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FLUSH PUSH BUTTON SWITCH FOR ELECTRIC CIRCUITS.

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1,328,481. Patented Jan. 20, 1920.

Fig. 1

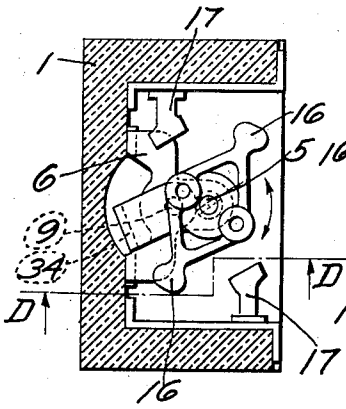


Fig. 2

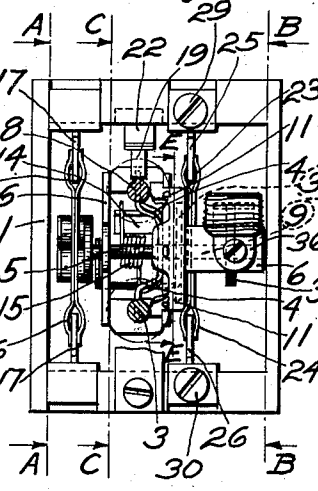


Fig. 3

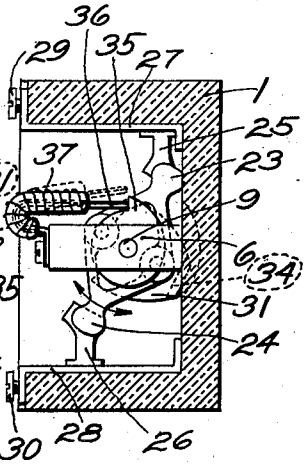


Fig. 4

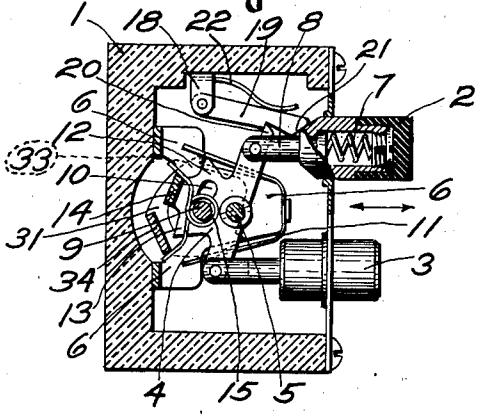


Fig. 5

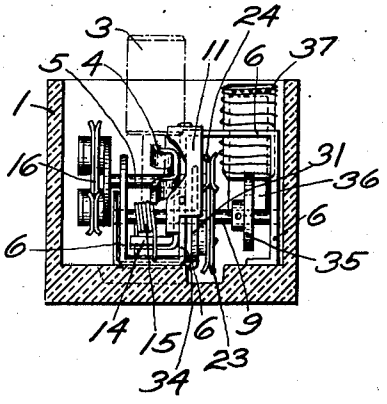


Fig. 6

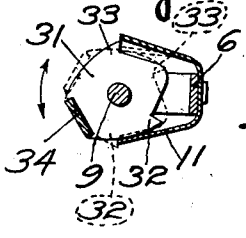
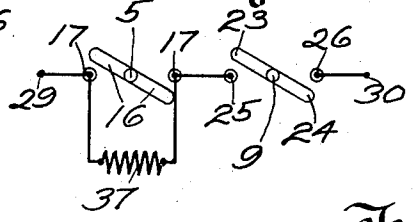


Fig. 7



Inventor,

Malcolm H. Baker.

UNITED STATES PATENT OFFICE.

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FLUSH PUSH-BUTTON SWITCH FOR ELECTRIC CIRCUITS.

1,328,481. Specification of Letters Patent. Patented Jan. 20, 1920.

Application filed November 8, 1915, Serial No. 60,457. Renewed April 14, 1919. Serial No. 290,087.

To all whom it may concern:

Be it known that I, MALCOLM H. BAKER, a citizen of the United States, and a resident of Braintree, in the county of Norfolk and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Flush Push-Button Switches for Electric Circuits, of which the following is a specification.

My invention relates broadly to switches of the type adapted to be operated by alternately pushing interconnected thumb buttons and wherein thermo-dynamically controlled means are embodied to retain the switch controlled circuit closed a brief predetermined interval of time after the controlling button adapted to open the switch controlled circuit has been actuated.

That is, a switch of said type which is closed in the usual manner for normal operation by the push on one control button, and which is opened by a push on another control button, but which does not break the circuit for a brief time after the said latter button has been pushed.

In other applications filed by me I have discussed in detail the many advantages derived from such a switch when used in connection with electric lights, and have broadly and specifically claimed my invention as applied to various classes of switches, and in the present application I specifically show it as applied to a push button type of switch utilizing separate control buttons to close and to cause opening of the switch.

I have illustrated my invention in the annexed drawings, in which Figure 1 is a sectional view of my improved switch taken in section on line A—A of Fig. 2. Fig. 2 is a front elevation, and Fig. 3 a section on line B—B of Fig. 2, the controlling push buttons being omitted for clearness in these three figures. Fig. 4 is a section on line C—C of Fig. 2, and Fig. 5 is a section on line D—D of Fig. 1. Fig. 6 is a section on line E—E of Fig. 2, and Fig. 7 is a diagram of the electrical connections of the switch.

In the drawings, 1 is the porcelain receptacle containing the switch mechanism, and 2, 3, the closing and opening buttons respectively. These buttons are pivoted respectively to opposite ends of a lever 4 fulcrumed at a shaft 5 carried in a bracket 6 attached to the container 1. The button 2 is hollow and contains a coiled spring 7 pressing against the stud 8 which is pivoted to the shaft or lever 4. The button 3 is a simple solid button. The bracket 6 also carries a shaft 9 which passes through a slot 10 in the lever 4. This lever 4 has two spurs adapted to engage, at opposite limits of its motion with a spring detent 11, the said spurs appearing at 12, 13. Said lever 4 also has a projection 14 which is straddled by the ends of a coiled spring 15 wound about the shaft 9. The shaft 5, of the lever 4, carries insulated contact clips 16 adapted to engage stationary blades 17 mounted upon the container 1.

The container 1 carries a bracket 18 having a hinged detent arm 19 notched to engage an end 20 of the lever 4 and also shaped to provide a cam surface 21 adapted to bear against the inner end of the button 2. A spring 22, mounted upon the bracket 18, acts to press the arm 19 against the end 20.

The main contacts of the switch, here shown as a single pole structure, appear at 23, 24, and engage blades 25, 26, stationary upon the container 1 through holding brackets 27, 28,—said brackets carrying binding post screws 29, 30, adapted to receive the line and load wires of the circuit. The main contacts are mounted upon and insulated from a cam plate 31 having spurs 32, 33, engaging the ends of the spring detent 11. The cam plate 31 also has an extension 34 adapted to limit the swing of said plate by engagement with the bracket 6. This cam plate 31 is fixedly mounted upon the shaft 9 which also carries a second cam plate 35 notched to be engaged by the end of the bi-metallic thermostat 36 which has a resistance winding 37 suitably insulated therefrom. This thermostat is mounted to the container 1 by means of the bracket 6.

Operation is as follows: When the button 2 is pushed to close the switch it compresses the spring 7, releases the detent arm 19 and then swings the lever 4 whereby the main contacts 23, 24, 25, and 26 are closed, with a marked snap due to the action of the spring detent 11. The heating winding 37 of the thermostat 36 is inoperative since said winding is short circuited by the contacting of the members 16, 17. The switch now operates in the normal manner to transmit current to the load. To open the circuit

the button 3 is pushed. This swings back the lever 4 against the yielding action of the spring detent 11 until the end 20 of said lever is engaged by the spring controlled detent arm 19, the main contacts being prevented from opening by the thermostat 36. The auxiliary contacts 16 are however opened thus placing the resistance winding 37 solely in series with the load. The thermostat is now heated, bends and releases the cam 35 which permits the main contacts to be snapped open under the action of the spring 15.

The position of parts illustrated in the drawings is that assumed after the opening button has been pushed, before the main contacts have opened, and while the thermostat is heating.

The time element elapsing between the pushing of the opening button and the actual opening of the switch is of course the time required to heat to operation the thermostat, and it is evident that this time may be varied in many ways, such as altering the amount or size of wire on the thermostat, etc.

While I have illustrated a bi-metallic thermostat as the time element to delay the opening of the switch, it is perfectly evident that any suitable or equivalent form of thermo-dynamic device may be employed.

Without, therefore, limiting myself to the precise embodiment of my invention herein shown, what I claim is,—

1. In an electric circuit switch having a pivoted contact member arranged for rocking movement and manual controlling means to cause rocking of the same to close and to open the switch, in combination automatic switch opening mechanism comprising a detent and controlling thermostat therefor positioned when the said thermostat is thermally deënergized to prevent the switch opening movement of said rocking member, rocking driving means for said member and having a resilient connection therewith, a detent device to hold said driving means when moved to a position to put a switch opening tension on said member, a normally inoperative electric heater for the thermostat, and means, controlled by said driving means in said last mentioned position thereof, and adapted to establish said heater in operable relation to the switch controlled circuit.

2. In an electric circuit switch having a pivoted contact member arranged for rocking movement and manual controlling means to cause rocking of the same to close and to open the switch in combination, automatic switch opening mechanism comprising a detent and controlling thermostat therefor positioned when the said thermostat is thermally deënergized to prevent the switch opening movement of the said rocking member, rocking driving means for said member and having a resilient connection therewith, a detent device to hold said driving means when moved to a position to put a switch opening tension on said member, a normally inoperative electric heater for the thermostat, and means controlled by said driving means in said last mentioned position thereof and adapted to establish said heater in operable relation to the switch controlled circuit; together with means, controlled by the reverse movement of said driving means, to close the switch.

3. In an electric circuit switch having a pivoted contact member arranged for rocking movement and manual controlling means to cause rocking of same to close and to open the switch in combination, automatic switch opening mechanism comprising a detent and controlling thermostat therefor positioned when the said thermostat is thermally deënergized to prevent said rocking member to move to open the switch, rocking driving means for said member and having a resilient connection therewith, a detent device to hold said driving means when moved to a position to put a switch opening tension on said member, a normally inoperative electric heater for the thermostat, and means controlled by the said driving means in said last mentioned position thereof and adapted to establish said heater in operable relation to the electric circuit; together with means, controlled by the reverse movement of said driving means to close the switch and to maintain it closed, independently of said thermostatic detent, for normal operation.

4. In an electric circuit switch, in combination, a pivoted rocking contact member, rocking driving means therefor having manual controlling means, a resilient connection between said driving means and said member, positive detent devices for said member governed by the movement of said driving means, a thermostatically controlled detent arranged to lock said member to maintain the switch closed when said member is tensioned for switch opening by movement relative thereto of said rocking driving means and adapted when energized to release said member to open the switch, auxiliary detent means to lock said driving means in position to open the switch when the switch is maintained closed by said thermostatic detent, an electric heater for the thermostat, and circuit connections to connect said heater operatively to the electric circuit when said driving means are moved to a position to cause opening of the switch.

5. In an electric circuit switch, in combination, a pivoted rocking contact member, rocking driving means therefor having manual controlling means, a resilient connection between said driving means and said member, positive detent devices for said member governed by the movement of said driving

means, a thermostatically controlled detent arranged to lock said member to maintain the switch closed when said member is tensioned for switch opening by movement relative thereto of said rocking driving means and adapted, when energized, to release said member to open the switch, auxiliary detent means to lock said driving means in position to open the switch when said switch is maintained closed by the said thermostatic detent, an electric heater arranged in series with the switch circuit and adapted when energized to operate the thermostat and a shunt circuit around said heater arranged to be normally closed while the switch is closed and further arranged to be opened when the driving means are moved to a position to cause opening of the switch.

6. An electric switch embodying an oscillatory contact member; an oscillatory actuator element mounted for swinging displacement relative to said member; a spring and detent connection between said member and said element whereby swinging displacement of said element relative to said member in either direction of the latter's oscillation causes quick follow-up movements of said member in the corresponding direction respectively to make and to break a circuit; a separate detent arranged to prevent said follow-up movement of said member from its circuit making position when said element is displaced therefrom; means to hold said element so displaced whereby said member is tensioned for circuit breaking movement; and normally inactive, slow-acting instrumentalities arranged to be operatively energized by said displacement of said element, and thereby rendered operative to free said separate detent after a predetermined interval of time.

Signed at Boston, in the county of Suffolk and Commonwealth of Massachusetts, this second day of November, 1915.

MALCOLM H. BAKER.

Witnesses:
R. D. SMITH,
SILVIO AMOROSO.