

June 3, 1958

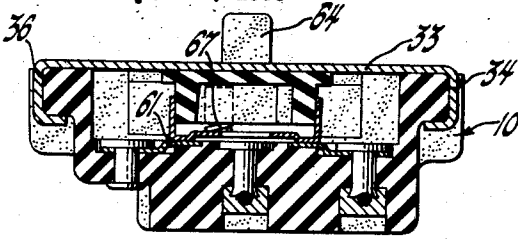
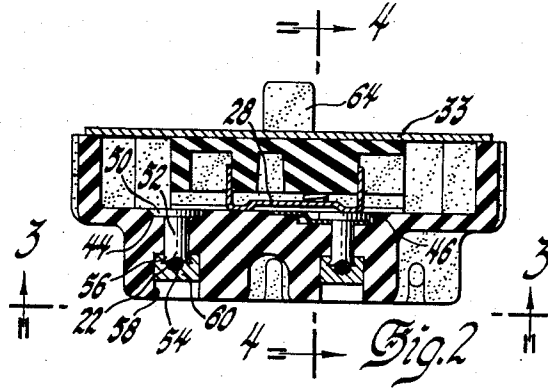
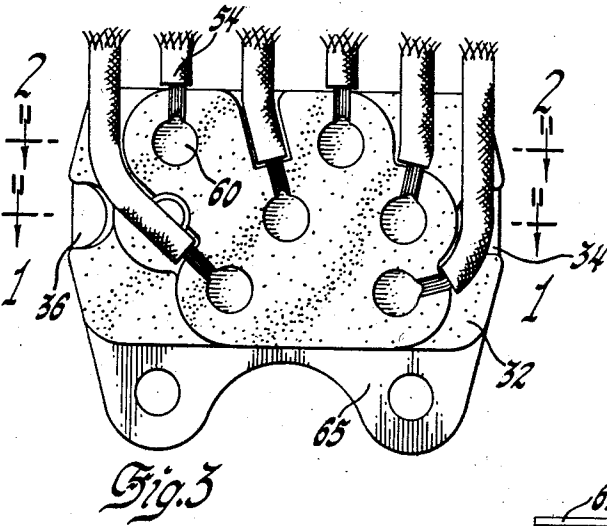
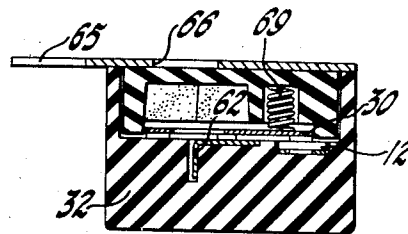
D. P. CLAYTON ET AL

2,837,609

ELECTRIC SWITCH

Filed Sept. 11, 1953

2 Sheets-Sheet 1



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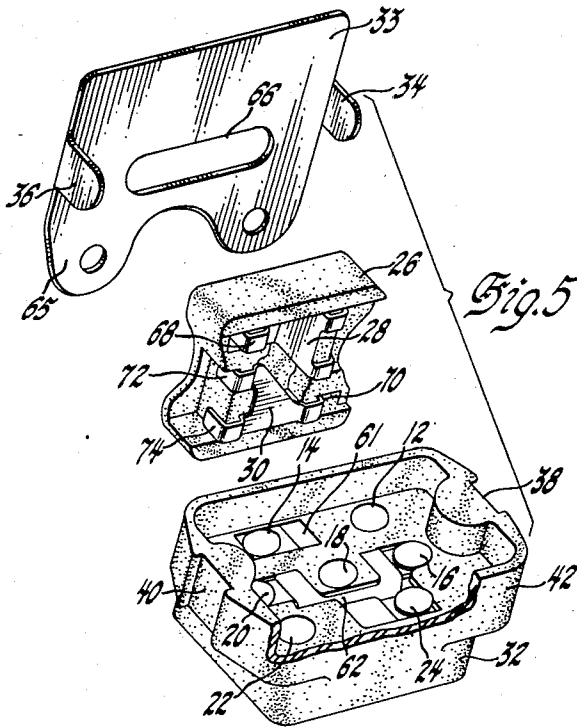
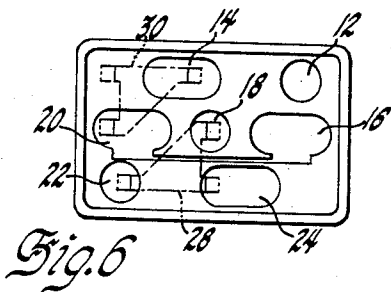
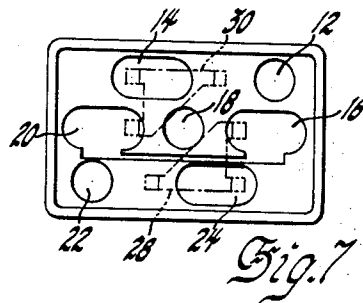
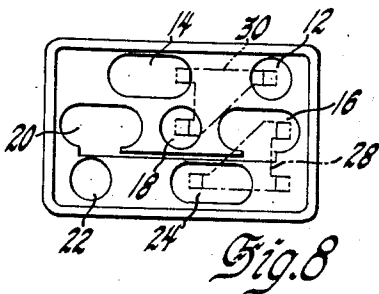
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2 Sheets-Sheet 2



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2,837,609

ELECTRIC SWITCH

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5 Claims. (Cl. 200—16)

This invention relates to electrical switches and more particularly to electrical switches of the type generally used in vehicle turn signal indicator mechanisms and similar devices.

The chief problem involved in the design of electrical switches suitable for use in turn signal indicator mechanisms concerns the provision of the relatively large number of electrical contacts necessary to establish the various circuits while yet maintaining the switch small in size so that it will fit into the limited amount of space available. In the ordinary vehicle turn signal mechanism, for example, provision must be made for opening and closing as many as six circuits, and the relatively large number of fixed and movable contacts thereby required must be incorporated into a switch having dimensions on the order of one and one half inches in length and one inch in width. At the same time, the switch must be extremely durable, dependable even after long and almost constant operation, and should preferably be simple in construction and low in cost.

Accordingly, it is an object of this invention to provide an electrical switch for vehicle turn signal mechanisms and the like which is simple in construction and therefore economical to manufacture and which at the same time is both durable and dependable. A further object is to provide a switch for opening and closing a relatively large number of circuits in which the arrangement of fixed and movable contacts is such that it may be of small size and therefore suitable for use in vehicle turn signal mechanisms wherein very limited space is available.

These and other objects are carried out in accordance with the invention by the provision of a switch having a single reciprocable contact block carrying two metal contactor plates designed for engagement with three linear groups of fixed contacts to thereby provide for opening and closing the various electrical circuits.

Other objects and advantages of the invention will appear more clearly from the following description and from the drawings in which:

Figure 1 is a sectional view taken on the line 1—1 of Figure 3, showing an electric switch embodying the invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 3;

Figure 3 is a bottom view of the switch taken on the line 3—3 of Fig. 2;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2;

Figure 5 is an exploded view of the switch;

Figure 6 is a diagrammatic view of the fixed and mov-

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able contacts when the switch is in the left turn position;

Figure 7 is a view similar to that of Figure 6 but with the switch in neutral position; and

Figure 8 is a view similar to that of Figure 6 but with the switch in the right turn position.

As best shown by Figures 1, 2 and 5, the switch comprises an elongated housing 10 having on the bottom wall thereof a plurality of fixed contacts 12, 14, 16, 18, 20, 22 and 24, and a reciprocable contact block 26 within the housing carrying a pair of triangularly shaped metal contactor plates 28 and 30. In the embodiment shown, the housing consists of a casing member 32 and a metal closure plate 33 which forms the top wall of the housing and which is secured to the casing member by a pair of integral lugs 34 and 36 which are bent first downwardly to fit into slots 38 and 40 and then inwardly around a flange 42 which forms the top wall of the casing member. We prefer to construct the casing member 32, as well as the movable block 26, of hard rubber, Bakelite or some other suitable natural or synthetic polymeric insulating material. When so constructed, these parts may be easily molded and are therefore quite inexpensive to manufacture. However, the housing and the movable contact block may be made from any suitable material so long as provision is made for electrically insulating the contacts and contactor plates from each other for proper operation of the switch, as hereinafter described.

The bottom inside wall of the casing 32 is provided with recesses such as are illustrated, for example, at 44 and 46 in Figure 2 for reception of the various fixed contacts. Each of the fixed contacts, as for example contact 22 shown in Figure 2, comprises a head portion 50 which fits into the recess 44 provided in the bottom inside wall of the casing, and a shank portion 52 which extends through a bore communicating with the recess 44 to the outside of the housing where it is connected by some suitable means to an electrical conductor 54 leading away from the switch. For establishing electrical connection between the fixed contacts and the lead wires, we prefer to use the structure and method of assembly disclosed in United States patent application Serial No. 271,795, filed February 15, 1952, which is assigned to the assignee of the present invention. Briefly, these electrical connections are established by bifurcating the end of the contact shank as shown at 56, positioning the bifurcated shank portion in counterbore 58, placing the lead conductor in the groove formed by the bifurcation and then tamping or otherwise forcing a soft metal 60 such, for example, as lead into the counterbore to force the lead conductor into good electrical contact with the shank portion of the contact and at the same time interlock with the end portions of the contact to thereby tightly and durably secure the members.

The fixed contacts are arranged in three linear groups all parallel with the longitudinal axis of the housing 10. Thus, fixed contacts 16, 18 and 20 form an inner linear group, contacts 12 and 14 form one outer linear group and contacts 22 and 24 form another outer linear group. The particular switch shown is designed for a turn signal circuit wherein the inner linear group requires three contacts and the two outer groups require two contacts each. However, it will be understood that the invention is also applicable to switches wherein any of the groups may contain more or less contacts than those shown as, for ex-

ample, where an outer group may consist of a single fixed contact.

As can best be seen in Figure 5, the head portions of fixed contacts 14, 16, 20 and 24 have an elongated shape so that they are adapted for engagement by the contactor plates when the block 26 is in one of two different switching positions. With reference to Figures 1 and 5 it will be seen that we have formed the elongated head portions of these contacts by means of metal tabs, one of which is shown at 61. With the exception of contacts 16 and 20 which are electrically connected by a conductor 62, all of the fixed contacts are electrically insulated from each other.

The block 26, which is sized for reciprocation longitudinally within the housing 10, is provided with an operating arm 64 which extends upwardly through the elongated slot 66 in the closure plate 33. When the switch is installed into a turn signal operating mechanism by means of the apertured extension 65 on the closure plate 33, the arm 64 is engaged by linkage such that it will be actuated to and fro in accordance with the vehicle operator's movement of the turn signal operating lever for left and right turns.

Each of the triangularly shaped contactor plates 28 and 30, which are carried on the bottom of the block 26 for bridging engagement with the fixed contacts as hereinafter described, is provided with raised corner portions, indicated by 68 in Figure 5, to assure positive electrical contact with the fixed contacts. Coil springs 67 and 69, which are recessed into the block 26, are biased between the block and each of the respective contactor plates 28 and 30 to resiliently urge them into engagement with the fixed contacts. As shown in Figure 5, each of the contactor plates 28 and 30 is maintained in its proper position with respect to the block 26 by means of legs 70, 72 and 74 which extend into recesses formed in the block 26.

The contactor plates 28 and 30, which are electrically insulated from each other, are positioned side by side transversely of the housing and of the direction of reciprocation of the block 26. One raised corner portion of each of these contactor plates is thereby adapted to engage the inner group of fixed contacts, while the outer raised corner portions of each contactor plate are adapted to engage the respective outer groups of contacts. Thus, the operation of the switch is as follows:

When the block 26 is in center position as shown in Figure 7, contactor plate 28 connects contact 24, which leads to the left rear lamp, to contact 16, which connects to the stop light switch. At the same time, contactor plate 30 connects contact 14, which leads to the right rear lamp, to contact 20, which also connects to the stop light switch. Thus, in this position, both rear lamps are in circuit with the stop light switch which is actuated by the brake pedal.

When the block 26 is moved to the left, as shown in Figure 6, contactor plate 28 bridges contact 18, which is the flasher feed, to the contact 22 for the left front turn signal lamp, and to contact 24 leading to the left rear lamp. At the same time, contactor plate 30 bridges contact 20, the stop light switch lead, to 14 which connects to the right rear lamp.

When the block is moved to the right, as shown in Figure 8, contactor plate 28 bridges 16 to 24 so that the left rear lamp is in circuit with the stop light switch, while contactor plate 30 bridges the flasher feed contact 18 with both the right front turn signal lamp contact 12 and the right rear lamp contact 14.

It will be understood, of course, that switches embodying the invention as herein described may be adapted for various other types of turn signal circuits.

It will be noted from the above description of a preferred embodiment of the invention that the large number of contacts required by such devices as turn signal mechanisms are provided in a single block switch having relatively small dimensions. This has been accomplished,

in accordance with the invention, by arranging the fixed contacts in three linear groups, as described, and by positioning the contactor plates in side-by-side relation transversely of the direction of reciprocation of the block so that each of the plates may simultaneously bridge the inner group of contacts with one of the outer groups. By this means, the simplicity of the single block type switch is retained and the length of the switch is diminished greatly without substantially increasing the width.

We claim:

1. An electric switch comprising a housing, a block adapted for reciprocation within said housing, a plurality of fixed contacts in one wall of said housing and arranged in three linear groups all parallel with the direction of reciprocation of triangular shaped said block, and a pair of contactor plates arranged side by side on said block transversely to the direction of reciprocation of said block, one of said contactor plates being positioned for bridging engagement with the inner group of fixed contacts and one of the outer groups of fixed contacts and the other of said contactor plates being positioned for bridging engagement with the inner of said groups and the other of the outer of said groups of fixed contacts.

2. An electric switch comprising an elongated housing, a block within said housing and adapted for reciprocation longitudinally thereof, a plurality of fixed contacts in one wall of said housing and arranged in three linear groups all parallel with the direction of reciprocation of said block, a pair of triangular shaped contactor plates arranged side by side on said block transverse to the direction of reciprocation of said block, one of said contactor plates being positioned for bridging engagement with the inner group of fixed contacts and one of the outer groups of fixed contacts and the other of said contactor plates being positioned for bridging engagement between the inner of said groups and the other of the outer of said groups of fixed contacts, and spring means biased between each of said contactor plates and said block resiliently urging said contactor plates into engagement with said fixed contacts.

3. An electric switch for turn signal mechanism comprising a housing having seven fixed contacts in the bottom wall thereof, a block within said housing adapted for reciprocation therein, a pair of triangular shaped contactor plates carried by said block, said contactor plates being arranged side by side transversely to the direction of reciprocation of said block, and spring means biased between said block and said contactor plates to resiliently urge said contactor plates against the bottom wall of said housing, said fixed contacts being arranged in an inner linear group comprising three contacts and two outer linear groups, each comprising two contacts, all of said groups being parallel to the direction of reciprocation of said block, one of said contactor plates being positioned to bridge the inner group of contacts with one of the outer groups and the other of said contactor plates being positioned to bridge the inner group with the other of said outer groups.

4. An electric switch for turn signal mechanisms and the like comprising an elongated housing having a plurality of fixed contacts in one wall thereof and arranged in three linear groups all parallel with the longitudinal axis of said housing, and a block in said housing adapted for reciprocable movement longitudinally thereof, said block carrying a pair of triangular shaped contactor plates arranged side by side transversely to the longitudinal axis of said housing, one of said contactor plates being positioned for bridging engagement with the inner group of fixed contacts and one of the outer groups of fixed contacts and the other of said contactor plates being positioned for bridging engagement with the inner of said groups and the other of the outer of said groups of fixed contacts.

5. An electric switch comprising a housing, a pair of triangular shaped contactor plates reciprocable as a unit

within said housing and arranged side by side transversely to the direction of reciprocation, and a plurality of fixed contacts in one wall of said housing and arranged in three linear groups all parallel with the direction of reciprocation of said contactor plates, one of said contactor plates being positioned for bridging engagement with the inner group of fixed contacts and one of the outer groups of fixed contacts and the other of said contactor plates being positioned for bridging engagement with the inner of said groups and the other of the outer of said groups of fixed contacts.

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