

No. 682,693.

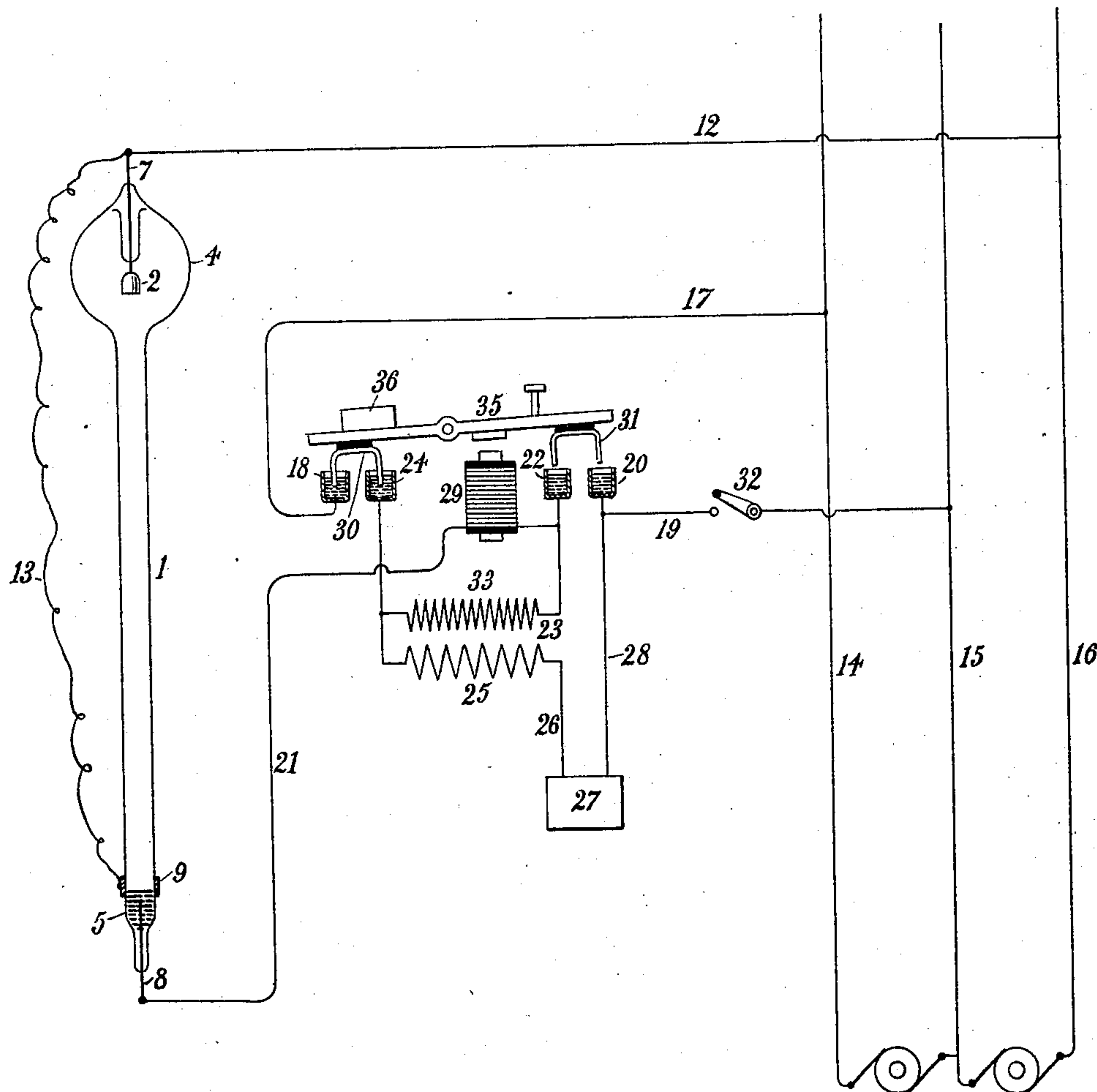
Patented Sept. 17, 1901.

P. C. HEWITT.

STARTING APPARATUS AND CIRCUIT FOR ELECTRIC LAMPS.

(Application filed Apr. 5, 1900.)

(No Model.)



Witnesses:

Raphael Tetter
H. H. Chapel.

Inventor

Pat. Cooper Hewitt
by Charles A. Perry. Atty

UNITED STATES PATENT OFFICE.

PETER COOPER HEWITT, OF NEW YORK, N. Y., ASSIGNOR TO PETER COOPER HEWITT, TRUSTEE, OF SAME PLACE.

STARTING APPARATUS AND CIRCUIT FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 682,693, dated September 17, 1901.

Application filed April 5, 1900. Serial No. 11,613. (No model.)

To all whom it may concern:

Be it known that I, PETER COOPER HEWITT, 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 Starting Apparatus and Circuits for Electric Lamps, of which the following is a specification.

The invention relates to certain improvements in the construction of apparatus and organization of circuits for starting and operating electric lamps of the gas or vapor type, such as described in an application filed by me April 5, 1900, Serial No. 11,605. In the operation of such electric lamps having a vapor or gas path so organized as to receive currents of considerable quantity at moderate electromotive forces it is found desirable in some instances to start the lamp by the application of electric currents of higher potential than those employed for the continued operation of the lamp. For this purpose a transformer of any suitable construction or any convenient form of device for changing the existing potential of the circuit may be employed, and for convenience such devices will be referred to in the specification and claims by the general term "transformer." I have found it convenient in some instances to use interrupted currents derived from the same source as the currents employed for running the lamp and to induce by the interrupted currents the electric currents of the higher potential. It is usually desirable to cut out of circuit the apparatus employed for producing the higher-potential starting-current when it has performed its function of starting the lamp.

The accompanying drawing illustrates an organization of circuits and apparatus for starting the lamp.

Referring to the drawing, a lamp is represented consisting of a gas-containing chamber 1, shown in the present instance as having an enlargement 4 at its upper end, constituting a cooling and impurity-containing chamber. At or near the upper end of the lamp there is placed an electrode 2, connected with a leading-in wire 7. An electrode 5 at or near the other end of the lamp is connected

with a leading-in wire 8. A conductor—such, for instance, as a band of foil 9—is shown as being placed around the lamp near the electrode 5 and connected by a conductor 13 with a leading-in wire 7. A three-wire system of distribution is represented by the conductors 14 15 16. A conductor 12 leads from the conductor 16 to the leading-in wire 7. A conductor 17 leads from the conductor 14 to a contact-point 18, and a conductor 19 leads from the conductor 15 (which is the neutral wire of the three-wire system) to a contact-point 20. A conductor 21 leads from a contact-point 22 to the leading-in wire 8. A transformer 23 has one terminal of its primary coil 25 connected with a contact-point 24. The other terminal of this primary coil 25 is connected by a conductor 26 with one terminal of a suitable circuit-interrupter 27. The other terminal of this circuit-interrupter is connected by a conductor 28 with the conductor 19. An electromagnet of any suitable character 29 is included in the conductor 21, and this magnet operates when traversed by currents of sufficient quantity to operate the lamp to remove a bridge-piece 30 from the contacts 18 and 24 and to close the connections between the contacts 20 and 22 by a bridge-piece 31.

The operation of the apparatus is as follows: When the lamp is to be turned on, the circuit is closed—as, for instance, by a switch 32 in the conductor 19—and current then flows from the conductor 15 through the conductors 19 and 28 to the interrupter 27, thence through the primary coil 25 to the contact-point 24, through the bridge-piece 30 to the point 18, and through the conductor 17 to the main conductor 14. The circuit-interrupter 27 serves to produce a rapidly-interrupted current in the coil 25, which in turn induces a high electromotive force in the secondary conductor 33 of the transformer, the terminals of which are connected with the points 24 and 22, respectively. These induced currents find a path through the conductor 21 to the leading-in wire 8, thence through the lamp 7 to the conductor 12, thence through the main supply system to the conductor 14, and thus back to the other terminal of the secondary coil 33.

When the lamp has been traversed by these higher-potential currents, the vapor-path of the lamp is placed by them in such condition as to receive currents under the influence of the electromotive force existing between the conductors 14 and 16 which is at that time being applied to the terminals of the lamp through the conductor 12 and the conductor 17, bridge-piece 30, secondary coil 33, and conductor 21. When currents of the character required to illuminate the lamp brilliantly flow through the lamp under the influence of the difference of potential between the conductors 14 and 16, the electromagnet 29 acts to close the connections between the points 20 and 22 and to open the connections between the points 18 and 24. The lamp is thereby transferred to one side of the three-wire circuit, its connections then being from conductor 16 through the conductor 12 to the leading-in wire 7 and from the leading-in wire 8 through the conductor 21, electromagnet 29, contact-point 22, bridge-piece 31, contact-point 20, and conductor 19 to the middle wire 15. At the same time the converter 23 and the circuit-interrupter 27 are cut out of circuit. The apparatus will stay in this condition until the circuit of the lamp is opened—as, for instance, by the switch 32—whereupon the connections between the points 20 and 22 will be again interrupted and the connections between the points 18 and 24 will be closed, the apparatus then being in readiness for again starting the lamp when required.

The construction of the mechanism for operating the bridge-pieces 30 and 31 may be variously modified. In the drawing I have shown them as being carried upon the arms of an armature 35, placed in one direction by the action of the electromagnet and in the opposite direction by a weight 36. Usually it is desirable that the connections between 20 and 22 should be closed before the connections between 18 and 24 are interrupted.

In certain other applications filed by me—for instance, Serial Nos. 11,605, 11,606, and 11,607, filed April 5, 1900, and Serial Nos. 44,647, 44,648, and 44,649, filed January 25, 1901—claims are made upon certain of the features disclosed herein.

The invention claimed is—

1. The combination with a vapor or gas lamp of the character described, of a system of apparatus and circuits for starting and operating the same comprising a circuit-interrupter and a transformer for inducing a starting potential, means for applying a starting potential to the terminals of the lamp, an electromagnet included in the circuit of the lamp, and means operated thereby for closing a circuit to the lamp independent of the transformer.

2. The combination with a lamp inclosing a vapor acting as a conductor, of means for applying a constant difference of potential to its terminals, a circuit-interrupter, a transformer for temporarily raising the potential

at the terminals of the lamp, and means for closing a second circuit to the lamp independent of the transformer and the circuit-interrupter.

3. The combination of a vapor or gas lamp requiring a starting-current of higher potential than the operating-current, a three-wire main supply-circuit, means for applying a difference of potential to the terminals of the lamp from the outer wires of the three-wire system, a circuit-interrupter and a transformer connected between the middle wire and one of the outer wires of the three-wire system, and means for applying the difference of potential produced by the transformer to the terminals of the lamp.

4. The combination with a device requiring an initial current of higher potential than the operating-current, a three-wire system of distribution, means for connecting said device between the outer wires of said three-wire system, a transformer having its primary coil connected upon one side of said three-wire system, means for applying the difference of potential induced in said transformer to said device, means for interrupting the connections of the transformer and simultaneously transferring said device to one side of said three-wire system.

5. The combination of a three-wire supply-circuit, a gas or vapor lamp having one terminal connected with one side of said system, a transformer through which connections are formed from the other side of said system to the other terminal of the lamp and through the secondary coil of which transformer the last-named conductor is connected with the middle wire of said system, a circuit-interrupter in the last-named connections, and means for opening the circuit leading to the transformer-coils and closing a circuit to the lamp independently thereof from the middle wire of said system.

6. In an apparatus for applying a starting-current to an electric lamp, a potential-raising device included in the circuit at starting and an electromagnet included in the operating-circuit of the lamp acting when traversed by operating-currents to close the circuit of the lamp through a third circuit independently of the potential-raising device.

7. The combination with an electric lamp, of a source of electric current with which the lamp is connected at starting, a starting device connected with said source, and means for transferring the lamp to a source of still lower electromotive force when the lamp is in operation.

8. The combination with an electric lamp, of a source of electric currents for operating the lamp after it is started, means for applying to the terminals of the lamp a higher difference of potential at the time of starting, and means for transferring the lamp when in operation to a still lower potential source.

9. The combination of a translating device, means for applying three different electric

pressures thereto, means for starting the translating device in connection with the intermediate pressure by means of the highest pressure, and means for transferring the translating device when in operation to the source of lowest pressure.

10. The combination of two electric circuits of different pressures, an electric lamp, means for boosting the higher-pressure circuit for starting the lamp on the higher-pressure circuit, means for shifting the lamp from the high-pressure circuit when started to the low-pressure circuit, and means for shifting the lamp-circuit from the low pressure to the high pressure when extinguished.

11. The combination of a translating device, means for applying three different electric pressures thereto, means for starting the translating device in connection with the intermediate pressure by means of the highest pressure, means for transferring the translating device when in operation to the source of lowest pressure, and means for automatically disconnecting the translating device from the source of the higher pressure.

12. The combination with an electric lamp in which electric light is produced by the conduction of currents of considerable quantity and moderate electromotive force through a gas or vapor path, of a three-wire system of distribution, electric connections from the outside wires of said three-wire system to the terminals of the lamp, and means for connecting the lamp between the neutral con-

ductor and one of the outside conductors of said system when the lamp is in operation.

13. The combination with an electric lamp in which electric light is produced by the conduction of currents of considerable quantity and moderate electromotive force through a gas or vapor path, of a three-wire system of distribution, electric connections from the outside wires of said three-wire system to the terminals of the lamp, and means for automatically connecting the lamp between the neutral conductor and one of the outside conductors of said system when the lamp is in operation.

14. The combination with an electric lamp in which electric light is produced by the conduction of currents of considerable quantity and moderate electromotive force through a gas or vapor path, a three-wire system of distribution, electric connections from the outside wires of said three-wire system to the terminals of the lamp, and means for automatically connecting the lamp between the neutral conductor and one of the outside conductors of said system when the lamp is in operation.

Signed at New York, in the county of New York and State of New York, this 26th day of March, A. D. 1900.

PETER COOPER HEWITT.

Witnesses:

WM. H. CAPEL,
CHARLES B. HILL.