

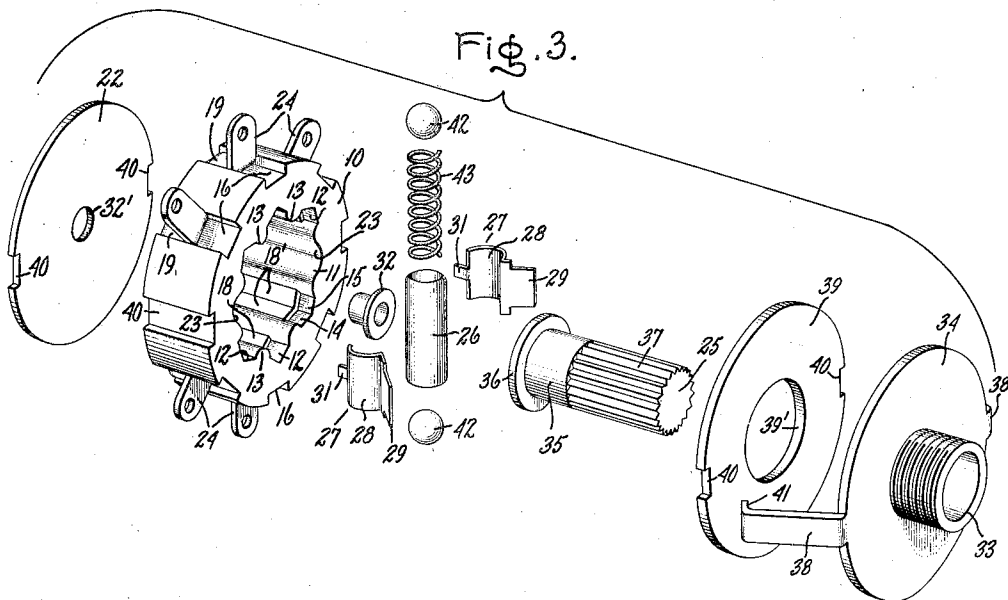
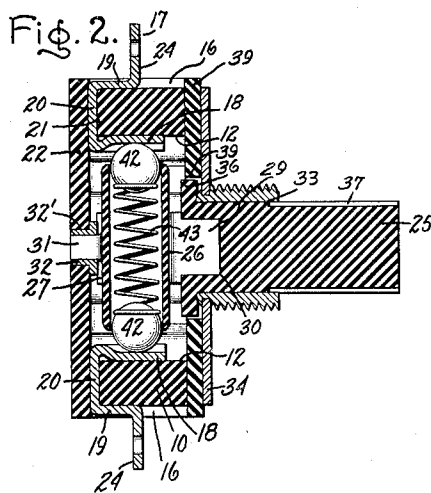
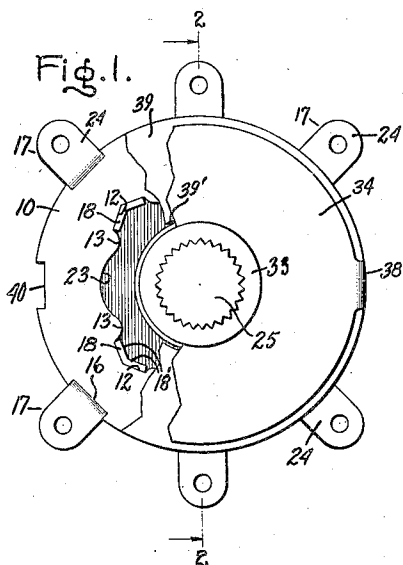
May 21, 1940.

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2,201,881

ROTARY SWITCH

Filed Oct. 7, 1938



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UNITED STATES PATENT OFFICE

2,201,881

ROTARY SWITCH

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Application October 7, 1938, Serial No. 233,788

4 Claims. (Cl. 200—8)

This invention relates to electric switches, and more particularly to a rotary electric switch employing roller contacts.

It is an object of the invention to provide an improved construction and arrangement in switches of the type described which maintains an excellent electrical contact between the switch points, which is easily assembled, and which may be manufactured at low cost.

In the accompanying drawing Fig. 1 is a plan view of the switch with a portion of the cover broken away to show the interior of the switch; Fig. 2 is a sectional view through the switch taken along the line 2—2 of Fig. 1; and Fig. 3 is an exploded view of the switch elements.

Referring to the drawing, the numeral 10 designates a housing for the switch structure. In the form of the invention illustrated the housing is of cylindrical form and is provided with a substantially circular recess 11 having grooves 12 spaced around the periphery thereof. As shown most clearly by Fig. 2, the recess extends entirely through the housing for the reception of switch contacts to be described later. Each of the grooves 12 is separated from another by a hill portion 13 and each is V-shaped to provide opposing faces 14 and 15. The exterior of the housing is provided with a plurality of circumferentially spaced notches 16 which are in radial alignment with the grooves 12.

It will be apparent that the grooves 12 and the notches 16 cooperate to provide holding and positioning means for contacts 17. The contacts 17 are substantially U-shaped, the inner arm 18 of the U being disposed within the groove 12 and the outer arm 19 of the U being disposed within the corresponding aligned recess 16. This arrangement makes it possible to assemble the contact structures quickly and easily by sliding them over the housing within the grooves 12 and 16. All of the contact structures are identical which makes possible uniformity and low manufacturing costs. The base 20 of the U-shaped contact is seated within a recess 21 formed in the housing end so that it is flush with the end of the housing 10 and a cover plate 22 engages the end of the U and retains the contact on the base with the arms 18 and 19 seated in the grooves 12 and 16, respectively. In this manner the contacts 17 are held mounted securely upon the base. The arm 19 of each of the contacts is provided with an outstanding ear 24 for connection to an electrical conductor. It should also be noted that the inner arm 18 of the contact structure is substantially V-shaped corre-

sponding to the shape of the recess 12 and forming two contacts faces 18'.

It will be apparent from reference to Fig. 3 that as many contacts as desired may be spaced circumferentially around the periphery of the housing. In the form of the invention illustrated, six of the contact structures 17 are provided, but this number may be increased or decreased at will. To provide for an "Off" position of the switch, two of the contacts may be omitted as shown at 23.

A switch operating mechanism cooperates with the fixed contacts 17 and is operated by means of a handle 25 formed of insulating material. The mechanism includes a cylindrical element 26 of insulating material which is secured to the handle by means of the clamping clips 27. For closely engaging the cylindrical member 26 the clips are provided with extending tangs 29 which fit within a recess 30 formed in the handle. Extending rearwardly from the clips are the projections 31 which are seated within a bearing element 32 mounted in an opening 32' in the closure plate 22. By securing the tangs and projections together by means of the handle and closure plate, respectively, the clips securely embrace the element 26 and maintain it in operative position. The structure is assembled without the use of screws or other fastening means. The handle 25 is rotatably supported in a collar 33 secured to a closure plate 34. The inner portion of the handle is provided with a plain bearing surface 35 for engaging the collar 33 and, in addition, is provided with an annular flange 36 which engages the inner end of the collar and prevents the handle from being pulled longitudinally through the collar. In order to provide a frictional grip upon the handle 25 the outer portion is grooved longitudinally, as shown at 37. In addition to providing a rotatable support for the handle, the collar 33 is threaded so that it may support the switch upon a mounting panel by cooperation with a locking nut (not shown). The closure plate 34 is provided with extending arms 38 which encircle the switch housing 10 and cover plate 22 to maintain the elements in assembled relationship. A disk 39 of insulating material such as fiber, or the like, separates the closure plate 34 from the housing 10 and is provided with an opening 39' for receiving the flange 36. When in assembled position, the arms 38 are received in the grooves 40 which are formed in the housing 10, the cover plate 22 and the closure plate 34. In addition, the arms are bent over the cover plate, as indicated at 41, to lock

the elements in assembled relationship. By the construction just described, a bearing means is provided for rotatably supporting the switch-operating mechanism within the housing.

- 5 The switch operating mechanism supports movable contacts for cooperation with the fixed contacts 17. To this end roller contacts 42 are placed within each end of the cylindrical member 26 where they engage one of the fixed con-
10 tacts 17. In the form of the invention illustrated, the roller contacts take the form of ball bearings, but manifestly, other forms of roller contacts may be employed such as pivoted cylindrical members. The ball bearings 42 are inter-
15 connected by means of a compression spring 43 which serves as an electrical conductor between the roller bearings and, in addition, maintains them firmly and securely in contact with the fixed contacts 17. In this manner the respective dia-
20 metrically opposed stationary contacts are electrically connected together in series.

It will be apparent that as the switch-operating mechanism is rotated within the housing the roller contacts 42 will move longitudinally within
25 the cylindrical housing element 26 against the compression of the spring 42 as the contacts pass over the hills 13 which separate the contact members 17. The roller or ball bearing contacts rotate as the switch is actuated thereby reduc-
30 ing friction and making possible a construction which is easily operated. At the same time the spring 43 maintains the ball bearings firmly in engagement with the fixed contacts thereby ensuring an adequate electrical connection. The
35 switch cannot assume an intermediate position because the compression of the spring 43 will force the roller contacts down the sides of the hills and into contact with one or the other of the fixed contact members 17. By making the in-
40 ner leg 18 of the fixed contact V-shaped it is possible to secure two points of contact between the leg and the corresponding roller contact 42. This ensures adequate electrical contact at all times between the roller contacts and the respec-
45 tive fixed contacts.

It will be apparent that by the construction described the switch mechanism may be rotated in either direction to control the circuits with which the switch is connected.

- 50 What we claim as new and desire to secure by Letters Patent of the United States, is:

1. In an electric switch, a base having a recess therein, said recess having axial grooves spaced around the periphery thereof, contacts disposed
55 in said grooves and having terminal lugs extending beyond the confines of said base, a closure

plate for said recess engaging said contacts to hold them in position, contact supporting means comprising a cylindrical member rotatably mounted within said recess, roller contacts ro-
5 tatably mounted within said member, a handle for operating said supporting means, and clip elements surrounding said cylindrical member, said clip elements having projections extending into said handle and other projections supported
10 in said plate to form a bearing for said member.

2. An electric switch comprising a base having a circular recess therein, contact members disposed around the periphery of said recess, closure plates closing the ends of said recess, a
15 contact holding element disposed within said recess, contacts rotatably mounted in said element, a handle rotatably mounted in one of said plates, and clip elements secured to said handle and surrounding said element and having projections
20 pivotally supported in the other of said plates for rotatably mounting said contact holding element.

3. In an electric switch, a base having a recess therein, stationary contacts disposed around the periphery of said recess, closure plates closing
25 the ends of said recess, a cylindrical contact holding element disposed within said recess, ball bearing contacts rotatably mounted in the ends of said element, spring means interconnecting said rotatable contacts and urging them into engage-
30 ment with said stationary contacts, a handle rotatably mounted in one of said plates, and clip elements secured to said handle and surrounding said contact holding element, said clip elements
35 having projections pivotally supported in the other of said plates for rotatably mounting said element.

4. An electric switch comprising a base having a circular recess therein, stationary contacts disposed in spaced relationship around the periph-
40 ery of said recess, closure plates covering the ends of said recess, one of said plates securing said contacts within said recess, an operating handle rotatably mounted in the other of said closure plates, a cylindrical member within said recess, clip elements surrounding said member and hav-
45 ing portions engaging said handle, said clip elements being provided with projections engaging said one closure plate to provide a pivotal mounting for said cylindrical member, ball bearing con-
50 tacts freely rotatable within said cylindrical member, and a spring disposed within said member and engaging said ball bearing contacts for pressing them outwardly into engagement with said stationary contacts.

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