

No. 684,169.

Patented Oct. 8, 1901.

M. H. BAKER.

REGULATING DEVICE FOR ARC LAMP CIRCUITS.

(Application filed Mar. 23, 1901.)

(No Model.)

Fig. 1

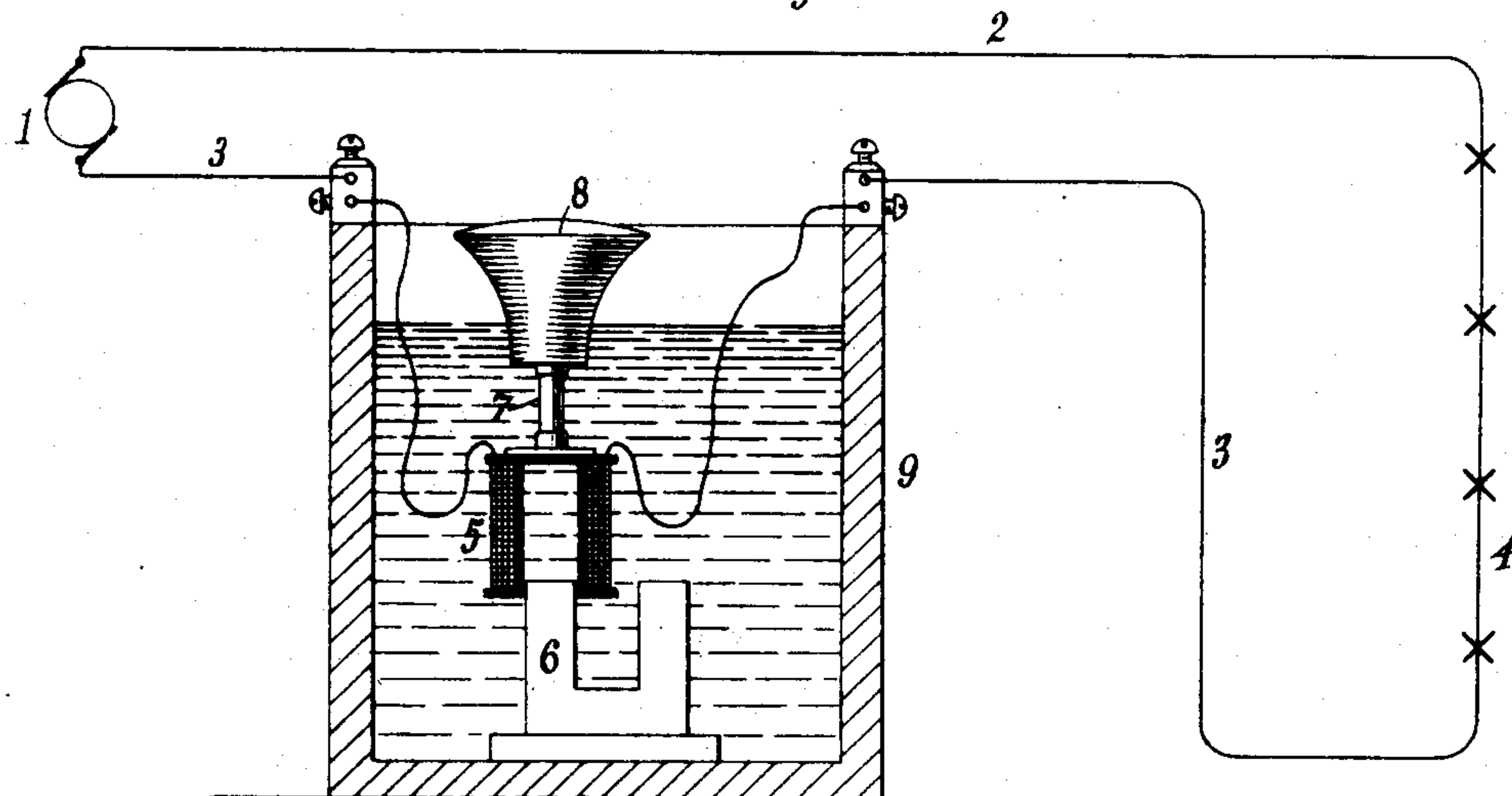
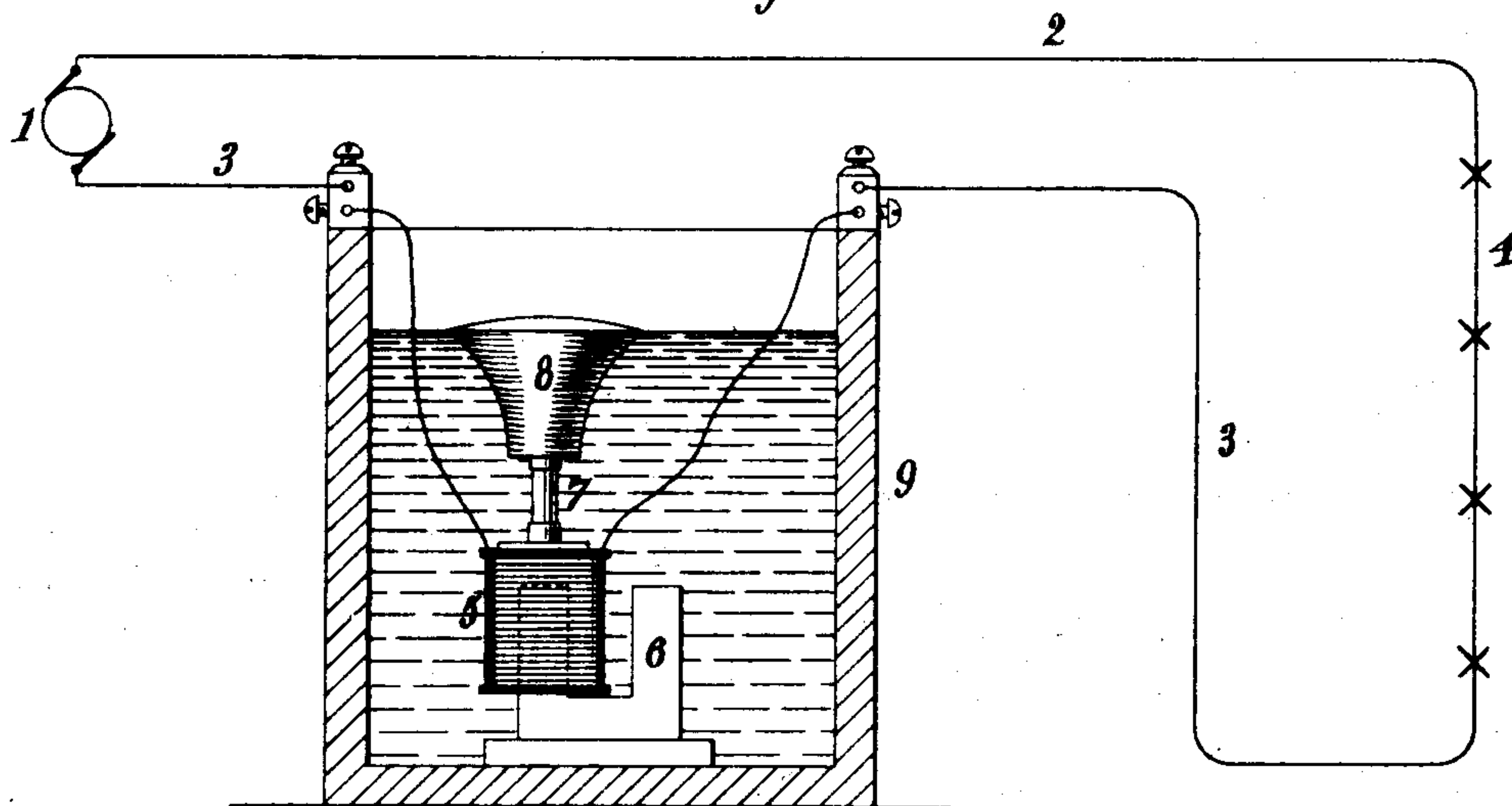


Fig. 2



Witnesses:
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UNITED STATES PATENT OFFICE.

MALCOLM HARLAN BAKER, OF NEWARK, NEW JERSEY, ASSIGNOR TO
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REGULATING DEVICE FOR ARC-LAMP CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 684,169, dated October 8, 1901.

Application filed March 23, 1901. Serial No. 52,478. (No model.)

To all whom it may concern:

Be it known that I, MALCOLM HARLAN BAKER, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, 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 a very simple mechanism having few parts and very little liable to get out of order.

My invention relates, broadly, to the matter of 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 automatic-

ally 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 float having a generally conical or parabolic shape and so connected with the moving part of my regulating reactance-coil as to cause a greater and greater displacement of liquid for each unit distance of movement as the core and the coil approach each other more and more intimately.

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

Figure 1 shows my apparatus 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; and Fig. 2 is a similar view showing the position of the reactance device at minimum load.

In the drawings, 1 is a suitable source of alternating current, and 2 and 3 are 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 a float 8, the shape of which is in the main conical, as shown. The reactance-coil 5, together with its iron core 6, is supported within a suitable receptacle 9, of porcelain or other similar material, and is, as shown, immersed in a liquid, such as oil. The float 8 is adapted to be drawn downward into the liquid as the coil 5 becomes more and more energized—say by the cutting out of lamps in the lamp-circuit. As this progress takes place, however, the displacement per unit of downward movement of the coil becomes greater and greater. Accordingly the effect of the float increases as the pull of the coil increases. In this way I

provide a counteracting force which increases in the same proportion as the choking effect of the reactance-coil increases, the conditions of this counteraction being that the float shall
5 be properly shaped to produce the amount of displacement necessary at each movement of the parts.

The float may be attached to the core 6 instead of the coil 5. The action is the same
10 in each case.

The position of the float 8 when the circuit is fully loaded is, it will be seen, one in which the magnetic pull of the coil with relation to the core is comparatively slight. It will also
15 be seen that the effect of the float 8 is at its minimum in this position of the parts. On the other hand, when the circuit has its minimum load, as illustrated in Fig. 2, the mechanical effect of the float is at its maximum,
20 while the magnetic pull as between the coil and the core is also at its maximum.

I claim as my invention—

1. In a system of electrical distribution, a regulating reactance-coil having a moving
25 part adapted to increase the choking effect in said coil, a float connected to the said moving part and adapted to displace a liquid in increasing amounts per unit of movement

into the liquid, the effect of the float corresponding to the increasing magnetic pull of
30 the reactance-coil.

2. In an electric-lighting system, a regulating reactance-coil having a moving part adapted to increase the choking effect in the said coil, a number of arc-lamps in series with the
35 said coil, and a float partially immersed in a liquid and attached to the said moving part, the said float being generally conical or parabolic in shape.

3. In an electric-lighting system, a regulating reactance-coil having a moving part adapted to increase the choking effect in the said coil, a number of arc-lamps in series with the
40 said coil, and a float partially immersed in a liquid and attached to the said moving part,
45 the said float being so shaped as to displace increasing amounts of liquid per unit of immersion, in the same proportion as the magnetic pull of the reactance-coil increases.

Signed at New York, in the county of New
York and State of New York, this 22d day of
March, A. D. 1901.

MALCOLM HARLAN BAKER.

Witnesses:

WM. H. CAPEL,
GILBERT E. CHAPIN.