

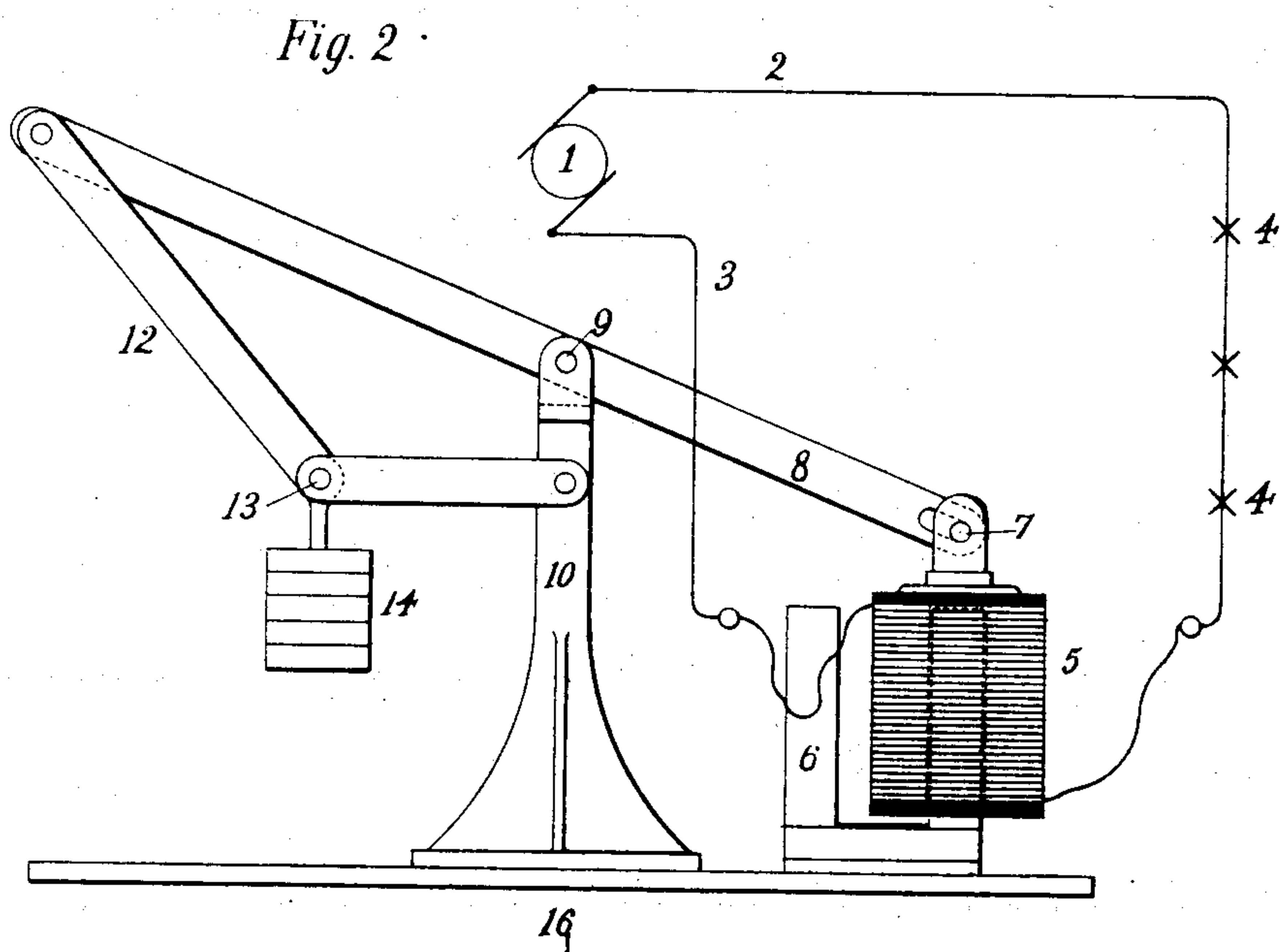
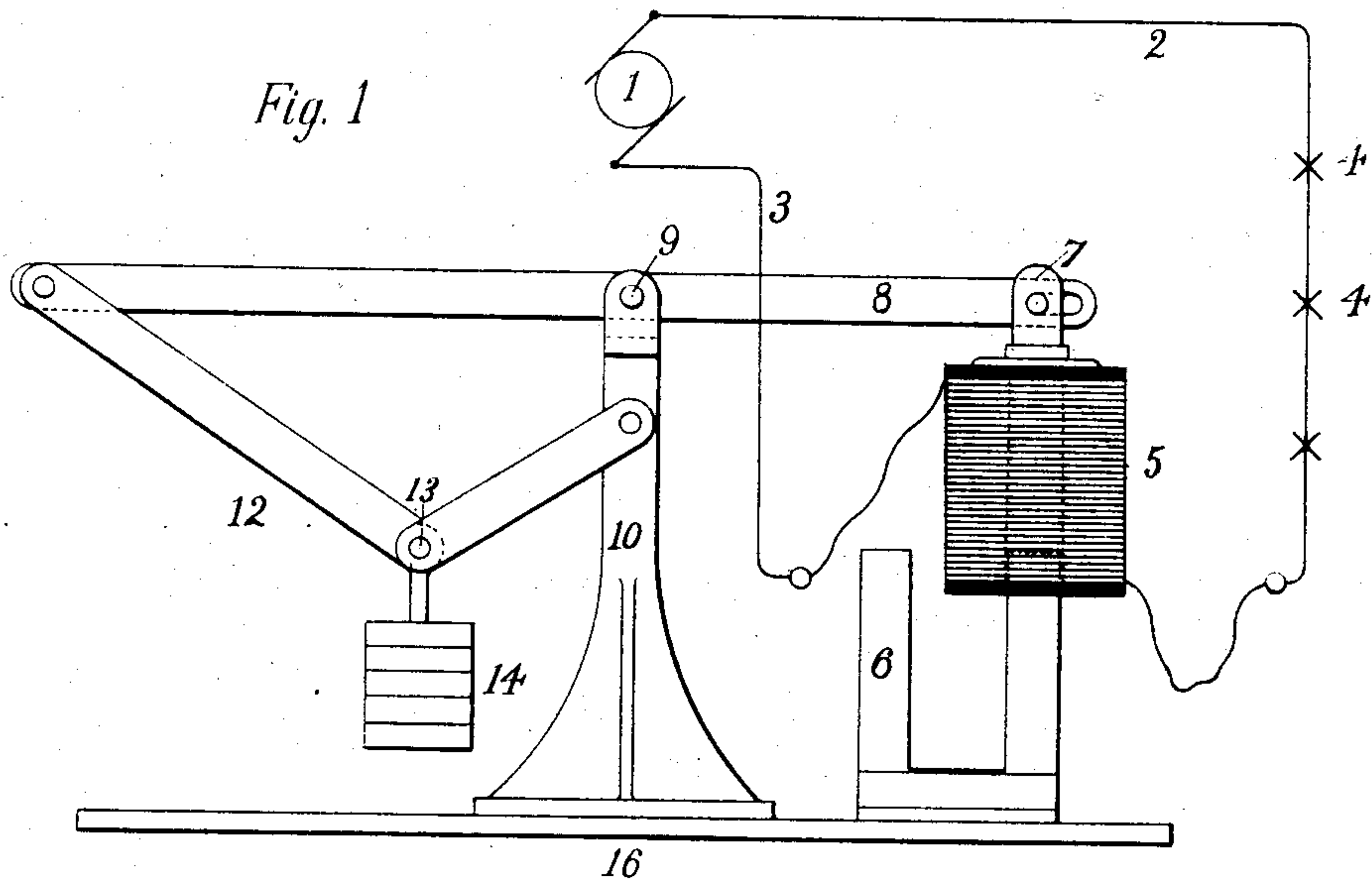
M. H. BAKER.

REGULATING DEVICE FOR ARC LAMP CIRCUITS.

(Application filed Mar. 21, 1900. Renewed Mar. 9, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Raphael Ketter
George H. Stocking

Inventor
Mathew H. Baker
 by *Charles A. Perry* Atty

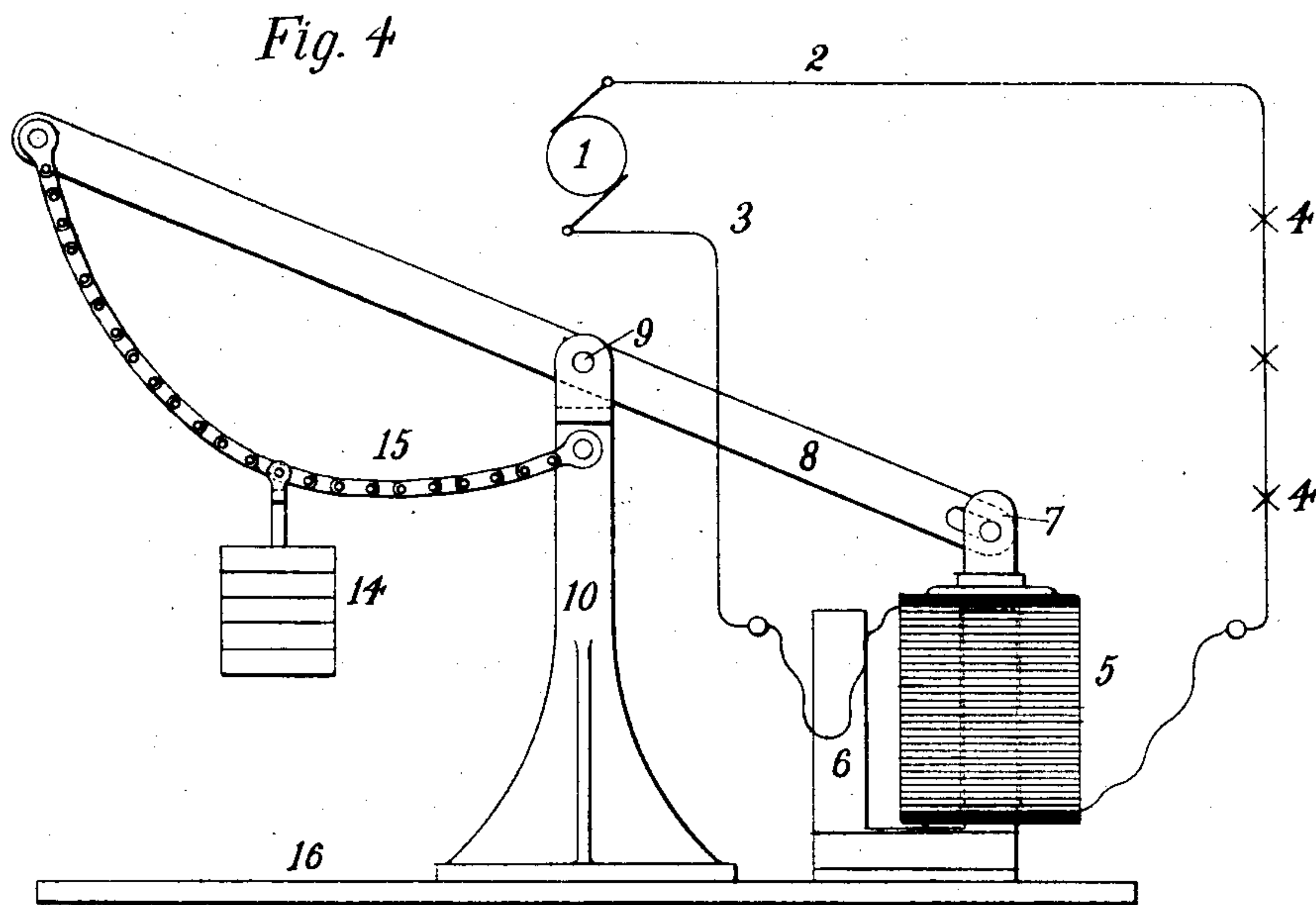
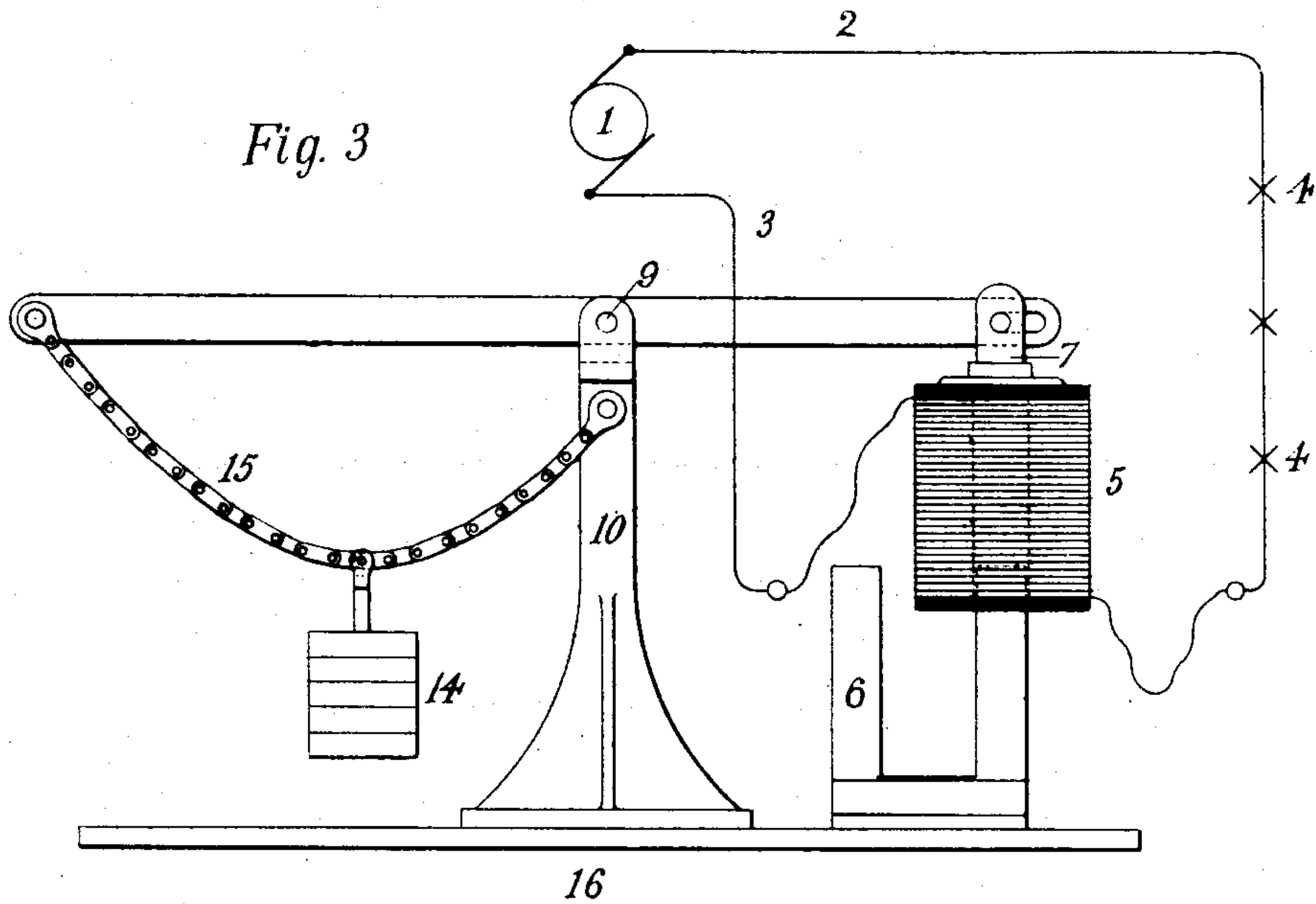
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(Application filed Mar. 21, 1900. Renewed Mar. 9, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

MALCOLM H. BAKER, OF NEW YORK, N. Y., ASSIGNOR TO THE MANHATTAN
GENERAL CONSTRUCTION COMPANY, OF SAME PLACE.

REGULATING DEVICE FOR ARC-LAMP CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 684,167, dated October 8, 1901.

Application filed March 21, 1900. Renewed March 9, 1901. Serial No. 50,534. (No model.)

To all whom it may concern:

Be it known that I, MALCOLM H. BAKER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Regulating Devices for Arc-Lamp Circuits, of which the following is a specification.

My invention relates to improvements in regulators for circuits containing alternating-current arc-lamps arranged in series. Heretofore the regulation of this class of devices has been accomplished through the medium of very complicated and expensive apparatus. By means of my present invention all complication is avoided and the regulation of a current in an alternating-current arc-lamp series circuit is made certain and effective by the use of very simple mechanism having few parts and very little liable to get out of order.

My invention relates, broadly, to automatically varying the reactance in a circuit such as described to compensate for changes in the resistance of the circuit due to the cutting in or out of lamps or to any other cause. Otherwise expressed, my invention relates to automatically varying the value of a variable reactance in the circuit in accordance with changes of resistance in the said circuit in such a manner as to maintain the current practically constant.

In carrying out my invention I include in the circuit in series with the lamps a reactance device consisting of a coil of wire so placed as to have a free relative movement with respect to a laminated core inside the coil. It is well understood that the current passing through a coil having such a relation to a magnetic core is more or less choked or impeded, according to the relative position which the coil and the core occupy, the choking or impeding effect increasing with the farther and farther insertion of the core within the coil and decreasing with the gradual withdrawal of the core from the coil. The relative movements of the coil and the core may be brought about by variations of the magnetic pull due to variations of the current passing through the coil. If now a force could be discovered which would automatically vary the choking effect produced in the

coil in correspondence with variations in the resistance of the circuit, which force should oppose and vary with the magnetic pull of the said coil, the value of the current traversing the coil might be made practically independent of the resistance of the circuit, so that a constant current could be maintained irrespective of the number of lamps in operation in the circuit. I have discovered that such a force can be supplied mechanically in several ways. In the present instance I make use of a pivoted lever connected at one end to the moving part of my regulating reactance-coil and joined at the opposite end by a chain or by links to the standard or pedestal on which the lever is pivoted. To the chain or the links, as the case may be, I attach a weight, selecting in the case of the chain a suitable point for my purposes and in the case of the links so selecting the relative length thereof as to produce the results at which I aim. In either case a lifting of that end of the lever which is remote from the reactance device will increase the effective pull of the weight, while the dropping of that end of the lever will produce the opposite effect. By properly selecting the length of the chain the weight of the counterbalance and the point of attaching the counterbalance to the chain or by properly choosing the relative length of the links and the weight of the counterbalance the forces at work at the opposite ends of the lever may be automatically counterbalanced through the entire excursion of the moving parts.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 shows my apparatus with the link construction connected up in series with a single group of lamps, the reactance device being shown in cross-section and the position of the parts being that which they occupy when the circuit is fully loaded. Fig. 2 is a similar view showing the position of the reactance device at minimum load; and Figs. 3 and 4 correspond precisely to Figs. 1 and 2, respectively, with the substitution of a chain in place of the links.

In the drawings, 1 is a suitable source of alternating current, and 2 and 3 are electrical mains leading therefrom. The lamps

are shown at 4 4, and the regulating or reactance coil appears at 5. The said coil is represented as surrounding one leg of a laminated iron core 6, of horseshoe shape, and its top is connected by a suitable link 7 to the end of the slotted lever 8, which is supported on a pivot 9 at the top of an upright or standard 10.

In Figs. 1 and 2 a link 12 appears, one end of the link being pivotally joined to the outer end of the lever 8 and the other end of the link being pivoted to the upright or standard 10. To a pivot 13, which joins the two parts of the link 12, is attached a weight 14, which constitutes a counterbalance for the moving part of the reactance device. Now the relative lengths of the two parts of the lever 12 and the point of pivoting the link to the standard 10 and also the weight of the counterbalance 14 are so selected that the effect of the counterbalance becomes greater in precisely the same proportion as the pull of the reactance-coil increases when lamps are cut out of the circuit. In other words, the relations of the parts named are such that the weight in its upward and downward movements as the reactance-coil exercises a greater or less pull upon the core passes through a "critical curve," whereby the effects named are produced. In Figs. 3 and 4 a chain 15 is substituted for the link 12, the conditions being substantially the same in other respects. The whole structure is mounted upon a suitable base 16.

The lever 8 may be attached to the core 6 instead of to the coil 5. The action is the same in either case.

The parts of the counterweight 14 when the circuit is fully loaded is one in which the magnetic pull of the coil with relation to the core is comparatively slight. It will also be seen that the effect of the weight 14 is at the minimum in this position of the parts. On the other hand, when the circuit has its minimum load, as illustrated in Figs. 2 and 4, the me-

chanical effect of the weight 14 is at its maximum, while the magnetic pull, as between the coil and the core, is also at its maximum.

The particular shape of the core of the reactance device may be varied. Moreover, my apparatus may be applied to a single series of arc-lamps, or a number of them may be combined with several series of arc-lamps.

The invention claimed is—

1. In a system of electrical distribution, a regulating reactance-coil having a moving part adapted to increase the choking effect in said coil, a pivoted lever connected to the said moving part, and also connected at its opposite end to a suitable counterweight through the medium of a flexible support attached at one end to the said lever and at the other to a stationary point.

2. In an electric-lighting system, a regulating reactance-coil having a moving part adapted to increase the choking effects of the said coil, a number of arc-lamps in series with the said coil, and a pivoted lever connected to the moving part of the reactance device, in combination with a counterbalance carried by a flexible support one end of which is attached to the pivoted lever and the other to a fixed point.

3. In an electric-lighting system, a regulating reactance-coil having a moving part adapted to increase the choking effect in said coil, a number of arc-lamps in series with the said coil, a pivoted lever joined to the said moving part, and a weight or counterbalance for the said lever, the said weight being supported upon a link or flexible support one end of which is attached to the outer end of the said lever and the other to a fixed point.

Signed at New York, in the county of New York and State of New York, this 17th day of March, A. D. 1900.

MALCOLM H. BAKER.

Witnesses:

WM. H. CAPEL,

GEORGE H. STOCKBRIDGE.