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E. W. RYAN

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METHOD OF MOUNTING MISCH METAL IN RADIOTRONS

Filed Dec. 31, 1925

FIG. 1

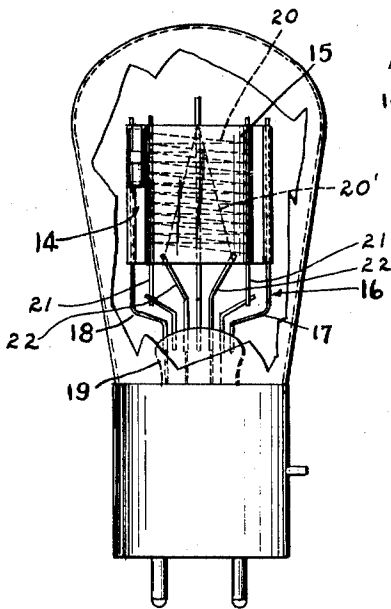


FIG. 2

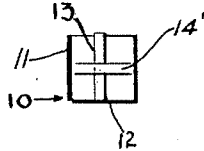


FIG. 4

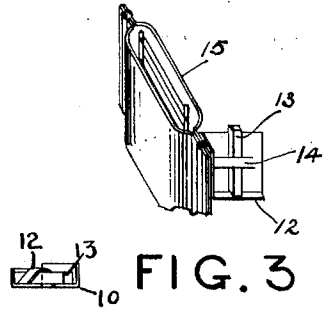


FIG. 6.

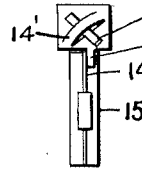


FIG. 8

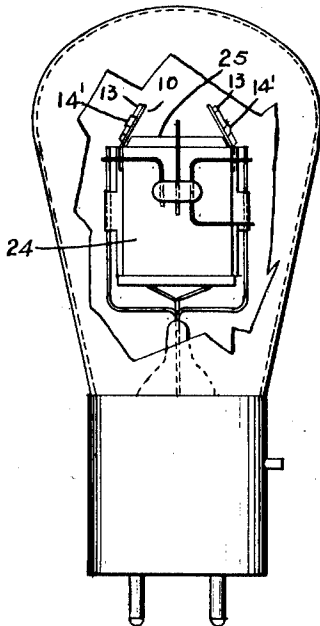


FIG. 5

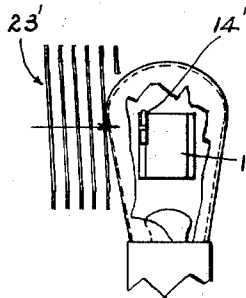


FIG. 7.

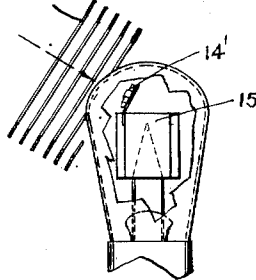


FIG. 9

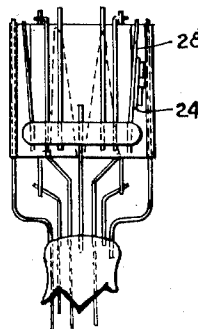
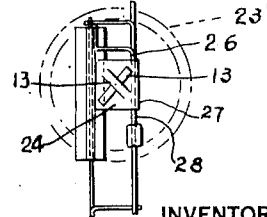


FIG. 10



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UNITED STATES PATENT OFFICE.

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METHOD OF MOUNTING MISCH METAL IN RADIOTRONS.

Application filed December 31, 1925. Serial No. 78,522.

This invention relates to vacuum devices and more particularly to devices utilizing a metallic clean-up agent such as misch metal or the like which is volatilized to remove the residual gases in a sealed container.

In the manufacture of thermionic devices, such as radio tubes, used for receiving and amplifying purposes in radio apparatus, it is desirable to produce a highly evacuated container, and the practice is to employ the usual pumps to mechanically remove the greater portion of the air from the container. Owing to the inefficiency of the mechanical means employed, a small amount of residual gas remains in the container which gas is subsequently removed or physically destroyed by the vaporization of a so-called clean-up agent.

It has been found practical to apply a quantity of a clean-up agent to one of the electrodes of a mount after which the mount is sealed into the tube, the tube evacuated and tipped off, after which the clean-up agent is volatilized by means of a high frequency coil which heats the clean-up agent resulting in its vaporization and a solidification of the gases thereby creating a high vacuum. Various materials have been used as clean-up agents such for example as magnesium, which are usually deposited on the plate electrode or anode of the tube and subsequently vaporized by the passage of the lines of force from a high frequently coil. The present invention, however, relates particularly to the use of a clean-up agent, such as misch metal, which cannot be successfully volatilized from the anode or plate electrode since such electrode is preferably made from sheet nickel and the misch metal alloys therewith.

An object of the present invention is, therefore, to facilitate the use of misch metal or similar clean-up agents in connection with radio or thermionic tubes.

Another object of the invention is to so apply a quantity of misch metal to an electrode of a lamp mount in such manner that the same may be vaporized without detrimental effects upon a nickel electrode.

Another object of the invention is to provide a method of vaporizing a clean-up agent with a minimum amount of heating of the elements within a container.

Another object of the invention is to provide a method of vaporizing a clean-up agent in an expeditious effective manner.

In practicing the present invention I provide supplemental support members or tabs which may be of iron or other material readily weldable to an electrode, such as the anode or plate of a mount, iron being preferable for the reason that it is not deleteriously affected by a vaporization of the misch metal which may be secured thereto.

A tab carrying a quantity of the misch metal may be attached to a mount just prior to the sealing or union of a mount to a bulb and consequently just previous to the operation of applying the bulb to the pumps as provided. The tab is so arranged as to dispose the misch metal in a plane which may be readily positioned in the lines of force or output coils of a high frequency apparatus and thus readily heated and vaporized.

By reason of the present novel method and disposition of the misch metal the same may be quickly and effectively volatilized in the absence of an unnecessary heating of the elements within a tube. Furthermore, inasmuch as the lines of force are directed to pass through the misch metal when isolated from the other electrodes a quicker heating and consequently rapid volatilization is obtained.

The invention will be more fully understood by reference to the accompanying drawings in which:

Fig. 1 shows a radio tube having a clean-up agent applied thereto in accordance with the present invention.

Fig. 2 shows a tab having a strip of a clean-up agent attached thereto.

Fig. 3 is an edge view of the tab shown in Fig. 2 and illustrates the means for securing the clean-up agent to the tab.

Fig. 4 is a perspective view of a tab attached to a plate or anode of a radio tube.

Fig. 5 is a view showing an anode within a bulb and having a tab positioned to support a clean-up agent in a horizontal plane and also shows the position of a high frequency coil to effect a volatilization of the clean-up agent by passage of the lines of force directly therethrough.

Fig. 6 shows an anode or plate having a tab with a clean-up agent thereon disposed in a vertical plane.

Fig. 7 shows a fragmentary view of a radio tube having an angularly disposed tab carrying a clean-up agent and illustrates the position of the high frequency coil to direct lines of force through the clean-up agent.

Fig. 8 shows a device such as a rectifier and illustrates the use of two angularly disposed tabs carrying a clean-up agent when a relatively large amount of such agent is desirable.

Fig. 9 shows a mount having a tab secured to a support member thereof and

Fig. 10 is an edge view of the mount shown in Fig. 9.

As illustrated, the present invention may comprise a member for supporting a quantity of misch metal, such member being termed a tab and indicated as a whole by reference numeral 10. The tab may be in the form of a plate of sheet metal having a projection or foot 11 along one edge thereof. Another edge of the plate is provided with a relatively narrow extension or ridge 12. Inasmuch as the misch metal is supplied in the form of a section 13 of a rod of the desired length, it has been found desirable to pierce the plate of the tab to provide a strip 14' beneath which section 13 of misch metal is disposed and held. The misch metal may also be welded to the tab to give more intimate contact therewith for the conduction of heat from the tab. The tab with the misch metal or clean-up agent attached thereto may, as shown in Fig. 1, be mounted by securing the foot 11, as by welding or otherwise, to a flattened portion 14 of a plate or anode 15 of a mount 16.

The invention is applicable to various types of mounts in electrical devices, the one selected being in use in the usual type of radio tube and comprised of the anode 15 secured to support members 17 and 18 embedded in a stem press 19. Other electrodes of the mount may comprise the usual grid 20 and filament 20' properly secured to other support members 21 and 22 respectively, which members are embedded in the stem press. The tab attached to an anode in the manner above described is more clearly shown in Fig. 4 and it will be noted that the ridge 12 is disposed beneath the positioned section of misch metal. Furthermore, in accordance with the present invention, the tab is applied to the side of the anode which is removed from any external supporting members for the elements thus upon the volatilization of the misch metal or clean-up agent, the possibility of a deposit of the misch metal upon such supports or the glass connectors therefor, as provided in some mounts, is greatly reduced. A section of misch metal when mounted upon a plate in a radio tube is activated by heat through the agency of induction heating. This is effected by directing the lines of force of a coil 23 of a high frequency transformer through the misch metal. By reason of the present invention, it is possible to place the misch metal in the direct lines of force of the coil as shown in Fig. 5. The tab is so positioned that a relatively large area thereof is exposed to the

effect of the lines of force of the high frequency coil and the misch metal is positioned in offset or remote relation to the plate. The plate on the other hand, is presented edgewise to the lines of force to receive a minimum amount of heating effect therefrom. By reason of the large area of the tab which supports the misch metal and owing to the fact that such area is positioned in the direct lines of force of the coil, the tab may be quickly heated and conduct heat to the misch metal to activate or volatilize the same. For the purpose of preventing any of the misch metal from flowing off the plate, the ridge for ledge 12 is provided. Although the above form of tab is of the preferred construction, the same may, as shown in Figs. 6, 7 and 8, be provided with a projection 11' for securing the tab to the plate 15.

With this construction of tab, the same may be mounted on the top edge of the plate as shown in Fig. 7 and the coil applied so that the lines of force are directed transversely through the tab. In this construction, it is also evident that the tab will be highly heated, whereas, the plate being edgewise with respect to the lines of force from the coil 23 will be heated a minimum amount.

The invention is adapted for use in various types of electrical devices, such for example as a rectifier shown in Fig. 8 which comprises a special form of mount having a plate 24 enclosing another plate 25. In this construction the tab 10 may be provided with the extension 11' and the clean-up agent may be positioned at opposite sides of the plates and so disposed that the lines of force for vaporizing the clean-up agent will be directly edgewise with respect to the plates. In devices, such as a rectifier, it is necessary to provide a greater amount of clean-up agent and as will be appreciated a plurality of tabs may be provided as shown.

If desirable, the tab for carrying the clean-up agent may be applied to a mount in a manner different from that above described, that is, it may be secured by means other than welding. As shown in Figs. 9 and 10, a tab 26 is secured by bending a portion 27 about a support wire 28 of the mount. This arrangement also positions the tab away from the plate and the lines of force of a high frequency coil may be directed through the large area of the tab and toward the edge of the plate to minimize the heating effect thereof.

The present invention, which provides a tab for supporting the misch metal or other clean-up agent substantially in the same plane of the turns of the output coil of a high frequency transformer permits a more rapid and efficient method of vaporizing the clean-up agent and is convenient and practical in the factory.

In the manufacture of a radio or other electron emission devices employing a tubular

or plate anode, a tab having a section of misch metal applied thereto may be quickly secured to the plate. The tab may be readily disposed in any suitable relative position with respect to the plate and one which makes it convenient to arrange the clean-up agent to intercept the lines of force sent from the output coil of a high frequency apparatus to vaporize the clean-up agent.

By reason of the present invention when misch metal is used it is subjected to less handling since the same may be applied to the tabs and welded to the mount as a last operation preparatory to uniting the mount with a bulb, thus reducing the possibility of any oxidation which may be due to exposure to the atmosphere during the mounting.

Although a preferred embodiment of the means and method of practicing the present invention have been herein set forth, it is to be understood that modifications may be made therein without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A mount for an electron emission device comprising an electrode of nickel, an iron sup-

port member secured to said electrode and projecting therefrom to support a quantity of misch metal in spaced relation to said electrode.

2. A support for a clean-up agent comprising a tab formed of sheet metal having a portion of relatively large area for effective heating by the interception of the lines of force of a high frequency coil, means on said portion to secure a quantity of a clean-up agent, one edge of said portion being bendable to provide a foot for attachment to the mount of an electrical device and a ledge along another edge of said portion, the said portion supporting the clean-up agent being of relatively large area compared to said clean-up agent so as to effectively intercept the lines of force of a high frequency coil.

3. A mount for an electron emission device comprising an electrode of nickel, an iron support member secured to said electrode to support a quantity of misch metal.

In testimony whereof, I have hereunto subscribed my name this 30th day of December, 1925.

EDWARD WALTER RYAN.