Dec. 27, 1960 B. F. MEYER 2,966,559

CIRCUIT CONTROLLER

Filed June 17, 1957

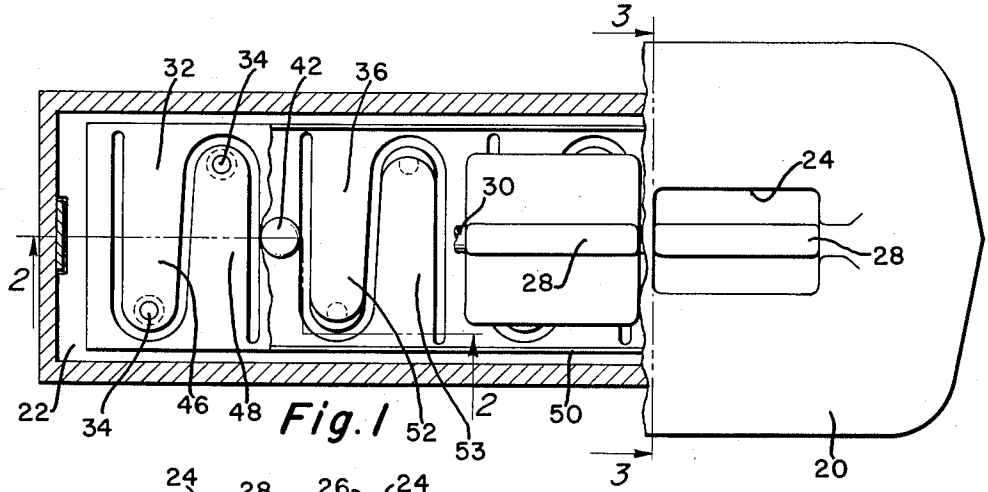


Fig. 1

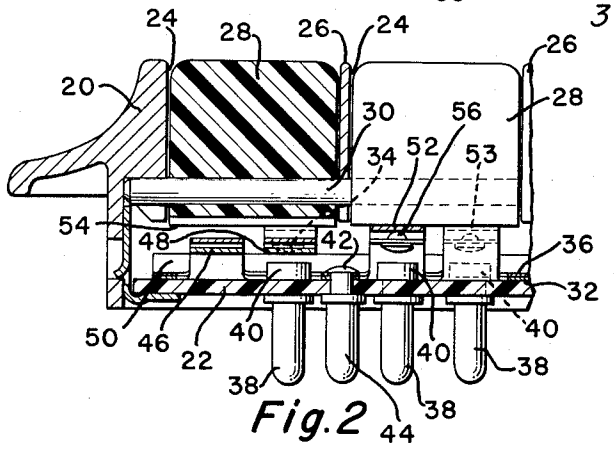


Fig. 2

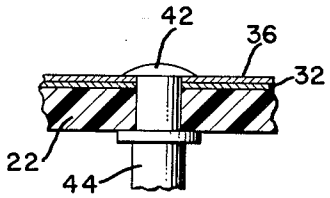


Fig. 5

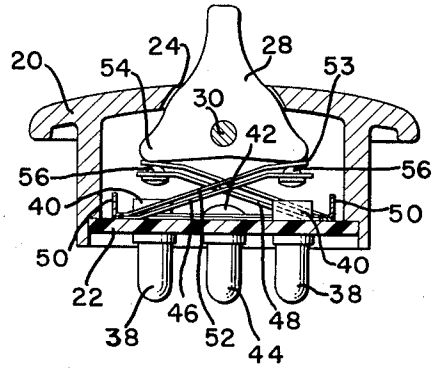


Fig. 3

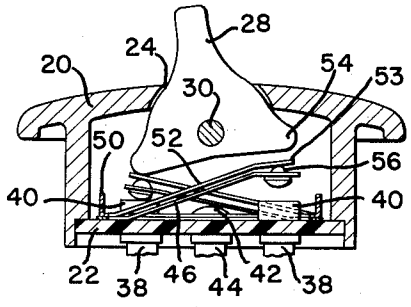


Fig. 4

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CIRCUIT CONTROLLER

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3 Claims. (Cl. 200—6)

This invention relates to circuit controllers and is more particularly concerned with an electric switch structure wherein a bank of individual switches are located side by side in a row in a common switch housing.

It is an object of the present invention to reduce the number of parts of a circuit controller that includes a plurality of individual switches which are arranged side by side in a row in a common housing.

A further object of the present invention is to use a unitary member that is formed of a strip of spring material to maintain all of the pivotally mounted actuating buttons of a plurality of individual switches that are arranged side by side in a row in a common switch housing in alignment.

Another object of the present invention is to maintain all of the actuating buttons of the individual switches which are located side by side in a row and pivoted in a switch housing in alignment with a single member and to use a single member to carry all of the movable contacts of the switch.

A still further object of the present invention is to reduce the overall width of the housing for a circuit controller which carries a plurality of individual switch elements which are located side by side in a row in the housing by having the individual contact carrying arms for all of the switches formed as part of a single metal piece which arms are located side by side with the alternate arms extending oppositely from the edges of the part.

It is a further object of the present invention to provide a circuit controller with a single member which carries all of the movable contacts of a plurality of individual switches which are located side by side in a row in a common housing and to provide the controller with a single member which will constantly urge all of the individual actuating buttons for the individual switches to a neutral position and permit any one of the buttons to be pivotally moved in the housing to flex a portion of the movable contact carrying member so engagement will occur between one of the movable contacts and one of the stationary contacts that is secured to an insulated base for the housing so as to complete a circuit from a common terminal carried by the base and electrically secured to the movable contact carrying member and the stationary contact engaged by the movable contact.

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

In the drawing:

Figure 1 is a top view of the circuit controller showing various parts of the switch as broken away to reveal the arrangement of the switch parts.

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

Figure 3 is a cross-sectional view taken along line 3—3 in Figure 1 showing the switch parts in an at rest position.

Figure 4 is a cross-sectional view taken along line 3—3 in Figure 1 showing the switch parts in a circuit closing position.

Figure 5 is an enlarged view showing a portion of the movable contact carrying member and the member which maintains the switch buttons in a neutral position as secured by a common terminal to the housing base.

The circuit controller shown in the drawings has a housing 20 which may be formed of a die-cast material, and a base 22 which is formed of insulating material. The base 22 and housing 20 are secured to each other. The housing 20 is provided with four openings 24 which are located side by side in a row. Between each of the openings are ribs 26 separating the individual actuating buttons 28 pivoted on the rod 30 carried by the housing 20. The buttons 28 are pivoted and arranged to actuate the switch contacts in the manner which will be hereinafter described.

The base 22 is arranged to carry the support 32 for the movable contacts 34, the member 36 which constantly urges the buttons 28 to a neutral position in openings 24 and the terminals 38 which are connected with the stationary contacts 40. The support 32 and the member 36 are secured to the base 22 by suitably located rivets 42, one of which is elongated to provide a common terminal 44.

The support 32 is formed of a single strip of metal to have portions thereof struck out and upwardly bent to form the extending arms 46 and 48. Each one of these arms 46 and 48 has a contact 34 secured thereto which is arranged to engage one of the stationary contacts 40. The stationary contacts 40 as shown are staggered on opposite sides of a center line of the base 22 so adjacent contacts on opposite sides of the center line are disposed in a compartment beneath one of the buttons 28.

The member 36 is also formed of a single strip of metal which has upwardly turned flanges 50 which will impart rigidity to the member. The member 36 is also formed with arms 52 and 53 which extend upwardly and are also alternately and oppositely faced along the length of the strip and arranged to constantly engage the portions 54 of the actuating buttons 28. The arms 52 and 53 have a sufficient length to extend between the portions 54 and the rounded surface portions 56 of the contacts 34. The rounded surface 56 will provide a bearing surface which has a minimum amount of friction when the buttons 28 are moved from the neutral position shown in Fig. 3 either to the left or right as for example to the position shown in Figure 4. When the buttons 28 are thus moved, the portions 54 will force the arm 52 downwardly to ride upon the portions 56 and force the arm 48 downwardly to cause engagement between the contacts 34 and contact 40. As is heretoforce stated, the terminal 44 is a common terminal and is in electrical contact with both the support 32 and the member 36 as shown in Fig. 5. Therefore, when any one of the contacts 34 is moved into engagement with the contact 40 located beneath the moved contact 34 an electrical circuit will be complete between the terminal 44 through the metal material of member 36 or the support 32, the engaged contacts 34 and 40 to any one of the stationary terminals 38. When the force that cause the buttons 28 to be moved from the position shown in Figure 3 to the position shown in Figure 4 is removed, the arms 52 of the member 36 will cause the buttons 28 to return to a neutral position wherein they will be maintained in alignment by the arms 52. The material which forms the member 32 is also formed of spring metal so that the engagement between the contacts 34 and 40 will be broken when the buttons 28 return to the neutral position.

From the above it is apparent that the inter-digited

arms 46 and 48 on the supports 32 and 52 and 53 on member 36 will provide a switch structure wherein the arms on the member 36 will constantly maintain the switch buttons 28 in a neutral position in openings 24. The arms 46 and 48 on supports 32 and 42 and 53 on member 36 being interdigited will provide a switch structure of minimum overall dimensions and a minimum number of parts regardless of the number of individual switches which are located side by side in the common housing.

While the embodiments of the present 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: an insulating base, a housing secured to said base and forming a compartment therewith, a switch button pivotally supported by said housing having a switch actuating portion extending into said compartment, a first metal member having a first supporting portion and having a first pair of integral arms each carrying an electrical contact extending from said supporting portion, said arms being located in side-by-side relationship and extending in opposite directions from said first supporting portion, a second metal member having a second supporting portion overlying and engaging said first supporting portion and having a second pair of integral arms extending from said second supporting portion, said second arms extending substantially coextensively with said first arms and being located between the switch actuating portion of said button and said first arms and being positioned in engagement with both said switch actuating portion and said first arms, the ends of said second arms being freely movable to thereby move said buttons back to a predetermined position when actuating pressure is removed from a button, means for securing the supporting portions of said first and second metal members to said base, and a pair of switch contacts supported by said base positioned to be engaged by the contacts carried by said first arms.

2. In a circuit controller, the combination comprising, a base formed of insulating material, a first unitary sheet metal assembly supported by said base including a first supporting portion engaging said base, said first sheet metal assembly including a portion having relatively narrow serpentine slots defining first pairs of oppositely directed arms each carrying an electrical contact, a second unitary sheet metal assembly having a second supporting portion engaging said first supporting portion and including a portion having relatively narrow serpentine slots defining second pairs of oppositely directed arms overlying said first arms, a plurality of pivotally mounted actuating buttons each contacting a pair of said second arms, and a plurality of fixed contacts supported by said base and positioned to be engaged by said contacts carried by said first arms when said first arms are deflected in one direction by movement of one of said actuating buttons and one of said second arms.

3. A circuit controller comprising, a base formed of insulating material, a first unitary sheet metal assembly supported by said base including a first supporting portion engaging said base, said first sheet metal assembly including a portion having relatively narrow slots defining first pairs of oppositely directed arms each carrying an electrical contact, a second unitary sheet metal assembly having a second supporting portion and including a portion having relatively narrow slots defining second pairs of oppositely directed arms, a plurality of shiftable actuating buttons each urged to predetermined positions by a pair of said second arms, a plurality of contacts supported by said base for engagement with the contacts carried by said first arms, said actuating buttons being positioned to deflect said first arms to contact closing position when shifted, and means securing said first and second sheet metal assemblies to said base.

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