Dec. 29, 1931. R. C. ANGELL 1,838,983

ELECTRIC SWITCH

Filed Nov. 1, 1929 2 Sheets-Sheet 1

FIG. 1.

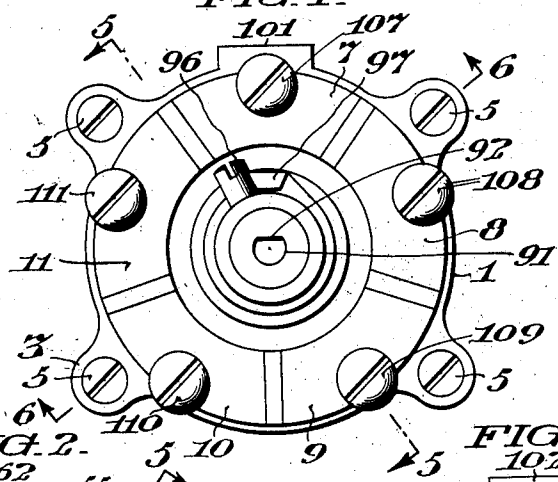


FIG. 2.

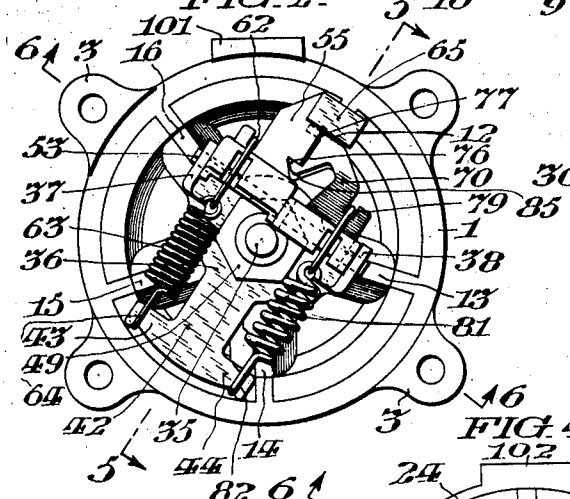


FIG. 3.

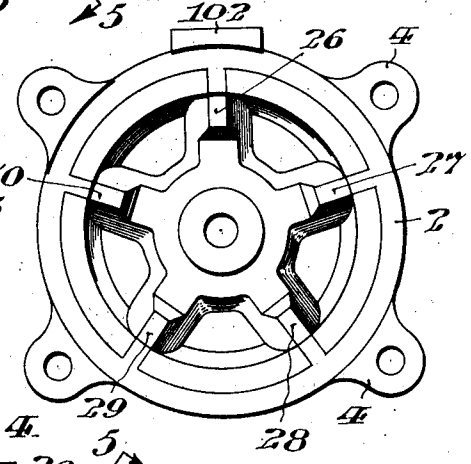
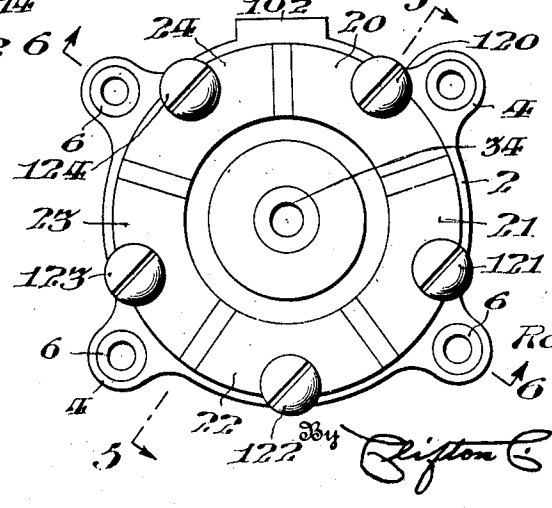


FIG. 4.



Inventor
Robert C. Angell,
By Clifton C. Hallowell
Attorney

Dec. 29, 1931. R. C. ANGELL 1,838,983

ELECTRIC SWITCH

Filed Nov. 1, 1929 2 Sheets-Sheet 2

FIG. 5.

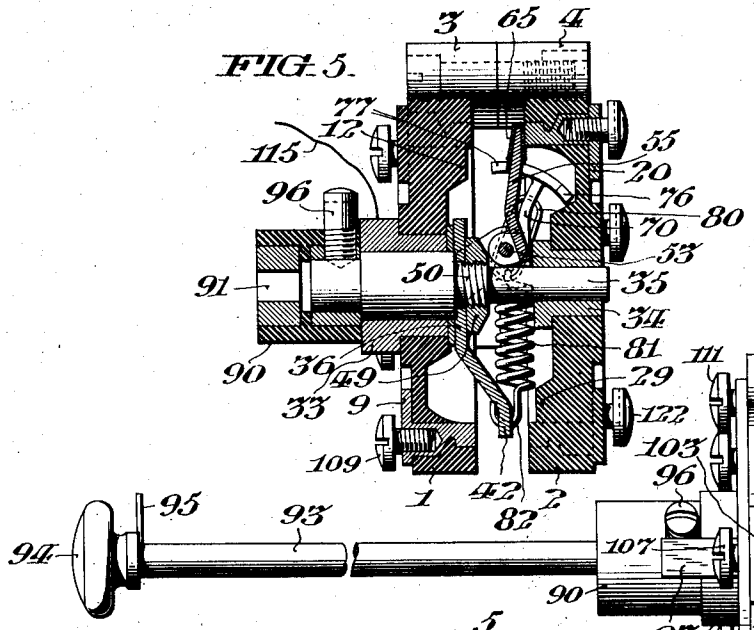


FIG. 7.

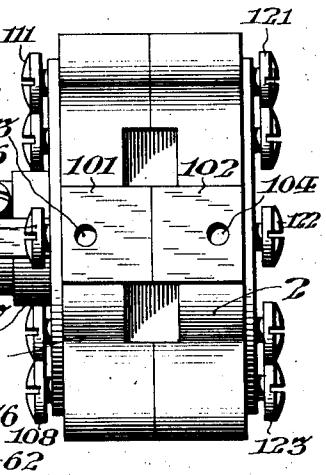


FIG. 6.

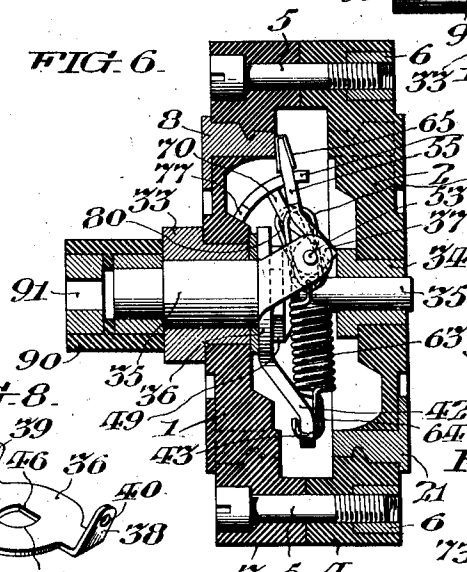


FIG. 8.

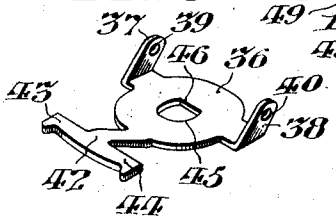


FIG. 9.

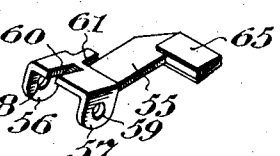
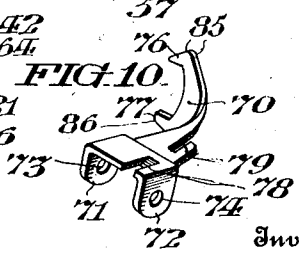


FIG. 10.



Inventor

Robert C. Angell,

By Clifton C. Hallowell

Attorney

Patented Dec. 29, 1931

1,838,983

UNITED STATES PATENT OFFICE

ROBERT C. ANGELL, OF PRINCE BAY, NEW YORK, ASSIGNOR TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA

ELECTRIC SWITCH

Application filed November 1, 1929. Serial No. 403,940.

My invention relates particularly to that class of electric switches that are commonly known as quick make and break switches and is especially directed to the means by which the contact brush is actuated to snap from one contact plate to another.

The principal objects of my invention are to provide an electric switch of such compact structure that it may be conveniently employed where the conservation of space is a major consideration; that may be economically manufactured and readily assembled, and that will be dependable in its action.

Other objects of my invention are to provide an electric switch in which the contact brush maintains a uniform pressure throughout its engagement with the contact elements with which it cooperates, whereby a constant uniform circuit is insured.

Further objects of my invention are to provide an electric switch arranged to independently control different voltages and which maintains a closed circuit irrespective of the position of its controlling brush.

Specifically stated, the form of my invention as hereinafter described comprises opposed contact carrying blocks relatively connected and respectively provided with a relatively spaced series of circularly arranged sectoral contact elements, the elements of the series of one block being disposed in staggered relation to the series of the other block, a pivoted contact brush rotatably mounted to sweep the circular series of contact elements, and a brush tripping lever actuated by means on said blocks to cause said brush to alternately engage the contact elements of the respective series when rotated.

My invention also includes all the various novel features of construction and arrangement as hereinafter more definitely specified.

In the accompanying drawings, Figure 1 is a front elevational view of an electric switch constructed in accordance with my invention; Fig. 2 is a rear elevational view of said switch with the rearward block removed and showing the assembled parts within the switch body; Fig. 3 is a front elevational view of the rearward block of the switch body showing its inner face; Fig. 4 is a rear elevational view of the switch structure shown in Fig. 1; Fig. 5 is a longitudinal sectional view of said switch taken obliquely along the axial plane on the line 5—5 in Figs. 1, 2 and 4; Fig. 6 is a longitudinal sectional view of said switch taken obliquely along the axial plane on the line 6—6 in Figs. 1, 2 and 4, showing the contact brush and cooperative parts in an alternate position from that shown in Fig. 5; Fig. 7 is a plan view of the switch, showing the key comprising the stem and knob by which it may be actuated; Fig. 8 is a perspective view of the brush mounting; Fig. 9 is a perspective view of the brush; and Fig. 10 is a perspective view of the brush tripping lever.

In said figures, the switch body comprises the forward block 1 and rearward block 2, preferably formed of bakelite, hard rubber or other suitable insulating material, and respectively having lugs 3 and 4 comprising opposed bosses which are abutted, and said blocks are joined by the headed screws 5 which extend though said lugs and bosses from the front of the switch and are in threaded engagement with metallic bushings 6 in the lugs of the rear block 2, thus forming a hollow switch body, in the hollow of which the brush actuating parts may be conveniently disposed.

The forward block 1 is provided with a plurality of sectoral metallic contacts 7, 8, 9, 10 and 11 relatively spaced and embedded in the block 1, and said block is recessed in its inner face and provided with a plurality of spoke-like ribs 12, 13, 14, 15 and 16. The rear block is similarly provided with relatively spaced sectoral metallic contacts 20, 21, 22, 23 and 24 and is also provided with spoke-like ribs 26, 27, 28, 29 and 30.

The sectoral contacts and spoke-like ribs

of the forward block 1 and the sectoral contacts and spoke-like ribs of the rearward block 2 are so disposed that, when the two blocks are assembled and held together by the screws 5, they are in such relatively staggered relation that the contacts and ribs of one are equally spaced between the contacts and ribs of the other.

The blocks 1 and 2 are respectively provided with the axially alined bearing bushings 33 and 34 affording suitable bearings for the shaft 35, which is mounted for rotation therein and which carries the brush mounting 36 having the wings forming bearing-lugs 37 and 38 provided with apertures 39 and 40 respectively, and having the tail piece 42 provided with the lateral extensions 43 and 44. Said brush mounting has the central aperture 45 provided with the flat side 46 and is arranged to be mounted on the shaft 35, the flat side 46 being provided to engage a similarly flat surface on the shaft 35 to prevent relative rotation in a manner well known. Said brush mounting is arranged to be held on said shaft by the nut 49 in threaded engagement with the threads 50, as best shown in Fig. 5.

As shown in Figs. 2, 5 and 6, the lugs 37 and 38 are provided with the pintle 53 extended through the apertures 39 and 40, and said pintle carries for oscillation the contact brush 55, shown in perspective in Fig. 9, having the lugs 56 and 57 provided with the apertures 58 and 59 through which said pintle extends. The brush 55 is provided with the slits 60 and 61 for the convenient reception of the link 62 which embraces the pintle 53, as shown in Fig. 6, and which is connected with the spiral spring 63 having the terminal hook 64 engaged with the lateral extension 43 of the brush mounting 36. Said spring 63 is arranged to exert such tension on the link 62 as to maintain the brush, which may have a suitable contact apron 65, against any one of the respective sectoral contacts 7, 8, 9, 10, 11, 20, 21, 22, 23 or 24, it being obvious from inspection of Fig. 6 that when said brush 55 is shifted toward the left in Fig. 6 and passes to the left of a dead center plane extended through the axis of the pintle 53 and the hook 64, the tension of the spring 63 will tend to force it over and maintain the brush against one of the sectoral contacts of the forward block, but when it is shifted to the right of such plane, the tension of the spring 63 will cause it to bear upon one of the sectoral contacts of the rearward block 2, as shown in Fig. 5.

The pintle 53 also carries the trip lever 70 having the lugs 71 and 72 provided with the apertures 73 and 74 through which said pintle 53 extends. The trip lever 70, shown in perspective in Fig. 10, has its forward free end twisted laterally and provided with the relatively spaced prongs 76 and 77 which are arranged to embrace the brush 55, as shown in Figs. 2, 5 and 6, in such relation as to engage said brush and shift it toward the forward block 1 or toward the rearward block 2 according to its direction of movement. The trip lever 70 is provided with the slit 79 arranged to receive the link 80, shown in Figs. 2, 5 and 6, which is connected by the spiral spring 81 with the lateral extension 44 of the brush mounting 36, and like the linked connection of the brush 55, its relative position towards the left, as shown in Fig. 6, or towards the right, as shown in Fig. 5, depends upon its passing the dead center as determined by a plane passing through the axis of the pintle 53 and the hook 82 of the spring 81.

The oscillatory movement of the tripping lever 70 is effected by the spoke-like ribs of the respective blocks 1 and 2, with which ribs the inclined surfaces 85 and 86 of the forward portion of said trip lever 70 cooperate when the shaft 35 is rotated, it being obvious that when the inclined surface 85 rides upon one of the ribs 26, 27, 28, 29 or 30, the trip lever 70 will be forced toward the left until it is past its dead center when, by the tension of the spring 81, it will be forced to the left and occupy the position shown in Fig. 6.

In its movement toward the left, the prong 76 engages the brush 55 forcing it past its dead center and by the tension of its spring 63 it is maintained in contact with the sectoral contact 8 of the block 1, see Fig. 6. Similarly, when the tripping lever 70 engages one of the spoke-like ribs 12, 13, 14, 15 or 16 of the block 1 by rotation of the shaft 35, the inclined surface 86 will ride thereon and cause said tripping lever to be forced toward the right past its dead center, thus engaging its prong 77 with the brush 55, thereby forcing it from its contact 8 in the block 1 over toward the right past its dead center and by reason of the tension of its spring 63 is forced into electrical contact with the sectoral contact 20 of the block 2. Thus it will be seen that by rotation of the shaft 35, the contact brush 55 will be forced to alternately engage the relatively spaced sectoral contacts of the respective blocks 1 and 2. For instance, by anti-clockwise rotation of the shaft 35, the brush 55 will be forced to disengage the contact 20 on the block 2, and engage the contact 7 on the block 1, and by further rotation it will leave the contact 7 and engage the contact 24 on the block 2, and so on alternately forward and back.

The shaft 35 is provided with the hub 90 having the aperture 91 provided with the flat side 92 arranged to receive a similar flat side on the stem 93 of the key comprising the handle or knob 94, which may be provided with the pointer 95 to indicate the position of the brush within the switch body. Said

hub 90 is engaged with the shaft 35 by the set screw 96 which also serves as a lug to engage the stop 97 serving to prevent a continuous rotation of the shaft 35 and thereby limiting it to a movement of oscillation.

As shown in Figs. 1, 2, 3 and 7, the blocks 1 and 2 are respectively provided with pads 101 and 102 which are arranged to engage a suitable support, being provided with the threaded apertures 103 and 104 for the reception of suitably provided retaining screws.

The sectoral contacts 7, 8, 9, 10 and 11 are respectively provided with binding screws 107, 108, 109, 110 and 111, and the sectoral contacts 20, 21, 22, 23 and 24 are similarly provided with binding screws 120, 121, 122, 123 and 124 for the engagement with connecting wires. The return or ground wire 115 may be conveniently connected by solder or otherwise, as to the bearing bushing 33.

My invention is advantageous in that the brush 55 is instantaneously snapped from one contact to the next of different voltages and cannot be in contact with contacts of two different voltages at the same time.

I do not desire to limit my invention to the precise details of construction and arrangement as herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

Having thus described my invention, I claim:

1. An electric switch comprising opposed contact carrying blocks, a pivoted contact brush rotatably mounted between said blocks, and means arranged to effect rocking of said brush to alternately engage the contacts of the respective blocks as it is rotated, on a relatively different axis.

2. An electric switch comprising opposed contact carrying blocks, each having relatively spaced series of contact elements, a pivoted contact brush rotatably mounted between said blocks, and means arranged to effect pivotal movement of said brush on one axis to alternately engage the contacts of the respective blocks as it is rotated, on a relatively different axis.

3. An electric switch comprising opposed contact carrying blocks, each having a relatively spaced series of circularly arranged contact elements provided with opposing relatively parallel contact faces, a contact brush rotatably mounted between said blocks, and arranged to alternately engage the contacts of the respective blocks as it is rotatively progressed.

4. An electric switch comprising opposed contact carrying blocks, each having a relatively spaced series of circularly arranged contact elements in relatively staggered relation, a contact brush mounted to rotate between said blocks, and arranged to alternately snap into engagement with the individual contact elements of the respective blocks as it is rotatively progressed.

5. An electric switch comprising opposed contact carrying blocks each having a relatively spaced series of circularly arranged contact elements in relatively staggered relation and having a plurality of projections corresponding to said contact elements, a contact brush mounted to rotate between said blocks, and means arranged to cooperate with said projections to cause said contact brush to snap into engagement with the individual contact elements of the respective blocks as it is rotatively progressed.

6. An electric switch comprising opposed contact carrying blocks each having a relatively spaced series of circularly arranged contact elements in relatively staggered relation and having a plurality of ribs corresponding to said contact elements, a contact brush mounted to rotate between said blocks, and a spring actuated lever having inclined surfaces arranged to engage said ribs and be rocked thereby to cause said brush to snap into engagement with the individual contact elements of the respective blocks as it is rotatively progressed.

7. An electric switch comprising opposed contact carrying blocks each having a relatively spaced series of circularly arranged contact elements and having a corresponding number of projections, a brush support rotatably mounted on the axis of said contact elements, a brush pivotally mounted on said brush support, means tending to maintain said brush in contact with the contact elements of either of said blocks, and means cooperative with said projections arranged to alternately cause said brush to engage the contact elements of the respective blocks as said brush support is rotated on its axis.

8. An electric switch comprising opposed contact carrying blocks each having a relatively spaced series of circularly arranged contact elements and having a corresponding number of projections, a brush support rotatably mounted on the axis of said contact elements, a brush pivotally mounted on said brush support, means tending to maintain said brush in contact with the contact elements of either of said blocks, and a tripping device arranged to cause said brush to engage the contact elements of the respective blocks as said brush support is rotated about its axis.

9. An electric switch comprising opposed relatively spaced series of contact elements circularly arranged, a brush pivoted to oscillate toward and from the respective series and to rotate therebetween, and means arranged to contemporaneously rotate and oscillate said brush on relatively directed axes and to thereby cause said brush to alternately engage contact elements of the respective series.

10. An electric switch comprising a relatively spaced series of circularly arranged contact elements in relative staggered relation, and a contact brush mounted to rotate between said series and arranged to alternately snap into engagement with the individual contact elements of the respective series as it is rotatably progressed.

In testimony whereof, I have hereunto set my hand this 30th day of October, A. D., 1929.

ROBERT C. ANGELL.