June 2, 1964 A. J. COLAUTTI ET AL 3,135,839

MULTIPLE POSITION SLIDING SWITCH

Filed Feb. 12, 1960 2 Sheets-Sheet 1

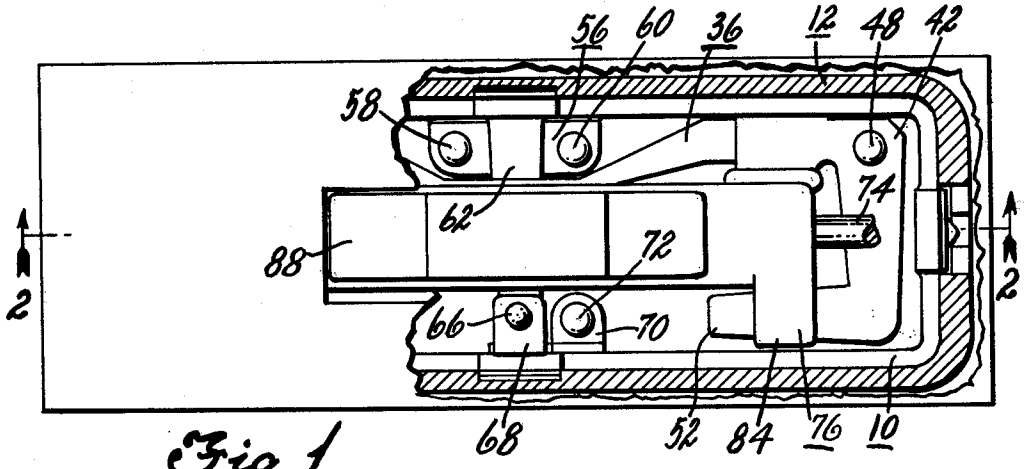


Fig. 1

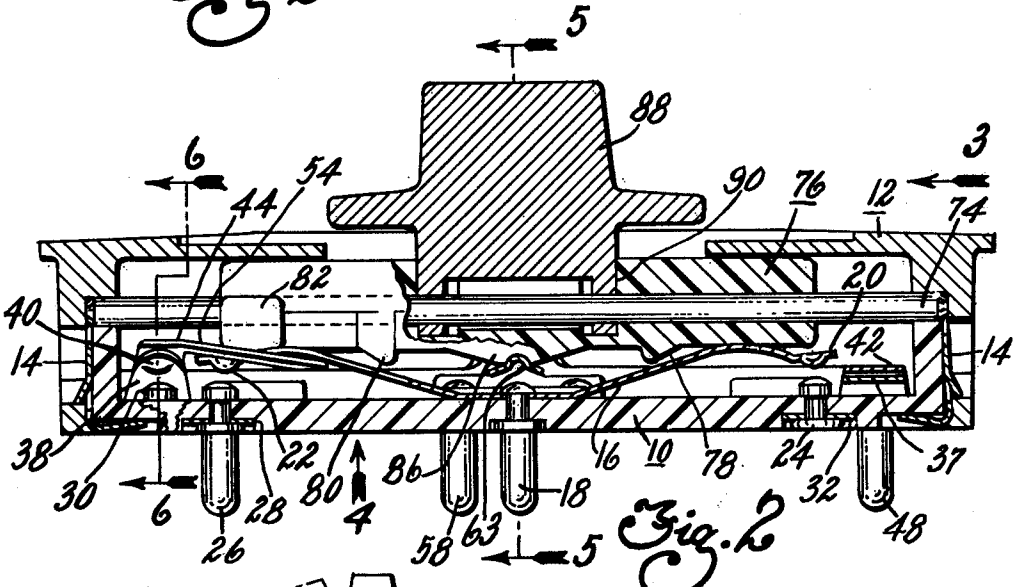


Fig. 2

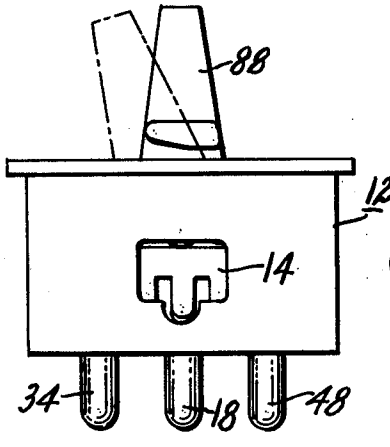


Fig. 3

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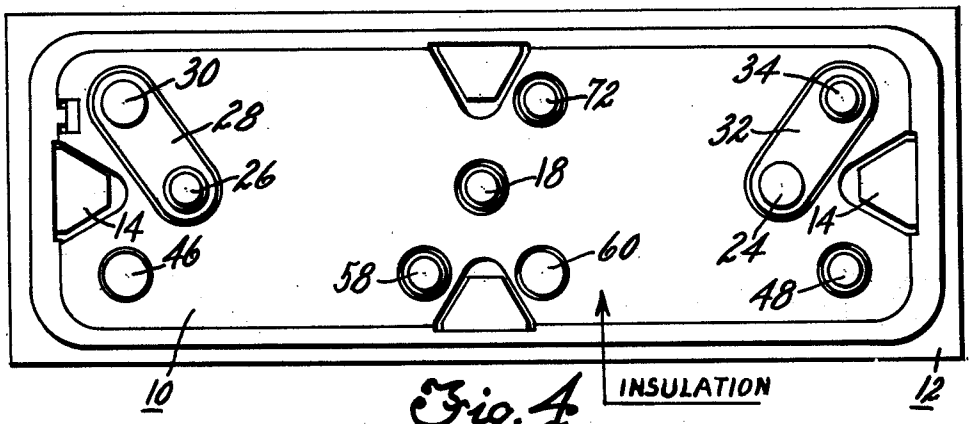


Fig. 4

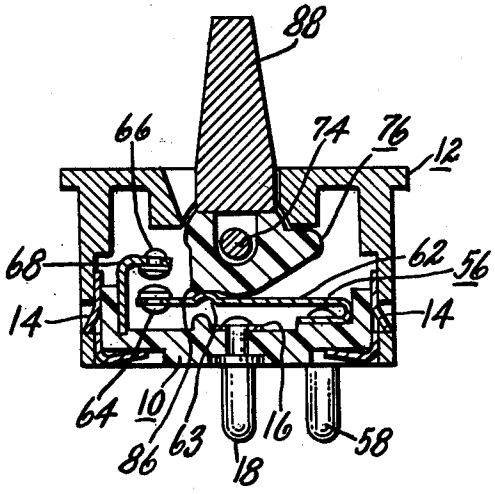


Fig. 5

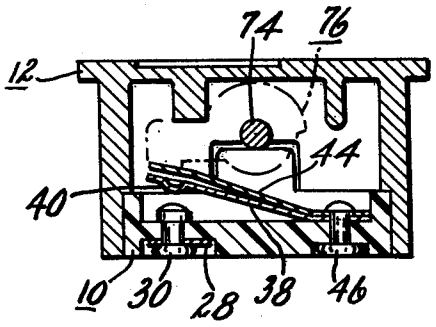


Fig. 6

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MULTIPLE POSITION SLIDING SWITCH

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8 Claims. (Cl. 200—5)

This invention relates to manually operable electric switches and more particularly to switches that are adapted for use in controlling the seat adjusting mechanism of motor vehicles.

One of the objects of this invention is to provide a switching mechanism that is adapted to control a plurality of circuits by manual actuation of a single actuating button that is slidable axilly in opposite directions to cause a switching action and which is rotatable at the ends of its sliding movement to cause another switching action.

Another object of this invention is to provide a switching mechanism including a pair of leaf spring members that are connected with terminals, the leaf spring members that are connected with terminals, the leaf spring members being deflected to close electrical circuits by a manually operable actuator that is slidable in opposite directions to operate one of the leaf springs and which is rotatable at the ends of its slidable movement in a given direction to operate the other leaf spring member.

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 top view with parts broken away of an electric switch made in accordance with this invention.

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

FIGURE 3 is an end view of the electric switch illustrated in FIGURE 1.

FIGURE 4 is a lower plan view of the switch illustrated in FIGURE 1.

FIGURE 5 is a sectional view taken along line 5—5 of FIGURE 2.

FIGURE 6 is a sectional view taken along line 6—6 of FIGURE 2.

Referring now to the drawings and more particularly to FIGURE 2, it is seen that the switch of this invention includes a base member 10 which is formed of a suitable electrical insulating material. The base member 10 carries a cover 12 formed of metal material and the cover and base are held together by spring clips 14.

The base member 10 carries a contactor 16 which is formed of spring metal material and which is secured directly to the base portion 10 by a terminal 18 that is headed over at its top end thereof, as shown. The contactor 16 has projections 20 and 22 which serve as electrical contacts and which at times are deflected downwardly into engagement with the top ends of rivet 24 and terminal 26. It is seen that the top ends of rivet 24 and terminal 26 are shaped to provide fixed electrical contacts that cooperate with the contacts 20 and 22 of the leaf spring member 16. The terminal 26 secures a strap connector 28 in place, and this connector serves to electrically connect the terminal 26 with a rivet 30. The rivet 24 holds a strap connector 32 in place and this strap connector serves to connect the rivet 24 and the terminal 34.

The base 10 also supports a connector or contactor 36 which extends from one side of the switch to the other and which has a pair of arm portions 37 and 38 that are adapted to be deflected downwardly into contact with rivet 30 and terminal 34. One of these arm portions is

illustrated in the sectional view of FIGURE 6 and is designated by reference numeral 38. It is seen that this arm portion has a contact portion 40 which at times is moved into engagement with the head of rivet 30. The two opposite arm portions 37 and 38 of contactor 36 are located below the spring metal members 42 and 44. A rivet 46 holds the arms 38 and 44 together at one end of the switch whereas a terminal 48 holds the arms 37 and 42 together. It will, of course, be apparent that the contactor 36 is formed of spring metal material and is one unitary piece having the arms 37 and 38 whereas the spring metal members 42 and 44 are separate elements which overlie the arms 37 and 38. The arm 42, as is clearly apparent from FIGURE 1, has an extending portion 52 and, in a like manner, the arm 44 is formed with an extending portion 54, these extending portions being actuated by a manually operable actuator in a manner to be more fully described hereinafter.

The base 10 carries a bracket member 56 formed of spring metal material which is secured in place by the terminal 58 and the rivet 60. This bracket member has an arm portion 62 which is illustrated in the sectional view of FIGURE 5 that carries an electrical contact 64. The electrical contact 64 cooperates with an electrical contact 66 carried by fixed contact assembly 68. The assembly 68 has a portion 70 which engages a terminal 72, the terminal serving to hold the fixed contact assembly 68 in place.

Fitted snugly within openings formed in the cover 12 and on the top edge of base member 10 is a rod 74 which extends the entire length of the switch and which carries an actuating member 76 which is formed of an electrical insulating material. This actuating member 76 has projecting portions 78 and 80 which are best illustrated in FIGURE 2 and has radially extending portions 82 and 84. The portions 78 and 80 are arcuately shaped in vertical cross section. It is seen that the radially extending portions 82 and 84 overlie the extensions 52 and 54 of the arm members 42 and 44.

The actuating member 76 has a downwardly projecting portion 86 which engages the contact arm 62, the contact arm 62 serving to hold the actuating member 76 in a neutral position. The contact arm 62 has a ridge 63 fitting in a slot formed in the portion 86. It is seen that the actuating member 76 carries a button 88 which is snugly fitting within an opening 90 formed in the actuating member 76. It is apparent from FIGURE 2 that the rod 74 passes through suitable openings in downwardly depending portions of actuating knob 88 and that movement of knob 88 causes the actuating member 76 to move therewith.

In the operation of this switch, the terminal 58 is normally connected with a source of power such as one side of a storage battery. With the switch actuating button 88 in the position illustrated in FIGURE 2, the contact 64 is held away from contact 66 so that no circuit is made between the battery and the contact 66.

If the actuating button 88 is now shifted for example rightwardly in FIGURE 2, the contact arm 62 will no longer be prevented from moving upwardly since the portion 86 will be shifted rightwardly. The contact 64 will therefore move up under its own spring force to engage the contact 66 and apply battery power to the contact 66 completing a circuit between the input power terminal 58 and the terminal 72 which is connected with the contact 66. The terminal 72 may be connected with a pair of solenoids through a door jamb switch (not shown) and power is then returned to the electric switch via terminals 34 and 26. It thus can be seen that terminals 34 and 26 are another pair of power input terminals and that rivets 24 and 30 will be at the same electrical potential as terminals 26 and 34 due to the strap connectors 28 and 32.

Since we have assumed that the switch actuating button **88** was shifted rightwardly, the contact **20** on the spring metal contactor **16** will be moved downwardly into engagement with the head of rivet **24**. This downward movement of contact **20** is due to the engagement of downwardly projecting portion **78** with the leaf spring member **16** as it moves rightwardly. With contact **20** in engagement with rivet head **24** it can be seen that a circuit has been completed from power input terminal **34** to the terminal **18** via the right side of spring metal contactor **16**.

Assuming that the switch contactor **88** is still in its full rightward position, if the button **88** is now rotated counterclockwise as is illustrated in FIGURE 3, the radially extending portion **84** of actuator **76** will engage the extending portion **52** of spring metal member **42** to cause the arm member **37** to move downwardly with a consequent engagement of the contact carried by arm **37** with the top end of terminal **34**. Thus the counterclockwise movement of switch actuating button **88** will cause a circuit to be closed between terminal **48** and terminal **34**.

If the switch actuating button **88** is shifted leftwardly from the FIGURE 2 position, the contacts **64** and **66** once more will become engaged and the contact **22** will be forced down into engagement with the top end of terminal **26**. This will complete a circuit between terminals **26** and **18**. If the actuating button **88** is now rotated counterclockwise the contactor **40** is shifted down into engagement with the top end of rivet **30** to complete a circuit between terminal **26** and terminal **48**.

It is to be noted that the projecting portions **78** and **80** are arcuately shaped and of sufficient circumference to hold the spring contactor **16** down when the actuating member **76** is being rotated to actuate contact **40** and the contact carried by arm member **37**. The double layer construction including the contact arm **38** and the arm member **44** insures that the actuating knob **88** will always be rotated back to its neutral position, that is it will be rotated back to its neutral position after the operator of the switch releases the button. The switch is held in its neutral axial position against axial movement of the switch by the projecting portion **63** formed on contact arm **62** which snaps into a recess formed in the downwardly extending portion **86** of actuating member **76**. It thus is apparent that the contact arm **62** and the leaf spring contact member **16** serve to oppose rotation of the actuating knob **88** when it is in its FIGURE 2 position and that the spring metal members **42** and **44** serve to rotate the knob **88** back to its neutral position when it has been shifted either leftwardly or rightwardly in FIGURE 2.

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. An electric switch comprising, a base member formed of insulating material, a rod member supported by said base member, a switch actuating member slidably and rotatably supported by said rod member, a first switch contact arm positioned between said actuating member and said base member, a second switch contact arm positioned between said switch actuating member and said base member, fixed contacts carried by said base member in alignment with said first and second contact arms, first means projecting from said switch actuating member for deflecting said first contact arm into engagement with a first fixed contact when said actuating member is shifted axially to a predetermined position, and second means extending radially from said actuating member for deflecting said second contact arm into engagement with a second fixed contact when said actuating member is rotated after being shifted axially to said predetermined position.

2. An electric switch comprising; a base member, a rod means supported by said base member, an actuating member carried by said rod means for sliding and rotative movement about the axis of said rod means, a first contact member carried by said base member and having outwardly extending arms, said actuating member having portions arranged to deflect said contact member upon axial movement of the actuating member in opposite directions, and a second contact member carried by said base member and having oppositely directed arm portions, said arm portions being positioned so as to be deflected by rotative movement of said actuating member after said actuating member is shifted axially in one direction.

3. An electrical switch comprising; a base member, a rod means supported by said base member, a switch actuator member carried by said rod means for sliding and rotative movement thereon, first switch means including a first shiftable contactor mounted on said base member and being normally held away from a fixed contact member when said actuator member is in a first position, second switch means including a second shiftable contactor carried by said base member and being movable to a closed position by said actuator member when the actuator member is shifted axially in one direction, the axial movement of said actuator member allowing said first contactor to move to a closed position, and a third movable contactor carried by said base member being shiftable to a closed position by said switch actuator when said switch actuator is rotated after having been shifted axially.

4. An electric switch comprising; a base member formed of insulating material, a rod means supported by base member, a switch actuating member carried by said rod means and being adapted for axial and rotative movement thereon, first, second and third contact arms formed of spring metal material and supported by said base member, first, second and third fixed contacts carried by said base member and being co-operable with said contact arms, means carried by said actuating member for engaging said first contact arm in a neutral position, said first contact arm shifting into engagement with said first fixed contact by virtue of its own spring bias when said actuating member is shifted axially, means on said actuating member for deflecting said second contact arm into engagement with said second fixed contact when said actuating member is shifted axially to a predetermined position, and means on said actuating member for deflecting said third contact arm into engagement with said third contact when said actuating member is rotated after having been shifted axially to said predetermined position.

5. An electric switch comprising; a base member formed of insulating material, a first contactor formed of spring metal material having oppositely directed arms overlying fixed contacts supported by said base member, a second contactor formed of spring metal material having oppositely directed arms overlying fixed contacts supported by said base member, a first terminal connected with said first contactor, a second terminal connected with said second contactor, a rod means supported by said base member, a switch actuating member carried by said rod means for sliding and rotative movement on the axis of said rod means, first means extending from said switch actuating member for deflecting said first spring metal contact member when said actuating member is shifted axially, and second means extending from said switch actuating member and spaced from said first means for deflecting said second contact member when said switch actuating member is rotated after being shifted axially to a predetermined position.

6. An electric switch comprising; a base member formed of insulating material, a rod member supported by said base member, an actuating member supported for sliding and rotative movement by said rod member, a first contact arm carried by said base member and being shiftable into engagement with a first fixed contact supported by said base member when said actuating member is shifted axially on said rod member, and a second contact arm carried by said base member and being shiftable

into engagement with a second fixed contact by said actuating member when said actuating member is rotated and after it has been shifted axially to a predetermined position, said actuating member being of such transverse length that said first contact arm is maintained engaged with said first contact as said actuating member is rotated to cause engagement of said second contact arm with said second fixed contact.

7. An electric switch comprising; a base member formed of insulating material, first, second and third terminal members supported by said base member and projecting therefrom, a first contact arm supported by said first terminal and adapted to be deflected to connect said first and third terminals, a second contact arm connected with said second terminal and adapted to be deflected to connect said second and third terminals, a rod means supported by said base member, a switch actuating member carried by said rod means for axial and rotative movement thereon, a first means on said switch actuating member for deflecting said first contact arm when said actuating member is shifted axially, and second means on said switch actuating member for deflecting said second contact arm when said actuating member is rotated after being shifted axially to a predetermined position.

8. An electric switch comprising; a base member, a rod means supported by said base member, an actuating member carried by said rod means and being adapted for axial and rotative movement on the axis of said rod means, first electrical switching means supported by said

base member and including a first movable contactor and a first fixed contact, a second electrical switch means carried by said base member and including a second movable contactor and second fixed contact, first switch actuating means carried by said actuating member for shifting said first movable contactor into engagement with said first fixed contact upon a sliding movement of said actuating member along the axis of said rod means, and second switch actuating means carried by said actuating member for shifting said second movable contactor into engagement with said second fixed contact upon rotative movement of said actuating member about the axis of said rod means after said actuator member has been shifted axially in one direction, said first switch actuating means being of such transverse length as to maintain said first movable contactor in engagement with said first fixed contact when said actuating member is rotated to move said second movable contactor into engagement with said second fixed contact.

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