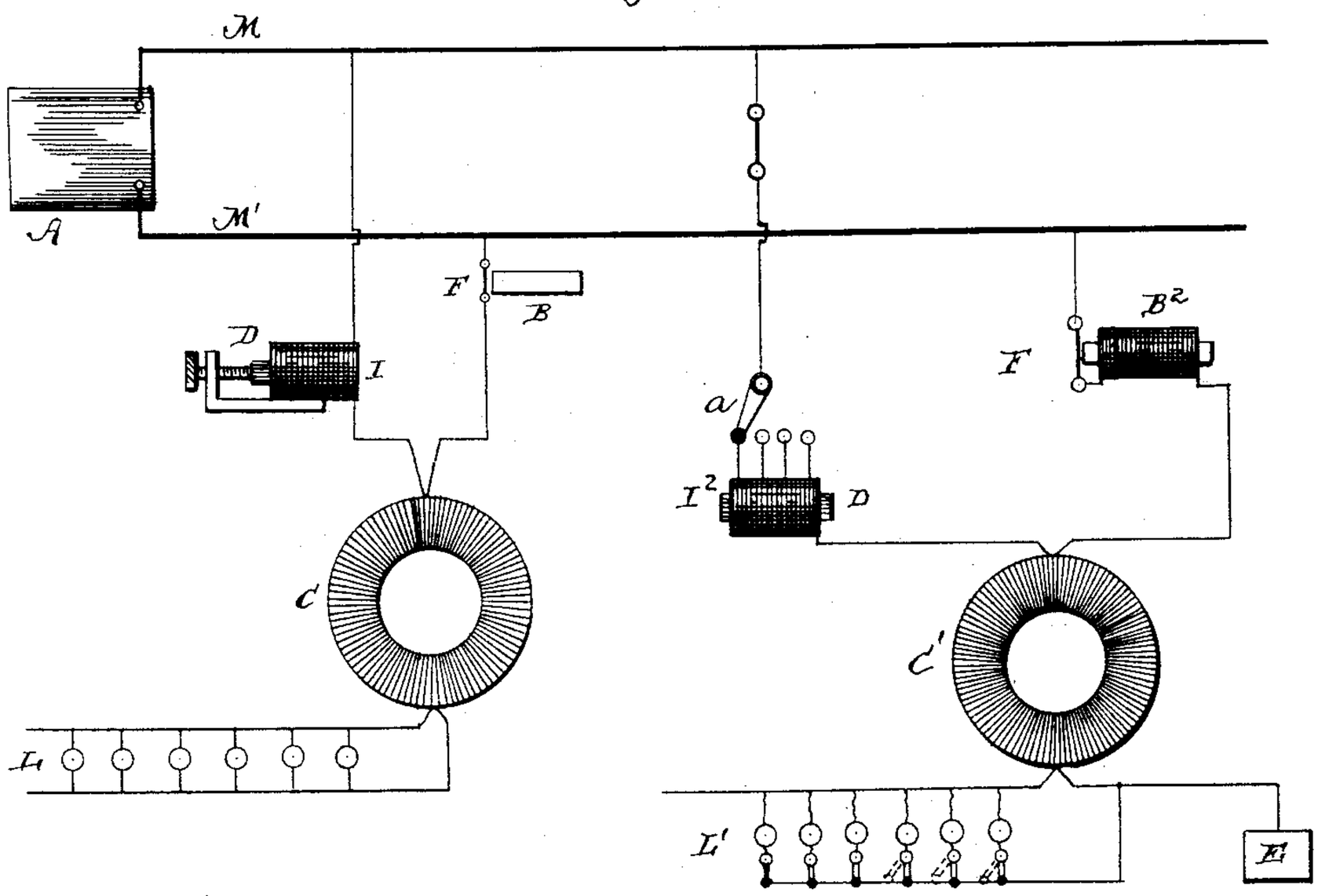
(No Model.)

E. THOMSON.

DISTRIBUTION OF ELECTRIC CURRENTS.

No. 401,608. Patented Apr. 16, 1889.

Fig. 1.



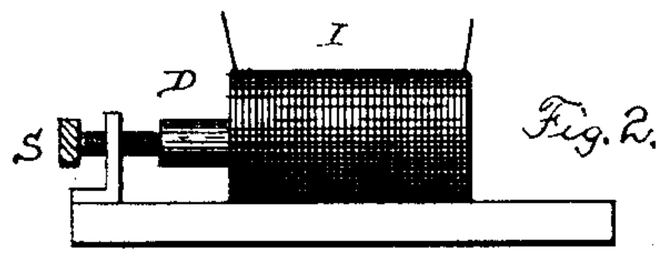


Fig. 2.

Fig. 3.

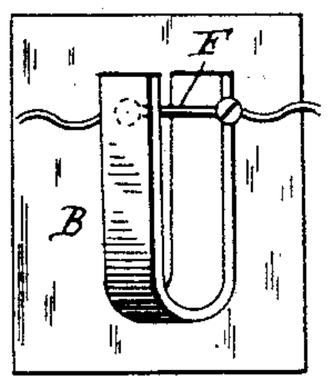


Fig. 4.

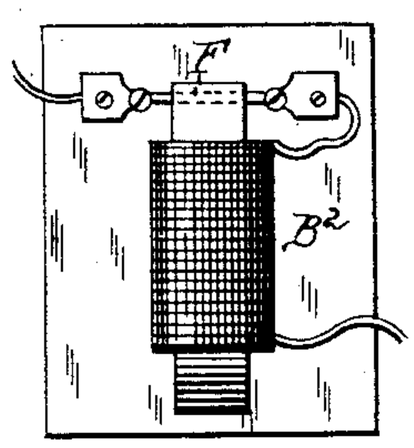
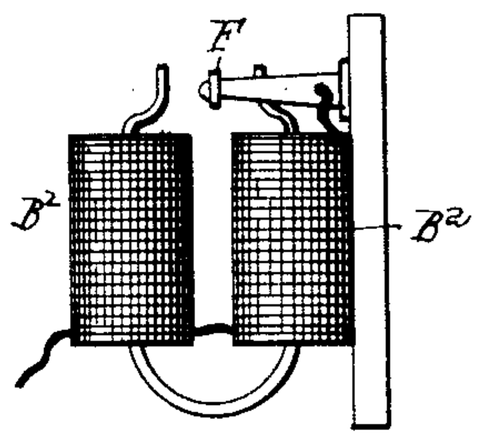


Fig. 5.



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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF LYNN, MASSACHUSETTS.

DISTRIBUTION OF ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 401,608, dated April 16, 1889.

Original application filed December 6, 1886, Serial No. 220,850. Divided and this application filed March 8, 1889. Serial No. 302,537. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented a certain new and useful Distribution of Electric Currents, of which the following is a specification.

My present invention is a division of an application for patent filed by me December 6, 1886, Serial No. 220,850.

My invention relates to those systems of electric distribution in which the translating devices—such, for instance, as incandescent lamps placed on local or independent circuits independent of the circuit for the prime electrical source—are fed or operated by induced currents set up by induction apparatus placed between such local circuit and the main or principal circuit leading from a source of electric currents at a distance.

My invention is especially useful in application to those systems of distribution in which the transformers or induction-coils have their primaries fed in multiple from alternating-current mains, while their secondaries supply the electric lights or other translating devices in multiple arc.

The object of my invention, when employed in connection with such a system, is to secure a certain rupture of the circuits whenever the primary or secondary is made to carry a current of an abnormal or unsafe amount; to which end my invention consists in the combination, with a safety-catch or fusible wire or strip applied, preferably, in the primary circuit, of an arc-rupturing device for breaking or rupturing any arc which might follow upon the melting of the fuse and be maintained across the clamps, electrodes, or other metal holding parts for the fuse.

My invention consists, further, in the combination, with the electrodes or holders for an electric safety-fuse placed on any circuit of such tension that an arc might follow or be established across the electrodes on rupturing the fuse, of an arc-rupturing device—such, for instance, as a magnet or its equivalent—as hereinafter set forth, for rupturing, displacing, or dispersing such arc.

In the accompanying drawings, Figure 1 is a system of electric distribution in which my invention is embodied. Fig. 2 is a separate view of a detail of the system. Fig. 3 is a separate view of one form of my combined fusible plug and arc-rupturing device. Figs. 4 and 5 illustrate in plan and in side view another modification of the invention.

In Fig. 1, A represents an alternating-current generator suitably placed to supply the mains M M′ with alternating impulses of electric current. At various points along the line of the mains induction-coils or transformers C C′ are connected. The said coils are wound in any desired way, and have a fine-wire coil, for example, constituting the primary and connected by its terminals with the mains M M′, and a secondary, of coarser wire, connected to the wires leading to the incandescent lamps L, or other devices, placed, for instance, in multiple.

In the circuit of the primary wires from the mains M M′ to the induction-coils I introduce a self-inductive coil consisting of a coil with a movable and adjustable iron-wire core, D, in its axis, whose purpose is to permit an opposing action of varying degree, according to the position of the core D in the coil I, to be exerted as a check upon too great vigor of the impulses or too great electro-motive force in the mains. Putting the core D into the coil causes a high self-induction acting to oppose the impulses and cut down their force.

In Fig. 2 the adjusting device for the coil is shown as consisting of a screw, S. At I^2, Fig. 1, the same purpose is fulfilled by dividing the coil into sections, as indicated at I^2, which permanently surround the coil D, and providing a switch-arm, *a*, whereby one or more of such sections of coil may be included in the permanent circuit.

Should the force of the mains be too high, an addition of one or more sections of I^2 is made by moving arm *a* to the proper point.

The devices I I^2, applied to the system in the manner and for the purpose set forth, form no part of my present invention, but are claimed in my application filed December 6, 1886, Serial No. 220,850.

To provide for the case of an undue current passing through the primary branch or branches, which will occur if a short circuit of the secondary, either within its coils or upon

the local lamp-line, takes place, or upon a short circuit of the primary coil itself occurring, I provide a fuse, F, which will melt with excess of current, it being connected into the circuit of the primary coils; but when the difference of potential existing between M and M′ is very high—say one thousand volts—a short fuse is ineffective to rupture the primary circuit, as its melting is followed by an arc bridging the gap in the circuit. This arc will not be formed if the fuse be made quite long; but such a disposition is not economical on account of the added resistance of such a long fuse-wire as would be needed. To overcome this difficulty, I combine with the fuse an arc-rupturing device of some suitable character—such, for instance, as that described in my prior United States Patent No. 321,464, and adapted to disrupt, disperse, or put out the arc as soon as it forms—thereby securing immunity from arc across the fuse-supporting plate or electrode, even when a very short fuse is employed.

B, Fig. 1, shows a permanent magnet, a pole of which, being placed near or alongside the fuse F, so disturbs and moves any arc stream following the melting of F as to prevent its continuation.

Instead of a permanent magnet, a bundle of soft-iron wires, which is included in the primary circuit, as indicated at B^2, may be substituted with advantage.

Fig. 3 shows how the fuse F may be mounted between the poles of a horseshoe permanent magnet, B, for the purposes before described.

Figs. 4 and 5 show in two positions a horseshoe electro-magnet, B^2, included in the primary circuit and disposed similarly with respect to the fuse F, which is between its poles. The coils are so connected that the magnetism developed by the impulses in B^2 is such as to derive an arc from between the poles when the fuse melts.

The employment of the fuse in the primary of the system hereinbefore described, but without any arc-rupturing device, is not herein claimed, as that forms the subject of claims in my application of which this case constitutes a division.

What I claim as my invention is—

1. The combination, in a system of electric distribution, of a main or principal circuit, a local or independent circuit, interposed apparatus for transforming the electric energy in the main into electric energy in the local without contact between the circuits, a fusible plug or safety-strip in the connection from the main to said apparatus, and means, as described, for rupturing an arc at the fusible plug, as and for the purpose described.

2. The combination, in a system of electric distribution, of a main or principal circuit, local independent circuits, induction apparatus interposed between the local circuits and the main, and fed in multiple arc from the latter, fusible plugs or safety-strips in the multiple-arc connection, and arc-rupturing devices for said strips or plugs, as and for the purpose described.

3. In an alternating or rapidly-varying current system in which induction-coils are used, the combination of primaries fed in multiple from the mains, secondary circuits feeding local lighting or other devices, a fusible plug in the primary circuit, and means of rupturing an arc thereat, as described.

4. The combination, with a safety strip or fuse in a system of electric distribution, of an arc-rupturing device, substantially as described.

5. The combination, with a safety strip or wire fusible by excess of current, of a magnet whose pole or poles are in proximity to said strip or wire.

Signed at Lynn, in the county of Essex and State of Massachusetts, this 4th day of March, A. D. 1889.

ELIHU THOMSON.

Witnesses:
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