April 8, 1930. F. H. PRESCOTT 1,753,624

ELECTRIC SWITCH

Filed Jan. 28, 1928

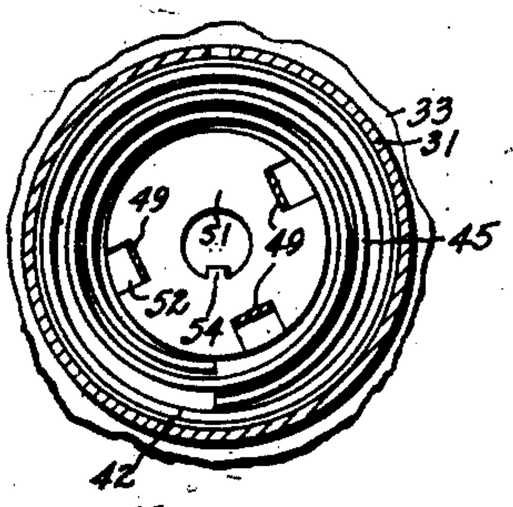


Fig. 6

Fig. 1

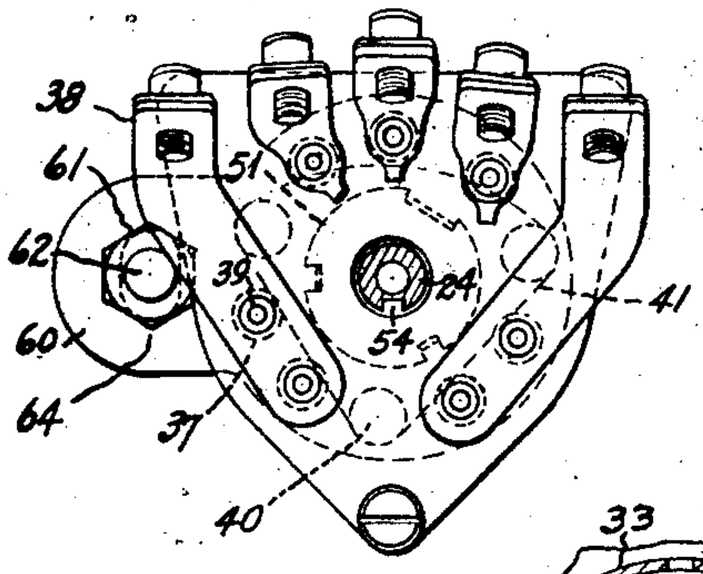


Fig. 2

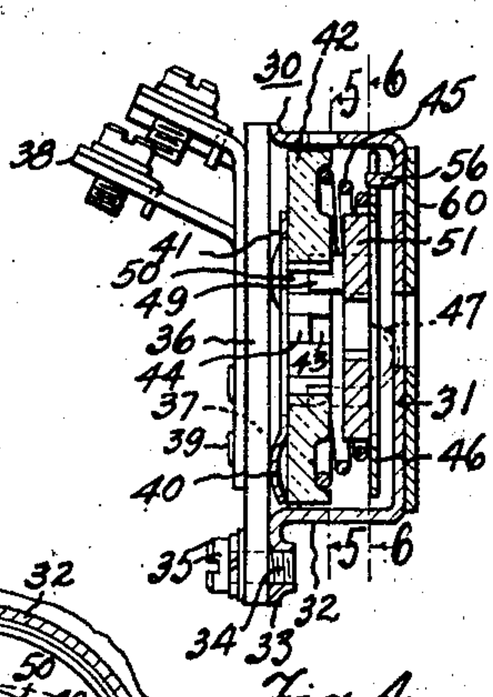


Fig. 4

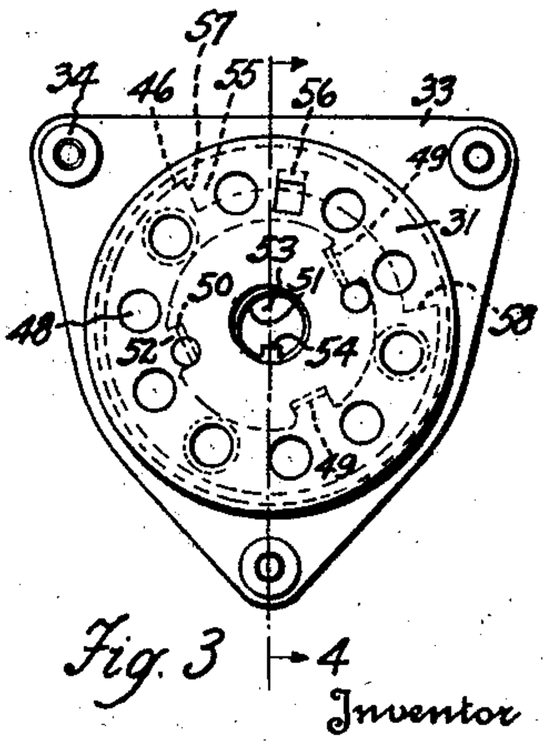


Fig. 3

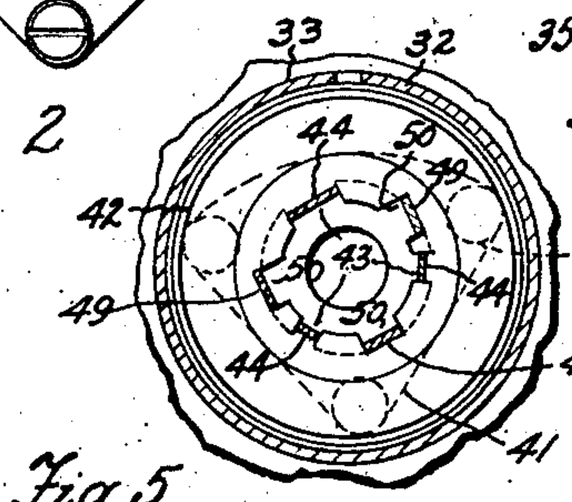


Fig. 5

Inventor

Frank H. Prescott

By Spencer Hardman & Fehr

his Attorneys

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UNITED STATES PATENT OFFICE

FRANK H. PRESCOTT, OF ANDERSON, INDIANA, ASSIGNOR TO DELCO-REMY CORPORATION, OF DAYTON, OHIO, A CORPORATION OF DELAWARE

ELECTRIC SWITCH

Application filed January 28, 1928. Serial No. 250,126.

This invention relates to electrical switches for automobiles and particularly to switches which are adapted to be mounted adjacent the lower end of the steering column of the automobile and to be operated by a shaft extending through the column and connected with a handle adjacent the hub of the steering wheel.

The present invention has been developed with the aim of simplifying the construction and reducing the cost of manufacture of switches of this type.

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

In the drawings:

Fig. 1 is a fragmentary side elevation of a steering column assembly to which a switch embodying the present invention is attached.

Fig. 2 is a view of the switch looking in the direction of the arrow 2 of Fig. 1.

Fig. 3 is a view of the switch taken on the plane of the line 3—3 of Fig. 1.

Fig. 4 is a sectional view on the line 4—4 of Fig. 3.

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

Referring to the drawings, 20 designates the mast of the steering column which is supported by the steering gear housing 21 and which provides a bearing for a steering tube 22 attached to a steering wheel 23. The tube 22 encloses a plurality of concentric tubes, the innermost of which is designated by numeral 24. The tube 24 is connected with a lever 25 located adjacent the hub of the steering wheel 23, and extends through the steering column and is connected at its lower end with a switch 25 which forms the subject matter of the present invention.

The switch 25 comprises a cup-shaped case 30 having a flat end wall 31 and a cylindrical side wall 32 and having a flange 33. The flange is provided with tapped holes 34 for receiving screws 35 by which a non-conducting cover plate 36 is attached to the case 30. The plate 36 carries stationary switch contacts 37 which are arranged in a circular row and are electrically connected with various terminal brackets 38 respectively.

The stationary contacts 37 are formed by the heads of rivets 39 which secure the terminal brackets 38 to the plate 36. These contacts are adapted to be engaged by certain of a plurality of movable contacts formed by providing a somewhat triangular shaped plate 41 with spherical bosses 40. The plate 41 is supported by and is driven by a non-conducting disc 42 or contact carrier which is provided with a central opening including notches 43 for receiving tangs 44 respectively provided by the contact plate 41. A spring 45 bears at one end against the disc 42 and at the other against a detent plate 46 and thus tends to separate the parts 42 and 46 and urges the contact bosses 40 into engagement with the plate 36 or the stationary contact and urges the spherical bosses 47 provided by the plate 46 toward the end wall 31 of the switch case. The end wall 31 is provided with holes 48 arranged in a circular row and each adapted to receive one of the spherical bosses 47. The contact carrying disc 42 is drivingly connected with the detent plate 46 by providing the latter with tangs 49 which are received by notches 50 provided by the contact carrier 42.

Both the contact carrier 42 and the detent plate 46 are driven through the tangs 49 by a disc 51 having notches 52 for receiving the tangs 49 and provided with a central opening 53 for receiving the shaft 24 and provided with a key 54 which is received by suitable longitudinal grooves in the tube 24.

The spring 45 performs the dual function of maintaining the movable contacts into engagement with the stationary contacts and maintaining the detent bosses 47 in engagement with the holes 48 of the plate 41 so that the movable contact will be yieldingly retained in various operating positions into which it is moved by the lever 25.

Motion of the movable contact is limited by providing the plate 46 with an arcuate notch 55 which receives a lug 56 integral with the case wall 31. The parts 57 and 58 defining the notch 55 serve as stops engageable with the

lug 56 in order to limit movement of the plate 46 in either direction.

The switch case is fixed to the lower end of the steering gear case 21 by a mounting plate 60 attached to the switch case 30 and having a slot 61 for receiving the threaded end 62 of a stud 63 attached to the steering gear case 21. A nut 64 cooperates with stud end 62 to clamp the plate 60 to the stud 63. The slot 61 permits adjusting the case 30 angularly relative to the shaft 24 so that the switch may be located properly with respect to the switch operating handle 25.

The present invention provides for constructing a switch without requiring a fine degree of accuracy, for example, the switch case wall 31 need not be exactly parallel to the cover plate 36. The connections between the carrier 42 and the detent plate 46 will allow these parts to accommodate themselves to adjacent surfaces of the plate 36 and switch case wall 31 respectively. When the switch is mounted on the steering column, the switch case 30 need not be exactly concentric with the shaft 24. The relation of the movable parts of the switch to the switch case will be determined somewhat by the connection of a shaft 24 with a disc 51. If, after this connection is made, the disc 51 should be slightly eccentric to the cylindrical wall 32 of the switch case, the switch may be successfully operated since there is sufficient clearance between the case wall 32 and the carrier 42 and the detent plate 46, to permit lateral movement of these parts relative to the switch case.

While the form of embodiment of the present 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 a rotatable contact carrier, a detent plate rotatable coaxially with the carrier, driving connections between the plate and carrier and permitting relative axial movement between the plate and carrier, a driving member connected with the carrier and plate through said driving connections between them, a case enclosing the carrier, plate and member, stationary contacts carried by a wall of the case, a movable contact attached to the carrier and engageable with the stationary contacts, means for urging the movable contact against the stationary contacts and for urging the detent plate toward another wall of the case, and cooperating projection-and-recess locating means provided by the case and detent plate.

2. An electric switch according to claim 1 in which the driving connections between the contact carrier and detent plate are provided by tangs extending from one part and received by notches in the other part.

3. An electric switch according to claim 1 in which a helical coil spring is located between the carrier and detent plate for the purpose specified.

4. An electric switch according to claim 1 in which the driving member is a disc having notches for receiving tangs which extend from the detent plate to the carrier and drivingly connect them.

5. An electric switch comprising a rotatable contact carrier, a detent plate rotatable coaxially with the carrier, driving connections between the plate and carrier and permitting relative axial movement between the plate and carrier, a case enclosing the carrier and plate, and providing stationary contacts in a wall thereof, a movable contact attached to the carrier and engageable with the stationary contacts, means for urging the movable contact against the stationary contacts and for urging the detent plate toward another wall of the case.

6. An electric switch comprising a rotatable contact carrier, a detent plate rotatable coaxially with the carrier, driving connections between the plate and carrier and permitting relative axial movement between the plate and carrier, a case enclosing the carrier and plate, and providing stationary contacts in a wall thereof, a movable contact attached to the carrier and engageable with the stationary contacts, means disposed between the carrier and plate for urging the movable contact against the stationary contacts, and for urging the detent plate toward another wall of the case.

7. An electric switch comprising a rotatable contact carrier, a detent plate rotatable coaxially with the carrier, driving connections between the plate and carrier and permitting relative axial movement between the plate and carrier, a driving member connected with the carrier and plate through said driving connections between them, a case enclosing the carrier, plate and member, stationary contacts carried by a wall of the case, means for urging the contact carrier against the stationary contacts and the detent plate toward another wall of the case.

In testimony whereof I hereto affix my signature.

FRANK H. PRESCOTT.