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H. V. ELLIOTT
ELECTRIC SWITCH

2,808,476

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2 Sheets-Sheet 1

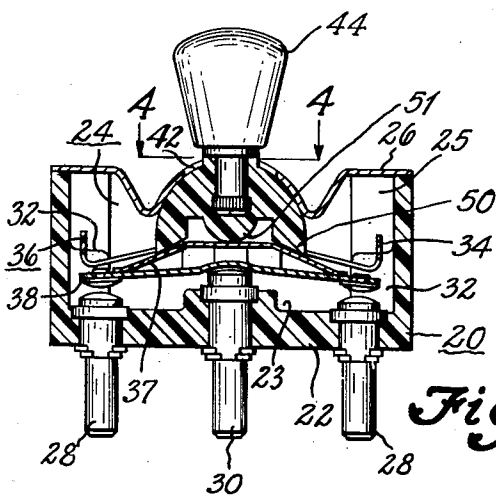
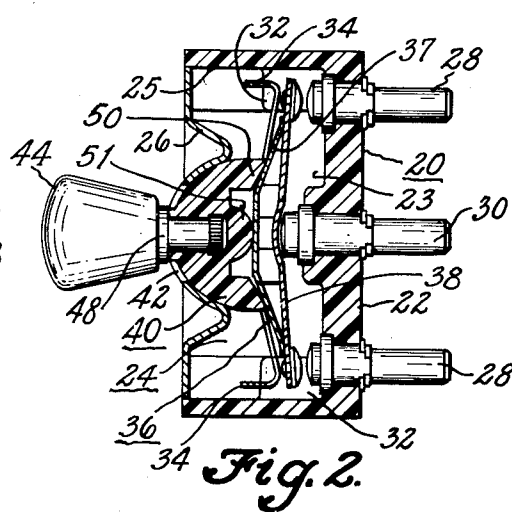
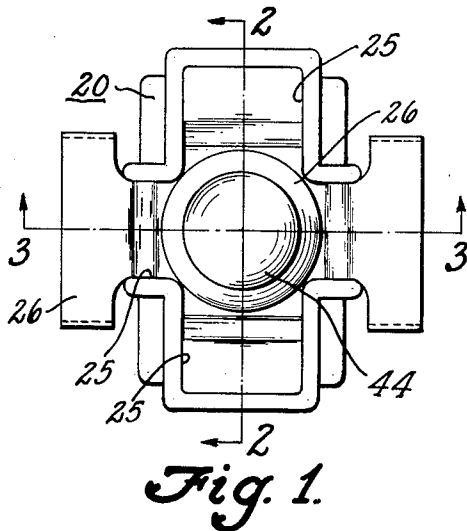


Fig. 5.

Fig. 3.

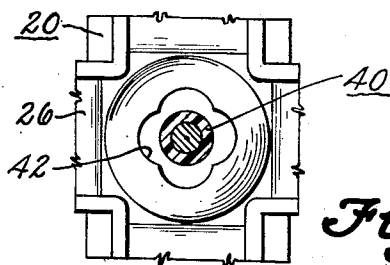
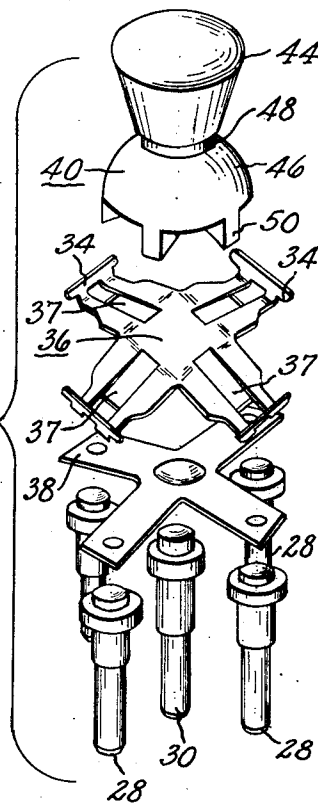


Fig. 4.



INVENTOR.
HAROLD V. ELLIOTT
BY *Blair D. Maurer*
ATTORNEY

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2 Sheets-Sheet 2

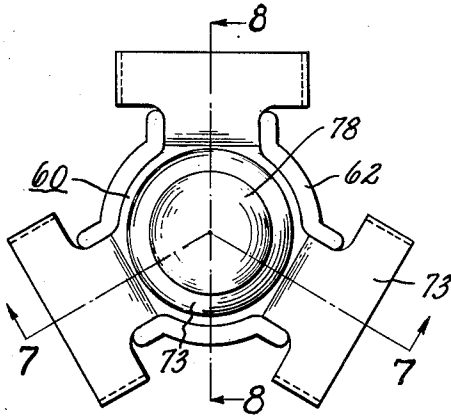


Fig. 6.

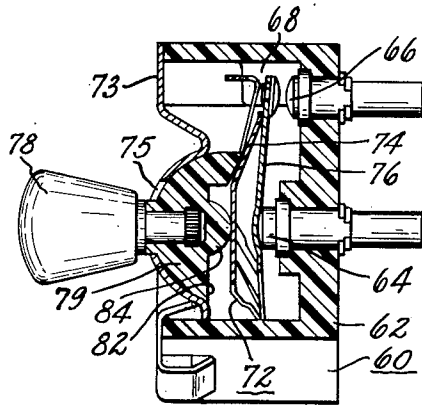


Fig. 8.

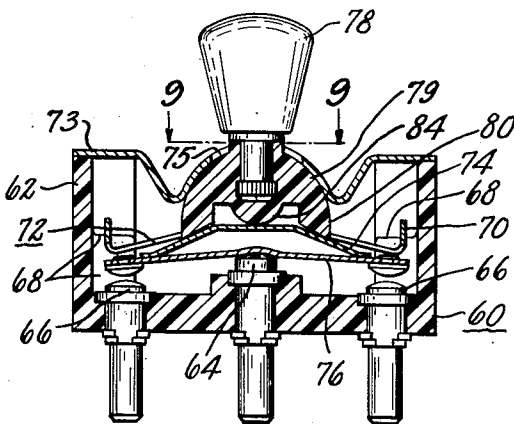


Fig. 7.

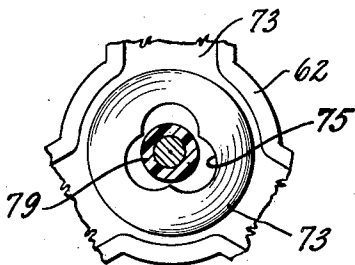
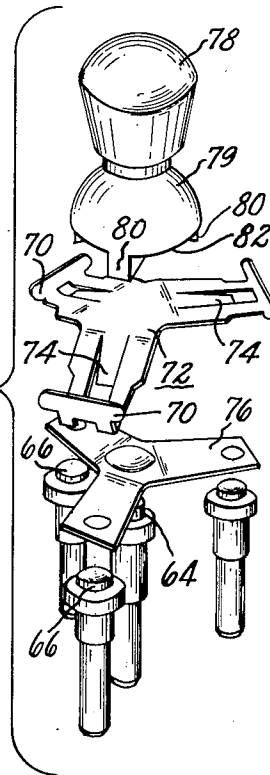


Fig. 9.

Fig. 10.



INVENTOR.
HAROLD V. ELLIOTT
BY

John D. Manier
ATTORNEY

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2,808,476

ELECTRIC SWITCH

Harold V. Elliott, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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7 Claims. (Cl. 200—6)

This invention relates to electric switches and more particularly to an electric switch that has its parts normally maintained in a neutral position.

It is an object of the present invention to provide an improved mechanism for an electric switch that includes a contact actuator which constantly urges a movable contact to a neutral position and transmits movement of an actuating handle to pivot a movable contact plate into engagement with a stationary contact that is spaced from the pivot for the movable contact plate for closing an electric circuit therebetween.

It is another object of the present invention to provide a switch that has spaced stationary contacts arranged so that one of the contacts acts as a pivot for a movable contact plate which is urged to a neutral position by a contact actuator that has a shape complementary to the movable contact plate and has a portion thereof normally resting on the switch housing. The contact actuator, positioned between a pivotal operating handle and the movable contact, has integrally formed fingers which engage the movable contact and are in turn engaged by portions of the handle to transmit movement of the handle to the movable contact for causing the same to pivot and engage one of the stationary contacts and close a circuit between the pivot contact and the engaged contact.

It is a further object of the present invention to provide a switch with a housing that has spaced stationary contacts and a center contact disposed intermediate the stationary contacts so a contact plate positioned within the housing and pivoted on the center contact may selectively engage any one of the stationary contacts when a spring strip contact actuator, that has portions thereof normally carried by abutments on the housing, is flexed by an actuating handle that is pivotally moved, against the spring force of the actuator, relative to the housing to move and flex finger or ear portions integrally formed on the strip actuator that are normally in contact with the contact plate and rock said plate about its pivot from the neutral position into contact with one of the stationary contacts.

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 embodiment of the present invention is clearly shown.

Figure 1 is a plan view of the switch according to the present invention.

Figure 2 is a view partly in section along line 2—2 in Figure 1.

Figure 3 is a view partly in section along line 3—3 in Figure 1.

Figure 4 is a view partly in section along line 4—4 in Figure 3.

Figure 5 is an exploded view in perspective showing the arrangement and shape of the stationary contacts, the movable contact, the contact actuator and actuating handle of the switch according to the present invention.

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Figure 6 is a plan view of a modification of a switch according to the present invention.

Figure 7 is a view partly in section along line 7—7 in Figure 6.

Figure 8 is a view partly in section along line 8—8 in Figure 6.

Figure 9 is a view partly in section along line 9—9 in Figure 7.

Figure 10 is an exploded view in perspective showing the arrangement and shape of the stationary contact, the movable contacts, the contact actuator and actuating handle of the switch shown in Figure 6.

Referring first to Figures 1—5 of the drawings, the numeral 20 designates a switch housing that is generally cruciform in shape with a base portion 22 formed of any suitable insulating material, for example a phenolic condensation product and filler, which provides a cruciform shaped recess 24 which is closed by a cruciform shaped cover 26 that is suitably secured to the base 22 by any well known means. The cruciform recess 24, because of its inherent shape, will provide four spaced radially extending arm recesses 25 that are interconnected by a central recess portion designated by a numeral 23. As clearly seen in the drawings a stationary contact 28 is located in each of the arm recesses 25 and a center contact 30 is disposed in recess 23 so as to be spaced intermediate the stationary contacts 28. The contacts 28 and 30 preferably are embedded in the material which forms the base 22 for the housing during the molding process during which abutments 32 are integrally formed with recesses 25 at the extremities thereof in a position that is remote from the center contact 30. These abutments are arranged so that the ends 34 of the contact actuator 36 may rest thereon.

A movable contact member or plate 38 is seated upon central contact 30 so that it may be moved into engagement with any one of the spaced stationary contacts 28. Contact plate 38 is also of cruciform shape, as clearly seen in Figure 5, so that it may be received in the cruciform shaped recess 24 and may engage any one of the contacts 28 when it is moved through actuating member 36 as will become hereinafter apparent. The contact actuating member 36 is of cruciform shape and is carried in recess 24 by ends 34 which normally rest on the abutments 32. Integral fingers or ears 37 formed in each of the arms of contact actuator 36 constantly engage the arm portions of contact plate 38 when the ends 34 are resting on the abutments 32. Ears 37 constantly urge the contact plate 38 to a neutral position and out of engagement with the spaced contacts 28 when contact actuator 36 is positioned between contact plate 38 and an actuating handle 40 and cover 26 are assembled with the base 22. Handle 40 extends through a recess 42 in housing cover 26 which is shaped to permit a pivotal movement between the housing 20 and cover 26 toward each of the recesses 25. The hemispherically curved portion 46 of handle 40 is held in position and in engagement with a correspondingly curved portion on cover 26 by the spring action of contact actuator 36. Contact actuator handle 40 is provided with a handle portion 44 which is connected with the generally hemispherically shaped end portion 46 by a neck portion 48 which is received in recess 42 when the switch is assembled. This necked portion permits the pivotal movement to occur between the cover 26 and the actuating handle 40. The hemispherically shaped end 46 is provided with radially spaced projecting portions 50 which engage the finger portions 37 of the contact actuator 36 when the actuating handle is in place. Thus if the actuating handle 40 is moved in clockwise direction, Figure 3, projections 50 will cause the right finger 40 of contact actuator 38 to

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be flexed downwardly and move the right arm of contact plate 38 into engagement with the contact 28 in the rightly disposed recess 25 while the left arm of contact 38 is moved upwardly. Simultaneously with the downward flexing of finger 37, the rim of the hemispherical end 46 will engage the portions on the right arm of contact actuator 36 which surround the right finger 37, to flex the right arm of the actuator 36 downwardly and against the abutment 32 in the right recess 25 while the left arm of actuator 36 raises upwardly and out of engagement with the abutment 32 in the left disposed recess 25. Thus the flexed right arm of contact actuator 36 will constantly urge the operating handle 40 to be returned to a neutral position after the force required to close the contacts is released.

The end 46 of handle 40 also has a central hemispherically shaped projection 51 formed thereon. This projection 51 engages the central portion of actuator 36 and presses the actuator fingers or ears 37 into engagement with the contact plate 38 to tightly maintain the plate 38 on the central contact 30 and acts as a point of pivot when handle 40 is moved while maintaining the various movable component parts in position without rattling after the switch is assembled regardless of the position of handle 40.

As clearly seen in the drawings the ends of contacts 28 and 30 extend to the bottom exterior of the housing base 22 to form terminals. These terminals may be connected in any suitable manner to any suitable circuits wherein the central contact 30 is common to each of the circuits that are connected with contacts 28 so that any one of four circuits can be made when the handle is pivoted toward the proper contact 28. The switch shown is thus particularly useful as a control for the movement of front seat of a vehicle with a single handle. Thus the common contact 28 terminal may be connected to a battery and the other contact 30 terminals may be connected in suitable circuits to electric devices to raise, lower or move the seat backwardly or forwardly as desired.

In Figures 6-10 a switch 60 is shown as having a Y-shaped housing 62 defining a Y-shaped recess wherein the arms forming the recess are spaced preferably at 120° from each other. The housing is formed with a central contact 64 which is disposed intermediate the radially spaced stationary contacts 66 as located in the arms of the recesses. Abutments 68 are also included in each of the recesses to normally carry the ends 70 of Y-shaped contact actuator 72 which through fingers or ears 74 bears against the arms of a Y-shaped contact plate 76 that is pivotally seated upon central contact 64 so as to engage any one of the stationary contacts 66 when plate 76 is moved through the contact actuator 72 by handle 78.

The handle 78 extends through a shaped recess 75 in the housing cover 73 and has three spaced projections 80 on the hemispherically shaped end 79 that is included within the switch housing. Projections 80 are in engagement with the fingers 74 while the rim 82 and hemispherically shaped projection 84 on end 79 both engage the central portion of the Y-shaped contact actuator 72.

Thus when handle 78 is pivotally moved toward any of the arms of the recess in housing 62, as for example clockwise in Figure 7, the right arms of the contact actuator 72 and the contact plate 76 will be moved downwardly while the other two arms of each of the members will move upwardly and the ends 70 of each of the upwardly moved arms of the contact actuator 72 will move out of contact with the abutments 68 whereon they are normally seated. As heretofore stated when the handle is moved, the contact plate 76 is pivoted toward one of the arms of the recess on the central contact 64 and the finger 74 and arm associated therewith is forced downwardly and flexed when the projections 80 and rim 82 of the handle 78 are moved. Hence when the clockwise direction of force is removed, the contact actuator 72 will urge and move the handle 78 and contact plate 76

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to a neutral position and out of contact with the spaced stationary contacts 66. It is to be noted that all other parts of the switch and functions thereof as shown in the modification are similar to that described in the embodiment in Figures 1 to 5 and the central contact 64 when connected in common with circuits associated with the three contacts 66 will permit any one of the circuits to be closed when the handle is moved in the proper direction.

While the embodiments of the present invention as herein disclosed, constitutes 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 housing having spaced stationary contacts and a center contact intermediate said spaced contacts, a contact plate within said housing pivoted on said center contact adapted to selectively engage any one of said stationary contacts, a spring strip carried by said housing having integral ear portions in contact with said contact plate for normally maintaining said plate in a neutral position and a pivotal operating handle having an end adapted to engage the ear portions of said spring and adapted to contact the ear portions of said spring and adapted to flex said spring for rocking said plate from said neutral position about said center contact and into engagement with one of said spaced contacts.

2. In an electric switch having a housing carrying spaced stationary contacts and a center contact spaced intermediate said stationary contacts, the improvement comprising; a contact plate pivoted on said center contact adapted to selectively engage any one of said stationary contacts, an operating handle pivotally mounted within said housing; a spring strip having ends normally carried by said housing, a central portion in contact with one end of said handle for normally maintaining said handle in a neutral position, and integral ear portions intermediate the ends and central portion of said strip in contact with said plate for normally maintaining said plate and handle in a neutral position, said handle being adapted when moved from said position to flex said spring and move the ear portions thereof for rocking said plate on said central contact into engagement with any one of said stationary contacts.

3. An electric switch having a housing of insulating material defining a central chamber with a plurality of radially disposed recesses interconnected with each other through said central recess, an abutment formed integrally on said housing in each of said radial recesses and disposed therein remote from said central recess, a central stationary contact in said central recess and a stationary contact in each of said radial recesses disposed intermediate said central contacts and said abutments; a movable contact plate having its mid portion pivotally carried by said central pivot and having radially disposed arms in each of said recesses adapted to engage said stationary contacts, an actuating means for moving said contact plate, said means including; a spring having a central portion with radial arm portions extending therefrom, each of said arms being received in a radial recess and having the ends thereof normally resting on an abutment, and an integrally formed finger portion in each of said spring arms adapted to engage an arm of said contact plate, and a pivotal operating handle having an end in contact with the central portion of said spring and bifurcated portions on said end in contact with said finger portions whereby said handle is normally maintained in a neutral position by said spring and is movable from said neutral position toward one of said recesses to flex an arm of said spring toward the contact arm in said recess and cause the finger portions associated with said arm to move the contact plate into engagement with the stationary contact in said recess while the end of the arm portions of said spring remove from the flexed arm is

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moved out of engagement with the abutment wherewith it is associated.

4. In a switch of the character described, a contact actuator comprising a unitary member having a central portion and radially disposed arm portions adapted to have the ends thereof normally rest on abutments in a switch housing and a finger portion in each of said arms disposed intermediate the central portions and the ends thereof adapted for pivotally moving a movable contact member when the finger and the arm associated therewith is flexed toward said contact member.

5. In a switch of the character described, a contact actuator comprising a unitary member of resilient material having a central portion with radially disposed arm portions extending therefrom, finger portions integral with each of said arms arranged for normally holding a movable pivotal contact plate in a neutral position, each of said arms and the finger portion associated therewith being adapted when flexed for pivoting said contact plate from said neutral position into contact with a stationary contact spaced from the point of pivot of said contact.

6. An electric switch having a cruciform shaped housing, defining a recess having cruciformly disposed arms, a stationary contact in each of the arms of said recess, a center contact intermediate said stationary contacts in the central portion of said recess, a cruciform shaped contact plate pivoted on said center contact adapted when pivoted to selectively engage any one of said stationary contacts, a resilient cruciform shaped contact actuator carried by said housing and having an ear in each of its

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arms in contact with an arm of the contact plate for maintaining said plate in a neutral position, and a pivotal operating handle having one end adapted to engage the ear portions of said actuator for flexing said actuator and rocking said plate from the neutral position about said contact and into engagement with any one of said stationary contacts.

7. An electric switch having Y-shaped housing, a stationary contact in each of the arms of said housing, a center contact intermediate said stationary contacts in the central portion of said Y-shaped housing, a Y-shaped contact plate pivoted on said center contact adapted when pivoted to selectively engage any one of said stationary contacts, a resilient Y-shaped contact actuator carried by the ends of its arms on said housing and having an ear in each of its arms in contact with an arm of the contact plate for maintaining said plate in a neutral position, and a pivotal operating handle having one end adapted to engage the ear portions of said actuator for flexing said actuator and rocking said plate from the neutral position about said contact and into engagement with any one of said stationary contacts while the other arms of said actuator are moved out of engagement with said housing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,825,991	Bobroff	Oct. 6, 1931
1,829,037	Bobroff	Oct. 27, 1931