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2,098,644

SWITCH

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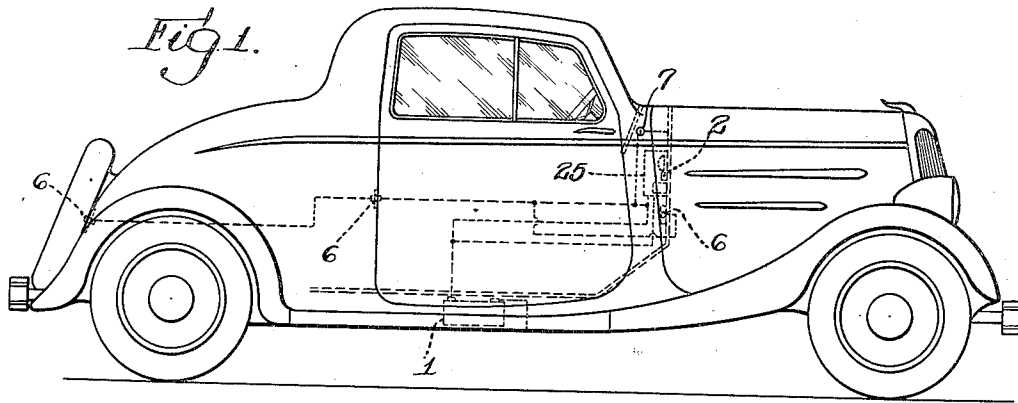


Fig. 2.

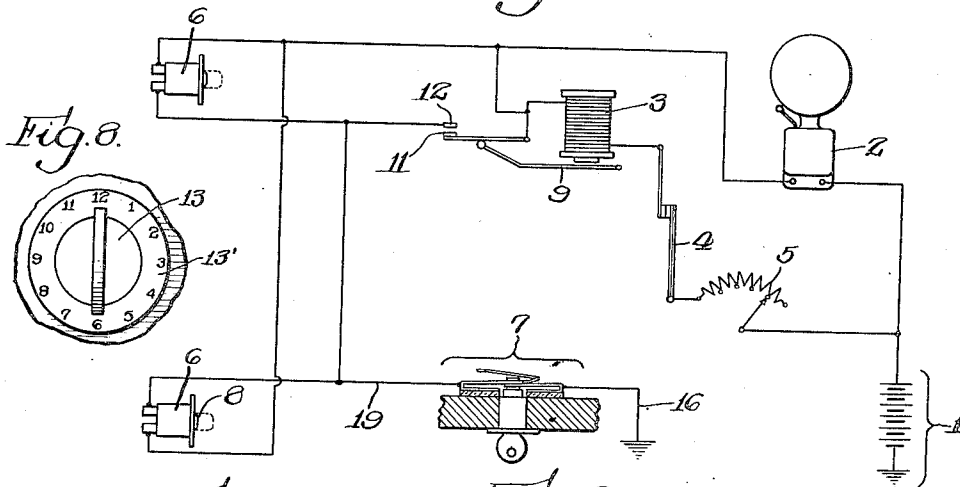


Fig. 3.

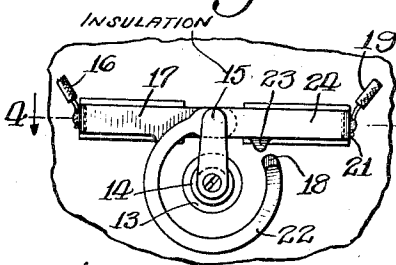


Fig. 4.

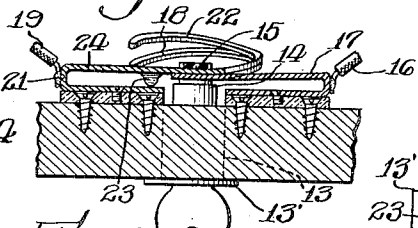


Fig. 6.

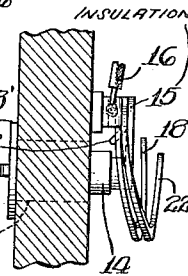
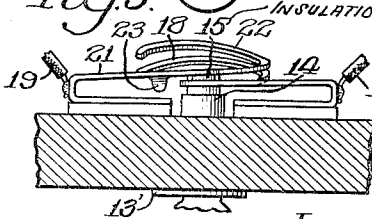
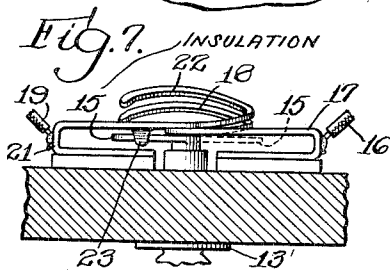


Fig. 5.



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UNITED STATES PATENT OFFICE

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SWITCH

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7 Claims. (Cl. 200—44)

This invention pertains to electrical switches capable of various uses, but especially valuable when forming part of burglar alarm systems for automotive vehicles.

5 In order to illustrate the invention, it is herein shown and described as forming part of an alarm system for automobiles.

One of the objects of the invention is to provide a switch which can be rotated into, or out of, circuit closing position by movements of the operating key, or other suitable operating mechanism, in a manner similar to the rotative movements of a combination lock so that when a key is used as the operating member, not only is the possession of the right key necessary, but the operator must also know what combination of rotative movements are required to render the switch operative or inoperative.

Another object of the invention is to provide an electrical switch which may be rotated selectively either to circuit closed or circuit open position only in a predetermined manner, the mechanism being concealed from view and a knowledge of the necessary movements being a prerequisite to the accomplishment of the desired result.

Other objects and advantages of the invention, particularly in connection with the use of the invention in an automotive burglar alarm system will be described hereinafter, or will become apparent from a perusal of the following specifications.

In the drawing:

Fig. 1 shows a side elevation of an automobile, indicating diagrammatically the position of this system as installed in an automobile.

Fig. 2 is a diagram of the circuit employed in my invention and showing the controlling or setting device by a plan view thereof,

Fig. 3 is a side elevation of the control device,

Fig. 4 is a section on the line 4—4 of Fig. 3,

Fig. 5 is a plan view of the setting device showing the circuit open to prevent the giving of an alarm should any of the alarm switches thereafter be opened,

Fig. 6 is a plan view of the setting device showing one of the steps in operating the same,

Fig. 7 is a plan view of the setting device showing one phase in the operation thereof, and

Fig. 8 is a side elevation showing the numbered combination dial.

This invention aims, when utilized to its best advantage, to place an alarm switch on both doors of the hood, on every car door, and, if necessary, every window and upon such accessories as the spare tire holder, so arranged that when

through tampering by some unauthorized person, any of these alarm switches become closed a gong, horn or other sound producing mechanism will be sounded.

The system is electrical and preferably employs for its operation the battery 1 of the automobile, to which is connected any sound producing device such as a gong 2, a self-locking relay 3, a temperature controlled circuit breaker 4, variable resistance 5, a plurality of alarm switches 6 and a master switch 7. As will be explained in greater detail hereinafter, the master switch 7 ordinarily will be arranged so that the electrical circuit from ground through it, as shown in Fig. 2, will always be maintained. Should a door, hood or spare tire holder be opened, a spring pressed button 8 on such a connected switch will be allowed to spring outwardly and will close the switch 6. These switches are well known in the art and may be purchased readily in the open market, being commonly used when the plunger or button thereof is out or in to close or open circuits. The details of such switches therefore do not form a part of this invention. It is sufficient that the switch be constructed to close a circuit through itself when a door or other device is opened and that the closing of the door will open the circuit. When a circuit is closed through one of the alarm switches, ground will then be established through the closed switch through the coil of the relay 3 through the circuit breaker 4, resistance 5, thence to battery.

When the relay is energized the armature 9 will move upwardly, as shown in Fig. 2, to close the circuit through contacts 11 and 12 which will thereupon establish a circuit through the coil of the relay directly from battery through the control switch 7 to ground, thus locking the relay until the switch 7 is opened, subject, however, to the action of the circuit breaker 4. In order that the alarm may not continue to sound until the battery is exhausted, a circuit breaker 4, so indicated diagrammatically, and of any suitable construction may be employed. Preferably this breaker will be such that it may be set to open the circuit only after the current has been passing through its coil a period of time such as ten or fifteen minutes. This would be deemed to be ample time for giving a warning. Cooling of the coil of the circuit breaker would restore ringing of the gong again should a circuit to ground be closed or become closed through any of the alarm switches 6.

It is contemplated that the control or setting device 7 be located and mounted upon some sta-

tionary and fixed part of the frame, for example, between the front door and the hood. This control device may be operated simply by a knob but preferably should be operated only upon the insertion of the key. The type of lock and key employed will preferably be similar to that at present employed in automobiles, namely, a cylinder lock whose key can be withdrawn only in one position, thus making it simple for the owner of the vehicle to lock the system either in alarm sounding position or non-alarm sounding position.

The setting device consists of the lock having a barrel 13 and a shaft 14 rotatable within an index plate 13' and by means of the key. Fixed on the outer end of the shaft 14 is a finger 15 made of insulating material such as insulating fiber, for example. By means of the key the operator may rotate the shaft and the insulating finger without limit in either direction but must return it when withdrawing the key to the angular position shown in Fig. 3. Connected with the lead 16 of the circuit leading to ground is a resilient contact member 17 which has formed preferably integrally therewith a curved member 18 shaped substantially as shown in the drawing. Connected with the lead 19 of the system is a spring contact member 21, having formed integrally therewith, preferably, a curved member 22. As shown in Figs. 3 and 6, the tip of the outer curved member 22 does not extend as far around in a circle as does the tip of the inner member 18. The insulating finger if rotated by the key from the position shown in Fig. 7 in a clockwise direction, as viewed in Fig. 3, will engage a downwardly extending tip 23 and ride up upon the same, thereby passing on to the outer surface 24 of the contact member 21. It will then follow the outer surface of the curved member 22. If the finger be continuously rotated in the same direction it will fall off the end of the member 22, thence off the end of the member 18 and will repeat the cycle.

But should the owner of the car desire to render the system inoperative so that the doors and hood may be freely opened and closed without giving alarm, he will rotate the insulating finger 15 in the counterclockwise direction above described, viewing Fig. 3, until the finger just barely rides off the end of the member 22. The member 22, being somewhat under compression, will be released and will spring outwardly. The operator may then reverse the rotation, that is, rotate the finger clockwise causing it to pass between the curved contact members. He will then continue to rotate it until he has it back to the position shown in Fig. 5. At this point it will be observed that the insulating finger insulates the members 17 and 21 thus opening the circuit to ground and preventing the alarm from being sounded even though thereafter any of the alarm switches may be closed.

One not knowing the combination, that is, how far to rotate the insulating finger counterclockwise and at which point to begin the clockwise rotation will be entirely unable to position the insulating finger in the manner shown in Fig. 5. Rotation of the insulating finger in a clockwise direction continuously will cause it to pass repeatedly under the contact 17. This is indicated by the relative position of the parts, as illustrated best in Fig. 7. Anyone who may obtain or improvise a key for rotating the combination switch and lock may freely rotate the finger continuously clockwise or continuously counter-

clockwise without in any manner injuring the electrical contacts.

Should a thief endeavor to guess the combination and fail to insert the insulating finger in such a position that it will actually insulate contacts 17 and 21, any subsequent opening of doors, hood or removal of the spare tire will immediately set off the alarm.

It will be obvious that different combinations may be obtained by extending or diminishing the arcuate extent of the curved members 18 and 22. For example, viewing Fig. 3, if the insulating finger should be moved from the position shown, that is, by the car owner, in a counterclockwise direction around to what may be called the two o'clock position on a clock face, the movement should then be changed to clockwise and the insulated finger be moved back to twelve o'clock position. This will place the insulating finger between members 17 and 21 and render the system inoperative. In order to give the car owner a different combination the tips of members 18 and 22 may be both cut back so that the change of motion may occur only at the three o'clock or three-thirty position, otherwise one will fail to insert the insulator between these curved members.

It will now be obvious that the space at which the foregoing described reversal of motion should take place may be varied to any position back toward the starting 12 o'clock position, or by extending both the members 18 and 22 more than 360° from the 12 o'clock position more than one full revolution of the insulator before it reaches the critical space for reversing will be required.

The form and tension of contacts 17 and 21 are such that they will always contact each other excepting when positively separated by the insulating finger.

Ordinarily when the car owner leaves his car in a protected condition he will lock the finger in the position shown in Fig. 4.

In order to prevent a car thief from quickly forcing open a door and destroying the system, the gong, relay, circuit breaker and resistance will preferably be encased in a secure manner in a steel casing 25 and likewise the master switch will also be well concealed within the body of the car where it cannot quickly be reached. The protective casing 25 will preferably be provided with a few very small apertures to permit the ready escape of sound. The details of construction of this casing are subject to great variation and need not be shown, it being understood that the casing will be heavy and preferably will be screwed, riveted, or locked to the fire wall of the car so that it would take quite a few minutes to remove it. All of the wiring of the system should be concealed within the car structure. Should the car owner accidentally set off the alarm, he may quickly render the system inoperative with proper use of his key.

It should be understood that this invention is illustrated herein in its preferred embodiment but that it is subject to considerable variation and modification without departing from the spirit and scope of the invention as expressed in the appended claims.

Having shown and described the invention, I claim:

1. A switch comprising a pair of contacts normally maintaining a circuit through themselves by mutual contact and supported on a surface in spaced apart relation thereto, a rotatable shaft

perpendicular to said surface having an insulator finger fixed thereon constructed and arranged to be rotated between said surface and said contacts in one direction of rotation, means for causing the insulator to ride up over the outside surface of said contacts when rotated in the opposite direction, and arcuate resilient extensions on said contacts constructed to be overridden by said insulator during said opposite rotative movement, the extension most remote from said surface being shorter than the other providing a space for admitting the insulator between said extensions.

2. A switch comprising a pair of flexible contacts normally mutually contacting to maintain a circuit through themselves, arcuate members connected with said contacts, a rotatable shaft having its axis concentric with the arcs of said members, an insulator finger fixed on said shaft having a radial length greater than the radius of said arcuate members, means connected with said contacts to cause the insulator to override both members in one direction of rotation, the relative positions of said contacts, member and insulator being such that during the opposite rotation of said insulator it will pass underneath said members and contacts, the outer of said members being shorter than the inner member to facilitate insertion of the insulator therebetween.

3. A switch comprising a rotatable shaft having an arm extending laterally therefrom, a pair of contact members having adjoining contact areas for establishing an electric circuit therethrough, substantially parallel arcuate guide elements connected with and extending from said members and curved around said shaft, the end of one element extending a slight distance circumferentially further than the end of the other element, said arm, contact members and guide elements being so constructed and arranged that during continuous rotation of the arm in one direction it will rotate out of operative relation with said elements, and means for causing the arm during opposite continuous rotation to ride over both elements, the arm and guide elements being constructed and arranged so that the arm maintains a resilient contact with the guide elements while overriding them and being further arranged so that after the arm overrides the end of one element and before overriding the end of the other element it can be inserted between them by a reversal of rotation and guided into the space between the contact areas of said members by further reverse rotative movement.

4. A switch comprising a pair of conductors for establishing a circuit, a rotatable shaft having an arm extending therefrom for rotation between said conductors, and a pair of guide means connected with said conductors and cooperating with said arm providing a gap into which said arm may be moved only after rotation in a predetermined direction a predetermined amount and from which gap the arm may then be moved in the opposite direction to a position between said conductors to operate said switch, the whole being arranged whereby if the arm is continuously rotated in either direction past said gap without reversal of motion it will fail to operate said switch.

5. A switch comprising a rotatable shaft having an arm extending laterally therefrom, a pair of members having adjoining contact areas for establishing an electric circuit therethrough, substantially parallel guide elements extending from said members within the area of the path of

said arm, one element extending in one direction a slight distance further than the other element, said arm, members and guide elements being so constructed and arranged that during continuous rotation of the arm in one direction it will rotate out of operative relation with said elements, and means for causing the arm during opposite continuous rotation to ride over both elements, the arm and guide elements being constructed and arranged so that the arm maintains a resilient contact with the guide elements while overriding them and being further arranged so that after the arm overrides the end of one element and before overriding the end of the other element it can be inserted between them by a reversal of rotation and guided into the space between the contact areas of said members by further reverse rotative movement.

6. A switch comprising a rotatable shaft having an arm extending laterally therefrom, a pair of members having adjoining contact areas for establishing an electric circuit therethrough, substantially parallel guide elements extending from said members within the area of the path of said arm, one element extending in one direction a slight distance further than the other element, said arm having a non-conducting portion insertable between said contact areas, said arm, members and guide elements being so constructed and arranged that during continuous rotation of the arm in one direction it will rotate out of operative relation with said elements, and means for causing the arm during opposite continuous rotation to ride over both elements, the arm and guide elements being constructed and arranged so that the arm maintains a resilient contact with the guide elements while overriding them and being further arranged so that after the arm overrides the end of one element and before overriding the end of the other element it can be inserted between them by a reversal of rotation and guided into the space between the contact areas of said members by further reverse rotative movement.

7. A switch comprising a rotatable shaft having an arm extending laterally therefrom, a pair of members having adjoining contact areas for establishing an electric circuit therethrough, substantially parallel guide elements extending from said members within the area of the path of said arm, one element extending in one direction a slight distance further than the other element, said arm having a non-conducting portion insertable between said contact areas, said contact areas being normally resiliently in contact when not separated by said arm, said arm, members and guide elements being so constructed and arranged that during continuous rotation of the arm in one direction it will rotate out of operative relation with said elements, and means for causing the arm during opposite continuous rotation to ride over both elements, the arm and guide elements being constructed and arranged so that the arm maintains a resilient contact with the guide elements while overriding them and being further arranged so that after the arm overrides the end of one element and before overriding the end of the other element it can be inserted between them by a reversal of rotation and guided into the space between the contact areas of said members by further reverse rotative movement.

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