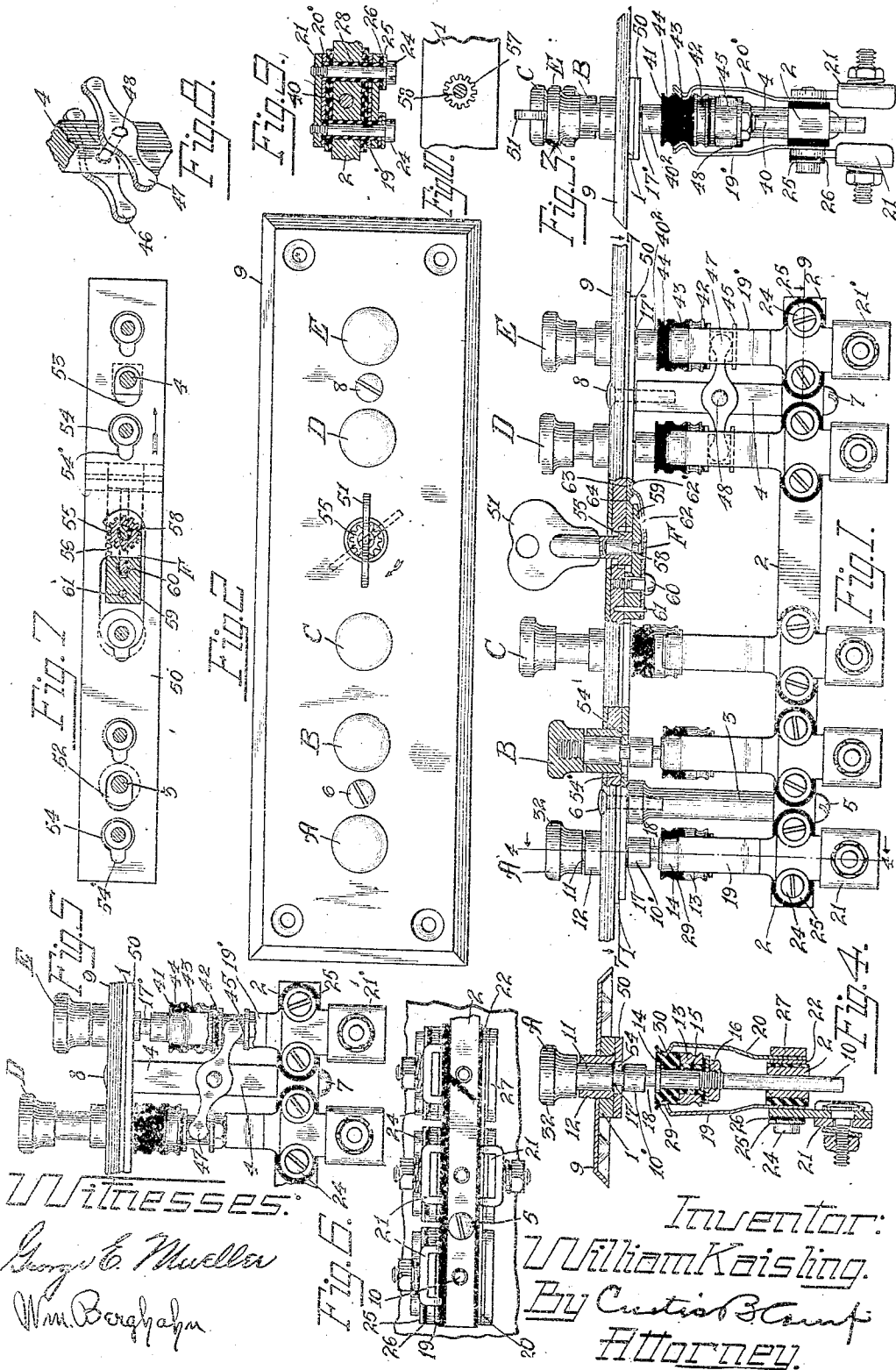


W. KAISLING.
ELECTRICAL SWITCH.
APPLICATION FILED OCT. 27, 1913.

1,293,794.

Patented Feb. 11, 1919.



UNITED STATES PATENT OFFICE.

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

ELECTRICAL SWITCH.

1,293,794.

Specification of Letters Patent.

Patented Feb. 11, 1919.

Application filed October 27, 1913. Serial No. 797,411.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification.

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 on automobiles, an object of my invention being to provide a device of the character above referred to which is simple in construction, positive in operation and cheap to manufacture. Certain features thereof will be more particularly pointed out in the ensuing part of the specification and claims.

In the accompanying drawing I have illustrated the preferred embodiment of my invention in which like parts are indicated by like reference characters in the different views and in which—

Figure 1 is a side elevation thereof;

Fig. 2 is a top view of Fig. 1;

Fig. 3 is a right end elevation of Fig. 1;

Fig. 4 is a sectional view along line 4—4 of Fig. 1 looking in the direction of the arrow indicated in connection therewith;

Fig. 5 shows the magneto and battery switch in one of its operated positions;

Fig. 6 is a bottom view of the three independently operable light switches illustrating more particularly the terminal arrangement thereof;

Fig. 7 is a sectional view along the line 7, 7 of Fig. 1 looking downwardly and illustrating more particularly the locking device for the switch actuating members;

Fig. 8 illustrates in perspective the link mechanism for connecting the plungers or operating members of the battery and magneto switch;

Fig. 9 is a sectional view along the line 9 of Fig. 1 illustrating the preferred arrangement of insulating the switch springs from the frame; and

Fig. 10 shows a portion of the frame plate illustrating more particularly the serrated or gear-tooth guiding arrangement for the locking key.

I have preferably provided three independently operable switch operating members or plungers A, B and C and a pair of cooperating members or plungers D, E together with a common locking device F, although it will be apparent that the number of operating members may be varied.

Referring more in general to the form illustrated in Fig. 1, the switches A, B and C have operative and non-operative positions, switches A and B being shown in their non-operative position and switch C in its operative position. As to the so-called magneto and battery switch operating plungers D and E, as illustrated in Fig. 1 both plungers are in normal positions and are so arranged that if one plunger, D for example, is moved out into an operative position, the plunger E is moved to a non-operative position, and vice versa. The locking device F is preferably arranged to lock the plungers A, B and C in either an operative or non-operative position, this arrangement being preferred on account of their use in connection with ordinary lighting circuits on the automobile whereby the different circuits may be locked in their operative or inoperative condition. As to the switches D and E, I preferably arrange to lock their plungers in a normal position only, this being preferable in order to prevent an operator from locking a switch plunger D or E in an operative position by mistake when leaving the car.

Referring now more in detail to the switch construction, a frame comprising elongated top and bottom bars 1 and 2 respectively, and connecting posts 3 and 4, is provided, posts 3 and 4 being preferably fastened to bars 1 and 2 by means of screws 5, 6, 7, 8. An escutcheon plate 9 is also provided being secured to the switch proper by means of the screws 6, 8 which clamp said plate against the frame 1. Each of the plungers A, B and C is preferably of the same construction, this being illustrated more particularly in the sectional view, Fig. 4. A main plunger rod 10 is provided, extending through aligned bearings in the frames, the lower portion of said rod extending through the bar 2 and an upper portion 11, extending through a bushing 12 which is firmly secured to the frame plate 1. Conducting and insulating cams 13, 14 respectively, are secured to the plunger 10, the insulating

cam 14 resting against an annular shoulder on rod 10 and the conducting cam 13 being preferably insulated from the rod 10 by means of an insulating bushing 15, said elements 13, and 14 being clamped in position by means of a nut 16 threaded upon the rod 10. A pair of locking grooves 17, 18, are provided, the groove 17 being adapted for use when a plunger is locked in a non-operative position and the groove 18 being used when the plunger is locked in an operative position. A pair of contact springs 19, 20, are provided for each of the switches A, B, and C, springs 19 being insulated from each other and each provided with a terminal binding post 21. These binding posts are clamped against their corresponding contact springs 19, as indicated in the drawing. The contact springs 20 are insulated from the frame bar 2 but are connected by a common conducting strip 22, shown in Fig. 6 and provided with a common terminal 21.

Fig. 9 which is a section through the line 9, of Fig. 1, illustrates the manner in which the screws, contact springs, and clamping plates are insulated from the frame and from each other. The clamping screws 24 extend through metal and insulating washers 25, 26, and other elements of the switch, then threading into a clamping plate 27 or terminal extension 21 according to whether a terminal 21 is or is not used. The clamping plates 27 receive the threaded ends of the screws 24 in place of the terminals 21 and so act as clamping plates for the spring sets. Suitable insulating bushings 28 are provided to insulate the screw from the frame and contact springs where necessary. The upper parts 29, 30, of springs 19 and 20 fit into annular grooves of the cams 13 and 14 so that when a plunger A, B or C is in a non-operative position as shown in Fig. 4, the ends 29, 30 rest in the groove of cam 14 holding the plunger in such position and maintaining the springs 19, 20, insulated from each other. When a plunger is moved into its operating position as shown by the plunger C, the ends 29, 30, of the contact springs fall into the annular groove of the conducting cam 13 whereby the plunger is held in its operative position and the contact springs 19, 20 conductively connected. Operating buttons 32 are provided for each of the plungers being preferably threaded thereon.

I have preferably arranged the so-called light switches A, B and C so that a common source of current may be connected to the contact springs 20, which springs are connected in common by the conducting plate 22 as already pointed out. The associated contact springs 19 are each provided with an individual terminal 21 so that they may be connected to different circuits, but it will be

apparent the terminal arrangement may be varied according to the particular circuit arrangement.

Now as to the battery and generator switch plungers D and E, these members differ in some respects from the plungers of switches A, B and C. A main plunger rod 40 is provided having insulating and conducting cams 41, 42 respectively mounted thereon, insulating cam 41 having normal and non-operative grooves 43, 44 respectively. The cam 41 rests against a shoulder on the plunger rod 40, the conducting cam 42 being insulated from the rod 40 in a manner similar to the construction of plunger 10 as shown in Fig. 4. A link support 45 is also carried by rod 40 being clamped in position with the cams 42, and 41 by means of a clamping nut. Contact springs 19¹ and 20¹ preferably like springs 19, 20, are also provided for each of the plungers D and E, being mounted as shown in Fig. 9 and each having an individual terminal binding post as 21 connected thereto. The arrangement of these binding posts may of course be varied.

As already briefly referred to, the switch plungers D and E are preferably arranged for connecting the magneto or battery to the automobile circuit in a well-known manner. As it is desirable to have this switch so that only one set of the contacts can be in an operative position at one time, I have connected the plungers D and E by means of links 46, 47, which links are preferably pivoted at a central point and connected to the post 4 by means of a pivoted pin 48, the free end of said links riding in the grooved link-supports 45. Thus with plungers D and E in a normal position, the contact springs 19¹, 20¹ of each device D, E, rest in the groove 43 but assuming that the plunger D is withdrawn to an operative position as shown in Fig. 5, although its contact springs are electrically connected to the associated conducting cam 42, the plunger E is simultaneously moved into an inoperative position with its contact springs 19¹, 20¹ resting in their inoperative holding groove 44. Likewise should the plunger E be withdrawn to its operative position, due to the connecting links 46, 47, the plunger D is moved down into an inoperative position.

In connection with the switch operating members A to E inclusive, I provide a common locking device F comprising in general a locking plate 50 and a key 51. Plate 50 is supported between shoulders on the connecting posts 3, 4, and the frame plate 1, said plate 50 having orifices 52, 53, through which the posts 3 and 4 extend, the supporting arrangement being such as to allow a free reciprocating movement of the locking plate 50. Each of the plunger rods extends through an orifice 54 in plate 50, which per-

mits a free reciprocating movement of the plunger when the plate is in an unlocking position, but when the plate 50 is moved to a locking position, each slot 54¹ encircles a locking groove in the associated plunger preventing movement thereof.

For operating the locking bar 50, the key 51 is preferably provided with a serrated or gear-toothed circular portion 55 which is adapted to cooperate with an internal rack 56 carried by the locking plate 50. In order to prevent the insertion of any but the proper key, an internal serrated peripheral edge or surface 57 is provided, preferably in the frame plate 1 as shown more particularly in Fig. 10. I also provide guiding means for the key 51 in the nature of a stud 58, which is supported by an arm 59 secured to the frame by a screw 60 and held by a dowel pin 61. A hole is of course provided in the key 51 to conform to the supporting stud 58 as shown more clearly in the cross sectional portion of Fig. 1. The locking plate 50 has two positions, locking and non-locking positions, and I provide a resilient member in the form of a spring 62 having an end 62¹ adapted to rest in non-locking groove 63 or locking groove 64 to hold the plate in either position. By the use of the serrated or gear-mesh lock arrangement, it will be apparent that little chance is presented of inserting anything but the proper key to actuate the lock.

As previously referred to, the switch actuating plungers A, B, and C are preferably arranged so that the locking plate 50 may cooperate with either slot 17 or slot 18 and thus lock these plungers in a non-operative or an operative position. In connection with the switch members D and E, I have preferably arranged the locking device so that the plungers must be in a normal position to permit operation of key 51, whereby the slots 17¹ of said members D and E register with the locking plate 50 as shown in Fig. 1. With the switches D, E in an operative position as shown in Fig. 5, the enlarged portion 40² of the plunger rod is in position to prevent movement of the plate 50. Likewise at the switch members A, B and C, the enlarged portion 10¹ of the plunger rods prevent movement of bar 50 unless the plungers are in an operative or inoperative position.

Thus with the plungers in the position shown in Fig. 1, by inserting the key 51 so that its part 55 will mesh with the rack 56 of the locking plate 50, upon turning said key 51 into the position indicated by the dotted lines in Fig. 2, plate 50 is moved in the direction of the arrow indicated thereon in Fig. 7, thus locking all of the switch operating plungers in the position illustrated. The key may now be withdrawn, because when in its operated position its teeth again register with the internal guiding teeth 57.

To unlock the switch the key 51 is again inserted through the guiding means 57 so that the toothed portion 55 engages the rack 56 whereby a counter clockwise rotation of the key will move the plate 50 toward the left thus moving the locking slot 54¹ clear of their corresponding plunger rods. The key 51 may be withdrawn.

From the foregoing it will be apparent that the actuating members A, B or C can be locked in operative or inoperative position but at the same time it is necessary to have the so-called battery and magnetic switch members D and E in a normal position. Otherwise the enlarged portion 40² of the operative plunger rod is positioned within the corresponding locking-plate orifice 54 so that although the key 51 may be inserted, a rotation thereof to move the locking plate 50 is prevented. It will be seen from this that although the so-called light-switch members A, B, C will permit operation of the lock in either their operative or inoperative positions, it is necessary to have the switch members D, E in a normal position before the lock can be operated and the key withdrawn.

In illustrating my invention I have chosen an embodiment especially adapted for use with the commercial lighting and ignition circuits now in use, but I do not desire to be limited to the exact structure as shown and described as I am aware that many modifications and changes will readily suggest themselves and I contemplate using my invention otherwise than the particular embodiment illustrated.

Having described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A switching device including a supporting frame having parallel frame bars, longitudinally reciprocating switch operating members supported in alined openings in said bars, each of said switch operating members having normal, operative, and non-operative positions, mechanism whereby when either one of said members is moved to its normal, operative or non-operative position the other member is moved to its normal, non-operative or operative position, respectively, a common locking plate supported adjacent one of said bars and operable to lock said switch operating members only when they are in normal position, and a key adapted to be inserted through said last mentioned bar to engage and operate said plate to lock said switch actuating members against operation.

2. A switching device including a supporting frame having front and rear frame bars, longitudinally reciprocating switch operating members supported in alined openings in said bars, an actuating button for each of said members positioned before said front

bar, two of said members having normal, operative and non-operative positions, mechanism for said two members whereby when either one of said two members is moved to normal, operative or non-operative position the other member is moved to its normal, non-operative or operative position, respectively, a common locking plate suitably supported beneath said front bar operable for locking said switch operating members against actuation, said locking plate being inoperative to lock said two switch operating members in other than their normal positions, and a manually operable key adapted to be inserted through said front plate to reciprocate said locking plate.

3. A switching device comprising a pair of switch operating members, each of said members having normal, operative, and non-operative positions, link mechanism for said members whereby when either one of said members is moved to its normal, operative or non-operative position the other member is moved to its normal, non-operative, or operative position respectively, and locking means operable to lock said switch operating members only when they are in normal position.

4. A switching device comprising a pair of switch operating members, each of said members having normal, operative, and non-operative positions, link mechanism for said members whereby when either one of said members is moved to its normal, operative or non-operative position the other member is moved to its normal, non-operative, or operative position respectively, means for yieldingly holding said members in said positions, and means for locking said switch operating members, said means being inoperative to lock said members in other than their normal positions.

5. A switching device comprising a pair of switch operating members, each of said members having normal, operative, and non-operative positions, link mechanism for said members whereby when either one of said members is moved to its normal, operative or non-operative position the other member is moved to its normal, non-operative, or operative position respectively, means for locking said switch operating members against effective operation when in their normal positions, and means for preventing an operation of said locking means when said switch members are in other than their normal position.

6. A switching device comprising a pair of switch operating members, each of said members having normal, operative and non-operative positions, link mechanism for said members whereby when one of said members is in its normal, operative or non-operative position the other member is in its normal, non-operative or operative position respec-

tively, means for locking said switch operating members against effective operation when in their normal positions, and means to prevent locking operation of said device except when said switch operating members are in their normal positions.

7. A switching device including a supporting frame having parallel frame bars, a pair of studs connecting said frame bars, a pair of switch operating plungers supported in aligned openings in said bars, each of said switch plungers having normal, operative and operative positions, angularly grooved elements carried by the plungers, a connecting link pivoted to one of said studs and having its opposite ends within said plungers whereby when either one of said plungers is moved to its normal, operative or non-operative position the other plunger is moved to its normal, non-operative or operative position, respectively, and locking means operable to lock said plungers only when they are in normal position.

8. An electrical switch including a supporting frame having parallel frame bars, a stud connecting said frame bars, a pair of switch actuating plungers supported by said frame bars, each of said plungers having normal, operative and non-operative positions, a connecting link pivoted to said stud having its ends connected to said plungers whereby any actuation of either plunger to its normal, operative or non-operative position will move the other plunger to its normal, non-operative or operative position, respectively, other switch actuating plungers, and a common locking mechanism for locking all of said plungers against actuation.

9. An electrical switch comprising a pair of reciprocating actuating members each member having normal, operative and non-operative positions, means for yieldingly holding said members in their three different definite positions, connecting mechanism whereby when one member is moved to its normal, operative or non-operative position the other member assumes its normal, non-operative or operative position respectively, other switch actuating members and a common locking bar for locking all of said members against actuation.

10. An electrical switch comprising a face plate, a plurality of plungers extending through said plate, contact devices controlled by said plungers, two of said plungers having normal, operative and non-operative positions, mechanism for said pair of plungers whereby when either one of said plungers is moved to its normal, operative or non-operative position the other plunger is moved to its normal, non-operative or operative position, respectively, a locking plate lying against the inside surface of said face plate and having locking orifices there-

in encircling said plungers, and means for moving said locking plate, thereby locking all of said plungers against effective actuation.

5 11. A switching device comprising a supporting frame having parallel frame bars, longitudinally reciprocating switch operating members supported in openings in said bars, each of two of said reciprocating switch operating members having normal, operative and non-operative positions, connecting mechanism whereby when one of said pair of switch operating members is moved to its normal, operative or non-operative position the other one of said pair of members assumes its normal, operative or non-operative position, respectively, a common locking plate supported adjacent one of said bars, and a key adapted to be inserted through the last said bar to engage and operate said plate for locking all of said switch actuating members against operation.

12. An electrical switch including a supporting frame having parallel bars, switch actuating members supported by said bars for controlling lighting circuits, a bar extended at right angles to said other bars forming a part of the supporting members, a pair of switch actuating members for controlling the ignition circuits, each of said last mentioned members having normal, operative and non-operative positions, a link pivotally secured to said last bar having its opposite ends operatively connected with said last mentioned actuating members whereby

when one of said last members is moved to its normal, operative or non-operative position the other member assumes its normal, non-operative or operative position, respectively, and a common locking plate for locking all of said switch actuating members against actuation.

13. A switching device including a supporting frame having parallel bars, longitudinally reciprocating switch operating members supported in aligned openings in said bars for controlling lighting circuits, a horizontal bar connecting said parallel bars, a pair of switch actuating members for controlling ignition circuits, each of said last switch members having normal, operative and non-operative positions, a central link pivoted to said last bar and operatively connected to said last switch actuating members whereby the movement of either of said pair of switch actuating members to its normal, operative or non-operative position will cause the other member to assume its normal, non-operative or operative position, respectively, and a common locking member for locking all of said plungers against actuation.

Signed by me at Chicago, county of Cook, and State of Illinois, in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:

GEORGE E. MUELLER,
M. R. ROCHFORD.