

June 7, 1960

R. C. THOMPSON

2,939,612

DISHWASHING MACHINE WITH DETERGENT DISPENSER

Filed Dec. 26, 1957

2 Sheets-Sheet 2

FIG. 2

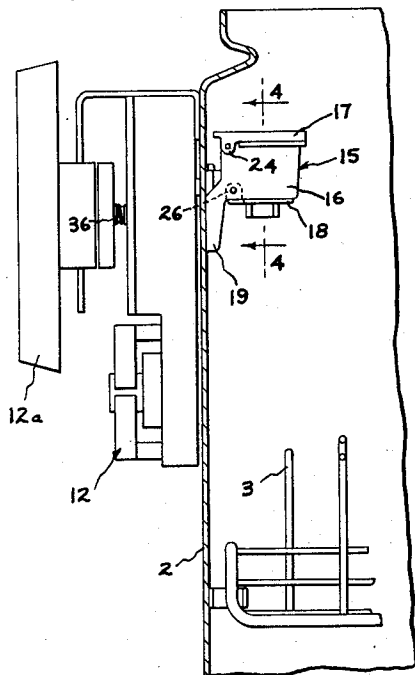


FIG. 3

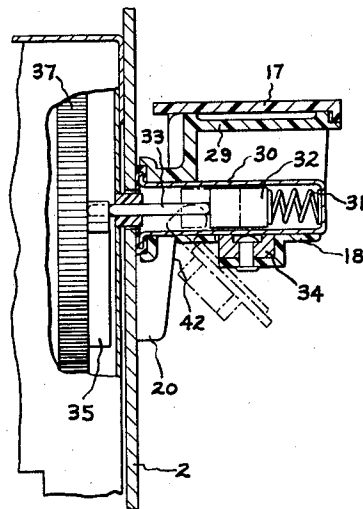


FIG. 4

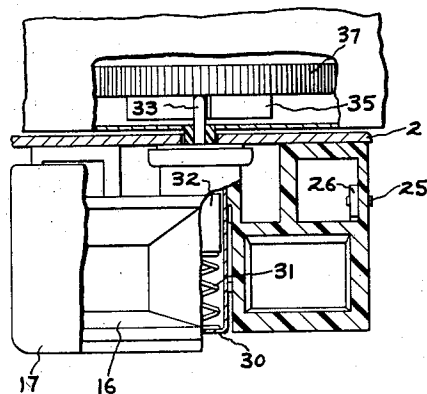
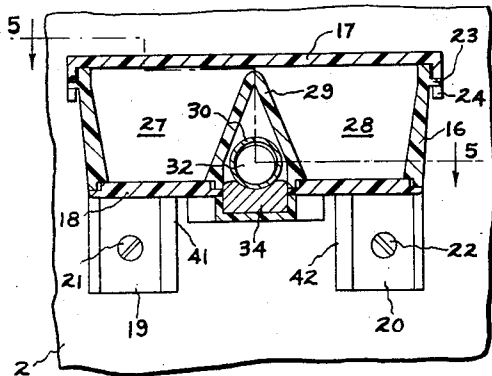
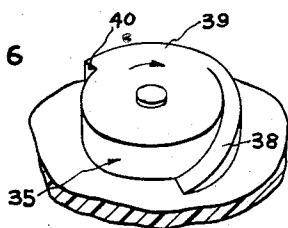


FIG. 5

FIG. 6



INVENTOR.
RAYMOND C. THOMPSON

BY *T. G. Dupont*
HIS ATTORNEY

1

2,939,612

DISHWASHING MACHINE WITH DETERGENT DISPENSER

Raymond C. Thompson, New Albany, Ind., assignor to General Electric Company, a corporation of New York

Filed Dec. 26, 1957, Ser. No. 705,153

3 Claims. (Cl. 222—181)

This invention relates to washing machines, and more particularly to a dishwasher including means for automatically introducing a charge of detergent or the like into the washing compartment.

A principal object of this invention is to provide a dishwasher including a magnetically operated detergent dispenser arranged to automatically open and close at predetermined times.

Further objects and advantages of the invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Briefly stated, in accordance with one aspect of this invention there is provided a detergent dispenser including a bottom wall portion pivotally mounted within a vat or tub for movement between a horizontal position and an inclined dumping position, magnetic means arranged to move the bottom wall portion from its inclined position to its horizontal position and hold it in the latter position, and means for disabling the magnetic means so as to permit the bottom wall to move to its inclined position.

For a better understanding of this invention reference may be made to the following description and the accompanying drawing in which:

Fig. 1 is a front elevation view, with some of the parts broken away, of a dishwasher embodying the present invention.

Fig. 2 is a sectional view taken along the line 2—2 in Fig. 1.

Fig. 3 is a cross-sectional view taken along the line 3—3 in Fig. 1.

Fig. 4 is a cross-sectional view taken along the line 4—4 in Fig. 2.

Fig. 5 is a cross-sectional view taken along the line 5—5 in Fig. 4.

Fig. 6 is an enlarged perspective view of one of the parts shown in Fig. 3.

Referring to Fig. 1 of the drawing, there is shown a dishwasher designated by the numeral 1 having an enclosed washing compartment or tub 2 of generally rectangular configuration in which is mounted an upper rack 3 and a lower rack 4 arranged to support dishes or the like during washing operations. Dishwasher 1 is provided with a water inlet valve 5 adapted to be connected to a water supply system, a water inlet conduit 6, and a fill funnel 7 communicating with the interior of tub 2. Located at the bottom of the tub 2 and arranged to circulate washing fluid throughout the washing compartment is a rotary impeller 8. A drain pump 9 having an inlet communicating with tub 2 and an outlet connected to drain conduit 10 is supported beneath the tub, the housing of pump 9 being arranged to support an electric motor 11 which drives the impeller 8 so as to circulate the fluid in the tub when rotating in one direction, and to operate pump 9 so as to discharge fluid through conduit 10 when driven in the other direction. Automatic opera-

2

tion of dishwasher 1 is effected by a timer control assembly, generally designated by the numeral 12, which is arranged to control the energization of inlet valve 5 and motor 11 as well as the actuation of the detergent dispensing means of the present invention. Timer 12 includes a switch actuating rotary cam driven by a constant speed motor, such devices being well known in the art. Tub 2 has a top access opening which is closed by hinged top cover 13 during washing operations, being held in closed position by a latch mechanism 14 which includes an interlock arrangement mechanically connected to rotary control member 12a of timer 12. This cover latch mechanism is disclosed and claimed in application Serial No. 673,909, now Patent No. 2,896,641, filed July 24, 1957 by Melvin R. Kauffman and John A. Dicken, Jr. and assigned to the assignee of the present application.

A typical operating cycle of dishwasher 1 includes a number of rinsing, washing and drying steps which may comprise the following sequence; for example:

(1) A preliminary rinse in which the inlet valve 5 is opened to admit a predetermined quantity of water into the tub 2, impeller 8 is rotated by motor 11 for a short period of time (two minutes, for example) to circulate water within the tub, and finally motor 11 is reversed so as to operate drain pump 9 and discharge the first charge of washing fluid from the tub.

(2) Second preliminary rinse in which step 1 is repeated.

(3) A washing step, similar to steps 1 and 2 except that detergent is introduced into the water at the beginning of the step and the water is circulated in the tub for a somewhat longer period of time (five or six minutes, for example).

(4) At least one and preferably three rinse steps similar to step 1.

(5) A drying step, in which air is permitted to circulate through the tub.

In accordance with the present invention, a detergent dispensing device generally designated by the numeral 15 is provided to effect introduction of detergent or other water conditioning material into the washing compartment of a dishwasher during a cycle such as that outlined in the preceding paragraphs. It will of course be understood that this invention may be utilized in various types of dishwashers, and that the foregoing description of a particular dishwasher and operating cycle has been made for the purpose of providing a full disclosure of the present invention and its mode of operation. Referring now to Fig. 2 of the drawing, detergent dispenser 15 comprises a body portion 16 which may be made of molded plastic or other suitable material, a hinged cover 17 pivotally mounted on body portion 16, and a horizontally disposed bottom wall 18 pivotally secured to the lower edge of body portion 16. Dispenser 15 is fixedly secured to tub wall 2, body portion 16 being provided with legs 19 and 20 which are fastened to the tub wall by mounting screws 21 and 22. Cover 17 is pivotally mounted on body portion 16 by means of a suitable hinge structure such as that provided by a hinge pin 23 molded integrally with body portion 16 and arranged to project through an opening in an ear portion 24 of cover 17. Bottom wall 18 is similarly mounted on body portion 16 by means of a hinge pin 25 (Fig. 5) extending through an ear portion 26 formed on the rear edge of wall 18.

Detergent container 15 is formed so as to provide a pair of detergent compartments 27 and 28 which are separated by V-shaped wall member 29, the space between the two portions of wall member 29 being arranged to accommodate a tube 30 formed of a non-magnetic material, such as brass. The flanged open end of tube 30 is secured to tub wall 2 (see Fig. 3) and encloses a coiled spring 31 com-

pressed against the closed end of the tube by a magnet element 32 and an axially moveable cam follower 33. Magnet element 32 cooperates with a magnet element 34 which is secured to bottom wall 18 and arranged so that when the parts are in the position shown in Fig. 3, magnet element 32 and 34 attract each other and hold bottom wall 18 in its horizontal position.

Magnet 32 is arranged to be axially moveable in tube 30, and in the preferred embodiment of this invention it is arranged to be actuated between the position shown in full lines in Fig. 3 and the position shown in broken lines by rotary cam 35 which is rotated by timer mechanism 12, being secured to the main shaft 36 of the timer adjacent timer gear 37. Cam 35 includes an inclined cam surface 38, a raised cam surface 39 and a drop-off ledge 40, each of which successively engages cam follower 33 as shaft 36 rotates during operation of the dishwasher. It will be evident that cam follower 33 will be maintained in the position shown in Fig. 3 during the interval when it engages raised cam surface 39, and that it will be rapidly moved to the position shown in broken lines by spring 31 as the follower 33 passes over drop-off ledge 40. Thus it will be seen that magnet 32 will be maintained in attracting relation with magnet element 34 while cam follower 33 engages cam surface 39, and that it will be shifted into repelling relation with magnet element 34 after cam follower 33 passes over drop-off ledge 40. As rotation of cam 35 continues cam follower 33 will eventually ride up inclined surface 38, thus returning magnet element 32 to the position shown in full lines in Fig. 3.

Downward pivotal movement of bottom wall 18 is limited by engagement of a portion thereof with stop projections 41 and 42 which may be conveniently formed as a part of legs 19 and 20 respectively. Thus wall member 18 is movable between a horizontal position in which detergent or other powdered material may be retained in detergent compartments 27 and 28 and an inclined dumping position shown in broken lines in Fig. 3 in which the detergent is permitted to pass out of the detergent container and into washing tub 2. In accordance with the present invention, downward movement of bottom wall 18 is limited so that magnet element 34 remains close enough to tube 30 that it will be attracted upwardly toward magnet element 32 when the latter is returned to its latching or attracting position. Thus, after each dishwashing cycle has been completed rotary movement of cam 35 in the direction indicated by the arrow shown in Fig. 6 will have brought cam portion 39 into engagement with cam follower 33 so that magnet element 32 is returned to the position shown in full lines of Fig. 3, whereupon bottom wall 18 will be automatically returned to its horizontal closed position.

In describing the operation of the present invention it will be assumed that dishes to be washed have been placed on the racks 3 and 4 in tub 2 of the dishwasher, and that the machine has been prepared for a washing operation by connecting the inlet side of valve 5 to a suitable hot water supply and connecting drain conduit 10 to the waste pipe of a plumbing system. At the beginning of each washing operation, the parts will be in the position shown in Fig. 2, it being understood that cover 17 is closed after a suitable quantity of detergent has been placed in the detergent dispenser. Cover 17 protects the detergent from the water circulating in the dishwasher during the preliminary rinse steps, and at the same time cam follower 33 remains in engagement with raised portion 39 of cam 35, thus maintaining magnet element 32 in the position shown in full lines in Fig. 3 so that bottom wall 18 is held in closed position. At the beginning of the wash step of the cycle, cam follower 33 drops off ledge 40, magnet element 32 is moved to the left (as viewed in Fig. 3) by spring 31 and hence bottom wall 18 is pivoted by the force of gravity and by magnetic repelling force to the position shown lines. Thus detergent in compartments 27 and 28 is discharged into the tub, and the water circulated by

impeller 8 is sprayed upwardly through dispenser 15 with sufficient force to open cover 17 and completely wash out and remaining detergent. As the washing, rinsing and drying steps of the complete operating cycle succeed each other, it will be understood that wall member 18 remains in the position shown in broken lines in Fig. 3, and that only after the drying step has begun (at which point cam follower 33 is in engagement with inclined portion 38 of cam 35) does magnet element 32 return to a position in which it attracts magnet element 34. As cam follower 33 reaches raised portion 39 of the cam, magnet element 32 returns to its initial position and magnetic attraction between it and magnet element 34 causes bottom wall 18 to return to its closed position, so that the detergent dispenser is automatically set for the next cycle of operation.

While I have shown and described a specific embodiment of my invention, I do not desire the invention to be limited to the particular construction disclosed, and I intend by the appended claims to cover all modifications within the true spirit and scope of my invention.

What I claim is:

1. A dispensing device comprising a container including a movable bottom wall, said wall being movable between a supporting position and a discharge position, a first magnet element secured to said wall, a second magnet element movably mounted in cooperating relation with said first magnet element, means for moving said second magnet element from a first position in which said wall is supported in its supporting position by magnetic attraction between said magnet elements to a second position in which said magnetic attraction is insufficient to support said wall, said wall being sufficiently close to said second magnet element when in said discharge position that it is moved to its supporting position by said magnetic attraction when said second magnet element is returned to its first position.

2. A dispensing device comprising a container including fixed side walls, a hinged horizontally disposed cover, a hinged horizontally disposed bottom wall, said bottom wall being movable to an inclined discharge position, a first magnet element secured to said bottom wall, a second magnet element movably mounted in cooperating relation with said first magnet element, means for moving said second magnet element from a first position in which said wall is supported in its horizontal position by magnetic attraction between said magnet elements to a second position in which said magnetic attraction is insufficient to support said wall, said wall being sufficiently close to said second magnet element when in said inclined position that it is moved to its horizontal position by said magnetic attraction when said second magnet element is returned to its first position.

3. A dispensing device comprising a vertical support wall, a body portion fixedly secured to said support wall, a horizontally disposed cover pivotally secured to said body portion, a horizontally disposed bottom wall pivotally secured to said body portion, the pivotal axes of said cover and said bottom wall being parallel to said support wall, a tube of non-magnetic material supported on said support wall adjacent said body portion and overlying a part of said bottom wall, the axis of said tube being perpendicular to said support wall, a first magnet element secured to said part of said bottom wall, a second magnet element supported within said tube for movement between a first position in which said bottom wall is supported in a horizontal position by magnetic attraction between said magnet elements and a second position in which said magnet elements repel each other so that said bottom wall is pivoted to an inclined dumping position, means for moving said second magnet element between said positions, and stop means on said body portion for limiting the movement of said bottom wall so that said bottom wall remains sufficiently close to said tube when in said inclined position that it is automatically returned to its horizontal position

by said magnetic attraction when said second magnet
is returned to its said first position.

References Cited in the file of this patent

UNITED STATES PATENTS

517,127	Burvis	Mar. 27, 1894
998,389	Penick	July 18, 1911
1,995,331	Snyder	Mar. 26, 1935

5

2,102,311
2,123,606
2,325,441
2,435,758
2,537,942
2,609,974

1,065,775

Fisher et al.	Dec. 14, 1937
Latocha	July 12, 1938
Tucker et al.	July 27, 1943
Snyder	Feb. 10, 1948
Martin	Jan. 9, 1951
Brous	Sept. 9, 1952

FOREIGN PATENTS

France	Jan. 13, 1954
--------	---------------