F. M. G. JOHNSON.

CONTINUOUS ELECTRIC SWITCH.

APPLICATION FILED DEC. 26, 1908.

1,007,291. Patented Oct. 31, 1911.

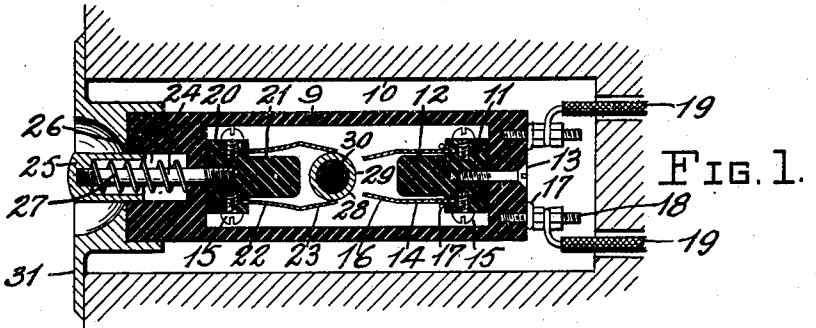

FIG. 1.

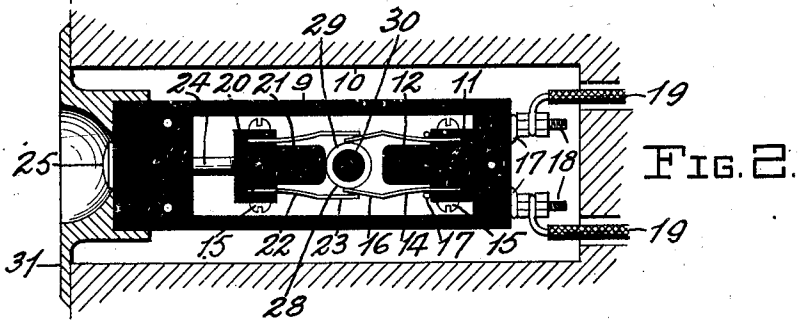

FIG. 2.

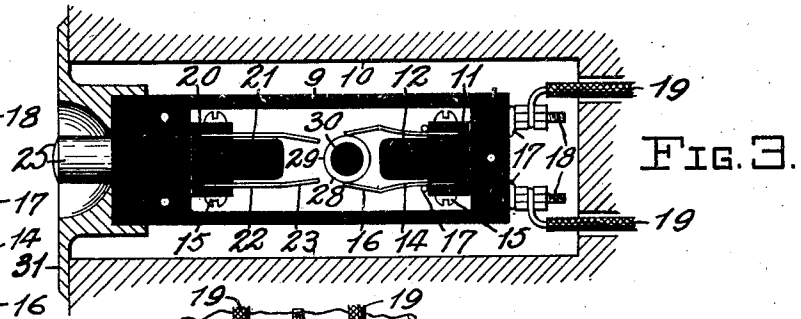

FIG. 3.

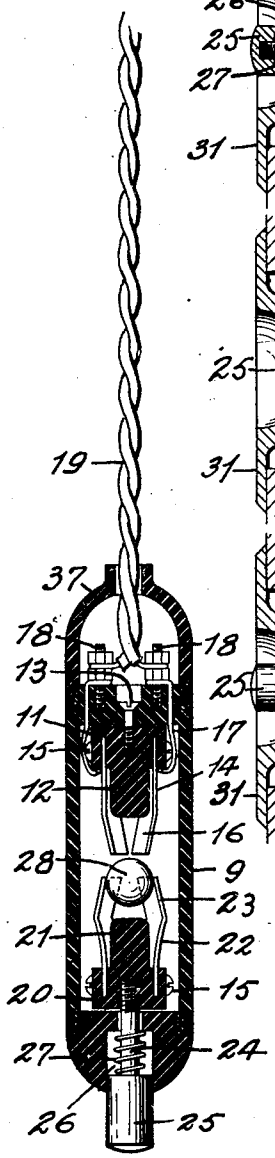

FIG. 6.

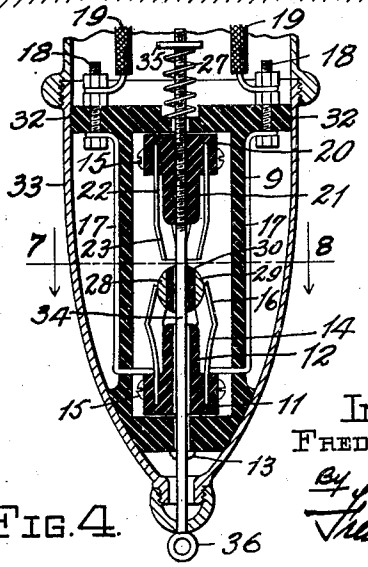

FIG. 4.

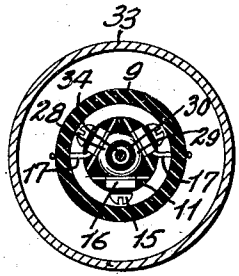

FIG. 5.

WITNESSES

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CONTINUOUS ELECTRIC SWITCH.

1,007,291. Specification of Letters Patent. Patented Oct. 31, 1911.

Application filed December 26, 1908. Serial No. 469,271.

To all whom it may concern:

Be it known that I, FREDERICK M. G. JOHNSON, of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Continuous Electric Switches, of which the following is a full, clear, and exact description.

This invention relates to electric switches and is particularly adapted to be used in connection with incandescent lighting circuits.

The main object of the invention is to provide a switch having a single operating push button that will repeat the operation of making and breaking the circuit alternately, thus eliminating one of the push buttons commonly used; that will prevent or avoid arcs between the separated portions of the circuit; and that will be neat and attractive in appearance and simple and inexpensive in construction.

The device consists, briefly considered on its broader aspects, of two relatively movable members one of which contains the normally separated terminals of the switch, and a contact member for closing the circuit between said terminals, transferable bodily by said relative movement alternately from one member to the other, and in its preferred embodiment consists more specifically of a stationary member to which the circuit wires are attached, having spring terminals separated by an insulating material, and a movable member having spring jaws adapted to temporarily engage a contact device. The spring jaws are constructed so that the contact member is caught and held alternately by the movable member and the stationary member, thereby making or breaking the circuit as desired.

In the drawings which illustrate this invention:—Figure 1 is a vertical longitudinal sectional view of the switch in open position. Fig. 2 is a side elevation with the cover removed and shows the switch at the completion of the closing movement. Fig. 3 is a view similar to Fig. 2 and shows the switch closed with the carrier returned to its initial position. Fig. 4 is a vertical sectional view of the device arranged as a continuous pull switch in an electrolier. Fig. 5 is a transverse section on the line 7—8 of Fig. 4, and shows more clearly the modification. Fig. 6 is a vertical sectional view of the switch used as a hanging or portable switch.

In the above defined figures, which present a preferred embodiment of my invention, and which for the sake of clearness of understanding, I will describe in all its specific details, 9 designates a preferably rectangular casing of insulating material adapted to be located in the usual switch recess or box 10, in a wall. A block 11 of insulating material having a central tongue 12 is fixed to the inside of the casing at the rear end by means of a screw 13. Parallel spring fingers or blades 14 are fixed to the block 11, one on each side of the tongue, by screws 15, the extremities 16 of the fingers converging beyond the tongue as seen. Wires or other conductors 17 are fixed to the fingers 14, preferably by means of solder, and electrically connect the same with binding posts 18 on the rear of the casing to which the circuit wires 19 are attached in the usual manner. A carrier block 20, is provided at the front end of the casing having a tongue 21 and spring fingers 22 provided with converging extremities 23, said block and fingers being preferably the exact duplicates of the block 11 and fingers 14. The carrier block instead of being fixed to the casing, is mounted on a reciprocable rod 24 extending through the front of the casing and terminating in a button 25. The button extends into a recess 26 formed in the front of the casing and normally projects beyond the casing, as seen in Figs. 1, 3 and 6, by reason of a helical compression spring 27 surrounding the rod 24. The spring 27 is compressed between the button and the rear of the recess 26 and operates to maintain the button projecting beyond the casing, and the carrier block in engagement with the front of the casing. The spring fingers 14 and 22 are of such a length that their extremities are normally out of engagement, but when the carrier block is moved toward the block 11, the fingers 14 and 22 engage each other slidably. A small cylindrical contact member or connector 28 is provided consisting preferably of an electro-conductive shell 29 having a filling 30 of insulating or other material. The connector is adapted to be gripped by the extremities of one pair of spring fingers, and held until removed by the other pair. In the case of a wall switch, as shown in Figs. 1, 2 and 3, a recessed plate 31 may be provided in the usual manner.

In Figs. 4 and 5, I have shown the device

adapted to a continuous pull switch, such as is commonly used in electroliers. In this form it is found advisable to make the casing 9 cylindrical in form and provide it with flanges 32, or other suitable means for supporting the same within the shell 33 of the electrolier. In this modification, the blocks 11 and 20 are circular in form and provided with three fingers each in place of two as in the wall switch. The connector in this case may be spherical in form. The button 25 is replaced by a rod 34 which extends centrally through the block 11 and connector, and is screwed into the carrier block 20. The rod projects through the carrier block and the upper end of the casing, and is surrounded by a helical compression spring held in place by a washer 35. The lower end of the rod 34 projects through the shell of the electrolier and terminates in an eye 36, through which a chain or cord may be fixed in the usual manner.

The form shown in Fig. 6 is a further modification of the device, adapting it to hanging or portable switches. In this form the casing is cylindrical and the blocks 11 and 20 circular and provided with three fingers each, as in Figs. 4 and 5. The button 25 is located in the lower end, as in Figs. 1, 2 and 3, and operates the carrier block as before. The binding posts 18 are covered by a cap 37 of insulating material through the top of which the circuit wires enter in the form of an ordinary twisted wire. As the binding posts are necessarily much closer together in this form, the screw 13 is sunk below the level of the casing to prevent the same from forming a short circuit between the binding posts.

The operation of the device is simple and consists in alternately pressing the button Figs. 1, 3 and 6 and allowing the same to return to its original position, thus opening and closing the circuit. It will be noted in the drawings that the extremities of the fingers gripping the connector are sprung farther apart than the idle fingers, whose distance apart is less than the diameter of the connectors. Assuming the parts to be in the relation shown in Fig. 1, *i. e.* open circuit position, the cycle of operation is as follows:—The button 25 is pressed moving the carrier block 20 with the connector gripped between the fingers 22 toward the block 11. The first contact is made by the connector touching the extremities 16 of the fingers 14. As the carrier block advances, the connector is prevented from advancing by the fingers 14, until the tongue 21 of the carrier block comes in contact therewith, as seen in Fig. 2. When the tongue 21 is forced against the connector, the extremities of the fingers 22 are forced past the gripping point on the connector so that a small portion of the fingers projects beyond this point and, by reason of the curvature of the connector, a space is left between the same and the extremities of the fingers. When the extremities of the fingers 22 are sprung apart by the connector, it will be seen that the extremities 16 of the fingers 14 lie closer together. As the carrier block advances pushing the connector with it, the extremities 16 of the fingers 14 are forced apart by the connector, and pass between the connector and the fingers 22, until the parts assume the position shown in Fig. 2. From the moment that the fingers 14 touch the connector, the circuit is closed but in the position shown in Fig. 2 the fingers 14 are able to grip and retain the connector thus maintaining the circuit closed, the current passing from the wires 19 through the binding posts, conductors 17, fingers 14 and connector 28. When the pressure on the button is released, it returns to its initial position by reason of the spring 27, taking the carrier block with it and leaving the connector gripped between the fingers 14, as shown in Fig. 3. When it is desired to open the circuit, the button is again pressed and the carrier block forced toward the block 11. The fingers 22 press the connector against the tongue 12, enter between the connector and the fingers 14 as before described, and on the retreat of the carrier block remove the connector, the parts returning to the position shown in Fig. 1. It will be seen that the operation in opening the circuit is the reverse of the operation in closing the circuit. In the opening process, after the fingers 22 have gripped the connector, and the button is released, the spring withdraws the carrier block and connector so rapidly that the fingers and conductor do not become burned by the spark due to the breaking circuit. It will be understood that the gap in the circuit is between the fingers 14. In the form shown in Figs. 4 and 5, the operation is exactly the same, with the exception that the carrier block is moved by the tension rod 34 instead of the push button 25, the rod sliding freely through the connector and block 11. One of the three fingers 14 may be dead; *i. e.* not electrically connected, and serves merely to hold the connector more securely. The operation of the form shown in Fig. 6 will be readily understood from the foregoing description.

From the above description it will be readily seen that my invention is broadly new in a number of respects and is capable of a wide range of embodiments without departing from the spirit and scope of my invention. The connector or contact device is bodily transferred from the switch terminal member to the coöperating members, and vice versa, simply by the relative movement of said members, and when in circuit closing position is preferably left there while the coöperating member retreats. Preferably

also said contact device, when engaged by either of said relatively movable coöperating members, has no connection with or attachment to the other member, although, irrespective of whether it is so connected (as for instance in Fig. 4) or not, it is bodily transferred from one member to the other at each complete relative movement, and remains so transferred until the next complete operation takes place. Again, a further novel feature, as pointed out more definitely in certain of the appended claims, resides in providing, in connection with two relatively reciprocable members, one of which contains normally separated switch terminals, a connector of conductive material which is automatically placed and left in circuit closing position by one complete reciprocation of said relatively reciprocable members, and is removed from and kept out of circuit closing position by a succeeding complete reciprocation thereof. Preferably the contact device is circular in cross section in order that it may automatically keep changing its points of engagement, thereby continually bringing into service fresh portions of its surface, and for many purposes its preferred shape is spherical, especially when it is left entirely free to move in any direction, uncontrolled by any anchoring or guiding device, such, for instance, as shown in Figs. 4 and 5. The wedging construction and operation of the contact device is a further advantageous feature as it insures stability of position as well as good electrical contact. My invention makes it feasible to provide a practical switch of exceedingly small size for comparatively heavy current. Also the switch is rendered unusually neat and attractive as well as compact, because only a single push button (or other operating part as in Fig. 4) is externally visible. There are no pinions, ratchets, pawls, or other rotary, swinging or delicate parts.

Having thus described my invention, what I claim is:—

1. An electric switch, containing two relatively movable members one of which contains the normally separated circuit terminals of the switch, and a contact device for closing the circuit between said terminals, transferable bodily by said relative movement alternately out of engagement with one member into retained engagement with the other.

2. In a device of the character described, two relatively movable members one of which contains the normally separated circuit terminals of the switch, and a loose contact device for closing the circuit between said terminals movable bodily into engagement with one of said members out of engagement with the other of said members, and vice versa.

3. In a device of the character described, a fixed terminal member having spring fingers projecting therefrom, a loose contact device adapted to be thrown into or out of engagement with said fingers and means for moving said contact device, said contact device when in circuit closing position being retained solely by said fingers.

4. In a device of the character described, a fixed terminal member having spring fingers projecting therefrom, a reciprocable member opposite said fixed member, and a loose contact device adapted to be alternately thrown into and out of engagement with said spring fingers by means of the reciprocable member, said contact device when in circuit closing position being retained in said position by said spring fingers, and when in open circuit position being retained by said reciprocable member.

5. In a device of the character described, a fixed terminal member having a pair of spring fingers projecting therefrom, a movable member having a second pair of spring fingers, a contact device, and means for causing said contact device to be engaged alternately by each pair of spring fingers.

6. In a device of the character described, a fixed terminal member having a pair of spring fingers projecting therefrom, a reciprocable member opposite said fixed member having a second pair of spring fingers, a loose contact device, and a push button connected with said reciprocable member for throwing said contact member alternately into and out of engagement with each pair of spring fingers.

7. A switch device comprising a stationary terminal member, a movable member having a pair of spring fingers projecting therefrom, a loose contact device located between said members, and means for causing said movable member to carry said contact device into engagement with the fixed member and then retreat away from said contact device, which is left in said engagement.

8. An electric switch comprising a fixed terminal member having spring fingers projecting therefrom, a movable member having a pair of spring fingers opposite said fixed member, a loose contact device, and a push button connected with said movable member and adapted to reciprocate the movable member in such a manner as to carry the contact device alternately into and out of engagement with the fixed member.

9. An electric switch comprising a fixed terminal member, a movable member having a pair of spring fingers projecting therefrom, a loose contact member, and means for causing said fingers yieldingly to embrace the contact member and to carry the contact member alternately into and out of engagement with the terminal member.

10. A switch comprising an insulated cas-

ing having wire terminals connected thereto, a fixed block having spring fingers connected with said terminals, a carrier block disposed opposite said fixed block and having a pair of spring fingers projecting therefrom, a spring actuated push button adapted to normally hold said carrier block away from the fixed block, and a loose contact device located between the fixed block and the carrier block.

11. An electric switch, comprising two relatively reciprocable members one of which contains the normally separated circuit terminals of the switch, and a contact device for closing the circuit between said terminals, transferable to circuit closing position by a complete relative forward and backward movement of said members, and transferable to open circuit position by a subsequent complete forward and backward movement of said members.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FREDERICK M. G. JOHNSON.

Witnesses:
C. W. TAYLOR,
E. R. MCKENZIE.