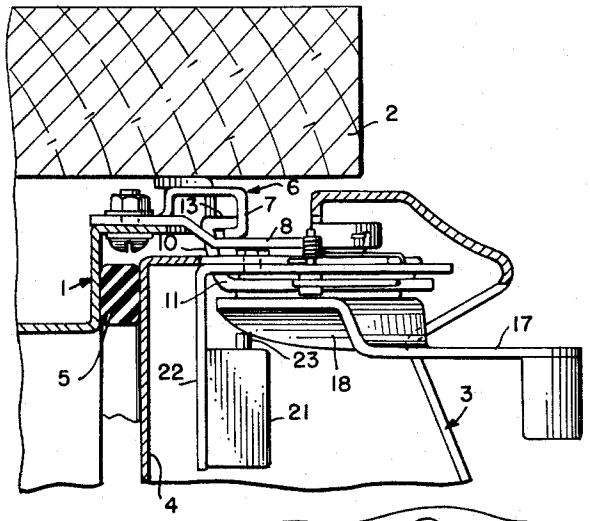
Oct. 17, 1961 D. A. JELLIES 3,005,065

DOMESTIC APPLIANCE

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FIG. 1



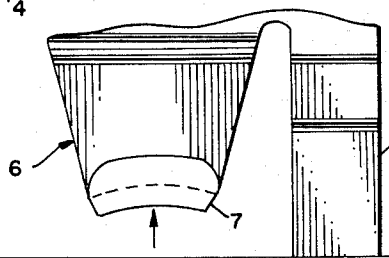
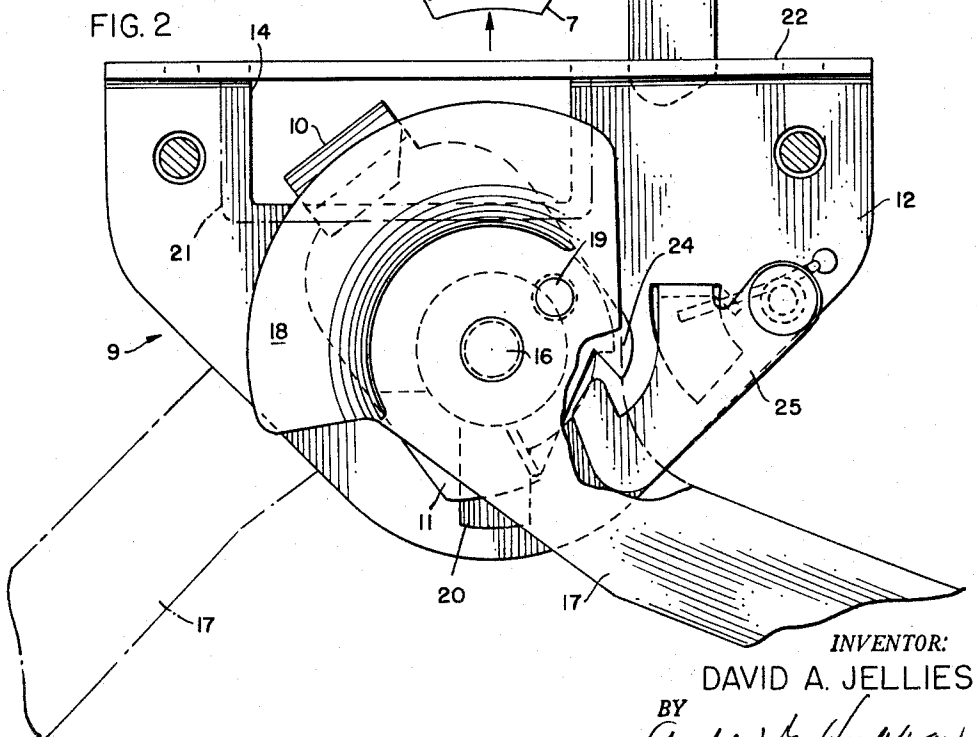


FIG. 2



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FIG. 4

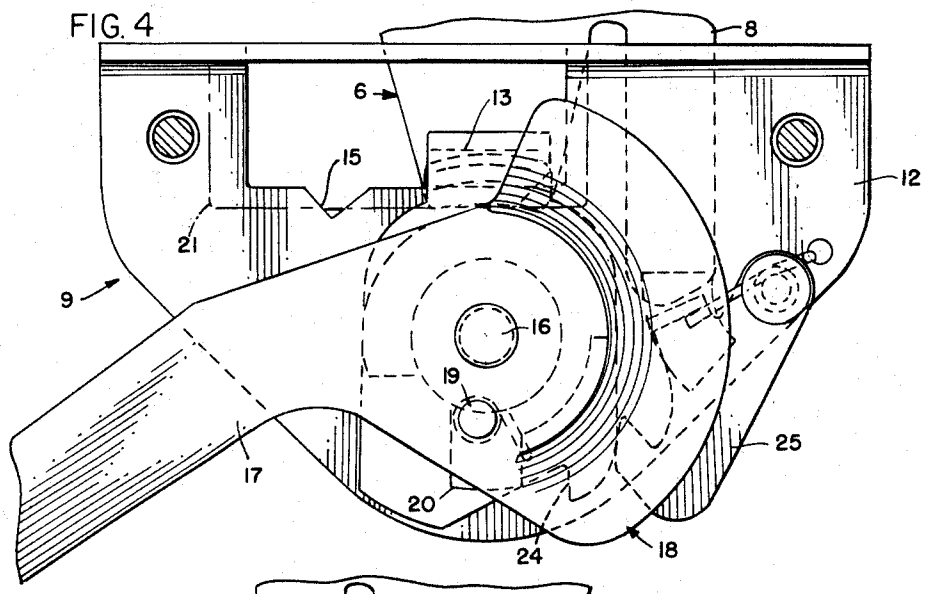
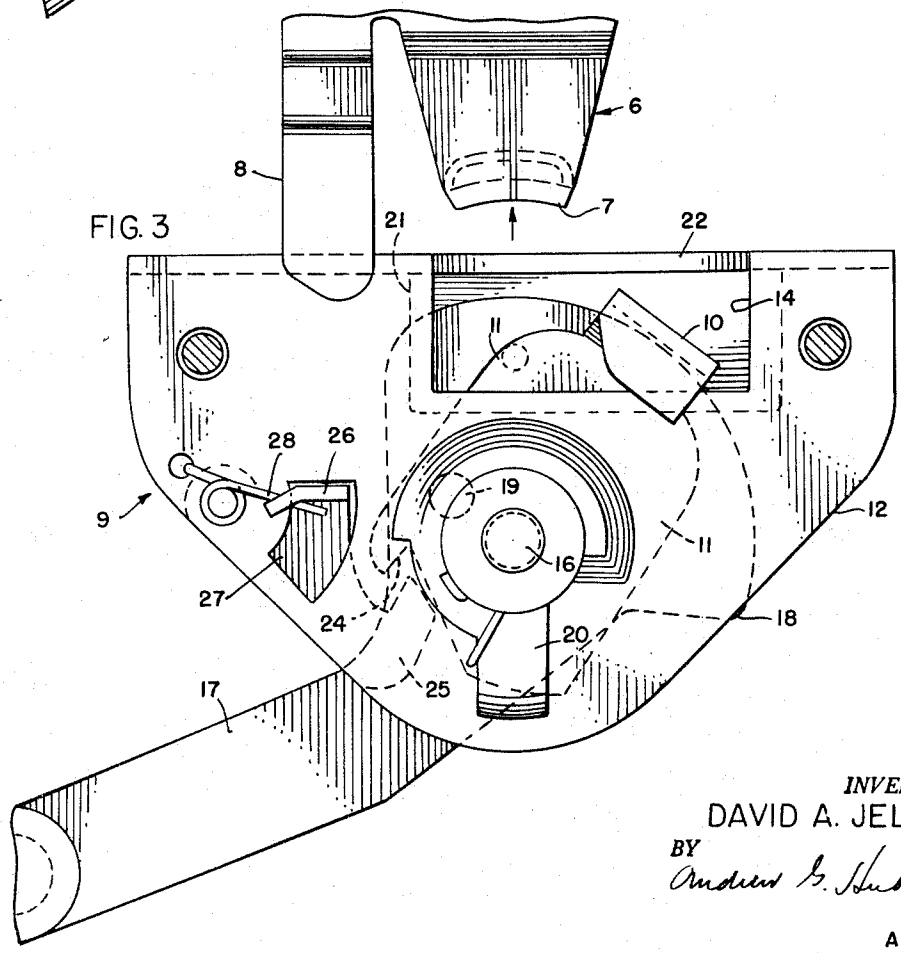


FIG. 3



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FIG. 5

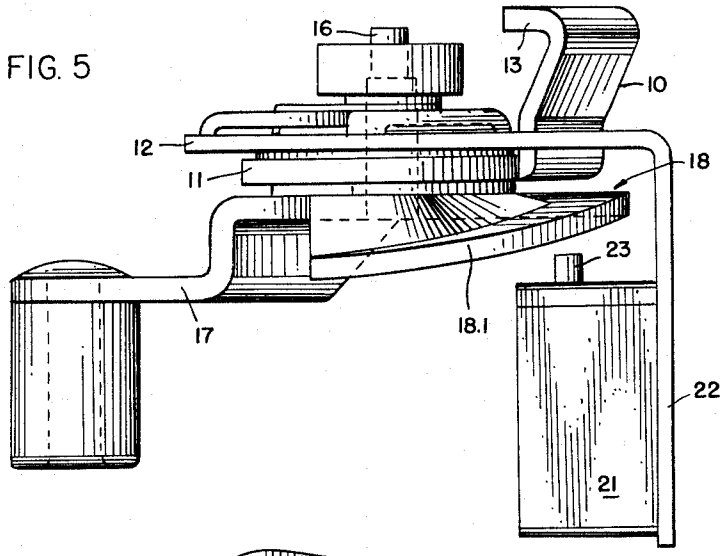
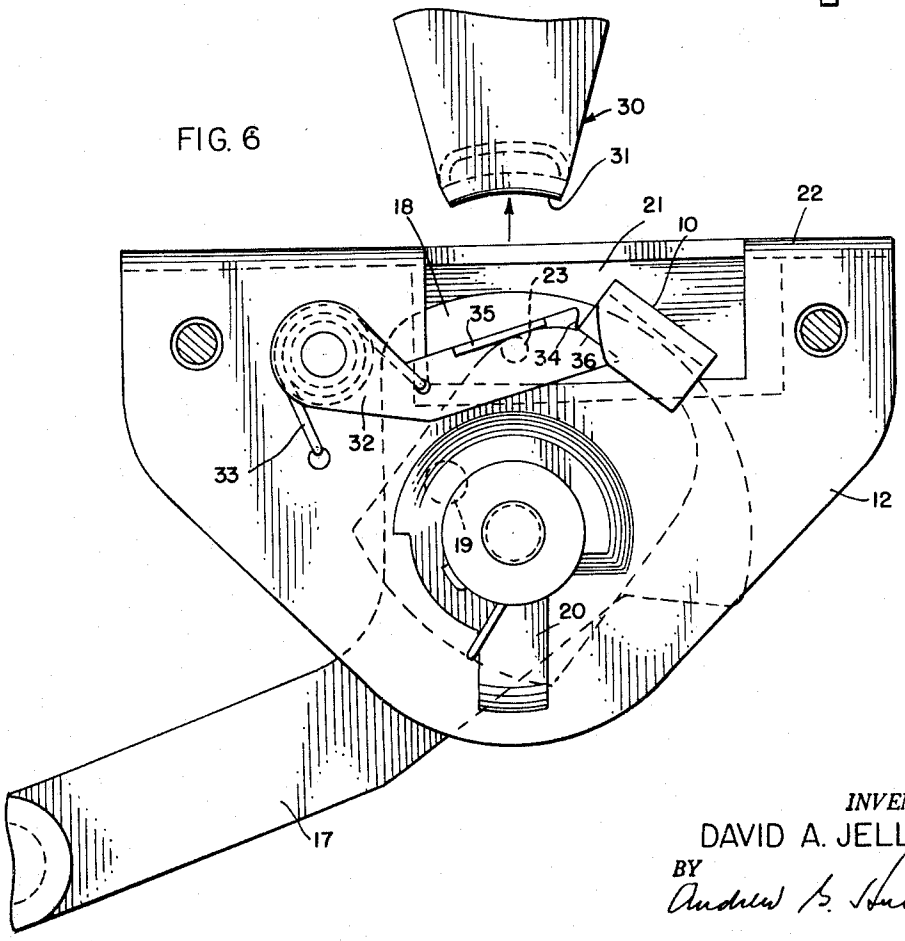


FIG. 6



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3,005,065

DOMESTIC APPLIANCE

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8 Claims. (Cl. 200—61.62)

This invention relates to apparatus in which an electrical switch is to be operated by means of a latch arranged to secure a cabinet door or other closure in a tightly closed position, and it is a particular object of the invention to provide means which will prevent the operation of the switch until the cabinet door attains a predetermined position relative to the cabinet.

The invention is presently applied to automatic dishwashers manufactured by applicant's assignee herein. In the dishwasher, a normally open, door-latch operated switch is in series electrical circuit with the electrically actuated timing devices which automatically conduct the dishwasher through a predetermined series of operations which include various washing and rinsing steps. It is frequently the case that after the dishwasher is placed in operation, the user wishes to add a dish or utensil which he had forgotten to place in the dishwasher, and the door-latch operated switch will break the energizing circuit when the latch is operated to permit the door to be opened. The obvious purpose of this is to prevent the operation of the dishwasher when the door is even in an ajar position; for as well known in the art, dishwashers operate on the principle of subjecting the dishes to the action of sprays or streams of washing liquid, and such liquid would splash out of an even partly opened door if the operation of the pump or impeller were not interrupted in advance of opening the door.

It was noted by the applicant herein that with conventional latch-operated switches, it is possible to resume operation of the dishwasher when the door was open. For example, if the dishwasher had been placed in operation and the energizing circuit completed through the timing devices, the operation of the latch to open the door would interrupt the power circuit only at the latch-operated switch. If while the door remained open, the latch were operated in its latching direction, as it might be by a playful or mischievous child, the full operating circuit would be restored and the dishwasher would resume operation with resultant flooding of the kitchen floor.

It is, therefore, an object of the present invention to provide a switch-operating latching mechanism for the door of a cabinet, in which the switch assumes an open-circuit condition when the latch is operated in an unlatching direction, and the latching mechanism is automatically locked against movement in its latching direction when the door is moved away from its closed position.

It is another object of the invention to provide a latching mechanism having a latching lever arranged to operate an electric switch to a desired circuit condition upon operation of the lever in an unlatching direction, and means which will thereupon restrain the latching lever from actuating the switch to another circuit condition.

In a presently preferred embodiment of the invention, a lever-operated latching device is provided with means adapted when operated in a predetermined direction to depress an actuating button of an electric switch. Pursuant to the invention, a lockout device mounted on the latch engages with the latch immediately upon movement of the door in an opening direction, thereby securing the lacth against an operation which would actuate the switch to closed circuit condition. The lockout device remains effective until the door attains its closed position, whereupon the latch strike or other means provided in relation thereto disables the lockout device to permit rotation of the latch to secure the door and actuate the switch to closed circuit position. The dishwasher is then ready for usual operation.

Other features and advantages of the invention will be apparent from the following description of presently preferred embodiments thereof, read in connection with the accompanying drawings in which:

FIG. 1 is a fragmentary section elevation of the upper front portion of a dishwasher door and cabinet, showing the door in fully closed, latched, position;

FIGS. 2 and 3 are, respectively, a bottom plan view and a top plan view of the latch and the strike, with the latch lever in its unlatching position and the lockout device in its detent position;

FIG. 4 is a bottom plan view of the latch in its latching position, showing the manner in which the lockout device has been disabled upon closing the cabinet door;

FIG. 5 is a vertical elevation of a latch showing parts which are common to the embodiments illustrated herein; and

FIG. 6 is a top plan view of a second embodiment of the invention.

In FIG. 1, the upper front portion of a dishwasher tub 1 is illustrated in its usual environment below a kitchen counter 2. The dishwasher door 3 is in its fully closed position; the rim 4 of the door is engaging the peripheral gasket 5 about the rim of the tub to effect a tight seal to protect against leakage of liquid when the dishwasher is in operation. The dishwasher tub has a strike 6 secured thereto for adjustable forward projection therefrom. The strike has a hooked head 7 and, in the FIG. 2 embodiment, also includes, as a preferably integral part thereof, a tongue 8 which projects a substantial distance in front of the head 7.

It will be understood that reference to the door 3 is not to be taken in any limiting sense. Applicant's assignee herein makes dishwashers of the front opening door type and of the top opening and pull out drawer types. The present invention is applicable to all three of said types.

The cooperating latch mechanism 9 is mounted within the door 3 as by securement to the underside of the top transverse portion thereof, and includes a bolt 10 (FIG. 5) integral with a latch plate 11 rotatably mounted on the underside of a mounting bracket 12, by means of which the plate 11 is affixed relative to the transverse member of the door. As best shown in FIGS. 2 and 5, the bolt 10 has an angular hook-like extremity 13 which adapts it for engagement behind the head 7 of the strike. The bolt 10 projects upwardly through a suitable opening in the bracket 12, and it will be understood that the upper portion of the door is also suitably apertured to accommodate the latch mechanism. The dimensions of the opening 14 in the bracket 12 and, of course, the dimensions of the opening in the door member, permit rotation of the bolt 10 between the fully unlatched position established by the seat 15 and the fully latched position, both shown in FIG. 4. The latch plate 11 is mounted for rotational and slidable movement relative to the bracket 12, by the shaft 16. The latch plate 11 is operated by a lever 17 mounted on shaft 16 below plate 11. As best seen in FIG. 4, the lever 17 includes a camming portion 18 from which extends a pin 19 which provides the actuating link between the camming plate and the carrier plate 11. The mechanism is of the conventional type in which following a rotation of the lever 17 counterclockwise through an angle of about 30°, as viewed in FIG. 3, the bolt 10 is then drawn rearwardly along the embossed guideway 20, to urge the door 3 into a tightly closed position. The mechanism for accomplishing this compound rotational and linear movement has not been

detailed, for it is not necessary to an understanding of the present invention.

A switch 21 is mounted on a leg 22 of the L-shaped bracket 12 and is provided with an actuating pushbutton 23 disposed in the path of movement of the cam 18. When the lever 17 is rotated counterclockwise of FIG. 6, the switch button is depressed by operation of the portion of the cam commencing at the reference point 18.1 in FIG. 5. In a dishwasher or similar appliance in which switch 21 is a normally open switch in series with the main power circuit (not shown), the actuation of the switch to closed circuit condition is coincident with the latching engagement of the bolt 10 with the strike member 7, thereby insuring that the dishwasher will not be operated until the door 3 is fully closed. It is, of course, possible that some conditions of operation will require the switch 21 to be of a normally closed position, whereupon the operation of the cam 18, as described above, will open the switch circuit.

In the embodiment illustrated in FIG. 2, the carrier plate 11 has a locking notch 24 arranged for cooperation with a latch-lever lockout device, comprising a dog 25, pivotally mounted on the underside of bracket 12. An ear 26 projects upwardly from the dog through an arcuate slot 27 in bracket 12, and is disposed in the path of the finger 8 of the strike 6, as best shown in FIG. 3. A coil spring 28 biases the dog into counterclockwise rotation, pursuant to which the hooked extremity of the dog is normally disposed to engage within the notch 24 of the plate 11 after a very brief rotation of the lever 17, thus holding the plate 11 and cam 18 against further rotation. The limited movement of the cam 18 before the engagement of the dog with the notched portion 24 is insufficient to cause the cam to actuate the switch, whereupon, in the illustrated example, the switch will remain open. The dishwasher cannot then be operated regardless of any manipulation of the timing device or other controls (not shown). As the door is closed, however, the tongue 8 engages the ear 26 rotating the dog clockwise of FIG. 3 and thereby clearing the plate 11 for rotation. The respective elements are so related that the dog 25 is moved to its disengaged position when the door is closed sufficiently for the bolt 10 to engage behind the head 7 of the strike, whereupon the rotation of the handle completes the latching of the door and the cam 18 actuates the switch button 23. As shown in FIG. 4, under this condition the spring 28 causes the dog 25 to bear idly against the edge of the plate 11, ready again for movement into cooperating relation with the locking notch 24 upon rotation of the handle 17 in an unlatching direction and the subsequent opening of the door.

In the embodiment illustrated in FIG. 6, the strike 30 does not include any member structurally like the finger 8 of the earlier embodiment. Instead, the head portion 31 of the strike actuates the mechanism to release the latch handle 17 for operation. Pursuant to this embodiment, the latch-lever lockout device comprises a lever 32 pivotally mounted on the upper surface of the bracket 12. The lever 32 is biased by means of spring 33 into counterclockwise rotation. The end of the lever 32 is forked to provide a notch 34 having a wall 36 which will engage behind the bolt 10. Further, the lever 32 is formed with an upwardly extending portion 35 which is directly in the path of the head 31 of the strike. When the latch handle 17 is rotated in an unlatching direction to disengage the bolt from the strike, the resulting movement of the cam 18 releases the switch button 23 and the power circuit is opened to interrupt the operation of the dishwasher. Drawing the door forward in the opening direction, frees the lockout lever 32 for movement to the FIG. 6 position, whereupon the bolt 10 is engaged as aforesaid and the latch lever 17 is held against movement in a direction which would operate the switch to its closed circuit position. However, when the door is returned to a position in which the bolt 10 is capable of latching behind the head 31 of the strike, said head will have engaged the portion 35 and will have moved the lever 32 clockwise of FIG. 6 to release the bolt 10 and thereby free the handle for movement in its latching direction.

While there have been described what are at present considered to be the preferred embodiments of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the scope of the invention.

I claim:

1. Combination latching and switch operating mechanism for a cabinet or the like provided with an access opening and a closure therefor, including a latching bolt on said closure and a strike on said cabinet for cooperation therewith, means for operating said bolt between latched and unlatched positions relative to said strike, an electric switch disposed in fixed position relative to said bolt operating means, means for operating said switch to a certain electric circuit condition upon predetermined movement of said bolt operating means in a latching direction, lockout means including a lever pivotally mounted relative to said bolt for interfitting engagement with said bolt for securing said bolt operating means against movement in said latching direction, means for operating said lockout means to effect said securement function when said bolt is withdrawn from said strike, and means for actuating said lockout means lever to disengage from said bolt upon movement of said bolt into a position relative to said strike permitting the bolt to enter into a latching relationship therewith, whereby said switch may then be operated to its certain electric circuit condition.

2. Switch operating mechanism, including a latching bolt and a strike for cooperation therewith, said bolt including structure movable relative to said strike following the disengagement of said bolt from said strike, means for operating said bolt between engaged and disengaged positions relative to said strike, an electric switch disposed in fixed position relative to said bolt-operating means, means for operating said switch to a certain electric circuit condition upon predetermined movement of said bolt-operating means in a direction to effect the engagement of said strike and said bolt, a lockout device fixed relative to said bolt-operating means, means responsive to movement of said bolt-carrying structure relative to said strike to engage with said bolt to cause said lockout device to secure the bolt-operating means against operation of said switch to its said certain circuit condition, and means effective upon movement of said bolt to a position permitting engagement of said bolt with said strike to disable said lockout means and thereby to release said bolt and bolt-operating means for movement effecting the operation of said switch and the substantially concurrent engagement of said bolt with said strike.

3. Switch operating mechanism according to claim 2, in which said bolt-operating means includes a rotatable plate having a detent element and said lockout device comprises a pivotally mounted dog biased for engagement with said detent element.

4. A combination latch and switch operating mechanism for a cabinet or the like having a door in which a strike is mounted on the cabinet structure and a latching bolt is mounted on the cabinet door, comprising means for rotating said bolt into or out of latching engagement with said strike, an electric switch mounted in fixed position relative to said bolt-rotating means, means including said bolt-rotating means for actuating said switch to a certain electric circuit condition upon operation of said bolt-rotating means in a latching direction, a lockout device mounted in fixed relation to said bolt-rotating means, a detent structure on said bolt-rotating means, means for preparing said lockout device and said detent structure for interengagement upon disengaging said bolt from said strike, spring means for moving said lockout device into engagement with said detent structure upon

withdrawal of said cabinet door from a closed position, whereby said lockout device secures said bolt-rotating structure against operation in a bolt-latching direction, and means engaging said lockout device to disengage the same from said detent structure as the cabinet door is moved to a closed position, whereupon said bolt-rotating means is freed for operation in a direction effecting the latching of said bolt to said strike and the concurrent operation of said switch to its said certain circuit condition.

5. A combination latch and switch operating mechanism according to claim 4, in which said lockout-engaging means comprises the strike.

6. A combination latch and switch operating mechanism according to claim 4, in which said lockout-engaging means comprises a tongue projecting from said strike.

7. A combination latching mechanism and switch actuating device for a dishwasher having a cabinet on which a latch strike is mounted and a door on which a bolt mechanism is mounted, comprising structure carried by said door for rotatably supporting said bolt mechanism for movement into or out of latching engagement with said strike, lever means for operating said bolt mechanism in latching and unlatching directions of rotation, a normally-open switch mounted on said bolt mechanism supporting structure, a cam member on said lever means, a switch actuator disposed in the path of movement of said cam member for operation of said switch to closed circuit condition upon operation of said lever in latching direction and for return of said switch to open circuit condition upon operation of said lever in unlatching direction, a lockout device mounted on said bolt mechanism supporting structure for engagement with said bolt mechanism to secure the same against operation in a bolt-latching direction, means effective upon withdrawal of said door from said cabinet for completing engagement of said lockout device with said bolt mechanism to preclude operation of said bolt mechanism in a latching direction, and means on said lockout device disposed for engagement by a projecting portion of said strike to disengage said lockout device from said bolt mechanism as said door attains a closed position, whereupon said lever means may then be operated to rotate said bolt mechanism into latching engagement with said strike and concurrently operate the switch to closed circuit condition.

8. A combination latching mechanism and switch actuating device for a dishwasher having a cabinet on which a latch strike is mounted and a door on which a bolt mechanism is mounted, comprising structure for supporting said bolt mechanism for movement into or out of latching engagement with said strike, means for operating said bolt mechanism in a desired direction, a normally open electric switch mounted in fixed relation to said bolt mechanism operating means, a switch actuator disposed in the path of movement of said bolt mechanism operating means for actuation of said switch to closed circuit condition upon movement of said bolt mechanism in a latching direction and return of said switch to open position upon return movement of said bolt mechanism, a lockout device mounted on said bolt mechanism supporting structure, said lockout device being operable between a first position engaging said bolt mechanism to prevent movement thereof in a latching direction and a second position releasing said bolt mechanism for movement in said latching direction, means effective upon closing said door against said cabinet to operate said lockout device to its second position whereby said bolt mechanism may be operated in latching direction and said switch concurrently operated thereby, means effective upon operation of said bolt mechanism in an unlatching direction to prepare said bolt means for engagement by said lockout device, and means for completing the operation of said lockout device to its first said position upon movement of said door in an opening direction.

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