Nov. 17, 1953 R. W. WOLF 2,659,782

LATCH AND INTERLOCK

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Fig. 1.

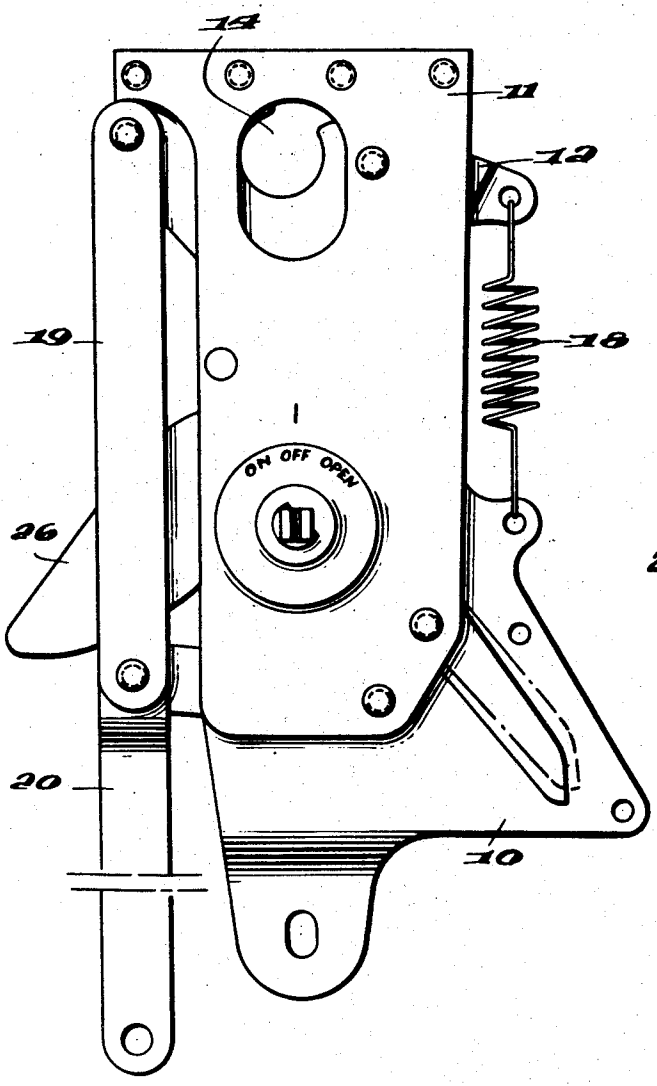
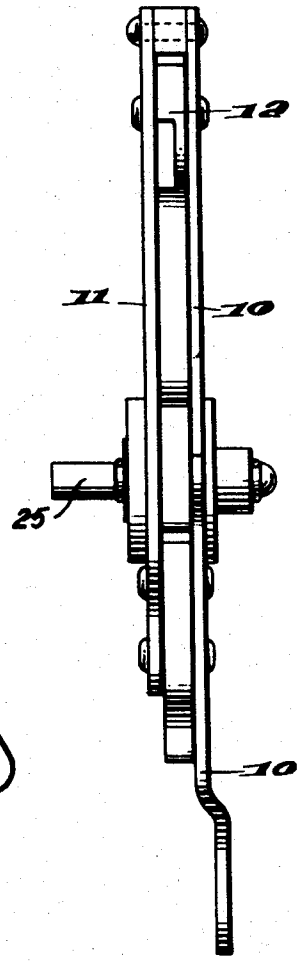


Fig. 2.



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Fig. 3.

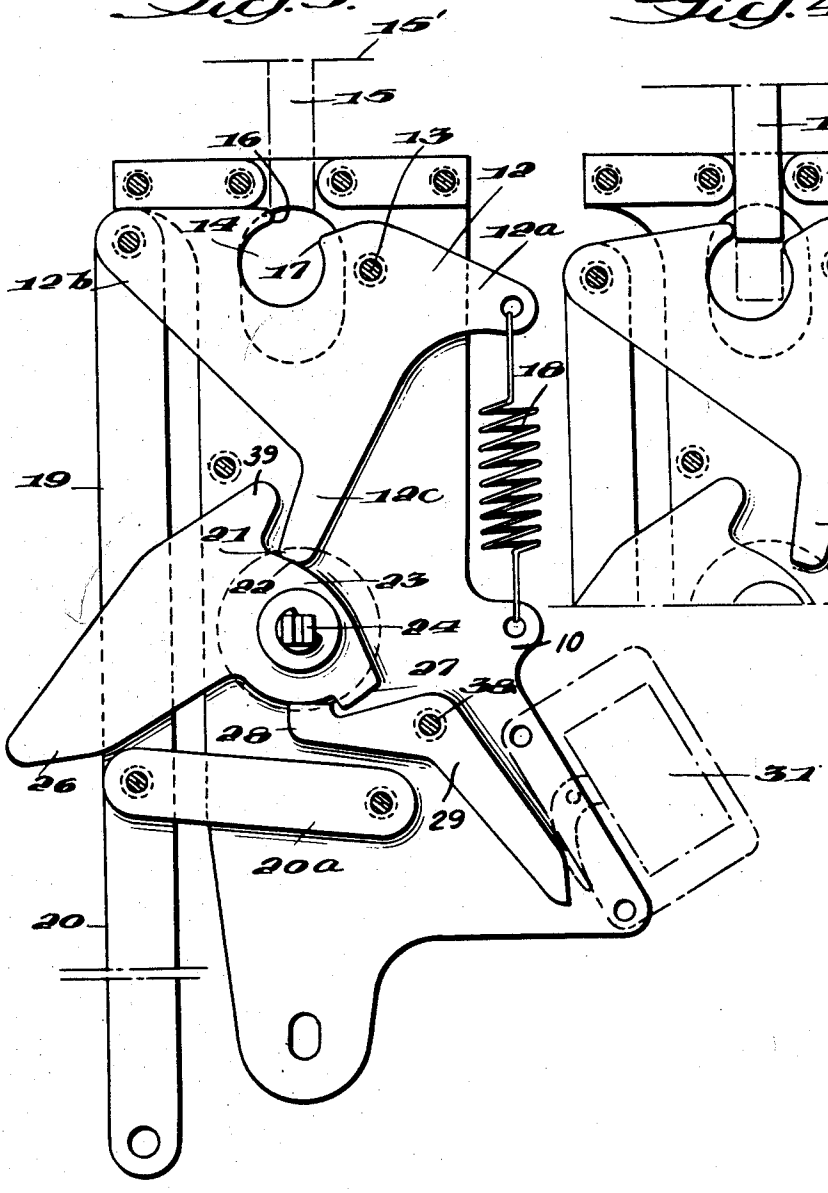


Fig. 4.

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LATCH AND INTERLOCK

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11 Claims. (Cl. 200—61.62)

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This invention relates to operation controlling devices and more particularly to devices for regulating and coordinating the movement of a closure between open and closed position. One important application of the invention is to latch structure for a dish washing machine in which the position of a closure is interlocked with the cycle of operation of the machine.

In dish washing machines and the like it is important that certain operations, particularly those involving the spraying of scalding liquids, be performed only when the machine cover is closed. Accordingly, it is an object of this invention to prevent the starting of the machine while the lid is open thereby protecting the operator from the rapidly moving liquids in the machine.

A further object of the invention is to provide a lock assembly which includes a means for operating the main control switch for the machine.

A further object of the invention is to provide a device for fastening a movable member to structure cooperating therewith and for interlocking the operation of said member with operating means for other apparatus, comprising latch means having an unlatching position, a latching position, and a third position which the latch means normally occupies when the movable member is spaced from said structure, a control element for moving said latch means toward said unlatching position and for controlling the operating means for said other apparatus, and detent means movable with said latch means and positioned to block movement of said control element to operate said apparatus control means when said latch means is in said third position, said detent means being positioned so as to be movable to inoperative position by movement of the latch means to latching position.

Another object of the invention is to provide a device for fastening a movable member to structure cooperating therewith and for interlocking the operation of said member with operating means for other apparatus, comprising latch means having an unlatching position, a latching position, and a third position which the latch means normally occupies when the movable member is spaced from said structure and in which third position a portion of the latch means

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projects into the path of movement of said latch means permitting movement of said latch means from said third position to said latching position by movement of said movable member toward said cooperating structure and into engagement with said latch means, a control element for moving said latch means toward unlatching position, means movable with said control means for controlling the operating means for said other apparatus, said means movable with said control means being movable to an inoperative position by movement of said control element to move said latch means to unlatching position, detent means movable with said latch means and positioned to block movement of said control element to operate said apparatus control means when said latch means is in said third position, and mounting means for said latch means permitting movement of said latch means from said third position to said latching position by movement of said movable member toward said cooperating structure and into engagement with said latch means, thereby moving said detent means to inoperative position and releasing said control element for movement.

Another object of the invention is to provide a control device for operating a latch mounted for movement to and from a position of latching engagement with a cooperating member, and for controlling the operation of other apparatus, comprising control means for said other apparatus normally occupying a position in which said other apparatus is inoperative, and a control element operably connected to said control means and to said latch, said control element having an "on" position in which it holds said control means in a position to cause operation of said other apparatus and said latch is left free to move both to and from a position of engagement with said member, a "release" position in which the control element maintains said latch disengaged from said member and said operating means is free to assume its normal position, and a "neutral" position intermediate said first two positions in which said latch is free to move to and from a position of engagement with said member and said operating means is free to assume its normal, inoperative position, the intermediate location of said "neutral" position requiring movement of the control element through said "neu-

tral" position when moving between said "on" and "release" positions.

It is to be pointed out that the device is not limited to use with dish washers or even to use with containers having locking lids, the embodiment in the present application being only a preferred embodiment of the invention.

The above and other objects will become apparent from the description of the drawings in which:

Fig. 1 is a front elevational view of the invention;

Fig. 2 is a side elevational view thereof;

Fig. 3 is a front view with the cover plate removed;

Fig. 4 is a fragmentary view showing the latch and latch engaging member in locked position.

Referring now to the drawings there is shown a supporting plate 10 and a covering plate 11 between which are mounted the cooperating elements of the latching and interlocking arrangement.

A latch 12 is positioned for pivoting about a front to rear axis 13 between the two housing plates. The latch comprises a generally triangular member having one of its sides facing upwardly with an opening 14 therein which receives the movable latch engaging member or tongue 15, (Figs. 3 and 4) carried by a lid indicated at 15'. This opening is partly closed by lips 16, 17 which extend toward each other from each of its sides, the opening being generally circular in configuration, with its open side being considerably smaller than a 180° portion of the circle. By means of this circular configuration of the opening in the upper side of the generally triangular latch member 12, the latch permits ready entry and release of the latch engaging member 15 into and from the opening 14 in the latch, as long as a line drawn between the two lips partially closing the opening is disposed slightly toward the horizontal from the position of Fig. 4. When the latch is tilted about its pivot 13 as in Fig. 4, lips 16 and 17 exert a friction grip upon the edge of latch engaging member (Fig. 4) and hold the lid closed. Then, by pivoting the latch to rotate the latch counterclockwise as seen in the drawings, and thereby to move the line across lips 16, 17 toward a horizontal position, the lid is released.

One end of one of the wings or apices 12a of the generally triangular latch is engaged by one end of a coil spring 18 which has its other end attached to plate 10, so that the spring urges the latch member in a clockwise direction about its pivot 13, as shown in Figs. 3 and 4. The other lateral wing or apex 12b of the latch is pivotally attached to a downwardly extending link member 19 which connects through another link 20 to remotely operable means such as a latch operating solenoid (not shown). Pivoted arm 20a guides movement of links 19 and 20. By this arrangement, energization of the solenoid exerts a downward pull upon the connecting links 19 and 20 and rotates the latch 12 in opposition to the pull of the spring 18. This counterclockwise movement effects release of the lid when the lid is in closed position.

The downwardly extending apex 12c of the triangular latch forms a stop member having a sloping abutment surface 21 which cooperates with a similar surface 22 formed on a collar 23 mounted on a shaft 24 which is rotatable by means of a manual control handle (not shown) which is mounted on shaft portion 25 on the front

panel of the cover of the casing for the machine (not shown). The collar 23 on the shaft also has an arm 26 which extends toward the connecting link 19 referred to above for engagement therewith so as to provide a means of moving this link downwardly to open the lid upon counterclockwise movement of the manual control from an "off" position to a "lid open" position. This arrangement is useful in case the lid is closed during non-use of the machine so as to prevent the entrance of dust into the container or tub, and provides a simple means of opening the lid for loading of the machine and subsequent use.

The collar on the control shaft also has a projection 27 thereon which engages one arm 28 of a bell crank lever 29 pivoted at 30, the other arm of which operates a normally open main control switch 31. By rotating the main control handle 25, the shaft 24, and the collar 23 in a clockwise direction, the projection 27 on the collar moves the bell crank lever 29 so as to close the switch 31 and set the machine into operation.

The cooperation between the lower abutment surface 21 on the latch 12 and the corresponding surface 22 on the collar carried by the control shaft is such that when the lid is open Fig. 3 and the spring 18 is holding the latch in its extreme position of clockwise movement, the two abutting surfaces 21, 22 are in contact, and the control shaft is blocked against clockwise rotation by the portion 12c of the latch until the abutting surface 21 of the latch is moved out of the way. This occurs only when the latch is rotated in a counter-clockwise direction as when the lid is closed or when the latch is rotated in a counterclockwise direction by the remotely controlled linkage 19, 20. By this construction the machine is prevented from being turned on while the lid is open.

Closing of the lid, Fig. 4, pushes the latch engaging member 15 carried thereby into engagement with lip 16 and on into the opening 14 in the latch, causing movement of the latch in a counter-clockwise direction sufficiently to move the abutment or stop surface 21 of the latch out of the way of the corresponding surface 22 on the collar 23 carried by the control shaft 24. This permits rotation of the manual control and the control shaft 24 sufficiently to move the bell crank lever 29 and close the main operating switch 31.

After the machine has operated for a predetermined length of time, a part of the apparatus such as a latch controlling solenoid is automatically energized to move the connecting links 19, 20 downwardly and turn the latch in a counter-clockwise direction sufficiently to release the member 15 and the lid, whereupon it is moved to an "open" position by any suitable means such as a spring actuated hinge.

In one embodiment of the invention, the dish-washing machine continues through a drying cycle after the lid opens, and at the conclusion of this cycle the latch controlling solenoid is deenergized, whereupon the spring 18 moves the latch in a clockwise direction, forcing the apex 12c on the latch against the portion 39 on the collar of the control shaft, and thus moving the control shaft to an "off" position in which the main control switch is opened.

When the machine is not in operation, the lid may be closed to keep out the dust, and when this is done, the pull of the spring 18 on the latch member 12 retains the lid shut until the control handle is turned to the "open" position, causing the arm 26 on the shaft collar to move down-

wardly and pull the connecting link 19 downwardly so as to rock the latch in a counterclockwise direction and release the lid.

I wish it to be understood that I have shown and described only a preferred embodiment of the invention and I fully realize that the invention is susceptible of numerous modifications without departing from the inventive concept. The invention is not to be limited to the preferred embodiment but is intended to cover all modifications of the invention falling within the scope of the appended claims.

I claim:

1. A control device for operating a latch mounted for movement to and from a position of latching engagement with a cooperating member, and for controlling the operation of other apparatus comprising, a spring biassing said latch to automatically engage and retain said member when it is moved to engagement position, control means for said other apparatus normally occupying a position in which said other apparatus is inoperative, a control element, a first surface on said control element for operating said control means, a second surface on said control element for operating said latch, said control element having an "on" position in which said first surface holds said control means in a position to cause the operation of said other apparatus and said second surface is in a position permitting said latch to move both to and from a position of engagement with said member, a "release" position in which said second surface maintains said latch disengaged from said member and said first surface permits said operating means to assume its normal position, and a "neutral" position intermediate said first two positions in which said first surface permits said operating means to assume its normal position, the intermediate location of said "neutral" position requiring movement of the control element through said "neutral" position when moving between said "on" and "release" positions.

2. A device according to claim 1, and detent means movable with said latch and having a position in which said detent means blocks movement of said control element from "neutral" position toward "on" position, said detent means being positioned so as to assume an inoperative position when said latch is in latching engagement with said member.

3. A device according to claim 2, and a remotely controllable member operably connected with said latch for moving said latch to releasing position whereby said latch can be released while said control element remains at "on" position.

4. A device according to claim 3, said cooperating member being movable relative to said latch, and a surface on said latch engageable with said control element for moving said control element from "on" position to "neutral" position by the action of said biasing means when said cooperating member is moved away from said latch and said remotely controllable member is inoperative.

5. A device for fastening a closure having a movable member to structure cooperating therewith and relative to which said closure is movable, and for interlocking the operation of said closure with operating means for other apparatus, comprising latch means having an unlatching position, a latching position in which said movable member is engaged, and a third position which the latch means normally occupies when the closure is spaced from said structure and in which third position a portion of the latch means projects into the path of movement of said closure, a control element for moving said latch means toward unlatching position, switch means engageable by said control element for controlling the operating means for said other apparatus, said switch means being movable to an inoperative position by movement of said control element to move said latch means to unlatching position, said latch means having a blocking surface engageable by said control element when said latch means is in third position to block movement of said control element to operate said switch means, means associated with said latch means for automatically retaining said member when it engages said latch means, and mounting means for said latch means permitting movement of said latch means from said third position to said latching position by movement of said movable member toward said cooperating structure and into engagement with said latch means, thereby moving the blocking surface of said latch to inoperative position and releasing said control element for movement.

6. A device as set forth in claim 5 in which said latch means is pivotally mounted and has an opening terminating in converging but spaced lips, one of which lips comprises the portion of the latch means which projects into the path of said movable member.

7. A device according to claim 5, and a surface on said latch means engageable with said control element on movement of said latch means to said third position for moving the control element to a position in which said switch means is inoperative and said other apparatus is inactive said automatic retaining means including means urging said latch to third position.

8. A device as set forth in claim 5, and a remotely controllable member operably connected with the latch means for moving said latch to unlatching position, said control element having a portion engageable with said remotely controllable member so as to move said latch means by moving said remotely controllable member.

9. A device for fastening a closure having a movable member to structure cooperating therewith and relative to which said closure is movable, and for interlocking the operation of said closure with operating means for other apparatus, comprising latch means having an unlatching position, a latching position in which said movable member is engaged, and a third position which the latch means normally occupies when the closure is spaced from said structure and in which third position a portion of the latch means projects into the path of movement of said closure, a control element having operating, intermediate and unlatching positions and having a surface engageable with said latch means for moving said latch means toward unlatching position when said control element is moved toward its unlatching position, switch means engageable by said control element for controlling the operating means for said other apparatus when said control element is in its operating position, said switch means being movable to an inoperative position by movement of said control element to move said latch means to unlatching position, said latch means having a blocking surface engageable by said control element when said latch means is in third position and said control element is in intermediate position to block movement of said control element to operate said switch means, and mounting means for said latch means permitting movement of said latch means

from said third position to said latching position by movement of said movable member toward said cooperating structure and into engagement with said latch means, thereby moving the blocking surface of said latch to inoperative position and releasing said control element for movement.

10. A device according to claim 9, a surface on said latch means engageable with said control element on movement of said latch means to said third position for moving said control element to intermediate position, thereby releasing said switch means, and bias means urging said latch to third position.

11. A device according to claim 9, and auxiliary latch releasing means operable independently of said control element.

ROBERT W. WOLF.

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