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H. KREFFT

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GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

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Fig. 1

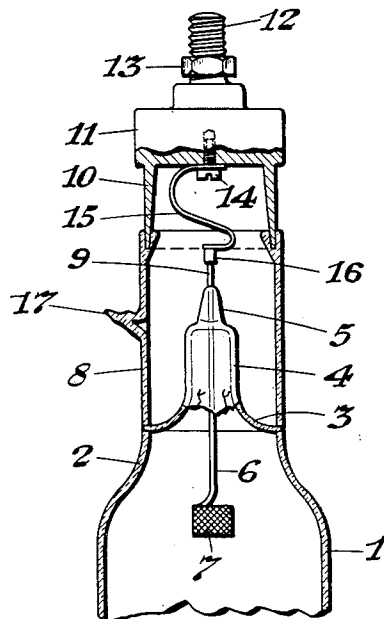


Fig. 2

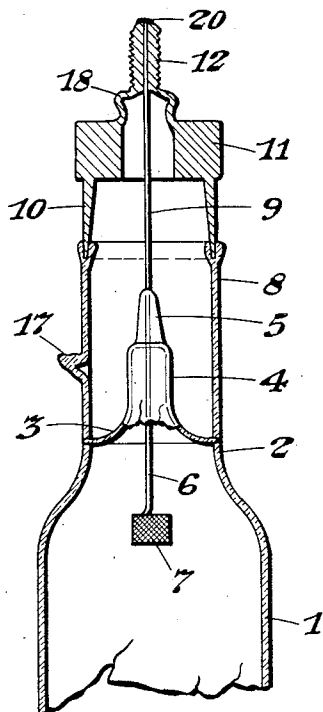
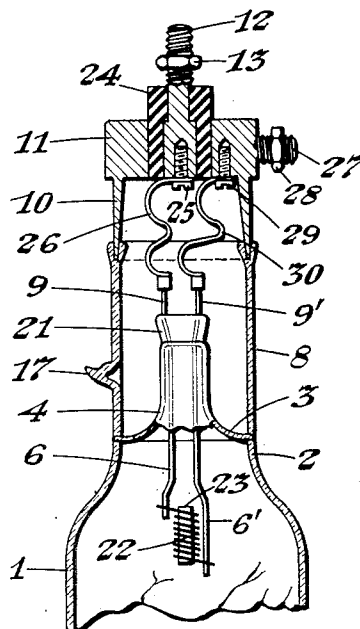


Fig. 3



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GASEOUS ELECTRIC DISCHARGE LAMP
DEVICEHermann Krefft, Berlin-Friedrichshagen, Ger-
many, assignor to General Electric Company, a
corporation of New YorkApplication August 5, 1935, Serial No. 34,811
In Germany August 10, 1934

5 Claims. (Cl. 176-126)

The present invention relates to gaseous elec-
tric discharge lamp devices generally.

I have frequently observed that the part of the
current inlead which projects outward from the
lamp vessel, is strongly oxidized by the ambient
atmosphere and that the oxide layer which forms
thereon gradually creeps forward into the her-
metic, fused joint between the respective current
inleads and the vessel, which loosens said joint
and causes gas leaks. This is apt to occur par-
ticularly when the current inleads consist of an
easily oxidizable metal, as for instance tungsten,
and if the discharge vessel and the fused joints
are at elevated temperatures of several hundred
degrees Celsius during operation of the lamp, as
is the case, for example, with electric illuminat-
ing tubes having a high pressure discharge, such
as a high pressure mercury vapor arc discharge,
or with electric illuminating tubes which contain
the vapors of metals difficult to vaporize, such as
sodium.

The object of the present invention is to provide
means whereby gas leaks caused by oxidation of
the external part of the current leads of a gaseous
electric discharge device are avoided. Still fur-
ther objects and advantages attaching to the
device and to its use and operation will be appar-
ent to those skilled in the art from the following
particular description.

Gas leaks at the fuse-in points of the current
inleads are effectively avoided when, in accord-
ance with the invention, that part of each current
inlead which projects outward from the discharge
vessel is enclosed in a hermetically sealed at-
tached vessel which is fused bluntly onto the end
part of the discharge vessel and which is evac-
uated or filled with an inert gas, which attached
vessel has one or more outwardly projecting cur-
rent connection contacts which are connected
with the enclosed current inlead or inleads. With
such a construction, those parts of the current
inlead wires which project directly from the dis-
charge vessel and which are strongly heated dur-
ing tube operation are protected from the oxidiz-
ing ambient atmosphere by the attached sealed
vessel. Oxidation of the electrical contact or
contacts on the attached vessel is not apt to occur
to a harmful extent since said contacts, being
comparatively remote from the discharge vessel
are not heated to an extremely elevated temper-
ature during the operation of the device and
because these contacts can easily be made of
metals or metal alloys which are more resistant
to oxidation than the tungsten inleads, for in-
stance chromium, nickel or brass. The relatively

large dimensioning of the contacts and the rela-
tively long distance between these and the fuse-in
points of the current inleads practically excludes
the forward growth of any oxide layer which may
form thereon, toward the fuse-in points of the
current inlead wires.

In the drawing accompanying and forming part
of this specification three embodiments of the
invention are shown, in which

Fig. 1 is a front, partly sectional, view of one
end of a gaseous electric discharge lamp embody-
ing the invention,

Fig. 2 is a similar view of another embodiment
of the invention, and

Fig. 3 is a similar view of still another embodi-
ment of the invention.

Like numbers denote like parts in all the figures.

Referring to Fig. 1 of the drawing the lamp
vessel 1, which is hermetically sealed and is filled
with desired gases, vapors or a gas-vapor mixture,
has at the end thereof a neck piece 2 which is
fused to the flared edge 3 of a stem 4. Said stem
4 has a nipple 5 which projects outward and into
which the current inlead and support-wire 6 of an
electrode 7, directly heated by the discharge, is
fused gas tight. Said electrode 7 consists of a
wound strip of metal gauze, such as tungsten
gauze, which is impregnated with an electron
emitting material, such as barium oxide. Onto
the neck part 2 a tubular glass member 8 is
bluntly fused, which member 8 concentrically
surrounds the nipple 5 and the outer part 9 of
the current inlead wire 6 which projects from
the nipple. Into the outer rim of the member 8,
the ring 10 of a metallic sealing cap 11 is fused
gas tight, which ring 10 is sharpened in wedge
shape. On this cap 11, an outwardly projecting
threaded bolt 12 is attached, which together with
a nut 13 forms a terminal contact for fastening
a current conductor. A screw 14 is affixed to the
inner wall of the cap 11, which screw serves to
fasten a spring 15 which is connected with the
thickened end 16 of the current inlead wire part
9. The connection between the cap 11 and the
current inlead wire part 9 is thus made flexible.
The attached vessel finally also has an evacuating
tube which, after the attached vessel is evacuated
and in a given case is filled with inert gas, such
as argon, is sealed off from the evacuating sys-
tem.

The embodiment of the invention shown in Fig.
2 is similar in all respects to that shown in Fig. 1
except that in this embodiment a flexible transi-
tion part 18 is provided between the cap 11 and
the outwardly projecting threaded bolt 12 so that

the threaded bolt 12 is somewhat movable in response to the force exerted thereon due to the expansion and contraction of said lead 9. The spring 15 of the embodiment shown in Fig. 1 is not necessary and the outer part 9 of the current inlead wire 6, as shown, can be lead directly through the threaded bolt 12 and can be welded thereto at the outer end 20 thereof.

In the embodiment shown in Fig. 3 the flared stem 3, 4 is provided with a pinch 21 into which two current inleads 6 and 6' are fused vacuum tight. Said leads 6 and 6' support an indirectly heated electrode consisting of a heating wire helix 22, such as a tungsten filament, wrapped around a rod 23 of electron emitting material, such as a compacted, sintered rod comprising barium oxide. The sealing cap 11, by means of a ring 10 which is sharpened wedge shaped, is again fused gas tight onto the attached member 8 which is fused to the neck part 2 of the illuminating tube vessel 1 the joint therebetween being a hermetic one. The outwardly projecting bolt 12 is set into the cap 11 by means of an electrically insulating sleeve 24. At the inner part of the threaded bolt 12 a screw 25 is affixed for fastening a spring 26 which establishes connection between the one outer current inlead wire part 9 and the connection contact consisting of the screw 12 and the nut 13. At the side of the cap 11 a second contact is provided which also consists of a projecting threaded bolt 27 and a nut 28. By means of a screw 29 and a spring 30 this second contact 27 and 28 is connected with the second outer current inlead wire part 9'. With this current inlead, as with the construction forms according to Figs. 1 and 2, the attached vessel is also provided with an evacuating tube 17 and is either evacuated or filled with an inert gas.

It will be understood that the other end of a complete lamp device made in accordance with the present invention has the same structure as the end of the lamp shown in the different figures of the drawing, when desired, and that numerous changes in the form and details of the device can be made by those skilled in the art without departing from the spirit and scope of the invention.

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

1. A base for a gaseous electric discharge lamp device, said lamp device comprising a container having a stem protruding therefrom and a current lead of easily oxidizable material sealed into said stem and projecting therefrom, said base being a hollow, hermetically sealed vessel fused to said lamp container and enclosing said stem and the part of said lead projecting outwardly therefrom, said base having an electrical contact mounted thereon at the end thereof remote from

said lamp container, the outwardly projecting part of said current lead in said base being attached to said contact, a portion of the structure comprising said lead and said base being flexible.

2. A base for a gaseous electric discharge lamp device, said lamp device comprising a container having a stem protruding therefrom and a current lead of easily oxidizable material sealed into said stem and projecting therefrom, said base being a hollow, hermetically sealed vessel fused to said lamp container and enclosing said stem and the part of said lead projecting outwardly therefrom, said base having an electrical contact mounted thereon at the end thereof remote from said lamp container, the outwardly projecting part of said current lead in said base being attached to said contact, a portion of said base between said lead and the part of said base fused to said lamp container being flexible.

3. A base for a gaseous electric discharge lamp device, said lamp device comprising a container having a stem protruding therefrom and a current lead of easily oxidizable material sealed into said stem and projecting therefrom, said base being a hollow, hermetically sealed vessel fused to said lamp container and enclosing said stem and the part of said lead projecting outwardly therefrom, said base having an electrical contact mounted thereon at the end thereof remote from said lamp container, the outwardly projecting part of said current lead in said base being attached to said contact.

4. A base for a gaseous electric discharge lamp device, said lamp device comprising a container having a stem protruding therefrom and a current lead of easily oxidizable material sealed into said stem and projecting therefrom, said base being a hollow, hermetically sealed vessel fused to said lamp container and enclosing said stem and the part of said lead projecting outwardly therefrom, said base having an electrical contact mounted thereon at the end thereof remote from said lamp container, the outwardly projecting part of said current lead in said base being flexible and being attached to said contact.

5. A base for a gaseous electric discharge lamp device, said lamp device comprising a container having a stem protruding therefrom and a current lead of easily oxidizable material sealed into said stem and projecting therefrom, said base being a hollow, evacuated, hermetically sealed vessel fused to said lamp container and enclosing said stem and the part of said lead projecting outwardly therefrom, said base having an electrical contact mounted thereon at the end thereof remote from said lamp container, the outwardly projecting part of the current lead of said lamp in said base being attached to said contact.

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