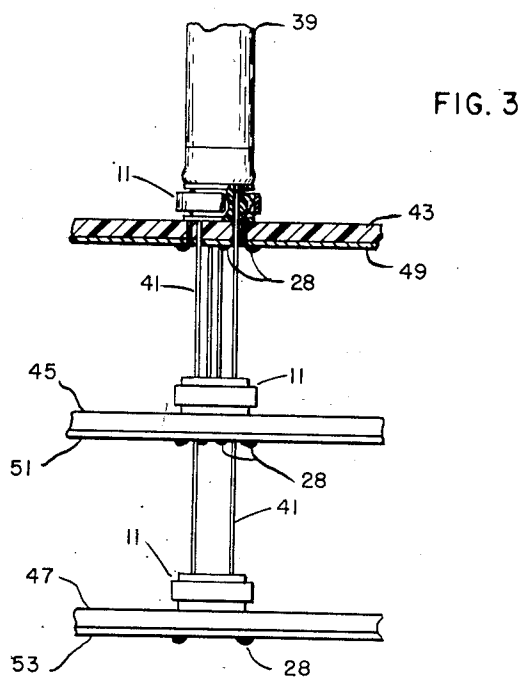
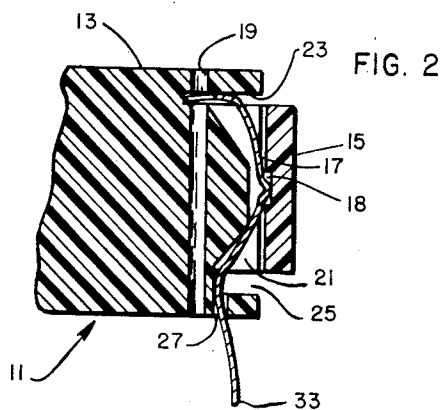
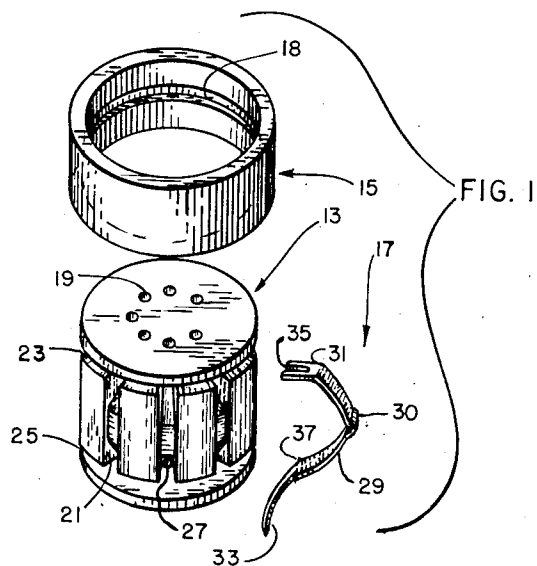


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ELECTRICAL CONNECTOR
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1

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ELECTRICAL CONNECTOR

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

The present invention relates to a socket or electrical connector.

In the assembly of certain electrical devices utilizing electronic tubes, a requirement often arises that the leads of such tubes be electrically secured to circuitry which is arrayed on different levels or decks. In addition to maintaining good electrical contact between the leads of the tubes and the circuits, it is also necessary that excellent mechanical locking connection be also obtained.

It is therefore an object of the invention to provide an electrical connector that will permit excellent electrical contact and firm and rigid mechanical contact between the leads of tubes and electrical circuitry.

Another object of the invention is to provide a connector that will readily lend itself for use in decking where tube leads are to be electrically connected to circuitry at different levels or decks.

Another object of the invention is to provide an electrical connector that will securely lock tubes in place.

Another object of the invention is to provide an electrical connector which will incorporate an individual locking means for each tube lead.

These and other objects are obtained by the utilization of a connector that is composed essentially of a socket body having axial bores therethrough through which tube leads can be extended, a separable metallic contact supported by said socket body that effects electrical contact between the tube lead and a circuit or an electrical component and a locking sleeve engageable with said socket body for wedging the metallic contact against the tube lead.

While in the specific embodiment described, the connector will be described in relation to its use in printed circuitry utilizing subminiature tubes, it will be obvious that the connector has other applications than the particular one described.

Other advantages and features of the invention will be apparent from the following description to be read in view of the accompanying drawing in which:

Fig. 1 is an exploded view in perspective of the connector and its associated locking sleeve and contact pin, both being shown removed from the core of the connector;

Fig. 2 is a cross-sectional view showing part of the connector with the locking sleeve about the core and engaging the contact, and

Fig. 3 is a view of an assembly of a subminiature tube electrically connected to three decks utilizing the connector of the present invention.

Referring to the drawing, there is shown the connector designated generally as 11. The connector is substantially cylindrical in shape and comprises a core 13, a locking sleeve 15, and a metallic spring contact pin 17.

The core 13 is preferably cylindrical in shape and composed of a substantially solid segment of non-con-

2

ductive material such as a phenolic compound or a ceramic material. The core is provided with a plurality of circumferentially disposed and axially aligned bores 19 which extend throughout the length of the core. In the particular embodiment described, there are shown seven such bores; however, it is to be understood that the number of bores can be varied to meet specific requirements depending upon the number of leads that form a part of the tube. The core is also provided with a plurality of relatively shallow axially aligned grooves 21 which have ridged elevations therein, said grooves being disposed about the periphery of the core. The number of grooves 21 correspond to the number of bores 19 and each of said grooves 21 is in parallel alignment with its respective adjacent bore 19. The core 13 is further provided with circular grooves or channels 23 and 25 on the cylindrical surface of the core. The groove 23 is slightly below the top surface of the core and is of sufficient depth to reach the bores 19. Channel 25 is located adjacent the bottom surface of the core and is of such depth as not to reach the bores 19 so that in effect the bores 19 are not of one continuous passage but are interrupted by the groove 23. Transverse to the channel 25 are holes or openings 27, the function and purpose of which will be hereinafter described.

The contact pin generally designated as 17 mentioned above, comprises a flat metal spring of one-piece construction made of an electrically conductive material such as copper. The contact pin has an arcuate central portion 29 provided with a bead 30, and two end portions 31 and 33 respectively, the end 31 being provided with a centrally disposed open notch 35 while the lower end 33 is slightly narrower than the central portion 29 thereby forming a retaining shoulder 37. The locking sleeve 15 is tubular in shape having an inside diameter very slightly larger than the outside diameter of the core 13 so that a tight fit is accomplished when the sleeve is placed over the core. The sleeve is provided with a continuous groove 18 on its inner periphery. As seen from Fig. 2, the contact pin 17 is of such configuration that it will fit into a groove 21 with the narrowed end portion 33 inserted through the hole 27, the central portion 29 resting partially against the ridge of the groove 21, and the end portion 31 being engageable in the groove 23 whereby the notch 35 will envelop the bore 19.

In the utilization of the connector described above, a wire lead of a subminiature tube, which lead is of an extremely fine wire, is inserted through the bore 19. The contact pin 17 is then placed in the groove and the retaining sleeve is forced over the core 13 of the connector. Due to the springiness of the metal, the contact pin 17 will be urged inwardly whereby the notched portion 35 will intimately engage the fine wire lead of the tube. The end portion 33 extends through the hole 27 and is bent upwardly to engage the printed circuitry. A blob of solder 28 may be applied to secure the end portion 33 and to effect electrical engagement between the end portion 33 and the circuitry. The same fine wire lead can then be introduced into another connector on another deck as will be more fully described hereinafter. To prevent any possible slippage or movement of the retaining sleeve, bead 30 will mesh with the groove 18 on the inner periphery of the locking sleeve 15. It is further apparent that by securing and soldering the end portion 33 to the underside of a deck such securing action will serve as an anchoring means for the connector.

In Fig. 3 there is shown a typical decked arrangement of layers of printed circuitry wherein the connector described herein is utilized for connecting any one lead or leads of a subminiature tube to separate decks as desired. In said figure, there is shown a subminiature tube 39 having fine wire leads 41, several of which are shown. Also

3

shown are three decks 43, 45, and 47, each of which has imprinted on its respective underside a printed circuit designated respectively 49, 51 and 53. In the embodiment shown, four of the leads of the subminiature tube are electrically secured to the circuit 49 by soldering the end of each lead to the printed circuit. Two of the leads are shown carried through the bores of the connector on to the second deck 45 and through said deck to the bottom connector and through said connector to the bottom deck 47 where the leads are then electrically secured to the circuitry 53 by soldering. By such arrangement and use of the connector described herein, it is possible to carry through to any number of decks, any number of leads or any one lead and terminate such leads or lead at any desired deck or decks.

While there has been described what is at present considered to be 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 the invention.

What is claimed is:

1. An electrical connector comprising a body having a plurality of mutually parallel longitudinal bores extending therethrough for receiving individual leads through each of said bores, a corresponding plurality of longitudinal grooves on the periphery of said body, first separate apertures extending from each of said grooves to each of said bores, a plurality of second apertures extending longitudinally through said body and in respective communication only with each of said grooves, a contact member insertable in each of said grooves, one end of each of said contact members extending through one of said first apertures and into said bore, the other end of each of said contact members extending through one of said second apertures for effecting electrical connection between said lead and an electrical circuit, said contact member having an arcuate central portion provided with a bead intermediate the ends thereof and a readily releasable means comprising a collar having an inside diameter slightly larger than the outside diameter of said body and provided with

4

a continuous groove on the inner face thereof for receiving the bead of the contact member which, when encompassing said body urges said contact member into electrical connection with said lead in said bore, and when removed from said body permits said contact member to become disengaged from said lead.

2. An electrical connector comprising a body having a plurality of mutually parallel longitudinal bores extending therethrough for receiving individual leads through each of said bores, a corresponding plurality of longitudinal grooves on the periphery of said body, a first channel transverse to said bores and extending from said bores to said grooves, a second channel transverse to and spaced from said bores, both of said channels being disposed on the outer peripheral surface of said body, a plurality of longitudinal openings in said body, each of said openings being in communication only with said second channel, a contact member in each of said grooves, one end of each of said contact members extending through the first transverse channel into its respective bore, the other end of each of said contact members extending through one of said openings for effecting electrical connection between a lead in said bore and an electrical circuit, said contact member having an arcuate central portion provided with a bead intermediate the ends thereof and readily releasable means comprising a collar having an inside diameter slightly larger than the outside diameter of said body and provided with a continuous groove on the inner face thereof for receiving the bead of the contact member which, when encompassing said body urges said contact member into electrical connection with said lead in said bore and when removed from said body permits said contact to become disengaged from said lead.

References Cited in the file of this patent

UNITED STATES PATENTS

1,988,725	Glade	Jan. 22, 1935
2,495,267	Larson	Jan. 24, 1950
2,528,121	Dickinson	Oct. 31, 1950
2,533,933	Heath	Dec. 12, 1950
2,696,535	McLean	Dec. 7, 1954