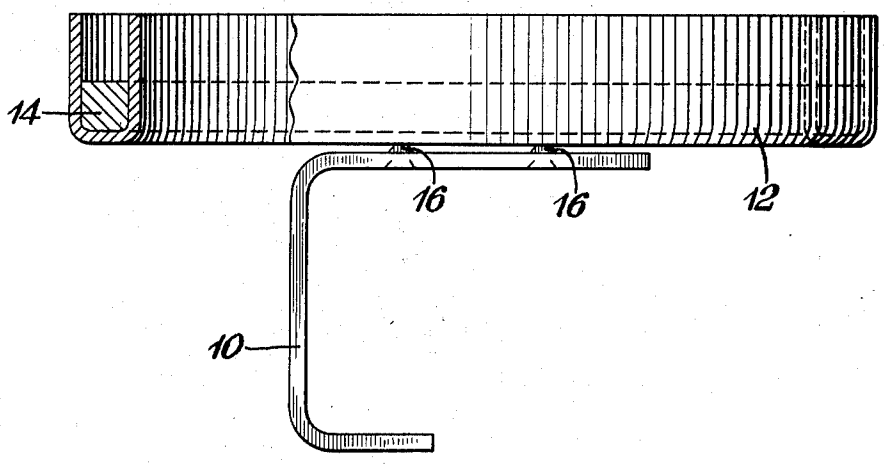
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MATCHED GETTER

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MATCHED GETTER

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This invention relates to matched getters for use in the manufacture of electronic vacuum tubes, and to a method for their production. By use of the term "matched getters" applicants mean getters each of whose total weight is maintained or controlled to be a uniform predetermined amount.

In the manufacture of electronic vacuum tubes, such as radio and television tubes, it is necessary that the residual gases left in the evacuated tubes be removed in order to maintain high tube quality. These gases are customarily removed by use of a so-called "getter" which is incorporated into the tubes before they have been evacuated. The getter briefly consists of a metallic container which is loaded with a powdered metal, usually an alkaline earth metal, for example barium and calcium, which when vaporized has the ability to absorb the residual gases and remove them from the tubes. The getter is activated or "flashed" by heating it to a high temperature, suitably by induction heating, whereupon the metal is vaporized. While the amount of metal to be vaporized, that is, the getter yield, will most often depend on the type of vacuum tube in which the getter is to be incorporated, the getter in a particular instance is required to satisfy a rigid standard of uniformity in its yield. This standard must be satisfied because, when the getter yield is low, the vaporized metal will not completely remove the residual gases and, when the getter yield is too high, vaporized metal has a tendency to condense on the vital components of the vacuum tube, hence reducing its quality. Heretofore this standard has not been satisfactorily met and, particularly when produced on a large scale, many getters of the type described have exhibited non-uniformity in their yields.

According to the invention it has been discovered that an important factor in the production of getters having a uniform yield is the total mass of the getter, that is, the combined weight of the container and powdered metal, and that the total getter mass should be kept constant. The getter container is relatively small and because of its size, it is difficult to control its weight so that variations, however small, in the size of the container result in getters whose yield is not uniform. However, it has been found in accord with the invention that when the weight of the powdered metal is adjusted to match the total weight of the getter to a production standard, getters can be made which exhibit a consistently uniform yield when flashed.

The principal object of this invention therefore is to provide a matched getter which will satisfy the rigid standards required by manufacturers of vacuum tubes, and to provide a method for its production.

The invention will be described in greater detail by reference to the accompanying drawing wherein the single figure is a partially sectioned elevational view of a getter embodying the principles of the invention.

Referring to the drawing there is illustrated a matched getter having a support arm **10** secured to a container **12** of the channel ring type. The container **12** is loaded with a powdered metal **14** to be vaporized and is secured to the support arm **10** by two projection welds **16**. The powdered metal **14** may suitably be an alkaline earth metal, for instance, barium or calcium. In the instance of the alkaline earth metal, however, which may be unstable in air, the metal is preferably alloyed with a stabilizing metal such as aluminum.

In accord with the invention the weight of the powdered metal is adjusted so as to match the total weight of the getter to a production standard. This standard, of course, will depend on the particular type of vacuum tube in which the getter is to be incorporated, but in any case, the total weight of the getter should be sufficient to promote the vaporization of the required amount of metal to absorb the residual gases and remove them from the evacuated tube.

A number of matched getters of the construction illustrated and embodying the invention have been made and tested. For example, in one test, getters were made in accord with the invention wherein the weight of the containers used was greater than a specified control because of increased thickness. Specifically, the getters were constructed of a stainless steel container of the channel ring type approximately 18 mm. in diameter, wherein the channel measured about 0.06 inch wide by 0.107 inch high. A powdered alloy was metered into the container, the weight of powder in each particular instance being sufficient to match the total weight of the getter to the weight of the control, and was then pressed under a pressure of about 8000 pounds per square inch. The powdered alloy had a composition of 53% by weight of barium and 47% by weight of aluminum. The getters were then flashed in an evacuated 500 ml. spherical flask. In each instance, the getter tested was located in the neck of the flask on a spring support in the center of a 4 turn RF (radio frequency) induction coil. The flask was then evacuated and when the pressure reached 7×10^{-5} mm. of Hg or lower, the container was heated by the coil to 1100° C. in about 12 seconds, at which time the barium began to vaporize. The container was heated for a total of 25 seconds to complete the vaporization. After the test, the barium yield was calculated and was recorded. In another test, getters of the identical construction were made, but in this instance, the weight of the powder was not adjusted. In still another test, the container weight was varied, while the weight of powder was held constant. These getters were tested as described above, and their barium yields were calculated and recorded. The results of these tests are tabulated in the table below, wherein the values listed are average values.

Barium yield vs. container and powder weight

	Number of Getters Tested	Ring Weight (mg.)	Powder Weight (mg.)	Total Weight (mg.)	Average Yield (mg.)
Control	123	452	200	652	75.5
Matched Getter	253	485	180	665	78.8
Powder Weight Not Adjusted	42	485	200	682	67.3
Container Weight Varied	3	502	180	682	69.3
	3	463	180	643	81.1

It will be appreciated from the above tabulated results that the matched getters of the invention had an average yield which closely approximated that of the control getter, and that when the powdered metal was not adjusted, the getters exhibited a yield which was not uniform.

We claim:

1. A method for manufacturing getters having uniform, predetermined yields upon flashing despite variations in the weight of the getter containers, wherein each of said getters comprises a quantity of powdered getter metal and a container therefor, comprising adjusting the total weight of each getter to be equal to a predetermined amount.

2. A getter comprising a quantity of powdered getter metal and a container therefor, having a predetermined yield upon flashing regardless of the weight of said container, wherein said predetermined yield is achieved by adjusting the total weight of the getter to be equal to a predetermined amount.

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