Oct. 20, 1959 A. J. COLAUTTI 2,909,624

CIRCUIT CONTROLLER

Filed July 3, 1957 2 Sheets-Sheet 1

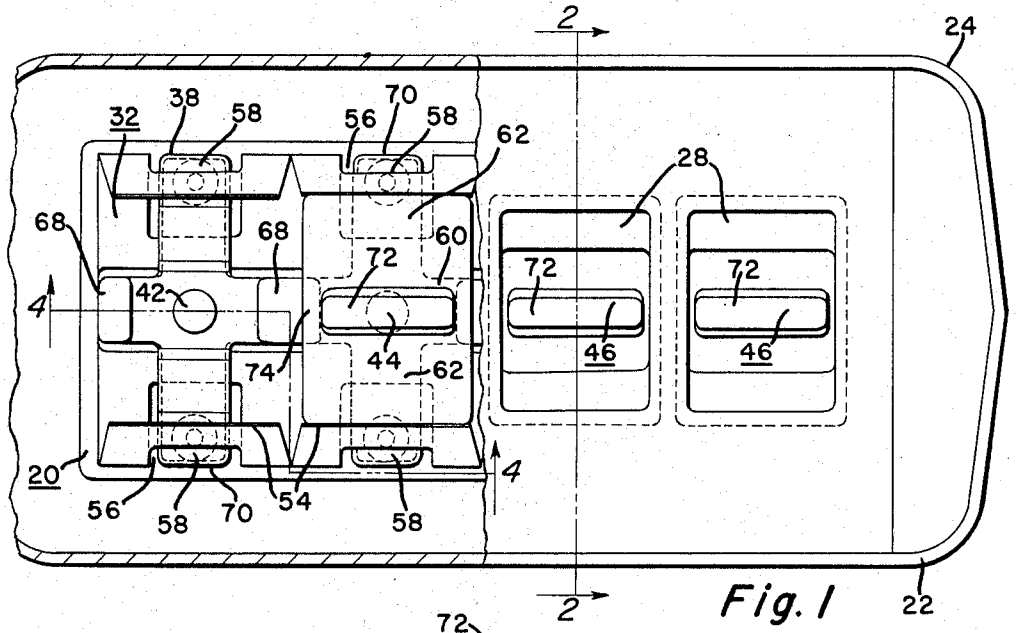


Fig. 1

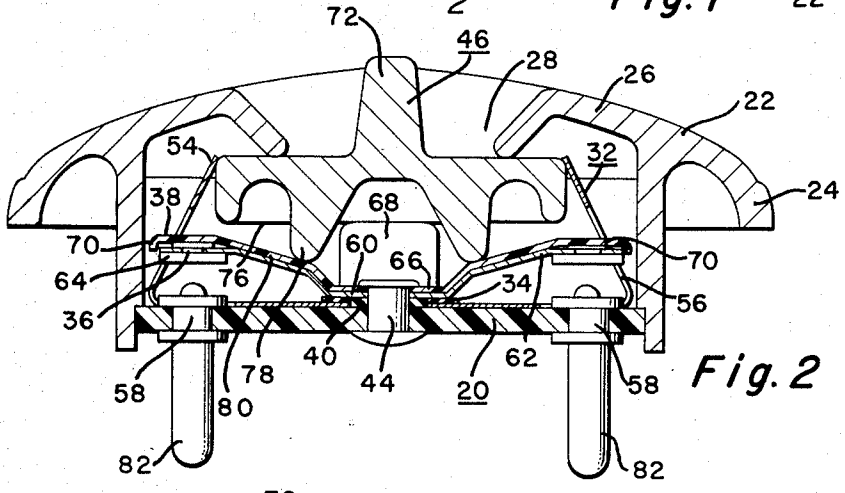


Fig. 2

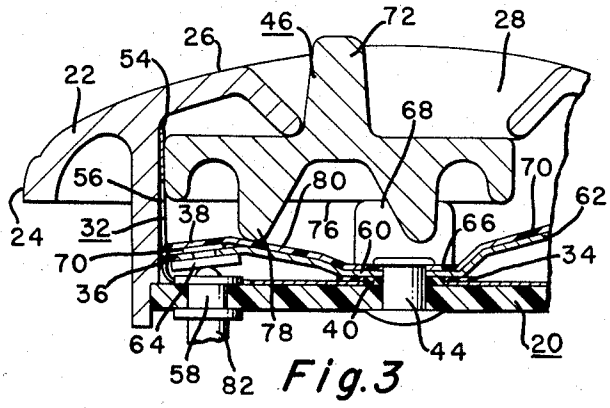


Fig. 3

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CIRCUIT CONTROLLER

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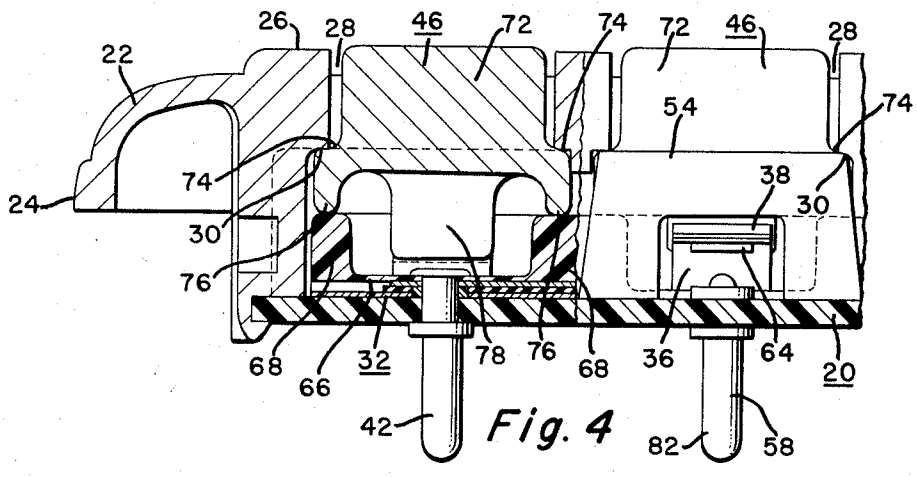


Fig. 4

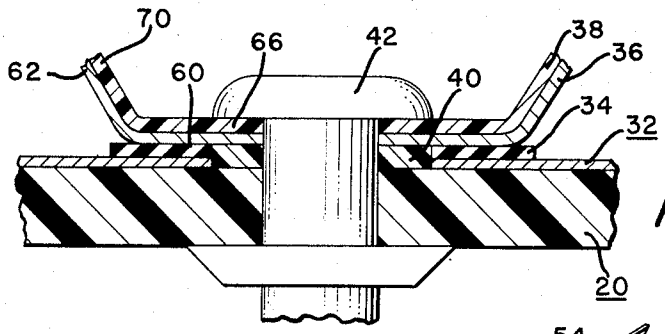


Fig. 5

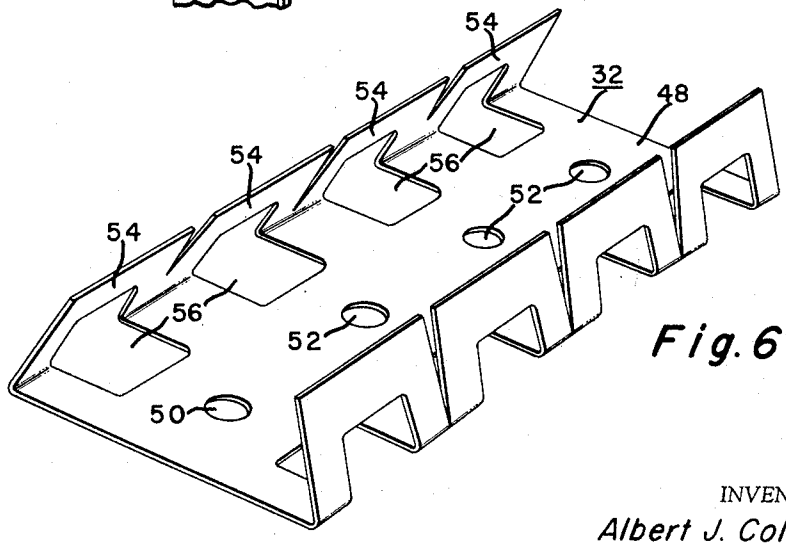


Fig. 6

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CIRCUIT CONTROLLER

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7 Claims. (Cl. 200—6)

This invention relates to electric switches and is more particularly concerned with a switch structure wherein a plurality of actuators are maintained in a neutral position by a single spring member.

It is an object of the present invention to provide an improved simplified switch structure wherein a single spring and a single contact actuator will maintain an actuator in a neutral position.

A further object of the present invention is to provide a switch structure wherein a plurality of slidable actuators are maintained in position in a switch housing by a single spring and single contact actuator.

Another object of the present invention is to provide a switch structure wherein a plurality of switch actuators which are slidable in parallel spaced recesses in the switch housing are constantly urged to a neutral position in the housing by a single spring and a single contact actuating member.

A still further object of the present invention is to provide a circuit controller structure wherein a plurality of separate switch elements each disposed side by side in a row in a unitary housing, each have an individual switch actuator that extends through an opening in the housing and is slidably maintained in a neutral position in the housing by a unitary spring member and a unitary member which carries all of the movable contacts of the switch and wherein the spring and contact carrying members are both secured to a unitary switch base to prevent the switch parts from rattling.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred form of the invention is clearly shown.

In the drawings:

Figure 1 shows a top plan view of the switch according to the present invention with a portion of the switch housing broken away to show the arrangement of the internal parts of the switch.

Figure 2 is a cross-sectional view taken along line 2—2 in Figure 1.

Figure 3 is a view showing a major portion of the switch parts in Figure 2 in a contact closing position.

Figure 4 is a cross-sectional view taken along line 4—4 in Figure 1.

Figure 5 is an enlarged cross-sectional view showing the securement of the switch parts by a common terminal.

Figure 6 is a perspective view of the spring member which constantly urges all of the switch parts to a neutral position.

In the drawings the numeral 20 designates an insulating base to which a housing or escutcheon 22 is attached. The housing 22 has a mounting flange 24 and openings 28 which are arranged in parallel and spaced in a row in the top surface 26 of the housing. Disposed along the two parallel sides of each of the openings 28 are runners 30 which are formed of the material of the housing 22 and located as shown.

In Figure 5 of the drawings, a spring member 32, an

insulator 34, a movable contact support blade 36 and a nylon shoe insulator 38 together with an insulating washer 40 are shown as secured to the base 20 by a common terminal member 42. These members are also secured at other points to the base by rivets 44 as shown in Figures 1–3.

The spring member 32 is most clearly seen in Fig. 6 of the drawings. This spring member is formed of a single strip of spring metal and will constantly urge the switch actuators or buttons 46 to a neutral position in openings 28 as will become hereinafter apparent. The spring member 32 has a mid-portion 48 secured to the base 20 by the common terminal member 42 which extends through opening 50 and the rivets 44 which extend through the openings 52. Disposed along the edges of the midportion 48 are the spaced extending arms 54. These arms are bent relative to the midportion 48 to constantly engage the buttons 46 as shown in Figure 2. Extending between a portion of each of the arms 54 and the midportion 48 are notches 56. The portion of the notch 56 which is disposed in the midportion 48 is sized to provide clearance between the spring member 32 and the stationary contacts 58. The stationary contacts 58 are secured in spaced relation to one another on the base 20 and are located relative to the buttons 46 as shown in Figure 1. Each of the buttons 46 has a pair of spaced stationary contacts associated therewith.

The spring member 32 is insulated from the terminal 42 and the contact support blade 36 by insulating washer 40 and insulator 34. The contact support blade 36 is also formed of a unitary strip of metal to have a central portion 60 from which the blade arms 62 extend. The central portion 60 is provided with suitable openings to permit its securement to the base by the common terminal 42 and rivets 44. The blade arms 62 are arranged to extend into notches 56 and each have a movable contact 64 secured thereto which is arranged to engage one of the stationary contacts of the switch when the arms 62 are pressed downwardly from the position shown in Fig. 2 to the position shown in Figure 3.

The shoe insulator 38 is also provided with a central portion 66 which is secured by the common terminal 42 and rivets 44 to the base 20. Extending upwardly from the central portion 66 are lugs 68 which are located as shown in Figures 1 and 4 and sized to provide a predetermined distance between the top surface of the lugs 68 and bottom surface of the runners 30. Branching outwardly from the central portion 66 and arranged to embrace the top surface of each of the blade arms 62 of the contact support blade 36 are arm portions 70 most clearly shown in Figures 2 and 3. These arm portions 70 will serve to electrically insulate the contact support blade 36 from the buttons 46.

The shape of the actuator buttons 46 is most clearly seen in Figures 2 and 4 of the drawings. Each of the buttons has a handle portion 72 which extends into openings 28. The portion of the actuator disposed within the switch housing adjacent the handle portion 72 is provided with shoulders 74 which will slidingly engage the runners 30. The actuator is also provided with a surface 76 which will slidingly engage the top surface of the lugs 68 to permit a sliding movement of the buttons 46 in the openings 28. Downwardly extending from the bottom surface of the buttons 46 are extending lugs 78 which are in constant engagement with the arm portions 70 of the shoe insulator 38. The shoe insulator 38 is normally urged upwardly into tight engagement with the lugs 78 by the force of the blade arms 62 to maintain the buttons 46 in tight engagement with the runners 30 and thereby prevent rattling of the switch parts.

From the above it is apparent that when any one of the buttons 46 are moved in either direction from the neutral

position as for example moved to the left from the position shown in Fig. 2 to the position shown in Figure 3, one of the lugs **78** will ride upon an inclined surface **80** of one of the arms **70** to force the proper blade arm **62** downwardly until the proper contact **64** engages the proper stationary contact **58** which is associated with the terminal **82** to complete a circuit between the common terminal **42** and one of the terminals **82**. Thus, whenever any one of the buttons **46** are moved in either direction from the neutral position, a circuit will be completed between the common terminal **42** and the terminal **82** toward which the button **46** was moved.

In the preferred embodiment of the invention, the shoe insulator **38** is formed as a molded nylon part. This will provide a good bearing and wear surface for the sliding movement of lug **78** on the arm portions **70**. The arms **54** of the unitary spring member **32** are arranged to engage each one of contact actuators **46** to normally maintain the handles **72** in alignment.

While the forms of the invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In a circuit controller, the combination comprising; a base, more than two stationary contacts carried by the base, a housing carried by the base, at least two contact actuators slidably carried within the housing, a spring formed of a single metal piece having integral arms arranged to engage opposite wall portions of said actuators to urge the actuators to a neutral position, a movable contact support formed of a single metal piece urging the actuators into engagement with the housing and carrying a plurality of pairs of contacts which engage the stationary contacts whenever one of the actuators is moved from the neutral position.

2. In a circuit controller, the combination comprising; a base, a common terminal carried by the base, more than two stationary contacts spaced from each other and from the common terminal on the base, a housing carried by the base, at least two actuators slidably carried on the housing, a spring formed of a single metal piece having integral arms arranged to engage opposite wall portions of said actuators to constantly urge the actuators to a neutral position in the housing, a support carrying a plurality of pairs of movable contacts formed of a unitary sheet metal piece urging each of the actuators into engagement with the housing, said support being secured in electrical contact with the common terminal and arranged to cause engagement between any one of the movable contacts and any one of the stationary contacts whenever one of the actuators is moved in either direction from the neutral position.

3. In a circuit controller, the combination comprising; a base, a housing secured to the base, at least two contact actuators slidably movable in the housing, a spring formed of a single sheet metal part arranged to constantly urge each of the actuators to a neutral position in the housing, more than two stationary contacts carried by the base, a support formed of a unitary sheet metal piece carrying more than two movable contacts and arranged to constantly urge each of the actuators into engagement with the housing, a common terminal member securing the spring and support to the base, and an insulator insulating said support from said spring and insulating said terminal member from said spring.

4. In a circuit controller, the combination comprising; a base, a housing secured to the base, at least two contact actuators slidably movable in the housing, a spring arranged to constantly urge each of the actuators to a neutral position in the housing, more than two spaced stationary contacts carried by the base, a support carrying more than two movable contacts, said support being arranged to constantly urge each of the actuators into engagement with the housing, an insulator member located between the support and actuators for insulating the support from each of the actuators, a common terminal securing the spring, support and insulator member to the base, and a second insulator insulating said support from said spring and insulating said terminal member from said spring.

5. In a circuit controller, the combination comprising; a base formed of insulating material, a housing having at least two parallel recesses therein, an actuator disposed in each of the recesses in the housing, a spring formed of a single metal part engaging opposite wall portions of said actuators and urging each of the actuators to a neutral position in the recesses more than two spaced stationary contacts carried by the base, a sheet metal support carrying more than two movable contacts, said support being arranged to constantly urge each of the actuators into engagement with the housing, an insulator member located between the support and actuators for insulating the support from each of the actuators, and a common terminal securing the spring, support and insulator member to the base.

6. In a circuit controller, the combination comprising; a base of insulating material, a housing secured to the base having at least two spaced parallel recesses and openings therein, an actuator disposed in each of the recesses, and openings, a unitary spring having integral arms engaging opposite wall portions of said actuators and urging each of the actuators to a neutral position in the openings, more than two stationary contacts carried by the base, a support carrying more than two movable contacts, said support being arranged to constantly urge the actuators into engagement with the housing, an insulating means formed of a single piece of insulating material disposed between the support and each of the actuators, and a common terminal securing the insulating means, the support and the spring to the base.

7. In a circuit controller, the combination comprising; a base formed of insulating material, a housing having a plurality of recesses therein, an actuator slidably disposed in each of said recesses, a first unitary sheet metal member having integral arm portions engaging opposite walls of said actuators for urging them to a neutral position in said recesses, a plurality of spaced stationary contacts carried by the base, a second unitary sheet metal member having integral arm portions each carrying an electrical contact that at times engages a respective stationary contact, said arm portions of said second sheet metal member constantly urging said actuators into engagement with the housing, an insulator member located between the arm portions of said second sheet metal member and actuators for insulating the second sheet metal member from the actuators, a common terminal member securing the first sheet metal member, second sheet metal member and insulator member to the base, and a second insulator member insulating said first said metal member from said second said metal member and insulating said common terminal member from said first said metal member.

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