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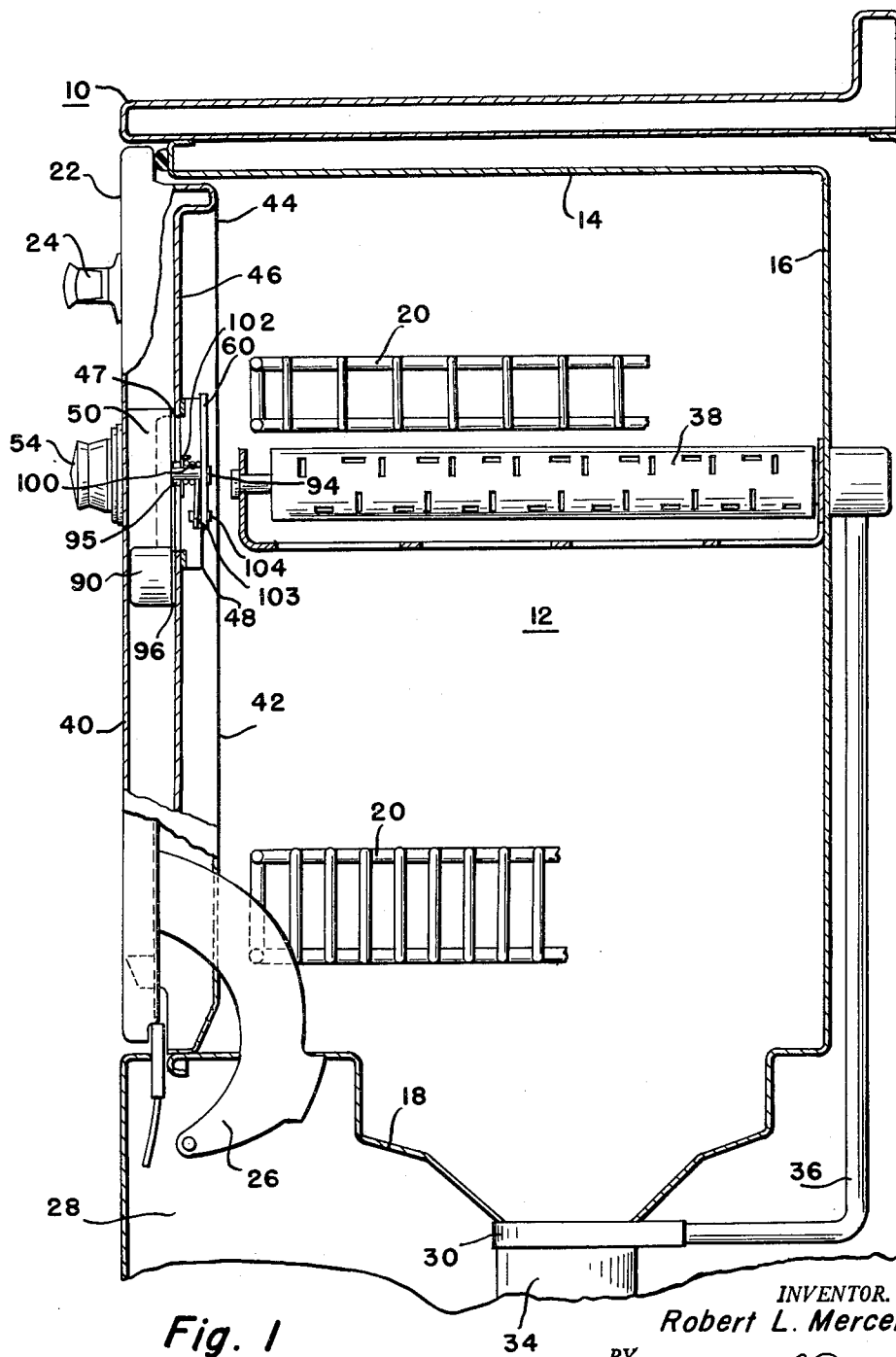
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3,019,802

DISHWASHER HAVING A DISPENSER

Filed Nov. 24, 1958

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

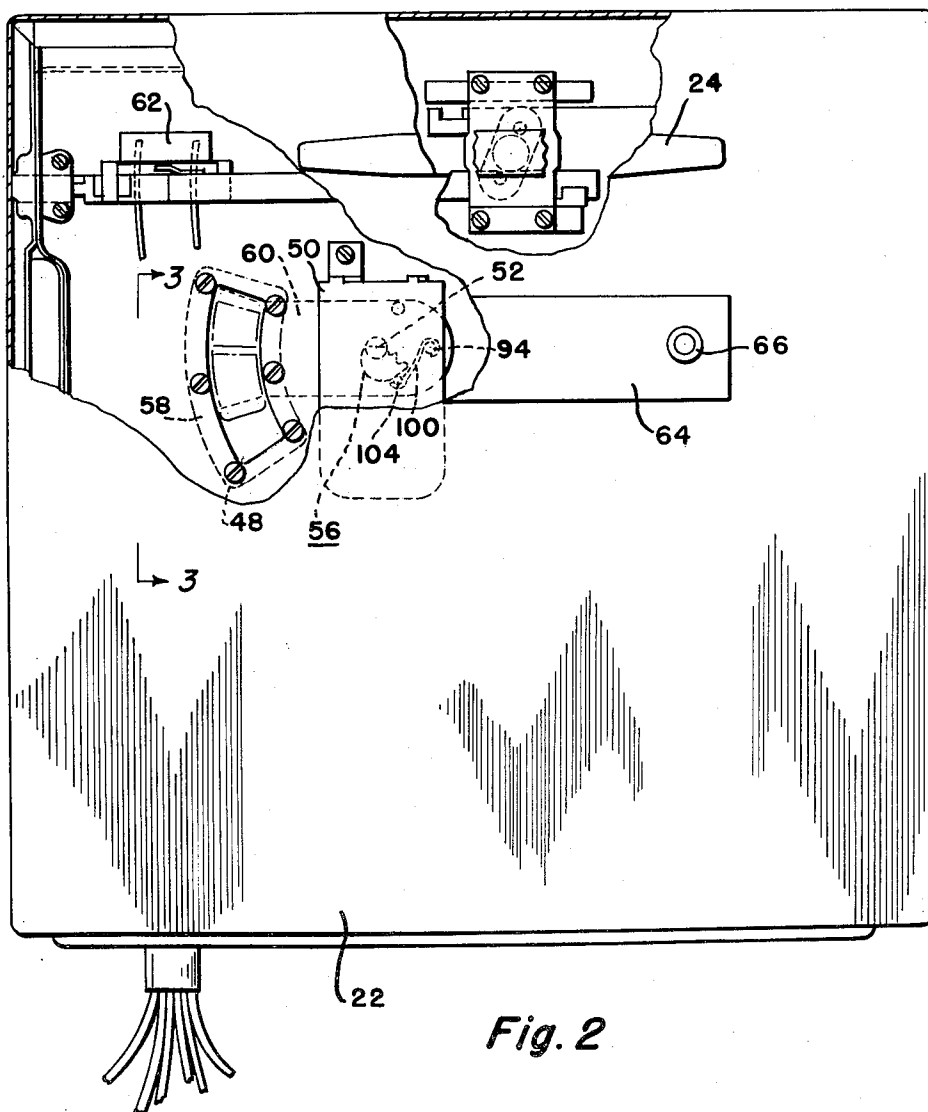


Fig. 2

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3 Sheets-Sheet 3

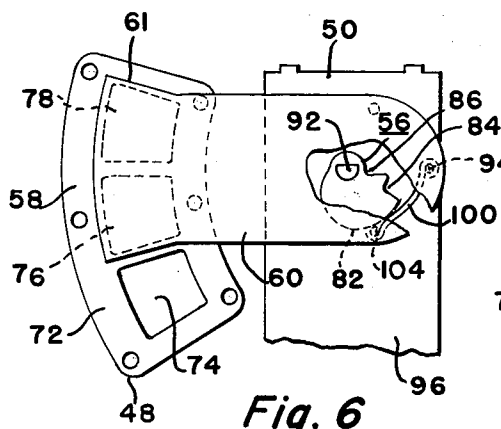


Fig. 6

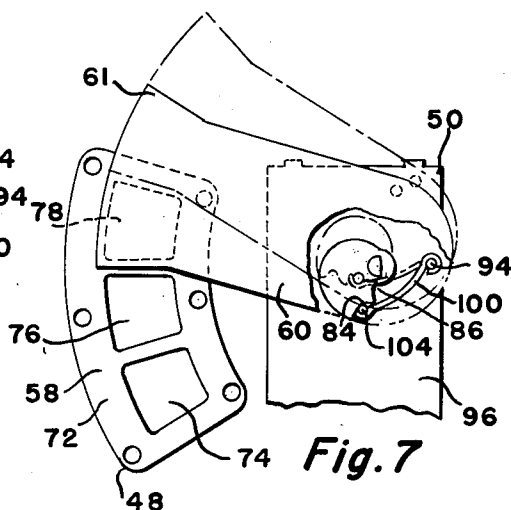


Fig. 7

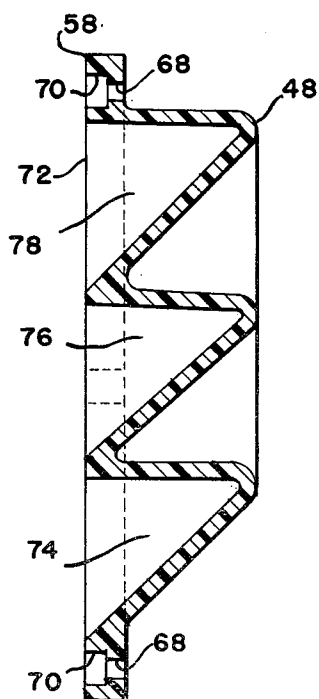


Fig. 4

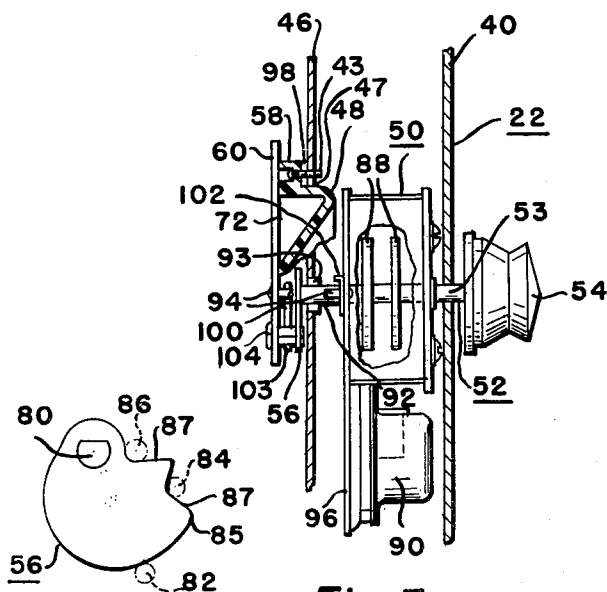


Fig. 3

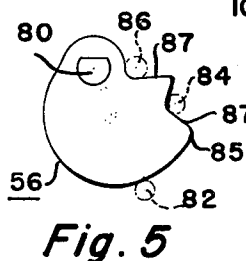


Fig. 5

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DISHWASHER HAVING A DISPENSER

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7 Claims. (Cl. 134-95)

This invention relates to a domestic appliance and more particularly to an improved dispenser for a dishwasher.

It is frequently desirable in automatic appliances having a sequence of operations to dispense various substances at different points in the automatic cycle. It has been well known that a plurality of electrically actuated containers could be energized at the desired point in the cycle but this requires additional electrical circuitry and additional cams in the timing mechanism. It is the purpose of this invention to provide a simplified dispenser which will emit a plurality of substances during an automatic cycle at different points therein without requiring additional circuitry.

Accordingly it is an object of this invention to provide a dispenser which will be actuated directly by the rotation of a timer shaft.

It is also an object of this invention to provide a timer having internal cams for sequentially operating electrical switches and an external cam for operating directly a valve for a dispenser.

More specifically it is an object of this invention to provide a 3-compartmented dispenser in combination with a timer shaft on one end of which resides a 3-stepped cam which pivots a spring biased pin on a dispenser cover plate to uncover certain of said compartments in accordance with the positioning of said shaft.

It is also an object of this invention to place the appliance timing mechanism within the appliance door.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a side sectional view of a dishwasher having a door in which this invention may be used;

FIGURE 2 is a front view of a dishwasher door with parts broken away to show the relative positions of the dispenser and timer combination of this invention;

FIGURE 3 is a partial side sectional view taken along line 3-3 with parts broken away to show the operation of the dispenser shutter plate by the timer;

FIGURE 4 is an enlarged side sectional view of the dispenser;

FIGURE 5 is an enlarged view of the stepped cam utilized with this invention;

FIGURE 6 is a view of timer and dispenser with the shutter plate positioned to admit the material contained in one of the dispenser compartments; and

FIGURE 7 is a view of the dispenser and timer with the shutter plate in second and third compartment opening positions.

In accordance with this invention and with reference to FIGURE 1 a dishwasher 10 is shown of the type taught more fully in the patent to Abresch et al. 2,734,520 issued February 14, 1956. The dishwasher 10 includes a dishwashing chamber 12 defined by a box-like receptacle having a top wall 14, a rear wall 16 and a sump or bottom wall portion 18. Disposed within the dishwashing chamber 12 are support racks 20 for tableware to be cleaned by the appliance. The front of the dishwashing chamber is closed by a door 22 having a handle 24 and hinged at 26 to a structural member within the motor compartment 28 of the dishwasher 10. The

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dishwasher is of the type wherein water is circulated from the sump 18 by a pump 30 driven by a motor 34. Water is directed by the pump 30 through a conduit 36 to a spray tube 38 which rotates in response to the motion of the water to direct a changing pattern of water jets over dishes disposed within the racks 20 and the dispenser to be described hereinafter. This explanation is believed to suffice for the purposes of this disclosure and a more complete understanding of this type of dishwasher circulating system may be gained from the aforementioned patent.

The door 22 is shown with parts broken away in FIGURES 1 and 2. The door 22 is comprised of a front panel 40 and a rear portion 42 facing the dishwashing chamber 12. To prevent water from draining onto the floor surrounding the dishwasher when the door 22 stands in an open horizontal position, the rear portion 42 is formed with a peripheral ridge 44 and a recessed inner panel or wall 46 is formed. It is through an opening 47 in the inner panel 46 that a detergent dispenser cup 48 projects. To eliminate the need for a wiring harness extending from the motor compartment 28 to the various electrically actuated devices which may be placed within the door 22, a timer 50 is installed between the panels 40 and 46 of the door 22. The timer is provided with a shaft 52 having one end 53 which may extend through the front or outer panel 40 into engagement with a control knob 54 and another end 92 which extends rearwardly through the inner panel 46 into engagement with a cam 56 which is utilized to operate a dispenser as will be described more fully hereinafter (FIGURE 3). With reference to FIGURES 2 and 3 the dispenser cup 48 is shown with a peripheral flange 58 which is utilized to attach the dispenser cup 48 to the panel 46. Thus the timer dispenser assembly is comprised of a timer 50, a dispenser cup 48, a timer shaft 52, a cam 56 and a shutter plate or dispenser valve 60 operated by the rotation of the timer shaft 52.

In order to insure that the dishwasher 10 is not operated when the door 22 is in an open position an interlock arrangement may be provided wherein the closing of the door and the actuation of the handle 24 will serve to close a switch 62 to condition the electrical circuit of the dishwasher for operation. This door latch interlock arrangement is taught more fully in copending application S.N. 710,715 filed January 23, 1958 to which reference may be had for further details with regard to this interlocking arrangement. The door 22, may, for decorative purposes, be provided with an escutcheon 64 on which a pilot light 66 is attached as an indicator when the machine is in operation.

The dispenser cup 48 is shown in enlarged section in FIGURE 4 and illustrated as of elastomeric or plastic construction. The cup 48 is formed with a flange 58 which circumscribes the cup 48. At spaced points on the flange 58 are mounting holes 68 which have recessed portions 70 to prevent any fastening means from protruding beyond the surface 72 of the dispenser cup 48. The cup 48 is arcuate in outline as illustrated best in FIGURES 2, 6 and 7 and includes a first compartment or pocket 74, a second compartment 76 and a third compartment 78. Each of these compartments are adapted to include a measured amount of a single detergent or each may include a different substance to be dispensed at spaced intervals during the washing cycle. For instance, detergents may be used in compartments 74 and 76 for a first and second washing operation while the third compartment 78 may contain a "spots-away" fluid or surfactant which prevents droplets from adhering to the tableware during the drying portion of the cycle to minimize spotting. Operating the valve plate 60 of the dispenser cup 48 is a cam 56 having a shaft mounting hole

80 on which one side is flat to prevent relative rotation when mounted on the end 92 of the rotating timer shaft 52. The configuration of cam 56 is designed in accordance with the number of compartments or pockets contained in the dispenser cup 48. For this reason the cam 56 is designed with a first compartment opening cam surface or position 82, a second compartment opening cam position or step 84 and a third compartment opening cam position or step 86. It will be noted that the cam configuration between each of these positions is a straight radially directed wall 87 so that the dispensing operation will follow a snap action pattern to be described more fully next following.

For a better understanding of the relationship of the timer and dispenser to the dishwasher door 22, it is best to refer to FIGURE 3 wherein a fragmentary section of the door 22, the timer 50 and the dispenser 48 are shown. The timer 50 is shown residing between the outer door panel 40 and the inner door panel 46. The timer 50 is formed with a casing to enclose a plurality of shaft mounted cams 88 within the timer to actuate a plurality of electrical switches (not shown) in accordance with conventional timer design. The shaft 52 and the cams 88 thereon are rotated through any conventional speed reduction mechanism by a timer motor 90. The shaft 52 extends through the outer door panel 40 into engagement with the timer knob 54. The timer 50 may be of the type wherein the on-off switch for the timer 50 is actuated by the push or pull of the knob 54 and the consequent reciprocation of the timer shaft 52. Thus it is important for the purpose of this invention to allow sufficient tolerance between the parts such as the cam 56 and the inner panel 46 in view of this back and forth movement for timer shaft 52. The timer shaft 52 is placed so that the rearward end 92 extends through a seal 93 in the inner door panel 46 toward the dishwashing chamber 12. On the end 92 of the timer shaft the cam 56 is affixed. Thus as the timer motor 90 is energized by the inward positioning of the timer shaft 52 the timer switch cams 88 and the external dispenser cam 56 will be rotated or pulsed by the movement of the timer shaft 52. A pin 94 is affixed to the rear wall 96 of the timer 50 and extends through a seal 95 in the inner door panel 46 for pivotally mounting the shutter plate 60 within the dishwashing chamber 12. Disposed between the shutter plate or dispenser valve 60 and the inner door panel 46 is the flange 58 of the dispenser cup 48, a portion only of which is shown in FIGURE 3. The cup 48 is affixed as by a conventional fastening means 43 to the door panel 46. Interposed between flange 58 and panel 46 is a gasket 98 to insure a water-tight connection, thereby preventing water in the dishwashing chamber 12 from gaining access to the area between the door panels 40 and 46. The shutter plate 60 is slidably supported on the outer surface 72 of the dispenser cup 48 and is urged into secure engagement therewith to prevent the premature release of detergent from the compartments 74, 76 and 78 prior to the point at which the shutter plate 60 uncovers the particular compartment.

The shutter plate 60 is biased in a continuously opened clockwise direction by the operation of a spring 100. The spring is wound about the stationary shutter plate pivot pin 94 and prevented from rotation relative to the pin by a stop member 102 which is affixed to the pin 94. In cooperation with the spring 100 a stud or protuberance 104 is secured to and carried freely by the shutter plate 60. The spring 100 has an end 103 extending outwardly into engagement with the shutter plate stud 104 and thus continuously biases the shutter plate in a clockwise position. In this biasing movement the spring 100 retains the stud 104 in engagement with the periphery of the shutter plate cam 56. Thus as the cam 56 rotates the pin 104 will be biased into the various positions or steps 82, 84 and 86 of the cam 56. The sharp definition or wall 87 between the positions on the cam 56 permits

a snap action so that the pin 104 on the shutter plate 60 will snap into each succeeding position. In response to this snap action the shutter plate 60 will uncover in successive steps the compartments 74, 76 and 78 of the dispenser cup 48.

The operation of this invention will best be understood with reference to FIGURES 6 and 7 wherein the combination is viewed from the dishwashing chamber 12 with the inner door panel 46 broken away. To load the dispenser cup 48 dishwasher door 22 is opened to a horizontal position and the shutter plate or cover 60 rotated in a counter-clockwise direction to expose all of the compartments 74, 76 and 78. As aforesaid these compartments may be filled with detergent only or with different compounds to be dispensed at various intervals during a dishwashing cycle. The shutter plate 60 has a flared outer end 61 which is formed in complementary fashion to the arcuate arrangement of the dispenser reservoirs or pockets 74, 76 and 78. In this fashion the pivotal movement of the shutter plate 60 about the pivot pin 94 will always keep the flared end 61 in covering relationship with the dispenser pockets. At the beginning of a dishwashing cycle the door 22 is placed in a closed position and the latch 24 closed to energize the timer motor 90. Since the shutter plate 60 is in covering relationship with only compartments 76 and 78 the load of detergent in compartment 74 will fall by gravity into the dishwashing chamber 12 and be utilized in the first washing operation. In accordance with the operation of the timer 50 the rotation of shaft 52 will drive the cam 56 in a clockwise position as viewed from the dishwashing chamber 12. So long as shutter plate pin or stud 104 is in engagement with the first cam position 82 the dispenser compartments 76 and 78 will remain closed. If the cam 56 rotates to the terminus 85 of the first position 82 the pin 104 will be forced in a snap action by spring 100 into the second position 84 as shown in solid line in FIGURE 7. Shutter plate 60 will then uncover compartment 76 and the ingredient therein will fall into the dishwashing chamber to be utilized in the dishwashing operation programmed at that time by the position of timer cams 88. Similarly the continued rotation of the cam 56 will cause the shutter plate stud 104 to move as by a snap action into the first position 86 shown in phantom line in FIGURE 7. This of course uncovers the last remaining compartment 78 and releases the ingredients contained for the operation then programmed by the timer 50. In all of these movements the shutter plate 60 is pivoting about the pin 94 which is fixed on the timer rear wall 96. It is also important that a snug engagement exists between the surface 72 of the dispenser cup and the shutter plate so that the ingredients will not be released prior to their need. It should also be recognized that a portion of the spray from the spray tube 38 will aid in cleansing the compartments 74, 76 and 78 as they are uncovered and thus will aid in a complete release of the ingredients contained.

It should now be seen that a multiple dispenser has been designed wherein electrical controls therefor are eliminated and a snap action is effected whereby a plurality of ingredients may be released at different intervals in the sequence of operations. These operations are accomplished in combination with a timer shaft adapted to operate both appliance operation actuating cams within a timer and a cam external to the timer itself for directly operating an auxiliary device. Further the compact arrangement of this invention permits installation within the confines of an appliance door thereby further conserving on space in the appliance.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In combination with a dishwasher having first,

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second and third sequentially actuated cycles, a timer for said dishwasher, said timer having a shaft for controlling said cycles, means on said shaft for actuating said cycles, a dispenser having first, second and third pockets, a pivotally mounted shutter plate for covering said pockets, a protuberance on said plate, a cam on said shaft having first, second and third positions, means for biasing said protuberance against said cam, and means for rotating said shaft to actuate said cycles and said shutter plate whereby said first, second and third pockets are uncovered during said first, second and third cycles respectively.

2. In combination with a cleaning apparatus having first, second and third sequentially actuated operations, a timer for said apparatus, said timer having a shaft for controlling said operations, means on said shaft for actuating said operations, a dispenser having first, second and third compartments, a pivotally mounted shutter plate for covering some of said compartments, a protuberance on said plate, a cam connected to said shaft having first, second and third positions, means for biasing said protuberance against said cam, and means for rotating said shaft to actuate said operations and said shutter plate whereby said first, second and third compartments are uncovered during said first, second and third operations respectively.

3. In combination with a cleaning apparatus having at least one operation, a timer for said apparatus, said timer having a shaft for controlling said operation, a dispenser having at least one container, a shutter plate for covering said container, a protuberance on said plate, a cam on said shaft having at least one position, means for biasing said protuberance against said cam, and means for moving said shaft to actuate said operation and said shutter plate whereby at least one of said containers is uncovered during said operation.

4. In combination with a cleaning apparatus having more than one sequentially actuated operation, a timer for said apparatus, said timer having a shaft for controlling said operations, means on said shaft for actuating said operations, a dispenser having more than one pocket, a pivotally mounted shutter plate for covering said pockets, a protuberance on said plate, a cam on said

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shaft having more than one position, means for biasing said protuberance against said cam, and means for rotating said shaft to actuate said operations and said shutter plate whereby some of said pockets are uncovered during some of said operations.

5. A sequentially operated dispenser comprising, an arcuate receptacle, first, second and third pockets in said receptacle, a timer shaft, a cam on said shaft, said cam having first, second and third stops, a plate covering at least two of said pockets and movable in conformance with the arcuate configuration of said receptacle, means for rotating said shaft, and means for biasing said plate into engagement with said stops to uncover selected ones of said pockets.

6. A sequentially operated dispenser comprising, a receptacle having more than one pocket therein, a timer shaft, a cam on said shaft, said cam having more than one stop, means covering at least one of said pockets and movable in conformance with the configuration of said receptacle, means for rotating said shaft, and means for biasing said covering means into engagement with said stops to uncover selected ones of said pockets.

7. In combination with a cleaning apparatus having at least one operation, a timer for said apparatus, said timer having a shaft member for controlling said operation, a dispenser having at least one container, a shutter plate member for covering said container, a protuberance on one of said members, a cam on the other of said members having at least one position, means for biasing said protuberance and said cam into engagement, and means for moving said shaft member to actuate said operation and said shutter plate member whereby at least one of said containers is uncovered during said operation.

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