June 9, 1931. M. J. PATE 1,809,527

SWITCH

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FIG. 1.

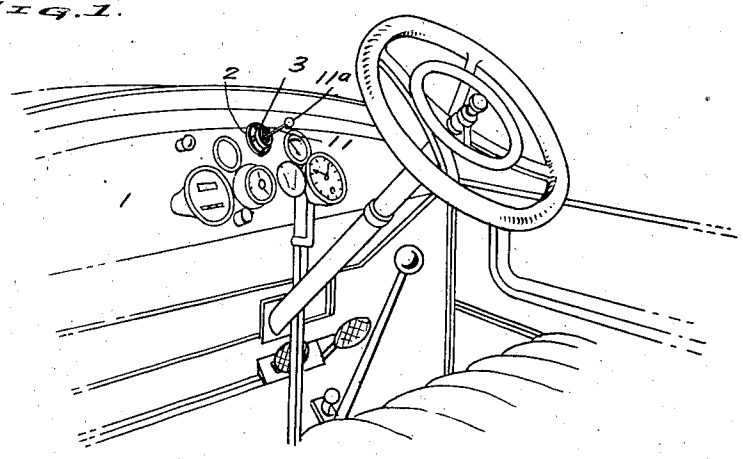
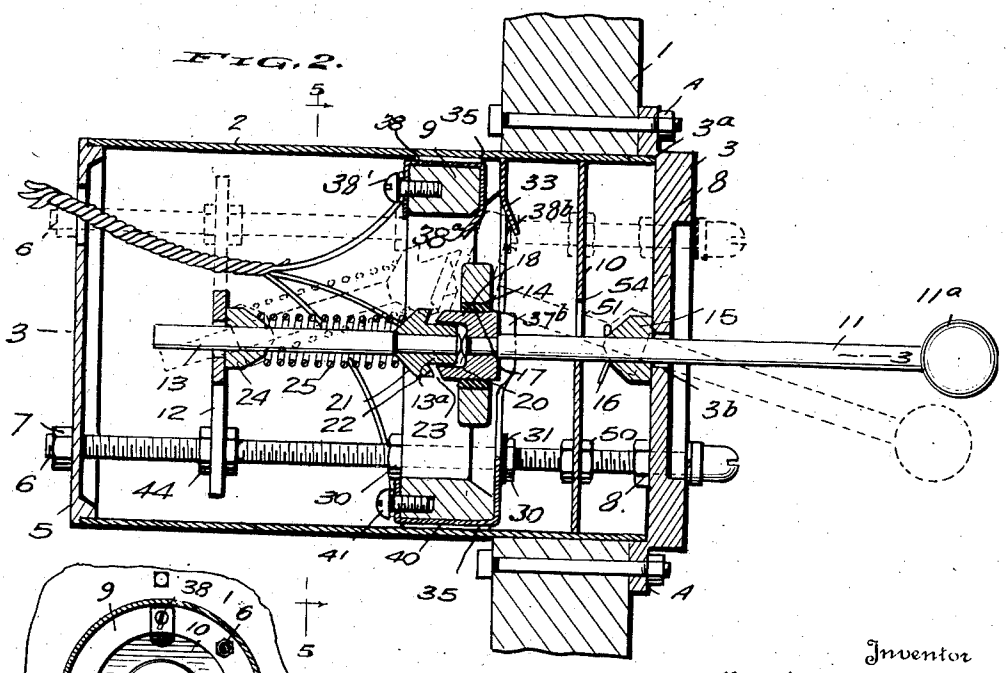


FIG. 2.



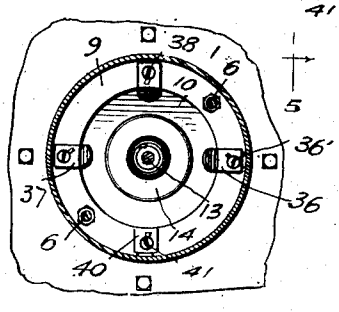


FIG. 5.

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SWITCH

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FIG. 5.

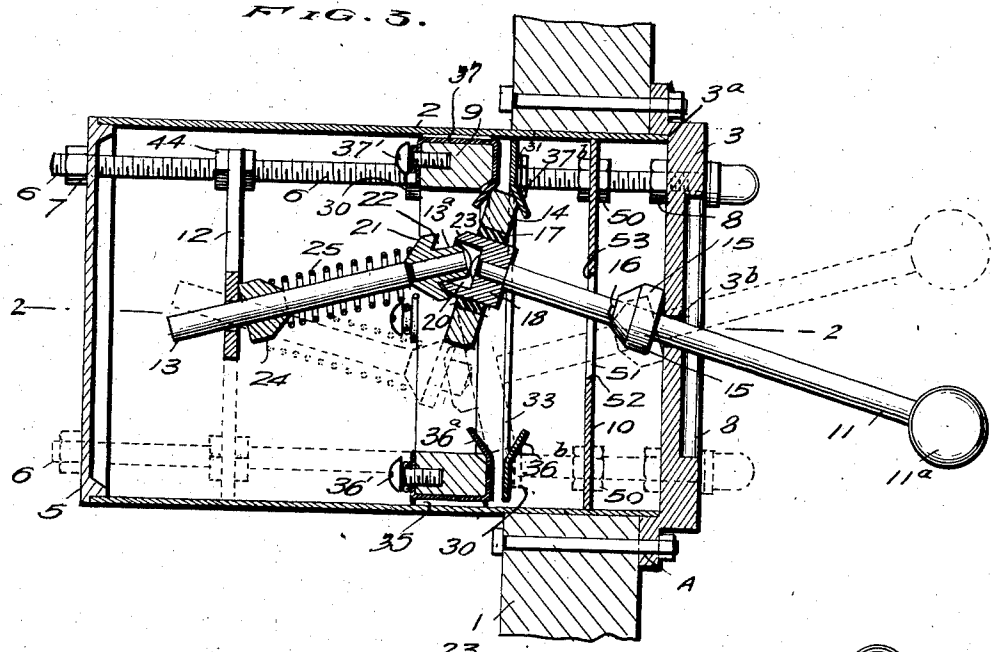
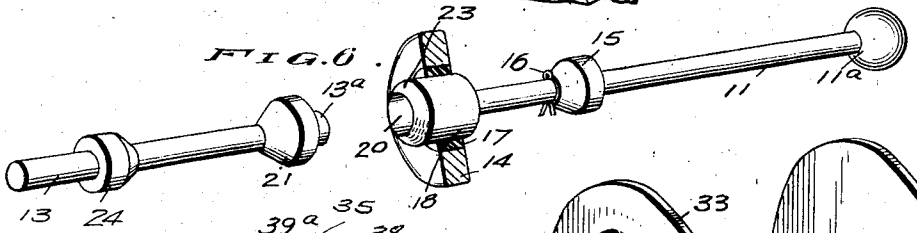


FIG. 6.



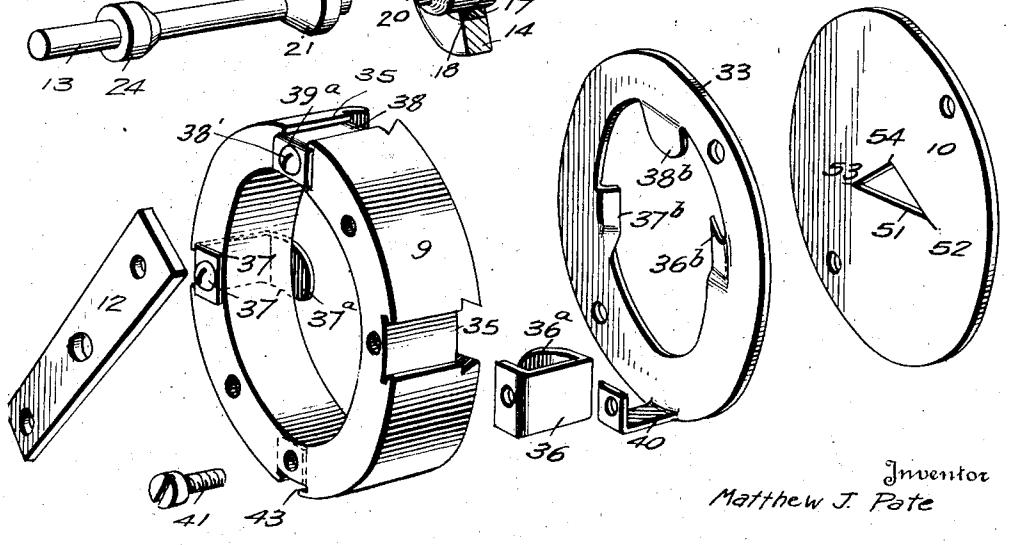


FIG. 4.

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UNITED STATES PATENT OFFICE

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SWITCH

Application filed August 10, 1928. Serial No. 298,730.

My invention relates to improvements in switches of the single or plural circuit control type and has for its primary object to provide a novel and improved device of this kind which is especially adapted for use in controlling the signal circuits of motor vehicles, although capable of other adaptations, as will be readily appreciated by those skilled in the art.

Another object of the invention resides in the provision of a switch, as characterized, which is very simple and inexpensive in construction, easily assembled and installed, and which is highly efficient and satisfactory in practical use.

The invention further contemplates a switch construction incorporating a novel and improved snap action circuit closing element, which is capable of assuming a plurality of positions for closing different circuits and which will automatically maintain itself in such position until manually released.

A still further object of the invention is to furnish a switch of this kind having a novel and improved multiple and selectively operable circuit closing element, there being employed novel guide means for directing said circuit closing element to a position to close the respective circuits and which guide means permits universal movement of said circuit closing element.

The invention also resides in certain novel constructions, combinations and modes of operation of the various parts.

In order that the invention may be fully understood, reference should be had to the accompanying drawings in connection with the following descriptive matter.

The drawings illustrate the now preferred embodiment of the invention, but it is to be understood that the same is susceptible of considerable change and modification without departing from the spirit and scope of the subject matter claimed hereinafter.

Referring briefly to the drawings,—

Figure 1 is a fragmentary perspective view showing the device applied to the instrument board of a motor vehicle;

Figure 2 is a central longitudinal sectional view through the switch unit and its enclosure or housing and showing the same applied to the dash board the view having been taken on the line 2—2 of Figure 3.

Figure 3 is a longitudinal sectional view taken on the line 3—3 of Figure 2 and showing two additional circuit closing positions of the switch element;

Figure 4 is a group perspective view of certain of the fixed elements of the switch disassembled;

Figure 5 is a cross-sectional view taken on the line 5—5 of Figure 2, and

Figure 6 is a group perspective view of the movable elements of the switch assembly.

The various elements of the device are designated by common reference characters through-out the several figures of the drawings. Numeral 1 designates the instrument board of a motor vehicle which is provided with a suitable hole to receive the cylindrical casing 2 of the switch. The casing includes a circular base plate 3 which is bolted to the instrument board, as shown at A, the inner face of the base plate being circularly cored out as at 3^a to receive the cylindrical body portion 2 of the casing. The disk-like closure plate 5 for the inner end of the casing 2 is tightly secured in effective position by means of elongated screw shanks 6 extending therethrough and through the base plate 3,—there being nuts on the ends of said screws 6, as indicated at 7, for binding the closure plate in place. It is also proper to note that the heads of the screws 6 are bound against the base plate 3 by nuts 8 which bear against the counter-sunk face 3^a thereof.

The screws 6 serve as the support for carrying the annular switch block 9, a guide disk 10 for the switch operating handle 11 and the transverse supporting bar 12 which receives the inner end of the auxiliary supporting stem 13 of the circuit closing disk 14, which is mounted upon the inner end of the handle 11. It will be apparent from the foregoing general description that the screws 6 perform a number of very important offices.

The switch operating handle, previously

referred to, has a knobbed finger piece 11^a, as shown, and the handle extends through an over sized hole 3^b in the base plate 3,—there being a shoulder or sleeve 15 upon said handle. This sleeve 15 is loose on the handle 11 and is backed by a cotter pin 16 at the end remote from plate 3. Thus, shoulder 15 serves as a stop to limit movement of the handle in an axial direction toward the plate 3.

The circuit closing disk 14 has a central hole tightly receiving a bushing 17 of insulating material which is rigidly fitted upon a short cylindrical metal block 18,—keyed or sweated upon the end of handle 11. As clearly shown in the drawings, the inner end of the member 18 projects a substantial distance beyond the insulating bushing 17. This end of member 18 is spherically cored out as at 20 to receive the ball end 13^a of the supporting stem 13. The supporting stem 13 has keyed thereon just inwardly of the ball end 13^a, a shoulder or enlargement 21, and it will be noted that the same has its end surface cored out or grooved, as at 22, to receive the beveled rim 23 of the socket 20. A sleeve 24 is loosely mounted on the supporting stem 13, and between the sleeve 24 and the shoulder 21 there is interposed a coil spring 25. This spring 25 forces the ball end 13^a into the socket 20 and the sleeve 24 against the transverse supporting bar 12. It will be manifest from the foregoing description that the supporting stem 13 and operating rod or lever 11 will be normally maintained in axial alinement. However, when the handle 11 is moved in a radial direction,—which is to say, toward the periphery of base plate 3,—the ball joint 13^a, 20 will permit the members 11, 13 to be thrown out of axial alinement, although remaining in end contact. The spring 25 will, of course, hold the members 11, 13 in the position mentioned until the lever 11 is manually moved toward the dead center of the hole 3^b whereupon the spring 25 comes into action to complete the return of members 11, 13 to their normal alined position.

The switch block 9 is held in place on screw 6 by nuts 30 on either side thereof,—there being washers 31 of insulating material between one set of nuts and the main current carrying annulus 33, which bears against one face of side of the annular block 9. It is understood that block 9 is of insulating material and that the screws 6 extend therethrough. The device shown in the drawings is a three point switch. In other words, three circuits are adapted to be controlled by the circuit closing disk 14. The annular switch block 9 has its outer periphery and its end or side adjacent the current carrying annulus 33, notched, as indicated at 35, to receive the copper straps or contact members which are denoted by reference characters 36, 37, 38, respectively. The straps 36, 37, 38 are thus spaced from contact with the member 33 and it will be seen that their ends are bent inwardly and rearwardly within the annular block 9 to define tabs or contacts 36^a, 37^a, 38^a, respectively. The current carrying annulus 33 has inwardly projecting contact tabs 36^b, 37^b and 38^b which are disposed opposite the respective tabs 36^a, 37^a, 38^a, as shown, each pair of tabs 36^a, 36^b, etc. defines a restricted, substantially V-shaped, recess to receive the periphery of the circuit closing disk 14. Each of the contact straps 36, 37, 38 is retained in place by a binding post or screw, these being denoted by reference characters 36′, 37′, 38′, respectively. Wires lead from each of the binding posts to the respective signals. Of course, the battery and the signals will be grounded as usual. The straps 36, 37, 38 and likewise the current carrying annulus 33 will preferably be of spring copper or some other resilient material so that their tabs will maintain or rather resume their normal relative position upon disengagement of the circuit closing disk 14 therefrom.

The current carrying annulus 33 has a lateral strap 40 extending around the member 9 and terminating at the opposite side thereof to receive the binding post 41 to which the main current supply wire from the battery will be attached. As shown, strap 40 is embedded in a notch or cut-out 43 in the periphery of block 9.

Nuts 44 threaded on screws 6 and disposed at opposite sides of the supporting bar 12 enable the same to be adjusted lengthwise of the screws 6 so as to increase or decrease the compression of the spring 25 so that the correct degree of compression can be secured and maintained.

The guide disk 10, which has been briefly referred to hereinbefore, is located at a predetermined point between the annular switch member 9 and the base plate 3 by means of nuts 50 threaded on the screws 6 and disposed against opposite faces of said disk 10. The operating handle 11 extends through a triangular hole 51 in disk 10 and when the handle 11 is in its normal position,—which is to say, in axial alinement with supporting stem 13,—it is in contact with the bottom wall of the triangular hole. The corner 52 of hole 51 is disposed toward the part of annulus 9 having the contact tabs 36^a, 36^b. Thus, when the handle 11 is moved in a general rightwardly direction (Figure 1) the disk 14 will be thrown leftwardly (see dotted lines Figure 3) and the handle 11 wedged into the corner 52 of hole 51 so that disk 14 will engage the contact tabs 36^a, 36^b to close the signal circuit, which includes the "right turn" signal. By the same token, leftward movement of the handle 11 will cause it to be guided into the opposite disk-hole corner

53 to effect the engagement of circuit closing disk 14 with the contacts 37^a, 37^b to close the "left turn" signal circuit. Downward movement of the handle 11 results in its being guided into the upper or intermediate notch 54 of hole 51 and since such notch is in a vertical plane with the contacts 39^a, 39^b, of the "stop signal" circuit the engagement of disk 14 with such contacts will be effected to close said circuit.

There is great advantage in the use of the disk 10 with the triangular hole 51 in that said hole enables the operating handle 11 to partake of a universal movement without necessitating its being returned to neutral position when it is desired to move it from one circuit closing position to another. For instance, the driver may have actuated the handle 11 to "right turn" position. In making the right turn traffic conditions may necessitate a sudden stop. This stop can be immediately indicated by simply hitting lever 11 in a general downward direction. The wall of hole 51 will guide the handle 11 into the intermediate or upper corner 54 and the stop signal circuit will be instantly closed.

An important feature of the device resides in the flat ended sleeves or stops 15, 24 which bear against base plate 3 and supporting bar 12, respectively, normally tending to hold parts 11, 13 in axial alinement. When parts 11, 13 assume any of the circuit closing positions the sleeve or stop members are balanced on edge as shown. Thus, it will be manifest that a slight knock on 11 to start circuit closer 14 toward neutral position will result in the pressure of the spring 25 forcing the flat ends of 15, 24 to seat against 3 and 12 respectively. It will be seen that the device is automatically brought back to a true neutral position with 11, 13 in alinement.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device of the class described comprising a mounting plate, an annular block, supporting means carried by said mounting plate for supporting said block in spaced relationship to said plate, a current carrying annulus secured to one face of said block, current contacts secured to said block adjacent said current carrying annulus and spaced from contact therewith, an operating lever, said base plate having an oversized hole through which said operating lever extends, said operating lever having means to limit its movement in an axial direction toward the outer face of said base plate and the inner end of said operating lever extending into said annular block, a circuit closing enlargement on said lever within said block and adapted to selectively engage the respective circuit contacts and said current carrying annulus, a cross piece carried by said supporting means, a supporting stem loosely extending through a hole in said cross piece, said stem and lever having a ball and socket connection, and a coil spring on said stem, said stem having a head enlargement against which said spring bears, the other end of said spring bearing against said cross piece whereby to hold said ball and socket joint assembled and the limiting means of said handle in contact with said base plate.

2. The combination set forth in claim 1, a partition member carried by said supporting means and having a hole therein through which said lever extends, said partition member being disposed between said mounting plate and said annular contact carrying block, the walls of said hole converging to define corners for the reception of said handle and said corners being located in such positions with respect to the contacts as to effect a closing of the respective circuits selectively depending upon the particular corner into which the lever is actuated.

3. A switch of the class described comprising a mounting plate, an annular switch block, means carried by the mounting plate for supporting the switch block in spaced relationship thereto, a universally movable switch rod extending into said block and carried by said mounting plate, a plurality of sets of circuit contacts carried by said block, means on said rod for bridging said contacts, and spring actuated means having a universal connection with the inner end of said rod and bearing against the same.

4. The combination set forth in claim 3,— and guide means for said rod comprising a plate having a hole through which said rod extends, the walls of said hole converging to define locating corners for said rod to indicate the position thereof for closing the respective circuits and whereby the handle can be actuated from one circuit closing position to another without necessitating its return to neutral or non-circuit closing position.

5. In a switch, a mounting plate, rods extending from one face of said plate, an annular switch block mounted on said rods and having circuit contacts, a universally movable switch lever extending through a hole in said mounting plate and having a contact engaging portion within said block, a supporting stem having a head adapted for universal end engagement with the end of said switch lever, a cross bar carried by said rods and having a hole concentric with said mounting plate hole and adapted to receive the free end of said stem, a coil spring on said stem and between said cross bar and head for forcing the head to cooperative engagement with the end of said switch lever.

6. The combination set forth in claim 5,— including a guide member for said switch lever and carried by said rods, and means whereby said switch, block guide member

and cross piece may be relatively adjusted upon said rods.

7. In a switch of the class described, a pair of supports, a circuit closing member comprising a spring toggle arranged between the supports and having a circuit closing portion at the toggle connection, a guide plate arranged between the supports and adjacent to the toggle connection, said guide plate having a polygonal opening through which one of the toggle members extend, the walls of said hole converging to define corners for said member to indicate the position thereof for closing the respective circuits, whereby the toggle can be actuated from one circuit closing position to another without necessitating the return of the toggle to co-axial or non-circuit closing position.

8. In a switch of the class described, a pair of supports, a circuit closing member comprising a spring actuated toggle arranged between the supports and having a circuit closing portion at the toggle connection thereof, a guide plate arranged between the supports and adjacent to the toggle connection, said guide plate having a triangular opening adapted to selectively retain the toggle members in alinement or a plurality of circuit closing positions.

In testimony whereof I affix my signature.

MATTHEW J. PATE.