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GETTER TAB FOR VACUUM TUBES

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Fig. 1.

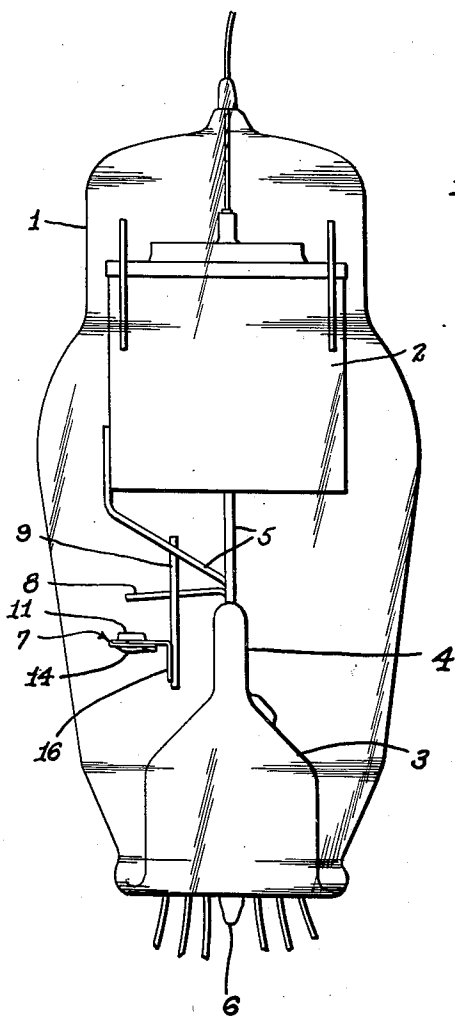


Fig. 2.

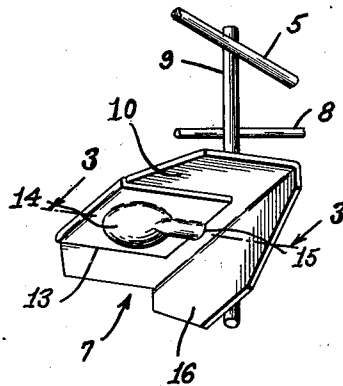
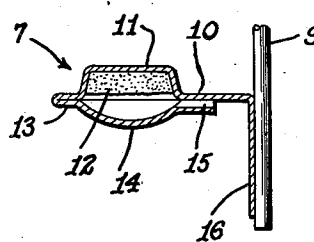


Fig. 3.



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GETTER TAB FOR VACUUM TUBES

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4 Claims. (Cl. 250—27.5)

This invention relates to a getter tab for vacuum tubes, such as electron discharge devices and the like.

In tubes of the above type which are exhausted of air during the manufacture thereof, it is the usual practice to vaporize a small quantity of a gettering agent, such as magnesium or barium, within said tube in order to clean up residual gases and produce a high vacuum. Also it is desirable to deposit some of the gettering material in active form on the interior walls of the tube so that it may clean up deleterious gases which may be given off from the various parts within the tube during the life thereof. If the vaporized getter condenses on the wall of the envelope in too great a concentration, there is a tendency for the condensed metal to peel off from the wall, producing what is called a blister. This produces various disadvantages, including unsightly appearance and possible presence of undesirable loose particles of metal within the tube.

An object of this invention is to devise a getter-supporting structure which increases the time that the vaporized getter remains in the vapor state, thus increasing the initial gettering action.

Another object is to disperse the vaporized getter over a larger area of interior wall surface so as to avoid any excess concentration at any one point, in this way substantially eliminating the possibility of blisters forming.

A still further object is to disperse the getter in active form over a relatively extended interior wall portion, whereby a greater area thereof is exposed to gases given off during life, and therefore increases the gettering action under these conditions.

The foregoing and other objects of my invention will be best understood from the following description of an exemplification thereof, reference being had to the accompanying drawing, wherein:

Fig. 1 shows an electron discharge device with a getter tab assembly incorporating my invention;

Fig. 2 is an enlarged detailed perspective view of the getter tab assembly shown in Fig. 1; and

Fig. 3 is a cross-section taken along line 3—3 of Fig. 2.

In the specific embodiment illustrated, the electron discharge devices consist of a sealed envelope 1 enclosing an electron assembly 2 supported from a reentrant stem 3 within the envelope 1. The stem 3 carries the usual press 4 at its upper end through which a plurality of

lead-in and electrode-supporting wires 5 are sealed. The device is provided with the usual exhaust tube 6 through which the interior of the envelope 1 may be exhausted. In order to clean up residual gases, my novel getter tab 7 is supported from a conductor 8 sealed in the press 4 by means of a getter-supporting wire 9 welded to the outer end of said conductor 8. In order to provide for a rigid support for the conductor 9, the upper end may also be welded to one of the wires 5.

The getter tab 7 consists of a sheet of metal having a main horizontal portion 10 provided with a recess 11 in which is placed getter material 12, either in the form of a pellet or as a quantity of powder. The outer edge of the portion 10 is provided with a flap 13 which is folded back so as to cover the getter 12 within the recess 11. In order to render the flap 13 firmly in place, the side portions thereof may be welded to the portion 10. The flap 13 is provided with a recess 14 which, as shown in Fig. 3, forms a chamber adjacent the surface of the getter material 12. The flap 13 is also provided with a groove 15 extending from the recess 14 to the outer edge of the flap 13. The groove 15 thus forms a channel which leads from the chamber inside the recess 14 to the edge of the flap 13. The portion 10 is provided at one side thereof with a depending flap 16. The flap 16 is placed in such a position that the outlet from the channel within the groove 15 points directly at said flap. The supporting wire 9 may be welded conveniently to the flap 16 in order to support the getter tab assembly in position within the envelope 1.

While the envelope 1 is connected to the exhaust pump by means of the exhaust tube 6, the getter tab 7 is subjected to a preliminary heating by the usual process of surrounding the envelope 1 with an induction coil which induces heating eddy currents within the getter tab. This preliminary heating drives out most of the occluded gases within said getter tab. Those which are liberated in the chamber within the recess 14 pass readily out through the channel within the groove 15, and thus readily pass out through the exhaust tube 6. When the various parts of the tube have been freed of occluded gases and the interior of the envelope 1 has been evacuated by the pumps to the desired degree, the getter tab 7 is then heated to a higher temperature at which the gettering material is vaporized from the recess 11. During this heating, not only the portion 10 but also the flap 16 is heated to substantially the same temperature.

As the metallic vapor is liberated from the getter material 12, this vapor creates a pressure of vapor in the chamber within the recess 14 which forces a stream of such vapor out through the channel within the groove 15. This vapor, therefore, is blown against the surface of the flap 16. However, since this flap is at an elevated temperature, there is no substantial condensation of the vaporized metal upon the surface of said flap 16. Therefore, the metallic vapor is reflected from the surface of the flap 16 back toward the walls of the envelope 1. As will be seen from Fig. 1, the getter tab 7 is so oriented as to cause the reflection to take place in this direction. During said reflection the stream of metallic vapor is dispersed to a certain extent which causes the vapor to disperse over a considerable portion of the walls of the envelope 1 and to condense thereon.

Due to the fact that the metallic vapor follows, the relatively deleterious path described above is maintained in its vaporized state for a considerably longer period than has heretofore existed in tubes of this kind. As will be seen, the vapor persists in the vapor state until it comes into contact with the walls of the envelope 1 and condenses thereon. I have found that by maintaining the vapor in its uncondensed state for the longer period of time, the initial gettering action thereof is increased to a substantial degree. Also the dispersion of the condensed getter over a considerable wall area within the envelope 1 prevents any excess concentration of the getter at any point on the envelope wall. I have found that by the use of my novel getter tab, the appearance of blisters is substantially entirely eliminated. Furthermore, I have found that the gettering action of the condensed metal upon the envelope walls during the life of the tube is greatly increased as the area exposed to the interior of the envelope is increased. Therefore, the dispersion of the metal over the interior walls of the envelope increases the gettering action thereof during the life of the tube.

It is to be understood that this invention is not limited to the particular details described above as many equivalents will suggest themselves to those skilled in the art. It is accordingly desired that the appended claims be given a broad interpretation commensurate with the scope of the invention within the art.

What is claimed is:

1. A getter tab assembly comprising a recep-

tacle containing a getter, said receptacle being closed except for a discharge opening, and a wall member disposed transverse to and spaced from said discharge opening, said opening being disposed substantially entirely opposite said wall member, said receptacle and wall member adapted to be heated simultaneously to substantially the flashing temperature of said getter, said discharge opening directly facing said wall member, whereby the flashed getter is directed against said wall member.

2. A getter tab assembly comprising a receptacle containing a getter, said receptacle being closed except for an elongated discharge passage terminating in a discharge opening, and a wall member disposed transverse to and spaced from said discharge opening, said opening being disposed substantially entirely opposite said wall member, said receptacle and wall member adapted to be heated simultaneously to substantially the flashing temperature of said getter, said discharge opening directly facing said wall member, whereby the flashed getter is directed against said wall member.

3. A getter tab assembly comprising a sheet of metal, a getter attached to a localized portion of said sheet, a flap of metal having a recess formed therein, said flap being secured to said sheet with said recess covering said getter to form a chamber adjacent said getter, a groove in said flap extending from said recess to the edge of said flap and forming a discharge passage, and a vapor-reflecting metal tab connected to one edge of said sheet of metal and disposed at an angle thereto facing the outlet of said discharge passage.

4. An electrical space discharge tube comprising a sealed receptacle containing an electrode assembly and a getter tab assembly comprising a receptacle containing a getter, said receptacle being closed except for a discharge opening, and a wall member disposed transverse to and spaced from said discharge opening, said opening being disposed substantially entirely opposite said wall member, said receptacle and wall member adapted to be heated simultaneously to substantially the flashing temperature of said getter, said discharge opening directly facing said wall member, whereby when said getter is flashed the vapor generated is reflected from the surface of said wall member, said surface being disposed to face the inner wall of said receptacle.

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