Dec. 9, 1958 J. ROTH 2,864,068

ADAPTOR FOR INTERCONNECTING ELECTRICAL ELEMENTS WHILE PROVIDING EXPOSED CONTACTS

Filed March 23, 1954

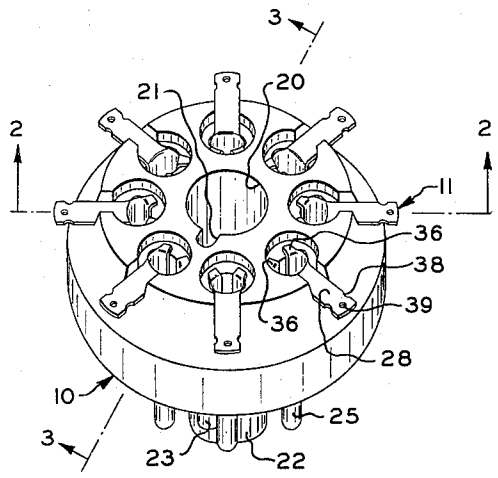


FIG. 1

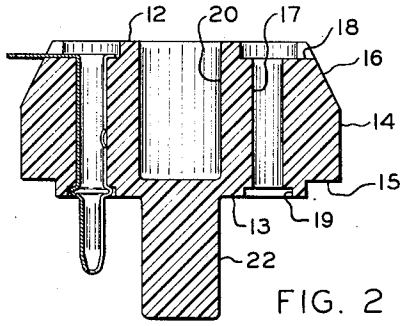


FIG. 2

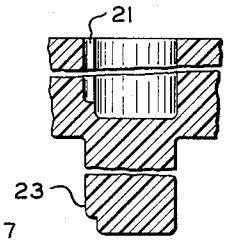


FIG. 3

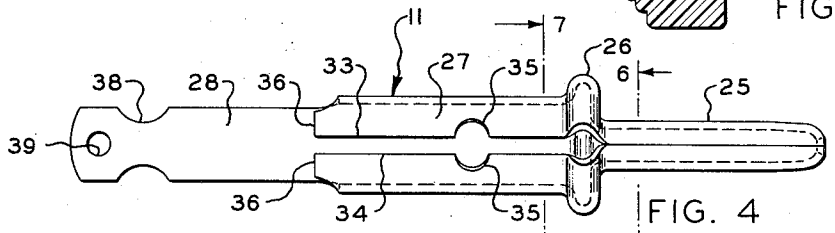


FIG. 4

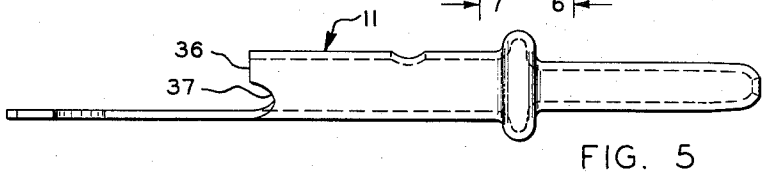


FIG. 5

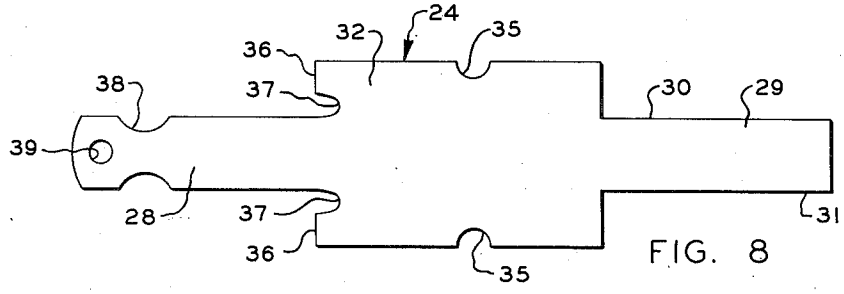


FIG. 8



FIG. 6

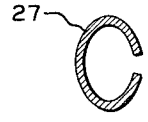


FIG. 7

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ADAPTOR FOR INTERCONNECTING ELECTRICAL ELEMENTS WHILE PROVIDING EXPOSED CONTACTS

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5 Claims. (Cl. 339—64)

The present invention relates to adaptors for interconnecting electrical elements and, more particularly, to adaptors for interconnecting electrical elements, ordinarily capable of being mated directly, in order to provide them with exposed contacts readily accessible to auxiliary leads or test prods.

It is common to mount a vacuum tube on the chassis of an electronic device by means of a socket having jacks for receiving the pins of the tube from above the chassis and tabs below the chassis for connecting the jacks and, in turn, the pins into a circuit. In order that a vacuum be conveniently maintained within the tube, the pins are rigidly potted in the tube base through which they project. Consequently, their relative positions may vary slightly from tube to tube as a result of manufacturing tolerances. In practice, therefore, the jacks, in order that they may readily receive the pins of one of the many vacuum tubes the socket may be called upon to mount, must be movable slightly with respect to each other, i. e., must float.

In operation, the tube and socket are snugly mated so that often the pins are accessible to electrical contact by auxiliary leads or test prods only from below the chassis and only when the chassis has been removed from its housing. In order to render the pins accessible to electrical contact from above the chassis, it is possible to interpose between the tube and the socket an adaptor comprising pins which project into the jacks of the socket, jacks which receive the pins of the tube and tabs which are readily accessible to electrical contact. A typical example of such an adaptor comprises pins rigidly fixed with respect to each other like the pins of a vacuum tube and jacks capable of receiving the pins of a vacuum tube with tolerance like the jacks of a chassis socket. The components of such an adaptor are unnecessarily numerous and their assembly is unnecessarily complex.

The object of the present invention is the provision of an adaptor having a one-piece base and one-piece connectors each of which incorporates a pin portion, a jack portion and a tab portion floating as a whole in the base. This construction is such that the connectors float with the socket jacks into which their pin portions project so that their jack portions are adapted to receive readily the pins of a vacuum tube. This adaptor is sturdy and inexpensive because its components are few and their assembly is simple.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the apparatus possessing the construction, combination of elements and arrangement of parts which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:

Figure 1 is an isometric view of an exemplary adaptor embodying the present invention;

Fig. 2 is a sectional view of the adaptor with one of its connectors omitted, taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view of the base of the adaptor, partly broken away, taken along the line 3—3 of Fig. 1;

Fig. 4 is an enlarged plan view of one of the connectors of the adaptor before it is mounted in the base;

Fig. 5 is an edge view of the connector;

Fig. 6 is a sectional view of the connector taken along the line 6—6 of Fig. 4;

Fig. 7 is a sectional view of the connector taken along the line 7—7 of Fig. 4; and

Fig. 8 is a plan view of a blank from which the connector is formed.

The exemplary adaptor shown in the drawing comprises generally an integral base 10 and eight integral elongated connectors 11 mounted for slight movement, i. e., floating, in the base. Base 10 is composed of an electrically insulating material, for example, a cast or molded ceramic or plastic. Connectors 11 are composed of a shaped, electrically conducting, resilient sheet metal, for example, silver coated Phosphor bronze.

Base 10, generally cylindrical, has an upper face 12, a lower face 13 and a periphery 14, chamfered at 15 and beveled at 16. A plurality of elongated, generally parallel openings 17 join the upper and lower faces. Each opening communicates with a countersunk groove 18 at upper face 12 extending to periphery 14, and a countersunk bore 19 at lower face 13. Extending into the base through upper face 12 is an opening 20 having a keyway 21 designed to receive the plug and key at the base of a vacuum tube. Extending from lower face 13 is a plug 22 and a key 23, aligned with keyway 21, which are designed to project into the opening and keyway of a chassis socket.

Each connector 11, shaped from a sheet metal blank 24 by a progressive dye or multiple dies, comprises a pin portion 25, a stop portion 26, a jack portion 27 and a tab portion 28. Pin portion 25, stop portion 26 and jack portion 27 are in the form of an elongated rigid unit by virtue of a rolled sheet metal construction now to be described. Pin portion 25 is rigidly formed by rolling the lower extension 29 of blank 24 until its edges 30 and 31 are in contact, as shown in cross section in Fig. 6, and by inwardly tapering the lower extremity of the resulting tube. Stop portion 26 and jack portion 27 are rigidly formed by beading the body 32 of blank 24 at its lower end and by rolling it into the shape shown in Figs. 4 and 5 and, in cross section, in Fig. 7. Longitudinal edges 33 and 34 of jack portion 27 are in spaced relation to permit opposed sections of the jack portion to be resiliently forced apart by the inserted pin of a vacuum tube. Longitudinal edges 33 and 34, further, are provided with notches 35 which prevent deformation of the upper part of jack portion 27 from appreciably affecting pin portion 25. Container 11, in the form shown in Figs. 4 and 5, is inserted upwardly into opening 17 of base 10, with the free longitudinal edges of jack portion 27 facing the center of the base, until stop portion 26 is seated in bore 19. The cross-sectional dimensions of jack portion 27 are less than the corresponding cross-sectional dimensions of elongated opening 17 by approximately 1 to 20 thousandths of an inch. Connector 11 is retained in opening 17 by tab portion 28 and a pair of lugs 36 which are flared outwardly until almost seated in countersunk groove 18. Notches 37, which separate lugs 36 from tab portion 28, permit the lugs and the tab portion to be flared outwardly without deforming jack portion 27.

In operation, when pin portions 25 are inserted into the jacks of a socket and jack portions 27 receive the

pins of a vacuum tube, lower face **13** is snugly seated upon the socket (and may be readily pried from the socket) by virtue of chamfer **15** and upper face **12** snugly receives the base of the vacuum tube by virtue of bevel **16**. Grooves **18** and bores **19** cooperate to ensure insulation of the connectors from each other. Tab portion **28**, which is exposed, is provided with a waist **38** around which a lead may be wound and a hole **39** into which a test prod may be inserted.

In various modifications of the illustrated adaptor, of course, opening **20**, keyway **21**, plug **22** and key **23** may be omitted and the number of connectors may be other than eight.

Since certain other changes may be made in the above-described device without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. An adaptor for interconnecting electrical elements, said adaptor comprising an integral, electrically insulating base having an upper face, a lower face and a plurality of elongated openings joining said faces, and a plurality of electrically conducting connectors floating in said openings, each of said connectors being formed from an elongated sheet metal blank having, in longitudinal sequence, a relatively narrow lower portion, a relatively wide medial portion and a relatively narrow upper portion, said lower portion being rolled until its longitudinal edges are substantially in contact with each other and the lower edge of said lower portion being inwardly tapered to provide a rigid pin, the lower edge of said medial portion being provided with a bead, said medial portion being rolled until its longitudinal edges are spaced apart and said bead is directed outwardly, said longitudinal edges of said medial portion facing inwardly, said bead being positioned at said lower face, said upper portion being flared outwardly to provide a tab for electrical contact, said tab being positioned at said upper face.

2. The adaptor of claim 1 wherein said longitudinal edges of said medial portion are interrupted by notches to prevent deformation of the lower section of said medial portion and of said pin from occurring as a result of outward deformation of the upper section of said medial portion.

3. The adaptor of claim 2 wherein said sheet metal is resilient.

4. The adaptor of claim 1 wherein the upper edge of said medial portion is notched at its junction with said upper portion to provide a pair of lugs which are flared inwardly.

5. The adaptor of claim 1 wherein said base is provided with a key extending downwardly from said lower face and a keyway communicating with said upper face, said key and said keyway being of similar cross section in alignment.

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