(No Model.)

E. THOMSON.

FUSIBLE CUT-OUT.

No. 502,330. Patented Aug. 1, 1893.

FIG. 1.

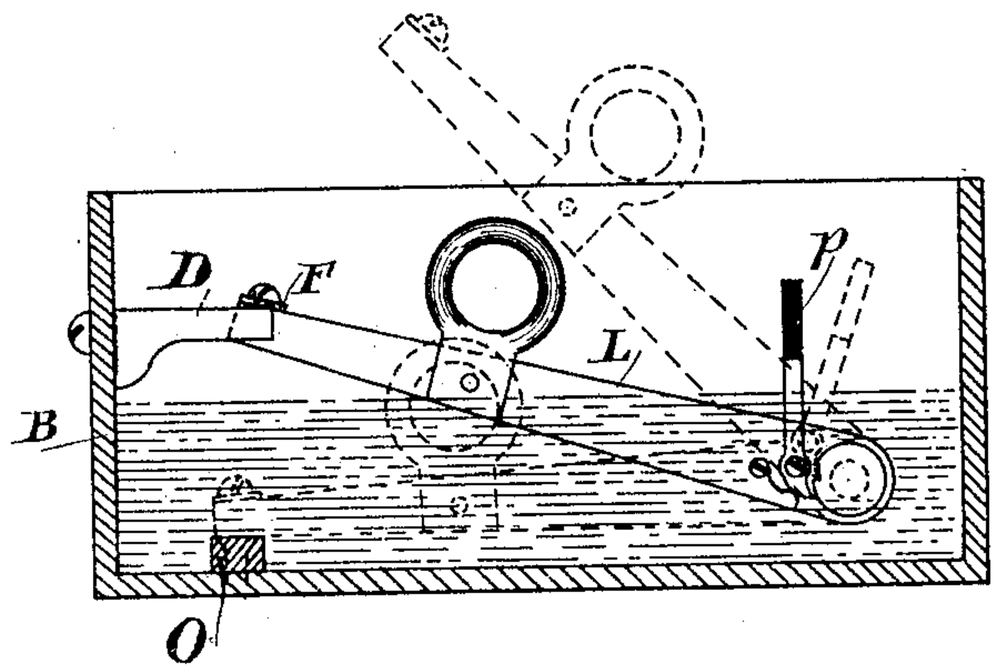


FIG. 2.

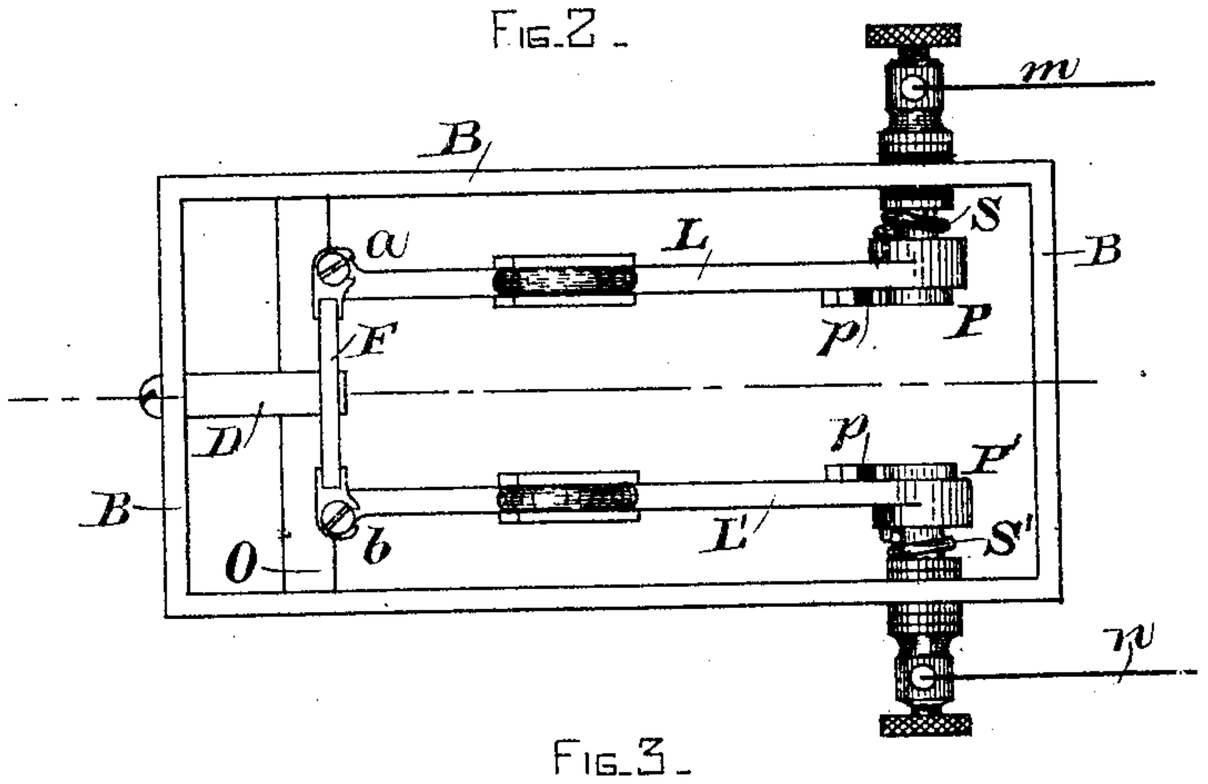
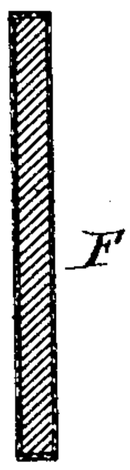


FIG. 3.

FIG. 4.



WITNESSES.

A. F. Macdonald.

A. E. Orme

INVENTOR.

Elihu Thomson

by

Bentley & Blodgett

Attys

UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

FUSIBLE CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 502,330, dated August 1, 1893.

Application filed September 17, 1891. Serial No. 406,009. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Fusible Cut-Outs, of which the following is a specification.

The present invention relates to fusible cut-outs for electric circuits, and consists in certain improvements in their arrangement and construction whereby they are made capable of cutting off high potential currents, made more permanent while running hot, and are made more capable of maintaing mechanical strains, such as are sometimes applied to cause the fuse to rupture, or in other words, they are made more definite in action in all particulars.

My invention is to be applied in some of its forms to the interruption of currents of such potentials as would maintain arcs between the fuse supporting blocks. Certain parts of my invention may be applied, however, without reference to this feature.

In the accompanying drawings, Figure 1 is a side view of my improved cut-out, showing its containing box in section. Fig. 2 is a plan of the same and Fig. 3 shows the fuse separately. Fig. 4 is a section of the fuse.

B, B, is a box or receptacle in which the fuse F, is mounted between terminals *a*, *b*, Fig. 2. These terminals are borne by levers L, L′ carried in a box or receptacle and movable on a pivot or pivots P, P′, suitable connections to circuit wires *m*, *n*, being provided to pass current through the fuse body. The levers L, L′, tend downward under the action of gravity or by the assistance of springs S, S′, and it is preferred to have the box or receptacle B, B, filled with an insulating oil which, does not however, rise high enough to completely cover the fuse F. The fuse F is caught upon an insulated projection D extending from the inside of the casing or receptacle. By this means the fuse is brought under moderate strain while mounted in the air space above the insulating fluid. If now the fuse is melted, it releases the levers L, L′ which at once drop into the oil and become immersed therein. This stops off any arc or short-circuit which might form between them.

In replacing the fuse the insulated handle H may be used to raise the levers to an elevated position shown in dotted lines while a pawl *p*, may be suitably arranged to retain the levers in such position while the new fuse is being attached, after which the release of the pawl allows the levers to come down and the fuse to rest upon the projection D as before, ready for a repetition of the action described on the occurrence of an abnormal flow of current. It is obvious that the two levers could be mechanically united by a strip of insulating material.

Electric fuses made of oxidizable metal, such as alloys of lead, tin, and the like, when running hot are apt to contract a scale or coating of oxide which causes the fuse to retain its form even after the body of the metal inside the scale or coating has been melted or rendered liquid. Putting the fuse under strain as in Fig. 1, tends to prevent this by breaking the casing of scale, and therefore renders the device more efficient. I also however, in some cases coat the fuse F, as in Fig. 4, with a layer of non-oxidizable metal, or a less oxidizable metal, such as silver, preferably by electro-plating, the silver being non-oxidizable even when hot, which protects the baser metal interiorly thereto even when present in a very thin film, while if the baser metal melts, the silver film is not sufficiently strong to stand up under any strain, and furthermore, is alloyed or dissolved by the melted interior metal, thus causing the fuse to give way. In case the fuse however, is not running at the temperature near its melting point, and is under strain, it would become liable to premature rupture by being softened or extended by the strains. I therefore make a further addition to it, as in Fig. 3. Alongside of the fuse and in multiple with it, I place a fine wire of steel or iron, or such other metal as has a considerable tenacity and a rather high specific resistance, preferably. It should, in fact, be made of so small size, that if it be of lower specific resistance than the fuse wire, its capacity for radiation and loss of heat is greater relatively so that it will not reach too high a temperature while in multiple with the main fuse itself. The main fuse may be made of quite fusible metal such

as tin or alloys of tin and lead, and it is evident that the compound fuse will possess the tensile strength of the iron or steel or other metal associated with it in addition to the strength of the main fuse. Consequently if the softer metal tends to fuse, the strain will be resisted by the harder metal. At the moment the main fuse itself melts the whole current flow is then turned upon the fuse of harder metal which is at once overheated and melts likewise.

When the levers L, L′, which constitute a carrier, and actuator for the fusible strip, descend into the liquid, they are arrested by an insulating stop O.

What I claim as new, and desire to secure by Letters Patent, is—

1. As a new article of manufacture, a safety cut-out for electric circuits, comprising a detent, a fusible strip engaging with said detent, and an actuator carrying said strip, consisting of two arms connected respectively with the terminals of the circuit, substantially as described.

2. As a new article of manufacture, a safety cut-out comprising a fixed detent, a fusible strip engaging therewith, two levers carrying said strip insulated from one another, and connected to the respective terminals of the circuit and spring and manual operating devices for such levers.

3. As a new article of manufacture, a safety cut-out comprising a fusible strip, a carrier and actuator therefor consisting of two spring actuated arms a releasable pawl for said carrier and a detent engaging with said strip.

4. As a new article of manufacture, a safety cut-out comprising a fusible strip, a swinging carrier and actuator therefor having an insulated handle, a detent engaging with said strip, and an additional insulating stop engaging with such carrier when the fuse melts.

5. As a new article of manufacture, a safety cut-out comprising a fusible strip, a swinging carrier and actuator therefor, an insulated detent engaging with said fusible strip, and a non conducting liquid interposed in the path of such carrier.

6. As a new article of manufacture, the combination of a receptacle containing a non-conducting liquid, a detent placed above said liquid a fusible strip engaging with such detent, a carrier and actuator for such strip and having strip holding terminals movable into such liquid.

7. As a new article of manufacture, a safety strip for electric cut-outs having a core of fusible metal and a coating of comparatively non-oxidizable metal.

8. As a new article of manufacture, a safety strip for electric cut-outs having a core of fusible oxidizable metal and a coating of comparatively non-oxidizable metal.

9. As a new article of manufacture, an electro-plated fuse for use upon electric circuits.

10. In combination a safety strip for an electric cut-out having a core of fusible metal and a plating of comparatively non-oxidizable metal and means, substantially as described, adapted to include such strip under strain in an electric circuit.

11. As a new article of manufacture, a safety cut-out comprising a carrier, a safety strip attached thereto, and consisting of two conducting parts united together and connected in multiple, one part being comparatively fusible, and the other part being comparatively infusible, and a detent engaging with said strip.

12. As a new article of manufacture, the combination of two movable terminals a body of non-conducting liquid placed beneath them, and means, substantially as described, adapted to automatically immerse said terminals in such liquid when an arc may be formed between them.

13. As a new article of manufacture, the combination with two movable terminals between which an arc is liable to be formed, of a body of non-conducting liquid placed below and in the path of motion of such terminals.

In witness whereof I have hereunto set my hand this 14th day of September, 1891.

ELIHU THOMSON.

Witnesses:
JOHN W. GIBBONEY,
BENJAMIN B. HULL.