

Dec. 9, 1930.

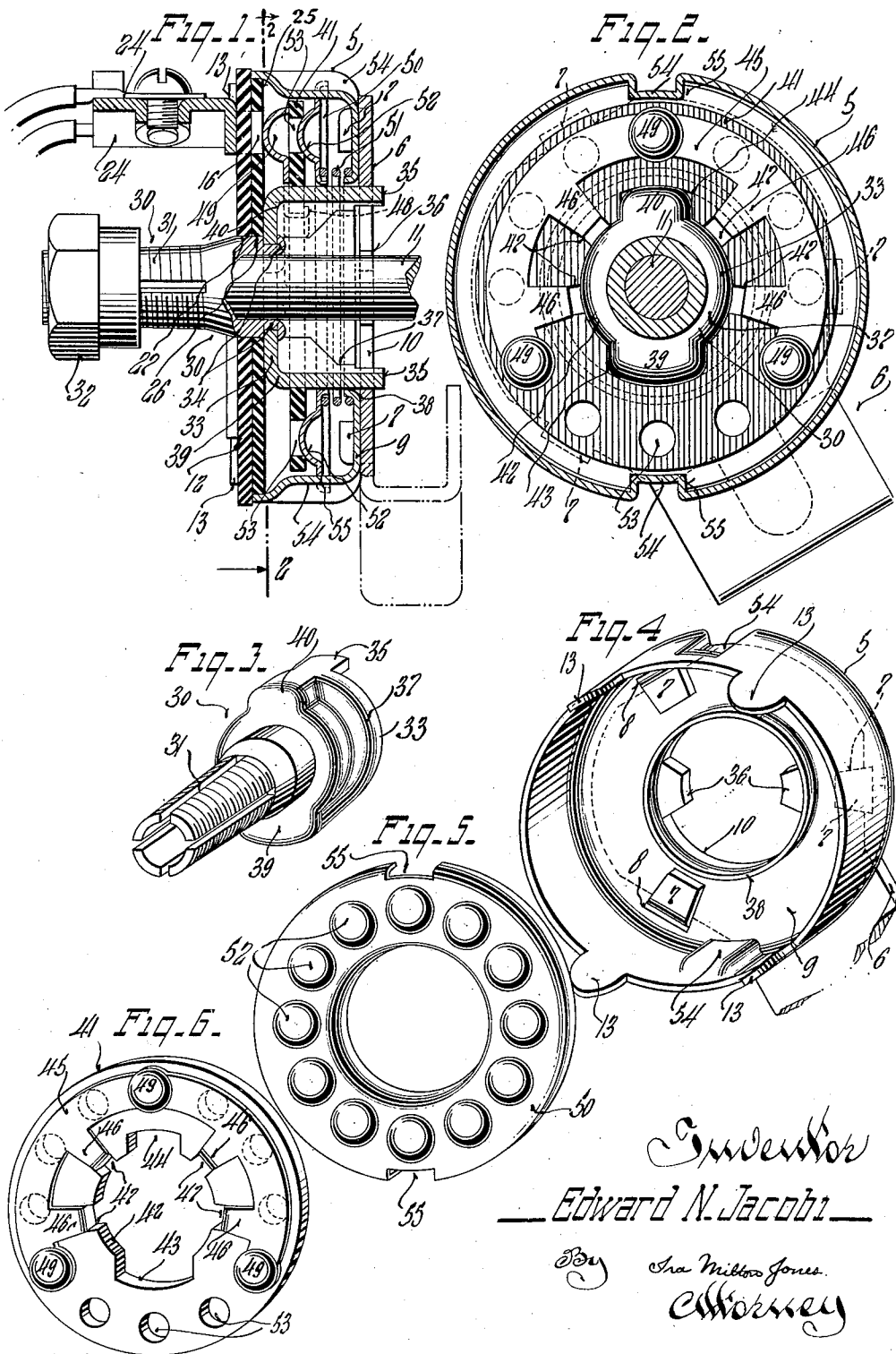
E. N. JACOBI

1,784,290

SWITCH

Filed Oct. 25, 1928

2 Sheets-Sheet 1



Dec. 9, 1930.

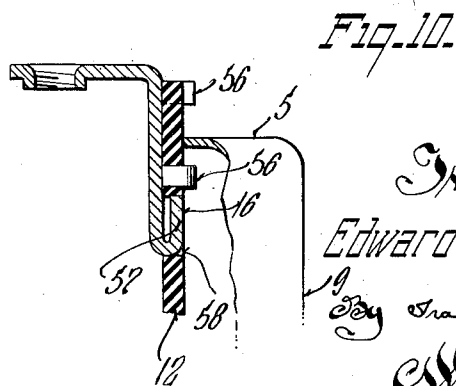
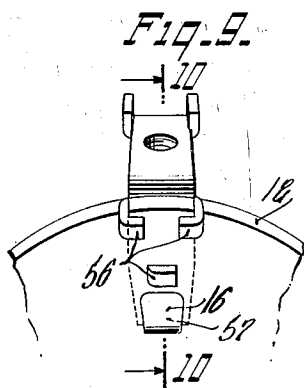
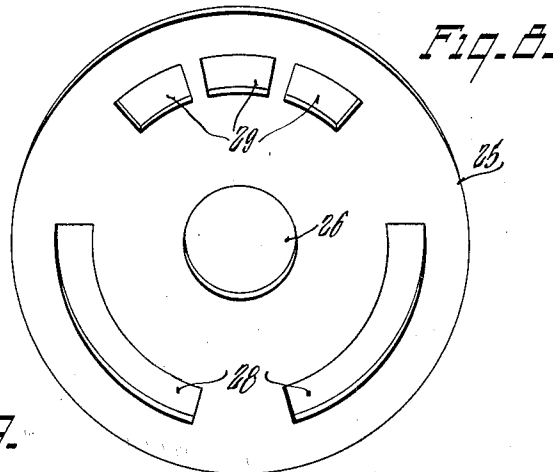
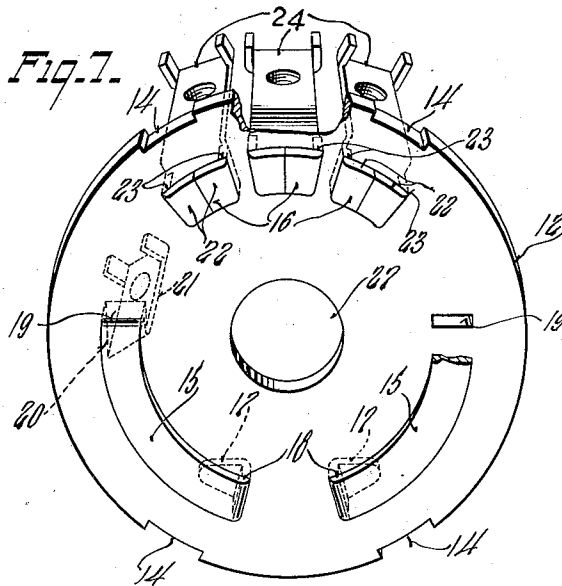
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1,784,290

SWITCH

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2 Sheets-Sheet 2



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SWITCH

Application filed October 25, 1928. Serial No. 314,950.

This invention relates to certain new and useful improvements in switches of the type especially designed to be mounted at the lower end portion of an automotive vehicle steering gear for operation from the upper end thereof through the medium of a rod or other means and has as an object the provision of an improved and simplified construction whereby the over-all size of the switch proper is materially reduced without impairing its efficiency.

Another object of this invention resides in the provision of an improved switch structure whereby a decided detent action is obtained to indicate the respective positions of the switch without necessitating the use of ball members, the detent action being obtained in the switch mechanism per se.

Another object of this invention resides in the provision of an improved switch structure of the character described, in which the driving member for transmitting movement to the switch elements from the operating rod or other means is a cup extended into the switch casing and provided with irregularities in its side wall forming the necessary driving tongues whereby the necessity of extending driving tongues back into the casing from a member exteriorly thereof is eliminated and an inherently stronger structure obtained.

A further object of this invention resides in the provision of an improved switch structure having an improved terminal head and mounting for the terminals.

And a still further object of this invention resides in the provision of a switch of the character described having an improved mounting bracket and means for connecting the same with the switch casing whereby added strength is imparted to the switch unit.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the

hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view taken transversely through the switch structure embodying my invention, parts thereof being in side elevation and parts in section;

Figure 2 is a view, partly in section and partly in elevation, taken through Figure 1 on the plane of the line 2—2;

Figure 3 is a perspective view of the actuating member or cup apart from the switch;

Figure 4 is a perspective view of the switch cup or casing illustrating the manner of securing the same to its mounting bracket;

Figure 5 is a perspective view of the member for providing the contact pressure and detent action;

Figure 6 is a perspective view of the fiber contact carrying disc and the contacts;

Figure 7 is a perspective view of the terminal head;

Figure 8 is a perspective view of the inner facing of the terminal head;

Figure 9 is a fragmentary, perspective view of a slightly modified manner of mounting the terminals on the terminal head, and

Figure 10 is a fragmentary view, partly in section and partly in elevation, taken through Figure 9 on the plane of the line 10—10.

Referring now more particularly to the accompanying drawings, in which like numerals designate like parts throughout the several views, 5 represents a switch housing or casing preferably of cup shape in which the switch instrumentalities, to be later described, are mounted, and 6 a mounting bracket provided with lugs or tongues adapted to be projected through apertures in the bottom wall 9 of the casing and struck thereover, as illustrated in Figures 1 and 2, to rigidly connect the housing with the bracket. That portion of the bracket 6 secured to the bottom wall of the housing is

preferably of a shape to substantially conform with that of the housing bottom wall so that the same has the effective strength of the bracket.

5 The bracket member 6 is adapted to be bolted or otherwise secured to the lower end of an automotive vehicle steering gear element, not shown, one manner of mounting being illustrated and described in my
10 pending application filed May 13, 1927, Serial No. 191,080. The bracket 6 has a central aperture 10 through which the lower end of an actuating rod 11 extends, the rod being
15 rotatably mounted in the steering column of the automotive vehicle, not shown, and having suitable lever or other actuating means, not shown, on its upper end.

The switch instrumentalities, now about to be described, are confined within the housing 5, the open end of which is closed by a
20 terminal carrying head 12 of special construction secured in place by tongues or projections 13 extended from the peripheral edge of the housing 5 to engage in notches 14 of
25 the terminal head and be directed thereover in the manner illustrated in Figure 1. The terminal carrying head is preferably formed of insulating material and has on its inner
30 face two elongated arcuate contacts 15 and a plurality of smaller spaced contacts 16 arranged on a common arc with the contacts 15.

In the embodiment illustrated in Figures 7 and 8, each contact 15 has an end 17 extended through an opening 18 in the terminal
35 head and then struck over the outer face thereof to firmly secure that end of the contact to the terminal head, the other end portion of the contact being passed outwardly
40 through an aperture 19 in the terminal head and having a portion thereof struck from the outer face of the terminal head, as at 20, to firmly clamp the contact to the terminal head, that portion thereof outwardly of the
45 portion 20 forming a terminal member 21 for the reception of a conductor, not shown. Each contact 16 is formed from a single blank and is substantially L or angular shaped having tongues or projections 22 extended
50 from the shorter arm of the L which pass inwardly through apertures 23 in the terminal head and are clinched thereover with their outer end abutting to form the contact 16 and firmly hold the terminal member 23 formed by the longer arm of the L to the terminal head 24.

55 It will be seen that the contact surfaces 15 and 16 are raised from the inner face of the terminal head proper and to assure a flush arrangement, a lining or facing 25, having a central aperture 26 corresponding to the aperture 27 of the terminal head and having elongated arcuate slots 28 and shorter arcuate slots 29 conforming to the configuration of the contacts 15 and 16, respectively,
60 is secured over the inner face of the terminal

head 12 and the inner surfaces of the contacts 15 and 16 are then flush with the inner face of the member 25, as best shown in Figure 1, so that the movable contacts, to be later described, freely ride on to and off of the contacts 15 and 16 in the manner later described.

The rod 11 passes through the switch unit as illustrated in Figure 1 and has an actuator 30 fixed thereto which consists of a
75 slotted externally threaded tubular member 31 clamped on that portion of the rod exteriorly of the terminal head by a nut 32 and a cup member 33 to which the inner end of the tubular member 31 is secured in any suitable manner such as by extending tongues 34
80 therethrough and swedging the same over. The cup 33 is of a depth substantially equal to the depth of the casing 5 and has spaced projections 35 extended from its marginal edge to rotate in the opening 10 of the bracket member and cooperate with stops or projections 36 integral with the bracket member and extended into its opening 10 to limit the rotation of the cup, as will be readily obvious.

The cup 33 is preferably stamped and is of irregular shape having the portion 37 near its marginal edge of true circular shape to conform with the inner diameter of a flange 38 struck inwardly from the casing bottom wall 9 concentric with the bracket opening 10 to provide a bearing for the member and having its walls inwardly of the portion 37
95 so shaped as to provide projections 39 and 40 of different widths which provide driving members for a fiber contact carrying disc 41 having a central aperture 42 with which recesses 43 and 44 conforming with the driving members 39 and 40, respectively, communicate, the member 33 conforming with the aperture 42, as best shown in Figure 2. From this structure it will be readily obvious that as the rod 11 is rotated the cup 33 rotates therewith carrying the fiber contact disc 41.

Mounted on the face of the fiber contact carrying disc 41 adjacent the terminal carrying head is a segmental member 45 having inwardly directed radial tongues 46 extended
105 through slots 47 in the disc 41 and clamped over the opposite side thereof, as at 48, to firmly secure the segmental member thereto, said member having a plurality of tits or projections 49 struck therefrom to provide movable contacts adapted for engagement with the contacts 15 and 16 of the terminal carrying head. The disc 41 is free to move axially on the cup 33 but is held against rotation with respect thereto by the driving member and is
115 yieldably urged at all times to engage the contacts 49 with the terminal carrying head by a washer or annular member 50 disposed between the contact carrying disc 41 and the casing wall 9 by an expansile spring 51 con- 120 125 130

finned between the wall 9 and the annular member.

The member 50 has a plurality of tits or projections 52 struck therefrom and arranged on a common arc to register with a plurality of recesses or apertures 53 in the contact disc 41 and provide the necessary detent action as the tits 52 ride in and out of the apertures 53. The member 50 is free to move axially with respect to the cup member but is held against rotative movement by beads or ribs 54 struck inwardly from the side wall of the casing 5 at diametrically opposite points and adapted to engage in slots or openings 55 in the periphery of the member 50.

In Figures 9 and 10, a slightly modified form of terminal carrying head is provided wherein the necessity of forming the head in two layers is eliminated, the terminal member being clamped to the head by lugs 56 directed therethrough and the contacts 16 being formed by folding over an end portion 57 of the terminal member into a recess 58 in the terminal head so that it is flush with the inner surface thereof.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which an invention of the character described appertains, that I have provided a novel and improved switch structure which, by reason of its design, is of reduced over-all dimensions, is of very rigid and durable construction and capable of production at a lower cost.

What I claim as my invention is:

1. In a switch mechanism, stationary contacts, a movable contact carrying member having both axial and rotary movement with respect to the stationary contacts, contacts carried by said member and adapted for engagement with the stationary contacts, a pressure applying member engageable with the face of the contact carrying member opposite the stationary contacts, means permitting axial movement of the pressure applying member but restraining rotary movement thereof, and spring means at all times urging the pressure applying member toward the contact carrying member whereby contact pressure is obtained between the movable and stationary contacts.

2. In a switch mechanism, stationary contacts, a movable contact carrying member having both axial and rotary movement with respect to the stationary contacts, contacts carried by said member and adapted for engagement with the stationary contacts, a pressure applying member engageable with the face of the contact carrying member opposite the stationary contacts, means permitting axial movement of the pressure applying member but restraining rotary movement thereof, spring means at all times urging

the pressure applying member toward the contact carrying member whereby contact pressure is obtained between the movable and stationary contacts, and projections extended from one of said members and engageable in recesses in the other of said members to provide a detent action indicating the relative positions of the contacts.

3. In a switch mechanism, a housing, a terminal carrying member closing the housing, contacts carried by the inner face of the terminal carrying head, a contact carrying member rotatable in the housing, contacts carried by said member and engageable with the contacts of the terminal head, an actuator rotatable within the housing and drivingly connected with the contact carrying member whereby the contact carrying member rotates therewith and is permitted axial movement thereon, a pressure applying member mounted in the housing between the contact carrying member and the closed end thereof, means permitting axial movement of the pressure applying member but restraining the same from rotary movement with respect to the housing, and a spring confined between the closed end of the housing and the pressure applying member whereby the contacts of said contact carrying member are at all times yieldably engaged with the registering contacts of the terminal carrying head.

4. In a switch mechanism, a substantially cup-shaped housing, a terminal carrying head closing the outer end of the housing, an actuator of substantially cup shape rotatably confined within the housing, switch instrumentalities mounted within the housing and including a movable contact carrying member, said actuator having a portion thereof of irregular shape in transverse section, said contact carrying member having a central opening of irregular shape to conform with the irregular portion of said cup-shaped member, whereby the switch carrying member is held against rotation with respect to the actuator but is permitted a limited axial movement, and means yieldably urging the movable contact carrying member toward the terminal carrying head.

5. In a switch mechanism, a substantially cup-shaped housing, a terminal carrying head closing the outer end of the housing, an actuator of substantially cup shape rotatably confined within the housing, switch instrumentalities mounted within the housing and including a movable contact carrying member, said actuator having a portion thereof of irregular shape in transverse section, said contact carrying member having a central opening of irregular shape to conform with the irregular portion of said cup shaped member, whereby the switch carrying member is held against rotation with respect to the actuator but is permitted a

limited axial movement, means yieldably urging the movable contact carrying member toward the terminal carrying head, a mounting bracket for the switch mechanism secured to the bottom of the housing and having an opening therein registering with an opening in the housing bottom, stops projected from the bracket into the opening, and projections extended from the actuator and cooperating with the stops to limit the rotary movement of the actuator and consequently the contact carrying member.

6. A switch mechanism comprising a substantially cup shaped housing having an opening in its bottom wall, a terminal carrying head closing the open end of the housing, switch instrumentalities mounted within the housing including a substantially cup-shaped member having its closed wall abutting the terminal carrying head, a tubular stem extended from the actuator outwardly of the casing to the terminal carrying head, an actuating rod for the switch passed through the opening in the casing bottom wall and through the actuator into the tubular stem, means connecting the rod with the stem whereby rotation thereof rotates the actuator, and means whereby rotation of the actuator actuates the switch instrumentalities.

7. A switch mechanism comprising a substantially cup-shaped housing having an opening in its bottom wall, a terminal carrying head closing the open end of the housing, switch instrumentalities mounted within the housing, a mounting bracket for the housing, an actuator for the switch instrumentalities including a substantially cup-shaped member having its closed wall abutting the terminal carrying head, a tubular stem extended from the actuator outwardly of the casing to the terminal carrying head, an actuating rod for the switch passed through the opening in the casing bottom wall and through the actuator into the tubular stem, means connecting the rod with the stem whereby rotation thereof rotates the actuator, means whereby rotation of the actuator actuates the switch instrumentalities, and cooperating means carried by the actuator and the mounting bracket for limiting rotation of the actuator.

8. In a switch mechanism including a substantially cup-shaped casing having its bottom wall centrally apertured, a terminal carrying head closing the open end of the casing, switch instrumentalities mounted within the casing, a bracket member mounting the switch mechanism having a portion fixed to the bottom of the cup shaped member to reinforce the same, said bracket member having an opening registering with the opening of the casing bottom wall, projections extended from the bracket member into the opening, an actuator rotatable in the casing and confined

between the terminal carrying head and the projections, and a drive connection between the actuator and the switch instrumentalities.

9. In a switch mechanism including a substantially cup-shaped casing having its bottom wall centrally apertured, a terminal carrying head closing the open end of the casing, switch instrumentalities mounted within the casing, a bracket member mounting the switch mechanism having a portion fixed to the bottom of the cup-shaped member to reinforce the same, said bracket member having an opening registering with the opening of the casing bottom wall, projections extended from the bracket member into the opening, a substantially cup-shaped actuator of a length substantially equal to the distance between the bottom wall of the casing and the terminal head with its closed end abutting the terminal carrying head, and a drive connection between the actuator and switch instrumentalities.

10. In a switch mechanism including a substantially cup-shaped casing having its bottom wall centrally apertured, a terminal carrying head closing the open end of the casing, switch instrumentalities mounted within the casing, a bracket member mounting the switch mechanism having a portion fixed to the bottom of the cup-shaped member to reinforce the same, said bracket member having an opening registering with the opening of the casing bottom wall, projections extended from the bracket member into the opening, a substantially cup-shaped actuator of a length substantially equal to the distance between the bottom wall of the casing and the terminal head with its closed end abutting the terminal carrying head, a drive connection between the actuator and the switch instrumentalities, and prongs extended from the actuator through the opening in the bracket member to cooperate with the said bracket member projections to limit the rotation of the actuator.

11. In a switch mechanism, a terminal carrying head of insulating material having a recess therein, a terminal member fixed to the terminal carrying head, and a part carried by said terminal member passed through an opening in the terminal carrying head and clinched over to lie in the said recess with its inner face flush with the inner face of the terminal carrying head to form a contact surface.

12. In a switch mechanism, a terminal carrying head of insulating material, terminal members fixed to the outer face of the head, parts carried by the terminal members and extended through the terminal carrying head and struck thereover to provide contacts, and an inner facing for the terminal carrying head of a thickness substantially equal to the thickness of said contact portions and having

openings conforming with the shape of said contact portions whereby the inner face of the terminal carrying face assembly and the contact portions are substantially flush.

13. In a switch mechanism, a housing, a movable contact carrying member mounted in the housing, a pressure applying member positioned within the housing, cooperating means carried by the movable contact carrying member and the pressure applying member for providing a detent action to indicate the rotative position of the movable contact carrying member, and inwardly pressed portions formed in the housing and engageable with the pressure applying member for maintaining the same against rotation.

14. In a switch mechanism, a housing, a movable contact carrying member, a pressure applying member, means connecting the pressure applying member with the movable contact carrying member to retain the movable contact carrying member in adjusted position, said pressure carrying member having a recess formed in its periphery, and a projection extended inwardly from the housing and engaged in the recess to restrain the pressure applying member from rotation.

15. In a switch mechanism of the character described, a stationary contact, a movable contact carrying member having both axial and rotary movement with respect to the stationary contact, a contact carried by said member and adapted for engagement with the stationary contact, a non-rotatable but axially movable member, rounded projections extended from one of said members and engageable in recesses in the other of said members to provide a detent action to indicate the relative position of the contacts, and yieldable means urging the non-rotatable member toward the contact carrying member.

16. In a switch mechanism of the character described, a rotatable contact carrying member, means for imparting rotation to the rotatable contact carrying member, a non-rotatable but axially movable member, one of said members having a plurality of circumferentially arranged equally spaced rounded projections engageable in recesses formed in the other of said members, and spring means yieldably urging the non-rotatable member toward the rotatable contact carrying member whereby the engagement of the plurality of rounded projections in said recesses provides a detent action for the movable contact carrying member as it is rotated.

17. In a switch mechanism of the character described, a rotatable contact carrying member, means for rotating the same, said member being formed of insulating material and having a plurality of circumferentially arranged equally spaced recesses, a non-rotatable but axially movable member adjacent the contact carrying member, a plurality of circumferentially arranged rounded projections extended

from the non-rotatable member and engageable in the recesses formed in the contact carrying member, and spring means yieldably urging the non-rotatable member toward the contact carrying member whereby the rounded projections—by engaging in the contact carrying member recesses—provide a detent action and form a support for the contact carrying member substantially about its entire periphery.

18. In a switch mechanism of the character described, a rotatable contact carrying member, means for rotating the same, said contact carrying member being formed of insulating material and having a relatively large number of depressions in one face thereof arranged circumferentially adjacent its periphery and equally spaced, a non-rotatable member stamped from bendable metal and having a number of rounded projections directed toward the contact carrying member, said rounded projections being equal in number to the depressions of the contact carrying member and adapted to engage therein, and spring means yieldably urging the non-rotatable member toward the contact carrying member to maintain its projections in engagement with the contact carrying member depressions.

19. In a switch mechanism, stationary contacts, a movable contact carrying member having both axial and rotary movement with respect to the stationary contacts, contacts carried by the said member and adapted for engagement with the stationary contacts, a non-rotatable but axially movable pressure applying member engageable with the contact carrying member, spring means at all times urging the pressure applying member toward the contact carrying member whereby contact pressure is obtained between the movable and stationary contacts, and cooperating means carried directly by the contact carrying member and the pressure applying member for providing a detent action to indicate the relative position of the contacts.

In testimony whereof I have hereunto affixed my signature.

EDWARD N. JACOBI.