Nov. 30, 1948. G. M. ANDERSON 2,454,760

ELECTRICAL CONNECTOR

Filed Oct. 1943

FIG. 1.

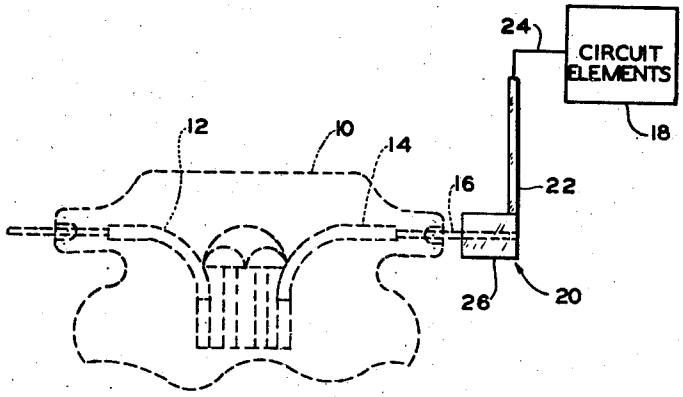


FIG. 2.

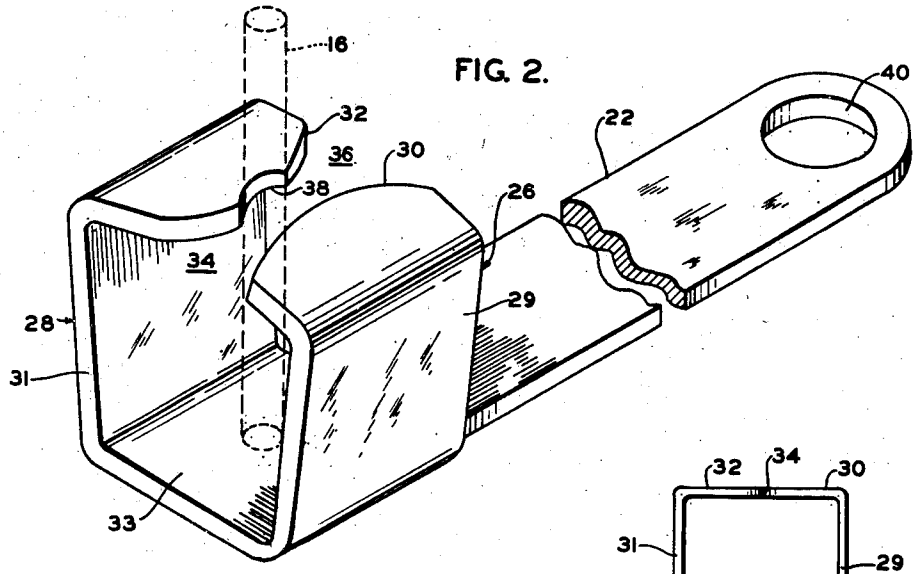
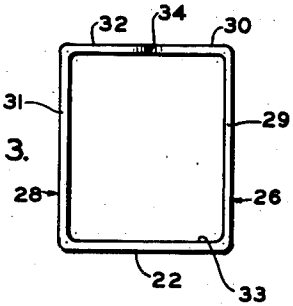


FIG. 3.



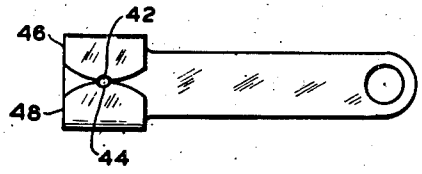


FIG. 4.

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ELECTRICAL CONNECTOR

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4 Claims. (Cl. 173—269)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to electrical connectors, and more particularly electrical connectors of the type used to detachably connect vacuum tube electrodes or the like into electric circuits.

Certain types of UHF tubes are known, wherein the electrode leads are made as short as possible in order to reduce the effect of the lead inductance for the purpose of decreasing the input and/or output resistance resulting from said lead inductance. It has also been found that, in order to facilitate the shortening of said leads, it is desirable to eliminate the conventional tube base and pins and to directly connect the tube electrodes to the circuit in which the tube is to be employed.

It is, therefore, a primary object of this invention to provide an electrical connector for detachably connecting vacuum tube electrode leads, or the like, into electrical circuits.

Another object of the present invention is to provide an electrical connector for vacuum tube leads which permits the insertion and removal of the tube from a circuit with a minimum of manipulative effort.

Still another object of the present invention is to provide an electrical connector whereby good electrical contact between the connected electrode and the circuit elements may be obtained.

A further object of the present invention is the provision of an electrical connector which is simple in construction, economical to produce, and dependable in use.

In accordance with this invention, there is provided an electrical connector comprising an elongated body portion having a pair of resilient jaws formed at one end thereof, said jaws having cooperating, inwardly-directed flanges adapted to receive and grip a vacuum tube electrode therebetween.

To the accomplishment of the foregoing general objects, and such other more specific objects as hereinafter appear, my present invention consists in the apparatus elements and their relation to one another as are hereinafter described and sought to be claimed in the following specification. The specification is accompanied by a drawing in which:

Figure 1 is a view of the electrical connector as employed with an UHF tube;

Figure 2 is a perspective view of the preferred form of my invention;

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Figure 3 is an end elevational view thereof; and

Figure 4 is a top plan view of a modified form of electrical connector.

Referring to the drawing and in particular Figure 1 thereof, there is shown, in phantom, a fragment of a UHF tube 10 having conventional electrodes, two of which are here shown at 12 and 14. Electrode 14 is provided with a lead 16 connected at one end to said electrode 14. The free end of the lead 16 extends through a glass envelope, and is adapted to be connected to an electrical circuit 18 by means of a connector generally designated by the numeral 20, in accordance with the present invention.

As shown, the connector is a clip-like device made of any suitable resilient electrically conducting sheet metal material such as hardened beryllium copper and comprises an elongated body portion 22, adapted to be connected to the circuit 18 by means of any suitable conductor 24, which may be fixedly attached to one end of said body portion 22, as by soldering. The other end of the said body portion 22 is provided with a pair of resilient jaws 26, 28, formed in a manner clearly disclosed in Figure 2.

The jaws 26, 28 are preferably made integral with the body portion 22 and, as shown in Figure 2, said jaws comprise upwardly extending walls 29, 31, which may be formed in the following manner: Starting with a T-shaped blank of which the cross arm has two portions corresponding to the aforementioned walls 29, 31, the latter may be bent toward each other at right angles to the plane of the body portion 22 along lines parallel to said body portion, forming the upstanding walls 29, 31, and a bight portion 33 disposed therebetween which, with the walls 29, 31, define a U-shape. The free ends of the walls 29, 31, are bent toward each other and at right angles to the planes of said walls 29, 31, and along lines parallel to the body portion 22, into abutting coplanar relation, forming opposing inwardly-directed flanges 30, 32. It will be seen that under normal conditions the plane of the flanges 30, 32 is parallel to the plane of the body portion 22 and perpendicular to the planes of the walls 29, 31. This relationship is clearly shown in Figure 3.

Referring again to Figure 2, it will be seen that the abutting edges of the flanges 30, 32 are convex-shaped in order to provide flared end openings 34, 36 for guiding the electrode 16 into a central gripping portion of the flanges 30, 32, at which point one of the flanges (in the illus-

trated embodiment, it is the flange 32) has a concave, substantially semi-circular notch 36 formed therein to receive the electrode 16.

The electrode is firmly held in position in the notch 36 by the edge of the opposing flange 30. The size of the notch 36 is preferably such that approximately half of the electrode cross section enters therein, the remaining portion of the electrode cross section serving to keep the flanges 30, 32 in spaced relation such that they exert pressure upon the electrode in order to firmly retain the same in the notch. In this position the jaws 26, 28 are slightly sprung outwardly with respect to the body portion 22. The connector is preferably placed on the electrode in such a way that the free end of the electrode lies flush against the body portion 22 of the connector and at right angles thereto, thus assuring good electrical contact therebetween.

At a point near the end of the body portion 22 remote from the jaws 26, 28 an aperture 40 may be formed at which the circuit wire 24 (Figure 1) may be fastened.

A modified form of connector is shown in Figure 4. As shown, the modified connector differs from the hereinbefore described device in the fact that concave shaped notches 42, 44 are formed at the midpoints of each of two convex flanges 46, 48, said notches serving to receive and retain the electrode 16. The size of the notches 42, 44 is such that when the electrode is positioned therein, the flanges 46, 48, normally in contact, are spaced from each other and thus exert pressure upon the electrode in order to keep the same in place in the notches.

In the foregoing description of my invention I have described the connector as applied to the problem of connecting electrode lead lines to circuit elements in which the tube may be employed. It will, of course, be understood that this application is but one of many to which the present invention may be applied and it is not intended that this invention be limited thereto.

While there has been described what is at present considered the preferred embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is therefore aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What I claim is:

1. A clip for connecting electrical circuit elements to a vacuum tube electrode comprising, a body portion connectable to the electrical circuit elements, a pair of resilient walls formed at one end of and at right angles to said body portion, cooperating inwardly directed coplanar flanges, parallel to the body portion, formed at the extremities of said walls and at right angles thereto, and means associated with said flanges adapted to receive and grip said vacuum tube electrode therebetween said means consisting of opposed convex-shaped ends on said flanges, and a concave gripping portion positioned at the central area of at least one of said concave shaped ends, so that said electrode may be moved into position between said flanges from either direction and may be securely gripped therebetween without auxiliary means.

2. A clip for connecting electrical circuit elements to a vacuum tube electrode comprising an elongated body portion connectable at one end to the electrical circuit elements, a pair of resilient walls formed at the other end of and at right angles to said body portion, cooperating inwardly directed flanges formed at the extremities of said walls, said flanges being coplanar and parallel to said body portion and having arcuately shaped abutting edges for guiding said vacuum tube electrode therebetween from either of two opposite directions, and means on one of said edges for yieldably retaining said electrode therebetween so that the free end of said electrode may be flush against the body portion aforesaid, and so that said electrode may be securely gripped between said edges without auxiliary means.

3. A clip for connecting electrical circuit elements to a vacuum tube electrode comprising, an elongated body portion connectable at one end to the electrical circuit elements, a pair of resilient walls formed at the other end and at right angles to said body portion and cooperating inwardly directed coplanar flanges formed at the extremities of said walls, said flanges being parallel to said body portion and having arcuately shaped abutting edges for guiding said vacuum tube electrode therebetween from either of two opposite directions, one of said flanges being notched so as to firmly retain said electrode therein without the need of any auxiliary means and allow its free end to make electrical contact with said body portion.

4. A clip for connecting electrical circuit elements to a vacuum tube electrode comprising, an elongated body portion connectable at one end to the electrical circuit elements, a pair of resilient walls formed at the other end of and at right angles to said body portion, and cooperating inwarly directed coplanar flanges formed at the extremities of said walls, said flanges being parallel to said body portion and having arcuately shaped notched abutting edges for guiding said vacuum tube electrode therebetween from either of two opposite directions in order to firmly retain said electrode therein without the need of any auxiliary means and allow its free end to make electrical contact with said body portion.

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