June 21, 1960 W. GLUCK 2,942,230

STACKING RADIO TUBE SOCKET

Filed June 5, 1957

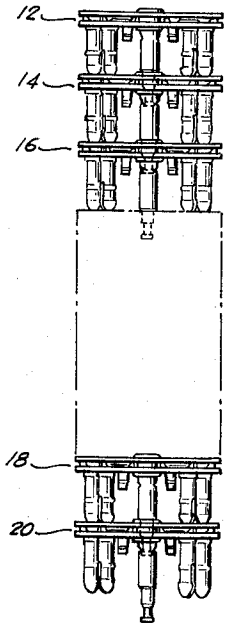


FIG. 1

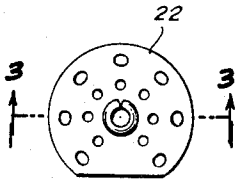


FIG. 2

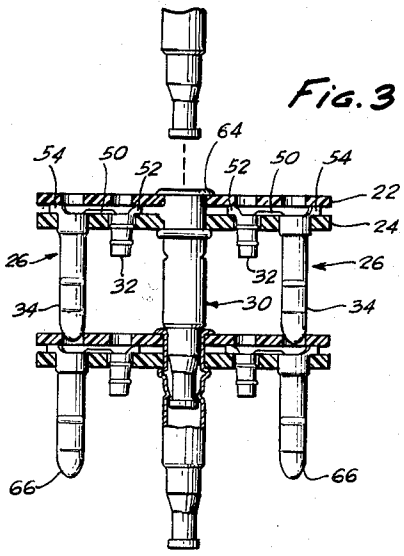


FIG. 3

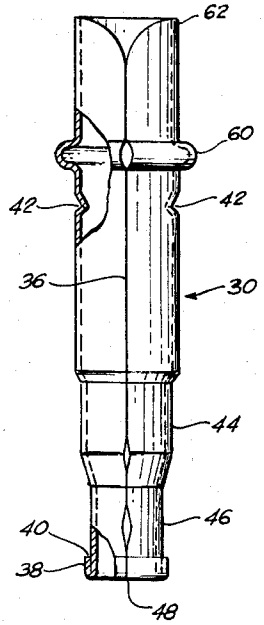


FIG. 4

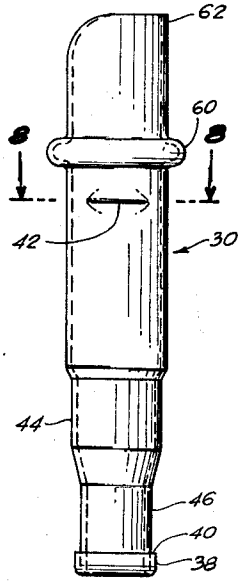


FIG. 5

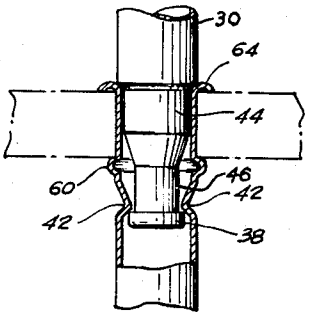


FIG. 6

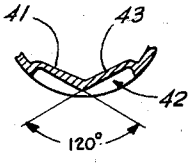


FIG. 8

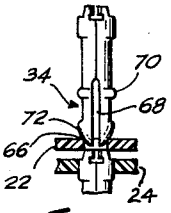


FIG. 7

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STACKING RADIO TUBE SOCKET

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12 Claims. (Cl. 339—194)

This invention relates to the female half of multipin connectors, especially radio tube sockets, and more particularly stacking sockets for printed circuits.

In my copending application Serial No. 579,664, filed April 20, 1956, and entitled "Mechanized Insertion of Radio Tube Sockets," I disclose a socket which improves the handling, storage and shipment of sockets by avoiding tangling together of the sockets. It also avoids the need for hoppering of sockets when arranging for the mechanized insertion of the same. For this purpose, the sockets may be disposed in superposed relation to form a stack of sockets, with the sockets held together with a snap engagement.

The primary object of the present invention is to generally improve sockets of the specified character. A more specific object is to improve the stacking action by making the interlocking or snap engagement of the sockets much more secure.

To accomplish the foregoing general object, and other more specific objects which will hereinafter appear, my invention resides in the socket elements and their relation one to another as are hereinafter more particularly described in the following specification. The specification is accompanied by a drawing in which:

Fig. 1 represents and partially shows a short length of stacked sockets;

Fig. 2 is a plan view of either the stack or a single socket;

Fig. 3 is a section taken approximately in the plane of the line 3—3 of Fig. 2, showing the relation of any two of the stacked sockets;

Fig. 4 is a partially sectioned elevation of an improved center ground post embodying features of my invention;

Fig. 5 is a side elevation of the same;

Fig. 6 is a fragmentary section drawn to enlarged scale to show the interlocking engagement of the center ground posts;

Fig. 7 is a side elevation of one of the contact posts; and

Fig. 8 is a fragmentary horizontal section taken in the plane of the line 8—8 of Fig. 5.

The invention is a socket of a type which may be formed into a connected series of sockets which may be handled as a stick. A piece of such a stick of sockets is shown in Fig. 1 of the drawing, it comprising superposed sockets 12, 14, 16, 18 and 20. Referring to Fig. 3, each socket comprises an insulation body 22, 24 carrying a ring of contacts 26, and a shield or center ground post 30. Each of the contacts 26 has a pin grip portion 32, and a terminal portion 34. The center ground post 30 is hollow, it being rolled up out of sheet metal, as is best shown in Figs. 4 and 5, with a longitudinal slit at 36 where the edges of the sheet metal blank abut. These edges are not secured together.

In accordance with the present invention, the periphery of the lower end of the post is reversely folded outward and upward, as shown at 38 in Figs. 4 and 5, to form a rigid annular step or shoulder 40. The upper portion of the post is transversely indented at opposite sides, as shown at 42. The lower end 38, 40 is so dimensioned

as to be received with a snap fit in the upper end of a similar center ground post between the indentations 42, as is best shown in Fig. 6. The post 30 has a part 44 of reduced diameter which is dimensioned to be slidably received within the upper end of a like post as shown in Fig. 6. Below the part 44, the post is still further reduced in diameter, as shown at 46, and at this point, the diameter is less than the spacing between the indentations 42.

The seam 36 is closed or abutting at the lower end of the post, as will be seen at 48 in Fig. 4. This fact, taken together with the reverse fold of metal at 38, causes the lower end of the post to be quite rigid and fixed in dimension. When the parts are pushed into snap engagement the yield takes place at the indentations 42, which spread apart. The spread is aided by the slit 36 which may open a bit to accommodate the passage of the part 38.

Considering the socket in greater detail, in the present case the insulation body is made up of upper and lower wafers 22, 24 of sheet insulation. The particular socket shown is intended to receive a miniature radio tube having seven pins at the spacing of eight, as will be seen by inspection of Fig. 2. However, it will be understood that identically the same construction is applicable to a socket having nine pins at the spacing of ten, as is needed for certain miniature tubes.

The metal contacts 26 may be of the type disclosed in my copending application Serial Number 579,664 aforesaid. Each contact is made of a single piece of sheet metal, and comprises a pin grip 32 which is of the split sleeve type. The terminal 34 is a hollow post which acts also as a support post for the socket when it is inserted in a mating ring of holes in a printed circuit board. The pin grip 32 and post 34 are connected by a bridge 50. The wafers 22 and 24 each have a center hole and two concentric circles of holes. The pin grips 32 pass through the inner holes of lower wafer 24, and the posts 34 pass through the outer holes, while the bridges 50 overlie the wafer. The contacts are held in position by the upper wafer 22, which is secured to the lower wafer by means of the upper end of the center post 30, which acts also as an eyelet. The pin grips are additionally supported by tabs 52, and in similar fashion the posts 34 are additionally supported by tabs 54.

The inner holes in the upper wafer 22 receive the pins of the radio tube, and permit their passage into the pin grips 32. The outer holes would not be needed in the upper wafer 22, except to assist in the stacking action by receiving the lower ends of the posts of a superjacent socket, as is shown in Fig. 3. In other words, the length of the center post 30 is so related to the length of the contact posts 34 that the lower ends of the contact posts 34 are received in the holes of the upper wafer 22 of a subjacent socket when the lower end of the center post 30 is received and locked in the upper end of the center post of the subjacent socket.

Referring to Figs. 4 and 5, the center post is initially fabricated with a bead 60. This acts as a lower head for the eyeletting together of the wafers 22 and 24. In assembling the socket, the post 30 is inserted through the wafers as far as the bead 60, and the upper end 62 of the post is expanded or flanged outward and downward by means of a suitable die, as is indicated at 64 in Figs. 3 and 6, thereby locking the wafers together.

Referring to Fig. 7 of the drawing, the contact posts 34 are hollow and generally cylindrical, for stiffness. The lower end of the contact post is pointed or rounded, as indicated at 66, and the lower portion of the post is longitudinally slotted at diametrically opposite sides as shown at 68, so as to be resiliently compressible. There are beads or enlargements at 70 and 72, the former to act as a stop when inserting the socket in a printed circuit board, and the latter to provide a snap engagement with

the board, thus holding the socket in position until the soldering operation is completed.

Fig. 7 also illustrates how the rounded lower end 66 of contact post 34 is received in a mating hole in upper lamination 22 of a subjacent socket.

The indentation 42 may be on a straight line, as though indented with a chisel having a straight edge, but it is preferably on two angularly disposed lines, as is best shown in Fig. 8. In that figure, it will be seen that the parts 41 and 43 of the indentation 42 are disposed at an angle, which in the present case is 120 degrees. The result is that the lower end of the next higher center post is engaged at four points, instead of at two.

It will be understood that while I have illustrated my improvement as applied to a laminated socket, it is equally well applicable to a socket having a molded one-piece insulation body of the type disclosed in my copending application Serial No. 666,916, filed June 20, 1957, and entitled "Socket for Radio Tubes or the Like."

It is believed that the construction and method of use of my improved socket, as well as the advantages thereof, will be apparent from the foregoing detailed description. The center ground post is sturdy, and its snap engagement with adjacent center ground posts is a firm and secure one. For this purpose, the lower end of the post is made rigid, and is provided with a sharp and distinct shoulder. The yielding action is obtained in the outer part, where there is adequate room to provide indentations of substantial dimension. The ability of these indentations to yield is restrained at the insulation base, but is aided by the longitudinal slit of the post, and between them an adequately stiff yet yielding motion is obtained.

It will be apparent that while I have shown and described my invention in a preferred form, changes may be made in the structure shown, without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A radio tube socket comprising an insulation body carrying a ring of metal contacts, and a center ground post, each of said contacts comprising a pin grip portion and a terminal portion, said center ground post being hollow, the periphery of the lower end of said post being reversely folded outward and upward to provide a rigid annular step or shoulder, the upper portion of said post being transversely indented to provide indentations at opposite sides, the aforesaid reversely folded lower end being so dimensioned as to be received in the upper end of a similar center ground post of a subjacent socket between said indentations of said subjacent socket with a snap fit in order to hold a series of sockets in stacked or superposed relation.

2. A radio tube socket comprising an insulation body carrying a ring of metal contacts, and a center ground post, said contacts being disposed generally radially and having their inner ends on a smaller circle and their outer ends on a larger circle, each of said contacts being made of a single piece of sheet metal and comprising a pin grip at its inner end and a support-and-terminal post at its outer end with a connecting bridge therebetween, said posts being substantially longer than the pin grips, and being hollow in cross section for stiffness, the lower ends of the posts being pointed and longitudinally slotted so as to be resiliently compressible, the periphery of the lower end of said center post being reversely folded outward and upward to provide a rigid annular step or shoulder, the upper portion of said center post below said insulation body being transversely indented to provide indentations at opposite sides, the aforesaid reversely folded lower end being so dimensioned as to be received in the upper end of a similar center ground post of a subjacent socket between said indentations of said subjacent socket with a snap fit in order to hold a series of sockets in stacked or superposed relation.

3. A socket for printed circuits, said socket comprising an insulation body carrying a ring of metal contacts, said contacts being disposed generally radially and having their inner ends on a smaller circle and their outer ends on a larger circle, each of said contacts being made of a single piece of sheet metal, and comprising a sleeve type pin grip at its inner end and a support-and-terminal post at its outer end with a conecting bridge therebetween, said insulation body having a center hole and two concentric circles of holes, said pin grips passing through the inner circle of holes and said posts passing through the outer circle of holes with the bridges therebetween, said posts being substantially longer than the pin grips and being hollow in cross section for stiffness, the lower ends of the posts being pointed and longitudinally slotted so as to be resiliently compressible, and a center ground post which is hollow and which is secured in the center hole at its upper end, the periphery of the lower end of said center post being reversely folded outward and upward to provide a rigid annular step or shoulder, the upper portion of said center post being transversely indented to provide indentations at opposite sides, the aforesaid reversely folded lower end being so dimensioned as to be received in the upper end of a similar center ground post of a subjacent socket between said indentations of said subjacent socket with a snap fit in order to hold a series of sockets in stacked or superposed relation.

4. A socket for printed circuits, said socket comprising an insulation body carrying a ring of metal contacts, said contacts being disposed generally radially and having their inner ends on a smaller circle and their outer ends on a larger circle, each of said contacts being made of a single piece of sheet metal, and comprising a sleeve type pin grip at its inner end and a support-and-terminal post at its outer end with a connecting bridge therebetween, said insulation body having a center hole and two concentric circles of holes, said pin grips passing through the inner circle of holes and said posts passing through the outer circle of holes with the bridges therebetween, said posts being substantially longer than the pin grips and being hollow in cross section for stiffness, the lower ends of the posts being pointed and longitudinally slotted so as to be resiliently compressible, and a longitudinally slit center ground post which is hollow and which is secured in the center hole at its upper end, the periphery of the lower end of said center post being reversely folded outward and upward to provide a rigid annular step or shoulder, the upper portion of said center post below said insulation body being transversely indented to provide indentations at opposite sides at each side of the slit, the aforesaid reversely folded lower end being so dimensioned as to be received in the upper end of a similar center ground post of a subjacent socket between said indentations of said subjacent socket with a snap fit in order to hold a series of sockets in stacked or superposed relation, the length of the center post being so related to the length of the contact posts that the lower ends of the contact posts are received in the corresponding holes of a subjacent socket when the lower end of the center post is received in the upper end of the center post of the subjacent socket.

5. A socket for printed circuits, said socket comprising an insulation body made up of upper and lower wafers of sheet insulation, said body carrying a ring of metal contacts, said contacts being disposed generally radially and having their inner ends on a smaller circle and their outer ends on a larger circle, each of said contacts being made of a single piece of sheet metal and comprising a sleeve type pin grip at its inner end and a support-and-terminal post at its outer end with a connecting bridge therebetween, said lower wafer having a center hole and two concentric circles of holes, said pin grips passing through the inner circle of holes and said posts passing through the outer circle of holes with the bridges therebetween, said posts being substantially longer than

the pin grips and being hollow in cross section for stiffness, the lower ends of the posts being pointed and longitudinally slotted so as to be resiliently compressible, the upper wafer having a center hole and concentric rings of holes in registration with the aforesaid holes in the lower wafer, and a center ground post which is hollow and which passes through the center holes at its upper end and serves to secure the wafers together, the periphery of the lower end of said post being reversely folded outward and upward to provide a rigid annular step or shoulder, the upper portion of said post below said insulation body being transversely indented to provide indentations at opposite sides, the aforesaid reversely folded lower end being so dimensioned as to be received in the upper end of a similar center ground post of a subjacent socket between said indentations of said subjacent socket with a snap fit in order to hold a series of sockets in stacked or superposed relation.

6. A socket for printed circuits, said socket comprising an insulation body made up of upper and lower wafers of sheet insulation, said body carrying a ring of metal contacts, said contacts being disposed generally radially and having their inner ends on a smaller circle and their outer ends on a larger circle, each of said contacts being made of a single piece of sheet metal, and comprising a sleeve type pin grip at its inner end and a support-and-terminal post at its outer end with a connecting bridge therebetween, said lower wafer having a center hole and two concentric circles of holes, said pin grips passing through the inner circle of holes and said posts passing through the outer circle of holes with the bridges therebetween, said posts being substantially longer than the pin grips and being hollow in cross section for stiffness, the lower ends of the posts being pointed and longitudinally slotted so as to be resiliently compressible, the upper wafer having a center hole and concentric rings of holes in registration with the aforesaid holes in the lower wafer, and a longitudinally slit center ground post which is hollow and which passes through the center holes at its upper end and serves to secure the wafers together, the periphery of the lower end of said center post being reversely folded outward and upward to provide a rigid annular step or shoulder, the upper portion of said center post below said insulation body being transversely indented to provide indentations at diametrically opposite sides at each side of the slit, the aforesaid reversely folded lower end being so dimensioned as to be received in the upper end of a similar center ground post of a subjacent socket between said indentations of said subjacent socket with a snap fit in order to hold a series of sockets in stacked or superposed relation, the length of the center post being so related to the length of the contact posts that the lower ends of the contact posts are received in the holes of the upper wafer of a subjacent socket when the lower end of the center post is received in the upper end of the center post of the subjacent socket.

7. As an article of manufacture, a stack of superposed radio tube sockets which are to be used separately when connected in a circuit but which are temporarily detachably connected to one another in superposed relation while awaiting utilization in a circuit, each of said sockets being a socket as defined in claim 1, and the lower end of the center post of each socket being received with a snap engagement in the upper portion of the center post of the next subjacent socket.

8. As an article of manufacture, a stack of superposed radio tube sockets which are to be used separately when connected in a circuit but which are temporarily detachably connected to one another in superposed relation while awaiting utilization in a circuit, each of said sockets being a socket as defined in claim 2, and the lower end of the center post of each socket being received with a snap engagement in the upper portion of the center post of the next subjacent socket.

9. As an article of manufacture, a stack of superposed sockets which are to be used separately when connected in a circuit but which are temporarily detachably connected to one another in superposed relation while awaiting utilization in a circuit, each of said sockets being a socket as defined in claim 3, and the lower end of the center post of each socket being received with a snap engagement in the upper portion of the center post of the next subjacent socket.

10. As an article of manufacture, a stack of superposed sockets which are to be used separately when connected in a circuit but which are temporarily detachably connected to one another in superposed relation while awaiting utilization in a circuit, each of said sockets being a socket as defined in claim 4, and the lower end of the center post of each socket being received with a snap engagement in the upper portion of the center post of the next subjacent socket, while the lower ends of the contact posts are received in the corresponding holes of the subjacent socket, thereby maintaining the sockets of the stack in desired relative orientation.

11. As an article of manufacture, a stack of superposed sockets which are to be used separately when connected in a circuit but which are temporarily detachably connected to one another in superposed relation while awaiting utilization in a circuit, each of said sockets being a socket as defined in claim 5, and the lower end of the center post of each socket being received with a snap engagement in the upper portion of the center post of the next subjacent socket.

12. As an article of manufacture, a stack of superposed sockets which are to be used separately when connected in a circuit but which are temporarily detachably connected to one another in superposed relation while awaiting utilization in a circuit, each of said sockets being a socket as defined in claim 6, and the lower end of the center post of each socket being received with a snap engagement in the upper portion of the center post of the next subjacent socket, while the lower ends of the contact posts are received in the holes of the upper wafer of the subjacent socket, thereby maintaining the sockets of the stack in desired relative orientation.

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