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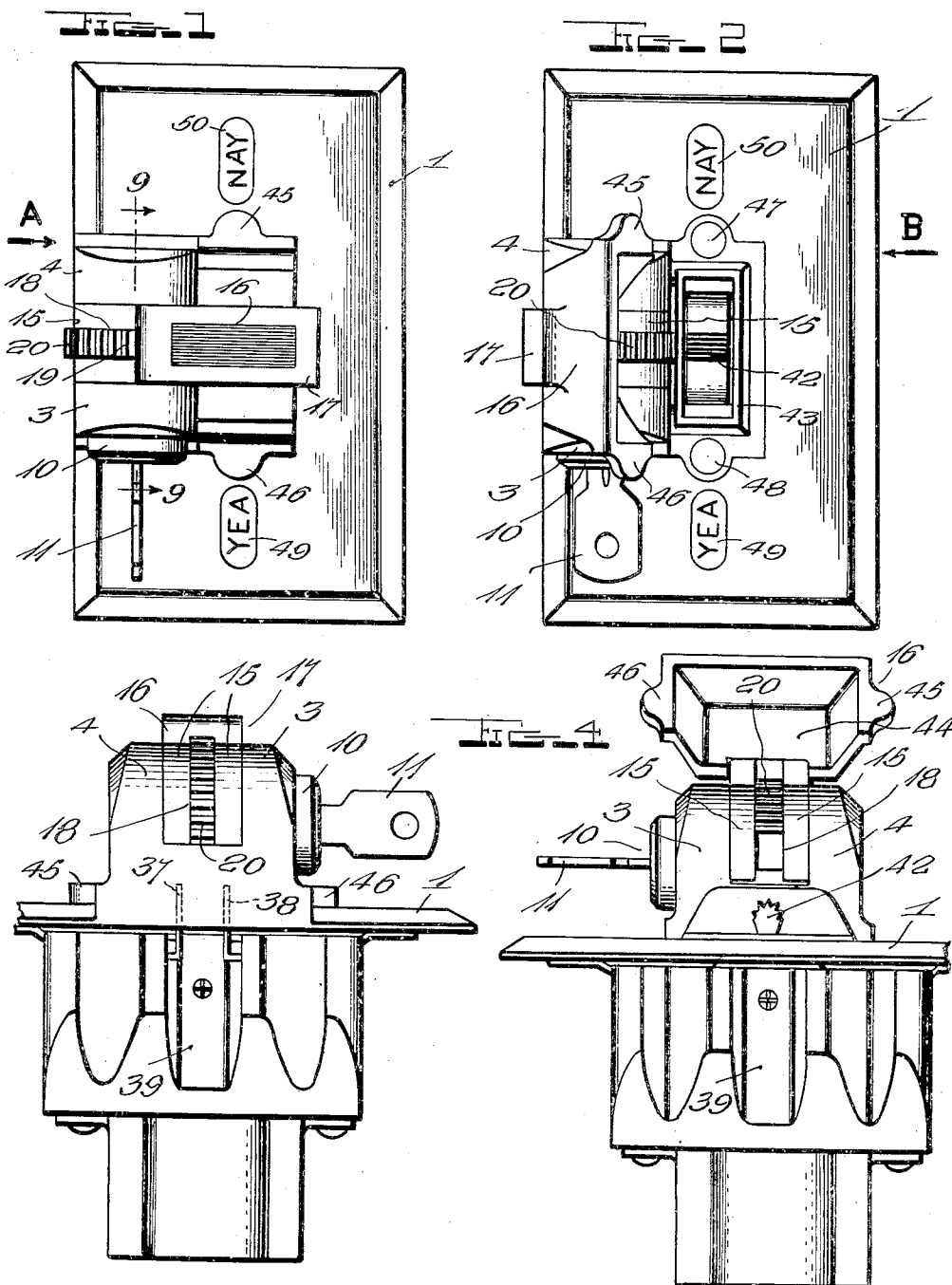
C. F. THOMPSON

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ELECTRICAL CIRCUIT CONTROLLER

Filed June 2, 1938

2 Sheets-Sheet 1



INVENTOR.
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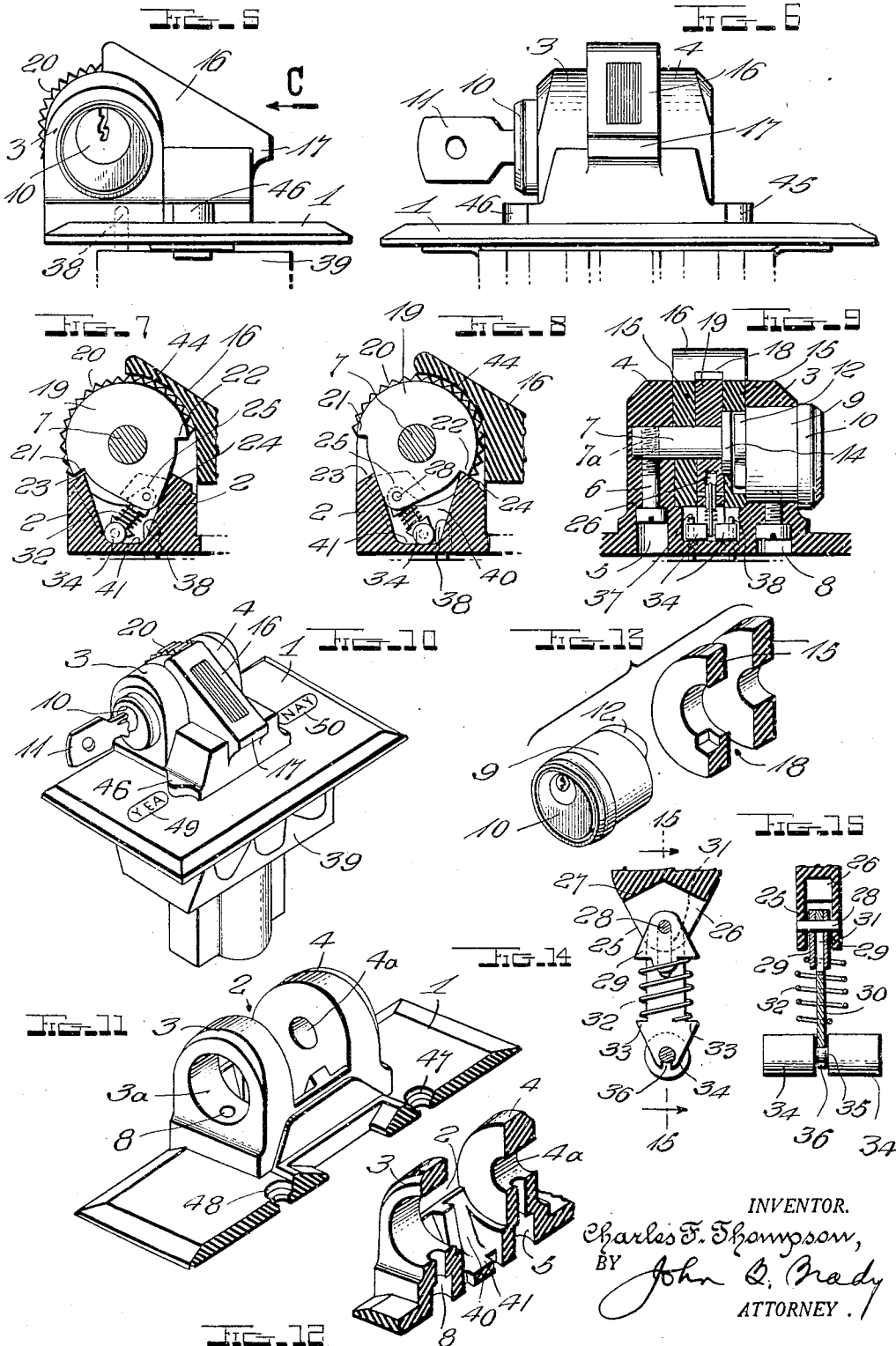
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UNITED STATES PATENT OFFICE

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ELECTRICAL CIRCUIT CONTROLLER

Charles F. Thompson, Richmond, Va.

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12 Claims. (Cl. 200—42)

My invention relates broadly to electrical control apparatus and more particularly to an improved construction of electrical controller comprising a main controller and an auxiliary electrical controller associated with the main controller.

One of the objects of my invention is to provide a construction of electrical controller adapted to be moved to either of two limiting positions for controlling an electrical circuit with an auxiliary electrical controller associated with the main controller and movable to either of two limiting positions where the auxiliary electrical controller is associated with a member for determining the condition of operation of the main electrical controller.

Another object of my invention is to provide a construction of electrical switch having a lock member associated therewith and having an auxiliary electrical controller associated with the lock mechanism.

Still another object of my invention is to provide an electrical switch of the toggle handle actuator type having a hinged mounted cover device operative to be moved to either of two positions for covering or uncovering the toggle handle actuator with means for locking the cover device in a position for preventing operation of the main toggle handle actuator with an auxiliary electrical controller associated with the cover device and free to be operated when the cover device is moved to either limiting position, independent of the operation of the main toggle handle actuator.

Still another object of my invention is to provide a construction of electrical switch which includes a main switch actuator and an auxiliary switch actuator and a cover device movable to either of two positions in one of which the main switch actuator is obstructed from operation.

A still further object of my invention is to provide an attachment for electrical switches which includes a cover device for the switch and an auxiliary switch associated with the cover device with means for locking the cover device in a position for preventing actuation of the electrical switch while permitting operation of the auxiliary switch.

Still another object of my invention is to provide a construction of electrical switch adapted to be mounted in coordination with a pair of hinged members and operative about an axis coincident with the axis of the hinged members.

Other and further objects of my invention reside in the construction of an electrical switch

and auxiliary actuator as set forth more fully in the specification hereinafter following by reference to the accompanying drawings in which:

Figure 1 is a top plan view of a circuit controller embodying my invention and illustrating the cover member in closed position with respect to the main switch and the auxiliary switch uncovered and ready for actuation; Fig. 2 is a view similar to Fig. 1 showing the cover member shifted to a position in which the main switch is uncovered ready for actuation and in which the auxiliary switch is also readily operative; Fig. 3 is a side elevation of the circuit controller looking in the direction of arrow A in Fig. 1 and showing the cover member closed for preventing operation of the main switch while the auxiliary switch is free for operation; Fig. 4 is an elevational view taken from the opposite side of the circuit controller looking in the direction of arrow B in Fig. 2 and illustrating the cover member moved to a position in which the main switch is readily operative and in which the auxiliary switch is also readily operative; Fig. 5 is a detailed end elevational view showing the cover member in position over the main switch while the auxiliary actuator is free for operation and illustrating the lock by which the cover member is maintained in position over the main switch; Fig. 6 is a side elevational view looking in the direction of arrow C of Fig. 5 and showing the cover member in closed position over the main switch; Fig. 7 is a transverse vertical sectional view through the auxiliary switch and actuator moved to off position; Fig. 8 is a similar view of the auxiliary switch showing the actuator moved to on position; Fig. 9 is a central vertical longitudinal sectional view through the auxiliary switch and showing the arrangement of lock and associated parts; Fig. 10 is a perspective view of the switch completely assembled and illustrated with the main switch covered by the cover member while the auxiliary switch is free for operation; Fig. 11 is a fragmentary perspective view of the switch plate showing the mounting structure for the auxiliary switch; Fig. 12 is a fragmentary sectional perspective view of the mounting structure for the auxiliary switch; Fig. 13 is a sectional perspective view of the lock and the coacting parts of the structure which carry the cover member of the main switch; Fig. 14 is a fragmentary sectional view on an enlarged scale showing the pivotally mounted contacting means of the auxiliary switch; and Fig. 15 is a transverse vertical sectional view of the pivotally mounted contacting means taken substantially on line 15—15 of Fig. 15.

14 and showing certain of the parts in side elevation.

My invention is directed to a circuit controller of general application. The switch structure of my invention may be used in various instances where it is desirable to lock an electric switch against operation while permitting the actuation of an auxiliary switch associated with the main switch. Such auxiliary switch may control a pilot device operative in association with the circuits controlled by the main switch.

The structure of my invention is very compact and is mounted upon a plate which covers the conventional electric outlet box. The switch plate is centrally apertured for the passage of the contacting arm of the conventional toggle switch so that on one side of the switch plate I provide supporting means for a pivotally mounted cover member which is adapted to be moved from a position wholly uncovering the toggle actuator arm of the main switch to wholly covering the actuator arm of the main switch. The cover member is provided with a hinge which is bifurcated and with respect to which an angularly shiftable actuator for an auxiliary switch is mounted. The angularly shiftable actuator is so arranged that when the cover member is shifted to open position, both the main switch and the auxiliary switch may be operated. However, when the cover member is shifted to a position wholly enclosing the main switch only the angularly shiftable actuator of the auxiliary switch may be operated. A lock device is arranged in coaxial alignment with the angularly shiftable actuator of the auxiliary switch for locking the cover member in a position wholly enclosing the actuator of the main switch to prevent tampering with the main switch while permitting operation of the auxiliary switch.

I have disclosed the circuit controller of my invention in a particular embodiment as applied to a parliamentary voting system but it is to be understood that the circuit controller of my invention has wide application and that the particular embodiment set forth is to be considered in the illustrative sense and not in the limiting sense.

Referring to the drawings in detail, reference character 1 designates a cover plate adapted to be mounted upon the conventional electric outlet box. The cover plate 1 supports the housing 2 which is formed integrally with the material of plate 1. The housing 2 is adapted to receive the auxiliary switch structure and the lock mechanism which will hereinafter be described in detail. The housing 2 includes a lock supporting portion 3 having an internal bore 3a. The housing 2 also includes a portion 4 having an internal bore 4a forming a switch shaft supporting portion 4. The switch shaft supporting portion 4 is apertured at 5 for the passage of a screw 6 which is adapted to engage the diametrically extending screw threaded aperture 1a in shaft member 7.

The lock supporting portion 3 of housing 2 is apertured at 8 to permit the passage of a screw member for engaging the lock cylinder 9. The lock cylinder 9 has a face 10 thereon protruding beyond the end of the lock supporting portion 3 and recessed to receive key 11 illustrated in Figs. 1, 2, 3, 4, 6 and 10. The lock which is operated by key 11 controls a key actuated cam 12 having a circular milled portion which is angularly shiftable to either of two limiting positions in shifting the cover member from open to closed position and vice versa.

The shaft member 7 has an end flange 14 thereon which is of a diameter equal to the diameter of the milled portion of the cam 12.

The support for the cover member 16 is bifurcated as represented at 15 to form a pair of supporting members which are spaced apart longitudinally of the axis of the shaft member 7. The space between the bifurcated parts of the support 15 has been designated as 18 and within this space the angularly shiftable auxiliary switch control member 19 is arranged. The angularly shiftable auxiliary control member 19 is rockable about shaft 7 for controlling the auxiliary switch. To facilitate manual control of the auxiliary switch, the periphery of the auxiliary switch control member 19 is knurled or serrated as indicated at 20 to enable finger-grip to be applied against the auxiliary switch control member. Limiting stops or faces 21 and 22 are formed on the auxiliary switch control member and coast with stops 23 and 24 arranged in operative positions on housing 2. I provide a projecting portion 25 on one side of the auxiliary switch control member 19. The projecting portion 25 is slotted as indicated at 26, the slot terminating in angularly disposed faces 27 arranged as shown. Mounted within the slot 26 I provide a bearing pin 28 for the auxiliary switch arm indicated at 30. The slot 26 receives the auxiliary switch arm 30 and the spring stops and spacers 29. The spring stops and spacers 29 are arranged on opposite sides of auxiliary switch arm 30 and serve as guides for the auxiliary switch arm 30 and as abutments for the coil spring 32. The auxiliary switch arm 30 is slotted as indicated at 31. The bearing pin 28 passes through the slot 31 in auxiliary switch arm 30 permitting auxiliary switch arm 30 to yieldably move into and out of slot 26 in the auxiliary switch control member 19. The auxiliary switch arm 30 is provided adjacent the contactor end with shoulders or stops 33 against which coil spring 32 bears. The coil spring 32 bears against stops or shoulders 33 at one end and against the spring stops and spacers 29 at the opposite end, thereby tending to yieldably maintain auxiliary switch arm 30 in projected position. The end of auxiliary switch arm 30 is slotted as indicated at 36 for receiving the shaft portion 35 of contact members 34. The slotted end 36 of auxiliary switch arm 30 is upset for gripping opposite sides of shaft member 35, thereby securing contact members 34 in position.

The contact assembly heretofore described is shiftable to either of the limiting positions illustrated in Figs. 7 and 8. The fixed contacts 37 and 38 of the auxiliary switch structure are supported in the main switch housing as indicated in Figs. 3, 7 and 8 and adapted to be bridged by the contact members 34 when the auxiliary switch control member 19 is shifted to the position shown in Fig. 8 while being wholly removed from the fixed contacts 37 and 38 when the contact members 34 are shifted to the opposite position illustrated in Fig. 7. A spring snap action is obtained by reason of the assembly of the auxiliary switch structure within the confined space 40 of the main switch housing 39. Contacts 37 and 38 may be attached to bottom of plate 1 instead of to main housing 39.

It will be seen that contact members 34 are in the form of rollers which engage the central inner face 41 of the housing 2 in the remote position illustrated in Fig. 7 and rolled to contacting position illustrated in Fig. 8 which is the opposite limiting position. The auxiliary switch control

member 19 is so proportioned with respect to the arrangement of contacts 34 and switch arm 30 that a complete shift from contacting position shown in Fig. 8 to disconnecting position shown in Fig. 7 is secured by quick rotative movement of auxiliary switch control member 19. The snap action is obtained by reason of the eccentricity of the projecting portion 25 of auxiliary switch control member 19 and the energy which is stored in coil spring 32 when the spring is compressed by movement of the auxiliary switch control member 19 about shaft 7 as a center. The limit of movement of the auxiliary switch control member 19 is determined by abutment of limiting stop 22 with limiting stop 23 as represented in Fig. 8 in the circuit closed position or by the abutment of limiting stop 21 and limiting stop 23 in the circuit open position as represented in Fig. 7.

The cover member 16 has a finger-grip extension 17 thereon, making it convenient for the cover member to be moved from the closed position shown in Fig. 1 to the open position shown in Fig. 2. In the open position, the actuator 42 which projects through the central aperture 43 in plate 1 and which may be in the form of a toggle controlled switch, is free to be operated, while in the covered position the main switch can not be actuated. However, the auxiliary switch may be operated regardless of whether the main switch is covered or uncovered as the support for the cover member, that is, the cover member unit may be shifted about the knurled portion 20 of the auxiliary switch control member 19. As represented in Fig. 1, the auxiliary switch control member 19 is operative on the left of the cover member, whereas in Fig. 2, the auxiliary switch control member 19 is operative beneath the cover member and to the right thereof, that is, intermediate the cover member and the actuator 42 of the main switch.

It will be observed that the cover member 16 is shaped in a very particular manner. That is, the cover member 16 is interiorly recessed as indicated at 44 to permit the cover member to be readily swung about the shaft 7 as an axis. The opposite ends of the cover member 16 have integrally extending projections 45 and 46 thereon which normally cover the screw holes indicated generally at 47 and 48 when the cover member is in closed position. The importance of this will be realized when it is understood that one of the objects of my invention is to provide a structure which is to be locked to prevent actuation of the main switch. If the plate 1 could be readily removed after locking the switch, this would render the structure of my invention ineffective. However, inasmuch as plate 1 is secured in position by screws the heads of which terminate in the areas designated 47 and 48, which areas are covered by extensions 45 and 46 on cover member 16 when in closed position, it is clear that tampering with the switch mechanism is prevented. The areas over the screws are also normally covered with cement or plastic material which fills the recesses constituted at 47 and 48.

While I have shown the lockable cover member 16 swingable to a position covering a toggle type switch having a toggle actuator 42, it will be understood that my invention is equally applicable to push button type switches, the actuators of which may be covered and protected when cover member 16 is in locked position.

When the structure of my invention is used as a circuit controller for a voting system, the oppo-

site limiting positions of the switch designate different conditions of the vote. I have indicated this by the designations "Yea" and "Nay" at 49 and 50. Any other designations may be readily applied to plate 1. When the structure of my invention is utilized in a voting system, the auxiliary switch control member 19 is utilized to control a page call circuit. Thus, a member may vote "Yea" or "Nay" by operating the main actuator 42 and function a page call circuit by operation of the auxiliary switch control member 19. When utilized in other systems, the main switch may control one circuit, while the auxiliary switch controls a wholly independent circuit.

While I have described my invention in one of its preferred embodiments, I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

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

1. Electrical control apparatus comprising a casing, a toggle switch, a laterally shiftable actuator for shifting said toggle switch to either of two limiting positions, a cover member hingedly connected with the casing of said toggle switch and shiftable from a position remote from said actuator to a position entirely enclosing the actuator, a lock for maintaining said cover member in position enclosing said actuator, and an auxiliary switch device concentric with and supported by the hinged connection of said cover member.

2. In combination with the actuating member of an electrical switch, an angularly shiftable cover member movable from a position remote from said actuating member to a position enclosing said actuating member, axle means for mounting said cover member including a lock device for maintaining said cover member in position wholly enclosing said actuating member, and an auxiliary switch mounted on said axle means independently of said lock device.

3. A multiple electric switch comprising a master switch, an actuator for the master switch, a cover member pivoted on an axle mounted adjacent said actuator whereby said cover member is swingable from a position remote from said actuator to a position substantially covering said actuator, an auxiliary switch rockably mounted on said axle in a position to be operated independently of the position of said cover member, and means for locking said cover member in position with respect to said actuator independent of said auxiliary switch.

4. In combination, a supporting member, a cover member carried by said supporting member and mounted for limited angular movement with respect thereto, means connected with said supporting member adapted to be enclosed by said cover member, and an electric switch member angularly shiftable to either of two limiting positions and hingedly connected with both the aforesaid members concentrically with the axis about which the aforesaid members are angularly movable.

5. A hinge structure comprising a pair of hingedly connected members, an electric switch including a contact member mounted on one of said hingedly connected members and a movable contact member, and an actuator for angularly shifting said movable contact member into and out of engagement with said fixed contact member, said actuator being hingedly connected with

both the aforesaid hingedly connected members on an axis substantially coincident with the axis of said hingedly connected members.

6. In combination, a supporting member, a cover member hingedly connected to said supporting member and mounted for a limited swinging movement about said supporting member, means connected with said supporting member adapted to be enclosed by said cover member, a pair of contacts mounted on said supporting member, and a snap action switch supported by the hinged connection of said supporting member and said cover member and controllable to open or close an electrical circuit with respect to said pair of contacts independently of the position of said cover member with respect to said means.

7. Apparatus of the class described comprising a switch box, a switch mounted in said switch box, a toggle handle actuator for said switch, an insulated plate constituting a cover member for said switch box and apertured for the passage of said toggle handle actuator therethrough, means projecting from one side of said plate adjacent the toggle handle actuator, a closure device for said toggle handle actuator pivotally mounted with respect to said means, and a lock supported by said projection means for engaging a portion of said closure device for locking said closure device in a position substantially enclosing said toggle handle actuator.

8. An electrical switch carried by a terminal box cover plate comprising in combination with a terminal box cover plate having a main switch actuator projecting therethrough, a bifurcated projecting portion on said cover plate, a cover member for said main switch actuator, said cover member having a bifurcated portion thereof adapted to be interengaged with the said bifurcated projecting portion and movable to either of two limiting positions substantially enclosing said switch actuator or remote with respect thereto, and an auxiliary switch interleaved with respect to the bifurcated portions of said projecting portion and said cover member and movable to either of two limiting positions.

9. Switch mechanism comprising in combination, an insulated casing having a transverse groove in one side thereof terminating in an interiorly recessed pocket, a shaft journaled in said insulated casing, a hinge member having a bifurcated support at one side thereof, said bifurcated support extending into the groove at one side of said casing, an angularly shiftable switch actuator disposed intermediate the bifurcated support, said switch actuator and one side of said bifurcated support being journaled on said shaft whereby said bifurcated support may be shifted about said shaft to either of two limiting positions with the bifurcated portions thereof on opposite sides of said switch actuator, a lock disposed in one portion of said casing, a lock engaging face in one of the bifurcated portions of said hinge member, and means actuated by said lock for effecting engagement with the lock engaging face of the bifurcated portion of said

hinge member whereby said hinge member may be locked in a selected position.

10. Apparatus of the class described comprising in combination with a terminal box for an electrical switch, an insulated plate adapted to be engaged with respect to the terminal box by members extending through the plate on opposite sides of a portion thereof apertured for the passage of a switch actuator, said plate having a projecting portion at one side thereof adjacent the apertured portion of the plate, a cover member, axle means for hingedly mounting said cover member with respect to said projecting portion of said plate, said hinged cover member including a closure portion and laterally extending face portions, and means constituting a portion of said axle means for locking said cover member in a position in which said closure portion embraces the switch actuator which projects through the apertured portion of said plate and in which the laterally extending face portions of said closure portion project over the members which secure said plate member to the terminal box for preventing operation of said switch actuator or removal of said plate when said cover plate is moved to a position immediately adjacent said plate member.

11. Means for protecting electrical switches comprising in combination with a terminal box, a cover plate apertured for the passage of a switch actuator and having securing means for mounting the switch plate with respect to the terminal box, a cover member hinged at one side with respect to the cover plate comprising a closure portion and laterally extending transverse portions, said cover member being movable from a position remote from the switch actuator to a position substantially enclosing the switch actuator with the transversely extending portions thereof projecting over the securing means which mount said switch plate with respect to the terminal box, and axle means for supporting said hinged cover member including means for locking said cover member in position for preventing operation of said switch actuator and preventing removal of said switch plate with respect to the terminal box.

12. In combination, a primary electrical switch device having manual actuating means, a secondary electrical switch device having contacts mechanically and electrically connected with said primary switch device, a common supporting means for said primary and secondary switch devices, manual actuating means for said secondary switch device and cover means for the actuating means of said primary switch device pivotally mounted on a common axle secured in said supporting means, and locking means operative with respect to said cover means with the cover means in closed position for preventing actuation of said primary switch device, said manual actuating means for the secondary switch device being operable independent of the cover means coaxial therewith.

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