(No Model.)

G. W. RICHARDSON.

AUTOMATIC CUT-OUT.

No. 438,326. Patented Oct. 14, 1890.

Fig. 1.

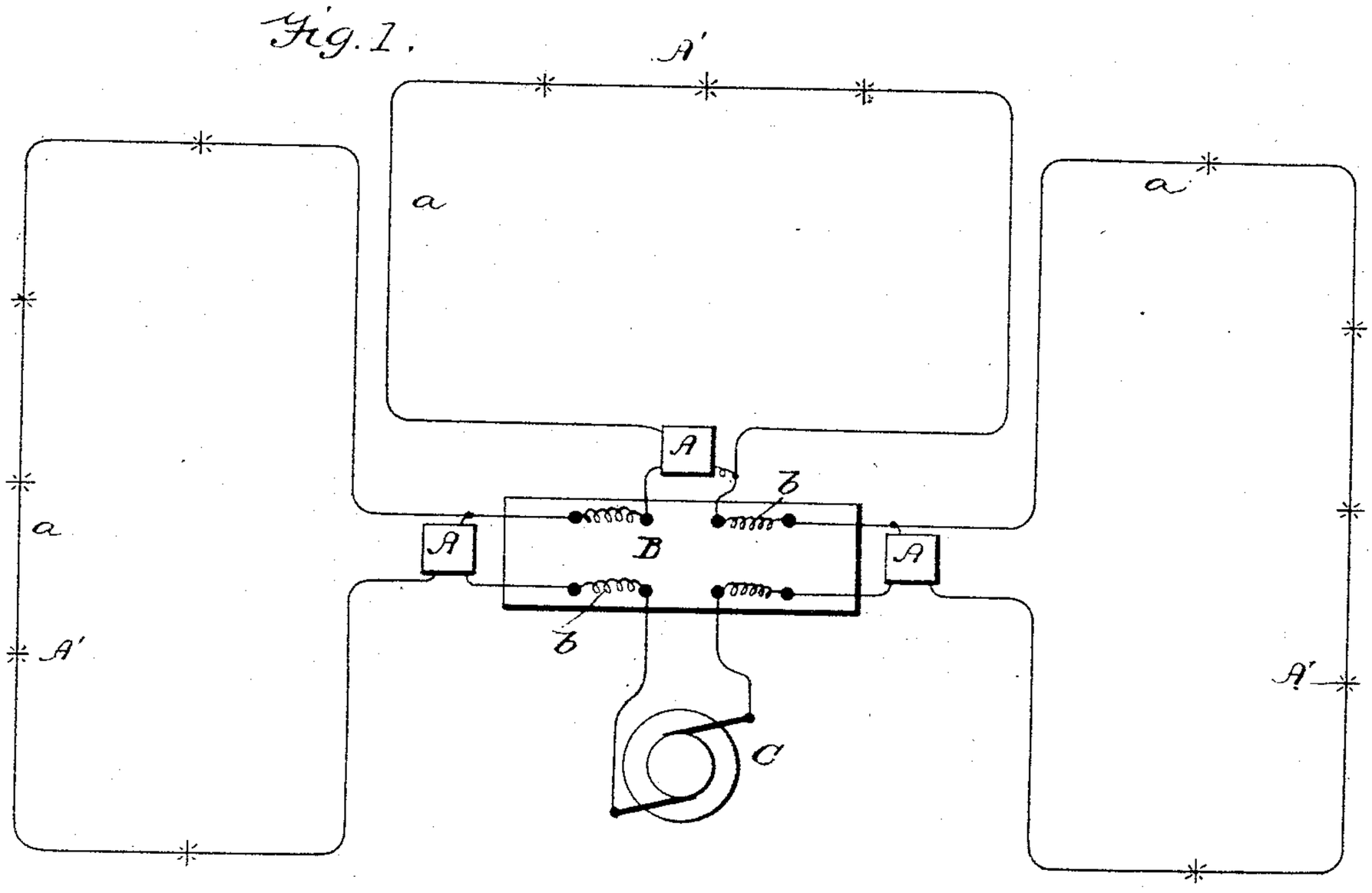
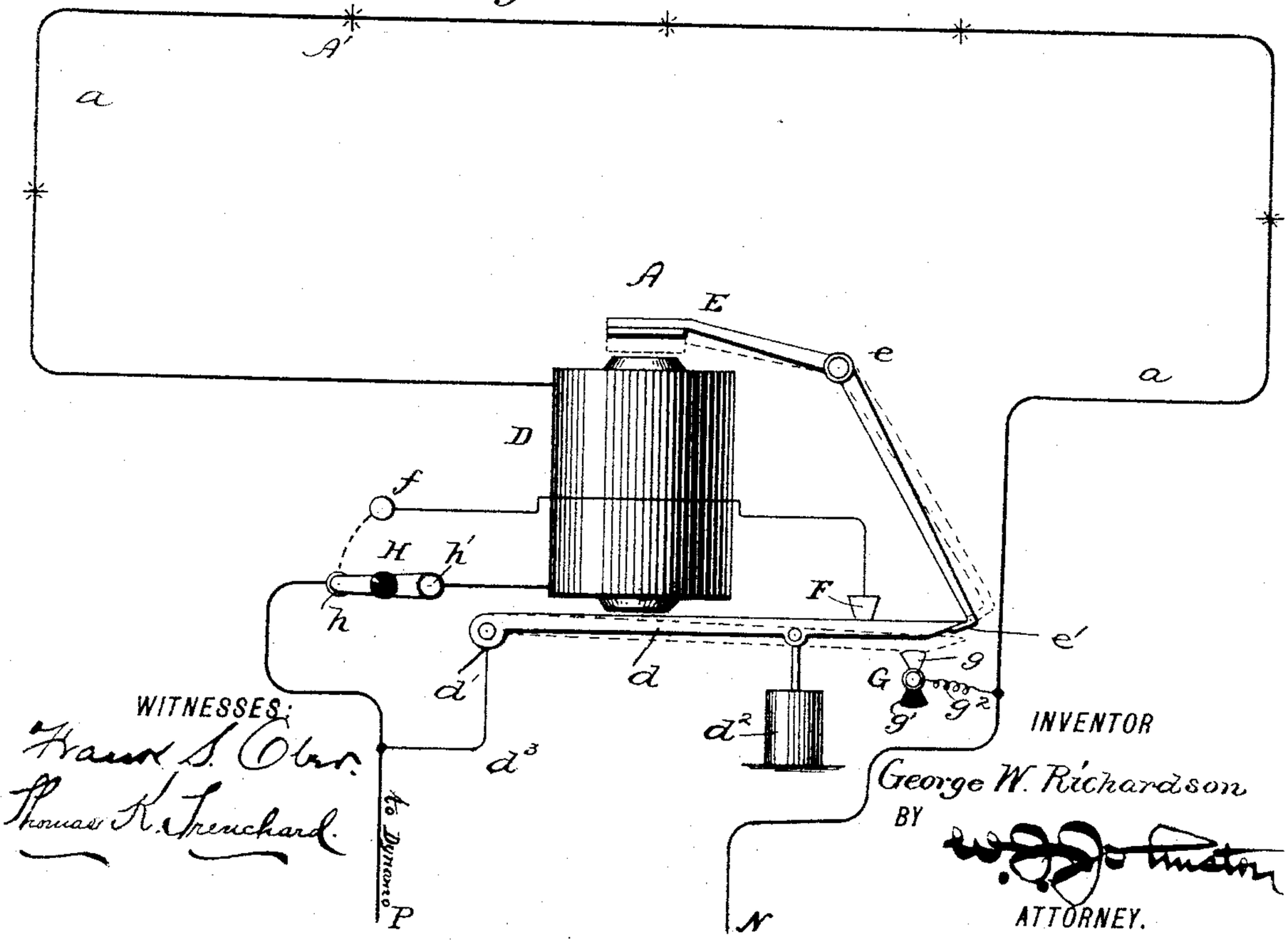


Fig. 2.



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GEORGE W. RICHARDSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO EDWARD D. GROSS, OF SAME PLACE.

AUTOMATIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 438,326, dated October 14, 1890.

Application filed May 20, 1890. Serial No. 352,473. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. RICHARDSON, a citizen of the United States, residing in Philadelphia, (Wissahickon,) in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Safety Devices for Electric Circuits, of which the following is a specification.

My invention relates to safety devices for automatically short-circuiting or opening the circuit of an electric translating device; and my object is to produce a device which, where two or more circuits in series from one dynamo are employed, will automatically short-circuit at the station a circuit which has become broken, and which device when but one circuit is employed and breaks will open that one at the station, in order that the break may be repaired with safety.

My device is intended particularly for use in connection with arc-light systems, although equally useful where other translating devices than lamps are employed.

When a plurality of circuits in series run from one dynamo and one breaks, it is desirable not only that a safety device shall be brought into action in order that the break may be repaired, but that the said circuit shall be closed at some point, preferably at or near the station, in order that the other circuits shall not be opened by the said break; and also when but one circuit from the dynamo is used it is desirable that if one breaks that a safety device shall be brought into action that will open the circuit, preferably near the station, in order that the break may be safely repaired. If such device were to short-circuit the said broken circuit, damage to the dynamo would be liable to ensue. Therefore the circuit should be automatically broken instead of being short-circuited. I attain these objects by means of the device hereinafter described, and in which my invention consists, as specified in the claims.

In the accompanying drawings, Figure 1 is a diagram showing the plurality of circuits (three) arranged in series from one dynamo and illustrating the preferable location of my safety device—one for each circuit—at the station or near the switch-board; and Fig. 2 is a plan view of the details of said safety device.

A indicates the safety device, one for each circuit *a*, having translating devices, as lamps A′.

B is the switch-board, having plugs and flexible connections *b*, and C is the dynamo, connected to two of the plugs of the switch-board.

The safety device has a magnet D, through which the current for the circuit passes. The lower armature-lever *d*, pivoted at *d′*, is also connected with a plunger of a dash-pot d^2 to prevent the dropping of the lever due to momentary interruptions of the current. Owing to flashing at the commutator or otherwise, lever E, pivoted at *e* and arranged above the magnet, carries a hook *e′* to engage the end of the lever *d*. A contact F, having connection with contact *f*, is fixed about lever *d*, and a pivoted contact G, having a metallic wing *g* and a wing *g′*, of insulating material, is placed below lever *d* and has a connection g^2 from its pivot to its circuit *a*. The wire P from the dynamo or switch-board leads to a contact *h* of the switch H and from the pivot *h′* of the switch to magnet D, thence out to the circuit, and back to the switch-board at N. A branch wire d^3 connects the main wire with the pivot of the armature-lever *d*.

The device operates as follows: When the plurality of circuits in series is employed, the safety device of each has its switch H and pivoted contact G set as shown in Fig. 2, and before the current is supplied the hook *e′* is engaged with the end of lever *d*. As soon as the current is sent through the circuit the magnet attracts both armatures and causes the hook *e′* to move to the dotted-line position and release the end of lever *d*, which, however, does not fall, owing to the continued attraction of the magnet. The unbroken current passes from P to contact *h* through H *h′*, magnet D, and the translating devices; but if a break occurs out in the circuit the failure of the current through the magnet immediately allows lever *d* to fall in contact with wing *g*, as shown in dotted lines, Fig. 2, and the current is short-circuited through the

branch wire d^3, the lever d, wire g, and wire g^2, and thus allows the current to continue through the other circuits, and the break can be safely repaired. When so repaired, the lifting of the lever d will break the short circuit and send the current through the lamps, as before described.

If but one of the circuits is to be employed, the switch H is to be turned to contact f, the pivoted contact turned to bring its insulating-wing g' uppermost, the hook e' engaged with lever d, as before, and the current turned on. The circuit now will be completed through branch wire d^3, lever d, contact F, contact f, switch H, magnet D, and the translating devices; but should a break occur out in the circuit the lever d will drop to the insulating-wing g' and break the contact at F, thus breaking the circuit at a second point, whereby the first break can be repaired with safety.

Having thus described my invention, I claim—

1. The combination, with an electric circuit including a magnet, of upper and lower armature-levers, the upper lever having a hook for engaging the lower one, and electric connections with the lower lever and with a stop therefor, whereby upon release of the lower lever from the magnet and upper lever the said circuit will be short-circuited through the said lower lever, substantially as described.

2. The combination, with an electric circuit, of a magnet in said circuit, two armature-levers, one of which carries a hook engaging the other lever, a contact connected to the circuit and adapted to be engaged by the latter lever when released by the former and by the magnet, and a branch connection from the circuit to the said latter lever, substantially as described.

3. The combination, with a plurality of electric circuits connected in series, of a safety device in each circuit, consisting of a magnet in said circuit, an armature-lever having connection with one portion of the circuit, a contact adapted to be engaged by said lever and connected with another portion of the circuit, and a second armature-lever for engaging the first-mentioned lever, whereby when the latter is released by the former and its circuit breaks the current will be short-circuited through the lever and contact without intertruping the other circuits, substantially as described.

4. The combination, with an electric circuit including a magnet, of a main armature-lever connected to the main circuit, a supplementary armature-lever for engaging the main lever, a contact on one side of the main lever and connected to the main circuit, and an insulated stop on the other side of the main lever, substantially as described.

5. The combination, with an electric circuit, of the magnet D, armature-lever d, armature-lever E, having hook e', connection d^3, contact G, having a metal wing and an insulating-wing, switch H, and connected contacts F f, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE W. RICHARDSON.

Witnesses:
JOSEPH MCGOWAN,
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