July 27, 1926. 1,594,288

H. D. WETHLING

ELECTRIC PERMUTATION SWITCH

Filed Jan. 31, 1924 2 Sheets-Sheet 1

Fig. 1.

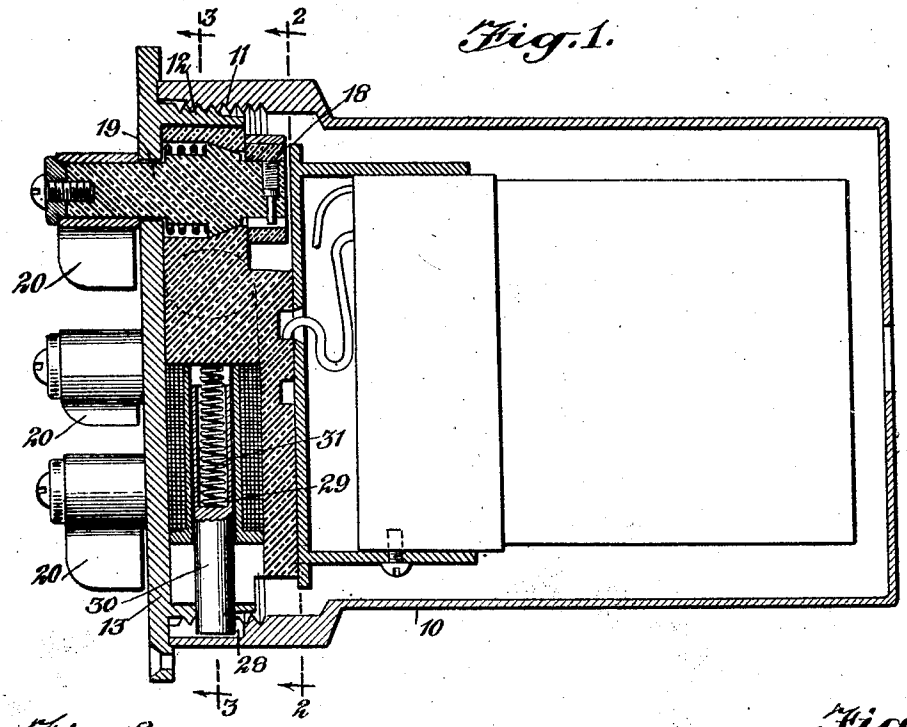


Fig. 2.

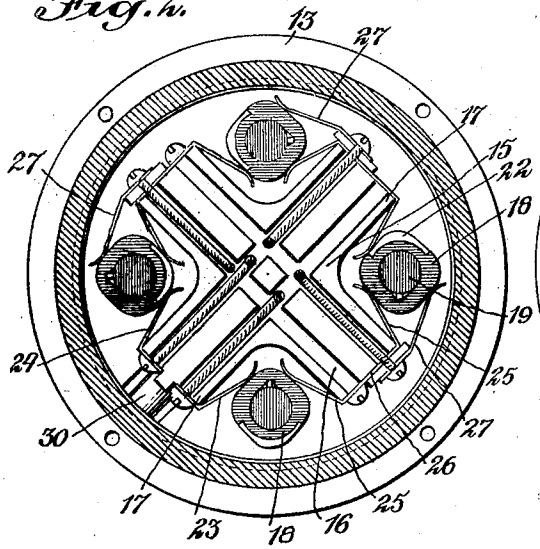
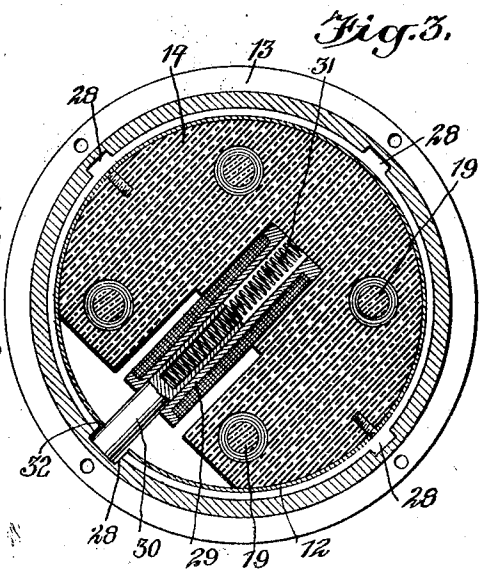


Fig. 3.



WITNESSES

INVENTOR

Harry D. Wethling

BY

ATTORNEYS

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Fig. 4.

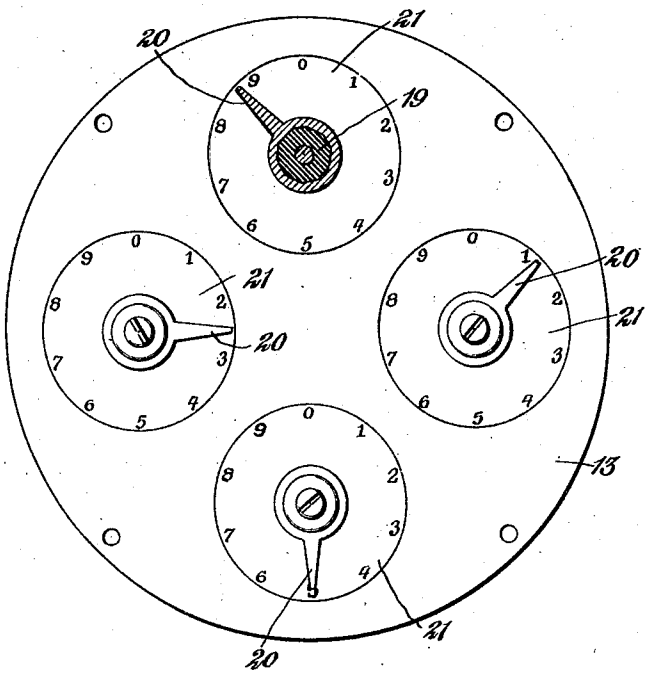
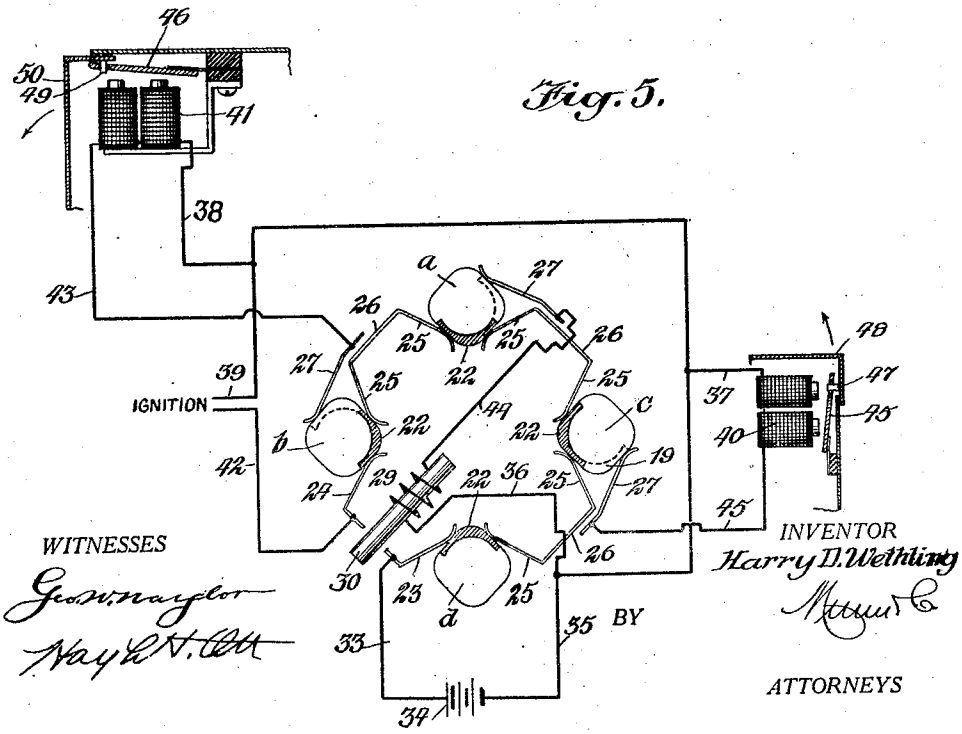


Fig. 5.



WITNESSES

Geo. W. Naylor

Nay & N. Att

INVENTOR

Harry D. Wethling

BY

ATTORNEYS

Patented July 27, 1926. 1,594,288

UNITED STATES PATENT OFFICE.

HARRY D. WETHLING, OF ORANGE, NEW JERSEY, ASSIGNOR TO WETHLING-BAKLEY LOCK CORPORATION, OF ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ELECTRIC PERMUTATION SWITCH.

Application filed January 31, 1924. Serial No. 689,830.

This invention relates to electric permutation switches and has particular reference to a switch which is controlled by a permutation lock similar to that set forth in my co-pending applications filed August 11, 1922, and October 25, 1922, bearing respectively Serial Nos. 581,227 (now Patent No. 1,503,403, dated July 29, 1924) and 596,828.

The present invention contemplates a permutation lock controlled electric switch mechanism by means of which a plurality of electric circuits having a common source of supply may be selectively closed or opened to perform various functions.

More specifically the invention relates to a permutation lock controlled electric switch which is designed for use in connection with motor vehicles for locking the ignition circuit, the housing for the switch, the coil box and the permutation lock mechanism, the hood, the spare tires or other similar devices or parts of the vehicle.

The outstanding object of the present invention resides in the provision of an extremely simple and compact electric switch mechanism in combination with a permutation lock controlling mechanism by means of which a multiplicity of independent circuits having the same source of supply may be selectively and separately closed to perform a predetermined function.

Furthermore the invention aims to provide means for enclosing the switch and permutation lock mechanisms, whereby the normally locked enclosing means is released by manipulation of the permutation lock mechanism and switch without the necessity of closing the other circuits controlled thereby.

As a still further object the invention resides in the provision of a device of the character set forth, which is comparatively simple in its construction, inexpensive to manufacture and install, and which is thoroughly reliable and highly efficient in its purpose.

With the above recited and other objects in view, the invention resides in the novel construction set forth in the following specification, particularly pointed out in the appended claims and illustrated in the accompanying drawings, it being understood that the right is reserved to embodiments other than those actually illustrated herein to the full extent indicated by the general meaning of the terms in which the claims are expressed.

In the drawings—

Figure 1 is a longitudinal sectional view through the device.

Fig. 2 is a transverse sectional view therethrough taken approximately on the line indicated at 2—2 in Fig. 1.

Fig. 3 is a similar sectional view taken approximately on the line indicated at 3—3 in Fig. 1.

Fig. 4 is a front view with parts in section.

Fig. 5 is a diagrammatic view.

In the following specification the device will be particularly described for use in connection with the ignition system of a motor vehicle, but it is to be understood that no restriction is made to the particular use to which the device may be adapted for the reason that the same may be equally as well employed as a lock for safes, chests, strong boxes, mail containers, doors, windows, cells, or the like, which may be opened or closed from a distance electrically by an initiated operator.

Referring to the drawings by characters of reference, 10 designates the body of a housing or casing which is formed with an internally threaded open end 11 for receiving the externally threaded annular flange 12 of the cover plate or closure 13 which is designed to close the housing body. On its inner side and within the flange 12 the cover plate carries an insulated block 14 which lies within the flange 12 and is provided with a substantially cruciform boss 15 also of an insulating material and preferably integral with the block 14. The boss 15 is provided with crossed pairs of parallel grooves 16 to constitute channels for the leading of the wiring to the various points of the boss. Between each of the radially projecting arms 17 of the cruciform boss in the angle formed thereby, a rotary switch head 18 is mounted which is of substantially circular formation and is also of a non-conducting material, the said head being carried by the inner end of a shaft 19 which extends through an opening in the cover plate and the insulated block 14 and which has attached to its outer end a pointer arm 20 which cooperates with a dial 21 on the outer face of the cover plate. The rotary heads 18 are each provided with a peripheral bridge plate 22 extending around slightly more than a quarter of the

circumference thereof. The outer end of one of the radial arms 17 is provided with a pair of separated resilient contact arms indicated at 23 and 24 which are mounted so as to constantly engage with the peripheries of the rotary head 18. The outer ends of the remaining arms 17 are each provided with a pair of contact arms 25 which are connected by a connecting bight 26, which arms 25 contact respectively with the peripheries of the adjacent rotary heads 18. The said remaining arms 17 are further provided with spring contact elements 27 which are insulated from the contact arms and connecting bights 26 and which contact elements 27 also frictionally engage with the peripheries of the rotary heads 18 adjacent thereto.

The housing body 10 is formed at its interiorly threaded end with a plurality of circumferentially spaced keeper notches 28, and a solenoid 29 is mounted within the block 14 with the core 30 thereof normally projected by a spring 31 through a radial opening 32 in the annular flange 12 whereby the outer end of the core 30 serves as a lock bolt for engagement within one of the keeper notches 28 to lock the cover and housing in closed relation. Under this arrangement relative rotary adjustment of the block and solenoid with respect to the annular flange 12 permits of the use of the solenoid core in conjunction with any one of the notches 28.

As diagrammatically illustrated in Fig. 5, a conductor wire 33 leads from a source of supply 34 to the contact arm 23, while a second conductor wire 35 leads from the opposite pole of the source of supply by branch conductors 36, 37, 38 and 39 respectively to the various devices controlled by the switch mechanism. In the present instance the branch conductor 36 leads to one terminal of the winding of the solenoid 29; the branch conductor 37 to one terminal of the winding of the electromagnet 40; the branch conductor 38 to one terminal of the winding of the electromagnet 41 and the branch conductor 39 to the ignition feed. The ignition feed return conductor 42 is connected to the contact arm 24; the return conductor 43 from the winding of the electromagnet 41 leads to one of the contact elements 27; the return conductor 44 leads from the winding of the solenoid 29 to another of the contact elements 27 and the return conductor 45 leads from the winding of the electromagnet 40 to the remaining contact element 27.

In use and operation of the device when the rotary heads 18 are arranged as illustrated in the diagrammatic view, by manipulation of the permutation lock mechanism, the peripheral bridge plates 22 thereof will bridge all of the spaced terminals of the arms 25 and at the same time contact with the arms 23 and 24 whereby current will flow from one pole of the source of supply 34 through the conductors 33, arm 23, bridge plates 22, arms 25 and their bights 26 to the conductor 42, thence through the ignition, through the branch conductor 39 and the feed conductor 35 back to the opposite pole of the source of supply. With the permutation lock mechanism in this arrangement, if it is desired to manipulate the switch for the purpose of connecting the solenoid 29 with the source of supply to release the free end of the core from the keeper notch 28, the rotary head 18 indicated at *a* in the diagrammatic view is turned until the bridge plate 22 thereof bridges the contact arms 25 and 27. This breaks the ignition circuit and establishes a circuit which includes a solenoid whereby the current flows from one pole of the battery through the feed wire 35, the branch conduit 36, through the solenoid winding, the return conduit 44, the contact arm 27, bridge plate 22 of a rotary head *a*, thence through the intervening contact arms 25, their bights 26 and the contact arm 23, conductor 33, to the opposite pole of the source of supply. While the ignition circuit is broken the circuit to the solenoid is established so that the core 30 thereof is retracted to release the same from the keeper notch 28 to permit of opening of the closure 13 from the housing body 10. Likewise when the rotary head indicated at *b* in Fig. 5 is rotated a quarter turn to the dotted line position whereby the bridge plate 22 is disposed in the dotted line position, the ignition circuit is broken while communication is established between the source of supply and the electromagnet 41 provided the rotary heads indicated at *a*, *c* and *d* are in bridging relation to the contact arms 25 and the contact arm 23. When the rotary head indicated at *c* is rotated to bring the peripheral bridge plate 19 thereof in bridging relation to the contacts 25 and 27 communication is established between the source of supply and the electromagnet 40. If the rotary head 18 indicated at *d* in Fig. 5 is turned to unbridging position with respect to the contact arms 25 and 23, all of the circuits are broken and therefore the ignition is locked against operation, while the armatures 45 and 46 of the electromagnets 40 and 41 perform their function to either engage with the keeper pin 47 of the hood 48 or the keeper pin 49 of a spare tire retainer 50, and the solenoid core 30 engages with the keeper notch 28.

It will thus be seen that by means of a single permutation lock controlled switch mechanism, a plurality of circuits may be closed or opened singly and selectively for the purpose of performing various functions, by an initiated operator.

I claim:

1. The combination with a plurality of

independent circuits, each including an electrically operated device, and a common source of supply for said circuits having a common feed conductor leading from one pole of the source of supply and connected with one of the conductors of each independent circuit, of a permutation lock controlled switch connected with the remaining pole of the source of supply and operable to lock all of said circuits open and upon proper manipulation to selectively close one of said circuits while retaining the remainder of said circuits locked in an open condition.

2. The combination with a plurality of independent circuits, each including an electrically operated device, and a common source of supply for said circuits having a common feed conductor leading from one pole of the source of supply and connected with one of the conductors of each independent circuit, of a permutation lock controlled switch connected with the remaining pole of the source of supply and operable to lock all of said circuits open and upon proper manipulation to selectively close one of said circuits while retaining the remainder of said circuits locked in an open condition, said switch comprising a plurality of movable circuit breaking and closing elements and means connected therewith for guiding an initiated operator in moving the same to their various set positions.

3. In a device of the character set forth, a plurality of circuits each including an independent electrically operated device, a common source of electrical current supply therefor, a selective switch mechanism for closing said circuits to control the feed of current thereto from the common source of supply, and a permutation lock controlling means for selectively closing one of the various circuits and opening the remainder upon proper manipulation thereof.

4. In a device of the character set forth, a plurality of circuits each including an independent electrically operated device, a common source of electrical current supply therefor, a selective switch mechanism for closing said circuits to control the feed of current thereto from the common source of supply, and a permutation lock controlling means for selectively closing one of the various circuits and opening the remainder upon proper manipulation thereof, said permutation lock controlling means also including means for locking all of said circuits in open condition upon proper manipulation thereof.

5. In a permutation lock controlled switch mechanism and a plurality of circuits each having an electrically operated device therein, of a common source of electrical current supply adapted upon proper manipulation of the lock controlled switch mechanism to operatively connect selectively and singly said circuits with the source of supply whereby one of the circuits is in closed active condition when the remainder are in an open active condition.

6. The combination with a plurality of independent circuits, each including an electrically operated device, and a common source of supply for said circuits having a common feed conductor leading from one pole of the source of supply and connected with one of the conductors of each independent circuit, of a permutation lock controlled switch connected with the remaining pole of the source of supply and operable to lock all of said circuits open and upon proper manipulation to selectively close one of said circuits while retaining the remainder of said circuits locked in an open condition, said switch comprising a plurality of movable circuit breaking and closing elements and means connected therewith for guiding an initiated operator in moving the same to their various set positions, one of said circuit closing and breaking elements constituting a master circuit closing and breaking means for all of the circuits and the remainder individual circuit closing and breaking means.

7. A permutation lock controlled switch mechanism operatively connected with a source of supply and a plurality of circuits to constitute means for selectively and singly establishing communication between the source of supply and the various circuits thereof, a casing housing said mechanism, a cover therefor, means for normally locking the cover in closed relation to the casing, means included in and operable by one of said circuits when closed for releasing the cover locking means, another of said circuits including ignition devices for an internal combustion engine, and the remainder including lock releasing means operable upon closing of the same to release the normally locked locking devices.

8. A permutation lock controlled switch mechanism comprising a housing having an open end and a cover therefor, a permutation mechanism comprising a plurality of rotary elements carried by and extending through the cover, a switch head carried by the inner end of each rotary element having a peripheral bridge plate, spaced resilient contact arms engaging the peripheries of the switch heads and adapted upon manipulation of the rotary elements of the permutation mechanism to bridge the spaced contact arms, a common source of electrical current supply, and a plurality of independent circuits including electrically operated devices connected with certain of the spaced resilient arms whereby upon manipulation of the permutation mechanism the said circuits are selectively and singly closed in

communication with the common source of supply, as and for the purpose specified.

9. A permutation lock controlled switch mechanism comprising a housing having an open end and a cover therefor, a permutation mechanism comprising a plurality of rotary elements carried by and extending through the cover, a switch head carried by the inner end of each rotary element having a peripheral bridge plate, spaced resilient contact arms engaging the peripheries of the switch heads and adapted upon manipulation of the rotary elements of the permutation mechanism to bridge the spaced contact arms, a common source of electrical current supply, a plurality of independent circuits including electrically operated devices connected with certain of the spaced resilient arms whereby upon manipulation of the permutation mechanism the said circuits are selectively and singly closed in communication with the common source of supply, a radially projectable normally projected locking bolt carried by the casing with which the same engages for normally locking the cover in closed relation, and means included in one of said circuits for retracting the bolt to unlock the cover.

10. A permutation lock controlled switch mechanism comprising a housing having an open end and a cover therefor, a permutation mechanism comprising a plurality of rotary elements carried by and extending through the cover, a switch head carried by the inner end of each rotary element having a peripheral bridge plate, spaced resilient contact arms engaging the peripheries of the switch heads and adapted upon manipulation of the rotary elements of the permutation mechanism to bridge the spaced contact arms, a common source of electrical current supply, a plurality of independent circuits including electrically operated devices connected with certain of the spaced resilient arms whereby upon manipulation of the permutation mechanism the said circuits are selectively and singly closed in communication with the common source of supply, a radially projectable normally projected locking bolt carried by the casing with which the same engages for normally locking the cover in closed relation, and means included in one of said circuits for retracting the bolt to unlock the cover, the said casing having a plurality of keeper means circumferentially spaced thereon whereby upon adjustment of the cover with respect to the casing the said locking bolt may cooperate with any one of said keeper means.

HARRY D. WETHLING.