June 27, 1950 W. S. FROHOCK 2,513,091

INSTANT START LAMP AND CIRCUIT

Filed July 30, 1948

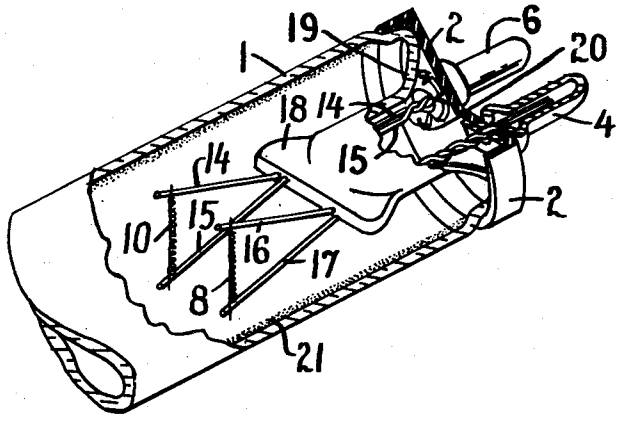


Fig. 2

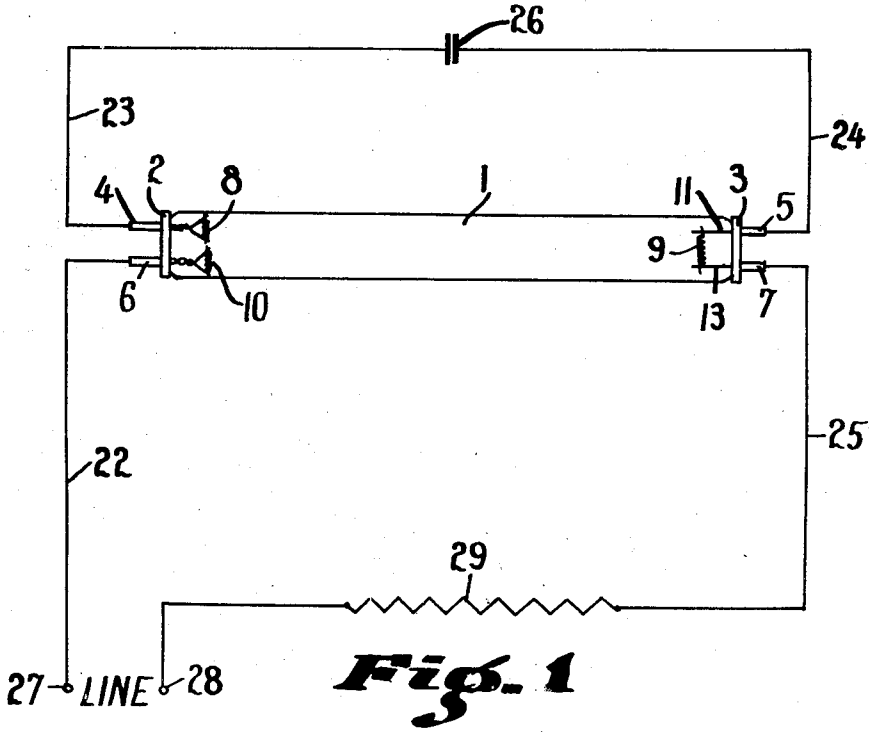


Fig. 1

INVENTOR.

Warren S. Frohock

BY

Lawrence Burns,

ATTORNEY

Patented June 27, 1950

2,513,091

UNITED STATES PATENT OFFICE

2,513,091

INSTANT START LAMP AND CIRCUIT

Warren S. Frohock, Danvers, Mass., assignor to Sylvania Electric Products Inc., Salem, Mass., a corporation of Massachusetts

Application July 30, 1948, Serial No. 41,691

3 Claims. (Cl. 176—122)

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This invention relates to electric gaseous discharge lamps, and particularly to long tubular lamps such as fluorescent or ultraviolet lamps.

Such lamps generally require high voltage for starting, this high voltage being provided by starting relays and switches, transformers or the like. The lamp of my invention, when connected in a proper circuit, will start at lower voltages without the need for starting relays or switches, and without the delay characteristic of such starting mechanisms. In fact, by replacing the starting relay in an ordinary fluorescent lamp fixture by a condenser, and using one of my novel fluorescent lamps, instant starting may be achieved with no further circuit changes.

I achieve this result by using two separate electron-emissive electrodes at one end of the lamp, and connecting one of these electrodes back to the electrode at the other end of the lamp through a condenser. An electrode at the other end of the lamp will be sufficient, although a double electrode may be used if desired.

My lamp may be placed in the usual fluorescent lamp sockets in the same manner as an ordinary fluorescent lamp, it being unpolarized; that is either end may be placed into either socket. The usual starter can thus be removed and replaced by a condenser, and my lamp operated. The annoyance and delay caused by such starters can thus be dispensed with. When the power is turned on, the lamp lights promptly, without the delay characteristic of such starters.

Other objects, features and advantages of the invention will be apparent from the following specification, taking with the accompanying drawings in which:

Figure 1 is a schematic diagram of a lamp and circuit according to the invention; and

Figure 2 is a drawing of the end of the lamp showing the double electrode.

In Figure 1 the lamp envelope 1, which may be a long glass tube coated with fluorescent materials, for example, has at each end the bases 2, 3 from which the contact prongs 4, 5, 6, 7 extend and are insulated from each other in the usual manner, although prongs 5 and 7 may be short-circuited to each other if desired. The electrode 9 may be the usual coiled-coil tungsten wire coated with one or more of the alkaline earth oxides, as shown for example, in U. S. Patent 2,250,158 to Erwin F. Lowry. Lead-in wires 11, 13 extend from the ends of electrode 9 through the end of envelope 1 and into the contact prongs 5 and 7. The electrodes 8, 10 at the other end of the tube 1 are also the usual coiled-coil tungsten wire coated with one or more of the alkaline earth oxides, for example as shown in the same patent. These are arranged side by side as shown in more detail in Figure 2.

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Lead-in wires 14, 15, 16, 17 extend from the glass press 18 which extends into stem 19 which closes off the end of tube 1. The wires are arranged in pairs, 14 and 15 being closer to each other than to 16 and 17, to provide a longer leakage path of insulation between the two electrodes assemblies, 10, 14, 15 and 8, 16, 17. To confine the discharge to the coated coils 8 and 10, the lead-in wires are coated with carbon, for example coated with a colloidal suspension of carbon in water (such as aquadag) and dried. Carbon is a conductor, but has a low electron-emissivity, and tends to prevent a discharge between the lead-in wires. Confining the discharge to the coils 8, 10 helps to get them quickly to a proper electron-emitting temperature. The two coils 8 and 10 are arranged in the same plane and parallel to each other.

The base 2 may be of insulating material with the pins 4, 6 staked thereto by their split and flattened ends 20. The lead-in wires 14 and 15 may be twisted together outside the lamp stem 19, that is between the stem 19 and the base 2 so that the lead-in wires 14, 15 are shorted in the finished lamp. During manufacture, the lead-in wires may be separated for passing current through the coil 10, for activation in the usual manner in the art. Lead-in wires 16 and 17 are also connected to each other in the finished lamp.

The lamp may have a fluorescent coating 21, if desired, as shown in Figure 2. The tube 1 will ordinarily have sealed therein a filling of one or more of the rare gases, for example, argon or krypton at a few millimeters pressure, and a drop of mercury to produce mercury vapor.

With the lead-in wires 14 and 15 from each end of electrode 10 connected to a single contact pin 6, and the lead-in wires from both ends of electrode 8 likewise connected to a single contact pin 4, and the lead-in wires 11, 13 from each end of coil 9 being each connected, respectively to a separate contact pin 5, 7, my lamp will be unpolarized or reversible, that is, either end of the lamp may be placed in either end of the usual sockets, that is, pins 4 and 6 may be connected to circuit wires 22, 23 in that order or its reverse, or to 24, 25 in that order or its reverse, as desired, the other contact pins 5, 7 being connected to the pair of circuit wires not connected to 4, 6. Thus to change a fixture from delayed-action starting

to my instant-starting, one need only change the usual starter interconnecting the ends of the lamp to a condenser **26** as shown, and then replace the present lamp by the lamp of my invention, without having to consider the question of which end of the lamp should be connected to which pair of wires.

If desired, of course, the pins **5, 7** may be short-circuited to each other, but the pins **4, 6** should not be short-circuited to each other.

The coils **8** and **10** may be arranged parallel to each other and transverse to the longitudinal axis of the tube. I have found a separation of about 2 to 4 mm. between the coils to be effective, and a typical coil may be of tungsten wire about 3 mils in diameter, formed into a coiled-coil with the coating material confined to the minor coil, that is the coil of smaller diameter, as shown, for example, in U. S. Patent 2,258,158 to Erwin F. Lowry.

The condenser **26**, which may be of 1 mfd. capacity, is connected between electrode **8** and one end of electrode **9**. The other end of electrode **9** may be connected to one end **28** of a line, of say 200 volts, for the usual 48-inch long, 1½ inch diameter, 40 watt fluorescent lamp. The electrode **10** may be connected to the other end **27** of said line. An impedance **29**, for example, an inductance is connected in one side of the line, for example side **28**, as shown.

Although a condenser is shown as the impedance element **26**, a resistance or inductance could be used. A condenser is preferable when the main impedance **29** is inductive, and vice-versa, to give a resonant voltage build-up, but a resistor can be used instead of condenser **26** if desired.

What I claim is:

1. An electric gaseous discharge lamp comprising: a long tubular envelope; a single, coiled filamentary electrode at one end thereof and coated with alkaline earth oxides; a pair of coiled filamentary electrodes, coated with alkaline earth oxides, at the other end thereof; lead-in wires from each end of each filament extending through the ends of said envelope; a base at each end of said envelope; two contacts extending from each base, the lead-in wires from each end of the single filament at one end of said envelope being connected to separate contacts, the lead-in wires from each end of one filament of the pair at the other end of said envelope being connected to a single contact of the base at that end of said envelope and thereby short-circuited, the lead-in wires from each end of the other filament of said pair being connected to the other contact of the base at said end of said envelope and thereby short-circuited.

2. The combination of claim 1, and a pair of connections for each end of said lamp, an impedance joining one connection of one said pair to one connection of the other pair, the other connections of each pair extending to the terminals of a voltage source, and a ballast impedance in at least one of the latter two connections.

3. The combination of claim 1, and a pair of connections for each end of said lamp, a condenser joining one connection of one said pair to one connection of the other pair, the other connections of each pair extending to the terminals of a voltage source, and a ballast impedance in at least one of the latter two connections.

WARREN S. FROHOCK.

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