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E. BRÜCHE

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ELECTRON DISCHARGE DEVICE

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Fig. 1

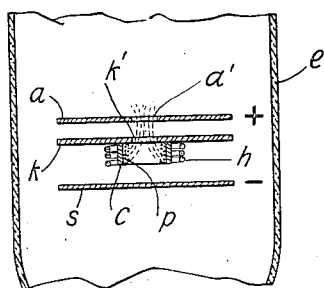


Fig. 2

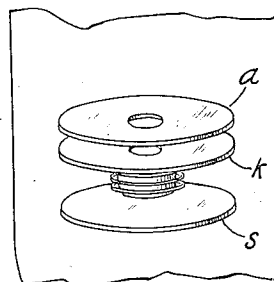
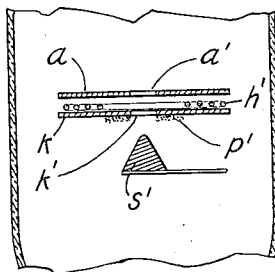


Fig. 3



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ELECTRON DISCHARGE DEVICE

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3 Claims. (Cl. 250—27.5)

My invention relates to electron discharge de-
vices of the gas type, more particularly to im-
provements in oxide coated cathodes therefor.

The conventional type of oxide-cathode mount-
ed in gas discharge tubes may have the oxide
coating destroyed as a result of the impact of
positive ions. Two methods have been employed
to prevent this result. One is to apply the oxide
material upon a wire in the axis of the path of
the electron stream or beam, while according
to the other method the cathode surface bear-
ing the oxide is positioned annularly about the
beam of reversely flowing ions. In the second
case, in more detail, a flat band or strip is dis-
posed around the axis of the electron beam or
rays, or a small pot or cup may be positioned in
the path of the rays so that the lateral surfaces
or walls thereof will no longer be struck by the
ions.

The principal object of my invention is to pro-
vide an improved type of oxide coated cathode
for gaseous discharge devices.

According to the present invention the oxide
coating on the cathode is more effectively shield-
ed from the impacts of positive ions than in con-
ventional type tubes. The oxide substance is
placed upon the face of the cathode sheet or strip
turned away from the anode. The lines of force
passing from the anode to the cathode sheet at-
tract the electrons in the path of the ray or
beam and guide the same to the anode. Accord-
ing to the invention, apart from excellent protec-
tion of the oxide, it is possible to use various
types of planar cathodes known in the art which
may have the form of sheets or laminae either
heated directly or indirectly.

The novel features which I believe to be char-
acteristic of my invention are set forth with
particularity in the appended claims, but the in-
vention itself will best be understood by refer-
ence to the following description taken in con-
nection with the accompanying drawing in which
Figure 1 is a schematic vertical section of an
electron discharge device embodying my inven-
tion; Figure 2 is a perspective of the electron
discharge device shown in Figure 1; and Figure 3
is a schematic vertical section of a modification
of the electron discharge device shown in Figure 1
and embodying my invention.

Referring to Figure 1 the electron discharge de-
vice has an envelope *e* containing an anode or
plate *a* provided with aperture *a'* and the control
sheet *s*, the anode and control sheet being on op-
posite sides of cathode *k*. On the face of the
cathode *k* turned away from the anode is a cyl-

inder or sleeve *c* secured concentrically about
the aperture *k'* in the cathode sheet, the inner
surface of said cylinder being coated with oxide
at *p*. The radius of the cylinder is larger than
that of the hole and is surrounded by heater *h*.
The lines of force act, as shown, thru the cathode
sheet and draw the electrons out. The cathode
could also be provided with several holes around
which oxide material is disposed. Of course, op-
posite each of such holes must be a corresponding
one in the anode.

In the modification in Figure 3 the oxide *p'*
of the cathode *k* is here applied or coated directly
upon the posterior face of the cathode sheet *k*.
The small metal block *s'* serves as a control sheet.
A heater *h'* is provided.

While I have indicated the preferred embodi-
ments of my invention of which I am now aware
and have also indicated only one specific applica-
tion for which my invention may be employed, it
will be apparent that my invention is by no means
limited to the exact forms illustrated or the use
indicated, but that many variations may be made
in the particular structure used and the purpose
for which it is employed without departing from
the scope of my invention as set forth in the ap-
pended claims.

What I claim as new is:—

1. A gas discharge device having an envelope
containing an anode and a cathode, said cathode
being formed of sheet material and provided with
an aperture, said anode being positioned on one
side of said cathode and a cylinder mounted on
the other side of said cathode at right angles to
the cathode sheet and around said aperture, and
an oxide coating on the inner surface of said
cylinder.

2. A gas discharge device having an envelope
containing a flat cathode provided with an aper-
ture, a flat anode positioned on one side of and
parallel to said cathode, an oxide coating provided
on the opposite side of said cathode from said
anode, means for heating said cathode and a con-
trol electrode positioned on the coated side of
said cathode.

3. A gas discharge device having an envelope
containing a flat disc-like cathode provided with
a single aperture, a flat disc-like anode positioned
on one side of and parallel to said cathode, an
oxide coating disposed on said cathode on the
opposite side of said anode, means for heating
said cathode, and a control electrode positioned
on the same side of said cathode as said oxide
coating.

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