No. 675,383. Patented June 4, 1901.

F. E. GREENSTREET & E. J. SELBY.

AUTOMATIC ELECTRIC CUT-OUT.

(Application filed June 12, 1900.)

(No Model.) 2 Sheets—Sheet 1.

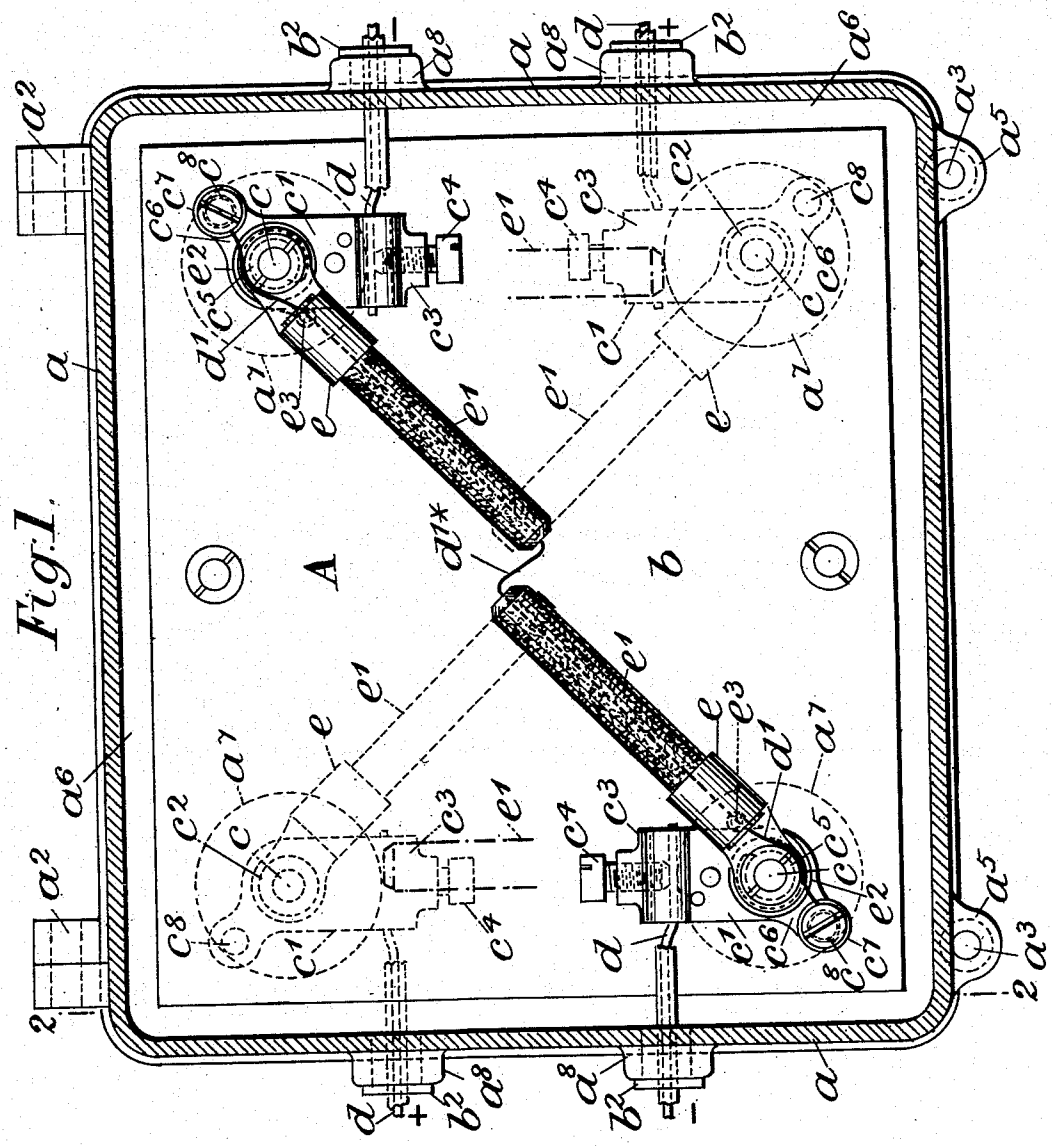


Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 2.

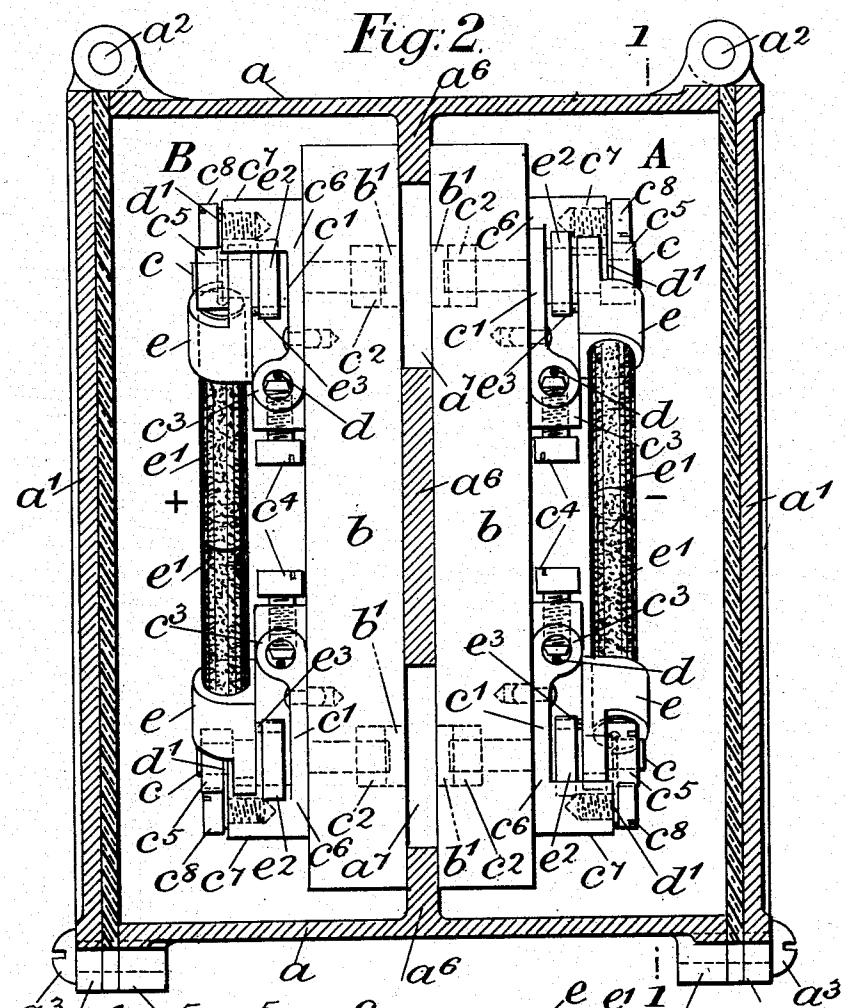
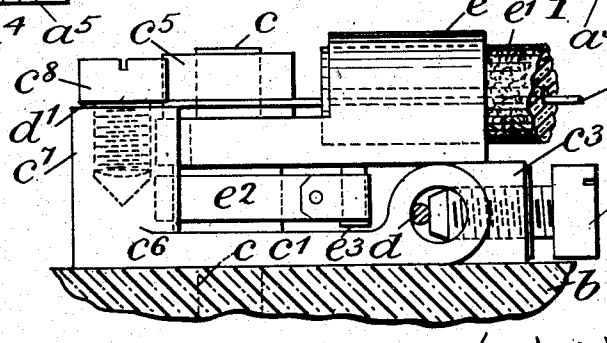


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK EDWARD GREENSTREET, OF HOLBORN, AND EDWIN JOHN SELBY, OF BIRMINGHAM, ENGLAND.

AUTOMATIC ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 675,383, dated June 4, 1901.

Application filed June 12, 1900. Serial No. 20,088. (No model.)

To all whom it may concern:

Be it known that we, FRANK EDWARD GREENSTREET, engineer, residing at 33 Brook street, Holborn, in the county of Middlesex, and EDWIN JOHN SELBY, electrical engineer, residing at Prospect Villa, Hillaries road, Gravelly Hill, Birmingham, in the county of Warwick, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Automatic Electric Cut-Outs, of which the following is a specification.

The invention relates to improvements in or connected with automatic electric cut-outs of that class in which a fusible wire is employed to effect the required break in the continuity of the circuit upon the heating of the conductor due to the current meeting with a dangerous resistance or a current in excess of the normal current passing in the circuit; and the object of the present invention is to obtain a simple and inexpensive device by the aid of which the break will be accomplished in a more effectual manner than heretofore.

In the accompanying drawings, Figure 1 is a vertical longitudinal section taken on the line 1 1 of Fig. 2 of an automatic electric cut-out constructed according to the present invention. Fig. 2 is a vertical transverse section taken on the line 2 2 of Fig. 1, and Fig. 3 is a side view of parts, showing one of the carbon arms in the vertical or parallel position which they assume after the break has been effected.

In the several figures, in which like parts are indicated by similar letters of reference, Fig. 3 is drawn to an increased scale with respect to the other figures of the drawings.

a represents a box of cast-iron or other suitable material, which is provided with covers or lids a', hinged at a^2 to the upper part of the box a and secured in position by means of screws a^3, passing through plain holes in ears a^4, formed on the covers a' and screwing into threaded holes provided in bosses or lugs a^5, formed on the box a.

The box a is divided into two compartments A and B by means of a central partition a^6 of cast-iron, or it might be insulating material, and upon each side of the partition a^6 is fixed a slab or base b of any suitable insulating material—such, for example, as slate, porcelain, or fiber. Upon one of the insulating slabs b and within the compartment A is mounted a metallic stud c, which has cast therewith a contact-plate c', hereinafter more fully referred to, which bears against the face of the slab b, and beyond said contact-plate the stud c is received into a hole provided in the slab b and securely fixed in position by means of a nut c^2, screwing onto the threaded end of the stud c, said stud and nut being effectually insulated from the partition a^6 and adjacent parts by means of a disk b' of insulating material covering the end of the nut c^2 and stud and by an opening a^7 provided in the partition a^6. The contact-plate c' is provided with a terminal c^3 and binding-screw c^4 to clamp in position the end of the — lead or conductor d, which passes into the box a through a perforated insulating-plug b^2, fitted into an apertured boss a^8, formed on the side of the box a. The stud c has pivotally mounted thereon a metallic holder e, which is held in position by means of a circular nut c^5, screwing upon the outer threaded end of the stud c, and in the holder e is fixed a hollow rod or arm e', of carbon or other suitable material, but preferably of carbon, and said holder is acted upon by means of a spring e^2, coiled around the stud c and at one end fixed therewith and at the other end fixed with a stud e^3, projecting from the holder e, or it might be otherwise arranged, which exerts a constant tendency to turn the holder e, and consequently the arm e', into a vertical position parallel with the side or end of the box a, as indicated by the thick dot-and-dash lines in Fig. 1, or to such a position as will prevent the current forming a circuit through the metallic box. Fixed with the stud c and conveniently forming part of the contact-plate c' is a short arm or offset c^6, which carries a binding-post c^7 and screw c^8, constituting a second terminal, and in this terminal is clamped one end of a length of fusible wire d', which passes partly around the circular nut c^5 and through the hollow carbon arm e'.

Upon the same insulating-slab *b* and upon the same side thereof, but at a corner diagonally opposite that in which the aforesaid stud *c* is fixed, is provided a second stud *c* and duplicate set of parts, to which the other end of the — lead or conductor *d*, which passes through a similar insulating-plug b^2 in that end of the box *a*, is connected.

In order to set the cut-out, the two carbon arms *e'* are turned into a diagonal position against the force of the springs e^2, with their ends nearly in line, as shown by the full lines in Fig. 1, and the length of fusible wire *d'*, after passing from the first terminal c^7 through the first carbon arm *e'*, is passed through the second arm *e'* to the terminal c^7 of the contact-plate *c'* and stud *c* at the inner end of said arm, to which its other end is clamped by the binding-screw c^8, and the carbon arms *e'* are thus held in their diagonal position by the short loop or length *d'** of fusible wire extending between their ends and over which loop *d'** the total current is necessarily carried. A similar set of two arms *e* and coacting parts is arranged within the chamber B upon the other slab or base *b* and to which the other or + lead or conductor *d*, which completes the circuit, is similarly connected; but the studs *c* of this set of parts are preferably located in different corners of the box to those occupied by the — arrangement, so as to render the insulation of the two sets of apparatus as perfect as possible.

The action of the apparatus hereinbefore described is as follows: So long as the current passing along the leads or conductors *d* is a normal one the short length or loop *d'** of the fusible wire *d'* between the ends of the carbons *e'* will remain intact, but upon undue heat being generated in the circuit the loop *d'** of fusible wire will become fused and the carbon arms *e'* will by the action of the springs e^2 simultaneously swing apart into their parallel positions notwithstanding that the fusible loop *d'** may be coated with a film of oxid, the strength of the springs e^2 being sufficient to break said film. The current will thus be effectually broken without liability to flash, and the remaining lengths of fusible wire *d'* by reason of being clamped to the offset terminals or posts c^7 and passed around the circular nuts c^5 will in the movement of the arms *e'* to their parallel position be shortened up and their fused ends drawn into the hollows of the carbon arms *e'*, so that no danger can arise therefrom, inasmuch as the arc is shifted from the fusible metal to the carbons *e'*, which take up and by reason of their separation break or destroy the same.

By the peculiar arrangement of the two sets of carbon arms *e'* upon insulating slabs *b*, located at opposite sides of the partition a^6, the possibility of a workman or attendant inadvertently completing the circuit by a tool in his hand while adjusting the fusible wire is avoided.

It will be obvious that the details of construction of the device may be otherwise considerably modified without departing from the spirit of the invention.

By the means hereinbefore described a simple and inexpensive automatic cut-out is obtained, which is instantaneous and otherwise highly efficient in its action, while possessing other advantages.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In an electric cut-out, a pivotally-mounted hollow carbon arm through which passes a length of fusible wire forming part of a lead or conductor, means located at the inner end of said arm for turning the arm on the axis of its pivot upon the breaking of the fusible wire, said fusible wire at its inner end passing around a projection so that upon the turning movement of the arm the severed end of the fusible wire will be drawn into the hollow of the arm, substantially as herein shown and described and for the purpose stated.

2. In an electric cut-out, two pivotally-mounted hollow carbon arms, a length of fusible wire forming part of a lead or conductor passing through said arms in such manner as to form a loop connecting the outer ends of the arms, means located at the inner ends of said arms for turning the same on the axes of their pivots upon the breaking of the fusible wire, said wire at its inner ends passing around projections so that upon the turning movement of the arms the severed ends of the fusible wire will be drawn into the hollows of the arms, thereby breaking the arc, substantially as herein shown and described and for the purpose stated.

3. In an electric cut-out, an insulating-slab, a metallic stud fixed at a suitable point in said slab, a contact-plate fixed with the stud, a terminal on said contact-plate adapted to receive one end of a lead or conductor, a holder pivotally mounted on the stud and there secured by a nut, a hollow carbon arm fitted in said holder, means for turning the holder and arm into a given position, a second terminal on said contact-plate, a duplicate set of parts and arm located at a convenient point on said slab and having connected thereto another end of the lead or conductor, a length of fusible wire passing from the second terminals of each contact-plate around the nuts and through the hollows of the arms in such manner as to form a loop connecting and holding the outer ends of the arms against the action of the turning means, so that upon the loop becoming fused the arms will automatically separate and the ends of the fusible wire will be drawn into the arms, thereby breaking the arc, substantially as herein shown and described and for the purpose stated.

4. In an electric cut-out, a box having a central partition, an insulating-slab fixed on

each side of the partition, a pair of hollow carbon arms pivotally mounted upon each slab in suitable positions, a length of fusible wire forming a continuation of the — lead or conductor passing through one pair of said arms and holding them with their ends in close juxtaposition, a similar length of fusible wire passing through the other pair of arms on the other slab in continuation of the + lead or conductor, and means for turning the arms on the axes of their pivots upon the breaking of the fusible wire, and thereby breaking the arc, substantially as herein shown and described and for the purpose stated.

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EDWIN JOHN SELBY.

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