

May 17, 1938.

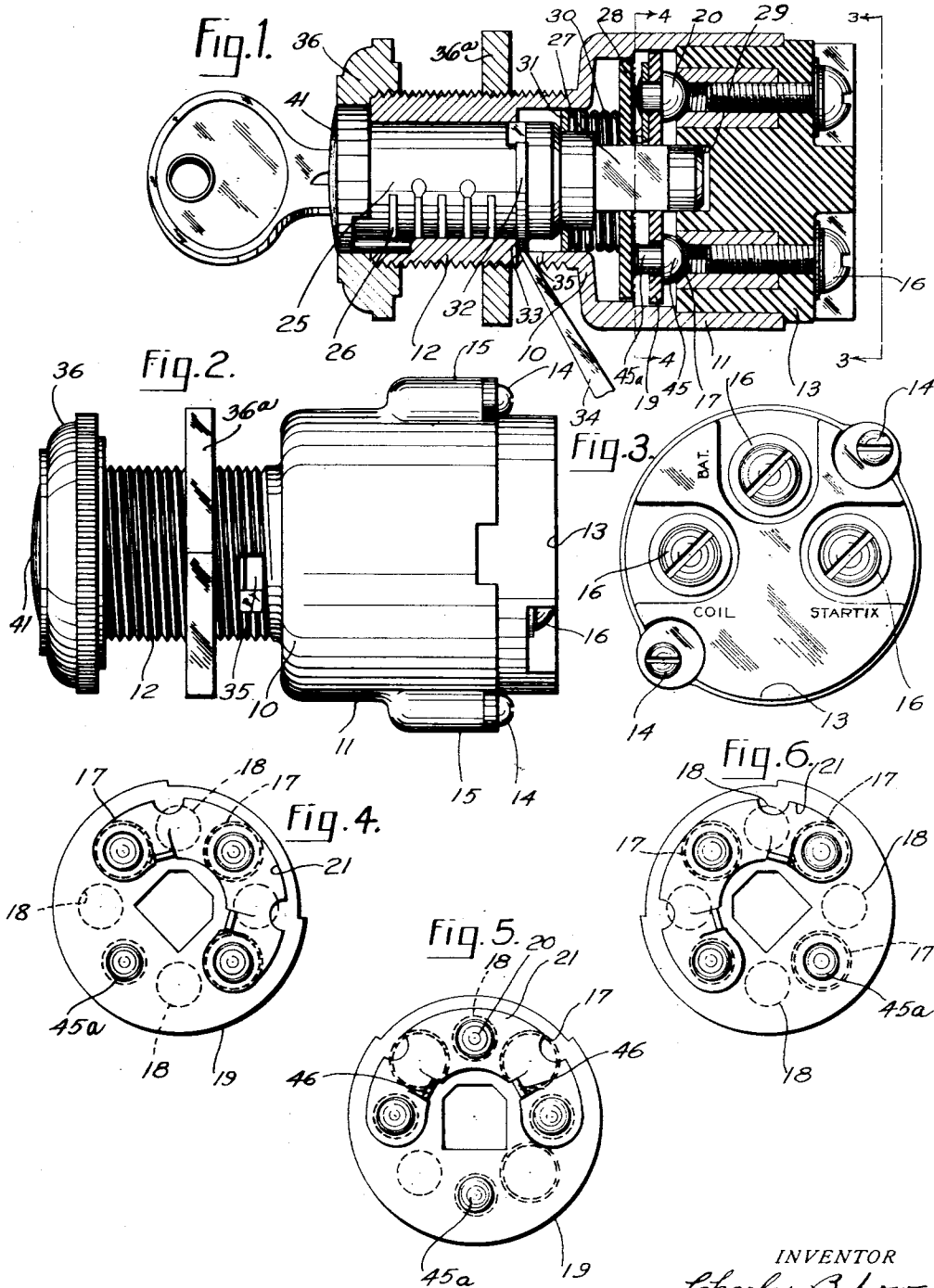
C. B. LOWE

2,118,012

SWITCH LOCK

Filed Sept. 19, 1934

2 Sheets-Sheet 1



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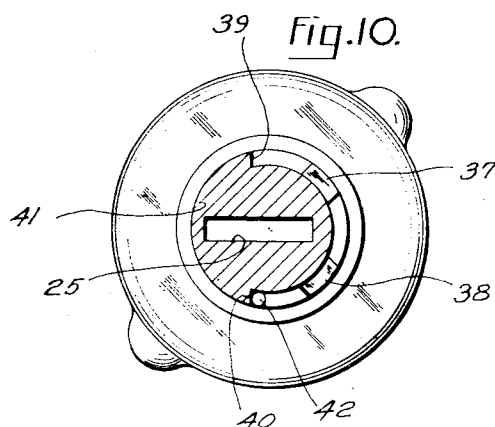
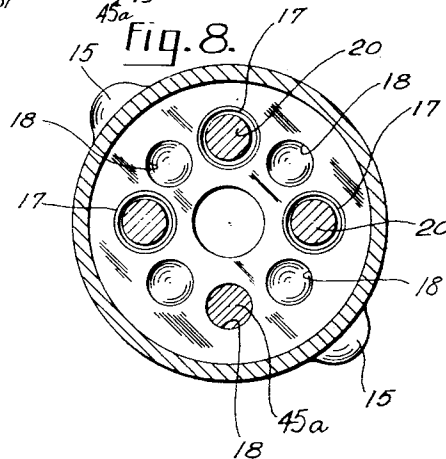
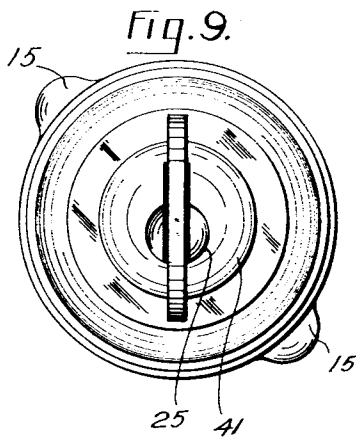
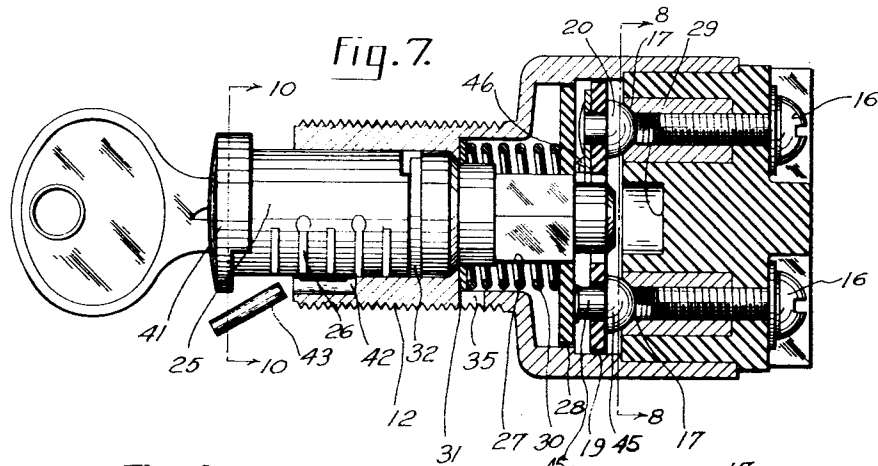
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UNITED STATES PATENT OFFICE

2,118,012

SWITCH LOCK

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9 Claims. (Cl. 200—44)

This invention relates to electric switches especially adapted for operation under the control of a locking device. More particularly this invention relates to a lock operated switch in which the lock operation may be readily limited in various ways depending upon the operation desired.

In the manufacture of automobiles today, there are generally provided auxiliary starting devices and sometimes auxiliary indicating devices which it is desired shall be placed in the main battery circuit at the same time that the ignition circuit is closed. It is, therefore, necessary to provide the usual main switch with parallel circuit controlling contacts as will be understood by those skilled in the art. On certain cars, where there are no such auxiliary devices, it is necessary to provide a different switch from the one disclosed above. Otherwise it is necessary to instruct the user of the car to operate his switch in a particular manner.

Where switches are supplied as initial equipment at the factory, it is quite simple to place the proper switch within the car. Where switches are sold as replacements, it would be necessary to sell several different types of switches to provide for the various operations used in various cars. Naturally, to have a plurality of types of switches manufactured in this way for replacement, considerable expense is incurred, and the cost of the replacement switches is increased. My invention proposes the utilization of a single switch which may be readily changed to any particular desired operation so as to do away with the necessity of providing a plurality of different types of switches for different operations.

In detail, my invention comprises a switch assembly having a stationary switch element, the movable switch element being lock operated. Fixed abutments are carried on the lock, and on the housing relatively to which it rotates, for normally limiting the movement of the lock and, therefore, of the switch element which it actuates. This movement may normally be sufficient to operate one or both of two parallel circuits. I provide means, which I prefer to place on the lock housing, whereby readily removable and readily attached limiting means may be added to the assembly for so limiting the movement of the lock, that its rotation will be confined between limits sufficient only to actuate one of the parallel circuits indicated supra.

While I have indicated generally the operation and the preferred construction of my lock con-

trolled switch, I attach considerable importance to the particular construction of my switch which will best be understood by reference to the accompanying drawings in which Fig. 1 illustrates the parts of my switch in assembled relation, certain of the elements being shown in section. Fig. 2 is an assembly view of the parts of Fig. 1. Fig. 3 is an end view along the line 3—3 of Fig. 1. Figs. 4, 5, and 6 are taken along section lines 4—4 of Fig. 1 and illustrate the operation of the moving switch element relatively to the stationary switch element. Fig. 7 shows parts of Fig. 1 when the plug has been released for outward movement so as to permit the changing of the limit means of the plug. Fig. 8 is a view along lines 8—8 of Fig. 7. Fig. 9 is a front view of the lock showing the key mounted therein and is taken endwise looking at Fig. 1. Fig. 10 is a section taken along lines 10—10 of Fig. 7.

Referring now more particularly to the drawings, reference numeral 10 indicates the main switch body having a sleeve-like switch containing portion 11, and a lock containing sleeve portion 12. The switch assembly per se embodies an insulation composition body 13 which is inserted endwise into the open end of the portion 11 held within the portion 11 by a pair of screws 14 entering into shoulders 15 on the end surface of portion 11, as is best shown in Figs. 2 and 3. For preventing rotation of the insulation body 13 in the portion 11, there is provided a lug 11a entering a slot 13a of the body 13. The insulation composition body 13 has mounted thereon three screw terminal members 16 which are for the coil, an automatic starting circuit, and the battery. The automatic starting circuit is used here because it illustrates a situation in which my invention is required to function as a two circuit switch control.

The screw members 16 terminate in a series of socket contacts 17 best shown by double dotted lines in Figs. 4, 5, 6 and by double full lines in Fig. 8. False sockets 18 are shown by single dotted circles in Figs. 4, 5, and 6 and by single full lines in Fig. 8. For cooperating with the sockets 17 and 18 I utilize a disc member 19 carrying a series of three interconnected spherical contact members 20 maintained in electrical connection by a brass conducting member 21, best illustrated in Figs. 4, 5, and 6. It will be quite obvious that in Fig. 5, electrical current entering the battery socket 17 from the battery terminal 16 will not be directed to either of the two circuits because the contacts 20 will all be displaced rela-

tively to the live sockets 17 and will all rest in the false sockets 18.

Should the disc 19 be moved from its position of Fig. 5 to its position of Fig. 6, it will be quite obvious that the circuit from battery contact 16 to coil contact 16 will be closed. On the other hand, the Startix circuit will be open. Should the disc member 19 be rotated from its position in Fig. 5 to its position in Fig. 4, it is quite obvious that both the coil and starting circuits will be closed. In other words, counter-clockwise rotation from Fig. 5 closes the coil circuit only, while clockwise rotation closes both the coil and automatic starting circuits.

It will naturally be understood that should a switch of the type disclosed so far as I have gone, be utilized in an automobile having both coil and automatic starting circuits, there will merely have to be provided means for limiting the rotation of the main switch element 19 in a counter-clockwise direction, and in a clockwise direction from a neutral central point. It will also be understood that should a switch of this type be placed on a car having no Startix circuit, it will be necessary to teach the owner the operation of the switch, all of which will be extremely unsatisfactory because of the average layman's ignorance regarding the operation of switch mechanisms. On the other hand, if a separate replacement switch should be designed for an automobile not having an automatic starting, considerable expense will be incurred.

From this point on, I shall continue the description of the remaining parts of my invention with special reference to the means for changing over the limiting means of the switch just disclosed to adapt it for single circuit operation.

In Fig. 1, I illustrate a locking plug 25 which is equipped with a series of tumbler chambers 26 in which the usual tumblers (not shown) are mounted for locking the plug 25 against rotation relatively to the sleeve 12. The plug has an integral extension 27 which is square in form and is adapted to traverse substantially square holes in a disc 28 and in the moving switch element 19, and to bear at its end in a socket 29 in the insulation composition body 13. Naturally, because of the square shape of the extension 27 of the plug, it will act to rotate the discs 28 and 19 for operating the switch.

A spring 30 rests against the disc 28 and pushes against a further disc 31 so as to apply pressure between the switch elements of the plug to maintain the parts against rattling, to normally urge the plug 25 outwardly from the sleeve 12, and to maintain the partially spherical contact members 20 within the live sockets 17 or the false sockets 18. For retaining the plug 25 within the sleeve 12, I utilize a retaining member 32 which is normally pressed outwardly by a spring (which is not shown) against a shoulder 33 whereby to retain the plug 25 within the sleeve 12 against the outward pressure exerted by the spring 30. When it is required to remove the plug from the housing, it is merely necessary to utilize a tool 34 insertible into the coil housing 10 through a hole 35 for depressing the retainer 32 to permit outward movement of the plug as is best illustrated in Fig. 7.

The outside of the switch assembly, which is exposed on the usual dashboard of the car, is decorated by a circular member 36 which is screw threaded about the sleeve 12 and which covers the end surface of the sleeve 12. This end surface of the sleeve 12 is equipped with a pair of

abutments 37 and 38 which are best shown in Fig. 10. These abutments cooperate with abutments 39 and 40 formed on the head 41 of the plug 25. Normally, where a two circuit control is desired, the plug 25 will occupy the position illustrated in Fig. 10 when it is at its medium or neutral point. It may then rotate from its position of Fig. 10 either in a clockwise or a counter-clockwise direction so as to close either one or both of the circuits provided.

For further limiting the movement of the plug 25 where it is desired to control but one of the circuits, I provide the end surface of sleeve 12 with a hole 42 in which I may place a pin 43 which will cooperate with the shoulder 40 of the plug for preventing movement of the plug in a counter-clockwise direction. Naturally, the hole 42 might be placed so as to cooperate with the shoulder 39. It is also within the purview of my invention to place the hole 42 in the head 41 of the plug. As is apparent from Fig. 7, once the plug is released for outward movement under the influence of spring 30 by operation of the tool 34, the pin member 43 may be readily withdrawn or inserted in place. It will be readily understood that because of this pin arrangement I may either have a two circuit switch or a one circuit switch by simply manipulating the assembly in a very simple way. I believe that this is a definite contribution to the switch art.

In order to insure firm contacting between the spherical contact members 20 and the live sockets 17, I place a false contact 45 in my disc 19 but mount it loosely in said disc so that it will not interfere with the positioning of the disc. I form my brass contact plate 21 so that it has a pair of lugs 46 cooperable with the spring pressed disc 28. It will be understood that the disc 28 will abut the end surface of the shaft 45A of the false contact 45 and the two lugs 46, and will thus be operative to urge the spherical contacts carried by the disc 19 firmly against the live sockets 17.

For securing the switch in position with its decorative head member 36 against the dashboard of an automobile, I utilize the adjustable nut 36a. When it is desired to insert the switch into position on the dashboard, the head 36 is removed and the sleeve 12 inserted through a hole in the dashboard. The head 36 is then applied, being screwed to the position of Fig. 1 so as to outline the key plug and to cover the open end of the sleeve 12. The nut 36a is then screwed forward against the rear of the dashboard.

While I have shown a particular modification of my invention, I believe my contribution to the art to be of considerable importance, and I do not wish to be limited in the monopoly granted me, except as may be required by the prior art.

I claim:

1. In a switch assembly of the class described, a switch element, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch element, a fixed abutment on the key plug cooperable with spaced fixed abutments on the cylinder sleeve for limiting the rotation of the plug in said sleeve in a clockwise and in a counter-clockwise direction from a neutral point, a removable stop member, and means specially designed for cooperation with said switch member whereby said stop member may be placed between the fixed abutments on said sleeve for preventing rotation of said plug in one of said directions, said stop member being retained in position by coaction with said key plug.

2. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch elements, a head on said plug having a fixed abutment, fixed abutments on the end surface of the cylinder sleeve cooperable with said plug abutment for limiting the rotation of said plug in said sleeve in a clockwise and in a counter-clockwise direction, the end surface of said sleeve having a hole into which a removable stop member may rest, said stop member being effective to further limit the possible rotation of said plug.

3. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch elements, a head on said plug having a fixed abutment, fixed abutments on the end surface of the cylinder sleeve cooperable with said plug abutment for limiting the rotation of said plug in said sleeve in a clockwise and in a counter-clockwise direction, the end surface of said sleeve having a hole into which a removable stop member may rest, said stop member being effective to further limit the possible rotation of said plug, said member being removable from said hole upon endwise outward movement of the plug from said cylinder sleeve.

4. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch elements, a spring between said plug and switch elements tending to take up any possible play and effective to eject the plug from said sleeve, means for retaining the plug in said sleeve against said spring pressure, removable means cooperable with said plug and cylinder sleeve to limit the plug rotation relatively to said cylinder sleeve, said means being accessible for removal upon endwise movement of the plug relatively to said sleeve by said spring when said retaining means are actuated to release the plug.

5. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch elements, a spring between said plug and switch elements tending to take up any possible play and effective to eject the plug from said sleeve, means for retaining the plug in said sleeve against said spring pressure, a head on said plug, said sleeve having an end surface against which the head rests, said end surface having a hole into which a plug limiting member may be placed for cooperation with the plug head to limit its movement relatively to said sleeve, said member being accessible for removal upon endwise movement of the plug relatively to said sleeve by said spring when said retaining means are actuated to release the plug.

6. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said

switch elements, a head on said plug, said sleeve having an end surface against which the head rests, said end surface having a hole into which a plug limiting member may be placed for cooperation with the plug head to limit its movement relatively to said sleeve, said member being accessible for removal when said plug is moved partially outward from said sleeve.

7. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch elements, a spring between said plug and switch elements tending to take up any possible play and effective to eject the plug from said sleeve, means for retaining the plug in said sleeve against said spring pressure, fixed abutments on said plug and sleeve adapted to limit rotation of the plug, and a removable abutment cooperable with said plug and cylinder sleeve to further limit the rotation of said plug relatively to said sleeve, said removable abutment being accessible for removal upon endwise movement of the plug relatively to said sleeve by said spring when said retaining means are actuated to release the plug.

8. In a switch of the class described, switch elements, a cylinder sleeve, a key plug in said sleeve and rotatable therein for operating said switch elements, a spring between said plug and switch elements tending to take up any possible play and effective to eject the plug from said sleeve, means for retaining the plug in said sleeve against said spring pressure, a head on said plug having a rearward abutment, an end surface on the sleeve relatively to which said head rotates; abutments on said sleeve end surface cooperable with said plug abutment for limiting the possible rotation of said plug, said end surface having a hole into which a member may be placed for cooperation with said plug abutment to further limit the rotation of said plug, said member being accessible for removal upon endwise movement of the plug relatively to said sleeve by said spring when said retaining means are actuated to release the plug.

9. In a switch of the class described, a stationary switch element comprising a series of sockets, a movable switch member comprising a disc having a series of partially spherical members for rotating relatively to said sockets and for dropping into said sockets to open and close circuits, at least one of said sphere members being arranged to traverse said disc and to be slidable relatively thereto and to have a portion thereof project on the reverse side of said disc, a pair of lugs fixed to said reverse side of said disc, and a flat spring pressed disc member adapted to press against said lugs and said loose contact member whereby to apply even pressure against said contact carrying disc to urge its contacts against the sockets in the fixed switch elements.

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