Nov. 1, 1955 W. E. RUDOLPH 2,722,669

CORONA SHIELD

Filed Sept. 14, 1951

FIG. 1.

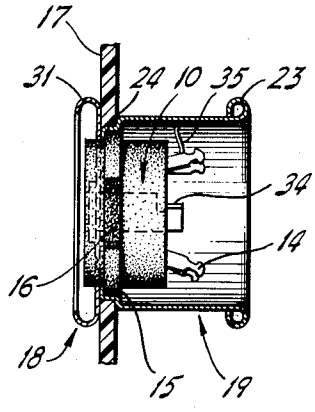


FIG. 2.

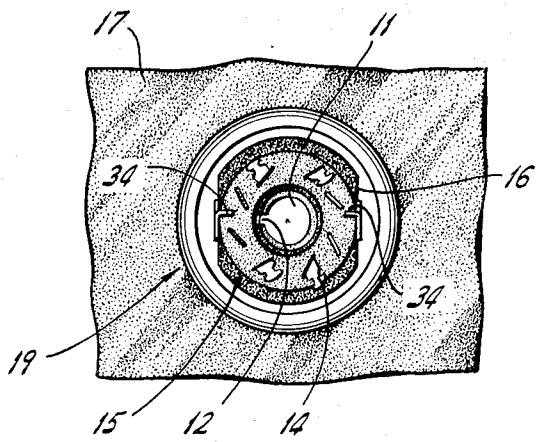
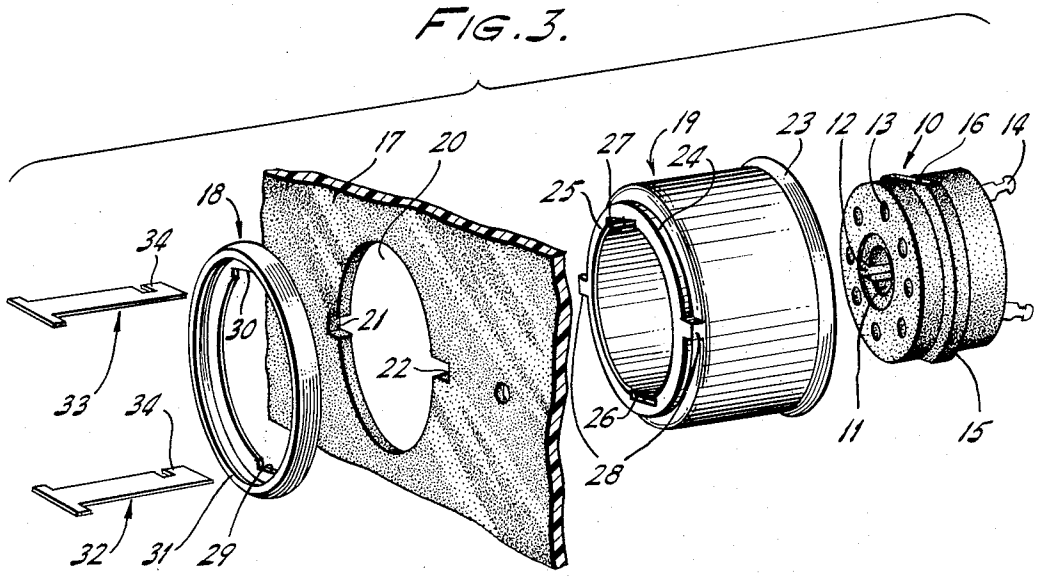


FIG. 3.



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CORONA SHIELD

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2 Claims. (Cl. 339—143)

My invention has to do with socket structures adapted for use with electron tubes and, more particularly, is concerned with prevention of the corona effects which are commonly encountered when socket lugs or terminals are maintained at a substantial potential difference with respect to the chassis of the apparatus with which the tube is employed. This condition may be met in circuits of a variety of types such, for example, as when the socket is used to support a high voltage rectifier tube of the type in which the anode terminal is brought out through a top cap. In such an application all of the tube pins, and hence the various socket terminals, are maintained at substantially the same elevated potential with respect to the chassis.

Where high potential differences are encountered, sharp corners of terminals and other conductors, solder points, terminal posts, and junctures, are conducive to corona and tend to result in energy losses and disturbances. While it is known to reduce these deleterious effects by painstaking rounding, and hence elimination, of the offending sharp corners and projections, such an approach to the problem is unsatisfactory being, at best, a time-consuming and costly procedure.

Accordingly, it is the principal object of this invention to provide for extremely simple and effective shielding of tube socket structure and consequent elimination of corona and its deleterious effects.

With more particularity it is an object of my invention to provide an inexpensive and highly effective tube socket and corona shield device, the apparatus being especially characterized by simplicity of manufacture and ease of assembly.

The manner in which the foregoing, together with other objects and advantages of the invention may best be realized, will be understood from a consideration of the embodiment of the invention illustrated in the accompanying drawing, in which:

Figure 1 is a sectional view of a tube socket and corona shield assembly constructed in accordance with the present invention;

Figure 2 is a plan view of the apparatus looking toward the terminal end of the assembly; and

Figure 3 is an exploded, perspective view illustrating the component parts of the apparatus and the mode of assembly thereof.

As illustrated in the figures of the drawing, and first briefly described, it will be seen that there is provided—in conjunction with a mounting panel of suitable non-conductive material—a tube socket and a pair of shield elements cooperable with the socket and the panel both to provide for simple and secure attachment of the socket to the panel and to eliminate the corona effects aforesaid.

The socket structure, indicated generally by the reference numeral **10**, is of known type comprising a generally cylindrical base member fabricated of non-conductive material, said base being provided with a central bore **11** having a keyway **12**, and also being provided with a

plurality of tube pin-receiving apertures **13** within which are received conductive means (not illustrated) for gripping the tube pins. Each of the latter means has an associated terminal lug **14** extending through the socket in the direction of the central bore **11** and being adapted for soldered connection with suitable conductors. The socket base is further provided with an annular flange **15** having a pair of "flatted" portions **16**. This flange is utilized in maintaining the several parts of the apparatus in assembled relation, as will presently appear.

It will be appreciated that the principles of the invention are applicable to a variety of tube socket bases, the illustrated type being shown merely by way of example. The manner in which such a base serves to support a tube and to connect the pins of said tube to the required circuitry, is well known and will be understood without further description.

In particular accordance with the present invention, the socket base **10** is releasably secured to supporting panel structure, fragmentarily illustrated at **17**, through the agency of shield elements **18** and **19** which, as will be clear from what follows, serve also to prevent the deleterious corona effects mentioned above.

The panel structure **17** has a circular socket-receiving aperture **20** therein and opposed portions of the annular wall which defines this aperture are notched, as shown at **21** and **22**. The shield element **19**, within which is received the socket base **10** when the apparatus is assembled, is of generally cylindrical form, its outer free edge being rolled as at **23** to reduce corona effects and its inner edge being provided with a circular boss **24** having an inwardly turned flange **25** which is notched at two regions **26** and **27**, these regions being disposed for alignment with the aforesaid flatted areas **16** of the flange **15** of tube base **10**. A pair of projections **28** are provided upon the flange **25** of the shield element **19**, these projections being cooperable with notched areas **21** and **22** of the panel structure **17** to prevent rotative movement of the assembly, with respect to the panel.

The other shield element **18** comprises a centrally apertured ring-like structure and, as is the case with shield element **19**, the central aperture of ring **18** has a pair of oppositely disposed notches, these appearing at **29** and **30** in the drawing. These notches, when the parts are assembled, are disposed in alignment with corresponding notches **26** and **27** of shield element **19** and also with the flatted portions **16** of the socket tube base **10**. It is to be borne in mind that corona discharges may occur in the vicinity of the pin-receiving contact means mounted within the apertures **13** of the base, and to eliminate deleterious effects which might otherwise arise from this latter source the ring-like shield element **18** is smoothly contoured, in which connection reference should be had to the rolled edge or lip shown at **31**.

Means is providede for securing the base **10** and the shield element **19** to the panel structure, and this means in the illustrated embodiment takes the form of a pair of T-shaped keys **32** and **33** disposed to react between the base **10** and the shield element **18**. As will be best understood from a consideration of Figures 1 and 3, the head portions of these T-shaped keys bear against the outwardly presented surface of ring **18**, the keys passing through notched portions or areas **26** and **27** and **29** and **30**, past the flatted areas **16** of tube base **10**, and into engagement with the tube base.

During assembly of the apparatus the tube base **10** is first placed within shield element **19** with its flange **15** bearing against the inner surface of the flange **25** provided upon shield element **19**. When the base and shield element have been thus associated, the shield element is moved into engagement with one face of the panel struc-

ture and into registry with the panel aperture **20**. In this position the projections **28** of the shield engage the notches **21** and **22** of the panel structure to prevent rotative movement of the parts, as above described. The ring-like element **18** is then disposed upon the opposite face of the panel, all of the notched areas being properly aligned. Completion of the assembly operation is now readily accomplished by inserting the T-shaped keys **32** and **33** within the notches **29** and **30**, the keys being of such a length as to extend through the panel structure, past the flatted areas **16** of the tube base and beyond the end of said base. A locking tab **34** is provided upon each of the keys and, as clearly appears from Figure 2, turning of these tabs out of the plane of the key structure causes them to overlie the end of tube base **10**. Since the head of each key bears against wall structure surrounding the notches **29** and **30** of shield element **18**, and since the key tabs **34** react against base **10** to hold it and the shield element **19** against the panel structure, the component parts of the device are securely though releasably mounted upon the panel.

Electrical connection between the lug structure of the base and the corona shield elements may be accomplished conveniently by extending a short connecting wire, shown at **35** in Figure 1, between one of the lugs and adjacent wall portions of shield element **19**. The shield element **18** is, of course, conductively associated with element **19**, and hence with the lugs of the base, by virtue of the fact that the keys **32** and **33**, which are of conductive material, bear against both of the shield elements.

From the foregoing description it will be understood that the device of my invention is not only extremely simple to assemble, but also that it is of very inexpensive construction. The shield elements **18** and **19** may be fabricated from light metal stampings readily formable to the desired contour by simple drawing and spinning operations. That shield elements configured and disposed in accordance with the disclosure of this invention are highly effective in preventing corona losses will be evident to those skilled in the art to which the invention appertains.

I claim:

1. A socket shielding and mounting assembly adapted for use with apertured panel structure, comprising: a pair of shielding elements each having an apertured panel-contacting portion, said elements being adapted for mounting on opposite sides of panel structure with the apertures of said elements in registry with the aperture provided in the panel structure; a socket disposed in one of said elements and having a contact-carrying portion shielded by said one element, said socket further having a second contact-carrying portion disposed to project from said one element through the aperture in the panel and into said other element to be shielded thereby; and securing means associated with said other element and being adapted to extend through the aperture of the panel structure and through the aligned aperture of the said one element into engagement with the socket therein, to couple said socket and said elements and to maintain them in assembled relation with respect to the panel structure.

2. Apparatus in accordance with claim 1, and further characterized in that said one element is provided with a peripheral seat defining the aperture therein, said peripheral seat being adapted to be engaged by said socket and disposed to extend within the panel aperture to locate said one element in the panel structure.

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