

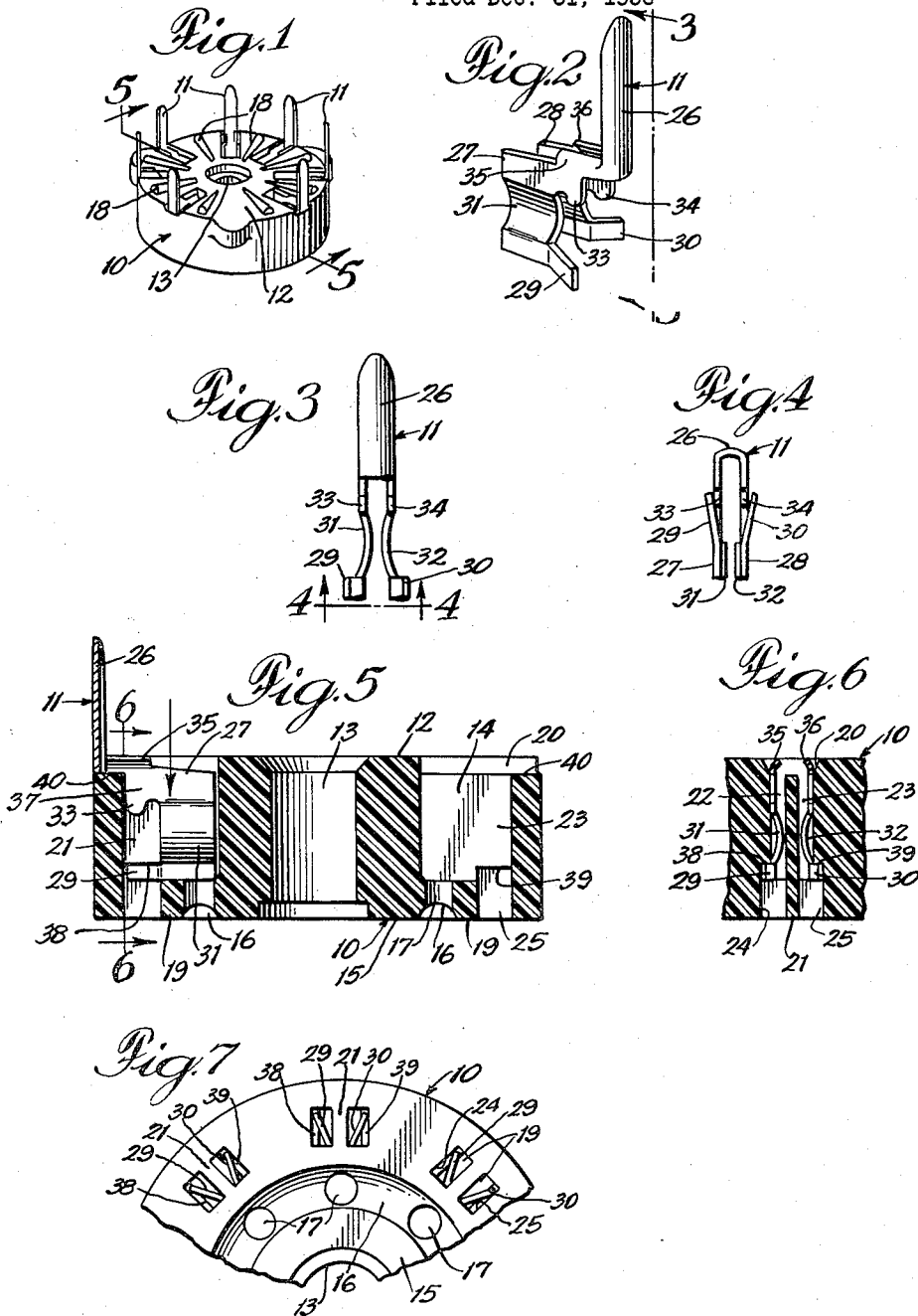
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SOCKET AND SNAP-IN CONTACT FOR PRINTED CIRCUITS

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SOCKET AND SNAP-IN CONTACT FOR PRINTED CIRCUITS

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This invention relates to a socket structure for vacuum tubes and other space discharge devices, and more especially to such a socket and snap-in contact arrangement particularly suited for use in printed circuits.

Traditionally, tube sockets have had their terminals or contacts secured in the openings therein provided for that purpose by swaging the terminals adjacent the ends of the openings, or by other terminal expanding means that also necessitate the use of suitable tools and separate operations. In recent years, there has been a departure from this technique as a result of the development of snap-in terminals that form an automatic interlock with the socket casting when inserted into the openings thereof. The present invention is concerned with snap-in terminals, but has for an object thereof the provision of an improved snap-in terminal and socket arrangement.

Another object of the invention is to provide an assembly of this character wherein the terminal is easily inserted into the opening therefor in the socket casting, but when in place is firmly anchored therein. Still another object is in the provision of a socket assembly having snap-in terminals, and wherein the terminals when in place are locked against movement in one direction by locking fingers that seat within recesses therefor in the casting, and which lock against movement in the opposite direction by engagement of the terminal tail with an outer surface of the casting whereby when the terminal tails are pressed through openings therefor in a printed wire panel, the resultant force exerted on the tail is transferred directly to the relatively large, rigid casting surface, with the result that there are no stresses placed on the locking fingers and on the thin edges of the recesses that receive the same.

A further object is that of providing a snap-in terminal and socket casting combination, in which the terminal has a prong-receiving socket, and locking fingers and terminal tail offset therefrom—the locking fingers being spaced apart and received within recesses therefor in the casting, and separated in the casting by an elongated rib defining a side of the prong-receiving socket so that when a tube pin is inserted thereinto, the rib in being positioned therebetween determines the minimum spacing between the fingers and insures seating thereof in the recesses. Still a further object is to provide in such structure, points of engagement between the socket and terminal spaced from each other along a radial line to prevent movement of the terminal in one direction and also to prevent twisting of the terminal—the locking fingers functioning to prevent movement of the terminal in an opposite direction. Additional objects and advantages will become apparent as the specification develops.

An embodiment of the invention is illustrated in the accompanying drawing, in which—

Figure 1 is a perspective view of a socket embodying the invention; Figure 2 is an enlarged perspective view of one of the terminals of the socket; Figure 3 is an enlarged end view in elevation of the terminal taken along

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the line 3—3 of Figure 2; Figure 4 is an enlarged bottom plan view of the terminal taken along the line 4—4 of Figure 3; Figure 5 is a transverse sectional view of the socket, viewed along the line 5—5 of Figure 1; Figure 6 is a vertical sectional view of the socket as seen along the line 6—6 of Figure 5; and Figure 7 is a fragmentary bottom plan view.

The socket assembly illustrated in the drawing comprises a socket casting 10 equipped with a plurality of terminals 11 which are frequently referred to as pins or contacts. As the socket is illustrated in Figures 1, 5 and 6, it is upside down or reversed—the surface 12 of the casting ordinarily being on the bottom adjacent the surface of the printed wire panel or board with which the socket herein shown is adapted to be used. It is illustrated in this position for convenience in that the terminals 11 are inserted into position within the casting 10 from the bottom side 12 thereof.

The casting 10 may be provided with a central opening 13 extending therethrough that customarily will have a grounding terminal (not shown) mounted therein for connection to the ground wire of a printed circuit. Concentric about the central opening 13 are a plurality of arcuately spaced terminal-receiving openings 14. Along the upper side 15 of the casting is an annular channel 16 that has opening thereinto at spaced points therealong the pin-receiving apertures 17 for receiving the pins of a tube. The channel 16 facilitates alignment of the tube pins with the respective apertures 17 for insertion of the pins thereinto. As shown in Figure 1, the bottom surface of the casting may have thereon a plurality of spaced apart, radially extending ribs 18 interposed between each of the openings 14, and these serve as barriers to separate the adjacent contacts 11.

The opening 14 is generally rectangular throughout except for the inner portion of each adjacent the wall 15 which is filled with a square-shaped abutment that defines the pin-receiving aperture 17. The outer wall of these abutment members are seen in Figures 5 and 6, and are designated with the numeral 19. Along the surface 12 of the casting 10, each opening 14 is slightly enlarged to define a perimetric entrance area 20 with diverging side walls, as is most apparent from Figure 6.

The outer portion of each opening 14 is compartmented by a vertically extending rib 21, the compartments for identification being designated in Figure 6 with the numerals 22 and 23, respectively. The inner edge of the rib 21, as is most clear from Figure 5, terminates on a line with the outer edge of the abutment wall 19. The side walls of each of the openings 14, and more particularly in the compartments 22 and 23 thereof, are recessed respectively (as shown at 24 and 25). These recesses extend upwardly from the surface 15 of the casting to a point slightly beyond the abutment wall 10, as shown in Figures 5 and 6.

The terminals or contact members 11 have a tail 26, a pin-receiving section defined by the spaced members 27 and 28, and a locking finger carried by each of these spaced members and numbered, respectively, 29 and 30. The tail 26, as shown in Figures 1 and 5, extends outwardly of the casting 10 when the terminals are in place therein, and are adapted to extend through openings provided therefor in a printed wire board (not shown) for connection with the printed wires thereon. The pin-receiving members 27 and 28 are offset from the tail 26, and their longitudinal axes are generally parallel thereto. The locking fingers 29 and 30 flare outwardly and extend from the members 27 and 28 in the direction of the offset of the tail 26. Preferably, each of the pin contactor members 27 and 28 have an inwardly bowed central section 31 and 32, respectively, for frictionally gripping the pin of a tube inserted thereinto so as to firmly hold

such pin and establish a good electrical connection therewith.

As seen in Figure 4, the tail 26 may be curved in section for purposes of stiffening it; and as shown in Figure 2, the spaced apart pin-receiving members and the tail are formed integrally with each other, and are so interconnected by intermediate portions 33 and 34. Such intermediate sections have the outer edges thereof turned inwardly toward each other (as shown at 35 and 36 in Figure 6), while the opposite edges thereof have depending ears 37 that aid in supporting the contact to prevent any rocking thereof which might disengage the locking fingers.

In assembling the terminals 11 with the casting 10, the terminals are held in position as shown in Figures 1 and 5 with the spring fingers 29 and 30 adjacent the surface 12 of the casting. The terminals are aligned with the respective openings 14 in the casting; and as the spring fingers are moved theretoward, the inclined edges of the perimetric frame 20 (that defines the outer edge of the opening) cam the spring fingers inwardly so that the terminal can then be moved downwardly in the direction of the arrow shown in Figure 5 to insert it into the opening.

During this downward movement, the spring fingers 29 and 30 rub along the outer walls of the compartments 22 and 23 of the opening 14, and ultimately align with the recesses 24 and 25 in such walls. Then, the spring fingers seat in the recesses, and through engagement of the respective shoulders 38 and 39 constrain the terminal against movement in the opposite direction. Thus, the terminals cannot now be withdrawn from the openings.

At the same time, wall portions of the intermediate sections 33 and 34 of the terminal substantially abut the shoulder or wall portion 40 at the outer side of each of the openings 14 adjacent the frame 20 thereof. Such abutment prevents further downward movement of the terminal with respect to the casting. Concurrently therewith, the contact-receiving members 27 and 28 along the lower edges thereof engage the upper surface of the abutment member 19, and further constrain downward movement of the terminal. Thus, the terminals are locked within the openings 14 by engagement of the locking fingers 29 and 30 with the shoulders 38 and 39 of the recessed wall portions, and by engagement of the intermediate sections 33 and 34 with the shoulders 40, and by further engagement of the pin-receiving members 27 and 28 with the abutments 19.

It will be apparent that the terminals are inserted by a direct movement thereof longitudinally with respect to the openings 14, so that the necessity of turning or twisting or cocking the terminals during such insertion is obviated; yet a firm, positive interlock automatically effectuated by the complete insertion of the terminals thereby anchors them in place and prevents movement of the terminals along longitudinal lines. The seating of the terminals at two radially spaced points—namely, the abutment member 19 and shoulder 40—prevents twisting of the terminal during insertion and withdrawal of a tube pin so that no abnormal stresses are placed on the terminal, and particularly on the locking fingers 29 and 30 thereof. Thus, there is little likelihood that the terminals will ever be damaged by mounting and removal of tubes from the socket, and therefore they can be made of relatively thin stock that, of course, decreases the cost thereof.

Further, the vertically extending ribs 21 are received between the locking fingers 29 and 30 when the terminals are inserted into the openings 14, and if for any reason such fingers should be compressed toward each other, the rib will cam them outwardly whereby it is assured that these fingers will seat within the locking recesses 24 and 25. Thus, the necessity of maintaining a precise or accurate dimensional spacing between the fingers 29 and 30 is eliminated—the rib 21 insuring that these members

will be spread apart widely enough to seat within the recesses 24 and 25, and the converging walls of the frame 20 camming the spring fingers toward each other if necessary to insure insertion thereof into the opening.

While in the foregoing specification, the invention has been described and illustrated in detail as to an embodiment thereof, it will be apparent to those skilled in the art that numerous variations may be made of those details without departing from the spirit and principles of the invention.

I claim:

1. A snap-in terminal and casting assembly providing a socket for a space discharge device, said casting having a plurality of arcuately spaced openings therethrough, each of said openings being generally rectangular and having along the outer side thereof a rib extending longitudinally therein to define substantially parallel compartments, each opening having also therein at one end an abutment member provided with an aperture therethrough adapted to receive a contact of such a space discharge device, and a terminal mounted in each of said openings and having a tail extending outwardly from said casting for connection with the wires of a printed circuit, each of said terminals having spaced apart pin-receiving portions adapted to receive the pin of a space discharge device therebetween for making electrical contact therewith, a pair of locking fingers, one carried by each of said pin-receiving portions, said locking fingers being aligned with each other and flaring outwardly at the ends thereof, each of said compartments having in a wall thereof a recess receiving a locking finger therein, the spaced pin-receiving portions being in substantial engagement with said abutment members, said casting providing a shoulder for each of said openings along the outer edge thereof in substantial abutment with the terminal therein, said abutment member and said shoulder being oriented in the same direction and being spaced apart along a radial line through the opening thereof for constraining movement of the terminal thereof in one direction and to prevent rotation thereof, said locking fingers and recesses being cooperatively related to prevent movement of the respective terminals in the opposite direction.

2. The structure of claim 1 in which said casting is provided with a recessed frame defining the end of each of said openings through which the terminals are passed, said recessed frame having inwardly converging side walls for camming said locking fingers toward each other during the insertion of the terminals into the respective openings.

3. In a socket assembly of the character described, a casting provided with an opening therein extending transversely therethrough, opposite walls of the casting defining said opening each having a recess therein, a terminal positioned within said opening and having locking fingers seated within said recesses to prevent movement of said terminal in one direction out of the opening, said casting having a rib positioned in said opening and extending longitudinally thereof, said rib being interposed between said locking fingers, and said casting and terminal having cooperating means for preventing movement of said terminal out of said opening in the opposite direction.

4. In combination, a socket casting having a plurality of spaced apart openings therein and apertures aligned therewith for receiving the pins of a tube, each of said openings having locking recesses in spaced apart walls thereof, a terminal mounted in each of said openings, each of said terminals having a pin-receiving portion aligned with an aperture for making contact with a pin received therein, spaced apart locking fingers carried by said pin-receiving portion and being seated in the respective recesses to prevent movement of the terminal outwardly of said opening in one direction, said casting

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having a rib positioned in each of said openings and extending longitudinally thereof, each of said ribs being interposed between said spaced apart locking fingers of said respective terminal for maintaining a minimum spacing therebetween when the terminals are inserted into said respective openings, an abutment member provided by said casting in each of said openings and being in substantial engagement with said terminal to prevent movement thereof in an opposite direction out of said opening, and a wall portion provided by said casting for each of said openings and also being in substantial engagement with said terminal to prevent movement there-

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of in the aforesaid opposite direction, said abutment member and said wall portion being radially spaced with respect to said casting and the respective openings thereof to prevent twisting of the terminal during insertion and removal of the pins of a tube.

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