Nov. 30, 1926. 1,608,585

H. A. DOUGLAS

COMBINED LIGHTING AND IGNITION SWITCH

Filed Nov. 16, 1925 2 Sheets-Sheet 1

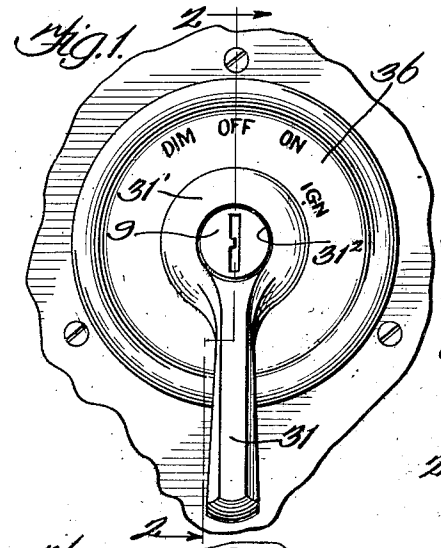
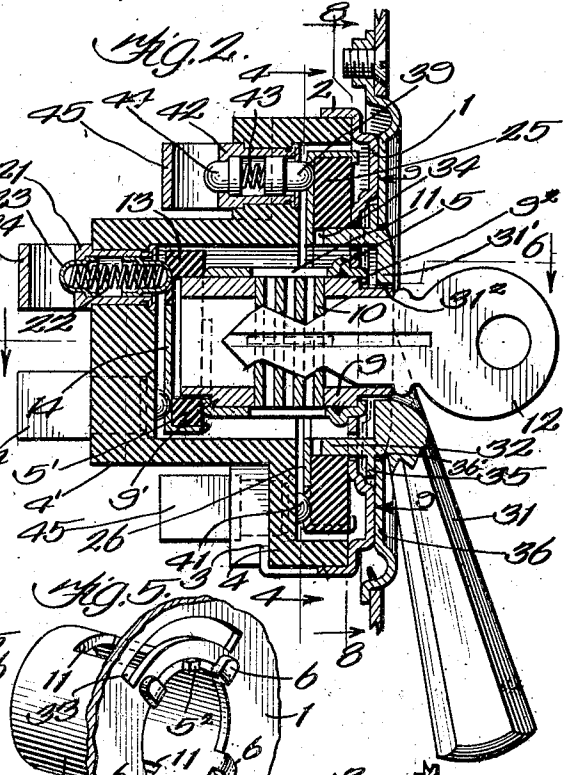


Fig. 1.


Fig. 2.

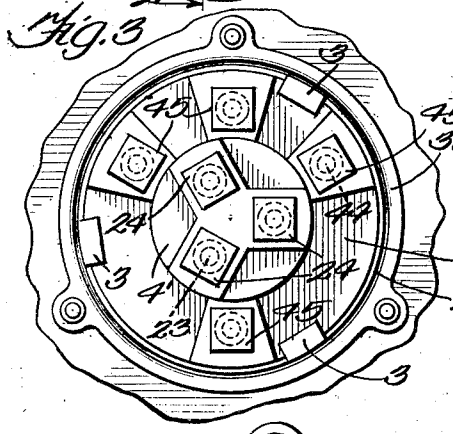
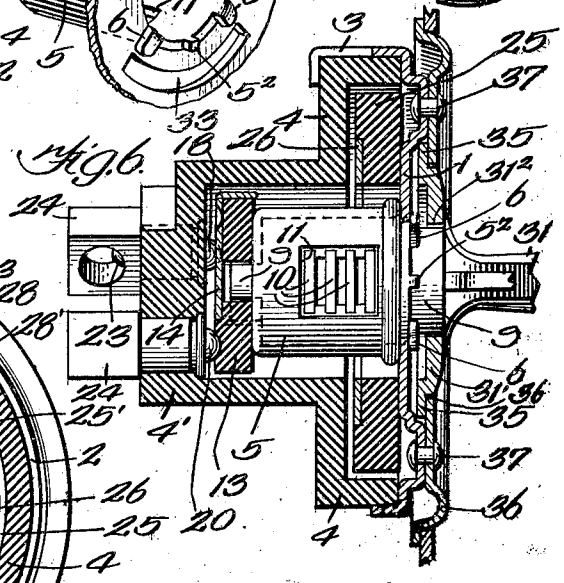
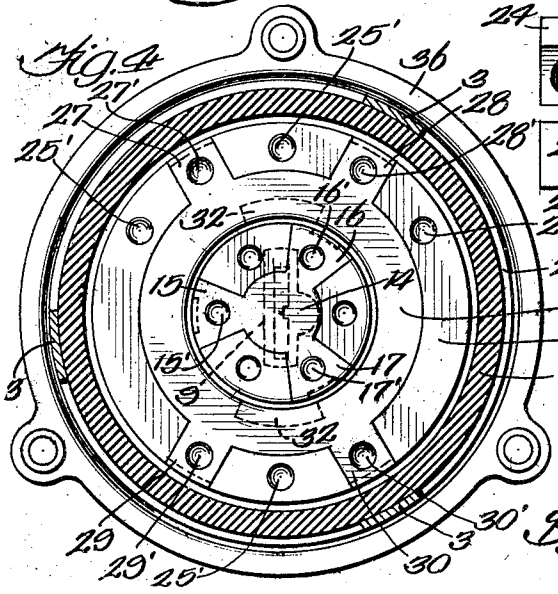

Fig. 3.

Fig. 5.


Fig. 6.


Fig. 4.

Inventor:
Harry A. Douglas
By A. L. Bragg Atty.

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Fig. 7.

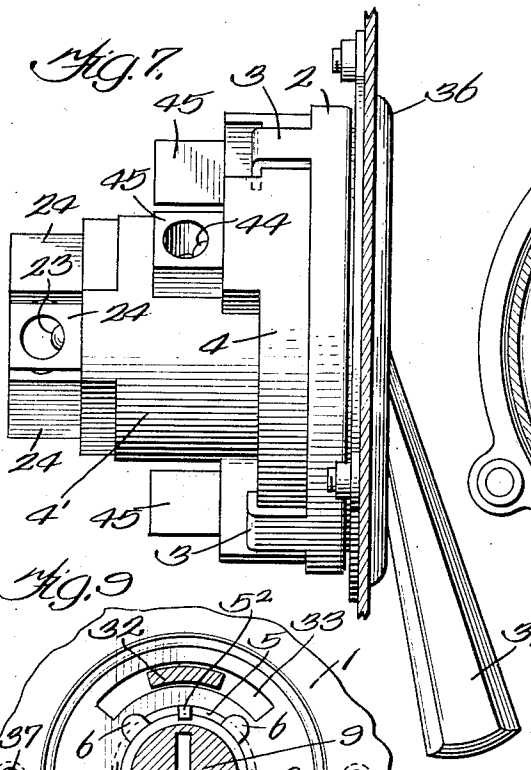


Fig. 8.

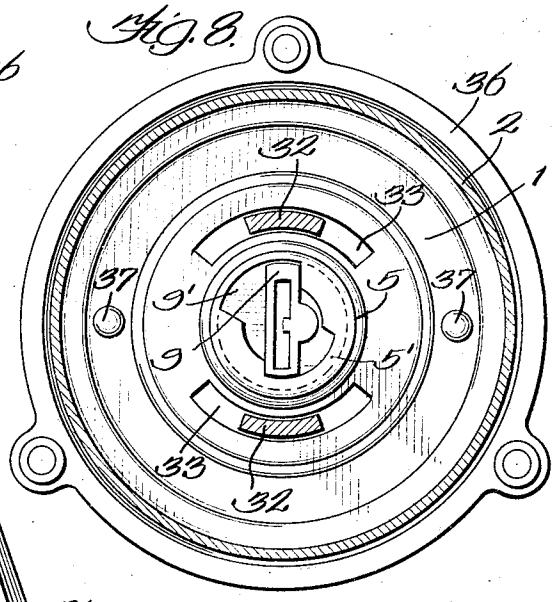


Fig. 9.

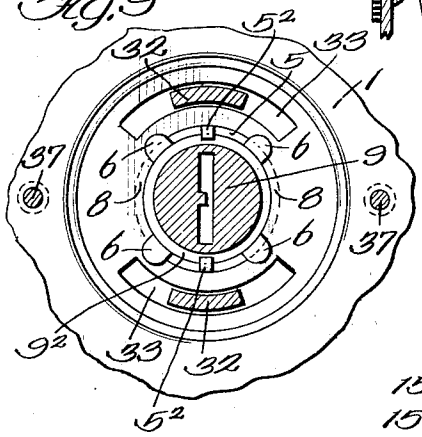


Fig. 10.

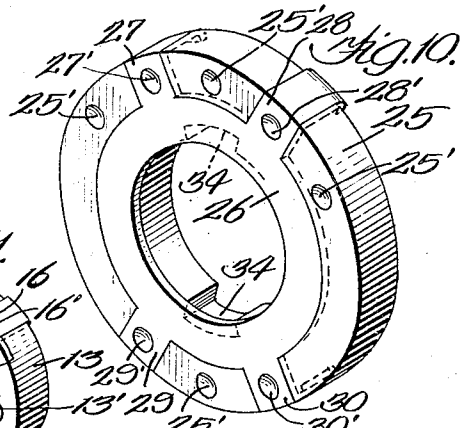


Fig. 11.

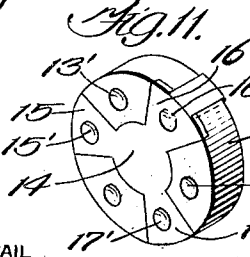


Fig. 12.

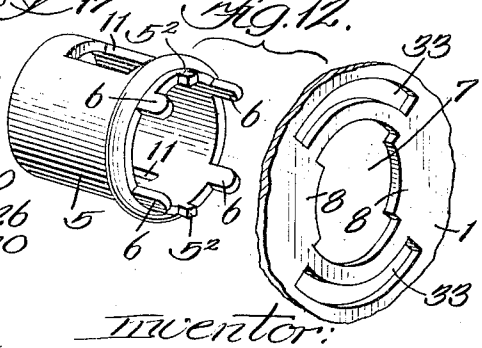
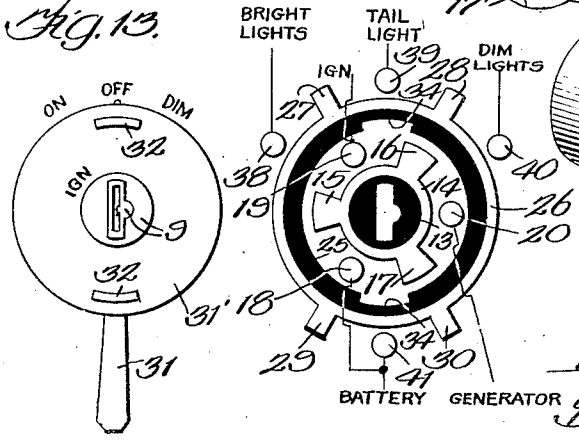


Fig. 13.



Inventor:
Harry A. Douglas
By G. L. Gregg Atty.

Patented Nov. 30, 1926.

1,608,585

UNITED STATES PATENT OFFICE.

HARRY A. DOUGLAS, OF BRONSON, MICHIGAN.

COMBINED LIGHTING AND IGNITION SWITCH.

Application filed November 16, 1925. Serial No. 69,406.

My invention relates to combined switches for governing the ignition or power controlling circuits and the lighting circuits of automotive vehicles and which combined switches employ switch handles for controlling the lighting circuits and locks for controlling the ignition or power controlling circuits. A prior switch of this class is provided with an enclosing casing for the contacting mechanism, this casing having a central tubular portion projecting outwardly beyond the casing into the hollow hub of the lighting circuit controlling handle. This tubular casing portion that is surrounded by the hub of a handle also constitutes a hollow member of the lock. This hollow lock member encloses a tumbler barrel that carries a number of tumblers which enter openings formed in opposite sides of the hollow lock member after the tumbler barrel is turned by the inserted key to bring the tumblers into register with said openings and in consequence of the withdrawal of the key following this turning movement of the tumbler barrel, the tumbler barrel being locked in fixed relation with the hollow lock member when the tumblers enter the openings in this member. When the key is inserted to withdraw the tumblers from said openings, the tumbler barrel may be turned by the inserted key to remove the tumblers from alignment with the openings to bring the tumblers out of locking relation with the hollow lock member, imperforate portions of this member then holding the tumblers out of locking relation with it. The tumbler barrel is in operating relation with the contact actuator within the casing that governs the ignition circuit. When the key is inserted and turned to turn the tumbler barrel to an unlocked position, the ignition circuit is consequently closed. When the key is reversely turned, the tumbler barrel is reversely turned, and the ignition circuit is consequently opened, the tumblers then being in register with the openings in the hollow lock member. When the key is withdrawn following its reversed turning movement, the tumblers are free to enter the openings in the hollow lock member to lock the ignition circuit open.

My present invention has among its objects an improved interrelation of the locking mechanism and the contact actuator controlled thereby, an improved interrelation of the two contact actuators and the locking mechanism, and an improved interrelation of contacts that are preferably carried by the actuators and the contacts complemental thereto.

In accordance with one feature of the invention, I provide a lock member, preferably hollow, upon an end wall of the casing and projecting into the casing and spring means for pressing the lock controlled contact actuator outwardly against the said lock member, this lock member carrying a complemental locking device. The contacts upon the actuators are desirably substantially rigid. The contacts complemental to these contacts are desirably spring pressed and are preferably carried upon the end wall of the casing opposite the end wall carrying the aforesaid lock member. The said complemental contacts are desirably in the nature of plungers that are provided with actuating coil springs which are carried by the end wall of the casing which supports these contacts and which springs are located to the rear of these plunger contacts. This arrangement permits of a marked reduction in the spaces between the actuators and the casing wall carrying said complemental contacts.

As I have practiced my invention, the contacts pertaining to each actuator are electrically connected and are integrally formed in one piece with a metallic carrier therefor, each carrier being desirably supported upon an insulating ring, constituting, with the carrier, a contact actuator.

In the preferred embodiment of the invention, the two contact actuators are in different zones as are the respective sets of complemental contacts. This arrangement enables more ready access to the complemental contacts for connecting them in circuit and enables the complemental contacts pertaining to each actuator to be readily distinguished from the contacts pertaining to the other actuator. The springs which press the plunger contacts inwardly against the contacts upon the actuators or against the insulating portions of the actuators ac-

cordingly as the circuits are opened or closed or modified, desirably also press rearwardly projecting plunger contacts into the bores of metallic sleeves that receive terminal plugs of the circuit wires.

The invention will be more fully explained in connection with the accompanying drawings in which Fig. 1 is a front view illustrating the preferred form of switch; Fig. 2 is a sectional view on line 2—2 of Fig. 1, on a larger scale; Fig. 3 is a rear view of the switch; Fig. 4 is a sectional view on line 4—4 of Fig. 2; Fig. 5 is a perspective view illustrating the assembly of the hollow lock member with the front end wall of the casing; Fig. 6 is a sectional view on line 6—6 of Fig. 2; Fig. 7 is a side view of the switch, a mounting panel being shown in section; Fig. 8 is a sectional view on line 8—8 of Fig. 2; Fig. 9 is a sectional view on line 9—9 of Fig. 2, on a smaller scale; Fig. 10 is a perspective view of the handle controlled contact actuator pertaining to the ignition circuit; Fig. 12 is a perspective view showing the hollow lock member and the casing that is to carry it, in separated relation; and Fig. 13 is a diagrammatic view illustrating the relation of the two actuators and contacts thereon with the lighting and ignition circuits.

The switching mechanism, to be later described, is enclosed within a casing which is inclusive of a front end wall 1 provided with a rearwardly projecting rim 2 having clips 3 thereon which clamp the body portion 4 of the casing against said end wall, this body portion projecting rearwardly from this end wall. The lock member 5 is desirably tubular and carries prongs 6 that are clinched outwardly against the outer face of the end wall 1, the lock opening 7 in said end wall being in register with the bore of said lock member. Wings 8 upon the wall 1 margin the openings 7 and are interposed between the prongs 6 as illustrated in Fig. 5. The outer end of the lock member 5 bears against the inner faces of these wings. The ears 6 cooperate with said wings to prevent movement of said lock member with respect to said casing end wall. Said lock member projects rearwardly from the casing end wall into the casing and contains a rotatable tumbler barrel 9 in which are provided a number of transversely movable tumblers 10 in the casing that are receivable in openings 11 formed in opposite sides of the lock member 5 and extending longitudinally of this member and located in the casing, the tumbler barrel 9 being held from rotation when the tumblers are in said openings. The tumbler barrel 9 and the tumblers 10 are in line with the axis of the handle. The tumbler barrel is prevented from having axial movement by means of its rear shoulder 9′ that engages the inturned rim 5′ upon the inner end of the lock member 5 and by means of the prongs 5^2 upon the front of the member 5 that are turned over the shoulder 9^2 upon the front end of the tumbler barrel. A suitably formed key 12 serves to withdraw the tumblers from the openings 11 and may be turned following the withdrawal of the tumblers from said openings through the intermediation of the tumblers.

A contact actuator is provided at the inner end of the lock member 5, this actuator being inclusive of an insulating ring 13 which surrounds the inner end of the tumbler barrel and is in sliding or splined connection therewith, this end of the tumbler barrel being oblong and entering the bore of the ring that is shaped correspondingly thereto, whereby the ring may move along its axis. This actuator is also inclusive of a metallic contact carrier 14 having radiating projections or portions 15, 16 and 17 which constitute substantially rigid contacts. The rear end wall of the casing body 4 is desirably of step formation, the rear end 4′ of the casing body being cylindrical and of shorter diameter than the front end of the casing body which is also cylindrical and is coaxial with the rear end of the casing. The contacts 18, 19, and 20 that are complemental to the contacts 15, 16 and 17 are preferably in the nature of inwardly pressed metallic plungers which are housed within metallic sleeves 21 passing through and fixed upon the rear end wall of the casing, the casing body 4 being desirably of insulation. The inner ends of these plunger contacts are receivable in cavities 15′, 16′ and 17′ formed in the contacts 15, 16 and 17 or in cavities 13′ formed in the insulating ring 13, according to the adjustment of the contact actuator 13—14. Springs 22 press the contacts 18, 19 and 20 forwardly against the contact actuator 13—14 to engage these contacts with the contacts 15, 16 and 17 or with the insulating ring 13, according to the adjustment of the contact actuator effected by turning the key, whereby the ignition circuit may be opened or closed, as will be readily understood by reference to Fig. 13. When the key is inserted to withdraw the tumblers from locking engagement with the lock member 5, the tumbler barrel may be turned to turn the contact actuator 13—14 to close the ignition circuit, imperforate portions of the lock member 5 then preventing the outward movement of the tumblers and, consequently, the withdrawal of the key, in accordance with the preferred practice. When the ignition circuit is to be opened and locked open, the key is reversely turned to bring the tumblers into register with the openings 11, whereafter the key may be withdrawn, the tumblers entering said openings to lock the tumbler barrel in the position to which it is turned. The springs 22, carried by and with-

in the rear casing wall, press rearwardly upon other metallic plunger contacts 23 which are projected by the springs into the bores of metallic sleeves 24 integrally formed with the sleeves 21 and extending transversely thereof. Plugs at the ends of the ignition circuit wires may be inserted into the sleeves 24 into engagement with the plunger contacts 23 in order to connect the contacts 18, 19 and 20 in circuit.

A second contact actuator, for controlling the lighting circuits, is surrounded by the front end of the casing body 4 and is inclusive of an insulating ring 25 and a contact carrier 26 in the form of a metallic ring and carrying substantially rigid portions constituting contacts 27, 28, 29 and 30. The second contact actuator is operated by a handle 31 mounted to turn upon the exterior of the casing and having prongs 32 that pass through arcuate slots 33 formed in the casing end wall 1, these prongs entering openings 34 that constitute radial enlargements of the bore of the insulating ring 25, this ring and these prongs being in sliding engagement. The handle is formed with flanges 35 that are received between the casing wall 1 and a plate 36, the hub 31′ of the handle entering a central opening 36′ in this plate that is coaxial with the rings, the wall opening 7, the tumbler barrel, the lock member 5, and the two contact actuators, the handle and the actuator 25—26 thus having an axis of movement which is coincident with the axis of movement of the ring 13. The hub portion 31′ of the handle is illustrated as having a lock opening 31^2 therethrough which is coaxial with the handle hub and through which the outer end of the tumbler barrel desirably projects, there being sufficient annular clearance surrounding the outer end of the tumbler barrel to prevent the handle from having engagement therewith so that the handle cannot incidentally and accidentally change the adjustment of the ignition circuit. The plate 36 is suitably assembled with the casing end wall as by means of rivets 37. The plate 36 may constitute a mounting plate for the switch structure, as illustrated.

The contacts 38, 39, 40 and 41 that are complemental to the contacts 27, 28, 29 and 30 are also preferably in the nature of inwardly pressed metallic plungers which are housed within metallic sleeves 42 passing through and fixed upon the rear end wall of the casing. The inner ends of these plunger contacts are receivable in cavities 27′, 28′, 29′ and 30′ formed in the contacts 27, 28, 29 and 30 or in cavities 25′ formed in the insulating ring 25, according to the adjustment of the contact actuator 25—26. Springs 43, carried by and within the rear casing wall, press the contacts 38, 39, 40 and 41 forwardly against the contact actuator 25—26 to press the ring 25 against or toward the front end wall of the casing and to engage these contacts with the contacts 27, 28, 29 and 30 or with the insulating ring 25 according to the adjustment of the contact actuator 25—26 effected by the handle whereby the lighting circuits may be controlled as will readily be understood with reference to Fig. 13. The springs 43 press rearwardly upon other metallic plunger contacts 44 which are projected by the springs into the bores of metallic sleeves 45 integrally formed with the sleeves 42 and extending transversely thereof. Plugs at the ends of the lighting circuit wires may be inserted into the sleeves 45 into engagement with the plunger contacts 44 in order to connect the contacts 38, 39, 40 and 41 in circuit. The contacts and actuator pertaining to the lighting circuits are in a different zone from the contacts and actuator that pertain to the ignition circuit so that these two sets of contacts may be readily distinguished whereby the attachment of the circuit wires is more readily accomplished. This desirable arrangement is preferably effected by laterally projecting the body of the casing where the sleeves 42 are carried so that all contacts assembled with the sleeves 21 and 42 are accessible from the rear. It will be observed that the contacts upon the contact actuators are very closely approached to the inner faces of the rear casing end wall rendering the contact arrangement more compact than hitherto.

The switch of my invention is thus seen to be of simple construction and cheap to make with the contacts pertaining to the ignition circuit and the contacts pertaining to the lighting circuits widely separated as these contacts are respectively in different circles and in different zones. By extending the lock member 5 into the casing and surrounding it by the contact actuators, the handle may be so assembled with the balance of the structure as to prevent it from having incidental engagement with the tumbler barrel.

Changes may be made without departing from the invention.

Having thus described my invention, I claim:—

1. A switch structure including a casing; a lock member upon an end wall of the casing and projecting into the casing; a rotatable, key operated locking device having an element surrounded by the casing and engageable with said lock member; a handle upon the exterior of the casing and mounted to turn, said locking device being upon the axis of the handle; a contact actuator in the casing and in the zone of said lock member and in connection with said handle; a second contact actuator facing the inner end of said lock member and coupled with said

rotatable locking device; spring means pressing the second contact actuator against said lock member; contacts governed by said actuators; and contacts complemental to said contacts.

2. A switch structure including a casing; a lock member upon an end wall of the casing and projecting into the casing; a rotatable, key operated locking device having an element surrounded by the casing and engageable with said lock member; a handle upon the exterior of the casing and mounted to turn, said locking device being in line with the axis of the handle; a contact actuator in the casing and in the zone of said lock member and in connection with said handle; a second contact actuator facing the inner end of said lock member and coupled with said rotatable locking device; contacts governed by said actuators; and contacts complemental to said contacts, the complemental contacts pertaining to the second actuator having spring means for effecting their engagement and serving to press the second contact actuator against said lock member.

3. A switch structure including a casing; a lock member upon an end wall of the casing and projecting into the casing; a rotatable, key operated locking device adjacent and having an element surrounded by the casing and engageable with said lock member; a handle upon the exterior of the casing and mounted to turn, said locking device being upon the axis of the handle; a contact actuator in the casing and in the zone of said lock member and in connection with said handle; a second contact actuator facing the inner end of said lock member and coupled with said rotatable locking device; contacts governed by said actuators; and contacts complemental to said contacts, the complemental contacts pertaining to the first actuator having spring means serving to press this actuator toward said casing end wall.

4. A switch structure including a casing; a lock member upon an end wall of the casing and projecting into the casing; a rotatable, key operated locking device adjacent and having an element surrounded by the casing and engageable with said lock member; a handle upon the exterior of the casing and mounted to turn, said locking device being upon the axis of the handle; a contact actuator in the casing and in the zone of said lock member and in connection with said handle; a second contact actuator facing the inner end of said lock member and coupled with said rotatable locking device; contacts governed by said actuators; and contacts complemental to said contacts, the complemental contacts pertaining to said actuators having spring means pressing them respectively toward said end wall and lock member.

5. A switch structure including a casing; two contact actuators within the casing; a handle upon the exterior of the casing and mounted to turn, said handle having a connection joining it with one of said actuators and passing through an opening formed in an end wall of the casing; a lock in line with the axis of the handle and having a rotatable member in turning connection with the other contact actuator; contacts upon said actuators; contacts complemental to the aforesaid contacts; a rearwardly projecting contact electrically connected with one of said complemental contacts; a sleeve into whose bore said projecting contact extends to be engageable by a plug inserted in said bore; and spring means carried by and within a wall of the casing and pressing the latter complemental contact into position to be engaged by a contact upon one of the actuators and pressing said rearwardly projecting contact rearwardly.

6. A switch structure including a casing having its body laterally extended at its forward end; two contact actuators within the casing; a handle upon the exterior of the casing and mounted to turn, said handle having a connection joining it with one of said actuators and passing through an opening formed in an end wall of the casing; a lock in line with the axis of the handle and having a rotatable member in turning connection with the other contact actuator; contacts upon said actuators; and contacts complemental to the aforesaid contacts and respectively carried by the extended portion of the casing and the rear end of the casing and positioned to be accessible from the rear of the casing.

7. A switch structure including a casing; a lock member upon an end wall of the casing and projecting into the casing; a rotatable, key operated locking device having an element surrounded by the casing and engageable with said lock member; a handle upon the exterior of the casing and mounted to turn, said locking device being upon the axis of the handle; a contact actuator in the casing and in the zone of said lock member and in connection with said handle; a second contact actuator coupled with said rotatable locking device; contacts governed by said actuators; and contacts complemental to said contacts, each contact actuator and the contacts pertaining thereto being located in a different zone from that containing the other actuator and the contacts pertaining thereto.

8. A switch structure including a casing; a lock member upon an end wall of the casing and projecting into the casing; a rotatable, key operated locking device having an element surrounded by the casing and engageable with said lock member; a handle upon the exterior of the casing and mounted to turn, said locking device being upon the

axis of the handle; a contact actuator in the form of a ring within the casing and surrounding said lock member and in connection with said handle; a second contact actuator coupled with said rotatable locking device; contacts governed by said actuators; and contacts complemental to said contacts, each contact actuator and the contacts pertaining thereto being located in a different zone from that containing the other actuator and the contacts pertaining thereto.

In witness whereof, I hereunto subscribe my name.

HARRY A. DOUGLAS.