Aug. 11, 1936. F. HAFECOST ET AL 2,050,885

RADIO TUBE SHIELD

Filed Feb. 9, 1935

Fig. 1.

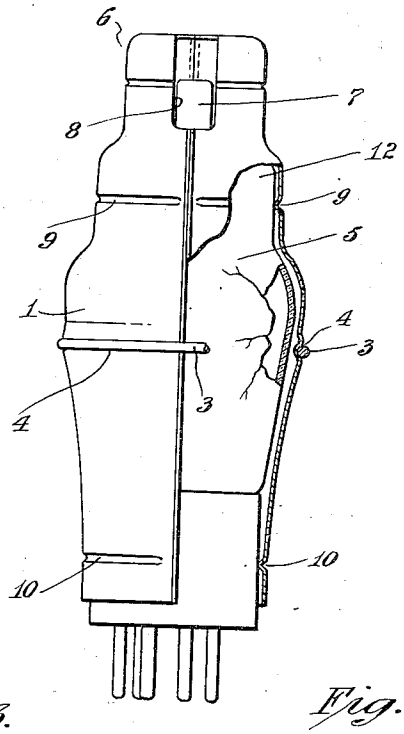



Fig. 2.

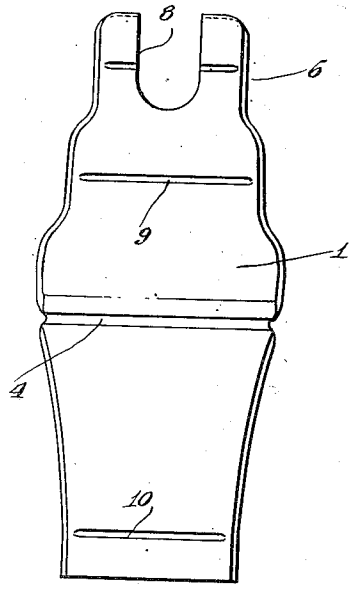



Fig. 3.

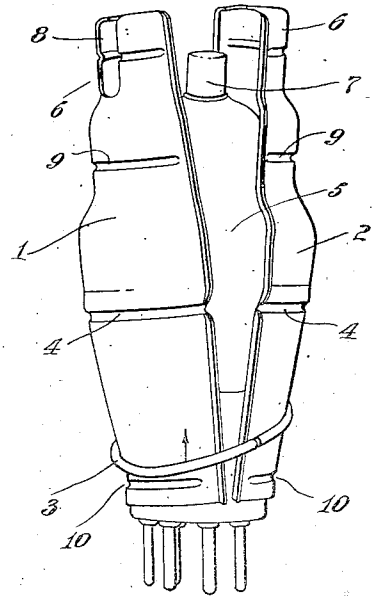



Fig. 4.

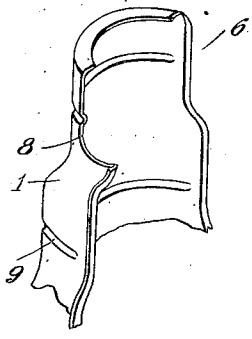
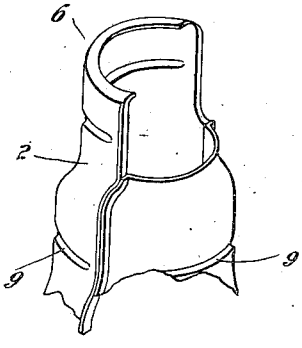



Fig. 5.




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## RADIO TUBE SHIELD

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Application February 9, 1935, Serial No. 5,690

7 Claims. (Cl. 250—27.5)

This invention relates to a radio tube shield, and more particularly to a form-fitting shield of the removable type.

It is common practice to electrostatically shield the tubes in the modern radio receiving sets. One form of shield employed is the so-called "can" shield which as the term implies is merely a metal can inverted over the tube so that the opened end seats on the chassis and completely encloses the tube. This type of shielding is effective but is extravagent of chassis space and does not always permit the positioning of the tubes to suit the set manufacturer's requirements.

A certain form-fitting tube shield now on the market overcoming these objections to the can shield, comprises two symmetrically paired parts of sheet metal and shaped to fit closely to the bulb of the tube, said parts being held in place by a clamping ring. The length of the dished metal parts is substantially equal to the length of the tube to be housed therein when measured along the tube axis, but not of sufficient length to completely house the customary electrode sealed in the end of the bulb and provided with a metallic top cap. With the top cap exposed or unshielded, the tube may be subject to external electrical disturbances, which render the shielding correspondingly imperfect.

It is an object of the present invention to provide a form-fitting shield adapted to enclose substantially the entire tube including the top cap, whereby improved electrostatic shielding is obtained.

It is another object of the invention to provide a form-fitting shield having a simple mechanical expedient that compensates for slight variations in the diameter of the bulbs of a given size and/or shape of tube; also in imperfections in joining the bulb to the base of the tube.

Other novel features of construction will manifest themselves as the description proceeds.

Referring to the accompanying drawing:

Fig. 1 is a partially sectioned view of the paired parts comprising the shield fitted to a radio tube;

Fig. 2 is an elevation of one of the paired parts of the shield as shown in Fig. 3;

Fig. 3 is a perspective view of the two halves of the shield slightly separated, but illustrating the manner in which it is applied to a radio tube;

Fig. 4 is a fragmentary perspective view of the top part of one of the shield halves, showing a modification; and

Fig. 5 is a fragmentary perspective view of another modified form of the shield assembly.

Referring to the accompanying drawing (Fig. 3 in particular) the form-fitting tube assembly shown therein comprises a plurality, in this case two, substantially symmetrical parts or halves 1 and 2 formed from sheet metal and adapted to be held in position by resilient means, in this case a split clamping ring 3 which is normally seated in a circumferentially formed groove 4. The position of the groove 4 may vary, but in the present instance is slightly below the maximum diameter of the bulb 5 of the tube and the clamping ring 3 is made of suitable spring wire and has a diameter slightly less than the outside diameter of the shield at the point of engagement therewith, so that when the ring 3 is snapped into the groove 4 the ends thereof are slightly separated, thus insuring the tension of the ring being exerted to hold the two halves or sections of the shield firmly together when assembled. The longitudinal edges of each of the half sections 1 and 2 are flanged outwardly and are of sufficient area as to form a substantial abutting surface when the two halves are positioned so as to oppose each other.

As will be observed from the drawing the general inner contour of each half part of the shield is substantially that of the outer contour of the tube. The lower end of the shield members 1 and 2 are semi-cylindrical in shape and together form a cylindrical extension which substantially covers the base of the tube. Immediately adjacent this extension the shield members 1 and 2 taper upwardly, following the general contour of the bulb. This taper increases upwardly until the parts 1 and 2 reach their largest radius at a point slightly above the middle of the bulb 5. The parts 1 and 2 then taper or curve inwardly so as to fit around the dome 12 of the bulb 5.

The top portion of the shield members converges inwardly so as to form a chimney 6 of smaller diameter than that of the dome 12, which extends upwardly a distance sufficient to enclose the electrode brought out the top of the bulb 5 and covered with a metal cap 7. To provide means for connecting a leading-in conductor to the top cap 7 a suitable aperture 8 is formed in the chimney section 6. The top edge of the chimney portion 6 is turned or spun inwardly a short distance, but there remains a circular opening or cut-away portion which is of sufficient diameter to remove any danger of electrical contact with the top cap 7. It also facilitates the attachment of the leading-in conductor without removing the shield when enclosing the tube.

In Figs. 2 and 3 of the drawing the aperture 8 is centrally located with respect to the curved or

cylindrical portion of one of the half shield members. As will be noted the aperture 8 is U-shaped and runs from the perimetral edge of the shield member and continues downwardly a distance to insure good clearance with the leading-in conductor for the top cap 7. When the aperture 8 is centrally located with respect to the chimney portion 6, the opposing half of the shield need not have a similar aperture, and consequently that section of the chimney is solid metal up to its perimetral edge. However, various modifications may be made with respect to the formation of the aperture 8. For example, the aperture may be formed so as to be equally divided between the adjacent longitudinal edges of each of the paired halves 1 and 2 of the shield (see Figs. 1 and 4). This form of construction makes in effect a right and a left of the two halves comprising the shield.

A modification of the shield assembly is shown in Fig. 5 consisting of using the shield half 2 which is not provided with the aperture 8, and combining it with a half of the shield-forming parts that does not have the chimney extension. Such a combination effects economy in material and may be used where complete shielding is not necessary because of the particular location of the tube on a specific design of chassis.

The different types of radio tubes now on the market vary with respect to their length as well as diameter; also they vary with respect to the contour of the bulb. For example, there is the small dome type represented by 77 and 78 type tubes; and the large dome represented by the 24A and 32 type tubes. These variations in size and/or type of tubes require variations with respect to length, diameter and general contour of the shield forming sections, which changes may be made because they are largely a matter of design. However, certain unintended minor variations in the bulb size of a tube of a given type present difficulties when it is sought to obtain a snug fit, and to compensate for this non-uniformity in bulb size as well as other imperfections, the present invention embodies a simple mechanical expedient which insures sufficient clearance between the bulb and shield-forming parts to obtain always a close fit therebetween.

This may be accomplished by providing circumferentially inwardly formed grooves 9 and 10 located near the top and bottom respectively of the shield members. The depth of the grooves 9 and 10 is sufficient to prove a two point or line contact between the outer wall of the bulb 5 and the inner surface of the shield sections 1 and 2 at the points of engagement with the ribs formed by making the grooves. That is to say, there is thus provided sufficient clearance between the inner walls of the shield parts and the outer wall of the tube so that the only points of contact between the shield members and the tube elements are where said ribs engage with the tube parts. This construction not only compensates for any variation in bulb size that would have a tendency to cause the shield halves 1 and 2 to fit the tube poorly, but also compensates for manufacturing imperfections such as crooked bases, i. e., bases imperfectly aligned with respect to the longitudinal axis of the bulb, etc.

The method of connecting the shield to a source of ground may be of any convenient form such as a spring clip, wire or the like. Since the manner or method of making this connection is well understood to those skilled in the art it has not been illustrated. Further, as no point has been made of the kind of material from which the shield is to be constructed, it may be assumed to be either magnetic or nonmagnetic material.

Although the invention has been described in its preferred form, modifications thereof will suggest themselves to those skilled in the art, but it is desired to cover all such modifications as may come within the scope of the appended claims.

What is claimed is:

1. A conductive shield for electrostatically screening the electrode system of a radio tube from external electrical disturbances comprising a pair of substantially similar dished metal members having a length sufficient to enclose the tube to be housed therein when measured from substantially the lower edge of the base to slightly above the end of the top terminal of the tube, the top part of said members surrounding said top terminal being substantially smaller in diameter than the remainder of the shield but substantially larger in diameter than the top terminal, one of said metal members being provided with an aperture originating at the perimetral edge of its top portion and extending downwardly a distance sufficient to insure clearance to a leading-in conductor for making electrical connection with the top terminal of the tube, and resilient means for maintaining said metal shield members in an assembled position, said shield members having peripherally extending channels or beads in the upper and lower portions thereof.

2. A form-fitting tube shield comprised of two symmetrical paired parts formed from sheet metal, said parts forming when assembled so that the longitudinal edges of one part abut those of the other, a hollow casing for the tube, said casing comprising a bulbous section having an inner contour substantially conforming to the outer contour of the bulb, a dome section adjacent thereto having an inner contour substantially conforming to the outer contour of the dome portion of the tube, and contiguous with said dome portion a chimney portion adapted to surround the top cap of the tube, said chimney being substantially smaller in diameter than the shield body yet substantially larger in diameter than the top cap of the bulb, said chimney portion being provided with a cut-away portion to permit the introduction of a leading-in conductor, and resilient means for maintaining said shield members in an assembled position, said shield parts having peripherally extending channels or beads in the upper and lower portions thereof.

3. A conductive shield for a radio tube of the type having a base sealed to one end of the glass bulb and an electrode sealed to the other end of the bulb, opposite to the base, said electrode being provided with a top cap extending in alignment with the longitudinal axis of the tube, said shield being adapted to electrostatically screen the electrode system of said radio tube from external electrical disturbances comprising a pair of thin sheet metal members, each having a length substantially equal to the space measured from substantially the lower edge of the base to slightly above the end of the top cap of the tube, the inner contour of each of said members conforming substantially to the outer contour of one-half of the bulb, said members forming, when assembled with the longitudinal edges of one abutting those of the other, a casing having substantially the configuration of the bulb, the upper part of each shield member having a semi-cylindrical extenstion, said semi-cylindrical extensions being adapted to form a chimney surrounding the top

cap of the bulb, said chimney being substantially smaller in diameter than the shield body yet substantially larger in diameter than the top cap of the bulb, a cutaway portion in said chimney suitable for permitting an electrical conductor to be attached to the top cap when the shield is in an assembled position, and a clamping ring seated in a circumferentially formed groove in the external surface of said shield members for maintaining them in an assembled position, said shield members having peripherally extending channels or beads in the upper and lower portions thereof.

4. A form-fitting tube shield comprised of two symmetrical paired parts formed from sheet metal, said parts forming when assembled so that the longitudinal edges of one part abut those of the other, a hollow casing for the tube, said casing comprising a bulbous section having an inner contour substantially conforming to the outer contour of the bulb, a dome section adjacent thereto having an inner contour substantially conforming to the outer contour of the dome portion of the tube, and contiguous with said dome portion a chimney portion adapted to surround the top cap of the tube, said chimney portion being provided with a cut-away portion to permit the introduction of a leading-in conductor, said shield members having sets of aligned semi-circular grooves formed on their surfaces, one set of said grooves being located adjacent the base of the tube, another set of said grooves being located at the dome section of the tube, said grooves forming internal ribs adapted to function as points of contact for the shield members with the tube, whereby variation in the bulb or imperfections in joining it to the base of the tube are compensated for with respect to the shield fitting the tube properly.

5. A form-fitting tube shield comprising a plurality of sections formed from sheet metal, said sections being adapted to be assembled with their longitudinal edges in engagement to form a hollow casing for a tube, said casing comprising a bulbous section having an inner contour substantially conforming to the outer contour of the tube, a dome section adjacent thereto having an inner contour substantially conforming to the outer contour of the dome portion of the tube, said shield sections having sets of indentations formed on their surfaces, one set of indentations being located adjacent the base of the tube, another set of said indentations being located at the dome portion of the tube, said indentations acting as bearing points for contact of the shield sections with the tube.

6. A form-fitting shield for radio tubes, said shield comprising a plurality of longitudinal sections adapted to mate at the edges extending longitudinally of the tube and when assembled to assume a configuration generally resembling that of the tube, the girth of said shield being slightly larger than that of the tube, means to hold the sections in assembled relation about the tube, and indentations spaced from said means on said sections adapted to act as bearing points for contact of the sections with the tube.

7. A form-fitting tube shield comprising a plurality of sections formed from sheet metal, said sections being adapted to be assembled with their longitudinal edges in engagement to form a hollow casing for a tube, said casing comprising bulbous and dome portions having an inner contour substantially conforming to the outer contour of the tube, said shield sections having peripherally extending channels or beads in the upper and lower portions thereof, and means to hold the sections in assembled relation about the tube.

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