

Jan. 20, 1959

J. R. GELZER

2,870,276

ROTARY ELECTRIC SWITCH

Filed April 8, 1957

Fig. 1.

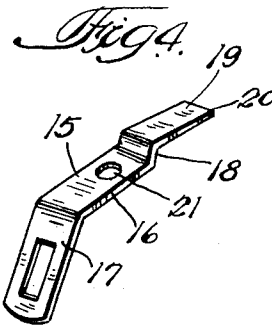
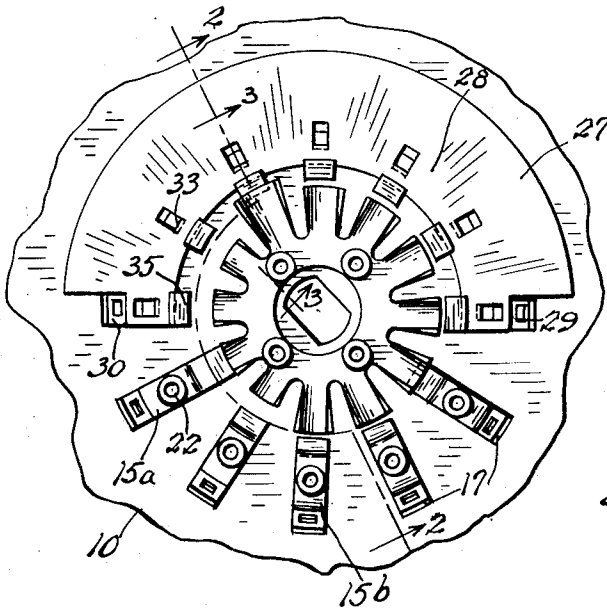


Fig. 2.

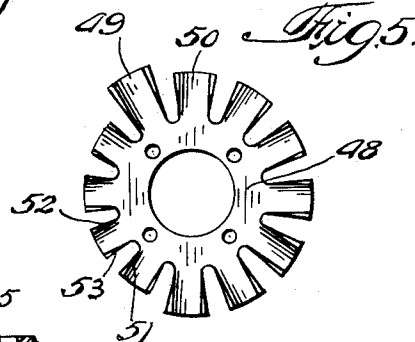
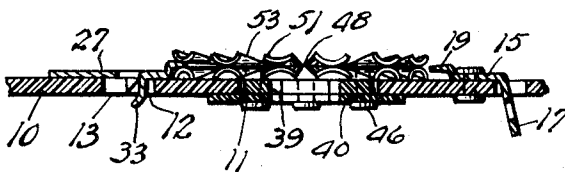


Fig. 6.

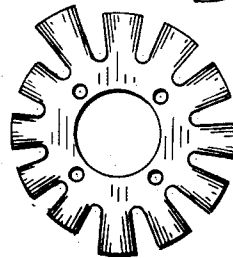
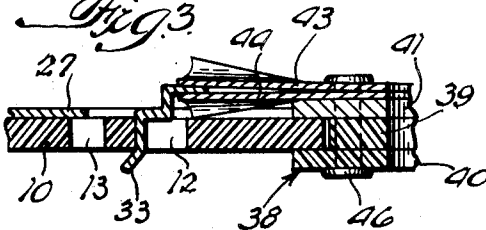


Fig. 3.



INVENTOR.
John R. Gelzer.
BY *Robert L. Kahn.*
Hatta.

2,870,276

ROTARY ELECTRIC SWITCH

John R. Gelzer, Barrington, Ill., assignor to Oak Mfg. Co., Cook County, Ill., a corporation of Illinois

Application April 8, 1957, Serial No. 651,531

5 Claims. (Cl. 200—11)

This invention relates to a rotary electric switch and one particularly adapted for switching low power circuits in such systems as communication equipment, tube testers and other apparatus where low power is involved. Switches for such apparatus must be adapted for different circuitry from a basic switch design. The switch embodying the present invention is well suited for such adaptation and provides a rugged construction having great operational adaptability and having considerable circuit adaptability while being free of any defect incident to delicate mechanical construction.

The invention will be disclosed in connection with a drawing wherein an exemplary embodiment is illustrated. It is understood that variations may be made within the scope of the invention as defined by the appended claims.

In the drawing, Figure 1 is a plan view of a switch embodying the present invention.

Figure 2 is a section along line 2—2 of Figure 1.

Figure 3 is an enlarged sectional detail on line 3—3 of Figure 1.

Figure 4 is a perspective view of one form of stationary contact.

Figure 5 is a plan view of the spring portion of the switch rotor, this view showing a complete contact member prior to cutting into any parts.

Figure 6 is a plan view of the companion spring portion of the switch rotor.

Referring to the drawing, a switch embodying the present invention is mounted on an insulating support or panel generally indicated by 10. Insulating support 10 is of rigid material such as Bakelite and has aperture 11 for accommodating a rotor. Disposed around rotor aperture 11 are series of apertures 12 and 13 for stator contacts.

The stator contact apertures in each series are preferably spaced at angular intervals around rotor aperture 11 and each such stator contact aperture in general will correspond to one switch position. Apertures 12 and 13 of the two series are radially aligned.

Insulating panel 10 carries stator contacts which may be of one type or another type or both types as illustrated here. One type of stator contact comprises individual contacts 15 consisting of mounting portion 16 having terminal lug portion 17 extending from one end of mounting portion 16 and bent at an angle thereto. Mounting portion 16 has shoulder 18 formed by lateral bending of the metal and from shoulder 18 contact blade 19 extends. Contact blade 19 may be tapered as illustrated, the taper extending to a contact edge 20. The taper may be obtained by swedging or other suitable means.

Mounting portion 16 of a stator contact has mounting aperture 21 for accommodating eyelet 22 for securing the contact to insulating member 10. Eyelet 22 passes through aperture 12. Terminal lug 17 is bent to pass through aperture 13. It will be noted that contact blade 19 is offset to clear the surface of insulating member 10.

Individual stator contacts may be made in different lengths for different switching combinations. Thus as illustrated in Figure 1, contact 15a has a long contact blade while remaining contacts 15b have shorter contact blades. Thus the effective radial distance from the center of rotor aperture 11 to the contact blades will be determined by the lengths of the blades.

A multiple stator contact 27 may be provided. This multiple contact may have any desired angular extent and has body portion 28 and ends 29 and 30. Ends 29 and 30 have formed thereon terminal lugs similar to lug 17. Body portion 28 has a number of fingers 33 punched out therefrom at spaced intervals corresponding to switch index positions, such fingers passing through apertures 12 in insulating panel 10. Fingers 33 are bent to lock contact 27 in position.

Multiple contact 27 is also provided with inwardly extending contact blades 35 disposed at spaced angular intervals corresponding to the spaced switch positions. For convenience, contact blades 35 are radially aligned with fingers 33. Contact blades 35 of the multiple contact are laterally offset from body 27 of the contact by bending to form a shoulder similar to shoulder 18. Thus all of the blades of the single and multiple stator contacts will lie generally in one plane laterally offset from the surface of insulating member 10.

The various stator contacts are preferably made of suitable metal such as copper or brass and may be silver plated. Blades 35 of the contact 27 may also be tapered radially similarly to blades 19.

Cooperating with the various stator contacts are rotor contacts carried by a rotor generally indicated by 38. Rotor 38 may consist of insulating disc 39 which is dimensioned to fit within rotor aperture 11 in insulating panel 10. Disposed on opposite faces of insulating disc 39 are insulating discs 40 and 41 large enough to overlap the material of insulating panel 10 bordering rotor aperture 11. Carried on insulating disc 41 are rotor contact members 43 and 44. The entire rotor is maintained intact by rivets 46 passing through suitable apertures in the various parts making up the rotor.

Rotor members 43 and 44 are generally similar and comprise inner body portions 48 and radially extending contact jaws 49, 50 and 51. The angular extent of each contact jaw is the same and corresponds to the angle for effecting one switch operation. The radial length of the contact jaws will vary, depending upon the length of the stator contacts and upon a desired switching pattern. For convenience, radial contact jaw 49 is shown as longest while jaws 51 are shown as being the shortest. It is understood that contact members 43 and 44 will be aligned so that the various jaws register with each other.

It is preferred to curl radial edges 52 and 53 of each rotor jaw outwardly away from the other contact member. Thus as illustrated in Figure 2, the two rotor contact members will have separated edge portions at each jaw with the jaw material at the center pressing tightly together.

The thicknesses of insulating disc 41 and contact members 43 and 44 are so selected with reference to the offset of the stator contact blades that contact blades 19 and 35 will be properly positioned and symmetrically disposed with respect to rotor contact members 43 and 44.

A large number of different switching patterns is obtainable by controlling the angular extent of the multiple stator contacts, the number of stator contacts, the angular position, the radial length of the active contact portions, the radial length of the rotor contact jaws, the angular extent of the rotor contact jaws and also by cutting the rotor members radially into two or more electrically separate members. It is understood that the rotor contact members will always operate in pairs to provide jaws on opposite sides of a stator contact blade.

Various means for controlling jaw flexibility may be provided. Thus the metal may be arched at the base of the jaw or the jaw may be narrowed, at its base, for making the jaw more resilient.

A number of switch sections may be ganged in spaced, parallel planes to be operated as one switch system. Each rotor is provided with a non-circular opening through the same for accommodating an operating shaft. Suitable index means for defining switch positions may also be provided.

It will be apparent that a switch embodying the present invention has many advantages. Thus a stationary contact may have any kind of terminal to which a wire or wires may be soldered or joined in any desired fashion. In the event that wires are soldered to such terminals, the heat due to soldering will have no effect upon the spring of the metal of the movable contacts. Furthermore the rotor is so constructed that end thrust on the rotor is not communicated to spring contacts. In addition, assembly of the parts making up the new switch is facilitated, it being possible to stack the various parts.

What is claimed is:

1. A rotary switch comprising a flat plate of insulation having a rotor aperture therethrough, a plurality of stationary contacts disposed on said insulating plate in a circular pattern around said aperture, said stationary contacts having active contact portions extending radially toward the aperture and being spaced at predetermined angular distances, means for maintaining the active contact portions of the stationary contacts in offset relation with respect to the insulating plate, a rotor construction disposed in said aperture, the stationary contacts having the active portions tapered to a knife edge at the innermost parts nearest the rotor, said rotor construction including superposed rotor contact members of similar construction, each member having radially extending jaws, said two rotor contact members being oriented to form cooperating jaw pairs and the contact jaws being curled so that the radial edges of each jaw are bent away from the cooperating jaw, and means for mounting all of said contacts so that all active portions of the stationary contacts are symmetrically disposed with respect to the two rotor contact members so that the stationary contacts may have the active portions thereof gripped between a pair of rotor contact jaws.

2. The construction according to claim 1 wherein the two contact members in the rotor and the stationary contact members have different effective lengths radially from the center of the rotor to obtain selective switching as the rotor is turned.

3. A rotary switch comprising a flat insulating plate having a rotor aperture therethrough and having at least one series of stator contact mounting apertures disposed symmetrically around said rotor aperture, a plurality of stator contacts attached to said insulating

plate at said stator apertures, said stator contacts lying against the insulating plate and having laterally offset active contact blades extending radially toward the rotor aperture, a rotor construction including a disc in said rotor aperture, said rotor construction comprising two similar superposed metal contact members, each rotor contact member having radially extending spring jaws, said two rotor members being oriented so that cooperating jaw pairs are provided, the rotor contact jaws being curled so that the sides of a jaw extend away from the cooperating jaw whereby the stationary contact can readily enter a pair of cooperating rotor jaws, said rotor being adapted to be turned through various switch positions so that said rotor contact members cooperate on opposite sides of a stator contact blade, said rotor members being adapted to have different radial dimensions around the rotor center, said stator contacts including at least one multiple contact having a plurality of angularly spaced contact blades, said multiple contact having fingers extending through the mounting apertures in the insulating plate for retaining the same in position.

4. The construction according to claim 3 wherein the stator contacts have the contact blades tapering radially, the innermost portion of the blade being the thinnest.

5. A rotary switch comprising a flat plate of insulation having a rotor aperture therethrough, a plurality of stationary contacts disposed on said insulating plate in a circular pattern around said aperture, said stationary contacts having active contact portions extending radially toward the aperture and being spaced at predetermined angular distances, a rotor construction disposed in said aperture, said rotor construction including superposed rotor contact members of similar construction, each member having radially extending jaws, said two rotor contact members being oriented to form cooperating jaw pairs, and means for mounting all of said contacts so that all active portions of the stationary contacts are symmetrically disposed with respect to the two rotor contact members so that the stationary contacts may have the active portions thereof gripped between a pair of rotor contact jaws, a stationary contact including a member having a substantial angular extent, said member having a plurality of angularly spaced active contact portions.

References Cited in the file of this patent

UNITED STATES PATENTS

2,139,561	Petersen	Dec. 6, 1938
2,440,578	Dietrich	Apr. 27, 1948

FOREIGN PATENTS

498,652	Belgium	Oct. 31, 1950
594,177	Great Britain	Nov. 5, 1947
1,033,998	France	Apr. 8, 1953