March 24, 1964 D. J. BARBULESCO ETAL 3,126,131

DOMESTIC APPLIANCE

Filed Nov. 19, 1962 2 Sheets-Sheet 1

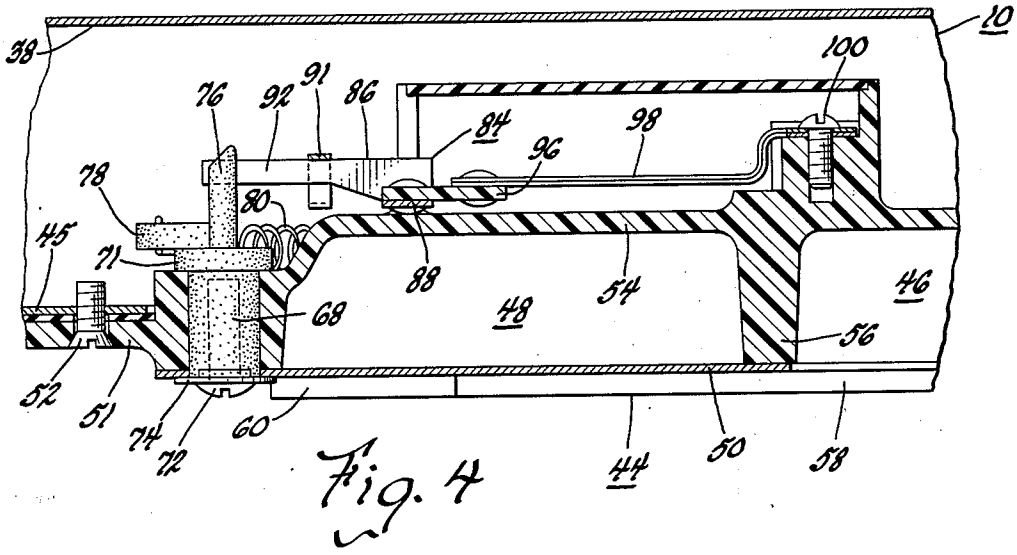


Fig. 4

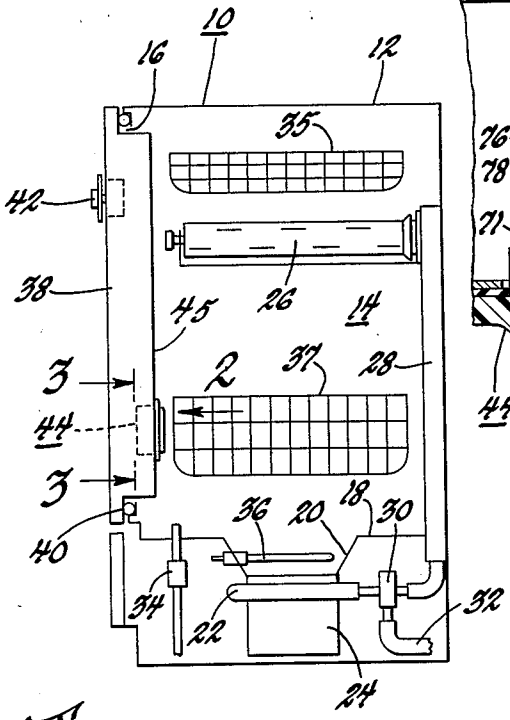


Fig. 1

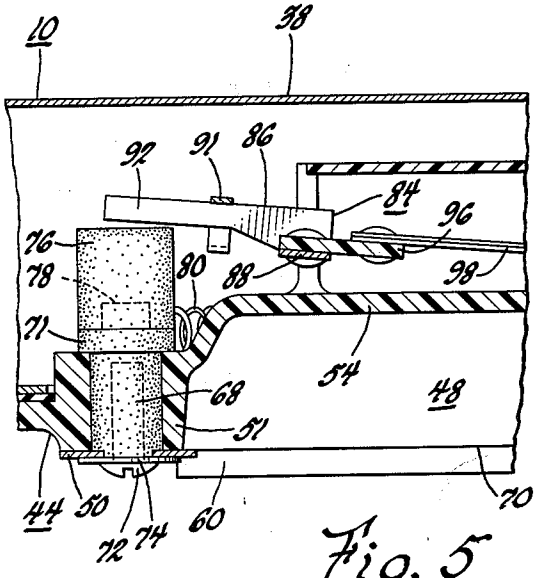


Fig. 5

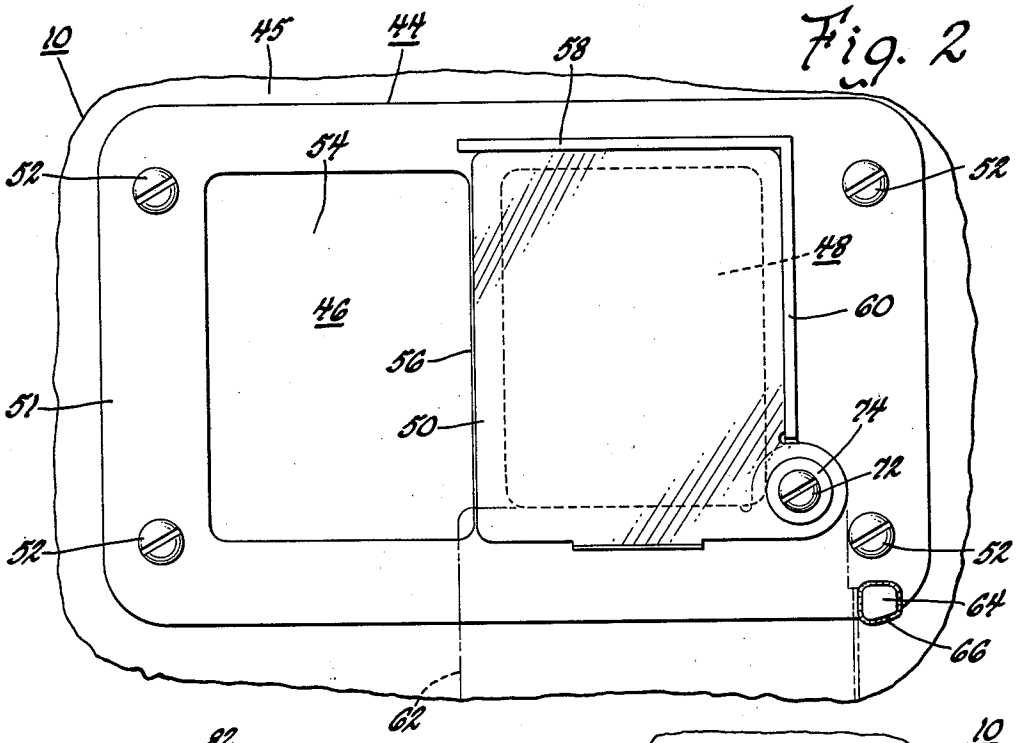
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Filed Nov. 19, 1962 2 Sheets-Sheet 2

Fig. 2



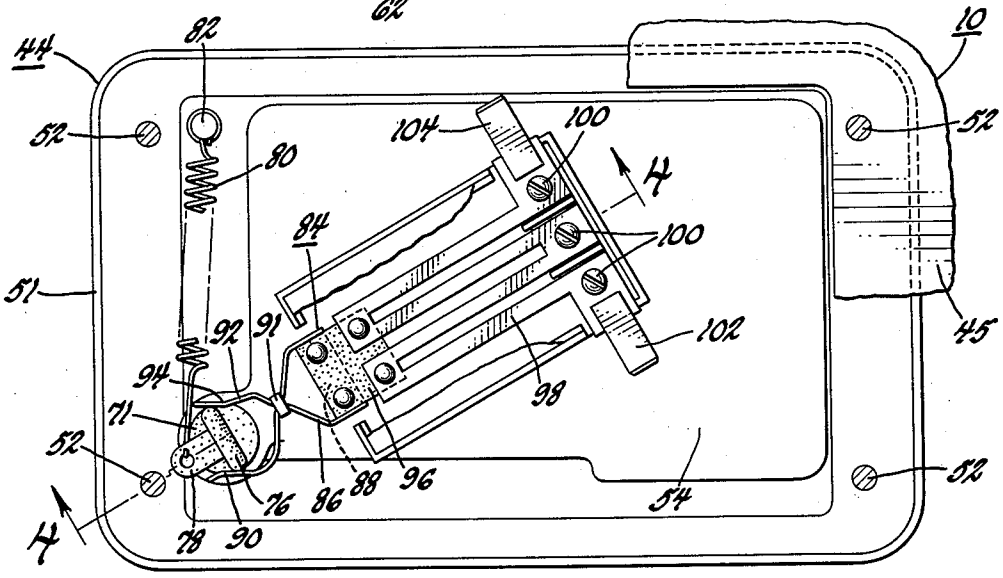


Fig. 3

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DOMESTIC APPLIANCE

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4 Claims. (Cl. 222—185)

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

In domestic dishwashers, it is frequently desirable to dispense quantities of detergent periodically throughout the dishwashing cycle by opening a lid or cover of a dispenser. It is also desirable to mount such a dispenser on the dishwasher door so that the dispenser is readily accessible for charging it with detergent when the dishwasher door is open. Thus, dispenser construction must be such that the opening of the dispenser cover does not conflict with structure present in the dishwashing chamber when the dishwasher door is closed.

Accordingly, it is an object of this invention to provide a dispenser having a compartment closable by a cover which is bimetal actuatingly movable in the plane of the opening.

Another object of this invention is the provision of simplified latching arrangement for a dispenser cover wherein a bimetal-actuated keeper releases a latch bolt integral with the single pivot shaft for the dispenser cover.

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 embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a schematic side sectional view of a dishwashed suitable for use with this invention;

FIGURE 2 is a fragmentary front elevational view taken in the direction of 2 in FIGURE 1 showing the dispenser cover closed in solid line and the dispenser cover open in phantom line;

FIGURE 3 is a fragmentary rear elevational view with parts broken away and taken along the line 3—3 in FIGURE 1;

FIGURE 4 is a fragmentary sectional view taken along line 4—4 in FIGURE 3 showing the dispenser cover in a latched closed position; and

FIGURE 5 is a fragmentary sectional view taken along the line 4—4 in FIGURE 3 showing the dispenser cover in an unlatched open position.

In accordance with this invention and with reference to FIGURE 1, a dishwasher **10** is schematically set forth. The dishwasher **10** is comprised of a casing **12** which defines a dishwashing chamber **14** having a front opening **16**. The bottom of the dishwashing chamber **14** is closed by a bulkhead or bottom wall **18** which has a depressed sump area **20** in a central portion thereof. The sump leads to a pump **22** which is operated by a motor **24**. Within the dishwashing chamber **14**, a rotatably mounted spray tube **26** is positioned and interconnected with the pump **22** by way of a conduit **28**. Interposed in the fluid stream between the spray tube and the pump is a diverter valve **30** which may be selectively energized to direct the output of the pump either to the spray tube **26** or to a drain line **32**. Water may be supplied to the sump **20** by means of a water valve **34** and a heater **36** is included in the sump for drying the dishes at the conclusion of the dishwashing cycle and for maintaining the temperature of the water during the dishwashing cycle. Utensil support baskets **35**, **37** are removably supported

on opposite sides of the spray tube to expose the dishes to the circulating spray.

The front opening **16** of the dishwashing chamber is closed by a door **38** which is hingedly mounted at **40** so that the door may be placed in a vertical position, as shown, for closing the dishwashing chamber and a horizontal position for loading the dishwasher. A conventional timer **42** is included in the door for selectively and sequentially operating the water valve **34**, the pump motor **24**, heater **36** and the diverter valve **30** throughout a conventional dishwashing cycle. Since a washing agent or detergent is added to the water in the sump during different portions of the dishwashing cycle, the dishwasher **10** is provided with a two-compartment dispenser shown generally at **44** and mounted on the back panel **45** of the dishwasher door. When the door **38** is in its horizontal position, a washing detergent may be placed within the two compartments **46** and **48** to be sequentially dispensed during the dishwashing cycle. The first compartment **46** will be emptied of its detergent charge due to gravity and the fact that water spraying from the spray tube **26** will enter the compartment **46** to flush away the detergent. The second compartment **48** is closable by a cover or shutter plate **50** which may be sequentially opened by the timer **42** during a subsequent portion of the dishwashing cycle. It should be noted generally that the compartment **48** is sheltered from the jets of water sprayed during the first wash portion of the cycle so that the washing agent therein may be available subsequently in the cycle.

Referring now to FIGURES 2 and 4, the detergent dispenser **44** is shown comprised of a molded phenolic plastic body or casing **51** fastened to the inner panel **45** of the dishwasher door as by screws **52**. The dispenser casing **51** is formed with a recessed back wall **54** and an integral central partition **56** for defining the detergent compartments **46** and **48**. The compartment **46** is permanently open so that the detergent may be flushed therefrom when the door is closed. However, and with reference to FIGURE 2, the compartment **48** is closable by the cover member or shutter plate **50** which has a closed position (solid line) against a pair of ribs **58**, **60** at right angles on the casing and an open position **62** (phantom line) against an integral bumper **64** having a synthetic rubber cushioning member **66** thereabout. FIGURE 2 illustrates the protective water shedding function of the ribs **58** and **60** in providing an overhang to prevent water from entering the compartment **48** while the shutter plate **50** is closed.

The shutter plate **50** is mounted on a single shaft **68** journaled in the dispenser body for pivotal movement of the shutter plate in the plane of the opening **70** of compartment **48**. The shaft **68** extends through an integral boss in the casing **50** and has a circular shoulder portion **71** bearing against the back side of the dispenser casing boss to limit shaft movement in one direction while a bolt **72** and washer **74** solidly affix the shutter plate **50** to the shaft and resist movement of the shaft in the opposite direction. The shaft **68** is formed of Delrin or other suitable self-lubricating plastic material and includes an integral, rearwardly directed, flat, latching shank or latch bolt portion **76** and an integral radially directed spring retainer lever **78**. Thus, the shutter plate **50** is continuously biased toward an open position by a stainless steel spring **80** attached to the lever arm **78** at one end thereof and to the back of the dispenser casing **50** at its other end **82** (FIGURE 3).

A latch actuator assembly on the back of the dispenser and shown generally at **84** is comprised of a bent-up actuator spring member or latch bolt keeper portion **86** of stainless steel having a transverse base portion **88** and a pair of longitudinally extending keeper arm portions

90 and 92 held together at one point by a clip 91. The arm portion 90 restrains one terminus or edge of the flat latch bolt member 76, while the arm portion 92 provides a similar function at the opposite terminus or edge of the latch bolt. Note that the arm 92 is bent in an obtuse angle at 94 to effect an overcenter snap action for retaining the shutter plate 50 in a closed position and for continuously applying a closing bias to the shutter plate. An electrical insulator 96 of melamine glass laminate is fastened to the base portion 88 of the keeper portion and is attached at its other end to a .022" bimetal 98 having its high expansion side next to the back wall of the dispenser casing. The bimetal is attached as at 100 to a boss on the back wall 54 of the dispenser and, thus, provides the sole support for the latch actuator assembly. Electrical connecting spades 102 and 104 extend outwardly from opposite sides of the bimetal for attachment to any suitable conductors controllable through the timer 42. When the bimetal 98 is energized, it will warp to the position shown in FIGURE 5, thereby releasing the latch bolt portion 76 of the pivot shaft 68 and the spring 80 will urge the shutter plate 50 to the open position against the bumper or stop 64 (phantom line FIGURE 2). This frees the detergent in compartment 48 for release to the dishwashing chamber 14.

In operation and with the dishwasher door 38 in a horizontally open position, detergent is placed into the compartments 46 and 48. Then the shutter plate 50 is pivoted to close the opening 70—the spring arms 90, 92 yielding to permit the latch bolt to move to the position in FIGURE 3. As the dishwasher door 38 closes, detergent will flow by gravity from the permanently open compartment 46 and an initial washing period follows. Subsequently, in the dishwashing cycle, the timer 42 will energize the electrical contacts 102, 104 to cause the bimetal to release the latch bolt portion 76 and the shutter plate 50 will pivot in the plane of the compartment opening 70 to expose the detergent contents thereof to the flushing action of the dishwashing spray. After the bimetal is deenergized, it will cool and return to the position of FIGURE 4 with the latch bolt portion in the position of FIGURE 5. Since the shutter plate is in the open position and pivot shaft 68 moves therewith, the latch bolt portion 76 will extend longitudinally of the latch bolt keeper arms 90, 92 instead of transversely thereto and will assume a position between and spaced from the keeper arms. Thus, whenever the shutter plate is again closed, the arms 90, 92 of the latch actuator will be in a position to latch the shutter plate in a closed position by yieldingly gripping the latch bolt portion 76 in the manner of FIGURE 3.

It should now be seen that an improved dispenser is provided wherein a simplified latch releases a dispenser cover for movement in the plane of the dispenser opening.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In combination, means forming a washing chamber having a front opening, support means in said chamber slidably removable through said front opening, a washing chamber door movable between a vertical position for closing said front opening and a horizontal position for uncovering said front opening, a dispenser body supported in fixed relationship to said door adjacent said support means when said door is in said vertical position and defining a compartment having an opening in a plane parallel with said door, a shutter plate having a closed position for covering said opening and an open position for uncovering said opening, means journaled in said dispenser body for pivotally mounting said shutter plate for movement in the plane of said opening between said open and closed positions in a manner to clear said support means when said door is in said vertical position, means interposed between said pivotally mounting means and said dispenser body for biasing said shutter plate to said open position, and means for selectively latching said shutter plate in said closed position, said latching means including a generally flat latch bolt supported as a coaxial extension on the end of said pivotally mounting means for movement therewith, a yieldable latch bolt keeper on said dispenser body including one keeper arm for restraining one side edge of said latch bolt and another keeper arm for restraining the opposite side edge of said latch bolt and having a first position in continuously twisting biasing engagement with said latch bolt when said shutter plate is in said closed position to retain said shutter plate in said closed position and a second position out of biasing engagement with said latch bolt for releasing said shutter plate for movement to said open position in response to said biasing means and bimetal means connected to said latch bolt keeper and energizable for moving said latch bolt keeper from said first position to said second position thereby to release said shutter plate for movement to said open position, said bimetal means being deenergizable for returning said latch bolt keeper to said first position after said shutter plate moves to said open position, thereby to condition said latch bolt keeper for yieldably grippingly reengaging said latch bolt to retain said shutter plate in said closed position when said shutter plate is moved to said closed position.

2. In combination with a washing apparatus door movable between a vertical position and a horizontal position, a dispenser body in fixed relationship to said door and defining a compartment having an opening in a plane parallel with said door, a shutter plate having a closed position for covering said opening and an open position for uncovering said opening, means journaled in said dispenser body at right angles to said shutter plate for pivotally mounting said shutter plate for movement in the plane of said opening between said open and closed positions, means interposed between said pivotally mounting means and said dispenser body for biasing said shutter plate to said open position, and means for selectively latching said shutter plate in said closed position, said latching means including a latch bolt supported as a coaxial extension on the end of said pivotally mounting means for movement therewith, a yieldable latch bolt keeper on said dispenser body selectively engageable with said latch bolt and having a first position in continuously twistingly biasing engagement with said latch bolt when said shutter plate is in said closed position to retain said shutter plate in said closed position and a second position out of biasing engagement with said latch bolt for releasing said shutter plate for movement to said open position in response to said biasing means and bimetal means connected to said latch bolt keeper and energizable for moving said latch bolt keeper from said first position to said second position thereby to release said shutter plate for movement to said open position, said bimetal means being deenergizable for returning said latch bolt keeper to said first position after said shutter plate moves to said open position, thereby to condition said latch bolt keeper for yieldably grippingly reengaging said latch bolt to retain said shutter plate in said closed position when said shutter plate is again moved to said closed position.

3. In combination with a support means movable between a first position and a second position, a dispenser body movable with said support means in fixed relationship thereto and defining a compartment having an opening through which dispensable material may be supplied to said compartment when said support means is in one of said positions and dispensable from said compartment when said support means is in the other of said positions, closure means having a closed position for covering said opening and an open position for uncovering said opening, means at right angles to said closure means for pivotally mounting said closure means for movement in the plane of said opening between said open and closed posi-

tions, means for biasing said closure means to said open position, and means for selectively latching said closure means in said closed position, said latching means including a latch bolt member supported as a coaxial extension on the end of said pivotally mounting means for movement with said pivotally mounting means, a yieldable latch bolt keeper member having one end fixed relative to said dispenser body and another end having a latched position in continuously twistingly biasing engagement with said latch bolt member when said closure means is in said closed position to retain said closure means in said closed position, an unlatched position out of biasing engagement with said latch bolt member for releasing said closure means for movement to said open position in response to said biasing means and electrically energizable means connected to said latch bolt keeper member for moving said latch bolt keeper member from said latched position to said unlatched position thereby to release said closure means for movement to said open position, said electrically energizable means being deenergizable for returning said latch bolt keeper member to said latched position after said closure means moves to said open position, thereby to condition said latch bolt keeper member for yieldably grippingly reengaging said latch bolt member to retain said closure means in said closed position when said closure means is moved to said closed position.

4. A dispenser comprising casing means forming a compartment having an opening alternately in planes for loading and dispensing, a shutter plate having a closed position for covering said opening and an open position for uncovering said opening when said opening is in said dispensing plane, unitary shaft means journaled in said casing means for pivotally mounting said shutter plate for movement in the plane of said opening between said open and closed positions, means for biasing said shutter

plate to said open position, and means for selectively latching said shutter plate in said closed position, said latching means including a flat latch bolt integral with said unitary shaft and extending coaxially from one end thereof, said latch bolt having opposite edges parallel to the pivotal axis of said shaft, a latch bolt keeper on said casing means having a pair of laterally yieldable spring arms arranged in a U-shape to partially selectively circumscribe said latch bolt and respectively engage said opposite edges, said spring arms having a first position in continuously biasing, twistingly gripping engagement with the opposite edges of said flat latch bolt when said shutter plate is in said closed position to retain said shutter plate in said closed position and a second position out of biasing engagement with said flat latch bolt for releasing said shutter plate for movement to said open position in response to said biasing means, said latching means having bimetal means drivably connected to the spring arms of said latch bolt keeper and energizable for moving said spring arms from said first position to said second position thereby to release said opposite edges of said flat latch bolt so that said shutter plate can move to said open position, said bimetal means being deenergizable for returning said spring arms to said first position after said shutter plate moves to said open position, thereby to condition said spring arms for yieldably twistingly grippingly reengaging said opposite edges of said flat latch bolt to retain said shutter plate in said closed position when said shutter plate is moved to said closed position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,812,881	Karig	Nov. 12, 1957
3,012,696	Kendt	Dec. 12, 1961
3,028,051	Jacobs	Apr. 3, 1962