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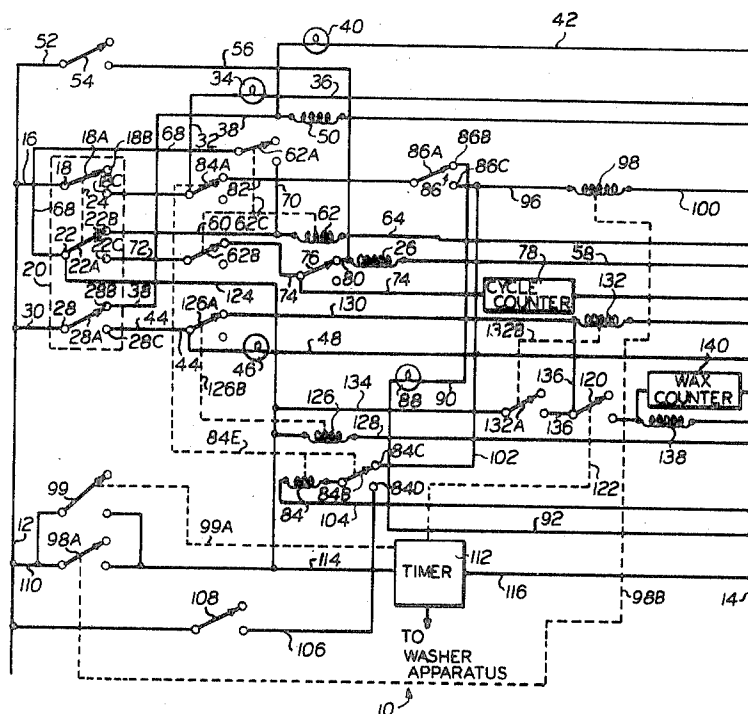
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[54] **CONTROL HAVING MEANS DETECTING DEVICE
TO BE WORKED ON**
13 Claims, 2 Drawing Figs.

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ABSTRACT: Control apparatus for controlling the operation of a mechanism adapted to perform specified acts on an associated device comprising a coin responsive mechanism adapted to move from a rest to a first position upon the deposit of a first amount of money. Detecting means is actuated by the coin responsive mechanism when it moves to the first position to detect the presence of the device upon which the acts are to be performed. The detecting means actuates an operate means when the presence of the device is detected for operating the mechanism which performs the acts. Additionally, a homing device is provided which is responsive to the operation of the operate means to move the coin responsive mechanism back to the rest position so that additional amounts of money may be deposited in the coin responsive mechanism to move the coin responsive mechanism back to the rest position.



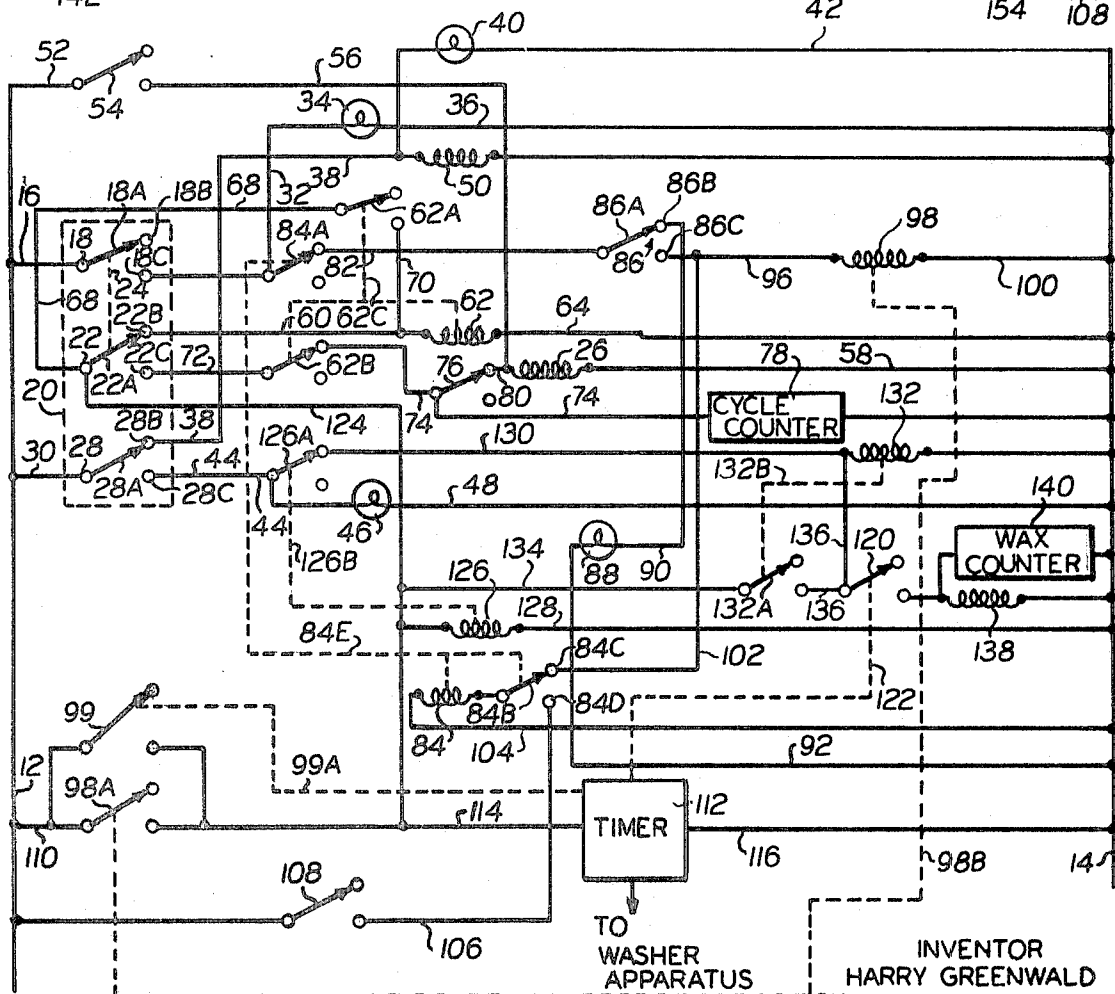
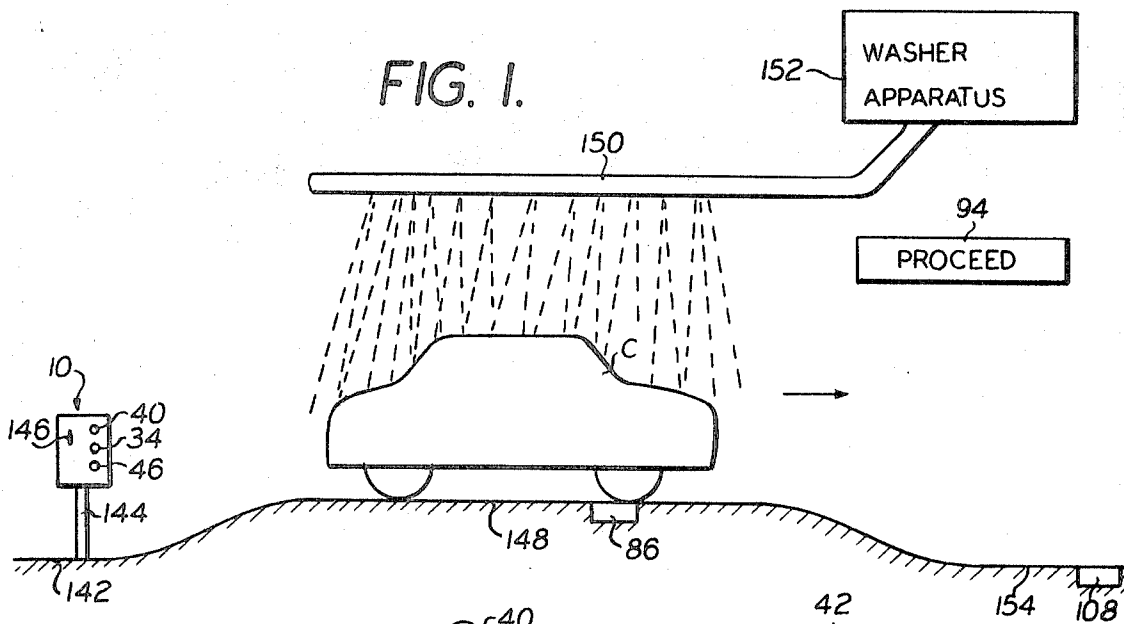


FIG. 2.

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CONTROL HAVING MEANS DETECTING DEVICE TO BE WORKED ON

This invention relates generally to a control apparatus and, more particularly, pertains to a money-responsive control apparatus for controlling the operation of an associated mechanism.

While the present invention has utility in a so-called fully automated coin-controlled car wash and will be described in conjunction therewith, it will be obvious that the invention may be utilized to control any mechanism which performs specified acts on a device such as a soda vending machine wherein the mechanism is operable to fill a cup with soda, and the like.

Thus, in automated car washes a person normally locates his automobile under the overhead washing apparatus and then inserts the proper monies into a coinbox to initiate operation of the washing mechanism. While this system is suitable in most cases, it is extremely time consuming and becomes annoying to those people waiting in line to use the wash.

Accordingly, an object of this invention is to provide an improved control apparatus for controlling the operation of an associated money-operated device which permits deposit of monies prior to the completion of operation of the associated device.

A more specific object of this aspect of the invention is to provide a control apparatus for controlling the operation of a washing mechanism in a coin-operated car wash which permits a succeeding driver to deposit money to have his car washed while the preceding automobile is being washed thereby eliminating unnecessary delays.

Another object of the invention resides in the novel details of construction which provide a control apparatus of the type described which does not actuate the washing mechanism until an automobile is correctly positioned below the same to eliminate the possibility of misalignment between the automobile and the washer heads.

A further object of the present invention is the provision of a control apparatus for an associated mechanism which is simple in construction and efficient in operation.

Accordingly, a control apparatus constructed according to the present invention is utilized to control the operation of a mechanism adapted to perform specified acts on an associated device and comprises deposit means normally in a rest position and movable to a first position in response to the deposit of a first amount of money. Detecting means is responsive to the movement of said deposit means to said first position for detecting the presence of the device upon which said acts are to be performed. Operate means which is operable by said detecting means upon the detection of the presence of the device is provided for operating the mechanism. Additionally, homing means is provided for moving the deposit means back to the rest position in response to the operation of the operate means, whereby additional amounts of money may be deposited to move said deposit means to the first position.

Other features and advantages of the present invention will become more apparent from a consideration of the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a diagrammatic representation of a washing mechanism utilizing the control apparatus constructed according to the present invention; and

FIG. 2 is a schematic circuit wiring diagram of the control apparatus shown in FIG. 1.

In the discussion which follows, reference will be made to a coin stepping switch which is disclosed in detail in Pat. application, Ser. No. 874,866, filed Nov. 7, 1969 entitled "Selectively Variable Coin Control Apparatus," inventors Harry Greenwald et al. Only those portions of the coin stepping switch necessary for an understanding of the present invention will be disclosed herein. However, if additional information is desired, the reader is referred to the aforementioned application.

Accordingly, as shown in FIG. 2, the control apparatus 10 includes a lead 12 and a lead 14 which may be connected to

opposite terminals of a source of potential (not shown). Connected to the lead 12 by a lead 16 is a terminal 18 of a coin stepping switch 20 of the type disclosed in the aforementioned application.

The coin stepping switch 20 includes an armature 18A which is connected to the terminal 18 and is normally connected with a terminal 18B and is movable to engage a terminal 18C. Additionally, the switch 20 includes a terminal 22 and an armature 22A which is connected thereto. The armature 22A normally engages a terminal 22B and is movable to engage a terminal 22C. The armatures 18A and 22A are ganged together as indicated by the dashed line 24. The coin stepping switch 20 also includes a stepping coil 26 which is operable to actuate the armatures of the coin stepping switch.

In the operation of the coin stepping switch, as noted in the referenced application, the switch includes a cam which is normally in a rest or home position. As coins of a particular denomination are deposited, the stepping coil 26 is energized to move the cam incrementally from the rest position until a first position is reached which corresponds to the deposit of a particular amount of money. When the cam reaches this first position it actuates a switch which causes the armatures 18A and 22A to engage the respective terminals 18C and 22C. As noted in greater detail below, means are also provided for returning the cam to the rest position so that the armatures 18A and 22A again engage the terminals 18B and 22B.

The coin stepping switch 20 further includes a terminal 28 which is connected to the lead 12 by a lead 30. Connected to the terminal 28 is an armature 28A which normally engages a terminal 28B and may be moved into contact with a terminal 28C. The armature 28A is adapted to be moved when the cam in the coin stepping switch reaches a second position which may or may not correspond with the first position to cause the armature 28A to engage the terminal 28C. In the example under consideration, the armatures 18A and 22A control the wash cycle of the washing mechanism whereas the armature 28A controls a waxing cycle if the car owner desires to have his car waxed in addition to being washed.

Terminal 18C is connected to a lead 32 to one terminal of a lamp 34. The other terminal of the lamp 34 is connected by a lead 36 to the lead 14. The lamp 34 is adapted to be illuminated when the requisite amount of money has been deposited for a wash cycle.

Connected to the terminal 28B by a lead 38 is one terminal of a lamp 40. The other terminal of the lamp 40 is connected by a lead 42 to the lead 14. The lamp 40 is adapted to be illuminated prior to a washing cycle to indicate to the driver that the control apparatus is in condition to receive coins or monies.

Connected to the terminal 28C by a lead 44 is a lamp 46. The other terminal of the lamp 46 is connected by a lead 48 to the lead 14. The lamp 46 is adapted to be illuminated when the requisite amount of money for a waxing has been deposited to indicate that the apparatus has been set to perform a waxing cycle.

Also connected between the lead 38 and the lead 14 is a reject coil 50 which is conventional in construction and is operable to cause a coin to be rejected when the coil is deenergized.

Connected to the lead 12 by a lead 52 is a coin switch 54. The coin switch 54 is conventional in construction and is adapted to close upon insertion of a predetermined coin into the coin mechanism. The other terminal of the coin switch 54 is connected to one terminal of the stepping coil 26 by a lead 56. The other terminal of the stepping coil 26 is connected to the lead 14 by a lead 58.

Connected to the terminal 22B of the coin stepping switch 20 by a lead 60 is one terminal of a relay winding 62, the other terminal of which is connected by a lead 64 to the lead 14. The relay winding 62 controls the operation of normally open contacts 62A and normally closed contacts 62B, as indicated by the dashed line 62C. That is, when the relay winding 62 is energized, the contacts 62A and the contacts 62B open.

The terminal 22 of the coin stepping switch 20 is connected to one terminal of the contacts 62A by a lead 68. The other terminal of the contacts 62A is connected to the lead 60 through a lead 70. Connected to one terminal of the contacts 62B by a lead 72 is the terminal 22C. The other terminal of the contacts 62B is connected by a lead 74 to one terminal of a homing switch 76 and, through a cycle counter 78, to the lead 14. The other terminal of the normally closed homing switch 76 is connected to the lead 56 by a lead 80.

The homing switch 76 forms a part of the coin stepping switch 20 and is described in detail in the aforementioned application. Accordingly, as described therein, when the stepping coil 26 is energized through the homing switch 76, the cam in the coin stepping switch 20 is moved one incremental distance. As the cam moves the homing switch 76 opens thereby deenergizing the stepping coil 26. As the stepping coil 26 becomes deenergized it releases a solenoid actuated plunger which permits the homing switch 76 to close. Accordingly, this action permits the stepping coil 26 to again be energized thereby moving the cam another incremental distance. As the cam moves through this incremental distance the homing switch 76 again opens thereby deenergizing the stepping coil 26. This process is repeated until the cam is moved back to the rest position, at which time armatures 18A, 22A and 28A engage the respective terminals 18B, 22B and 28B.

The lead 32 is also connected to a lead 82 through the normally closed contacts 84A of a latching relay 84. The lead 82 is connected to the armature 86A of a single-pole double-throw switch 86 having terminals 86B and 86C. The switch 86 is normally positioned beneath the head of the washer elements, as noted in detail below, and is normally spring biased so that the armature 86A engages the terminal 86B. However, when a vehicle is properly positioned beneath the washer head the weight of the vehicle causes the switch 86 to operate whereupon the armature 86A engages the terminal 86C. As the car moves away from the switch 86, the weight on the switch 86 is removed so that the armature 86A again engages the terminal 86B.

The terminal 86B is connected to one terminal of a lamp 88 by a lead 90. The other terminal of the lamp 88 is connected to the lead 14 by a lead 92. The lamp 88 illuminates a "proceed" sign 94 (FIG. 1) to indicate to the driver of a car C that he is to move the car beneath the washer head.

The terminal 86C is connected by a lead 96 to one terminal of an operate relay winding 98, the other terminal of which is connected to the lead 14 by a lead 100. The operate relay 98 is adapted to close the contacts of normally open contacts 98A when it is energized, as indicated by the dashed line 98B.

Lead 98 is connected to terminal 84C of the relay 84 by a lead 102. One terminal of relay winding 84 is connected to armature 84B, the other terminal of relay winding 84 is connected to lead 14 by a lead 104. The armature 84B is adapted to engage either the terminal 84C or a terminal 84D. To be more specific, as noted above, the relay winding 84 is a latching relay and is adapted to control the movement of the armature 84B and the contacts 84A, as indicated by the dashed line 84E. Thus, when the elements are as shown in FIG. 2, and the relay winding 84 is energized, the contacts 84A will open and the armature 84B will engage the terminal 84D. Moreover, the contacts 84A and the armature 84B will remain latched in these positions even if the armature winding 84 is deenergized. However, when the armature winding 84 is again energized, the contacts 84A will close and the armature 84B will move back to engage the terminal 84C. Again, the elements will remain latched in these positions (i.e., contacts 84A closed and armature 84B in contact with terminal 84C) even if the armature winding 84 is again deenergized. In fact, they will remain in these positions until the relay winding is again energized.

The terminal 84D of the relay 84 is connected to the lead 12 by a lead 106 through a spring loaded normally open single-pole single-throw switch 108. Similarly to the switch 86, the

switch 108 is positioned in the path of the vehicle C and is adapted to be closed by the vehicle as it moves away from the washer elements after a washing cycle, as noted in greater detail below.

One side of the contacts 98A of the relay winding 98 is connected to the lead 12 by a lead 110. The other end of the contacts 98 is connected to one side of a timer 112 by a lead 114, the other side of the timer is connected to the lead 14 by a lead 116. The timer 112 is adapted to control the washing and/or waxing cycle of the washer elements in the conventional manner. That is, when the timer is energized it initiates a washing cycle which may comprise a rinse with soapy water and then with clear water and, thereafter, a drying cycle. If the requisite amount of money has been deposited for a wax, the timer will also initiate a wax portion of the washing cycle. The timer 112 is conventional in construction and, since it does not form a portion of the present invention, is not described in detail herein. For example, the timer may comprise a clock motor suitably geared down to rotate a shaft which has a plurality of cams thereon wherein each cam controls a different portion of the washing cycle. Hence, a first cam may be operative to open a valve to permit water to flow while a second cam may permit a detergent to mix with the flowing water. However, it should be noted that the timer 112 controls the operation of the switch 66, as indicated by the dashed line 118, and the operation of a switch 120, as indicated by the dashed line 122. More specifically, when the timer 112 is energized, it is operable to close the switch 66 and, at the end of a washing cycle (as used herein, washing cycle means a complete cycle of operation of the washer apparatus which may or may not include the dispensing of wax) it is operable to open the switch 66. Additionally, the timer 112 is operable to close the switch 120 when the washing cycle reaches the point at which wax would normally be dispensed if the driver of the vehicle wishes to have his car waxed as well as washed. The timer also opens the switch 120 at the end of the waxing portion of the cycle.

Connected to the terminal 22 by a lead 124 is one end of a relay winding or relay 126, the other end of which is connected to the lead 14 by a lead 128. The relay 126 controls the operation of normally closed contacts 126A as indicated by the dashed line 126B. The contacts 126A connect the lead 44 with a lead 130 which, in turn, is connected to one end of the relay winding or relay 132, the other end of which is connected to the lead 14. The relay winding 132 controls the operation of normally open contacts 132A as indicated by the dashed line 132B. That is, when the relay winding 132 is energized, the contacts 132A close. One side of the contacts 132A is connected to the lead 124 by lead 134. The other side of the contacts 132A is connected to the lead 130 by a lead 136 and to one terminal of the switch 120. The other terminal of the switch 120 is connected to the lead 14 through a wax relay 138. A wax counter 140 is connected in parallel with the relay 138. The relay 138 is adapted to cause wax to be dispensed by the washer apparatus if the relay is energized with the timer 112 reaches that portion of the washing cycle at which wax would normally be dispensed. If the relay 138 is not energized at this point, the washing cycle will be completed without the dispensing of the wax.

FIG. 1 illustrates a car wash which may utilize the apparatus 10 of the present invention. Accordingly, the car wash of FIG. 1 includes an entrance portion designated generally by the reference numeral 142. Positioned adjacent the right hand side of the car (i.e., the driver's seat) is the apparatus 10 which is mounted on a post 144. The driver of the car inserts the necessary monies into a slot 146 on the apparatus which actuates the coin stepping switch 20 in the manner indicated above. The driver deposits the required amount of money in accordance with whether he wishes his car to be washed or washed and waxed. The lamps 40, 34 and 46 may be located adjacent the slot 146 to indicate to the driver whether he can insert the coins or whether he has inserted the correct money to actuate the wash or the wash and wax operation.

The washer also includes an intermediate ramp portion 148 which is located below the washer head 150 through which the water, detergent and wax exit. The washer head 150 is connected to the washer apparatus designated generally by the reference numeral 152. The washer apparatus contains the necessary elements such as valves, detergent storage, wax storage and the like to effect the washing process. The proceed sign 94 is mounted over the intermediate portion 148 and to the front thereof. Mounted below the washer head 150 and in the path of travel of the car C which is to be washed is the switch 86. The switch 86 is positioned so that it will be closed when the front wheel of the car rests on the switch. Moreover, the switch 86 is so located that when the switch is actuated by the front wheel of the car, the car will be in alignment with the washer head 150.

The washer also includes an exit portion 154 which the car rides down as it exits from the car wash. Positioned in the path of travel of the car as it traverses the section 154 is the switch 108. Accordingly, as the car moves through the portion 154 the wheels of the car ride over the switch 108 and close the same. It is to be noted that the switch 108 is located sufficiently upstream of the car so that the rear wheels of the car will have passed over the switch 86 before the front wheels of the car actuate the switch 108. In other words, the switch 86 will move to its normally open position before the car causes the switch 108 to close.

In operation, assuming that a driver wishes to have his car washed, he drives up to the apparatus 10. At this time there will be a complete circuit through the lamp 40 to illuminate the same to notify the driver that he can insert coins into the apparatus. More specifically, the lamp 40 will be illuminated through the circuit comprising the energized lead 12, lead 30, coin stepping switch 20 through the armature 28A, lead 38, the lamp 40 and lead 42 to the energized lead 14.

The driver then inserts the necessary coins to effect a detergent wash thereby operating the coin switch 54 to sequentially energize or pulse the stepping coil 26 to operate the coin stepping switch 20 in the manner indicated above. That is, the coin switch 54 is conventional in construction and will close each time a particular denomination coin is inserted into the apparatus. For example, if the coin switch 54, which is normally biased in the open position, is set to close when a 5-cent piece is inserted into the apparatus, the switch will close if a nickel is inserted. The coin switch 54 is conventional in construction and, therefore, is not described in detail herein. Thus, each time the coin switch 54 closes the stepping coil 26 is energized through the circuit comprising the energized lead 12, lead 52 and switch 54, lead 56, the coil 26 and lead 58 to the energized lead 14. Each time the stepping coil 26 is energized it causes the coin stepping switch 20 to move the incremental distance noted above. Initially it will be assumed that only a detergent wash is desired so that only the armatures 18A and 22A move to contact the terminals 18C and 22C. The armature 28A will remain in contact with the terminal 28B thereby maintaining the lamp 40 illuminated to notify the driver that he can insert additional coins if he desires a waxing in addition to a detergent wash and also to maintain the reject coil 50 energized through the energized lead 38 to the lead 14.

Accordingly, when a sufficient amount of money has been deposited to effect a detergent wash, the lamp 34 will be illuminated through the circuit comprising the energized lead 12, lead 16, armature 18A of the switch 20 which is contact with terminal 18C, lead 32, the lamp 34 and lead 36 to the energized lead 14. This notifies the operator or driver that he has paid for at least a detergent wash.

The light 88 which illuminates the proceed sign 94 will be illuminated through the circuit comprising the energized lead 32, contacts 84A of the relay 84, lead 82, switch 86 through the engagement of the armature 86A with the contacts 86B, lead 90, the lamp 88 and lead 92 to the energized lead 14. The driver then drives his car onto the intermediate portion 148 of the washer until the front wheel of the car rests on the switch 86 thereby causing the armature 86A to engage the terminal

86C. This action breaks the circuit to the lamp 88 thereby causing the proceed sign 94 to become dark. Hence, not only does the switch 86 detect the presence of a car on the intermediate portion 148 and serves to correctly position the car below the washer head 50 but the darkening of the sign indicates to the driver that the car is correctly positioned.

When the armature 86A and the switch 86 engages the terminal 86C, the winding of the relay 98 is energized through the energized lead 82 and the switch 86 and leads 96 and 100 to the energized lead 14. Accordingly, contacts 98A of the relay 98 close thereby energizing the timer 112 through the circuit including the energized lead 12, lead 110, lead 114, the timer and lead 116 to the lead 14. Simultaneously therewith, the latching relay 84 is energized through the circuit including the now energized lead 96, lead 102, armature 84B engaging the contact 84C of the relay 84, the relay winding, and lead 104 to the energized lead 14. Accordingly, the armature 84B of the relay 84 engages the contact 84D thereby breaking the energizing circuit to the relay. However, as noted above, the relay 84 is a latching relay and although the relay winding becomes deenergized the armature 84B remains in contact with the terminal 84D. At the same time, the relay winding 84 causes the normally closed contacts 84A of the relay to open. Hence, in effect, the switch 86 is disabled in that no matter which terminal the armature 86A engages, no current will flow through the switch 86 since the current is broken at the contacts 84A. At this point, the relay winding 98 becomes deenergized thereby releasing the contacts 98A to their normally open position.

However, it is to be noted that the timer 112 does not become deenergized at this time since as soon as the timer 112 is operated when the contacts 98A close, the timer 112 causes a normally open switch 99 which is connected in parallel with the contacts 98A to close, as indicated by the dashed line 99A, thereby establishing a holding circuit about itself. At the end of the washing cycle, the timer 112 is operative to again open the switch 99. It is to be noted that the relay 98 may be of the so-called delay type relay so that the contacts 98A remain closed for a delayed interval of time after the relay 98 is deenergized thereby to insure that the timer 112 will have operated to close the switch 99 before the contacts 98A revert back to their open state.

At the time that the circuit which includes the lead 114 is completed (i.e., at the time the timer 112 is energized) the relay 126 is energized through the circuit including the lead 114, lead 124, the relay winding 126 and lead 128 to the energized lead 14. The contacts 126A open in response to the energization of the relay 126 thereby preventing the energization of the relay winding 132 during the period that the coin stepping switch is returned to its rest position. That is, it has been assumed that only a detergent wash has been paid for so that the armature 28A remains in contact with the terminal 28B. As the coin stepping switch 20 is returned to its rest position, the armature 28A will engage the terminal 28C and would normally energize the relay 132 in the manner indicated below. However, since the contacts 126A are opened during the time that the armature 28A engages the terminal 28C, the relay winding 132 will remain deenergized during the homing cycle of the switch 20.

The homing or returning of the switch 20 to its rest position is accomplished through the circuit including the now energized lead 114, lead 124, armature 22A of the switch 20, terminal 22C, lead 72, contacts 62B, lead 74, the homing switch 76 and lead 80, the coil 26 and the lead 58 to the energized lead 14. It is also to be noted that a pulse will be applied to the cycle counter 78 through the lead 74 so that the washing cycle could be recorded. The homing cycle then begins by the alternate opening and closing of the switch 76 by the stepping coil 26, in the manner noted above, so that the armatures 18A and 22A are returned to their original position whereby they engage the respective contacts 18B and 22B. It is also to be noted that the armature 28A will engage the contact 28B at this time. It is to be noted that while the coin stepping switch

20 is being returned to its home or rest position, the timer 112 will be actuating the elements in the washer apparatus 152 so that a washing cycle will be performed.

When the coin stepping switch 20 is returned to its home position, the relay winding 62 will be energized through the circuit comprising the energized lead 124 which is connected to the lead 114, the coin stepping switch 20, the lead 60, the winding 62, lead 64 and the now closed switch 66 to the energized lead 14. Accordingly, the normally opened contacts 62A will close and the normally closed contacts 62B of the relay will open. The relay winding 62 will remain energized through the circuit including the energized lead 124, lead 68, the now closed contacts 62A, lead 70 and the winding of relay 62 through the lead 64 to the energized lead 14.

It is emphasized at this point that the next driver may insert the proper coins into the control apparatus 10 to prime the apparatus for his desired detergent wash or detergent wash and wax without waiting for the washing cycle to be completed with respect to the car C then under the washer head 150. To be more specific, the coin lamp will be illuminated through the aforementioned circuit which includes the armature 28A and terminal 28B of the switch 20 to notify the next driver that he can insert coins into the mechanism. Accordingly, when the next driver inserts the proper coinage into the device the armatures 18A and 22A again will engage the respective terminals 18C and 22C. However, nothing will happen at this point since the detecting switch 86 which detects the presence of the car on the intermediate portion 148 will be disabled by virtue of the open contacts 84A. Additionally, the homing arrangement which includes the switch 76 and the coil 26 will similarly be disabled because of the now opened contacts 62B. As a result, there will be measurable savings in the amount of time involved in processing cars since one driver does not have to wait until the completion of the preceding cycle before he can prime the mechanism for his own washing cycle.

The washing cycle continues under the control of the timer 112 until it is completed. When the washing cycle has been completed the timer 112 opens the switch 99 and becomes deenergized. When the switch 99 opens the relay winding 62 becomes deenergized and the contacts 62A open thereby breaking the holding circuit to the relay winding 62 and the contacts 62B close thereby priming the homing arrangement including the switch 76 and stepping coil 26. Even if the coin stepping switch 20 has been primed at this time so that armature 22A is in engagement with the contact 22C, it is to be noted that the homing arrangement will not be energized at this point since the switch 99 has opened thereby deenergizing the lead 114. Additionally, the relay winding 126 will be deenergized thereby permitting the normally closed contacts 126A to again close. Moreover, the relay winding 98 will remain deenergized even though the car C has operated the switch 86 so that the armature 86A engages the terminal 86C in view of the fact that the switch is disabled by virtue of the now open contacts 84A of the relay 84. As the driver of the car C drives the car off the intermediate portion 148 of the washer the wheels leave the switch 86 thereby permitting the armature 86A to again engage the contact 86B. However, since the circuit is broken at the contacts 84A, the lamp 88 will not be illuminated at this time and the proceed sign 94 will remain dark. However, as the car C traverses the portion 154 of the washer the switch 108 is closed. This action again pulses the latching relay winding 84 through the circuit comprising energized lead 12, lead 106 and the now closed contacts of the switch 108, armature 84B of the relay which is now in engagement with the terminal 84D, the relay winding 84, and lead 104 to the energized lead 14. This action causes the armature 84B to again engage the terminal 84C and also to close the contacts 84A. Thus the switch 86 will now be enabled and, if the coin stepping switch has been energized or primed by succeeding driver, the proceed lamp will be illuminated through the circuit noted above to indicate to the driver that he can now drive onto the intermediate portion 148. As the next driver drives onto the intermediate portion 148, he operates

the switch 86 to cause the armature 86A to engage the terminal 86C. Thus, the washing cycle will again repeat itself.

Assuming this next driver has inserted sufficient monies to also include a wax operation in his cycle, he will have caused the armature 28A of the switch 20 to engage the terminal 28C. The lamp 46 will be illuminated to indicate that a waxing operation has been paid for through the circuit comprising the energized lead 12, lead 30, the switch 20, lead 44, the lamp 46 and lead 48 to the energized lead 14. Simultaneously therewith, at the time the armature 28A engages the terminal 28C, the relay winding 132 will be energized through the circuit including the energized lead 44, normally closed contacts 126A of the relay 126, lead 130, and the winding of the relay 132 to the energized lead 14. This operation causes the normally open contacts 132A of the relay 132 to close. The relay 132 may also be of the delayed action type so that the contacts 132A will remain closed for a specified interval of time after the relay 132 has been deenergized. When the car C closes the switch 86 and energizes the relay winding 98 to close the contacts 98A, the relay winding 126 will be energized, as noted above, to break the circuit to the relay winding 132 by opening the normally closed contacts 126A. However, simultaneously therewith, the relay winding 132 will remain energized through the circuit comprising the energized lead 114, lead 124, lead 134 and the now closed contacts 132 of the relay, and lead 136 through the relay winding to the energized lead 14. Thus, the contacts 132A will remain closed even though the contacts 126A open.

As the timer 112 operates to control the dispensing of the detergent and rinsing portion of the washing cycle, it will eventually reach a point in the operation at which the wax should be dispensed. At this point the timer 112 will cause the switch 120 to close. If the driver did not desire to pay for the waxing operation, the contacts 132A would have remained open and nothing more would happen at this point. However, since the contacts 132A are closed the wax relay 138 will be energized when the switch 120 closes through the circuit including the energized lead 114, lead 134, closed contacts 132A of the relay 132, lead 136, and now closed switch 120 to the energized lead 14. The wax relay 138 may control elements within the timer control 112 to cause the wax to be dispensed. For example, the wax relay 138 may operate a solenoid valve which permits the wax to be dispensed during the timer and the switch 120 is closed. Additionally, the wax counter 114 will be energized the same time that the relay winding 138 is energized to record that a waxing operation has been paid for. After the waxing portion of the cycle has been completed, the switch 120 opens thereby deenergizing the relay 138. Additionally, at the end of the washing cycle the switches 66 and 99 will open and the closure of the switch 108 as the car leaves the washer will cause the circuit elements to return to the position shown in FIG. 2.

Accordingly, a control apparatus for controlling the operation of an associated mechanism has been disclosed which is simple in construction and efficient in the operation and which decreases waiting times between operations by permitting the apparatus to be primed prior to the completion of a preceding cycle.

While a preferred embodiment of the invention has been shown and described herein it will become obvious that numerous omissions, changes and additions may be made in such embodiment without departing from the spirit and scope of the present invention.

What is claimed is:

1. Control apparatus for controlling the operation of a mechanism adapted to perform specified acts on as associated device comprising deposit means normally in a rest position and movable to a first position in response to the deposit of a first amount of money, first detecting means operable when said deposit means is in said first position for detecting the presence of the device upon which said acts are to be performed, energizing means operable by said first detecting means upon the detection of the presence of the device for

operating said mechanism, and homing means for moving said deposit means to said rest position in response to the operation of said energizing means, whereby additional amounts of money may be deposited to move said means to the first position.

2. Control apparatus as in claim 1, in which said energizing means includes disabling means for disabling said detecting means when said energizing means is operated.

3. Control apparatus as in claim 2, in which said disabling means is movable from a first position wherein said first detecting means is enabled to a second position wherein said first detecting means is disabled in response to the operation of said energizing means, said disabling means comprising second detecting means for moving said disabling means to the first position in response to the removal of said device.

4. Control apparatus as in claim 1, and inhibit means responsive to the rest position of said deposit means for inhibiting the operation of said homing means until said specified acts have been performed.

5. Control apparatus as in claim 4, in which said inhibit means includes electromechanical means movable from a first position in which said homing means is operable in response to the operation of said energizing means to a second position in which said homing means is disconnected from said energizing means in response to movement of said deposit means to the rest position, and switch means adapted to be operated by said mechanism after said acts have been performed for moving said electromechanical means to the first position.

6. Control apparatus as in claim 1, in which said first detecting means is operable from a first to a second position by said device to operate said energizing means, and indicating means responsive to the first position of said first detecting means for indicating that the mechanism is ready to perform said specified acts.

7. Control apparatus as in claim 1, in which said deposit means is movable to a second position in response to the deposit of a second amount of money, operate means operable in response to the second position of said deposit means for causing further acts to be performed on said device, and stop means responsive to the operation of said energizing means for preventing reoperation of said operate means in response to the second position of said deposit means until said further acts have been performed.

8. In combination, a mechanism adapted to perform periodic cycles of specified acts on respective devices and a control apparatus therefore, said mechanism including circuit means for establishing an energizing circuit with a source of energy when said mechanism is operated and for maintaining said circuit during a cycle of operation and for breaking said energizing circuit at the end of said cycle of operation, said

control apparatus comprising first and second leads adapted to be connected to an energy source, deposit means normally in a rest position and movable to a first position in response to the deposit a first amount of energy for establishing a first circuit from said first lead through said deposit means, first electromechanical means movable from a first to a second position when energized to connect said mechanism between said first and second leads to operate said mechanism, a detection switch operable by said device for connecting said first electromechanical means between said deposit means and said second lead to energize said first electromechanical means through said first circuit and second electromechanical means connectable between said first and second leads by the operation of said detection switch to disconnect said detection switch from said deposit means.

9. The combination of claim 8, in which said deposit means is operable to establish a second circuit therethrough from said first lead through said first electromechanical means when said deposit means is in said first position, and homing means connected to said second lead and adapted to be energized through said second circuit to move said deposit means back to said rest position.

10. The combination of claim 9, and third electromechanical means connected at one end to said second lead and adapted to be connected to said first lead through said deposit means when said deposit means is moved to the rest position, said third electromechanical means being operable to disconnect said homing means from said deposit means when connected between said first and second leads.

11. The combination of claim 10, and a switch operable by said mechanism to connect said one end of said third electromechanical means to said second lead at the initiation of a cycle and to disconnect said one end therefrom at the end of said cycle.

12. The combination of claim 8, in which said second electromechanical means is operable to reconnect said detection switch with said deposit means when energized, and a finish switch operable upon the removal of said device for connecting said second electromechanical means between said first and second leads to energize the same.

13. The combination of claim 8, in which said deposit means is movable to a second position in response to the deposit of a second amount of money to establish a third circuit therethrough to said first lead, and fourth electromechanical means adapted to be connected between said first and second leads through said third circuit to energize the same, said mechanism being responsive to the energization of said fourth electromechanical means to perform additional acts on said device during a cycle of operation.

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