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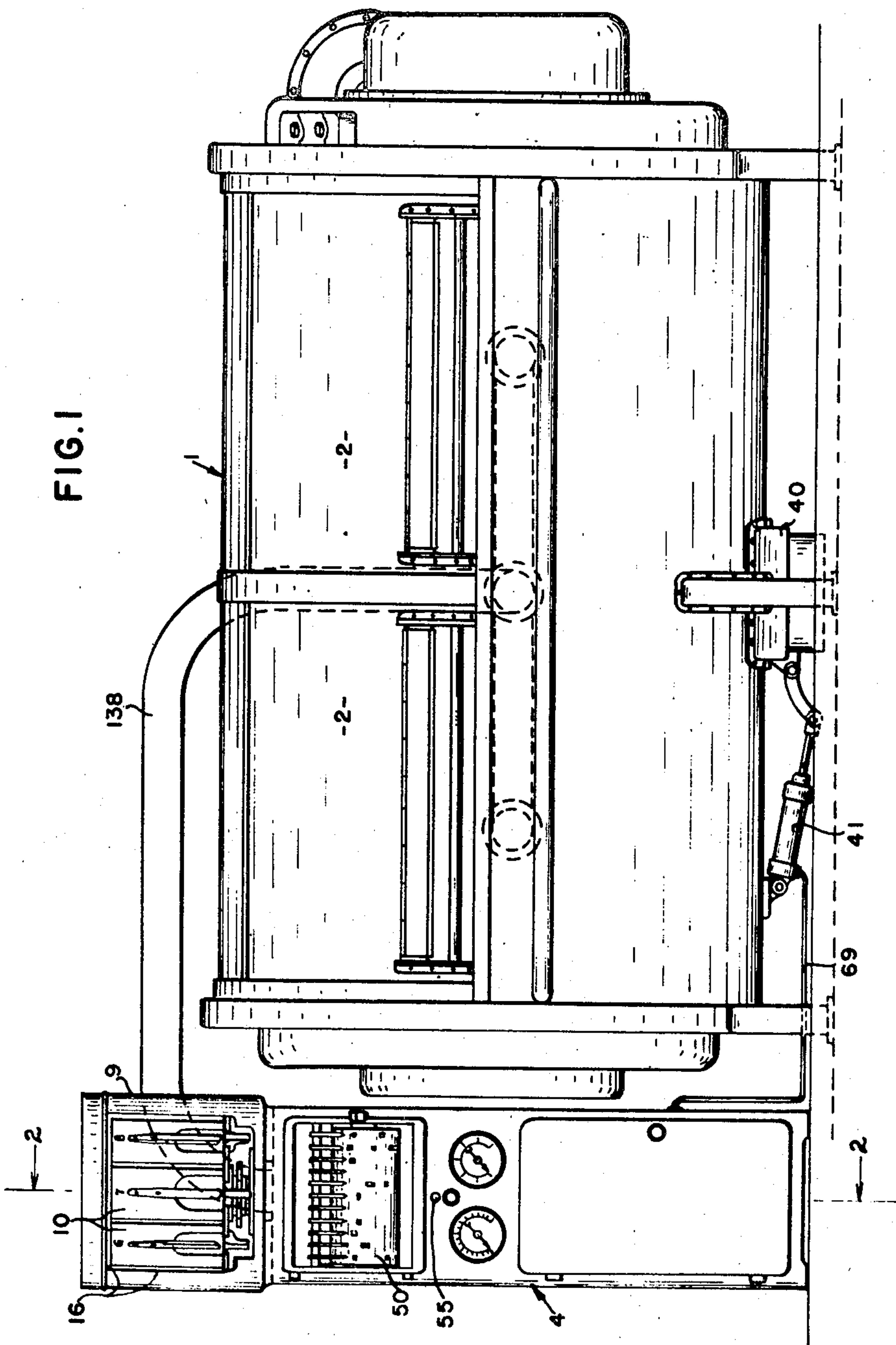
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2,540,431

LAUNDRY WASHING APPARATUS

Filed July 25, 1945

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

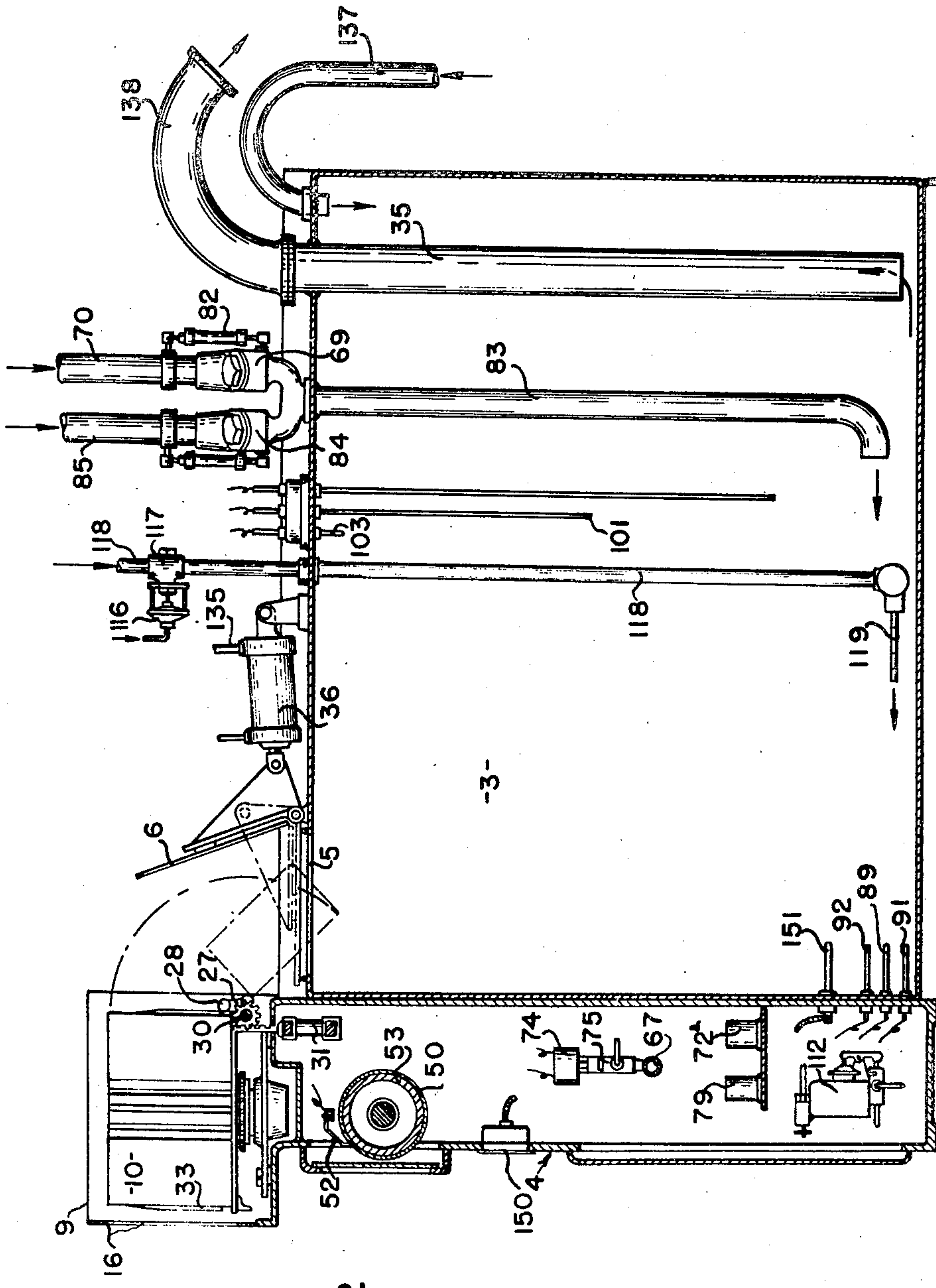


FIG. 2

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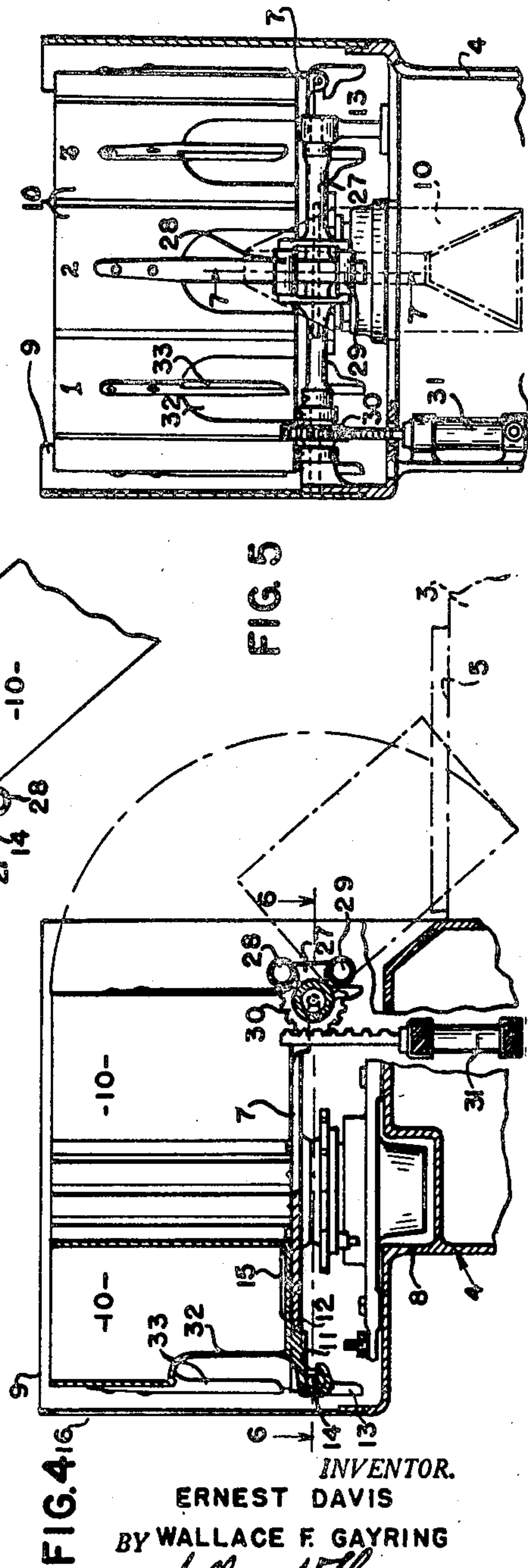
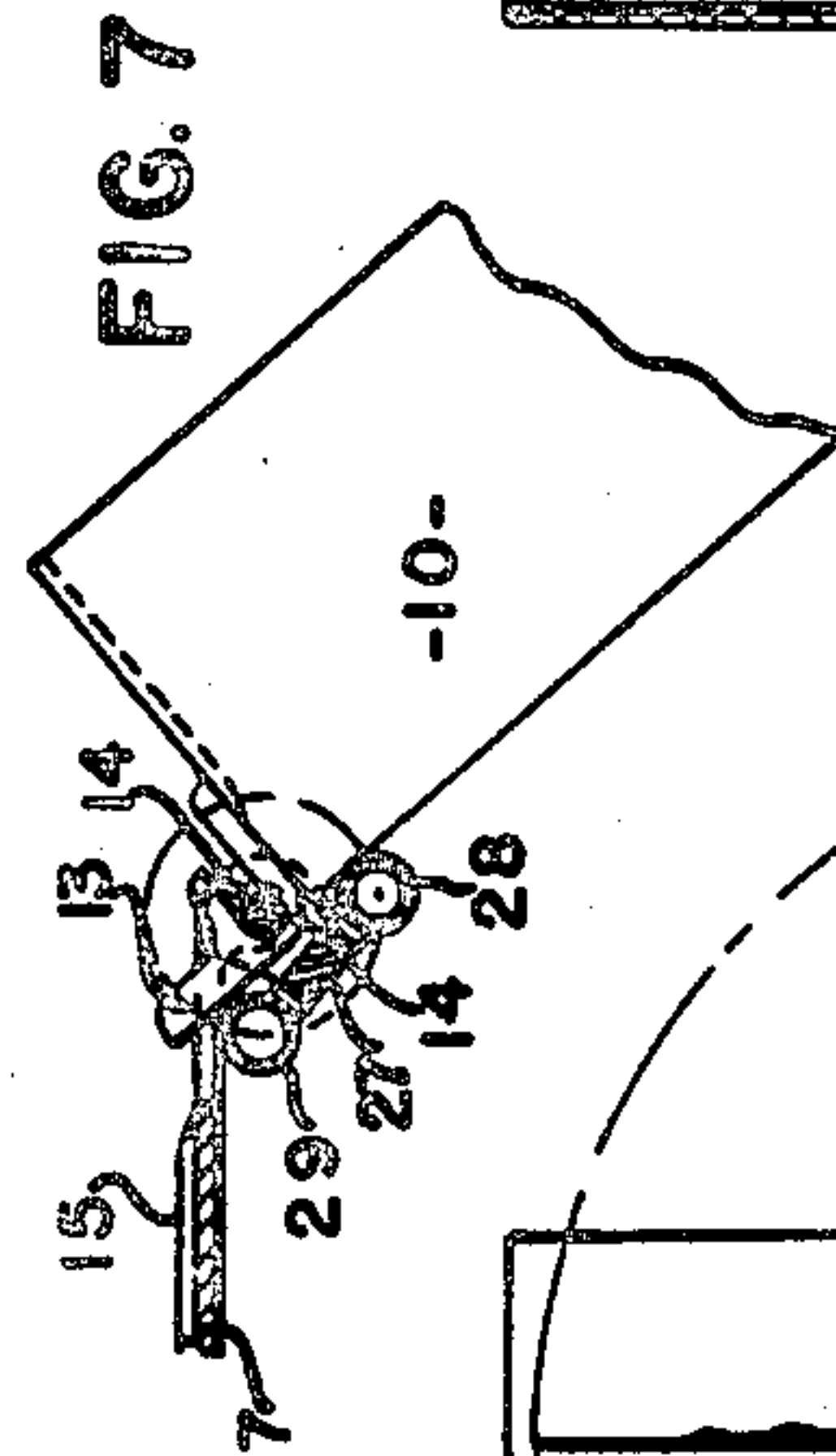
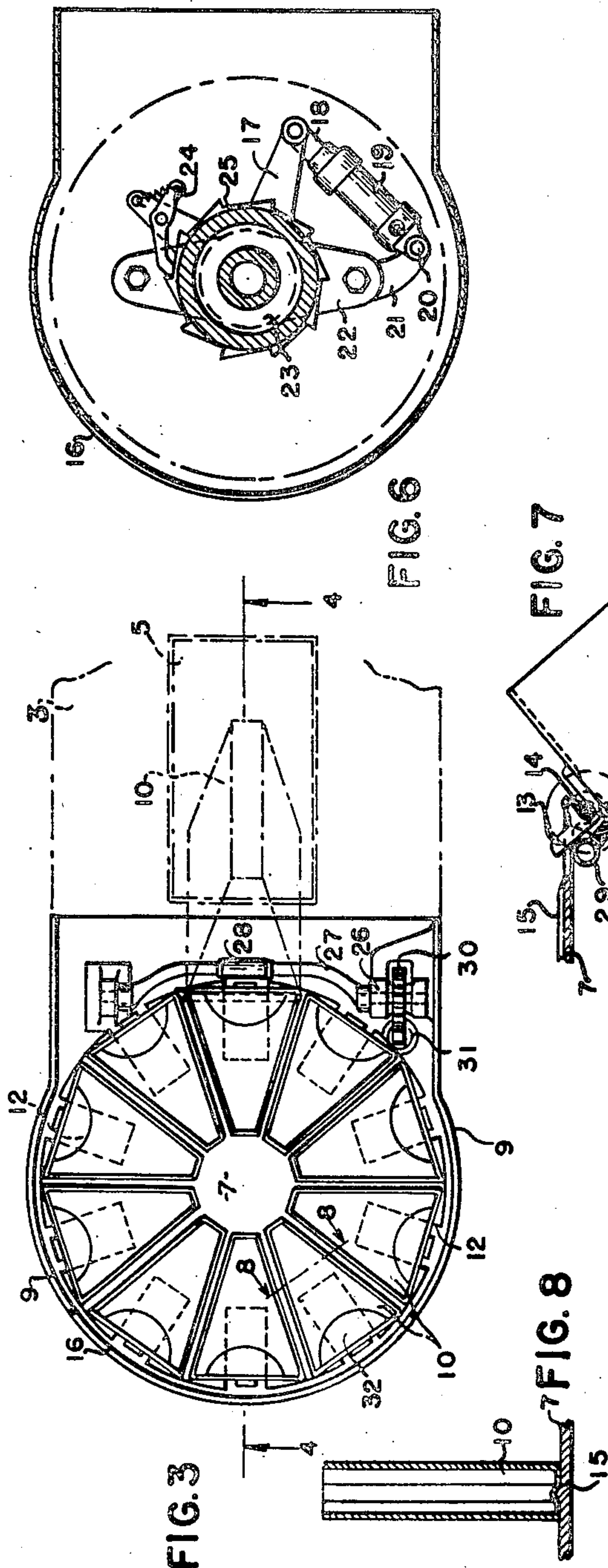
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4 Sheets-Sheet 3



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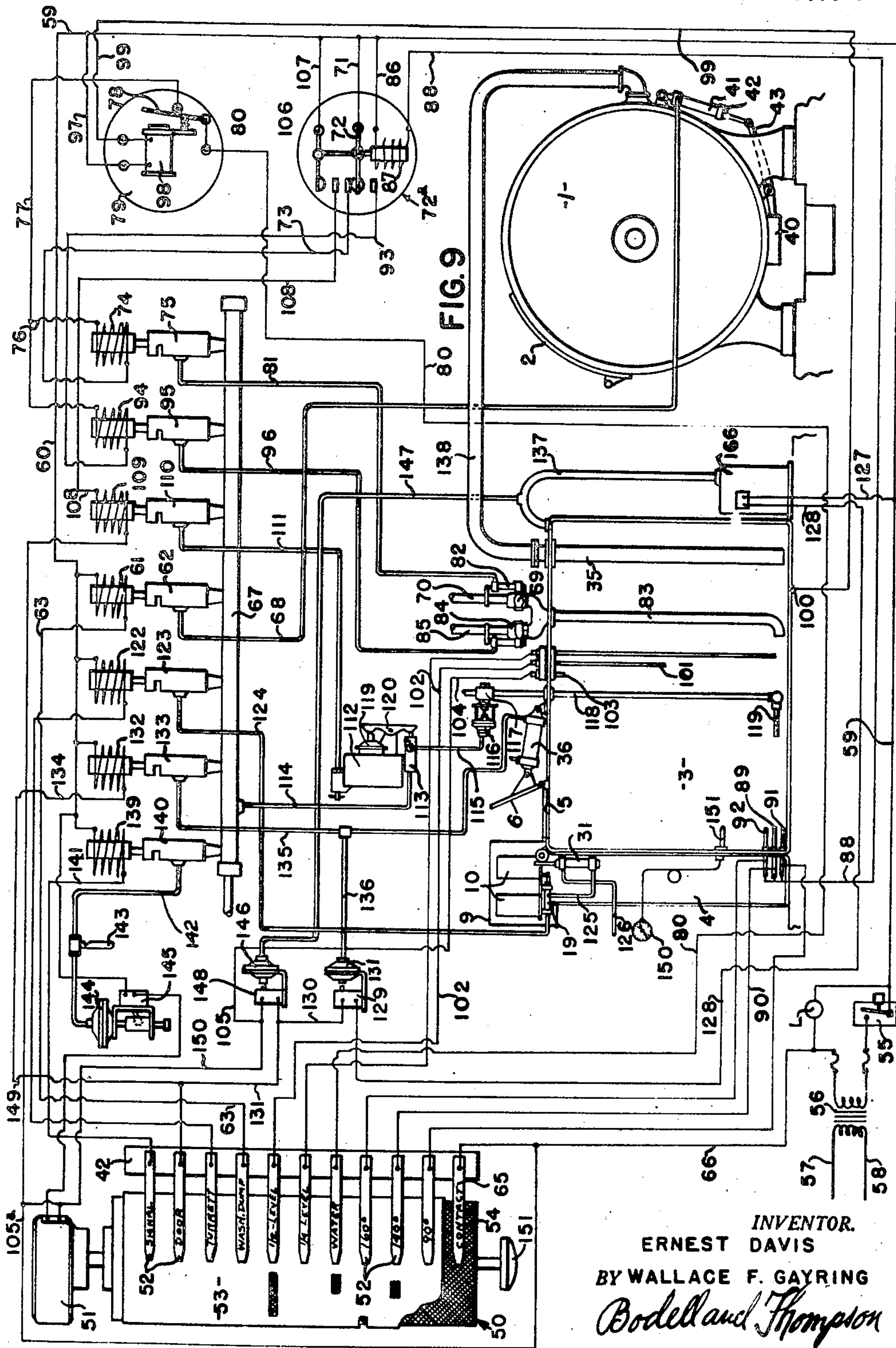
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LAUNDRY WASHING APPARATUS

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4 Sheets--Sheet 4



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UNITED STATES PATENT OFFICE

2,540,431

LAUNDRY WASHING APPARATUS

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3 Claims. (Cl. 222-117)

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This invention relates to washing apparatus of the general nature of laundry washing and cleaning machines. It has for its object, the relative arrangement of a mixing tank and the washing machine itself, wherein the mixing tank, in which the washing fluid is preliminarily mixed before being delivered to the washing machine, is located at one end of and on a level with the washing machine, in contradistinction to being located overhead. It also has for its object, the transfer of the mixed fluid from the tank so located to the washing machine by air pressure applied to the surface of the fluid in the tank. It further has for its object, a movable support, or turret, for containers for the ingredients to be mixed in the fluid in the mixing tank, the support, or turret, being so located on the mixing tank that the containers thereon are readily accessible from the floor. It also has for its object, a control for the turret and container dumping operations and the air pressure creating means operating to automatically close the tank when the air pressure is being applied to the fluid therein.

The invention further consists in a support for the containers, which is a turret, on which the containers are detachably mounted, the containers so mounted as to be tiltable about an axis to dump them into the tank through the top thereof, as the containers are brought around during the turning of the turret to a discharge position. The invention further consists in a mounting for the containers on the turret and the relative arrangement of the turret or the discharge station thereof, so that the container at the discharge station dumps directly into the tank through an opening in the top of the tank, and further a coupling by which the containers couple with tilting mechanism, as the containers move into discharge position.

The invention further consists in mechanism for turning the turret, dumping the containers, opening and closing the door through the opening of which the containers are dumped at the discharge station, discharging the mixed fluid into the washing machine and the timing of these operations in a certain sequence with the operations of the washing machine.

The invention further includes discharging the fluid in the tank to the washer by air pressure applied to the fluid in the tank.

The invention consists in the novel features and in the combinations and constructions herein-after set forth and claimed.

In describing this invention, reference is had

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to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a front elevation of a washing apparatus embodying this invention.

Figure 2 is a sectional view taken approximately on the plane of line 2-2, Figure 1.

Figure 3 is a plan view of the turret.

Figure 4 is a sectional view taken approximately on the plane of line 4-4, Figure 3.

Figure 5 is an elevation looking to the left in Figure 3.

Figure 6 is a sectional view taken on the plane of line 6-6, Figure 4.

Figure 7 is a sectional view taken on the plane of line 7-7, Figure 5.

Figure 8 is a sectional view taken on the plane of line 8-8, Figure 3.

Figure 9 is a diagrammatic view of the automatic control system for the mixing tank and the washing machine.

The numeral 1 designates the washing machine, this being here shown as the type including an outer cylindrical drum or casing suitably supported horizontally on the floor and a clothes receiving drum mounted in the outer casing to rotate about a horizontal axis, the outer casing having the usual loading and unloading doors 2. The inner drum also has similar doors which are brought into alignment with the doors 2 when the washer is being loaded or unloaded. 3 designates the mixing tank, and 4 a cabinet at one end of the mixing tank in which the control mechanism is mounted and on the top of which the turret to be described is mounted. The tank 3 and cabinet 4, as here shown, are arranged at one end of the washing machine 1 adjacent the same, with the cabinet 4 in front of the tank 3. The tank and the cabinet rest upon the floor and are thus at the same level as the washing machine. The tank 3 is provided with an opening 5 at its top near one end which is closed by a door 6 operated as hereinafter described, the door 6 being substantially air-tight when closed. This is the opening 5 through which the ingredients to be mixed with the fluid or water is discharged from the containers on the turret, as will be presently described.

The numeral 7 designates the turret, this having an upright axle mounted in a step 8 in the top of the cabinet 4, the turret being formed to receive containers or cans 10 for washing ingredients, the cans being accessible from the front of a cylindrical wall 9 enclosing the turret, the wall



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of each washing operation of the cycle, the water is dumped out of the washing machine, preliminary to the inlet of mixed washing fluid for the next operation from the mixing tank. The beginning of any mixing operation is therefore letting in a certain amount of water into the tank at the proper temperature for the next washing operation of the cycle. During the operation, the turret is actuated at proper timed intervals to dump the given or selected ingredient into the mixing tank. The formula sheet is provided with rows of slots, one row for each contact, located to register with the contacts at proper times for given washing cycles. Dirty laundry is classified and different formula sheets used for the timer for different classifications, as for example a load of colored laundry requires a different formula from a load of white goods, etc.

At the start of a washing cycle, the switch 55 (Figure 9) in the supply circuit is closed. As shown, the current is supplied through a transformer 56 from main service wires 57, 58. The timer or the formula sheet is arranged thereon so that a slot in the formula sheet 53 registers with "wash dump" contact of the series of contacts 52, so that the current passes through the closed switch 55, wires 59, 60, through the winding of the control solenoid 61 for the "wash dump" valve 62, thence through wire 63 to the "wash dump" contact of the series 52, thence through conductor drum 54 to return wire 66 and contact 65, which is always in contact with the drum. The energization of the winding of the solenoid 61 opens a relay control valve 62 to the passage of air from a manifold 67 through pipe 68 to the cylinder 41. This valve 62 as well as other control valves, operated by solenoids, are of the combined intake and exhaust type. When operated by the solenoid, a normally open exhaust port is closed and a normally closed intake port opened. Normally, the exhaust port is open and hence, when the valve, as 62, is operated to open position, the exhaust port closes, thus permitting the air to flow through the valve and its outlet pipe, as 68, to the air device to be operated, as the cylinder 41 of the cylinder and piston motor for the dump valve. When the valve 62 is again returned to its normal position to open the exhaust and close the intake, the air in the line supplied through the valve, as the pipe 68 and the cylinder 41, exhausts back through the valve and the exhaust port of the valve. This valve may be of any type of combined intake and exhaust valve. When the dump valve is closed or while it is closing, the "water" contact of the series of contacts 52 is closed to a circuit through a slot in the formula sheet 53 coming in register therewith, to cause a cold water valve 69 in cold water supply pipe 70 to open. The circuit is as follows: Through the starting switch 55, wires 59, 71 through a normally closed switch 72 of a "hot and cold water relay" switch 72^a, wire 73, winding of a solenoid 74 for operating cold water valve 75, thence through wires 76, 77, normally closed switch 78 of a water level relay switch 79 through wire 80 to the "water" contact of the series 52, and thence through drum 54 and return wire 66. The opening of the valve 75 permits air to flow from the manifold 67 through pipe 81 to an air motor device 82, which opens the water valve 69, permitting water to flow through the valve 69 and pipe 83 into the mixing tank 3.

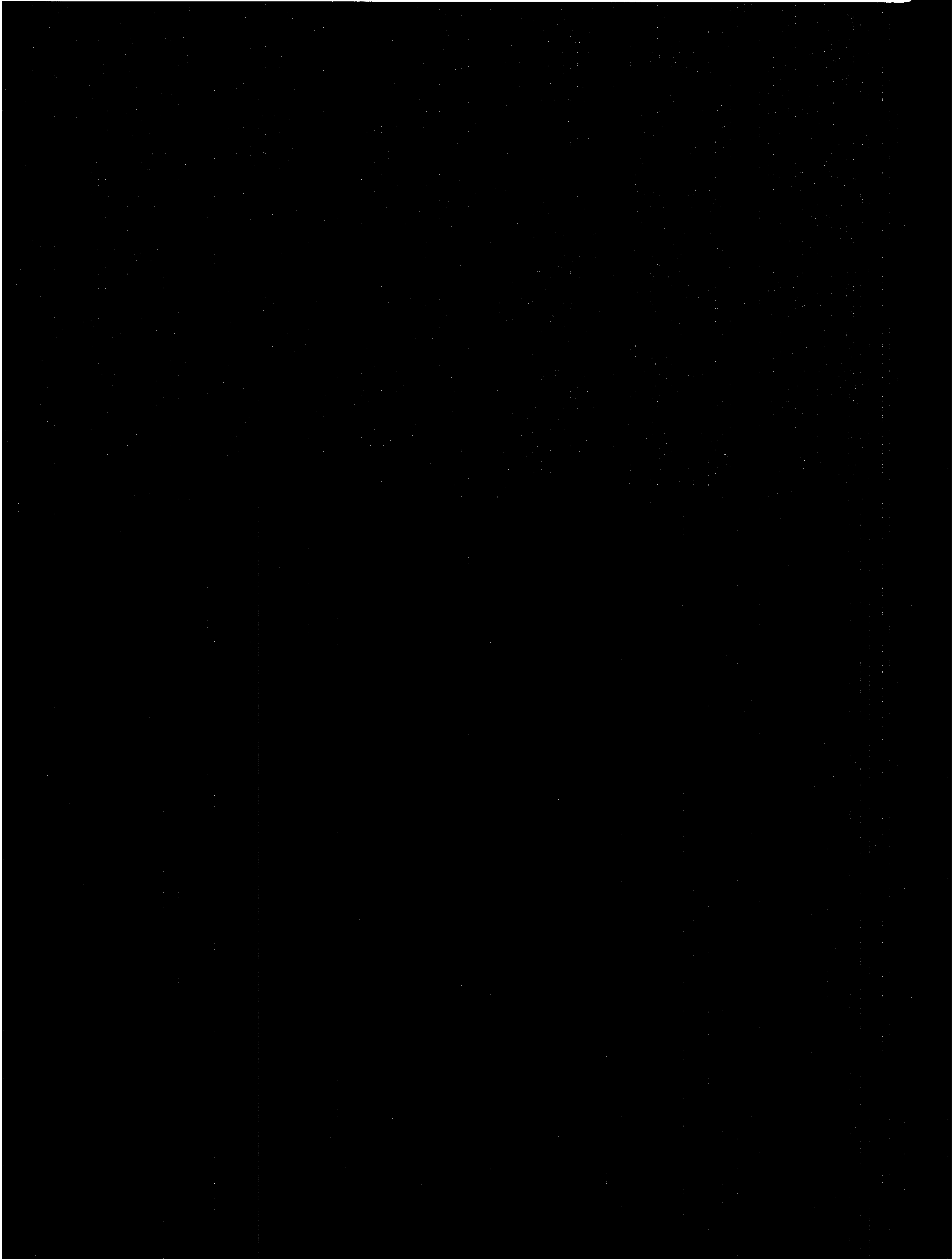
There are three temperature contacts in the series 52, that is, a low, intermediate and high, as 90°, 140° and 160°. A slot in the formula sheet

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53 is arranged to register with one or another of these temperature contacts in accordance with the temperature of the water desired in the mixing tank at a given operation of the cycle. Assume that a slot is arranged to come into register with the 140° contact immediately after or at the same time a slot registers with the water contact. The current then passes through the winding of a solenoid controlling the opening of the hot water valve 84, which communicates with a suitable hot water supply pipe 85 and with the tank 3 through the pipe 83, the current being as follows: From the starting switch 55 through wires 59, 86, winding 87 of a magnet, wire 88 through the intermediate 140° thermostat 89 located in the lower part of the tank 3 through wire 90 to the 140° contact of the series 52, and thence to the return wire 66 through the drum 54, the thermostat making this contact completing this circuit, when the cold water submerges the thermostat. The other temperature contacts, that is, the 140° and 160° contacts are in similar circuits as the 90° with thermostats 91 and 92 respectively in the tank 3.

25 The energization of the windings 87 of the hot and cold water relay switch 72^a closes a circuit as follows: From the starting switch 55 through wires 59, 71, switch 72, wire 93 through the winding of the solenoid 94 which opens the hot water relay valve 95 to the intake of air from the manifold 67 and the outlet of air through pipe 96 to an air motor device associated with the hot water valve 84 to open said valve, permitting hot water to enter from the source through pipe 85, pipe 83 into the tank 3. When any set temperature is reached, the circuit through the selected thermostat will be again broken, thus de-energizing the solenoid 87 of the hot and cold water relay switch 72^a, permitting the switch arm to return to normal position, wherein the circuit is broken through the winding of the solenoid 94 which operates the hot water valve.

The level or amount of water is controlled by contact fingers in the series 52, and as illustrated, there are three levels, a one-quarter level and a one-half level selected by the timer with slots cut in the formula sheet 53 in position to register with the one-half or the one-quarter level contact of the series of contacts 52, and a full level which has no contact finger, the full level being automatically selected when neither of the lower levels is selected. The circuits controlled by these level contacts are completed through the water in the tank 3. Assume that the one-half level contact finger is selected or registers with the slot cut in the formula sheet 53 to permit the one-half level contact finger to engage the drum conductor 54 through this slot. When the one-half level is reached in the tank 3, a circuit is established as follows: From the starting switch 55 through wires 59, 97, to the solenoid 98 of the level relay switch 79, thence through wire 99 to the terminal 100 in the bottom of the tank 3, where it is exposed to the water therein, and thence through the water in the tank to a terminal 101, thence through wire 102 to the one-half level contact of the series 52, through the drum conductor to the return wire 66. When the solenoid 98 is so energized, it opens the switch 78, thus breaking the circuit to the windings 74 and 94 of the hot and cold water relay valves 75, 95, so that the air is cut off from passing through these valves and the pipes 81, 96 to the air operated devices for



pipe 137 to the upper portion of the tank 3 and the door 6 being closed, the water is forced out through transfer pipe 138 into the washer 1. A slot in the formula sheet 53 shortly thereafter comes into register with the signal contact finger of the series 52 establishing a circuit through the windings 139 of the solenoid for controlling the opening of an air relay valve 140 and operating a signal indicating the close of the mixing period. These windings 139 are energized from the starting switch 55 through wires 59, 60, the windings 139, thence through wire 141 to the signal contact, the conductor drum 54 and return wire 66. The valve 140 being thus operated permits air to flow from the manifold 67 through pipe 142 to an audible signal, as a whistle 143. Air also passes to an air operated device as a diaphragm chamber 144 which operates a switch 145 to open the circuit to the motor 51 for the timer and hence stop the timer at the end of the cycle of operations.

A switch in the circuit for holding the door 6 closed until the blower stops, is provided, this being controlled by an air operated device 146 as a diaphragm chamber, the pressure side of which is connected by a pipe 147 to the outlet 137 of the blower. This device operates a holding switch 148 to closed position, so that a circuit is provided around the door contact finger of the series 52 to hold the door closed, even though the slot in the formula sheet moves out of register with the door closing finger while the blower is in operation, this shunt circuit being through wire 149 from solenoid windings 132 for the "door" relay air valve 133 to return wire 131, closed switch 148, thence through wire 150, wire 105^a to return wire 66. Before the switch 148 is closed, the solenoid windings are in a return circuit through the wire 149, wire 131 and "door" contact finger of the series of contacts 52. When the timer motor 57 is stopped, as described, at the end of the cycle, the washer is unloaded and reloaded and the next cycle started by turning the drum 54 by means of the handle 151 to bring the slot in the formula sheet in register with the "water" contact finger of the series of contacts 52.

A temperature indicator 150 in the cabinet 4 and temperature bulb 151 located in tank 3 show the temperature of liquid in the tank. Light "L" signals when the timer drum 50 is running.

What we claim is:

1. In a washing apparatus, a mixing tank for a washing fluid, means for supplying ingredients to the tank including a turret mounted to rotate about an upright axis, containers for ingredients on the turret and pivotally connected thereto to tilt radially outward, mechanism for intermittently turning the turret to bring the containers successively into position to discharge into the tank, and means operable to tilt the container at the discharge station to dump the contents thereof into the tank and to return the container to its normal position on the turret including a rock shaft located adjacent the discharge station and arranged with its axis extending in a general direction tangent to the turret, and having a cou-

pling arranged to normally engage the container on opposite sides of its pivotal axis when the container moves into discharge position and to thrust against the container to tilt the container about its axis.

2. In combination, a mixing tank for a liquid, means for supplying ingredients to the liquid of the mixing tank including a carrier, containers for ingredients on the carrier, the carrier being movable to bring the containers successively to discharge into the tank, the carrier and the containers having means by which the containers are pivotally connected to the carrier to tilt and dump the ingredients therefrom, mechanism for advancing the carrier to bring the containers successively to dumping position, and means operable to tilt the container in dumping position to discharge the contents thereof into the tank and to return the container to its normal position, including a rock shaft located at the dumping position of the containers and extending parallel to the pivotal tilting axis of the container in dumping position, the rock shaft having a bracket arranged to coact with the container on opposite sides of the pivotal axis thereof, so that upon rocking of the shaft the container is tilted and held by the bracket during the tilting operation.

3. Means for supplying ingredients to the liquid of a mixing tank, including a turret mounted to turn about an upright axis, containers for ingredients on the turret and each having a bracket at its bottom corner toward the edge of the turret, the bracket having a radial slot open at its inner end toward the axis of the turret forming a hook, pivots at the edge of the turret for receiving the hooks, mechanism for intermittently turning the turret to bring the containers successively to dumping position, and means operable to tilt the container in dumping position to discharge the contents thereof and to return the container to its normal position, including a rock shaft extending in a general tangential direction relative to the turret and parallel to the pivot of the container in dumping position, the rock shaft having a bracket arranged to press against the outer side of the container above the pivotal axis thereof and against the container below the pivotal axis, whereby upon rocking of the rock shaft the container in dumping position is tilted about its axis and held from displacement during the tilting movement.

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