W. J. NEWTON.

COMBINED SWITCH AND TAP-OFF.

APPLICATION FILED MAR. 4, 1911.

1,038,940.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

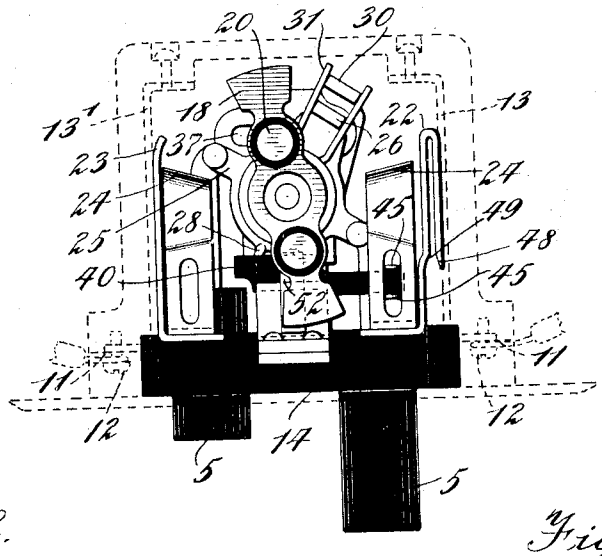


Fig. 2.

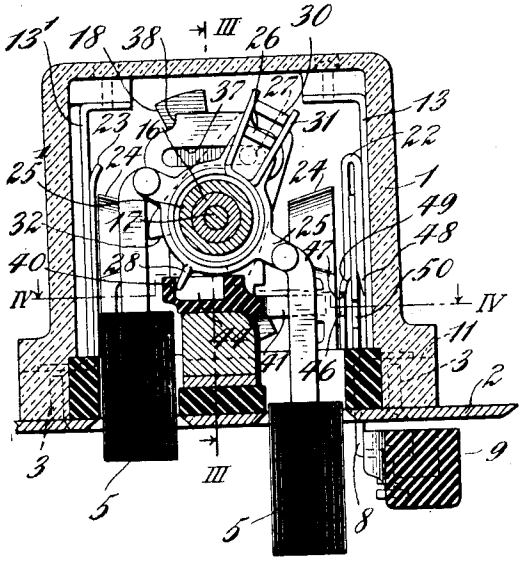


Fig. 3.

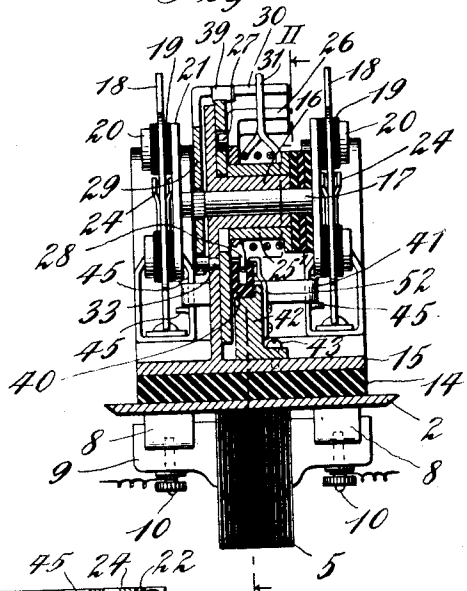
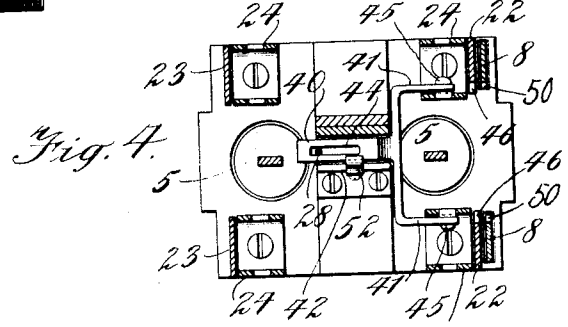


Fig. 4.



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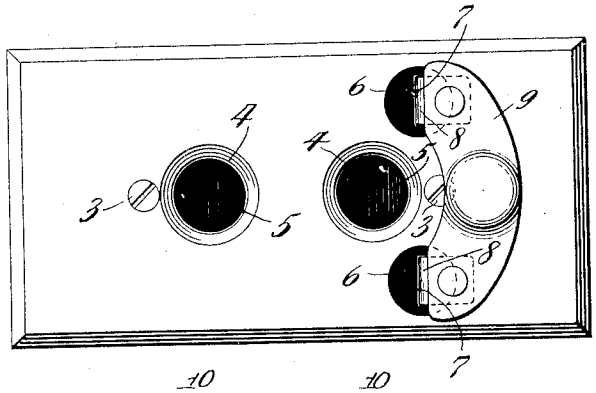
2 SHEETS—SHEET 2.

Fig. 5.



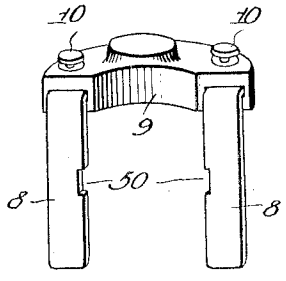
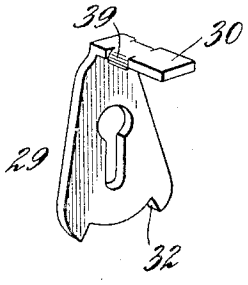


Fig. 10.

Fig. 7.

Fig. 6.



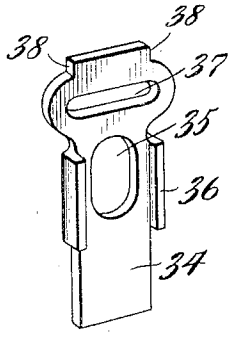


Fig. 8.

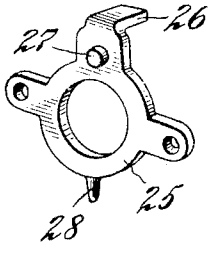
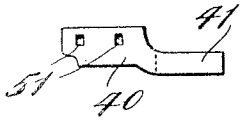


Fig. 9.



Witnesses:

Inventor

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By his Attorneys

Rosenbaum & Stockbridge

UNITED STATES PATENT OFFICE.

WILLIAM J. NEWTON, OF LYNBROOK, NEW YORK, ASSIGNOR TO METROPOLITAN ELECTRIC MFG. CO., A CORPORATION OF NEW JERSEY.

COMBINED SWITCH AND TAP-OFF.

1,038,940. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed March 4, 1911. Serial No. 612,219.

To all whom it may concern:

Be it known that I, WILLIAM J. NEWTON, a citizen of the United States, residing at Lynbrook, in the county of Nassau and State of New York, have invented certain new and useful Improvements in Combined Switches and Tap-Offs, of which the following is a full, clear, and exact description.

This invention relates to electric appliances, and more particularly to a novel combined wall switch and tap-off, the switch being of that type which is adapted to be embedded in a wall so as to be substantially flush with the surface thereof, and being preferably button operated.

The switch mechanism proper may be of any desired construction, but in the exemplification of my invention herein more particularly set forth, the arrangement and parts of said switch are very similar to those described in my Patent No. 917,348, issued April 6, 1909. In some respects also the tap-off forming elements of the device are analogous to those described in my co-pending application Serial No. 504,428, filed June 26, 1909, and allowed Dec. 24, 1910. Herein, however, I disclose a novel combination of switch and tap-off elements, which co-act together with auxiliary means to the end that when the switch parts are already in circuit making position, the contact elements of the tap-off proper cannot be disposed in operative or circuit making position; while correspondingly when the said contact making parts of the tap-off device are in circuit making position, they cannot be withdrawn therefrom until the switch elements have been actuated, thereby breaking circuit at the switch parts and preventing arcing between the tap-off contact making parts. I furthermore provide means whereby the switch cannot be closed if the contact making extensions of the tap-off device are improperly positoined. These and other objects of my invention will be hereinafter described and more particularly set forth in the appended claims.

In the accompanying drawings which form a part hereof and in which like reference characters designate like parts throughout the several views: Figure 1 is a side elevation of one form of my combined switch and tap-off, the retaining box being shown in dotted lines. Fig. 2 is a vertical sectional view of such mechanism taken on the line II—II of Fig. 3. Fig. 3 is a vertical sectional view taken on the line III—III of Fig. 2. Fig. 4 is a transverse section of the mechanism proper taken on the line IV—IV of Fig. 2. Fig. 5 is a plan of the cover plate showing the tap-off fixture in position thereon. Fig. 6 is a perspective view of one of the parts of the switch. Fig. 7 is a perspective view of a detent for controlling the movement of the switch element. Fig. 8 is a detail perspective view of the rocker to which the operating buttons are connected; and Fig. 9 is a detail of the locking member. Fig. 10 is a perspective view of the tap off plug.

Referring to Fig. 2, a casing or retaining box 1 is provided which is adapted to be received in a suitable aperture in the wall of a building, or in any other desired location. This box is preferably of porcelain, or other insulating material; is preferably of rectangular outline; and is adapted to be secured in position in any suitable manner. A cover plate 2 is provided for the said box which may be secured thereto by screws 3, or the like, to retain the operative parts in place therein; the said cover plate having four principal apertures therein as shown in Fig. 5; those disposed on the longitudinal median line of said plate being designated 4, and adapted for the reception of the operating buttons or cylindrical plugs 5, while toward the respective sides of the plate are the apertures 6 which, as in many cases, when the plate 2 is of conductive material, are preferably plugged with insulating material, such plugs being slotted as at 7 for the reception of the contact extensions 8 of the tap-off proper. These extensions preferably have the form of strips of sheet metal bent L-shape as shown in Fig. 2, and having the short legs of the L's secured to the insulating handle forming part 9; and binding posts 10 are mounted in the part 9 in electrical connection with said short legs, whereby connection may be made to the respective extensions or strips 8, as indicated in Fig. 3.

Recesses 11 are provided in opposite sides of the casing in which are disposed binding screws 12, to which may be secured the extremities of circuit wires, these screws being in electrical connection with somewhat Z-shaped contact strips 13 and 13′, which extend along the sides of the recessed walls of the casing, and afford means whereby the

switch and tap-off elements may be electrically connected in circuit by merely inserting the said parts in assembled relationship into the casing; the strips 13 and 13′ hence constituting means for mechanically supporting the switch mechanism and establishing all electrical connections thereof. The switch mechanism as a whole is best shown in Figs. 1, 2, and 3. Therein the base or plug of the switch is designated 14, and to this base all of the operative parts are secured. This base may be of porcelain or other insulating material, and carries a frame member 15, somewhat T-shaped in general outline, the stem of the T forming a standard upon which the movable switch elements are mounted, said standard having a lateral cylindrical extension 16 which constitutes a journal or bearing for the spindle 17 which is loosely received therein. This spindle has switch blades 18 secured thereto and insulated from the spindle, and from each other, by insulating bushings 19 supported by studs 20 which are carried by the arms 21 which are secured to a spindle 17. The contact strips 13 are in electrical connection with metallic spring blades 22 and 23 which are secured upon the base 14 and are in electrical contact with the U-shaped spring clips 24 with which the switch blades 18 are adapted to engage. The legs of each of these U-shaped clips are inwardly bent to adapt the same for engagement with the respective faces of the spring blades 18 when the latter are inserted therebetween; while the spring blades 22 and 23 in turn resiliently engage the contact strips 13 and 13′, and as shown in Fig. 2 the said blades upon the right hand side of said figure have the inner extremities thereof bent back upon themselves to embrace the inner extremity of the strips 8 above referred to when the same have been disposed in operative position. The strips 23 on the other hand are not so folded, but preferably have the inner extremities thereof slightly offset or bent to facilitate their entrance into the receptacle. The blades 22 and 23 are preferably supported on the base or plug 14 in a plane offset from the frame member 15, so as to insure against grounds or short circuits. The relation of the switch blades 18 to the spring clips 24, is such that each blade is capable of being swung into a substantially horizontal position, in which its extremities engage both of a corresponding pair of clips 24; or each switch blade may be swung into a substantially vertical position, where both of its extremities are widely separated from the said clips.

The mechanism for operating the blades is substantially identical with that described in my patent above mentioned, and hence will be but briefly set forth herein. The respective operating buttons 5 are pivotally connected to a rocker 25 which has a hub 25′ disposed around the cylindrical frame part 16. This rocker has an ear 26 and a pin 27 projecting in opposite axial directions therefrom, and also has a depending and preferably somewhat offset teat or extension 28, the function of which will be hereinafter referred to. In Fig. 6 is shown an arm 29 which is attached to the switch spindle 17 so as to control the angular movement thereof. This arm has a laterally extending ear 30 which normally overlies the ear 26 of the rocker 25, the respective ears being normally held in alinement by means of a spring 31 which spirally surrounds the hub 25′, and which has prongs or extensions which embrace the said ears. The arm 29 may be secured to the spindle 17 in any desired manner, as for example, by means of the keyhole slot shown therein which is received upon a flattened portion of the said spindle. Arm 29 further is notched as at 32 at the lower extremity thereof for the reception of a pin 33 on the frame 15 so as to limit the angular displacement of the arm and switch spindle in either direction.

A detent 34 is apertured as at 35 for the reception of the cylindrical hub 16 and this detent has laterally bent edges 36 which embrace a portion of the standard and serve as guides for the detent. The upper end of this detent is enlarged and slotted as at 37 for the reception of the pin 27 of the rocker. The upper end of the detent also has a pair of corners 38, adapted to engage a portion of the ear 30 of the arm 29, above described. For this purpose the said ear has portions of its sides bent downwardly as at 39 and sharpened to an acute edge.

Beneath the hub 25′ is disposed the body 40 of a Y-shaped locking member, the legs of the Y being designated 41. This element is preferably of insulating material, and its body 40 is slidably mounted in a recess formed in the upper extremity of a seat or support 42, which may be of any suitable material, and which is secured to the frame 15 by screws 43, or the like, as indicated in Fig. 3. The body 40 is longitudinally slotted as at 44 for the reception of the teat 28, above referred to, while the respective clips 24 upon the right hand side of the switch, as viewed in Fig. 2, have tongues 45 struck-up therefrom to form channel ways or guides for the locking arms 41. The bent strips 22 are notched as at 46 to permit of the passage of the said arms 41 therethrough, and when in its outermost position the said locking member will have the extremity of each of its arms firmly supported by the inner wall 47 of these notches 46. The tips of the folded over ends of the strips 22 are preferably beveled as at 48, while the corresponding opposed side or body portion of the strip is offset as at 49 so that when

the tap-off extensions 8 are introduced into the apertures 7, contact will not be made between said extensions and any portion of the strips 22, until the extremities of the extensions 8 have passed inwardly beyond the plane in which the Y-shaped locking member is adapted to reciprocate. The tap-off extensions are preferably notched laterally as at 50 in correspondence with the notches 46 of the strips 22, so that the extremities of the locking arms 41 may be inserted into these notches 50 when the tap-off extensions have been run into the casing the proper distance. In Fig. 2 the said extensions are shown as being slightly withdrawn, so that the locking arms cannot be thrust out in the manner described.

In operation the locking member co-acts with the several parts in the following manner: Assuming that the box has been connected to the circuit wires in the manner already described and that the switch mechanism has been inserted into position in the said box so that the spring blades 22 and 23 engage the respective strips 13 and 13′ and establish electrical contact therewith, while at the same time definitely positioning the switch mechanism within the box. The cover plate is then applied and fastened in place so that the switch mechanism is thereby fixedly held in place. When either of the buttons 5 is depressed the rocker 25 is correspondingly oscillated, and the arm 29 is impelled to make a corresponding movement on account of the spring 31 which embraces the ears 26 and 30 of the rocker and arm respectively. The arm 29 is, however, initially prevented from movement by the detent 34 since one of the corners 38 thereof will normally engage the edge 39 of the arm 30 at such time. The detent 34 is displaced upwardly as viewed in the respective figures through the instrumentality of the pin 27 during the first part of the movement of the rocker, which displacement still further insures a positive retention of the arm 29. As the rocker approaches the latter end of its movement pin 27 will depress the detent 34 and eventually when the rocker has almost completed its throw, the detent will have become so far depressed that its corner 38 will pass out of engagement with the edge 39 of ear 30, and the spring 31 will thereupon abruptly impel the said ear in the direction in which the rocker has just been rotated. Correspondingly, when the other button is depressed, a similar sequence of movements takes place in the reverse direction. The movement of the detent 34 takes place immediately on the depression of either button and before the lost motion of the spring has been overcome enough to impel the arm 29 to any extent. Hence the detent 34 is sure to be displaced sufficiently to intercept the movement of the arm 29 by the time the latter is impelled to leave its extreme position. This results in abruptly making or breaking contact between the switch blades and the respective U-shaped clips, and while such action is taking place toward circuit making position, for example, the teat 28 will correspondingly move from left to right, as viewed in Fig. 2, through the slot 40 in the locking member until it encounters the forward wall of the slot. Thereafter such member will move toward the right and the locking legs or prongs thereof will project outwardly through the slots or recesses 46 of the strips 22, and assuming that the tap-off extensions 8 have been withdrawn, will pass freely outward and across the path of said extensions so that the latter cannot be inserted into contact making position when the switch blades are in circuit closing position. On the other hand, assuming that the extensions 8 have been inserted between the respective sides of the folded strips 22 until the under side of the handle or base forming part 9 is in contact with the plate 2, the arms 41 can then be correspondingly shot forward into the same position, since the slots 50 in the extensions 8 permit the passage of the extremities of locking arms 41 therethrough. When the mechanism has been so arranged, it is obvious that the tap-off extensions 8 cannot be withdrawn until the locking member has been moved into its unobstructing position, which is only the case when the switch is in open circuit position.

Obviously, when the rocker is rotating clockwise, as viewed in Fig. 2, the teat 28 will first traverse the slot 44 from right to left before the locking member will start to withdraw, its unlocking movement being accomplished by the engagement of the teat with the left hand end wall of the slot, and during the last portion of the throw of the rocker. In order to firmly retain the locking member in its locking and unlocking positions, said member is preferably provided with notches 51 in one of its sides which are engaged by a suitable spring detent 52. Finally, it should be noted that since the switch blades are only displaced during the extreme end of each throw of the rocker, the length of the slot 44 may be so proportioned as to insure that the said blades shall not be able to move into closed circuit position until the locking member has been able to, at least, partially traverse the path of the tap-off extensions. As a result of this construction, the said extensions when inserted through slots 7 but not sufficiently to bring their slots 50 into alinement with slots 46 of the switch contact elements 22, will prevent the rocker from rotating sufficiently to throw the switch blades into circuit closing position and hence no current can flow through the tap-off circuit

under such conditions; a feature, obviously, of considerable importance since it obviates the possibility of inadvertently forming an arc upon withdrawing the tap-off extensions with current flowing therethrough.

Having described my invention, what I claim, is:

1. A combined plug wall switch and tap off comprising a casing, an apertured cover therefor, conductive members mounted in said casing and adapted to be connected to the leads of an electric circuit, a removable plug, switch elements carried by said plug, contacts in electrical communication with some of said switch elements and adapted to engage said conductive parts when the switch elements are inserted into said casing, and separate tap-off means comprising conductive elements adapted to be inserted through apertures in said cover into engagement with the contacts aforesaid which are carried by the plug.

2. A combined plug wall switch and tap-off comprising a casing, an apertured cover therefor, conductive members mounted in said casing and adapted to be connected to the leads of an electric circuit, a removable plug, switch elements carried by said plug, conductive parts carried by said plug including contacts in electrical communication with some of said switch elements and adapted to engage said conductive members when the switch elements are inserted into said casing, separate tap-off means comprising conductive elements adapted to be inserted through apertures in said cover into engagement with some of said conductive parts carried by said plug, and means for locking said conductive elements against displacement with respect to said conductive parts when the switch is closed.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

WILLIAM J. NEWTON.

Witnesses:
WALDO M. CHAPIN,
WILLIAM C. LARY.