Dec. 20, 1949 E. WILLIAMS 2,491,595

COMBINATION LOCK SWITCH

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Fig. 1.

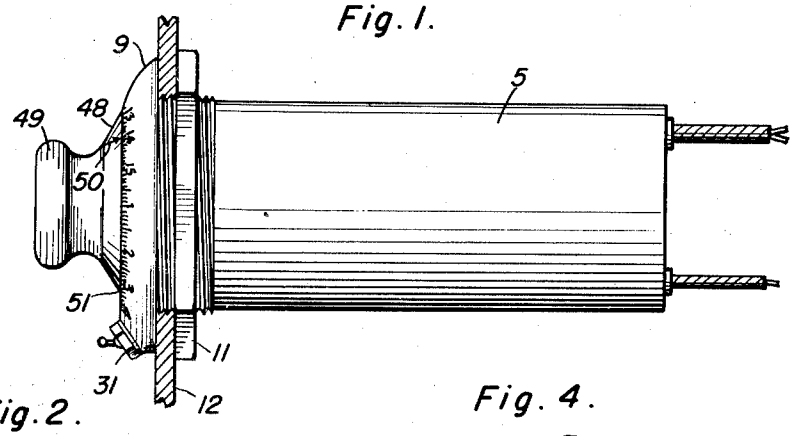


Fig. 2.

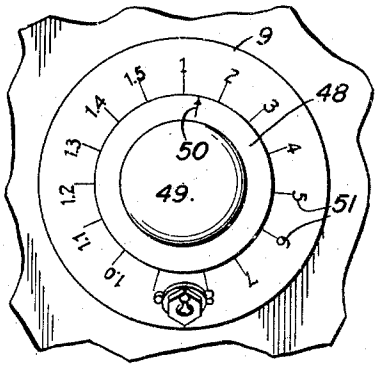


Fig. 4.

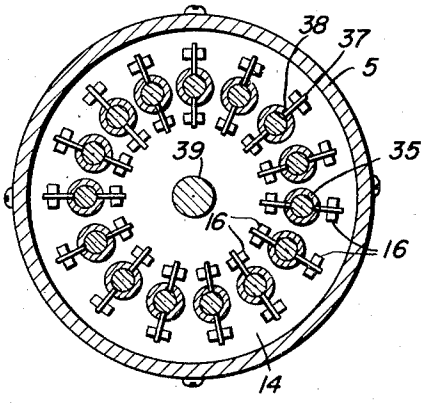
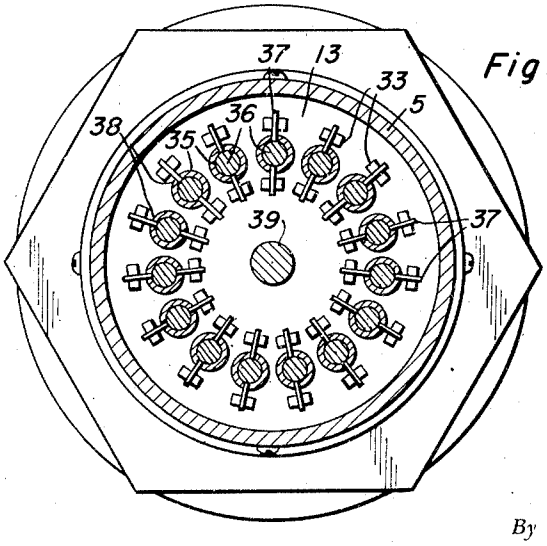


Fig. 5.



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COMBINATION LOCK SWITCH

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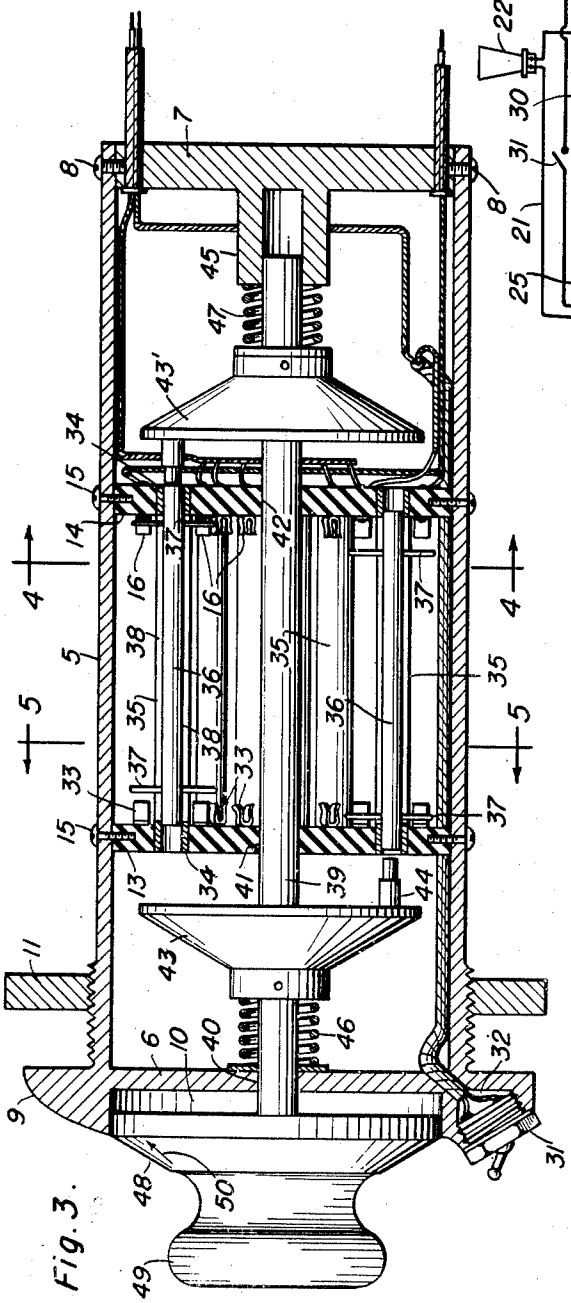


Fig. 3.

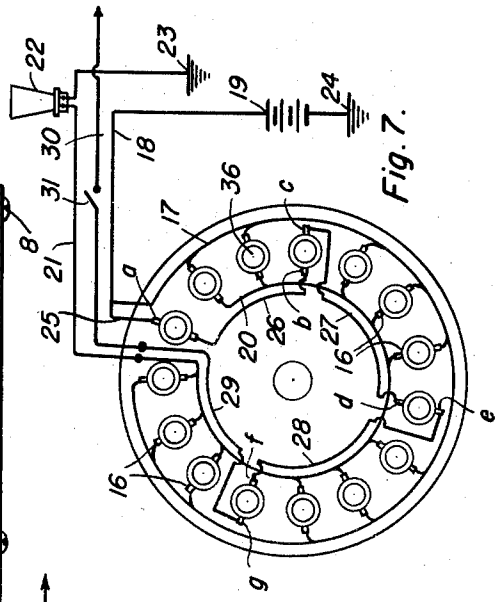


Fig. 7.

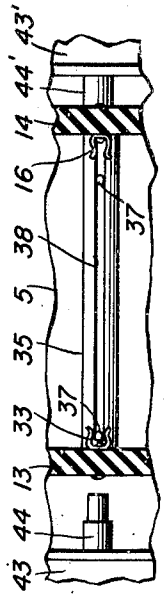


Fig. 6.

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COMBINATION LOCK SWITCH

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3 Claims. (Cl. 200—43)

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This invention relates to combination lock switches, and more particularly to a combination lock switch for controlling the ignition circuit and alarm circuit of an automobile, whereby a warning will be given whenever an unauthorized person attempts to close the ignition circuit and operate the automobile.

An object of the invention is to provide a combination lock switch in which a plurality of predetermined circuit-controlling elements must be moved to circuit closing position in order to complete the ignition circuit of an automobile, and in which movement of any one of a plurality of other circuit-controlling elements to circuit closing position will complete an alarm circuit.

Another object is to provide a combination lock switch which embodies a selecting and operating unit that is rotatable to select individual circuit-controlling elements, and which is capable of rectilinear movement in one direction to individually move the selected circuit-controlling elements to circuit closing position and in the opposite direction to individually reset the moved elements in circuit opening position.

A still further object is to provide a lock switch of the above kind which is comparatively simple, compact and durable in construction, which is efficient in operation, and which may be conveniently installed and used.

The exact nature of the present invention will become apparent from the following description when considered in conjunction with the accompanying drawings, in which:

Figure 1 is a view partly in section and partly in side elevation, showing a combination lock switch mounted in the instrument board of an automobile and constructed in accordance with the present invention;

Figure 2 is a front elevational view of the device shown in Figure 1;

Figure 3 is an enlarged central vertical longitudinal sectional view of the switch shown in Figure 1;

Figure 4 is a transverse section taken on line 4—4 of Figure 3;

Figure 5 is a transverse section taken on line 5—5 of Figure 3;

Figure 6 is a fragmentary longitudinal section showing the position of parts of the switch as a circuit-controlling element is reset to circuit opening position; and,

Figure 7 is a wiring diagram illustrating the manner in which the spring clip contacts of the switch are wired in the ignition and alarm circuits.

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Referring in detail to the drawings, the present switch embodies a casing including a cylindrical body 5 which is closed at its front end by an integral end wall 6 and at its rear end by a removable end wall 7 fitted within the body and secured in place by suitable means such as screws 8. At its front end, the body has an external annular flange 9 which is of sufficient thickness to extend forwardly of the integral end wall 6 and define a circular recess 10 therein. A nut 11 is removably threaded on the front end portion of the body behind the flange 9 so that the casing may be rigidly secured to an instrument panel 12 by passing the casing through an opening of said panel and clamping the latter between the flange 9 and nut 11 as shown in Figure 1.

Spaced transverse partition plates 13 and 14 of insulating material are fitted within the casing intermediate its ends, and are secured in place by suitable means such as screws 15. On the front face and near the edge of the rear partition 14 are secured a plurality of pairs of spaced spring clip contacts 16 which are arranged in a circular series concentric with the center of the plate 14. Corresponding contact clips of certain of the pairs of contact clips are connected in series with each other as at 17 in Figure 7, and are adapted to be connected as at 18 to one side of a source of current 19, the other spring clip contacts of said certain pairs of contact clips being also connected in series with each other as at 20 and being adapted to be connected to the other side of said source of current as at 21 through an alarm signal 22 and grounds 23 and 24, or the equivalent. One contact clip at the point indicated at *a* in Figure 7, of one of the remaining pairs of spring clip contacts is also connected to said one side of the source of current as at 25, and said remaining pairs of spring clip contacts are adapted to be bridged to place them in series with each other and to close an ignition circuit when all of them are bridged. For this purpose, the contact which is paired with the contact at *a* is connected as at 26 with a contact at *b*; the contact at *c* which is paired with the contact at *b* is connected as at 27 with a contact at *d*; the contact at *e* which is paired with the contact at *d* is connected as at 28 with another contact at *f*; and the contact at *g* which is paired with the contact at *f* is connected as at 29 with a wire 30 leading to the ignition coil of the automobile and having a single throw thumb switch 31 interposed therein. As shown in Figures 1–3 inclusive, the thumb switch 31 is

suitably mounted in a recess 32 provided in the lower portion of flange 9.

A plurality of pairs of spring clips 33 similar to the spring clip contacts 16, are similarly arranged with respect to and secured on the rear face of the front partition plate 13. Each partition plate has a circular series of openings as at 34, which are arranged so that one of the same is provided between the spring clip contacts of each pair and between the spring clips of each pair, each opening 34 of each plate being aligned with an opening of the other plate. Extending between and secured at their ends in aligned openings of the plates are guide tubes 35 having rods 36 slidably fitted therein. Each rod 36 has a cross pin 37 near each end, which projects through longitudinal slots 38 provided in opposite sides of the associated guide tubes. The pins 37 are arranged so that when the rods are moved rearwardly a certain distance, one pin of each rod is received and held by a pair of the spring clip contacts 16 so as to bridge the latter, and the other pin of said rod is disengaged from a pair of the spring clips 33. Also, when the rods are moved forwardly, said other pin 37 of each rod is received and held by a pair of the spring clips 33 and said one pin of the rod is disengaged from the pair of spring clip contacts 16.

A single unitary device is provided to select any desired ones of the rods and move them one at a time to shift their forward pins 37 out of engagement with the spring clips 33 and to shift their rear pins 37 into bridging relation with the spring clip contacts 16. This selecting and operating device is also adapted to similarly select the rods and move them one at the time to shift their rear pins 37 out of bridging relation to the spring clip contacts 16 and reset them with their front pins in engagement with the spring clips 33. This selecting and operating device includes a shaft 39 rotatably and slidably extended through central openings in the front end wall 6 of the casing and in the partition plates 13 and 14 as at 40, 41 and 42, respectively. This device also includes selector elements secured on the shaft 39 respectively in front of the front partition plate 13, and in back of the rear partition plate 14, each selector element comprising a plate 43 or 43' having a stud 44 or 44' projecting toward and selectively registerable with the adjacent ends of the rods. The rear end of the shaft 39 is received in a guide 45 carried by the rear end wall 7, and helical compression springs 46 and 47 are disposed on the shaft 39, respectively between the front selector element and the front end wall 6 and between the rear selector element and the guide 45, to yieldingly oppose longitudinal movement of the shaft 39 in opposite directions and to normally position the selector elements out of engagement with the opposite ends of the rods 36. An indicator plate 48, provided with a central operating knob 49, is secured on the front projecting end of the shaft 39 so as to be normally positioned partly within the recess 10 as shown in Figure 3. On the margin of the indicator plate 48 is an index mark 50 which coacts with graduations 51 provided on the adjacent face of the flange 9, the position of the index mark 50 corresponding to that of the stud 44, and the positions of the graduations 51 corresponding to those of the rods 36.

In explaining the operation of the present switch, it will be assumed that the rods 36 are all shifted to their forward positions with their

forward ends 37 engaged with the front spring clips 33, and with the rear pins 37 disengaged from the rear spring clip contacts 16. In order to close the ignition circuit, the thumb switch 31 is closed, and the indicator plate 48 is turned to register the index mark 50 with graduation number 2 and thereby align the stud 44 with the rod numbered 2 in Figure 7. The shaft 39 is then pressed rearwardly to shift this rod 36 rearwardly and cause the rear pin 37 thereof to bridge the adjacent spring clip contacts 16 and to disengage its front pin 37 from the associated spring clips 33. This is also done successively with the rods numbered 5, 9 and 13, whereupon the ignition circuit is closed or completed. If any one of these rods are not so shifted, the circuit will not be completely closed, and it will thus be apparent that an unauthorized person not familiar with the combination will have great difficulty in closing the ignition circuit and operating the automobile. Should any one of the remaining rods be so shifted, the circuit of the alarm signal 22 would be closed so as to warn those within hearing of the unauthorized attempt to operate the vehicle. This makes it extremely difficult for anyone not familiar with the combination to close the ignition circuit without closing the alarm circuit. By changing the connections with the spring clip contacts 16, the combination may be changed, if desired. When parking in a public parking place, the present switch may be left in set condition with the ignition circuit closed through the proper pairs of contacts 16, thereby permitting the attendant of the parking place to open and close the ignition circuit by mere operation of the thumb switch 31. Any of the rods 36 which may have been shifted rearwardly may be readily retracted or reset to circuit opening position by aligning the stud 44' therewith and pulling the shaft 39 forwardly.

From the foregoing description, it is believed that the construction, operation and advantages of the present invention will be readily understood and appreciated by those skilled in the art. Modifications and changes in detail of construction are contemplated, such as fairly fall within the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

1. In a combination lock switch, an arcuate series of shiftable circuit-controlling members, a rotatably and slidably mounted actuator member having spaced permanently and rigidly connected selective means thereon respectively engageable with opposite ends of a single circuit-controlling member for shifting the same when said actuating member is shifted bodily in either of opposite directions, and means to indicate the circuit-controlling members selected by rotary adjustment of said actuating member.

2. The construction defined in claim 1, wherein each circuit-controlling member is provided with cross pins near opposite ends thereof, in combination with a pair of spring clip contacts associated with and adapted to be bridged by one cross pin of each circuit-controlling member, and a pair of spring clips associated with each circuit-controlling member and adapted to retainingly receive the other cross pin of the latter when said circuit-controlling member is moved to disengage its first named pin from said spring clip contacts.

3. The construction defined in claim 1, wherein each circuit controlling member comprises a rod

having cross pins near opposite ends thereof, a pair of spaced plates, guide tubes extending between and supported by said plates and provided with longitudinal slots through which the cross pins project, each rod being slidably mounted in one of said guide tubes, spring clip contacts and spring clips carried by the respective plates and arranged for alternate reception of the respective cross pins of the rods when the latter are shifted in opposite directions, to respectively hold them in circuit closing and circuit opening position.

ELIAS WILLIAMS.

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