

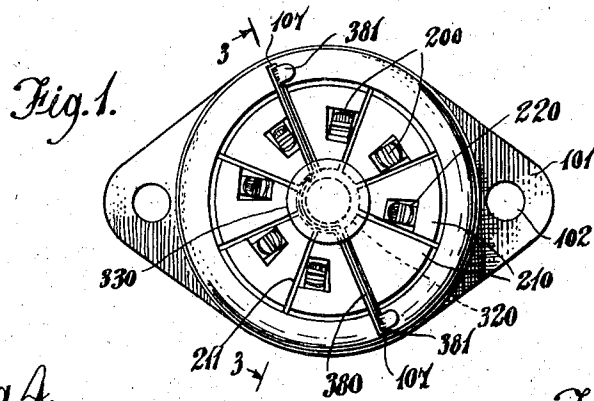
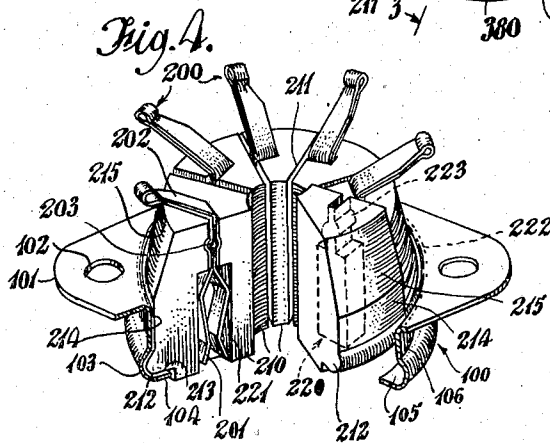
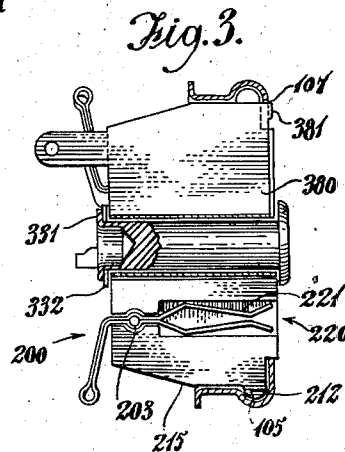
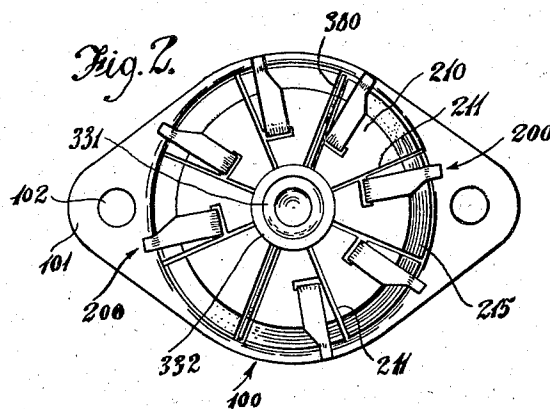
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D. JACKSON

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SOCKETS PRIMARILY FOR RADIO TUBES AND THE LIKE

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Inventor
Donald Jackson
By
Emery, Holcombe & Blair
Attorney

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SOCKET PRIMARILY FOR RADIO TUBES
AND THE LIKEDonald Jackson, Cambridge, England, assignor to
Pye Limited, Cambridge, England, a British
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7 Claims. (Cl. 173—328)

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This invention relates to devices of the character primarily designed as sockets for radio tubes and the like, although such devices and devices of similar character are also often used as sockets for coils, condensers and other electrical equipment.

An object of this invention is the provision of a socket structure having novel means for supporting the contact elements therein, facilitating assembly of the socket and combining other useful functions and advantages.

A further object of this invention is to provide a socket having a novel and improved structure rendering the contacts thereof self-aligning.

A further object of this invention is the provision of a mode of construction which is especially advantageous for the manufacture and assembly of miniature types of radio tube sockets.

A further object of this invention is a novel and improved method and means for assembling and self-locating the contact elements of a socket.

Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts and in the several steps and relation and order of each of the same to one or more of the others, all as will be illustratively described herein, and the scope of the application of which will be indicated in the appended claims.

In the drawing,

Figs. 1 and 2 are respectively top and bottom plan views of one embodiment of socket exemplifying the invention.

Fig. 3 is a section on the line 3—3 of Fig. 1, and

Fig. 4 is a perspective view of the socket inverted, certain parts having been removed and others being shown in section and broken away for the purpose of illustration.

The socket construction illustrated in the drawing is especially suitable for the manufacture of miniature types of tube sockets (for instance, of about $\frac{3}{4}$ " in diameter) such as are required for miniature radio tubes. However, the structure may, of course, also be employed for larger sockets. In the illustrated socket, the contact elements thereof, generally designated 200, are individually carried by a set of complementary segments 210

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of insulating material which are assembled side by side together in a closed circular array to produce a composite mount or carrier body of insulation of circular plate form. The individual segments 210 may be made as mouldings of synthetic resin or like plastic material or of ceramic material. The socket shown has eight similar segments, seven of which carry contact elements, the eighth or blank segment being without a contact element. This arrangement is provided to obtain a desired spacing of the contact elements of the socket, using segments of the same size, and is not an essential feature of the construction since, for example, one double-width segment could be provided in place of the blank segment and the adjacent one on the left as viewed in Fig. 1. Each contact-carrying segment 210 carries its contact element 200 in a recess 220 in one side of the segment, the contact element being introduced sideways into the recess 220 and being retained therein by the adjacent unrecessed side 211 of the next segment in the assembly, which thus in effect closes the recessed side of the preceding segment, as will be clearly seen in the drawing.

The contact elements may be of any suitable form and held in the side recesses of the segments in any suitable manner preventing accidental detachment of the elements from the segments, through the top or bottom of the latter. Illustratively, as seen more clearly in Figs. 3 and 4, the recess 220 in the side of each contact-carrying segment 210, is shown as being shaped to provide an upper enlarged portion 221 adjacent the upper face of the segment, to accommodate the flared tongues 201 of the contact element 200, the enlarged upper portion 221 communicating with a lower portion 222 of smaller bore adjacent the lower face of the segments and through which the terminal portion 202 of the contact element 200 passes to project from the bottom of the segment. The restricted portion 222 of the recess 220 has a local enlargement 223 therein which receives a complementary enlargement or projection 203 formed intermediately on the terminal portion 202 of the contact element 200, thus preventing the contact element, after it is laterally introduced into the recess 220, from being drawn out either from the top or from the bottom of the segment 210. Such a contact element may be formed in one piece from a short length of metal strip, for

example, of phosphor bronze, which is doubled back on itself and suitably stepped or flared remote from its doubled end 202 so as to form the springy tongues 201 which are adapted for receiving a cooperating contact pin or prong on the base of a radio tube or other device to be plugged into the socket. The tips of the tongues 201 are preferably flared, as shown, for guiding a cooperating pin or prong between them, and the tongues may also be suitably crimped or otherwise shaped, such as in the manner depicted, so as to provide points of line contact ensuring effective conductive engagement with the cooperating pin or prong. The strip is also suitably shaped to form the enlargement 203, and the doubled end 202 thereof serves as a terminal tag for effecting connection of a conductor to the contact element. The doubled terminal portion 202 may be opened out into a loop, as illustrated, for facilitating such connection, or it may be notched or perforated for the same purpose.

The segments 210, with contact elements 200 mounted therein as described, are assembled in a supporting and retaining member which is shown as in the form of a metallic ring generally designated 100, of suitable material such as tinned steel which is provided with ears 101 pierced with holes 102 for mounting the completed socket, for example on a radio chassis. The ring 100 is formed at its upper end with a peripheral bead 103 and an intumed flange 104, providing an annular internal groove 105 to receive a complementary peripheral bead 212 on the upper end of each segment 210 and adjacent a shoulder 213 which is adapted to receive the flange 104 of the ring 100. Each segment 210 has, below its bead 212, a cylindrical face portion 214 conforming substantially with the corresponding straight portion 106 of the ring 100. Below the portion 214 the face 215 on each segment 210 may be tapered conically, as shown.

On assembly, each contact-carrying segment 210 is inserted into the ring 100 to bring its peripheral bead 212 into the groove 105 of the ring. For enabling such insertion to be carried out with all the segments 210, it will be apparent that the individual segments, if assembled close together, must occupy less area than that of the interior of the ring so that there will be enough space to introduce all the segments into the ring in the manner described. This will be clear from the inspection of Fig. 4 where one of the segments 210 is shown in partially inserted position just prior to its bead 212 being brought alongside and into the groove 105. Thus, after insertion of all the segments 210, they will be loose in the ring 100. A suitable fixing element can then be introduced into the residual space left after bringing the beads 212 of the segments into interlocking engagement with the groove 105 of the ring, so as to maintain such engagement and prevent the segments from being removed or dropping out from the ring. For this purpose, the segments 210 are shaped so that when assembled together they form a central hole 320 through the assembly, in which a suitable headed fastener may be inserted. The fastener is shown as a metal rivet 330 inserted through the hole 320 from the face or upper side of the socket, the lower end 331 of the rivet 330 being swaged over a washer 332 on which can rest the inner portions of the bottom faces of the segments 210. The rivet 330 is of smaller diameter than that of the hole 320 so as to retain the assembly of segments in the ring 100 in such a manner that the segments

individually are still loose to a slight extent so that each has a limited degree of free movement substantially in all directions, so enabling the contact elements 200 carried thereby to be individually self-aligning. That is to say, when the contact pins or prongs on a radio tube base or other device are plugged into the socket, the looseness of the segments 210 permits each contact element 200 to adjust itself automatically into substantial alignment with the entry pin or prong. The contact elements 200 may also be slightly loosely fixed in their carrier segments 210, thus providing additional means assisting their self-alignment.

As well as providing a means of rendering the contact elements self-aligning, another advantage of employing discrete segments for the contact elements is that it simplifies manufacture and assembly of the socket, and especially the fixing of the contact elements, since these can be more easily fixed each in the individual segments which are thereafter assembled, than if all the contact elements were inserted and fixed in a one-piece body equivalent to the segment assembly. This is particularly advantageous with miniature types of tube sockets where the contact elements are even closer together than in the larger sockets. A further advantage of the segmental mode of construction is that it very readily enables effective electrostatic screening to be provided between adjacent contact elements or groups of contact elements, according to requirements, so enabling the screening between the input and output circuits and electrodes of radio tubes and their external circuits to be completed, in a simple and effective manner, by merely providing a screening partition or partitions between the appropriate segments carrying the contact elements that desirably are to be electrostatically screened from one another.

In order to locate the segment assembly in proper orientation in the ring 100 and to prevent rotational displacement of the assembly therein, any suitable locating means may be employed, as for instance, interlocking projections and recesses in the segments and supporting ring. However, in the embodiment shown this location is accomplished by means of a metallic screen 380 provided for electrostatically shielding certain contact elements of the socket from others. This screen 380 extends diametrically across the segment assembly, the central portion of the screen 380 skirting around the hole 320 so as not to foul the rivet 330. The ends of the screen 380 are provided with lugs 381 which project through slots 107 in the flange 104 of the ring 100 and are bent over against that flange, to which they may be soldered. The screen 380 thus locates the segment assembly against rotational displacement in the ring 100.

It will be evident to those skilled in the art that the embodiment of the invention hereinbefore described is but illustrative and not exhaustive, since many modifications may be made thereof and constructional details varied therein. Therefore, the invention is not to be regarded as limited in its broadest aspects to any of the specific details hereinbefore described and illustrated, but only by the scope of the appended claims.

I claim:

1. In a socket, a composite insulating body composed of juxtaposed individual complementary segments of insulation, at least some of said segments each having in one side thereof a longitudinal recess extending between opposite faces

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of the segment, said recess comprising a main wider portion extending from one of said faces of the segment and communicating with a narrower portion extending to the other of said faces of the segment, a plurality of contact elements housed one in each of said recesses and each comprising a pair of spaced pin-receiving tongues accommodated in said wider portion of its recess and a narrower terminal portion, part of which adjacent said tongues is arranged within said narrower portion of said recess and the remainder of which terminal portion extends from the narrower end of said recess so as to project from the adjacent face of the segment, each contact element being held against longitudinal displacement in its recess and further being held against lateral displacement from its recess by the adjacent side of the adjoining insulating segment in the assembly, and means embracing said insulating segments to hold them in assembled relation.

2. In a socket, an insulating body comprising an assembly of juxtaposed individual complementary segments of insulation at least some of said segments each having in one side thereof a longitudinal recess extending between opposite faces of the segment, said recess comprising a main wider portion extending from one of said faces of the segment and communicating with a narrower portion extending to the other of said faces of the segment, a plurality of contact elements housed one in each of said recesses and each comprising a pair of spaced pin-receiving tongues accommodated in said wider portion of its recess and a narrower terminal portion, part of which adjacent said tongues is arranged within said narrower portion of said recess and the remainder of which terminal portion extends from the narrower end of said recess so as to project from the adjacent face of the segment, each contact element being held against longitudinal displacement in its recess and further being held against lateral displacement from its recess by the adjacent side of the adjoining segment in the assembly, a support having an annular portion loosely embracing said segmental body and exteriorly interengaging with peripheral portions of said segments for supporting the same, said segment assembly including a member surrounded by said segments and engaging the same to hold the segments against peripheral disengagement from said annular portion of said support.

3. In a socket, a rigid support ring, a composite disc-like insulating body arranged within and supported by said ring and comprising a loose assembly of individual complementary segments of insulation, a plurality of said segments each having in one side thereof a recess extending between opposite faces of the segment and each carrying an individual contact element held in said recess to move bodily with the segment, the recess in each segment being closed by the adjacent side of the adjoining segment in the assembly, the segments exteriorly having peripheral means having interlocking engagement with said ring for holding the segments against axial displacement, the segment assembly having a substantially central axial aperture defined by inner peripheral walls of the segments, and a loose retainer member axially arranged within said aperture and supported by the inner peripheral portions of said segments to loosely hold the segments against disengagement from said ring while allowing each segment a limited freedom of independent movement in the annular space

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between said support ring and said retainer member.

4. A socket structure as defined in claim 3, wherein said retainer member comprises a loose rivet extending through said aperture and having headed ends overlying the opposite faces of the inner peripheral portions of the segments.

5. In a socket, a rigid support ring, a composite disc-like insulating body arranged loosely within said ring and composed of an assembly of individual complementary segments of insulation, a plurality of said segments each having an axially extending recess in one and the same side thereof and each carrying an individual contact element held in said recess so as to be bodily movable with its segment, the recess in each segment being laterally closed by the adjacent side of the adjoining segment in the assembly, said segments exteriorly having peripheral interlocking engagement with said ring for supporting the segments against axial displacement, said segment assembly having an axial aperture extending substantially centrally through said assembly and defined by inner peripheral walls of the segments, a loose retainer member axially arranged within said aperture and supported by the inner peripheral portions of said segments to loosely hold the segments against disengagement from said ring while allowing each segment a limited freedom of independent movement in the annular space between said support ring and said retainer member, and means to hold the segment assembly against rotational bodily displacement within said ring.

6. A contact unit for a socket structure, comprising an insulator of circular segmental shape having in one radial side thereof a recess extending between opposite faces of the segment, the other radial side being unrecessed, said recess having a main wider portion extending from one of said faces and communicating with a narrower portion extending to the other of said faces, said narrower portion having a local enlargement, and a contact element secured in said recess comprising a pair of spaced pin-receiving tongues accommodated in said wider portion of said recess and a narrower terminal portion, part of which adjacent said tongues is arranged within said narrower portion of said recess and is provided with an enlargement corresponding to and registering with the enlargement in said recess, and the remainder of which terminal portion extends from the narrower end of said recess so as to project from the adjacent face of the segment.

7. In a socket, a support member having an aperture therein, a composite insulating body arranged within said aperture and supported by said member and comprising a loose assembly of juxtaposed individual complementary segments of insulation, a series of contact elements each mounted within an individual segment to move bodily therewith, said segments exteriorly having peripheral means having interlocking engagement with said support member whereby to be supported by said member, said assembly of segments having an aperture therein defined by inner peripheral walls of said segments, and a loose retainer member located within said aperture in said assembly and having flanges which engage the opposite faces of the inner peripheral portions of said segments whereby said retainer member is supported by said inner peripheral portions of said segments to loosely hold said segments against disengagement from said support member while allowing each segment a limited

freedom of independent movement in the annular space between said support member and said retainer member.

DONALD JACKSON.

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