Sept. 6, 1927. 1,641,352

H. E. NORVIEL

ELECTRIC SWITCH

Filed Jan. 20, 1926

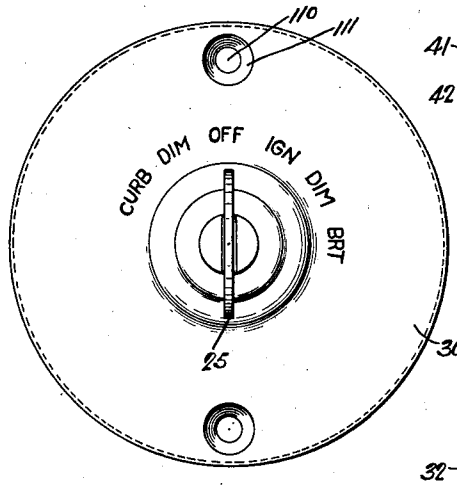


Fig. 1.

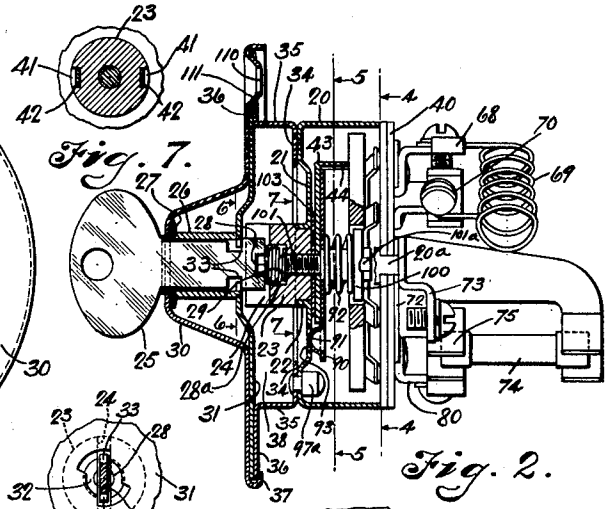


Fig. 2.

Fig. 6.

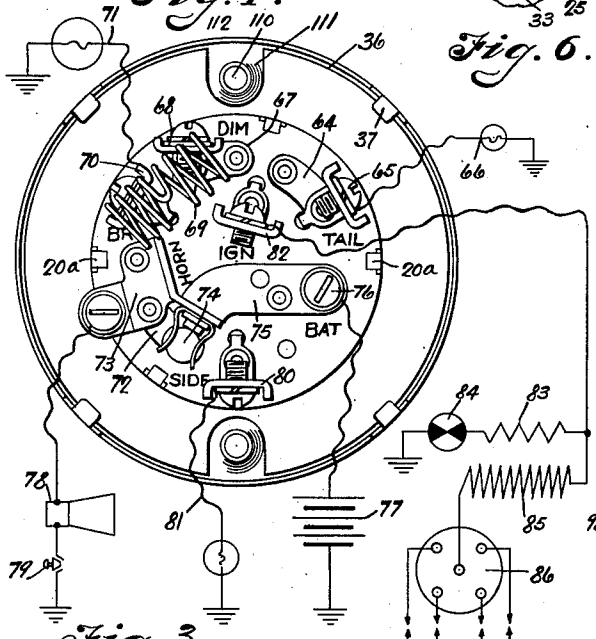


Fig. 3.

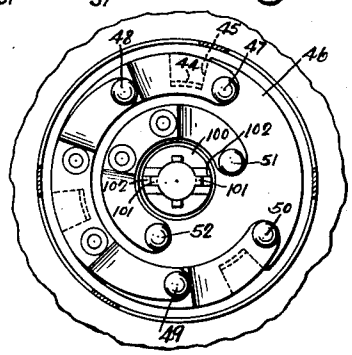


Fig. 4.

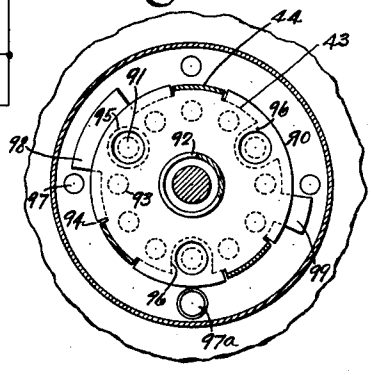


Fig. 5.

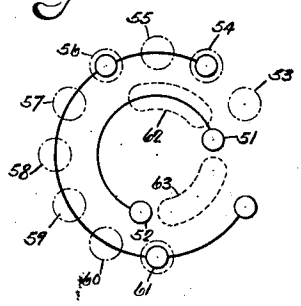


Fig. 8.

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UNITED STATES PATENT OFFICE.

HARRY E. NORVIEL, OF ANDERSON, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO DELCO-REMY CORPORATION, OF DAYTON, OHIO, A CORPORATION OF DELAWARE.

ELECTRIC SWITCH.

Application filed January 20, 1926. Serial No. 82,453.

This invention relates to electrical switches and especially to switches for controlling the ignition and lighting circuits of an automobile.

One of the objects of the present invention is to adapt for operation, by a detachable key or plug, certain types of lighting and ignition switches which hitherto have been operated by a single lever or handle permanently attached to the switch.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front view of a switch embodying the present invention;

Fig. 2 is a side view thereof, partly in longitudinal section;

Fig. 3 is a back view of the switch shown in Figs. 1 and 2, and a wiring diagram of connections with certain terminals of the switch;

Figs. 4, 5, 6 and 7 are sectional views taken, respectively, on the lines 4—4, 5—5, 6—6 and 7—7 of Fig. 2; and

Fig. 8 is a diagrammatic view of the switch contacts, this view being taken from the back of the switch.

The switch comprises a case 20 having an apertured end wall 21 provided with a bearing 22 for a switch shaft 23. The shaft 23 is provided with a notch or recess 24 for receiving the end of a key or plug 25. The key 25 is insertable through a key-supporting barrel or shaft 26 which is rotatably supported by a switch dial or face plate 30 and by a key-retaining plate 31. The plate 31 is provided with an aperture 32, the walls of which cooperate with the walls of the key which define the key notches 33 in a manner such that, when the key is turned to "Ign," "Dim" and "Brt" the key cannot be removed from the switch, and so that, when the key is turned into "Curb," "Dim" and "Off" positions the key is removable from the switch. The barrel 26 is kept from rattling, while the automobile is driven by its engine, by resilient washer 27 located between a shoulder on the barrel and the inside of plate 30; and the key 25 is kept from rattling by maintaining it in engagement with the key-retaining plate, by a disc 28 slidable in a recess 28a provided by the shaft 23 and urged by a spring 29 against the inner end of the key.

The case 20 is attached to the flange 34 of a tubular member 35 having a flange 36; and said flange and the plate 31 are attached to the face or mounting plate 30 by ears 37 integral therewith and bent around the edges of the plate 31 and the flange 36. In this manner, the switch case 20 is supported by the mounting plate 30 and in spaced relation therewith by the spacing tube 35. The tube 35, plate 31 and the casing end wall 21 provide a chamber 38 for receiving the switch shaft 23.

The parts enclosed by the case 20 and supported by a non-conducting cover 40, which is attached to the case 20 by lugs 20a integral therewith, are similar to the switch parts which are disclosed in my copending application, Serial No. 22,977, filed April 14, 1925. These parts will be described very briefly, as the particular construction and arrangement of them does not, of itself, constitute the present invention.

As shown in Fig. 7, the shaft 23 is provided with longitudinally-extending notches 41 which receive fingers 42 integral with a driving disc 43. The disc 43 is provided with longitudinally-extending fingers 44, which are received by notches 45 provided in a non-conducting contact carrier 46. The contact carrier 46 supports resilient contact fingers 47, 48, 49 and 50, which are electrically connected, and a pair of contact fingers 51 and 52 which are electrically connected but are insulated from the fingers 47, 48, 49 and 50. The contact fingers 48 to 50 are movable by the key 25 into engagement with certain stationary contacts carried by the switch case back 40. In Fig. 8, these contacts are represented by dot-and-dash-line circles numbered 53 to 61, inclusive. The contacts 51 and 52 cooperate, respectively, with stationary contacts 62 and 63, which are represented by the broken lines in Fig. 8. Contacts 53 and 54 are connected by conductor 64 and terminal 65 with a tail-lamp circuit 66. Contacts 55 and 56 are connected by conductor 67 and terminal 68 with a dimmer resistance 69 which is connected with a terminal 70. Terminal 70 is connected with a head-lamp circuit 71 and with the switch contact 57. Contacts 58, 59 and 60 are connected by conductor 72 and a terminal 73.

Terminal 73 is connected by a fuse 74 with a conductor 75 and a terminal 76. Conductor 75 is connected with switch contact 63. In this way a battery, which is connected with the terminal 76, is connected with contacts 63, 58, 59 and 60. Terminal 73 is connected with a circuit including a horn 78 and a horn button 79. The switch contact 61 is connected with a terminal 80 which is connected with a side or curb-lamp circuit 81. The contact 62 is connected through a terminal 82 with an ignition circuit including an ignition coil primary 83 and an ignition timer 84. Numeral 85 designates the ignition coil secondary, and 86 the ignition distributor.

Without describing in detail the circuits which may be completed by the turning of the key 25, in either direction from the "Off" position shown in Fig. 1, it will be apparent to those skilled in the art that counterclockwise rotation of the key 25 into "Dim" or "Curb" positions will produce clockwise rotation of the movable switch contacts, as viewed in Figs. 4 and 8, to complete circuits from the battery through the dimmer resistance to the head-lamp circuits 71 or from the battery to the side-light circuit 81; and that clockwise rotation of the key 25 into the different positions "Ign", "Dim" and "Brt" will produce counterclockwise rotation of the contacts, as viewed in Figs. 4 and 8, to connect, respectively, the battery with the ignition apparatus alone, the battery with the ignition apparatus and with the head-lamp circuit 71 through the dimmer resistance 69, and the battery with the ignition apparatus and directly with the head-lamp circuit 71, without the dimmer resistance.

The switch contact carrier 46 is maintained yieldingly in the various positions described, by means which includes a disc 90 having a plurality of equidistant projections 91 which are yieldingly urged by spring 92 into certain ones of the equidistant holes 93 in the end wall 21 of the switch case 20. The disc 90 is provided with notches 94 for receiving the fingers 44 of the driving disc 43. The disc 43 is provided with a hole 95 and notches 96 for permitting the projections 91 to extend from one side of the plate 43 and past the other side thereof into the holes 93. One of the rivets 97 which is used to secure the switch case 20 to the spacing tube 35, is provided with a head 97^a which serves as a stop to limit the movement of the switch key 25 and the driving plate 43, by the cooperation of the head 97^a with stops 98 and 99 provided by the driving disc 43. The spring 92 bears at one end against the detent disc 90 and at the other end against a washer 100, which encircles the head of a screw 101 and is retained by projections 101^a thereof which are received by grooves 102 provided by the washer 100. As shown in Fig. 2, the screw 101 secures to the shaft 23, the driving disc 43 and a spacing washer 103.

In my copending application referred to, there is disclosed a switch having a case and parts supported thereby and enclosed by the case, which corresponds with the present switch case 20 and parts supported thereby. Instead of a switch shaft 23, the said application discloses a handle having a hub attached to the movable switch contacts in the manner disclosed in the present application. By substituting for said switch handle, the shaft 23 and by attaching the switch case 20 to the parts 30, 31 and 35, and by mounting a key barrel 26 upon the parts 30 and 31, a handle or lever-operated switch can be readily adapted for operation by a key or plug.

The switch mounting plate 30 is provided with holes 110 surrounded by frustro-conical flanges 111 which are received by notches 112 provided by flange 36 of the spacing sleeve 35. In this way, the plate 30 is located correctly with respect to switch case 20 and contacts therein. The recesses provided by the flanges 111 receive flat-head screws by which the switch is attached to an instrument board.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. An electric switch comprising, in combination, a case having an apertured end wall, stationary contacts insulatingly supported by the case, movable contacts rotatable within the case, a shaft extending through said apertured wall and operatively connected within the case with the movable contacts, and provided outside of the case with a key-receiving recess, an index plate attached to the case and having a bearing in alignment with said shaft, and a key-receiving barrel supported by said bearing.

2. An electric switch comprising, in combination, a case having an apertured end wall, stationary contacts insulatingly supported by the case, movable contacts rotatable within the case, a shaft extending through said apertured wall and operatively connected within the case with the movable contacts, and provided outside of the case with a key-receiving recess, an index plate and a key-retaining plate connected in spaced relation with the switch shaft and having bearings in alignment therewith, and a key-receiving barrel supported by said bearings, said plate having a key-receiving aperture so shaped that the key is retained by the plate in certain positions of the key.

3. An electric switch comprising, in combination, a case having an apertured end wall, stationary contacts insulatingly supported by the case, movable contacts rotatable within the case, a shaft extending through said apertured wall and operatively connected within the case with the movable contacts, and provided outside of the case with a key-receiving recess, spaced plates attached to the case and providing bearings in alignment with the shaft, a key-receiving barrel supported by the bearings, and a resilient member bearing against the barrel and one of the plates to prevent the barrel from rattling.

4. An electric switch comprising, in combination, a case having an apertured end wall, stationary contacts insulatingly supported by the case, movable contacts rotatable within the case, a shaft extending through said apertured wall and operatively connected within the case with the movable contacts, and provided outside of the case with a key-receiving recess, a key-receiving barrel located in alignment with the shaft, means for supporting the barrel including a key-retaining plate having a key-receiving aperture so shaped that the plate will retain the key in certain positions thereof, and means carried by the shaft for resiliently urging a part of the key against the plate to prevent rattling of the key while it is being retained.

5. An electric switch comprising, in combination, a case having an apertured end wall, stationary contacts insulatingly supported by the case, movable contacts rotatable within the case, a shaft extending through said apertured wall and operatively connected within the case within the movable contacts, and provided outside of the case with a key-receiving recess, a flanged member attached to the case and having a notch in the outer edge thereof, a pressed metal index plate attached to said member and having a hole surrounded by a conical flange for receiving a screw, said conical flange being received by said notch to locate the index plate relative to the case, and a key-receiving barrel in alignment with the shaft and supported by the index plate.

6. An electric switch comprising, in combination, a case having an apertured end wall, stationary contacts insulatingly supported by the case, movable contacts rotatable within the case, a shaft extending through said apertured wall and operatively connected within the case with the movable contacts, and provided outside of the case with a key-receiving recess, sheet-metal index plate and key-retaining plate members having spaced central portions providing bearings in alignment with said shaft, a tubular member secured to the case and providing with the retaining member an enclosure for the shaft, means for securing together the tubular member and plate members, and a key-receiving barrel supported by said bearings of the plate members.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.