

Dec. 8, 1936.

C. H. BRASELTON

2,063,580

DISCHARGE LAMP FOR PRODUCING MODULATED LIGHT

Filed July 26, 1932

2 Sheets-Sheet 1

Fig. 1.

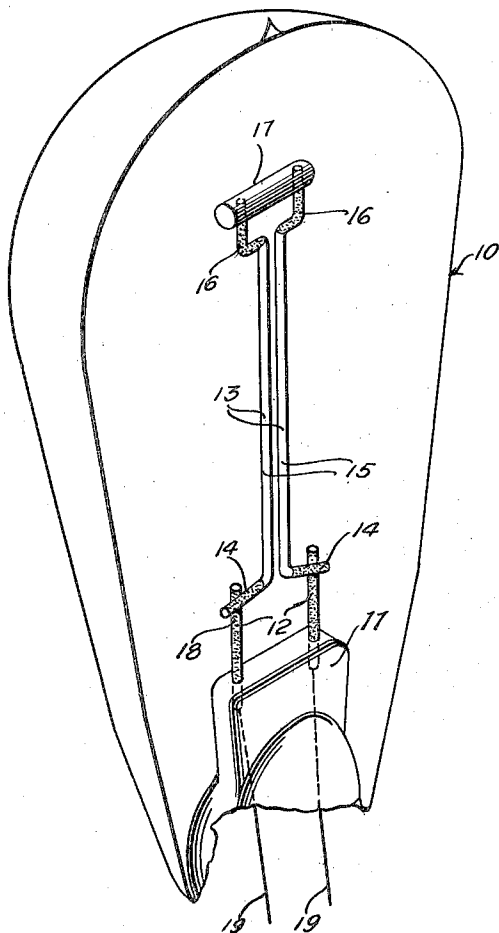


Fig. 2.

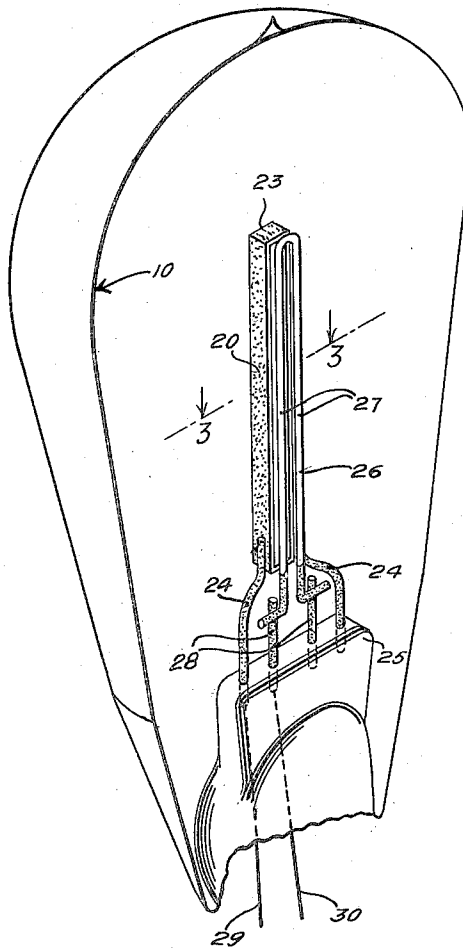
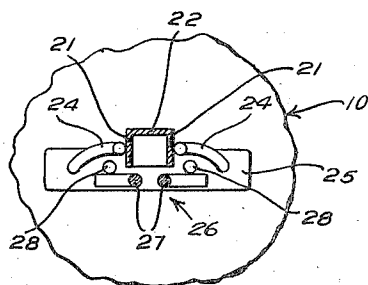


Fig. 3.



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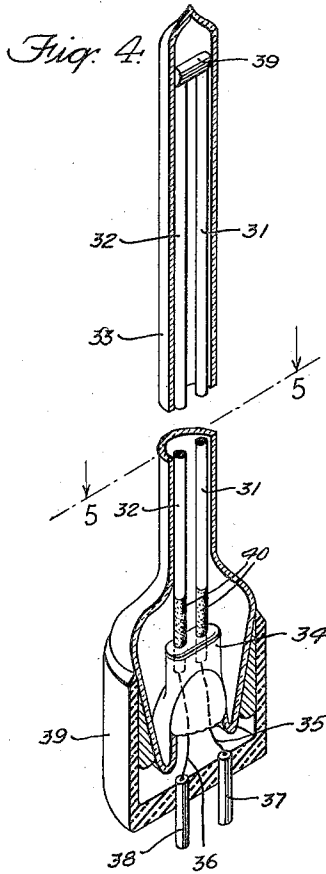
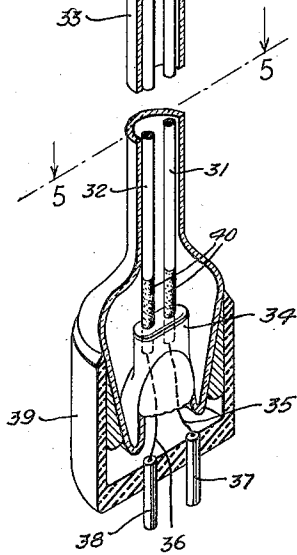
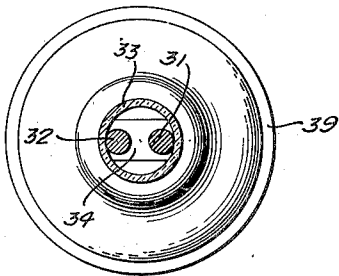
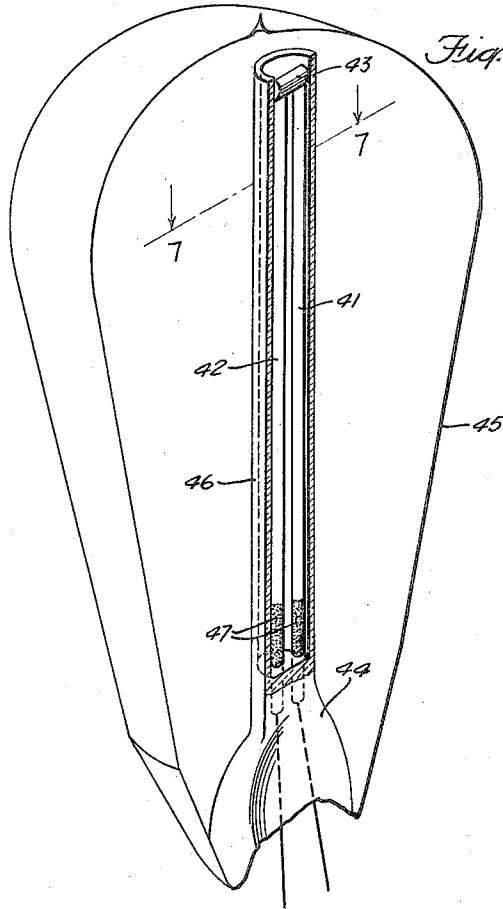
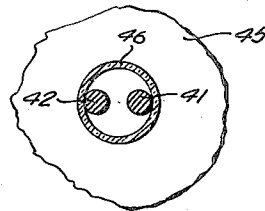
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DISCHARGE LAMP FOR PRODUCING MODULATED LIGHT

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2 Sheets-Sheet 2



INVENTOR

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## UNITED STATES PATENT OFFICE

2,063,580

DISCHARGE LAMP FOR PRODUCING  
MODULATED LIGHT

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poration of Delaware

Application July 26, 1932, Serial No. 624,722

7 Claims. (Cl. 176—122)

This invention relates to gaseous discharge lamps for producing modulated light and has for its principal object to produce a lamp having a source of brilliant white light.

Another object of the invention is to provide a lamp in which the light source takes the form of a line.

Other objects of the invention and objects relating particularly to the method of constructing and assembling the various parts of the lamp, as well as to the pressure and proportions of the various gases used, will be apparent as the description of the invention proceeds.

Several embodiments of the invention are illustrated in the accompanying drawings in which:

Fig. 1 is a perspective view partly in section of a lamp embodying the invention;

Fig. 2 is a similar perspective view of a modified form of lamp;

Fig. 3 is a sectional plan view of the elements shown in Fig. 2 and taken on the line 3—3 of that figure;

Fig. 4 is a perspective view partly in section of another embodiment of the invention;

Fig. 5 is a sectional plan view through the elements of the construction of Fig. 4;

Fig. 6 is a perspective view partly in section of still another embodiment of the invention; and

Fig. 7 is a plan view of the elements of the construction of Fig. 6.

Referring now more specifically to the drawings the invention is shown in Fig. 1 as comprising a bulb or envelope 10 of glass, quartz or other transparent material suitable for the purpose and provided with the usual intumed press 11 formed integral with the neck thereof in accordance with well known practice of making electric lamps. A pair of support rods 12 are sealed in the press 11 and to the upper ends of these rods are welded a pair of wires 13 which have outwardly bent feet 14 for attachment to the support rods 12 and straight parallel central portions 15 which are spaced a short distance apart. The wires 13 may be made of any desirable metal such as tungsten, molybdenum, tantalum, and the like, although softer metals such as copper or Monel metal may also be used. The upper ends of the wires 13 are provided with outwardly and upwardly extending portions 16 which may be sealed in a glass bead 17 for rigidly supporting the upper ends in spaced relation. Lead-in wires 19 may be connected to the lower ends of the rods 12 for making the external connections to the lamp.

The support rods 12, the feet 14, and the upper portions 16 of the rods 13 may preferably be

coated with an insulating material 18 which may be any suitable insulating material readily applied to the metal for insulating these parts from the gas surrounding them and reducing the possibility of a discharge forming thereon. Thus if I coat the parts with lamp black or carbonize them I have found that the tendency of a discharge is greatly reduced and this practice may be resorted to if desired.

The bulb 10 is filled with an ionizable gas such as neon, argon, or helium or mixtures of these gases at a pressure preferably under 5 mm. of mercury. When the lamp is connected in a circuit and a voltage in the neighborhood of 200 volts is impressed upon the lead-in wires 19 a concentrated discharge will take place between the spaced wires 13 which has a brilliant white color and forms a line of white light between the wires. This light may be easily modulated by operating the lamp in the output circuit of an amplifier whose input circuit is suitably modulated, as by the incoming signal wave of a television program or by a microphone where the recording of sound on film is contemplated.

Of course, the wires 13 may be made any desired length so that the line of light may have any desired dimension and they may also be made any desired cross section such as a square wire or a triangular wire. Also the outer surfaces of the wires may be coated with the insulating material 18 or otherwise protected against discharge so that the discharge will be concentrated between the wires rather than dissipated or spread over the outer surfaces.

In Fig. 2 another embodiment of the invention is illustrated in which the cathode 20 comprises a rectangular box-like structure having side walls 21, a rear wall 22, and end walls 23. This cathode may be made of any suitable material as mentioned above and may be supported upon two support rods 24 provided for that purpose and sealed in the press 25. The anode 26 is formed of a wire loop made if desired of a single piece of wire bent back upon itself to form two parallel sections 27 joined together at the top and with their free ends at the bottom. These free ends may be welded to two support rods 28 which may also be sealed in the press 25. The wires 27 are spaced apart with a clearance of about the width of the desired line of light and are positioned in front of the open side of the cathode which is preferably no wider than the total width of the wire loop and should be positioned about  $\frac{1}{2}$  of an inch therefrom.

A lead-in wire 29 may be connected to one of

the support rods 24 and a second lead-in wire 30 may be connected to one of the support rods 28, and when these wires are connected in a suitable circuit and with the bulb filled with the correct combination of gases, as described above, a discharge will appear inside of the box-like cathode 20 which may be observed from its front between the two wires 27. The discharge is concentrated in the center and forms a line of white light which is uniformly distributed throughout the length of the cathode and may be modulated when the lamp is suitably connected as described above.

In Fig. 4 another modification of the invention is shown in which the cathode and anode comprise rods 31 and 32 spaced in close proximity, similarly to the center portions of the rods 13, and enclosed in a tubular envelope 33 which is provided with a press 34 in which the ends of the rods 31 and 32 are sealed. Lead wires 35 and 36 may connect respectively to terminals 37 and 38 in a suitable base 39 which may be cemented to the envelope in a manner well known in the art. The upper end of the rods 31 and 32 may be connected by a bead 39 of glass or other insulating material and the lower ends adjacent the press 34 are preferably coated with insulating material 40 similar to that already described. In this case the walls of the envelope 33 are close enough to the anode and cathode to confine the discharge to a line of light.

I may prefer to use instead of the single tubular bulb illustrated in Fig. 4 a tube for confining the anode and cathode but open at the top so as to have access to a larger amount of gas. In Fig. 6 an anode and cathode comprising rods 41 and 42 are shown, similar to the anode and cathode in Fig. 4, and these rods may also be provided with a bead 43 of insulating material at the top to space the upper ends thereof. The lower ends may be sealed in the press 44 at the bottom formed integral with a relatively large envelope 45. A glass tube 46 open at its upper end and just large enough in diameter to slip over the rods 41 and 42 is fused to the press 44 and extends upwardly to a point a little above the top of the rods.

The discharge occurring between the rods 41 and 42 is confined within the tube 46 while the electrodes have access to the large amount of gas which is contained in the outer bulb 45 and little or no variation of the discharge is encountered due to absorption of gases by the electrodes. In this case also the lower ends of the rods 41 and 42 are preferably coated adjacent the press with an insulating material 47 so as to prevent the discharge occurring near enough to the press to overheat the glass.

It will be seen from the above that I have produced a discharge lamp in which the discharge takes the form of a thin line of light. But the lamp may be used either to produce a continuous light or a modulated light, as for instance that used in television apparatus or in sound-on-film recording devices, or wherever a variable light source is desirable or necessary.

Many modifications of the invention may be resorted to without departing from the spirit thereof and I do not, therefore, desire to limit myself to what has been shown and described except as such limitations occur in the appended claims.

What I claim is:

1. In a device of the class described a trough-shaped metallic cathode having closed sides and one open side, a looped anode positioned in close proximity to the open side of said cathode and conforming in contour to said cathode, and a mixture of neon and helium gases at a pressure less than five millimeters of mercury surrounding said anode and cathode, the open area of the anode being less than the area of the open side of the trough.

2. In a device of the class described a pair of conductors extending parallel to each other at a short distance apart and electrically connected together, a cathode mounted in back of said conductors and spaced slightly therefrom, a depression in said cathode, said depression being in line with the space between said conductors, and a mixture of helium and neon gases surrounding said disc and having a pressure less than five millimeters of mercury, the distance between said conductors being less than that across the cathode depression.

3. In a device of the class described a trough-shaped cathode, means to support said cathode, an anode comprising a U-shaped wire, means to support said wire in close proximity to the open side of said cathode with the space between the legs of the U in alignment with the opening in said cathode, and an ionizable gas surrounding said anode and cathode, the distance between the legs of the anode being less than across the trough of the cathode.

4. In a device of the class described a cathode, an elongated depression on one side of said cathode, an anode positioned adjacent that side of said cathode, said anode comprising two spaced apart members connected to one end with an opening therebetween which is substantially parallel with the depression in said cathode and in alignment with it, and an ionizable gas surrounding said anode and cathode, the cathode depression being uncoated and the remainder of the cathode being coated with carbon.

5. In a device of the class described a trough-shaped cathode, a looped anode spaced slightly from the face of said cathode and conforming in contour to said cathode, and a mixture of helium and an inert gas surrounding said anode and cathode, the sides and back of the cathode being carbonized, the open area of the anode being less than the open area of the cathode.

6. In a device of the class described a trough-shaped cathode, a looped anode spaced slightly from the face of said cathode and conforming in contour to the cathode, and an inert gas surrounding said anode and cathode, the looped area of the anode being less than the trough area of the cathode.

7. In a device of the class described a metal anode having an opening therethrough, a cathode having a depression therein mounted adjacent said anode with the depression in line with the opening in said anode and conforming in contour with the anode opening, and a mixture of ionizable gases surrounding said anode and cathode, the area of the opening of the anode being less than the area defined by the depression edge of the cathode.

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