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R. A. FISCH
INSULATED SHIELD FOR METAL
BACKED TELEVISION TUBES
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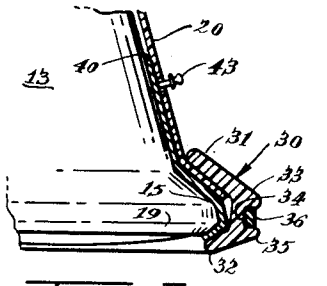


Fig. 7

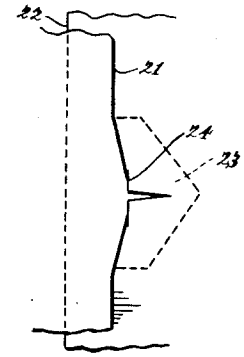


Fig. 3

Fig. 1

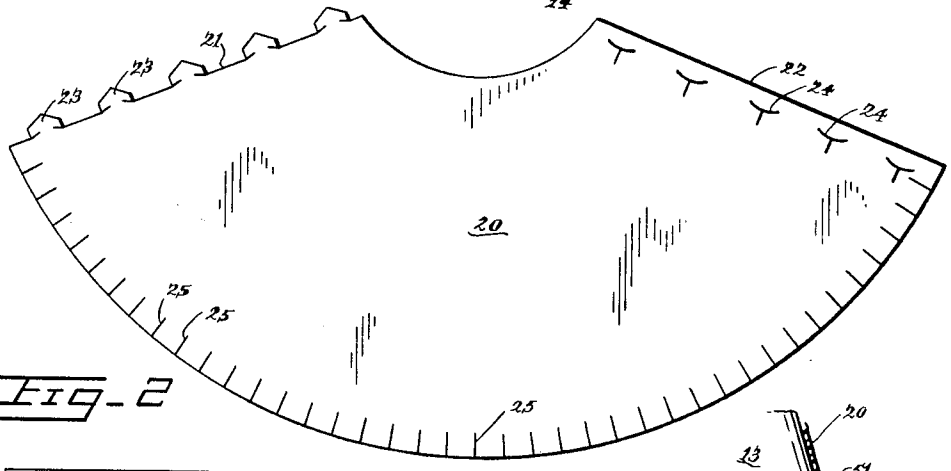


Fig. 2

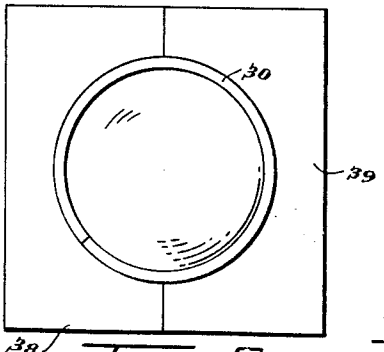


Fig. 5

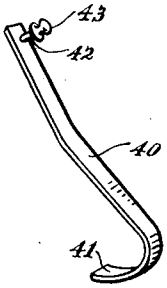


Fig. 4

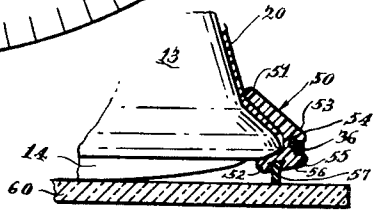


Fig. 6

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INSULATED SHIELD FOR METAL BACKED TELEVISION TUBES

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5 Claims. (Cl. 250—141)

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This invention relates to a novel device for shielding and protecting a metal backed television or cathode ray tube, more particularly it relates to a novel means for attaching an insulating shield to such a tube.

The general idea of shielding electrical equipment having exposed parts is old and well known but the shielding of metal backed cathode ray or television tubes presents peculiar difficulties. The metal backed cathode ray or television tubes comprise a glass bulb containing the electrode structure, a metal tube section which has a varying diameter (usually frustoconical) the small end of which is united to the end of the glass bulb and a glass lens element which is united to the open or large end of the said metal tube. In order that a good seal can be obtained between the lens and the metal backing, the metal back or conical section is flared outwardly at the large end to form a seat for the round edge portion of the lens. It is important to have a shield which fits closely about the metal backing and which also fits over the flared portion of the tube since this flared portion is the part which is most likely to be contacted. When a conical shield is placed about the tube it has a tendency to slip backward, away from the flared end or lens containing end of the tube, especially if the conical shield is made large enough to fit about the flared end of the metal backing.

An object of this invention therefore is to provide an improved insulating guard or shield for a metal backed cathode ray tube together with a means for holding the shield in place about the tube.

Another object of the invention is to provide an improved insulating shield for a metal backed cathode ray or television tube provided with means for grounding the metal backing.

Another object of the invention is to provide a novel means for securing an insulating shield to a cathode ray or television tube.

Another object of the invention is to provide a new ring of insulating material adapted to hold a shield in place on a television tube.

Another object of the invention is to provide a method and means for securing a conically shaped shield to a television tube and for attaching the combined shield and tube to a cabinet.

These objects and others ancillary thereto are obtained by making a conical shield from plastic material having a high insulating value which may be relatively stiff but is still bendable. The outer edge of the conical shield or skirt is slit radially at a plurality of points so that the outer

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edge can expand to fit about the flared portion of the tube and a circular clamping member made of flexible insulating material is provided to securely hold the slit portion of the skirt or shield snugly about the flared portion of the tube. The circular clamping member has the cross sectional shape of a distorted H and two of the legs of the H fit about the flange while the other two legs of the H extend away from the flanged edge and are adapted to hold an elastic member which in turn holds the clamping member tightly about the flanged edge of the tube. The outside groove of the clamping member which holds the elastic member also may be made deep enough to hold the edge of the cabinet structure which contains the opening for the television tube.

In some cases a plate glass is placed in front of a television tube to prevent injury if the tube should explode. Since the lens of the tube also collects an electrical charge, this lens will ordinarily collect dust and it is difficult to clean the dust from between the plate glass and the lens. In one modification of my invention I provide a dove tail groove in one of the outer edges of the clamping member and into the dove tail groove I insert an elastic projecting ring or gasket which seals off the space between the ring and the plate glass.

In general any resinous plastic material which has insulating properties may be employed to make the shield of the present invention. The shield may be formed from a flat sheet of material by first cutting to the shape of an appropriate sector and then uniting the edges to form a frustoconical tube. The edges may be united in any desired way as by heat sealing, cementing or by providing interfitting parts on the edges to be united. The hydrocarbon polymeric materials such as polyethylene, polyisobutylene, polystyrene, polymers and copolymers of butadienes, polymers and copolymers of methyl substituted homologues of butadiene such as isoprene, etc. are very suitable as the material for the shield. Other polymeric materials having high insulating values which may be employed are the polymers and copolymers of vinylidene chloride and vinyl fluoride, polyvinyl carbazole, polyvinyl naphthalene, etc. Impregnated fabrics such as cellulose acetate impregnated with vinyl butyral and similar materials may also be employed.

The clamping member is made from the same type of material as the shield and is preferably formed by an extrusion process.

Where a gasket or projecting ring is added to form a seal between the tube and a plate glass protecting plate, the gasket or ring, can be formed of any of the known elastic materials such as natural or synthetic rubber.

Since it is necessary to ground the metal backing, a metal strip adapted to extend inwardly from the large end and on the inside of the shield and having a button which extends through the shield is provided. The metal strip is held against the metal backing by clamping member and the grounding wire may be attached to the metal button which will be on the inside of the cabinet.

The novel features characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in connection with the accompanying drawings in which:

Figure 1 is a top plan view of a television tube with the shield of the present invention attached thereto.

Figure 2 is a plan view of a flat sheet of material from which the shield is made.

Figure 3 is a detail view showing how the edges of the shield made from the sheet of Figure 2 are attached together.

Figure 4 is a detail view of the grounding means.

Figure 5 is a front view of the tube inserted in a television cabinet.

Figure 6 is a detail view on an enlarged scale of a modification of the device.

Figure 7 is a detail view showing how the shield is attached to the edge of the tube.

The television tube for which this invention is specially useful is shown in Figure 1 and comprises the socket 10, the glass bulb section 11 containing the electrode, the metal backing 13 and the lens 14. The metal backing 13 is united to the glass bulb 11 at 12 and is flared at 15 to provide a seat for the glass lens element 14.

The shield 20 is preferably cut from the flat sheeting material into the form shown in Figure 2. The straight side 21 contains the projecting tabs 23 which are adapted to fit into the slits 24 inside the edge 22. The large curved edge is slit radially at a number of points 25. These radial slits 25 permit the outside edge of the skirt or shield to expand so that the body of the shield 20 will fit closely about the conical section 13 of the television tube. The edges 21 and 22 are united by inserting the tabs 23 in the slits 24 as illustrated in Figure 3. The overlapping edges of sides 21 and 22 may be heat sealed after uniting or if desired the edges may be united by heat sealing in the absence of the tabs and slots.

In order to hold the slit edge of the skirt or shield 20 at the flared end 15 of the television tube, a specially constructed clamping member 30 is provided (see Figures 1 and 7). This member 30 is made of stiff flexible plastic material such as polyethylene. This clamping member has the general outline of a circle the size of which is about the same as that of the flange or flared end of the television tube, and the clamping member has two interior or inwardly extending annular flanges 31 and 32, one of which (31) is slightly wider than the other and is adapted to press against the back of the flange or flared end 15 of the tube and the other of which (32) is adapted to extend over the edge portion of the lens 14

in the front of the tube. The clamping member also includes two exterior or outwardly extending annular flanges 33 and 35 with a groove or channel 34 formed therebetween. The annular flanges (31 and 32 especially) are made of sufficient thickness and extend at such an angle that they must be forced apart when the clamping member 30 is pressed tightly against the flanged or flared rim 15 of the tube so that when the clamping member 30 is held in place about said flared end 15 the annular flanges 31 and 32 are held tightly against and actually take the form of the flanged portion 15 of the tube as shown in the drawings.

The clamping member 30 is held in place by the annular securing member or band 36 which fits into the groove 34 and is preferably of elastic material but may be inelastic. It is essential however that the band 36 be capable of tightly holding the clamping member 30 against the flanged end 15 of the tube. After the annular member or band 36 is in place in the groove 34 there is preferably enough space left between the outwardly extending annular flanges 33 and 35 to permit the insertion of the edges of the cabinet sections or panels 38 and 39. These cabinet sections or panels have semi-circular openings, the edges of which cooperate with the annular member 36 to hold the clamping members 30 in place and the annular band 36 when made of elastic material furnishes a cushion mounting for the tube in the cabinet structure.

The grounding device 40 is shown in Figures 1 and 4 and comprises a hooked portion 41 which is adapted to be pressed against the edge 19 of the metal backing by the clamping member 30. The inside portion of the grounding device 40 comprises a projecting element for a neck 42 and a button 43, by which it is attached to the shield 20. The neck 42 is about the thickness of the shield 20 so that the button 43 projects through and extends outwardly from the shield, when the latter is in place on the tube 13.

A modified form of clamping member is shown at 50 in Figure 6. In this device the legs 51, 52, 53 and 55 correspond to the legs 31, 32, 33, 35 of Figure 1. The clamping member differs, however, in having an annular groove with a dovetail cross section 56. The rubber gasket 57 is inserted into the groove 56 so that it projects outwardly therefrom. The gasket 57 projects outwardly enough to close off the space between the curved lens 14 and the plate glass member 60 so that air and dust is prevented from accumulating on the lens 14.

It will be seen that this invention provides a novel means for securing an insulating shield to a metal backed television tube, for securing the shield and tube to a cabinet, for grounding the tube with such a shield, and (where a plate glass protecting member is employed) for preventing the accumulation of dust on the television lens.

I claim:

1. In a device which includes a metal backed cathode ray tube which has a glass bulb section containing the electrode structure and a tubular metal backing section with a smaller opening at one end sealed to said glass bulb and its larger opening at the opposite end flared outwardly and a lens seated and sealed in the flared opening of said metal backing, the improvement which comprises a shield of insulating material adapted to fit closely about said metal section of the tube, in combination with an insulating clamping member adapted to fit about the flared portion of said metal backing, said clamping member being of

substantially uniform cross sectional shape and having a pair of interior flanges adapted to straddle the said flared end of the metal backing of said tube with the end of said shield held between the clamping member and the said flared end, said clamping member also including a pair of exterior flanges forming a channel extending around the outside thereof and adapted to position a tightening band for holding the clamping member tightly about said flared end of the cathode ray tube.

2. In a device which includes a metal backed cathode ray tube which has a glass bulb section containing the electrode structure, a metal backing section of substantially frustoconical shape having its smaller end sealed to the glass bulb and its larger end flared outwardly and a lens seated and sealed in the flared opening of said metal backing, the improvement which comprises a frustoconical shield of insulating material adapted to fit closely about the said frustoconical section of said tube, in combination with an insulating clamping member having a generally circular outline, said clamping member having a pair of interior annular flanges adapted to straddle the flared end of said cathode ray tube with the large end of said shield held between the clamping member and the said flared end of said cathode ray tube, said clamping member also including a pair of exterior flanges forming a channel therebetween and adapted to position a tightening band for holding the clamping member tightly about the flared end of said cathode ray tube.

3. In a device which includes a metal backed cathode ray tube which has a glass bulb section containing the electrode structure, a metal backing section of substantialy frustoconical shape having its smaller end sealed to the glass bulb and its larger end flared outwardly and a lens seated and sealed in the flared opening of said metal backing, the improvement which comprises a frustoconical shield of insulating material adapted to fit closely about the said frustoconical section of said tube, the enlarged end of said shield having a plurality of slits therein permitting the edge portion to expand and adhere closely to the flared outside surface of said tube, in combination with an insulating clamping member having a generally circular outline, said clamping member having a pair of interior annular flanges adapted to straddle the flared end of said cathode ray tube with the large end of said shield held between the clamping member and the said flared end of said cathode ray tube, said clamping member also including a pair of exterior flanges forming a channel therebetween and adapted to position a tightening band for holding the clamping member tightly about the flared end of said cathode ray tube.

4. In a device which includes a metal backed cathode ray tube which has a glass bulb section containing the electrode structure, a metal backing section of substantially frustoconical shape having its smaller end sealed to the glass bulb and its larger end flared outwardly and a lens seated and sealed in the flared opening of said metal backing, the improvement which comprises a frustoconical shield of insulating material adapted to fit closely about the said frustoconical section of said tube, in combination with an insulating clamping member having a generally circular outline, said clamping member having a pair of interior annular flanges adapted to straddle

the flared end of said cathode ray tube with the large end of said shield held between the clamping member and the said flared end of said cathode ray tube, said clamping member also including a pair of exterior flanges forming a channel therebetween and adapted to position a tightening band for holding the clamping member tightly about the flared end of said cathode ray tube said frustoconical shield having a conducting element extending through a point in said shield which is slightly spaced from the larger end thereof and a conducting strip extending from the inside of said conducting element in the direction of and beyond said larger end of said shield whereby the interior flanges of said clamping member are adapted to positively grip the end of the conducting strip and hold the latter against the metal backing of the tube.

5. In a device which includes a metal backed cathode ray tube which has a glass bulb section containing the electrode structure, a metal backing section of substantially frustoconical shape having its smaller end sealed to the glass bulb and its larger end flared outwardly and a lens seated and sealed in the flared opening of said metal backing, the improvement which comprises a frustoconical shield of insulating material adapted to fit closely about the said frustoconical section of said tube, in combination with an insulating clamping member having a generally circular outline, said clamping member having a pair of interior annular flanges adapted to straddle the flared portions of said tube with the end of the said shield held between the said clamping member and the said flared end of the tube, said clamping member also having an exterior groove therein adapted to properly position a tightening band therein, a band in said outside groove of said clamping member adapted to hold the clamping member tightly against the flared end of said tube, and a pair of cabinet panels having semi-circular openings, the edges of which are adapted to fit over the said band and in said groove of the clamping member.

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