

Aug. 29, 1933.

B WIENECKE

1,924,266

PROCESS FOR INTERRUPTING CONNECTIONS IN VACUUM VALVES

Filed Oct. 24, 1928

2 Sheets-Sheet 1

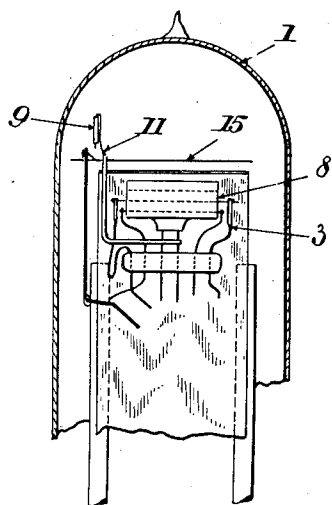


Fig. 2.

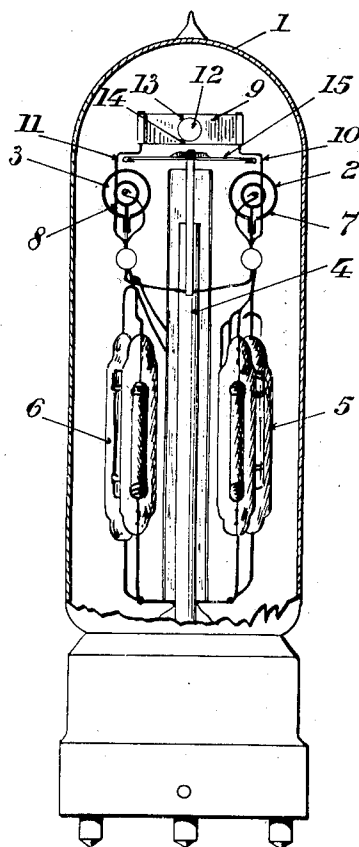


Fig. 1.

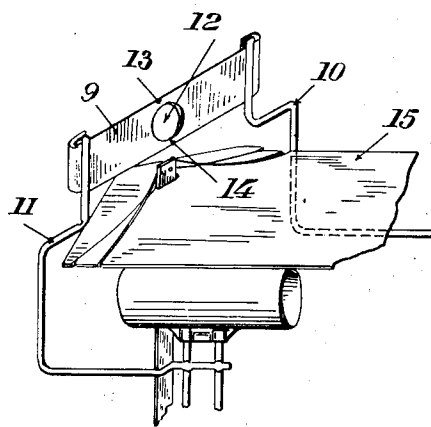


Fig. 3.

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2 Sheets-Sheet 2

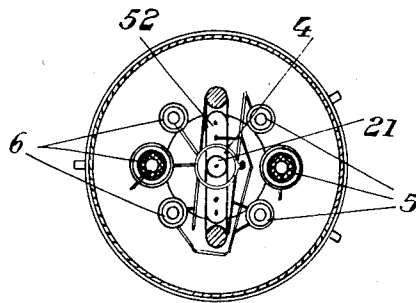


Fig. 4.

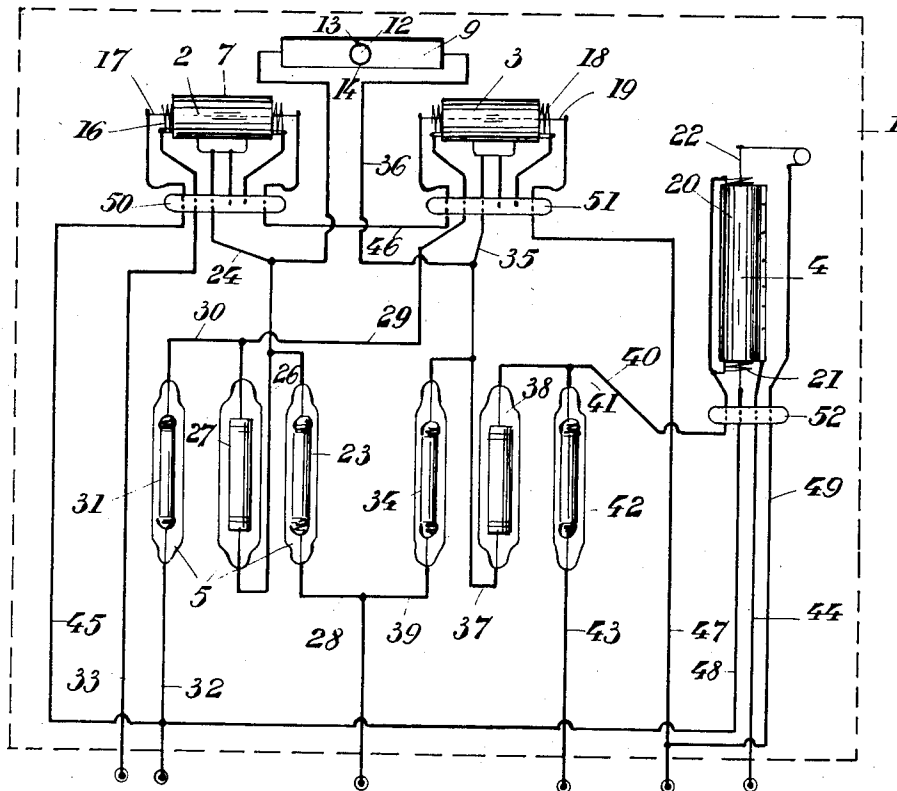


Fig. 5.

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UNITED STATES PATENT OFFICE

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PROCESS FOR INTERRUPTING CONNECTIONS IN VACUUM VALVES

Bruno Wienecke, Berlin, Germany

Application October 24, 1928, Serial No. 314,671,
and in Germany October 29, 1927

5 Claims. (Cl. 250—27.5)

My invention relates to a method of severing connections in thermionic valves and the like and to an arrangement for carrying out such a method.

In operating with thermionic valves, and more particularly in manufacturing such valves, it is often necessary after the completion of the valves to sever certain conductive connections present within the envelopes of the valves. The invention relates to a method of effecting such severing. The problem which forms the basis for the invention may be solved by making the connection with a thin wire which is caused to melt by means of a current passed through it for the purpose. The leads through the glass wall of the valve that are necessary, however, do not generally exist from the outset. If special leads are provided which are required merely once for the purpose of such melting and otherwise are not used, such leads are subsequently during the whole life of the valve a source of interference in electrical respects or may cause confusion.

According to my invention the lead to be severed is given the form of a thin metal tape which at suitable places is provided with one or several sufficiently large holes, the cross section at the places in question thus becoming very small. Such portions of reduced cross-section may by means of an alternating electro-magnetic field, produced in the neighbourhood of the valve, be caused to evaporate or disperse. In this connection the metal tape to be severed is provided of such dimensions and the disposition of the alternating current field is such that in the metal tape eddy currents are generated of such intensity that at the place of the severing the evaporation and/or dispersal temperature is reached.

The necessity of severing conductive connections may occur in various respects. During the process of evacuation it may, for instance, be desirable for certain metal parts to be conductively connected with one another which in the finished valve need no longer be connected or even must not be connected.

It is, for instance, frequently desirable for obtaining a good vacuum that all metal elements inside the envelope should be brought during the process of evacuation, to an increased temperature. For increasing the temperature of such conductor elements it may be desirable to connect some of the conductor parts in such a manner as to secure good conductivity both for electric currents and heat. This is explained

particularly by reference to an example of construction and in connection with a multiple valve represented in the accompanying drawings, by way of example.

Fig. 1 shows the valve in front view the glass bulb being partly broken away.

Fig. 2 shows in a side view the upper portion of the valve represented in Fig. 1.

Fig. 3 shows in perspective the connecting bridge according to the invention on a larger scale.

Fig. 4 shows the parts 4, 5 and 6 in section taken on a horizontal plane.

Fig. 5 is a development of Fig. 1, showing more clearly the connection between the singular electrodes.

In the figure 1 means the glass bulb containing the two electrode systems 2 and 3, the third electrode system 4 and the coupling elements, each united to groups 5 and 6.

The construction of the electrode systems 2, 3 and 4 is to be seen in detail in Fig. 5. The electrode system 2 consists of the anode 7, the grid 16, the cathode 17. In a similar way the electrode system 3 consists of the anode 8, the grid 18, the cathode 19, whilst the electrode system 4 possesses the anode 20, the grid 21 and the cathode 22.

The anodes 7 and 8 of systems 2 and 3 are connected by a bridge 9—preferably of magnesium, for instance a piece of magnesium foil—in such a manner that anode 7 is in conductive connection with holder 10, anode 8 with holder 11, whilst between the holders 10 and 11 the bridge 9 is arranged. This bridge shows a circular hole 12 which may be easily produced by punching, and the severing of the metal may take place in the metal narrows 13 and 14.

A piece of mica sheet 15 is screen-like arranged between the bridge 9 on the one hand and the three electrode systems 2, 3 and 4 on the other hand.

During the evacuation of gas by the anodes the connection between the anodes 2 and 3 is useful; if, however, after the completion of the valve the connection is to be severed, a coil carrying alternating current is placed round the valve. After continuance of the high frequency currents, for a short period, the bridge 9 is severed at the points 13 and 14. As compared with other possibilities of severing the dispersal of the magnesium has the special advantage that whilst the valve is not impaired, the vacuum is even improved.

The screen 15 ensures that during the dis-

persal of the magnesium no metallic precipitations take place on the electrode carriers serving for insulation.

The further connection of the illustrated multiple valve is to be seen in Figs. 4 and 5.

The group 5 of the coupling elements contains the anode resistance 23 connected by the leading wire 24 with the anode 7 of the electrode system 2, by means of leading wire 25 with the bridge 9, by means of wire 26 with the grid condenser 27, whilst at the other end of the anode resistance 23 a leading wire 28 is provided for the outset. The other electrode of the grid condenser 27 is connected by means of wire 29 with the grid 18 of electrode system 3 and by means of wire 30 with the grid-leak 31. The free end of the latter is provided with a wire 32 for the outset. The input circuit is connected with the wire 32 and a wire 33 leading to the input grid 16.

The group 6 of the coupling elements contains the anode resistance 34 connected by the leading wire 35 with the anode 8 of the electrode system 3, by means of the leading wire 36 with the bridge 9, by means of wire 37 with the grid condenser 38, whilst at the other end of the anode resistance 34 a leading wire 39 is provided for the outset. The other electrode of the grid condenser 38 is connected by means of wire 40 with the grid 21 of electrode system 4 and by means of wire 41 with the grid-leak 42. The free end of the latter is provided with a wire 43 for the outset. The output circuit is connected with the anode 20 by means of wire 44.

The heating circuit for the cathodes 17 and 19 consists of the leading wire 45, the cathode 17, the connecting wire 46, the cathode 19 and the leading wire 47. Therefore, the cathodes 17 and 19 are connected in series. To the heating filament 22 the heating current is led by means of wires 48 and 49.

Furthermore, the glass rods 50, 51 and 52 are provided for holding the electrode systems 2, 3 and 4.

My invention is not limited to the severing of conductive connections. In certain circumstances it may be useful to remove non-conductors existing within a vacuum vessel. This may also be effected by the invention—for instance by the non-conductor in question being first secured by metallic holders, such as magnesium bridges from which it is subsequently freed by eddy current evaporation.

I claim:

1. In an evacuated vessel, metallic electrodes, a metallic sheet connecting said electrodes, said metallic sheet having a hole in its middle part for being severed by eddy currents induced in said metallic sheet from outside.

2. In an evacuated vessel, metallic electrodes, a thin sheet of magnesium connecting said electrodes, said sheet of magnesium having a hole in its middle part for being severed by eddy currents induced in said magnesium sheet from outside.

3. In an evacuated vessel, metallic electrodes, a thin sheet of magnesium connecting said electrodes, said thin sheet of magnesium having a circular hole the centre of which coincides, as far as possible, with the point of intersection of the diagonals of the surface of said sheet, in order that said sheet may be severed by eddy currents induced from outside.

4. A thermionic valve comprising several systems of electrodes, a thin sheet of magnesium connecting corresponding electrodes of different systems, said magnesium sheet having a hole in order to form a quite narrow portion in the sheet of magnesium.

5. A thermionic valve comprising several systems of electrodes, a thin sheet of magnesium connecting the anodes of different systems, said magnesium sheet having a hole in order to form a quite narrow portion in the sheet of magnesium.

BRUNO WIENECKE.

45	120
50	125
55	130
60	135
65	140
70	145
75	150