



## UNITED STATES PATENT OFFICE

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## ELECTRIC LOCK STRUCTURE

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4 Claims. (Cl. 200—45)

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This invention relates to electric switches in general and particularly to a keyless, lockable electric switch structure.

One of the objects of this invention is to provide a relatively simple, inexpensive and highly effective electric switch device which may be manually operated and also manually set either for operation or non-operation by the predetermined setting of a plurality of cams by way of indexed discs.

Another object of this invention is the provision of an electric switch structure as above indicated, wherein the setting of the cams and discs control the positioning of a detent arranged along the operating path of the circuit-making and circuit-breaking element of the switch, and wherein a pressure member is employed for either causing the detent to move out of the path of the switch element or into its path and, when moved into the latter position, to permit said element to move to its circuit-breaking position, but preventing the element from assuming its circuit-closing position.

A further object of this invention is the provision of a detent in the form of a resilient spring or in the form of a spring-controlled shaft equipped with a detent bar extending therefrom.

The foregoing and additional objects and other important advantages of the present device may be more fully understood from the ensuing description in conjunction with the accompanying drawings, which latter although showing but one embodiment of the switch structure, are by no means intended in a restricting sense, since the structure of the switch may have to be altered in its adaptation for different purposes, such as the employment of the switch for the control of an automobile circuit, electric lights and many other uses.

In the drawings:

Fig. 1 is a plan view of the bottom member of the switch casing;

Fig. 2 is a section taken approximately along line 2—2 of Fig. 1;

Fig. 3 is a vertical section through the bottom casing member taken approximately along line 3—3 of Fig. 1;

Fig. 4 is a bottom view of the upper casing member;

Fig. 5 is a side elevation thereof;

Fig. 6 is a cross section of the combined top and bottom members taken approximately along a vertical plane indicated by numerals 6—6 of Fig. 5;

Fig. 7 is a diagrammatical detail view of a cam-equipped disc and the detent pressure member with the detent moved out of the path of the switch element;

Fig. 8 is a similar diagrammatical detail view with the cam moved to a position to cause the

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pressure member to release the detent into the path of the switch element;

Fig. 9 is a perspective modified illustration of the detent; and

Fig. 10 is a modified illustration of the disc and cam arrangement.

As presently preferred, the hollow switch casing, adapted to enclose all the mechanism of a keyless switch structure, is composed of a bottom member 10 and a top or cover member 11. Within the bottom member there is rotatably mounted a shaft 12. Extending therefrom are resilient glide fingers 13 of a structure 13', fixedly united with shaft 12 by means of end lugs 14. A coil spring 15 normally urges the set of fingers to stand upright, and when dislodged from that position, to move in anticlockwise direction, see Fig. 3. At the right-hand end of shaft 12, see Figs. 1 and 2, there is fixedly secured a pressure member 16 which is adapted to normally depress a resilient detent 17 which is fixedly mounted at one end at 18 while its free end is formed into a leg adapted to be engaged by pressure member 16. In Figs. 1, 2, 3, 6, 7 and 8 this detent is shown to comprise a spring member which has the tendency of swinging upwards with its free end, as clearly seen in full lines in Figs. 6 and 8 and in broken lines in Fig. 3.

Secured to the wall adjacent shaft 12 there is provided an arrangement of resilient grip or detent blades 19, the purpose of which will be explained presently. At the right-hand end of the casing bottom member there are shown two electric conductors 20 and 21, to which two leads of an electric circuit may be connected by means of screws 22 and 23. These conductors terminate in resilient clips or contacts 24 and 25.

In the top casing member 11, the outer surface of which is bowed upwardly, there is mounted a fixed shaft 26. Rotatable about that shaft are indexed wheels 27, 28 and 29 which partly project beyond the top casing member through suitable slots so that they may be manually operated. Also secured within the top portion of the casing is a switch member 30 in the form of a toggle switch, although any other suitable switch structure may be substituted. The handle or operating portion 31 of the switch extends above the casing top for manual operation, whereas the circuit-closing and circuit-opening element of the switch comprises a swingable arm 32 which is adapted to either engage or disengage contacts 24 and 25, thus either closing or opening an electric circuit controlled by these contacts.

Fixedly associated with wheels 27, 28 and 29 are cams 27', 28', and 29' which are adapted to move spring-loaded fingers 13 against the tension of spring 15, that is in clockwise direction, when the discs are turned to a position shown in Fig. 8. Each of the discs or wheels is

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provided with certain indices. Thus, wheels 27 and 28 are provided with numbers and wheel 29 with letters. Between the numbers and letters are notches or indentations 33 adapted to be engaged by the free ends of spring detent blades 19 to hold the discs in set position. The disc of course can be manually rotated to any predetermined combination and at which setting the cams will move fingers 13 in clockwise direction against the tension of spring 15. When thus moved, shaft 12 is moved also, and with the shaft moves pressure member 16 and permits the upward swing of detent 17 into the path of switch arm 32. At that position the switch arm may be moved to a contact releasing position but is prevented from moving into a contact engaging position, as clearly illustrated in Fig. 6.

In the diagrams 7 and 8 the position of the cams and the position of spring-loaded fingers 13, pressure member 16 and detent 17 are clearly illustrated in their two positions. Fig. 7 shows finger 13 in its normal position at which pressure member 16 urges detent 17 into its flat, switch arm-clearing position, whereas in Fig. 8 the cam is shown to engage finger 13, thus swinging pressure member 16 upwards, in consequence of which detent 17 is released into the path of switch arm 32.

The cams indicated in Figs. 3, 4, 7 and 8 are rather broad, and therefore the setting of the discs to prevent the operation of the switch structure would be relatively simple. In Fig. 10 there is shown a disc 34 associated with another cam design 35 opposite only one spacing between two adjacent indentations or notches 33, whereby the setting of the disc and of the cam in relation to fingers 13 becomes more definitely localized and therefore more difficult to achieve.

Only when all disc cams engage all of the glide fingers 13 is there sufficient force to overcome the tension of coil spring 15 so that member 16 can swing upward and release detent 17 to a switch-arresting position.

In Figs. 1, 2, 4 and 5 only three cams and discs are shown. It is quite obvious of course that the number of discs is a matter of choice and therefore these illustrations are by no means intended to limit the device to a three-disc arrangement.

Fig. 9 illustrates a modified construction of a detent for switch arm 32. It comprises a shaft 35 from which extends a detent blade 36, the latter being urged by spring 37 to normally assume an upward position as shown. This construction of the detent may be substituted for the resilient detent blade 17 described previously.

While the foregoing deals with the specific structure illustrated in the drawings, it is quite obvious that changes and improvements may have to be incorporated when the switch structure is designed for serving different uses, for which reason such changes and improvements are to be deemed included within the scope of this invention as defined in the annexed claims.

What is claimed as new is:

1. In a lockable electric switch, a hollow casing, a plurality of indexed discs having cams and being rotatable within the casing but projecting partly therefrom to facilitate their individual manual operation, a toggle switch operative in the casing with its handle projecting above the latter and a plurality of spring-loaded elements adapted for engagement by said cams, a switch detent governed by the position of said elements,

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the positioning of said elements being controlled by the setting of said discs for either causing said detent to assume a switch-clearing position, thus allowing free operation of said toggle switch or causing the detent to move into the operating path of the switch, thus arresting the switch in its circuit-opening position.

2. In a lockable electric switch structure, a hollow casing composed of separable portions, a plurality of individually settable, rotatably mounted cam-equipped discs operative within and partly projecting above said casing and having means for positioning them relative to one another, a spring-loaded glide member having fingers adapted for tensionally engaging the cams of said discs, a pressure element connected with and being operative by said glide member, a detent adapted for engagement by said pressure element, an over-center toggle switch operative within and projecting partly beyond said housing and having a contact arm, a pair of contact elements for engagement by said contact arm to close an electric circuit, said detent being arranged along the path of said contact arm and being adapted to be held in an arm-freeing position by said pressure element while said discs are set to a certain position and being further adapted to move into the operative path of said contact arm when released by said pressure element upon a change of setting of said discs, thus preventing the movement of the contact arm to its circuit-closing position, although permitting its movement from its circuit-closing to its circuit-opening position.

3. In a keyless, lockable electric switch structure, a hollow casing, a plurality of indexed discs, having cams, housed within and partly extending above the casing for manual setting, an electric switch element mounted in the casing and partly extending above the latter for manual operation, said switch element having a contact making and contact breaking arm, a detent arranged along the operating path of the arm, a pressure member actuable by said cams and adapted to move said detent into an arm-freeing position at a certain setting of the discs and to release the detent into the path of said arm at another setting of the discs, and electric contacts adapted for engagement and disengagement by said switch element arm.

4. In a keyless, lockable electric switch structure, a switch element operative therein, a plurality of cam-equipped manually and individually settable discs extending partly above the structure and means for controlling the operation of said switch element by the setting of the discs, said means comprising cam-responsive, spring-loaded fingers, one for each disc cam, and a resilient switch detent operative by the positioning of said fingers.

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