

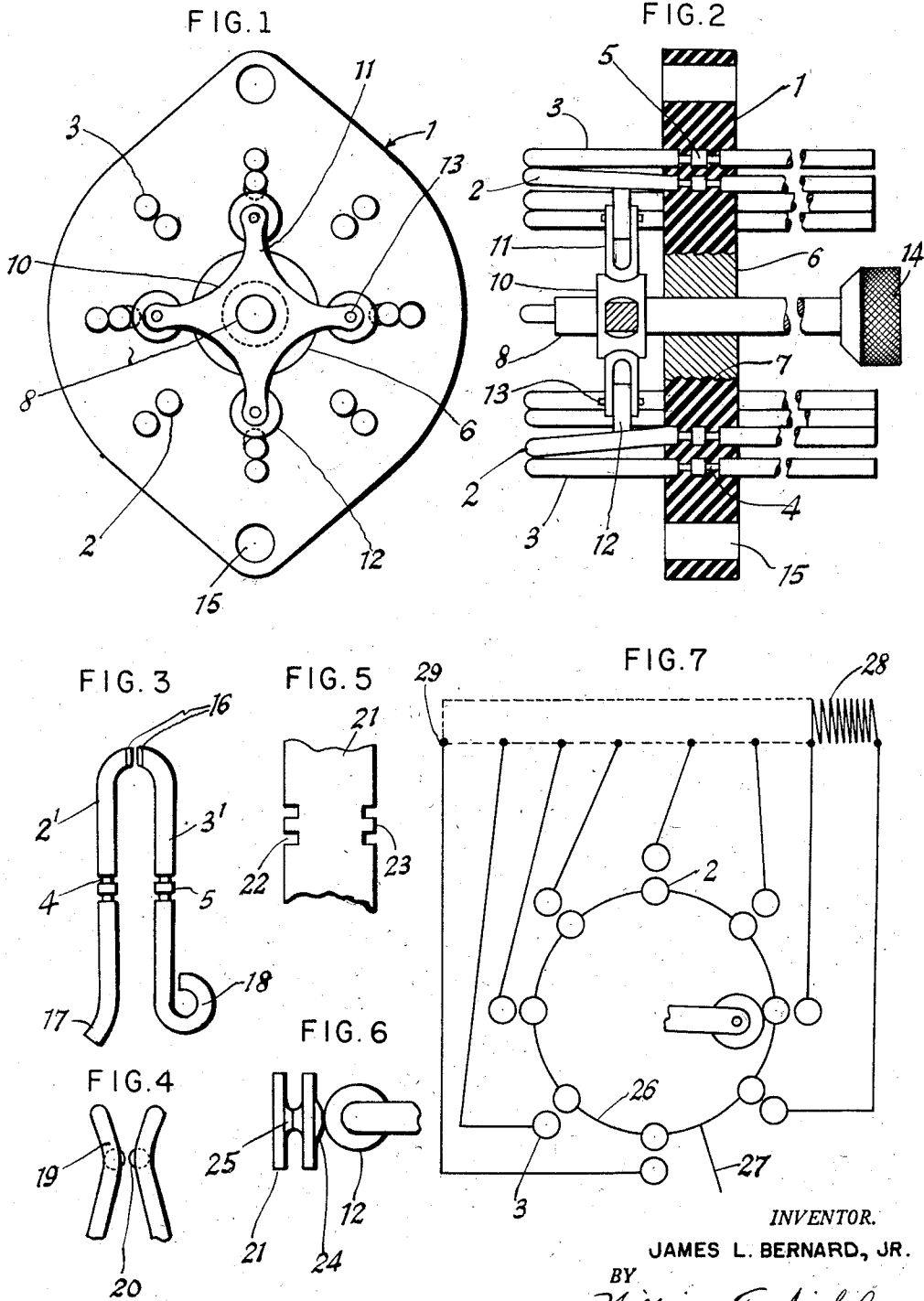
Aug. 12, 1958

J. L. BERNARD, JR

2,847,522

ELECTRIC SWITCHES

Filed July 27, 1955



INVENTOR.

JAMES L. BERNARD, JR.

BY

William F. Nickel
ATTORNEY

2,847,522

ELECTRIC SWITCHES

James L. Bernard, Jr., Eatontown, N. J.

Application July 27, 1955, Serial No. 524,653

1 Claim. (Cl. 200—6)

My invention is an improvement in electric switches; especially switches for completing a number of electric circuits or opening and closing parts thereof.

An important object of this invention is to provide a switch having a wide range of utility for various kinds of electrical apparatus in radio and other fields where multiple circuits are to be controlled, and which is simple and durable in construction and capable of efficient use.

Another object is to provide a switch comprising an insulating support bearing a desired number of electrodes or contact-making elements firmly embedded in or otherwise secured to the support, but flexibly mounted; in combination with a rotary member which is disposed so as to bring about engagements of said elements when one or more circuits are to be established.

A further object is to provide a switch comprising contact making elements or electrodes arranged in concentric circular rows, and grouped in pairs, one element of each pair being adapted to be moved into contact with the other; being actuated by a rotary member at the center of said rows.

These and other objects and the advantages of my invention are fully described in the ensuing description and the novel features are pointed out in the appended claim. The drawings illustrate several embodiments of my improvement; but variations in numerous details may be adopted without really altering or omitting any of the essential characteristics.

On said drawings:

Figure 1 is a front elevation of a switch according to my invention.

Figure 2 is a section on line 1—1 in Figure 2.

Figures 3, 4, 5 and 6 show details of parts of modifications; and

Figure 7 is a diagrammatic view of a switch of my invention connected in one type of circuit, as an example of the mode of using the switch.

The switch comprises a body or support 1 in or on which are mounted an inner circle of contact elements 2 and an outer circle of similar conductor elements 3. The support or base member 1 has the form of a plate, made of suitable insulating material and the elements 2 and 3 are metal pins, rods or blades that project from both faces of the member. Within the member 1, the elements 2 and 3 each have two adjacent grooves 4 extending all around these elements, and between each pair of grooves on the elements 2 and 3 is an annular projection or collar 5. The grooves and collar can be omitted and the elements 2 and 3 can be knurled on portions embedded in the support to mount them securely. The elements 2 and 3 are firmly secured to the member 1 by first setting up the elements in position, and then casting or molding the insulating material about them, so that the grooves 4 and lateral projections 5 are completely enveloped. The elements 2 and 3 then cannot be loosened or detached. The grooves 4 and collar 5 are located at such points that the elements 2 and 3 each project from the face of the body 1 the necessary distance. The contact elements are metal,

2

such as tempered spring silver, beryllium copper, Phosphor bronze, "brush" or spring copper, iridium, or alloys of metals capable of fulfilling the mechanical and electrical requirements involved. One element 2 of each pair is flexible and the other element is relatively fixed and rigid.

At the center of the member 1 is a circular bearing ring 6 with a central bore through it. This ring is also embedded as an insert in or otherwise attached to the insulation member, and may have a knurled outer surface 7 to secure it permanently in the body 1 if the latter is moulded.

The rings of elements 2 and 3 and the bearing 6 are concentric and each inner element 2 is in radial alignment with an outer element 3. The wires of different circuits, or different parts of one circuit are joined to each pair of elements 2 and 3, and when the elements of a pair are forced into contact with each other, as by bending an element 2 against its associated element 3, a circuit connection results. The ends of the elements on one face of the member 1 may be rounded and the external connecting wires are attached to the opposite ends forming the terminals of the circuits to be controlled. The ends shown rounded may of course be otherwise shaped.

The operating member of the switch is rotatable and is carried by a shaft 8. This shaft turns in the bore of the bearing ring 6. On the shaft is a hub 10 carrying fixed arms 11 and on each arm is a round roller 12 mounted on pins 13 in the ends of said arms. One extremity of the shaft has a knob 14 thereon, and the body 1 has openings 15 for screws to enable it to be affixed to a panel in a convenient location. The rollers 12 push the rounded ends of the elements 2 against the elements 3, and the arms 11 and elongated elements 2 and 3 are so arranged and spaced about the center of the body 1 and axis of the shaft 8, for example, that when one roller 12 forces an element 2 to engage its associated contact 3 in radial alignment therewith, the other rollers 12 will have a similar effect each on another pair of elements 2 and 3. Thus a number of circuits can be closed simultaneously. Each of the rollers 12 however, will thus actuate only one pair of elements at a time, the pairs of elements 2 and 3 at each side of the pair engaged continuing to be spaced apart. The number of rollers and elements 2 and 3 may of course be varied according to requirements; and the actuating member can be altered, omitting rollers and substituting fixed cam projections of such shape as may be desired or needed.

The rollers and elements 2 and 3 can of course be so arranged that each roller will force more than one element 2 against its adjacent element 3 and the rollers can be spaced so that they will act successively and not simultaneously, in any desired sequence on the element 2.

As indicated in Figure 3 the extremities of the electrode elements or poles 2' and 3' of the switch adjacent the rotary member may be bent towards each other and tipped with silver 16, and the opposite terminal ends on the other face of the support 1 can be bent or looped, as shown at 17 or 18 for fastening terminal connecting wires thereto. The ends of each pair of elements 2'' and 3'' adjacent the actuating member can also be bent away from each other, as shown in Figure 4, so as to present elbows or corners 19, equipped with contact balls 20 that are disposed to engage each other when one of said elements is bent towards the other. The contact elements 2 and 3 may also have the form of flat bars or blades 21 with notches 22 and projections 23 in their opposite side edges to be embedded in the insulator support 1. See Figures 5 and 6. The actuating member rotatable about the axis of the switch will force the bars

or blades into engagement in the same way by means of one or more rollers 12. The blades 21 will be mounted as before in concentric circular rings, presenting their wide faces to the hub rollers 12. The blades of the inner ring have projections 24 over which the rollers pass, and the opposing faces of each pair of associated bars have projecting contact points or knobs 25. Also the blades can be attached to the support by riveting, as in the case of a construction using ceramic insulation.

Figure 7 presents an example to show one way of connecting and using the switch of this invention. The electrodes or poles 2 of the inner ring are all joined by a conductor 26, which is united to one side of a circuit by a conductor 27. The poles 3 of the outer ring are connected to successive points or taps in the length of a coil 28, one end of which is joined by a conductor 29 to the opposite side of said circuit. The actuator member is of such construction that it will cause only one pair of electrodes 2 and 3 to engage when it is turned. Thus the coil can be by-passed altogether, or successive sections can be included, bringing more and more of the coil into the circuit till all the turns thereof are inserted.

Many other ways of employing the switch can be adapted and it will be seen that the above described switch is fully capable of serving all the purposes for which it is designed.

The poles 2 and 3 will be long, thin and flexible and elastic enough to bend easily and return to original positions. The rollers 12 can be of insulating or non-insulating material.

Having described my invention, what I believe to be new is:

A switch comprising a support of insulating material, a metal bearing ring embedded centrally in said support, a shaft rotatably mounted in said ring, an actuating member on said shaft adjacent one face of said support, elongated conductor elements mounted in said support and having notches and projections on portions that are embedded in said support, said elements projecting from said support at both their ends, and being parallel to said shaft, and all extending outward at substantially the same distance from said face of the support said elements being arranged in circular rows concentric with said shaft and adjacent said member, one element in each row being adjacent an element in the other row, said elements being flexible and elastic, said member when operated causing said adjacent elements in each row to assume contact-making positions, all said adjacent elements being in radial alinement with respect to said axis.

References Cited in the file of this patent

UNITED STATES PATENTS

1,254,331	LeBlanc	Jan. 22, 1918
1,969,974	Erickson	Aug. 14, 1934
2,121,607	McIlvaine	June 21, 1938
2,284,816	Harrington et al.	June 2, 1942
2,339,434	Stehlik	Jan. 18, 1944
2,444,198	Hasselhorn	June 29, 1948
2,587,458	Fritts	Feb. 26, 1952
2,591,684	Deakin	Apr. 8, 1952

FOREIGN PATENTS

734,173	Germany	Apr. 9, 1943
955,181	France	June 27, 1949