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ELECTRIC SWITCH

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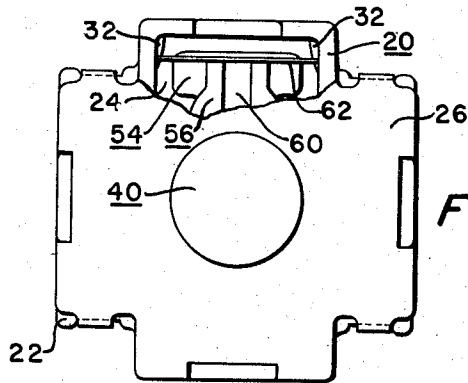


Fig. 1

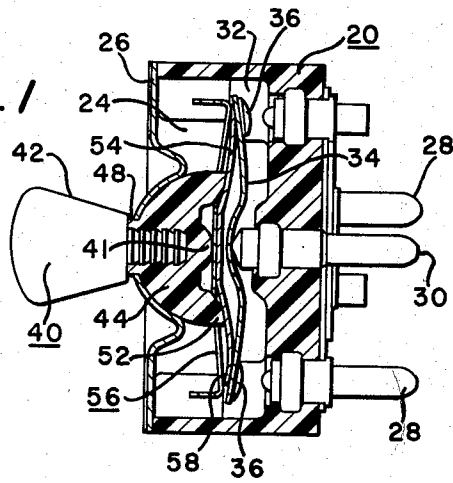


Fig. 3

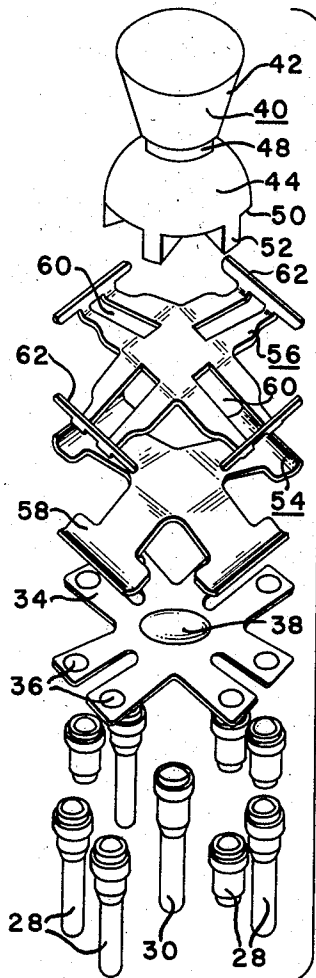


Fig. 2

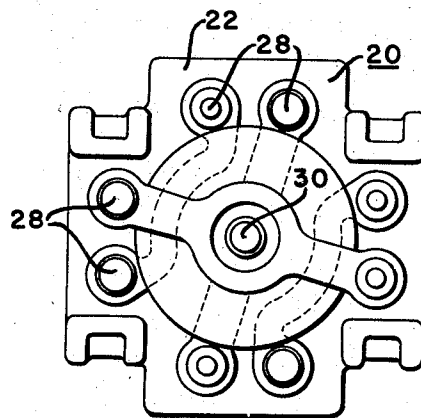


Fig. 4

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## ELECTRIC SWITCH

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11 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.

This application is a continuation in part of the application Ser. No. 439,301, filed June 25, 1954, which has been assigned to the assignee of the present invention.

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.

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 spring strip member that has a shape complementary to the movable contact plate and has a portion thereof normally resting on the switch housing. The spring member, positioned between a pivotal operating handle and the movable contact, has slots therein to permit portions of the handle to engage a second spring strip member to transmit movement of the handle to the movable plate 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. The movement of the handle being transmitted through a second spring strip member to the contact plate to rock said plate about its pivot from the neutral position into contact with one of the stationary contacts.

A still further object of the present invention is to provide a switch structure with an actuating mechanism which includes a pair of spring strip members, one of which is used to maintain an operating handle in a neutral position and the other is used to maintain a contact plate in a neutral position.

A further object of the present invention is to provide a switch structure with radially spaced pairs of contacts and a central contact which provides a pivot for a contact plate which is arranged to selectively engage any pair of said contacts when an actuating handle, pivotally carried by the switch housing and normally held in a neutral position by a spring strip member, pivots the plate through a second strip member which is engaged by the handle and normally maintains the plate in a neutral position.

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It is still another object of the present invention to provide a switch with a cross-shaped housing that defines a cross-shaped recess and to include pairs of contacts in each of the arms of the recess and a center contact in the center of the recess, and to provide permanent connectors between certain contacts of said contact pairs and a pivot connector means between said central contact and any one pair of said pairs of 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.

In the drawings:

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

Figure 2 is an exploded view in perspective showing the arrangement of the various parts of the switch in Figure 1.

Figure 3 is a sectional view and Figure 4 is a bottom view of the switch according to the present invention.

The numeral 20 designates a switch which preferably has a base 22 shaped like a cross. The base 22 may be formed of any suitable molding insulating material, for an example a molded phenolic condensation product and a filler and is formed to have a cross-shaped recess 24 which is closed by a cover 26. The recess 24, because of its inherent shape will provide for radially spaced recesses which are interconnected by a central recess. Located in each of the extending recesses are stationary contacts 28. If desired, only a single contact may be located in each recess or a pair of contacts may be arranged as shown. A single contact 30 is centrally located in the recess 24 intermediate the contacts 28. The contacts 28 and 30 are preferably embedded in the material of the base 22 during the formation thereof. Included also along the walls of the extending recesses are abutments 32 which are also formed during the molding process. The purpose of these abutments 32 will be hereinafter set forth.

Pivoted on the center contact is a movable contact plate 34. This contact member is most clearly shown in Figure 2 of the drawings and is of cruciform shape so it may be received in the cross-shaped recess 24. The contact plate 34 preferably is formed with bifurcated ends on the extending arms which bifurcated ends each have a contact 36 secured thereon. The contacts 36 are arranged to engage the stationary contacts 28 when the plate 34 is pivoted on the central contact 30 to complete a circuit between the central contact 30 and any pair of the stationary contacts 28. If desired, the contact member may have a central dished portion which will aid in maintaining the contact plate 34 in position in recess 24.

The switch 20 also includes an operating handle 40. This handle has portion 42 which extends through a cruciform shaped opening in cover 26. The portion 42 is connected to a hemispherically shaped body portion 44 by a neck portion 48. The hemispherical body portion 44 has a relatively sharp edge 50 along its bottom surface. Extending downwardly from the bottom surface of the body portion 44 are four circumferentially spaced lugs 52. The purpose of the sharp edge 50 and the extending lugs 52 will be hereinafter described.

Positioned between the actuating handle 40 and the contact member 34 is a pair of cruciform shaped members 54 and 56. Both of these members are formed of spring strip material. The member 54 is positioned to be in constant engagement with the contact plate 34. The member 56 is positioned above member 54 so that when the switch parts are in a neutral position, the knob 41

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on the handle 44 is in constant engagement with the member 56. The member 54 has a portion 58 formed on the extremity of each of its arms. These portions 58 are curved to rest upon the extending arms of the contact member 34.

The member 56 is formed with slots 60 in each of its arms. These slots 60 are arranged as shown so the lug portions 52 may extend through the slots and engage the arm portions of member 54 while the sharp edge 50 is in engagement with material of the extending arms of the member 56 which surrounds the slots 60. The member 56 also has extending portions 62 formed on the ends of each of the extending arms. These portions 62 are longer than the portions 58 on member 54 and are arranged to engage the abutments 32 while the portions 58 pass between the abutments without interference. Thus, when the parts of the switch are assembled, the portions 62 will rest on the abutments 32 and will normally urge the pivoted handle 40 to a neutral position. When the handle 40 is thus positioned, the lugs 52 will cause the member 54 to assume a neutral position and maintain the contact plate 34 out of engagement with the stationary contacts 28. When, however, the handle 40 is pivotally moved from the neutral position toward any one of the pairs of stationary contacts 28, the sharp edge 50 on the handle 40 will stress the material of a member 56 adjacent the slot 60. Simultaneously the lugs 52 will engage the proper arm portion of the contact actuator 58 and pivot the member 54 into engagement with one of the pairs of contacts 28 so a circuit is completed between the central contact 30 and contacts 28. The members 54 and 56 are resilient and will transmit the motion of the handle 40 to the plate 34. These members 54 and 56 will prevent the switch parts from rattling when the switch is installed in a vehicle irrespective of the position of the handle 40.

In Figure 4 of the drawings an arrangement whereby the various terminals may be interconnected is shown. This arrangement will permit various circuits to be simultaneously energized for any predetermined purpose whenever the handle is moved in one of the four directions.

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 housing having spaced stationary contacts and a center contact intermediate said spaced contacts, a contact plate within said housing pivoted on said center contact and arranged to selectively engage any one of said stationary contacts, a spring strip having end portions carried by said housing and a plurality of slots therein each oriented between said center contact and one of said spaced contacts, an actuator disposed between said spring strip and contact plate, and a pivotal actuating member having projecting lugs extending through said slots into engagement with said actuator and having a body portion in constant engagement with said spring strip, said actuating member, spring strip, actuator and contact plate being constructed and arranged so the pivotal movement of said actuating member is resiliently opposed by said spring strip and the pivotal movement of said actuating member is accompanied by a pivotal movement of said contact plate.

2. 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 and arranged to selectively engage said stationary contacts, a resilient actuator disposed above said contact plate, a slotted spring strip carried by said housing and positioned above said actuator for normally maintaining said plate and actuator in a neutral position, and a pivotal operating handle having a body portion in engagement with said strip and lug portions extending through the slots in said strip into engagement with said actuator for rocking said plate from

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the neutral position about said center contact into engagement with said spaced contacts.

3. In an electric switch having a housing carrying spaced stationary contacts and a center contact spaced intermediate said stationary contacts, the combination 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 resting on said housing and a central portion in contact with said handle for normally maintaining said handle in a neutral position, a plurality of radially extending slots in the central portion of said spring strip, a resilient strip actuator disposed between said spring strip and plate for normally maintaining said plate in a neutral position and means on said handle extending through said slots into engagement with said actuator for pivoting said plate when said handle is moved against the force of said strip from said neutral position.

4. In an electric switch having a housing carrying spaced stationary contacts and a center contact spaced intermediate said stationary contacts, the combination comprising; a contact plate pivoted on said center contact and adapted to selectively engage any one of said stationary contacts, an operating handle movable in said housing and having an end spaced from said plate, and a pair of spring strip members disposed one above the other in said housing between said plate and the end of said handle, said one strip being arranged in said housing for constantly maintaining said handle in a neutral position in said housing and said other strip being arranged for pivoting said plate into engagement with at least one of said stationary contacts when said handle is moved from said neutral position.

5. In an electric switch, the combination comprising; a housing of insulating material having extending arms defining a cross-shaped recess, a stationary contact in each of the arms of said recess, a pivotal stationary contact centrally located in said recess, a contact plate pivoted on said center contact arranged to selectively engage any of said stationary contacts, an operating handle movable in said housing and having an end spaced from said plate, and a pair of spring strips each having a cross shape, said spring strips being disposed one above the other in said recess between said plate and handle and being constructed and arranged so the strip adjacent said handle engages portions of said housing for urging said handle to a neutral position, and the strip adjacent said plate urges said contact plate to a neutral position when said handle is in a neutral position.

6. In an electric switch, the combination comprising; a housing having extending arms defining a plurality of recesses interconnected by a central recess, a stationary contact in each of the recesses, a stationary center contact in said central recess, a contact plate pivoted on said center contact having arm portions arranged to selectively engage any of said stationary contacts, an operating handle movable in said housing, and a pair of spring strip members positioned one above the other in said housing and between the handle and plate, said strips being constructed and arranged so the strip adjacent said handle constantly urges said handle to a neutral position and the strip adjacent said plate constantly urges said plate to a neutral position.

7. In an electric switch, the combination comprising; a housing having extending arms defining a plurality of recesses interconnected by a central recess, a stationary contact in each of the recesses formed by said arms, a stationary center contact in said central recess, a contact plate pivoted on said center contact having arm portions arranged to selectively engage any of said stationary contacts, an operating handle movable in said housing, and a pair of spring strip members positioned one above the other in said housing between the handle and plate, said strips being constructed and arranged so both of said

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strips are in contact with portions of said handle for constantly urging said handle and contact plate to a neutral position.

8. In an electric switch, the combination comprising; a housing having extending arms defining a plurality of recesses interconnected by a central recess, stationary contacts in each of the recesses formed by said arms, a stationary center contact in said central recess, a contact plate pivoted on said center contact having arm portions arranged to selectively engage said stationary contacts, an operating handle movable in said housing, and a pair of spring strip members positioned one above the other in said housing between the handle and plate, the strip adjacent said handle being slotted and in engagement with said handle for constantly urging said handle to a neutral position, and the strip adjacent said plate being engaged by portions of said handle extending through said slots for constantly urging said plate to a neutral position.

9. In an electric switch, the combination comprising; a housing having extending arms defining a plurality of recesses interconnected by a central recess, stationary contacts in each of the recesses formed by said arms, a stationary center contact in said central recess, a contact plate pivoted on said center contact having arm portions arranged to selectively engage said stationary contacts, an operating handle movable in said housing, and a pair of spring strip members positioned in said housing recesses between said handle and plate, the strip adjacent said handle being in constant engagement with said handle and portions of said housing for constantly urging said handle to a neutral position and the strip adjacent said plate being in engagement with portions of said handle and plate for constantly urging said plate to a neutral position.

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10. In an electric switch, the combination comprising; a housing having extending arms defining a plurality of recesses interconnected by a central recess, a pair of stationary contacts in each of the recesses formed by said arms, a stationary center contact in said central recess, a contact plate pivoted on said center contact having arm portions arranged to selectively engage any of said pair of contacts, an operating handle movable in said housing, and a pair of spring strip members positioned in said housing recesses between said handle and plate, the strip adjacent said handle being in constant engagement with portions of said handle and housing for constantly urging said handle to a neutral position and the strip adjacent said plate being in constant engagement with portions of said plate and handle for constantly urging said plate to a neutral position and for pivoting said plate on the center contact into engagement with any one pair of said stationary contacts when said handle is selectively moved from the neutral position.

11. In an electric switch the combination comprising; a cross-shaped housing having extending arms defining a cross-shaped recess, a pair of stationary contacts in each of the arms of said recess, a plurality of permanent connectors located without said recess electrically connecting a selected contact of one pair of contacts with a selected contact of another pair of contacts and a movable contact plate for selectively connecting the control contact with any pair of said stationary contacts.

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