May 8, 1962 B. F. MEYER ET AL 3,033,946

CIRCUIT CONTROLLER

Filed April 6, 1960 2 Sheets-Sheet 1

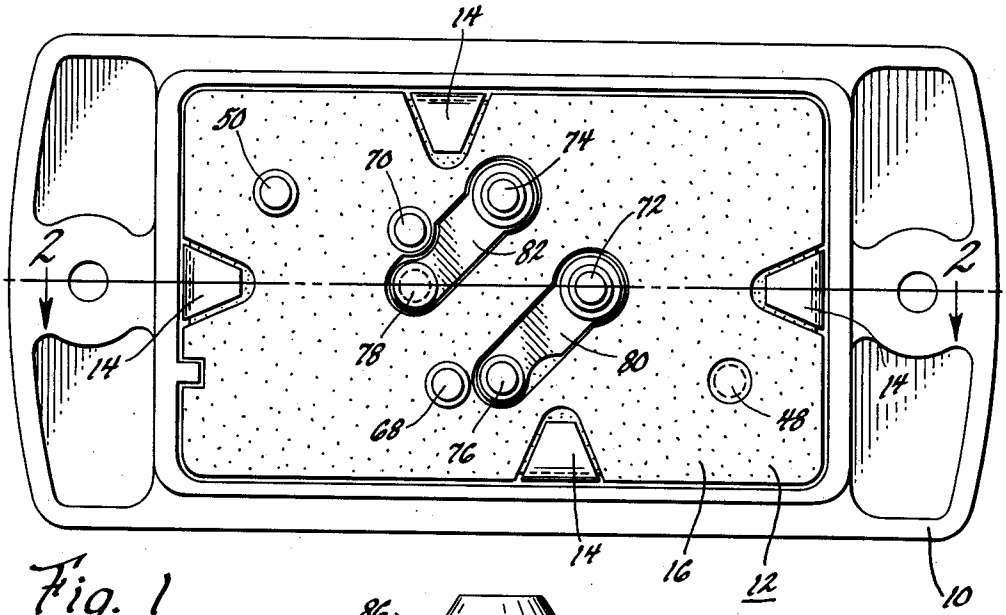


Fig. 1

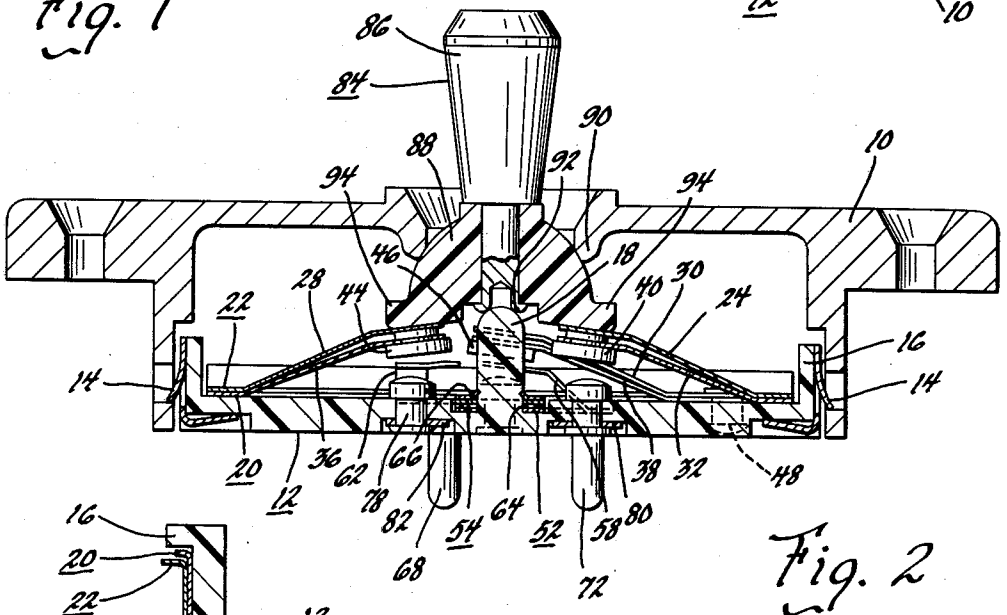


Fig. 2

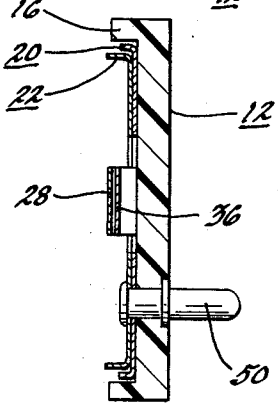


Fig. 4

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May 8, 1962 B. F. MEYER ET AL 3,033,946

CIRCUIT CONTROLLER

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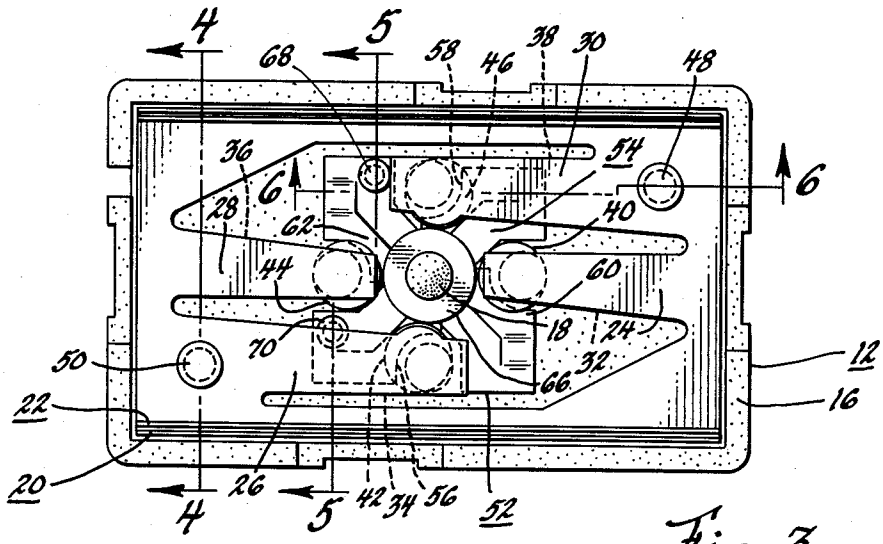


Fig. 3

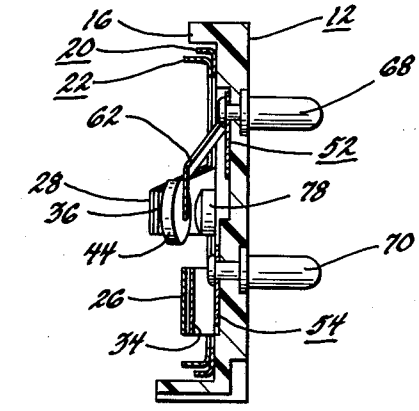


Fig. 5

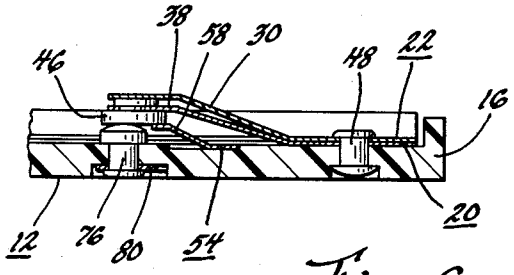


Fig. 6

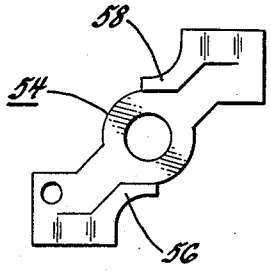


Fig. 7

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CIRCUIT CONTROLLER

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6 Claims. (Cl. 200—6)

This invention relates to circuit controllers that have particular utility in controlling an electric driven seat adjusting mechanism for a motor vehicle.

One of the objects of this invention is to provide a circuit controller that is adapted to control a plurality of circuits by use of a minimum number of parts and a single actuator that is shiftable in two planes.

Another object of this invention is to provide a circuit controller having a manually shiftable actuator that is movable in two planes, the switch including contactors adapted to complete two circuits when the actuator is shifted to either of two positions in each of its planes of movement.

A more specific object of this invention is to provide a circuit controller having an actuator which is shiftable in two planes and which moves contacts carried by spring arms into engagement with fixed contacts carried by an insulating base, the insulating base carrying a pair of strap connectors each having spring fingers which are alternately engaged by the movable contacts as the actuator is shifted in a given plane.

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

In the drawings:

FIGURE 1 is a lower plan view of a circuit controller made in accordance with this invention.

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1.

FIGURE 3 is a plan view of an assembly forming a component part of the circuit controller of this invention.

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 3.

FIGURE 5 is a sectional view taken along line 5—5 of FIGURE 3.

FIGURE 6 is a sectional view taken along line 6—6 of FIGURE 3.

FIGURE 7 is a plan view of a strap connector which forms a component part of the circuit controller of this invention.

Referring now to the drawings and more particularly to FIGURE 2, it is seen that the circuit controller of this invention includes a housing designated by reference numeral 10. The housing 10 carries an assembly which is designated in its entirety by reference numeral 12, the assembly 12 being secured to the housing 10 by means of spring clips 14. The assembly 12 includes a base member 16 which is formed of insulating material and which has an integrally formed central projection 18. The insulating base 16 carries a pair of sheet metal assemblies 20 and 22, the assembly 20 having its lower wall thereof engaging the insulating base 16 and the assembly 22 overlying the assembly 20. The sheet metal assembly 22 has portions cut away to form the spring arms 24, 26, 28 and 30. In a like manner the sheet metal assembly 20 is formed with cut away sections to provide spring arms 32, 34, 36 and 38 which are positioned directly below the spring arms 24, 26, 28 and 30. The spring arms 32, 34, 36 and 38 respectively carry contacts 40, 42, 44 and 46 as is clearly apparent from the drawings.

It can be seen from the sectional views of FIGURES 2 and 6 that the contacts 40 through 46 have portions projecting on either side of a respective contact arm, the portion extending from the top side thereof engaging the respective spring arms 24, 26, 28 and 30. The sheet metal assemblies 20 and 22 with their integral spring arms are held to the insulating base 16 by means of a rivet 48 and a terminal 50.

The insulating base 16 carries a pair of strap connectors 52 and 54. The strap connector 54 is better illustrated in the plan view of FIGURE 7 and it is seen that it has a central opening which slips over the central projection 18 formed integrally with the insulating base 16. The strap connector 54 has a pair of upturned contact arms 56 and 58. In a like manner, the strap connector 52 is provided with upturned contact arms 60 and 62. The strap connector 52 also has a central opening which slips over the upstanding post 18. As can be seen from the sectional view of FIGURE 2 the strap connector 52 is positioned in contact with the insulating base 16 whereas the strap connector 54 is spaced from the strap connector 52 by a sheet of insulating material 64. The strap connectors 52 and 54 preferably fit in recesses formed in the insulating base 12 and are held with respect to the post 18 by a fastener 66. The strap connector 52 is further held to the base by a terminal 68 whereas the strap connector 54 is further held to the base by a terminal 70. It can be seen that the terminal 68 is electrically connected with the strap connector 52 and that the terminal 70 is electrically connected with the strap connector 54.

The insulating base 16 carries terminals 72 and 74 and rivets 76 and 78. The terminal 72 is connected with rivet 76 by a strap connector 80 whereas the terminal 74 is connected with rivet 78 by the strap connector 82. The head of terminal 72 is positioned directly below the contact 40 so as to be engaged by this contact when the arms 24 and 32 are deflected downwardly. In a like manner, the head of terminal 74 is positioned directly below the contact 42 whereas the heads of rivets 76 and 78 are respectively located directly below contacts 46 and 44.

The circuit controller of this invention is provided with a manual actuator which is generally designated by reference numeral 84. This actuator has a handle portion 86 and a spherical portion 88 which engages the portion 90 of the housing 10. The actuator has a portion 92 formed with spherical walls that ride on the top end of the projecting post 18. In addition, the actuator 84 is formed with arms 94 which are positioned directly over the spring arms 24, 26, 28 and 30. The spring arms 24, 26, 28 and 30 serve to urge the spherical portion 88 of the actuator into engagement with the housing 10 and also serve to bias the actuator 84 to its FIGURE 2 position.

The circuit controller of this invention operates to complete a plurality of circuits when the actuator 84 is moved leftwardly or rightwardly in FIGURE 2 or in a plane perpendicular to this movement. In using this switch the terminal 50 is the power terminal and is connected to one side of a power source such as a battery. When the switch is used with one type of seat adjusting transmission the terminal 70 will be connected to a vertical solenoid whereas the terminal 68 will be connected to horizontal solenoid. The terminals 72 and 74 are motor terminals and provide respectively counterclockwise and clockwise rotation thereof.

If the actuator knob 86 is moved rightwardly in FIGURE 2 it can be seen that the spring arms 24 and 32 will be deflected and that the contact 40 will become engaged with the head of terminal 72. Since the power terminal 50 is connected with both sheet metal assemblies 20 and

22 it can be seen tht the rightward movement of the handle 86 will cause power to be applied to the counterclockwise motor terminal 72. This rightward movement of handle 86 will also cause the contact 40 to become engaged with the upstanding spring finger 60 carried by strap connector 52. This will thus cause power to be applied to the strap connector 52 and to the terminal 68 which is connected therewith.

If the actuating handle 84 were moved leftwardly in FIGURE 2 the contact 44 would be shifted down into engagement with the head of rivet 78. This would cause power to be applied to the clockwise motor terminal 74 via the rivet 78 and the strap connector 82. In addition, this movement of the actuator 84 to the left will cause the spring finger 62 to become engaged with the contact 44 so that the terminal 68 is once more connected with the power terminal 50. It can be seen from the foregoing that shifting of the actuating handle 86 leftwardly or rightwardly in FIGURE 2 will cause the horizontal solenoid terminal 68 to be energized in either direction of movement of the handle 86 and will cause the motor terminals 72 and 74 to be alternately energized depending upon the direction of movement of the handle 86.

If the actuating handle 86 were moved rearwardly in FIGURE 2 the contact 46 will be moved down into engagement with the rivet 76, thus connecting the power terminal with terminal 72 via the strap connector 80. The contact 46 will likewise engage the spring finger contact 58 to cause the power terminal 50 to be connected with the strap connector 54. If the handle 86 were now moved toward the viewer in FIGURE 2 the contact 42 will be moved down into engagement with the head of terminal 74 and the spring finger 56 will be moved down into engagement with the head of rivet 70. This will effectively connect the power terminal 50 with the terminal 74 and with the terminal 70. It thus can be seen that this type of movement will always cause the vertical solenoid terminal 70 to be energized and will alternately energize the terminals 72 and 74.

It will, of course, be appreciated that after each actuation of the handle 86 the handle is returned to the FIGURE 2 position by the spring arms 24, 26, 28 and 30. The spring arms 32, 34, 36 and 38 which carry the contacts are not unduly stressed by the construction of this switch since they are not required to move the actuating handle 86 back to a neutral position after it has been shifted to some circuit closing position.

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

What is claimed is as follows:

1. A circuit controller comprising, a base formed of insulating material, a sheet metal assembly carried by said base including a pair of arm members each carrying a contact, a power terminal carried by said base and connected with said sheet metal assembly whereby said arm members are both electrically connected with said power terminal, a pair of fixed contacts carried by said insulating base and positioned in alignment with the contacts carried by said arm members, a pivotally mounted actuating member movable in two directions adapted to shift said arm members, a strap connector carried by said insulating base having spring fingers engaged by the contacts carried by said arm members when said arm members are shifted to contact closed position by said actuating member in either direction of movement of said actuating member, and terminal means connected with said strap connector.

2. A circuit controller comprising, a base member formed of insulating material, a sheet metal member secured to said base member having an upstanding arm member carrying an electrical contact, a power terminal connected with said sheet metal member, a fixed electrical contact supported by said base member and adapted to be engaged by said electrical contact when said arm member is flexed, an actuator member for flexing said arm member, and a second sheet metal strap connector carried by said base member having an integral upstanding contact finger engageable with said electrical contact when said arm member is flexed by said actuating member.

3. A circuit controller comprising, a base member formed of insulating material, a sheet metal assembly carried by said base member including a pair of integrally formed spaced arm members each carrying electrical contact means, a pair of fixed contacts carried by said base member and adapted to engage said electrical contact means when said arms are flexed, a manually operable actuator for flexing said arms, and a strap connector carried by said base member having opposite ends formed with integral spring finger contacts, the electrical contact means carried by said arm members being adapted to simultaneously engage a fixed contact and one of said spring finger contacts when one of said arms is flexed by said actuating member.

4. A circuit controller comprising, a base member formed of insulating material, a pair of terminals and a pair of rivet members carried by said base member and spaced around a longitudinal axis of said base member, connector means connecting said terminals with said rivets, a sheet metal assembly carried by said base member including a plurality of integral arms each carrying electrical contact means that are adapted to be moved into engagement with the heads of said rivets and terminals, a shiftable actuator contacting all of said arm members for flexing an individual arm member, a pair of sheet metal strap connector members carried by said base member having opposite ends thereof formed with integral spring contact fingers that are engaged by said electrical contact means carried by said arms when said arms are deflected sufficiently to cause said contact means to engage a respective head of a rivet or terminal, means insulating said sheet metal members from one another, a terminal connected with each of said sheet metal members, and a power terminal carried by said base and connected with said sheet metal assembly.

5. A circuit controller comprising, a base member formed of insulating material, a pair of terminals and a pair of rivets carried by said base member and positioned around a longitudinal axis of said base member, a sheet metal assembly carried by said base member including a plurality of integral arms each carrying electrical contact means positioned to engage the heads of said rivets and terminals, means electrically connecting a respective terminal with a respective rivet, a pair of sheet metal members carried by said base member in criss-cross relationship, said sheet metal members having their ends thereof formed with integral spring finger contacts that are engageable with said electrical contact means carried by said arm members when said arms are deflected sufficiently to cause said contact means to engage a respective head of a rivet or terminal, and a pivotally mounted actuating member for moving said arm members.

6. A circuit controller comprising, a base member formed of insulating material, a pair of terminals and a pair of rivets carried by said base member and spaced around a longitudinal axis of said base member, a first sheet metal assembly carried by said base member including a plurality of first integral arms each carrying electrical contact means that are adapted to be moved into engagement with the heads of said terminals and rivets, a second sheet metal assembly positioned over said first sheet metal assembly and including a plurality of integral arms extending substantially coextensively with said first arms, a housing, an actuator pivotally mounted on said housing and engaging all of the arm members of said second sheet metal assembly, and a pair of sheet metal members mounted on said base member in criss-cross relationship having opposite ends thereof formed with integral spring finger contacts that are engageable with the electrical contact means carried by said first arm

members when said arm members are flexed by said actuating member.

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