Nov. 28, 1933. H. W. PARKER 1,936,854

INCANDESCENT LAMP

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Fig. 1

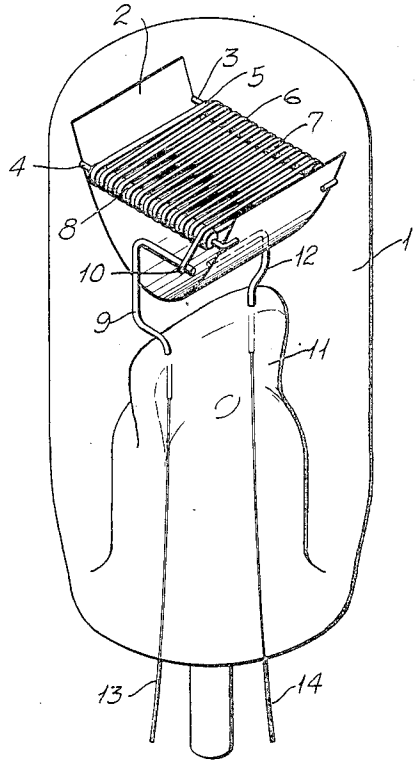
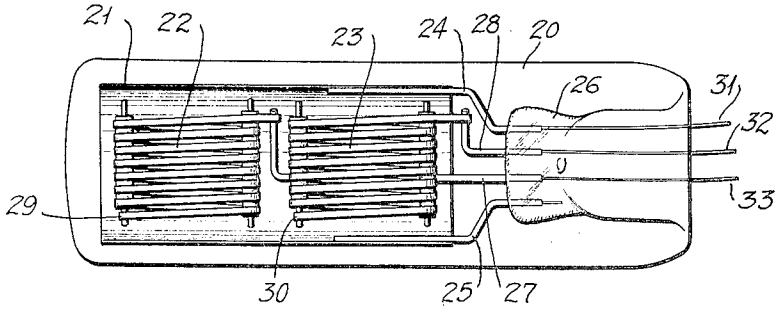


Fig. 2



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INCANDESCENT LAMP

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4 Claims. (Cl. 176—34)

My invention pertains to light sources or lamps and relates in particular to incandescent lamps.

An object of my invention comprises producing an incandescent lamp of such nature that the luminosity thereof varies in intensity with varying input energies.

Another object comprises producing an incandescent lamp in which the luminosity varies in intensity with minimum time lag, has, in other words, a high damping factor.

A further object comprises producing an incandescent lamp having a filament the degree of incandescence of which may be rapidly and visibly varied by small variations in intensity of input energy.

A still further object contemplated by my invention comprises producing an incandescent lamp, the luminosity damping factor of which is sufficiently high to follow the variations in frequency of an audio frequency current and yet have a substantial filament life.

Incandescent lamps as generally used are supplied with filaments designed to have minimum variation in luminosity with varying intensities of energy input, that the incandescence or luminosity thereof may be constant or, in other words, exhibit a low damping factor despite small or even relatively large variations in intensity of the input energy. The object desired is a constant source of lumination.

In many arts and particularly in many types of electrical equipment, as, for example, television receivers, a light source is desired the luminosity of which may be rapidly varied in intensity in accordance with the varying energy of the received electrical signal. In other words, the luminosity damping factor must be high. Incandescent lamps have hitherto been experimented with for this purpose, but the lamp in universal use for the purpose is of the type known as the glow discharge lamp or so-called neon lamp, as such lamps have been found to have a sufficiently high luminosity damping factor to be effective for the purpose.

The incandescent filament lamp has not hitherto been used for television receivers because it has been found that to achieve the required frequency response in a lamp of the filament type the filament of the lamp must have a diameter of the order of 0.0005 of an inch and it has been found that a filament of this dimension burns out in approximately four hours use due to the destruction of the filament by surface evaporation.

I have proved mathematically and verified by demonstrated test that a flat ribbon, preferably of tungsten, although molybdenum, tantalum, or platinum may also be used, having a thickness of about 0.0001 of an inch and a width of about 0.002 of an inch, thus having a surface area to volume ratio very much greater than a round wire of the same volume, has the same visible frequency response, when heated to only 1800 degrees Kelvin, as a round wire heated to 2500 degrees Kelvin. The flat ribbon filament therefore may be operated at conservative temperatures, thus insuring long useful life and still evidence the same frequency response or damping factor as a round wire heated to a degree which is prohibitive from the standpoint of useful life.

In the drawing accompanying and forming a part of this specification and in which like reference numerals designate corresponding parts throughout:

Fig. 1 is an enlarged perspective view of my improved lamp complete with enclosing envelope.

Fig. 2 is an enlarged plan view of an alternative form of my improved lamp.

Referring now particularly to Fig. 1, my improved lamp comprises in a preferred form an envelope 1, preferably of glass, provided with the usual stem and press 11 which supports standards 9 and 12. The standard 12 supports a reflector 2 preferably formed of nickel which may either be semi-circular or parabolic in form and which supports in turn, welded thereto, transverse supports 3 and 4, preferably of nickel wire. These carry, respectively, cylinders 7 and 8 of refractory insulating material and on these cylinders there is disposed in the form of a flat helical winding a tungsten, molybdenum, tantalum or platinum ribbon 6 having a thickness of less than 0.001 of an inch and a width of about 0.002 of an inch. One extremity of this metallic ribbon, as 10, is spot-welded to standard 9 and the other extremity 5 is spot-welded to one of the transverse supports 3. Electrical contact is thus made with the ribbon filament through conductor 13 and standard 9 and conductor 14, standard 12, reflector 2, and transverse support 3.

The envelope 1 is preferably exhausted, after which an attenuated atmosphere of hydrogen is placed therein. Hydrogen exerts a maximum cooling effect per atom of the contained gas and the effect of this gas is to assist in rapidly damping the filament temperature. I have found that radiation alone is fairly effective to achieve rapid damping with the flat metallic ribbon employed but the inclusion of a gas of the type of hydrogen or helium increases the damping so that greater

differentiation between varying luminosities is obtainable. While of course there are other gases which are chemically inert so far as the metallic elements within the envelope are concerned, I prefer to utilize either hydrogen or helium as with either of these gases approximately the same degree of cooling and hence luminosity damping factor may be obtained.

I prefer to employ a pressure with either helium or hydrogen of about 10 microns which corresponds in the case of hydrogen to a mean free path of one millimeter. At a pressure corresponding to a mean free path of one millimeter, hydrogen exerts a maximum cooling effect per atom of the contained gas. Further, I prefer to use hydrogen or helium as their ionization potentials is approximity 20 volts and thus eliminate the possibility of an ionization glow appearing in the tube.

I have found that utilizing a thin ribbon of tungsten having a thickness of approximately 0.0001 of an inch, and a width of 0.002 of an inch, that the area of the surface is increased with respect to volume relatively enormously and that the damping of the wire compared to a round wire of equal volume is approximately five times. I have found that a flat ribbon such as above mentioned gives a frequency response at about 1800° Kelvin equal to a round wire having equal mass when heated to 2500° Kelvin. The filament of flat ribbon thus has a useful life many times longer than the round wire. I have further found that a flat wire having the dimensions above noted has a luminosity frequency response when heated to 1800° Kelvin of the order of 2200 cycles per second, which is ample for various types of television systems.

Referring now particularly to Fig. 2, I have illustrated an alternative form of my improved lamp in which there is disposed in one enclosing envelope a pair of filaments 22 and 23. The extremities 29 and 30 of each of these filaments are spot-welded respectively to the metallic transverse supports attached to the reflector 21 and supporting the refractory cylinders of insulation material on which the filaments are mounted. The metallic reflector 21 is supoprted in the press by means of standards as 24 and 25. The free extremity of filament 22 is welded to standard 27 and provided with a terminal 33. The free extremity of filament 23 is spot-welded to standard 28 and is provided with terminal 32. A terminal 31 is provided for the reflector and the elements are all enclosed within the glass envelope 20.

As described with respect to Fig. 1, the filaments are preferably constructed of flat metallic ribbons of tungsten having a thickness of less than 0.001 of an inch and a width of about 0.002 of an inch. The envelope 20 is as hitherto described, provided preferably with a rarified atmosphere of hydrogen.

In many arts especially as hereinbefore pointed out in the art of television, it is advantageous to employ a source of light which can be rapidly varied in luminosity in accordance with the varying strength of the received television signal. Obviously, my improved lamp may be used to advantage in such systems, as a source of varying lumination having a high luminosity damping factor whereby electrical impulses of varying intensity may be rendered visible. In some instances, it may be desirable to employ a plurality of my improved filaments as shown in Fig. 2 whereby the varying strength of different electrical currents may be rendered simultaneously visible through varying luminosities of each one of the several filaments.

While I have illustrated and described two embodiments of my invention, it is to be understood that numerous changes may be made therein without departing from the spirit or narrowing the scope of my invention.

Having thus described my invention, what I claim as new and original and desire to secure by Letters Patent of the United States is as follows:

1. In an incandescent lamp, an envelope containing a rarified atmosphere of an inert gas, a press within said envelope, a reflector supported by said press and a plurality of filaments composed of a metallic ribbon disposed in the form of separate flat helices adjacent said reflector.

2. In an incandescent lamp, an envelope containing a rarified gas, a press within said envelope, a reflector supported by said press, a filament in the form of a ribbon of tungsten having a thickness not greater than 0.001 of an inch disposed in the shape of a flat helix adjacent said reflector.

3. In an incandescent lamp a substantially evacuated envelope, a press within said envelope, a pair of standards supported by said press, one of said standards supporting a plurality of members of refractory insulating material and a flat metallic ribbon wound in the form of a flat helix on said members of refractory material, the extremities of said ribbon being connected respectively to one each of said pair of standards.

4. In an incandescent lamp, an envelope containing a rarified gas, a press within said envelope, a pair of standards supported by said press, a reflector supported by one of said standards, a pair of refractory insulating members supported by said reflector and a flat metallic ribbon having a thickness not greater than 0.001 of an inch wound in the form of a flat helix on said refractory members, the extremities of said ribbon being connected respectively to one of said standards and to said reflector.

HENRY W. PARKER.