(No Model.)

J. D. F. ANDREWS.

COMBINED COUPLING AND CUT-OUT.

No. 452,173. Patented May 12, 1891.

Fig. 1.

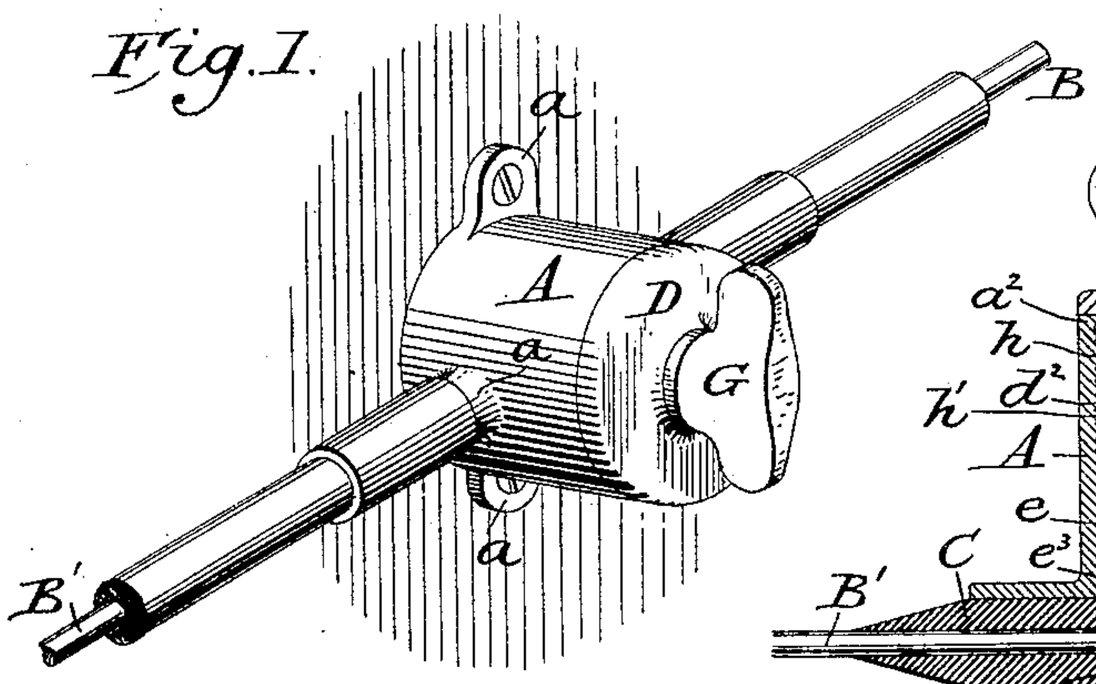


Fig. 2

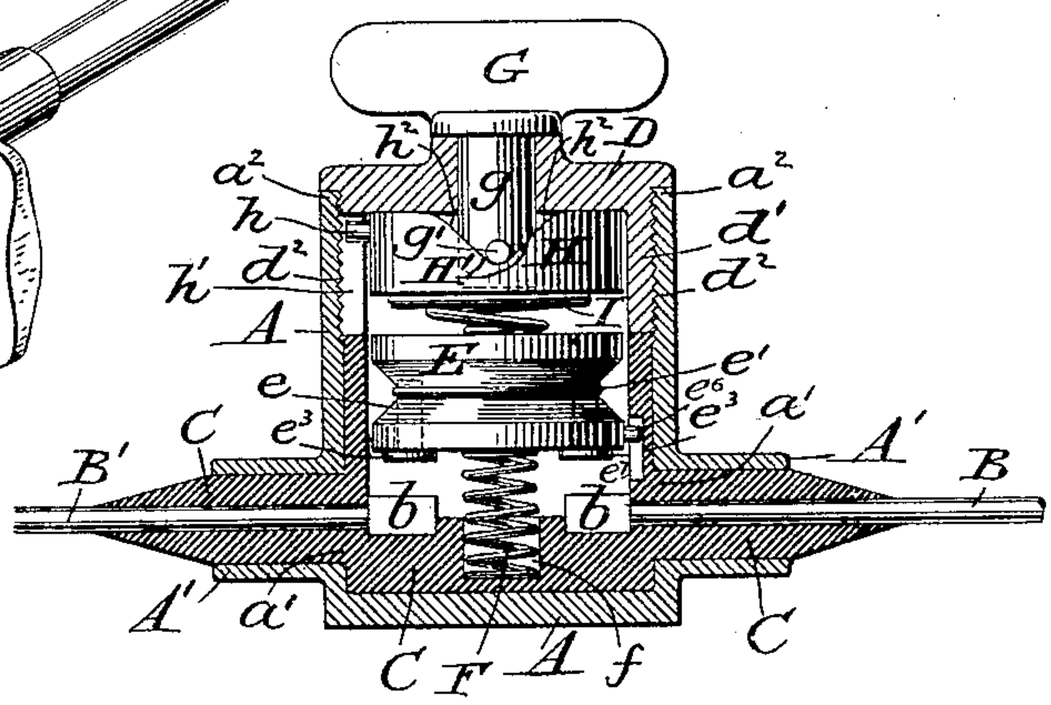


Fig. 3.

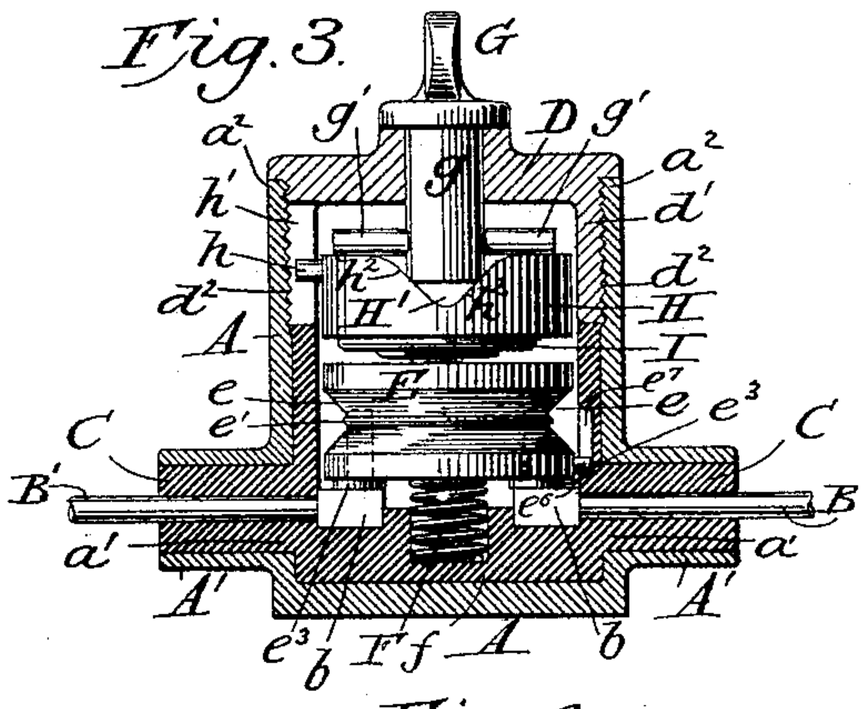


Fig. 4.

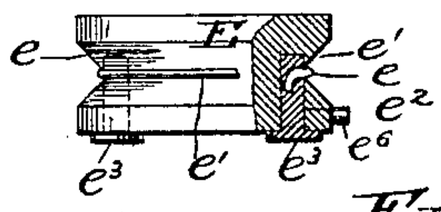


Fig. 5

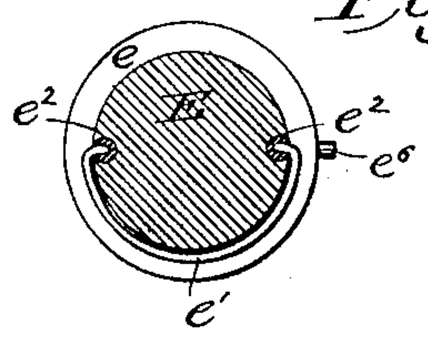
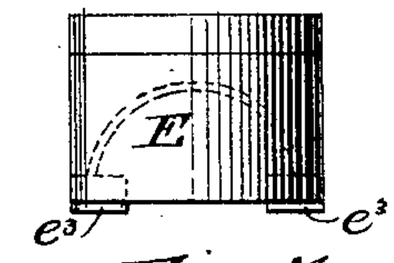


Fig. 6

Fig. 7.



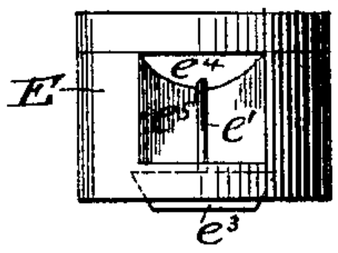
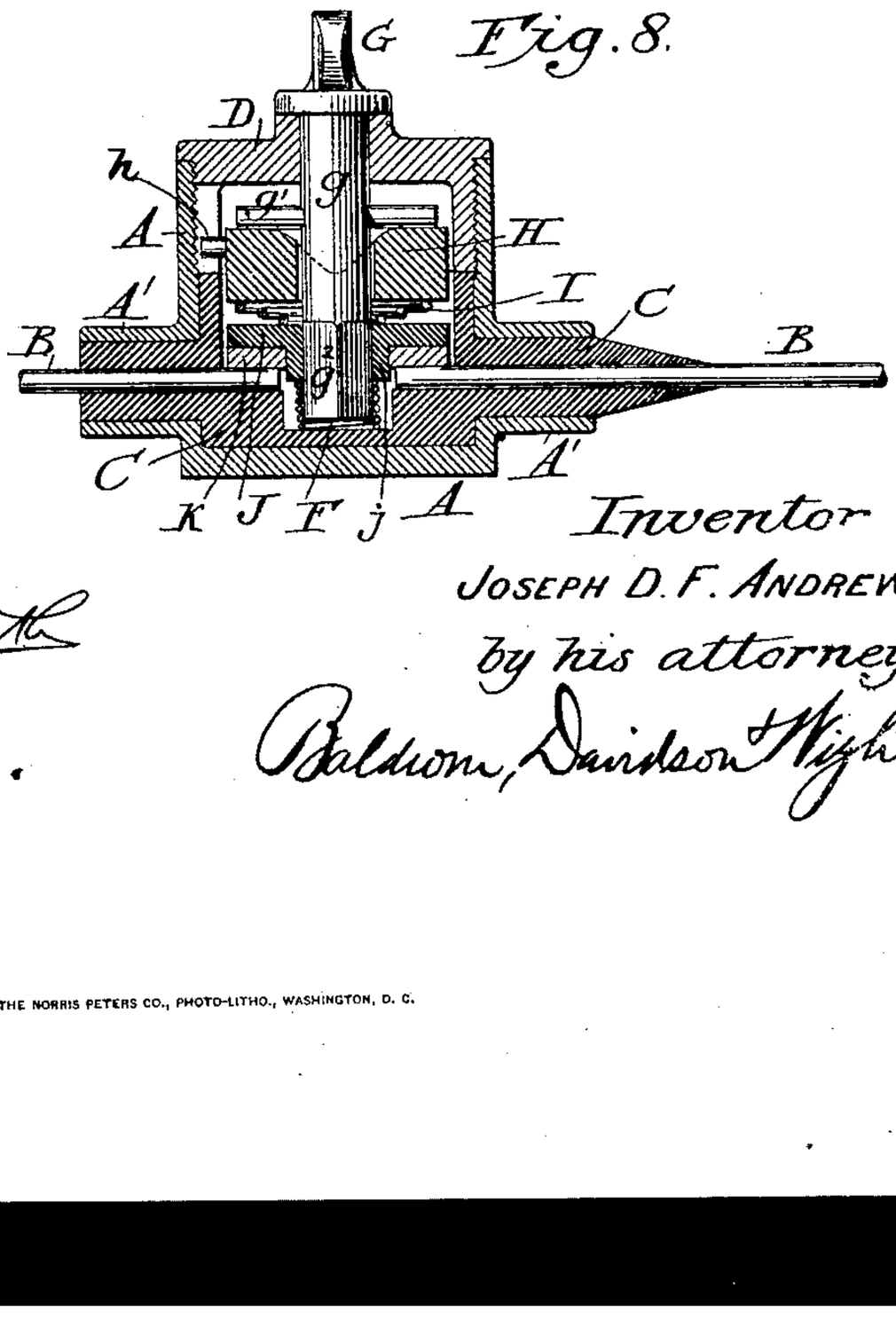


Fig. 8.



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JOSEPH DEVONPORT FINNEY ANDREWS, OF WESTMINSTER, ENGLAND.

COMBINED COUPLING AND CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 452,173, dated May 12, 1891.

Application filed October 27, 1890. Serial No. 369,515. (No model.) Patented in England December 18, 1889, No. 20,387.

To all whom it may concern:

Be it known that I, JOSEPH DEVONPORT FINNEY ANDREWS, a subject of the Queen of Great Britain, and a resident of Westminster, in the county of Middlesex, England, have invented certain new and useful Improvements in Couplings and Cut-Outs for Electrical Conductors, (for which I have received Letters Patent in Great Britain, No. 20,387, dated December 18, 1889,) of which the following is a specification.

The object of one part of my invention is to provide a switch or coupling which may be quickly operated and which is adapted to secure a reliable electrical connection between the terminals of electrical conductors.

The object of another part of my invention is to provide an improved fusible cut-out device that may be applied to the terminals of electrical conductors.

According to another part of my invention I combine in a novel way a switch with a fusible cut-out device.

The details of construction and the subject-matter claimed will be hereinafter designated.

Referring to the accompanying drawings, Figure 1 is a perspective view of my improved switch. Fig. 2 is a longitudinal central section through the casing, the interior parts being shown in elevation. Fig. 3 is a similar view, the switch devices being shown in a different position. Fig. 4 is a detail view of the incombustible block which carries the fusible wire. Fig. 5 is a section through this block, taken at right angles to its axis. Figs. 6 and 7 illustrate a modified form of the block for carrying the fusible wire. Fig. 8 is a longitudinal central section of a modified form of switch.

The casing A may be made of metal, and is preferably cylindrical and formed with laterally-projecting lugs a at its base to receive fastening devices. On opposite sides of the casing A are formed openings a', from which project tubular extensions A'. The ends of electrical conductors B B' extend into the tubular extensions A', and are electrically connected with contact-pieces b, separated a sufficient distance to be disconnected electrically. Insulating material C surrounds the conductors B and B' in the tubular extensions A' and also fills the casing A beneath the contact-pieces b. It also extends along the sides of the interior of the casing, preferably about half-way the distance from the base to the open end a^2. The end a^2 is closed by a cap or cover D, which has a screw-threaded hollow plug d', engaging corresponding screw-threads d^2 on the interior of the casing A. When screwed home, the plug at its inner end abuts against the end of the insulating material.

In Figs. 2 and 3 I have shown a switch embodying my invention combined with a fusible cut-out. As there shown, a block E of incombustible non-conducting material, preferably circular in cross-section, is provided with a groove e in its periphery, in which is arranged a wire e' of fusible metal or alloy. Sockets or recesses e^2 are formed in the block E on the same side, and the ends of the wire e' are turned into these recesses at their inner ends. I then pour molten metal into the recesses or sockets e^2, so as to fill them and surround the ends of the fusible wire e', so that they will be completely embedded in the molten metal and securely held in position. After filling, the recesses, projections, or buttons e^3 are formed, which constitute contacts adapted to engage with the contacts b. It is obvious that if the contacts e^3 be placed on the contacts b there will be an electrical connection between the wires B and B' through the buttons e^3, the metal in the sockets, and the fusible wire e'. The buttons e^3 and the metal in the sockets will be hereinafter called "cast-metal plugs." A spring F is interposed between the end of the casing and the block E. The spring is preferably seated in a recess f in the insulating material, and the tension of the spring is such as to lift the block, with the contacts e^3, away from the contact-pieces b, when the block is not moved positively in an opposite direction, by devices now to be described. A handle G is provided with a spindle g, extending through the cap or cover D. The spindle extends a short distance beyond the inner face of the cap, and is provided with laterally-projecting arms g'. These arms engage with the block H, between which and the fuse-carrying block E is interposed a stiff coiled spring I.

As shown in Fig. 2, the spring I is not under tension, and the spring F is also relieved of tension and holds the contacts of the block E away from the contacts *b*. On that side of the block H adjacent to the cover D are formed notches H′, having oppositely-inclined surfaces h^2. The arms *g*′, carried by the spindle *g*, project across the block H, and when the electrical connection is broken between the contacts the arms lie at the inner ends of the notches. A stud or pin *h*, projecting laterally from the block H, extends into a wide slot *h*′ in the flanged cover D. This slot is in line with the axis of the casing, and, as will be obvious, the arrangement is such that the block H can move parallel with the axis of the spindle by reason of the pin *h* being guided by either one side or the other of the slot; but it does not revolve relatively thereto, except to a limited extent, to allow the block H to move independently of the handle G, when contact is being broken, thus giving the advantage of a quick break independent of the operation. If now it is desired to complete the electrical connection between the wires B and B′, the handle G is turned, causing the arms *g*′ to ride along the inclined surfaces h^2, thereby causing the block H to move inwardly, place the spring I under tension, and move the block E toward the contacts *b*. The block E is prevented from turning by pin e^6, which is guided in a slot e^7. When the handle G has been given a quarter-turn, the several parts of the switch will occupy the relative positions shown in Fig. 3, and the electrical connection will be complete, both springs being under tension; but the tension of the spring I being greater than that of the spring F, and the block H being securely held by the arms *g*′, the pressure of the spring I overcomes the inferior pressure of the spring F and causes a pressure to be exerted between the contacts e^3 and *b*. Should an abnormal dangerous current traverse the circuit, the wire *e*′ would be fused and the circuit would be immediately broken. Any globules of molten metal formed by the fusion of the wire *e*′ would be confined within the casing and there would be no danger of setting fire to any combustible matter in the vicinity of the switch. When the fuse is destroyed, a new block with a fusible wire and contact-plugs may be quickly substituted at a trifling cost.

In Figs. 6 and 7 I have shown a modified way of connecting the ends of the fusible wire with the contact-plugs. As there shown, the wire *e*′, instead of extending around the periphery of the block, extends through a transverse opening e^4 and over a bridge-piece e^5, the ends being embedded in the cast-metal plugs e^3.

In Fig. 8 I have shown a slight modification. The fusible cut-out devices are omitted. The casing and its cover are substantially the same, as is also the insulating-filling; but the spindle *g* of the handle G is prolonged, extending through the block H, and through a block J of insulating material, having a boss *j*, around which is arranged a metallic ring K. The spindle *g* passes freely through the block H; but the lower end of the spindle is squared at g^2 and fits a corresponding opening in the block J, so that when the spindle is revolved the block will turn with it. The ring K is securely fastened to the block, so as to move therewith and make sliding contact with the terminals of the wires B B′. This ring is adapted to engage with the terminals of the wires B B′, and in operation when the handle G is turned a sliding contact is effected between the ring and the terminals of the wires. The springs F and I are arranged to operate in a similar manner to that described in connection with Figs. 2 and 3.

My improved switch and cut-out possess many advantages. The device may be manufactured at a small cost. By giving the handle a quarter-turn electrical connection may be quickly and securely made. By turning the handle a quarter-turn farther or back the electrical connection is instantly broken. By using cast-metal plugs to form the contact-pieces to which the ends of the fusible wire are connected there is no danger of a break in the circuit, except when an abnormal dangerous current traverses it.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a frame or casing, the terminals of the electrical conductors of the circuit, a block carrying a conductor for connecting the terminals, a spring for normally holding said block away from the terminals, a handle, a block moved by the handle toward and from the block which carries the conductor for uniting the terminals, and a spring interposed between the two blocks.

2. The combination, substantially as hereinbefore set forth, of the inclosing casing, contacts for the conductors, a block of insulating material carrying a conductor adapted to electrically connect said contacts, a spring tending to separate said conductor from the contacts, a rotatable handle having an inwardly-projecting spindle provided with laterally-projecting arms, and a notched recessed block with which said arms engage and which is operatively connected with the block of insulating material carrying the contact connecting conductor.

3. The combination, substantially as hereinbefore set forth, of a frame or casing, the terminals of two electrical conductors supported in the frame but insulated from each other, a block carrying a conductor adapted to connect the terminals, a spring for normally holding said terminal connector away from the terminals, a handle, a block connected with

the handle and moved thereby toward and from the terminals, and a spring interposed between said block and the block which carries the conductor which connects the terminals.

4. A thermal cut-out for electric circuits, consisting of a block of incombustible material having recesses filled with cast-metal plugs and provided with a groove within which is arranged a fusible wire having its ends embedded in the cast-metal plugs.

In testimony whereof I have hereunto subscribed my name.

JOSEPH DEVONPORT FINNEY ANDREWS.

Witnesses:
ALEX. CECIL RIDGWAY,
ALEX. RIDGWAY.