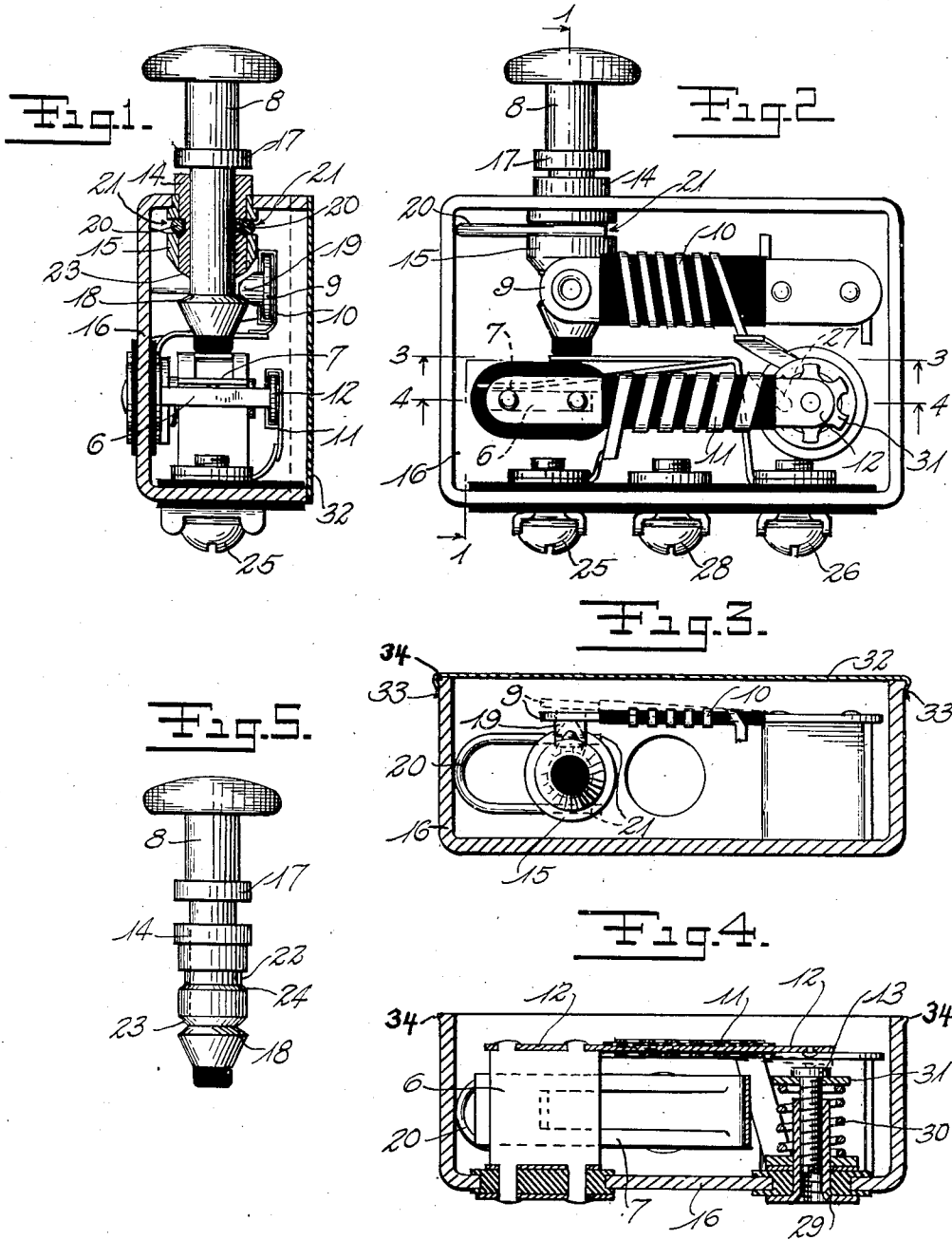


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LOCK SWITCH.
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1,294,045.

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LOCK-SWITCH.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN F. CAVANAGH, a citizen of the United States of America, residing at Meriden, Conn., have invented a new and useful Lock-Switch, of which the following is a specification.

My present invention relates to what are generally known as "lock switches", particularly for use on motor vehicles, which are designed to be "locked" or rendered inoperative when the machine is left unattended.

The objects of the invention generally are to provide a switch of this character of simple, inexpensive and entirely practical construction.

Another object is to combine the locking and controlling functions all in a single member so that by means of a single "controller" the switch may be operated to open or close the circuit or may be locked or rendered entirely inoperative.

Briefly stated, the invention resides in the combination with a suitable supporting base and circuit contacts mounted thereon, of a plunger or operating member having a certain limited movement on the base for controlling the circuit contacts and adapted to be entirely removed and separated from the base for the purpose of rendering the switch inoperative. In connection with said plunger there may be provided a thermostatically controlled latch for holding the plunger in a predetermined position and the invention embodies various other features and details of construction all as will later appear.

In the accompanying drawing I have illustrated the invention embodied in a practical commercial form but would have it understood that changes and modifications may be indulged in without departure from the true spirit and scope of the invention.

In said drawing:—

Figure 1, is a vertical sectional view of a switch constructed in accordance with and embodying the invention, said view being taken substantially on the plane of the line 1—1 of Fig. 2.

Fig. 2, is a view of the switch mechanism with the side wall of the switch casing removed.

Figs. 3 and 4 are sectional views taken

substantially on the planes of the lines 3—3 and 4—4 respectively of Fig. 2.

Fig. 5, is a detail view of the detachable operating key or plunger.

The switch illustrated is a so-called automatic ignition switch of the character disclosed in my Patent #1,232,458 consisting generally of a relatively stationary contact 6 and a spring contact 7, the latter being forced into engagement with the former by means of an operating key or plunger 8 which plunger is normally retained in the circuit-closed position by means of a thermostatic bar 9 which, when the circuit is left in closed condition, is warped through the action of a heating coil 10 engaged thereabout to release the plunger and thus permit the spring contact to separate from the stationary contact. This heating coil may be cut into circuit automatically by means of a primary heating coil 11 connected in the ignition circuit and coiled about the thermostatic bar 12 which, as it becomes heated due to the continued closed condition of the ignition circuit, makes engagement with a contact 13 forming a terminal for the heating coil 10.

The combined lock or key and switch operating plunger has a limited movement for the purpose of controlling the switch contacts and is removably supported so that it may be entirely disconnected and detached from the switch structure. In the present disclosure this is accomplished by slidably supporting the plunger within a bushing 14 and by detachably securing this bushing within a socket or tubular guide 15, the latter forming a part of, or being secured to the casing 16, which in this instance forms a base for the switch parts. The limited circuit-controlling movements of the plunger are provided for by the shoulders 17 and 18 on the plunger which limit the movements of said plunger within the tubular bushing 14. The lower shoulder 18 in the present disclosure is beveled to cooperate with a beveled lug 19 on the end of the thermostatic bar 9. The double bevel or inclination of this shoulder 18, as illustrated, enables the plunger being shifted either inward or outward against the tension of the thermostatic latching bar 9 and at the same time enables said

latching bar to yieldingly hold the plunger in either of the positions to which it may be shifted.

The supporting bushing 14 is removably secured in place in the present disclosure by a hairpin spring 20 engaged about the tubular guide 15 and with the spring arms thereof extending in through slots 21 in the sides of said tubular guide into position to engage in an annular locking groove 22 formed in the supporting bushing. The lower end of the supporting bushing is preferably beveled as indicated at 23 to spread the spring arms apart as the key is being inserted in the switch and the lower shoulder or edge of the groove 22 in the bushing may be beveled somewhat as indicated at 24 to facilitate the removal of the plunger.

When the plunger is engaged in its seat in the switch as in Fig. 1, it may be shifted either out or in to open or close the circuit at will. If left in the circuit-closed position and the circuit is closed at other points, the latching thermostat will operate to automatically release the plunger and thus permit separation of the circuit contacts. If it is desired to lock the switch inoperative, it is merely necessary to pull the switch plunger and its supporting bushing out of its socket, leaving the switch contacts separated, with no means for bringing them into closed relation. The key plunger, with its associated bushing, is relatively light and small and so can easily be carried about. When it is desired to close the circuit again, the plunger is simply forced to its seat in the socket provided therefor and when thus engaged in its socket may be shifted to either the open or the closed circuit position. In inserting the plunger the upper shoulder 17 on said plunger acts as an abutment for forcing the bushing down into the tubular guide or socket, and in removing the plunger the lower shoulder 18, serves as an abutment engaging the lower end of the bushing to carry the bushing along with the plunger.

The various parts of the switch may be suitably mounted within the supporting base 16 and the necessary circuit terminals will be provided therefor. In the illustration there is provided one terminal 25 for the primary heating coil 11, and another terminal 26 for the spring contact 7, one end of the primary heating coil is connected with the thermostatic bar 12 on which it is mounted, as indicated at 27, and said bar is directly connected with the stationary contact 6, as shown in Fig. 4 so that under normal working conditions the ignition circuit will be completed by way of terminal 25, primary heating coil 11, thermostatic bar 12, stationary contact 6, spring contact 7 and terminal 26. If the circuit remains closed for a dangerous length of time, as

predetermined upon, coil 11 heats the bar 12 sufficiently to cause it to make contact with the terminal 13 for the secondary heating coil 10, which latter then quickly heats up the thermostatic bar 9 to such an extent as to cause said bar to release the plunger and allow the spring contact to separate from the stationary contact and thus break the ignition circuit. The circuit for the secondary heating coil 10 may be completed through the switch base 16, which is usually in the form of a metallic box, by fastening the thermostatic bar 9 directly to the box, by connecting one end of the heating coil 10 with the bar and by providing an external terminal 28 in electrical connection with the box.

The terminal 13 for the heating coil 11 is of novel construction, comprising as it does, a screw stud engaged within a tubular bushing 29 set in the rear wall of the box or casing 16, there being a spring 30 coiled about said bushing and engaged between the inner wall of the box and an abutment washer 31 at the contact end of said contact screw 13. This spring, acting as it does against the inner wall of the box, serves to retain the bushing in place, which is entered from the outside of the box and at the same time acts frictionally to hold the contact screw in its adjusted position. The outward end of the contact screw may be slotted, as indicated, or otherwise constructed for engagement by an adjusting tool such as a screwdriver, so that the point at which the main thermostatic bar 12 will close circuit through the unlatching heating coil may be readily determined.

The invention will from the foregoing be seen to possess many advantages, particularly in the ease with which the switch may be locked or rendered inoperative and again be made operative and controlled as desired. The open side of the switch casing may be closed by a suitable cover such as that indicated at 32, having flanges 33 engaged over ribs or flanges 34 at the edge of the casing.

I claim:

1. In a switch of the character described, a supporting base, circuit-controlling contacts on said base, a removable operating member for said contacts, a support for said operating member readily removable from the supporting base and arranged when engaged on the supporting base to permit movement of the operating member for the opening and closing of the circuit through the switch contacts and means for detachably securing said support for the operating member on the supporting base, whereby said support and the operating member carried thereby may be entirely detached from the supporting base, and whereby when said support is engaged with the supporting base the operating member may be actuated to

operate the switch contacts for opening or closing the circuit, and means whereby the operating member may be left in position with the contacts in open or closed circuit position.

2. In combination, switch contacts, a supporting bushing, a plunger for controlling the switch contacts slidably engaged in the bushing, a socket for the bushing and means for yieldingly securing said bushing in the socket.

3. In combination, switch contacts, a supporting bushing having a locking shoulder on the side thereof, a contact controlling plunger slidably mounted in the bushing and having shoulders for engagement with the opposite ends of the bushing, a socket for supporting the bushing with the plunger carried thereby in operative relation to the switch contacts, and securing means engaged with the shoulder on the bushing.

4. In combination, switch contacts, a plunger for controlling said contacts, a removable bushing for supporting the plunger in operative relation to the contacts, and spring means for yieldingly and removably securing said bushing in such position.

5. In combination, a switch base provided with a socket, contacts mounted on said base, a bushing removably engageable in said socket, spring means engaging said bushing to yieldingly retain the same in the socket, a plunger slidably engaged in the bushing for controlling the switch contacts, and shoulders on the plunger for engagement with opposite ends of the bushing to limit the switch operating movements of the plunger, and arranged to form abutments for the bushing when the bushing is inserted in or removed from the socket by means of the plunger.

6. In combination, switch contacts, a tubular guide, a hairpin spring embracing said tubular guide and having one arm thereof projecting within the guide, a bushing engageable within the tubular guide and

provided with an annular groove to receive the inwardly projecting spring arm aforesaid, and a contact controlling plunger having a limited sliding movement within the bushing.

7. As an article of manufacture, a supporting bushing having an annular locking groove therein for engagement by securing means and a switch controlling plunger having a limited sliding movement in said bushing.

8. The combination in a switch, of a casing, an interiorly threaded post passed through said casing from the outside to the inside thereof, a contact screw rotatably engaged in said tubular post at the inside of the casing and provided with means at its outer end for engaging with an operating tool, and a coil spring engaged about the tubular post between the inner wall of the casing and the inner end of the contact screw to frictionally retain said screw in the position to which it is adjusted from the outside of the casing.

9. As an article of manufacture, a pull-out switch operating plunger and a supporting bushing having limited sliding movement thereon and provided with a locking shoulder for engagement with a locking device when said plunger with its bushing is pushed into a seat in a switch.

10. In a switch of the character described, a supporting base having a tubular guide, a bushing removably engaged in said guide, a plunger having a limited sliding movement in the bushing, circuit controlling contacts on the base positioned to be controlled by the plunger in the push-and-pull movements thereof and spring means for yieldingly securing the bushing in the tubular guide therefor and arranged to yield on the application of a pulling force to the plunger to enable the plunger and attached bushing being entirely withdrawn from the base.

JOHN F. CAVANAGH.