

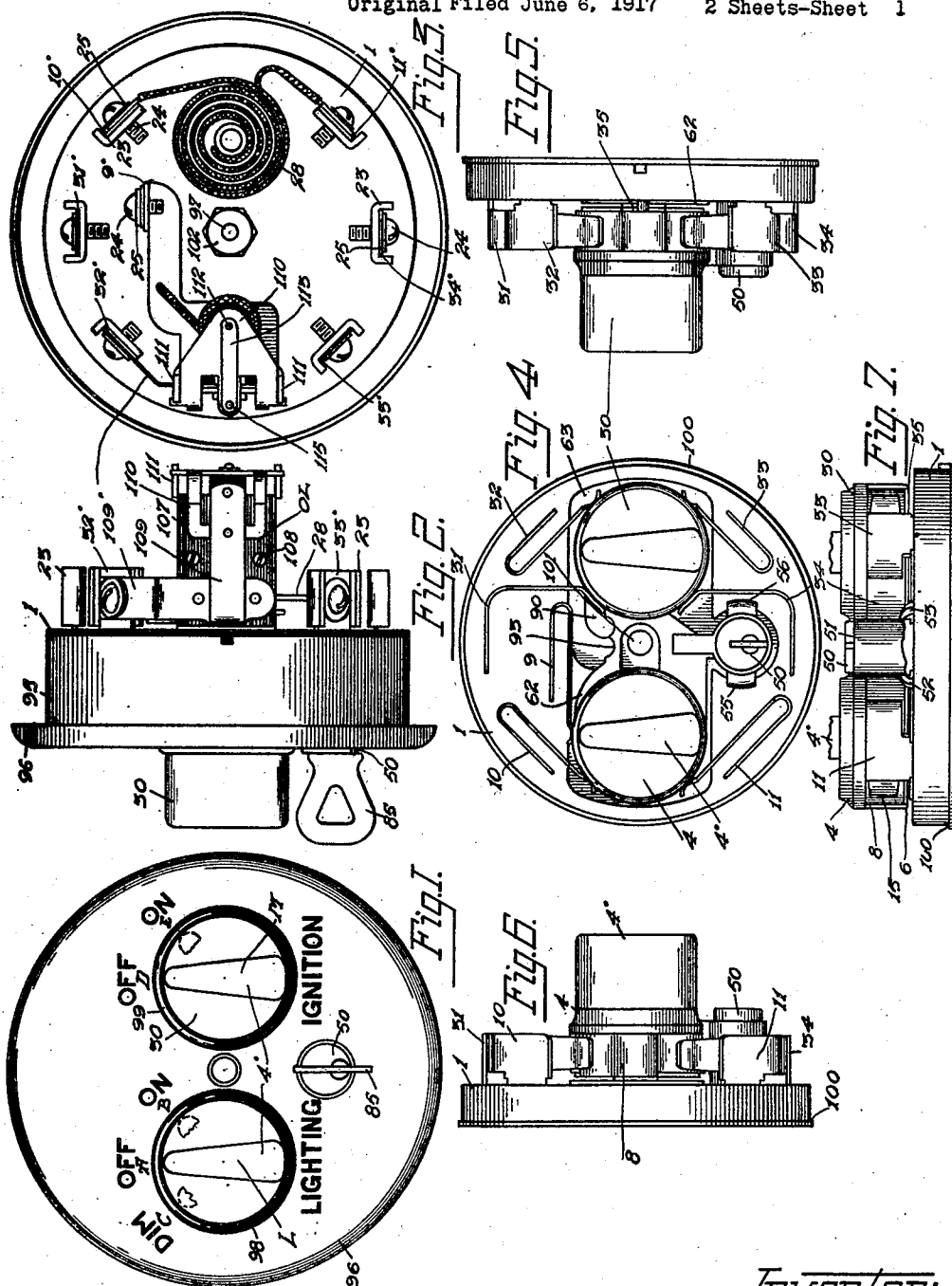
June 26, 1928.

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W. KAISLING

LOCK FOR COMBINATION LIGHTING AND IGNITION SWITCHES

Original Filed June 6, 1917 2 Sheets-Sheet 1



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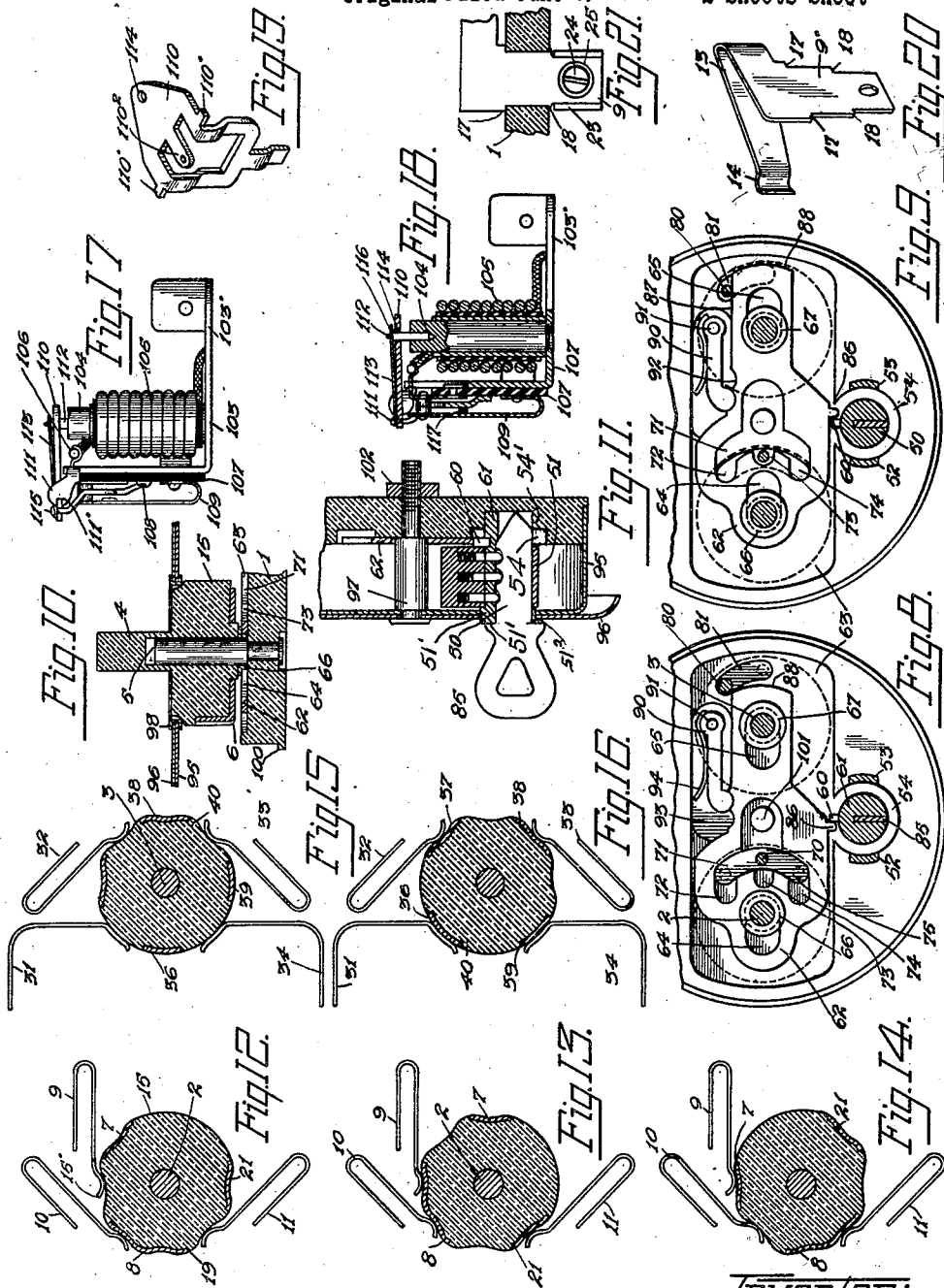
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2 Sheets-Sheet 2



Inventor:
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Attorney

UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LOCK FOR COMBINATION LIGHTING AND IGNITION SWITCHES.

Original application filed June 6, 1917, Serial No. 173,084. Divided and this application filed March 18, 1921. Serial No. 453,494.

My invention relates to electrical switches in general and has to do more particularly with switches for controlling a plurality of circuits, the present embodiment of my invention being constructed more particularly for use in connection with ignition and light circuits for automobiles. This application is a division of my application S. N. 173,084, filed June 6, 1917.

It is an object of my invention to produce novel means for holding a cylinder lock in position. My invention as disclosed in this application has to do with the locking mechanism which controls the ignition lighting switches, and in one aspect has to do with the novel means for holding the lock in position relative to the mechanism that locks the switches against actuation. My invention has in general to do with the complete locking mechanism of the switch. Reference may be had to the accompanying drawings forming a part hereof, in which the same reference characters indicate like parts throughout the several views, and in which

Fig. 1 is a face view of the combination switch of my invention;

Fig. 2 is a right side elevation of Fig. 1;

Fig. 3 is a rear view of Fig. 1;

Fig. 4 is an interior face view of the mechanism with the cap removed;

Fig. 5 is a right side elevation of Fig. 4, omitting the mechanism on the back of the mounting plate;

Fig. 6 is a left side elevation of Fig. 4, omitting the mechanism on the back of the mounting plate;

Fig. 7 is a bottom view of Fig. 4, showing one of the springs broken away and omitting the mechanism on the back of the mounting plate;

Fig. 8 is a partial view of the interior mechanism, part of the apparatus being removed to more clearly show the locking arrangement, the switching knobs being at normal and unlocked;

Fig. 9 is similar to Fig. 8, showing the locking mechanism in its operated position;

Fig. 10 is a sectional view through the lighting switch unit to more clearly show the supporting means of the actuating member;

Fig. 11 is a sectional view through the locking mechanism;

Figs. 12, 13 and 14 illustrate the normal and two actuating positions of the lighting switch unit;

Figs. 15 and 16 illustrate the normal and actuated positions of the ignition switch unit;

Fig. 17 is a side view of the overload relay associated with the switch;

Fig. 18 is a sectional view of the relay taken on the line 18—18 of Fig. 3;

Fig. 19 is a perspective view of the armature of the overload relay;

Fig. 20 is a perspective view of one of the contact springs, and

Fig. 21 is a partial sectional view showing the method of securing a spring to the mounting plate.

Referring now in general to my invention as illustrated, it comprises a lighting switch unit L and an ignition switch unit M. The lighting switch unit L has a normal position A and two operative positions B and C, and when the switch is in position B the head lights, tail light and cowl light are lighted brightly to full candle power, and when in position C the head lights are dimmed, but the tail and cowl lights remain at the same brilliancy as when the lighting switch unit L was in its position B. I do not wish to be limited to this particular arrangement, as many different combinations can be made without departing from the invention.

The ignition switch unit M has a normal position D and an operative position E, and when the ignition switch is moved into position E, the ignition apparatus is rendered operative and the horn circuit is closed, as will be more fully hereinafter described. I also provide locking mechanism which consists preferably of a standard tumbler lock which controls a sliding lock plate which is adapted to lock the lighting and ignition switch units L and M. The locking mechanism is so arranged that it operates only when the switch M is in its normal or inoperative position D, but will operate to lock the switch L in any position. When the ignition switch unit M is in its position D, the lock can only be turned part way by the key. Now, if the operator attempts to operate the lock, he is at once aware that the ignition switch is in its operative position

and must be moved to its inoperative position D so that the lock can be operated and the key withdrawn.

The locking mechanism of the lighting switch unit L is so constructed that the key may be turned to lock the said lighting switch unit L in any of its positions A, C or B, so that the operator can leave the lights turned off or on and still lock the ignition switch against operation.

Referring now more in detail to my invention as illustrated, it comprises preferably a mounting base or plate 1 made of any suitable insulating material, having studs 2 and 3 fastened to it in any suitable manner, as by staking (as illustrated in Fig. 10). The stud 2 is provided for the lighting switch unit L, and the stud 3 for the ignition switch unit M. The lighting switch unit L comprises a switching knob 4 preferably moulded in the form illustrated in Figs. 4, 5 and 6, and made of any suitable insulating moulding material such as bakelite or the like. The knob 4 is provided with a bearing 5 into which the stud 2 fits (as shown in Fig. 10). The knob 4 is also provided with a button 4' integrally formed with said knob, the button being adapted to be grasped by the hand of the operator for operating the lighting switch unit L. A conducting plate 6 is provided, preferably set in the said knob during the moulding of the same, the said plate having portions 7, 8 and 21 turned at right angles to the said plate 6 to form conducting segments which cooperate with the contact springs 9, 10 and 11 associated with the lighting switch unit L. The springs 9, 10 and 11 are all similar in shape and are all secured to the plate 1 in the same manner, so that by describing the method for securing spring 9, a further description of the method of fastening the others will be unnecessary.

The spring 9 (formed as illustrated in Fig. 20) has its free extremity bent substantially parallel with the attached portion of the arm 13, the free end being rounded to form a contact portion 14 for engagement with the knob 4 and its conducting strips 7 and 8. The spring normally rests on the concave portion 15' of the annular surface 15 of button 4. The tongue 9' of the spring 9 is forced into a suitable opening 16 in the plate 1, the said opening being slightly smaller than the tongue 9' so as to produce a forced fit. The spring 9 is provided with shoulders 17 which rest against the top surface of the plate 1 when the spring is in position, and with shoulders 18 which extend slightly beyond the bottom surface of the plate 1. The shoulders 18 are turned over or riveted to hold the said spring in position to prevent it from being withdrawn from the said plate 1. To produce a snap action when the switching knob 4 is moved

to its different operative positions, a portion of the annular surface 15 of the knob is corrugated or formed into concave portions, and the conducting segments 7, 8 and 21 are also corrugated and provided with concave portions so that when the switching knob 4 is in the position illustrated in Figs. 4, 5 and 6, the free ends of the springs 9, 10 and 11 rest in these concave portions. Now, when the switching knob 4 is moved from one position to another, the free ends of the springs leave the furrows 20 of the corrugated portions and ride upon ridges 19, and due to the springs being under tension, when the springs leave the apexes of the ridges 19 they tend to turn the knob 4, thus producing a snap action for the said switching knob, at the same time the springs hold the said switching knob 4 in its new position. The springs 9, 10 and 11 have their respective tongues 9', 10' and 11' extend through the plate 1 to form connecting terminals.

A clamping member 23 is provided for each of the springs 10 and 11, and provides means for securing electrical conductors to the said springs. A threaded screw 24 is provided with a split lock washer 25 for securely holding the electrical conductors between the said switch spring tongues 10' and 11', and the contact surfaces of the clamping members 23. Tongue 9' of the spring 9 is connected to one terminal of the winding of the overload relay by means of a screw 24 and lock washer 25.

For purposes that will be more fully hereinafter described, a resistance coil or unit 28 is connected to the terminals of the contact springs 10 and 11, this resistance coil being used in the lighting circuit arrangement to cut down the current flow through the lighting circuit to dim the lights contained therein. When the lighting switch is in normal position A, the lighting circuits are open, as the contact springs 9 and 11 rest upon insulated portions of the annular surface 15 of the knob 4. When the switching knob 4 is moved to position B, the contact springs 9 and 10 engage the segment 8, and spring 11 engages the segment 21, as clearly illustrated in Fig. 13, thus giving one combination of lights. If the switching knob 4 is now moved to position C, the contact spring 9 engages the segment 7, the contact spring 10 engages an insulated portion of the annular surface 15 and the spring 11 engages a portion of the segment 8, thus giving the same combination of lights but cutting in the resistance 28 to dim the headlights, as will be more fully hereinafter described.

Referring now to the ignition switch M, it comprises a switching knob 30 similar in construction to the knob 4 of the lighting switch unit L, with the exception of the

number of conducting segments and spring combination associated with the said segments. Contact springs 31, 32, 33 and 34 associated with the ignition switch unit M are mounted in plate 1 in a similar manner to that described in connection with the contact springs associated with the lighting switch unit L. The switching knob 30 is also provided with a plate 35 having segments 36, 37, 38 and 39 turned up at right angles to the said plate 35 to form contact surfaces to be engaged by the contacting springs 31, 32, 33 and 34, with which they are operatively associated. The springs 31, 32, 33 and 34 associated with the ignition switch M have their tongue portions 31', 32', 33' and 34' extend through the bottom of the plate 1 to form terminal members for their respective springs, screws 24, lock washers 25, and clamping members 23 being provided for the said terminals, as previously described in connection with the lighting switch unit L. The contact springs 32 and 33 are formed similarly to those associated with the lighting switch unit L. The contact springs 31 and 34 are L-shaped, the free ends of the said springs 31 and 34 being shaped to conform to the annular surface 40 of the knob 30. A portion of the annular surface 40 is also corrugated or concave, for purposes already described in connection with the lighting switch unit L.

When the ignition switch M is in its normal position D, there is no circuit connection between the contact springs (as illustrated in Fig. 15). When the switching knob 30 is moved to its position E, the contact springs 31, 32, 33 and 34 engage their respective conducting segments 36, 37, 38 and 39 (as illustrated in Fig. 16) to close operating circuits that will be more fully hereinafter described.

A locking arrangement, whereby the lighting and ignition switch units L and M may be locked against movement is provided and includes a well known tumbler lock 50 which is operatively associated with a slidable locking plate 62. The plate 1 is provided with a pair of concentric recesses 54 and 54' in steps of decreasing diameters and notches 55 and 56 in the recess 54 are adapted to receive a pair of depending lugs 52 and 53 integrally formed with the barrel 51 of the lock 50, and the notches 55 and 56 in the recess 54 are slightly smaller than the size of the lugs 52 and 53 to provide a force fit to insure a firm seat for the lock 50. The cylinder 61 of the lock 50 protrudes through the barrel 51 and extends into the recess 51' in the plate 1 and the lugs 52 and 53 on the barrel 51 resting in the notches 55 and 56 in combination with the cylinder end resting in the recess 54' insures a firm seat for the lock to prevent the lock from tilting when positioned as just described. The cylinder

61 is provided with an enlarged head portion 51' of a size to fit into the circular orifices 51² in the cover cap 95. The lock is provided with a pin 60 which is fastened to the cylinder 61 and as the cylinder 61 is rotated through the agency of the key the pin 60 rotates with the cylinder 61. The recess 54 in the plate 1 is of a size to permit a substantially complete revolution of the pin 60 when the cylinder 61 of the lock is rotated to operate the locking plate 63 as will be more fully hereinafter described.

The locking mechanism includes a sliding lock plate 62 set in a recess 63 of the plate 1. Oblong openings 64 and 65 are provided in the locking plate 62 through which extends the studs 2 and 3. Collars 66 and 67 are provided which slip over said studs 2 and 3 and rest in the openings 64 and 65 of said plate 62 to form guiding means for the plate 62. The collars 66 and 67 also maintain the sliding plate 62 in its position in recess 63. The knobs 4 and 30 keep the collars 66 and 67 in position. These collars cannot be removed until the cover-cap 95 is first removed and then the knobs 4 and 30 removed. I have preferably arranged the ignition switch unit M so that it can only be locked in its inoperative position D, and the lighting switch unit L so that it may be locked in any of its actuated or normal positions, as hereinbefore mentioned. The switching knob 4 of the lighting switch unit L is provided with a pin 70 suitably fastened to it for cooperating with an arcuate opening 71 in the plate 62. Three short slots 72, 73 and 74 are also provided in the plate 62 and extend into the arcuate opening 71. These slots cooperate with the pin 70 of the lighting switch knob 4 to lock the said knob in any of its different positions. An arcuate recess 75 is provided in the plate 1 to limit the movement of the switch knob 4 by the pin 70 engaging the ends of the said recess 75. A pin 80 is also secured to the ignition switching knob 30 and extends downward into an arcuate recess 81 in the plate 1, the said recess limiting the movement of the knob in its normal and actuated positions. The pin 80 also cooperates with the locking plate 62 to lock the ignition switch, as will be more fully described.

In Fig. 8 I have shown the locking mechanism and the switching knobs 4 and 30 of the switches L and M in their normal position, and the locking mechanism in an unactuated position. In Fig. 9 I have shown the locking mechanism operated and the switching knobs 4 and 30 of the switches L and M in their normal positions but locked against movement. To lock the switch, the key 85 is turned until the pin 60 engages the projection 86 of the plate 62. This moves the plate 62 to the right into the position shown

in Fig. 9. The pin 70 of the switching knob 4 of lighting switch L is now in the slot 73, thus preventing any movement of the switching knob 4 of the switch L, and the switching knob 30 of the ignition switch unit L cannot be actuated due to the edge 87 of the plate 62 engaging the pin 80. Assuming now that the ignition switch is in its position E (the pin of the said switching knob 30 being shown in dotted line in Fig. 8) and that the lighting switching knob 4 is in any of its operative positions, if the key is inserted in the lock and an attempt made to operate the said lock, the key can only be turned part way until the edge 88 of the plate 62 comes in contact with the pin 80. The key cannot be withdrawn when it is in this position, and this unsuccessful attempt to turn the key will indicate to the operator that the ignition switch member is in operative position. Then to lock the two switch members L and M, the member M must be moved to its normal or inoperative position D, and when in this position the pin is beyond the edge 88 of the plate 62 and the key can now be turned to lock the switch units L and M. The lighting switch unit L may be locked in either of its actuated positions B or C, provided the ignition switch M is in its inoperative position D, as may readily be seen from inspection of Figs. 8 and 9. To yieldingly hold the plate 62 in its locked or unlocked positions, I provide an arm 90 pivoted to the plate 1 by means of the pivot pin 91. Notches 92 and 93 are provided in the plate 62 in which the arm 90 rests. The arm 90 is spring-pressed in the said notches by means of the spring 94 which is suitably fastened to the plate 1.

A cap 95 is provided to enclose the mechanism and a top or name plate 96 is also provided, the two being held together by means of a stud 97 which is turned over or riveted after passing through suitable openings in plates 95 and 96. Ferrules 98 and 99 are provided and pass through suitable openings in the cap 95 and the plate 96, the ferrules being of a size to permit the passage of the switching knobs 4 and 30. The ferrules are spun over the openings of the cap 95, to hold the plate 96 and the cap 95 in alignment. The ferrules 98 and 99 are of a size to fit into the annular grooves in the knobs 4 and 30 (as shown most clearly in Fig. 10), thereby preventing the said knobs 4 and 30 from being raised off of the pins or studs 2 and 3 until the cover cap 95 has first been removed. The cap 95 also holds the tumbler barrel 50 in position, as most clearly shown in Figs. 2 and 11. To remove the knobs 4 and 30 and the tumbler barrel 50, it is merely necessary to remove the cover-cap 95, and then the knobs 4 and 30 and the tumbler barrel 50 may be removed from the mounting plate 1. The mounting plate 1 has an annular shoulder

100 upon which the cap 95 rests when in position, and the stud 97 passes through a suitable opening 101 in the plate 1. The said stud 97 is provided with a threaded end portion to receive a nut 102 which holds the cap 95 securely upon the plate 1. The cap 95 and the plate 96 are also provided with suitable openings for the lock 50.

Associated with the switching device is an overload relay OL which comprises a heel iron 103 to which the core 104 of the relay is suitably fastened. A suitable winding 105 is provided for the said relay and has one of its terminals secured to the terminal 9' and its other terminal connected to the contact piece 106, which contact piece is suitably mounted upon an insulation plate 107, which plate is in turn mounted upon the heel iron 103 by means of screws 108. A contact spring 109 is in normal engagement with the contact 106, the said spring being suitably fastened to the plate 107, the terminal of the said spring 109 being connected to the terminal 32'. An armature 110 is provided for the relay, and is supported by the heel iron 103. The heel iron 103 is provided with upturned ears 111, the said ears being slotted at 111' to receive the extensions 110' of the armature 110. The armature 110 is pivotally supported by the said slots 111', and is held in place by means of a pin 112 and a spring 113. The said pin 112 fits into a suitable opening in the core of the magnet and extends through an opening 114 in the armature 110. The tension spring 113 has one end fastened to the tongue projection 110² of the armature 110 by means of the rivet 115. The free end of the said spring 113 is provided with a suitable opening 116 which is of a size to fit over the reduced portion of the pin 112. This spring 113 pivotally secures the armature 110 in the ears 111 of the heel iron 103. The spring also holds the armature in its normal position under spring tension and also prevents the pin 112 from displacement in the core 104. An insulating button 117 is suitably secured to the spring 109, and is adapted to be engaged by the armature 110 to open the normally closed contacts 109 and 106, upon the energization of the said relay. The relay OL is held in place by means of the extension 103' of the heel iron 103, which extension is secured to the terminal 9' by means of a screw 24. The spring 109 is provided with an extension 109' which is secured to the terminal 32' by means of a screw 24.

To remove the armature from the relay, it is only necessary to raise the spring 113, turn it to either side and remove the pin 112 from the core of the magnet, and then the armature may be removed by sliding the armature ears 110 and 110' out of their bearings in the heel iron of the relay.

While the invention has been described with particular reference to the details of construction, it should be understood that it is not limited thereto, as many changes and modifications may be made therein without departing therefrom, and I, therefore, wish to cover all such changes and modifications which come within the spirit and scope of the appended claims.

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

1. A device of the character described including a mounting plate, an orifice cut in said mounting plate, a lock barrel having a lock cylinder set partially into said orifice, a cover for said device provided with an orifice through which a portion of said lock cylinder extends, said lock barrel being provided with a shoulder against which said cover fits to prevent displacement of said lock barrel and cylinder, and means integrally formed on said lock barrel for engaging an opening in said mounting plate to prevent the rotary movement of said lock barrel.

2. A cylinder lock having a case and projections extending from each end of said case, said projections constructed to be received in orifices formed in spaced supporting plates or the like, and thereby retain said lock in operative position between said plates or the like.

3. In a cylinder lock, a case, a key plug within said case and projecting from one end thereof, lugs upon said case and projecting from the opposite end thereof, said projecting lugs and key plug constructed to be received in sockets formed in the spaced elements between which said cylinder lock is mounted, whereby the lock is retained in its operative position between said elements.

4. In combination with an automobile switch casing having a manually operable switch therein, a key controlled lock for preventing the operation of said switch, said lock having projections extending from the opposite ends thereof and constructed to project into orifices formed in the opposite walls of the switch casing, whereby the lock is retained in operative position within said casing.

5. In combination with a switch casing having a manually operable switch therein, a cylinder lock mounted within said casing for locking said switch, said cylinder lock having projections upon its opposite ends constructed to project into the opposite walls of said casing and thereby retain said lock in its operative position.

6. In a switch casing having a manually operable switch therein, a cylinder lock mounted in said casing for locking said switch, said lock provided with a case and a key plug rotatable therein, lugs formed upon said case and constructed to project into

sockets formed in one wall of said switch casing, said lugs retained in said sockets by the opposite face of said lock case engaging a second wall of said casing, whereby said cylinder lock is retained in operative position within its switch casing.

7. In combination with a switch casing having a manually operable switch therein, a cylinder lock for locking said switch, said lock comprising a case having a key plug rotatable therein, said key plug constructed to project beyond said case into engagement with one wall of the switch casing, and lugs upon the opposite end of said lock case constructed to extend into the opposite wall of said switch casing, whereby the cylinder lock is held between the opposite walls of said casing and retained by said projections in operative position within said switch casing.

8. In combination with a switch casing having a manually operable switch therein, a plate slidably mounted within said casing for locking said switch, a cylinder lock within said casing comprising a lock case and key plug, and means upon said key plug for operating said plate, said lock constructed to be retained between the opposite walls of said switch casing, and rearwardly projecting lugs upon the lock casing constructed to extend into the rear wall of the switch casing to thereby retain the cylinder lock in place within said switch casing.

9. In combination with a receptacle having manually operable means therein, a cylinder lock within said casing for locking said means, said lock constructed to be held between the opposite walls of said receptacle and provided with projections extending into the opposite walls of said receptacle to thereby retain said lock in its operative position within said receptacle.

10. A pin tumbler lock having a case constructed to be positioned between the front and rear walls of a receptacle in which it is mounted, said case provided with projections constructed to extend into said walls to thereby retain said lock in place within said receptacle.

11. In combination with a cylinder lock, a supporting plate having sockets formed therein, means for retaining said lock in place upon said plate, comprising lugs upon said lock projecting into said sockets, and means engaging the opposite face of said lock for retaining said lugs in said sockets.

12. A pin tumbler lock having projections extending from the opposite ends thereof for retaining the lock in place.

13. A cylinder lock having lugs projecting from one end thereof and the key plug projecting from the opposite end thereof for retaining said lock in place.

14. In combination with a receptacle having separate front and rear walls, a pin tumbler lock having a case within said receptacle,

means projecting from the opposite ends of said case into said walls, and means for securing said walls in spaced relation, said last-mentioned means serving also to secure said lock in place within said receptacle.

15. In combination with a switch casing having separate front and rear walls, a pin tumbler lock having a case within said switch casing, projections extending from said case into said walls, and means for securing said walls in their spaced relation, said last-mentioned means serving also to secure said lock in place within said casing.

16. In combination with a pair of spaced mounting plates, a pin tumbler lock having a case and a key barrel, said key barrel constructed to project from said case into said plates to secure said lock in place between said plates, and means extending from said case into one of said plates to prevent relative rotation therebetween.

17. In combination with a pair of spaced mounting plates, a cylinder lock having a case and a key barrel, said key barrel having its outer end extending beyond the face of said case, said case having rearwardly projecting lugs formed thereupon, said lugs and outer end of the key barrel projecting into said plates to secure the lock in place therebetween.

18. In combination with a pair of spaced mounting plates, a cylinder lock having a case, said case having a key barrel extending therefrom in one direction and lugs extending from the case in the opposite direction, said lugs and key barrel projecting into said plates to secure the cylinder lock in place therebetween.

19. In combination with a pair of spaced mounting plates, a pin tumbler lock applied to the rear face of the forward plate and having a case and a key barrel, rearwardly projecting lugs upon said case, said rear plate having lug-receiving sockets formed therein, said lugs seated in said sockets and retained therein by the forward plate against which the outer face of the lock case abuts.

20. In combination with a pair of spaced mounting plates having a drill hole in the forward plate and sockets in the rear plate, a pin tumbler lock having a case and a key barrel, rearwardly projecting lugs upon said

case seated in said sockets, said key barrel having its outer end extending through said drill hole, and said spaced plates positioned to prevent said lock from moving axially therebetween, whereby said lock is retained in place.

21. In combination with a pair of spaced mounting plates, a cylinder lock having a case, means projecting from the opposite ends of said case into said plates to secure said lock in place between said plates.

22. In combination with a pair of spaced mounting plates, a cylinder lock having a case, means projecting from the opposite ends of said case into said plates to secure said lock therebetween, whereby separation of said plates releases said lock from both of said plates.

23. In combination with a pair of spaced mounting plates, a cylinder lock having a case retained therebetween, and means projecting from the opposite ends of said case into said plates for securing said lock in place between said plates.

24. In combination with a pair of spaced mounting plates, a cylinder lock having a case retained therebetween, means projecting from the opposite ends of said case into said plates for securing said lock in place between said plates, and means slidably mounted on the rear spaced plate operated by said lock.

25. In combination with a pair of spaced mounting plates, a cylinder lock having a case mounted between said plates, said case having a key barrel projecting from one face thereof and having lugs projecting from the opposite face thereof, said projecting end of the key barrel extending through one plate and said lugs projecting into the other plate and holding the lock case in spaced relation to said last-mentioned plate, whereby the cylinder lock is secured in place between said plates, and means slidably mounted on said last-mentioned plate between the same and the end of the locking case, said means operated by said lock.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 3rd day of March, 1921.

WILLIAM KAISLING.