

E. M. HEWLETT.
MAGNETIC BLOW-OUT OR FUSE BOX.

(Application filed Apr. 21, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

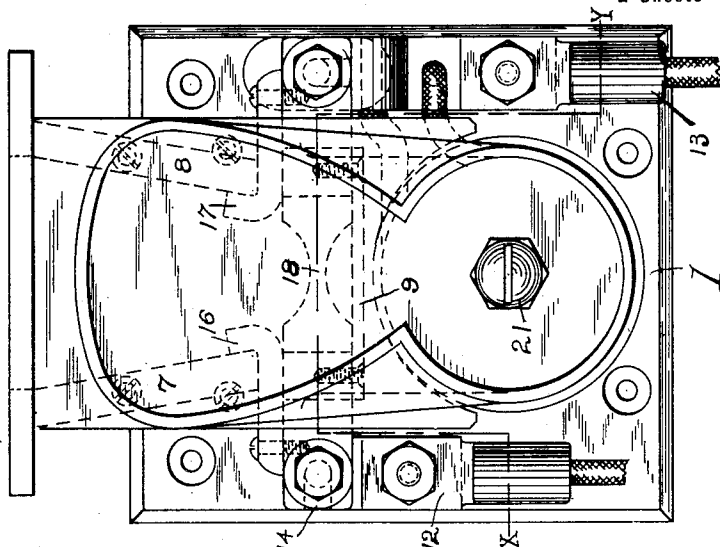


Fig. 2.

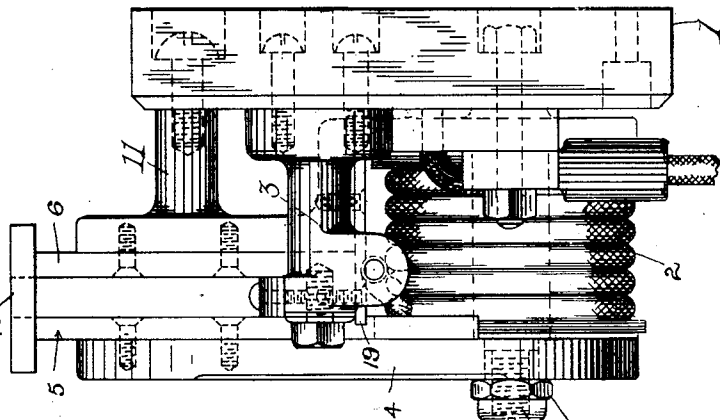
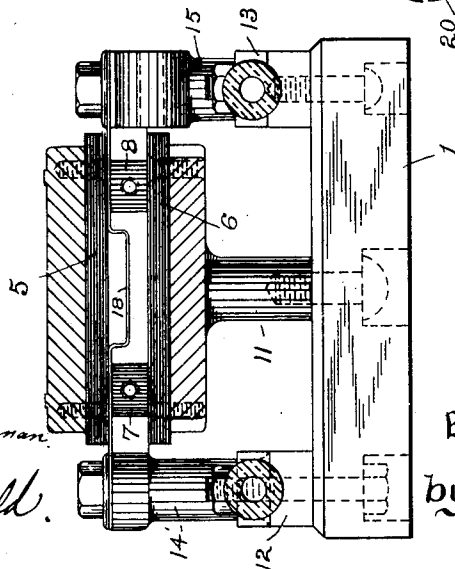


Fig. 3.



Witnesses.

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2 Sheets—Sheet 2.

Fig. 5.

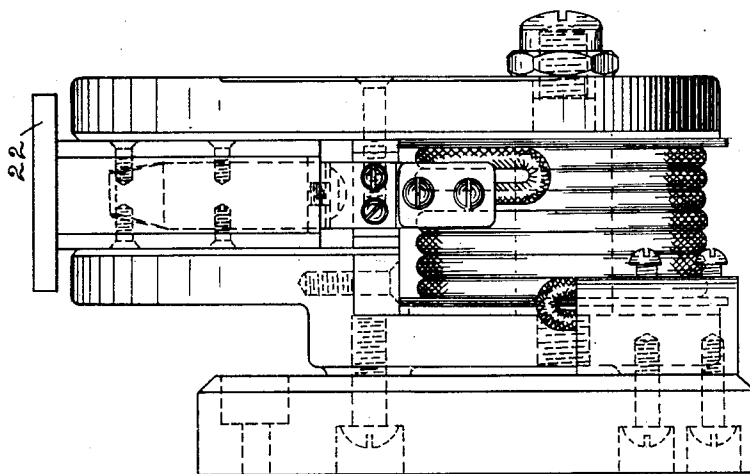
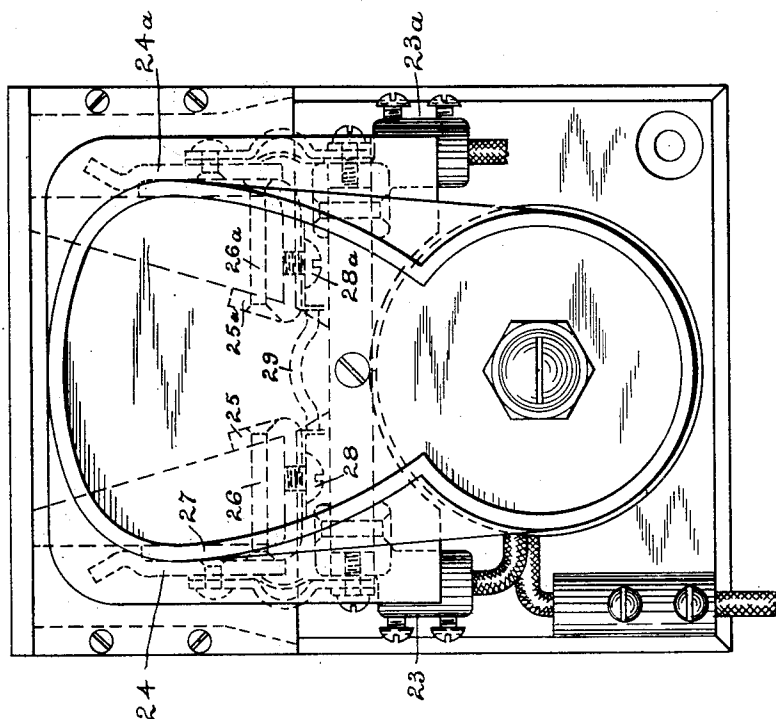


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD M. HEWLETT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE
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MAGNETIC BLOW-OUT OR FUSE-BOX.

SPECIFICATION forming part of Letters Patent No. 659,671, dated October 16, 1900.

Application filed April 21, 1900. Serial No. 13,717. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. HEWLETT, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Magnetic Blow-Outs or Fuse-Boxes, (Case No. 1,492,) of which the following is a specification.

This invention relates to thermal cut-outs which interrupt an electric circuit by the melting of a fusible conductor when the current traversing said conductor acquires a value beyond its current-carrying capacity. In interrupting a circuit, and particularly one carrying high potential, by a device of this character the arc holds, unless special provision is made to prevent it, until the fuse is consumed and the terminals damaged.

The object of my invention is particularly to prevent such damage to the terminals, and I effect the result by providing in conductive relation to the terminals auxiliary masses of metal, which take up the arc after it has attained a certain length and permit the disruption of the circuit to occur while the auxiliary arcing tips are in circuit.

My invention is particularly applicable to that type of fuse-box in which the arc is blown out by electromagnetism, the arcing tips being placed adjacent to the fuse in the line along which the expulsive action of the magnet is directed.

My invention also contemplates an arrangement of the parts of the fuse-box by which the introduction of a new fuse is facilitated after the circuit has been interrupted by the operation of the fuse-box.

In carrying out the invention I provide on an insulating refractory base an electromagnet having extended poles brought close together in parallel planes and lined with insulating and preferably refractory material, so as to form between the poles of the magnet, on five sides, an inner space, forming a chute for the direction of the arc-gases. Across this chute extends the fuse, clips or fastening-screws being provided at the sides by which it may be included in circuit with the winding of the magnet. In good conductive relation to the fuse-terminals are detachably

mounted two relatively-massive arcing tips of copper or brass, each penetrating a short distance into the chute, so as to take up the arc when the fuse blows, and thus short-circuit the latter after a determinate portion has been consumed, thereby restricting any damage created by the arc to the arcing tips and preventing damage to the terminals. In the preferred form of my invention, particularly for heavy currents, I make the upper pole-piece of the magnet removable and provide it with a transverse groove, so that when placed over the magnet it makes a tight joint with the rear of the chute, and yet permits easy replacement of the fuse after the device has once acted. For fuse-boxes designed to operate on small currents I prefer to make the fuse-box removable bodily from the pole-pieces, leaving the inner end of the box open, so that the fuse-wire may be easily fixed in place, and provide terminals with spring-clips by which the circuit connections of the fuse are established when the box is pushed into place between the pole-pieces of the magnet.

The several features of novelty of the invention will be more fully pointed out hereinafter, and will be specifically indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figures 1, 2, and 3 represent a form of my invention as applied to a fuse-box designed to carry large currents, Fig. 1 being a top plan view with the removable pole-pieces in place, Fig. 2 being a side elevation of the device stood on end, and Fig. 3 being an end elevation, the chute, pole-pieces, and terminals being shown in section on a plane indicated by the line X Y of Fig. 1. Figs. 4 and 5 are views of a modified form designed for use with currents of smaller amperage, Fig. 4 being a top plan, and Fig. 5 a side elevation, of a fuse-box stood on end.

Referring first to the type shown in Figs. 1, 2, and 3, 1 represents a base-plate of slate or other insulating refractory material, on which is mounted an electromagnet provided with a coil of thick wire to carry without undue heating a current of large amperage, as indicated at 2. The magnet is provided with extended pole-pieces, the lower of which

curves upwardly, as shown at 3, and then extends in a plane parallel to the removable pole-piece 4. The cooperating pole-faces are lined with insulating refractory material, which may be indurated fiber or other suitable material, which is lagged fast to the pole-pieces by screws. These refractory lining-walls are indicated at 5 6. Side walls are formed by blocks of refractory insulating material, as indicated at 7 8, (see Figs. 1 and 3,) and the rear end of the box or conduit formed by this refractory lining is closed by a plate 9 of refractory insulating material. Thus there is formed between the pole-pieces of the magnet a chute closed on five sides, the front being open, as indicated at 10. The lower pole-piece of the magnet may be conveniently formed as a casting, integral with which is a supporting post or pillar 11, bearing on the base, adapted to be fastened thereto by a set-screw from beneath, as indicated in Fig. 3. The terminals of the box are seen at 12 13, the former of which has an integral extension, forming a post 14, which forms one of the fuse terminals, being provided at the top with a set-screw to receive one end of the fuse or its connector. The other end of the fuse may be fastened to a similar post 15, independently mounted on the base, into which one end of the magnet-winding is fastened. The other terminal of the magnet-winding is fastened to the terminal 13. The side walls of the chute are interrupted to permit the strips carrying the arcing tips 16 17 to be inserted. These strips are fastened by screws to the fuse-terminals and are in good conductive relation to them. They are relatively massive compared with the carrying capacity of the fuse. The latter may be a strip of fusible metal provided with a reduced neck at or near the middle of its length, as indicated at 18 in Fig. 1, so as to produce at that point a spot of decreased current-carrying capacity. The side walls of the chute may be of slightly-decreased height where traversed by the fuse in order to make a close fit, if desired, and the fuse may with advantage be bent or depressed at the portion between the arcing tips, as indicated in Figs. 1 and 3, an arrangement of common employment in the art, by which the arc is not brought in direct contact with the walls of the inclosure, and the upper pole-piece of the magnet may be provided with a transverse groove, with which the end of the base forms a tongue-and-groove joint, as indicated at 19 in Fig. 2, to form a tight joint at the rear of the chute and prevent access of the arc-gases to the magnet-coils or the heads of the magnet-spool. The magnet-core is provided with a screw-threaded extension 20, which when the upper pole-piece is in place extends through the latter, being clamped in position by a nut 21. The refractory lining may be secured to the pole-pieces by screws or otherwise. The arcing tips 16 17 are provided with a bend corre-

sponding to the inclination of the side walls of the chute, so that when in place they extend some little distance along the chute, as indicated in Fig. 1. As thus organized, when the carrying capacity of the fuse is exceeded it melts and the arc is taken up, when it reaches a point approximating the dotted lines indicated in Fig. 1, by the arcing tips, the field of force of the magnet quickly driving the conducting-gases formed by the arc outward in the chute. They are thus carried away from the fuse itself, and the increase of potential drop across the burned portion of the fuse almost instantly exceeds the drop across the arcing tips, so that the latter takes the full current and any damage to the fixed fuse-terminals is hereby avoided. The almost-instantaneous action of the magnet in expelling the arc-vapors, however, prevents any serious damage to the arcing tips. When the latter become seriously damaged by repeated use, they can easily be removed and new ones substituted.

In the case of a fuse-box designed for small currents the entire chute may be removed without disturbing the upper pole-piece of the magnet. Such an organization is shown in Figs. 4 and 5, 22 representing the removable chute and 23 23^a representing the fixed fuse-terminals. To the latter are connected elastic contacts 24 24^a, mounted on the end of conducting-springs, (shown in dotted lines in Fig. 4,) arcing tips 25 25^a being riveted fast to the side walls of the removable chute by rivets 26 26^a passing through the wall. The outer end of the piece of metal which forms these arcing tips constitutes a contact, as 27, which when the chute is pushed between the pole-pieces of the magnet engages the spring-terminals 24 24^a. Set-screws 28 28^a permit clips on the ends of the fuse-wire 29 to be electrically connected with the arcing tips. The outer ends of the elastic contacts 24 24^a are bent inwardly, as indicated in Fig. 4, to hold the chute in position when inserted between the pole-pieces of the magnet. With this organization after the fuse has been connected between the arcing tips 25 25^a it is pushed in between the pole-pieces of the magnet and the spring-contacts 24 24^a automatically connect the fuse in circuit. When the fuse 29 blows, the arcing tips 25 25^a take the arc, and the action is similar to that of the organization described in connection with Figs. 1, 2, and 3.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electric fuse provided with means for extinguishing the arc, and arcing tips electrically connected with the fuse-terminals.

2. An electric fuse provided with means for extinguishing the arc, and arcing tips electrically connected with the fuse-terminals, and separated by an air-gap of less length than the fuse.

3. A fuse-box provided with means for ex-

tinguishing the arc, a fuse connected with the terminals, and removable arcing tips electrically connected with the fuse-terminals and separated by an air-gap less than the distance between the fuse-terminals.

4. A fusible cut-out for an electric circuit, comprising a fuse mounted in a magnetic field, and arcing tips massive relatively to the fuse, electrically connected with the fuse-terminals, said arcing tips lying in the path of expulsion of the arc-gases.

5. A cut-out for an electric circuit, comprising a magnetic blow-out and auxiliary removable arcing tips projecting in the path of expulsion of the arc-gases when the circuit

is interrupted, said arcing tips being electrically connected with the circuit-terminals.

6. A thermal cut-out for an electric circuit, comprising means for establishing a magnetic field, a fuse within said field, a chute for the arc-gases, and arcing tips electrically connected with the fuse-terminals extending into the chute in the path of the gases expelled from the fuse when it blows.

In witness whereof I have hereunto set my hand this 19th day of April, 1900.

EDWARD M. HEWLETT.

Witnesses:

BENJAMIN B. HULL,
MABEL E. JACOBSON.