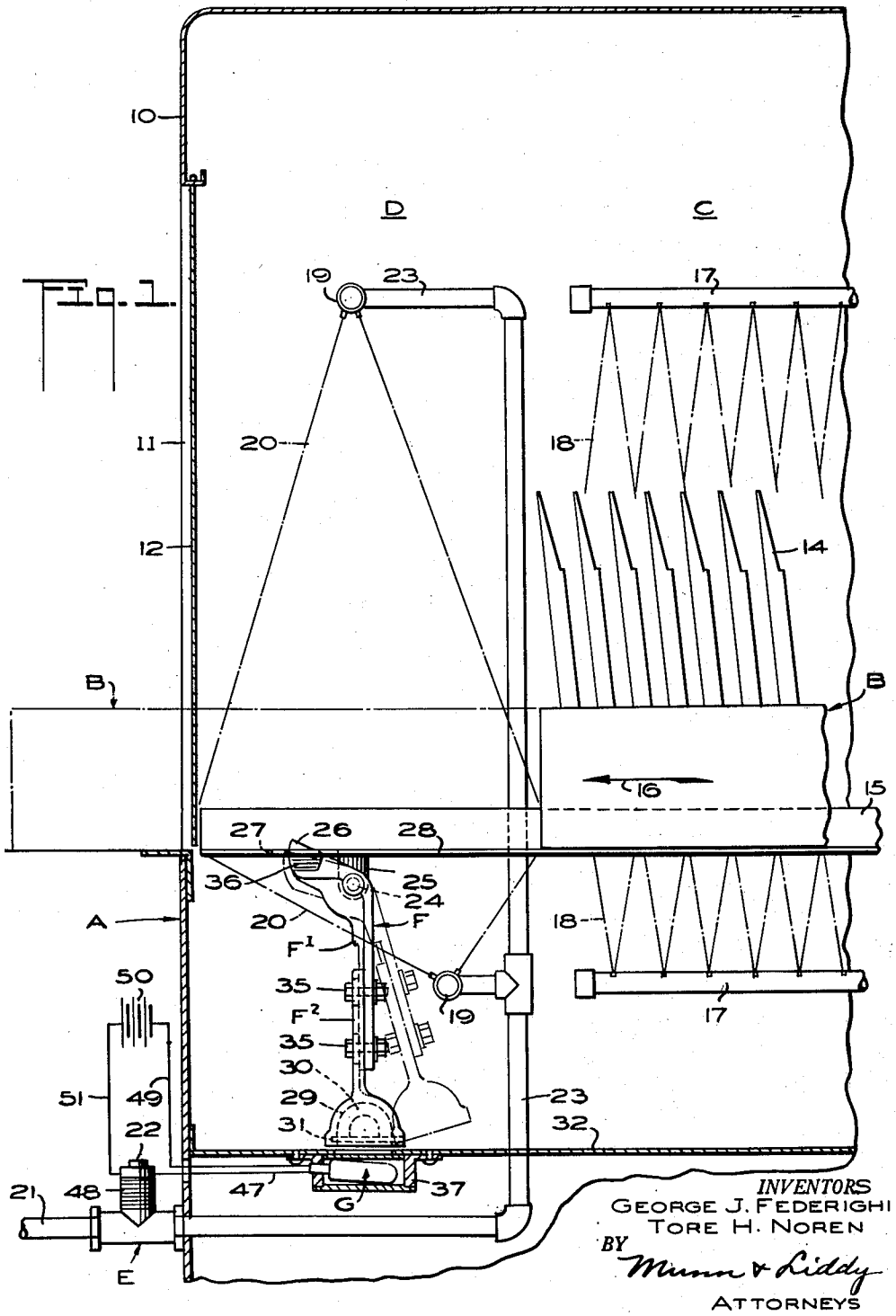
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MAGNETIC MECHANISM FOR CONTROLLING FLOW OF RINSE WATER IN DISHWASHING MACHINES

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2 Sheets-Sheet 2

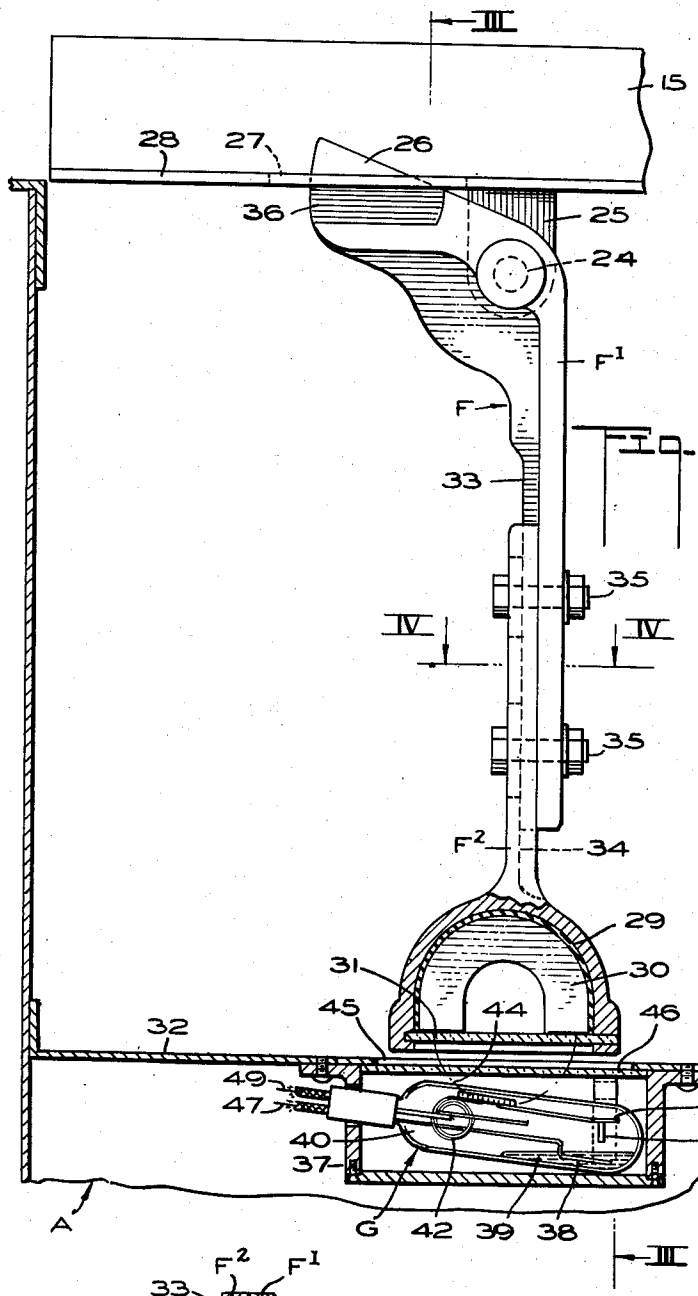


FIG. 2.

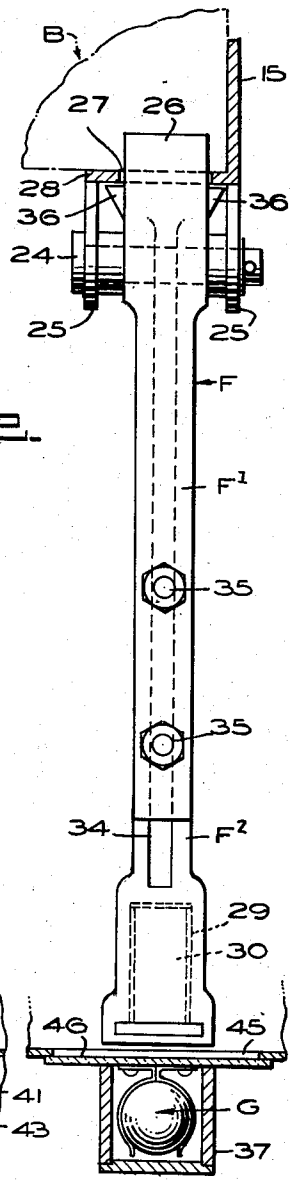


FIG. 3.

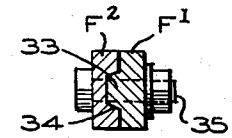


FIG. 4.

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MAGNETIC MECHANISM FOR CONTROLLING FLOW OF RINSE WATER IN DISHWASHING MACHINES

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Application February 23, 1952, Serial No. 273,076

1 Claim. (Cl. 134—46)

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The present invention relates to a magnetic mechanism for controlling flow of rinse water in a dish-washing machine. It has particular reference to improvements over our copending application, entitled "Rinse Water Control Mechanism for Dish-Washing Machines," Serial No. 262,276, filed in the United States Patent Office on December 18, 1951.

In the above identified copending case, we provide an electrically-operated valve, which is arranged exteriorly of a rinsing compartment of a dish-washing machine, for controlling the discharge of hot rinse water over dishes being advanced in baskets through this compartment. For actuating the valve automatically, we provide a trip having a mercury switch mounted therein, which is disposed to be actuated as each basket is advanced through the rinsing compartment. The switch is connected to the valve by wirings, which extend through the rinsing compartment, where they are subjected to water being discharged over the dishes.

It is proposed in the present invention to avoid running the electrical wirings into the rinsing compartment. Within this compartment, a pendulum-like trip is mounted so as to be actuated by the advancing baskets. The trip is provided with a magnet, which is made to operate the valve-controlling switch. The latter and all of the necessary electrical wirings connected therewith are mounted exteriorly of the rinsing compartment so as to be free from exposure to the rinsing water.

Other objects and advantages will appear as the specification continues. The novel features will be pointed out in the claim hereunto appended.

Drawings

For a better understanding of our invention, reference should be had to the accompanying drawings, forming part of this application, in which:

Figure 1 is a longitudinal vertical sectional view taken through a portion of a dish-washing machine and embodying our improved magnetic mechanism for controlling the flow of rinse water;

Figure 2 is an enlarged view of the lower left-hand portion of Figure 1;

Figure 3 is a vertical transverse sectional view taken along the plane III—III of Figure 2; and

Figure 4 is a horizontal sectional view taken along the line IV—IV of Figure 2.

While we have shown only the preferred form of our invention, it should be understood that various changes, or modifications, may be made within the scope of the annexed claim without departing from the spirit thereof.

Detailed description

Referring to the drawings, we have shown a

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portion of a dish-washing machine, which includes a cabinet-like structure indicated generally at A in Figures 1 and 2. The upper part of this structure defines a hood 10 having an exit opening 11 at its rear, which may be closed by a drop curtain 12.

Dishes 14 to be washed are placed in baskets B. The latter are supported on and guided along a pair of spaced-apart rails 15, which extend lengthwise through the bottom portion of the hood, delivering the dish-carrying baskets through the exit opening. The arrangement for advancing the baskets in the direction of the arrow 16 (see Figure 1) is fully shown in another of our copending applications, entitled "Mechanism for Moving Dish-Containing Baskets Through an Automatic Dish-Washing Machine," Serial No. 220,954, filed in the United States Patent Office on April 13, 1951.

The interior of the hood defines washing and rinsing compartments C and D, respectively, through which the baskets are advanced. A plurality of slotted pipes 17 are arranged in the washing compartment so as to discharge hot detergent-containing water 18 against the dishes from above and below (see Figure 1).

After the dishes have been cleaned, the baskets B are advanced between spray nozzles 19 arranged in the compartment D. These nozzles direct hot rinse water 20 over the dishes. This water is supplied from a suitable source, such as a boiler, and flows through an inlet pipe 21 to an electrically-operated valve E. Normally, the plunger 22 of this valve closes against its seat. However, when the valve is opened, the hot water is delivered through pipes 23 to the spray nozzles.

It will be noted that the valve E is disposed exteriorly of the cabinet-like structure A so as to be out of reach of the detergent-containing water 18. In order to conserve hot rinse water, and at the same time prevent an excess amount thereof from diluting the detergent water, the spraying of the rinse water from the nozzles is controlled by the forward advancement of the baskets B. This is accomplished by placing a trip E in the path of the advancing baskets.

As shown in the drawings, the trip is pendulum-like in construction and is swingably supported on a journal pin 24, which extends through ears 25 fixed to and depending from one of the rails 15. Any other suitable means may be employed for mounting the trip for swinging movement. The trip is balanced for moving by gravity into the full-line position disclosed in Figure 1.

At the upper end of the trip, we have shown an inclined nose 26 that projects upwardly through a slot 27 fashioned in a horizontal flange 28 of the rail 15 on which the trip is supported. This nose slopes in the direction of travel of the baskets B, and is disposed to be

depressed by the advancing baskets, swinging the trip into the dot-dash line position suggested in Figure 1 of the drawings.

The lower end of the trip is formed with a recess 29 in which a horseshoe magnet 30 is arranged, the magnet being suitably insulated from the wall of the recess. For the purpose of preventing water from gaining access to the magnet, a non-magnetic plate 31 is disposed to provide a liquid-tight closure over the mouth of the recess.

In order to allow the magnet to be adjusted toward or away from a bottom wall 32 of the compartments B—C, the trip has been made in upper and lower sections F1 and F2, respectively, which are slidably interconnected with each other. With particular reference to Figures 2 and 4, it will be seen that a rib 33 on the upper section F1 projects into a companion groove 34 fashioned in the lower section F2. Bolts 35 are provided for clamping these two sections in adjusted position relative to one another.

The clockwise swinging of the trip about its journal pin 24 is limited by stops 36, which are arranged to abut the underneath surface of the rail 15 on which the trip is supported (see Figures 2 and 3).

For the purpose of controlling the electrically-operated valve E, and thereby the rinse water, we have arranged a conventional mercury switch G in a casing 37 mounted underneath the wall 32. This switch includes a fixed terminal 38, which extends into a body of mercury 39 enclosed in a glass capsule 40 of the switch (see Figure 2). Moreover, the switch has an armature terminal 41 which is supported by a coil spring 42. The latter urges the contact 43 of the armature terminal toward the mercury.

However, when the magnet 30 is disposed above the switch G, the field 44 established by the magnet will attract the armature terminal, raising the contact 43 of the latter out of the mercury. When the trip is swung into its dot-dash line position, as shown in Figure 1, due to a basket B riding over the nose 26, the magnetic field is removed from the armature terminal. Thereupon, the latter will be moved downwardly by the spring 42 until the contact 43 enters the mercury.

The wall 32 is interposed between the magnet 30 and the mercury switch, with the latter and all wirings connected thereto being disposed exteriorly of the rinsing compartment and separated therefrom by this wall. Of course, the wall 32 may be made of non-magnetic material in order to allow the magnetic field 44 to pass therethrough. In the event that this wall is fashioned from magnetic material, then an opening 45 may be formed therein, and a non-magnetic plate 46 welded or otherwise secured thereover. This plate will permit passage of the field from the magnet to the armature terminal.

The fixed terminal 38 has a wire 47 leading to one end of the solenoid windings 48 of the valve E (see Figure 1), while the armature terminal 41 is connected by a wire 49 to one side of a source of electricity 50. The other end of the solenoid windings and the remaining side of the electrical source are interconnected by a wire 51 to complete the circuit.

Inasmuch as the magnet 30 is disposed directly above the mercury switch, in the absence of a basket B passing over the nose 26 of the trip, the switch normally will be opened. Thus, current will not be flowing through the electrical circuit and the valve E will remain closed. However, as soon as a basket is advanced to swing the trip into its dot-dash line position shown in Figure 1, the switch will close, resulting in opening the valve E and causing hot rinse water to be discharged over the dishes contained in the basket B then disposed in the rinsing compartment.

Upon moving the basket B through the exit opening 11, the trip F will gravitate into its normal full-line position shown in Figure 1. Thereupon the switch G will be opened; the valve E will close; and further discharge of hot rinse water from the nozzles 19 at this time will be stopped.

Obviously, other types of switches could be provided, which would be closed by a magnetic trip due to the latter being swung by the passage of a dish-carrying basket B over the nose 26 of the trip.

We claim:

In a dish washing machine, a rinsing compartment, a rail extending longitudinally through said compartment and adapted to support baskets having dishes therein, means forming an opening in said rail, a spray nozzle mounted above said rail and adapted to direct fluid downwardly toward said rail, a journal pin positioned below and attached to said rail, a trip pivotally mounted on said pin and comprising a normally vertically extending arm portion depending from said pin, and a second nose-forming portion rigidly connected at an angle to the first portion and normally extending upwardly through said rail opening and adapted to be engaged by a basket traveling on said rail, the first mentioned portion having a magnet secured therein, said compartment comprising a floor and upstanding side walls, means forming an opening in said floor, a plate formed of a non-magnetic material closing said opening, a switch positioned below said opening and attached to said floor and comprising a fixed contact and a movable contact, said movable contact having an armature attached thereto, said armature being attracted toward said magnet to open said switch when the first mentioned portion is vertically positioned, means in said switch normally urging said movable contact toward said fixed contact to close said switch, a supply pipe connected to said nozzle for supplying fluid thereto, a magnetic valve positioned in said pipe for controlling the flow of fluid therethrough, said valve being operable upon closing of said switch contacts, said switch contacts closing upon pivotal movement of the first mentioned portion out of its normal vertical position when the second mentioned portion is engaged by a basket.

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