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THERMOCONDUCTIVE SCREENING CAN FOR ELECTRONIC TUBE

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Fig. 1.

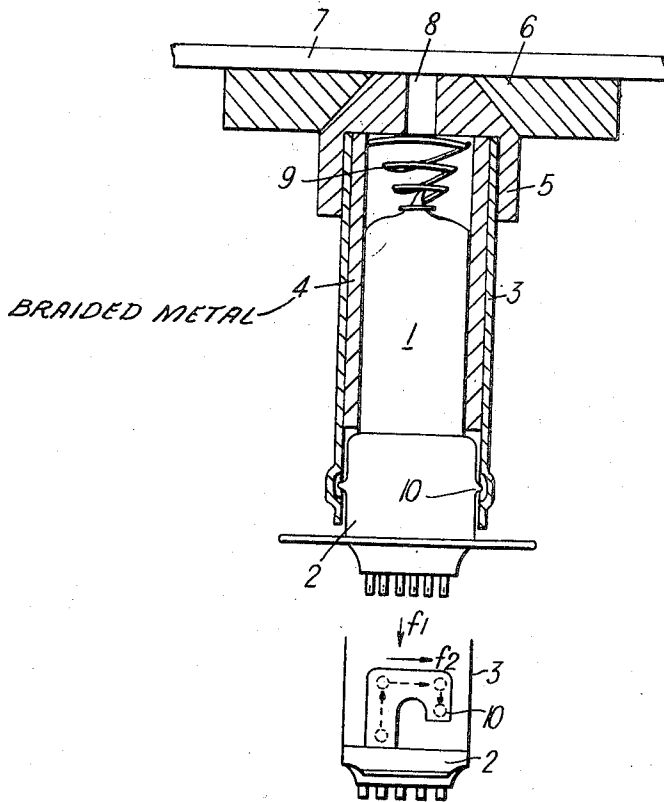
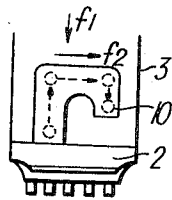


Fig. 2.



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THERMOCONDUCTIVE SCREENING CAN FOR ELECTRONIC TUBE

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2 Claims. (Cl. 257-263)

The invention relates to a screening can for an electronic tube comprising in particular thermoconductive means for dissipating the heat produced at the hot points of an electronic tube.

In most of the known screening cans, a certain space exists between the outer surface on the tube glass and the can. This space is filled with air and constitutes an insulating cushion, preventing the heat produced at the hot point of the tube from reaching the screening can. This heat may influence the elements of the electrical circuit which is near the electronic tube: condensers, resistors, etc., by damaging them or at least by modifying their values.

If in the vicinity of the hot point of the tube itself, the temperature exceeds a certain value, the tube is deteriorated, its internal screening layer in magnesium being evaporated and deposited on the electrodes.

In apparatus where many electronic tubes are concentrated in a close space, there is a tendency for the stagnation of the heat produced by each tube to produce a cumulative effect because of the neighboring tubes which causes points with temperatures sufficiently high to deteriorate one or more tubes or to diminish their life time.

A first object of the invention is to produce a thermoconductive device between each electronic tube and its screening can so that the heat can be conducted from the outer casing of the tube towards the screening can.

A second object of the invention is to provide a thermoconductive device enabling further to conduct the heat from any screening can towards the external common casing in contact with the ambient air.

According to a feature of the invention, there is provided a screening can for an electronic tube which is adaptable to the socket of said tube and is heat conductive. It comprises at its superior internal surface an elastic device (for instance a spring) resting on the bulb of said tube, the can being such that its internal surface is formed by an elastic network with braided conductive metal strips of suitable thickness leaving an internal dimension slightly inferior to the external dimension of the bulb of said tube so as to ensure a good contact (nevertheless elastic), between said bulb and said network when the can is placed around the tube and so that the network is normally maintained against the can by said elastic device so as to enable the heat to be conducted from the bulb towards the screening can via said network.

According to another characteristic of the invention, said screening can itself or a member enclashed on the end part of said can is made of conductive metal (for instance red copper), the end part of said can or of said member having a cone frustum shape so as to fit easily within a fixation aperture of the common external casing in contact with the ambient air, said end part penetrating in said aperture against the action of said elastic device, a good contact being thus ensured between said

can and said external casing which permits, through the conductive link with conductive metal, to conduct the heat from said can to said external casing.

The above mentioned and other objects and features of the invention will become more apparent and the invention itself will be best understood by referring to the following description of an embodiment taken in conjunction with the accompanying drawings in which:

Fig. 1 shows a sectional view of an electronic tube and its screening can according to the invention;

Fig. 2 shows as an example a method of fixing the screening can to the socket of said electronic tube.

Fig. 1 shows an electronic tube of which the bulb is represented by 1 and the socket by 2. On this tube is placed a cylindrical screening can 3. This screening can can be fixed to the socket 2 by the well known method shown at Fig. 2. By pressing on the can in the direction of the arrow f_1 (Fig. 2), the spring 9 (Fig. 1) is compressed between the can and the bulb so that the pin 10 of the socket is then lifted in the first vertical groove of the can shown at the left of Fig. 2. Then by turning the can in the direction of the arrow f_2 , the pin 10 of the socket is displaced in the horizontal groove of the can and by releasing the latter, the action of the spring 9 forces the can upwards whilst the pin 10 descends vertically in the second vertical groove shown at the right of the can (Fig. 2).

The space between the external cylindrical surface of the bulb 1 and the internal cylindrical surface of the screening can 3 being normally filled with air constitutes a cushion non-conductive for heat which may cause high temperatures at the hot point of the bulb in the vicinity of the anode (not shown).

To improve the conduction of heat from the bulb 1 towards the can 3, a network of braided metal conductive threads 4 is inserted between the bulb 1 and the screening can 3. This network is fixed cylindrically against the internal surface of the screening can, to which it is maintained for instance by the greater turn of spring 9. The network metallic conductor may for instance be copper; the can for instance may be brass.

The radial thickness of the network 4 is such that the internal diameter of the can with the network is slightly less than the external diameter of the bulb 1 so that a good contact is thus ensured between the bulb and the network.

The braided copper network 4 presents, besides its conductivity, the advantage that it has a certain elasticity enabling the screening can to be easily applied to the electronic tube and as easily withdrawn.

Many solutions have been suggested, including the use of profiled copper foils, but the profiled parts making contact with the bulb are not elastic enough. Research has shown that there is often a risk of disengaging the tube from its socket by trying to withdraw the can, or, what is more dangerous, of tearing the glass bulb out of its inner casing.

With the network of braided threads the tube is easily withdrawn out of the can when required.

It will be noted that when the can is placed around the tube, the bulb 1 provides a further lateral support for the network 4 against the can 3.

It is also advantageous to be able to conduct the heat which is present on the screening can of each tube towards a common external casing directly in contact with the ambient air. This is true, for example, in the case of the bays of ringing panels for telephony in which many tubes are concentrated in a space of very small dimensions and where the heat locally produced may cause damage, sooner or later, to the neighboring tubes.

On the screening can, which is already heat conductive

because made of brass, a heat conductive member 5 (for instance of red copper) can, for instance, be encased, so as to serve as a link between the screening can 3 and the common external casing 7, (for instance a cover) (Fig. 1).

Since the tube has a certain play in its fixation socket a device must be provided to enable a good contact between the member 5 of the screening can and the common external casing 7.

The member 5 can be ended, for instance, in a cone frustum shape which can be provided with an aperture 8 in order to verify if the tube is working or not. The cone frustum part of the member 5 conforms with a corresponding cone frustum cavity of the common external casing 7, or, for instance, of a heat conductive ring 6 (in red copper), fixed on the external casing 7 (Fig. 1).

The more narrow part of the cone frustum shaped member 5 can easily be inserted in the wider part of the frustum shaped cavity of ring 6, and the member 5, as well as the can 3 and the tube 1, 2, are automatically centered by the cone frustum guiding. A good contact is thus ensured, since also, when the external casing 7 (copper) is in position, the spring 9 is slightly compressed, thus exerting a force which increases the contact pressure between the member 5 and the ring 6.

The screening can 3 can be made entirely of red copper and may be terminated by a frustum cone profile which avoids the encasing of member 5.

While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.

I claim:

1. A screening can for an electronic tube which is attachable to the socket of said tube and is heat conductive and comprises an elastic device within said can which rests on the bulb of said tube, characterized in this, that the internal surface of said can is covered by an elastic network of braided conductive metal threads of suitable thickness, said network having internal dimensions slightly less than the external dimensions of the bulb of said tube so as to ensure a good, though elastic, contact between said bulb and said network when said can is placed around said tube, said network being normally maintained against said can by said elastic device so that the heat can be conducted from the bulb to the screening can via the said network.

2. A screening can, as claimed in claim 1, and adapted to be attached to an external casing, characterized in this, that said screening can further comprises means at the end thereof formed of heat conductive metal and having the shape of a cone frustum, so as to be easily fitted into a fixation aperture in the external casing in contact with ambient air, said means being urged into the aperture against the action of said elastic device, a good contact being thus ensured between said can and the external casing enabling heat to be conducted from said can to the external casing.

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