Feb. 26, 1957 F. W. ROBSON ET AL 2,782,792

DISHWASHING APPARATUS

Filed March 5, 1956 5 Sheets-Sheet 1

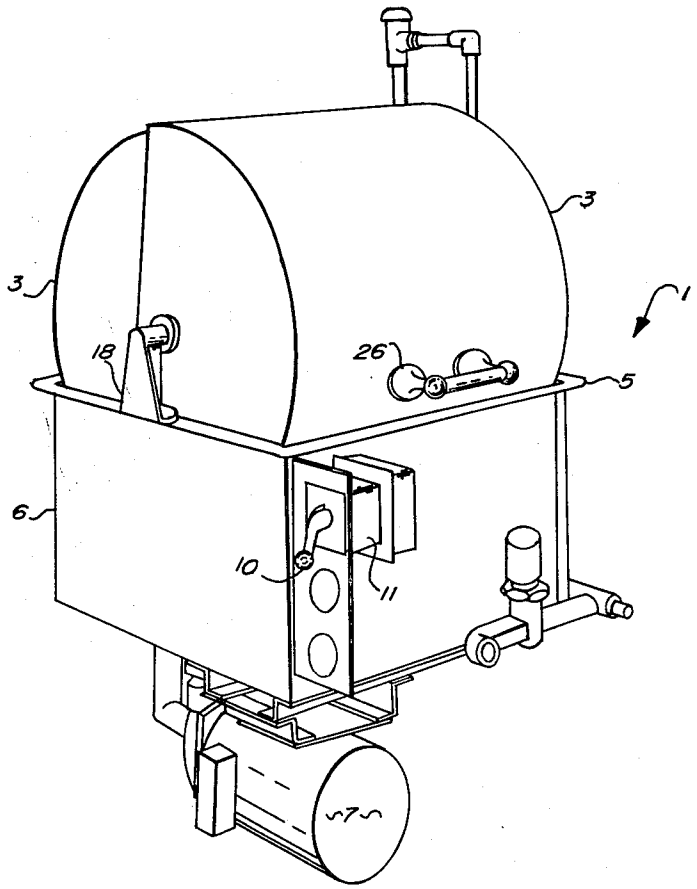


Fig. I

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DISHWASHING APPARATUS

Filed March 5, 1956 5 Sheets-Sheet 2

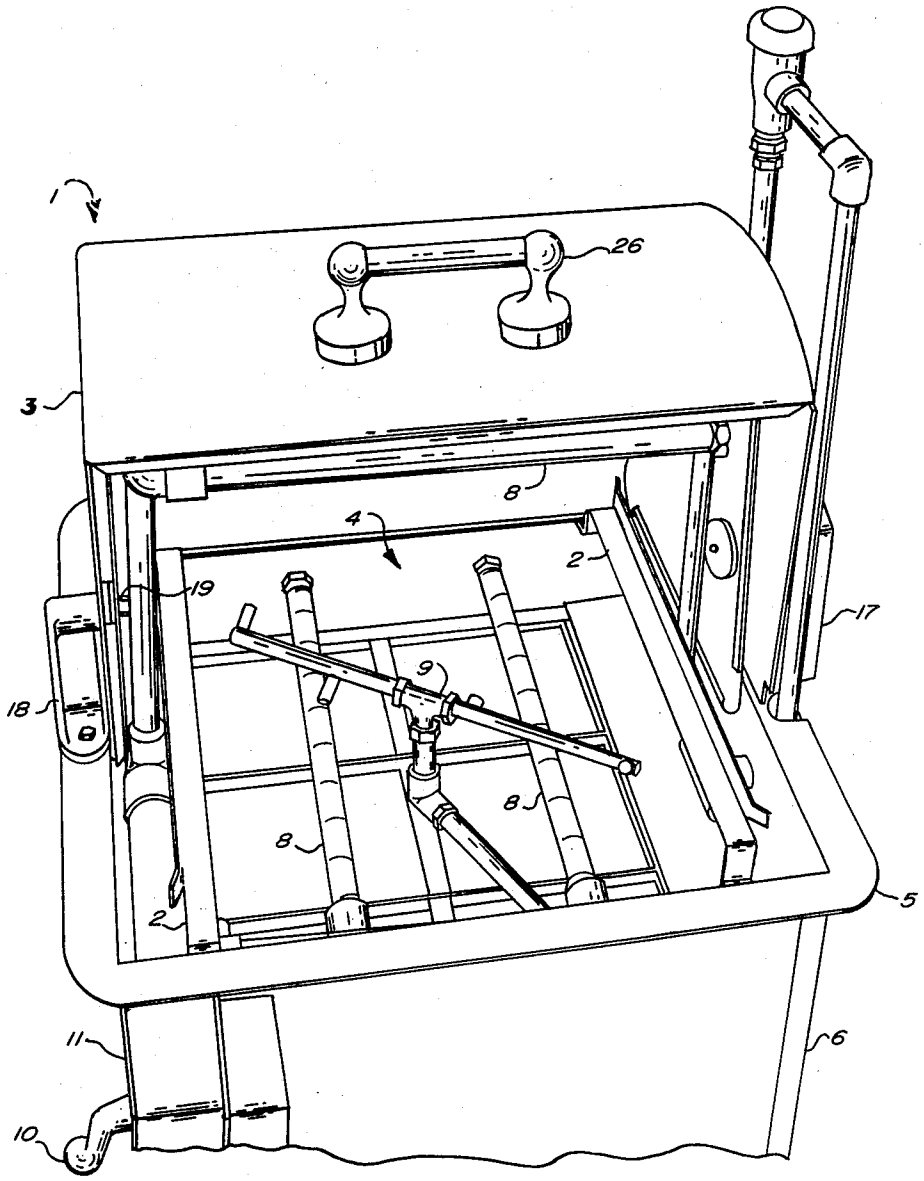


Fig. II

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DISHWASHING APPARATUS

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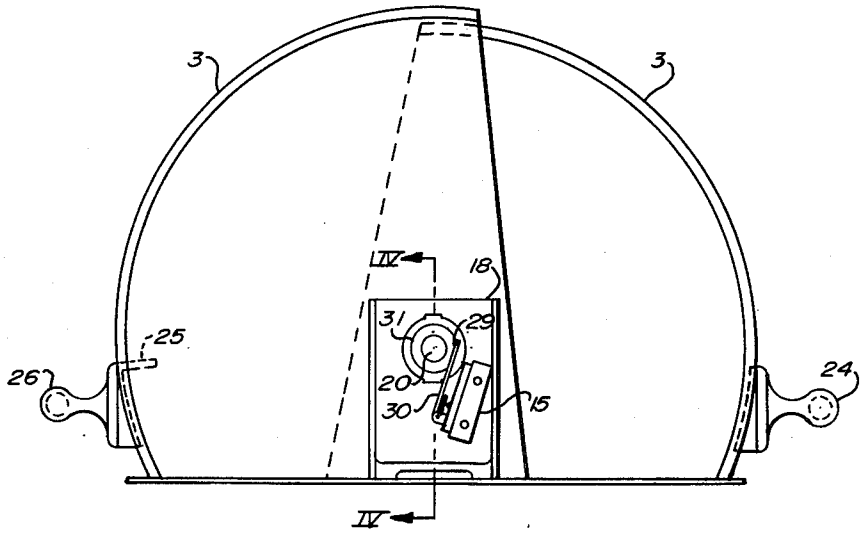


Fig. III

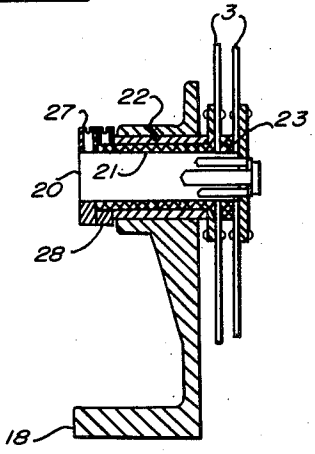


Fig. IV

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DISHWASHING APPARATUS

Filed March 5, 1956 5 Sheets-Sheet 4

SWITCH HANDLE	CONTACTS CLOSED		
WASH	A-B	G-H	E-D
OFF	—	—	—
RINSE	A-H	G-F	D-C

Fig. V

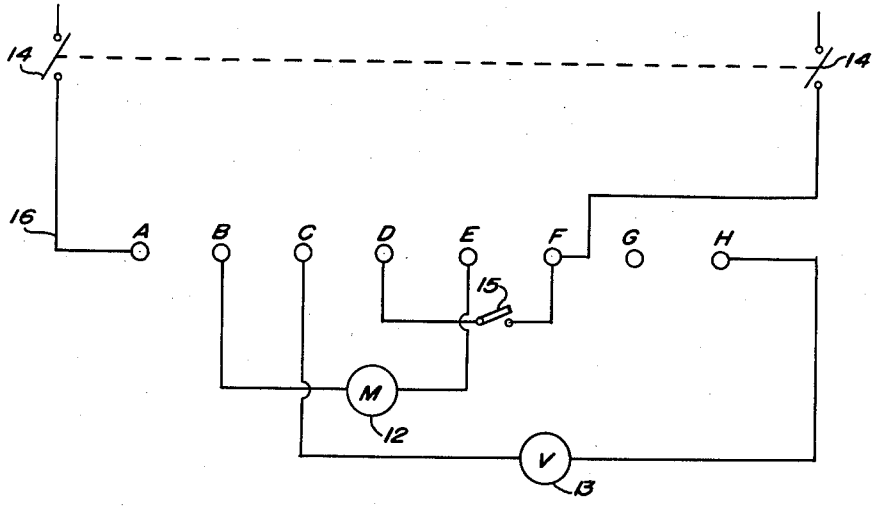


Fig. VI

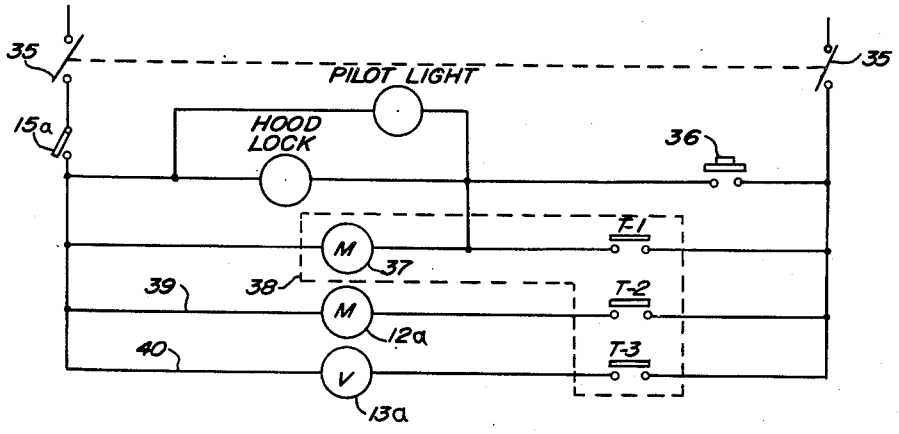


Fig. IX

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DISHWASHING APPARATUS

Filed March 5, 1956 5 Sheets-Sheet 5

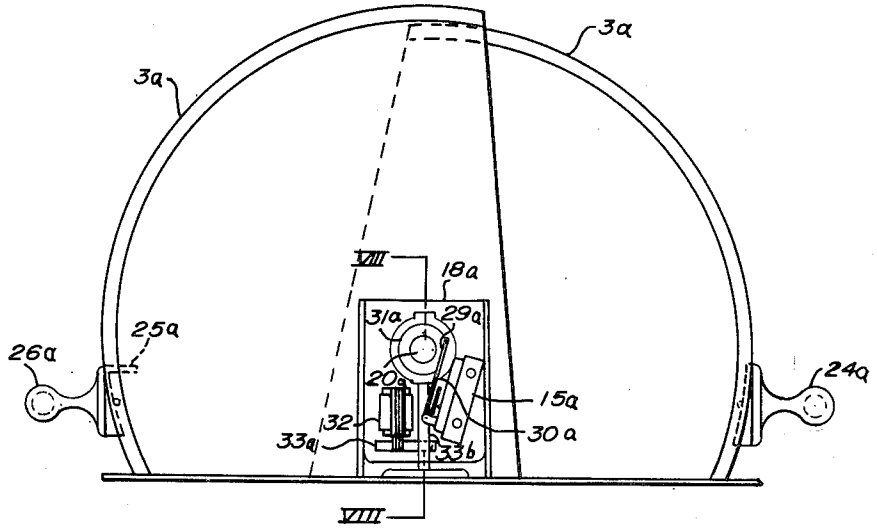


Fig. VII

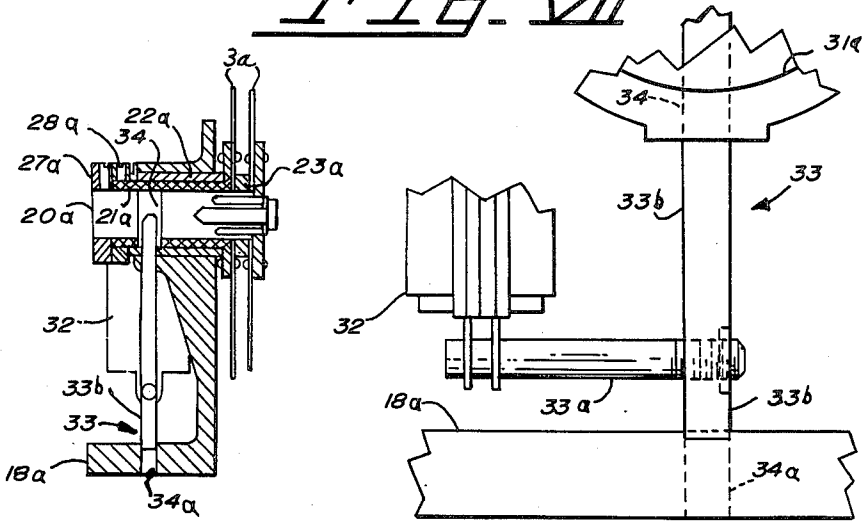


Fig. VIII Fig. X

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2,782,792

DISHWASHING APPARATUS

Frederick W. Robson and Gerhard L. Wiederhold, Rochester, N. Y., assignors to Toledo Scale Company, Toledo, Ohio, a corporation of New Jersey

Application March 5, 1956, Serial No. 569,628

4 Claims. (Cl. 134—58)

This invention relates to dishwashing machines, and in particular to a safety device for preventing scalding or drenching of an attendant by hot washing or rinsing fluid during operation of the machine.

The safety device is especially useful for dishwashing machines of the counter-type which are used in small restaurants, drive-ins, snack bars, clubs and other establishments with limited space. Counter-type dishwashing machines are compactly built for convenient installations in counters and dishtables and may have a pair of retractable semi-cylindrical hoods rockable in opposite directions to provide unhindered access from either side of the machine. If either one of the hoods is accidentally opened during the washing or rinsing process, hot water may be sprayed out into the open and may scald or at least drench anyone who is near.

The principle object of this invention is to provide a simple, rugged, compact and easily adjustable safety device for stopping and preventing further spraying of washing or rinsing fluid in a dishwashing machine if the machine is accidentally opened during a washing or a rinsing operation, the safety device being particularly well adapted for use with two-doored machines of the counter-type.

Another object of the invention is to provide a simple, rugged, compact and easily adjustable combination safety device for locking a dishwashing machine while washing or rinsing fluid is being sprayed and for stopping and preventing further spraying of washing or rinsing fluid should the machine somehow be accidentally opened, the combination safety device being particularly well suited for use with two-doored machines of the counter-type.

Other objects and advantages will be apparent from the following description in which reference is had to the accompanying drawings.

According to the invention, a counter-type dishwashing machine is provided with a pair of pivotally mounted hoods rockable in opposite directions about the axis of a shaft for enclosing or exposing a washing and rinsing space. Thus, there is unhindered access from either side of the machine. A pair of cams that are operatively connected one to one of the hoods and the other to the other of the hoods are also rockable about the axis of said shaft, whereby rocking of a hood causes rocking of a cam. Whenever either one of the hoods is opened, a cam is turned operating a safety switch which opens an electrical circuit controlling the operation of washing and rinsing spraying mechanism to stop and/or prevent spraying of hot water. The apparatus easily may be modified by the addition of a hood lock which may be controlled by said cam-operated safety switch to prevent opening of the hoods while hot water is being sprayed.

In the drawings:

Figure I is a perspective view of a dishwashing machine embodying the invention.

Figure II is an enlarged perspective view of the dishwashing machine shown in Figure I with one of its hoods in open position illustrating the interior of the machine.

Figure III is a fragmentary elevational view of the machine shown in Figures I and II looking toward the right hand side of the machine with a bracket cover removed to illustrate a cam-operated safety switch.

Figure IV is a vertical sectional view taken along the line IV—IV of Figure III.

Figure V is a diagram indicating which of the contacts shown in the electrical circuit illustrated in Figure VI are closed to manually initiate and terminate washing and rinsing cycles.

Figure VI is an electrical wiring diagram of a system wherein electrical means for controlling liquid supply mechanism in the dishwashing machine may be manually controlled.

Figure VII is a fragmentary elevational view similar to Figure III showing a machine modified by the addition of a safety hood lock.

Figure VIII is a vertical sectional view taken along the line VIII—VIII of Figure VII.

Figure IX is an electrical wiring diagram of a system wherein electrical means for controlling liquid supply mechanism and the safety hood lock illustrated in Figures VII and VIII may be automatically operated.

Figure X is an enlarged and detailed fragmentary elevational view illustrating the safety hood lock shown in Figure VII.

These specific figures are intended merely to illustrate the invention but not necessarily to limit its scope.

Referring to Figures I and II in particular, there is shown by way of illustrative example a counter-type machine for washing dishes or utensils and the like which is generally indicated by the reference numeral 1. A supporting track 2 is provided therein to position a rack (not shown) which is adapted to carry glasses or dishes to be washed. A pair of pivotally mounted hoods 3 rockable in opposite directions, adapted to enclose a washing and rinsing space 4 located generally above a frame 5, are suitably mounted for movement to an open position (Figure II), providing for the ready insertion and removal of a rack of dishes or utensils from either side of the machine, and to a closed position (Figure I) when the machine is operated. The machine is further provided with a tank or sump 6 communicating with washing mechanism including a motor driven pump 7 that is adapted to circulate a wash fluid contained within the tank to slotted wash tubes 8 within the washing and rinsing space 4, there being two tubes below (Figure II) and two, one of which is illustrated in Figure II, above the dishes. The wash fluid is forcibly expelled through the slotted wash tubes 8 and recirculated by means of the pump 7 to effect a washing and cleansing of the dishes. Rinsing mechanism including additional spray tubes 9 are provided above and below the dishes to supply hot rinse fluid from a fresh water supply located outside of the machine directly onto the dishes for rinsing and sterilizing the dishes. The lower spray tubes 9 are of the revolving type and the upper spray tubes (not shown) may be stationary. Hence, the wash fluid is recirculated and reused while the rinse fluid is always fresh. The rinse fluid drains from the dishes down into the tank 6 holding the wash fluid to replenish such supply of wash fluid, an overflow pipe being provided therein to prevent overflowing of the tank.

Operation of the washing and rinsing mechanisms is initiated and terminated by manually turning a switch handle 10 mounted on a control box 11 located at one side of the frame 5. The handle 10 operates a switch having three positions, "wash," "off," and "rinse," and eight contacts, A, B, C, D, E, F, G, and H. Figure V indicates which of said contacts are closed in the various

positions of the switch and Figure VI is a wiring diagram showing the eight contacts of the switch.

Electrical operation of the dishwashing machine is as follows:

Referring to Figure VI, an electrical circuit is illustrated which controls the operation of the washing and rinsing mechanisms. The washing mechanism includes the wash tubes **8** and the pump **7** which is driven by a motor **12** (Figure VI) and the rinsing mechanism includes the spray tubes **9** through which rinse fluid is permitted to pass under normal city water line pressure from a fresh water supply when a normally closed solenoid valve **13** is electrically opened (Figure VI). Assuming that the contacts of a master disconnect switch **14** are closed and the contacts of a safety switch **15**, the function of which is hereinafter described, also are closed, when an attendant turns the switch handle **10** to "wash" position, contacts A—B, G—H, and E—D close and current flows through a lead **16** and closed contacts A—B to the motor **12** and through the closed contacts E—D and the closed contacts of the safety switch **15** to the opposite side of the line. The motor **12** then runs and causes the pump **7** to circulate wash fluid from the tank **6** under pressure to the wash tubes **8**. The length of the washing cycle is manually controlled and continues until the attendant turns the switch handle **10** to "off" position. All of the eight contacts A, B, C, D, E, F, G, and H are open in the "off" position and the motor **12** is stopped.

After a suitable dwell period, the attendant turns the switch handle **10** to "rinse" position and contacts A—H, G—F, and D—C close and current flows through the lead **16** and closed contacts A—H to energize the solenoid of the normally closed valve **13** and through the closed contacts C—D and the closed contacts of the safety switch **15** to the opposite side of the line. Energization of the solenoid opens the valve **13** permitting hot fresh rinse fluid to pass under normal city water line pressure from a water supply to the spray tubes **9**. The length of the rinsing cycle is manually controlled and continues until the attendant turns the switch handle **10** to "off" position causing all of the contacts A, B, C, D, E, F, G, and H to open.

The present invention consists in providing safety mechanism which prevents scalding or at least drenching of the attendant. Such mechanism is supported by the frame **5** and is enclosed by a bracket cover **17** which may be seen in Figure II. Such cover **17** is removed from the machine as shown in Figures III and IV to illustrate the safety mechanism in detail.

The pivotally mounted hoods **3** are mounted between a pair of brackets **18** one of which is supported at the left side of the frame **5** (Figures I and II) and the other one of which is supported at the right side of the frame (Figures III and IV). The left hand one of the brackets **18** carries a shaft **19** about the axis of which the hoods **3** are rockable in opposite directions and the right hand one of the brackets **18** carries a shaft **20** which is shown in detail in Figure IV.

The shaft **20** is mounted for rotation within a sleeve **21** which in turn is mounted for rotation within a bearing **22** fixed in an opening through the right hand bracket **18**. One of the hoods **3** is fixed to an end of the shaft **20** and the other one of the hoods is fixed to an end of the sleeve **21**, the hoods being separated from each other by a spacer **23** and being rockable in opposite directions about the axis of the shaft. The right hand hood **3** (Figure III) may be lifted by means of a handle **24** and rocked until it strikes a stop **25**. The left hand hood **3** (Figure III) may be lifted by means of a handle **26** until the stop **25** fixed thereto strikes the other one of the hoods. A cam **27** is adjustably fixed to the end of the shaft **20** remote from the hoods **3** and a similarly shaped cam **28** is adjustably fixed to the end of the sleeve **21** remote from the hoods **3**. Rocking of that one of the hoods **3** fixed to the shaft **20** rocks the cam **27** and rocking of that one of the hoods fixed to the sleeve **21** rocks the cam **28**.

When the hoods **3** are closed, as shown in Figure III, flat portions **29** one on each of the cams **27** and **28** are generally parallel with an arm **30** of the safety switch **15** permitting the arm **30**, which is spring loaded, to press against and cooperate with the flat portions **29**. In such position, the contacts of the switch **15** (Figure VI) are closed and the washing and rinsing cycles may be manually initiated and terminated as hereinbefore described. Should either one of the hoods **3** be lifted while hot water is being sprayed, the high portion of the cam operatively connected thereto trips the switch **15** which opens the electrical circuit and cuts off power to the pump motor **12** or to the solenoid valve **13** depending upon which one is being electrically operated. The high portions **31** of the cams **27** and **28** occupy all of the peripheral surfaces of the cams except for the low or flat portions **29**. Neither the motor **12** nor the valve **13** can be electrically operated until both of the hoods **3** are completely closed. The attendant, thus, is protected against burning or drenching should the hoods **3** be lifted while the machine is operating.

There is, thus, provided a simple, rugged, compact and easily adjustable safety device for stopping and preventing further spraying of washing or rinsing fluid in a dishwashing machine if the machine is accidentally opened during a washing or a rinsing cycle, the safety device being particularly well adapted for use with a two-doored machine of the counter-type.

The safety device easily may be modified by the addition of a hood lock to prevent opening of the hoods **3** while hot water is being sprayed. Such modified apparatus is shown in Figures VII, VIII and X and an electrical circuit therefor is shown in Figure IX. Reference numerals in Figures VII, VIII and X identify parts which are alike in structure and function to those previously identified in Figures I—VI by similar reference numerals.

Figures VII and VIII are exactly like Figures III and IV respectively except that automatic hood locking means including a coil **32** and a T-shaped locking pin **33** operatively connected thereto is supported by the right hand bracket **18***a* adjacent to the shaft **20***a* and a hole **34** is drilled through the bracket **18***a*, the bearing **22***a*, the sleeve **21***a* and the shaft **20***a*, and a second hole **34***a* axially aligned with the first hole **34** is drilled through the bottom of the bracket **18***a*. The T-shaped locking pin **33** includes a horizontal leg **33***a* operatively connected to the coil **32** and vertical arms **33***b* as best shown in detail in Figure X. When both of the hoods **3***a* are closed, the hole **34** in each separate part is aligned with the common axis of the arms **33***b* of the locking pin **33** so that when the coil **32** is energized it causes the upper one of the arms **33***b* of the locking pin **33** to move into the hole **34**. In such position, the locking pin **33** prevents the hoods **3***a* from being opened by preventing turning of the shaft **20***a* or of the sleeve **21***a*. The lower one of the vertical arms **33***b* cooperates with the hole **34***a* in the bracket **18***a* and acts as a guide for the pin **33**. When the coil **32** is energized with the upper one of the vertical arms **33***b* locking the shaft **20***a* and the sleeve **21***a* as shown in detail in Figure X, the lower one of the vertical arms **33***b* remains in the second hole **34***a* in the bracket **18***a* thus acting as a guide for the pin **33** at all times. Energization of the coil **32** may be controlled by the cam-operated safety switch **15***a*. Should the hood lock somehow fail to function, the cam-operated safety switch **15***a* will stop and prevent further spraying of washing or rinsing fluid by opening the electrical circuit should the machine be accidentally opened during a washing or a rinsing cycle as hereinbefore described. Electrical operation of the modified machine may be controlled by a circuit of the type shown in Figure VI wherein the means for controlling the liquid supply mechanism is manually controlled

or the system may be made completely automatic by using an electrical circuit as shown in Figure IX.

Automatic electrical operation of the dishwashing machine is as follows:

Referring to Figure IX, an electrical circuit is illustrated which controls the liquid supply mechanism and the hood lock. Assuming that the contacts of a master disconnect switch **35** are closed and the contacts of the safety switch **15***a* also are closed by the hoods **3***a* being closed, when an attendant momentarily depresses a start button **36**, current flows through the closed contacts of the safety switch **15***a* to a motor **37** of a timer **38** and through the closed contacts of the start button **36** to the opposite side of the line. The motor **37** runs causing timer contacts T–1 and T–2 to close. Closing of the timer contacts T–1 keeps the circuit from the motor **37** to the opposite side of the line closed after the attendant releases the start button **36**. The timer contacts T–1 are kept closed for suitable washing, dwell, and rinsing cycles which may, for example, last for about ninety seconds. Current at the same time flows through the coil **32** (Figure VII) of the hood lock and through the now closed timer contacts T–1 to the opposite side of the line. This energizes the coil **32** moving the pin **33** into locking position as hereinbefore described. In such position the locking pin **33** prevents the hoods **3***a* from being opened.

Current also flows through a lead **39** to a wash motor **12***a* and through the now closed timer contacts T–2 to the opposite side of the line. The motor starts and causes the pump **7** (Figure I) to circulate wash fluid from the tank **6** under pressure to the wash tubes **8**. The washing cycle lasts until the timer **38** opens its contacts T–2. The washing cycle may be automatically timed to last, for example, about seventy-three seconds.

A dwell period follows for an interval which may last three seconds during which neither washing or rinsing takes place because the timer contacts T–2 and T–3 are open.

The timer **38** then closes its contacts T–3. Current flows through a lead **40** to the solenoid of the normally closed solenoid valve **13***a* and through the now closed timer contacts T–3 to the opposite side of the line. The solenoid is energized and the valve **13***a* opens. Opening of the valve permits fresh hot rinse fluid to pass under normal city water line pressure to the spray tubes **9**. The automatically timed rinsing cycle may last for about twelve seconds and is terminated by the opening of the timer contacts T–3.

After the end of the rinsing cycle the timer contacts T–1 remain closed for a second or two to allow the hot rinse water to drain down into the tank **6** and then the timer contacts T–1 open. Opening of the timer contacts T–1 stops the timer motor **37** and also causes deenergization of the coil **32** of the hood lock. The locking pin **33** then moves out of the hole **34** under the influence of gravity and the attendant may open either one of the hoods **3***a*. Pushing of the start button **36** is ineffective to cause the wash motor **12***a* or the solenoid of the rinse valve **13***a* to be electrically operated unless both of the hoods **3***a* are closed to cause closing in turn of the contacts of the safety switch **15***a*.

There is, thus, provided a simple, rugged, compact and easily adjustable combination safety device for locking a dishwashing machine while washing or rinsing fluid is being sprayed and for stopping and preventing further spraying of washing or rinsing fluid should the machine somehow be accidentally opened, the combination safety device being particularly well suited for use with two-doored machines of the counter-type.

Various modifications and changes in the details of construction may be made without departing from the spirit and scope of the invention.

Having described the invention, we claim:

1. In a dishwashing machine, in combination, a frame having a washing and rinsing space thereabove, a shaft supported by the frame, a pair of pivotally mounted hoods rockable in opposite directions about the axis of the shaft for enclosing or exposing the washing and rinsing space, washing mechanism including spraying means within said space, rinsing mechanism including spraying means within said space, an electrical circuit for controlling the operation of the washing and rinsing mechanisms, and a pair of cams that are rockable about the axis of the shaft and that are operatively connected one to one of the hoods and the other to the other of the hoods whereby rocking of a hood causes rocking of a cam, said circuit including a safety switch that is operated by the cams and that is adapted, whenever either one of the hoods is rocked, to open the circuit which stops and prevents operation of either the washing mechanism or of the rinsing mechanism.

2. In a dishwashing machine, in combination, a frame having a washing and rinsing space thereabove, a shaft supported by the frame, a pair of pivotally mounted hoods rockable in opposite directions about the axis of the shaft for enclosing or exposing the washing and rinsing space, washing mechanism including a motor driven pump, rinsing mechanism including a normally closed solenoid valve, an electrical circuit for independently controlling the running of the motor driven pump and the operation of the solenoid valve, a rockable sleeve surrounding the shaft, and a pair of cams one of which is fixed to the shaft and the other of which is fixed to the sleeve and both of which are rockable about the axis of the shaft, one of the hoods being fixed to the shaft and the other of the hoods being fixed to the sleeve whereby rocking of a hood causes rocking of a cam, said circuit including a safety switch that is operated by the cams and that is adapted, whenever either one of the hoods is rocked, to open the circuit which stops and prevents running of the motor driven pump and permits the closing of the normally closed solenoid valve.

3. In a dishwashing machine, in combination, a frame having a washing and rinsing space thereabove, a shaft supported by the frame, a pair of pivotally mounted hoods rockable in opposite directions about the axis of the shaft for enclosing or exposing the washing and rinsing space, automatic hood locking means, washing mechanism including spraying means within said space, rinsing mechanism including spraying means within said space, an electrical circuit for controlling the operation of the automatic hood locking means and of the washing and rinsing mechanisms, and a pair of cams that are rockable about the axis of the shaft and that are operatively connected one to one of the hoods and the other to the other of the hoods whereby rocking of a hood causes rocking of a cam, said circuit including a safety switch that is operated by the cams and that is adapted to close the circuit whenever both of the hoods are closed and to open the circuit whenever either one of the hoods is rocked, the closing of the circuit operating the automatic hood locking means for a predetermined interval and the opening of the circuit stopping and preventing operation of either the washing mechanism or of the rinsing mechanism.

4. In a dishwashing machine, in combination, a frame having a washing and rinsing space thereabove, a shaft supported by the frame, a pair of pivotally mounted hoods rockable in opposite directions about the axis of the shaft for enclosing or exposing the washing and rinsing space, automatic hood locking means including a coil and a locking pin supported by the frame adjacent to the shaft, washing mechanism including a motor driven pump, rinsing mechanism including a normally closed solenoid valve, an electrical circuit for controlling the operation of the automatic hood locking means, the running of the motor driven pump and the operation of the solenoid valve, a rockable sleeve surrounding the shaft, and a pair of cams one of which is fixed to the shaft and the other of which is fixed to the sleeve and both of which are rockable about the axis of the shaft, one of the hoods

being fixed to the shaft and the other of the hoods being fixed to the sleeve whereby rocking of a hood causes rocking of a cam, there being holes in the shaft and in the sleeve which are aligned with the axis of the locking pin when both of the hoods are closed, said circuit including a safety switch that is operated by the cams and that is adapted to close the circuit whenever both of the hoods are closed and to open the circuit whenever either one of the hoods is rocked, the closing of the circuit energizing

the coil of the hood locking means for a predetermined interval which moves the locking pin into said holes in the shaft and in the sleeve preventing movement of the hoods during said interval and the opening of the circuit stopping and preventing operation of either the washing mechanism or of the rinsing mechanism.

No references cited.