(No Model.)

F. BROADNAX.

ELECTRIC SWITCH.

No. 476,781. Patented June 14, 1892.

Fig. 1.

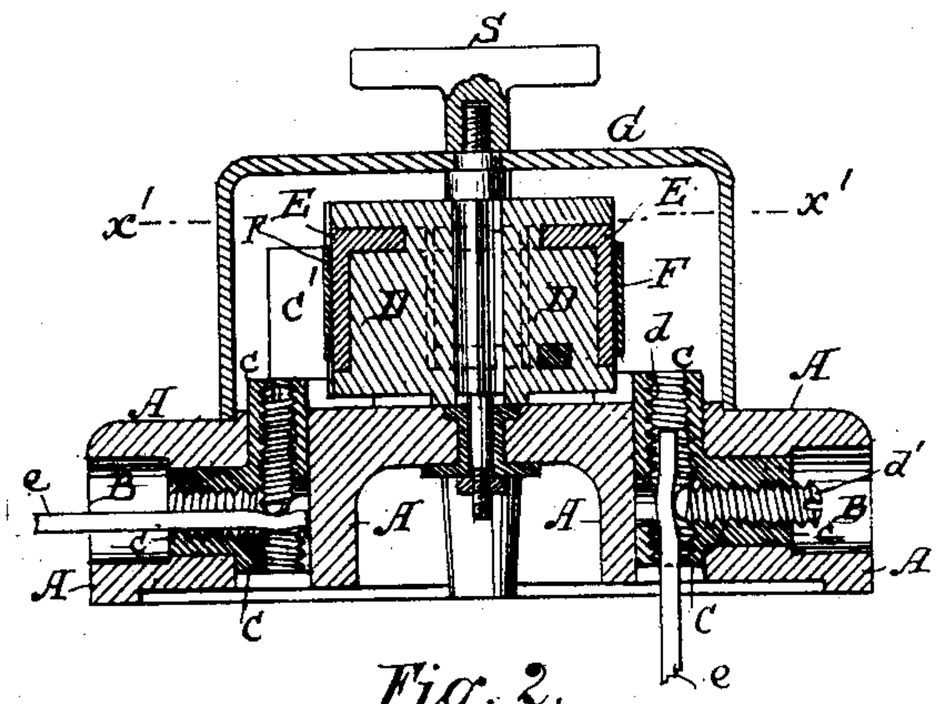


Fig. 2.

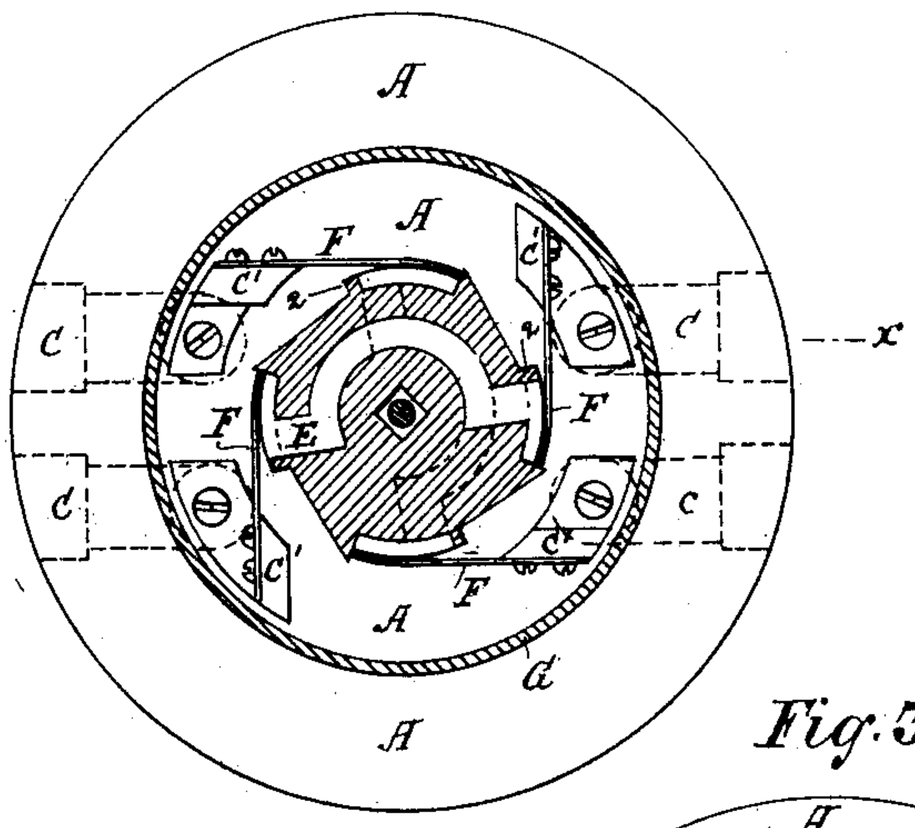


Fig. 3.

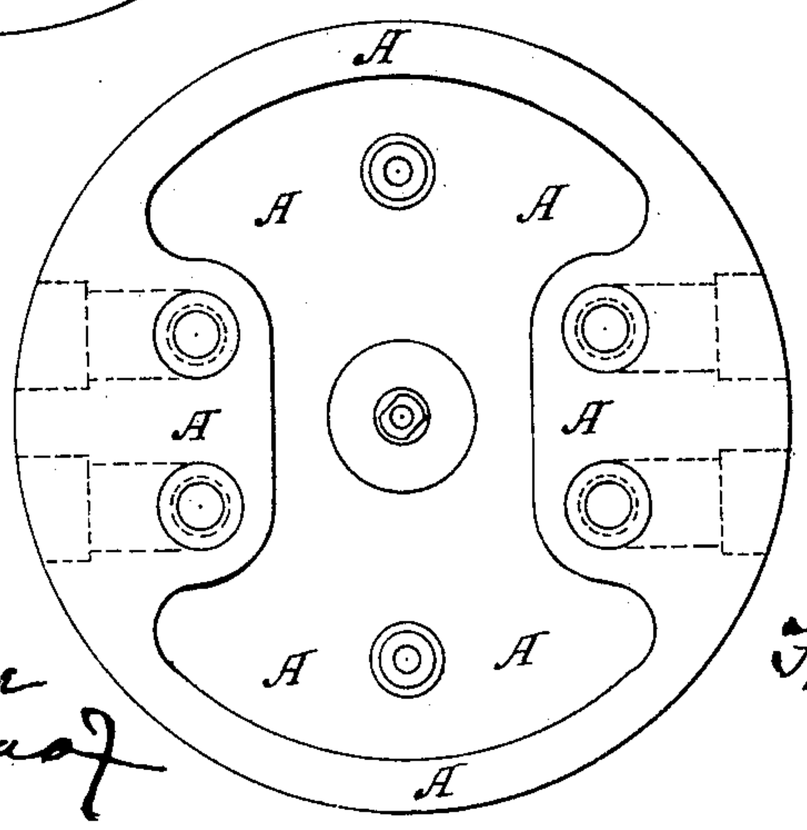


Fig. 4.

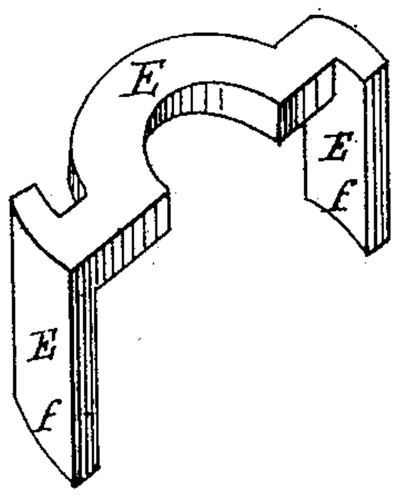


Fig. 5.

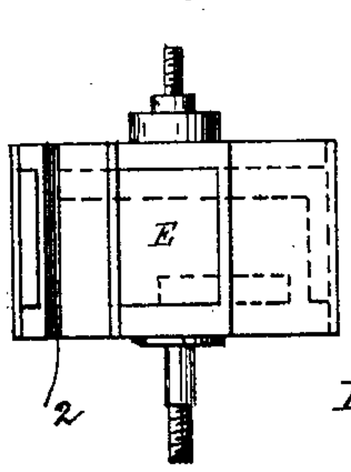
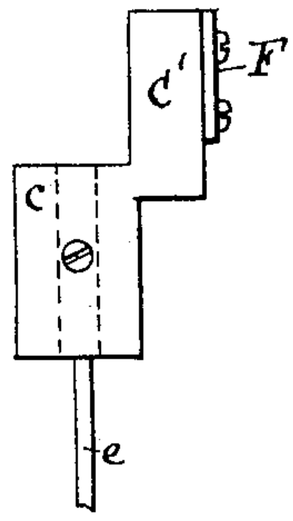


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANCIS BROADNAX, OF NEW YORK, N. Y.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 476,781, dated June 14, 1892.

Application filed November 3, 1890. Serial No. 370,136. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS BROADNAX, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates more especially to that variety of electric switches known as "double-pole switches," by which both poles of the circuit are simultaneously disrupted or closed.

The novel features of my invention will be separately pointed out in the claims concluding this specification.

Referring to the accompanying drawings, Figure 1 is a transverse vertical section through a switch embodying my present invention, taken on the dotted line *x x* of Fig. 2. Fig. 2 is a horizontal section through the switch on the dotted line *x' x'*, Fig. 1. Fig. 3 is a plan of the switch turned bottom side up. Fig. 4 is an elevation of one pair of contact-plates and the conductor uniting them. Fig. 5 is an elevation of the rotating cam carrying the contact-plates. Fig. 6 is a perspective of a coupling-piece and attendant parts.

I will now describe the structure illustrated in the accompanying drawings, which show a good practical form of double-pole switch involving all the novel features of my present invention.

A is the body or base-piece of the switch. It is made wholly of glass and has attached to it the coupling-pieces *c*, each of which is fitted with a binding-screw *d'*. These coupling-pieces are bored and screw-threaded both horizontally and vertically, so that the line-wire *e* may be introduced and clamped therein either from the sides or bottom. The binding-screw *d'* fits both screw-threaded perforations. It will be seen that on the left-hand side of Fig. 1 the line-wire *e* enters from the side and is held by a binding-screw inserted in the vertical screw-threaded hole from above, while on the right-hand side of said figure the conductor *e* enters from beneath and is held in place by the binding-screw *d'*, inserted horizontally from the side. It is plain from the drawings that the conductor on the left-hand side might be inserted and clamped, as shown on the right-hand side, and that the conductor on the right-hand side might be inserted and clamped, as shown on the left-hand side of Fig. 1, or that both conductors might enter from the sides or both from below. This feature is very advantageous, as by a simple device it permits the conductors approaching the switch vertically or horizontally to be clamped therein without bending.

The coupling-piece *c* has mounted upon it a standard *c'*, to which the contact-brush F is attached in any suitable way. This is shown in detail in Fig. 6.

D is a rotating cam. It is attached to the base in the ordinary manner by a spindle which permits the cam to be freely rotated on its axis, said spindle being provided with a thumb-piece S, taking on the upper screw-threaded end thereof.

G is a cover, also preferably made of glass, which may be removed when the thumb-piece S is unscrewed. The rotating cam D is also made of glass and into or onto it are set the contact-pieces E. As shown in Fig. 4, these plates are arranged in pairs electrically connected together. The conductor which connects them is curved so as to avoid making contact with the spindle of the cam. The connecting-conductor of one pair of plates is at the top and the connecting-conductor of the other pair at the bottom, so that they may cross without touching. The standards *c'*, projecting from the coupling-pieces *c*, carry the contact-brushes F. The cam D is preferably made in a mold into which the contact-plates are first set in position, the glass being then cast around and upon them. In this way they are firmly held in position without the use of screws or other equivalent devices, and extending as the connecting-conductors do through the body of the cam-piece itself they cannot be detached therefrom while the cam remains intact.

The rotating cam D has its periphery cut into eight separate faces. Each alternate face is fashioned in the arc of a circle, the center of which is the line about which the cam revolves, and is provided with a contact-plate E. The contact-plate does not extend the entire width of the face on which it is set. A small ledge 2 of the non-conducting material of which the body of the cam is formed projects beyond it. This ledge, which is flush with the face of the contact-plate, prevents

the brush cutting and making irregular the edge of the contact-plate as it leaves it, not only increasing the life of the parts, but also diminishing sparking at this point. It also prevents the establishment of an arc between the brush and contact-plate when they are separated without increasing the depth of the steps by interposing between the two a barrier of solid insulating material. Every alternate face is of non-conducting material, in this case being the material of which the body of the cam is made. Each insulating face is fashioned so that at one end it is a greater distance from the center of the cam than at the other end. The brushes F are preferably curved, so that they bear for a considerable distance upon the contact-plates, and as these plates are a segment of a circle of which the spindle of the cam is the center, the brushes present an equal surface in contact with the plates during a considerable rotation of the cam, and there is no force exerted tending to cause the cam to revolve in either direction when the brushes rest upon the contact-pieces. The intermediate insulating-faces being inclined permit the periphery, with its contact-surfaces formed as described, to be cut into a series of steps dividing contiguous surfaces. The ledge of insulating material 2 prevents accidental contact between a brush and a contact-plate when the cam has been rotated to break circuit.

In switches of this character it is desirable to have as much of the conducting material inclosed in insulating material as possible, and to have the contact-pieces of a given pair romote from each other to avoid short accidental circuiting and uncertain insulation, and to obtain absolute certainty in simultaneously closing and disrupting both poles of the circuit.

By the arrangement above described I am able to provide a switch in which only the actual contact-surfaces of the plates are exposed, the conductors joining the plates of each pair being completely surrounded by and embedded in insulating material. As the conductors joining the plates of each pair are of irregular shape, being in the form of a loop, the metal parts of the switch are held more securely in position by the glass itself when molded upon and around them. A consideration of Fig. 2 will show that the contact-plates on the cam in electrical connection with each other are on opposite sides of the cam, and are separated from each other on both sides by three faces, the connecting-link between the two passing directly through the body of the cam, as described.

Having thus described a structure embodying all the novel features of my present invention, what I claim, and desire to secure by Letters Patent, is—

1. In a double-pole switch, a rotating cam provided with a series of faces of conducting material—such as metal—and non-conducting material—such as glass—in the form of steps, the contact-plates of each set being placed diametrically opposite each other and connected together by a conductor upon and around which the insulating material of which the cam is formed is molded.

2. In an electric switch, a rotating cam provided with a series of faces of conducting and non-conducting material in the form of steps, the conducting-faces being provided with an insulating-ledge 2, extending beyond and flush with the conducting-plate.

3. In an electric switch, a coupling-piece provided with a plurality of intersecting screw-threaded apertures having an angular relation to each other, combined with a suitable set-screw.

4. In a double-pole switch, a rotating cam provided with a series of faces of conducting material—such as metal—and non-conducting material—such as glass—in the form of steps, the contact-plates of each set being placed diametrically opposite each other and connected together by a conductor of irregular form, upon and around which the insulating material of which the cam is formed is molded.

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