

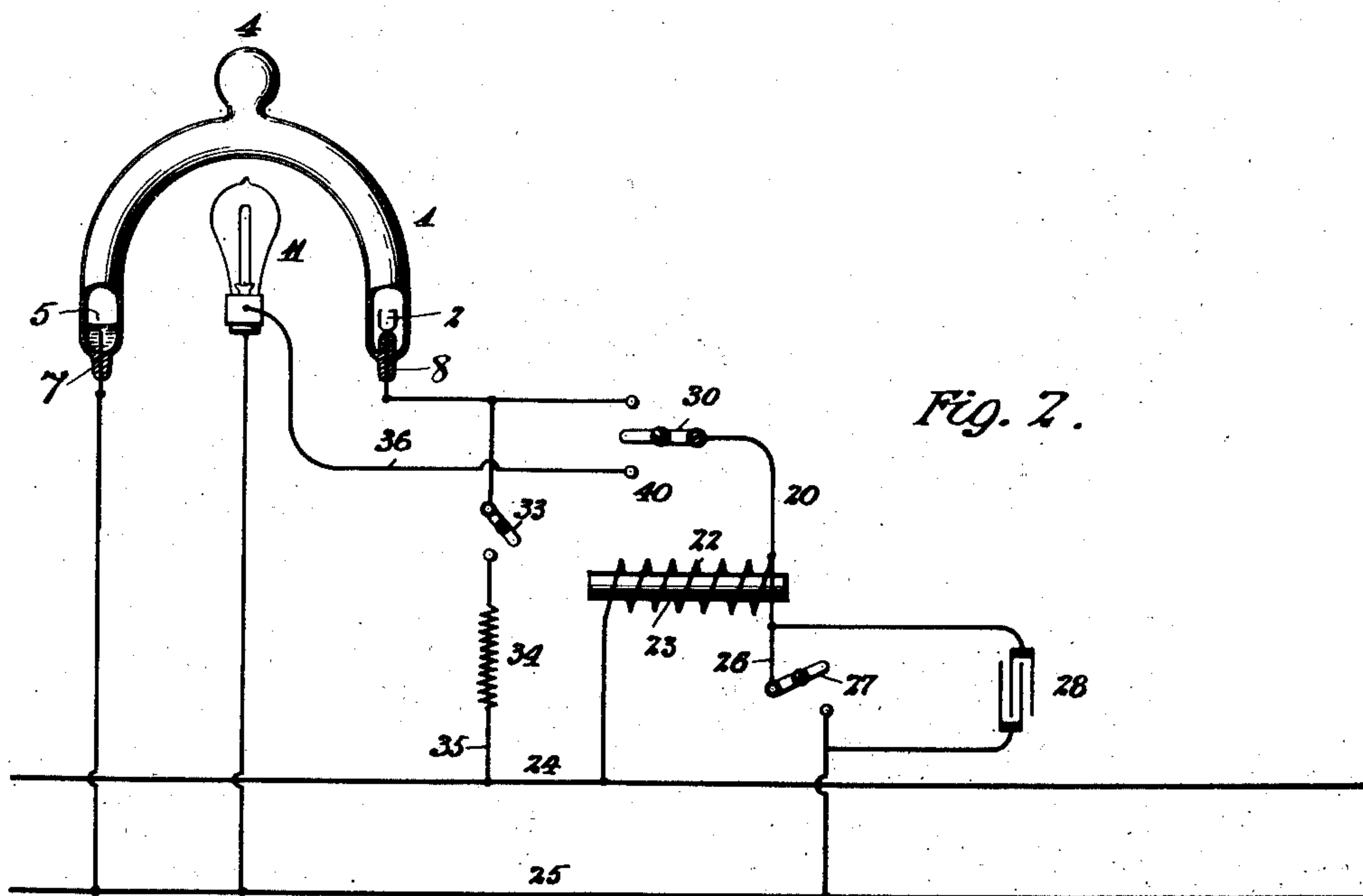
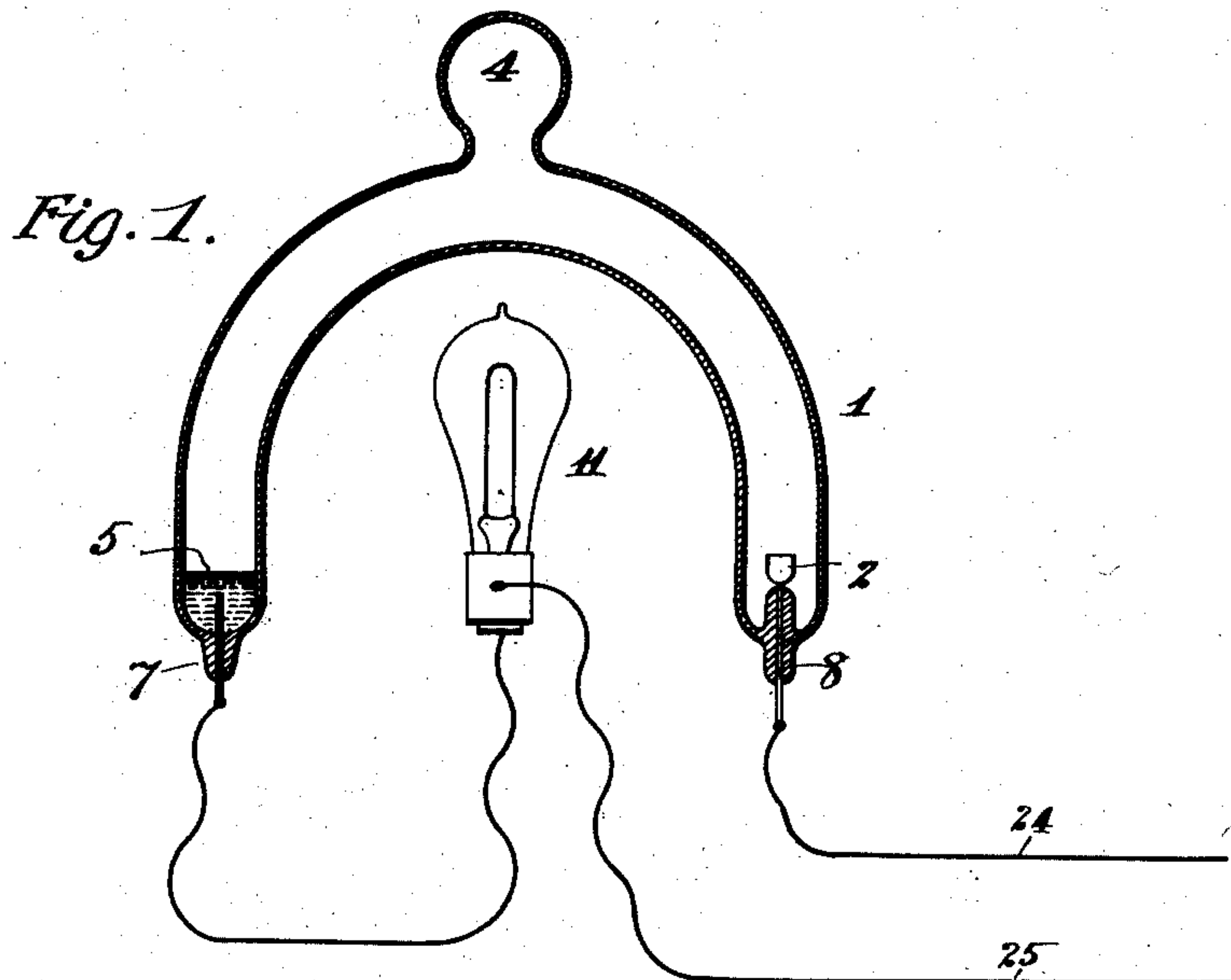
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APPARATUS FOR ELECTRIC LIGHTING.

APPLICATION FILED MAY 3, 1902. RENEWED APR. 16, 1908.

901,294.

Patented Oct. 13, 1908.



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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR ELECTRIC LIGHTING.

No. 901,294.

Specification of Letters Patent.

Patented Oct. 13, 1908.

Original application filed April 5, 1900, Serial No. 11,608. Divided and this application filed May 3, 1902,  
Serial No. 105,723. Renewed April 15, 1906. Serial No. 427,208.

*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 Apparatus for Electric Lighting, of which the following is a specification.

My invention relates to improvements in electric lighting apparatus in which electric energy is employed for producing light through the agency of vapors and gases.

In another application filed by me, April 5th, 1900, Serial Number 11,605, I have described a form of vapor or gas electric lamp in which a good conducting path is formed for currents of moderate potential, and which is capable of regulating within itself the current flowing, so that it is suited for general use upon commercial circuits. One of the materials sometimes employed for the light emitting medium in the lamp referred to is mercury vapor. The spectrum of mercury is deficient in red rays, and for some classes of lighting an abundance of red rays is desirable.

My present invention aims to combine with a lamp having a vapor or gas yielding a spectrum lacking certain rays, another lamp which will produce the rays not produced by the first.

For convenience of description, it will be assumed that a lamp is employed in which the main portion of the light is produced by mercury vapors and that it is desired to supplement it with a spectrum having a sufficient abundance of red rays.

The present application is a division of an application No. 11,608, filed by me on the fifth day of April, 1900, the prior application illustrating and describing an apparatus in which the above described result is accomplished by combining or associating with the mercury vapor, a vapor or gas such, for instance, as nitrogen, helium, or argon, which also is to be acted upon by the electric current so as to produce red rays in addition to such other rays as are contained in its spectrum, thereby supplying the deficiency of the mercury spectrum.

In the present application, I show and describe means for accomplishing the desired result by combining with such a lamp as the mercury vapor lamp an ordinary form of in-

candescent lamp such, for instance, as a carbon or other solid filament lamp connected in series or parallel therewith, but so located as to have its rays mingle with those of the mercury lamp.

My invention is illustrated in the accompanying drawings, in which

Figure 1 shows a mercury vapor lamp in series with an ordinary incandescent lamp; and Fig. 2 illustrates a mercury vapor lamp in parallel with an ordinary incandescent lamp, showing also a diagram of a system of starting circuits which may be employed in connection with the former.

Referring to Fig. 1, a tube, 1, of glass is shown as containing two electrodes, 2 and 5. The electrode 2 is here shown as consisting of a solid body which is conductive under proper condition. The electrode 5 consists in this instance of a body of mercury. Leading-in-wires, 7 and 8, respectively, connect with the two electrodes through the walls of the glass. Adjacent to or in proper relation with the tube 1 is an ordinary incandescent lamp 11. The tube 1 is shown as provided with a bulb 4 which may be used as a cooling and impurity containing chamber, or may be dispensed with under certain conditions. It is usually desirable that the chamber 4 should be out of the conducting vapor path.

The two lamps shown in Fig. 1 are connected in series. In the operation of this class of vapor lamps, it is sometimes desirable that a steadying resistance be connected in series with the vapor lamps, and in such instances the incandescent lamp, connected as in Fig. 1, well serves this purpose.

To render the gas or vapor lamps suitable for general use upon commercial circuits, it is desirable that they should receive currents under the influence of moderate electromotive forces and possess within themselves the capacity of self regulation with respect to the amount of current received. I have found that lamps may be made which will conduct current at low potentials and within requisite limits proportional to the electromotive force applied in such manner as to be self regulating and highly efficient. The general plan of manufacture is to thoroughly cleanse the tubes or receptacles by alkalies and proper acids, then exhaust them by passing electric currents through them during the process of exhaustion. The lamp is further



treated by properly heating the electrodes and creating such chemical reactions therein as would be liable to take place in use, and drawing off the impurities and deleterious materials and subjecting the lamps while in the process of manufacture to the class of currents with which they are to be operated, and introducing within the tubes, the proper amount of vapor or light emitting materials.

10 In the present application claims are not made upon the method of constructing the lamps, and, it will not be necessary to enter more in detail into the method of construction and manufacture.

15 For the purpose of starting lamps of this character, it is usually desirable to employ an initial higher potential for producing within the lamp such a condition on the part of the vapor as will cause it to receive currents of the potential with which it is designed to be operated. To accomplish this any convenient arrangement of circuits may be employed, and in Fig. 2, wherein I illustrate a mercury vapor lamp in parallel with

25 an incandescent lamp, I have shown one organization of such circuits.

The lamps 1 and 11 are connected across main circuit conductors 24 and 25. In the conductor 20 there is included the coil 22 of

30 a suitable spark-coil or reactive device, the core of which is represented at 23. A conductor 26, including a switch 27, leads from one terminal of the coil 22 to the main conductor 25, the arrangement being such that

35 the coil 22 may be placed in closed shunt across the circuit 24, 25. A suitable condenser 28, of any desired form, is connected in shunt around the switch 27. When the switch is closed, an electric circuit is completed through the coil 22, and upon breaking the conductor 26 a high difference of potential is established at the terminals of the lamp 1, and the result of this is to create

such a condition on the part of the vapor column as to cause the current from the conductors 24 and 25 to flow easily through the lamp and operate it.

Referring again to Fig. 2, a switch, 30, is introduced into the conductor 20. A switch, 33, is also introduced into a conductor 35 running from the main conductor, 24, and also containing a resistance, 34. The conductor 35 is connected beyond the switch to the conductor 20.

In still another application filed January 18, 1908, Serial Number 411,384 as a division of the same parent application above referred to, claims are made upon other features of the system herein disclosed.

I claim as my invention:

1. The combination with a U-shaped vapor lamp having electrodes, at least one of which is vaporizable, the operating position of the said lamp being one in which the arms of the U are lower than the bend, of a cooling chamber located above the bend and a neck or constricted portion connecting the cooling chamber and the main body of the lamp.

2. In combination, a vapor lamp in the shape of an arc or arch, the said lamp being adapted to give a definite spectrum, and a lamp adapted to give a different spectrum, the last named lamp being located within the arc or arch of the other lamp.

3. In combination, a mercury vapor lamp, in the shape of an arc or arch, and an incandescent lamp in series therewith, the said incandescent lamp being located within the arc or arch of the mercury vapor lamp.

Signed at New York, in the county of New York, and State of New York, this 23rd day of April, A. D. 1902.

PETER COOPER HEWITT.

Witnesses:

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