

Jan. 24, 1961

M. E. BARRITT
DETERGENT DISPENSER

2,969,072

Filed Jan. 20, 1958

2 Sheets-Sheet 1

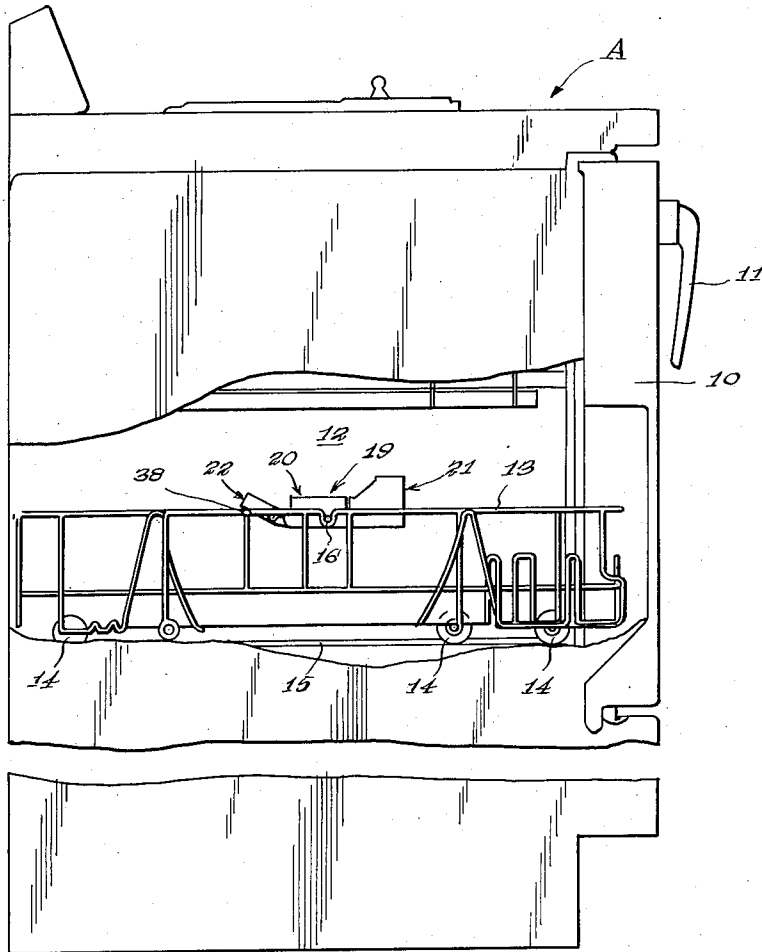


FIG. 1

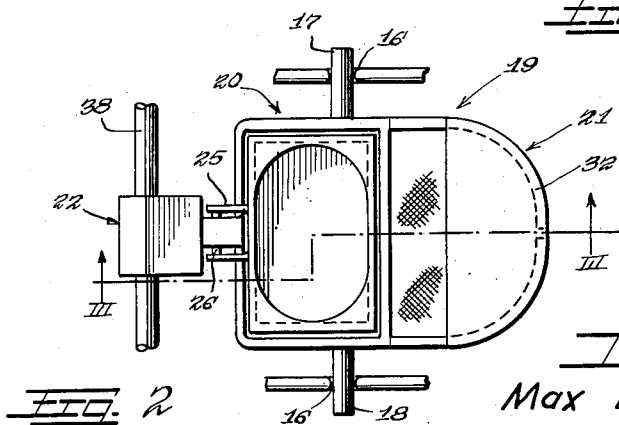


FIG. 2

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2 Sheets-Sheet 2

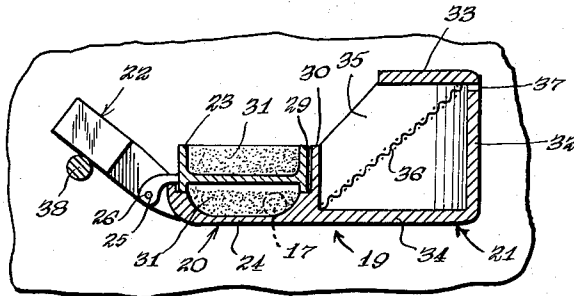


Fig. 3

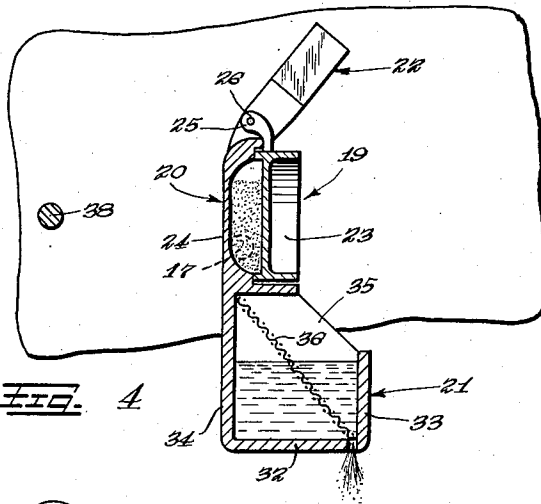


Fig. 4

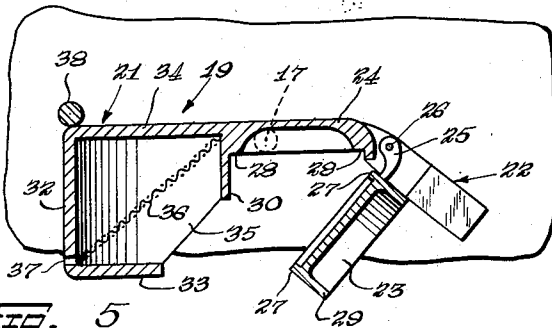


Fig. 5

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2,969,072

DETERGENT DISPENSER

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12 Claims. (Cl. 134—93)

The present invention relates broadly to dispensing devices, and is more specifically concerned with a novel water conditioning agent dispenser for dish washers and the like.

It has been noted with some frequency, particularly in communities having a relatively hard water supply, that there is an accumulation of spots on glassware and similar objects even after exposure to a complete wash and rinse cycle of modern high efficiency dish-washing machines. Efforts to date in attempting to solve this problem have not been completely successful, and have required substantial amounts of time, washing compound, and water.

Applicant has discovered that greatly improved results can be obtained by the provision of a novel dispensing device for water conditioning agents which is constructed and arranged to house and introduce into the dish washer at least two separate charges of detergent or other water conditioning agent at spaced time intervals which permits the spent liquid from the first wash phase to be essentially completely washed away. Briefly stated, the device of this invention in its preferred form comprises a pair of pivotally mounted detergent containers arranged one above the other and provided at opposite ends with a counterbalance weight and a water trapping compartment having a drain opening therein. In operation, detergent is flushed from the upper container into washing relation with objects in the dish washer and the water trapping compartment substantially simultaneously filled to the desired level. This causes the containers, balance weight and water compartment to pivot clockwise approximately 90°, and water in the trapping compartment to drain through the opening therein. When drainage is complete, the balance weight forces rotation of the assembly through approximately another 90° arc about the pivot point, and introduction of the detergent charge from the lower compartment into the dish washer. The rate of drainage is controlled by the diameter of the opening so that all water is emptied from the compartment prior to start of the second wash water into the dish washer, and yet at the same time, if the compartment is continuing to receive water, as during a rinsing phase, pivotal movement will not occur since the balance weight will not be sufficient to overcome the weight of the relatively full trapping compartment.

It is therefore an important aim of the present invention to provide a relatively simple and effective device for introducing separate charges of detergents and the like into a dish washer or similar machine at spaced time intervals.

Another object of the invention lies in the provision of a dispensing device pivotally mounted within a dish washing machine and operable to first introduce one charge of detergent into washing relation with objects supported in the dish washer, then travel into an intermediate position during first washing of said objects, and thereafter move into a final position to introduce a sec-

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ond detergent charge into washing relation with said objects.

Another object of this invention is to provide a dispensing device particularly well adapted for dish washing machines, and which performs effectively with granular, liquid or jellied detergents.

Still another object of the present invention is to provide a detergent dispensing device for introducing separate charges into dish washers and the like, featuring a relatively simple and effective means for assuring that the second charge will not be ejected prematurely.

A further object of the invention lies in the provision of a dispenser wherein multiple independently operable detergent compartments are sequentially discharged at different preselected portions of a washing, rinsing and drying cycle or program.

Other objects and advantages of the invention will become more apparent during the course of the following description, particularly when taken in connection with the accompanying drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevational view of a typical dish washer, a portion thereof being broken away to show the dispensing device of this invention;

Figure 2 is a plan view of the dispensing device;

Figure 3 is a vertical sectional view taken substantially along the line III—III of Figure 2;

Figure 4 is a sectional view of the dispensing device of this invention after rotation through approximately 90° from the position of Figure 3; and

Figure 5 is a sectional view of the dispensing device after rotation through approximately 180° from the position of Figure 3 and introduction of the detergent charges from both compartments.

Referring now to the drawings, there is shown in Figure 1 a cabinet type dish washer A with which the dispensing device of this invention has proven well adapted in practice. The front wall of the dish washer is provided with a forwardly and downwardly opening door 10 releasable by a handle 11 to expose interiorly of the washer a washing, rinsing and drying compartment 12 within which is received a basket 13 provided with wheels 14 slidable upon tracks 15. In a dish washer of this type the door 10 is normally also equipped with tracks which substantially meet the tracks 15 when the door is lowered, to thereby facilitate the loading and unloading operation. While the drawings illustrate a dish washer having a forwardly opening door, it will of course be appreciated that the features of this invention apply equally well to known constructions which are loaded and unloaded through a door which opens upwardly from the top wall thereof. Also, a dispensing device as herein disclosed may be utilized effectively in clothes washers and similar machines.

The basket 13, within which is supported dishes, glassware and the like, is preferably of a welded wire construction, and is shaped along its upper portion with recesses or notches which provide bearing surfaces 16 receiving stub shafts 17 and 18 pivotally supporting the dispensing device 19 of this invention. The dispensing device may be fabricated of a suitable plastic or metallic material, and comprises a central detergent containing portion 20 to which is connected at opposite ends thereof of a water trapping container 21 and balance weight means 22.

The detergent containing portion 20 may be of generally rectangular shape in plan, and as shown in Figure 3, comprises an upper compartment 23 and lower compartment 24. The lower compartment 24 may be formed integral with the water trapping container 21 to provide a housing, and it is to the lower compartment that the

stub shafts 17 and 18 are preferably secured. The upper compartment 23 is pivotally mounted on the balance means 22, and a suitable manner is to employ hinges 25 pinned at 26 to said balance weight. The upper compartment 23 may be formed with downwardly depending leg portions 27 received upon ledges 28 provided along the upper surface of the lower compartment 24, and is preferably arranged with a front wall 29 in closely spaced parallel relation with a rear wall 30 of the water trapping container 21. Both detergent compartments 23 and 24 may be shaped generally concavely along their lower inner surfaces to assure that the entire quantity of detergent 31 contained therein will be effectively dispensed or flushed therefrom. As noted previously, the dispensing device 19 of this invention is well adapted to detergents of all types, including granular, liquid and jellied forms.

The water trapping compartment or container 21 may be shaped to present a rounded front wall 32 in plan, and generally parallel top and bottom walls 33 and 34, respectively. As appears in Figures 3, 4 and 5, the top wall 33 of the water trapping container is of relatively lesser length than the bottom wall 34 to provide an opening 35 through which water may enter to fill the container 21 during the first washing and rinsing phases of the complete cycle. Extending across the opening 35, but spaced inwardly therefrom, is a filter 36 which may be suitably secured to the inner walls of the water trapping container and functions to prevent the entrance of foreign particles into a drain hole 37 provided in the front wall 32 and adjacent the top wall 33 of the water trapping compartment.

The hole or opening 37 in the water trapping container 21 functions to drain from said container water which is received therein during the first phases of the operation while the detergent 31 in the upper compartment 23 is being flushed therefrom into washing relation with the objects carried in the basket 13. While the operation of applicant's improved dispensing device will be described in detail later, it is to be noted that as the detergent 31 in the compartment 23 is flushed away, water is also received into the water trapping container and the weight thereof will cause the entire dispensing device 19 to pivot upon the bearing surfaces 16 approximately 90° into the position shown in Figure 4. While in this position, water will drain from said container 21 through the opening 37 therein. The diameter of said opening 37 is such, however, that complete drainage of the container 19 will not take place and further movement to the position of Figure 5 accomplished, until the spent wash water from the first phase is flushed away. This will normally be provided by a rinse phase which may continue to flow water into the container 21 while in the position of Figure 4. Accordingly, drainage of said container provides a delay during which the spent wash water from the first washing operation is substantially completely flushed away prior to introduction of a second detergent charge into the compartment 12 of the dishwasher A.

The weight means 22 preferably extends outwardly and upwardly with respect to the base of the detergent containing portion 20 and water trapping container 21, and is suitably attached to the lower compartment 24 of said detergent portion 20 by welding or the like. To maintain the dispensing device 19 in substantially the level position of Figures 1 and 3, there is provided a bar member 38 extending across the wire basket 13 and against which the balance weight 22 bears by contact along its bottom surface. The weight of the dispensing device as shown in Figure 3, considered forwardly of the shafts 17 and 18 and prior to entrance of water into the trapping compartment, is relatively less than the weight of said device rearwardly of said shafts. Accordingly, in the absence of means such as the bar member 38, it is possible that the dispenser 19 would tip counter-clockwise and eject the detergent therefrom.

The operation of applicant's invention may be described as follows. A suitable detergent 31 is first located in the lower compartment 24, the upper compartment 23 swung downwardly into covering relation thereupon, and detergent loaded into said upper compartment. Upon initiation of the first phase of the washing and rinsing cycle, a water spray enters the compartment 12 of the dishwasher A and against the detergent 31 contained in the compartment 23 of the dispensing device 19. The detergent is flushed therefrom, and substantially simultaneously water also flows into the trapping compartment 21 through the opening 35 and filter 36 therein. The capacity of the water trapping container 21 and the size of the drain 37 are related to the flow of water downwardly against the dispensing device to assure that all detergent will be flushed from the upper compartment 23 prior to the dispensing device 19 pivoting clockwise upon the bearing surfaces 16 into position of Figure 4.

After a predetermined time calculated to flush all of the detergent from the compartment 23, which normally will assure an initial thorough washing of the dishes and other objects carried in the basket 13, the weight of the water in the trapping compartment 21 will be relatively greater than the weight of the balance means 22 and the dispensing device will pivot through an arc of approximately 90° into the substantially vertical position of Figure 4. At this time the dishwasher A is normally going through the rinsing phase of the complete cycle, and water may continue to flow into the trapping container 21 during the final stages of the rinsing phase. However, when the first washing and rinsing phases are completed, and the water supply to the compartment 12 temporarily shut off, the water in said trapping container 21 will flow downwardly through the opening 37 in said container in the manner shown in Figure 4. When all water in said container has drained therefrom, the balance means 22 will tilt or swing the dispensing device 19 through a second 90° arc upon the bearing surfaces 16 into the final position shown in Figure 5, in which the bottom of said device is in contact with the bar member 38. As the dispensing device 19 makes its second pivotal movement, the upper detergent compartment 23 will swing outwardly and downwardly on its hinges 25 about the pivot point 26 to discharge by gravity the detergent 31 from the lower compartment 24. As water is flowed against the objects in the basket subjected to a second detergent charge, there will be completely cleansed from said objects all particles of food and other materials which may remain thereon from the first washing operation described. Rinsing of the dishes and other articles will then proceed in the customary manner and final phases of the entire cycle such as drying may take place. It may be seen from the foregoing that applicant has provided a relatively simple and effective device to controllably introduce into washing relation with objects supported in dishwashers and the like predetermined quantities of detergents or other similar materials. The device is comprised of relatively few moving parts which might malfunction, and being constructed and arranged as described will render carefree operation over a relatively long period of time. By provision of separate detergent-containing compartments arranged one above the other in the manner disclosed, there is little likelihood that detergent housed in the lower compartment will be contacted by water during the initial washing operation. Further, the dispensing device may be constructed of relatively inexpensive materials, and operates effectively with all known types of detergents and similar compounds in dishwashing machines of various types, as well as in clothes washing machines.

It is to be understood that the form of the invention herein shown and described is to be taken as an exemplary embodiment of the same, and that various changes in the size, shape and arrangement of parts may be undertaken

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without departing from the spirit of the invention or the scope of the subjoined claims.

I claim as my invention:

1. A device for dispensing detergents and the like into a washing compartment, comprising a plurality of pivotally mounted containers arranged to individually introduce a predetermined quantity of detergent into washing relation with objects located within the compartment, a water trapping container located at one end of said device to pivot said containers generally downwardly after introduction of detergent from one of the containers into said washing compartment, and balance means at the opposite end of said device to cause further pivotal movement of the containers and release of detergent from another of said containers into washing relation with the objects in the compartment.

2. A device for dispensing detergents and the like into a washing compartment, comprising a plurality of containers arranged to individually introduce a predetermined quantity of detergent into washing relation with objects located within the compartment, pivot means supporting said device within said compartment, a water trapping container located at one end of said device to pivot said containers generally downwardly after introduction of the detergent from one of the containers into said washing compartment, said water container having a drain opening therein, and balance means at the opposite end of said device to cause further pivotal movement of the containers after drainage of water from the opening in the trapping container to thereby release detergent from another of said containers into washing relation with objects in the compartment.

3. A device for dispensing detergents and the like into washing relation with objects located within a compartment, comprising a pair of detergent containers supported one above the other, the upper of said containers being mounted by said device for swingable movement relative to the lower of said containers, pivot means mounting said device within the compartment for swinging movement therein, a water trapping container located outwardly of said pivot means on one side thereof and provided with an opening in one wall thereof, and balance means located outwardly of said pivot means on the opposite side thereof, said water trapping container receiving water therein substantially simultaneously with flushing of detergent into said compartment from the upper of said containers to cause swinging movement of the balance means, detergent containers and water container about the pivot means whereby the water in said container drains from the opening therein and the balance means inverts the lower of said detergent containers while swinging the upper of said containers away from said lower container to introduce the detergent in said lower container into washing relation with the objects in the compartment.

4. A device for dispensing detergents and the like into washing relation with objects located within a compartment, comprising a housing which includes a detergent container and a water trapping container having an opening in one wall thereof, pivot means supporting the housing for swinging movement within the compartment, balance means carried by the housing, said water trapping container and said balance means being located at opposite sides of said pivot means, and a second detergent container pivotally mounted on said balance means and supported upon the first detergent container, said water trapping container receiving water therein substantially simultaneously with flushing of detergent from the second detergent container to cause swinging movement of the balance means, detergent containers and water container about the pivot means whereby the water in said container is caused to drain downwardly from the opening therein and the balance means causes further swingable movement of the housing about the pivot means to substantially simultaneously pivot the second detergent con-

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tainer on the balance means and introduce detergent from the first container into washing relation with the objects in the compartment.

5. In combination with a dishwasher having a compartment and means therein for supporting objects to be washed, comprising a housing which includes a detergent container and a water trapping container provided with an opening in one wall thereof, pivot means on the housing carried by the supporting means to provide swingable movement of the housing thereupon, balance means at one end of the housing, said water trapping container and said balance means being located at opposite sides of said pivot means, a second detergent container supported upon the first detergent container and substantially enclosing the open end thereof prior to pivotal movement of the housing upon the supporting means, and means on the balance means pivotally supporting the second detergent container for swinging movement away from the first container after introduction of the detergent therein into washing relation with the objects in the supporting means and substantial pivotal movement of the housing upon said supporting means.

6. A detergent dispensing device for dishwashers and the like, comprising a pair of open top detergent containers arranged one above the other, pivot means carried by one of said containers to provide swingable movement of said device within the dishwasher, a water trapping container located at one end of said detergent device and swingable substantially simultaneously therewith, said water container being provided with a water entrance opening and drain to permit egress of water from said container upon pivotal movement thereof, and balance means carried at the opposite end of said detergent dispensing device and swingably carrying the other of said detergent containers to rotate the detergent containers and water trapping container upon the pivot means following drainage of substantially all water therefrom and to swing the upper of the detergent containers away from the lower of said containers to thereby introduce the detergent in said lower container into the dishwasher.

7. A detergent dispensing device for dishwashers and the like, comprising a pair of open top detergent containers arranged with one container supported upon the other and substantially protecting the other from the entrance of water therein during the first wash portion of the dishwasher cycle, pivot means carried by the lower detergent container and supporting said device for swingable movement within the dishwasher, a water trapping container at one side of said pivot means integral with the lower detergent container and provided with an open upper portion to receive water therethrough during the first wash portion of the cycle, said water container having a drain opening in one wall adjacent the upper portion thereof to permit drainage of the water from the container after pivotal movement in one direction following completion of the first wash and rinse portions, and weight means at the opposite side of said pivot means fixedly supported by the lower detergent container and pivotally carrying the upper detergent container to substantially simultaneously cause further movement in said one direction of said detergent containers and water container upon the pivot means following complete drainage of the water from said water container and downward swinging movement of the upper detergent container and introduction of detergent from the lower container into the dishwasher.

8. In combination with a dishwasher having a compartment therein and means supporting the objects to be washed in said compartment, a dispenser for detergents comprising a lower detergent container and pivot means for said container mounted by the support means, a water trapping container at one end of said detergent container and having a drain opening along the upper portion thereof, weight means carried at the opposite end of said detergent container and extending generally upwardly and outwardly therefrom, and an upper deter-

gent container supported upon the lower detergent container and pivotally joined to the weight means for swinging movement away from the lower container when said lower container moves upon the pivot means into a substantially inverted position.

9. In combination with a dishwasher having a compartment therein and means supporting the objects to be washed in said compartment, a dispenser for detergents comprising a lower detergent container and pivot means for said container mounted by the support means, a water trapping container at one end of said detergent container and having a drain opening adjacent the upper portion thereof, weight means carried at the opposite end of said detergent container and extending generally upwardly and outwardly therefrom, and an upper detergent container supported upon the lower detergent container and pivotally joined to the weight means, said upper detergent container and water trapping container receiving water during the first wash portion of the dishwasher cycle to flush the detergent into washing relation with the objects and substantially fill the water trapping container to thereupon swing the weight means, detergent containers and water container upon the support means and cause drainage of the water in said container through the opening therein, whereupon the weight means forces further pivotal movement of the detergent containers and substantially empty water trapping container into a generally inverted position and during said movement pivoting of the upper detergent container away from the lower container and introduction of the detergent therein into washing relation with the objects in the support means.

10. In combination with a dishwasher having a compartment therein and a basket supporting the objects to be washed in said compartment, comprising a pair of superimposed generally cup-shaped detergent containers, shaft means carried by the lower one of said containers, bearing surfaces along the upper portion of the basket receiving the shaft means to pivotally support the detergent containers within the compartment, a water trapping container attached to the lower one of the detergent containers and having a drain opening in the upper portion thereof sized to control the rate of flow of water from the trapping container after downward pivotal movement of said water trapping container following the first wash portion of the dishwasher cycle, and weight means attached to the opposite end of the lower one of said detergent containers to pivot the substantially empty water container into a generally inverted position and introduce detergent from the upper of said containers into washing relation with the objects in the basket.

11. In combination with a dishwasher having a compartment therein and a basket supporting the objects to be washed in said compartment, comprising a pair of superimposed generally cup-shaped detergent containers, shaft means carried by the lower one of said containers,

bearing surfaces along the upper portion of the basket receiving the shaft means to pivotally support the detergent containers within the compartment, a water trapping container attached to the lower one of the detergent containers and having a drain opening in the upper portion of one wall thereof sized to control the rate of flow of water from the trapping container after downward pivotal movement of said container following flushing of detergent from the upper of the detergent containers, filter means in said water trapping container, weight means attached to the opposite end of the lower one of said detergent containers to pivot the substantially empty water container generally clockwise into an essentially inverted position and introduce detergent from the lower of said containers into washing relation with the objects in the basket, and means also on the basket contacting the weight means prior to downward pivotal movement of the trapping container to prevent counterclockwise travel of the detergent containers, weight means and trapping container.

12. A dispensing device for dispensing detergents in a treatment zone and for apparatus operable in a cycle having a series of washing and rinsing periods, which device comprises means forming plural compartments in said device for confining plural charges of conditioning media, means forming liquid confining means on said device for collecting liquid in a first position of said device and during operation of the apparatus in a first period during which liquid is directed against said device to admix the charge in a first one of said plural compartments with the liquid, said liquid confining means operable to actuate said device to a second position when filled with liquid, drain means in said device operable to drain said liquid-confining means in said second position, and actuating means for moving said device to a third position upon substantially complete drainage of said liquid confining means whereupon a second of said plural compartments is exposed to admix a second charge with liquid in the apparatus.

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