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A. J. SCHMITT

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MOUNTING MEANS MORE PARTICULARLY FOR RADIO SOCKETS

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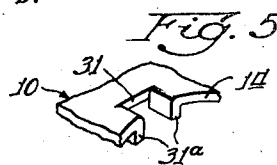
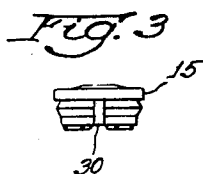
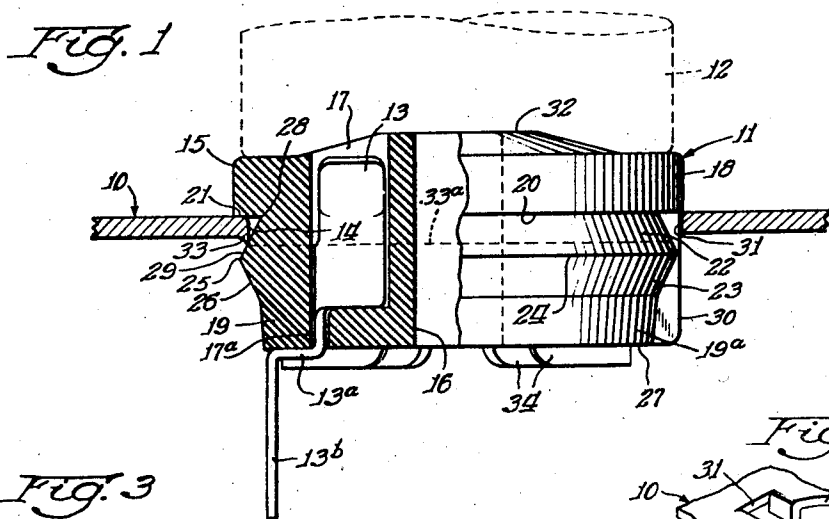


Fig. 2

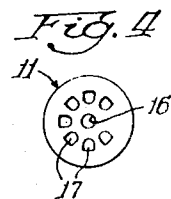
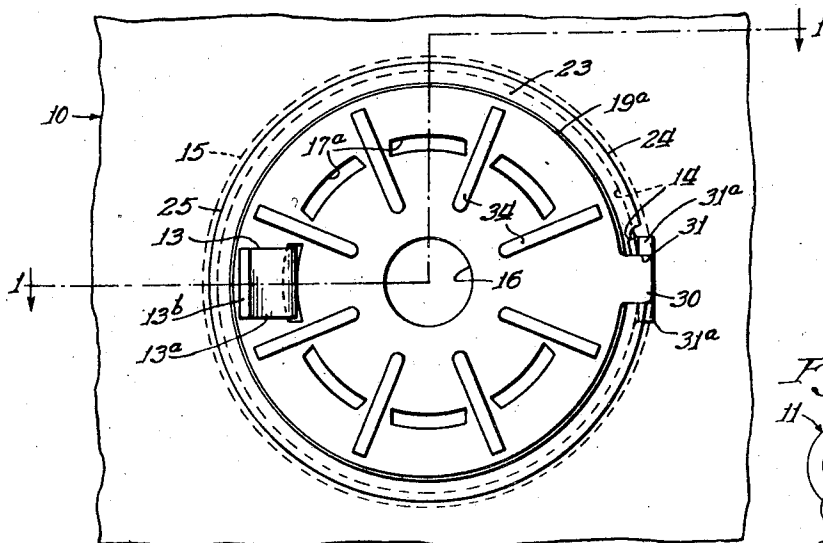
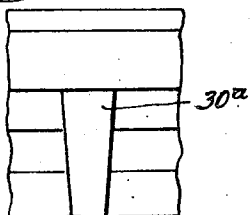


Fig. 6



Inventor:
Arthur J. Schmitt

By: A. Truitt Jones

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MOUNTING MEANS MORE PARTICULARLY
FOR RADIO SOCKETS

Arthur J. Schmitt, Chicago, Ill.

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3 Claims. (Cl. 173—339)

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This invention relates to mounting means more particularly for mounting radio tube sockets directly on the chassis of a radio receiving set, and aims to provide a simple and inexpensive but at the same time highly efficient and improved means for this purpose.

As is well known in the art, it is commonly desirable to have the socket cylindrical and not only to mount the socket on the panel so as to inhibit axial movement of the socket on the panel but also to fix the relative rotative position of the socket with respect to the panel aperture, and the present invention provides improved means for both of these purposes integral with the insulating socket body, and without the need for adapter plates, retaining spring, rivets, solderings or other extraneous accessories, thus lending itself readily to mass production methods of assembly and ready removal or replacement of sockets in the mounting plate when desired for repair purposes or the like.

Another important object of the invention is to provide an improved molded socket for electrical apparatus and particularly one of the so-called miniature type in which a number of electrical contact members are carried within a strikingly small socket diameter and wherein the only metal parts are those necessary to insure the proper electrical functioning of the socket.

The invention contemplates, in one important aspect thereof, an entire plug-like socket of a resilient material, such as a synthetic elastomer, which snaps into an opening in the chassis or mounting plate and is locked and retained therein solely by the resilience of its material and inhibiting to a marked degree by its entirely resilient body objectionable microphonic effects.

The invention will be understood by reference to the following specification, together with the accompanying drawings, setting forth an illustrative embodiment of the invention, and in which drawings:

Figure 1 is an enlarged view of the improved mounting means thereof, showing a radio chassis or mounting plate in section and the improved socket partially in section and partially in elevation;

Figure 2 is a bottom view of the structure of Fig. 1;

Figure 3 is an elevational view of the socket body itself, with the contact members absent, and which may be of full size;

Figure 4 is a top view of the socket body of Fig. 3;

Figure 5 is a fragmentary perspective view of the chassis plate; and

Figure 6 shows a modified form of rib on the body.

Referring in detail to the illustrative embodiment shown in the drawings, the mounting plate

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10 may here represent a fragment of a metal chassis panel for a radio receiving set, which set might be produced in large quantities at low cost, emphasizing the need for minimizing the material required and the steps of assembly operation.

The socket 11, in which the present invention more inherently resides and which will be presently more specifically described, is adapted to engage both mechanically and electrically with the prongs (not shown) on a base indicated in dotted lines and here given the numeral 12 of a conventional vacuum tube or other electric plug-in device, as will be readily understood by those skilled in the art and need not be here further explained, it being here sufficient to point out that the socket may carry one or more and commonly a series of metallic electric contact members, one of which only for illustration is here indicated by the numeral 13.

Commonly the chassis plate 10 has a circular opening 14 therein to receive the socket 11, and the body 15 of the socket is plug-like and preferably cylindrical both to correspond with the usual cylindrical base 12 of the plug-in device as well as to provide, with a minimum of material, space for a central hole 16 in the socket to receive the usual central guide prong (not shown) on the plug-in device 12, and, grouped thereabout in an annular series, a plurality of axially extending passages 17 in the socket body for the reception of, first the contact members 13 and later also the peripheral prongs on the base 12, there being commonly as many as seven or eight of these annularly arranged axially extending passages 17 within a very small miniature socket or button type socket having an area of say as little as five-eighths of an inch in diameter. The contact openings 17 may be reduced at their lower ends, as at 17a, to pass the tail 13b of the contact member therethrough, which may be then angled as at 13a to retain it in place. Thus the body 15 has a central portion (preferably integral) extending throughout the axial length of the body, said central portion having axially extending restricted passageways therein for receiving metallic contact members, said passageways being each relatively small relatively to the area of the body whereby the body retains its plug-like character.

The socket body 15, in accordance with the present invention, is desirably of a resilient, dielectric material, for example, a synthetic elastomer or resilient thermo-plastic substance, which may be molded, usually under the influence of heat and pressure, to the form shown and which will have the characteristics of retaining substantially its molded form and resisting excessive distortion in normal handling, while possessing at the same time a degree of elasticity

and resilience which permits it to yield and spring back for the purpose and with the object here contemplated. One of the polymerized materials which are now known and available on the market, such as polyethylene or one of the vinyl resin plastics, can be used.

The socket body 15 has one part, in this instance an upper part 18, and another part, in this instance a lower part 19, providing a pair of axially spaced apart oppositely facing shoulders. In the present instance, except as later noted, the socket parts 18 and 19 are of continuous cylindrical formation. The part 18 provides a substantially annular downwardly facing shoulder 20 about the periphery of the socket, which, when the socket is inserted from, say, the upper side of the chassis 10 and into the opening 14, supports the socket from downward movement with respect to the chassis by means of the abutment of the downwardly facing shoulder 20 of the socket with the circular margin 21 of the chassis opening 14.

Further in accordance with the present invention, the lower part 19 of the present socket is formed at its upper end as here shown in the form of a pair of truncated conical portions 22 and 23, these portions meeting at the plane represented by the line 24 which is coincident with the widest part of the conical portions 22 and 23. The annular holding flange or shoulder is thus formed at 25 on the lower socket portion 19 which takes under the lower face of the chassis 10 margining the circular opening 14.

Since it is contemplated by the present invention that the over-all diameter of the socket part 19 in the plane of the annular locking flange or shoulder 25 be slightly larger than the diameter of the opening 14, in order to retain the socket therein, and that the socket shall be pushed into the opening 14 from one side, the upper side of the chassis plate in this instance, against the resistance of the material of the socket body itself, provision is here made for mechanically expediting the temporary displacement of the elastomeric material of the body to permit its insertion in the chassis opening, and, to this end, the conical formation 23 advantageously affords an annular beveled or cam surface 26 which tapers inwardly from the point 25 of largest diameter toward the reduced lower end 19a of the socket part 19, the lower face 27 of which is advantageously of a diameter slightly less than that of the opening 14, the socket thus terminating in the reduced lower end 19a from which the contact tails 13 depend.

Similarly, and for purposes presently more particularly pointed out, the conical portion 22 of the socket body part 19 also tapers inwardly but upwardly from the shoulder 25 toward the center of the body where it integrally joins the part 18 as at 28 by meeting the adjacent downwardly facing shoulder 20. Thus the conical portion 22 provides another beveled or cam surface 29 which serves a multi-fold function, one of which is as will be seen to form an auxiliary part of the shoulder 25 which engages the chassis plate and other functions of which will be later described.

Before describing more particularly the functions of the beveled or tapered surfaces 26 and 29 already alluded to, in addition to their function of providing by their inherent formation the holding flange or shoulder 25, it may be pointed out that it is desirable in devices of this character to polarize or predetermine the rotative position of the socket in the opening 14 and this may

be readily accomplished by molding as here shown a key protuberance or rib 30 extending axially of the socket body on the part 19 of the latter and which rib is snugly and matingly received in a notch or key-way 31 in the chassis opening 14, so that the socket body may be inserted therein in only one rotative position. To the extent of the rib 30 the shoulders 20 and 25 are not continuously annular.

So constructed and arranged, when it is desired to assemble the socket 11 with the chassis 10, all that is necessary to be done is to first locate the lower face 27 of the socket body 15 in the chassis opening 14, with the rib 30 aligned with the notch 31, and then press, as with the thumb, upon the upper face 32 of the socket whereupon the socket will snap into position as indicated. In this movement of the socket body completely and lockingly into the opening 14, the beveled surface 26 forms a substantially annular cam which mechanically assists in displacing the yieldable elastomer material of the socket body sufficiently to reduce the diameter of the socket part 19 in the plane of the annular shoulder 25 so that this shoulder 25 is permitted to pass through the chassis opening 14.

When the socket has been pushed in as far as it will go, the shoulder 25 will spring outwardly again to its normal maximum diameter and the socket will be locked to the chassis by having the annular margin 21 of the opening 14 of the latter located in the space, triangular in vertical cross-section, between the downwardly facing shoulder 20 on the upper portion of the socket and the upwardly facing shoulder 25, or, more specifically the beveled or tapered auxiliary portion 29 of the shoulder 35.

One of the advantageous multi-fold functions of the beveled shoulder 29, as an operative part of the shoulder 25, is that the margin 21 of the chassis plate is wedged in this triangular space above referred to and thus play or chattering of the socket on the chassis is prevented, this wedging action being enhanced by the elastic character of the socket body material so that the lower edge 33 or corner of the chassis plate at the opening 14 digs slightly (annularly as at 33a) into the material of the body, the elastic character of the latter permitting sufficient displacement of material of the body for this purpose and contributing to the locking function just described. This wedging action also desirably guards against play which might otherwise occur due to variation in thickness of the chassis plate. In forming the opening 14 in the chassis, a downturned annular edge or burr is desirably formed at 33, as shown, to enhance the interengagement of chassis and socket.

Still another of the multi-fold functions of the beveled surface 29 is that when it is desired to remove the socket from the chassis as for repair or replacement, the beveled surface 29 also serves as a cam to mechanically assist in displacing the socket body material to reduce the diameter of the shoulder 25 to permit removal of the socket body 15, when sufficient force is placed upon the socket to flex it against its natural resilience together with the digging in effect of the corner 33 into the beveled shoulder 29. It is of course desirable that when once in position it should not be too easily removable.

It will now be understood that by this novel provision of forming the entire plug-like socket body of an elastomer, any vibration in the chassis panel 10 will be dampened by the material of the

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socket body, thus inhibiting any microphonic effect which might otherwise be transmitted to the electric contact members carried by the socket. Furthermore, by reason of the resilient character of the entire socket body, the metallic contact members carried therein are retained in part by the springy nature of the material, the openings for the contact members being such that the latter are intended to be pushed into the socket body against the inherent resilience of the latter and thus further not only preventing objectionable play or microphonic effects but moreover gripping the metallic contact members (and through the latter the tube prongs) throughout their surface which engage the body and requiring a minimum of locking means between the metallic contact members and the body.

What has just been said is not only true of the contact metallic members but to a comparable degree is also true of the gripping effect of the body upon any central pilot pin of the tube base 12 which may be received in the central hole 16 of the socket body and which may have a very close fit therein, and thus firmly holding the tube in place on the socket.

The customary barrier ribs 34 may be provided as usual upon the lower face 27 of the socket to further separate the contact members 13.

With respect to the central hole 16, it may be remarked that the latter may if desired be provided with a central metallic grounding sleeve into which the central pilot pin of the tube base 12 may enter, as need not be here further explained and as will be readily understood in the art, or the hole 16 may be provided with another central metallic member such as a pin, without other metal members being carried by the body, in which case the body might function as a jack.

Such central metallic member may advantageously be inserted after the socket is in place on the chassis, the central metallic member being slightly larger in diameter than the hole 16 and thus being inserted by a force fit which tends to expand the elastic material of the body in the chassis opening and further enhance its securement to the chassis as shown. Use of such a pin might well permit the employment of a more elastic material than that here specifically described for the body while counteracting any possibility of the socket working loose in the chassis.

The edge of the key-way 31 is desirably turned down as at 31a at each side of the rib 30 in the form of a pair of lugs struck out from the material of the chassis 10 to form the key-way, which lugs contact the side of the rib, and further insure against undesired rotation of the socket in the chassis.

As shown in Figure 6, the securement of the rib in the key-way 31 may be still further enhanced by making the rib wedge-shape in an axial direction as at 30a, which, as the socket is forced into the chassis opening, will wedge the rib into the key-way 31, the rib being here shown slightly wider at its top than the distance between the lugs.

It is intended to be understood that the invention is not limited to details of construction here shown for purposes of illustration and that such changes may be made as fall within the scope of the appended claims without departing therefrom.

The invention having been described, what is here claimed is:

1. Mounting means for radio sockets and the like comprising a cylindrical resilient plug-like

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body of insulating elastomeric material having a central portion extending substantially throughout the axial length of the body, said central portion having at least one axially extending restricted passageway therein relatively small with respect to the area of the body for receiving a metallic contact member, said body having a pair of cooperating peripheral substantially oppositely facing annular shoulders, one of said shoulders being defined by a surface in a plane perpendicular to the axis of said body and the other by a conical surface having its largest diameter axially spaced from said perpendicular surface, and said conical surface intersecting at its smallest diameter said perpendicular surface, whereby to provide a peripheral substantially annular space triangular in cross-section for a substantially annular edge of a mounting plate opening and adapted to have said edge wedged therein, and a second conical surface on said body pitched in opposite direction to said first conical surface and further spaced from said perpendicular surface, the largest diameter of said conical surfaces being greater than the diameter of said opening, whereby the body may be pressed into said opening against the resilience of said body and tightly held therein, said conical surfaces providing cams to assist in inserting and removing said body from said opening selectively.

2. Mounting means for radio sockets and the like comprising a cylindrical resilient plug-like body of insulating elastomeric material having a central portion extending substantially throughout the axial length of the body, said central portion having at least one axially extending restricted passageway therein relatively small with respect to the area of the body for receiving a metallic contact member, said body having a pair of cooperating peripheral substantially oppositely facing annular shoulders, one of said shoulders being defined by a surface in a plane perpendicular to the axis of said body and the other by a conical surface having its largest diameter axially spaced from said perpendicular surface, and said conical surface intersecting at its smallest diameter said perpendicular surface, whereby to provide a peripheral substantially annular space triangular in cross-section for a substantially annular edge of a mounting plate opening and adapted to have said edge wedged therein, the largest diameter of said conical surface being greater than the diameter of said opening, whereby the body may be pressed into said opening against the resilience of said body and tightly held therein, said conical surface providing a cam to assist in removing said body from said opening when desired.

3. Mounting means for radio sockets and the like comprising a cylindrical resilient plug-like body of insulating elastomeric material having a central portion extending substantially throughout the axial length of the body, said central portion having at least one axially extending restricted passageway therein relatively small with respect to the area of the body for receiving a metallic contact member, said body having a pair of cooperating peripheral substantially annular shoulders, one of said shoulders being defined by a surface in a plane substantially perpendicular to the axis of said body and the other by a conical surface having its largest diameter axially spaced from said substantially perpendicular surface, and said conical surface intersecting at its smallest diameter said substantially perpendicular surface, whereby to provide a pe-

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ripheral substantially annular space triangular in cross-section for a substantially annular edge of a mounting plate opening and adapted to have said edge wedged therein.

ARTHUR J. SCHMITT.

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