

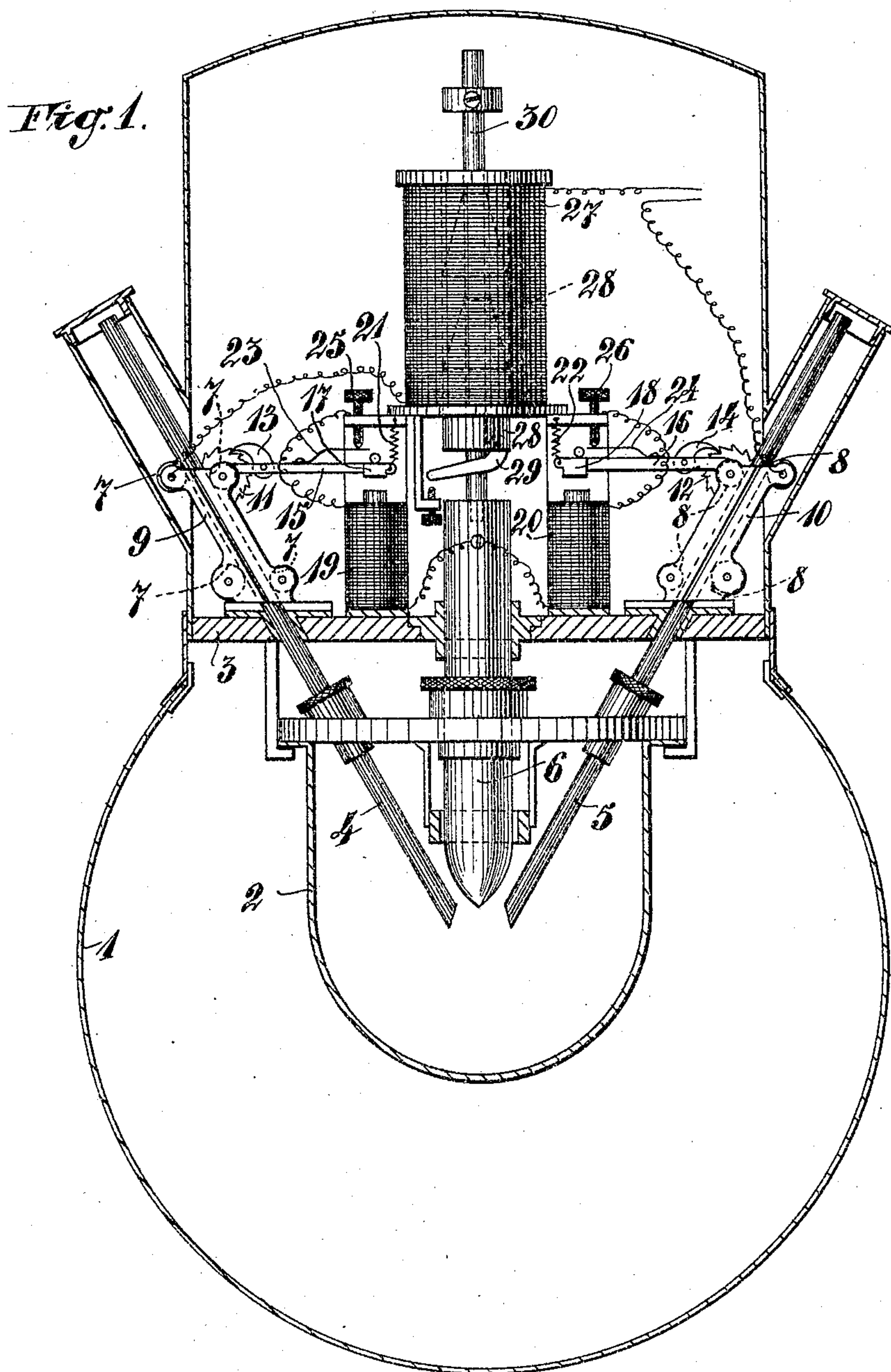
No. 773,774.

PATENTED NOV. 1, 1904.

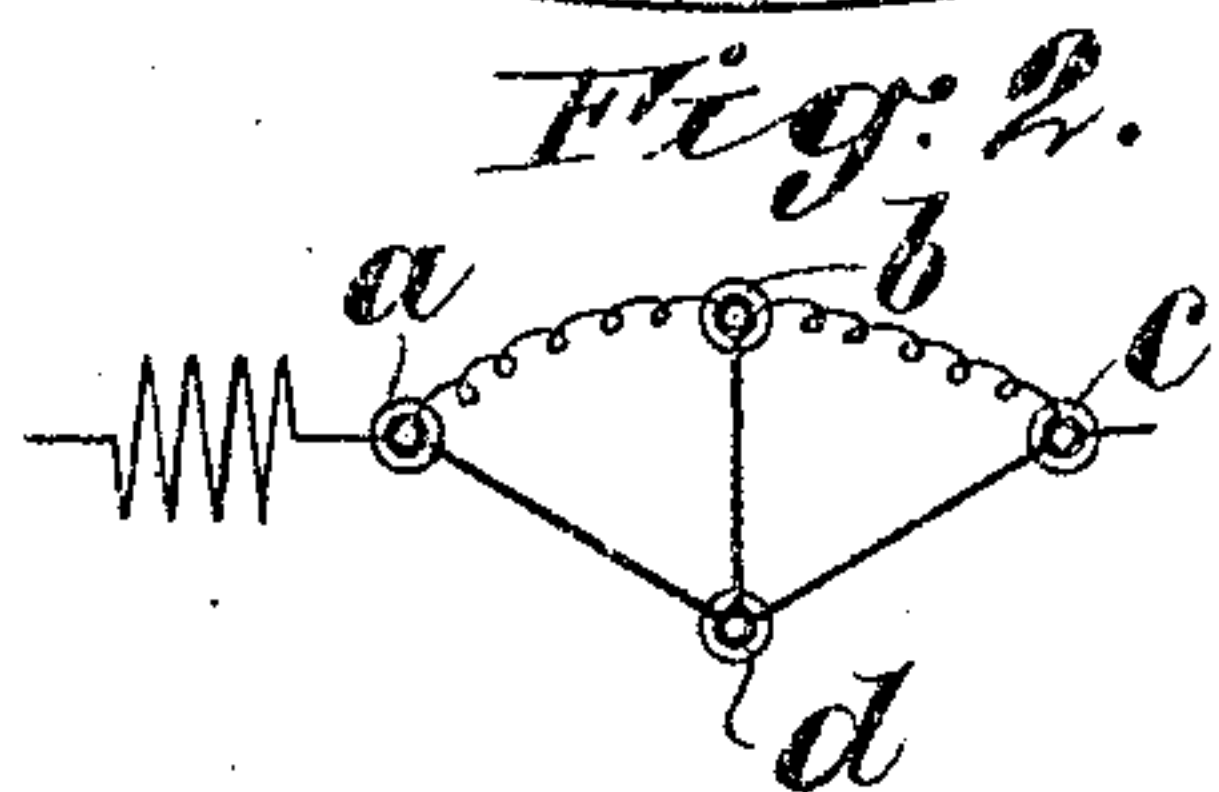
L. S. ANDERSSON.  
ELECTRIC ARC LAMP.

APPLICATION FILED APR. 15, 1902.

NO MODEL.



Witnesses:  
Lustig & Jält.  
Sverdrup & Lindkvist.



Inventor:  
L. S. Anderson  
by Alsdahl  
his att'y



# UNITED STATES PATENT OFFICE.

LORENS SIGFRID ANDERSSON, OF STOCKHOLM, SWEDEN.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 773,774, dated November 1, 1904.

Application filed April 15, 1902. Serial No. 102,984. (No model.)

*To all whom it may concern:*

Be it known that I, LORENS SIGFRID ANDERSSON, a subject of the King of Sweden and Norway, and a resident of Karlbergsvägen 31, Stockholm, Sweden, have invented a new and useful Improvement in Arc-Lighting Lamps, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof.

10 This invention relates to improvements in arc-lighting lamps.

Arc-lighting lamps in which are used two electrodes passed by the main current and fed against a third electrode are well known. It is also known to arrange the three electrodes in such a manner that two arcs of light are obtained between the points of the electrodes, whereby also the point of the said third electrode will be heated to incandescence, though its point only is passed by the main current, while the other part of the last-mentioned electrode will normally be not passed by the current. Such lamps have heretofore not come into practical use, depending essentially thereon that the same on account of unsatisfactory regulation burn irregularly.

The disadvantages of the arc-lighting lamps of the kind in question will be removed by the present invention, thereby that both the two side electrodes and the central electrode are made adjustable independently of each other. The central electrode may preferably be arranged as neutral conductor in a Wheatstone bridge in which the two arcs of light constitute two of the branches of the bridge, while suitable resistances constitute the two other branches of the same, the balancing-currents in the conductors of the bridge being used for regulating or controlling of the arcs. The said resistances may preferably be constituted by the electromagnets controlling the feeding of the electrodes.

In the accompanying drawings I have illustrated a suitable constructional form of an arc-lighting lamp according to the present invention.

Figure 1 shows a vertical section of the lamp, and Fig. 2 a diagrammatic view of the bridge in the lamp shown in Fig. 1.

The lamp consists in usual manner of an outer casing 1 and an inner casing 2. The said outer casing 1 is divided into two chambers by means of a wall or bottom 3, made, preferably, of a suitable heat-insulating material, such as mica, the upper one of said chambers inclosing the regulating or controlling mechanism. The arcs of light are formed between the two electrodes 4 5 and the electrode 6, which latter preferably may be made of carbon, but may also be made of any other refractory material. The said electrodes 4 and 5 may suitably be placed between two sets of rollers 7, respectively, 8, which are journaled in brackets 9, respectively, 10, supported by the said wall or bottom 3, from which they are insulated by a suitable insulating material, such as ebonite or the like. To one of said rollers 7 8, at each of the electrodes 4 and 5, is attached a toothed wheel 11, respectively, 12, in which engages a pawl 13, respectively, 14, pivoted to a lever 15, respectively, 16, which is journaled on the axle of said toothed wheel 11, respectively, 12. The said levers 15 and 16 carry the armatures 17 and 18, respectively, of two electromagnets 19 and 20, respectively, and are actuated by springs 21 and 22, respectively, which tend to keep the said armatures lifted from the said electromagnets. The levers 15 and 16 are further provided with contact-springs 23 and 24, respectively, which are normally in contact with screws 25 and 26, respectively.

When the current in one of the electromagnets 19 or 20 increases, so that the electromagnet attracts its armature, the circuit will be broken between the corresponding contact-spring 23 or 24 and screw 25 or 26, whereupon the armature will immediately be lifted by spring 21 or 22, the corresponding lever 15 or 16 thereby turning, by means of its pawl 13 or 14, the toothed wheel 11 or 12, thus feeding the electrode 4 or 5 against the electrode 6. The controlling of the electrode 6 is in usual manner effected by means of a main-circuit solenoid 27, the core 28 of which raises or lowers the said electrode 6 by means of a clamp 29 and an extension 30 of said electrode.



The current flows from the positive pole of the source of current through the solenoid 27 to the bracket 9. From the latter the main current flows to the rollers 7 of the same and to the electrode 4, from the latter to the conductor 6, an arc of light being produced between said electrodes, from the electrode 6 to the electrode 5 another arc of light being produced, from the electrode 5 to the rollers 8 and bracket 10 to the source of current. The shunted current flows from the bracket 9 to the lever 15, the contact-spring 23, the screw 25, the electromagnet 19, the electrode 6, the electromagnet 20, the screw 26, the contact-spring 24, and the lever 16 to the bracket 10.

Referring to Fig. 2, the part *a b* corresponds to the winding of the electromagnet 19, while the part *b c* corresponds to the winding of the electromagnet 20. The parts *a d* and *d c* correspond to the electrodes 4 and 5, respectively, with their arcs of light. The part *b d* corresponds to the electrode 6. When the parts *a b* and *b c* offer the same resistance, no current will flow through the part *b d*. If the length of the arc of light in the part *a d* increases, so that the resistance of the same becomes larger than that of the other arc of light, a balancing-current will flow in the part *b d* from *b* to *d*, said balancing-current increasing the current in *a b*. If the resistance in the branch *c d* becomes larger than that in *a d*, the balancing-current will flow from *d* to *b*, so as to increase the current in *b c*. Such variations of the intensity of current are according to the present invention used for controlling the lamp. When the resistance is increased—for instance, in the left arc of light—the current will also be increased in the left controlling-magnet 19 until it attracts its armature 23, thereby breaking the circuit at the contact-spring 23 and screw 25, so that the armature 17 is lifted from the electromagnet 19, causing the lever 15 to turn the toothed wheel 11 by means of the pawl 13, so that the electrode 4 will be fed against the electrode 6 until the current is equal in both arcs. The working will be analogous if the resistance in the right arc of light increases so as to bring the right controlling magnet 20 to attract its armature. If the resistance in both arcs of light be increased in the same degree, the controlling of the lamp will be effected by means of the main-current solenoid 27, which will allow the electrode 6 to sink, so that the resistance decreases, causing an increase of the current in the arcs. The said solenoid 27 also serves to form the arcs of light when lighting the lamp, inasmuch as in closing the circuit of the lamp the

said solenoid will lift the electrode 6 sufficient to produce the desired length of the arcs.

Having now described my invention and in what manner the same may be performed, what I claim, and desire to secure by United States Letters Patent, is—

1. The combination with an arc-lighting lamp having two electrodes connected in series to the main circuit of the lamp, and a third electrode forming a bridge between the first-mentioned electrodes, of means for regulating the said electrodes independently of each other.

2. In an arc-lighting lamp the combination of, two electrodes connected in series to the main circuit of the lamp and forming together with their arcs of light two branches in a Wheatstone bridge, two resistances forming the other two branches of the said bridge, a third electrode forming the neutral conductor of the said bridge, and means for regulating the said electrodes independently of each other, substantially as and for the purpose set forth.

3. In an arc-lighting lamp the combination of, two electrodes connected in series to the main circuit of the lamp and forming together with their arcs of light two branches in a Wheatstone bridge, two electromagnets forming the other two branches of the said bridge, said electromagnets being part of the regulating devices for the said two electrodes, a third electrode, and means for regulating the said third electrode independently of the other electrodes, substantially as and for the purpose set forth.

4. In an arc-light lamp the combination of two electrodes connected in series to the main circuit of the lamp and forming together with their arcs of light two branches in a Wheatstone bridge, rollers for guiding and feeding said electrodes, two electromagnets forming the other two branches of said bridge, armatures of said electromagnets, levers supporting said armatures, pawls pivoted on said levers, toothed wheels operated by said pawls so as to feed said electrodes, a third electrode forming the zero conductor of said bridge, and a main-circuit solenoid controlling the position of said third electrode, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LORENS SIGFRID ANDERSSON.

Witnesses:

JOHN DELMAR,  
KARL RUNESKOG.