

W. W. DEAN.
ELECTRIC SWITCH.
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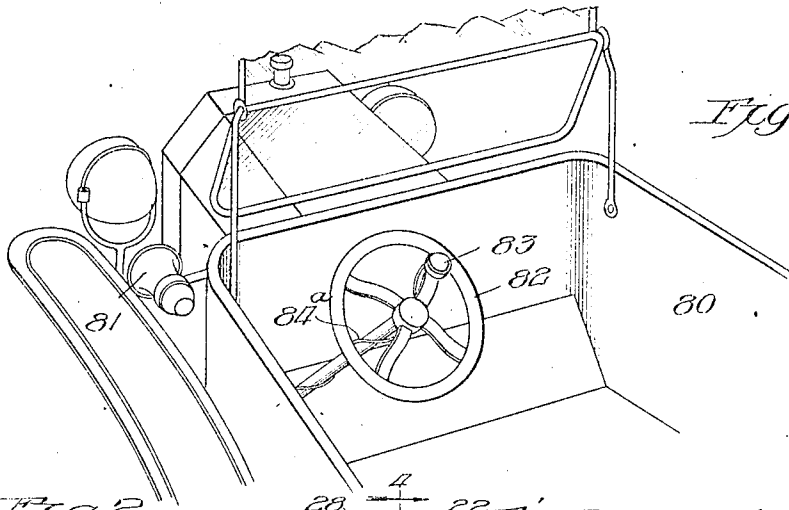
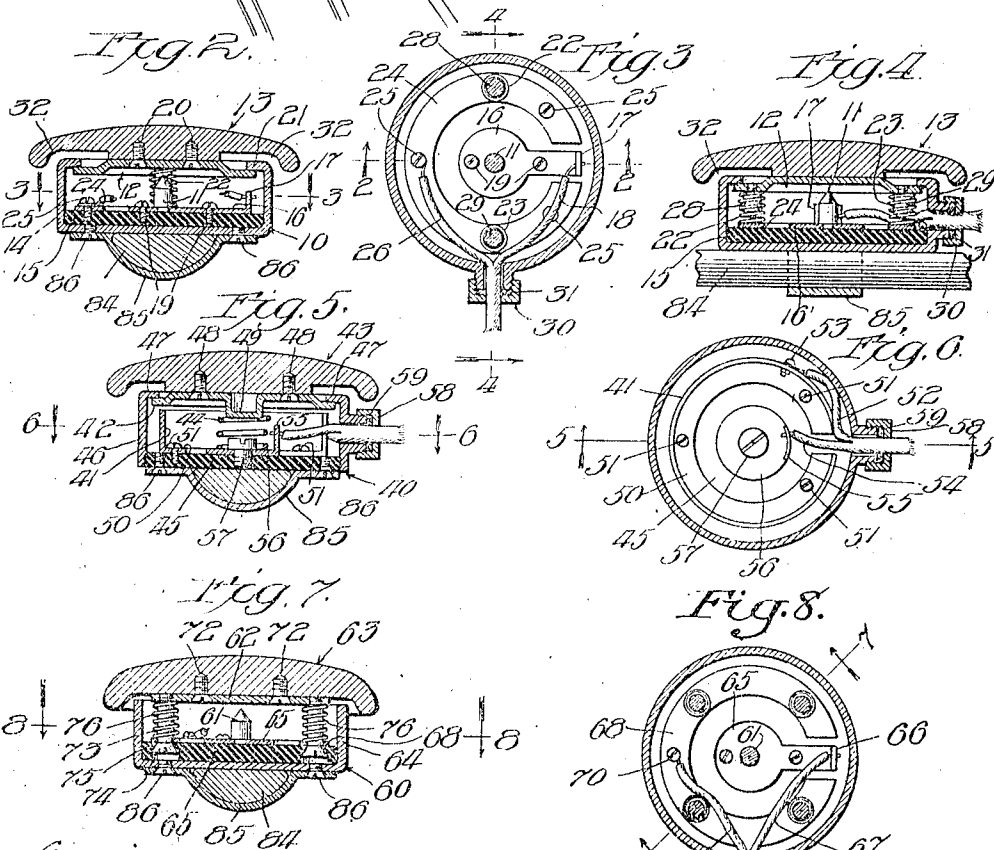


Fig. 1.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,256,210.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric Switches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

The present invention relates generally to electric switches of the pressure-operated type, and more particularly to switches of this class which can be positively operated without the exercise of special care or attention on the part of the user.

Such switches are especially applicable to situations where the time and attention of the user are taken up with other matters and a minimum only can be given to the operation of the switch. An example of such a situation is the operation of the control switch of an electric horn of an automobile. They are also desirable in other situations where for any reason the operating pressure cannot be carefully applied.

One object of the present invention is to provide a switch of this readily operable character in which the contact-actuating member or button shall be tiltable about fulcrum more or less distant from the center of the switch. Another object is to provide a switch which shall be closed against the weather, while retaining all the positiveness of operation required by switches of this class. Another object is to provide a switch which is simple in construction and economical to manufacture. These and other objects and advantages of my invention will be more fully understood upon reference to the following detailed description taken in connection with the accompanying drawing, and the scope of the invention will be particularly pointed out in the appended claims.

In the drawing—

Figure 1 is a general perspective view of a portion of an automobile illustrating one application of my invention, namely, that above referred to in which the switch is employed to control the circuit of an electric horn;

Fig. 2 is a vertical section of an electric switch constructed in accordance with my invention, illustrating also the manner of

attaching the same to the spoke of an automobile steering wheel, the section being taken on a plane indicated by the line 2—2 of Fig. 3;

Fig. 3 is a horizontal section of the same 60 taken on a plane indicated by the line 3—3 of Fig. 2;

Fig. 4 is a vertical section of the same taken on a plane at right angles to that of Fig. 2, indicated by the line 4—4 of Fig. 3; 65

Fig. 5 is a vertical section, similar to Fig. 2, of a modified form of the invention, the plane of section being indicated by the line 5—5 of Fig. 6;

Fig. 6 is a horizontal section of this modified form of the invention taken on a plane indicated by the line 6—6 of Fig. 5;

Fig. 7 is a vertical section, similar to Figs. 2 and 5, of a third form of the invention, the plane of section being indicated by the line 7—7 of Fig. 8; and 75

Fig. 8 is a horizontal section of this third form taken on a plane indicated by the line 8—8 of Fig. 7.

Throughout these views like characters refer to like parts.

Referring to the drawing in detail, and more particularly for the present to the first form of the invention, illustrated in Figs. 2, 3 and 4,—10 designates generally a support, 11 and 12, switch contacts, and 13 a contact-actuating member or button. The support 10 in the present instance consists of a cup 14 and an insulating base 15 located within the cup. The cup is preferably composed of brass or similar material, while the base is preferably composed of a suitable insulating material. The switch contact 11 is centrally disposed within the cup 14 upon a terminal plate 16, which terminates near the wall of the cup in an upturned end or terminal 17, which is slotted or perforated for the reception of the end of one conductor 18, which may be soldered or otherwise secured to the same. The terminal plate 16 may be secured to the base 15 in any suitable way, as by the screws 19. The contact 12 consists, in the present instance, of a dished plate which is secured to the button 13 in any suitable way, as by screws 20. This contact plate 12 is overlapped at its periphery by the intumed edge 21 of the cup 14 and normally the two rest in engagement, thereby providing a comparatively dust-proof and water-proof casing for the 110

switch contacts. The normal engagement of the contact plate 12 and the intumed edge 21 of the cup 14 is maintained by coiled springs 22 and 23. Any desired number of these springs may be employed. They bear at their top against the under side of the contact plate 12 and at their bottom upon a terminal ring 24, which is secured to the base 15 in any suitable way, as by means of the screws 25. One of these screws serves as a binding post for the end of the conductor 26. The springs 22 and 23 are held in place by pins 28 and 29, which are secured to the contact plate 12 and extend downwardly from the same within the embracing convolutions of the springs. The circuit from the conductor 26 is extended to the contact plate 12 through the terminal ring 24 and the springs 22 and 23. In order to provide a dust-proof and water-proof joint at the point where the conductors 18 and 26 enter the casing, the cup 14 is provided with an apertured extension, which is threaded at its outer end for the reception of a packing nut 30, which when screwed home presses the packing 31 into close engagement with the insulation of the conductors and thereby produces a tight joint which will exclude dust and water. The button 13, as clearly illustrated, extends entirely over the top of the casing and slightly beyond the periphery of the same, so that it may be readily actuated. It is cut away on its under side, as illustrated at 32, so that the outer peripheral portion of the button is spaced from the periphery of the casing. When the button is operated its downward movement is limited by its engagement with the adjacent portion of the periphery of the casing. Normally, the contacts 11 and 12 are slightly separated. They may be brought into electrical engagement by bodily moving the button 13 downward or by tilting it. Under a bodily movement the contact plate 12 is, of course, out of engagement with the lip 21 at all points. However, when tilted the periphery of the contact plate 12 and the overhanging lip 21 remain in engagement at a point diametrically opposite the point at which the pressure is applied to the contact-actuating member 13. Since the pressure may be applied at various peripheral points, the engaging portions of the plate 12 and lip 21 constitute fulcrum for the different operations of the member 13.

In the second form of the invention, illustrated in Figs. 5 and 6, the support 40, contacts 41 and 42, and the actuating member 43 cooperate in much the same way as in the form shown in Figs. 2, 3 and 4, but in this case the contact 41 is in the form of a ring, and the plurality of supporting springs are replaced by a central spring 44. The support 40 comprises a base 45, of fiber or

other insulating material, to the periphery of which is secured an annular ring 46 forming a wall corresponding to the vertical wall of the cup 14. This ring is provided with an intumed edge 47 corresponding to the intumed edge 21. The contact plate 42 is secured to the under side of the member 43 by screws 48 and is provided with a centrally depressed portion 49 which is embraced by the upper convolutions of the spring 44 in much the same way as the springs 22 and 23 embrace the pins 28 and 29. Contact ring 41 is provided at its base with a flange 50 by which it is secured to the insulating bottom 45, preferably by screws 51. Connection may be made between the contact ring 41 and the conductor 52 by a binding screw 53, or otherwise, as desired. The other conductor 54 is connected to a terminal 55 formed on a terminal ring 56 secured to the center of the insulating base 45 by screw 57 which has an enlarged head, which assists in maintaining the spring 44 in its correct position. The connection between the conductor 54 and the terminal 55 may be established by soldering or otherwise, as desired. The circuit is completed from the terminal plate 56 to the contact plate 42 through the spring 44. A packing nut 58 and packing 59 cooperate with an apertured extension of the annular wall 46 to provide a water-tight and dust-tight connection around the conductors 52 and 54, just as the corresponding parts did in the previous form of the invention. The actuating button 43 is cut away on its under side as in the first form of the invention and for the same purpose. In operation, the button 43 may be pressed so as to carry the contact ring 42 bodily downward out of engagement with the lip 47 and into engagement with the contact ring 41. In such a case, electrical engagement will be made throughout the entire extent of the ring 41. If, however, the button 43 be tilted, then the contact plate 42 will remain in engagement with the lip 47 at one point and will be brought into engagement with the contact ring 41 at a diametrically opposite point. As before, since the button 43 may be pressed at various peripheral points, the engaging portions of the contact plate 42 and the overhanging lip 47 constitute fulcrum for the different operations of the button 43.

In the third form of the invention, illustrated in Figs. 7 and 8, the fulcrum for the different operations of the actuating button are provided somewhat differently. In this form the support 60, contacts 61 and 62 and the actuating button 63 are related similarly to the corresponding parts in the first form. The support 60 consists of a cup 64 which is the same in construction as the cup 14, except that it is not provided with an intumed lip at its upper edge. It includes also an

insulating base 65, similar to the base 15. The contact 61 is formed on a terminal plate 65^a having an upturned end or terminal 66 to which the conductor 67 is connected. A contact ring 68 is likewise connected to conductor 69 by a screw 70. These conductors pass through a gland formed by the packing nut 70 and packing 71, as in the other forms. Contact 62 is a flat plate secured to the under side of the button 63 in any suitable way, as by screws 72. It is provided with three or more downwardly extending studs 73 which are provided with heads 74, which underlie overhanging portions 75 of the base 65. These heads are, in the present instance, similar to the heads of ordinary wood screws, and the cooperating overhanging portions are conical to properly engage them, but it is obvious that both heads and cooperating faces on the base 65 might be differently shaped. Helical springs 76 embrace the several studs 73 and normally hold the heads 74 in engagement with the overhanging portions 75 and thereby maintain the contacts 61 and 62 separated. In this instance, as in the previous ones, the button 63 may be moved some distance downward before engaging the peripheral portions of the casing, but the latter serve to limit its movement. In operation, if the contact 62 be moved bodily downward, the heads 74 will all be moved out of engagement with the portions 75 of the base 65, and the contacts 61 and 62 will be brought into electrical engagement to complete the circuit. If the button 63 be pressed so as not to move the contact 62 bodily downward, but to tilt it, then all the heads 74 will not move out of engagement with the normally engaged portions of the base 65, but one at least will remain in such engagement and act as a fulcrum for the button 63 in its contact-operating movement. It will, of course, be obvious that in some instances two of the heads 74 would remain thus in engagement and act as a single fulcrum for the operation of the button. This would occur for instance if the button were pressed downward directly over the center of the terminal 66. In such event, the two heads on the left would thus act.

In the particular illustration of the invention, namely, that involving the control of the circuit of an electric automobile horn, which I have illustrated in Fig. 1, 80 designates the automobile, 81 the electric horn, 82 the steering wheel, 83 the electric switch, and 84^a the conductors extending from the switch to the horn and the electric battery, magneto, or other source of current. In the several figures of the drawing I have illustrated the switch upon the spoke 84 of a steering wheel. In each such instance, a strap 85 embraces the spoke and is suitably secured to the switch support by screws 86.

It will of course be understood that the invention is capable of application to various other uses and that the disclosure may be modified and altered in many respects without departing from the spirit and scope of my invention. I therefore do not wish to be limited to the applications of the invention and the particular disclosure of the same herein recited but aim to cover by the terms of the appended claims the various applications and the various alterations and modifications which properly come within the utility and scope of the invention.

Claims to the subject-matter common to this application and my co-pending application No. 749,135 have been put in said application No. 749,135, leaving in this application only the claims for subject-matter which is not disclosed in said application No. 749,135.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. A tipping push switch comprising a casing member, circuit-controlling elements inclosed thereby, a top or cover for said casing member having a tilting and rectilinear movement to operate said controlling elements to close the circuit and having a periphery overhanging the periphery of the casing member, and a mounting for said cover engaging portions of said casing to form different fulera for said cover in its different contact-operating movements and permitting the tilting of the cover when the periphery is subjected at any point to a glancing or oblique side blow or pressure.

2. A tipping push switch comprising a casing member, circuit-controlling elements inclosed thereby, a top or cover for said casing member having a tilting and rectilinear movement to operate said controlling elements to close the circuit, said top or cover having its periphery overhanging the periphery of said casing member and provided with a downwardly extending skirt sufficiently removed from the exterior wall of said casing member to accommodate the tilting of said top or cover, and a mounting for said top or cover engaging portions of said casing to form different fulera for said cover in its different contact operating movements and permitting the tilting of the cover when the periphery is subjected at any point to a glancing or oblique side blow or pressure.

3. A tipping switch comprising a casing member, circuit-controlling elements inclosed thereby, a top or cover for said casing member having a universal tilting movement to operate said controlling elements to close the circuit and having a periphery overhanging the periphery of the casing member, and a mounting for said top or cover engaging portions of said casing to form different fulera for said cover in its

different contact operating movements and permitting the tilting of the cover when the periphery is subjected at any point to a glancing or oblique side blow or pressure.

4. A tipping switch comprising a casing member, circuit-controlling elements inclosed thereby, a top or cover therefor having a universal tilting movement to operate said controlling elements to close the circuit, said top or cover having its periphery overhanging the periphery of said casing member and provided with an outwardly extending skirt sufficiently removed from the exterior wall of said casing member to accommodate the tilting of said top or cover, and a mounting for said top or cover engaging portions of said casing to form different fulcrum for said cover in its different contact operating movements and permitting the tilting of the cover when the periphery is subjected at any point to a glancing, or oblique side blow or pressure.

5. A tipping top switch comprising a casing, circuit-controlling elements inclosed by said casing, the width of the casing being greater than the element-inclosing depth thereof, a tipping top or cover for said casing having its hand-engaging portion above the casing and of substantially the same or greater width, and a mounting for said top or cover engaging portions of said casing to form different fulcrum for said cover in its different contact-operating movements and permitting the tipping of the same when struck by the hand to operate said circuit-controlling elements.

6. A tipping push top switch comprising a casing, circuit-controlling elements inclosed by said casing, the width of the casing being greater than its element-inclosing depth, a tipping and rectilinear movable top or cover for said casing having its hand-engaging portion above the casing and of substantially the same or greater width, and a mounting for said top or cover engaging portions of said casing to form different fulcrum for said cover in its different contact-operating movements and permitting the tipping and rectilinear movement of the same when struck by the hand to operate said circuit-controlling elements.

7. An electric switch comprising a casing, cooperating switch contacts, an overhanging contact actuating cover tiltable to operate the switch contacts having a shiftable fulcrum point on said casing, said fulcrum point being always diametrically opposite the point of pressure applied to said member for operating said contacts.

8. An electric switch comprising a casing, cooperating switch contacts within said casing, a movable overhanging cover for said casing connected to the periphery of said casing and having a shiftable fulcrum point

thereon, said fulcrum point being always diametrically opposite the point of pressure applied to said cover for operating said contacts.

9. In an electric switch, the combination with a casing, of an insulating base within said casing, a contact in said casing, a movable cover for said casing connected to the periphery of said casing, a contact mounted on said cover, and means tending to separate said cover from said casing, said cover having a shiftable fulcrum on said casing.

10. An electric switch comprising a casing, an insulating base in said casing, a contact mounted on said base, a tiltable cover having a shifting fulcrum substantially at the periphery of said casing, and a contact on said cover moved into engagement with the contact on the base within the periphery on which the fulcrum point shifts when the cover is tilted.

11. An electric switch comprising a casing provided with a peripheral flange, an insulating base within said casing, a contact mounted on said base, a tiltable and rectilinearly movable cover for said casing connected to said peripheral flange, a contact mounted on said cover cooperating with the contact on said base and means tending to separate said cover from said base.

12. An electric switch comprising a casing provided with a peripheral flange, an insulating base mounted within said casing, a contact mounted on said base, a tiltable contact actuating cover for said casing, a contact plate mounted on said cover and engaging beneath said flange for connecting the cover to the casing and means tending to separate said cover from said casing.

13. In an electric switch, cooperating contacts, a tiltable overhanging button for controlling the contacts, a stationary annular ring, and an outwardly extending annular engaging part on the button, which annular part is adapted to find a fulcrum on the stationary ring at any point upon the periphery thereof when the button is tilted.

14. In an electric switch, a stationary ring, a depressible and tiltable overhanging button having an outwardly extending annular engaging part which is adapted to find a fulcrum on the stationary ring irrespective of where tilting pressure is applied, circuit closing contacts controlled by the button when the latter is depressed or tilted, and means for restoring the button to its inactive position when pressure thereon is relieved.

15. In an electric switch, cooperating contacts, and an overhanging contact-operating member having rectilinear movement and also tiltable movement upon pressure being applied at any point about the axis of the operating member, to close the contacts, and

a shiftable fulcrum for the contact operating member when tilted, the fulcrum point being radially beyond and outside the point of contact of the electrical contacts.

5 16. In an electric switch, cooperating switch contacts, a contact operating member having rectilinear and tiltable movement for closing the contacts, and a fulcrum member for the operating member when tilted con-
10 centric with the axis thereof, the location of the fulcrum point depending upon the point of application of tilting pressure, said fulcrum member being located beyond and outside the point of contact of the electrical
15 contacts.

17. An electric switch comprising a closed casing, cooperating switch contacts within said casing, a pressure-operated member outside of said casing having a tiltable and
20 rectilinear movement for operating said contacts.

18. An electric switch comprising a normally closed casing having a portion of its wall movable relative to the rest of said cas-
25 ing, cooperating switch contacts within said casing, a pressure-operated member outside of said casing secured to said movable portion of the casing wall and having a tiltable and rectilinear movement for operating the
30 contacts.

19. An electric switch comprising a closed casing, cooperating switch contacts within said casing and a tiltable pressure-operated member outside of said casing for operating
35 said contacts.

20. An electric switch comprising a normally closed casing having a portion of its inclosing wall movable relative to the rest of said casing, cooperating switch contacts
40 within said casing and a tiltable pressure-operated member operating outside of said

casing and secured to said movable portion of the casing wall for operating said contacts.

21. An electric switch comprising a nor- 45
mally closed casing having a portion of its inclosing wall movable relative to the rest of the casing, cooperating switch contacts within said casing and a tiltable pressure-
50 operated member for operating said switch contacts secured to said movable portion of the casing wall.

22. An electric switch comprising a casing, a relatively large, flat operating member substantially covering the top of said 55
casing, a switch contact in the center of said casing, a cooperating switch contact, electrical connections in said casing with said switch contacts and operating connections
60 between said operating member and one of said switch contacts for operating said contacts in response either to the tipping of said member or to its bodily movement toward said casing.

23. An electric switch comprising a cas- 65
ing, a relatively large, flat operating member substantially covering the top of said casing, a switch contact in the center of said casing, a cooperating switch contact, elec-
70 trical connections in said casing with said switch contacts and operating connections between said operating member and one of said switch contacts for operating said contacts in response to the tipping of said mem-
75 ber.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM W. DEAN.

Witnesses:

ROBERT LEWIS AMES,
ANNE SOLOMON.