

May 27, 1924.

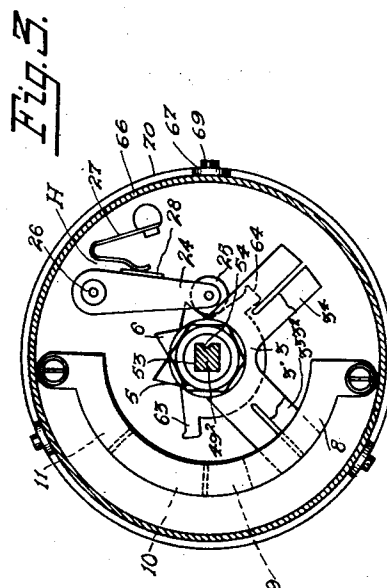
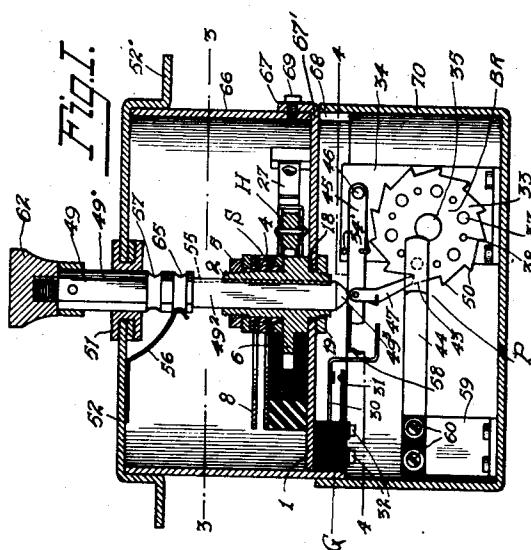
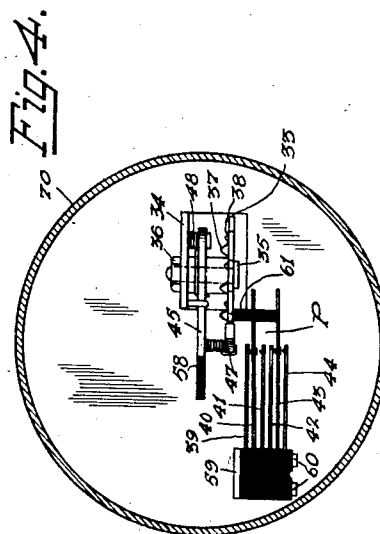
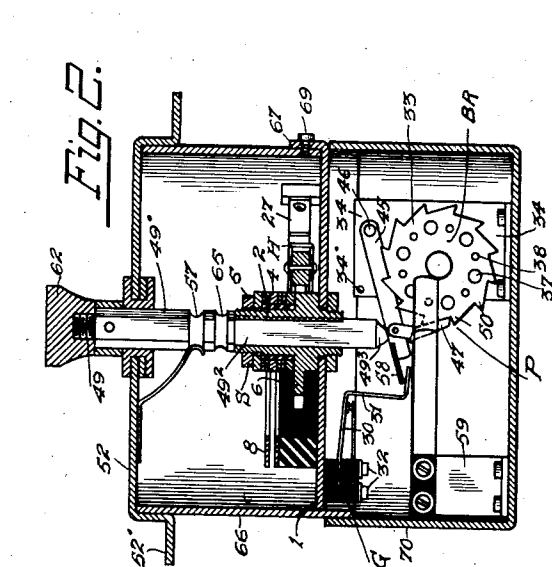
1,495,829

G. A. YANOCHOWSKI

LIGHTING AND IGNITION SWITCH

Filed April 12, 1920

2 Sheets-Sheet 1



*Inventor:*  
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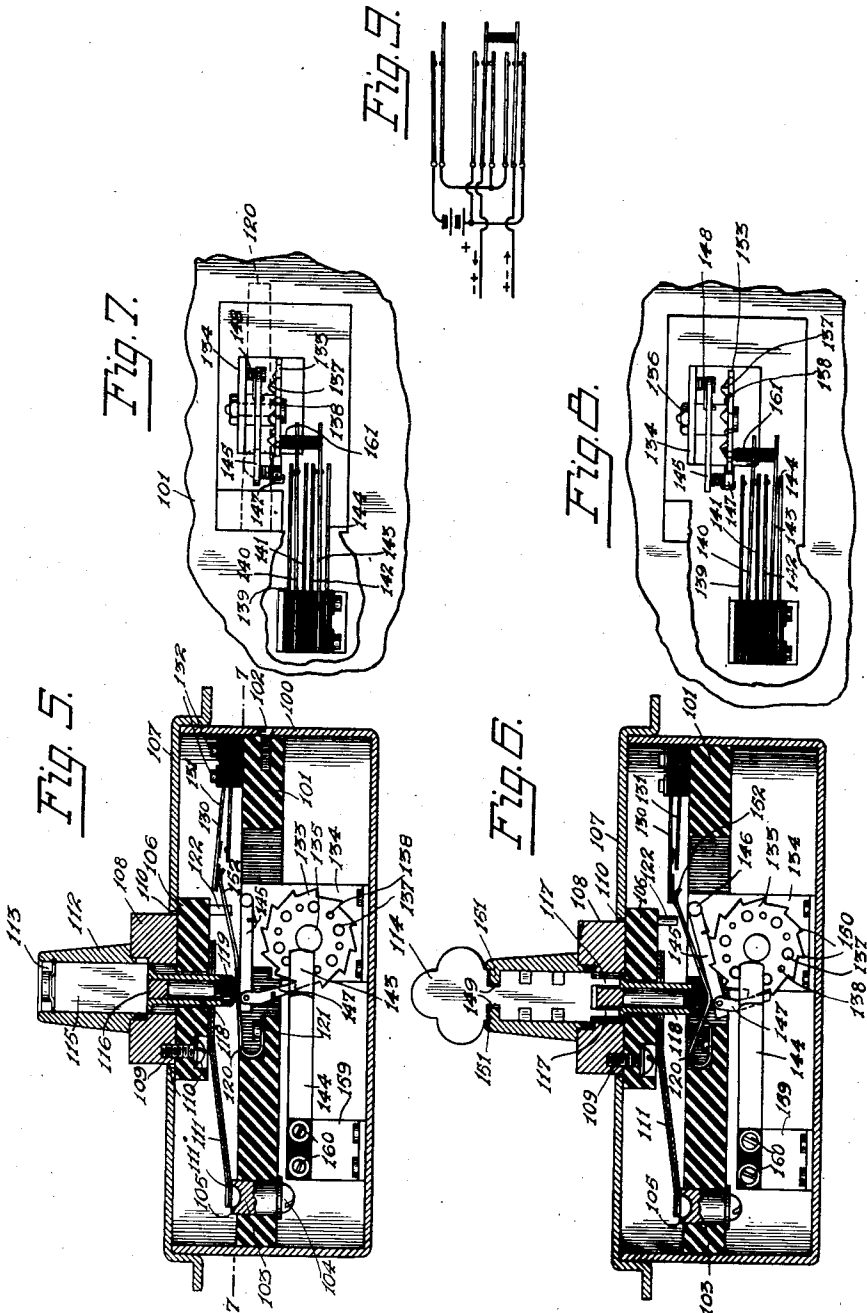
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2 Sheets-Sheet 2



Inventor:  
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Attorney.

## UNITED STATES PATENT OFFICE.

GEORGE A. YANOCHOWSKI, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCH-BOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## LIGHTING AND IGNITION SWITCH.

Application filed April 12, 1920. Serial No. 373,448.

*To all whom it may concern:*

Be it known that I, GEORGE A. YANOCHOWSKI, a citizen of the United States, and residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Lighting and Ignition Switches, of which the following is a specification.

My invention relates to electrical switches and has to do more particularly with combination lighting and ignition switches for automobiles, such as are generally provided for control by the operator, and the general object of my invention is to provide a unitary structure including both a lighting and an ignition control switch which embodies desirable features and advantages all in a simple, compact, efficient and economical manner.

Lighting and ignition switches of the type now commonly used have two separate actuating members for operating the switches, one for controlling the lighting circuit and the other for controlling the ignition circuit, and they are generally provided with more or less complicated locking means for locking the switches in their different operative positions.

An object of my invention is the provision of a switch of the above type which eliminates the complicated locking mechanism, but is so arranged as to prevent its switches from being moved from one position to another unless the operator is provided with the key or operating means for performing the different functions of the switch.

A feature of my invention is the provision of a key or actuating member which controls both the lighting and ignition switches in a simple and efficient manner. Another feature of my invention is the provision of means whereby the insertion of the key or operating handle operates the ignition switch and at the same time actuates means which alternately reverses the current in the ignition circuit. The above named features, as well as others, which appear in my invention will be more particularly pointed out in the ensuing specification and the appended claims.

Referring now more particularly to the accompanying drawings in which I illustrate my invention, and in which like reference

characters and, in the several views denote like parts, and in which—

Fig. 1 is a central sectional view of one form of switch embodying my invention with the key or operating handle in one position;

Fig. 2 is a view similar to Fig. 1, showing the operating handle or key in its fully operated position;

Fig. 3, is a sectional view along the line 3—3 of Fig. 1;

Fig. 4 is a sectional view along the line 4—4 of Fig. 1;

Fig. 5 is a central sectional view of another form of switch embodying my invention with the key or operating handle removed;

Fig. 6 is a view similar to Fig. 5, but showing the operating handle or key in place;

Fig. 7 is a sectional view along the line 7—7 of Fig. 5, showing the polarity reversing springs in one position;

Fig. 8 is a sectional view similar to Fig. 7 and showing the polarity reversing springs in an alternate position; and

Fig. 9 shows one circuit arrangement.

Referring now more in general to the unitary switch mechanism as illustrated in Figs. 1 to 4, inclusive, it comprises a light switch S having a normal and a plurality of operating positions whereby the different combinations of lights may be connected in circuit. I also provide an ignition switch G in the form of a pair of leaf springs normally open and which when suitably closed bring the ignition apparatus in circuit, as will be more fully hereinafter described. The lighting switch S is so arranged that it may be left in any one of its plurality of operating positions, and the ignition circuit interrupted without affecting the position of the lighting switch S. A battery reversal unit BR is provided and is actuated each time the key or operating handle is inserted to reverse the polarity of the battery ignition circuit, all of which will be more fully hereinafter described.

With this general understanding of my invention as illustrated, I will now describe it more in detail. A mounting plate 1 is provided for carrying a rotatable switch supporting member S, as shown in Fig. 1, which

member S comprises a shaft 2 which carries a pair of insulatingly mounted wipers 3 which are separated, although electrically connected by a washer 4, the said wiper 3 and washer 4 being clamped upon the shaft 2 by means of a nut 5 which has screw-threaded engagement with the upper portion of the shaft 2.

I provide a device for yieldingly holding the light switch S in its different operating positions, this device including a notched or serrated disc 6, which is preferably integral with the shaft 2, and an arm 24 provided with a roller 25 for co-operating with the member 6 in a manner to be more fully hereinafter described. The wipers 3 are preferably constructed of two parts electrically united by a washer 4 as before mentioned, the upper wiper comprising parts 3' and 3<sup>2</sup>, and the lower wiper comprising parts 3<sup>3</sup> and 3<sup>4</sup>, the upper blades 3' and 3<sup>2</sup> co-operating with the common segment 8 while the lower blades 3<sup>3</sup> and 3<sup>4</sup> co-operate with the segments 9, 10 and 11.

The light switch S, as a whole, is rotatably supported in an annular orifice 18 in the mounting plate 1 and held against longitudinal movement by means of a nut 19, which has screw-threaded engagement with the lower portion of the shaft 2. In order to yieldingly hold the light switch in any of its plurality of operative positions, I provide a holding device H, comprising an arm 24 carrying a rotatable roller 25 adapted to cooperate with the serrated disc 6, the said arm being pivotally supported at its other end by means of the stud 26 carried by the plate 1. A spring member 27 rests upon the connecting bridge 28 of the arm 24, and the spring 27 presses the roller 25 against the serrated disc 6 so that when the light switch is operated, a tooth of the notched disc 6 presses against the roller 25 forcing it outwardly against the action of the spring 27, and as the disc 6 advances the roller 25 acts upon the opposite face of the tooth to give a quick snap action to the switch, and thereafter operates to maintain the switch S in its operated position. For a further understanding of the light switch, reference may be had to the copending application Serial No. 89,013, filed April 5, 1916. The plates 8, 9, 10 and 11 are provided with terminals to which may be fastened the connecting wires.

Referring now to the ignition switch, it comprises a pair of resilient leaf spring members 30 and 31, insulatingly mounted upon the mounting plate 1 in any suitable manner, as by means of the screws 32. The polarity reversing mechanism P of the ignition switch comprises an interrupter disk 33, rotatably mounted upon a supporting bracket 34 by means of the bolt 35 and nut 36. The interrupter disk 33 is provided with a plurality of depressions or recesses

37 and 38, formed in the disk 33 by means of a suitable forming operation. The depressions 37 are of greater depth than depressions 38, the said depressions 37 and 38 co-operating with the battery reversal springs 39, 40, 41, 42, 43 and 44 for purposes as will presently be described. An arm 45 pivotally supported upon the bracket 34 by means of a pivot pin 46 carries a pawl 47 which co-operates with the interrupter disk 33. The arm is held against a stopper 34' by means of a coil spring 48 which is coiled about the pivot pin 46, one end of the spring 48 being secured to the bracket 34, and its other end engaging the arm 45. The arm 45 is in the position shown in Fig. 1 when the key or operating handle 49 has been withdrawn. a plurality of teeth 50 are formed upon the periphery of the disk 33, the said teeth 50 being operatively associated with the pawl 47, which pawl 47 is spring pressed into engagement with the teeth 50 of the disk 33.

The actuating plunger or operating handle 49 is divided into two portions, the upper portion 49' being preferably hexagonal in shape and cooperates with the collar 51, which is rotatably secured to the cap 52 in any suitable manner. The lower portion 49<sup>2</sup> is square in shape, and cooperates with a rectangular orifice in the shaft 2 of the light switch. The shaft 2 of the light switch S has a square orifice 53 extending its full length, one side of which is provided with a bead or rib 54 extending its length, and the square portion 49<sup>2</sup> of the handle 49 is provided with a groove 55 of a size and shape to receive the bead 54 of the square opening 53 of the light switch shaft 2.

When the operator inserts the key or handle 49 into the collar 51, the operator rotates the handle, due to the rotatable collar, until the groove 55 in the portion 49<sup>2</sup> of the handle 49 coincides with the bead 54 in the shaft 2 of the light switch S, and when the key 49 is in this position it may be further longitudinally operated to bring its end 49<sup>3</sup> into engagement with the pivoted arm 45. The continued longitudinal movement forces the arm 45 downward and as the pawl 47 is in engagement with a tooth 50 of the disk 33, the disk 33 is rotated the distance of one tooth. The longitudinal movement of the key is limited by a shoulder formed by means of the hexagonal portion 49' and the square portion 49<sup>2</sup>, and this shoulder engages the end of the shaft 2 of the light switch S. This serves as a stop, and to hold the key 49 in this position against longitudinal movement, a spring 56 secured to the cap 52 has its free end resting in an annular groove 57 cut in the portion 49' of the handle 49. The arm 45 at its free extremity carries an insulation strip 58 which when the arm 45

moves in a downward direction upon the insertion of the key engages the spring 30 to move it into engagement with its companion spring 31, thus closing the ignition circuit contacts. The depressions in the disc are of such a depth as to prevent the disc from rotating backward when the key is withdrawn. The disc always rotates in the same direction and reverses the current in the ignition circuit upon each insertion of the key. The movement of the key or removable handle from the position shown in Fig. 1 to the position shown in Fig. 2 substantially simultaneously closes the ignition circuit and reverses the current flow therein. The polarity reversing springs 39, 40, 41, 42, 43 and 44 are insulatingly mounted upon a bracket 59 by means of the screws 60 and are operatively associated with the disc 33. They, of course, are provided with terminal ends, not shown. The spring 40 carries an insulation buffer 61 which always rests in a recess 37 or 38, as the case may be, and as illustrated in Fig. 1, I show it resting in a depression 37, allowing the contacts to assume the position as shown in Fig. 4. When the key 49 has been fully inserted, as illustrated in Fig. 2, and the disc 33 rotated the distance of one tooth as already described, this movement causes the depression 37 to be stepped from under the buffer 61 and bring the shallower depression 38 in position under the buffer 61. When in this position, the contact springs 39, 40, etc., assume their alternate positions, due to the depression 38 being shallower than 37. The movement of the contact springs 39, 40, etc., to their alternate position brings about the automatic reversal of the direction of current flow, thereby avoiding the pitting of the vibrator or interrupter contacts.

To move the lighting switch S into any one of its plurality of positions, the operator grasps the knob 62 and rotates it in a direction to light any particular combination of lights that is desired. The movement of the key 49 rotates the wipers 3 into engagement with different segments to close circuit arrangements to give the combination of lights desired. The light switch S is held in its operated position by means of the yielding holding device H, as before described. To limit the movement of the switch S in a clockwise direction, or a counter-clockwise direction, beyond its fully advanced position or its normal inoperative position, I provide stops 63 and 64 upon the notched disc 6, and preferably integral with the same which engage the roller 25 to prevent further movement in either direction.

Now should the operator wish to open the ignition circuit and still keep any combination of lights, all that is necessary is

to longitudinally move the key 49 until the key 49 is in the position illustrated in Fig. 1, in which position the spring 56 rests in an annular groove 65 in the portion 49' of the key 49. When the key 49 is in this position, the arm 45 is permitted to move upward against the stop 34', due to the spring 48. The pawl 47 pivotally supported upon the arm 45 engages another tooth 50 on the disc 33 and the insulation buffer 58 upon the forward end of the arm 45 disengages the spring 30, permitting the ignition contacts 30 and 31 to open and interrupt the ignition circuit. Should the operator desire to leave his car standing at any place for any length of time, he disassociates the actuating member or key 49 from its casing by entirely removing it therefrom, thereby opening the ignition switch, while permitting the lighting switch S to remain in any desired position. When the key is thus removed, the ignition switch is inaccessible to any person other than the one provided with the proper combination key, as is also the lighting switch S. When the key is again fully inserted the end 49<sup>3</sup> engages the arm 45, moving it in a downward direction rotating the disc 33 the distance of one tooth, and moving the depressions 37 or 38, as the case may be, from under the buffer 61, and moving a depression 37 or 38 under the buffer 61 to move the springs 39, 40, etc., to a position opposite to that in which they were in when the key was withdrawn, thereby reversing the current flow from the battery and at the same time closing the ignition circuit.

I provide a casing 66 in the form of a cylindrical tube for enclosing the switch apparatus, the said casing 66 forming the supporting means for the mounting plate 1. The mounting plate 1 has a plurality of ears 67 struck up at right angles to the face of the said plate 1, the said ears 67 aligning with suitable slots 68 cut in the casing 66, so that when the mounting plate 1 is inserted in the casing 66 the portion 67' of the ears 67 enter the slots 68 in the casing 1. Suitable holes are provided in the ears 67 to receive screws 69 which have screw-threaded engagement with tapped openings in the casing 66, thus securing plate 1 and its parts in the casing 66. A cap 70 is provided for enclosing the lower portion of the switch structure, and is held in place upon the casing by means of suitable screws. An orifice is provided in the cap 70 through which the connecting wires extend. The brackets 59 and 34 which support the polarity reversing springs 39, 40, etc., and the disc 33, arm 45 and pawl 47 are secured to the cap 70. A front cover cap 52 is provided which fits over the opposite end of the casing 66 and is provided with an integrally formed flange

52' for fastening the device as a unit to any desirable mounting member.

From the foregoing, it is immediately apparent that I have produced a device in which the key or removable handle not only controls the lighting switch but also controls the ignition switch and that upon each actuation of the said key the current flow in the ignition circuit is reversed.

Referring now to Figs. 5 to 8, inclusive, I illustrate my invention adapted for use in another form of switch in which a cup-shaped casing 100 is shown which contains the switch mechanism. A disc 101 of suitable insulation is provided, and is of a size to be slipped into the cup-shaped casing 100, and secured thereto in its desired position by means of screws 102 which pass through suitable openings in the casing 100, and has screw-threaded engagement with suitable tapped openings in the disc 101. A series of metal bushings 103 radially disposed are set in the base 101 and protrude slightly beyond the top and bottom faces of the base 101. The portion of the bushings 103 which protrudes slightly beyond the bottom face of the base 101 are tapped to receive screws 104 which form binding posts for the wiring which leads to the external circuits. The portion of the studs 103 which protrude slightly beyond the top face of the base 101 are provided with depressions 105 for purposes as will be presently described. A switch member or contact disc 106 of insulating material is carried by the cover plate 107 and has a hub 108 secured thereto by means of the screws 109 which fit within a suitable opening 110 in the cover plate 107. Secured to the bottom of the disc 106 is a sheet metal spider 111 having radial arms 111' with their ends convex so as to fit the depressions 105 in the protruding studs 103, the said spider 111 being preferably in duplicate to produce a more substantial spring construction. The spring action of the radial arms 111' of the spider 111 in bearing upon the studs 103 serves to hold the disc 106 in its bearing relation with the cover plate 107 in the opening 110. A handle 112 is countersunk in and secured to the hub 108 and is provided with a key hole slot 113 through which the key 114 may pass and occupy the slot which extends entirely through the cylindrical upper portion of the key guide 115 fitting in the cylindrical opening of the handle 112. The key guide 115 besides its split cylindrical upper portion has a boss 116 at its lower end which forms a connection for the lower ends of the two sections of the split cylindrical portion. Parallel fingers 117 which project from the end of the key 114 straddle the opposite sides of the boss 116 and engage the flanged upper end of the thimble or tubular plunger 118 which fits on the boss 116. The plunger

118 has a boss 119 at its lower end which engages the spring 120. The spring 120 is suitably secured to the disc 101 by means of the screw 121. The spring 120 normally presses the plunger 118 upwardly, and is held thereby against the bottom of the cylindrical upper portion of the key guide 115 when the key is removed. Locking pins 122 project from the bottom surface of the disc 106 in position to receive the spring 120 between them when the key is withdrawn from the key guide to lock the light switch against movement.

Referring now to the ignition switch, it comprises a pair of resilient leaf spring members 130 and 131, insulatingly mounted upon the plate or disc 101 in any suitable manner, as by means of the screws 132 and springs 130 and 131. The polarity reversing mechanism comprises a disc 133 rotatably mounted upon a bracket 134, by means of the bolt 135 and nut 136. The disc 133 is provided with a plurality of depressions or recesses 137 and 138, formed in the disc 133 by means of a suitable forming operation. The depressions 137 are of a greater depth than the depressions 138, and the said depressions 137 and 138 cooperate with the battery reversal springs 139, 140, 141, 142, 143 and 144, to reverse the current flow in the ignition circuit. An arm 145 is pivotally supported upon the bracket 134 by means of a pivot pin 146. The arm 145 carries a pawl 147 which cooperates with the disc 133. The arm 145 is held in its normal uppermost position against the spring 120 by means of a coil spring 148 as already described in connection with Figs. 1 to 4. A plurality of teeth 150 are formed upon the periphery of the disc 133, the said teeth 150 being operatively associated with the pawl 147, which pawl 147 is spring-pressed into engagement with the teeth 150 of the disc 133.

Now when the key 114 is inserted into the key slot or guide 115 and moved longitudinally, the parallel fingers 117 straddle the opposite sides of the boss 116 and move the thimble 118 and plug 119 downward. The plug 119 engages the spring 120 and flexes it, and when the key 114 is fully inserted key 114 is given a quarter of a turn to hold it in this depressed position, which is permitted by the notches 149 in the opposite edges of the said key 114. The notches 149 receive the flanged portion 151 of the handle 112 in which the key slot 115 is formed, and the upward pressure of the spring 120 against the plug 119 holds the key 114 in position. The movement of said key 114 moves the thimble 118 and plug 119 to flex the spring 120, causing the arm 145 to move downward, and as the pawl 147 is in engagement with a tooth 150 of the disc 133, the said disc 133 is rotated the distance of one tooth. When the spring 120 is fully flexed, its free end

152 is carried out of the path of the pins 122 so that the switch may be freely turned. The free end 152 of the spring 120, when the key 114 has been withdrawn, rests between the pins 122, and allows the ignition springs 130 and 131 to remain open, but when the key 114 is inserted and the spring 120 is flexed, the free end 152 moves downward, allowing the spring 130 to move downward into engagement with contact spring 131 to complete the ignition circuit.

The polarity reversing springs 139, 140, 141, 142, 143 and 144 are insulatingly mounted upon a bracket 159 by means of the screws 160 and are operatively associated with the interrupter disc 133. The spring 140 carries a buffer 161 of suitable insulation material, the said buffer 161 always resting in a recess 137 or 138, as the case may be, and as illustrated in Fig. 5 I show it resting in a depression 137, allowing the contacts to assume the position shown in Fig. 7. When the key 114 has been fully inserted, as illustrated in Fig. 6, and the disc 133 rotated a distance of one tooth, as already described, this movement causes the depression 137 to be moved from under the buffer 161 and brings the shallower depression 138 in position under the buffer 161. When in this position, the contact springs 139, 140, etc., assume their alternate positions, due to the depression 138 being shallower than the depression 137. The movement of the contact springs 139, 140, etc., to their alternate position brings about the automatic reversal of the direction of current flow and reduces or prevents the pitting of the vibrator or interrupter contacts.

To move the lighting switch into any one of its plurality of positions, the operator grasps the handle 112 and rotates it, moving disc 106 therewith, and as the spider 111 is also secured to the disc 106, its arms engage the studs 103 to allow any particular combination of lights that is desired. The lighting switch is held in its operated position by means of the spring action of the arms of the spider 111, as already described. Should the operator wish to open the ignition circuit and still keep any combination of lights, all that is necessary is to give the key a quarter turn, thus permitting its withdrawal from the key slot 115, and the spring 120 being under tension forces the thimble 118 in an upward direction. The free end 152 of the spring 120 again engages the spring 130 to open the ignition spring contacts 130 and 131, thus interrupting the ignition circuit. The free end 152 of the spring 120 is again moved between pins 122, and when the switch is in this position, the spring 120 resting between the pins 122, prevents turning of the switch handle 112, but still permits the combination of lights to remain. This upward movement of the spring,

120, when the key is withdrawn, permits the arm 145 to move upward and the pawl 147 pivotally supported at the free end of the arm 145 engages another tooth 150 of the disc 133 so that when the key is again fully inserted, the spring 120 is flexed, moving the arm 145 in a downward direction, causing the pawl to rotate the disc 133 a distance of one tooth and moving the depression 137 or 138, as the case may be, from under the buffer 161 and to move the other depression under the buffer 161, thereby moving the springs to a position opposite to that in which they were when the key was withdrawn so as to reverse the flow of current in the ignition circuit.

From the above, it will be seen that when the key 114 is removed from the switch in any position thereof, the switch handle 112 cannot be turned to change the lighting connections and the ignition circuit cannot be closed as it is opened at contacts 130 and 131, due to the free end 152 of the spring 120 engaging the contact spring 130, but as soon as the key is returned, however, the ignition circuit is again closed due to the flexing of the spring 120, causing its free end 152 to disengage the spring 130, permitting the ignition circuit to again close and also allowing the handle 112 of the switch to be freely rotated to establish any other combination of lights that may be desired.

The stationary contacts, while shown as spring contacts, may be stationary terminal posts, the movable contacts only being spring contacts. In Fig. 9 I have diagrammatically shown only one of various circuit arrangements which may be used.

In this switch I provide an extra handle for operating the light switch, but the removable key still controls the opening and closing of the ignition circuit, also the reversal of the current therein, and the locking and unlocking of the light switch.

In illustrating my invention I have chosen preferred forms but it is to be understood that many changes and modifications will readily suggest themselves, and I, therefore, do not desire to be limited to the exact structures 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 combination switch of the character described for automobiles and the like including a lighting switch and a combination ignition and polarity reversing switch, a removable key for controlling the actuation of said lighting switch and adapted when inserted to operate the said combination ignition and polarity reversing switch.

2. In a combination switch a removable

- handle, switch contacts, a rotatable member having contact members for cooperation with said switch contacts, said rotatable member being controlled by said handle, and combination auxiliary ignition and polarity reversing switch contacts controlled by the insertion of the removable handle to reverse the flow of current through said ignition contacts.
3. A switch comprising a base having contacts, a rotary switch member having contact means for differently engaging said contacts, a removable key for locking said rotary switch member against actuation, and a combined ignition and polarity reversing switch actuated by the insertion of said removable key.
4. In a combination lighting and auxiliary polarity reversing switch, a key controlling said lighting switch, a pair of normally opened contacts and means controlled by the insertion of the key for actuating said auxiliary polarity reversing switch to close said contacts and to change the directional flow of current through said contacts upon each insertion of the key.
5. A combination switch comprising a base having stationary contacts, a rotary switch member having contact means for progressively engaging said stationary contacts, a removable key for locking said rotary switch member against actuation, and an auxiliary combination ignition and polarity reversing switch, said combination switch adapted to be actuated to close the auxiliary switch circuit and reverse the flow of battery therein upon each insertion of the key and adapted to open said auxiliary circuit upon the removal of the key.
6. In an electrical switch, a lighting switch provided with stationary contacts and a passive contact for cooperation therewith, a combination ignition and polarity reversing switch, a removable key adapted after insertion to be operated to move said active contact into engagement with the different passive contacts of the lighting switch, said key being adapted when inserted to operate said combination ignition and polarity reversing switch, said key when removed rendering inoperable the actuation of the active light switch contact and rendering ineffective the ignition circuit.
7. In an electrical switch a plurality of circuit contacts, a switch arm engageable with said contacts in succession, a removable key and mechanism arranged to be operated thereby to lock said switch arm in any of its successive positions, and a supplementary polarity reversing switch adapted to be actuated by the insertion of said key to reverse the flow of battery through said supplementary switch.
8. In an electrical switch a rotatable switch shaft adapted to be set to various positions, a supplementary ignition and polarity reversing switch, and a removable handle constructed and arranged to lock said rotary switch shaft against actuation and to operate said supplementary ignition and polarity reversing switch to reverse the directional flow of battery through the ignition switch circuit when inserted.
9. An electrical switch comprising a plurality of contacts adapted to be connected to different circuits, a switch arm movable to any one of a plurality of positions to engage said contacts and control the circuits connected thereto, a second switch including a circuit closer and a polarity reversing switch, key actuated devices adapted to simultaneously unlock said first switch arm and to actuate said second switch to reverse the flow of battery through said circuit closer and a key for actuating said devices.
10. A switch comprising a base having contacts, a rotary switch member having means for engaging the contacts, a removable key for controlling the actuation of said switch member, an auxiliary polarity reversing switch actuated by the insertion of said removable key to reverse the flow of battery through said auxiliary switch.
11. In a combination switch including a lighting switch and a combined ignition and polarity reversing switch, a removable key for controlling the actuation of said lighting switch and to actuate said combined ignition and polarity reversing switch when said key is inserted.
12. In a combination switch including a lighting switch and an auxiliary polarity reversing switch for automobiles and the like, a pair of contacts, a removable actuating member for actuating said auxiliary switch and said pair of contacts upon the insertion of said actuating member to reverse the flow of battery through said pair of contacts, and means controlled by said actuating member for actuating said lighting switch.
13. A combination switch having contacts, a rotary switch member having contact means for engaging said contacts, a removable key for controlling the actuation of said switch member, a polarity reversing switch and a pair of contacts, said polarity reversing switch actuated and adapted to operate said pair of contacts to close a circuit through said pair of contacts and to reverse the flow of current through said contacts in a direction opposite to that in which battery flowed before said polarity reversing switch was actuated upon the insertion of said removable key.
14. In an electric switch, a plurality of circuit contacts, a switch arm engageable with said contacts in succession, a removable key, a combined ignition and polarity reversing switch, and mechanism constructed



ed and arranged to lock said switch arm in any of its successive positions and controlled by said removable key, the actuation of said ignition and polarity reversing switch controlled by the insertion of said key.

15. In an electric switch, a rotatable switch shaft having a longitudinal opening throughout and adapted to be set at various positions, a removable key adapted to engage the opening in said shaft and to rotate said shaft, a contact member for said switch shaft, a combined ignition and polarity reversing switch actuated when said removable key is fully inserted into said rotatable shaft, and a member constructed and arranged to lock said contact member and switch shaft in any position to which the switch shaft may be set by said removable key.

16. In a combination lighting and polarity reversing switch, a pair of normally open contacts, a key-controlled lighting switch, and a polarity reversing switch adapted to be actuated by the insertion of said key to close said pair of contacts and to reverse the flow of battery through said contacts upon each insertion of said key.

17. In a combination switch including a lighting switch having a rotatable shaft and an orifice throughout said shaft, a removable key for engaging said orifice and for rotating said shaft, a combined ignition and polarity reversing switch actuated when said removable key is fully inserted into the orifice of said rotatable shaft.

18. In a combination switch including a lighting switch having a rotatable shaft, an orifice throughout said shaft, a removable key for engaging said orifice and for rotating said shaft, a combined ignition and

polarity reversing switch actuated each time said removable key is fully inserted into the orifice of said rotatable shaft, said rotatable shaft rendered inoperative upon the withdrawal of said removable key.

19. A combination switch including a lighting switch having a rotatable shaft provided with a longitudinal opening throughout, a removable key adapted to be inserted into the opening of said rotatable shaft and to rotate said shaft, a mounting plate having a pair of normally open contacts secured thereto, a polarity reversing switch actuated by the insertion of said removable key and said normally open contacts adapted to close upon the actuation of said polarity reversing switch and to open when said key is removed, said polarity reversing switch reversing the flow of battery current through said pair of contacts upon each insertion of said key.

20. In a combination switch including a lighting switch and a polarity reversing switch, a pair of normally opened contacts operatively associated with said polarity reversing switch, a removable key for actuating said first switch and also adapted when inserted to actuate said second switch to close said pair of contacts and to reverse the flow of current through said contacts so that current will flow through said contacts in a direction opposite to that direction in which current flowed when said contacts were closed by the insertion of said key immediately preceding the last insertion of said key.

Signed by me at Chicago, county of Cook and State of Illinois, this 10th day of April, 1920.

GEORGE A. YANOCHOWSKI.