Sept. 21, 1926. 1,600,660

R. K. WINNING

ELECTRIC SWITCH

Filed April 13, 1923 2 Sheets-Sheet 1

Fig. 1.

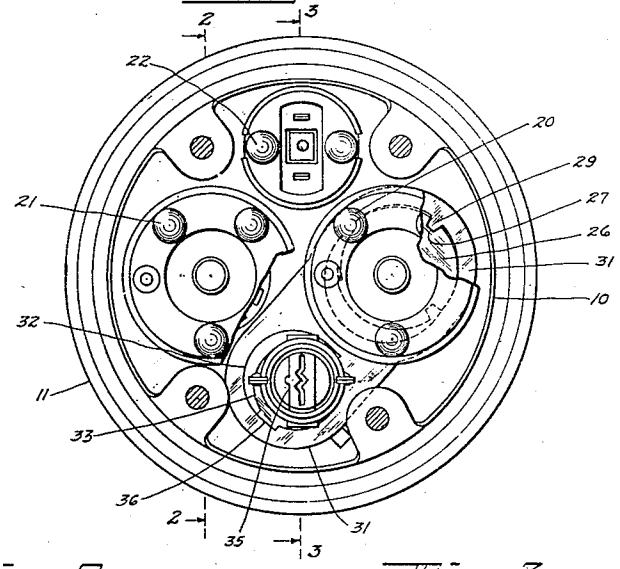


Fig. 2.

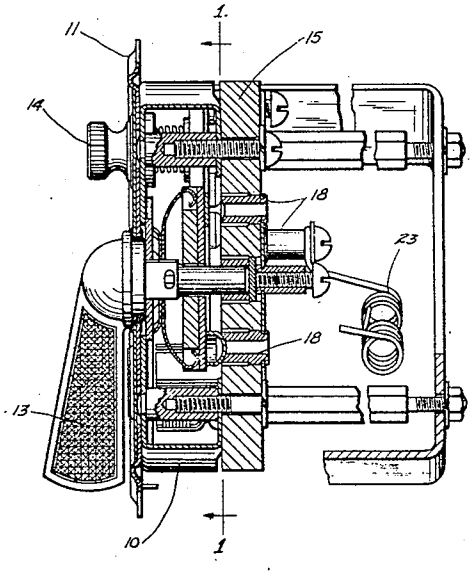
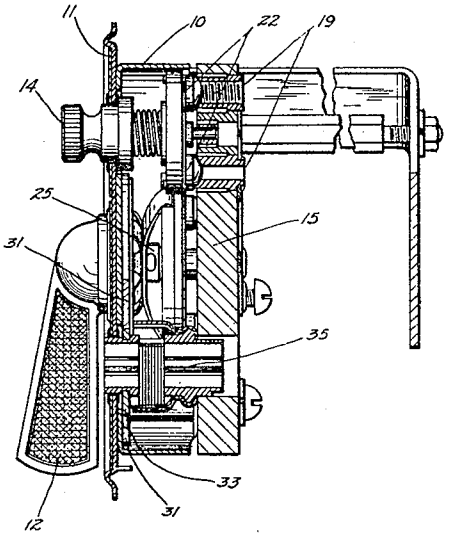


Fig. 3.



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Fig. 4.

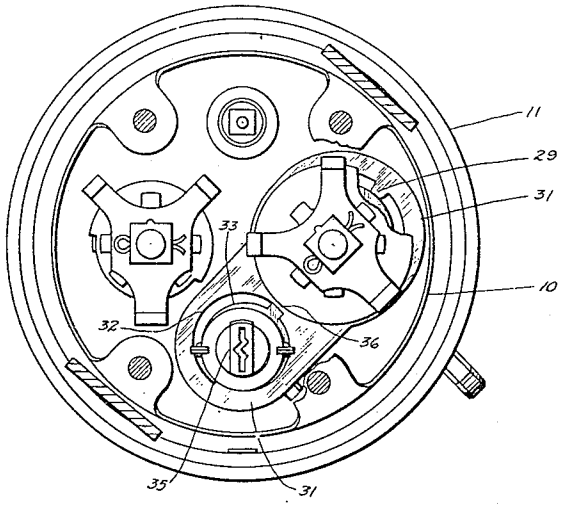


Fig. 6.

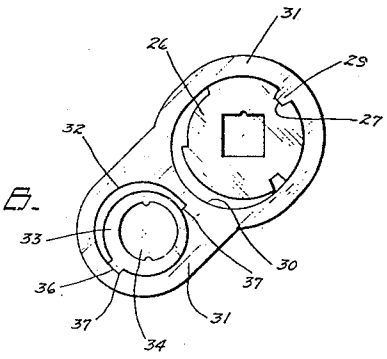
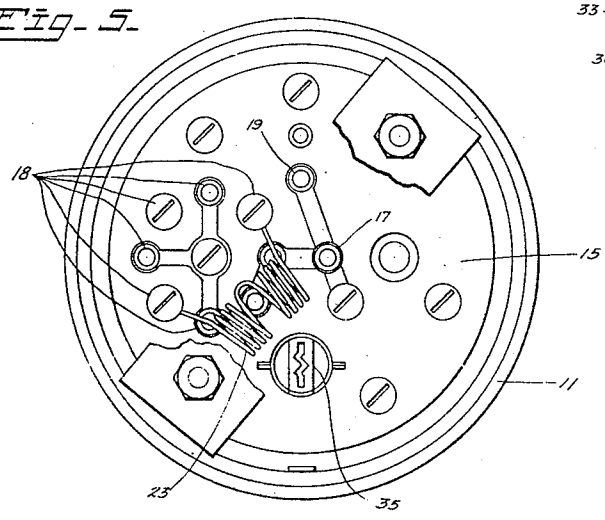


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

Application filed April 13, 1923. Serial No. 631,852.

This invention relates to electric switches, and more particularly to a switch assembly adapted for use upon the dashboard of a motor vehicle for controlling the ignition and lighting circuits thereof, and has for one of its objects to provide a switch of this character which will be simple in construction, comparatively inexpensive to manufacture, and more efficient in use than those which have been heretofore proposed.

Specifically, it is an object of this invention to provide means whereby a short stemmed operating handle having a hub mounted on the face plate of a switch casing, may be utilized to hold a set of stampings or sheet metal members in compact assembly upon the inner surface of the face plate, said members including a locking disk, a co-operative locking slide, and an oscillatory switch member, all of which are securely held in position by a detachable key or pin, and whereby the locking slide or the handle retaining portion thereof may have a bearing on the inner surface of the face plate in the closest possible proximity to the handle and may lock the handle without having strains transmitted through that portion of the stem upon which the switch member is mounted.

A further object of this invention is to provide a switch structure in which an oscillatory handle stem, polysided in cross section, may be utilized to operatively engage a series of stampings including a locking disk, a co-operating slide, a clamping disk, and a switch member, all of which may be clamped in position and removably held to the inner surface of the face plate of a switch casing under resilient pressure by an ordinary cotter pin.

A still further object of the invention is to provide a simple, inexpensive, and relatively efficient means for locking the ignition controlling switch.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals designate like parts in all the views:

Figure 1 is a rear elevational view of a switch assembly made in accordance with the present invention, with the rear insulating disc or plate removed, exposing the movable contact member, the said figure being taken approximately on the plane indicated by the line 1—1 of Fig. 2;

Fig. 2 is a vertical sectional view of the parts shown in Fig. 1, taken approximately on the plane indicated by the line 2—2 of the said figure, looking in the direction of the arrows, and showing the lighting switch;

Fig. 3 is a view similar to Fig. 2, taken approximately on the plane indicated by the line 3—3 of Fig. 1, looking in the direction of the arrows and showing the ignition switch;

Fig. 4 is a view similar to Fig. 1, with the rear plate or disc of insulation and the movable contact members removed, the ignition switch being shown in unlocked position;

Fig. 5 is a rear elevational view, with the rear insulating disc or plate in position, and showing the various connections between the contact points of the switches; and,

Figure 6 is a detail view of the locking disk, slide, and slide operating eccentric in assembled relation to each other.

In the said drawings the numeral 10 indicates any suitable housing or casing, preferably formed of sheet metal, and provided with a face plate 11, having suitable openings through which project the stems of the switch handles or levers, 12 and 13, and the knob or finger member 14, by means of which the various switches may be controlled, as will presently appear. The rear portion of the said casing 10 is normally closed by means of an insulating disc or plate 15, provided with three sets of stationary contact members, 17, 18 and 19, see Fig. 5, which are adapted to co-act respectively with three sets of movable contact members, 20, 21 and 22, to respectively control the ignition main and auxiliary lighting circuits. The construction of the contact members of these switches forms no particular part of the present invention, and they may be of any desired and suitable construction. Certain of the contact members 18 may have a resistance coil 23 bridged across them for the purpose of dimming the headlights in the well known manner.

As above stated, the switches may be of any desired construction, but are preferably of the oscillatory type, and the movable

member 20 of the ignition controlling switch, which has a square central opening in which the stem 25 of the handle 12 is adapted to fit. The portion of the stem 25 within the casing and adjacent to the face plate is square in cross section and receives the locking disk 26, see Figures 1 and 6, said disk having a square opening through which the stem 25 passes before passing through the oscillatory member 20. The disk 26 is provided with a notch 27 in its outer margin, said margin also having an elongated notch 27′ in which a relatively fixed projection 27″ may loosely engage to limit the oscillatory movement of the disk, stem 25 and handle 12. The stop 27″ projects from the inner surface of the face plate, as best shown in Figure 1.

In locking position the recess 27 receives a locking tooth 29 which projects into the aperture 30 of a slide member 31 which is preferably formed to encircle the disk 26. The aperture 30 is elongated to allow a movement of the slide sufficient to carry the tooth 29 into or out of the recess 27, said slide being preferably shaped substantially as shown in Fig. 6. The said slide member is also provided with a second hole or aperture 32, to accommodate a disc 33, eccentrically carried by the barrel 34 of a suitable lock 35, which is mounted within the casing or housing 10. The said eccentric disc 33 is provided with a projection 36, adapted to bear against the marginal wall of the aperture 32, which marginal wall is preferably provided with a curved notch terminating in shoulders 37, adapted to be engaged by the said projection 36, whereby rotary movement of the disc 33 may be limited. The end of the slide having an aperture 32 is guided or limited as to lateral movement by a projection 32′ which is struck up from the face plate, as shown in Figure 4, lateral movement of the slide in the opposite direction being limited by a disk 38 through which extends the stem 39 of the lighting switch handle.

The parts are so designed and constructed that when a key is inserted in the lock 35 and the barrel 34 thereof turned, the rotation of the eccentric disc 33 will, through its engagement with the slide member 31, cause the latter to be reciprocated to bring its tooth or projection 29 into and out of the notch 27 to engage and disengage the disk 26, thereby locking or unlocking the ignition lever. A bearing plate or disk 40 also having a square aperture to receive the stem 39 is of sufficient diameter to form a seating for the disk 26 and the associated end portion of the slide 31. This disk 40 is pressed against the disk 26 and slide 31 by a disk shaped member 41 having multiple arms 42. The central portion of the oscillatory member 20 bears against the disk 41 and is held in pressure relation thereto by a cotter pin or detachable key 44. The multiple arms 42 will of course yield slightly under pressure, whereby when the cotter pin is inserted, all of these interior parts of the switch will be bound to the inner surface of the face plate in pressure relation to each other. The notch 27 is located at a substantial distance from the axis of the operating piece or stem 39, whereby the locking operation is performed at an effective radius. The disk 26 cannot rotate independently of the large square shank or operating piece 39 which not only has an extended bearing in the disk, but the disk itself is clamped between the face plate and the bearing plate 40 and therefore held against distortion.

The locking mechanism will thus be seen to be extremely simple, and it can be quickly and cheaply manufactured from stamped sheet metal. It thus results that while an efficient locking means is provided whereby the unauthorized movement of the ignition switch may be effectively prevented, at the same time the cost of manufacture is maintained at the lowest possible point.

While one form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure except as may be required by the accompanying claims.

What is claimed is:

1. The combination with a switch including a terminal head and a face plate, of a plurality of handles having parts projecting through said face plate, a lockable member connected with one of said handles and abutting said face plate, a locking member formed for interaction with said lockable member and operatively connected to receive motion from the other of said handles, said locking member being in contact with said face plate, and a spring yieldably pressing said locking member toward said face plate, whereby to maintain a pressure engagement between said locking member and face plate.

2. The combination with the terminal head and face plate of a switch, of a resilient contact member confined between said terminal head and face plate, a handle therefor having a portion extending through said face plate, and a locking slide reciprocable along said face plate and interposed between said face plate and contact member and maintained under the resilient pressure of said member, means carried by said handle portion for interacting with said slide, and means for reciprocating said slide.

3. Locking means for electric switches comprising the combination with a face plate, of an oscillatory switch member, an operating piece for said switch member ex-

tending through the face plate, a locking slide interposed between the switch member and the face plate and encircling said operating piece, said slide being held to the face plate by the switch member, and co-operating means for actuating said slide.

4. In an electric switch, the combination with an oscillatory switch member, an associated face plate, an operating piece connected with the switch member and extending through the face plate, a notched plate associated with the operating piece to oscillate therewith, a slide engageable in the plate notch when the switch member is in neutral position, a disk adapted to cover the notch plate and the associated portion of the slide to hold them in assembled relation against the inner surface of the face plate, and means for utilizing the switch member and operating piece to hold the disk in retaining relation to the slide and plate.

5. In an electric switch, the combination with an oscillatory switch member, an associated face plate, an operating piece connected with the switch member and extending through the face plate, a notched plate associated with the operating piece to oscillate therewith, a slide engageable in the plate notch when the switch member is in neutral position, a disk adapted to cover the notch plate and the associated portion of the slide to hold them in assembled relation against the inner surface of the face plate, and means for utilizing the switch member and operating piece to hold the disk in retaining relation to the slide and plate, together with a key-operated member associated with another portion of the slide.

6. In an electric switch, the combination with an oscillatory switch member, an associated face plate, an operating piece connected with the switch member and extending through the face plate, a notched plate associated with the operating piece to oscillate therewith, a slide engageable in the plate notch when the switch member is in neutral position, a disk adapted to cover the notch plate and the associated portion of the slide to hold them in assembled relation against the inner surface of the face plate, and means for utilizing the switch member and operating piece to hold the disk in retaining relation to the slide and plate, together with a key-operated member associated with another portion of the slide provided with a slide actuating eccentric.

7. In a switch of the class described provided with oscillatable contacts, a disc provided with a recess on its edge, rigid with said contacts; a slidable member provided with a pair of apertures, one of which accommodates said disc and is provided with a projecting tongue adapted to engage said recess; a lock having a rotatable portion; and an eccentric disc carried by the rotatable portion of said lock engaging the other of said apertures in said slidable member for moving the latter to cause its tongue to engage and disengage said recess.

8. In a switch of the class described provided with oscillatable contacts, a disc provided with a recess on its edge, rigid with said contacts; a slidable member provided with a pair of apertures, one of which accommodates said disc and is provided with a projecting tongue adapted to engage said recess and the other of which apertures is provided with shoulders; a lock having a rotatable portion; and an eccentric disc carried by the rotatable portion of said lock engaging the other of said apertures in said slidable member for moving the latter to cause its tongue to engage and disengage said recess, said eccentric disc being provided with a projection adapted to engage said shoulders to limit rotation thereof.

9. In an electric switch mechanism, the combination with a switch operating piece, a notched plate detachably mounted thereon and engaged to oscillate therewith, a slide having an elongated aperture in one end portion adapted to receive said notched plate and provided with a projection movable into and out of engagement in the notch thereof, and a key-operated eccentric operatively engaged with another portion of the slide to move the slide in a direction to carry its projection into and out of engagement with the notched portion of the plate when said plate and operating piece are in neutral position.

10. In a device of the character described, the combination with a face plate and a rotatable switch member and a lock therein, of a locking slide reciprocable along said face plate wholly guided in its path of reciprocation along said plate by said switch member and lock, said locking slide and lock being adapted for motion transmitting interaction from said lock to said slide, and said locking slide and switch member being adapted for interaction in a selected position of said slide to secure said member against rotation.

11. The combination of an oscillatory switch member, a face plate, an operating piece extending through the face plate and switch member and engageable with the switch member to oscillate the latter, an apertured locking slide interposed between the switch member and the face plate with the operating piece extending through said aperture, an annular bearing plate interposed between the switch member and slide, a disk shaped member provided with multiple arms interposed between the switch member and bearing plate with said arms in pressure relation to the bearing plate and a detachable key for holding the switch member, disk shaped member, bearing plate, and slide in assembled relation against the inner surface

of the face plate; and key-operated means for actuating said slide into and out of locking relation with the operating piece.

12. The combination with an oscillatable lock member and an oscillatable switch actuating member, of a lock plate reciprocably transversely of said members and provided with apertures receiving said members, one of said apertures being in the form of a slot having margins laterally guided by said switch actuating member and having another marginal portion at an end of said slot formed for interaction with said member, together with an eccentric on said lock member, the other of the apertures in said plate being laterally guided upon said eccentric and provided with an arcuate margin complementary to said eccentric and adapted to receive motion therefrom to reciprocate said plate during the oscillation of said last mentioned member.

13. The combination with a switch casing including spaced guiding and supporting members, of a pair of manually operable rotors mounted in one of said members, a switch within said casing carried by one of said rotors, locking means carried by the other of said rotors, an eccentric connected for rotation with said last mentioned rotor, a plate held in face contact with one of said members and provided with an aperture receiving said eccentric and having margins complementary thereto, whereby said eccentric is adapted to reciprocate said plate, said plate and the rotor carrying said switch contact being formed for interlocking interaction in one position of reciprocation of said plate.

14. The combination with a switch casing including spaced guiding and supporting members, of a pair of manually operable rotors mounted in one of said members, a switch within said casing carried by one of said rotors, locking means carried by the other of said rotors, an eccentric connected for rotation with said last mentioned rotor, a plate held in face contact with one of said members and provided with an aperture receiving said eccentric and having margins complementary thereto, whereby said eccentric is adapted to reciprocate said plate, said plate and the rotor carrying said switch contact being formed for interlocking interaction in one position of reciprocation of said plate, said plate being interposed between said contact and one of said members and held to said member by said contact.

15. The combination with a switch casing including a face plate; of manually operable rotors mounted therein and projecting therethrough; a switch contact assembly including an actuating member splined to one of said rotors, a contact carrying member secured to said actuating member and guided for free floating movement on the same rotor, and resilient means interposed between said actuating member and contact carrying member; complemental contacts mounted respectively on said carrying member and adjacent portions of said casing, said assembly being yieldably confined between said face plate and said last mentioned casing portions; a locking plate formed for interaction with the rotor carrying said contact assembly and held under the resilient pressure of said assembly against said face plate; and means carried by the other rotor for actuating said locking plate to and from locking position with reference to the rotor carrying said assembly.

16. In a device of the character described, the combination with a face plate and a switch rotor mounted therein and having a portion projecting interiorly beyond said face plate and provided for a part of its length with a configuration adapting it for splined connection with other parts, of a contact carrying element guided on the inner end of said rotor, an actuator connected with said element and in splined connection with said rotor part, a terminal head spaced from said face plate and co-acting with said contact carrying element, locking means interposed between said actuator and said face plate and formed for operative interaction with said rotor to restrain the oscillation thereof in a predetermined position of said locking means, and a second rotor mounted in said face plate and operatively connected with said locking means to impart movement thereto, whereby to be adapted to advance it to a position for interaction or to retract it from such position.

17. In a device of the character described, the combination with a face plate and a switch rotor mounted therein and having a portion projecting interiorly beyond said face plate and provided for a part of its length with a configuration adapting it for splined connection with other parts, of a contact carrying element guided on the inner end of said rotor, an actuator connected with said element and in splined connection with said rotor part, a terminal head spaced from said face plate and co-acting with said contact carrying element, locking means interposed between said actuator and said face plate and formed for operative interaction with said rotor to restrain the oscillation thereof in a predetermined position of said locking means, and a second rotor mounted in said face plate and operatively connected with said locking means to impart movement thereto, whereby to be adapted to advance it to a position for interaction or to retract it from such position, said locking means comprising a plate guided in a reciprocating path by said rotors.

18. In a device of the character described, the combination with a face plate and a

switch rotor mounted therein and having a portion projecting interiorly beyond said face plate and provided for a part of its length with a configuration adapting it for splined connection with other parts, of a contact carrying element guided on the inner end of said rotor, an actuator connected with said element and in splined connection with said rotor part, a terminal head spaced from said face plate and co-acting with said contact carrying element, locking means interposed between said actuator and said face plate and formed for operative interaction with said rotor to restrain the oscillation thereof in a predetermined position of said locking means, and a second rotor mounted in said face place and operatively connected with said locking means to impart movement thereto, whereby to be adapted to advance it to a position for interaction or to retract it from such position, said locking means comprising a plate guided in a reciprocating path by said rotors, said plate being apertured to receive said rotors and each of said rotors being provided with disks connected for rotation therewith and fitted between the lateral margins of said apertures to guide said plate while interacting therewith.

19. The combination with a switch casing including a spaced terminal head and face plate, of a switch rotor projecting through said face plate, a switch contact element guided and floated on the inner end of said rotor, a contact actuator operatively connected with said element and said rotor, a spring interposed between said element and actuator and maintained under compression by the confinement of said element and actuator between said terminal head and face plate, a lock slide interposed between said actuator and face plate and held by the compression of said spring in frictional engagement with said face plate, said switch rotor having a part formed for interaction with said slide in one position of said slide, together with a lock rotor projecting through said face plate and provided with means connected with said slide for the reciprocation thereof.

20. The combination with a support, a switch, and lock rotors mounted for oscillation therein, of interlockable members connected to receive motion respectively from different rotors and adapted in one position of one of said rotors to restrain the other against oscillation, together with means for subjecting one of said members to resilient frictional pressure, whereby to maintain the position to which it is adjusted.

21. The combination with a support, a switch, and lock rotors mounted for oscillation therein, of interlockable members connected to receive motion respectively from different rotors and adapted in one position of one of said rotors to restrain the other against oscillation, together with means for subjecting one of said members to resilient frictional pressure, whereby to maintain the position to which it is adjusted, said last mentioned member being in face contact with said support, and said means including a spring carried by one of said rotors and exerting pressure in the direction of said support to press said last mentioned member thereagainst.

22. The combination with a switch actuating member, of a disk splined thereto, a slide apertured to receive said disk and formed for motion restraining interaction therewith in one position of said slide, a support for said rotor including an abutment for said disk and slide, and a washer encircling said rotor in face contact with both said disk and said slide, whereby to maintain said disk and slide against said abutment and in a common plane.

23. The combination with a switch actuating member, of a disk splined thereto, a slide apertured to receive said disk and formed for motion restraining interaction therewith in one position of said slide, a support for said rotor including an abutment for said disk and slide, and a washer encircling said rotor in face contact with both said disk and said slide, whereby to maintain said disk and slide against said abutment and in a common plane, together with a spring seated with reference to a portion of said rotor and resiliently pressing said washer toward said abutment, whereby yieldingly to maintain said disk and slide in frictional engagement with said abutment.

24. In a device of the character described, the combination with a support and a switch rotor mounted therein, of a switch assembly including a pair of oppositely acting springs secured upon said rotor in a position where one of said springs is maintained under compression in the direction of said support, a switch contact under pressure of the other of said springs, a terminal head co-acting with said contact.

25. In a device of the character described, the combination with a support and a switch rotor mounted therein, of a switch assembly including a pair of oppositely acting springs secured upon said rotor in a position where one of said springs is maintained under compression in the direction of said support, a switch contact under pressure of the other of said springs, a terminal head co-acting with said contact, and a locking slide for said rotor interposed between said springs and support, together with means extending through said support for the actuation of said slide.

26. In a device of the character described, the combination with a support and a switch rotor mounted therein, of a switch assembly

including a pair of oppositely acting springs secured upon said rotor in a position where one of said springs is maintained under compression in the direction of said support, a switch contact under pressure of the other of said springs, a terminal head co-acting with said contact, and a locking slide for said rotor interposed between said springs and support, together with means extending through said support for the actuation of said slide, said slide being guided upon said means and said rotor in its path of reciprocation along said support.

27. In a device of the character described, the combination with a switch rotor and a lock rotor, of a locking plate operatively adapted to interact with said switch rotor to restrain motion thereof in one position of said plate, and means for actuating said plate including an eccentric on said locking rotor, said eccentric including a radially projecting lug and said plate being provided with an aperture fitted about said eccentric including said lug and having an arcuate margin of limited extent for the travel of said lug, said margin terminating in shoulders whereby to restrict the rotative movement of said lock rotor.

28. In a device of the character described, the combination of a lock rotor, of a lock slide arranged to receive reciprocative movement therefrom, said rotor being provided with an eccentric having portions of differing radii, and said slide having an aperture provided with complementary portions formed in arms of differing radii, the eccentric and the margin of said aperture being formed for interaction to restrict the oscillation of said rotor.

In testimony whereof, I affix my signature.

ROBERT K. WINNING.