Nov. 8, 1955 R. A. LANG 2,723,384

ELECTRON TUBE SOCKET

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Fig. 1.

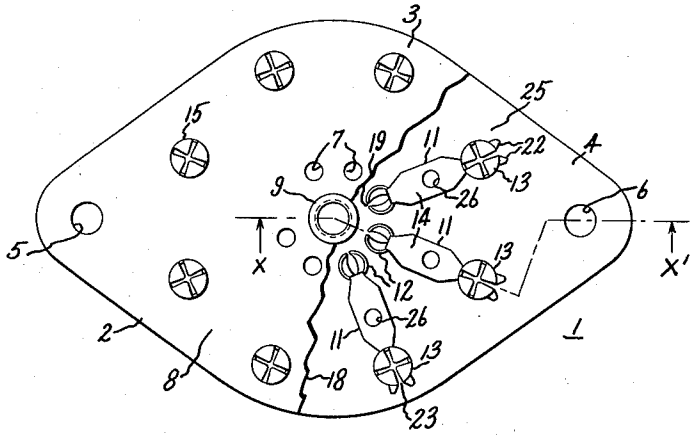


Fig. 2.

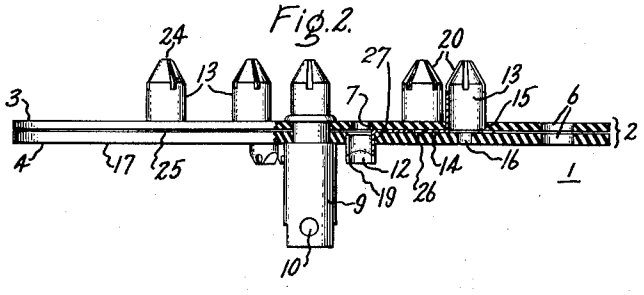
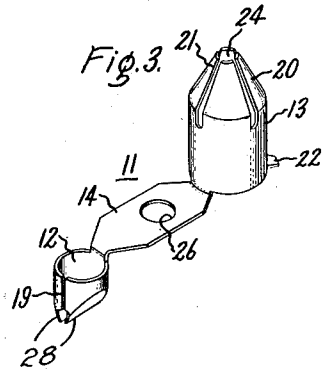


Fig. 3.



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ELECTRON TUBE SOCKET

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2 Claims. (Cl. 339—194)

My invention relates to sockets for supporting electron tubes and more particularly to such sockets in which the lead-connecting terminals extend through and project above the upper surface of the tube socket, i. e., the surface through which the radio tube pins are inserted.

Radio tube sockets in prior art arrangements generally comprised an insulating body having positioned therein contact members or elements. Each of these members included a socket portion adapted to receive the tube prongs or pins and a lead-connecting terminal portion which extended downwardly from the lower surface of the tube socket. It was to these terminal portions that the various lead connections within the radio receiver were soldered.

In the manufacture and assembly of radio receivers employing such sockets it was necessary to individually solder the desired leads to each separate terminal member. This was a time-consuming and inefficient operation in which it was impossible to insure uniformly soldered joints.

It is therefore desirable to have a radio tube socket in which all the lead wires may be simultaneously soldered to the contact elements of the socket thus insuring an efficient and uniform soldering operation. A manufacturing technique for simultaneously soldering a number of terminals has heretofore been developed. In this technique the terminals and lead wires to be soldered are dipped into a molten bath of solder. This is called pot-soldering.

It is therefore a primary object of my invention to provide a new and improved radio tube socket which is adapted to pot-soldering techniques.

It is a further object of this invention to provide an improved radio socket in which the lead-connecting terminal members project substantially above the upper surface of the tube socket.

For additional objects and advantages and for a better understanding of my invention, attention is now directed to the following description and accompanying drawings. The features of my invention which are believed to be novel are particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a top plan view of my improved radio tube socket in which a portion has been cut away so as to show more clearly the location and configuration of the contact members.

Fig. 2 is a side elevation view, partly in section, taken along lines X—X' of the socket shown in Fig. 1.

Fig. 3 is an enlarged perspective view of the contact member shown in Figs. 1 and 2.

Referring to Figs. 1 and 2, I have shown an improved tube socket **1** which is adapted for use in radio and television chassis assembled and soldered in part by pot-soldering techniques. The tube socket **1** comprises an insulating member **2** which in my preferred embodiment comprises two superposed insulating plate members **3** and **4** (shown better in Fig. 2). It will be evident that instead of the two insulating plates a single molded plastic

body member might well be employed. While the external configuration of the tube socket is not controlling, I have shown one which is essentially diamond-shaped and includes apertures **5** and **6** through which suitable means such as rivets may be inserted for securing the tube socket to a suitable radio chassis.

An inner ring of apertures **7** extending through the upper plate **3** and opening on the upper surface **8** thereof is provided for the reception of the pins of a radio tube. Each of these apertures **7** is slightly larger in diameter than that of the tube pin. The number and positions of the apertures **7** in this inner ring correspond to the number and positions of the tube pins to be received therein.

The two superposed insulating plates **3** and **4** are secured together by means of the centrally disposed combination rivet and grounding lug **9**. It will be of course understood that these plates might well be fastened together by suitable eyelets passing through the mounting apertures **5** and **6**. The combination rivet and grounding lug **9** is provided with a lead-admitting aperture **10**.

A plurality of contact members **11** are positioned within the body member **2** to complete the electrical connection between the tube pins and the desired circuit leads. As seen in Fig. 2, a tube pin receiving portion **12** of the contact member **11** is positioned below the aperture **7** in the upper plate **3** and within an aperture **27** in the lower plate **4**. The contact member **11** also comprises a lead-connecting terminal portion **13** connected to the pin-receiving portion **12** by means of a flat web portion **14**. It should be noted that the interconnecting web portion **14** lies between the superposed insulating plates **3** and **4**. The pin-receiving portion **12** then is positioned within the aperture **27** of the insulating plate **4** and is further positioned, throughout the web portion **14**, above the upper surface **25** of the insulating plate **4**. The tubular lead-receiving portion **13** is entirely above this upper surface **25**.

The lead-connecting terminal portions **13** project above the upper surface **8** of the body member **2** through suitable apertures **15** provided in the body member **2**. Each aperture **15** extends through the upper insulating plate **3** and is in radial alignment with the corresponding inner aperture **7**. These apertures **15** form an outer ring concentric with the inner ring of apertures **7**.

There is provided an opening **16** in the lower surface **17** of the body member **2** which extends through the lower plate **4** and is in registry with the aperture **15** in the upper plate **3**. It is through this aperture **16** that suitable circuit leads pass to be soldered to the lead-connecting portion **13**. Aperture **15** is larger than the tubular portion **13**. Opening **16** is of smaller diameter than that of the tubular portion **13** positioned above it.

As seen in Fig. 1, a portion of the upper surface **8** of the body member **2** including the upper plate **3** has been cut away along the line **18** so as to show the relative positioning of the contact members **11** within the body member **2**, and further to illustrate how the contact members **11** are positioned on the upper surface **25** of insulating plate **4**.

In some applications it may be desirable to omit the upper insulating plate **3**, in which case the contact members **11** may be secured to the upper surface **25** of the insulating plate **4** by any suitable means. For example, rivets may be inserted in the apertures **26** in the web portion **14**. It will be evident that when glass base tubes are employed, there is no need for insulation directly above the inner ring of apertures **7**.

The contact member **11** described generally above is best shown in Fig. 3. The pin-receiving portion **12** is tubular in shape and includes the beveled jaws **28** which are adapted to grasp a tube pin. The cintact member **11** is a metal stamping and for ease in manufacture the

tubular portion **12** is split at **19**. This pin-receiving portion **12** is integrally connected to and depends from the horizontal web portion **14**. The other end of the web portion **14** is integrally connected to the upstanding lead-connecting portion **13** which is also tubular in nature. This portion **13** includes an open-ended conical portion **20** having a plurality of axial slots **21**. This slotted cone portion acts to secure the lead wires within the tubular lead connecting terminal before the final soldering operation is undertaken.

I have found that in many applications it is not necessary to employ the conical portion **20** and that a simple pin-type hollow or tubular terminal having an open end is satisfactory.

The tubular lead-connecting portion **13** also includes at the outer periphery thereof locating and securing means comprising the two tabs **22** which serve to anchor that portion within the body member. The tubular lead-connecting portion **13** is split in a manner similar to that described in connection with the pin-receiving portion **19**. This can best be seen as the slit **23** shown in Fig. 1.

The tube socket when completely assembled is secured to a suitable radio chassis by any suitable means. The circuit leads to be connected to the tube socket are positioned within the tubular lead-connecting portions **13**. The tube socket and chassis may be then inverted and passed through a molten bath of solder in which only the projecting lead-connecting portions **13** are immersed. The liquid solder may then flow through the slots **21** and the openings **24** provided at the ends of the terminal members **13**, thus insuring a uniformly soldered joint between those members and the interpositioned circuit leads.

In many installations, I have found it desirable to position a circular channel-shaped shielding member over the outer ring of lead-connecting terminal members **13** so that they can not be subjected to accidental body contact during operation of circuits in which the socket is connected.

With my improved tube socket, the lead terminal members project above the chassis, thus enabling voltage and other measurements to be made at the tube socket while the radio tube is in operating position.

It will thus be apparent that I have provided an improved tube socket which has particular application in the manufacture and assembling of radio receivers in which pot-soldering techniques are employed, whereby the lead connections to the terminal members of the radio tube socket may be simultaneously and uniformly soldered in one operation. This is structurally accomplished by bringing the lead-connecting terminal members out through and above the upper surface of the tube socket.

While a specific embodiment of my invention has been shown and described and certain modifications have been suggested, it will of course be understood that various other modifications may be made without departure from the principles of the invention. The appended claims are therefore intended to cover any such modifications within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A tube socket comprising an insulating body member having an upper and a lower surface, a plurality of integral contact members positioned therein, apertures in said upper surface, each of said contact members comprising a pin-receiving portion of tubular configuration terminating in beveled jaws at one end thereof engageable through one of said apertures in said upper surface and positioned below it, apertures in said lower surface and a tubular lead-connecting portion engageable through said apertures in said lower surface and projecting through said upper surface, said tubular lead-connetcing portion being adapted to have secured therein by pot-soldering a lead engaged through said lower surface and a web portion connecting said pin-receiving portion and said lead connecting portion.

2. A tube socket comprising an insulating body member having an upper and lower surface, a plurality of integral contact members positioned therein, apertures in said upper surface, each of said contact members having at one end a first tubular pin-receiving portion having beveled jaws at one end thereof engageable through said apertures in said upper surface and positioned below it, apertures in said lower surface and a second tubular lead-connecting portion aligned with and engageable through said apertures in said lower surface and projecting through and above said upper surface, said tubular lead-connecting portion having a conical section provided with axial slots therein so as to be adapted to have secured therein by pot-soldering a lead engaged through said aperture in said lower surface, and a web portion connecting said first tubular portion with said second tubular portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,702,234	Goodridge	Feb. 12, 1929
1,774,646	Goudy	Sept. 2, 1930
2,066,876	Carpenter	Jan. 5, 1937
2,486,115	Chiuchiolo	Oct. 25, 1949
2,502,291	Taylor	Mar. 28, 1950
2,563,775	Del Camp	Aug. 7, 1951
2,593,479	Nieter	Apr. 22, 1952

FOREIGN PATENTS

726,159	France	Feb. 23, 1932