Dec. 15, 1936. A. W. FRANKLIN 2,064,157

SWITCH CONSTRUCTION

Filed March 4, 1935

Fig. 1

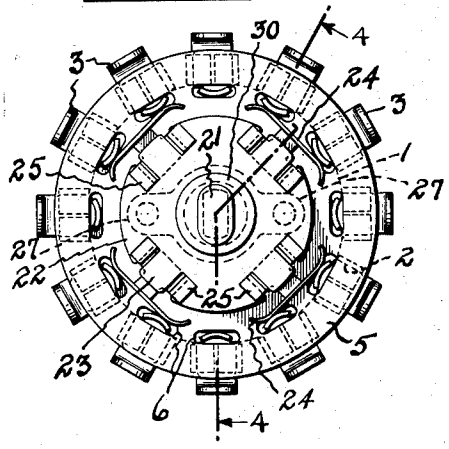


Fig. 2

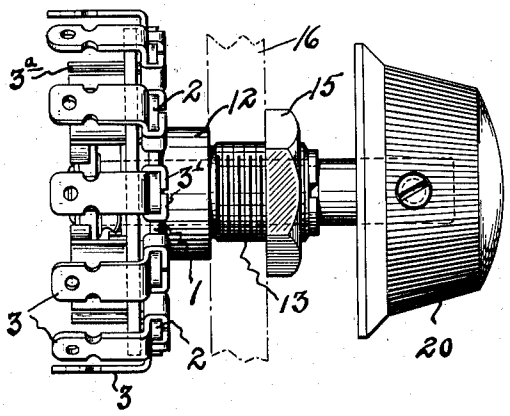


Fig. 3

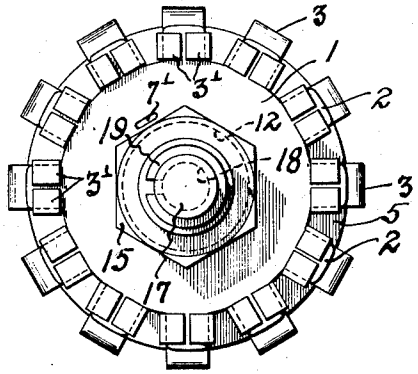


Fig. 4

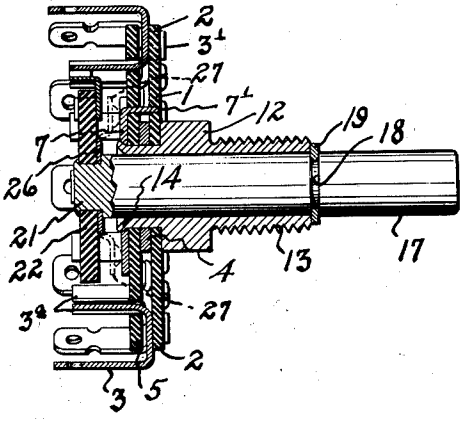


Fig. 5

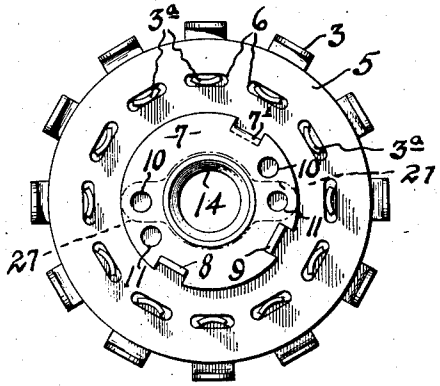
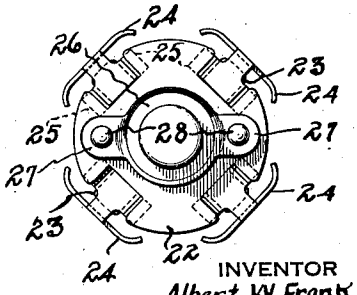


Fig. 6



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SWITCH CONSTRUCTION

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Application March 4, 1935, Serial No. 9,231

11 Claims. (Cl. 200—11)

This invention relates to improvements in electric switch construction.

One of the objects of this invention is to provide an improved form of multiposition electric switch employing a large number of terminals and contacts in exceedingly compact form.

A further object of this invention is to provide a multicontact switch structure employing a relatively large number of contacts which may be easily assembled into a compact, rugged structure at the expense of a minimum amount of time and equipment.

A more specific object of this invention is to provide a so-called "all wave" switch of compact construction of the type now commonly used for adapting radio receivers for operation on several wave length bands.

A still further object of this invention is to provide in such structures a supporting plate for a plurality of combined terminal and contact members which are merely attached thereto by sliding them radially onto projections formed on a support, and then locking them in place by means of a locking plate having apertures engaging the contact portions of the terminals, and holding them against outward radial movement.

A still further object of the invention is to provide, in combination with such a structure, a rotor having a plurality of contact members mounted thereon by sliding them radially onto projections on the rotor and then mounting the rotor with respect to the supporting plate so that the contacts on the rotor are held thereon by the contact portions of the terminals.

A still further object of the invention is to provide, in a switch of this type, an accurate indexing and positioning means which also acts to resiliently hold the rotor when positioned.

These and many other objects, as will appear from the following detailed description, are secured by means of this invention.

This invention resides substantially in the combination, construction, arrangement, and relative location of parts, all as will be fully set forth below.

Referring to the drawing—

Figure 1 is a rear elevational view of a switch structure in accordance with this invention;

Fig. 2 is a side elevational view thereof;

Fig. 3 is a front elevational view of the switch with the operating knob removed;

Fig. 4 is a cross sectional view, taken on the line 4—4 of Fig. 1;

Fig. 5 is a rear elevation view of the switch with the rotor and shaft removed; and

Fig. 6 is a rear elevational view of the rotor.

The switch illustrated in the drawing is of a construction which particularly adapts it for use in so-called "all wave" radio receivers. It will be apparent to those skilled in the art as the description proceeds that the features of construction which comprise the invention may be embodied in other switches for all kinds of use. It will also be apparent that the structure nicely adapts itself for use in so-called "gang" switches where a plurality of separate units are mounted upon the same operating shaft. It will also be noted that the switch illustrated is of the single pole type which is mounted on a panel or other suitable support in a single opening and locked in place with a single nut.

As illustrated, the switch comprises a main support plate 1 constructed of any suitable insulating material. This support plate is provided with a plurality of radial projections or lugs 2, the number depending upon the number of terminals and contacts to be employed. The terminals are illustrated at 3, of general U-shaped outline, as will be apparent from Fig. 4. The inner shorter leg, indicated at 3a in the various figures, forms the contact portion of the terminal, while the longer or outer leg is the portion to which the circuit wires are connected. Formed on the portion of the terminals intermediate the legs are the ears or flaps 3' which have a double bend in them so as to form a rectangular opening. This permits of the mounting of the terminals upon the support plate 1 by sliding them onto the lugs 2 in a radial direction towards the center, as will be clear from the structure illustrated. The terminals may, therefore, be quickly and accurately mounted upon the support plate by simply sliding one on each of the lugs provided.

At 5 is the locking plate or disc, which is likewise constructed of any suitable insulating material, and is provided with a plurality of elongated apertures arranged upon the same radius and spaced at the proper distance so that the contact portion of each terminal on the plate 1 will register with one of the apertures.

The locking plate is slipped down onto the contact portion of the terminals, as is clear for example from Fig. 5, so as to lock the terminals against outward radial movement by registry of the contact portions 3a of the terminals in the apertures 6. Interposed between the support plate 1 and the locking disc 5 is a washer 4 of any suitable material of a thickness equal to the thick-

ness of the flaps or lugs 3' so as to properly space the plate and disc. These parts are mounted upon the reduced portion 14 of a bushing which has an enlarged cylindrical portion 12 intermediate its ends and a reduced threaded portion 13. The threaded portion adapts the device for a single hole mounting on a supporting panel, as illustrated for example at 16, by means of a lock nut 15. The support plate 1, the washer 4, and the locking plate 5 fit snugly onto the reduced portion 14 of the bushing.

At 7 is a metal disc which may properly be termed the "indexing washer". This washer fits next to the locking plate on the reduced portion 14 of the bushing and is provided with an arm 7' bent at right angles thereto which registers with a pair of aligned apertures in the support 1 and the locking disc 5, as is clear from Fig. 4. The aperture in these plates is so positioned as to properly position the indexing washer 7. This indexing washer, as is clear from Fig. 5, is provided with a pair of spaced upstanding ears or legs 8 and 9 and with the pairs of holes or depressions 10 and 11. The end of the reduced portion 14 is beaded, or spun over, so as to lock all of these parts rigidly in place upon the bushing.

At 17 is the operating shaft for the switch which is journaled in the bushing, as is clear from Fig. 4. This shaft is provided with an annular groove 18 properly positioned so that the shaft may be locked in place in the bushing by means of a ring 19 which is snapped into the groove and presses against the end of the threaded portion 13 of the bushing. At 20 is illustrated an operating knob which may be fastened to the shaft by means of a set screw in accordance with common practice.

Upon the reduced end 21 of this shaft is mounted the rotor disc 22, likewise of any suitable insulating material. This disc is provided with pairs of spaced radial slots extending inwardly from the periphery to form the lugs 23 upon which the movable contacts are mounted, see Fig. 6. These contacts comprise the shoe or contacting portions 24 and are mounted on the rotor by sliding them radially inwardly on the lugs 23. They are held in place by means of the ears 25, as is clear from Figs. 1 and 6. These contacts are not locked in place on the rotor, other than by the frictional engagement caused by the bent ears, since, as is clear from Figs. 1 and 4, the rotor fits down within the contact portions 3^a of the fixed terminals, thereby holding the movable contacts against outward radial movement on the rotor.

Interposed between the shoulder formed on the shaft 17, by reason of the reduced portion 21, and the rotor is the indexing spring which comprises a centrally apertured disc portion 26 having a pair of outwardly extending arms 27 in which are formed the small bosses 28. The arms 24 lie in a plane slightly raised above the plane of the disc portion 26, as will be clear from Fig. 4, so that the bosses thereon may resiliently cooperate with the holes 10 and 11 in the indexing washer. These arms also cooperate with the ears 8 and 9 to limit rotation of the rotor. The rotor and indexing spring are locked on the shaft by beading over the end, as is clear from Fig. 4. A washer 30, Fig. 1, is preferably employed against which the beaded end of the shaft presses to protect the rotor against damage.

It will be seen that the ring 19 in the groove 18 locks the shaft and the parts mounted thereon against longitudinal movement in one direction (to the left, Fig. 4), and permits limited longitudinal movement to the right against the resiliency of the arms 27 on the indexing spring.

In the structure shown, the ears 8 and 9 are so positioned that the rotor may only move so that each contact shoe 24 may connect one of the terminals on the support plate 1 with either of the next adjacent terminals on each side thereof. Thus, every third terminal represents a common pole which may be alternately connected to the next adjacent terminals on each side thereof.

It will, of course, be apparent to those skilled in the art that the proportion of the parts may be varied and the number of contacts changed so that every possible circuit combination and contact engagement may be made.

Those skilled in the art will readily appreciate that the features of this invention have a wide application and that they are not therefore limited to use in the specific structure illustrated in the drawing for the purpose of disclosing the invention. I do not, therefore, desire to be strictly limited to the disclosure, as given for purposes of illustration, but rather to the scope of the appended claims.

What I claim as new and useful and of my own invention is:

1. A switch as described comprising a support plate having radial lugs on the periphery, a plurality of contacts mounted on said lugs, one for each, an apertured locking plate engaging said contacts to lock them against outward radial movement, a rotor journaled on said plate having contacts thereon for engagement with said terminals, and indexing means for limiting movement of the rotor in either direction.

2. A switch as described comprising a support plate having radial lugs on the periphery, a plurality of contacts mounted on said lugs, one for each, an apertured locking plate engaging said contacts to lock them against outward radial movement, a rotor journaled on said plate having contacts thereon for engagement with said terminals, and indexing means for limiting movement of the rotor in either direction, said indexing means comprising a pair of cooperating members one fixed on the support plate and the other on said rotor.

3. A switch of the type described comprising an insulating support having a plurality of terminals mounted thereon, each terminal having a contact portion, an insulating locking plate engaging the contact portions of the terminals for locking them in place, a rotor journaled on said insulating support, and a plurality of contacts mounted on said rotor so as to be engageable with the contact portions of the terminal members, said rotor having a plurality of radial lugs upon which its contacts are mounted.

4. In a switch of the type described, the combination comprising an insulating support, an insulating disc having a plurality of radial lugs on its periphery, a terminal member mounted on each lug, each terminal member having a contact portion extending at right angles to the plane of said disc, a locking disc having a plurality of apertures through which the contact portion of each terminal member extends whereby the terminal members are locked against outward radial movement upon said disc, and a rotor journaled on said disc having a plurality of contacts mounted thereon for cooperation with the contact portions of the terminal members.

5. In a switch of the type described, the combination comprising an insulating support, an insulating disc having a plurality of radial lugs on its periphery, a terminal member mounted on each lug, each terminal member having a contact portion extending at right angles to the plane of said disc, a locking disc having a plurality of apertures through which the contact portion of each terminal member extends whereby the terminal members are locked against outward radial movement upon said disc, a rotor journaled on said disc having a plurality of contacts mounted thereon for cooperation with the contact portions of the terminal members, an indexing washer mounted on said disc, and an indexing spring mounted on said rotor, said washer and spring cooperating to limit the movement of the rotor in either direction and to accurately position it at the limit of its movement in either direction.

6. In a switch structure as described, the combination comprising an insulating plate having a plurality of lugs at its periphery, a terminal member mounted on each lug, each terminal member having a contact portion extending at right angles to said disc, a bushing member mounted on said disc, a shaft journaled in said bushing member, a locking disc mounted on said bushing and engaging the terminal members to hold them against outward radial movement, and a rotor mounted on said shaft and lying within the contact portions of the terminal members and a plurality of contacts mounted on the rotor and engageable with the contact portions of the terminal members.

7. In a switch structure as described, the combination comprising an insulating plate having a plurality of lugs at its periphery, a terminal member mounted on each lug, each terminal member having a contact portion extending at right angles to said disc, a bushing member mounted on said disc, a shaft journaled in said bushing member, a locking disc mounted on said bushing and engaging the terminal members to hold them against outward radial movement, a rotor mounted on said shaft and lying within the contact portions of the terminal members and a plurality of contacts mounted on the rotor and engageable with the contact portions of the terminal members, said rotor comprising a disc of insulating material having lugs on its periphery upon which the rotor contacts are mounted.

8. In a switch of the type described, the combination comprising a disc of insulating material having a plurality of radially extending lugs distributed around its periphery, a substantially U-shaped terminal member mounted on each lug by means of a pair of double bent ears forming a passage in which the lugs lie, the legs of the U-shaped terminal members extending at right angles to the plane of said disc, an apertured locking plate engaging one arm of each terminal member to lock the terminal members of said disc, and a rotor journaled on said disc having a plurality of contacts thereon for cooperating with the contact portions of the terminal members.

9. In a switch of the type described, the combination comprising a disc of insulating material having a plurality of radially extending lugs distributed around its periphery, a substantially U-shaped terminal member mounted on each lug by means of a pair of double bent ears forming a passage in which the lugs lie, the legs of the U-shaped terminal members extending at right angles to the plane of said disc, an apertured locking plate engaging one arm of each terminal member to lock the terminal members of said disc, a bushing mounted on said disc, a shaft journaled in said bushing, a rotor secured to said shaft, and a plurality of contacts mounted on said rotor for cooperation with the contact portions of the terminal members.

10. In a switch of the type described, the combination comprising a disc of insulating material having a plurality of radially extending lugs distributed around its periphery, a substantially U-shaped terminal member mounted on each lug by means of a pair of double bent ears forming a passage in which the lugs lie, the legs of the U-shaped terminal members extending at right angles to the plane of said disc, an apertured locking plate engaging one arm of each terminal member to lock the terminal members of said disc, a bushing mounted on said disc, a shaft journaled in said bushing, a rotor secured to said shaft, and a plurality of contacts mounted on said rotor for cooperation with the contact portions of the terminal members, said rotor having radial lugs upon which the contacts are mounted by inward sliding movement.

11. In a switch of the type described, the combination comprising a disc of insulating material having a plurality of radially extending lugs distributed around its periphery, a substantially U-shaped terminal member mounted on each lug by means of a pair of double bent ears forming a passage in which the lugs lie, the legs of the U-shaped terminal members extending at right angles to the plane of said disc, an apertured locking plate engaging one arm of each terminal member to lock the terminal members of said disc, a bushing mounted on said disc, a shaft journaled in said bushing, a rotor secured to said shaft, a plurality of contacts mounted on said rotor for cooperation with the contact portions of the terminal members, an indexing washer mounted on said bushing, and an indexing spring mounted on said shaft for cooperating with the indexing washer to position and index the rotor.

ALBERT W. FRANKLIN.