May 11, 1926. 1,584,167

R. W. CAMFIELD

TUBE ADAPTER

Filed March 2, 1923

FIG. 2.

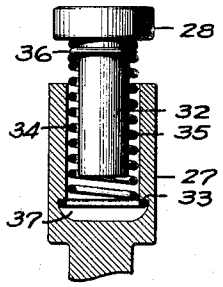


FIG. 1.

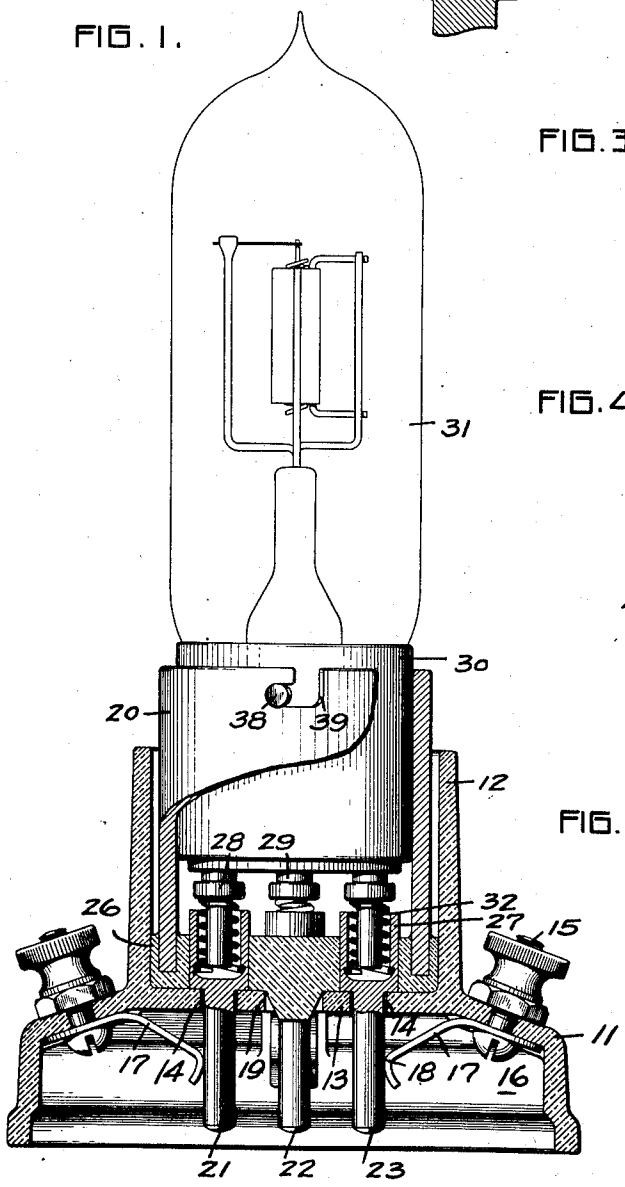


FIG. 3.

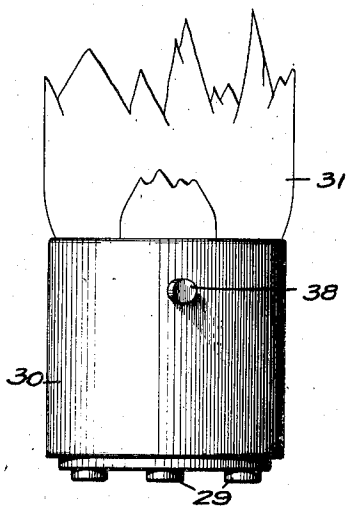


FIG. 4.

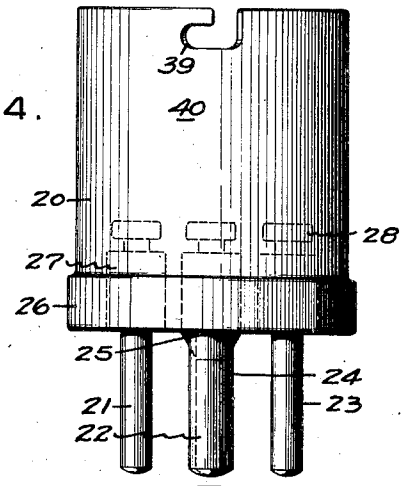
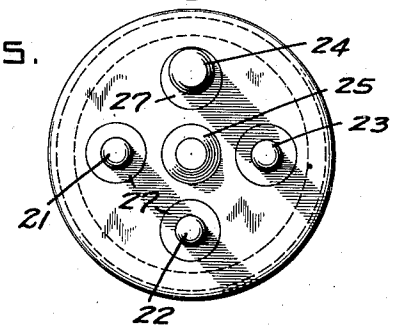


FIG. 5.



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Patented May 11, 1926. 1,584,167

UNITED STATES PATENT OFFICE.

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TUBE ADAPTER.

Application filed March 2, 1923. Serial No. 622,282.

This invention relates to an adapter for a vacuum tube, such as is used in connection with radio signaling. At the present time there are several sizes of vacuum tubes or thermionic devices on the market, and each type has been used extensively. In order to change from one kind of tube to the other in the same system, the tube socket must also be changed so as to cooperate properly with the contacts on the device which it is desired to use. One manner in which the change may be readily accomplished from one kind of socket to another is by the provision of an adapter that is arranged to fit removably inside of a socket. With the adapter removed, the tube having the larger base may be directly accommodated within the socket. To take care of the tube having the smaller base, the adapter is first inserted into the socket, and then the tube is placed into the adapter. Of course the adapter carries contacts that serve to connect the tube contacts with those of the socket.

It is one of the objects of my invention to provide an adapter of this sort that is simple and inexpensive to manufacture.

It is another object of my invention to provide a spring-pressed contacting device, adapted for use in connection with thermionic tubes, in which the parts are few and rugged, and in which there is a certainty that proper electrical connections may be maintained even after continued and prolonged use.

My invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description, where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. Although I have shown in the drawings but one embodiment of my invention, I do not desire to be limited thereto, since the invention as expressed in the claims may be embodied in other forms also.

Referring to the drawings:

Figure 1 is a view of a tube, fitting into an adapter embodying my invention, which adapter is shown as inserted into a socket; the adapter and socket being mainly in section;

Fig. 2 is an enlarged sectional view of the top portion of one of the contacts used in the adapter shown in Fig. 1;

Fig. 3 is an elevation of the lower part of a vacuum tube, showing the base which is capable of cooperating with an adapter embodying my invention;

Fig. 4 is an elevation of the adapter; and Fig. 5 is a bottom plan view of the adapter shown in Fig. 4.

The tube socket 11 in the present instance is shown as made of insulation material and as comprising a hollow portion 12, in the bottom 13 of which there are apertures 14. These apertures are provided to permit the passage of contact posts or prongs associated with the tube that is designed for use with the socket 11. A plurality of binding posts 15 fastened to the hollow base portion 16 of the socket 11 serve as convenient means for connecting the tube to its external circuit. For furthering this object, resilient metal contacts 17 are fastened within the base 16 to the binding posts, and are arranged to present curved surfaces, such as 18, in the path of movement of the contact posts projecting beyond the base of the vacuum tube inserted within the socket 11. In this way there is produced a rubbing contact between these flat springs 17 and the contact posts whenever the tube is so inserted within the socket as to project the contact posts through the apertures 14.

In order to prevent any improper connection from the tube elements to the external circuits, it is customary in this type of apparatus to provide for at least one contact post or prong of different size or shape from the others, and also preferably spaced irregularly with respect to the center of the socket and the remaining posts. Thus there is just one relative position of the socket and tube which will permit the insertion of the contact posts in the apertures 14. Furthermore a central aperture 19 in the portion 13 may be provided for accommodating a central projection. Although a special form of socket 11 has been described, it is of course to be understood that many of the features of my invention may be utilized with substantially any other type of socket.

The adapter 20, shown most clearly in Figs. 4 and 5, is provided with a plurality of contact posts or prongs 21, 22, 23 and 24, which correspond to those of the tube for which the socket 11 was originally designed. It is to be noted that prong 24 is larger in diameter than the others, and that it is

farther from the central boss 25. These metallic prongs are embedded, in a base 26 of insulation material, preferably molded bakelite, and for this purpose, each of them is provided with an enlarged hollow portion 27. This enlarged portion also serves to hold the contact buttons or studs 28 in a resilient manner, so that they may cooperate properly with the contacts 29 located on the base 30 of a tube 31. The studs 28 have each a shank portion 32, as shown most clearly in Fig. 2, which projects into the enlarged hollow portion 27 of the contact post. A shoulder 33 is formed at the bottom of the longitudinal aperture 34 so as to anchor the last turn of the spring 35 in this aperture. The spring is utilized to support the stud 28 and to urge it resiliently against the tube contacts 29. For this purpose, it surrounds the shank 32 and is anchored to the shank by the aid of an annular projection or flange 36 formed on the shank.

The manner of assembling the contact and its spring within the post 21, 22, 23 or 24 is extremely simple. The spring 35 is pressed over the projection 36 so that at least one turn of the spring is held between this projection and the head 28. Then the bottom turn of the spring is expanded so that in its free condition it will have a diameter appreciably larger than that of the other turns. This turn is then temporarily compressed to a smaller diameter so that it may enter aperture 34, and it is placed into the aperture and urged toward the bottom thereof. As soon as the last turn slips past the shoulder 33, it expands to its free size, and snaps underneath the shoulder 33. The last turn is thus securely anchored in the enlarged space 37 at the bottom of the aperture 34. This type of contact may also be used advantageously in connection with any form of tube socket, and is not limited in use to an adapter.

In the present instance, the adapter 20 is shown as arranged to accommodate a tube 31 which has a radial pin 38 projecting from its base 30. This pin may enter the bayonet slot 39 formed at the top of the hollow cylindrical portion 40 of the adapter 20. This portion may be formed integral with the base 26, but in the present instance I have shown it as made of metal and embedded within the base. The external diameter of this portion 40 must of course be slightly less than the internal diameter of socket 11.

It is evident that the adapter may, by appropriate change in design, serve to provide a connection socket for substantially any type of tube that is smaller than the socket within which the adapter is accommodated. Furthermore, the resiliently supported contact studs 28 are reliable in service; all liability of mis-alinement or of loosening of the contacts is obviated by the scheme of anchoring described.

I claim:

1. In an adapter for a thermionic tube, an insulating base, a contact post having an aperture in one end held by said base so that the post projects therethrough, said aperture having an enlargement near the bottom, forming a shoulder, a coiled spring disposed in the aperture and having a portion of its turns of larger diameter than the remainder for anchoring the spring on the shoulder at one end, and a contact stud attached to the opposite end of the spring.

2. A contact post having an aperture, said aperture being enlarged at its bottom so as to form a shoulder, a coiled spring in said aperture having a portion of its turns of larger diameter than the remainder for anchoring the spring on the shoulder at one end, and a contact stud attached to the opposite end of the spring.

3. A contact post having an aperture, said aperture being enlarged at its bottom so as to form a shoulder, a coiled spring in said aperture having a portion of its turns of larger diameter than the remainder for anchoring the spring on the shoulder, and a contact stud having a shank encircled by the spring, said stud being provided with an annular projection for anchoring it to the spring.

In testimony whereof, I have hereunto set my hand.

RUSSELL W. CAMFIELD.