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J. O. ROESER

2,801,310

MAKE BEFORE BREAK SWITCH

Original Filed July 12, 1952

Fig. 1

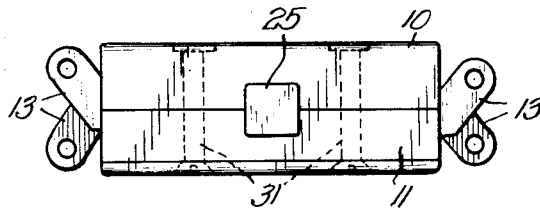


Fig. 2

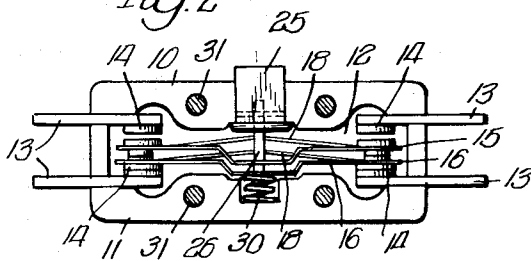


Fig. 3

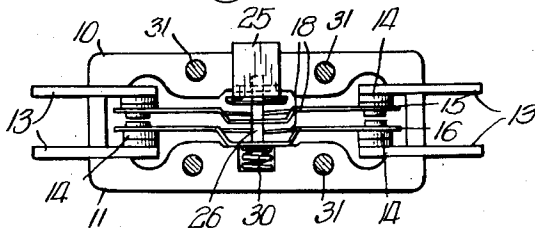


Fig. 4

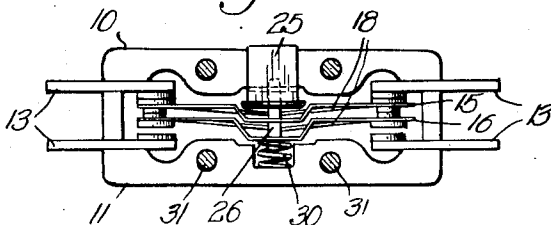


Fig. 5

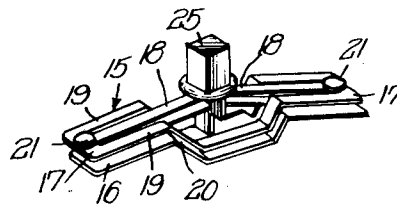


Fig. 6

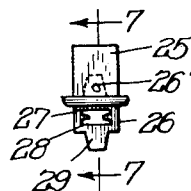
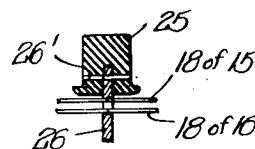


Fig. 7



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2,801,310

MAKE BEFORE BREAK SWITCH

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Original application July 12, 1952, Serial No. 298,607, now Patent No. 2,750,463, dated June 12, 1956. Divided and this application September 13, 1955, Serial No. 533,950

4 Claims. (Cl. 200—67)

This application is a division of my co-pending application, Serial No. 298,607, filed July 12, 1952, now Patent No. 2,750,463, granted June 12, 1956.

It is a main object of the invention to provide a snap action single pole double throw electric switch which makes contact with the normally open contacts before breaking contact with the normally closed contacts as the switch is operated, and to make contact with the normally closed contacts before breaking contact with the normally open contacts as the switch returns to normal position.

Another object of the invention is to provide a snap action make before break single pole double throw switch contact of relatively few parts, thereby facilitating assembly and permitting economic manufacture.

Further objects of the invention not specifically mentioned here will be apparent from the detailed description and claims which follow, reference being had to the accompanying drawings in which a preferred embodiment of the invention is shown by way of example and in which:

Fig. 1 is a plan view of a switch embodying the invention;

Fig. 2 is an elevational view of the switch with the front half of the housing removed and showing the mechanism in normal position;

Fig. 3 is a view similar to Fig. 2, showing the switch mechanism at the end of the first stage of its operation;

Fig. 4 is a view similar to Fig. 2, showing the switch fully operated;

Fig. 5 is a perspective view of the spring plates and actuator;

Fig. 6 is an elevational view of the actuator; and

Fig. 7 is a cross sectional view through the actuator, taken along the line 7—7 of Fig. 6, looking in the direction of the arrows and with the spring tongues engaged therewith.

The switch of the present invention incorporates in a snap action switch a make before break arrangement through which contact with the normally open contacts is made before the normally closed contacts are opened as the switch is operated, and the action is reversed as the switch restores to normal.

The embodiment of the invention shown by way of example consists of housing members 10 and 11 composed of an insulating material and fitted together to enclose cavity 12 in which the switch mechanism is positioned. Terminals 13 lead into the cavity at the ends of the housing members and carry at their inner ends contacts 14 which are arranged in pairs, with the contacts of each pair in spaced apart confronting position. Located within the cavity and extending substantially from end-to-end thereof are spring plates 15 and 16, each of which contain a bight portion 17 at each of its ends, centrally located tongue portions 18, and side arms 19 which at their medial portions are offset, as shown at 20, to abut together the ends of the tongues 18 thereby to bias the spring plate. Contacts 21 are fixed to the bight portion 17 of each of the springs.

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Extending through an opening in the housing members is a plunger 25 composed of an insulating material, and projecting from the bottom of this plunger is a metallic stem 26 secured in the plunger by a pin 26' and containing a slot 27 into which the tongues 18 of the spring plate 15 project and abut, and a second slot 28 into which the tongues 18 of the spring plate 16 project and abut. Projecting from the lower end of the stem 26 is an ear 29 which projects into a spring 30 that is disposed in a socket in the housing members.

The slots 27 and 28 are positioned so that when the switch is in normal position as shown in Fig. 2, the abutting ends of tongues 18 on plate 15 are slightly nearer a plane through the bights 17 of that plate than the ends of tongues 18 on the plate 16 to a plane through the bights of plate 16. This results in a slightly greater bias downwardly on plate 16 than on plate 15.

To operate the switch, pressure is applied to the actuator 25 to move it inwardly of the housing against the tension of spring 30 and the spring tongues 18. Since the tongue 18 of the switch plate 15 is nearer the plane through the bight portions 17 of that switch plate, the switch plate 15 will overcenter before the switch plate 16 overcenters. The elements then assume the position shown in Fig. 3, switch plate 15 having snapped upwardly to engage the contacts 21 thereon with the contacts 14 on the upper terminals 13. The tongue 18 of the switch plate 16 has not yet overcentered; therefore, the switch plate 16 maintains contact with the lower contacts 14.

Continued movement of the plunger 25 inwardly of the housing increases the overcenter bias of the tongues 18 on the switch plate 15 and moves the tongues 18 on the switch plate 16 through center, with the result that the switch plate 16 snaps upwardly away from the lower contacts 14 and into engagement with the contacts 21 on the switch plate 15. Thus it will be seen that as the switch is operated, make before break action results.

When the pressure on the actuator 15 is released, the action is reversed. Since the tongues 18 on the switch plate 16 do not overcenter until near the end of the inward movement of the actuator, the overcenter bias of the switch plate 16 is now less than that of the switch plate 15. As the spring 30 moves the actuator towards normal, the tongues of switch plate 16 overcenter first, causing that plate to snap back into the position in which it is shown in Figs. 2 and 3. Further movement of the actuator moves the tongues of switch plates 15 overcenter and that switch plate snaps back into the position shown in Fig. 2. Thus it will be seen that make before break action is achieved as the switch restores to normal.

The switch of the present invention embodies a minimum of parts, can be easily assembled, and economically manufactured.

While I have chosen to illustrate my invention by showing and describing a preferred embodiment of it, I have done so by way of example only, as there are many modifications and adaptations which can be made by one skilled in the art within the teachings of the invention.

Having thus complied with the statutes and shown and described a preferred embodiment of my invention, what I consider new and desire to have protected by Letters Patent is pointed out in the appended claims.

What I claim is:

1. In a make before break electric switch of the snap action type in which a pair of spaced apart confronting contacts are positioned at each end of an elongated cavity in a housing; a pair of movable contacts disposed between each pair of fixed contacts; a pair of spring plates in said cavity, each of which carries one of said movable contacts on each of its ends; a pair of tongues on each spring plate extending from the ends into abutment at the centers thereof and upwardly out of the

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planes of the ends to bias the spring plates downwardly, the tongues of the upper spring plate abutting closer to the plane of the upper plate than the tongues of the lower plate abut with respect to the plane of that plate; and plunger means engaging said tongues and movable downwardly to move the tongues overcenter in sequence, thereby to cause the plates to snap upwardly in sequence.

2. In a make before break electric switch of the snap action type in which a pair of spaced apart confronting contacts are positioned at each end of an elongated cavity; a pair of spring plates disposed one above the other; a movable contact fixed on each end of each plate; biasing tongues on each plate extending from the ends thereof into abutment above the center thereof to bias the plates downwardly to hold the movable contacts on the lower plate against the lower ones of said pairs of stationary contacts and to hold the movable contacts on the upper plate against the contacts on the lower plates, said tongues placing a greater bias on the lower plate than on the upper plate; and plunger means engaging said tongues and movable into said cavity to move said tongues downwardly overcenter in sequence, thereby to cause the upper plate to snap its movable contacts into engagement with the upper stationary contacts before the lower plate contacts disengage from the lower stationary contacts.

3. A switch as specified in claim 2, in which movement of the plunger into the cavity to move the lower plate upwardly biases the upper plate upwardly to a greater extent than the lower plate with the result that as the plunger moves in a reverse direction the lower plate snaps into engagement with the lower stationary contacts before

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the upper plate contacts disengage from the upper stationary contacts.

4. A make before break electric switch of the snap action type comprising: a housing composed of insulating material and containing an elongated cavity; two pairs of terminals projecting through said housing into the cavity, one pair at each end of the cavity; stationary contacts on said terminals, the contacts of each pair being in spaced apart confronting relation to each other; a pair of spring plates in the cavity disposed one above the other and extending lengthwise in the cavity; movable contacts on each end of each spring plate; a pair of tongues on each spring plate abutting together on the transverse median line of the plate to bias the plate to maintain said movable contacts in engagement with the lower ones of said stationary contacts, the bias on the upper one of said plates being less than the bias on the lower plate; a plunger extending through a wall of said housing into said cavity; a stem fixed on said plunger and having slots in which the abutting ends of said tongues are positioned, said plunger being movable into the cavity to move the tongues of the upper plate overcenter to cause the upper plate to snap its contacts into engagement with the upper ones of said stationary contacts while the lower plate contacts remain engaged with the lower stationary contacts.

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