Oct. 25, 1949. H. SAUCET 2,486,065

LEAD-IN STRUCTURE FOR VACUUM TUBES

Filed July 16, 1946

FIG. 2

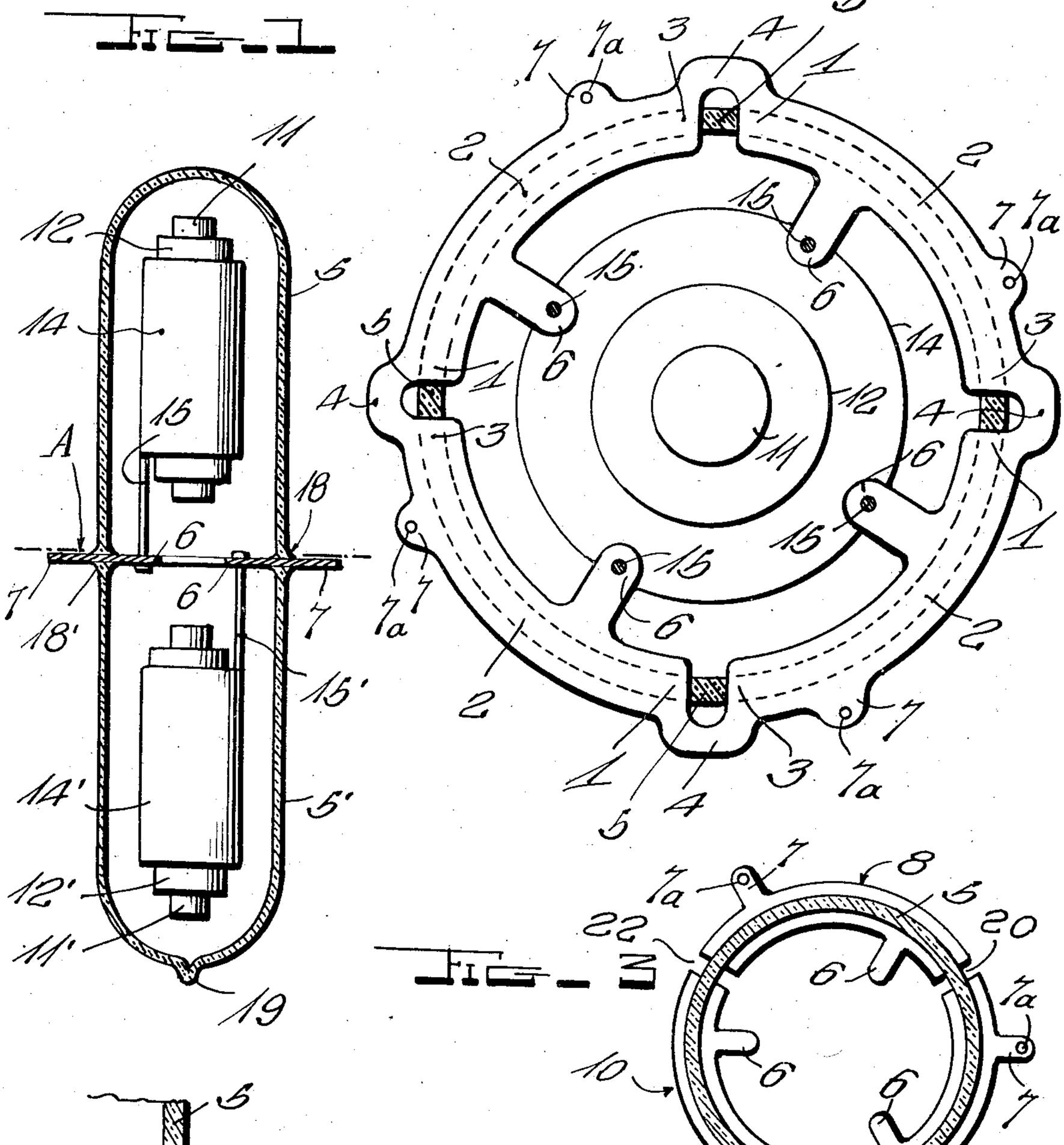

FIG. 3

FIG. 4

INVENTOR.
HENRI SAUCET,
BY
John B. Brady
ATTORNEY

Patented Oct. 25, 1949

2,486,065

UNITED STATES PATENT OFFICE

2,486,065

LEAD-IN STRUCTURE FOR VACUUM TUBES

Henri Saucet, Paris, France, assignor to Societe Francaise Radio-Electrique, a corporation of France

Application July 16, 1946, Serial No. 684,054
In France April 24, 1944

Section 1, Public Law 690, August 8, 1946
Patent expires April 24, 1964

3 Claims. (Cl. 250—27.5)

1

This invention relates to a method for closing vacuum tubes by means of sealed joints.

Vacuum tubes are generally closed by means of an annular weld which connects a base to a bulb.

The present invention concerns a method which permits of closing a vacuum tube, even of a high power, without necessitating first the making of a base. The principle of the method consists in interposing between the glass portions to be united, a metallic, annular and perforated disk, the continuity of which is insured by lugs; in heating this disk in a high frequency oven at a temperature high enough for fusing the glass and thus achieve the soldering; finally, in eliminating or severing the lugs so as to obtain, in the glass container of the vacuum tube, several metallic isolated sectors which may be used as lead-in connections for the electrodes or for the fixation of the tube. My invention will be more readily understoood by reference to the accompanying drawings, in which:

Figure 1 diagrammatically shows one form of vacuum tube constructed in accordance with my improved method;

Fig. 2 is an enlarged horizontal plan view of the disk assembly employed for supporting the tube electrodes prior to the severance of the disk into sectors for forming the connecting means for the several electrodes, the view being taken looking down on the disk assembly in the direction of the arrow A in Fig. 1;

Fig. 3 is a schematic illustration showing the principle involved in severing a disk in a tube constructed similar to the tube of Fig. 2, but including a smaller number of inwardly directed supporting lug members, into sectors for providing electrical connections for the electrodes within the tube; and

Fig. 4 shows one manner of establishing electrical connection with the lugs extending from the sectors formed by the disk.

In Figure 1, I have illustrated a multiple valve comprising a pair of two electrode valves assembled in cup-like containers disposed end-to-end on the disk assembly which unites or couples the enclosing envelope. While I have illustrated the invention in connection with two electrode valves it will be understood that the method and principles of my invention are readily applicable to multiple electrode valves and that the disclosure herein is simply for illustrative purposes in explaining the principles employed in the method of apparatus of my invention.

Fig. 2 gives, by way of nonlimitative example, as regards the number, form and arrangement

2

of the individual elements, an embodiment according to the invention. The metallic, perforated disk, made of a metal having the same dilatation coefficient as glass (for example, a composition comprising 54% of iron, 23% of nickel and 17% of cobalt; or a composition such as ferrochromium, etc. . . .) is interposed between the glass parts to be united along rimming portions 1, 2, 3, separated by as many intervals void of metal 1, 3, the continuity of the disk being insured by metallic lugs 4. During the heating of the metal, the fusion of glass is effected either through contact in intervals 1, 2, 3, or through radiation in intervals 1, 3, where lugs 4 happen to be at a higher temperature than the remainder of the disk, for they are situated in a more intense high frequency field and are not cooled by the contact of glass. During the welding operation, glass flows into the intervals 1, 3, where a small empty space exists between the two glass parts to be united, and the void is progressively filled in from 1 towards 3, from 3 towards 1, and from the exterior towards the interior. When the soldering is finished, the lugs 4 are mechanically removed, or severed and there is obtained an assembly of several metallic sectors which are substantially welded in the glass container of the vacuum tube and electrically insulated. The whole has then an appearance similar to that schematically represented in Fig. 3, in which the disk assembly is divided into sectors represented at 8, 9 and 10 by clipping off the exceess of the projections constituted by lugs 4. Thus, the sectors form separate electrical buses or connectors leading to the electrodes interiorly of the tube.

In the embodiments of my invention as illustrated in Figs. 1 and 2 the tube electrodes have been illustrated generally at 11, 12, and 14. These electrodes have been illustrated generally in elevation in Fig. 1 and in the particular assembly shown constitute a heater 11, an electron emitter 12, and a plate electrode 14. These electrodes are supported and electrically connected with the metallic lug 6 by wire supports represented at 15 which may be bent to shape in providing the required mechanical support and electrical connection to the several electrodes.

It appears, quite obviously, that the method according to the invention permits of eliminating the conventional base of the valve and replacing it by a cup 5 (Fig. 1) serving only as container, by utilizing every metallic sector as lead-in connection for the current and mounting all the electrodes on metallic lugs 6 (see Fig. 2). The same method permits also of eliminating the

socket and the fixation of the tube in the set, by utilizing the lugs 7 (Fig. 2) which may, for instance, be pierced with a hole 7a receiving a screw, or be folded in order to insert between two clips 16 and 17, as illustrated in Fig. 4.

In the assembly view illustrated in Fig. 1 I have shown one cup-shaped closure container 5 extending upwardly from the horizontally extending disk assembly for housing one set of tube electrodes. A similar cup-shaped closure container 5' depends downwardly from the disk assembly and serves to house the set of electrodes represented at 11', 12' and 14', corresponding to the electrodes 11, 12 and 14 within container 5. The two tubes are exhausted through the sealing off connection represented at 19. The depending support 15' is representative of the supporting and electrical connecting members which extend from the inwardly directed metallic lugs 6 for mounting the second set of electrodes within the envelope of the tube. I have represented the welded connection of the envelope 5 with the horizontally extending disk assembly at 18. I have similarly represented the welded connection of tubular envelope 5' with the horizontally extending disk member by the annular weld 18'.

It will be understood that Fig. 3 represents the arrangement of three connecting sectors after severance of the external portions of lugs 4 leaving an insulation gap 20, 21 and 22 therebetween. For purposes of explaining my invention Fig. 3 illustrates only three such sectors; although the form of my invention shown in Fig. 2 when ultimately completed for use would provide for four such sectors. Thus, in the arrangement in Fig. 2 electrical connections to opposite ends of the heater electrode, and a connection to a cathode electrode, and a connection to an anode, may be provided. In the more restricted arrangement of Fig. 3, connections will be provided for opposite ends of a heater electrode, or cathode, and for an anode. Any combination of electrodes may readily be provided for by simply increasing the number of sectors in the disk or annular ring assembly.

For the utilization of the valve on short waves, the lugs 7 (Fig. 2) will be preferably disposed opposite to the lugs 6, so as to have a minimum length at the outlet. The lugs may also be covered with a conductive metal, such as copper, silver, gold, etc. . . . e. g. through electrolytic means; likewise, it is also possible to silver the entire ring before the closing.

In addition, it will be understood that the same vacuum tube may include several rings according to the invention located at different levels or spaced from each other longitudinally of the tube.

What I claim is:

1. A vacuum tube comprising a relatively flat annular conductor having a plurality of radial slots disposed therein with outwardly projecting lugs adjacent said slots, inwardly extending lugs connected with said flat annular conductor, an electrode assembly having the electrodes thereof

mechanically supported and electrically connected with said inwardly extending lugs, an enclosing container enveloping said electrode assembly and connected with said flat annular conductor and radially disposed lugs connected with the flat annular conductor intermediate the radially disposed slots therein forming electrical connections to the electrodes of the electrode assembly within said container, the projecting lugs on said conductor adjacent the slots therein being severable for isolating said conductor into electrically connecting segments.

2. A vacuum tube system comprising an electrically conducting flat peripheral member, electrically conducting tongues extending radially inward from said member, electrically conducting lugs projecting radially outwardly from said member, there being radially disposed slots interiorly of said member and having offset projecting lugs radially aligned therewith, an electrode assembly having electrodes supported by said inwardly directed tongues, and an envelope enclosing said electrode assembly and peripherally connected with said electrically conducting flat peripheral member, the offset projecting portions of said peripheral member being severable for providing independent sectors electrically connecting said electrodes.

3. A multiple vacuum tube structure, comprising a central flat ring member having inwardly extending radially directed tongues thereon and outwardly extending projections intermediate the said tongues, the projections being partially slotted adjacent the inner portions of said flat ring member in alignment with each of the outwardly extending projections, electrode assemblies supported by said tongues and extending in opposite directions with respect to said flat ring member, envelopes enclosing said electrode assemblies and welded on opposite faces of said flat ring member with the material thereof extending between the partial slotted portions of said flat ring member adjacent the outwardly extending projections, said outwardly extending projections being severable externally of said envelopes forming isolated sectors in said flat ring member where each of said sectors provides electrical connection means for electrodes of the electrode assemblies within said tube.

HENRI SAUCET.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,976,391	Foster	Oct. 9, 1934
2,030,187	Salzberg	Feb. 11, 1936
2,037,231	Heintz	Apr. 14, 1936
2,203,249	Bohme	June 4, 1940
2,339,402	Herzog	Jan. 18, 1944
2,395,043	Goodchild	Feb. 19, 1946