

Aug. 3, 1965

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3,198,387

TREATING AGENT DISPENSING MEANS

Filed Feb. 17, 1964

2 Sheets-Sheet 2

FIG. 5

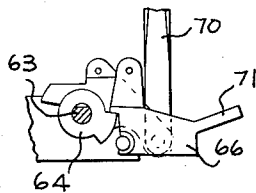


FIG. 2

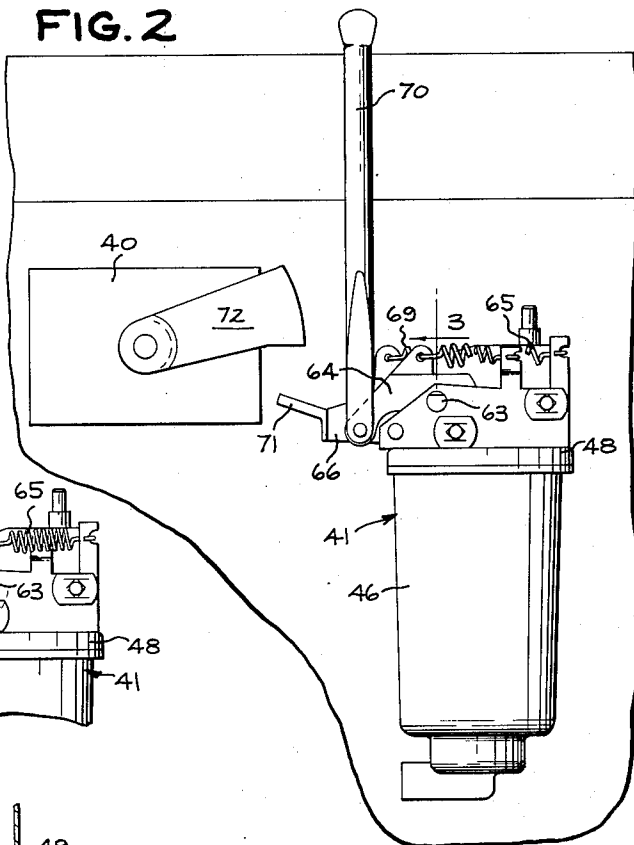


FIG. 6

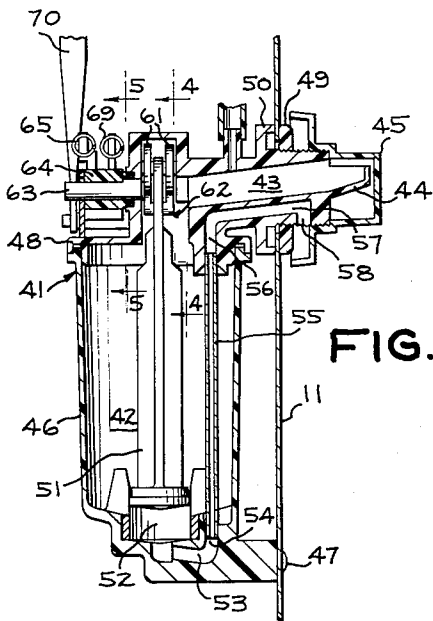
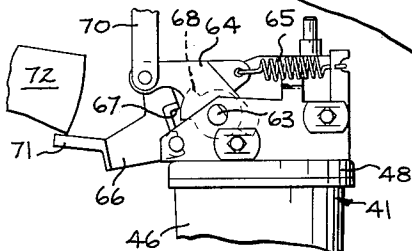


FIG. 3

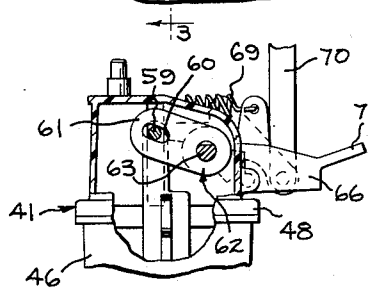


FIG. 4

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1

2

3,198,387

TREATING AGENT DISPENSING MEANS

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Filed Feb. 17, 1964, Ser. No. 345,432

3 Claims. (Cl. 222-70)

This invention relates generally to automatic washing machines and, more specifically, to a treating agent dispensing means for an automatic washing machine.

The present invention is particularly useful as a rinse aid injector for an automatic dishwasher, although obviously not limited in usefulness to such an application. A rinse aid, or wetting agent, is injected into the wash chamber of a dishwasher during the final rinse to minimize spotting of the dishes, and particularly the glassware, as the dishes are dried following the rinse. The broad concept of injecting a rinse aid at this point in a dishwasher cycle is not new and many devices have been heretofore proposed for accomplishing this. However, the devices heretofore proposed involve costly solenoids, require refilling after each operation, or do not allow selectivity of operation.

For example, the most common rinse aid injector in use today includes a very expensive solenoid to operate the metering or dispensing mechanism. Since a solenoid is used, there is also an additional switch required in the sequence control means. Moreover, the solenoid operated device does not provide selectivity of operation without the employment of a second additional switch to override the switch in the sequence control means. Selectivity, as used herein, means the ability to operate the dishwasher through a full cycle with, or without, rinse aid being injected at the selection of the user. With a solenoid operated dispenser, it is necessary to position an additional selection switch in electrical series with the solenoid to override the sequence control means switch in the event it is desired to omit the dispensing during a particular wash cycle.

It is also desirable to be able to store several days supply of agent in the dispenser so that it is not necessary to refill the dispenser after each dishwasher operation. This is especially true in connection with a rinse aid dispenser since the rinse aid, or wetting agent, is generally a viscous liquid not easily poured in small quantities.

Accordingly, it would be desirable to have a treating agent dispensing means capable of storing several days supply, which will provide selectivity of operation and which obviates a costly solenoid.

It is an object of this invention to provide an improved treating agent dispensing means for an automatic washing machine.

It is also an object of this invention to provide an improved treating agent dispensing means which will store several days supply of treating agent.

It is another object of the present invention to provide a treating agent dispensing means which will allow for selectivity of operation by the user of the washing machine.

Briefly stated, in accordance with one aspect of the invention, there is provided a treating agent dispensing means for use in an automatic washing machine having a wash chamber adapted to contain articles to be washed therein, wash means to effect a washing action upon the articles, and sequence control means to conduct the machine through a sequence of operations comprising a wash cycle. The dispensing means includes a reservoir adapted to contain several times the quantity of agent dispensed with each operation of the dispensing means. A metering means is provided to meter a predetermined quantity of

agent and direct it from the reservoir into the wash chamber. Energy storing means are associated with the metering means such that release of the energy stored by the storing means causes operation of the metering means. Manually operable means are provided to energize the energy storing means and the energy storing means are adapted to be released by the sequence control means to thereby cause dispensing of the agent into the washing chamber. It should be noted that with the above-described arrangement, the dispensing means will not operate unless it has been manually energized. Therefore, the operator of the automatic washing machine can select the cycle during which the dispensing means will operate by manipulating the manually operable means.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed the invention will be better understood from the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a side view, partially cut away to show details, of a top-opening portable dishwasher employing the present invention;

FIGURE 2 is an elevational view of the treating agent dispensing means of the present invention;

FIGURE 3 is a sectional view taken along line 3-3 of FIGURE 2;

FIGURE 4 is a sectional view taken along line 4-4 of FIGURE 3;

FIGURE 5 is a sectional view taken along line 5-5 of FIGURE 3; and

FIGURE 6 is a partial view similar to FIGURE 2 showing the treating agent dispenser in a different step of its operation.

Referring to the drawings and particularly to FIGURE 1, there is illustrated an automatic washing machine in the form of a portable dishwasher 10 having an outer cabinet 11 which, in cooperation with a bottom wall 12 and a top wall 13, forms a wash chamber 14. Disposed within wash chamber 14 are dish supporting racks 15 and 16. Dish supporting rack 16 is divided into two sections, a stationary rear section 17 and a movable front section 18.

A closure member 19, of which top wall 13 forms the inner surface, is provided to allow access to wash chamber 14. Closure member 19 pivots about a hinge member 20 when opened or closed. Bracket 21 interconnects front section 18 of rack 16 with closure member 19 such that, when closure member 19 is opened, section 18 moves 45 upwardly and rearwardly to overlie section 17. An arm 22, hingedly connected to section 18 at point 23 and also hingedly connected to cabinet 11 at point 24, is provided to control tipping of section 18 as it is moved. The rack 16, and its association with closure member 19, does not form a material part of the present invention and may be substantially as described and claimed in U.S. Patent No. 3,087,769, issued to Lauren W. Guth on April 30, 1963, and assigned to the General Electric Company, assignee of the present invention.

Bottom wall 12 has a centrally depressed portion forming a sump 25 so that any liquid within chamber 14 will collect therein. Supported by bottom wall 12 in sump 25 is a motor-pump unit 26. Motor-pump unit 26 includes an electric drive motor 27 and a pump 28. Pump 28 has an inlet 29 which draws fluids from sump 25 and, in one direction of rotation of motor 27, pumps this fluid up through spray arm 30 and spray tube 31. In this same direction of rotation of motor 17, pump 28 70 also pumps liquid through conduit 32, which interconnects with conduit 33 at coupling 34. The fluid pumped into

3

conduit 32 is ejected from spray device 35, rotatably secured to closure member 19.

In the opposite direction of rotation of drive motor 27, pump 28 draws wash fluids from sump 25 and propels them through effluent discharge outlet 36 which communicates with a normal household sewer system (not shown). An electrical resistance heating element 37 may be provided in wash chamber 14 for the purpose of heating the wash fluids therein or facilitating the drying of dishware supported by racks 15 and 16 upon completion of the washing and rinsing thereof.

All of the structure thus far described is, in most respects, conventional and may therefore vary a great deal without materially affecting the present invention. The present invention is, as mentioned earlier, in no way limited in utility to application in a dishwasher, a dishwasher being shown and described for purposes of illustration only.

Attached to the front side of cabinet 11 is member 33 which, due to its spaced relationship with the front side of cabinet 11, forms an enclosure 39 which houses such elements as a sequence control means 40 (FIGURE 2) and the treating agent dispensing means 41 of the present invention.

Referring now to FIGURES 2-6, the treating agent dispensing means 41 is shown in greater detail for purposes of clearer illustration. The treating agent dispensing means 41 includes a reservoir 42, the interior of which communicates with a fill tube 43. As best shown in FIGURE 3, fill tube 43 extends through cabinet 11 so as to terminate within wash chamber 14. With this arrangement, any spillage that occurs during filling of the reservoir will settle into sump 25 rather than onto the surrounding floor as may occur if the fill tube were outside wash chamber 14. A funnel-like element 44 is provided in fill tube 43 to facilitate the pouring of treating agent into fill tube 43. A removable cap 45 covers the open end of fill tube 43.

Reservoir 42 is defined by a lower portion 46 of the dispensing means 41. Lower portion 46 is secured at its lower end to cabinet 11 by means of a screw 47 and is secured at its upper end to an upper portion 48 of dispensing means 41. Sealing means (not specifically shown) may be provided at the junction between lower portion 46 and upper portion 48 to avoid any leakage of the treating agent from the reservoir 42. Upper portion 48 is secured to cabinet 11 by means of a nut 49 which cooperates with a flange 50 to grip cabinet 11 therebetween.

Positioned within reservoir 42 is a metering means including a piston 51 and a cylinder 52. The cylinder 52 is in the form of a depressed sump-like area in the bottom wall of reservoir 42 as best seen in FIGURE 3. Means are provided to interconnect the cylinder 52 with the wash chamber 14. These means include a first hole or passageway 53 in lower portion 46 and a second hole 54 which intersects first hole 53. Second hole 54 receives a tube 55 which extends upwardly within reservoir 42 until it intersects an opening 56 in upper portion 48. Opening 56 is intersected by a second opening 57, which in turn is intersected by a third opening 58 to form a continuous passageway. It can therefore be seen that movement of piston 51 downwardly will result in fluid being conveyed, via the afore-described series of holes, tube and openings, from cylinder 52 to wash chamber 14.

It may be well to point out at this time that the required amount of agent to be dispensed into chamber 14 is from 1.0 cc. to 1.8 cc. In other words, if an amount of treating agent within these limits is dispensed into the wash chamber 14, the desired result will be achieved. This comparatively large tolerance of 0.8 cc. allows for the variation created by a variance of the level of agent in reservoir 42 as well as variance in efficiency of the metering means. When reservoir 42 is completely full of agent, the passageways interconnecting cylinder 52 and wash

4

chamber 14 remain substantially filled between operations of the piston 51. However, when reservoir 42 is nearly empty, the passageways interconnecting cylinder 52 and wash chamber 14 become substantially empty since the level of agent in tube 55 is substantially the same as the level of agent in reservoir 42. The volume of the passageways interconnecting reservoir 42 and wash chamber 14 may be dimensioned such that the amount of agent dispensed in wash chamber 14 will vary from approximately 1.8 cc. when reservoir 42 is substantially full and the metering means as at a maximum efficiency to approximately 1.0 cc. when reservoir 42 is substantially empty and the metering means is at a minimum efficiency.

Piston 51 extends into upper portion 48 and a pin 59 passes through piston 51 near its upper end. Pin 59 extends outwardly from each side of piston 51 where it is received by a slot 60 in each leg 61 of yoke 62. Yoke 62 is carried by a shaft 63 which extends out through upper portion 48. The portion of shaft 63 which extends out beyond upper portion 48 receives ratchet 64 which has a spring 65 interconnecting it with a section of the upper portion 48. As can be seen from the drawing, spring 65 biases ratchet 64, shaft 63 and yoke 62 such that piston 51 is forced downwardly.

Pivotaly secured to upper portion 48 of the dispensing means 41 is a latch member 66. Latch member 66 has a surface 67 which cooperates with a surface 68 on ratchet 64 to retain ratchet 64 in the "cocked" position. The "cocked" position is the position wherein piston 51 is in the upper position and spring member 65 has been put in tension. This position is illustrated in FIGURES 3, 4 and 5. A spring 69 is provided to bias latch member 66 toward ratchet 64 so that latch member 66 will automatically retain ratchet 64 in the cocked position whenever ratchet 64 is rotated so as to move surface 68 to surface 67.

A manually operable handle 70 is provided to allow manual cocking of ratchet 64. Latch member 66, spring 65 and ratchet 64 all combine to form an energy storing means which, when released, causes dispensing of agent from reservoir 42 into wash chamber 14.

Cocking, or energizing, of the energy storing means is accomplished by manually depressing handle 70 which causes a counterclockwise rotation of ratchet 64 (as seen in FIGURES 2 and 6). Handle 70 is depressed a distance sufficient to cause surface 68 of ratchet 64 to pass surface 67 of latch member 66 whereupon spring 69 biases latch member 66 in a clockwise direction (as seen in FIGURES 2 and 6) to interengage surfaces 67 and 68. The energy storing means remains thus energized until latch member 66 is rotated in a counterclockwise direction to release ratchet 64, whereupon spring 65 will cause piston 51 to dispense agent as described above. Latch member 66 is provided with an extension 71 positioned to be contacted by a cam 72 which is moved by sequence control means 40.

It should be clear from the foregoing description, that the present invention provides a treating agent dispensing means capable of storing several days supply of treating agent, which will provide selectivity of operation and which obviates a costly solenoid. Selectivity of operation is achieved by the unique cocking arrangement including handle 70 and the releasing means including cam 72 and extension 71 of latch member 66. Sequence control means 40 rotate cam 72 one revolution for each cycle of the dishwasher operation; however, cam 72 is effective to release the energy storing means only if the energy storing means has been energized by depression of handle 70. Another salient feature of the present invention is that by employing manual energy to energize the energy storing means, only a minimum of work is required by the motor within the sequence control means to operate the treating agent dispensing means. In other words, the sequence control means is not called upon to furnish the energy to dispense the treating agent. This is im-

portant because motors normally incorporated in sequence control means are of very low power and their effective life is greatly diminished if they are called upon to perform any measurable amount of work.

Another very important feature of the present invention is the structural arrangement wherein it is virtually impossible for any significant leaks to develop. A review of FIGURE 3 will illustrate that all joints in the conduit interconnecting the metering means and the wash chamber are positioned within the reservoir 42 so that if any leaks shall develop at these joints, leakage would simply occur within the reservoir thereby creating little or no problem.

As will be evident from the foregoing description, certain aspects of the invention are not limited to the particular details of construction of the example illustrated, and it is contemplated that various other modifications or applications will occur to those skilled in the art. It is therefore intended that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of the invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. For use in an automatic washing machine having a wash chamber adapted to contain articles to be washed therein, wash means to effect a washing action upon the articles, and sequence control means to conduct the machine through a sequence of operations comprising a wash cycle, a treating agent dispensing means comprising:
 - (a) a housing forming a reservoir adapted to contain several times the quantity of agent dispensed with each operation of the dispensing means,
 - (b) a depressed sump in the bottom of said reservoir forming a cylinder,
 - (c) a piston disposed within said reservoir and adapted to cooperate with said cylinder,
 - (d) a first passageway formed in said housing and communicating with said cylinder,
 - (e) a second passageway formed in said housing and communicating with the wash chamber,
 - (f) a tube at one end connected to said first passageway at a point internally of said housing and at the other end connected to said second passageway at a point internally of said housing,
 - (g) energy storing means associated with said piston whereby release of the energy stored by said storing means causes movement of said piston,
 - (h) manually-operable means to energize said energy storing means,

(i) said energy storing means being adapted to be released by the sequence control means to thereby cause dispensing of agent into the wash chamber.

2. For use in an automatic washing machine having a wash chamber adapted to contain articles to be washed therein, wash means to effect a washing action upon the articles, and sequence control means to conduct the machine through a sequence of operations comprising a wash cycle, a treating agent dispensing means comprising:

- (a) a housing forming a reservoir adapted to contain several times the quantity of agent dispensed with each operation of the dispensing means,
- (b) metering means disposed within said reservoir to meter a predetermined quantity of agent from said reservoir into the wash chamber,
- (c) said housing having an upper portion extending at least partially into the wash chamber,
- (d) a first passageway formed in said housing and communicating with said metering means,
- (e) a second passageway formed in said upper portion of said housing and communicating with the wash chamber,
- (f) a tube interconnecting said first passageway with said second passageway and disposed within said reservoir,
- (g) energy storing means associated with said metering means whereby release of the energy stored by said storing means causes operation of said metering means, and
- (h) manually-operable means to energize said energy storing means,
- (i) said energy storing means being adapted to be released by the sequence control means to thereby cause dispensing of agent into the wash chamber.

3. The treating agent dispensing means defined in claim 2 further comprising a fill tube in said upper portion communicating at one end with said reservoir and at the other end opening into the wash chamber whereby said reservoir may be filled with agent.

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LOUIS J. DEMBO, *Primary Examiner.*