Feb. 11, 1936. M. PIRANI ET AL 2,030,715

GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

Filed May 3, 1933

Fig. 1

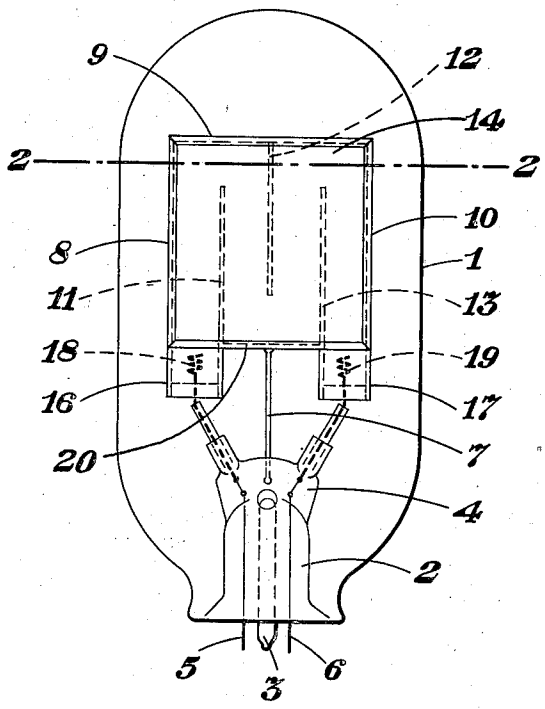
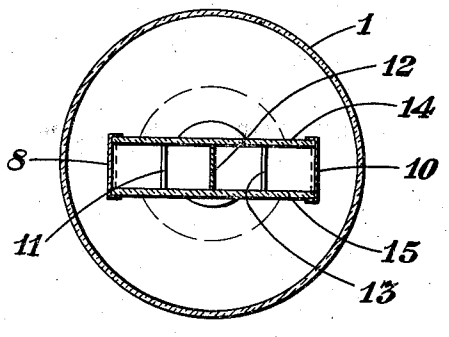


Fig. 2



INVENTORS
Marcello Pirani
Martin Reger
BY
Charles V. Mullen
ATTORNEY

Patented Feb. 11, 1936 2,030,715

UNITED STATES PATENT OFFICE

2,030,715

GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

Marcello Pirani, Berlin-Wilmersdorf, and Martin Reger, Berlin, Germany, assignors to General Electric Company, a corporation of New York

Application May 3, 1933, Serial No. 669,238
In Germany May 23, 1932

3 Claims. (Cl. 176—122)

The present invention relates to gaseous electric discharge lamp devices generally and more particularly the invention relates to improvements in such devices in which baffles interposed between the electrodes causes the gaseous electric discharge to follow a tortuous path.

Baffles fused to the walls of a glass, or quartz container are impractical due to the stresses at the fused joints caused by the uneven heating of the baffles and the container walls by the gaseous electric discharge. The object of the present invention is to provide a practical gaseous electric discharge device wherein the discharge between the electrodes follows a tortuous path. Another object of the invention is to simplify the manufacture of such devices. A further object of the invention is to provide a gaseous electric discharge lamp device which is a concentrated light source of high intensity. Still further objects and advantages attaching to the device and to its use and operation will be apparent to those skilled in the art from the following particular description and from the appended claims.

In accordance with these objects the invention comprises an element having baffles which are located in parallel planes and which overlap. Said element is sealed into the container of the gaseous electric discharge lamp device, is separate from the container walls and encloses the electrodes as well as the discharge path between said electrodes. The baffles and walls of the element which do not transmit light are made of metal and the other walls of said element are made of light pervious material such as glass, quartz or wire netting. The element is enclosed in a gas tight container and since the element itself need not be gas tight the glass and metal walls thereof need not be fused to each other, as in prior devices of this type, mechanical joints therebetween are sufficient. This simplifies the manufacture of such devices and makes available for use in the arts generally a strong practical lamp device of the above type having a long useful operating life. When a metal having a high melting point, such as tungsten, is used in the walls of said container which do not transmit light higher current densities can be used in such devices than were practical heretofore and the device is a high intensity, concentrated light source.

The voltage drop in the positive column discharge between the electrodes of the new and novel lamp device should be less than the sum of the anode and cathode at the electrodes to prevent short circuiting of the discharge by the metal walls of the element surrounding the discharge. The accomplishing of this same result can be aided or attained by covering the surfaces of said metal walls facing the discharge path with an electrical insulating material, as by oxidizing said surfaces, the insulating material preventing the starting of the discharge between the electrodes and the metal walls of the element.

When desired the metal walls of the element adjacent the electrodes can be used as auxiliary electrodes to facilitate the starting of the gaseous electric discharge between the electrodes of the device. Part of the walls of the element are polished, when desired, to reflect and direct the light from the luminous positive column discharge in a desired direction.

In the drawing accompanying and forming part of this specification an embodiment of the invention is shown in which

Fig. 1 is a front elevational view of the lamp device, and

Fig. 2 is a top sectional view along the line 2—2 of Fig. 1.

Referring to the drawing the new and novel lamp device comprises a container 1 having a stem 2 fused therein. An exhaust tube 3 is fused into said stem 2 and current leads 5 and 6 for electrodes 18 and 19 are sealed into the pinch-part 4 of said stem 2. A metal support rod 7 is fused into said pinch-part 4 and the bottom metal wall 20 of the element surrounding the electrodes 18 and 19 and the discharge path between said electrodes 18 and 19 is fastened to said rod 7.

The side and top walls 8, 9 and 10 of the enclosing element as well as the baffles 11, 12 and 13 are made of metal, such as tungsten, and the front and back walls 14 and 15 thereof are light pervious and are made of a material such as glass, quartz or wire net. The bottom edges of the front and back walls 14 and 15 rest on the bottom wall 20 and are held in position by flanges on said bottom wall 20. The walls 8, 9, 10, 14 and 15 are held in position with respect to each other by the flanges on said walls 8, 9, 10 and 20 clamping said walls 14 and 15 and forcing said walls 14 and 15 against the baffles 11, 12 and 13. It will be understood, of course, that either of said walls 14 or 15 is made of metal where it is desired to send out the light of the luminous positive column discharge in one direction and in this case it is advantageous that the surface of the metal wall 14 or 15 facing the discharge path have a polished surface to reflect and direct the light of the positive column discharge in a desired direction. The electrodes 18 and 19

are electron emitting when heated and are heated by the gaseous electric discharge therebetween during the operation of the lamp device. Said electrodes 18 and 19 are located in extensions 16 and 17 respectively of the enclosing element and the external ends of said extensions 16 and 17 are closed by plugs of insulation material such as mica, or lavite. Said extensions 16 and 17 are formed by parts of the front and back walls 14 and 15, the side walls 8 and 10 and the baffles 11 and 13 respectively. The baffles 11, 12 and 13 are arranged in parallel planes and overlap for at least part of their length to form a tortuous discharge path between said electrodes 18 and 19. Said baffles 11 and 13 are fused to the bottom wall 20 of said enclosing element and the baffle 12 is fused to the top wall of said element. As the joints between the metal walls 8, 9, 10 and 20 and the glass walls 14 and 15 and between the metal baffles 11, 12, 13 and the glass walls 14 and 15 are mechanical joints rather than fused joints strain thereon due to their different coefficients of expansion and the uneven heating of said parts by the gaseous electric discharge between said electrodes 18 and 19 is reduced to a minimum to avoid fracturing said joints during the operation of the lamp device. The container 1 is filled with an electric discharge conducting gaseous atmosphere consisting of a rare gas, such as neon, or a mixture of gases, such as a mixture of argon and mercury vapor. The gaseous atmosphere in said container 1 flows easily through the mechanical joints of the enclosing element in said container and is present in the discharge path between said electrodes 18 and 19 at all times.

The above described lamp device is a concentrated light source of high intensity useful in the illuminating arts generally and particularly in beacon or signalling work.

While we have shown and described and have pointed out in the annexed claims certain novel features of the invention, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its use and operation may be made by those skilled in the art without departing from the broad spirit and scope of the invention, for example, all the walls of the enclosing element are made of metal net, when desired, the metal wall of the enclosing element adjacent one or both of said electrodes 18 and 19 is connected through a resistance to the electrode opposite that to which it is adjacent to act as an auxiliary electrode during the starting and operating of the lamp device and it will be understood, of course, that in such case such wall is insulated fram the other metal walls of said enclosing element, and the metal walls are of nickel, iron, or tungsten as desired.

What we claim as new and desire to secure by Letters Patent of the United States is:—

1. An electric discharge device comprising a container, electrodes sealed therein a gaseous atmosphere therein and a gas pervious element therein separate from the walls of said container and surrounding said electrodes and the positive column discharge path between said electrodes and including a plurality of baffles whereby the discharge path is caused to deviate from a straight line between said electrodes in a multiplicity of overlapping parallel paths, said baffles having a different coefficient of expansion than the other parts of said gas pervious element, the joints between said baffles and said other parts being mechanical joints.

2. An electric discharge device comprising a container, electrodes sealed therein a gaseous atmosphere therein and a gas pervious element therein separate from the walls of said container and surrounding said electrodes and the positive column discharge path between said electrodes and including a plurality of baffles in parallel planes whereby the discharge path is caused to deviate from a straight line between said electrodes in a multiplicity of overlapping parallel paths, the voltage drop in the positive column discharge being less than the value of both the anode and cathode voltage drop at said electrodes, said baffles having a different coefficient of expansion than the other parts of said gas pervious element, the joints between said baffles and said other parts being mechanical joints.

3. An electric discharge device comprising a container, electrodes sealed therein a gaseous atmosphere therein and an element therein comprising metal walls, metal baffles and glass walls, the joints between said glass and metal walls being mechanical joints, said baffles being in parallel planes and overlapping for part of their length, said element being separate from the walls of said container and surrounding said electrodes and the positive column discharge path between said electrodes whereby the discharge path is caused to deviate from a straight line between said electrodes.

MARCELLO PIRANI.
MARTIN REGER.