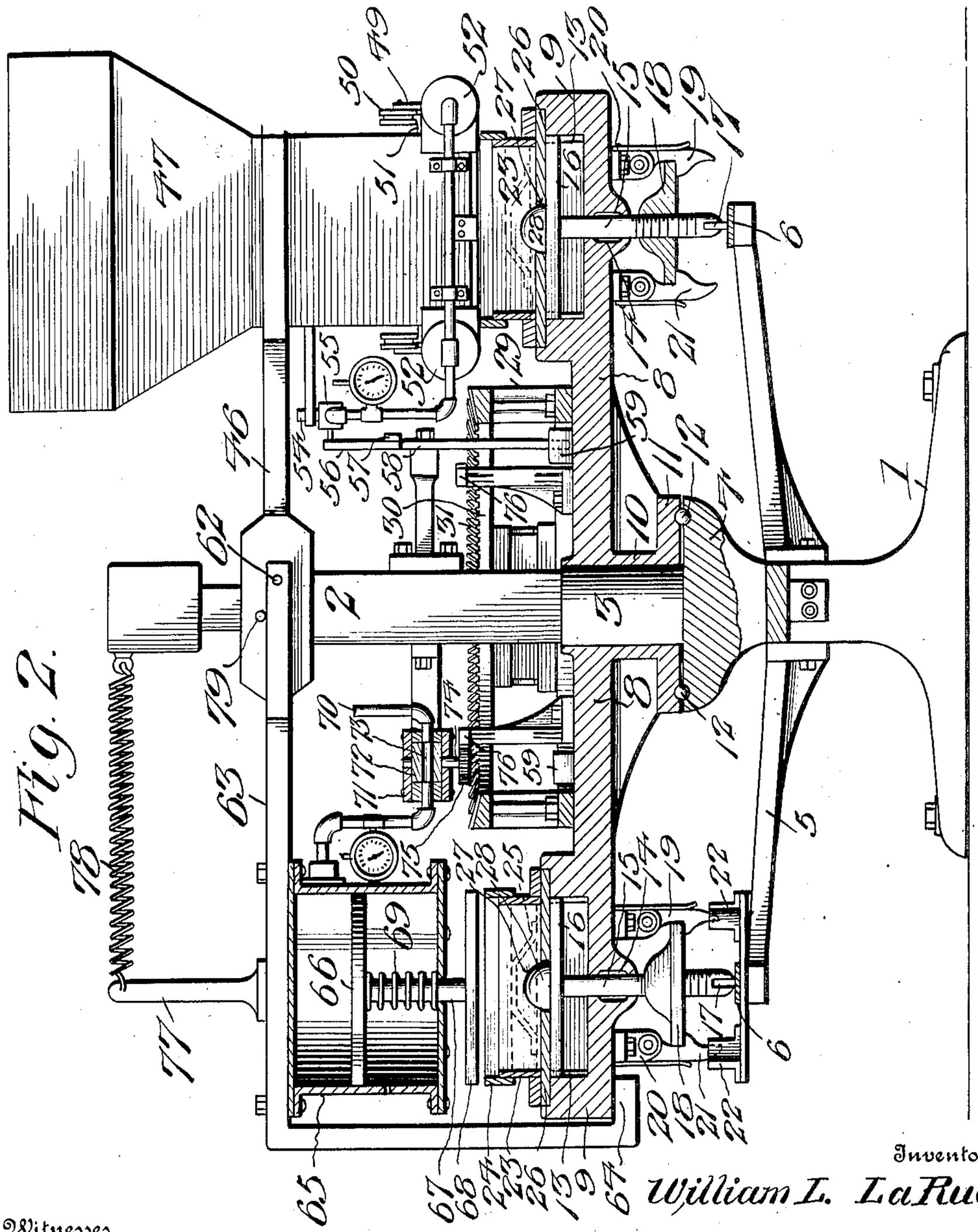

Fig. 2.

Witnesses

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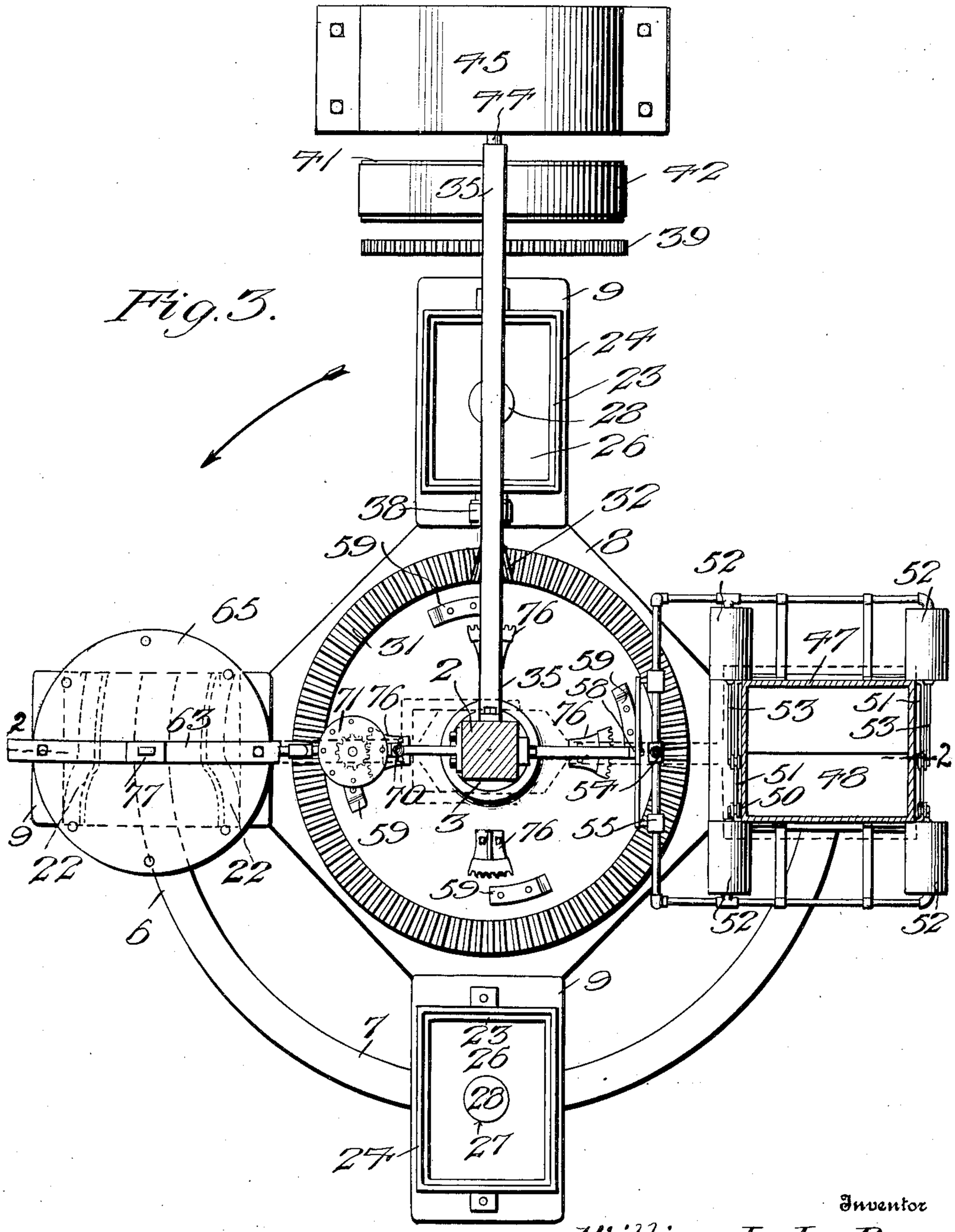
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

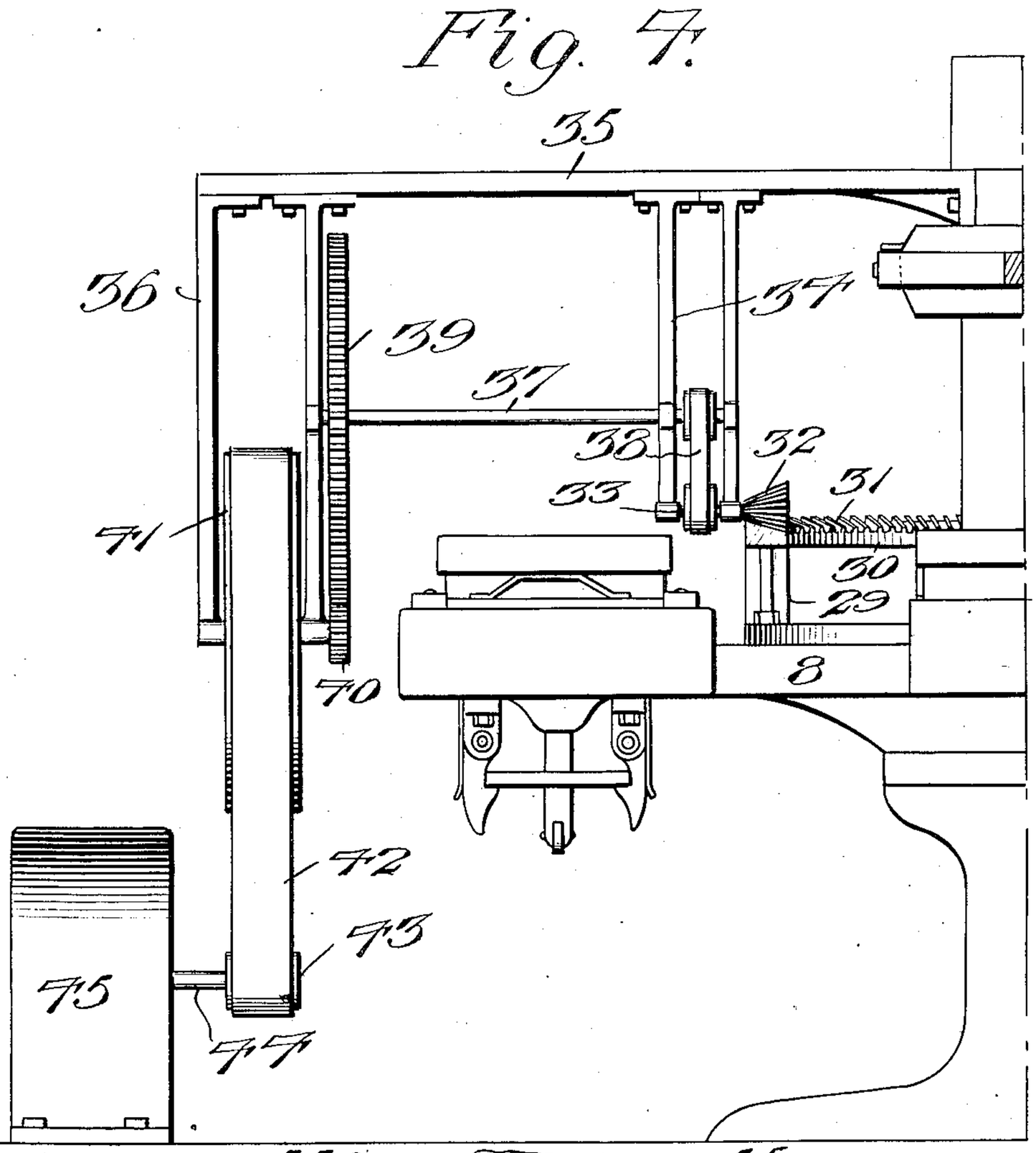
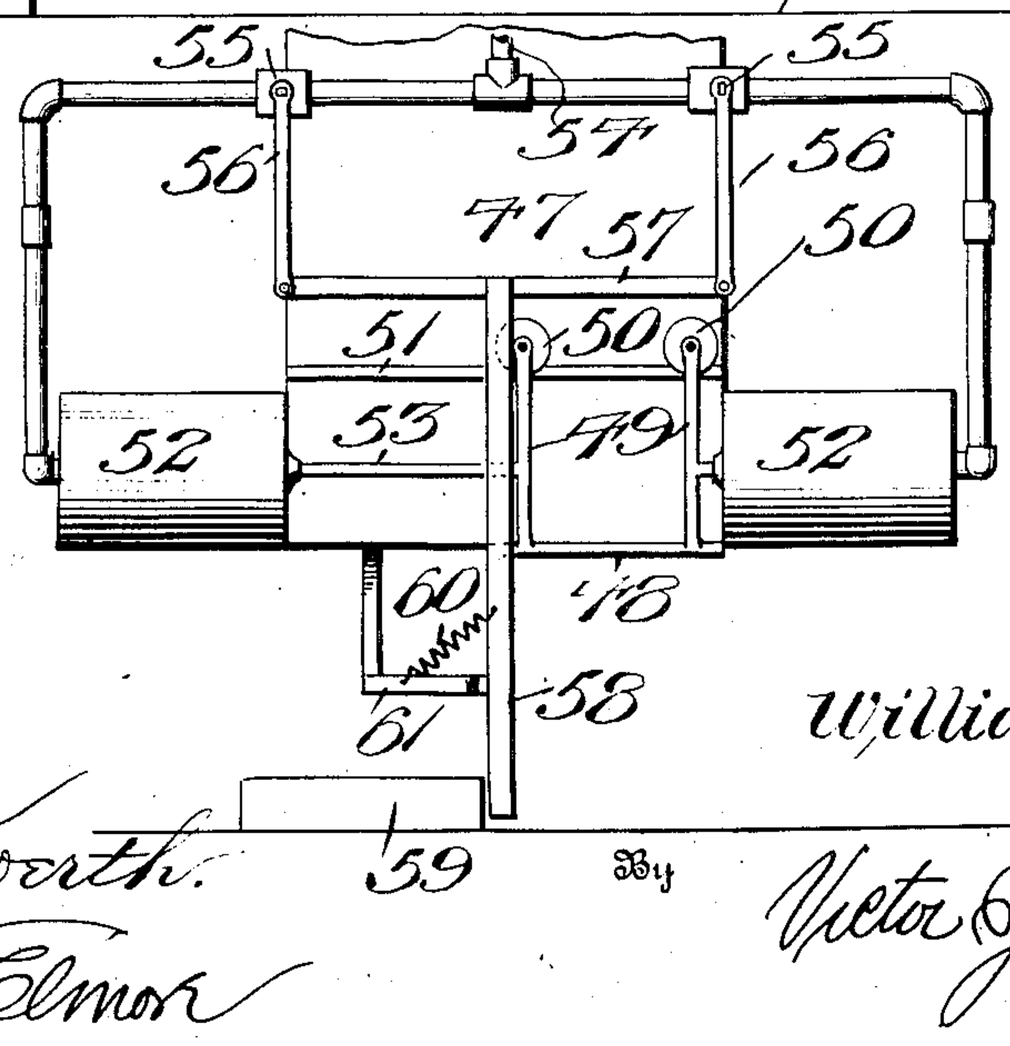


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM L. LA RUE, OF PITTSFIELD, MASSACHUSETTS.

MOLDING-MACHINE.

No. 897,114. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed February 6, 1907. Serial No. 356,102.

To all whom it may concern:

Be it known that I, WILLIAM L. LA RUE, a citizen of the United States, residing at Pittsfield, in the county of Berkshire and State of Massachusetts, have invented new and useful Improvements in Molding-Machines, of which the following is a specification.

This invention relates to molding machines designed for producing sand flasks or molds to be subsequently employed in casting operations.

The improved machine embodies in its organization a mold filling mechanism including a storage vessel or tank adapted to hold a supply of sand or other matrix material and a compressing mechanism including a pressure device operable through the medium of a fluid under pressure for compressing the material in the mold boxes, together with a rotatable carrier or table adapted for carrying a plurality of boxes successively to the filling and compressing mechanisms.

The invention has for its objects to provide a comparatively simple, inexpensive device of this character wherein the boxes will be automatically filled with the matrix material and the latter thereafter acted upon by the compressing device, one wherein the operations of filling one box and compressing the material in another will be simultaneously performed, and one in which the table will be positively moved for carrying the boxes successively to the filling and compressing mechanisms and automatically brought to rest at predetermined intervals for properly positioning the boxes during the filling and compressing operations.

A further object of the invention is to provide a machine of this type wherein the mouth of the supply tank will be automatically opened and closed at predetermined intervals for properly charging the mold boxes, one in which the plunger operating fluid will be automatically controlled for operating the plunger at determined intervals, and one wherein the completed flasks may be removed during the intervals of rest of the table and while filling one mold and compressing the material into another.

With these and other objects in view, the invention comprises the novel features of construction and combination of parts more fully hereinafter described.

Figure 1 is a side elevation of a machine embodying the invention. Fig. 2 is a central transverse central view of the machine, the hopper and its attachments being illustrated in elevation. Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1. Fig. 4 is a side elevation viewed at right angles to Fig. 1 and showing the table operating mechanism. Fig. 5 is a detail side elevation of the lower portion of the supply vessel showing the mechanism for operating the cut-off valve.

Referring to the drawings, 1 designates a supporting base having a vertical portion or standard 2 provided at a point above and suitably remote from the base with a cylindrical bearing portion or journal 3 terminating at its lower end in a horizontal bearing ledge or flange 4, there being bolted to the standard 2 at a point beneath the flange 4, a plurality of radial supporting arms or beams 5 designed for sustaining a horizontal semicircular track or rail 6 having at the front of the machine a depressed portion 7 disposed in a horizontal plane below the normal level of the remaining portions for a purpose which will hereinafter appear.

Journaled for rotation on the cylindrical portion 3 of the standard is a horizontal table or carrier 8 having at diametrically opposite points radially projecting portions or extensions 9 and provided with a central, tubular portion or hub 10 terminating at its lower end in a horizontal bearing flange 11 which overlies the flange 4 and between which and the latter there is arranged a series of antifriction balls 12, there being formed in the upper faces of the extensions 9 vertical, upwardly opening chambers or recesses 13, while slidably disposed in vertical bearing openings 14 provided in the extensions 9 are vertically movable plunger members or rods provided with heads or followers 16 arranged in the chamber 13 and having their lower ends equipped with rollers 17 arranged to travel on the track or rail 6, the rods having their lower portions threaded for the reception of vertically adjustable clutch heads or disks 18 each adapted for engagement by a pair of spring pressed clutching members or dogs 19 pivoted in bearings 20 beneath the table and provided at their lower ends with engaging portions or fingers 21 adapted for contact with underlying tripping members or rails 22 having inclined portions which act on the fingers 21 to throw the dogs outward to releasing position.

Positioned on the portions 9 of the table

and respectively over the chambers 13 are a plurality of removable boxes or molds 23 having vertically depressible portions or sections 24 sustained in projected condition under the action of supporting springs 25, while arranged over the chambers 13 beneath the boxes are follow boards or palettes 26 on which the matrix material rests during compression and which are in turn provided with openings 27 through which the patterns 28 carried by the plungers 16 are projected into the boxes, there being sustained on the table 8 by means of vertical supports 29 a horizontal, circular gear 30 having teeth 31 engaged by a pinion 32 fixed on the end of a hanger shaft 33 journaled in bearings at the lower end of a pair of hangers 34 attached to and depending through a suitable overhead support 35 included in a framework 36.

Journaled in the frame 36 is a horizontal shaft 37 connected by a belt 38 with the shaft 33 and equipped with a gear 39 in mesh with a pinion 40 fixed on the shaft of a belt wheel 41 rotatively sustained in the frame and in turn connected by a belt 42 with a pulley 43 fixed on the shaft 44 of a motor 45 from which power is derived for driving the carrier 8 through the medium of the intermediate connections.

Fixed on the standard 2 at a point above and suitably remote from the table 8 is a rigid, horizontal supporting arm 46 which sustains a vessel or container 47 adapted to hold a supply of sand or other matrix material and provided at its lower end with a discharge mouth normally closed by means of a horizontally movable cut-off plate or valve 48, which as seen more clearly in Fig. 5, is provided at its ends with vertically uprising connecting members or arms 49 equipped at their upper ends with rollers 50 arranged for travel on horizontal rails 51 attached to and at opposite sides of the vessel, while sustained in pairs at opposite sides of the vessel and parallel with the line of movement of the cut-off 48 are cylinders 52 containing movable actuating members or pistons, the rods 53 of which are connected at their outer ends with the adjacent hanger arms 49 whereby the pistons in their movements serve to open or close the cut-off valve 48.

Leading from a suitable source of supply, not shown, is a pipe or duct 54 having branches leading to and communicating with the cylinders 52 for supplying steam, air or other fluid under pressure to the cylinders for operating the pistons, there being arranged in the branch portions of the duct cut-off valves 55, the stems of which are equipped with operating levers 56 connected by a link 57 having a vertically depending arm 58 adapted to be acted upon by tripping members or blocks 59 fixed at appropriately spaced intervals on the table 8 for moving the arm in one direction to open the valves 55, the arm being movable in the reverse direction for closing the valves by means of a spring 60 attached to a stop 61 which limits the closing movement of the arm.

Pivoted to the standard 2 at 62 is a normally horizontal frame member or arm 63 having a vertically depending portion terminating in a finger 64 which engages beneath the table 8, there being fixed to the arm 63 a cylinder 65 containing a piston 66, the stem 67 of which projects downward through the lower end of the cylinder and carries a pressure head 68 adapted to compress the material within the mold boxes, there being arranged on the stem 67 within the cylinder a normally expanded spring 69 which tends to hold the head in raised condition, while communicating with the cylinder at a point above the piston 66 is a pipe or duct 70 in which is connected a valve casing 71 containing a valve 72 having an opening or passage 73 and on the stem 74 of which there is fixed a toothed pinion 75 adapted to be acted upon by toothed segmental racks 76 fixed at appropriately spaced intervals on the table 8, it being understood that the duct 70 supplies air, steam or other fluid under pressure to the cylinder 65 for operating the piston 66.

Fixed to and arising from the frame member 63 at a point above the cylinder 65 is a vertical post 77 to which is attached one end of a lifting spring 78 having its other end connected with the upper end of standard 2 and tending to raise the outer end of arm 63, the upward movement of the arm under the influence of the spring being limited by means of a stop 79 fixed on the frame member 46 at a point adjacent the pivot 62.

In practice, and during operation of the machine, the table 8 is continuously rotated through the medium of the driving mechanism, the pinion 32 and gear 30 for carrying the mold boxes successively beneath the supply tank 47 and pressure device 68. As the boxes come to a position beneath the lower end of the supply vessel 47 the corresponding tripping heads 59 act upon the lower end of arm 58 for moving the levers 56 to open one of the valves 55 and close the other, whereby fluid under pressure will be admitted to the right hand cylinders 52 for operating the pistons therein to move the cut-off 48 to open position and allow the matrix material to discharge from the vessel into the underlying mold, it being understood that as soon as each box has received a proper quantity of material the corresponding tripping head will have passed beneath the arm 58, whereupon the latter will be returned to normal position by the spring 60 for cutting off the supply of fluid to the right hand cylinders 52 and admitting fluid under pressure to the left hand cylinders to operate

the pistons therein for again closing the cut-off 48, it being understood that the cylinders are provided at their outer ends with suitable exhaust ports through which the contained fluid may escape to permit free inward movement of the pistons. During rotation of the table and as the filled mold boxes pass beneath the pressure head 68 the racks 76 act on the pinion 75 for opening the valve 72 to admit fluid under pressure to the cylinder 65 above the piston 66, thereby moving the latter downward against the action of spring 69 to cause the head 68 to compress the material in the underlying box, in which operation the box extensions 24 will be moved downward against the action of spring 25 to permit the surplus material contained in the section to be compressed within the body of the box.

After the piston has moved downward an appropriate distance under the action of the operating fluid the latter escapes through an exhaust port provided in the cylinder, whereupon the piston will be returned to normal position through the medium of the spring 69, it being understood that the rack 76 serves to first open the valve 72 for admitting fluid to the cylinder and thereafter closes the valve for cutting off the supply. As soon as each of the boxes has passed beneath the member 68 for having the material compressed the lower end of the stem 15 passes over the depression and the members 22 move the dogs 19 to open position for releasing the clutch head 18, whereupon the stem 15 will move downward under the influence of the weight of the clutch head thereby withdrawing the pattern 28 from the mold box, whereupon the box passes onto an intermediate position between the filling and compressing devices and at the front of the machine to permit removal of the hold containing the finished flask and the substitution therefor of an empty mold, it being understood that the operations of filling and compressing are continuously and successively repeated throughout the period of operation of the machine, and further that as the empty boxes pass to a position beneath the filling mechanism the rollers 17 in riding upward on the elevated portion of the track raise the stems 15 for projecting the pattern into the empty box and forcing the head 18 automatically into engagement with the locking dogs 19 by which the pattern is held in active position. When air is first admitted to the cylinder 65 the pressure exerted thereby on the piston 66 moves the arm 63 slightly upward for moving the engaging portion 64 into contact with the table, thus locking the parts 63 and 9 to cause them to travel together during the filling and compressing operation and until this pressure is relieved. As soon, however, as the pressure in the cylinder is relieved due to exhausting of the fluid the spring 78 acts for returning the arm 63 to normal position.

Having thus described my invention, what I claim is:

1. In a flask molding machine, a base, a movable table supported thereon, a standard rising from said base, a pivoted arm projecting from said standard, said arm being formed with a depending portion, said portion terminating in a finger, said finger engaging the under surface of the table.

2. In a flask molding machine, a base, a movable table supported thereby, a standard rising from said base, a pivoted arm projecting laterally from said standard, a post carried by the arm, and flexible means connecting the post to the standard.

3. In a flask molding machine, a base, a movable table supported thereon, a plurality of boxes carried by the table, a standard rising from said base, an arm projecting from the standard, a cylinder secured to the under surface of the arm and adjacent the end thereof, a piston disposed in said cylinder, a stem depending from said piston and passing through the bottom of the cylinder, a pressure head carried by the stem, a spring arranged in the cylinder and contacting with the under surface of the piston and with the bottom of the cylinder, said spring holding the pressure head in raised position.

In testimony whereof, I affix my signature in presence of two witnesses.

WILLIAM L. LA RUE.

Witnesses:
BESSIE M. ROWE,
LUTHER L. OTWOOD.