May 11, 1943. A. W. KIMBELL 2,318,868

ELECTRICAL SOCKET

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FIG. 1.

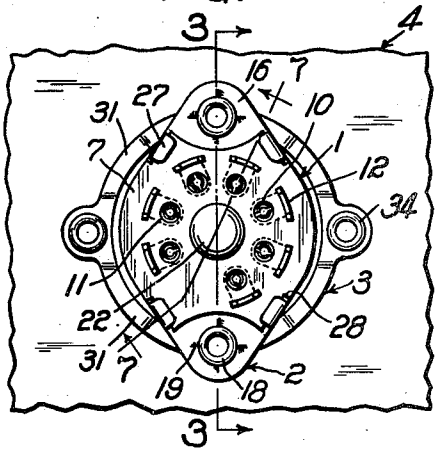


FIG. 2.

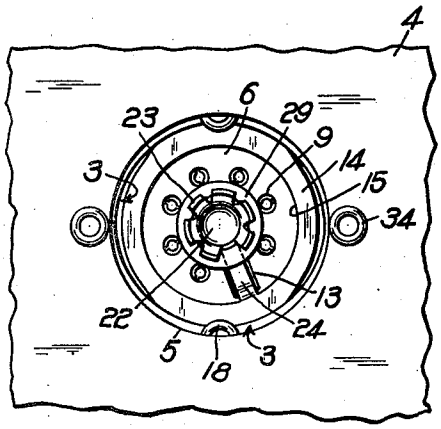


FIG. 3.

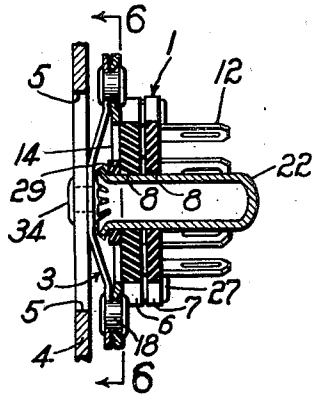


FIG. 4.

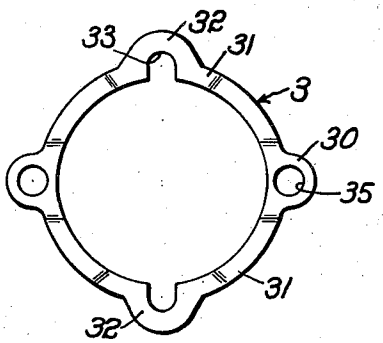


FIG. 5.

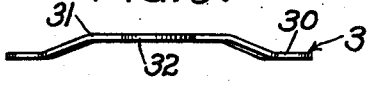


FIG. 6.

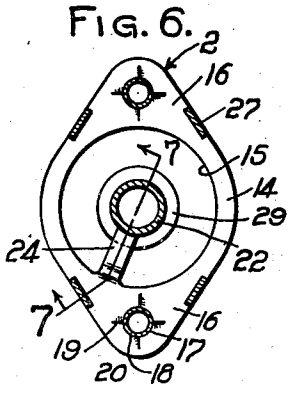
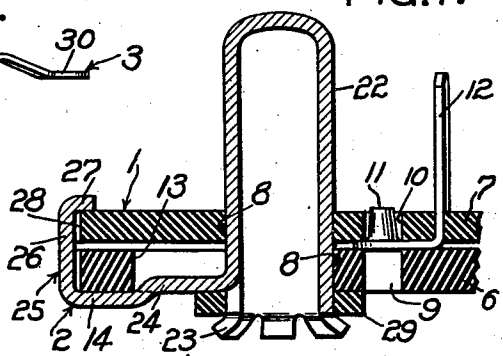


FIG. 7.



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FIG. 8.

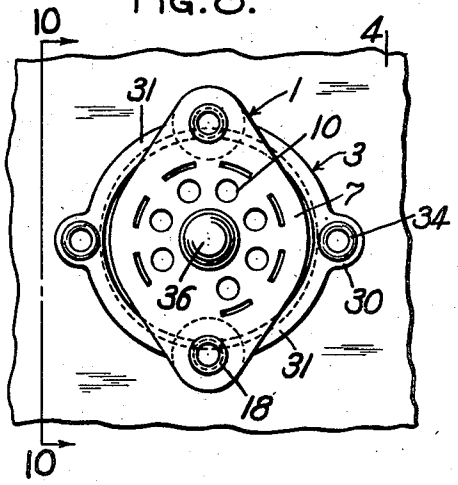


FIG. 9.

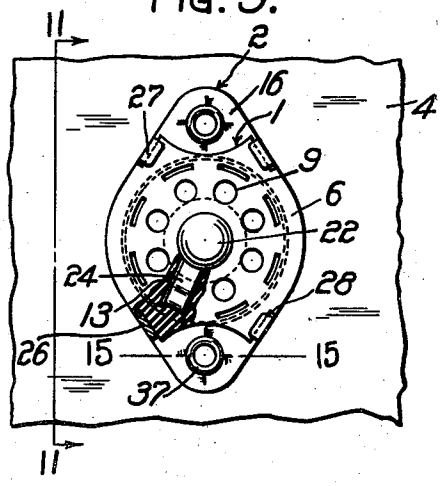


FIG. 10.

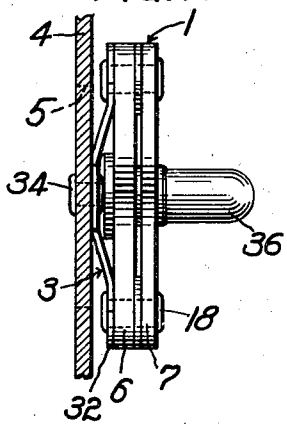


FIG. 11.

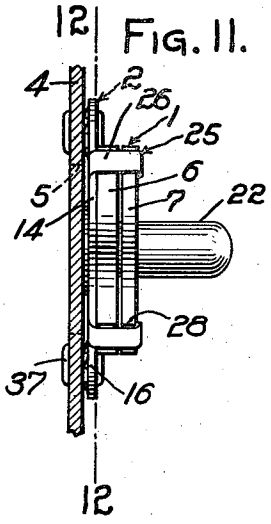


FIG. 12.

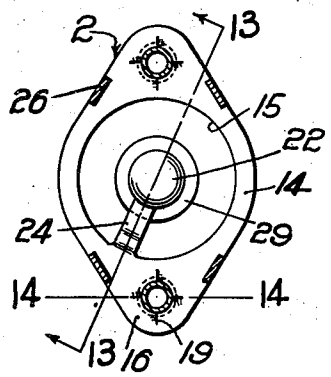


FIG. 14.

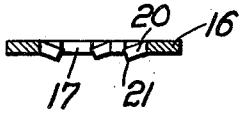


FIG. 15.

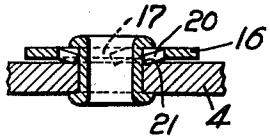
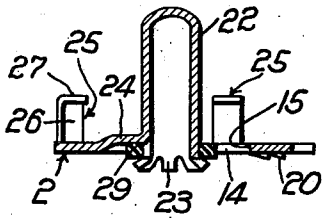


FIG. 13.



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Patented May 11, 1943 2,318,868

UNITED STATES PATENT OFFICE

2,318,868

ELECTRICAL SOCKET

Arthur W. Kimbell, West Newton, Mass., assignor to United-Carr Fastener Corporation, Cambridge, Mass., a corporation of Massachusetts

Application October 11, 1940, Serial No. 360,784

7 Claims. (Cl. 173—328)

This invention relates to improvements in electrical sockets and more particularly to sockets for vacuum tubes for radio sets and the like.

One of the objects of this invention is the provision of a socket having a metal saddle or mounting member providing an integral drawn cup which acts to shield certain of the socket contacts and also serves as a receptacle for a glass seal forming a part of a radio tube.

Another object of the invention relates to the construction of the saddle member wherein it has sharp edges projecting upwardly adjacent an opening for receiving a rivet by which the saddle member is secured to a metal supporting member. As a result of this construction, the sharp edges become embedded in the supporting member during the operation by which the saddle is attached to the supporting member, thereby assuring a good electrical connection.

A still further object is directed to a method eliminating microphonics in the tube, which includes the provision of a flexible metal ring secured to the socket and a supporting panel between the parts and constructed to yield toward and away from the supporting panel so as to absorb the impact shocks which a portable receiver particularly might be subjected to during operation.

Other objects and uses of my invention will be apparent from inspection of the drawings and specification hereinbelow set forth.

Referring to the drawings, in which I have illustrated preferred embodiments of my invention—

Fig. 1 represents a bottom plan of a socket installation including a supporting panel and a socket member carrying my improved saddle member and secured in shockproof relation to the panel by a ring member;

Fig. 2 is a top plan of the installation shown in Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a plan of the ring member which serves to effect a shockproof mounting between the socket and panel members;

Fig. 5 is a side elevation of the ring member shown in Fig. 4;

Fig. 6 is a section taken along the line 6—6 of Fig. 3, the supporting panel and ring being omitted;

Fig. 7 is an enlarged partial section taken along the line 7—7 of Figs. 1 and 6, the supporting panel and ring being omitted;

Fig. 8 is a bottom plan of a socket installation similar to that shown in Fig. 1 but omitting the saddle member;

Fig. 9 is a bottom plan view of a socket installation similar to Fig. 1 but omitting the ring member;

Fig. 10 is a section taken on the line 10—10 of Fig. 8;

Fig. 11 is a section taken on the line 11—11 of Fig. 9;

Fig. 12 is a section taken on the line 12—12 of Fig. 11;

Fig. 13 is a section taken on the line 13—13 of Fig. 12;

Fig. 14 is an enlarged section taken on the line 14—14 of Fig. 12; and

Fig. 15 is an enlarged section taken on the line 15—15 of Fig. 9.

Referring to my first form of socket installation illustrated in Figs. 1–3 of the drawings, I have shown a socket member 1 having a metal saddle or mounting member 2 and a ring member 3 attached to the mounting member and also to a metal supporting panel 4 so as to secure the socket member in shock-proof relation to the panel. The panel 4 has an aperture 5 for receiving a base of a vacuum tube member (not shown) when the tube and socket are electrically connected.

Referring in detail to the socket member, I have shown one having an insulating base which in my preferred form comprises an upper plate 6 and a lower plate 7 formed of suitable insulating material, the plates 6 and 7 having registering central apertures 8—8 (Figs. 3 and 7). The upper plate has an annular series of prong-receiving apertures 9 disposed around its respective aperture 8 and the plate 7 has an annular series of contact-receiving apertures 10 disposed in registering relation to the apertures 9. Contact members are carried by the socket having prong-receiving portions 11 (Fig. 7) disposed within the apertures 10 of the plate 7 and integral soldering terminals 12 extending through the plate. The upper plate 6 preferably has a slot 13 (Figs. 2 and 7) extending radially from the aperture 8 thereof for a purpose to be described.

The saddle or mounting member 2 is formed entirely from one piece of sheet metal material and includes a flat plate portion 14 having an opening 15 of greater diameter than the imaginary circle defined by the openings 9 of the insulating plate 6. Flat mounting portions or wings 16 are provided at opposed ends of the plate 14 having openings 17 for receiving suitable

attaching members such as the rivets 18. In my preferred construction of the mounting member 2 a number of slits 19 are formed in the wings 16 extending radially from the respective openings 17 and defining a number of lugs 20. The lugs 20 are bent upwardly out of the plane of the plate 14 so as to present sharp edges 21 (Figs. 14 and 15) which are adapted to be embedded in the material of the ring member 3 or be pressed firmly thereagainst so as to effect a good electrical connection between the parts. The mounting member 2 has a shielding means drawn from material taken from within the opening 15 of the plate 14. The shielding means is preferably in the form of a cup 22 which extends concentric with the axis of the plate 14. The cup 22 has an annular series of ears 23 adjacent its open end and the cup is connected to the plate 14 by a narrow connecting portion 24 which is joined integrally to the cup a predetermined distance from the outermost free edges of the open end, as most clearly shown in Fig. 7.

In assembling the parts of the socket base and retainer, the socket contacts are disposed in assembly with the insulating plate 7 and the insulating plate 6 is superposed upon the plate 7 with its openings 9 in alignment with its openings 10. The mounting member 2 is then moved toward the base to extend the cup 22 through the aligned openings 8—8 of insulating plates 6 and 7. At the same time the plate 14 of the mounting member engages the outer surface of the insulating plate 6 and the connecting portion is disposed within the slot 13 of the plate 6, as most clearly shown in Fig. 7. The parts are secured in assembly by means of lugs 25 integral with the marginal edges of the plate portion 14 and having straight portions 26 extending outwardly from the plate portion to engage the peripheral edges of the plates and free ends 27 which are bent over against the outer surface of the lower insulating plate 7 (Figs. 1 and 7), thereby maintaining the plates 6 and 7 in fixed relation between the plate 14 and lug ends 27. The insulating plates 6 and 7 have notches 28 in their peripheral edges which receive the straight portions 26 and the walls of the plates 6 and 7 adjacent the notches cooperate with the straight portions 26 to prevent relative rotation of the parts. The cup 22 is secured against movement axially of the openings 8—8 by means of a positioning washer 29 of suitable insulating material which is passed over the open end of the cup 22 so as abut the connecting portion 24. The ears 23 of the cup 22 are then clenched over to engage the washer and the parts are fixed against relative movement.

It will be seen that when the parts of the socket have been finally assembled, the cup 22 extends slightly beyond the length of the soldering lugs 12 in interposed relation to the plate and grid contacts and as a result a low grid-to-plate capacitance is maintained. By joining the cup 22 integrally to the plate 14 by the connecting portion 24 an uninterrupted electrical continuity is provided between the cup and plate portion thereby effecting a relatively low ground discharge loss. Furthermore, the cup 22 may present a predetermined inside diameter enabling it to receive and clear the glass envelope seal (not shown) which protrudes from the base of the most recently developed glass vacuum tube.

The ring membr 3 is a one-piece sheet metal spring stamping and provides a pair of diametrically opposed flat attaching portions 30. Semicircular portions 31 of the ring between the attaching portions 30 are deformed out of the plane of the portions 30 to one side thereof and provide a second pair of diametrically opposed attaching portions 32 disposed in a plane spaced from the portions 30. The ring member is secured to the mounting member 2 by means of the rivets 18 which extend through the openings 17 of the wings 16 and openings 33 (Fig. 4) formed in the attaching portions 32. The entire socket unit including the ring member is secured to the panel 4 by any suitable means such as rivets 34 which extend through openings 35 (Fig. 4) of the attaching portions 30 and the supporting panel. The cup 22 is thus grounded to the supporting panel 4 through the mounting member 2 and the ring member 3. As a result of the construction of the ring member, the semicircular portions 31 thereof between the attaching portions 30 yield toward and away from the panel 4 so as to absorb impact shocks to which a portable receiver and the like might be subjected, thereby eliminating microphonics in the tubes.

The socket installations shown in Figs. 8 and 10 and 9 and 11 respectively are modifications of the installation shown in Figs. 1–3 and like parts of the various installations carry the same identifying numbers. The contacts have been omitted from the illustrations of these last forms, but it is understood that any suitable type might be assembled with these socket bases. The installation shown in Figs. 8 and 10 differs primarily from the installation of Figs. 1–3 by the fact that the mounting member has been omitted and the ring member 3, which serves to secure the socket base in shockproof relation to the supporting panel 4, is secured directly to the insulating plates 6 and 7 by attaching members such as the rivets 18 which extend through the plates 6 and 7 and the attaching portions 32 of the ring member. Shielding of the contacts in this form of installation is performed by a cup-shaped unit 36 which is secured in assembly with the plates 6 and 7 and which extends through aligned central openings of the plates in the manner of the integral cup portion 22 of the mounting member 2. The cup 36 may be grounded to the panel 4 by a lead-off wire.

My third form of installation shown in Figs. 9 and 11 differs from the installation of Figs. 1–3 by the fact that the ring member 3 is omitted and the mounting member 2 is secured directly to the panel 4 by attaching members such as the rivets 37 extending through openings 17 of the wing portions 16 and the panel. During the operation by which the mounting member is secured to the panel, the blow which heads over the rivets 37 causes the edges 21 of the ears 20 to embed themselves in the panel, as most clearly shown in Fig. 15, so as to assure a good electrical connection between the mounting member and supporting panel.

Although I have illustrated and described preferred embodiments of my invention, I do not wish to be limited thereby as the scope of my invention is best set forth in the following claims.

I claim:

1. In combination with a sheet metal support of an electrical socket device comprising an insulating base carrying a plurality of contact members, a one-piece sheet metal mounting member assembled with said base having mounting portions disposed laterally of said base and adapted to be secured to said support so as to be elec-

trically engaged therewith, said mounting member including an integral tubular seal-receiving shielding means extending into and axially through said base and disposed between two of said contact members and a bridge portion integrally joining said shielding means and said mounting member.

2. In combination with a sheet metal support, of an electrical socket device comprising an insulating base carrying a plurality of contact members, a one-piece sheet metal mounting member assembled with said base adapted to be secured to said support so as to be electrically engaged therewith, said mounting member having an integral cylindrical seal-receiving shielding means extending into and axially through said base and disposed between two of said contact members and a portion integrally joining said shielding means and said mounting member.

3. In combination with a sheet metal support, of an electrical socket device comprising an insulating base carrying a plurality of contact members, a one-piece sheet metal mounting member assembled with said base, said mounting member including a body portion having an opening, integral attaching portions engaging said base for securing said mounting member thereto, said body portion having flat mounting portions on opposed sides extending laterally beyond said base for attachment to said support so as to be electrically engaged therewith, and said mounting member having a cylindrical hollow shielding means within the opening of said body portion, and extending into said base and disposed between two of said contact members, and a bridge portion integrally joining said shielding means and said mounting member.

4. An electrical socket device comprising an insulating base having an annular series of openings extending through said base, a plurality of contacts carried by said base within said openings, a one-piece sheet metal mounting member assembled with said base, said mounting member including a body portion having an opening in alignment with and of greater diameter than said annular series of openings, said mounting member having an integral tubular shielding means extending axially through said base and disposed between a pair of said contacts.

5. In combination with a sheet metal support, of an electrical socket device comprising an insulating base having upper and lower sides and an annular series of openings extending through said base, a plurality of contacts carried by said base within said openings, a metal mounting member assembled with said base and attached to said support, said mounting member including a flat plate portion disposed adjacent the upper side of said base and having an opening in alignment with and of greater diameter than said annular series of openings, attaching portions integral with said plate portion and engaging an oppositely facing side of said base from said top side for securing said mounting member to said base, said mounting member having a shielding means disposed axially of the opening of said plate portion and extending through said base and disposed between two of said contact members, and a portion integrally joining said shielding means and said mounting member.

6. In combination with a sheet metal support, of an electrical socket device comprising an insulating base having a central opening extending therethrough and an annular series of openings around said central opening extending through said base, a plurality of contacts carried by said base within said openings of said annular series, a one-piece sheet metal mounting assembled with said base and attached to said support, said mounting member including a body portion disposed adjacent one side of said base and having an opening in alignment with and of greater diameter than said annular series of openings, said mounting member having a tubular shielding means forming an integral part thereof, said shielding means extending through said central opening of said base and a bridge portion integrally joining said shielding means to said body portion.

7. An electrical socket device comprising an insulating base having superposed disks, said disks having aligned central openings and aligned series of annular openings around said central openings, a plurality of contacts carried by said base within said openings of at least one of said annular series, a one-piece sheet metal mounting member assembled with said base, said mounting member including a plate portion engaging the outer face of one of said disks and attaching lugs integral with said plate engaging the periphery of said disks to secure said disks in assembly, said plate having an opening in alignment with and of greater diameter than said annular series of openings, a tubular shielding member forming an integral part of said mounting member extending through said central openings of said disks, and a bridge portion extending partly across the opening in said plate and integrally joining said shielding member to said plate portion.

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