

No. 712,522.

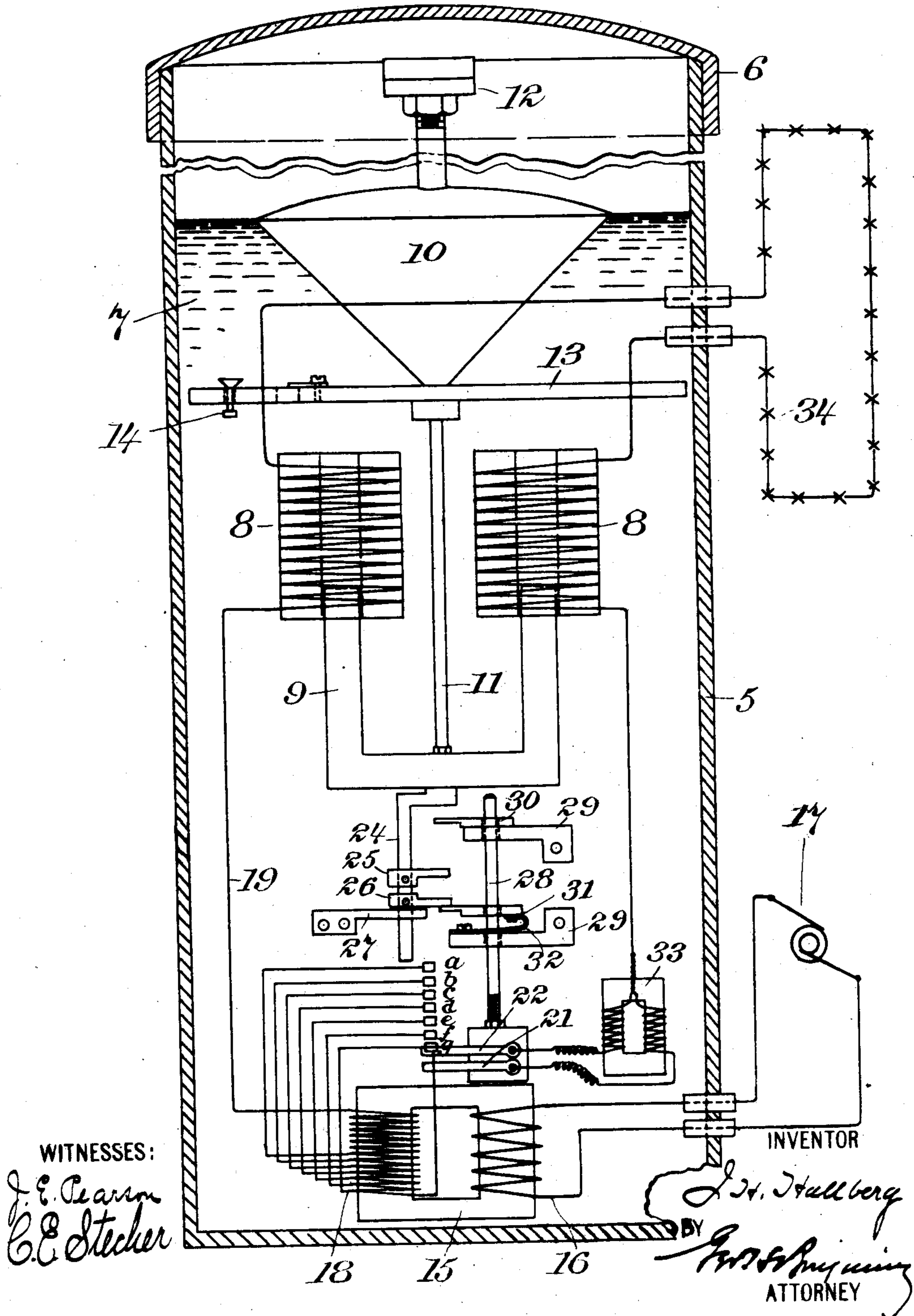
Patented Nov. 4, 1902.

J. H. HALLBERG.

REGULATOR FOR ALTERNATING SERIES ARC LIGHT SYSTEMS.

(Application filed Jan. 29, 1902.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOSEF HENRIK HALLBERG, OF NEW YORK, N. Y., ASSIGNOR TO GENERAL INCANDESCENT ARC LIGHT COMPANY, OF NEW YORK, N. Y., A CORPORATION.

REGULATOR FOR ALTERNATING SERIES ARC-LIGHT SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 712,522, dated November 4, 1902.

Application filed January 29, 1902. Serial No. 91,734. (No model.)

To all whom it may concern:

Be it known that I, JOSEF HENRIK HALLBERG, a citizen of the United States, residing at New York city, county and State of New York, have invented certain new and useful Improvements in Regulators for Alternating Series Arc-Light Systems, of which the following is a specification.

My invention relates to a device adapted to be connected in series with a number of arc-lamps and the secondary coil of an alternating-current transformer and which has for its purpose to maintain the current on the line constant irrespective of the number of lamps in operation.

A further object of my invention is to provide a device for automatically changing the ratio of the current transformation, whereby the power factor of the system will be maintained practically constant from zero to full load.

A further object of my invention is to decrease the size and cost of the regulator required to maintain the current constant in a system involving a definite number of current-consuming devices.

The accompanying drawing, which is a view partially in elevation and partially a diagram, will serve to illustrate my invention and the circuit connections.

In the drawing, 5 represents a suitable inclosing casing with a removable cover 6. The interior of the casing is adapted to be partially filled with a body of oil 7 or other insulating fluid. Located within the casing, and suitably supported therein in any convenient manner, are a pair of solenoidal magnets 8. Arranged to have a vertical motion in such magnets is a core 9.

10 represents a float connected to the core 9 through the rod 11, and mounted over the float is an adjustable weight 12.

13 represents a disk of wood or other material, which serves as a dash-pot and in which is a gravitally-acting relief-valve 14.

Located in the bottom of the casing 5 is a transformer 15. The primary of the transformer 16 is connected to the main line, which in turn is connected to the alternating generator 17. The secondary of the trans-

former 18 is connected through one terminal 19 to the solenoid 8 and arranged to have its coil, which is divided into sections *a, b, c, d, e, f,* and *g*, connected through contact-brushes 21 22 to the opposite terminal of the solenoid 8.

Depending from the core 9 is a rod 24, carrying the adjustable fingers 25 26. The rod 24 is movable in the guide 27. 28 is a rod movable in the guide 29, and surrounding this rod are the ring-clutches 30 31. Under the ring-clutch 31 and between it and the guide is a spring 32. 33 is a choking-coil.

34 represents lamps in the lamp-circuit, which is connected to the upper terminals 9.

The operation of the device is as follows: When the device is cut into the main circuit, the solenoids 8 attract the core 9, thereby lifting the rod 24 and the adjustable fingers 25 and 26. When the resistance in the lamp-circuit is decreased by cutting lamps out, further motion of the core upward takes place, which has the effect of introducing an impedance upon the lamp-circuit corresponding to the lamps cut out. As the lamps are cut out of circuit the core continues to rise until the finger 25 coacts with the ring-clutch 30, surrounding the rod 28. If now further lamps are cut out of circuit, the rod 28 is raised, causing the brushes 21 22 to lap the terminals of the coils *f g*, cutting out such coils. As further movement takes place the brushes 21 22 advance gradually, lapping successive contacts *a b c d e* and cutting out these coils until the limit of movement of the core has been reached. If now the lamps are again cut into circuit, the rod 24 moves downward and with it the finger 25, which trips the clutch 30 and allows the rod 28 to feed downward, as in the manner of an upper carbon in an arc-lamp. This motion is continued until the finger 26 strikes the clutch 31, which releases the rod and allows it to drop to the position shown in the figure.

It will be understood that by reason of the division of the secondary coil of the transformer the ratio of conversion will be in proportion to the work in the lamp-circuit.

By means of the adjustable weight 12—*i. e.*, by increasing or decreasing this weight—the initial position of the core 9 relative to the

solenoid 8 can be determined and the current strength at which the regulator will come into operation regulated.

Having thus described my invention, I
5 claim—

1. A regulator for alternating series arc-light systems, comprising a device responsive to any increase of current upon the line within predetermined limits, and which will act
10 when energized to introduce an impedance upon the line proportional to any decrease in load upon such line, and means for automatically changing the ratio of the current transformation through said device, whereby the
15 power factor of the system will be maintained practically constant from zero to full load.

2. A regulator for alternating series arc-light systems, comprising a device responsive to any increase of current upon the line within predetermined limits, and which when energized will introduce an impedance upon the line proportional to any decrease in load upon such line, a transforming device introduced between said first-named device and
25 the main source of energy, and means actuated by said first-named device which will change the ratio of current transformation through the transformer in proportion to the decrease in load in the translation-circuit
30 which the first-named device is designed to regulate.

3. A regulator for alternating series arc-light systems, comprising a case containing a

body of oil, a pair of solenoids having a fixed position in such case, a core for said solenoids, 35 a buoyant device for overcoming the weight of the core, means for regulating the position of the core in the solenoids, a current-transforming device, and means actuated by the core for determining the active portion of 40 said transforming device.

4. A regulator for alternating series arc-light systems, comprising a case containing a body of oil, a pair of solenoids having a fixed position in such case, a device buoyant in 45 said body of oil, a core for said solenoids carried by said buoyant device, a transformer having its secondary coil divided into sections, and means carried by said core for progressively cutting said transformer-sections 50 out of circuit.

5. A regulator for alternating series arc-light systems, comprising a pair of coacting elements, one element fixed and the other movable, a transformer having its secondary 55 divided into a series of sections, and means energized by the movement of the movable element for progressively changing the ratio of transformation from the transformer to the fixed element. 60

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEF HENRIK HALLBERG.

Witnesses:

J. E. PEARSON,
C. E. STECHER.

Correction in Letters Patent No. 712,522.

It is hereby certified that in Letters Patent No. 712,522, granted November 4, 1902, upon the application of Josef Henrik Hallberg, of New York, N. Y., for an improvement in "Regulators for Alternating Series Arc-Light Systems," an error appears in the printed specification requiring correction, as follows: In line 13, page 2, the word "hanging" should read *changing*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of November, A. D., 1902.

[SEAL.]

F. I. ALLEN,
Commissioner of Patents.