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ELECTRICAL CONNECTOR  
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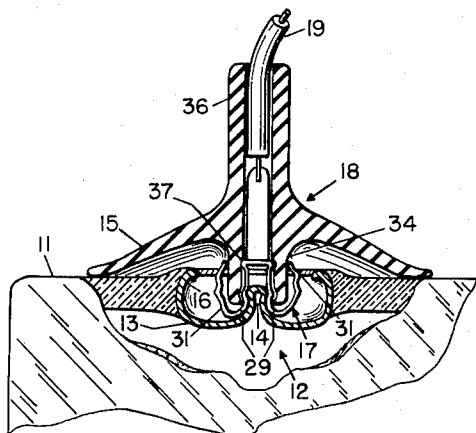


Fig. 1

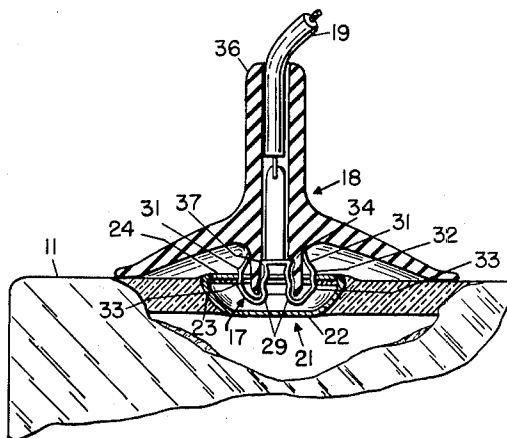


Fig. 2

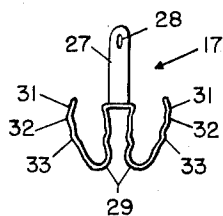


Fig. 3

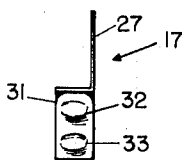


Fig. 4

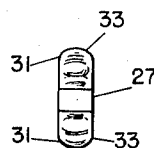


Fig. 5

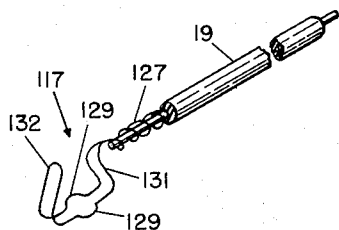


Fig. 6

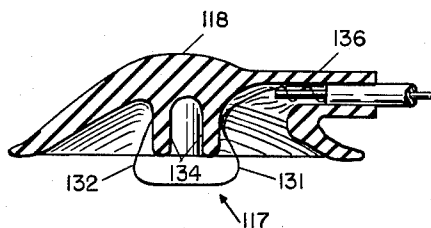


Fig. 7

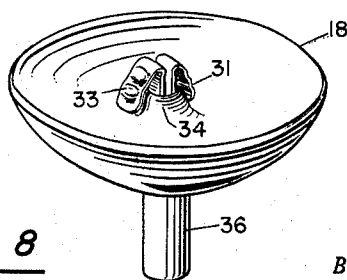


Fig. 8

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## ELECTRICAL CONNECTOR

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3 Claims. (Cl. 339—60)

This invention relates to electrical connectors for use with electrical contacts of the type commonly used in the glass side wall of cathode ray tubes.

Electrical connection to the high voltage anode of a cathode ray tube is commonly made in the art by either of two principal types of connectors formed in the side wall of the tube. One type connector comprises a conducting material sealed in an opening in the tube, the material having a central outwardly projecting element formed therein to serve as a contact. The other type connection employs a similarly shaped conducting element sealed into the tube but relying for electrical contact on the edges of the opening rather than a centrally located projection. In the art, different structures for making contact with the two types of connection have been required.

It is accordingly a fundamental object of the invention to provide an improved connector useful with either type contact.

Other objects and advantages will in part be obvious and in part appear hereinafter.

The structure accordingly embodies an electrical contact element and the joint employing it, wherein the contact element is a unitary piece turned upwardly at the ends, the base thereof being reentrant to define an open projection, the whole being of resilient material so that it resists lateral compression in the plane of its section. The details of the structure and the various features of the invention will be apparent from the following description and drawings, in which:

Figure 1 is a cross-sectional view of a portion of a cathode ray tube showing one type contact formed therein with the connector and joint embodying the invention;

Figure 2 shows a cross section of a portion of a cathode ray tube having the other type contact formed therein with the connector and joint embodying the invention;

Figures 3 and 4 are an end and a side view and Figure 5 is a plan view of the connector shown in Figure 1;

Figure 6 shows an alternative embodiment of the invention;

Figure 7 shows the connector of Figure 6 in combination with its insulating cover in section; and

Figure 8 is a perspective view of one embodiment of the connector.

The connector in accordance with the invention comprises a resilient, metallic element formed in such a way as to follow the contours and match the contacting parts of both types. The metallic element thus formed is inserted into a matched resilient insulating member which both holds and reinforces it.

Referring to Figure 1 a portion of the wall of a cathode ray tube 11 has sealed therein a cup shaped contact 12 comprising a base portion 13, a reentrant contact member 14 protruding upwardly therefrom, and side wall 16 curved inwardly forming an inwardly turned lip at the upper edge thereof.

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The electrical connector comprises a resilient bifurcated metallic element 17 and an insulating holder 18 with which said metallic element is matched. Connection to the usual source of potential is made by means of a conventional insulated wire 19.

The metallic element 17 in its preferred form is a longitudinal strip bent downwardly from the central portion thereof forming essentially parallel sides, and the outer ends being bent upwardly. The element may also be described as resembling a W. As shown in Figure 3, the central portion of the W is crimped so that the open end portion defined thereby has a reduced opening.

In one embodiment, the element 17 is formed from a piece of flat spring stock having the central portion bent to form a tongue 27, having sides 29. Preferably an aperture 28 is located near the outer end thereof for connection to the wire 19 shown in Figures 1 and 2. The outer extremities of the strip are turned outwardly and upwardly forming C-shaped members 31. A plurality of slight undulations 32 and 33 may be formed in the C-shaped members 31.

The insulating member 18 comprises preferably a tubular element having near the lower end a flange or skirt portion 15 extending outwardly and downwardly with the lower edge thereof substantially in a plane with the lower end of said tubular portion.

The metallic element 17 is supported by the insulating member 18 by inserting the central portion of the W within the lower end of the tubular portion 34, which forms a collar, of the insulator 18. The upwardly projecting end portions of the metallic element 17 extend outside this tubular portion of the insulating member 18.

The connector is shown in Figure 1 as used with the first type of cathode ray tube contact described above. In this version, the opening in the contact member 17 formed by the downwardly extending portions 29 in the center thereof slip over and about the upwardly extending contact member 14 on the tube, making resilient firm contact therewith. The skirt portion of the insulating member 18 extends beyond the side walls of the contact 12 onto the wall of the cathode ray tube so as to cover completely all metallic parts.

When the connector 17 is used with an anode contact 12 as shown in Figure 1, the downwardly turned sides 29 of the tongue 27 grip the central contact member 14 near the base thereof and maintain a hold thereon by virtue of their resiliency. Repeated disengagements of the electrical connector 17 from the anode contact 12 may in time result in weakening the sections 29 and in order to prolong the life of the connector, this weakening the resiliency of the sections 29 is reduced by the resilient tubular portion 34 of the insulating cover 18. This tubular portion 34 surrounds part of the sections 29 of the connectors 17 and acts as a stop for the outer ends of the C-shaped members 31. Thus, when the connector 17 is inserted into the anode contact 12, the sections 29 are expanded causing the outer ends of the C-shaped members 31 to press against the portion 34 the resiliency of which aids the resiliency of the sections 29 for gripping the contact member 14. The center of the tubular portion 34 is open to accommodate the connector 17 and the neck 36 of the insulating cover 18 has a longitudinal opening to receive one end of the connecting wire 19. Where the opening in the portion 34 meets the opening in the neck 36, there is preferably a slight ridge 37 forming a terminal abutment.

In Figure 2 the same electrical connector having similar parts indicated by the same reference characters is shown attached to the second type of contact 21 in the wall of the cathode ray tube 11. In this case the contact 21 also is substantially cup-shaped and generally similar

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to the contact 12. It differs primarily in that it has no contact member extending upwardly from the base portion 22 thereof, depending instead on the upper inwardly curved edges of the opening to make electrical contact. A washer 24 is supported at the upper edge by the in-turned rim 23 and electrical contact is made at the inner edge of the central opening in the washer 24.

The resilient terminal portion of the connector 17 is inserted into the central opening of the washer 24. The upwardly curved end portions of the metallic member 17 resiliently press against the inner edges of the opening formed by washer 24 thus making the electrical contact.

As may be seen from Figures 1 and 2, the electrical contact in one instance is made by the central opening of the metallic member 17 serving as a contact resiliently pressing against the upwardly extending contact member 14 and the outer upwardly extending portions of the metallic member 17 serve to provide compressional resiliency. In the second instance, the electrical contact is made between the upwardly extending end portions of the metallic member 17 contacting the inner edge of the opening in the washer 24, the central portion of the metallic member 17 in this latter case serving to provide added resiliency.

As mentioned previously, preferably the upwardly turned end portions of connector 17 extend inwardly near the outer edge thereof forming a curved section in order to provide a rounded head to simplify its insertion and withdrawal from washer 24. As in the first instance, the skirt portions extend beyond the contact 12 so as to cover all metal parts. In this fashion a universal contact is provided adaptable for use with either of the popular types in the side wall of the cathode ray tube.

In a contact of the type 21 shown in Figure 2, the C-shaped members 31 are compressed by the rim of the aperture in the flat washer 24, and again the resiliency of the tubular portion 34 of the insulating member 18 aids the resiliency of the sections 29 in maintaining good connection. It is in this type of anode contact that the undulations engage the washer 24 closely and prevent the connector 17 from being withdrawn by small, accidental pressure thereon.

In Figure 6, the connector 117 is formed of spring wire instead of flat metal stock as was connector 17. The wire forming connector 117 is doubled back on itself and one or both ends are preferably coiled into a helix 127 to receive the wire 19. The upwardly curled portions 131 and 132 grip the walls of an anode contact of the type shown as contact 21 in Figure 2 in the same way as the C-shaped members 31 of connector 17. The slightly bowed sections 129 grip the base of a central projection

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14 of the type shown in Figure 1 in the same way as the sections 29 of the connector 17.

Figure 7 shows the connectors 117 enclosed in an insulating cover 118 which differs from the cover 18 shown in Figures 1 and 2 in that the neck 136 extends parallel to the side wall of a cathode ray tube instead of perpendicular thereto as does the neck 36 in Figures 1 and 2. The inwardly extending portion 134 aids the resiliency of the portions 131 and 132 in the same way as the portion 34 aids the resiliency of the C-shaped members 31 in Figures 1 and 2.

Although this invention has been described in terms of specific embodiments, it will be apparent to those skilled in the art that modifications in the shapes of the elements may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. An electrical connector comprising an insulating element formed to define a central aperture surrounded by a collar, said element also being flared to provide a flanged cover for said connector, an electrical contact in said aperture comprising a metallic member extending into said aperture, said metallic member being bifurcated to provide electrical contact on opposite sides of said aperture, the bifurcations of said metallic member extending out from said opening and being turned back on said collar, whereby said external portion of said member provides additional electrical contact.

2. The electrical connector in accordance with claim 1 in which said aperture is a central longitudinal opening through said insulating element and provides connection for a wire therethrough.

3. The electrical connector in accordance with claim 2 wherein the bifurcated metallic element is formed of a spring metal to provide resilient contact therewith.

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