FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

Inventor
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By his Attorney
A. Alexander Thomas
To all whom it may concern:

Be it known that I, WILLIAM H. COLLIER, a citizen of the United States, and a resident of Painesville, Lake County, State of Ohio, have invented certain new and useful Improvements in Circuit-Control Devices for Automobiles, of which the following is a specification.

My invention relates to devices for controlling the various electric circuits with which motor vehicles, particularly passenger cars, are usually equipped for operating the lights, the starter, the ignition and the signal. The object of my invention is to provide a simple device for opening and closing these electric circuits by means of a hand-operated member conveniently located within the driver's reach.

My invention is characterized by a novel construction of switches, which include a rotary switch arm for controlling some of the circuits and a separate switch arm adapted to operate between a pair of spaced terminals for controlling other circuits. Both switch arms are actuated by a rod or shaft mounted in the steering post of the automobile. A button or like member projecting out of the center of the steering wheel serves to turn the shaft for operating the rotary switch arm and to move the shaft axially for operating the other switch arm. The switches are preferably enclosed in a casing to protect them from dust, moisture and other deleterious elements.

The novel features and advantages of my invention will be understood from a detailed description of the construction illustrated in the accompanying drawings, in which—

Figure 1 shows a preferred form of my new control device, certain of the parts being shown in vertical cross-section for clearness;

Figure 2 is a transverse cross-section on line 2—2 of Fig. 1;

Figure 3 is a cross-section approximately on line 3—3 of Fig. 1;

Figure 4 is a detached perspective view of the spring which holds the switch-operating shaft in normal position axially; and

Figure 5 is a detached perspective view of the rotatable switch arm which controls the lighting and ignition circuits.

In Figure 1, I have shown part of a steering wheel 1 mounted at the top of a steering post 2, the latter being shown broken away. At the lower end of the steering post 2 is a housing or support 3 for the steering screw. These parts are of usual construction and require no further description. The support 3 carries a casing indicated as a whole by A. The casing has an extension or bracket 4 through which pass suitable fastening members 5 for securing the casing to the support 3. The casing A, which in practice will preferably be made cylindrical in shape, has a chamber 6 closed at the bottom by a removable cover 7. In the casing A are mounted switch terminals, usually called binding posts, to which the conductors of the various electric circuits are connected. These binding posts, which may be of any suitable construction, are shown in the form of nuts adapted to receive nuts for clamping the wire connections. This is one of the most common forms of binding post in use. The binding post 8 is for the signal or alarm circuit, which operates a suitable signal, usually a horn. The binding post 9 is in the starter circuit. The binding post 10 is in the battery circuit, or other source of electrical energy. The three binding posts 11, 12 and 13 are connected in the lighting circuits. The circuit of the headlamps leads to the binding post 11; the circuit of the tail-light goes to the binding post 12, and the circuit of the sidelights goes to the binding post 13. All of the binding posts 8 to 13 inclusive are properly insulated from the casing A by suitable insulating bushings 14.

An operating shaft or rod 15, mounted in the steering post, extends into the casing A through an opening in the top plate 16 of the casing. The upper end of the shaft 15 projects through the hub of the steering wheel and terminates in a knurled head or button 17 by means of which the shaft is turned or moved up and down, as desired. The lower end of the shaft is provided with a pair of bushings 18 of insulating material, which are held in place by a nut 19, or otherwise. The bushings 18 form a circular groove 20 for a purpose which will presently appear. The shaft 15 carries a rotatory contact member indicated as a whole by C and best shown in Figure 5. The part C, which may conveniently be stamped out of a single piece of metal, is formed with a bushing 21, a flange 21' and an extension 22, which I will call a switch arm. The contact member C is firmly mounted on an insulating bushing 23, in the opening of which
is secured a metallic sleeve 24. The contact part C, bushing 23 and sleeve 24 are mounted as a single member upon the operating shaft 15. Any suitable means may be used for compelling rotation of the switch arm 22 with the shaft 15, and yet permit an axial movement of the shaft in either direction relative to the contact member. This may conveniently be accomplished by a key or spline 25 secured to the shaft 15 and extending into a groove or slot 26 in the sleeve 24. In this way the shaft 15 may be moved up and down without disturbing the position of the switch arm 22. However, a rotatory movement of the shaft is always accomplished by a corresponding rotatory movement of the switch arm 22.

The axial movements of the shaft 15 operate a switch arm 27, which I have shown in the drawings as part of a spring member S, best illustrated in Fig. 4. The member S, which is made of spring metal having good conductivity, comprises the arms 27 and 28, connected by a neck portion 29. The member S is secured to the binding post 10 and electrically connected thereto, but insulated from the casing A. The binding post 10 passes through a hole 29 in the neck portion 29 of the metal S. It will be understood that this integral construction of the arms 27 and 28 is here mentioned merely as a preferred form and not by way of limitation.

The switch arm 27 has an opening 30 in which it fits the insulating bushings 18 at the reduced or grooved portion 29, whereby the arm 27 is operatively connected to the shaft 15 and insulated therefrom. That is to say, an axial movement of the shaft 15 in either direction is accompanied by a corresponding movement of the arm 27. The engagement between the bushings 18 and the switch arm 27 is sufficiently loose to permit free rotatory movement of the shaft 15. The arm 27, acting as a spring, normally holds the shaft 15 in the position shown in Fig. 1.

The spring arm 28 terminates in a pair of curved extensions 31 arranged to engage the underside of the circular flange 21* of the contact member C. The tension of the spring arm 28 is such that the extensions 31 yieldably press against the member C and hold the bushing 23 against the top 16 of the casing, thereby preventing axial movement of the switch arm 22 when the shaft 15 is moved up and down. The arm 28 performs the additional function of permanently connecting the switch arm 22 with the binding post 10 of the battery circuit.

The binding posts 11, 12 and 13 terminate at their lower ends in rounded contact rings or buttons 32 arranged to be engaged by the switch arm 22. The spring arm 28 tends to hold the switch arm 22 firmly against the heads or buttons 32.

To the binding posts 8 and 9 are connected contact pieces or terminals 33 and 34, respectively. These terminals, which are insulated from the casing A, may conveniently be shaped as angle pieces out of sheet metal. The free end of the switch arm 27 projects between the terminals 33 and 34. When the shaft 15 is in normal position, the free end of the arm 27 is out of contact with the terminals 33 and 34, as shown in Fig. 1.

When the shaft 15 is pushed down, the arm 27 engages the terminal 33 and closes the electric circuit which operates the horn or whatever signal device is used on the car. As soon as the pressure on the button 17 is released, the spring arm 27 moves the shaft 15 back into normal position. When the shaft 15 is moved up by a pull on the button, the arm 27 engages the terminal 34, thus closing the starter circuit.

In the casing A is mounted a suitable switch, indicated as a whole by T. As this switch may be of any construction and does not in and of itself form part of my invention, I need not show or describe any structural details of the switch. It will be sufficient to say that the switch T may be of a type sold in the open market as a pendant switch, in which there is a spring-pressed pin or plunger 35. The arrangement is such that when the pin 35 is pushed in, it closes the circuit and immediately snaps back into normal position. When the pin 35 is next pushed in, the circuit is opened. In other words, the circuit controlled by such a switch as T is alternately closed and opened by successive operations of the pin or plunger 35. The switch T is so mounted in the casing A that the pin 35 projects in the path of movement of the switch arm 22. Consequently, when the button 17 is turned clockwise (as viewed in Fig. 2), the point 36 of the arm 22 pushes against the end of the pin 35, which is thus operated to close the circuit. When the button 17 is released, the spring-pressed pin 35 pushes the arm 22 back into normal or neutral position, as shown in Fig. 2. The switch T controls the ignition circuit of the car. In Fig. 2 I have shown an electrical connection 37 leading from the switch T through the casing A. This connection is supposed to be part of the ignition circuit. When it is desired to open the ignition circuit, it is only necessary to turn the button 17 again clockwise as far as it will go. That movement will operate the pin 35 of the switch T and open the ignition circuit. The spring-pressed pin 35 thus serves the double function of operating the switch T and automatically restoring the switch arm 22 to normal position after each operation of the switch. The switch T is, therefore, an independent circuit-controlling member for the ignition circuit and remains in actuated position (either open or closed) until again
acted upon by the arm 22. It will be understood any other suitable form of circuit-closing device may be used in conjunction with the arm 22 for controlling the ignition or other circuit.

In order to close the circuit connections through the lights, the button 17 is turned counterclockwise from normal position until the switch arm 22 engages one or more of the binding posts 11, 12 and 13. The arm 22 may be made wide enough to engage all three of these binding posts simultaneously, so that, when the arm is in the position indicated by the dotted line 22' in Fig. 2, the headlights, sidelights and tail-light are all on. The arm 22 may be moved in position to engage only the contact 11 or 12 or the contacts 11 and 12, or the contacts 12 and 13. If desired, a pointer may be attached to the upper end of the shaft 15 to indicate on a dial the particular circuit or circuits which are closed in any particular position of the shaft 15.

I have not deemed it necessary to show the circuit connections in which the terminals or bindings posts 8, 9, 10, 11, 12 and 13 and the switch T are included, because these circuits are well understood by the skilled electrician. It will be enough to say that the insulated conducting members 27 and 28, which are permanently connected to the binding post 10 of the battery or generator circuit, form a common connection between the source of electrical energy and the circuit wires leading to the binding posts 8, 9, 11, 12 and 13. The battery or other generator is included in the ignition circuit 37 by a suitable connection 38 between the binding post 10 and the switch T, as shown in Fig. 2.

It will be seen from the foregoing that I have provided a circuit-controlling device of very simple construction and operation, and which consists of parts that are not easily broken or liable to get out of order. The location of the button 17 at the center of the steering wheel places the control of the starting, lighting, signal and ignition circuits almost at the finger tips of the driver. Furthermore, the device of my invention is easily installed on any type of car equipped with the usual electrical circuits.

What I claim as my invention is:

1. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for rotary and axial movement in the steering post of an automobile, a switch arm connected with said shaft near the lower end thereof so as to rotate therewith and permit axial movement of the shaft, one or more terminals arranged to be engaged by said rotary switch arm, a second switch arm mounted for rotary and axial movement in the steering post of an automobile, a switch arm connected with said shaft so as to be actuated when the shaft is moved axially and to remain stationary when the shaft is rotated, means for supporting said second switch arm independently of said shaft, a terminal arranged to be engaged by said second switch arm when the shaft is moved axially in one direction, a second terminal arranged to be engaged by said second switch arm when the shaft is moved axially in the opposite direction, said second switch arm being normally out of contact with both of said last-mentioned terminals, and means adapted to connect said switch arms with a source of electrical energy.

2. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for rotary and axial movement in the steering of an automobile, a switch arm connected with said shaft near the lower end thereof so as to rotate therewith and permit axial movement of the shaft, one or more terminals arranged to be engaged by said rotary switch arm, a second switch arm connected with said shaft so as to be actuated when the shaft is moved axially and to remain stationary when the shaft is rotated, means for supporting said second switch independently of said shaft, said second switch arm being of spring metal adapted to act as a resilient support for the shaft and automatically return the shaft to normal axial position, a terminal arranged to be engaged by said second switch arm when the shaft is moved axially in one direction, a second terminal arranged to be engaged by said second switch arm when the shaft is moved axially in the opposite direction, said second switch arm being normally out of contact with both of said last-mentioned terminals, and means adapted to connect said switch arms with a source of electrical energy.

3. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial movement in the steering post of an automobile, a switch arm connected with said shaft so as to be positively actuated by an axial movement of said shaft in either direction, means for supporting said switch arm independently of said shaft, a terminal arranged to be engaged by said arm when the shaft is pushed down, and a second terminal arranged to be engaged by said switch arm when the shaft is pulled up, said switch arm being normally out of contact with both terminals.

4. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial movement in the steering post of an automobile, a switch arm connected with said shaft so as to be actuated by an axial movement of said shaft in either direction, said switch arm being of spring metal and constituting a resilient support for said shaft, a terminal arranged to be engaged by said arm when the shaft is
pushed down, and a second terminal arranged to be engaged by said switch arm when the shaft is pulled up, said switch arm being normally out of contact with both terminals.

5. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial movement in the steering post of an automobile, a casing into which the lower end of said shaft extends, a switch arm of spring metal secured at one end to said casing, means for positively connecting said arm at an intermediate point to said shaft in such a way that the arm constitutes a resilient support for the shaft and is actuated by an axial movement of the shaft, and a terminal arranged to be engaged by the free end of said arm when the shaft is moved axially, said switch arm automatically returning the shaft to normal position.

6. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for rotary movement in the steering post of an automobile, a switch arm at the lower end of said shaft so as to rotate therewith, a terminal of the lighting circuit arranged to be engaged by said arm when the shaft is turned in one direction, and an independent switch in the ignition circuit adapted to be operated by said arm when the shaft is turned in the other direction.

7. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for rotary movement in the steering post of an automobile, a switch arm arranged at the lower end of said shaft so as to rotate therewith, said switch arm extending from said shaft in a substantially radial direction and movable in a plane approximately at right angles to the axis of said shaft, and three terminals of the lighting circuits having their contact surfaces arranged in the plane of travel of said switch arm so as to be engaged by said arm when the shaft is turned, said terminals being so arranged and spaced that said switch arm may engage either end terminal alone, or either end terminal with the middle terminal, or all three terminals simultaneously.

8. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for rotary movement in the steering post of an automobile, a switch arm at the lower end of said shaft and rotatable therewith, and an independent switch in the ignition circuit adapted to be operated by said arm when the shaft is turned.

9. In a circuit-controlling device for automobiles and the like, a pair of spaced terminals, a switch arm of spring metal secured at one end and extending at its free end between said terminals, and an axially movable shaft connected to said switch arm so as to actuate the same into contact with either terminal when the shaft is moved axially in one direction or the other, said switch arm forming a resilient support for said shaft and being normally held by its own tension out of contact with both terminals.

10. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for rotary and axial movement in the steering post of an automobile, a switch arm connected with said shaft so as to rotate therewith and to remain stationary during the axial movement of the shaft, one or more terminals of the lighting circuits arranged to be engaged by said rotary switch arm when the shaft is turned in one direction, a circuit-controlling member in the ignition circuit arranged to be operated by said rotary switch arm when the shaft is turned in the other direction, a second switch arm connected with said shaft so as to be actuated when the shaft is moved axially and to remain stationary when the shaft is rotated, a terminal arranged to be engaged by said second switch arm when the shaft is moved axially in one direction, a second terminal arranged to be engaged by said second switch arm when the shaft is moved axially in the opposite direction, said second arm being normally out of contact with both of said last-mentioned terminals, and means adapted to connect said switch arms with a source of electrical energy.

11. In a circuit-controlling device for automobiles and the like, a casing provided with a chamber, a fixed terminal secured to said casing and adapted to be connected with a source of electrical energy, a substantially U-shaped spring member of conducting material secured to said terminal within the chamber in such a position that the shanks or legs of the member extend across the chamber, one leg of said member forming a switch arm and the other leg forming a resilient extension, a pair of terminals arranged on opposite sides of the free end of said switch arm, a rotary switch arm engaged by said resilient extension which holds said rotary arm against axial movement and electrically connects the same to said fixed terminal, a plurality of terminals arranged to be selectively engaged by said rotary switch arm when the same is turned in one direction, a circuit-controlling device adapted to be operated by said rotary switch arm when the same is turned in the other direction, and a hand-operated shaft capable of rotary and axial movement for operating said switch arms independently of each other.

12. As a new article of manufacture for use in circuit-controlling devices for automobiles and the like, a strip of spring metal having a pair of substantially parallel legs connected by a neck portion, one of said legs

13. As a new article of manufacture for use in circuit-controlling devices for automobiles and the like, a strip of spring metal having a pair of substantially parallel legs connected by a neck portion, one of said legs
terminating in a forked extension and the other leg having an opening intermediate its ends approximately in alignment with said forked extension, substantially as and for the purposes specified.

13. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial and rotary movement in the steering post of an automobile, switch means operated by the rotary movements of said shaft in opposite directions to control the lighting and ignition circuits, and switch means operated by the axial movements of said shaft in opposite directions to control the starter and signal circuits.

14. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial and rotary movement in the steering post of an automobile, a switch arm connected to said shaft so as to be actuated only by the rotary movements of said shaft to control certain circuits, and a second switch arm connected to said shaft so as to be actuated only by the axial movements of said shaft in either direction to control other circuits, said second switch being constructed and arranged to act as a resilient support for said shaft.

15. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial and rotary movement, a switch arm mounted on said shaft so as to rotate therewith but permitting axial movement of the shaft, a spring member comprising a portion adapted to support said shaft yieldably at the lower end thereof and a second portion adapted to hold said switch arm against axial movement with the shaft, contact terminals controlled by said switch arm, and other contact terminals controlled by the shaft-supporting portion of said spring member.

16. In a circuit-controlling device for automobiles and the like, a hand-operated shaft mounted for axial and rotary movement, a spring member connected to said shaft at or near the lower end thereof for resiliently supporting the shaft, said spring member being movable with said shaft so as to return the same to normal position when moved axially in either direction from said position, and contacts controlled by said spring member when actuated by the axial movements of said shaft in either direction.

17. In a circuit-controlling device for automobiles and the like, a rotary shaft, a switch arm mounted on said shaft so as to rotate therewith, a circuit terminal arranged to be engaged by said arm when the shaft is turned in one direction, and a switch having a member arranged to be actuated by said arm when the shaft is turned in the other direction, said switch being separate from said switch arm and adapted to control a separate circuit.

18. In a circuit-controlling device for automobiles and the like, a rotary shaft, a switch arm mounted on said shaft so as to rotate therewith, a circuit terminal arranged to be engaged by said arm when the shaft is turned in one direction, and a separate switch adapted to be operated by said arm when the shaft is turned in the other direction, said switch remaining in actuated position until again acted upon by said arm.

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