

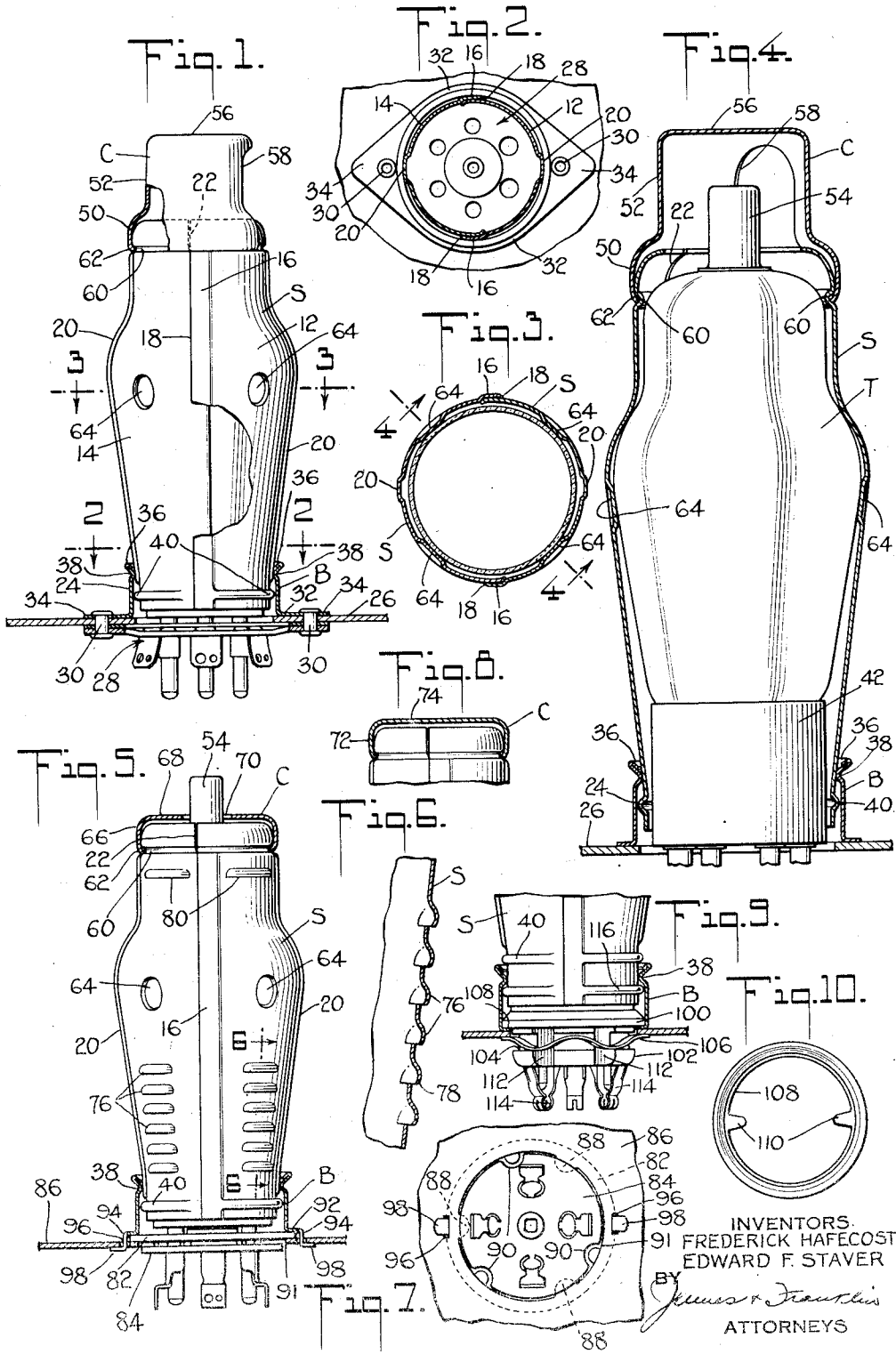
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RADIO TUBE SHIELD

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RADIO TUBE SHIELD

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This invention relates to shielding for electrical apparatus, and more particularly to radio tube shields, especially of the form-fitting type.

The primary object of our invention is to generally improve form-fitting shields for radio tubes. More specific objects are to provide more complete or continuous shielding around the tube; to establish good electrical contact between the various sections of the shield; and to fulfil these objects despite variations in the girth or diameter of the tube about which the shield is placed. To this end, we form the shield of a plurality of longitudinal sections which mate at their longitudinal edges to form an assembly having a configuration generally like that of the tube, but, contrary to prior practice, the meeting edges of the sections are overlapped for a substantial distance, each section preferably having an external lap pressed outwardly near one edge, with the edge turned inwardly to bear against the subjacent edge of the next section. In addition to the advantages of continuous shielding with good electrical contact despite variations in tube girth, this construction eliminates the outwardly projecting flanges or fins heretofore employed which are unsightly and frequently lead to injury, as when inserting or removing a shielded tube from the tube socket.

Further objects of my invention center about the grounding connection between the tube shield and the radio receiver chassis, and are to provide a grounding member which will be strong; which will afford excellent electrical grounding connection; which will operate to shield the base of the tube as well as the glass envelope; and which will serve further to hold the component sections of the shield in assembled relation. For this purpose, we have devised a grounding element in the form of a continuous ring-like base for the shield, the said base having appropriate means to secure the same to the chassis at the tube socket and being suitably dimensioned to receive the bottom end of the shield. In accordance with a further object and feature of our invention, the sections of the shield are provided with a transverse bead near the bottom end thereof, and the base is indented or channelled to form an inwardly directed ridge near the top edge thereof, the shield being inserted in the base, with the bead engaged below the ridge. Considerable difficulty arises because of rather large differences which arise when cementing the glass envelope in the insulation base of the tube, resulting in corresponding variations in the over-all height of the tube; and in accordance with our invention the

aforsaid bead and ridge are so related as to accommodate a substantial variation in tube height, say, one-quarter inch.

Further objects of our invention relate to the top of the shield and are to afford better enclosure of the tube therein; to facilitate the application of a pigtail clip to or its removal from the top terminal of the tube; and to avoid injury when so doing, as sometimes occurs with the so-called chimney top shield. With these objects in view, we provide a separately formed cap which may be placed on or removed from the top of the shield and which when removed exposes the top terminal of the radio tube to receive the pigtail clip. The shield sections are preferably peripherally grooved near the top end thereof, and the cap is turned inwardly at the lower edge thereof and so dimensioned as to fit into the aforesaid groove with a snap fit. It will be appreciated that the shield sections are held in assembled relation by the cooperative action of the base at the bottom of the shield and the cap at the top of the shield. In accordance with further features and objects of our invention, the shield sections are indented intermediate the top and bottom ends and preferably near the large-diameter part of the shield, to form fulcrum points which bear against the glass envelope of the radio tube and thereby spread or tension the ends of the sections within the confining base and cap; and at the same time we press the sections outwardly intermediate the edges to form dummy ribs preferably resembling the laps and operating to stiffen and strengthen the shield sections.

Other objects of our invention concern the cooling or ventilation of the shielded radio tube, and are to devise ventilating openings which will not reduce the continuity of the shielding wall; which will not reduce the strength and rigidity of the shield sections; and which will not present sharp edges which might lead to injury. To this end, we form louvers on the surface of the shield and preferably shape the same as later described.

Still another object of our invention is to provide the shield in two sizes and dimensions which are readily recognizable on inspection and which are so related that both may, if desired, be made in the same die equipment.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, our invention consists in the tube shield elements and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The

specification is accompanied by a drawing, in which:

Fig. 1 is a partially sectioned side elevation of a tube shield assembly embodying features of our invention;

Fig. 2 is a horizontal section taken in the plane of the line 2—2 in Fig. 1;

Fig. 3 is a horizontal section taken in the plane of the line 3—3 of Fig. 1;

Fig. 4 is a section taken in elevation in the plane of the line 4—4 of Fig. 3;

Fig. 5 is a partially sectioned side elevation of a modified form of the invention;

Fig. 6 is an enlarged section through the ventilating louvers and is taken in the plane of the line 6—6 of Fig. 5;

Fig. 7 is an inverted plan view of the arrangement of Fig. 5;

Fig. 8 is a section showing a modified cap for closing the top of the shield;

Fig. 9 is a section showing the invention in another form; and

Fig. 10 is a plan view of the grounding base shown in Fig. 9.

Referring to the drawing, the complete shield assembly of our invention comprises a plurality of longitudinal sections S which may be placed together about a radio tube T and which approximately follow the configuration of the tube. The sections S are held in assembled relation about the tube by a grounding base B which is secured to the chassis of the radio receiver at the tube socket, and a removable cap C which is placed over the upper end of the shield. With this arrangement the radio tube including its base and top terminal is completely housed by continuous shielding.

Considering the arrangement in greater detail and referring more specifically to Figs. 1 through 4 of the drawing, the particular form of the invention illustrated employs two shield sections 12 and 14 which are similar and interchangeable, each of the sections being provided near one edge with an outwardly pressed lap 16 the edge 18 of which is turned inwardly. The sections 12 and 14 overlap at the edges, the raised laps 16 coming outside the un-raised subjacent edge of the other section. This overlapping relation is desirable, first, because the shielding is kept complete and continuous; secondly, because good electrical contact is obtained between the two halves of the shield; thirdly, because differences or variations in the diameter or girth of the glass envelope of the radio tube are readily accommodated without losing the aforesaid advantages; and fourthly, because our present arrangement eliminates the outwardly projecting fins or flanges which were formerly employed and which frequently led to injury when placing a shielded tube in or removing the same from the tube socket. With the present arrangement, there is no possibility of injury because even the edges of the laps 16 are turned inwardly, as shown at 18, (Figs. 2 and 3), and there are no exposed or projecting sheet metal edges.

To strengthen and stiffen the shield sections as well as to give the assembled shield a symmetrical and attractive appearance, we press the sections outwardly intermediate the longitudinal edges thereof to form channels or ribs 20 which are dimensioned like and in every way resemble the laps 16. In this way the stiffening ribs 20 act as dummy laps, and when the shield is as-

sembled it is only on close scrutiny that the observer can ascertain that some laps are real and some dummy, or, in other words, that the shield is assembled rather than integral. Both the laps 16 and ribs 20 are preferably terminated below the bottom edge of cap C, and the shield sections need not overlap at all within the cap C, this being indicated by the cut-away area at 22 in Fig. 1.

The base or grounding ring B may be formed from sheet metal and comprises a preferably seamless tubular portion 24 provided with means at the bottom end thereof to secure the same to the chassis shield plate 26 at the tube socket 28. In the present case the socket is itself secured to plate 26 by rivets or eyelets 30, and the ring 24 is flanged outwardly at 32 and enlarged at 34 to provide arms which are perforated in alignment with the eyelets 30, the said eyelets thereby serving to hold the base B as well as the tube socket.

The tubular portion 24 of the base is preferably folded or rolled inwardly at 36 to provide a smooth protective edge and is preferably grooved or indented to form an inwardly directed peripheral ridge 38. At the same time, the shield sections S are pressed outwardly near the bottom ends to form transverse beads 40 which bear against the inner wall of the base and which tend to be anchored beneath the ridge 38. It will be noted on inspection of Figs. 1 and 4 that the bead 40 is located a substantial distance below the ridge 38, and in practice the ridge 38 is preferably located near the top of the base in order to make this relation possible. We have found that manufacturing variations in the dimension of the tube envelope are small; that practically no variation occurs in the molded tube base 42; but that substantial variation occurs in the over-all height of the tube, this apparently being due to differences in the positioning of the glass envelope in the base when cementing the same together. We have therefore designed the relation of ridge 38 and bead 40 in the manner shown to accommodate variations in tube height, and the illustration shows the case of a tube of mean or average height. It will be understood that with a tube of greater height, the bead 40 is elevated to a position nearer ridge 38, while with a tube of lesser height the bead 40 is lowered within the base B.

Cap C is preferably pressed or drawn from a single piece of sheet metal and in the present instance comprises a rounded portion 50 dimensioned to fit over the top end of the shield sections, an approximately cylindrical dome portion 52 which surrounds the top terminal 54 of the tube with ample clearance for the spring clip intended to be slipped over terminal 54, and a top 56. The side wall is cut away at 58 to receive the lead or pigtail running to the clip. The shield sections are peripherally grooved at 60, and the bottom edge of the cap is turned inwardly at 62 and protectively concealed thereby, leaving no exposed edge. The parts are so dimensioned as to mate together with a snap engagement.

The shield sections are preferably indented intermediate the top and bottom ends, say near the large-diameter part of the shield, to form fulcrum points 64. In the present case four such fulcrum points are used, two on each section and each located approximately mid-way between the laps 16 and dummy ribs 20, as is best shown in Fig. 3. These fulcrum points bear

against the glass envelope of the tube, as is evident from inspection of Fig. 4.

In practice the sections S are placed around the tube, and the shielded tube is then pressed into the tube socket. The bottom end of the shield passes freely into the grounding base B because at this time the shield sections are free to spread apart at the top. The pigtail clip is then readily slipped over the top terminal 54 of the tube, after which the cap C is snapped over the top of the shield, thus completing the shield assembly and drawing the shield sections together snugly about the tube. At the same time the bottom of the shield is expanded into tight engagement with the interior of the grounding base B, the sections of the shield pivoting about fulcrum points 64. This construction results in a surprisingly sturdy and integrated and electrically efficient assembly.

The cap may be modified to accommodate various conditions. The domed cap previously described is most efficient and desirable, but where shielding of the pigtail clip is not needed the cap may be simplified to assume the flat top form shown in Fig. 5, in which the circular portion 66 is continuous and is surmounted by a flat top 68 cut away at 70 to clear the tube terminal 54. The clip applied to terminal 54 stops short of the top wall 68 of the cap. The arrangement is simple and convenient, but the shielding is not as complete as with the domed cap.

Some tubes have no top terminal, and in such case the cap may assume the form shown in Fig. 8, in which it comprises a circular side wall 72 and an imperforate top wall 74. Even when dealing with tubes having no top terminal, it is sometimes desirable to use the apertured cap of Fig. 5 rather than the cap of Fig. 8 because the aperture facilitates removal of the cap; makes the cap interchangeably usable with tubes having a top terminal; and affords ventilation and cooling of the tube. If desired, a simple wire ring may be used in groove 60, instead of a cap.

Where ventilation is considered important, we have devised improved ventilating means, best shown in Figs. 5 and 6 of the drawing, and comprising louvers 76 struck outwardly on the side wall of the shield between laps 16 and dummy ribs 20. These louvers preferably extend horizontally and are closed at the top and open at the bottom, thereby encouraging upward circulation of cold air between the shield and the tube. The louver is formed with its bottom edge 78 turned inwardly, as is best shown in Fig. 6. This louver construction is far superior to the use of simple ventilating holes, first, because in the present case there is complete shielding, no metal being cut away; second, because the structural strength of the shield is unimpaired; and third, because there are no sharp edges which might lead to injury when handling the shield or placing a tube and shield assembly in the socket. The louvers are preferably nested near the lower portion of the shield for intake of cool air, particularly so where there is an opening at the top of the shield for discharge of the heated air, as, for example, the opening 58 on the domed cap, or the opening 70 in the flat cap. In the form shown in Fig. 5 we add louvers 80 near the top of the shield to admit additional cool air for flow over the top of the tube. It is manifest that, if desired, inverted air discharge louvers may be provided near the top of the shield, as when using an imperforate cap such as is shown in Fig. 8; also that the louvers may be struck inwardly instead of outwardly, the

open edge then being at the top for an air intake louver.

The mode of attachment of grounding base B to the receiver chassis may be modified in accordance with the particular form of socket used in the chassis. In Figs. 5 and 7, the socket is of the cinch type and comprises a pair of insulation discs 82 and 84 which are located on opposite sides of the metallic chassis plate 86. The chassis plate is provided with spaced inwardly directed tongues 88, and the bottom plate 84 has mating indentations 90. The smaller-diameter or bottom plate 84 of the socket is slipped through the large socket opening 91 of the chassis plate 86, the indentations 90 clearing the tongues 88, whereupon the socket is turned to displace the indentations from the tongues, thereby anchoring the socket on the chassis plate. With this form of socket, the grounding base B is flanged outwardly at 92 to fit over the periphery of the top plate 82 of the socket and is provided with depending tongues 94 which are passed through mating slots 96 in the chassis plate and are thereupon bent outwardly, as shown at 98.

In Figs. 9 and 10 we show the adaptation of the grounding base B to a molded socket comprising a single-piece molded construction including a top shoulder 100 which seats above the socket opening in the chassis plate, and a bottom shoulder 102 between which is provided a channel 104 dimensioned to receive a spring ring 106 which is inserted in place after the socket is dropped downwardly through the chassis plate. With this type of socket the grounding base B is provided with an inwardly rather than an outwardly bent flange 108 dimensioned to fit beneath the top shoulder 100 and which is locked between said shoulder and the chassis plate. Flange 108 is enlarged to form inwardly directed tongues 110, best shown in Fig. 10, which tongues are received within several of the vertical radial grooves 112 which are anyway provided on the socket between the spring contacts 114. The mating of tongues 110 and grooves 112 prevents rotation of the grounding base relative to the socket and chassis. These tongues may be enlarged and bent downwardly and soldered to the chassis, should a soldered connection be desired, as where the chassis metal is lacquered. It is evident that the other bases may also be soldered.

Radio tubes have been standardized so that a single shield may be used with a considerable number of different types of tube both with and without top terminals, all as heretofore described. However, there is another group of tubes which are similarly dimensioned in almost all respects except that they are about a quarter of an inch greater in length. To accommodate this class of tube, it is, of course, possible to design a shield just like that already described but of increased length. However, we have found it advantageous to shield such tubes in a shield exactly like that already described but modified solely at the bottom portion thereof in a manner best shown in Fig. 9. Referring to that figure, it will be seen that we project the tube shield downwardly below the regular bead 40, and add a second bead 116 located about a quarter of an inch below the first bead. With this arrangement the bead 116 acts as the regular bottom bead of the shield and is anchored below the ridge 38 of the base. Bead 116 and ridge 38 are relatively movable, as heretofore described, to accommodate unintended or manufacturing variations in tube height. We find this construction of advantage because it is possi-

ble to see at a glance whether the shield in question is of the longer or shorter type, the shorter shield having only a single bead, and the longer shield having a double bead. A more important
 5 advantage, however, arises when the two beads are made similar in construction and size, as shown, for it is then possible to make all of the shields of the longer type and to sever the bottom end from the shield to convert the same to
 10 the shorter type. The manufacturer is thus enabled to make both the longer and shorter shields with the same die equipment.

It is believed that the mode of constructing and using our improved form-fitting shield, as well
 15 as the many advantages thereof, will be apparent from the foregoing detailed description. The shielding is complete and electrically efficient despite variations in tube girth and height. There are no exposed sharp edges which might
 20 injure the user, and the top terminal of the tube is fully exposed during the application of a pig-tail clip thereto. The grounding base is continuous and rigid, and affords good electrical connection and shielding of the tube base. The
 25 parts of the shield overlap and are tightly locked together. Special ventilation may be provided, if desired, without loss of strength or shielding efficiency. Various caps and bases may be used with the same longitudinal shield sections, depending
 30 upon special requirements to be met, and even the longitudinal sections may be varied in dimension in an especially convenient manner.

It will therefore be apparent that while we have shown and described our invention in preferred
 35 forms, many changes and modifications may be made in the structures disclosed, without departing from the spirit of the invention, defined in the following claims.

We claim:

40 1. A form-fitting sheet metal shield for conductively shielding radio tubes comprising a plurality of readily separable longitudinal sections adapted to mate at the edges extending longitudinally of the tube and when assembled to assume a configuration generally resembling that
 45 of the tube, the meeting edges of the sections being overlapped for a substantial distance, one of each pair of overlapping edges being bent side-wardly to receive the other edge, said overlapping edges being devoid of fastening means, and
 50 releasable means for holding the sections in assembled relation about a radio tube.

2. A form-fitting shield for radio tubes comprising a plurality of readily separable pressed sheet
 55 metal sections adapted to mate at edges extending longitudinally of the tube and when assembled to assume a configuration generally resembling that of the tube, the meeting edges of the sections being overlapped for a substantial distance, said overlapping edges being devoid of fastening
 60 means, and the sections being similar and each having an external lap pressed outwardly near one edge, with the edge of the lap turned inwardly to prevent injury when handling the assembled
 65 shield, and releasable means for holding the sections in assembled relation about a radio tube.

3. A form-fitting shield for radio tubes comprising readily separable pressed sheet metal sections adapted to mate on lines extending longi-
 70 tudinally of the tube and when assembled to assume a configuration generally resembling that of the tube, the meeting edges of the sections being overlapped for a substantial distance, said overlapping edges being devoid of fastening means,
 75 the sections being similar and each having an

external lap of substantial width pressed outwardly at one edge, each of said sections being pressed outwardly intermediate the edges to form dummy ribs of substantial width resembling the
 5 aforesaid laps in appearance and operating to stiffen and strengthen the shield, and releasable means for holding the sections in assembled relation about a radio tube.

4. A shield assembly for radio tubes comprising in combination a shield made of a plurality of
 10 longitudinal sections which when assembled approximately follow the configuration of the tube, and a circular grounding base having means to secure the same to a chassis plate at the tube socket, the sections of said shield having a trans-
 15 verse bead near the bottom end thereof, and said base having a ridge near the top edge thereof, said shield being dimensioned to be inserted in and held in assembled relation by the base.

5. A shield assembly for radio tubes comprising
 20 in combination a sheet metal shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, and a circular sheet metal grounding base having means to secure the same to a chassis
 25 plate at the tube socket, the sections of said shield having a transverse bead near the bottom end thereof, and said base being indented or channeled to form an inwardly directed ridge near the top edge thereof, said shield being dimensioned to be inserted in the base with the shield
 30 bead engaged below the ridge of the base, the parts being adjustable in a vertical direction to accommodate variations in the over-all length of the radio tubes with which the shield is used.
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6. A shield assembly for radio tubes comprising in combination a shield made of a plurality
 40 of sections which when assembled approximately follow the configuration of the tube, and a circular grounding base having means to secure the same at the tube socket, the meeting longitudinal edges of the sections being overlapped for a substantial distance, the sections being similar and each having an external lap pressed outwardly
 45 at one edge to receive the adjacent edge of the next section, and the assembled shield being dimensioned to be inserted in and held assembled by the base.

7. A shield assembly for radio tubes comprising in combination a sheet metal shield made of a
 50 plurality of sections which when assembled approximately follow the configuration of the tube, and a circular metal grounding base having means to secure the same to a chassis plate at the tube socket, the meeting longitudinal edges of
 55 the sections being overlapped for a substantial distance, the sections of said shield having a transverse bead near the bottom end thereof, and said base being indented or channeled to form an inwardly directed ridge near the top
 60 edge thereof, said shield being dimensioned to be inserted in the base with the shield bead engaged below the ridge of the base.

8. A shield assembly for radio tubes comprising in combination a shield made of a plurality of
 65 longitudinal sections which when assembled approximately follow the configuration of the tube, and a cap for holding the sections in assembled relation and for closing the top of the shield.

9. A shield assembly for radio tubes comprising in combination a sheet metal shield made of
 70 a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, and a sheet metal cap for closing
 75

the top of the shield, the sections of the shield being peripherally grooved near the top end thereof, and the cap being turned inwardly at the lower edge thereof and so dimensioned as to fit into the aforesaid groove.

10. A shield assembly for radio tubes comprising in combination a shield made of a plurality of sections which when assembled approximately follow the configuration of the tube, and a cap for holding the sections in assembled relation and for closing the top of the shield, the meeting longitudinal edges of the sections being overlapped for a substantial distance, and the sections being similar and each having an external lap pressed outwardly at one edge.

11. A shield assembly for radio tubes comprising in combination a sheet metal shield made of a plurality of sections which when assembled approximately follow the configuration of the tube, and a sheet metal cap for closing the top of the shield, the meeting longitudinal edges of the sections being overlapped for a substantial distance, the sections of the shield being peripherally grooved near the top end thereof, and the cap being turned inwardly at the lower edge thereof and so dimensioned as to fit into the aforesaid groove.

12. A shield assembly for radio tubes comprising in combination a shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, a circular metallic grounding base, and a cap for closing the top of the shield, the sections of said shield being dimensioned at the bottom end thereof to be received in the base, and being dimensioned at the upper end thereof to be received in the cap, whereby the shield sections are held in assembled relation about the tube by the cooperative action of the base and the cap.

13. A shield assembly for radio tubes comprising in combination a shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, a circular grounding base, and a cap for closing the top of the shield, the sections of said shield having a transverse bead near the bottom end thereof, and said grounding base having a peripherally indented rib near the upper edge thereof dimensioned to receive and anchor the bottom end of the shield therein, the shield sections being grooved near the upper end thereof, and the cap having its lower edge turned inwardly and dimensioned to fit into said groove.

14. A shield assembly for radio tubes comprising in combination a shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, a circular grounding base, and a cap for closing the top of the shield, the meeting edges of the sections being overlapped for a substantial distance, the sections of the shield being indented to form fulcrum points located intermediate the ends of the shield, the bottom end of the shield being dimensioned to be received within the base, the top of the shield being dimensioned to be received within the cap, and the shield sections being held in assembled relation about the tube by the cooperative action of the base, the cap, and the fulcrum points bearing against the tube.

15. A shield assembly for radio tubes comprising, in combination, a shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, a circular grounding base having means

to secure the same to a chassis plate at the tube socket, and a cap for closing the top of the shield, the meeting edges of the sections being overlapped for a substantial distance, the sections being similar and each having a lap displaced at one edge, the sections of the shield being indented to form fulcrum points located at approximately the large-diameter part of the shield, the sections of said shield having a transverse bead at the bottom end thereof, and said grounding base having a peripheral rib near the upper edge thereof dimensioned to receive and anchor the bottom end of the shield therein, the shield sections being grooved near the upper end thereof, and the cap having its lower edge turned inwardly and dimensioned to fit into said groove, the shield sections being held in assembled relation about the tube by the cooperative action of the base, the cap, and the fulcrum points bearing against the tube.

16. A shield assembly for radio tubes comprising in combination a shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, and a circular grounding base having means to secure the same to a chassis plate at the tube socket, the sections of said shield having two spaced transverse beads near the bottom end thereof, and said base being indented or channeled to form an inwardly directed ridge near the top edge thereof, said shield being dimensioned to be inserted in the base with the lowermost shield bead engaged below the ridge of the base.

17. A shield assembly for radio tubes comprising in combination a shield made of a plurality of longitudinal sections which when assembled approximately follow the configuration of the tube, and a grounding base having means to secure the same to a chassis plate at the tube socket, the meeting edges of the sections being overlapped for a substantial distance, the sections being similar and each having a lap at one edge, the sections of said shield having two spaced transverse beads near the bottom end thereof, and said base being indented or channeled to form an inwardly directed ridge near the top edge thereof, said shield being dimensioned to be inserted in the base with the ridge of the base between the two beads of the shield.

18. A shield for a radio tube, and ventilating means for affording circulation of air around the tube, said means including a plurality of louvers formed on the surface of the shield.

19. A shield for radio tubes, said shield comprising a plurality of sections which when assembled enclose a radio tube, and ventilating means for affording circulation of air around the tube, said means including a plurality of louvers formed on the surface of the lower part of the shield, the louvers being shaped to prevent decrease of the shielding action and to prevent injury when handling the shield.

20. A form-fitting shield for radio tubes comprising metal sections adapted to mate on lines extending longitudinally of the tube and when assembled to assume a configuration generally resembling that of the tube, and ventilating means for affording circulation of air around the tube, said means including a plurality of louvers formed on the surface of the shield.

21. A form-fitting shield for radio tubes comprising metal sections adapted to mate on lines extending longitudinally of the tube and when assembled to assume a configuration generally resembling that of the tube, the meeting edges

of the sections being overlapped for a substantial distance, the sections being similar and each having an external lap displaced outwardly at one edge, and ventilating means for affording
5 circulation of air around the tube, said means including a plurality of louvers formed on the

surface of the shield, the louvers being shaped to prevent decrease of the shielding action and to prevent injury when handling the shield.

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