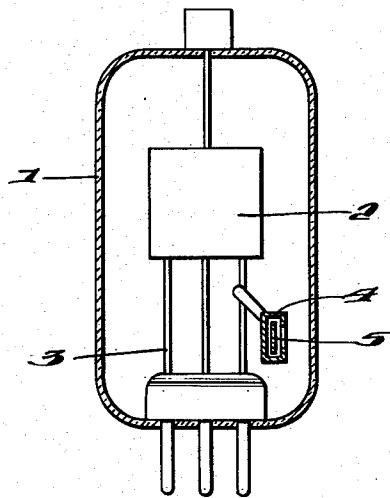


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PROCESS OF FILLING A DISCHARGE CHAMBER
WITH MERCURY AND PRODUCT
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PROCESS OF FILLING A DISCHARGE CHAMBER WITH MERCURY AND PRODUCT

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4 Claims. (Cl. 313—174)

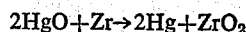
The following methods for filling a discharge chamber with mercury are known.

(a) *The insertion of the mercury into the chamber before the evacuation thereof.*—This method has the disadvantage that the vessel cannot be heated to a temperature sufficient for a thorough degassing because the mercury would be vaporized and the mercury vapor would be lost through the pump. Besides, the mercury readily may become contaminated.

(b) *Introduction of mercury into the chamber connected to the pump after the evacuation.*—In this method the mercury cannot be accurately measured and the process is expensive and requires special pumping equipment.

(c) *The liberation of the mercury in the chamber, after it has been evacuated, by decomposition of mercury oxide which is present on a heatable support within the chamber.*—The disadvantage of this method is that there is a large amount of oxygen which cannot be removed from the chamber quickly enough with the usual pumping equipment. The long pumping time required increases the danger of damage by oxidation.

The process according to the present invention involves a further development of process (c) described above. It avoids the mentioned disadvantage of method (c) by immediately chemically binding the oxygen liberated by the decomposition of the mercury oxide. In accordance with the invention, after the chamber has been degassed, a mixture of mercury oxide, a reducing agent and a metal which serves to retard the reaction, supported within the chamber, is caused to react by heating. An example of a suitable mixture is a mixture of mercury oxide with zirconium as the reducing agent and iron as the reaction retarder. At a temperature of about 700° C. a thermite type reaction takes place and mercury is liberated as appears from the following reaction equation



The iron present in the mixture serves to moderate the otherwise explosive reaction. A suitable ratio of the ingredients of the mixture is 1 part by weight of the mercury oxide, 1 part by weight of zirconium and 2 parts by weight of iron.

In place of zirconium any other reducing agent may be used which is not vaporized at the reaction temperature. Zirconium is especially adapted for economical use. In place of iron other metals may be used such as nickel, manganese, chromium or cobalt.

An embodiment of the invention is illustrated in the accompanying drawing.

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For carrying out the process a support is provided within the chamber and a compressed pill formed of the above mentioned materials in powdered form is secured to the support. The chamber is then evacuated in the known manner at a temperature of, for example, 400° C. After the evacuated chamber has cooled the carrier alone is heated to about 700° C. to start the reaction. This may be done advantageously by magnetic induction which of course requires that the carrier must be made of metal. The carrier advantageously can be made of nickel which is easy to degas. The mercury which is liberated and vaporized by the reaction condenses on the cold parts of the chamber. The amount of mercury which is lost through the pump is not worth mentioning. There is no other gaseous or volatile material which remains to be pumped out or which will contaminate the chamber. The reaction residue forms a coherent, hard sinter of ZrO_2 , Zr , Fe_2O_3 and Fe . Consequently the chamber can be sealed shortly after the burning of the pill.

The purity of the mercury generated and released by the mixture depends upon the use of pure mercury oxide. An especial advantage of the simple and inexpensive process is the accurate dosability of the mercury oxide.

A discharge chamber made in accordance with the invention is generally characterized in that it contains the carrier or support upon which a sinter body has been formed, said sinter body containing the oxide of the reducing agent, unconsumed reducing agent and oxide of the metal used to moderate the reaction.

Referring to the drawing 1 is the discharge chamber referred to above, 2 is the electrode, 3 is the electrode support, 4 is the support for the mixture of mercury oxide, reducing agent and reaction retarder and 5 is a compressed pill of said mixture.

We claim:

1. Process for filling a discharge chamber with mercury which comprises supporting therein a mixture of mercury oxide, a first metallic reducing agent capable of thermite type reaction with the mercury oxide to liberate mercury and form a stable, non-volatile oxide thereof, said reducing agent being not volatile at the reaction temperature, and a second metallic reducing agent capable of moderating said thermite type reaction, evacuating the chamber and heating said mixture to a temperature sufficient to initiate said thermite reaction.

2. A process of filling a discharge chamber with mercury which comprises supporting therein a mixture of mercury oxide, zirconium and iron, evacuating the chamber and heating said mixture to a temperature sufficient to effect a reaction between said mercury oxide and said zirconium to release mercury within the chamber.

3. A process as defined in claim 2 in which the mercury oxide, zirconium and iron are in the weight ratio of 1 to 1 to 2.

4. A process as defined in claim 3 in which the mixture is in the form of a compressed mass.

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