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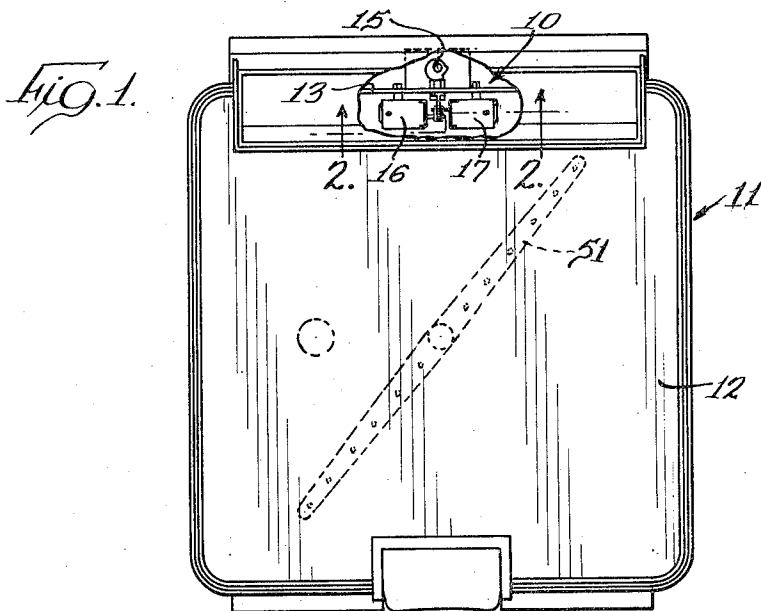
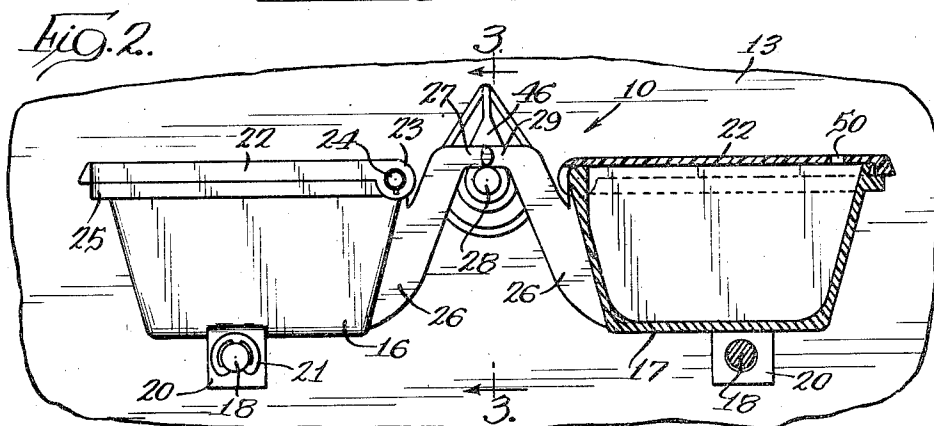
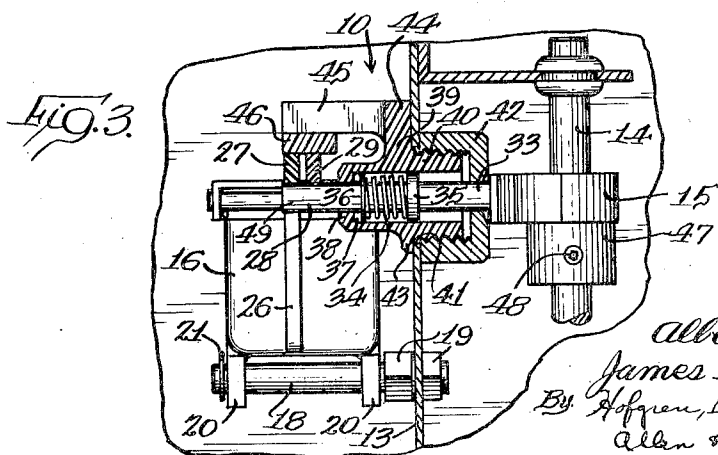
A. T. BRAGA ET AL

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DETERGENT DISPENSER FOR WASHING MACHINE

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2 Sheets-Sheet 1



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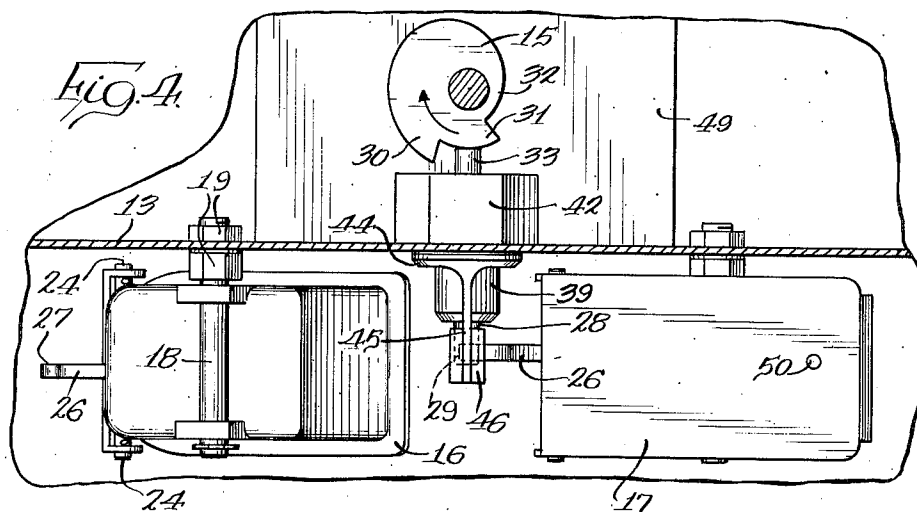
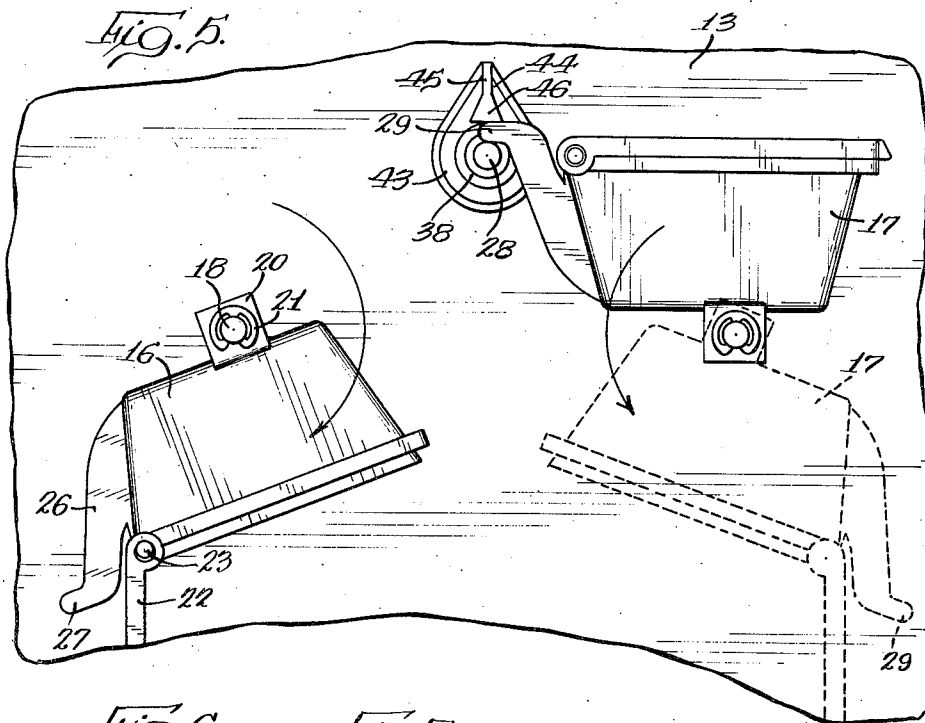
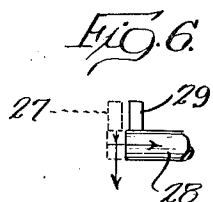
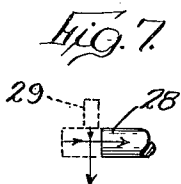
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DETERGENT DISPENSER FOR WASHING MACHINE

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2 Sheets-Sheet 2



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3,038,640

DETERGENT DISPENSER FOR
WASHING MACHINE

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7 Claims. (Cl. 222-70)

This invention relates to dispensers and in particular to dispensers for dispensing material such as powdered detergent in appliances such as dishwashers.

One feature of the instant invention is the provision of a dispenser having new and improved means for dispensing one or more charges in the cycle of operation of the apparatus in which the dispenser is installed.

Another feature is the provision of such a dispenser having a pair of cups, means supporting the cups at their bottoms for pivotal movement thereabout by gravitational action from a charge holding upwardly opening disposition to a charge dispensing downwardly opening disposition, and a unitary control member movable for selectively engaging and retaining both, only one, or neither of the cups against pivotal movement from the charge holding to the charge dispensing disposition.

A further feature of the invention is the provision of a timer operated means for selectively positioning the control member in a plurality of positions to empty both, only one, or neither of the cups.

Still another feature is the provision of such dispensing apparatus wherein each of the cups is provided with a latch portion, the latch portions being juxtaposed when the cups are in the charge holding, upwardly opening disposition, the control member comprises a rod disposed between the cups and movable longitudinally for selectively releasing the latch portions, and the means supporting the cups defines parallel pivotal axes whereby the pivotal movement of the cups is in mutually opposite directions of rotation.

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

FIGURE 1 is a plan of a dishwasher with a portion thereof broken away to show the installation therein of a dispensing apparatus embodying the invention.

FIGURE 2 is an enlarged, fragmentary vertical view taken substantially along the line 2-2 of FIGURE 1.

FIGURE 3 is a transverse vertical section taken substantially along the line 3-3 of FIGURE 2.

FIGURE 4 is a fragmentary plan of the dispensing apparatus with the left cup in the charge dispensing disposition and the right cup in the charge holding disposition.

FIGURE 5 is a front elevation thereof, with the right cup further shown in dotted lines in the charge dispensing disposition.

FIGURE 6 is a diagrammatic illustration of the movement of the control rod relative to the cup finger in releasing the first cup.

FIGURE 7 is a diagrammatic illustration of the movement of the control rod relative to the second cup finger in releasing the second cup.

A dispensing apparatus generally designated 10 embodying the invention is illustratively shown in the drawings as provided in a dishwasher appliance generally designated 11. The dishwasher may be of generally conventional construction of the top loading type having a hinged mounted cover 12 providing access to the interior of the dishwasher for loading and unloading operation. Dispensing apparatus 10 is illustratively shown as mounted on the rear wall 13 of the dishwasher. The

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dishwasher is provided with a control mechanism of conventional construction (not shown) having a shaft 14 rotatable to different angular positions during operation of the dishwasher. As discussed more fully subsequently, a cam 15 is mounted on shaft 14 to control operation of the dispensing apparatus 10 to dispense sequentially at preselected times the detergent from the dispensing apparatus to the wash water in the dishwasher.

More specifically, dispensing apparatus 10 includes a pair of cups 16 and 17 of substantially identical construction, the following description of the cups being limited primarily to cup 16, it being understood that the description applies equally well to cup 17. As best seen in FIGURES 3 and 4, cup 16 is pivotally mounted on wall 13 by means of a post 18 secured to wall 13 by suitable means such as nuts 19 to extend horizontally outwardly therefrom and through a pair of depending ears 20 on the bottom of the cup. The cup is retained on post 18 by suitable means such as split locking ring 21 at the outer end thereof. As best seen in FIGURE 2, the ears are offset slightly from the vertical center of gravity of the cup so that when allowed to hang free, the cup will swing to the inverted position illustrated in FIGURE 5.

When in the charge holding position of FIGURE 2, the cup is closed by a cover 22 hingedly mounted at one end 23 on a pair of outwardly projecting lugs 24. Lugs 24 are disposed on the opposite side of the center of gravity of cup 16 from ears 20 so that when the cup swings to the dispensing disposition of FIGURE 5, the cup is fully opened. A peripheral depending flange 25 on cover 22 extends to below the upper end of the cup thereby effectively precluding entry of water into the cup when the cup is in the charge holding disposition of FIGURE 2.

The cup is held in the charge holding disposition of FIGURE 2 by a finger 26 thereon extending perpendicularly to the parallel axes of post 18 and lugs 24. The outer end 27 of finger 26 is turned to extend horizontally when the cup is in the charge holding disposition of FIGURE 2 and rest on a control rod 28 extending longitudinally movably through dishwasher wall 13. Finger 26 is disposed slightly to one side of the vertical central plane of the cup extending perpendicular to the axes of post 18 and lugs 24. Cup 17 is carried on wall 13 with its finger 26 extending toward cup 16 and, thus, the end portion 29 of its finger is spaced a small distance toward wall 13 from end portion 27 of the finger 26 of cup 16.

Cups 16 and 17 are retained in the charge holding disposition of FIGURE 2 by the resting engagement of the finger ends 27 and 29 on the control rod 28. Thus, a pre-rinse operation of the dishwasher may be effected with detergent in the cups 16 and 17, the cups being closed by their covers 22. To effect a first wash operation, cup 16 is allowed to swing by the action of gravity from the charge holding position of FIGURE 2 to the charge dispensing position of FIGURE 5. This is caused by an axial movement of control rod 28 from the position of FIGURE 3 to the dotted line position of FIGURE 4. Such movement of control rod 28 is effected by cam 15 which has a portion 30 of maximum radius, a second portion 31 of lesser radius, and a third portion 32 of minimum radius. The outer end 33 of control rod 28 is urged against the periphery of cam 15 by a coil spring 34 compressed between a collar 35 on control rod 28 and a washer 36 bearing against a sealing ring 37 seated on a flange 38 of a support member 39 through which control rod 28 extends. The outer portion 40 of support member 39 is peripherally threaded and projects through an opening 41 in dishwasher wall 13. A cup-shaped cap 42 is threaded over portion 40 to bear against wall 13

and draw an annular boss 43 on the support member tightly against the inner surface of wall 13. Annular boss 43 is enlarged radially upwardly at 44 and provided with a longitudinally projecting extension 45 having a depending downwardly widening portion 46 at its outer end spaced slightly above control rod 28. Portion 46 is resilient and is adapted to retain outer ends 27 and 29 of the cup fingers against upward movement, as best seen in FIGURE 2, after ends 27 and 29 have been positioned on control rod 28 by momentary lateral deflection of portion 46. Cam 15 may be secured to shaft 14 by suitable means and is illustratively shown in FIGURE 3 as being provided with a longitudinally projecting portion 47 secured to the shaft 14 by a set screw 48. Shaft 14 is suitably rotated by conventional means such as timer mechanism 49 as seen in FIGURE 4 to dispose control rod 28 in its innermost disposition of FIGURE 3 at the initiation of a dishwashing cycle. At a preselected time during the dishwashing cycle, for example, during the first wash cycle, cam 15 rotates sufficiently to cause control rod end 33 to pass from portion 30 of the cam to portion 31 thereof thereby moving the inner end 49 of control rod 28 (as illustrated in FIGURE 6) from the position of FIGURE 3 to the position of FIGURE 4, allowing dispenser cup 16 to pivot by the action of gravity to the position of FIGURE 5 and dispense the detergent therefrom.

At a second preselected time in the operation of the dishwasher 11, such as during the second wash cycle, cam 15 rotates sufficiently to cause control rod end 33 to pass from cam portion 31 to cam portion 32, thereby permitting the inner end 49 of control rod 28 to move sufficiently outwardly (as illustrated in FIGURE 7) to permit finger end 29 of cup 17 to clear control rod end 49 whereupon cup 17 swings from the detergent holding position shown in full lines in FIGURE 5 to the detergent dispensing position shown in broken lines therein.

During the completion of the dishwashing cycle, cam 15 rotates sufficiently to redispense portion 30 thereof substantially in alignment with control rod 28 thereby urging inner end 49 of the control rod back to substantially the position of FIGURE 3. In returning the cups to the detergent holding position of FIGURE 2, the operator swings each of the cups further in the direction in which they pivoted to the detergent dispensing disposition. Thus, cup 16 is swung in a clockwise direction from the dispensing disposition of FIGURE 5 to the detergent holding disposition of FIGURE 2, and cup 17 is swung in a counterclockwise direction from the dotted line position of FIGURE 5 to the position of FIGURE 2. Member 39 is preferably formed of a resiliently yieldable material such as plastic permitting the ends 27 and 29 of the cup fingers 26 to move the projection 45 and enlargement 46 thereon sufficiently laterally to permit the finger ends to pass thereunder into engagement with the upper surface of control rod 28. The cover 22 of each cup is then pivoted to an open position permitting the cup to be filled with the desired amount of detergent.

The weight of the cover 22 is sufficient to retain the cover across the top of the cup during the rinse operations of the dishwasher. To prevent development of a suction pressure within the cup, which in combination with surface tension between the cover and the cup might prevent the cover from swinging to the open disposition shown in FIGURE 5, a hole 50 is provided in each of the covers. The holes are relatively small to preclude passage of any appreciable amount of water into the cups prior to their release to the detergent dispensing disposition.

When the cups are in inverted dumped position they are washed clean with water from the bottom spray arm 51 which is below the level of the cups. Thus, at the completion of the drying operation, the cups are clean and dry. When in the normal upright position and containing detergent the covers 22 keep water from the spray arm 51 from entering the cups. Both the arm 51 and

a drain 52 are located adjacent the bottom of the appliance.

While we have shown and described one embodiment of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claims.

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. Dispensing apparatus comprising: a pair of cups; means supporting the cups in a horizontally juxtaposed relationship for pivotal movement through the space between the cups from a charge holding upwardly opening position to a charge dispensing downwardly opening position whereby the cups dispense to a limited area underlying said space; a control rod for engaging and retaining said cups against pivotal movement from said charge holding to said charge dispensing position; and means positioning said rod to engage and retain selectably both, only one, or neither of said cups.

2. Dispensing apparatus comprising: a pair of cups; means supporting said cups for pivotal movement from a charge holding upwardly opening position to a charge dispensing downwardly opening position; a unitary control member for engaging and retaining said cups against pivotal movement from said charge holding to said charge dispensing position; cam means positioning said control member to engage said cups; means biasing said control member against said cam means; and timer operated means for moving said cam means during a programmed cycle of operations to permit said control member to move relative to said cups under the bias of said biasing means to selectively dump said cups during predetermined periods of said cycle.

3. Dispensing apparatus comprising: a pair of cups each having a latch portion; means supporting the cups for pivotal movement by gravitational action from a charge holding upwardly opening position wherein the latch portions are juxtaposed to a charge dispensing downwardly opening position; and a unitary control member disposed between said cups and movable for selectably engaging said latch portions to retain both, only one, or neither of said cups against pivotal movement from said charge holding to said charge dispensing position.

4. The dispensing apparatus of claim 3 wherein the means supporting said cups defines parallel pivotal axes and the pivotal movement of said cups is in mutually opposite directions of rotation.

5. Dispensing apparatus comprising: a pair of cups; means supporting the cups in a horizontally juxtaposed relationship for pivotal movement through the space between the cups from a charge holding upwardly opening position to a charge dispensing downwardly opening position whereby the cups dispense to a limited area underlying said space; a control member for engaging and retaining said cups against pivotal movement from said charge holding to said charge dispensing position; and means releasing said control member.

6. Dispensing apparatus comprising: a pair of cups; means supporting the cups in a horizontally juxtaposed relationship for pivotal movement through the space between the cups from a charge holding upwardly opening position to a charge dispensing downwardly opening position whereby the cups dispense to a limited area underlying said space; a control member for engaging and retaining said cups against pivotal movement from said charge holding to said charge dispensing position; and means positioning said control member to engage and retain selectably both, only one, or neither of said cups.

7. Dispensing apparatus comprising: a cup; means supporting the cup for pivotal movement in one direction from a charge holding upwardly opening position to a charge dispensing downwardly opening position; a control member selectively engaging said cup, said mem-

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ber being movable between a cup engaging position wherein the cup is held against pivotal movement and a cup releasing position wherein the cup is free to pivot; retaining means spaced from the control member for effectively precluding disengagement of the cup from the control member when the control member is in said cup engaging position, said retaining means comprising a resilient member normally in retaining position retaining a portion of said cup firmly against a portion of the control member when the control member is in said cup engaging position; and means associated with said cup for displacing said resilient member away from said engaging position when said cup is pivoted in a continuation of said one direction from said charge dispensing position to said charge holding position.

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