May 18, 1948. R. B. McGEE 2,441,938

SHIELDED SOCKET FOR RADIO TUBES

Filed March 26, 1947

Fig. 1.

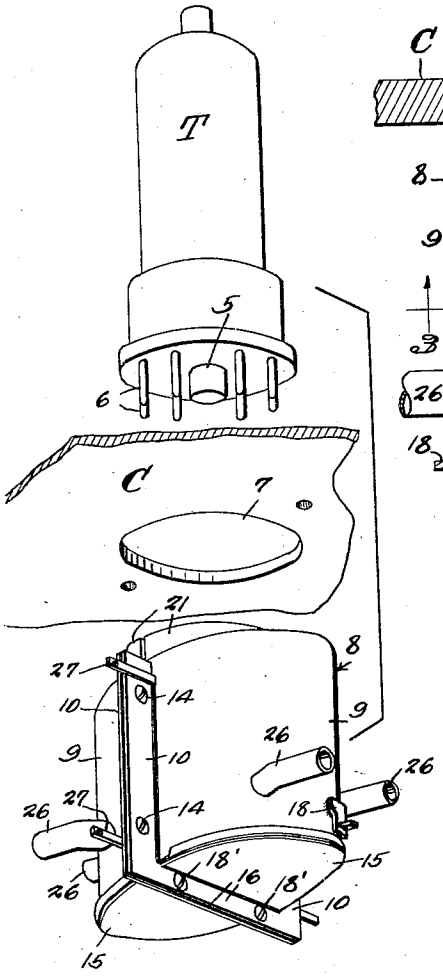


Fig. 2.

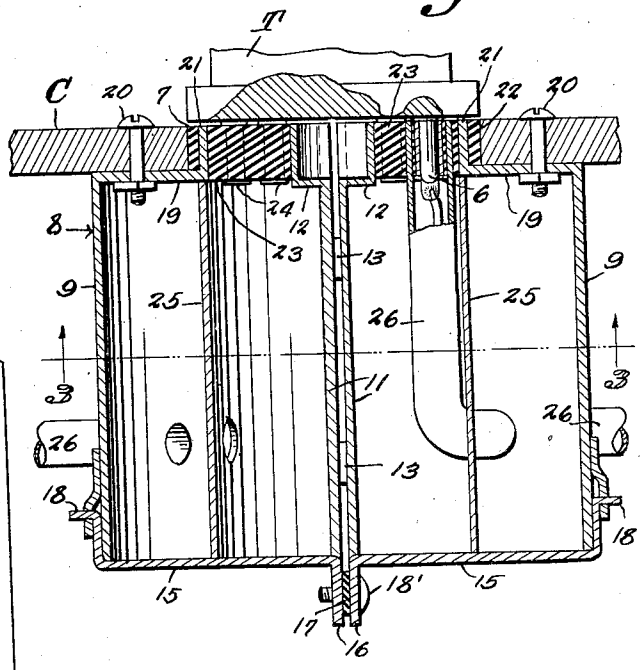
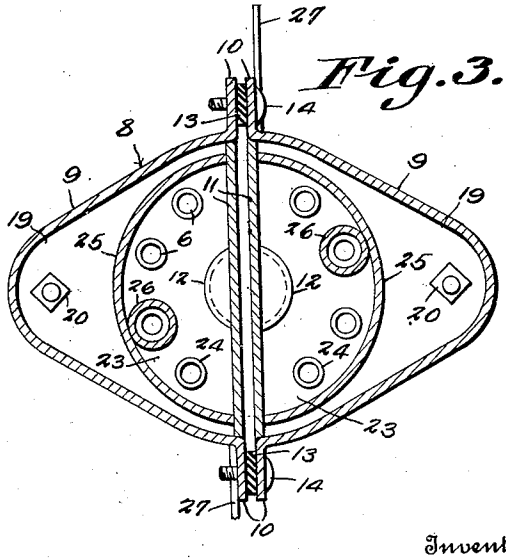


Fig. 3.



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Patented May 18, 1948 2,441,938

UNITED STATES PATENT OFFICE

2,441,938

SHIELDED SOCKET FOR RADIO TUBES

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Application March 26, 1947, Serial No. 737,242

2 Claims. (Cl. 174—35)

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This invention relates to sockets for radio vacuum tubes, and more particularly, has reference to a socket of this type in which a built-in shield structure is embodied, constituting means for effectively isolating the input and output circuits passing through the socket.

By way of background, conventionally formed vacuum tube sockets have not hitherto been formed with shields, for the purpose stated above. In fact, until fairly recent developments have pointed to the need for such a shield, there has been no necessity for constructing sockets with circuit-isolating means as indicated.

With the advent of present-day high amplification circuits, and with the resultant steadily increasing use of high amplification tubes, there is arising the problem of "feedback" of energy between the input and output circuits of the tubes, occurring in the tube sockets, pointing to the necessity of completely shielding the circuits one from the other in the sockets so as to eliminate this reaction.

Some steps have already been taken in this direction, but no provision has been made for complete elimination of "feedback" between the input and output circuits within the tube socket. It is accordingly the primary object of the invention to provide a tube socket in which is embodied means for efficiently and completely isolating the input and output circuits, by closing all paths of "feedback" between these circuits. Additionally, the structure designed for this purpose provides isolation of the circuits from external fields of reaction extending around the filaments and other element leads.

In order to carry out the stated objects of the invention, I provide a tube socket in which is incorporated a built-in cross sectional shield structure, and in which, additionally, are provided a cylindrical shield structure providing further isolation from the fields extending around the filaments, and a sleeve shield structure adapted to shield the grid and plate pins of the tube, and the leads extending therefrom out of the socket.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings:

Figure 1 is a perspective view, showing a tube, a portion of a chassis shield plate, and a tube socket constructed in accordance with the invention, these parts being shown detached one from the other.

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Figure 2 is a longitudinal vertical sectional view through a tube socket constructed in accordance with the invention, the socket being mounted on a chassis shield plate.

Figure 3 is a view taken substantially on line 3—3 of Figure 2.

Referring to the drawing in detail, the letter of reference T designates generally a vacuum tube of conventional construction, constituting no part of the invention, said tube being provided with a centrally disposed locating prong 5 and contact or base pins 6, which in the tube illustrated, are disposed in a circle around the locating prong. It is pointed out, in this connection, that the tube socket which is the subject of the application does not require the use of tubes of the particular type illustrated in Figure 1, the tube socket being adapted for the use of various types of tubes, as desired, as will be apparent from the description.

The letter of reference C designates a chassis shield plate, having the opening 7, through which contact is established between the tube T and the tube socket.

I provide in my improved tube socket an outer shield 8. This is formed in two opposed and identically constructed sections. Each section is provided with an outer wall 9. The side edges of each outer wall 9 are bent outwardly to provide opposed side flanges 10. Between its side flanges 10, each of the outer walls 9 is bent rearwardly, so that when the two sections forming the outer shield 8 are placed together, the over-all structure of the tube socket, when viewed in horizontal section, as shown in Figure 3, is substantially elliptical.

The respective sections forming the outer shield 8 are additionally formed with flat-surfaced opposed inner walls 11, that extend from top to bottom of the tube socket. The upper edges of the opposed inner walls 11 are formed, intermediate their ends, with substantially semicircular recessed portions 12, between which are received the locating prong 5.

As shown clearly by Figures 2 and 3, the inner walls 11 are slightly spaced from each other, by means of insulating washers 13. These are interposed between the side flanges 10, and receive screws 14, that fixedly secure together the two sections comprising the outer shield 8.

Each of the sections comprising the outer shield 8 is additionally provided with a bottom

cover 15. The bottom covers 15 are formed with opposed depending flanges 16 that are spaced from each other by washers 17, there being provided screws 18 whereby the respective bottom covers 15 may be connected together.

Each of the bottom covers 15 may additionally be securely locked in position by means of latching or locking elements 19 whereby the covers may be secured to the outer walls 9.

Each of the sections forming the outer shield 8 is formed with a top piece 19 that is preferably of integral formation with the outer wall 9, the top piece having an opening in which is received a fastening means 20, by means of which the tube socket may be secured detachably to the chassis shield plate C. The inner edges of the respective top pieces 19 are extended upwardly to form opposed semi-circular collars or flanges 21. These are extended upwardly through the opening 7 of the chassis shield plate C, and are insulated therefrom by means of an annular insulating washer 22 that is interposed between the collars 21 and the wall of the opening 7.

The opposed collars 21, after the two sections forming the outer shield 8 are secured together, form a large circular opening that is split diametrically into halves by the spaced apart upper edges of the inner walls 11. In each of the semi-circular halves of this opening there is mounted, by any suitable means, a socket element 23, which is formed of insulating material, and which is provided with suitable openings 24 for receiving the contact pins 6 of the tube T. The socket elements are each formed with a curved edge that abuts against the collar 21, and with a straight edge that abuts against the inner wall 11, the straight edge being rearwardly curved along part of its length to receive the recessed portion 12 of each inner wall 11.

Thus it is seen that the input and output circuits of the tube and tube socket are efficiently separated and isolated completely, by reason of the provision of a socket formed in the manner described above. In this way, there is no danger of the possibility of a "feedback" of energy occurring between these two circuits, inasmuch as the paths thereof are completely closed off by the construction described.

However, there is also the possibility, in tubes of the type described, of the circuits being interferred with by reacting to external interfering fields.

In order to prevent this, I provide a shield structure within each of the sections comprising the outer shield 8, this being in the nature of an inner shield. While the outer shield 8 is constructed in separate sections for the purpose of isolating the input circuit from the output circuit, the inner shield which is placed within each section is for the specific purpose of isolating each of the said circuits from reacting to the presence of external interfering fields at the socket itself. This is quite common to circuits where high mutual conductance tubes are used.

My inner shield comprises a curved member 25, which is transversely curved in semi-circular form, and which has its side edges secured to the inner walls 11 of each section. The curved members 25, as clearly seen from Figure 2, constitute an extension of the collars 21 and result in the formation of a cylindrical enclosure extending from the top to the bottom of the socket, said cylindrical enclosure being divided as hereinbefore described.

I further provide in my device shielding pipes

or sleeves 26, which are extended laterally through the outer walls 9 and curved members 25, being then extended upwardly to pass through the socket elements 23, and terminating at the upper surface thereof. The shielding pipes 26, as clearly shown in Figures 2 and 3, fully surround the openings 24 of the socket 23 from the upper to the lower surfaces thereof, providing interference-resistant shields for the contact pins 6, and additionally providing an interference-resistant shield for each of the elements leading from the contact pins 6.

By reason of the construction which I have described, I have provided a tube socket with built-in shield, that is fully effective in high amplification circuits particularly, in isolating the respective input and output circuits from one another, so as to prevent completely any energy leakage between these circuits within the socket. Further, I have provided means whereby each of the respective circuits, in passing through the tube socket, is isolated from reaction from, or interference by, other elements. In addition, the use of the shielding pipes 26 further eliminates any pickup of stray energy from other paths of introduction, such as the other elements on the particular side of the socket in which said pipes are respectively mounted. Thus, the pipes close off effectively the last paths of stray pickup both from the other elements themselves, and from the leads extending to said elements.

It is pointed out that the use of separated inner walls 11, on each of the sections comprising the outer shield 8, eliminates re-radiation occurring at high frequencies.

Completing the construction of a tube socket in accordance with the invention, there are secured to the side flanges 10 soldering lugs 27 whereby the shield may be wired to ground connections.

What is claimed is:

1. A radio tube socket, including an outer shield, the outer shield comprising separate sections insulated from each other, a socket element, carried by each section, formed with openings for receiving the contact pins of a radio tube, and shielding pipes extending through the socket elements around the openings therein, said shielding pipes being extended through the walls of the outer shield.

2. A radio tube socket, including an outer shield, the outer shield comprising separate sections insulated from each other, an inner shield member dividing each section into separate chambers, a socket element carried by each section, said socket elements being formed with openings for receiving the contact pins of a radio tube, and shielding pipes extending through the socket elements and around the openings formed therein, said pipes being extended downwardly from said openings and through the walls of the outer shield.

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REFERENCES CITED

The following references are of record in the file of this patent:

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