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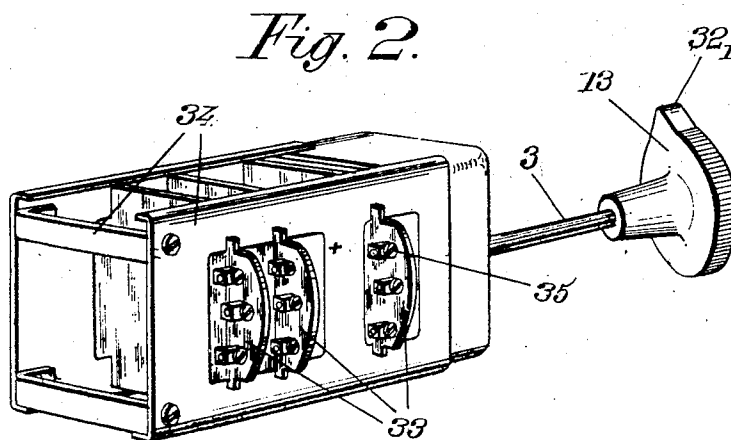
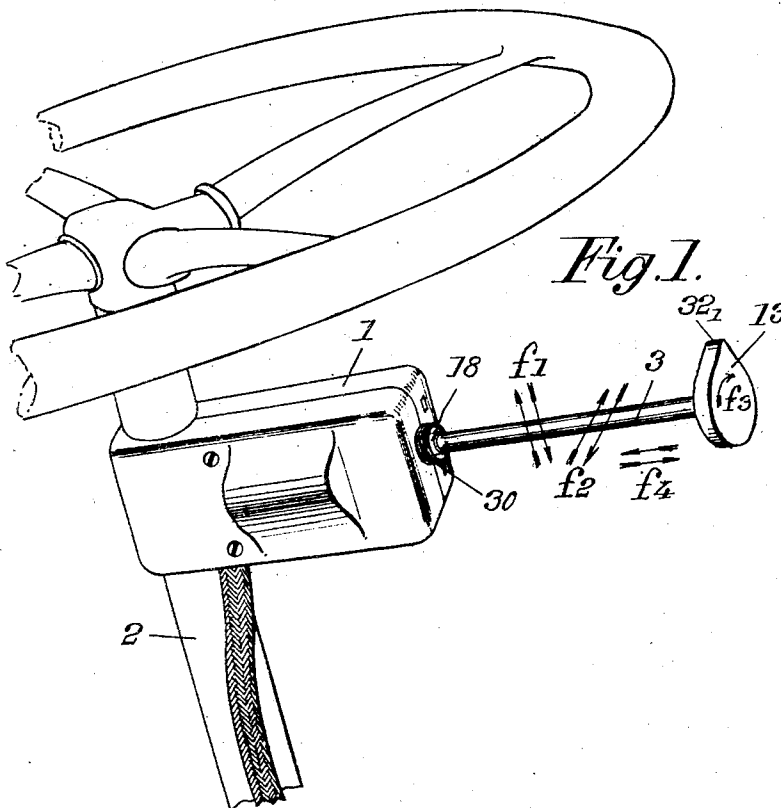
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2,453,035

MULTIPLE FUNCTION SWITCH

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4 Sheets-Sheet 1



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Fig. 3.

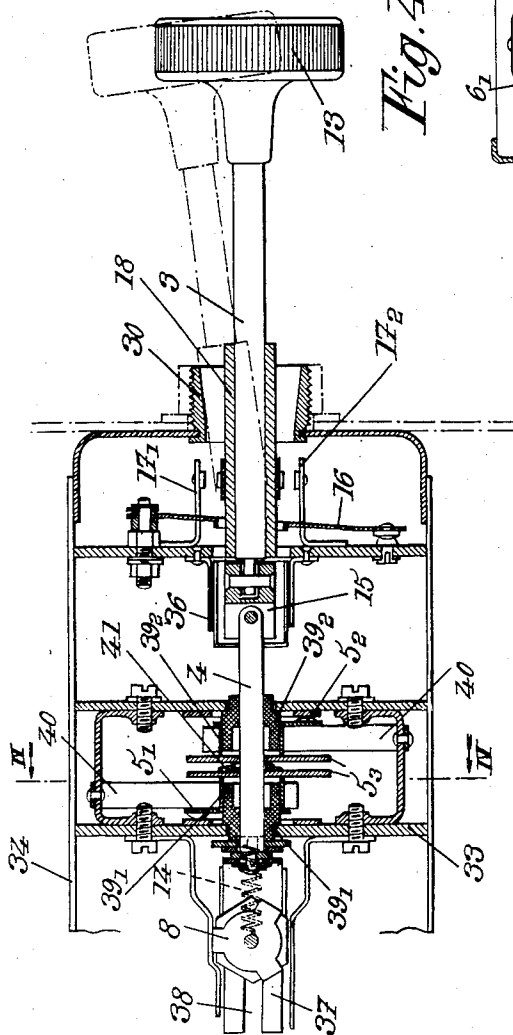
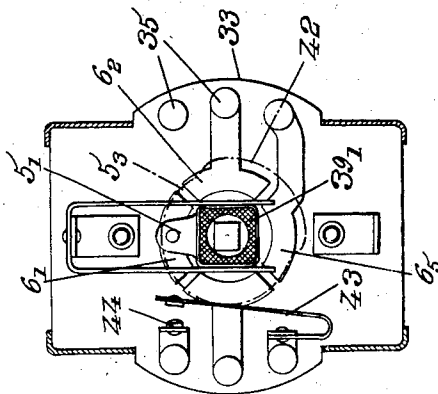


Fig. 4.



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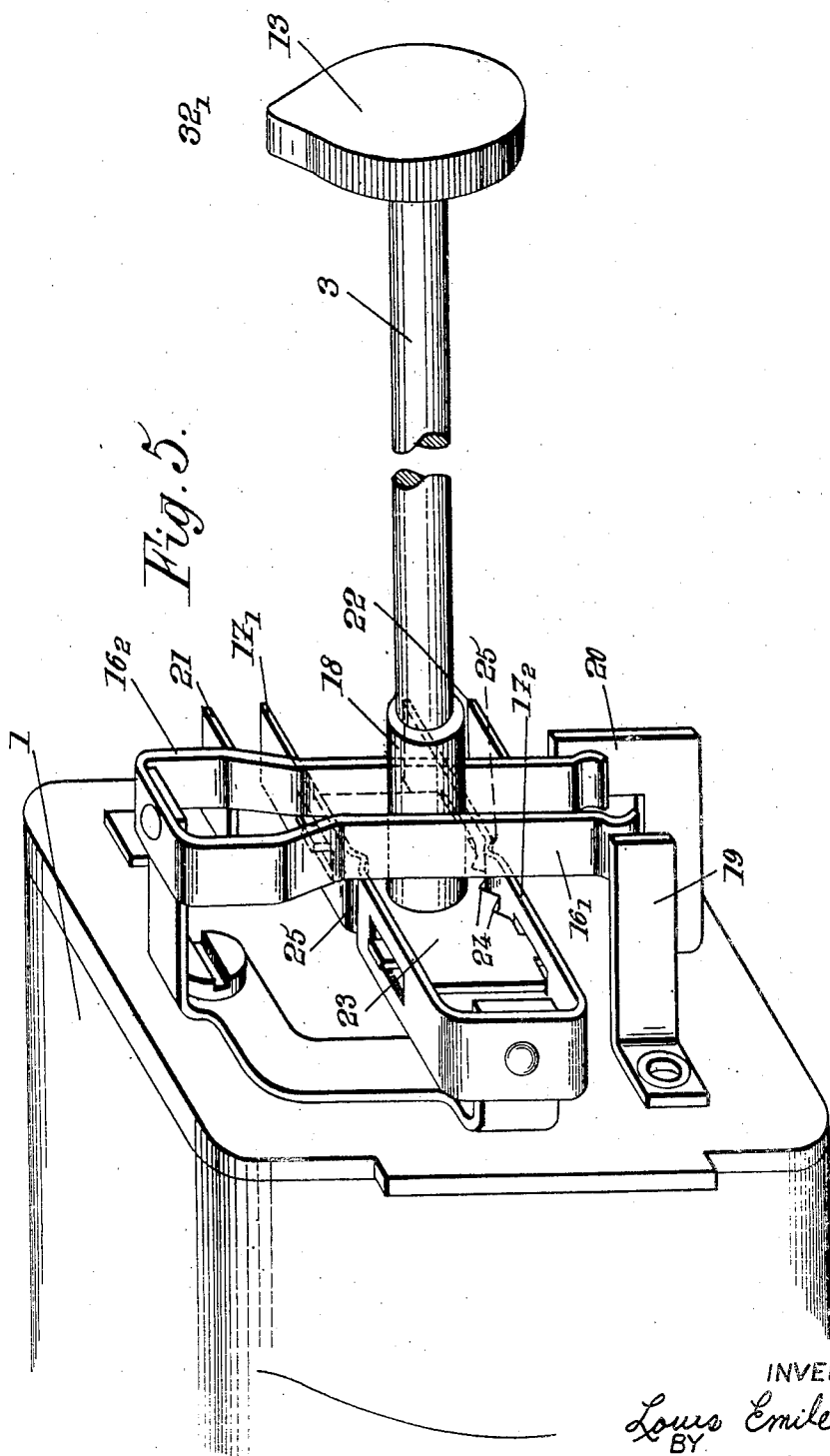
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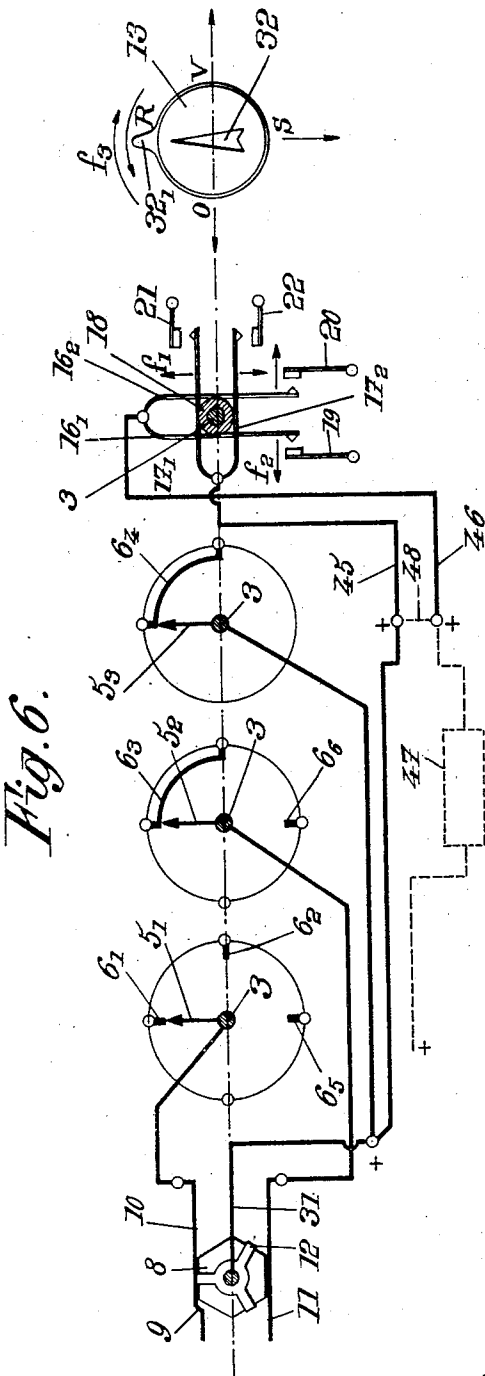
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MULTIPLE FUNCTION SWITCH

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4 Sheets-Sheet 4



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MULTIPLE FUNCTION SWITCH

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9 Claims. (Cl. 200—4)

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My invention relates to multiple function switches and in particular to those intended to be fitted on vehicles for controlling the lighting and signal control circuits thereof.

The chief object of my invention is to provide a device of this kind which is better adapted to meet the requirements of practice than those used for the same purpose up to this time.

Preferred embodiments of my invention will be hereinafter described with reference to the accompanying drawings, given merely by way of example and in which:

Fig. 1 shows, in perspective view, an automobile vehicle steering wheel and a switch device fitted on the steering column and made according to my invention;

Fig. 2 shows this device in perspective view with the casing removed;

Figs. 3 to 5 show this device respectively in axial section, in cross section on the line IV—IV of Fig. 3 and in perspective view on an enlarged scale;

Fig. 6 is the electric wiring diagram of the device.

It should be reminded that it has already been suggested to provide a single switch to control a plurality of different circuits, in particular those corresponding to the city driving beam bulbs, the country driving beam bulbs and the parking lights. It is also known to provide, for the switch control member, two kinds of movements, to wit the usual rotation movement and a translatable reciprocating movement along the axis of rotation of the first movement, this in particular to make it possible to switch from "country" beam to "passing" beam.

According to a feature of my invention, the switch control member is made capable of undergoing displacements transverse to its rotation axis, in particular of pivoting about a point of this axis.

It is thus possible to increase the number of operations to be controlled by the switch. But it should be well understood that the above feature may be applied whatever be the number and nature of these operations, and that said transverse movement may be utilized in combination with only the usual axial rotation or only an axial translatable movement, although it is of interest to provide the switch with a push piece

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capable, as it will be hereinafter assumed, of undergoing the three above mentioned kinds of displacements, to wit:

- a. A rotation,
- b. A translation, and
- c. A transverse movement, and especially a pivoting one.

Besides, this last mentioned movement may be provided in several different directions which may correspond to as many different functions; for instance in directions at right angles to each other, as shown by arrows f_1 , f_2 in Fig. 1.

Such an arrangement will permit of controlling through the switch in question all the lighting system and signalling systems electric circuits, in particular those corresponding to:

City lighting (city beam of the headlights and tail light switched on);

Country lighting (country beam of the headlights and tail light switched on), with the possibility, in particular through a translatable reciprocating displacement of the switch control member, of passing from "country" beam to "passing" (no glare) beam and vice-versa;

Parking lamps (right side one or left side one);
Acoustic signals, advantageously including a city horn and a country horn;

Steering indicator signals, for turning toward the right or toward the left (arrows or any other devices).

In the embodiment shown by the drawings, the contacts relating to these circuits may be grouped in the same casing, such as 1, mounted for instance either close to the steering wheel and in particular carried by the steering column 2, as shown (but also adapted to be fixed on the instrument board, for instance by screwing, said casing being for this purpose provided with a threaded collar 30). A push piece 3 is adapted to undergo any of the above mentioned displacements, represented on Fig. 1 by arrows f_1 , f_2 , f_3 , f_4 .

It will be supposed that the movements of piece 3 along f_3 and f_4 are used for controlling the lighting circuits, whereas the movements along f_1 and f_2 are utilized for controlling the signalling devices (acoustic signals for f_1 and direction indicator for f_2).

Concerning now the portion of the switch that is concerned with the movements of push piece 3 in the directions of arrows f_3 (rotation) and f_4

(translatory reciprocation), I preferably make use of another feature of my invention according to which:

a. The rotary displacements (arrows f_3) of push piece 3 serve to prepare the electric circuits corresponding to the desired operation such as country beam on, city beam on, parking lights on; and

b. The translatory displacements (arrows f_4) of the same push piece serve to switch from one to the other of these operations.

Owing to this arrangement, control of the lighting system will become extremely simple for the driver. He will first select the desired circuit, by rotating the push piece (operable through knob 13) into one of its three characteristic positions (a fourth one corresponding to neutral). Then he will give the push piece with a translatory displacement to bring this circuit into operation.

According to the embodiment of Figs. 3 and 4, the switch includes the following elements:

On the one hand, three rotary contacts 5₁, 5₂, 5₃, controlled by rotation of the push piece rod 3, these contacts coacting with contact studs or other suitable contact elements 6₁ to 6₆ (Fig. 6), respectively connected with the country beam circuit, the city beam circuit, with the passing beam circuit, the tail light or lights circuit, the left hand side parking light circuit and the right hand side parking light circuit;

And, on the other hand, a switch device brought into play by translatory axial displacements of rod 3, this device including for instance a hexagonal piece 8 adapted to rotate by tipping against an abutment 9 every time the push piece is pushed (said push piece being subsequently brought back in position by a spring), which piece 8 is adapted to place the positive terminal of a battery (connected through 31), through the intermediate of contacts 12, in communication either with plate 10, connected with contact 5₁, or with plate 11 connected with contact 5₂, said terminal being on the other hand permanently connected with contact 5₃.

This device works as follows:

In position zero (index 32 opposite 0, Fig. 6), nothing occurs, as contacts 5₁ to 5₃ are inoperative.

In the country beam position, at 90° to the preceding one (index 32 opposite R), the tail lamps are switched on and the driver obtains, according to the position of hexagonal piece 8, either the country beam through 6₁, or the passing beam through 6₃.

In the city beam position, at 90° to the preceding one (index 32 opposite V), the tail lamps are still switched on (contact element 6₄ extending over 90°, same as element 6₃) and the driver obtains, according to the position of hexagon 8, either the city beam (5₁ being on 6₂) or the passing beam.

And, finally, in the parking position, at 90° to the preceding one (index 32 opposite S), the driver obtains, according to the position of the hexagon, the switching on of either the left hand side light (5₁ on 6₅) or of the right hand side light (5₂ on 6₆).

In order to mark the angular position of button 13, any means may be provided. For instance I provide an indicating projection 32₁.

Figs. 2 to 4 show some details of the apparatus. The parts are advantageously carried by insulating plates such as 33, carried by a frame 34 to the outside of which they project (Fig. 2), to permit

fixing of the wires to the terminals 35. The whole is surrounded by casing 1.

Rod 3 drives (through means which will be hereinafter described), a spindle 4 which carries the rotary contacts or elements 5₁ to 5₃ and which controls, at the end, the rotation of hexagonal piece 8 in combination with a guiding member 37 with a groove 38. A return spring for spindle 4 and rod 3 is visible at 14.

Contacts 5₁ and 5₂ are mounted on pieces 33₁, 39₂ of square section fixed on spindle 4. They are electrically connected with plates 10 and 11 through elastic U-shaped pieces 40 which yieldingly keep them in the desired angular position. A spring 41 ensures contact of the cooperating parts.

Contact 5₃ is made in the form of a double cam the projecting portion 42 of which is adapted to ensure contact between two elements 43, 44 of a switch inserted in the circuit of the tail lamps.

Concerning now the portion of the switch including the contacts to be brought into play when displacements are given in directions f_1 and f_2 , they are made for instance as follows:

These displacements must take place in such manner as to maintain control of the displacements in directions f_3 and f_4 , which can be obtained for instance by interposing, between spindle 4 (guided at 36 in the frame) and rod 3, a cardan joint such as 15 (Fig. 3).

Of course, it will be necessary to provide means for yieldingly locking the control member in the median position and, preferably, in the other positions.

According to an embodiment, as shown by Figs. 5 and 6, I provide two pairs of contacts 16₁, 16₂ and 17₁, 17₂, at right angles to each other, through which passes rod 3, suitably insulated at 13, said pairs of contacts coacting with fixed contacts 19, 20, 21, 22, respectively connected with the circuits of the signalling devices.

19 is connected to the right hand side direction indicator, 20 to the left hand side direction indicator, 21 to the "country" horn, and 22 to the "city" horn.

Thus, according as member 3 is moved in the direction of arrows f_1 or f_2 , either the desired acoustic signal or the desired direction indicating signal is brought into play.

In order to obtain a yielding locking of rod 3 in each of its active positions, I make use for instance of a locking piece 24, with which projections 25 provided on plates 17₁, 17₂ are adapted to coact.

No locking has been provided for movements in direction f_1 corresponding to the operation of the sound signalling means.

It should be further noted that, as shown on the diagram of Fig. 6, I may provide for pieces 16₁, 16₂ and 17₁, 17₂ two distinct current supplied at 45, 46 respectively, this in order to permit, if so desired, of utilizing a twinkling device 47 for illuminating the direction indicating arrows. If this device is not utilized, a connection 48 is interposed between 45 and 46.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle movable with respect to said frame with both rotary displacements about its axis and translatory displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements, respectively, in different ways according to the position of said spindle with respect to said frame, a member for controlling said spindle, said control member being connected with said spindle so as to be movable transversely to the axis thereof, and supplementary contacts carried by said frame operative by said control member in response to transverse displacements thereof with respect to said axis.

2. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements respectively in different ways according to the position of said spindle with respect to said frame, a push piece pivoted to said spindle about at least one axis at right angles to the axis of said spindle, a control member carried by said push piece, and supplementary contacts carried by said frame operative in response to pivoting displacements of said push piece with respect to said spindle.

3. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements respectively in different ways according to the position of said spindle with respect to said frame, a push piece pivoted to said spindle about two axes at right angles to each other and to the axis of said spindle, a control member carried by said push piece, and supplementary contacts carried by said frame operative in response to pivoting displacements of said push piece with respect to said spindle.

4. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory reciprocating displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements, respectively, in different ways according to the position of said spindle with respect to said frame, a battery terminal, a rotary part mounted in said frame, said part being rotatable through a given angle in response to every axial displacement of said spindle in one direction in said frame, and contact means controlled by said rotary part for connecting said battery terminal alternately to at least two of the first mentioned contacts, respectively.

5. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and

translatory reciprocating displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements, respectively, in different ways according to the position of said spindle with respect to said frame, a battery terminal, a rotary part mounted in said frame, said part being rotatable through a given angle in response to every axial displacement of said spindle in one direction in said frame, contact means controlled by said rotary part for connecting said battery terminal alternately to at least two of the first mentioned contacts, respectively, a push piece pivoted to said spindle about at least one axis at right angles to the axis of said spindle, a control member carried by said push piece, and supplementary contacts carried by said frame operative in response to pivoting displacements of said push piece with respect to said spindle.

6. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory reciprocating displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements, respectively, in different ways according to the position of said spindle with respect to said frame, a battery terminal, a rotary part mounted in said frame, said part being rotatable through a given angle in response to every axial displacement of said spindle in one direction in said frame, contact means controlled by said rotary part for connecting said battery terminal alternately to at least two of the first mentioned contacts, respectively, a push piece pivoted to said spindle about two axes at right angles to each other and to the axis of said spindle, a control member carried by said push piece, and supplementary contacts carried by said frame operative in response to pivoting displacements of said push piece with respect to said spindle.

7. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements respectively in different ways according to the position of said spindle with respect to said frame, a push piece pivoted to said spindle about two axes at right angles to each other and to the axis of said spindle, a control member carried by said push piece, supplementary contacts carried by said frame operative in response to pivoting displacements of said push piece with respect to said spindle, and means for yieldingly locking said push piece with respect to said frame in a plurality of different angular relations to said spindle.

8. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements respectively in different ways according to the position of said spindle with respect to said frame, a push piece pivoted to said spindle about two axes at right angles to each other and to the

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axis of said spindle, a control member carried by said push piece, supplementary fixed contacts carried by said frame and contacts movably carried by said frame adapted to cooperate with said supplementary contacts respectively in response to pivoting displacements of said push piece with respect to said spindle.

9. A multiple function switch which comprises, in combination, a frame, a plurality of contact elements carried by said frame, a spindle guided in said frame so as to be movable therein with both rotary displacements about its axis and translatory displacements along said axis, contact elements carried by said spindle adapted to cooperate with said first mentioned contact elements respectively in different ways according to the position of said spindle with respect to said frame, a push piece pivoted to said spindle about two axes at right angles to each other and to the axis of

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said spindle, a control member carried by said push piece, supplementary fixed contacts carried by said frame, contacts movably carried by said frame adapted to cooperate with said supplementary contacts respectively in response to pivoting displacements of said push piece with respect to said spindle, and means for yieldingly locking said push piece with respect to said frame in a plurality of different angular relations to said spindle.

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