# United States Patent [19]

**Hornman et al.**

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[54] **GAS DISCHARGE TUBE COMPRISING MERCURY VAPOR AND PROVIDED WITH A GETTER**


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[58] **Field of Search**.....313/174, 176

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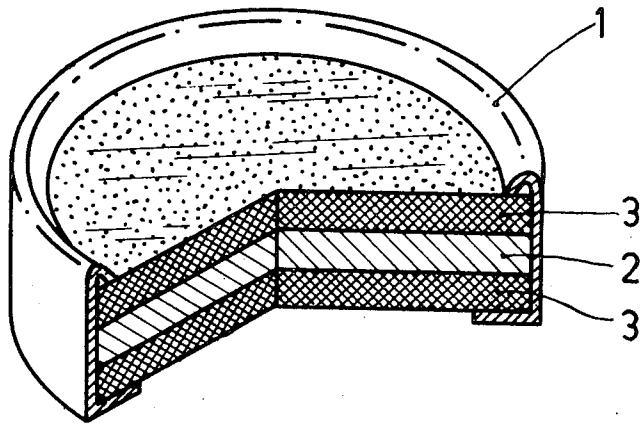
[57] **ABSTRACT**

A getter for a gas discharge tube having mercury vapor in which the getter which is active at room temperature is separated from the mercury-containing atmosphere by porous sintered bodies.


**3 Claims, 2 Drawing Figures**



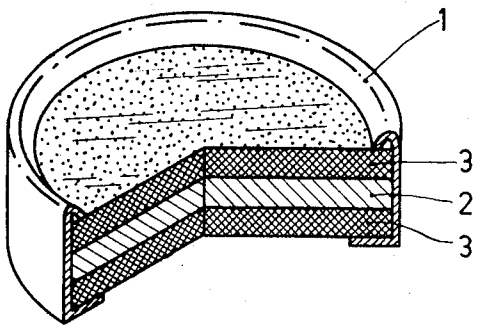



Fig. 1

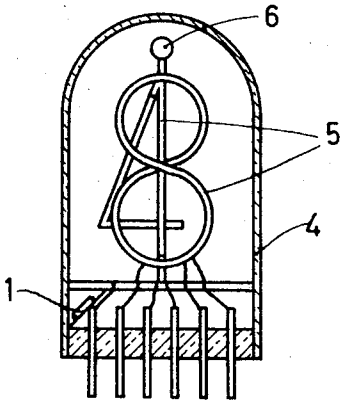



Fig. 2

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# GAS DISCHARGE TUBE COMPRISING MERCURY VAPOR AND PROVIDED WITH A GETTER

The invention relates to a gas discharge tube comprising mercury vapor and provided with a getter which is operative at room temperature.

It is known from German Pat. specification No. 1,234,866 and German Auslegeschrift No. 1,514,658 to provide gas discharge tubes comprising mercury vapor with a getter which is maintained at a comparatively high temperature during operation of the tube. In the German Pat. specification No. 1,234,866 the getter material is provided for that purpose as a layer on the anode or on a screen grid. It is also known, for example from U.S. Pat. specification No. 2,747,124, to heat a getter body by means of a filament.

In many cases, however, the use of a heated getter is not desirable. In gas discharge tubes for low energy discharges in which the electrodes show only a small increase in temperature, said increase in temperature cannot be used for heating the getter. By supplying extra energy for heating the getter, the useful effect of the tube is strongly reduced since said extra energy in such tubes which operate with low discharge energy may be approximately equal to the effective discharge energy. The energy supplied to the tube must then approximately be doubled.

An unheated, non-evaporating getter which is operative at room temperature, however, is found to become substantially inoperative in a mercury vapor-containing atmosphere for gettering gases, such as oxygen, carbon monoxide and water vapor which are liberated during the life of the tube.

It has proved to be possible to avoid the above-mentioned drawbacks in a gas discharge tube in which a mercury vapor-containing atmosphere and a non-evaporating getter are present if, according to the invention, a getter material which is operative at room temperature is separated in known manner from the surrounding space by one or more porous sintered bodies.

Porous, sintered tungsten bodies as they are used in supply-cathodes are very suitable. It has been found that the pores are permeable to the undesirable gases present in the tube but that the memory atoms are substantially not permitted to pass.

From German Pat. specification No. 879,430 a getter is known in which the active material is separated from the surrounding space in a tube for high voltages by means of sintered porous bodies. However, it was the object of this construction to avoid getter particles from getting into the space. The space contained no mercury vapor. Nothing pointed to the fact that such



porous sintered bodies are substantially impermeable to mercury vapor. This is the more surprising since migration of barium atoms in supply-cathodes does take place through such pores.

In order that the invention may be readily carried into effect, it will now be described in greater detail, by way of example, with reference to the accompanying drawing of which

FIG. 1 is a perspective sectional view of a holder with a getter according to the invention, while

FIG. 2 shows a gas discharge tube provided with such a getter.

Referring now to FIG. 1, reference numeral 1 denotes a getterholder consisting of a metal ring which is flanged so that the gettermaterial 2 and the porous bodies 3 which consist of sintered tungsten are held tight. The gettermaterial 2 which may consist, for example, of zirconium hydride or of a mixture of zirconium, aluminium, tungsten and nickel, is separated from the surrounding space by the porous bodies 3.

FIG. 2 shows a digit tube having a glass envelope 4, electrodes 5 in the form of digits and a holder 6 having a readily decomposable mercury compound. The getterholder 1 is present at the bottom of the envelope 4.

The holder 6 and the getterholder 1 can be heated, for example, by means of the passage of current or high frequency currents for releasing mercury vapor and for activating the getter, respectively. Afterwards, however, heating of the getter need no longer take place. The getter absorbs substantially no mercury vapor, the quantity of mercury vapor in the tube remains constant. It is found that the gettering effect for gases such as carbon monoxide, oxygen and carbonic acid is substantially entirely maintained also without heating the getterholder 1.

Although only one embodiment has been described, the invention is also of importance for gas discharge panels and other low-operating-energy tubes.

What is claimed is:

1. In a gas discharge tube having a mercury vapor-containing gas atmosphere the improvement being a non-evaporating getter having a gettermaterial which is operative at room temperature and which is separated in a predetermined manner from the surrounding space by one or more porous sintered metal bodies.

2. A gas discharge tube as claimed in claim 1, characterized in that the porous bodies consist of sintered tungsten.

3. The discharge tube of claim 1 wherein said gettermaterial is sandwiched between two sintered metal layers.

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