E. D. SMITH.

SWITCH LOCK.

APPLICATION FILED OCT. 9, 1914.

1,195,619. Patented Aug. 22, 1916.

Fig. 1.

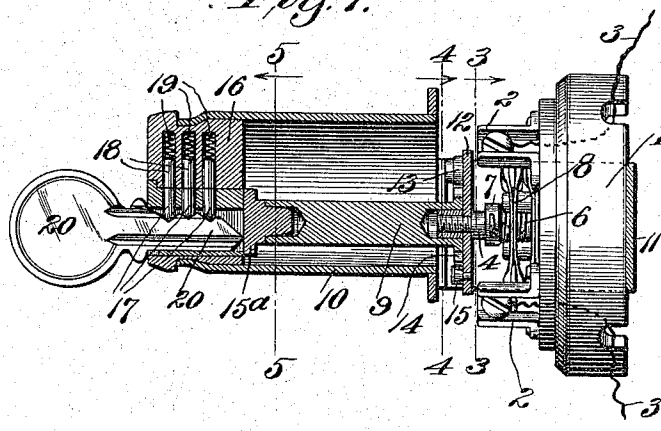


Fig. 3.

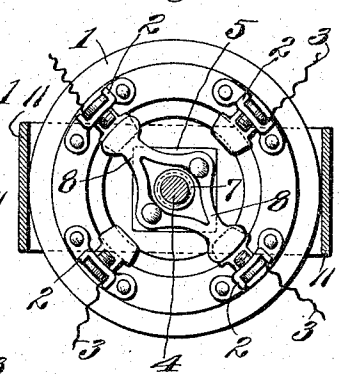


Fig. 2.

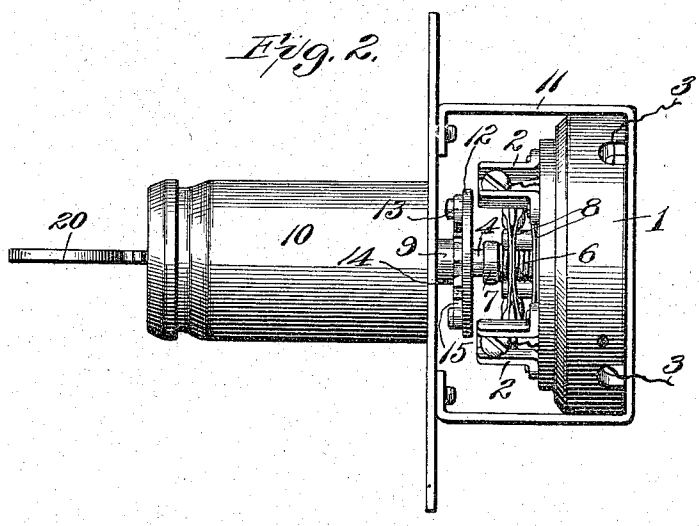


Fig. 4.

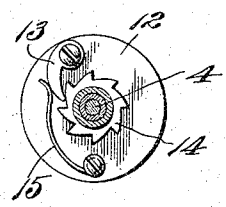
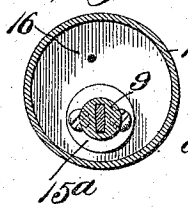


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SWITCH-LOCK.

1,195,619. Specification of Letters Patent. Patented Aug. 22, 1916.

Application filed October 9, 1914. Serial No. 865,812.

To all whom it may concern:

Be it known that I, EDWIN D. SMITH, a citizen of the United States, residing at the city of St. Louis and State of Missouri, have invented a new and useful Switch-Lock, of which the following is a specification.

This invention relates to switch locks for controlling electrical circuits, and it consists of the novel construction, combination and arrangement of parts whereby a key and tumbler lock is combined with a switch in such a manner that the switch may be locked in position to open or to close one or more circuits, with provision for enabling the movement of the key to be reversed and turned to the starting point and withdrawn without disturbing the locked adjustment of the switch whether the circuit be open or closed.

An object of the invention is to combine a lock of the tumbler type with an electrical switch, with provision whereby the lock may be operated in one direction to open or to close the switch, and with a further provision that the actuating key of the lock may be turned backwardly or reversed to the starting point and withdrawn without disturbing the locked position of the switch, the switch being thus locked in opened or closed adjustment.

Another object is to provide a key actuated lock of the tumbler type, in combination with an electrical switch, with intermediate devices whereby actuation of the lock in one direction will operate the switch to open or to closed position or adjustment, and in which the operation of the lock may be reversed to the starting point to enable the key to be withdrawn without disturbing the adjustment of the switch, so that the switch may be locked in any desired adjustment and the key withdrawn therefrom.

With the foregoing and other objects in view I have produced my invention in a suitable embodiment, one form of which is illustrated in the accompanying drawings in which—

Figure 1 is a sectional view of the invention. Fig. 2 is a side elevation. Fig. 3 is a sectional view on the line 3—3 of Fig. 1. Fig. 4 is a sectional view on the line 4—4 of Fig. 1. Fig. 5 is a sectional view on the line 5—5 of Fig. 1.

In the embodiment illustrated the support 1 is of suitable insulating material, such as porcelain or the like, and supports a number of members 2 constituting the terminals of the circuit wires 3. The type of terminal support illustrated is adapted particularly for use in switch-boards in which circuits of different potential are controlled by a single switch. Thus it will be understood that my invention is adapted for use with equal advantage under various conditions and with various kinds of switches.

A rod 4 has one end journaled in a bearing formed in a block 5 secured within a recess in the support 1. A spring 6 encircles the rod 4, and has one end in engagement with a flange 7 rigid with said rod, and the other end in connection with the controlling devices (not shown) of the terminal connecting members 8. The controlling devices of the terminal connecting members 8 are well known in the art, and do not constitute any part of the present invention, so that it is not necessary to illustrate or describe them in detail. It is sufficient to understand that when the rod 7 is turned in a direction to tension the spring 6, the power of said spring is exerted upon the devices which control the connecting members 8, and at a time determined by the construction of said devices the controlling devices are released and snapped by the spring from one position to another. The position to which the connecting members are moved may be from a position in which one circuit is opened to a position in which the same circuit is closed, or vice versa; or from a position in which one circuit is closed to a position closing another circuit. Thus, it will be understood that the switch may be of any desired construction, and may be one in which the connecting members included in the same switch control circuits of different potential.

The end of the rod 4 is received in an opening in the end of an adjacent rod 9 which is supported within the lock case or shell 10. The case or shell 10, in the embodiment shown, is connected with the support 1 by a bracket 11 having its central portion attached to said support 1 and its extremities attached to the case or shell 10. A plate or disk 12 is attached to the rod 4 adjacent to the extremity of the rod 9, and supports a pivoted pawl 13 engaging with a ratchet 14 which is rigid with the extremity of the rod 9. A spring 15 also supported by

the plate or disk 12 presses the pawl 13 against the ratchet 14. This arrangement enables the rod 9 to turn in one direction without operating the rod 4, but operation of the rod 9 in the opposite direction actuates the rod 4 and thereby actuates the connecting member 8 to open or to close the switch, or to change the potential of the circuit by moving from the terminals of one circuit to the terminals of a circuit of different potential.

The outer end of the rod 9 is connected to a slotted barrel 15ª which is revolubly supported in a body portion 16 rigidly secured within the case or shell 10. The barrel is provided with a number of wards 17 of varying lengths, so that it is necessary to use a special key for actuating the switch. In the normal or starting position of the barrel the wards 17 are in alinement with and against the inner ends of corresponding pins 18 supported in radial bores or recesses in the body portion 16. Each pin 18 is actuated inwardly by a spring 19. It is well understood that in locks of this general construction it is necessary that the barrel be in its normal or starting position before the key can be inserted. The key 20 utilized is of special construction for the particular switch to which it is adapted, being provided on one edge with the usual notches and teeth, the notches being adapted to receive the ends of the wards 17, thereby holding the ends of said wards flush with the surface or periphery of the barrel 15, and holding the pins 18 out of engagement with said tumbler 15, thereby permitting said tumbler to be turned by the key. When the barrel is turned from its normal or starting position it is impossible to remove the key because the wards 17 cannot be pressed outwardly, and it is also impossible to operate the switch without the special key, because the barrel is locked against rotation by the pins 18 extending partially into the barrel, in the well understood manner.

When it is desired to operate the switch the key 20 is inserted in the barrel in the usual manner and is turned in a direction to cause the ratchet 14 to actuate the pawl 13 and thereby turn the rod 4 to actuate the connecting member 8 through coöperation with the usual controlling devices (not shown), found in the switches well known commercially, with which I have combined my invention. Thus, the switch can be turned or set in any desired position, either to open or to close a circuit, or to change the potential of the circuit from which power is taken by moving the connecting member from a circuit of one potential to a circuit of another potential. After the switch has been adjusted in the desired position, the operation of the tumbler may be reversed, the ratchet 14 moving freely under the end of the pawl 13 in the reversed direction, until the barrel arrives at its starting point. When the barrel arrives at its starting point the key may be withdrawn in the usual manner, and the barrel is thereupon automatically locked by the pins 18, thereby also locking the switch in the desired adjustment. Thus, the switch may be locked in position to open or close the circuit and the key may be withdrawn from the switch whether the circuit be open or closed and, since a special key is required for operation of the switch, it is obvious that unauthorized operation of the switch is impossible.

I do not restrict myself to the precise features of arrangement and construction illustrated and described, nor to the use of the switch in any particular embodiment, nor to the use of the locking mechanism in combination of any particular type of switch. It is apparent that numerous variations in these particulars may be resorted to without departure from the scope of the invention, and I contemplate such variations as may be preferred, and as are within equivalent limits of the invention.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a device of the character described, the combination with mechanism to be set in operative and inoperative positions, of a revoluble rod operable to actuate said mechanism to its operative and inoperative positions by movement of said rod in one direction, a part connected with said rod and having an opening therein, a removable device adapted to be engaged in said opening to actuate said part and said rod and thereby said mechanism, means enabling the movement of said rod to be reversed for the purpose described while the mechanism remains stationary, and elements preventing operation of said rod by other than said removable device.

2. In a device of the character described, the combination with mechanism settable in different positions, of an actuator therefor comprising a revoluble member, a removable device for actuating said member, and means whereby said member will actuate said mechanism when operated in one direction and will move independently of said mechanism when actuated in the opposite direction.

3. In a device of the character described, the combination with mechanism to be set in different positions, of an actuator therefor comprising a revoluble member, a key, means whereby said key may be connected with or detached from said member in the starting position of said member and preventing removal of said key when said member is in other than its starting position, means whereby said member will actuate said mechanism when said member is turned

in one direction and will move independently of said mechanism when operated in the reverse direction to its starting point after the mechanism has been set in the desired position.

4. In a device of the character described, the combination with mechanism to be actuated, of a rod for actuating said mechanism, a revoluble actuator for said rod, a removable key for actuating said actuator, and a ratchet and pawl device whereby said movement of said rod in one direction will operate said mechanism.

5. In a device of the character described, the combination with mechanism to be actuated, of an actuator therefor comprising a revoluble member, a removable manually operable device for controlling said member, and a ratchet and pawl device whereby movement of said member in one direction will operate said actuating device and movement of said member in the opposite direction is independent of said actuating device.

6. In a device of the character described, the combination with mechanism to be actuated, of an actuator therefor comprising a rod, a second rod, a ratchet and pawl device whereby movement of said second rod in one direction will operate said first-named rod and enabling said second rod to move in the opposite direction independently of said first-named rod, a device controlling said second-named rod, an element for actuating said device, and means for positively holding said device from movement by means other than said element.

7. In a device of the character described, the combination with mechanism to be actuated, of an actuator therefor comprising a rod, ratchet and pawl devices whereby movement of said rod in one direction will operate said actuator leaving said rod free to move in the opposite direction independently of said actuator, mechanism controlling said rod, elements holding said mechanism from movement, and a device movable to release said elements and to actuate said rod.

8. In a device of the character described, the combination with mechanism to be actuated, of an actuator therefor comprising a rod, of a pawl supported by said rod, a second rod, a ratchet supported by said second rod and adapted to be engaged by said pawl whereby movement of said second rod in one direction will operate said first-named rod leaving said second rod free to move in the opposite direction independent of said first-named rod, a member for operating said second rod, elements holding said member, and a device movable in one direction to release said elements and in another direction to move said member.

9. In a device of the character described, the combination with mechanism to be actuated, of an actuator therefor comprising two relatively movable rods for operating said mechanism, a pawl and ratchet device whereby movement of one of said rods in one direction will actuate the other rod and thereby actuate said mechanism, a removable device for actuating said rods in unison or one of said rods independently of the other, and releasable elements controlled by said device preventing operation of said rods by means other than by said device.

10. In a device of the character described, mechanism to be actuated, in combination with actuating mechanism therefor comprising a rod for operating said switch mechanism, a pawl supported by said rod, a ratchet engaged by said pawl, means for operating said ratchet effectively to engage said pawl and rotate said rod, or independently of said pawl and rod as desired, and elements controlled by said means for preventing operation of said ratchet.

11. In a device of the character described, the combination with mechanism to be actuated to operative and inoperative positions, of a member for actuating said mechanism, provision whereby said member may be operated in one direction to actuate said mechanism to operative or inoperative positions, and in the opposite direction to the starting point independently of said mechanism whereby said mechanism may be placed in any desired adjustment, and means for preventing unauthorized operation of said mechanism from any adjustment in which it is placed.

12. In a device of the character described, the combination with mechanism to be actuated to operative and to inoperative positions, of a member for actuating said mechanism, a removable device for operating said member, provision whereby operation of said device in one direction will operate said mechanism to operative and to inoperative positions, leaving said member free to be operated in the opposite direction to the starting point while the mechanism remains in the adjustment in which it was placed by the first operation thereof, substantially as described.

In witness whereof, I have signed this specification in the presence of two subscribing witnesses.

EDWIN D. SMITH.

Witnesses:
J. C. DEANE,
G. B. RANDALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."