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LATCHING MECHANISM FOR FRONT OPENING CABINETS

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5 Sheets-Sheet 2

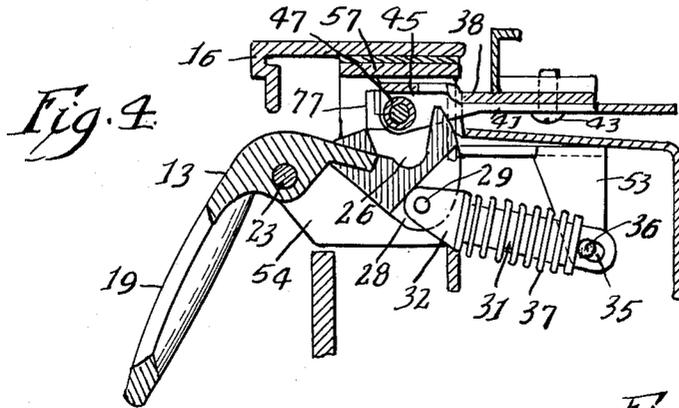


Fig. 4

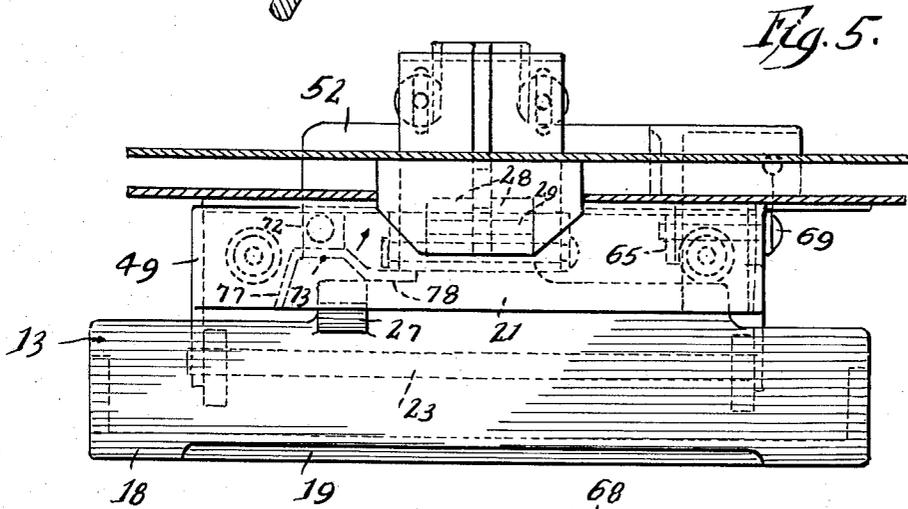


Fig. 5

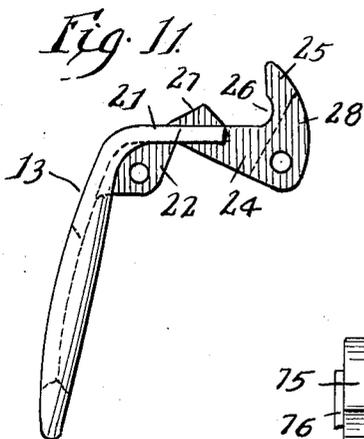


Fig. 11

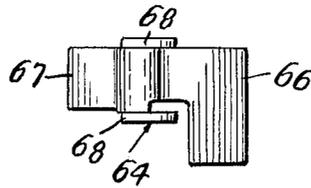


Fig. 14

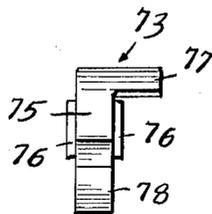


Fig. 15

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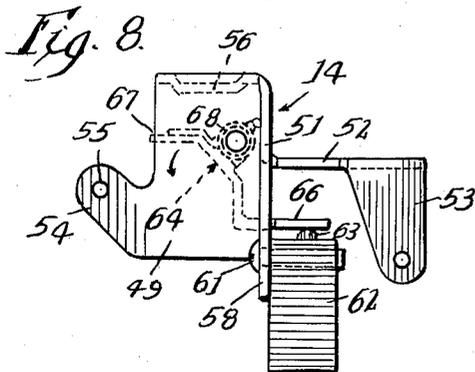
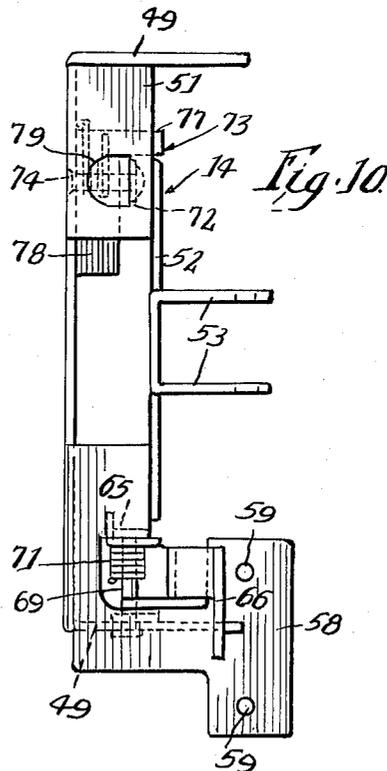
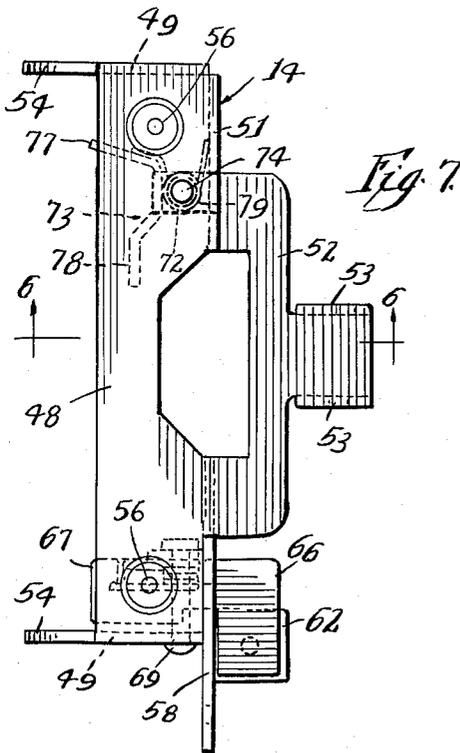
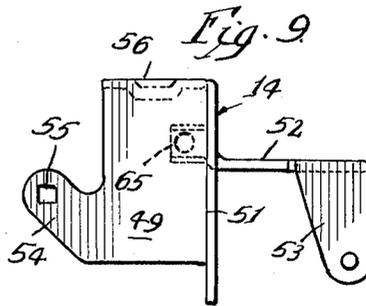
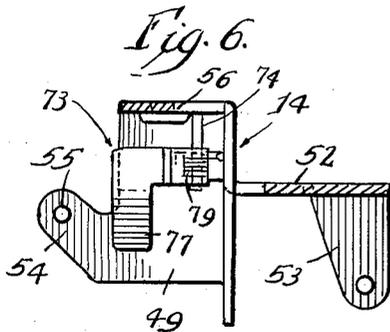
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5 Sheets-Sheet 3



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## LATCHING MECHANISM FOR FRONT OPENING CABINETS

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 6 Claims. (Cl. 200-61.68)

The present invention relates to a novel latching mechanism and more particularly to a novel spring-biased latching means adapted to be utilized on a front-opening household appliance such as a dishwasher or similar appliance.

Among the important objects of the present invention is the provision of a latching mechanism having a spring-biased latch handle which is pivotally mounted in a door of a cabinet or enclosure. The latch handle includes an upwardly extending latching projection which cooperates with a roller mounted on a strike bracket affixed to the top of the enclosure. The handle has a generally downwardly extending portion at the exterior of the door which is grasped by the operator to unlatch the door from the cabinet.

Another important object of the present invention is the provision of a spring retainer assembly to bias the latch handle to the normal latching position. The spring retainer assembly includes an elongated spring retainer member which is pivotally mounted at one end onto the lower portion of the latching projection of the latch handle, and at its other end the retainer is mounted for limited longitudinal movement on a rivet. A compression spring surrounds the retainer and urges the latch handle and its latching projection to the latched position.

A further object of the present invention is the provision of a locking arm which retains the latch handle in its unlatched position when the door is pivoted away from the cabinet. The locking arm is pivotally mounted on the latch housing mounted on the door of the appliance and spring-biased toward its locking position with a projection of the arm abutting the strike assembly with the door in a closed position and the opposite end of the arm biased over a locking projection on the latch handle when the handle is in an unlatched position and the door is opened and removed from the strike assembly. This locking arm prevents accidental actuation of a switch in the door to initiate a cycle of operation which is adapted to be actuated by movement of the latch handle to its closed position. Thus, actuation of the switch is prevented when the door is in its open position.

The present invention further comprehends the provision of a switch arm pivotally mounted in the latch housing to provide for automatic initiation of an operating cycle when the door is closed and latched. The switch arm is spring-biased and has one end resting on a portion of the latch handle which is raised to latch the door. The opposite end of the arm rests on the actuating button or plunger of a switch mounted on the latch housing so that latching the door by moving the latch handle will act to depress the switch button through pivotal movement of the switch arm.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

FIGURE 1 is a front elevational view of a cabinet or enclosure and door for a front loading automatic dishwasher and shows the latch handle of a latching mechanism therefor.

FIG. 2 is a vertical cross sectional view taken on the

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line 2—2 of FIG. 1 looking in the direction of the arrows. FIG. 3 is a vertical cross sectional view taken on the line 3—3 of FIG. 1.

FIG. 4 is a vertical cross sectional view similar to FIG. 3 but with the latching mechanism in a substantially unlatched position.

FIG. 5 is a top plan view of the latching mechanism with the lid of the enclosure removed.

FIG. 6 is a vertical cross sectional view taken on the line 6—6 of FIG. 7 showing the latch housing.

FIG. 7 is a top plan view of the latching housing assembly.

FIG. 8 is an end elevational view of the latch housing assembly.

FIG. 9 is an end elevational view of the latch housing.

FIG. 10 is a rear elevational view of the latch housing assembly.

FIG. 11 is a side elevation view of the latch handle.

FIG. 12 is a top plan view of the strike member.

FIG. 13 is a side elevational view of the strike member.

FIG. 14 is a top plan view of the switch arm.

FIG. 15 is a top plan view of the locking arm.

Referring to the disclosure in the drawings wherein is shown an illustrative embodiment of the present invention, FIG. 1 discloses a cabinet or enclosure 10 for an automatic dishwasher or the like which may be installed in the cabinetry of a kitchen or may be a portable type having a hinged front door 11 to provide a front loading appliance. The door is hinged adjacent the base of the cabinet, and the hinges may include a spring-loaded structure to retain the door in a fully open position. The latching mechanism 12 is mounted within the door 11 adjacent the top thereof with only the latch handle 13 being exposed to view.

As more clearly seen in FIGS. 2, 3 and 6 to 10, inclusive, the latching mechanism 12 includes a latch housing 14 mounted within the door 11 and carrying the latch handle 13, and a strike assembly 15 which is mounted on the top of the cabinet 10 and engaged by the latch handle to latch the door in a fully closed position. The top of the door 11 includes an overlapping downwardly extending lip 16 which is cut away at 17 to allow for movement of the latch handle to unlatch the door 11. The handle includes a substantially rectangular portion 18 having an opening 19 therethrough so that the hand of the operator can easily grasp and operate the handle. The portion 18 is normally substantially vertically disposed (FIG. 3) and merges into a substantially horizontal and inverted portion 21 having spaced depending ears or tabs 22 for pivotally mounting the handle onto the latch housing 14 with an elongated rivet or transverse pin 23.

The horizontal portion 21 terminates in a centrally located latching portion 24 (FIGS. 4 and 11) which extends rearwardly and upwardly in a hook-like projection 25 having a rounded undercut area 26 adapted to engage the strike assembly 15. A triangular locking projection 27 is formed on the horizontal portion 21 and offset from the latching portion 24 and cooperates with a locking arm to be later described. A bifurcated portion 28 depends from the inner end of the latching portion 24 and has aligned openings for a transverse pin or rivet 29 extending therethrough to mount a spring retainer 31 thereon. The retainer has an enlarged head 32 fitting within the bifurcated portion 28 and having an opening receiving the rivet 29 and an elongated body 34 having a slightly elongated opening 35 adjacent the opposite end adapted to receive a retainer rivet or pin 36 mounted in the latch housing 14. A compression spring 37 has one end bearing against the enlarged head 32 on the retainer 31 and the opposite end bearing against the retainer rivet 36.

The strike assembly 15 (see FIGS. 12 and 13) includes a plate 38 having a stepped portion 39 intermediate the ends thereof and spaced downturned sides or edges 41. A pair of transversely spaced and longitudinally extending elongated openings 42 are located adjacent one end of the plate for suitable securing means such as the mounting screws 43 affixing the strike to the top of the cabinet 10. Adjacent the opposite end of the plate, and on the other side of the stepped portion 39, is a laterally extending elongated opening 44 adapted to receive the upper end of the hook-like projection 25. The downturned edges 41 are enlarged at 45 adjacent the opening 44 and have aligned openings for a strike rivet or pin 46 extending therethrough. A strike roller 47 is mounted on the rivet or pin 46 and is adapted to be engaged by the undercut portion 26 of the hook-like projection 25.

The latch handle 13 is pivotally mounted on the elongated pin or rivet 23 supported in the latch housing 14 (FIGS. 6 to 10, inclusive). The housing includes an elongated top wall 48 with downwardly extending end walls 49, 49 and a downwardly extending rear wall 51. Approximately halfway down the rear wall 51 and defining the lower boundary of a central opening therein is a centrally located rearwardly projecting extension 52 terminating in a pair of spaced parallel downwardly extending ears 53. The end walls 49, 49 each have a forwardly and upwardly extending supporting ear 54 having opening 55 adapted to receive the elongated rivet or pin 23.

The top wall 48 includes openings 56 for suitable securing means, such as screws, to affix the housing to the top edge 57 of the door 11. At one end of the rear wall 51 is located a depending laterally extending flange 58 having spaced openings 59 for suitable securing means 61 to mount a switch 62 on the flange 58. The switch has a button or plunger 63 projecting from the top thereof adapted to be actuated by a switch arm 64 mounted on a vertical tab 65 formed on the rear wall 51 but extending forward from the wall. The switch 62 is suitably connected into the operating circuit of the dishwasher in a manner to be later described.

The switch arm 64 includes a laterally extending horizontal arm 66 adapted to contact the switch button 63 and an upper horizontal arm 67 adapted to engage the upper horizontal surface of the latch handle 13. The arms are connected by an angularly positioned plate having upwardly and rearwardly extending ears 68 which include openings for a pivot pin 69 to mount the switch arm on the flange 65. A helical spring 71 has extended ends engaging the rear wall 51 and the top surface of the arm 66 to yieldably urge the switch arm in a counterclockwise direction as seen in FIG. 8.

A horizontal tab 72 extending forwardly of the rear wall 51 adjacent the opposite end of the latch housing 14 mounts a locking arm 73 for pivotal movement on a vertical pivot pin 74. The locking arm 73 includes a central base 75 with perpendicular ears 76 having openings to receive the pivot pin 74. A forwardly and downwardly extending arm portion 77 is angularly positioned relative to the base 75 and an arm portion 78 on the opposite side of the base 75 is slightly offset therefrom. A helical spring 79 surrounds the pivot pin 74 and has extended ends which bear against the rear wall 51 and the outer surface of the arm portion 77 to yieldably bias the locking arm 73 in a counterclockwise direction as seen in FIG. 7.

Now considering operation of the latching mechanism for an automatic dishwasher or the like, FIGS. 2 and 3 show the latch mechanism with the door 11 closed and latched on the cabinet 10. To unlatch the door, the handle 13 is pulled outward and pivots around the pin or rivet 23 to withdraw the latching portion 24 of the handle 13 downwardly and out of the opening 44 in the strike plate 38 (FIG. 4). Movement of the handle is made against the force of the compression spring 37 which urges the handle to its latching position. Once the

hook-like projection 25 clears the strike roller 47, the door 11 can be opened outwardly and downwardly to a horizontal position.

As the door is opened, the arm portion 78 no longer abuts the strike plate 38 and the spring 79 urges the locking arm 73 in a counterclockwise direction around the pin 74 until the arm 78 engages the rear wall 51 of the latch housing 14. The downwardly extending arm 77 is rotated to a position over the triangular projection 27 on the handle 13 where the arm engages the forward surface of the projection when the handle has been actuated to lock said handle in said actuated position. Also, with the handle pivoted from its normal latching position the switch arm 64 is also allowed to rotate under action by the spring 71 to allow the switch button 63 to rise and open the switch contacts. The locking arm 73 holding the handle in its unlatched position thus prevents a reactivation of the switch 62 when the door 11 is open for unloading or loading of the cabinet 10.

When the cabinet has been loaded, the door is moved to closed position and the arm portion 78 is engaged by the strike plate 38 to rotate the locking arm 73 in a clockwise position to release the handle 13. The compression spring 37 urges the handle to its latched position, and the horizontal portion 21 of the handle contacts the arm 66 to rotate the switch arm 64 in a clockwise position so that the arm 65 depresses the switch button 63 to close the switch contacts. The switch 62 is in a circuit which when the switch is closed, initiates the timed operating cycle of the dishwasher, and when the rinse cycle is concluded the timer in the circuit shuts off the circuit and resets the timer even though the contacts of the switch 62 remain closed.

While this invention has been shown and described as being advantageously applicable to an automatic dishwasher, it is not my desire or intent to unnecessarily limit the scope or the utility of the invention by virtue of this illustrative embodiment.

Having disclosed the invention, I claim:

1. A latching mechanism for a front opening door of a cabinet such as a dishwasher or the like, comprising a latch housing mounted in the door of the cabinet, a latch member pivotally mounted in the latch housing and including a handle and a latching portion having an upwardly extending latching projection, a strike member mounted in the cabinet above the latch housing and adapted to be engaged by the latching projection to latch the door in closed position, a spring retainer pivotally mounted at one end to the latching portion of the latch member and mounted for limited longitudinal movement at the opposite end on the latch housing, resilient means urging the spring retainer and latch member toward the latching position, and means to lock the latch member in unlatched position when the door is opened.
2. A latching mechanism for a front opening door on a cabinet such as an automatic dishwasher or the like, comprising a latch housing mounted in the door of the cabinet and carrying an elongated pin, a latch member pivotally mounted on said pin and including a handle portion and a generally horizontal latching portion, a latching projection extending upwardly from said latching portion and having an undercut surface thereon, a strike member affixed to the cabinet and having an opening accommodating the latching projection, a strike roller mounted on the strike member and adapted to cooperate with the undercut surface on the latching projection, a spring retainer having an enlarged head at one end pivotally mounted on said latching portion and mounted at its opposite end for pivotal and limited longitudinal movement on said latch housing, a compression spring with one end abutting the enlarged head of the spring retainer and the opposite end abutting the latch housing to yieldably urge the latch member to its latched position, and means to

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lock the latch member in its unlatched position when the door is opened.

3. A latching mechanism as set forth in claim 2, in which said locking means includes a locking arm yieldably biased to a locking position and a locking projection on the upper surface of the latching portion of the latching member cooperating with the locking arm.

4. A latching mechanism as set forth in claim 3, in which said locking arm has a central portion pivotally mounted on the latch housing and one end portion abutting the strike member when the door is in closed position, the other end extending outwardly and downwardly, and means to bias the locking arm to locking engagement with the locking projection when the latch housing is moved away from the strike member.

5. A latching mechanism as set forth in claim 2, including a switch mounted on the latch housing and a switch arm pivotally mounted on the latch housing and having one end contacting a button projecting upwardly

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from the switch to open or close the switch and the opposite end contacting the upper surface of the latching portion of said latch member.

6. A latching mechanism as set forth in claim 5, in which the switch arm is yieldably biased to contact said latching portion and when the latch member is pivoted to its unlatched position the switch arm pivots to open the switch contacts.

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