My invention relates generally to illuminating devices, particularly of the type where rare gases such as neon, argon, mercury vapor, carbon dioxide gas, or the like, contained in transparent tubes or containers are rendered luminous by the passage of an electric current therethrough and my present invention is an improvement upon the luminous vapor lamp forming the subject matter of application for U. S. Letters Patent filed by me September 5, 1939, Serial No. 293,443.

The objects of my present invention are, to generally improve upon and simplify the construction of the lamp disclosed in my aforesaid application for patent and to provide a lamp wherein the main body thereof is provided with a permanently sealed chamber containing rare gases that are rendered luminous by the passage of an electric current therethrough and which lamps are of such form and construction as to be readily applied to and removed from conventional lamp sockets of the type used for illumination purposes and upon the panels of illuminated signs and the like.

Inasmuch as the individual lamps contemplated by my invention contain small amounts of rare gases and which are rendered luminous by the passage of a relatively small amperage of current, it is one of the objects of my invention to combine with the individual lamps and their sockets a transformer that is effective in reducing the amperage of the supply line so that the gases in the lamps will be rendered luminous as a result of the passage of a current of proper amperage therethrough.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawings in which:

Fig. 1 is a vertical section taken through the center of a lamp and the socket for receiving the plug end of said lamp and with a transformer located within said socket.

Fig. 2 is an elevational view partly in section of one of the lamps contemplated by my invention.

Fig. 3 is a cross section taken approximately on the line 3–3 of Fig. 2.

Fig. 4 is a cross section taken on the line 4–4 of Fig. 1.

Fig. 5 is a cross section taken on the line 5–5 of Fig. 1.

Fig. 6 is a diagrammatic view of the transformer used in connection with my improved lamp.

Fig. 7 is a diagrammatic view illustrating a series of lamps arranged to form the outline of a letter and showing a transformer associated with said series of lamps.

Fig. 8 is a perspective view showing a lamp having the shape of a letter, also showing the socket for said lamp and the transformer that is associated with said socket and lamp.

Referring by numerals to the accompanying drawing which illustrates a preferred embodiment of my invention, 10 designates a conventional electric lamp socket that is adapted to be secured by screws or otherwise to a base or panel 11, which latter may be the rear panel or wall of an advertising sign or the like, said socket being formed from suitable insulating material, such as glass, porcelain or the like, and internally threaded for the reception of the threaded plug portion of a lamp and a threaded transformer.

Current supply conductors 12 of a standard lighting circuit enter the rear portion of the socket 10 and are electrically connected to contacts 13 located at the inner end of the threaded recess in the socket.

Screw seated in the rear portion of the recess in the socket is a transformer having a body composed of insulating material, such as glass, porcelain or the like, and which contains the primary coil 15 and a secondary coil 16.

The ends of the primary coil are electrically connected to contacts 17, which latter directly engage the contacts 19 when the transformer is properly positioned in the socket. The ends of the secondary coil 16 of the transformer are connected to contacts 18, which latter are preferably in the form of rings located on the face of the transformer opposite the face on which the contacts 17 are located in order that they may be directly engaged by contacts 19 that are mounted on the end of the plug portion 20 of the lamp that is positioned in the socket. This plug portion which is formed from suitable insulating material, for instance, glass, porcelain or the like, is externally threaded so that it may be conveniently screw seated in the socket and when so positioned, the contacts 19 directly engage the contacts 18 on the transformer and which form the terminals of the secondary coil in said transformer.

Formed integral with the plug portion 20 of the lamp is an outer member or wall 21 and an inner member or wall 22, said members being...
practically identical in shape but with the inner member slightly smaller than the outer member so as to form between all portions of said members a narrow chamber 23.

The walls or members 21 and 22 may be shaped after the fashion of a conventional electric lamp bulb as illustrated in Figs. 1 and 2 or they may be shaped to form a square, angular, or star-shaped body, or they may be shaped after the manner of flowers, buds, birds, birds, or the like.

Formed integral with the walls 21 and 22 at diametrically opposite points within the chamber 23 are thin partitions 24 which, together with the walls 21 and 22, are preferably formed from transparent or translucent glass.

The ends of the partitions 24 at the end of the bulb or body opposite the end on which the threaded plug is located are spaced apart to form a narrow opening 25, thus establishing communication between those portions of the chamber to the sides of the partitions 24.

Leading from the contacts 19 on the end of the plug portion of the bulb through said plug portion are conductors 50, portions of which project into the chambers to the sides of the partitions 24, thus functioning as electrodes to conduct current to the gas contained in said chambers.

At the time the bulb and plug are formed air is withdrawn from the chambers 23 and replaced by rare gases such as neon, argon, or the like, and at the same time air is withdrawn from the chamber surrounded by the inner wall 22, thus producing a vacuum which is effective in countering the tendency of the bulb to become heated while in use.

As a result of the construction just described, current from the supply wire will pass from contact 12 to the contact 17 with which said contact 12 is engaged, thence through primary coil 18 of the transformer to the other one of the contacts 17, thence to that contact 13 with which said last mentioned contact 17 is engaged and thence to the other side of the supply line.

The reduced current set up in the secondary coil 16 of the transformer as a result of current flow through primary coil 18 will flow through one of the ring contacts 10, thence through the conductor that is connected to said contact, thence through the rare gas filling the chamber 23, thence through the other one of the conductors 26 and from the latter through the contact 19 to which said conductor is connected and thence to the other one of the ring contacts 18 on the transformer. As a result of the current flow through the rare gas contained in chamber 23, said gas will be illuminated, thus achieving the desired results.

Obviously, the chamber 23 may be filled with gases or combination of gases to produce differently colored luminous effects, for instance, blue, green, yellow, and the like.

In Fig. 7 I have shown a number of the lamps assembled to form a letter 'T', which lamps are connected in series by a conductor 27, the ends of which are connected to the secondary coil of the transformer, including a primary coil 26, the latter being located in the supply line, and thus the reduced current flow to all of the lamps forming the letter are under control of a single transformer and which construction is especially applicable where large outdoor advertising signs are produced.

In Fig. 8 I have illustrated the bulb or body of the lamp shaped to form a letter and which type of lamp may be advantageously employed in the production of advertising signs. Formed integral with the body of the letter or character shaped bulb is an externally threaded plug portion 28 that is adapted to screw into an internally threaded socket 30 and there being a transformer 31 that is removably positioned in the socket behind the inserted plug portion 28.

It is to be noted that my improved construction and particularly the provision of an insertable transformer enables lamps to be interchangeably used with the conventional forms of electric lamp sockets.

The illuminating device contemplated by my invention is particularly effective when used for interior lighting purposes, as well as for both interior and outdoor advertising and they. The use of bulbs containing rare gases that are rendered luminous by the passage of an electric current therethrough will eliminate the annoyance and expense incident to the burning out of electric light bulbs and likewise eliminating the time and labor involved in the replacement of burned out bulbs where large numbers thereof are used for illumination purposes or on large outdoor advertising signs or panels.

To increase the luminous power of the external surface of the inner wall 22 of the bulb may be treated so as to produce a mirror-like reflecting surface, thus increasing the brilliancy of the illumination.

Thus it will be seen that I have provided an illuminating device that is relatively simple in construction, inexpensive of manufacture and very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved luminous vapor lamp, may be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claim.

I claim as my invention:

In a luminous vapor lamp, the combination with a lamp socket provided with a threaded recess with contacts at the bottom of said recess and conductors connected to said contacts, of a separately formed externally threaded transformer unit seated in said socket, contacts on the inner end of said transformer unit for engaging the contacts in the recess in said socket, contacts on the outer end of said transformer unit with a screw plug seated in said socket, a lamp bulb integral with said plug, which bulb is provided with a chamber that is filled with gas that is rendered luminous by the passage of an electrical discharge therethrough, conductors embedded in said plug and having portions projecting into said gas filled chamber and contacts carried by the outer end of said plug, which contacts are connected to said conductors and are adapted to engage the contacts that are carried by the outer end of said transformer unit.

JOSEPH MORLEY.