(No Model.)

E. E. BAILEY & G. J. GALBRAITH.

ELECTRIC CUT-OUT.

No. 437,324. Patented Sept. 30, 1890.

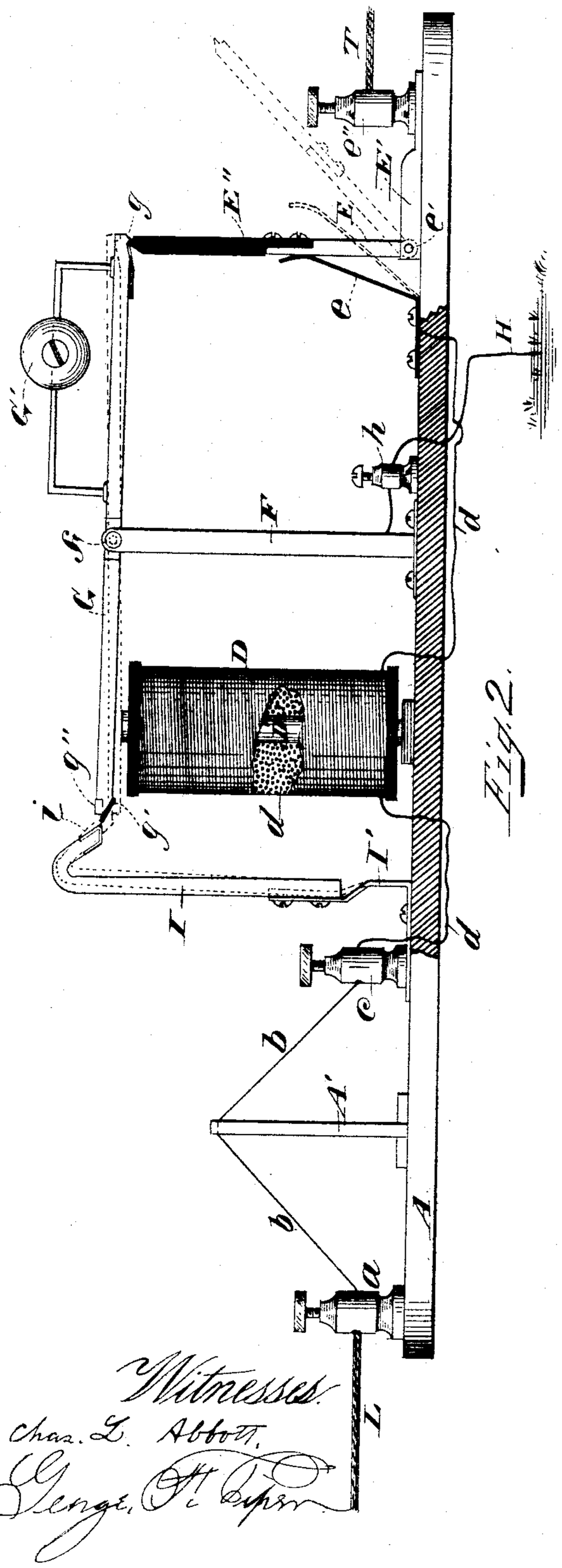

Fig. 2.

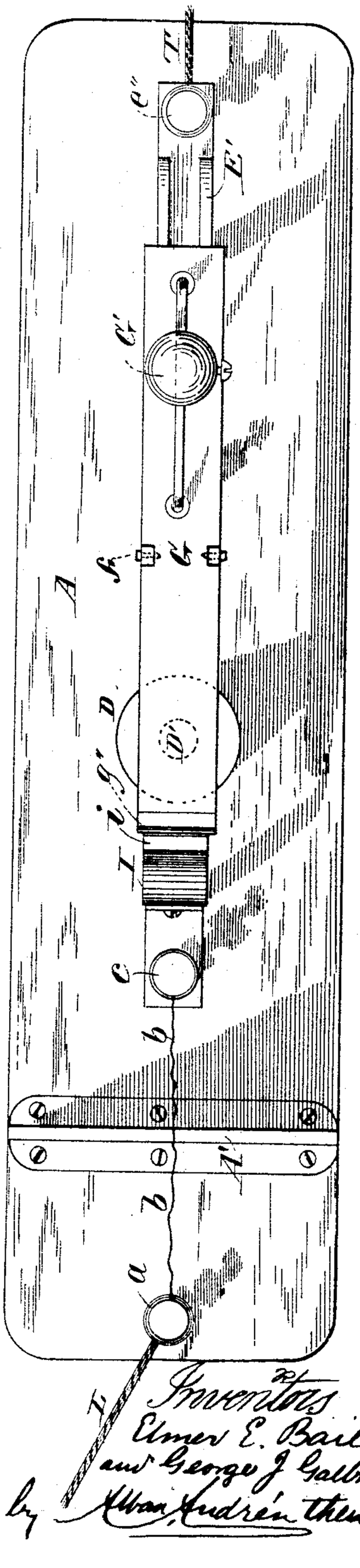

Fig. 1.

Witnesses.
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UNITED STATES PATENT OFFICE.

ELMER E. BAILEY, OF EVERETT, AND GEORGE J. GALBRAITH, OF BOSTON, ASSIGNORS OF ONE-THIRD TO THOMAS W. LANE, OF BOSTON, MASSACHUSETTS.

ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 437,324, dated September 30, 1890.

Application filed May 27, 1890. Serial No. 353,319. (No model.)

To all whom it may concern:

Be it known that we, ELMER E. BAILEY and GEORGE J. GALBRAITH, citizens of the United States, and residents, respectively, of Everett, county of Middlesex and State of Massachusetts, and of Boston, in the county of Suffolk and State of Massachusetts, have jointly invented new and useful Improvements in Electric Cut-Outs, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in what are called "electric cut-outs" for the purpose of automatically breaking the circuit to telephones, telegraphic instruments, electric clocks, or other electrically-operated devices, in case the wire or wires leading thereto should accidentally come in contact with power or light wires of high and dangerous voltage, or receiving by induction such excessive currents, thus preventing fires and accidents in or near the place where the instrument is located.

The invention is constructed as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a plan view of the device, and Fig. 2 represents a side elevation of the same, partly shown in section.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In the drawings, A represents a suitable base, to which the various parts of the cut-out device are secured, said base being preferably made of slate or other suitable non-conducting material.

To one end of the base A is secured the binder-screw *a*, which is metallically connected to the line-wire L, and to such binder-screw and line-wire is metallically connected one end of a fusible metal wire *b*, having its other end connected to another binder-screw *c*, also secured to the base A.

Between the two binder-screws *a* and *c* we prefer to locate a plate or bridge A′, made of slate or other suitable non-conducting material, over which the fuse *b* is carried for the purpose of preventing an arc between the binder-screw *b* and *c* after the fuse has been melted by an excessive or dangerous current passing through it.

D is an electro-magnet secured to the frame A, and having a metal core D′, surrounded by spirally-wound insulated wire *d*, as usual, one end of said wire being metallically connected to the binder-screw *c*, and having its other end metallically connected to a spring *e*, normally resting against a metal lever E, pivoted at *e′* to a metal plate E′, secured to the base A, and having attached to it a binder-screw *e″*, to which is connected the wire T, leading to the telephone, telegraph, or other electric instrument.

F is a metal post or bearing secured in a suitable manner to the base A, and to its upper end is pivoted at *f* an armature-lever G, the front end of which is normally held from contact with the electro-magnet core D′, preferably by means of weight G′, adjustably secured to the rear end of the armature-lever G or a rod on the same. Instead of such weight an adjustable spring may be employed without departing from the spirit of our invention. The rear end of the said armature-lever is normally made to rest on the upper end of a piece or lever E″, made of vulcanized rubber or other suitable non-conducting material, which is secured to and forms an extension of the pivoted lever E, as shown in Fig. 1, said insulated extension E being normally held by the pressure of the spring *e* against a tooth or projection *g* on the rear end of the armature-lever G, as shown in Fig. 1. The post F is metallically connected to the ground-wire H, preferably by means of a binder-post *h*, secured to the base A, as shown.

To the front end of the armature-lever G is secured in a suitable manner a plate *g′*, preferably made of isinglass or other non-conducting material, against which is normally held the upper end of a spring-pressed lever I, preferably secured in its lower end to a spring I′, which is metallically connected to the binder-post *c*, as shown in the drawings. The lever I may to equal advantage be pivoted in its lower end to the base A with a spring pressing against it for holding its upper end normally in contact with the insu-

lated strip or plate g' on the armature-lever, similar to the lever E and its spring *e;* but we prefer to make it in the manner shown. The upper end of the lever I is preferably faced with platinum *i*, and we prefer to secure to the upper front end of the armature-lever G a stop projection or plate g'', also made of platinum or other hard-melting or heat-resisting substance.

The operation of the device is as follows: During the ordinary use of the telephone, telegraph, or other electric instrument the low-tension current enters the device through the line-wire L, and is conducted through the binder-screw *a* to the fuse *b* and binder-screw *c* without melting the said fuse. From the said binder-screw *c* the current passes through the electro-magnet coil-wire *d* to the metal spring *e*, from which it is conducted through the pivoted metal lever E to the metal plate E′ and binder-screw e'', and from the latter through the wire T leading to the telephone, telegraph, or other electric instrument that is to be guarded. During such ordinary use the current is prevented from passing from the spring-pressed lever I to the armature-lever G on account of the interposed non-conducting material g', as described. The current is also prevented from passing from the lever E and its spring *e* to the armature-lever G on account of the interposed non-conducting material or lever extension E″, by which grounding of the current is prevented between the line and instrument wires. The ordinary low-tension current being not strong enough to magnetize the core D′ sufficiently to attract the weighted armature-lever G, it will be seen that the various parts of the device will be held in their relative positions, as represented in full lines in Fig. 2. If the line-wire becomes crossed by a high-tension wire, or if from any cause, by induction or otherwise, a high-tension, excessive, or dangerous current should be conducted to the line-wire it will cause the core D′ to be sufficiently magnetized to attract the armature-lever G, and to overcome the resistance of its weight G′, and thus causing said armature-lever to be moved to the position shown in dotted lines in Fig. 2. Such rocking motion of the armature-lever causes the lever I to be metallically connected and locked to the forward end of the armature-lever G, by which the excessive current is made to pass from said lever I to the armature-lever and from it to the post F, and to the ground through the ground-wire H. At or about the same time (or immediately after) the ground-connection is thus established from the line-wire, the fuse *b* is melted, causing the line-wire to be automatically cut out, thereby saving the cut-out device and the telegraph or other electrical instrument from injury, as well as preventing them and the building from being ignited. At or about the time this takes place the insulated arm E″ is liberated from the hooked rear end of the armature-lever, and said arm with its lever E is automatically swung to the position shown in dotted lines in Fig. 2, by the influence of the pressure of the spring *e*, causing the instrument-wire T to be automatically cut out from the circuit, thus preventing damage from fire to the electric instrument or injury to the person operating the same. The tension of the spring *e* is so adjusted that a locked ground-connection is established through the armature-lever a little in advance of the break between the lever E and its spring *e*, for the purpose of preventing an arc to be made between the armature-lever and the spring-actuated lock-lever I.

Having thus fully described the nature, construction, and operation of our invention, we wish to secure by Letters Patent and claim—

1. The herein-described cut-out, consisting of a fuse and an electro-magnet in the circuit, a pivoted armature-lever normally held out of the field of the electro-magnet, a spring-pressed lever connected to the line-wire and normally held insulated from the armature-lever, a ground-wire metallically connected to the armature, and a second spring-pressed lever arranged normally in the circuit and having an insulated portion normally held in a locked position relative to the armature-lever, substantially as and for the purpose set forth.

2. The herein-described cut-out, consisting of a fuse, an electro-magnet, and spring-pressed lever arranged normally in the circuit, a pivoted armature-lever having a ground-connection, and a second spring-pressed lever connected to the line-wire and insulated from the armature-lever, the whole being so arranged as to cause the armature-lever to be actuated by an abnormal current and causing a ground-connection to be established from the line-wire in advance of the cut-out of the instrument, substantially as and for the purpose set forth.

3. The herein-described cut-out, consisting of a fuse and electro-magnet, a spring-pressed lever arranged normally in the circuit and arranged between the line-wire and electro-magnet, a ground-connected armature-lever normally insulated from said spring-pressed lever and instrument-wire, and a second spring-pressed lever connected to the line-wire and normally insulated from the armature-lever, the whole being so arranged as to cause an abnormal current to cause a ground-connection to be established between the line-wire, fuse, and armature-lever in advance of the cut-out of the instrument-wire, substantially as specified.

4. The herein-described cut-out, consisting of a fuse and electro-magnet, a spring-pressed lever arranged normally in the circuit and arranged between the line-wire and electro-magnet, a ground-connected armature-lever normally insulated from said spring-pressed lever and instrument-wire and provided with an adjustable weight, and a second spring-

pressed lever connected to the line-wire and normally insulated from the armature-lever, the whole being so arranged as to cause an abnormal current to cause a ground-connection to be established between the line-wire, fuse, and armature-lever in advance of the cut-out of the instrument-wire, substantially as specified.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 23d day of May, A. D. 1890.

ELMER E. BAILEY.
GEORGE J. GALBRAITH.

Witnesses:
ALBAN ANDRÉN,
ALICE A. PERKINS.