

No. 765,466.

PATENTED JULY 19, 1904.

S. E. FLICHTNER.

STARTING SYSTEM FOR GAS OR VAPOR ELECTRIC DEVICES.

APPLICATION FILED AUG. 10, 1903.

NO MODEL.

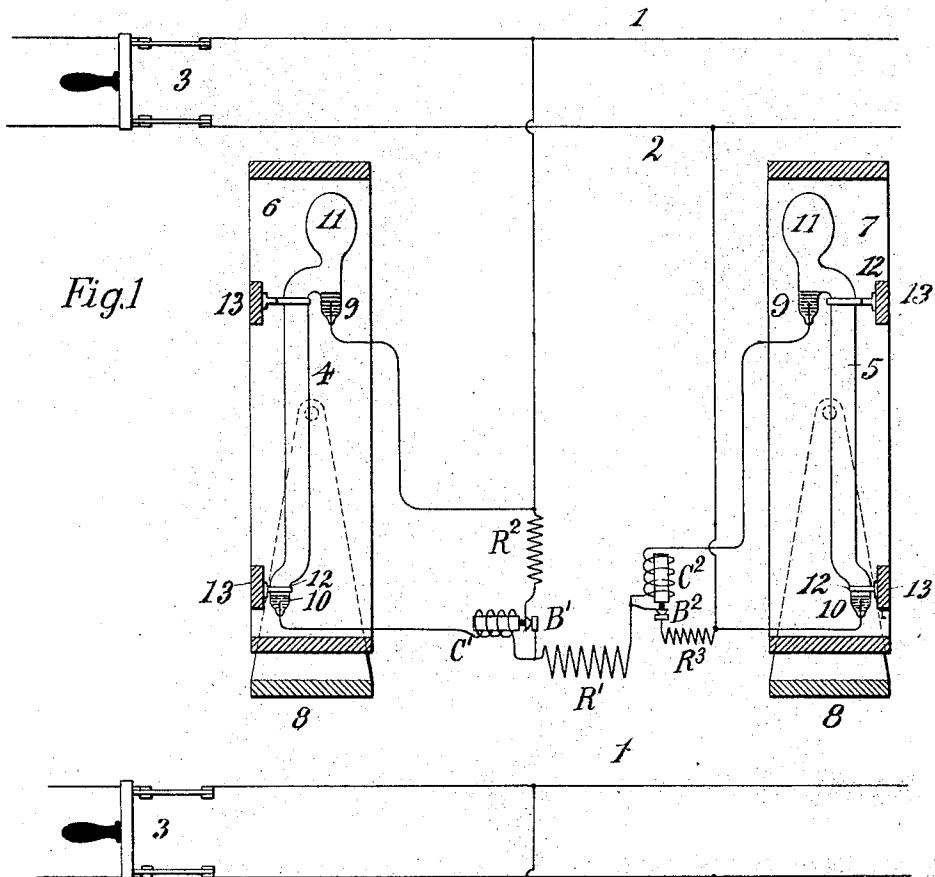
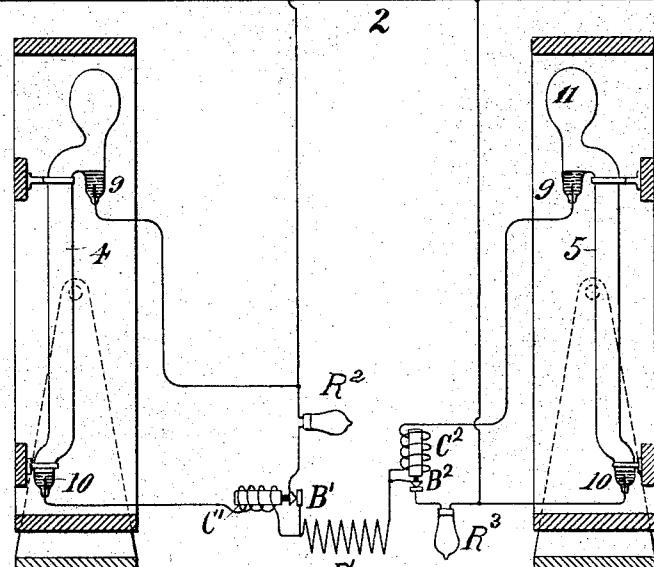


Fig. 2



Witnesses:

W. A. Cope  
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Inventor  
Stanwood E. Flichtner  
by Charles A. Sims, Atty.

## UNITED STATES PATENT OFFICE.

STANWOOD E. FLICHTNER, OF ENGLEWOOD, NEW JERSEY, ASSIGNOR  
TO COOPER HEWITT ELECTRIC COMPANY, A CORPORATION OF  
NEW YORK.

## STARTING SYSTEM FOR GAS OR VAPOR ELECTRIC DEVICES.

SPECIFICATION forming part of Letters Patent No. 765,466, dated July 19, 1904.

Application filed August 10, 1903. Serial No. 168,982. (No model.)

To all whom it may concern:

Be it known that I, STANWOOD E. FLICHTNER, a citizen of the United States, and a resident of Englewood, county of Bergen, State 5 of New Jersey, have invented certain new and useful Improvements in Starting Systems for Gas or Vapor Electric Devices, of which the following is a specification.

In another application executed by me on 10 the same day herewith I have shown and described means whereby a gas or vapor electric apparatus may be started by tilting the apparatus so as to cause a stream of conducting liquid to pass from one electrode to another in a container having its electrodes arranged one above the other. It is found in practice that this mode of starting an apparatus of the class named is well adapted to its 15 purposes. The described mode of starting is especially adapted to initiating the operation 20 of two or more gas or vapor devices in series, and in the application above referred to such a utilization of the method is fully set forth.

The present invention relates to means 25 whereby, through the operation of a similar starting process, two or more gas or vapor devices may be started and run independently or in series at will, the extra voltage to be taken up in a series resistance.

30 My invention will be clearly understood by reference to the accompanying drawings, in which—

Figure 1 is a diagram of the apparatus, circuits, and connections adapted to carrying out 35 the invention; and Fig. 2 is a diagram of a modified arrangement.

Referring to the drawings, 1 and 2 are main conductors, and 3 is a switch for opening and closing the main circuit.

40 The gas or vapor devices are shown at 4 and 5, and they are mounted, respectively, in frames 6 and 7, which are pivoted in standards 8. The gas or vapor devices are each provided with electrodes 9 and 10 and with a 45 cooling or condensing chamber 11. Each device is mounted, as shown, in clips 12 12, secured to cross-pieces 13 13 in the frames 6 and 7. By suitable means (not shown) the

frames can be tilted on their pivots, so as to cause a stream of electrode material—say of 50 mercury—to flow from the upper electrode to the lower electrode, forming a continuous liquid conductor from one electrode to the other.

In the circuit of the gas or vapor device 4 55 I arrange a coil C', a switch B', and a resistance R<sup>2</sup>, the switch B' being closed at the beginning of the operation. Similarly I place in the circuit of the device 5 a coil C<sup>2</sup>, a switch B<sup>2</sup>, and a resistance R<sup>3</sup>, the switch B<sup>2</sup> being 60 also closed at the beginning of the operation. Between the stationary parts of the switches B' and B<sup>2</sup> is located a resistance R', which is always in circuit. On closing the main switch current would flow from the mains through 65 the resistance R<sup>2</sup>, the switches B' and B<sup>2</sup>, and the resistance R<sup>3</sup>, back to the other main conductor. Either device—say 4—could then be 70 started by the tipping process above described, and the circuit through the resistance R<sup>2</sup> could be opened by manually operating the switch B' or by permitting the coil C' to act upon the movable element of the said switch so as to open the same automatically when the circuit of the device is completed. Any other 75 suitable means for cutting out the resistance R<sup>2</sup> can be made use of. Current would then flow through the device 4, the resistance R', and the resistance R<sup>3</sup>, back to the main conductor. This gas or vapor device could then 80 be permitted to operate independently as long as desired, or the device 5 might be started in a similar manner, cutting out the resistance R<sup>3</sup>.

It will be understood that each of the resistances R<sup>2</sup> and R<sup>3</sup> is equal to the resistance 85 of the gas or vapor device under normal current.

In place of the resistances R<sup>2</sup> and R<sup>3</sup>, I may, as illustrated in Fig. 2, utilize incandescent 90 lamps of the proper resistance. This is advantageous, inasmuch as the lamps serve not only the purposes of resistance, but also as soon as the main circuit is closed by operating the switch 3 the incandescent lamps begin 95 to glow and the operator can, in an otherwise

dark room or place, see how properly to conduct the tilting operation for starting the several vapor devices.

The coils C' and C<sup>2</sup> may be utilized as inductive resistances which remain constantly in the circuit of the devices after one or both is started into operation.

I claim as my invention—

1. The combination with an electric circuit, of a gas or vapor electric device, a resistance in shunt thereto, means for tilting the said device and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, and means for cutting out the resistance when the device is started.
2. The combination with an electric circuit, of a gas or vapor electric device, a resistance in shunt thereto, means for tilting the said device and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, and automatic means for cutting out the resistance when the device is started.
3. The combination with an electric circuit, of two or more gas or vapor electric devices, an electrical resistance in shunt upon each of the said devices, means for tilting either device independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, and means for cutting out the resistance of either device when it is started.
4. The combination with an electric circuit, of two or more gas or vapor electric devices, an electrical resistance in shunt upon each of the said devices, means for tilting either device independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, and automatic means for cutting out the resistance of either device when it is started.
5. The combination with an electric circuit, of two or more gas or vapor electric devices, an electrical resistance in shunt upon each of the said devices, means for tilting either device independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, and means for cutting out the resistance of either device when it is started, one or more of the resistances being an incandescent lamp.
6. The combination with an electric circuit, of two or more gas or vapor electric devices, an electrical resistance in shunt upon each of the said devices, means for tilting either device independently of the other and thereby divid-

ing the circuit between the said device and the said resistance and starting the device into operation, and automatic means for cutting out the resistance of either device when it is started, one or more of the resistances being an incandescent lamp.

7. In an electrical system, two or more gas or vapor electric devices, a resistance in shunt to each device, means for tilting either of the said devices independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, means for cutting out the resistance when the device is started, and a resistance in series with the said devices, such last-named resistance remaining constantly in the circuit.

8. In an electrical system, two or more gas or vapor electric devices, a resistance in shunt to each device, means for tilting either of the said devices independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, automatic means for cutting out the resistance when the device is started, and a resistance in series with the said devices, such last-named resistance remaining constantly in the circuit.

9. In an electrical system, two or more gas or vapor electric devices, a resistance in shunt to each device, means for tilting either of the said devices independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, means for cutting out the resistance when the device is started, and a resistance in series with the said devices, such last-named resistance remaining constantly in the circuit, and being wholly or in part an inductive resistance.

10. In an electrical system, two or more gas or vapor electric devices, a resistance in shunt to each device, means for tilting either of the said devices independently of the other and thereby dividing the circuit between the said device and the said resistance and starting the device into operation, automatic means for cutting out the resistance when the device is started, and a resistance in series with the said devices, such last-named resistance remaining constantly in the circuit, and being wholly or in part an inductive resistance.

Signed at New York, in the county of New York and State of New York, this 6th day of August, A. D. 1903.

STANWOOD E. FLICHTNER.

Witnesses:

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GEORGE H. STOCKBRIDGE.