

Dec. 4, 1928.

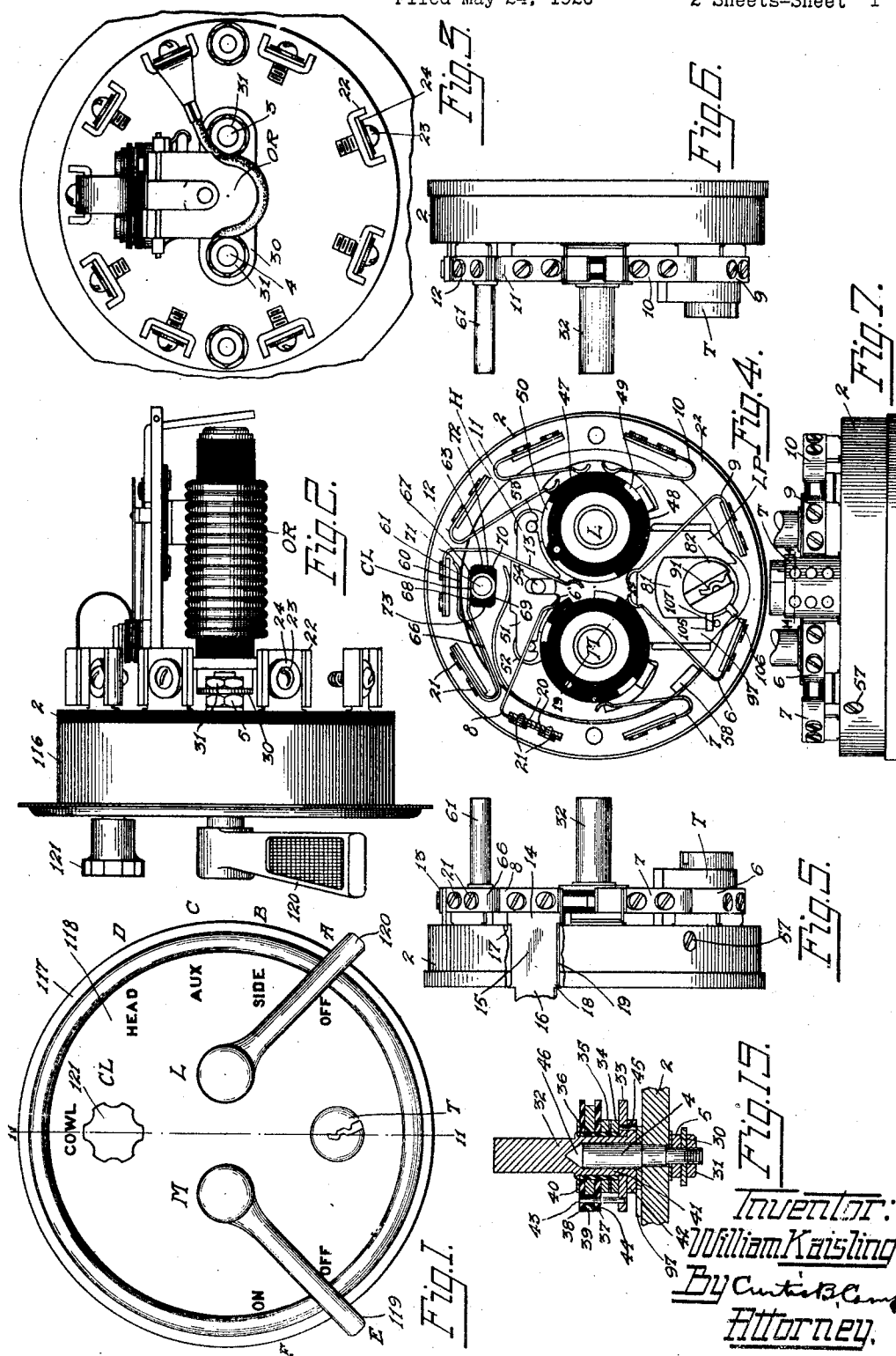
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LOCK FOR IGNITION AND LIGHTING SWITCHES

Filed May 24, 1920

2 Sheets-Sheet 1



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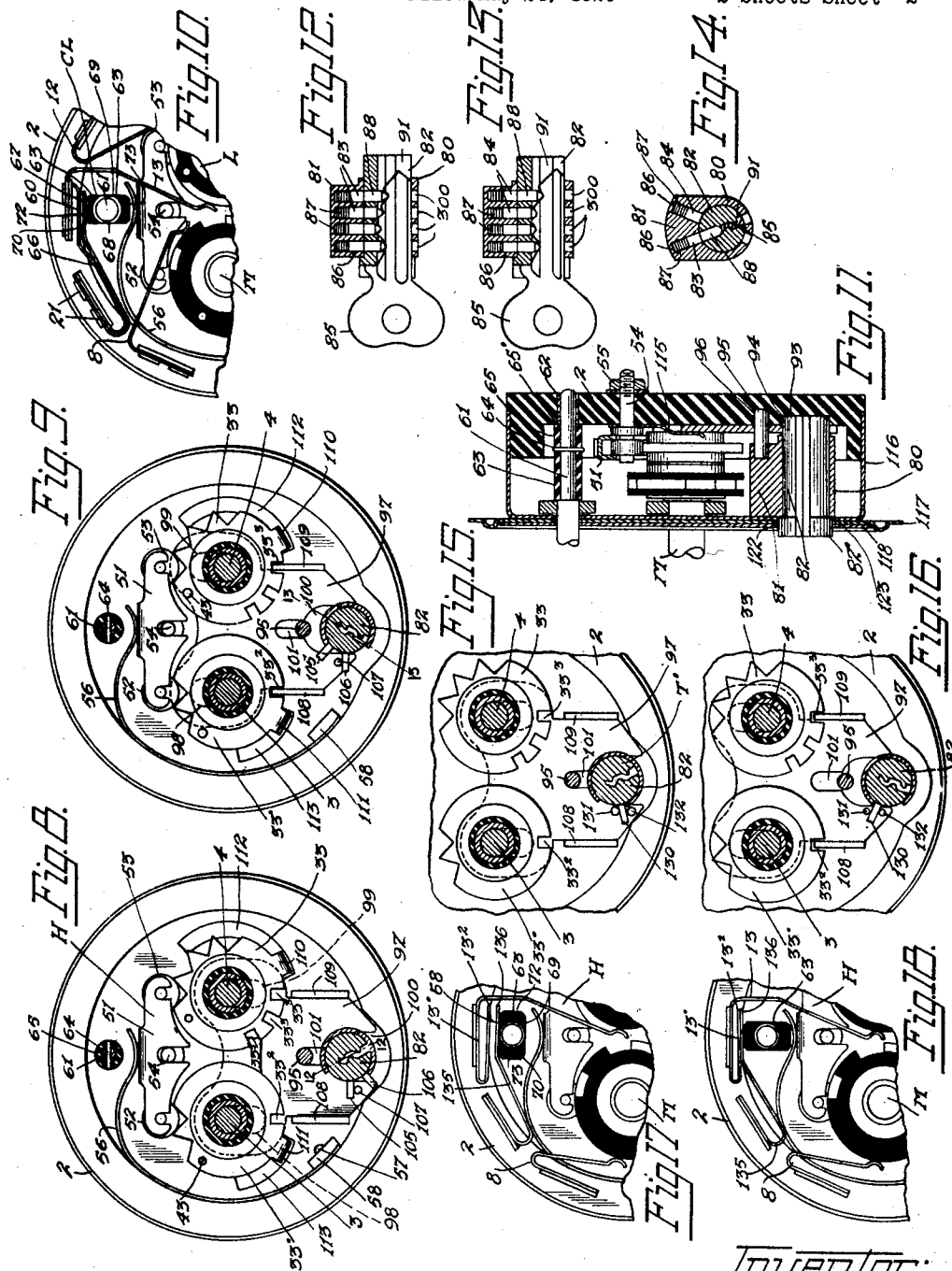
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LOCK FOR IGNITION AND LIGHTING SWITCHES

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2 Sheets-Sheet 2



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LOCK FOR IGNITION AND LIGHTING SWITCHES.

Application filed May 24, 1920. Serial No. 333,667.

My invention relates to electrical switches in general, and has to do more particularly with the so-called combination ignition and lighting switches such as are used for controlling the lighting and ignition circuits of an automobile or the like. An object of my invention is to provide a device of the above character which contains novel features of construction and combination of parts, all of which produce a simple, efficient and economical switch structure.

A feature of my invention is the provision of a lock of the pin tumbler type, which is used for locking the lighting and ignition units of the switch against actuation, that is, when the locking unit is in one position, the switch units are free to be actuated, but when the locking element is in its alternate position the switch units are locked against actuation. The pin tumbler cylinder lock of my invention is of novel construction, comprising a tumbler extension provided with two sets of pin tumblers in association with one set of pin tumblers in the key barrel. This method of construction permits the key to be operated through only a small degree of rotation to either lock or unlock the locking element of the switch, and the key may also be withdrawn without the necessity of making a complete rotation of the key barrel, as is the case with the present types of pin tumbler cylinder locks in use.

Another feature of my invention is a novel spring arrangement in association with a rotatable cam button for controlling the actuation of the said springs. The said springs control the cowl light circuit of the switch of my invention, but it is to be understood that it may be used for other purposes without departing from the scope of my invention.

The above features, as well as others, consist in the novel details of construction and combination of parts hereinafter more particularly pointed out in the ensuing specification and in the appended claims.

For a more complete understanding of my invention, reference may be had to the accompanying drawings, in which like reference characters in the several views denote like parts, and in which

Fig. 1 is a plan view of my invention;

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

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

Fig. 4 is an interior face view of the switch-

ing mechanism, the cap of the switch being removed;

Fig. 5 is a left side view of Fig. 4;

Fig. 6 is a right side view of Fig. 4;

Fig. 7 is a bottom view of Fig. 4;

Fig. 8 is an interior face view with parts of the apparatus omitted to more clearly show the locking arrangement, the operating levers being at normal and unlocked;

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

Fig. 10 is a fragmentary view of a portion of the switch structure, illustrating the button which controls the cowl light spring combination in its actuated position;

Fig. 11 is a sectional view along the line 11—11 of Fig. 1;

Fig. 12 is a sectional view of the pin tumbler cylinder lock along the line 12—12 of Fig. 8;

Fig. 13 is a sectional view of the pin tumbler cylinder lock along the line 13—13 of Fig. 9;

Fig. 14 is a sectional view of the pin tumbler cylinder lock along the line 14—14 of Fig. 7;

Fig. 15 is a fragmentary view of a portion of the switch structure illustrating another method of moving the sliding locking plate to a locking or unlocking position;

Fig. 16 is a view similar to Fig. 15, but showing the locking mechanism in its operated position;

Fig. 17 is a fragmentary view of a portion of the switch structure, illustrating another cowl light spring combination controlled by the cowl button showing it in its normal or inoperative position;

Fig. 18 is a view similar to Fig. 17, but showing the cowl springs and button in their operative position; and

Fig. 19 is a sectional view along the line 19—19 of Fig. 4, illustrating the construction of the rotor element of one of the switch units.

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 or off position A and three operative positions B, C and D. In position B the side lights of the automobile lighting system are connected in circuit, in position C the auxiliary lights are connected in circuit, and in position D

the head lights are connected in circuit, but I do not wish to be limited to this particular arrangement, as different combinations can be used without departing from the invention.

5 The ignition switch unit M has a normal or "off" position E and an operative position F, in which position the ignition apparatus is rendered operative, as will be more fully hereinafter described. I also provide locking
10 mechanism which consists preferably of a pin-tumbler, cylinder type lock T, which controls a sliding locking plate LP, which is adapted to lock the lighting and ignition switch units L and M against actuation. The
15 locking mechanism is so arranged that it operates only when the ignition switch unit M is in its normal or "off" position E, but will operate to lock the lighting switch unit L in its positions A, B and C; but when in position D the lock cannot be operated. When the igni-
20 tion switch unit M is in its position F, the lock T can only be turned part way by the key. Now, if the operator attempts to operate the lock T, he is at once aware that the ignition
25 switch unit M is in its operative or "on" position F or the lighting switch unit L is in its "D" position.

The cowl light control button CL and its associated springs are provided for control-
30 ling the circuit of the cowl light, as will be more particularly pointed out in the following specification.

Referring now more in detail to my invention as illustrated, it comprises, preferably,
35 a mounting plate 2 made of any suitable insulating material such as bakelite, and having studs 3 and 4 fastened to it in any suitable manner, as by means of the nuts 5, which nuts 5 have screw-threaded engagement with the
40 threaded portions of the studs 3 and 4, which extend beyond the rear face of the plate 2. The plate 2 is provided with a peripheral ridge 2², extending upwardly from the plate proper. The plate is also provided with a
45 flange upon which the cover cap of the device rests. The stud 3 is provided for the ignition switch unit M and the stud 4 is provided for the lighting switch unit L. Springs 6, 7 and 8 are associated with the ignition switch unit
50 M, and springs 9, 10, 11, 12 and 13 are associated with the lighting switch unit L. Springs 6, 7, 8, 9, etc., are similarly constructed so that, by describing one of them, the construction of the others is readily ap-
55 parent.

A tongue or terminal blade 14 of suitable conducting material is provided with an intermediate reduced portion 15 and a further reduced end portion 16, which reduced por-
60 tions 15 and 16 form shoulders 17 and 18 upon the blade 14. The blade 14 is forced into a suitable opening 19 in the plate 2, which opening is slightly smaller than the intermediate reduced portion 15, so as to provide a
65 force-fit. The blade 14 when in place has its

shoulder 17 engaging the face of the ridge 2² of the plate 2, and the shoulder 18 formed by the end reduced portion 16 protrudes slightly beyond the bottom face of the plate 2, and this protruding shoulder 18 is upset
70 to hold the blades 14 against lateral movement in the opening 19 of the plate 2. The spring 8 is formed out of spring metal and is provided with openings 20 in its one end, through
75 which screws 21 pass, the said screws 21 having screw-threaded engagement with suitable tapped openings in the blade 14, to secure the said spring 8 to the blade 14.

The free end of the spring 8 is provided with a rounded or curved end portion which
80 forms a contacting end which engages its associated switch unit. The portion 16 of the blade 14 which extends beyond the bottom surface of the plate 2 forms a connecting terminal for the spring 8 and is provided with a
85 saddle or clamping member 22, which provides means for securing an electrical conductor to the terminals formed by the portion 16. Screws 23 are provided with washers 24,
90 which screws 23 have screw-threaded engagement with the clamping members 22 for securely holding the electrical conductor between the portion 16 of the blade 14 of its
95 associated spring 6 and the said clamping member 22.

Associated with the combination ignition switch as illustrated, I show an overload relay OR, which is used for purposes well
understood. The relay OR is secured to the supporting plate 30 in any suitable manner,
100 and its supporting plate 30 is in turn secured to the studs 3 and 4 by means of the nuts 31, which nuts 31 have screw-threaded engagement with the threaded portions of the studs 3 and 4.
105

The lighting switch unit L and the ignition switch unit M are each provided with a rotor element, and as both are similar in construction, a description of one of them will suffice. The rotor element associated with the
110 lighting switch unit L comprises a supporting stud 32, a holding disc 33 for holding the lighting switch unit L in its different positions, washers 34 and 35, a sleeve 36 of suitable insulating material, cams 37 and 38 of
115 suitable insulation material, a cam 39 of suitable conducting material and a washer 40, which members are all supported upon the stud 32. The disc 33 is provided with an orifice of a size to permit its being slipped over
120 the body portion 41 of the stud 32, and when the said member 33 is in place, it rests against the shoulder portion 42 of the stud 32. The insulation sleeve 36 is provided with an orifice of a size to permit its being slipped over
125 the body portion 41 of the stud 32, the said sleeve 36, when in place, resting against the member 33. Washers 34 and 35 are provided with orifices of a size to permit their being
130 slipped over the insulation sleeve 36, and the

cams 37 and 38, which are of suitable insulation material, are also provided with orifices of a size to permit their being slipped over the insulation sleeve 36. The metallic cam 39 is also provided with an orifice of a size to permit its being slipped over the sleeve 36 and, when in place, rests between the two insulation cams 37 and 38. The washer 40 is also provided with an orifice of a size to permit its being slipped over the body portion 41 of the stud 32, and when the member 33, washers 34 and 35, cams 37, 38 and 39 and washer 40 are in place, a portion of the body 41 of the stud 32 protrudes slightly beyond washer 40, and this portion is upset or spun over, securing the said members upon stud 32 against displacement.

To prevent the members 33, 34, 35, 37, 38, 39 and 40 from rotating about the stud 32, I provide a pin 43, which is secured to the member 33, the said pin 43 extending through the members 37, 38 and 39, but insulated from the said members 39 by means of a sleeve of insulation 44 through which the said pin 43 extends. The member 33 is also secured to the stud 32 by means of a pin 45, the said pin 45 passing through the member 33 and the shoulder portion 42 and the stud 32. The stud 32 is also provided with a central opening 46 of a size to receive the supporting stud 4 of the lighting switch unit L, to permit the rotation of said lighting switch unit rotor. The insulation cams 37 and 38 are provided with wing portions 47 and 48, and the metallic member 39 is provided with wing portions 49 and 50, which wings cooperate with the free ends of the springs 9, 10, 11, 12 and 13, when the lighting switch unit L is moved to its several positions, as is readily understood.

The cowl light control unit CL comprises a leaf spring 60 secured to a terminal blade 14 by means of screws 21 as already described, and I illustrate the cowl unit CL in Fig. 4 in its normal or inoperative position. A shaft 61 rotatably supported by the mounting plate 2 in a suitable bearing 62 has secured thereto a rectangular shaped cam member 63, which cam member 63 is held in place thereon by means of a pin 64. The cam member 63 is provided with a reduced cylindrical portion 65, which forms a shoulder 65', which rests against the face of the mounting plate 2. To hold the cam member 63 in either its normal or operative positions against rotation, I provide a leaf spring 66 secured to the terminal blade 14 by means of the screws 21. When the cam member 63 is in its normal or inoperative position, the free end 67 of the spring 66 engages a wide face 68 or 69 of the cam 63, depending in which direction it was rotated when placing the said cam 63 in its normal position, and this holds the said cam 63 in its normal position. The cam 63 may be rotated either to

the right or left to move the cowl light spring 60 to its operative position. Upon rotation of the shaft 61, a cam apex 70 of the cam 63 engages the leaf spring 66 and in turn forces the free end 71 of the spring 60 into engagement with the terminal blade 14 of the spring 13. When the apex 70 passes beyond its highest point in its rotation, the tension of the free end 67 of the spring 66 forces the further rotation of the cam 63, producing a snap action. The cam 63 when in operative position has its peripheral face 72 or 73 engaging spring 66 to hold the free end 71 of spring 60 in engagement with the terminal blade 14 of spring 13, as illustrated in Fig. 10. Now, to restore the cam 63 to its inoperative position, it may be rotated to the right or left, causing a cam apex 70 to again engage the free end 67 of the spring 66, and when the apex passes beyond its highest point in its rotation, the tension of the free end 67 of spring 66 is such as to force further rotation, which produces a snap action, again placing the free end 67 of the spring 66 in engagement with a face 68 or 69, depending in which direction the cam was rotated to restore it to its normal position. When the cam is in the position so that the end 67 of spring 66 again engages a face 68 or 69 of the cam 63, the free end 71 of the spring 60 disengages the blade 14 of spring 13, again opening the cowl light circuit.

The holding member 33 is in the form of a notch or toothed disc, and to cooperate with the discs 33 and 33' to yieldingly hold the lighting and ignition switch units L and M, respectively, in any of their different positions, I provide a holding device H which comprises a centrally pivoted member 51, which carries rotatable rollers 52 and 53 in its bifurcated ends, said rollers 52 and 53 operating in connection with the discs 33' and 33 of the ignition switch unit M and the lighting switch unit L. The member 51 is pivotally supported at its center by a stud 54, which is suitably fastened to the mounting plate 2 by means of a nut 55, which nut 55 has screw-threaded engagement with the threaded portion of the stud 54. A spring 56 for yieldingly holding member H against the discs 33 and 33' of the switch units L and M is provided. The free end of the spring 56 rests against the bridge of the member H, the other end of the spring 56 being fastened to the mounting plate 2 by means of a screw 57 and nut 58. When one of the switch members is operated, the teeth of its disc are rotated against its associated roller, due to the action of the spring 56, and as the disc 33 advances the roller acts upon the next tooth notch so as to give a snap action to the switch member and at the same time hold the actuating members of the switch in place.

A locking arrangement is provided where-

by the lighting and ignition switch units L and M may be locked in their different positions. I, therefore, provide a pin tumbler cylinder lock T which cooperates with a sliding locking plate LP. The cylinder lock T comprises a lock case 80, which lock case 80 is provided with a tumbler-extension 81, and rotatably mounted in the lock case 80 is the key barrel or cylinder 82. The pin tumbler lock T comprises two sets of pin tumblers 83 and 84, angularly displaced in relation with each other, the two sets of tumblers 83 and 84 being placed at a forty-five degree angle from each other so that the key 85 is rotated through only forty-five degrees of movement to place the lock in a locking or unlocking position. The two sets of pin tumblers 83 and 84 rest in suitable orifices 86 in the tumbler extension 81 and are spring-pressed toward the cylinder 82 by means of the coil spring 87. The pin tumbler sets 83 and 84 are in duplicate for purposes as will presently be described. The key barrel or cylinder 82 also contains a set of pin tumblers 88 which are operatively associated with the pin sets 83 and 84 in the tumbler extension 81. When the key barrel 82 is in the position illustrated in Fig. 8, the said barrel 82 is in its unlocking position, and when the key 85 of the lock is inserted in the key slot 91 of the key barrel 82 the tumblers 88 are moved by the contour of the key edge in alignment with the tumblers of set 83 to permit the key 85 and barrel 82 to be rotated to the right through forty-five degrees of rotation, in which position the tumblers 88 of the barrel are in alignment with the tumblers of set 84. The key may now be withdrawn, and this places the barrel 82 in a locking position, as illustrated in Fig. 9. To place the barrel 82 in an unlocking position, the key 85 is again inserted in the key slot 91 and the tumblers 88 are moved in alignment with the tumblers of set 84 by the contour of the key edge, and when the key 85 is fully inserted it may be rotated to the left through forty-five degrees of rotation which places the tumblers 88 of barrel 82 in alignment with the tumblers of set 83 so that the key may be withdrawn, and permit the key barrel to remain in its unlocking position.

The key barrel 82 extends rearwardly from the casing 80, and this rearwardly extending portion 93 rests in a pocket or depression 94 in the mounting plate 2. The tumbler extension is provided with a pin 95 suitably secured to it, and this pin 95 rests in a suitable orifice 96 of a size to receive the said pin 95. The lock barrel 82 resting in the pocket 94 and the pin 95 in the orifice 96, centers the lock in the said pocket 94 and prevents rotation of the same in the said pocket 94, when the said key 85 of the lock is turned. The sliding locking plate LP, which is provided for locking the switching units L and M so

that they cannot be operated, consists of a plate 97 provided with elongated slots 98 and 99, through which the studs 3 and 4 extend. The plate 97 is also provided with a U-shaped notch 100 of a size to permit it to span the lock barrel 82 which rests in the pocket 94 in the mounting plate 2, and is also provided with a smaller U-shaped notch 101 of a size to permit it to span the pin 95. The slots 98 and 99 and the U-shaped notches 100 and 101, in association with the studs 3 and 4 and the key barrel 82 and pin 95, form guiding means for the plate 97, when the said plate is moved to lock or unlock the switch units L and M, as the case may be.

To permit movement of the plate 97 when the key 85 is rotated to lock or unlock the switch units L and M, I provide a pair of pins 105 and 106 which are secured to the rearwardly extending portion 93 of the key barrel 82, the said pins 105 and 106 cooperating with a pin 107 which is secured to the sliding locking plate 97 in any suitable manner, the said pin 107 resting between the pins 105 and 106 of the barrel 82. The plate 97 is also provided with angular extensions 108 and 109, which extensions are preferably integrally formed with the said plate 97, the said extensions 109 and 108 cooperating with the discs 33 and 33' of the switching units L and M. I have preferably arranged the ignition switch unit M so that it can only be locked in its normal or inoperative position, and I, therefore, provide a single slot 33² in the disc 33', while the disc 33 of the lighting switch unit L is provided with three slots 33³, 33⁴, and 33⁵, whereby the lighting switch unit L may be locked in its normal or two of its three operative positions. No slot is provided for the fourth operative position of the switch unit L, so that when the lighting switch unit L is in its position D and an attempt is made to lock the switch after the ignition switch unit is restored to its inoperative position, the key can only be turned part way and the operator is at once notified that the switch lever must be turned back to any of its positions A, B or C to enable him to lock the switch, as is readily apparent.

The discs 33 and 33' of the units L and M are provided with angular, downwardly extending arms 110 and 111, which extend into slots 112 and 113, respectively, which slots are cut in the mounting plate 2. The extremities of the respective slots 112 and 113 limit the movements of the switch units L and M in their normal and farthest advanced position.

In Fig. 8 I have shown the locking mechanism and operating members of the lighting and ignition switch units L and M in their normal position and unlocked; and in Fig. 9 I show the locking mechanism operated to lock the switching units L and M against movement, but also show-

ing the mechanism at normal. To lock the switch units L and M, the key of the lock T is inserted and turned to the right causing the pin 106 in the key barrel 82 to engage the pin 107 in the plate 97. Continued rotation of the key 90 in the lock T moves the plate 97 in an upward direction into the position shown in Fig. 9. The extensions 108 and 109 enter the slots 33² and 33³ of the switching units M and L, respectively, preventing the movement of said units. To unlock the switch units L and M, the key is turned to the left, causing the pin 105 to engage pin 107 to move the plate 97 in a downward direction, and this downward movement of the sliding locking plate 97 withdraws the extensions 108 and 109 from the slots 33² and 33³.

To yieldingly hold the plate 97 in its locked or unlocked positions, I provide a flat spring 115 secured between the member H and the plate 2 by means of the stud 54, which holds the plate 97 in its different positions, the free end of the spring 115 engaging the sliding plate 97; the spring 115 also serves to maintain the key barrel 82 in its adjusted positions by preventing movement of the plate 97 which is provided with a pin 107 which engages the pins 105 and 106 on the key barrel 82 to hold it against rotation. A cover or casing 116 is provided for enclosing the mechanism, and a top plate 117 is also provided, as is also a name plate 118, the said cover 116, plate 117 and name plate 118 being held together in any suitable manner and being provided with suitable openings to permit the passage of the studs 3 and 4 and shaft 61 of the cowl control unit CL. Handles 119 and 120 are secured to the studs 3 and 4 in any suitable manner, the said handles 119 and 120 being grasped by the operator to move the switching units L and M to their different operative positions. A knob 121 is also provided which is secured to shaft 61 to facilitate actuation of the cowl light unit cam 63 to place the springs in operative position, as already described. The cover 116 and plate 117 and plate 118 forming a face plate for the switch are also provided with a suitable opening 122 of a size to permit the passage of the forward end or head 82' of the key barrel 82, this opening 122 also forming a bearing for the head 82' of the key barrel 82 when it is rotated by the key.

From the above description, it will be seen that with the cylinder lock mounted with the rearwardly extending portion 93 of the barrel 82 resting in the pocket 94 and the pin 95 resting in the orifice 96 and the barrel head 82' projecting through the opening 122 in the casing 116, the lock will be rigidly secured in place between the casing 116 and the mounting plate 2. The opening through which the head 82' of the key barrel 82 projects and the rear portion 93 of the barrel 82 which rests in the pocket 94 in the mounting

plate 2 both serve as bearings for the barrel 82 when it is rotated by the key, the said pocket 94 also seating the lock in position. The shoulder 123 formed by the barrel casing 80 abuts against the inner surface of the casing 116, preventing displacement of the lock in the pocket 94, and the pin 95 resting in the orifice 96 prevents the lock from rotating as a whole when the key is turned.

From the construction herein described, it will be apparent that it is unnecessary to rigidly secure the lock to any member of the switch or casing, because when the casing is secured to the plate 2 by means of nuts not shown on the drawing, the lock will be clamped between the casing 116 and mounting plate 2. The switch rotors are also held in position by the cover casing.

Referring now to Figs. 15 and 16, I illustrate another method of controlling the sliding locking plate 97 as to its movement to a locking and an unlocking position. In the above figures I only illustrate a fragmentary portion of the switch structure which is the same as described in connection with Figs. 1 to 14, inclusive. The lock T' as shown is of a construction similar to that shown and described in connection with Figs. 1 and 14, inclusive. In the instance of Figs. 15 and 16, I show the barrel extension 93 provided with a pin 130 suitably secured thereto and operatively associated with a pair of pins 131 and 132 suitably secured to the sliding locking plate 97, the said pin 130 of the barrel extension 93 rests between these pins 131 and 132 of the plate 97. Now, when the key is inserted into the key slot 91 of the barrel 82, and rotated, the said barrel 82 is rotated therewith and the pin 130 in the barrel 82 engages the pin 131 secured to the plate 97 and moves the said plate 97 upward, and the extensions 108 and 109 of the plate enter the slots 33² and 33³ of the switching units M and L, respectively, preventing movement of the said units. To unlock the units M and L, the key 35 is rotated to the left and the barrel 82 rotates therewith, causing pin 130 secured to the said barrel 82 to engage the pin 132 secured to the plate 97 and move it in a downward direction, and this downward movement of the sliding locking plate 97 withdraws the extensions 108 and 109 of the plate 97 from the slots 33² and 33³. The spring 115 serves to maintain the locking plate 97 in its adjusted positions and through the agency of the plate 97 and pins 131 and 132 secured thereto and pin 130 on the key barrel 82 the key barrel 82 is prevented from unauthorized or accidental rotation when the lock is in either a locking or an unlocking position.

Referring now to Figs. 17 and 18, I illustrate another means for controlling the cowl light circuit. In the above figures I only illustrate a fragmentary portion of the switch

structure which is the same as described in connection with Figs. 1 to 14, inclusive. The cam member 63 and its parts as shown are of a construction similar to that shown and described in connection with Figs. 1 to 14, inclusive.

To hold the cam member 63 in either of its operative or inoperative positions against rotation, I provide a contact spring 135 secured to the mounting plate 2 in any suitable manner, and its free end 136, when the cam member 63 is in its normal position, engages a wide face 68 or 69 of the cam 63, depending upon which direction it was rotated when placing the cam 63 in its normal position, as illustrated in Fig. 17. The spring 13' of the light switch unit L is provided with an extension 13² which is bent back so that its extended portion 13² is parallel with the body portion of the spring 13'. The spring 135 and the extension 13² form the circuit closing means for the cowl light circuit. The cam 63 may be rotated in either direction to close the cowl light circuit, and upon rotation of the cam 63 a cam apex 70 of the cam 63 engages the free end 136 of the spring 135 and forces it upward against its normal tension against the extension 13² of the spring 13'. When the apex 70 of the cam 63 passes beyond its highest point in its rotation, the tension of the free end 136 of the spring 135 forces the further rotation of the cam 63, producing a snap action. The cam 63 when in its operative position, in which position it holds the spring 135 and extension 13² in closed relation, is illustrated in Fig. 18, and when in this position the free end 136 of the spring 135 engages either peripheral face 72 or 73 of the cam 63 to hold the cam 63 in its operative position. To open the cowl circuit, the cam 63 is again rotated in either direction, causing a cam apex 70 to again engage the free end 136 of spring 135, and when the apex passes beyond its highest point in its rotation, the tension of the spring 135 causes a snap action and the end 136 of spring 135 again engages a face 68 or 69 of the cam 63.

From the foregoing it is at once apparent that I have so arranged the lock mechanism that it is never necessary to rotate the lock barrel one complete revolution. With lock mechanism of the prior art type, a great deal of trouble and inconvenience is encountered in rotating the lock mechanism a complete revolution, and especially so if the lock key is attached to a ring of keys. Also, by constructing the lock barrel so that it does not need to be rotated through three hundred sixty degrees, it is unnecessary to plug up the drill holes 300.

While I have described various forms of my invention, it is to be understood that changes and modifications will readily suggest themselves to those skilled in the art,

and, therefore, I do not wish to be limited to the exact structure as shown, but aim to cover all such changes and modifications as 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 including a face plate, a cylinder lock having a barrel portion and a case, a projection extending from one end of said barrel portion, said projection constructed to be received in an orifice formed in the face plate, a supporting plate provided with a recess, and a pin extending from the case of the cylinder lock into the said supporting plate for preventing rotation of said cylinder lock, said recess forming a bearing for one end of said cylinder lock.

2. A device of the character described including a mounting plate and a cover-cap, a cylinder lock controlled locking plate provided with a slot, a cylinder lock extending through said slot and adapted to be placed between said mounting plate and cover-cap, the cover-cap and mounting plate preventing longitudinal movement of the cylinder lock, and a pin extending from the casing of the cylinder lock into said mounting plate to prevent rotation of the cylinder lock casing.

3. A device including a mounting plate and a face plate, a cylinder lock having a lock barrel and a casing, a locking member having an orifice controlled by said cylinder lock, a recess formed in said mounting plate and an orifice cut in said face plate adapted to receive the lock barrel to hold the lock in position, and a pin extending from the lock casing through the orifice in said locking member and into the mounting plate for preventing rotation of the lock casing.

4. A device of the character described including a pair of supporting plates, one of the supporting plates being provided with a recess and the other supporting plate with an orifice, a cylinder lock having a lock barrel adapted to fit into said recess and orifice, a cylinder lock controlled locking means provided with a slot and a pin extending from the lock barrel casing through the slot in said locking means and into one of said supporting plates to prevent rotation of the cylinder lock casing.

5. A device of the character described including a mounting plate provided with a recess, a cover adapted to fit on to the mounting plate and provided with an orifice, a cylinder lock having a lock case and a key plug, the said key plug extending from the lock case into the said recess and said orifice, the lock case abutting against the cover to prevent movement of the cylinder lock, a locking means provided with a slot and controlled by said cylinder lock, and a pin extending from the lock case through said slot in said locking means and into an orifice in

the mounting plate to prevent rotation of the said lock case.

6. A switch case having manually operable means therein, a cylinder lock within said case for locking said means, said lock constructed to be clamped between opposite walls of said case, and a pin extending into the pin tumbler extension of the case of the cylinder lock and into one of the plates of the switch case for preventing rotation of the case of said cylinder lock, said manually operated means being provided with a slot for receiving the cylinder of said lock.

7. A switch casing comprising a face plate and a mounting plate and having manually operable means therein, a cylinder lock within said casing for locking said means, a key barrel for said cylinder lock extending through an orifice in the said face plate of the plates forming said switch casing, the other end of said key barrel extending into a recess formed in the mounting plate of said switch casing and said recess forming a bearing for the end of the key barrel extending therein; a lock case provided with a pin tumbler extension for said cylinder lock, and a pin extending from the pin tumbler extension into an orifice in said second mounting plate to prevent rotation of the cylinder lock case.

8. A cylinder lock having a case and a key barrel rotatable therein, a key-way cut in said key barrel adapted to receive a key for rotating the key barrel, two sets of pin tumblers for said lock case adapted to cooperate with the said key barrel whereby the key may be removed from the lock barrel in two different positions to prevent rotation of said key barrel, a casing having rotatable means therein, said lock adapted to be secured between the walls of said casing and to lock said means, and means for preventing the rotation of said cylinder lock in its secured position.

9. A cylinder lock of the character described comprising a lock casing and a key barrel, a key-way in said key barrel adapted to receive a key for rotating the key barrel, tumbler mechanism for said key casing adapted to cooperate with the key barrel so that the key may be removed from the key barrel in a plurality of different positions to prevent rotation of said key barrel in any of said positions, and a pair of members, said cylinder lock clamped between said pair of members whereby said cylinder lock is secured in position.

10. A lock mechanism of the character described including a lock case and a key-controlled rotatable member supported by said key case, a slot cut in said rotatable member adapted to receive a key for rotating the same, cooperating tumbler members for said key case and rotatable member whereby the key may be removed from the rotatable mem-

ber in a plurality of positions to prevent rotation of the same after the removal of said key, a rear mounting member having means secured thereto adapted to be operated by said lock mechanism, and an enclosing casing for engaging said mounting member, said lock mechanism clamped between said mounting member and said casing against rotation and lateral movement.

11. A key device of the character described including a key case and a key barrel rotatably supported in said key case, a slot cut in said key barrel adapted to receive a key for rotating the key barrel, pin tumblers carried by said key barrel, two sets of spring-pressed pin tumblers supported by said key case for cooperation with the pin tumblers of the key barrels whereby the key may be removed from the key barrel when the pin tumblers of the key barrel are in operative relation with either set of said spring-pressed pin tumblers and the key barrel locked in this position against rotation, a back mounting plate having mounted thereon means to be operated by said key device, and a cover-cap, said key device positioned between said mounting plate and cover-cap and secured therein by said mounting plate and cover-cap against any movement.

12. A lock device of the character described including a lock case and a key barrel rotatable in said case, a key slot in said key barrel adapted to receive a key for rotating the same, a set of pin tumblers carried by said key barrel and rotatable therewith, a plurality of sets of spring plungers carried by said lock case for cooperation with the said pin tumblers carried by said key barrel whereby said key may be withdrawn from said key slot in a plurality of positions of the key barrel to prevent rotation of said key barrel, a mounting plate having means adapted to be locked by said lock device, and a cover-cap for enclosing said means, said lock device clamped in position against movement between said mounting plate and cover-cap.

13. A key device of the character described provided with a key case and a key-controlled barrel, cooperating mechanism for said key case and key barrel whereby the key barrel may be locked in a plurality of positions, and a mounting plate having means adapted to be locked by said key device, and a cover-cap for enclosing said means, said key device clamped in position against movement between said mounting plate and cover cap.

14. A key device of the character described including a key case and a key barrel, a key-way cut in said key barrel adapted to receive a key for controlling the same, a lock bolt adapted to be controlled by said key barrel, cooperating mechanism for the key case and key barrel whereby the lock bolt may be moved to either one of two positions without rotating the key barrel a full revolution, and

the key withdrawn when the lock bolt is in either of its positions, a member carrying means to be operated by said key device, another member for enclosing said means, said key device clamped in position between said member and said other member against endwise movement, and means on said key device for engaging said first member to prevent rotation of said key device.

15. A device of the character described including a mounting plate and a cover-cap, a cylinder lock adapted to be placed between said mounting plate and cover-cap, the cover-cap and mounting plate preventing longitudinal movement of the cylinder lock, a pin extending from the casing of the cylinder lock into said mounting plate to prevent rotation of the cylinder lock casing, a lock bolt controlled by said cylinder lock, and a slot cut in said lock bolt through which the cylinder of said lock extends.

16. A device including a mounting plate and a face plate, a cylinder lock having a lock barrel and a casing, a recess formed in said mounting plate and an orifice cut in said front plate adapted to receive the lock barrel to hold the lock in position, a pin extending from the lock casing into the mounting plate for preventing rotation of the lock casing, a lock bolt controlled by said cylinder lock, and a slot cut in said lock bolt through which the cylinder of said lock extends.

17. A key device including a key-controlled barrel, cooperating mechanism associated with said barrel whereby the key may be withdrawn when said barrel is in a plurality of positions, and spring-controlled means including a lock bolt, and a plurality of pins on said bolt, cooperating with a pin on said barrel to yieldingly hold it in position to which it is turned by the key.

18. A key device including a key barrel, a key-way in said barrel adapted to receive a key for controlling the same, a lock bolt adapted to be controlled by the turning of said key barrel, cooperating mechanism whereby the lock bolt may be moved to either of two positions and the key withdrawn when the lock bolt is in either of its positions, means yieldingly holding the lock bolt against being shifted, said cooperating mechanism linking said bolt and said barrel so that said means also yieldingly holds said barrel.

19. A key device of the character described including a key-controlled barrel, cooperating mechanism whereby the key may be withdrawn when said barrel is in either of two positions, one of said positions being an unlocking position, and cooperating spring-pressure apparatus including a lock bolt, and a plurality of pins on said bolt and said key barrel cooperating to yieldingly hold said barrel when in unlocking position against actual displacement.

20. A lock mechanism, including a key-controlled rotatable member, a case in which said rotatable member is supported, tumbler apparatus for said rotatable member, a recess for said case cooperating with said tumbler apparatus to permit withdrawal of said key when said rotatable member is at one point of revolution, a recess for said case cooperating with said tumbler apparatus to permit withdrawal of said key when said member is at a different point of revolution, and pressure means including a spring pressed lock bolt, and a plurality of pins on said lock bolt and said member tending to hold said member at either point of revolution.

21. A switch case having manually operable means therein, a lock mechanism for locking said means including a key and a member rotatable thereby, cooperating mechanism for said member whereby it may be locked in a plurality of positions of revolution and the key withdrawn, and apparatus including pressure means consisting of a spring pressed lock bolt and a plurality of pins located on said lock bolt and said member comprising a frictional cooperating contact tending to hold said member in any of said positions.

22. A switch case having manually operable means therein, lock mechanism for locking said means including a key and a member adapted to receive and be rotated by said key, cooperating means whereby said key can be removed from said member at two different points of rotation, and pressure means including a spring pressed lock bolt, and a plurality of pins located on said lock bolt and said rotatable member adapted to form a frictional contact tending to hold said member in position to which it is rotated.

23. A switch having manually operable means, a lock mechanism for locking said means having a key removable in two different positions of revolution, a lock bolt adapted to be controlled by said mechanism, and pressure means tending to hold said bolt in position to which it is moved, a plurality of pins, said pressure means adapted to hold said lock mechanism in position by means of said bolt and said plurality of pins.

24. A key device including a key case and a key controlled barrel, cooperating mechanism for said key case and key barrel whereby said key barrel may be locked in a plurality of positions, a pin secured on said barrel, spring pressed means including a locking plate, and a plurality of pins on said plate cooperating with said pin on said barrel to yieldingly hold it in position when the key is in the barrel.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 20th day of May, 1920.

WILLIAM KAISLING.