

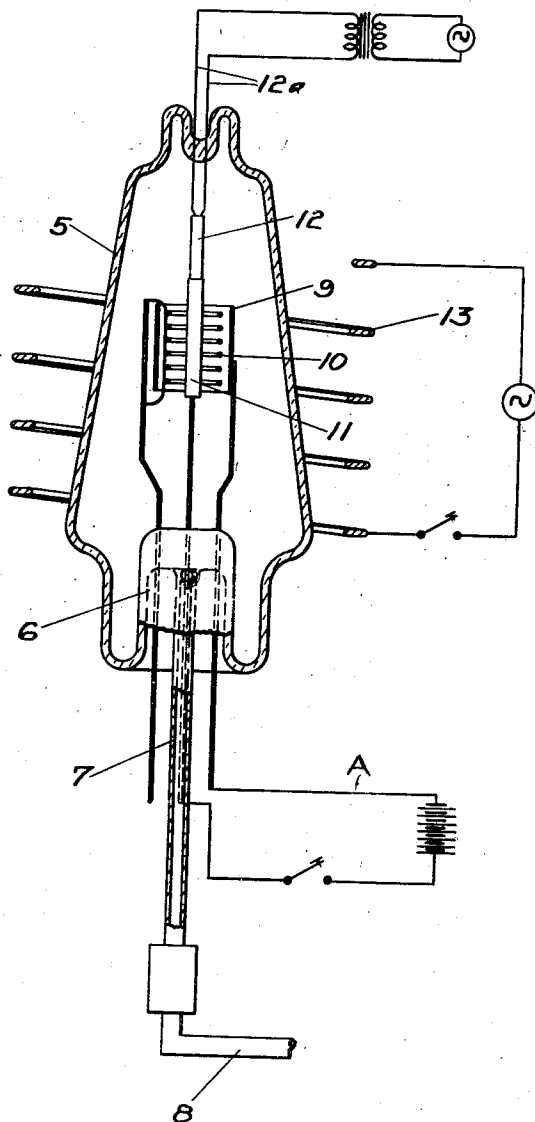
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METHOD OF DEGASIFYING RADIO TUBES

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METHOD OF DEGASIFYING RADIOTUBES.

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This invention is for a method of pumping vacuum or radio tubes of the type having a cylindrical cathode.

In co-pending applications, I have shown a radio tube having a cylindrical cathode carried on a heater element in the form of a porcelain rod in which is a resistance heater. This cathode is generally coated to give high emission at relatively low temperatures.

In de-gasifying the usual type of tube, in which the cathode is of the filament type, in which there is a materially smaller emitting surface than in the tube as above described having the full cylindrical cathode, the tube, after being connected on the pump and baked for the necessary period of time, has its cathode heated by the application of the filament voltage, after which a plate voltage is applied to the tube. With the plate voltage on, the "oscillator" is energized, that is, the radio frequency coil surrounding the tube in the pumping apparatus is energized, and this is continued until the tube clears.

Such a process when applied to tubes of the cylindrical cathode type, where the size and capacity is so much greater than with the usual filament type cathode tube, the plate current arcs over upon the oscillator being energized, disintegrating and vaporizing or melting the high emission coating on the cathode and the cathode itself.

The object of the present invention is to provide a method of de-gasifying a tube of the cylindrical cathode type efficiently and without injury to the cathode or the coating thereon.

In the drawing, I have illustrated a partially completed tube of the general type to which the present invention relates.

In the drawing, which is in general a vertical section, 5 is the envelope of the tube having a base stem 6 in which is the sealing tube 7 that connects with the vacuum or exhausting line 8. In the tube is a plate 9, a grid 10, and a cathode 11 carried on a heater element 12. A radio frequency coil 13 surrounds the tube when it is being pumped. This coil is in a suitable high frequency circuit.

After being connected with the pump line for the desired period during which the tube may be baked, the baking is discontinued and a voltage is applied to wires 12^a leading to the heater, raising the temperature

of the heater and driving out the contained gases. After the heater has been energized for a few seconds, until it has been brought to the glowing temperature, the external coil is energized, or, as expressed in the art, the oscillator is applied until the tube has cleared up and before any potential is put on the tube. By "clearing up" I mean that time when the glow in the tube has practically vanished. Then the radio frequency current is shut down, and with the heater still in operation, the plate voltage is applied, and this is applied until the tube again clears up.

As the tube is quite highly evacuated before the plate voltage is applied, and as this is done after the oscillator is shut down, the impedance of the tube when the plate voltage is applied is such that arcing between the plate and cathode will not occur.

As it was heretofore considered necessary to apply the plate voltage while the oscillator was operating, and as such operation with cylindrical cathode tubes frequently resulted in arcing, with injury to the cathode, it will be seen that the present process is a distinct departure therefrom, and at the same time one which gives equally good results, so far as driving out gas is concerned, as does the former method and without damage to the cathode.

In the drawing, A designates diagrammatically the plate voltage circuit.

It will be evident that the drawing is referred to by way of illustration and without limiting the invention to any particular construction. When the evacuation of the tube is completed, the tube is sealed off by closing sealing tube 7 in a manner familiar to those skilled in the art.

I claim as my invention:

1. A method of de-gasifying electron tubes having low temperature high emission sheet metal cathodes which includes the steps of connecting the tube in a pumping system, baking the tube, heating the cathode by energizing its heater from a source of alternating current, applying an oscillating field to the tube while the cathode remains heated, shutting off the oscillating field, applying a plate voltage to the tube while the cathode remains heated, and after the oscillating field has been shut down, and then sealing off the tube.

2. A method of de-gasifying an electron tube having a low temperature high emission

cylindrical cathode and a heater therefor which includes the steps of connecting the tube in a pumping system, baking the tube, energizing the cathode heater, applying an
5 oscillating field to the tube while the cathode heater remains energized and until the tube clears, then shutting down the oscillating field and keeping the heater energized, then applying a plate voltage until
10 the tube again clears, and then sealing off the tube.

3. A method of degasifying an electron tube having a gas absorbent cathode heater and a sheet metal cathode supported on the

heater which includes the steps of connect- 15
ing the tube to a pumping system, energizing the cathode heater to drive out absorbed gases, applying an oscillating field to the tube while the cathode heater remains energized and until the heater has been sub- 20
stantially degasified, then cutting off the oscillating field while keeping the heater energized, then applying a plate voltage until the tube clears, and sealing off the tube.

In testimony whereof I hereunto affix my 25
signature.

FREDERICK S. McCULLOUGH.