

Feb. 27, 1940.

S. SUTTER

2,191,871

CONNECTOR DEVICE

Filed Aug. 14, 1937

3 Sheets-Sheet 1

Fig. 1.

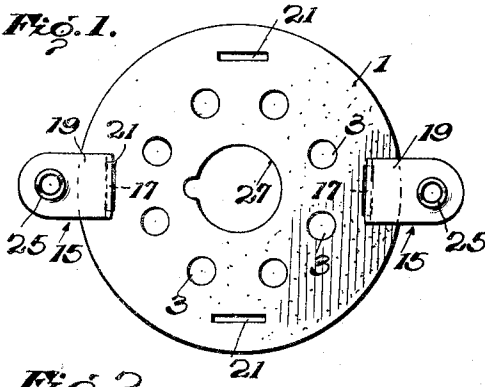


Fig. 3.

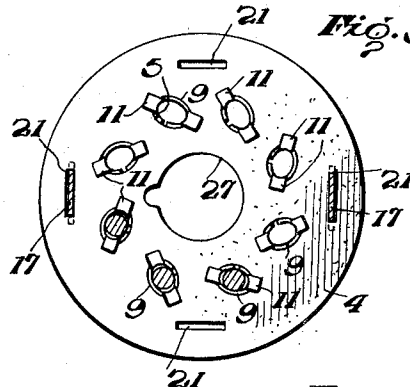


Fig. 2.

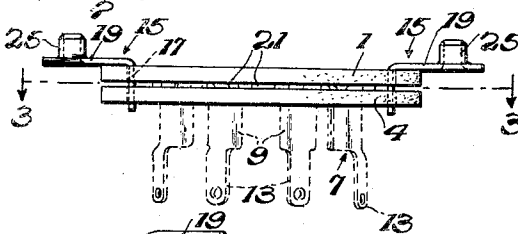


Fig. 4.

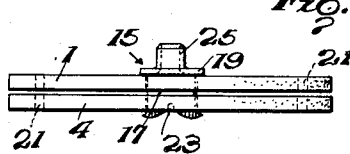


Fig. 5.

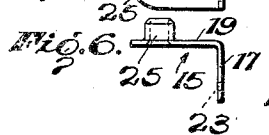


Fig. 11.

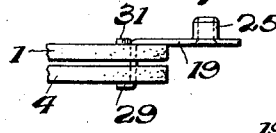


Fig. 6.

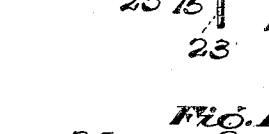


Fig. 7.

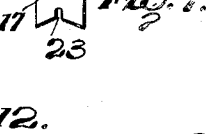


Fig. 8.

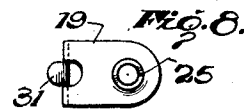


Fig. 10.

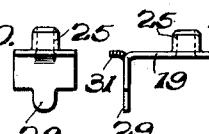


Fig. 9.

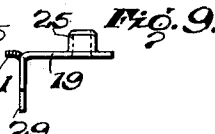


Fig. 12.

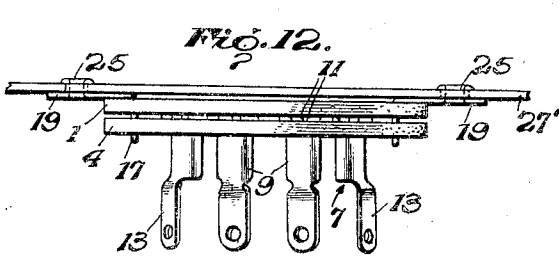


Fig. 13.

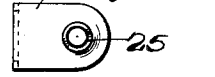
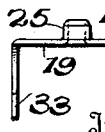


Fig. 15.



Fig. 14.



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S. SUTTER

2,191,871

CONNECTOR DEVICE

Filed Aug. 14, 1937

3 Sheets-Sheet 2

Fig. 16.

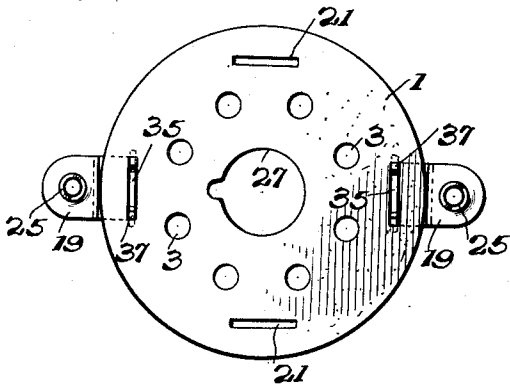


Fig. 18.

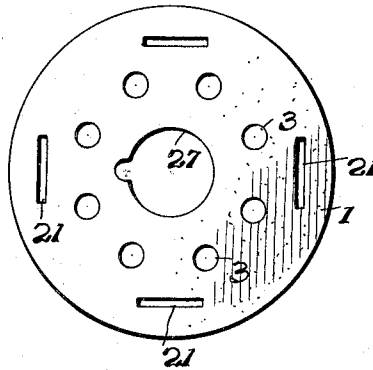


Fig. 17.

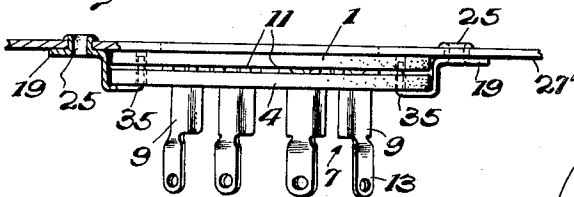


Fig. 19.

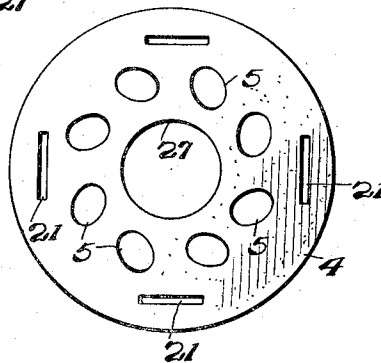


Fig. 20.

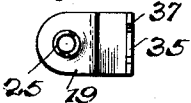


Fig. 23.

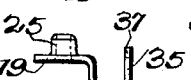
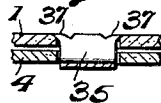


Fig. 22.

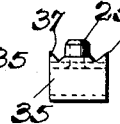


Fig. 27.

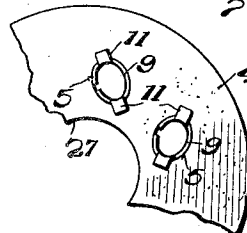


Fig. 24.

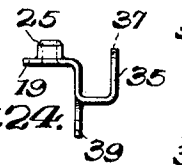


Fig. 25.

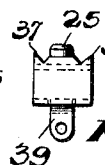
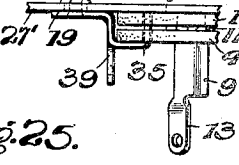


Fig. 26.



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2,191,871

CONNECTOR DEVICE

Filed Aug. 14, 1937

3 Sheets-Sheet 3

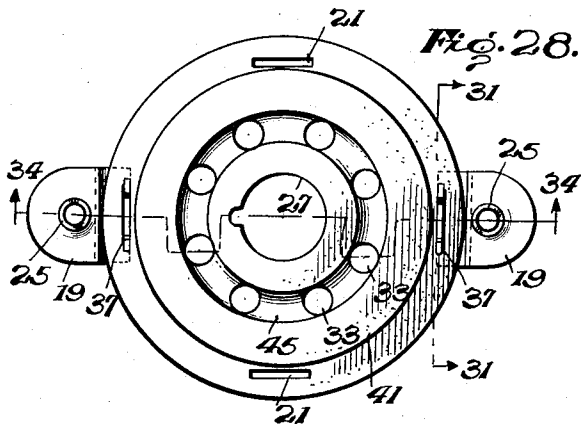


Fig. 30.

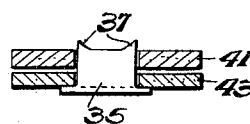


Fig. 31.

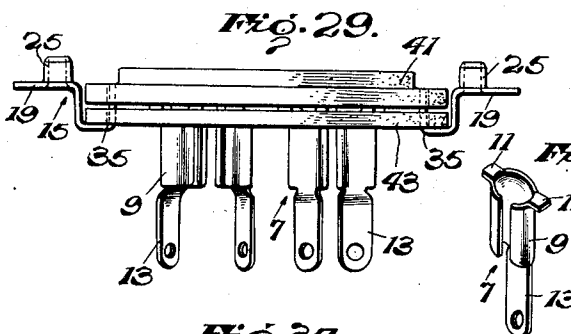
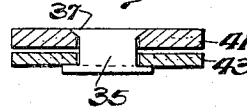


Fig. 32. Fig. 33.

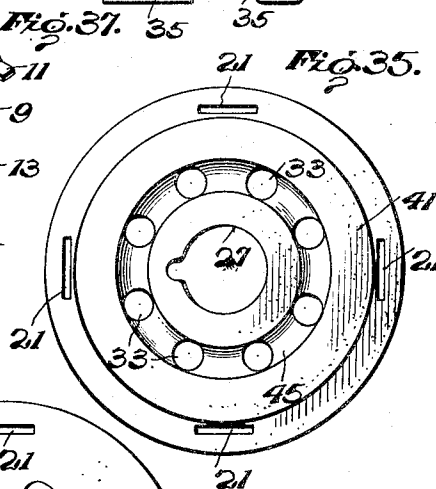
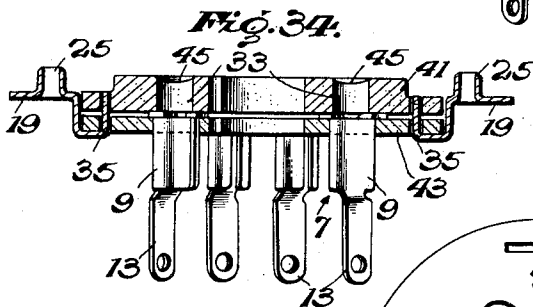
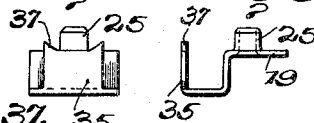
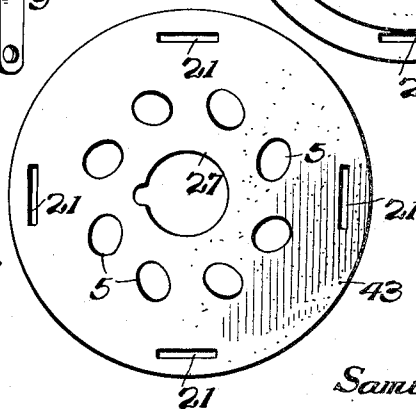


Fig. 36.



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UNITED STATES PATENT OFFICE

2,191,871

CONNECTOR DEVICE

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tion of Pennsylvania

Application August 14, 1937, Serial No. 159,175

4 Claims. (Cl. 173—339)

My invention relates to connector devices such as sockets of the type commonly utilized in connection with radio tubes and the like, though not of necessity limited thereto.

In accordance with the teaching of the prior art as exemplified, for example, by the Recker Patent #1,517,684 and the McFadden Patent #1,904,670, it has been customary to construct a vacuum tube socket or female connector device by superposing upon each other two perforated plates of insulating material, between which plates the anchoring portions of a plurality of female contact elements are held. For the purpose of securing the plates together, a rivet such as that shown in the McFadden patent, a screw such as is shown in the Recker patent or a plurality of rivets such as are shown in the Benjamin Patent #1,904,662 heretofore have been utilized.

Furthermore, it has been usual to make the insulating plates sufficiently wide or long to enable them to be affixed directly to a radio chassis or the like by a plurality of bolts or rivets.

It is, accordingly, an object of my invention to provide means having the double function of securing together the usual two perforated plates of insulating material and of securing the assembled socket to a radio chassis or the like.

Another object of my invention is to provide a connector device or the like that, by reason of minimization of insulating material necessary, shall be less expensive to manufacture than sockets heretofore known.

A still further and more specific object of my invention is to provide a vacuum tube socket or the like that may be assembled expeditiously in the factory and that may be incorporated into a radio receiver without the necessary of utilizing additional rivets for supporting purposes, as has been usual in connection with the mounting of sockets constructed according to the teachings of the prior art.

In accordance with my invention, I provide a plurality of discs of insulating material, each disc having perforations corresponding in position to the arrangement of the prongs of a vacuum tube or the like, both of the said discs having, in addition, a plurality of circumferentially disposed rectangular perforations. The latter mentioned rectangular perforations are preferably disposed circumferentially of the discs in pairs, the perforations of each pair being diametrically opposite one another. I also provide at least two clamping devices preferably made from strip material, each clamping device having a portion that extends through the aligned rectangular openings, respectively, of a pair of such openings that are diametrically disposed, the said clamping device having an angularly diverging portion provided with a drawn eyelet, which may be inserted through a preformed opening

in a radio receiver chassis or the like, and thereafter riveted over to hold the socket assembly in place.

The end of the clamping and supporting element or device that extends through a plurality of rectangular openings may assume a variety of forms according to my invention, such forms being more fully explained in detail hereinafter.

It also falls within the scope of my invention to omit the eyelet and to provide a perfectly plain anchoring portion that may be spot-welded to the chassis if desired. The gist of my invention, however, resides in the provision of means for both clamping together the laminations comprising a radio tube socket and the like and for supporting the assembled socket in registry with an opening in a radio chassis or a similar element whereby the use of separate clamping and supporting rivets or screws is obviated.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view of a laminated radio tube socket constructed according to my invention.

Fig. 2 is a view in side elevation of the device shown in Fig. 1.

Fig. 3 is a top plan view of the lower plate of the device shown in Fig. 1, looking in the direction of the arrows, 3—3 in Fig. 2, showing the contact elements per se in place.

Fig. 4 is an end view in elevation of the device shown in Fig. 1.

Figs. 5, 6 and 7 are top plan, side elevation and end elevation views of a combined clamping and supporting element constructed according to my invention.

Figs. 8, 9 and 10 are top plan, side elevation and end elevation views, respectively, of an alternative combined clamping and supporting element constructed according to my invention.

Fig. 11 is a fragmentary view of a portion of a socket assembly exemplifying the use of a supporting and clamping device such as is shown in Figs. 8, 9, and 10.

Fig. 12 is a view in side elevation of a socket of the type exemplified by Figs. 1, 2 and 3, illustrating the manner in which the eyelets of the combined clamping and supporting device are riveted to a radio chassis or the like.

Figs. 13, 14 and 15 are top plan, elevation and end elevation views of yet another alternative form of a combined clamping and supporting device, constructed according to my invention.

Fig. 16 is a top plan view of a socket or connector device constructed according to my invention, the combined clamping and supporting elements having such configuration as to afford somewhat more rigidity than those shown in Figs. 1, 2 and 3.

Fig. 17 is a view in side elevation of the device exemplified by Fig. 16, partly in section.

Fig. 18 is a plan view of a top plate of insulating material.

Fig. 19 is a plan view of a bottom plate of insulating material.

Figs. 20, 21 and 22 are top plan, side elevation and end elevation views, respectively, of the combined clamping and supporting device shown in Figs. 16 and 17 before assembly.

Fig. 23 is a fragmentary sectional view in elevation exemplifying the manner in which the clamping portion of the device shown in Figs. 20, 21 and 22 is peened over for the purpose of clamping the insulating plates together.

Figs. 24 and 25 are side elevation and end elevation views, respectively, of a combined clamping and supporting element constructed according to my invention, the said element having a struck out soldering lug that may be utilized for grounding purposes if desired.

Fig. 26 is a fragmentary view of a socket assembly exemplifying the utilization of a combined clamping, grounding, and supporting element of the type illustrated by Figs. 24 and 25.

Fig. 27 is a fragmentary top plan view of a bottom plate showing several contact elements in position in the perforations therethrough.

Fig. 28 is a top plan view of a socket assembly constructed according to my invention, the top plate thereof being molded.

Fig. 29 is a view in side elevation of the socket shown in Fig. 28.

Figs. 30 and 31 are sectional views in elevation taken along a line corresponding to the line 31—31 in Fig. 28, Fig. 30 showing the clamping portion of the supporting device before the peening-over operation and Fig. 31 showing the appearance of the said clamping device after the peening-over operation.

Figs. 32 and 33 are end and side elevation views, respectively, of the clamping device per se.

Fig. 34 is a cross sectional view in elevation of an assembled socket taken along a line corresponding to the line 34—34, in Fig. 28.

Fig. 35 is a top plan view of a molded top plate.

Fig. 36 is a plan view of the bottom plate of the type utilized in the device exemplified by Figs. 28, 29 and 34, and.

Fig. 37 is a view in perspective of a female contact element.

In all figures of the drawings, corresponding parts are similarly designated.

Referring now to Figs. 1, 2, 3 and 4 in accordance with my invention, I provide a top plate having a plurality of circumferentially disposed perforations 3 corresponding in number and position to the prongs of a vacuum tube or the like and a bottom plate 4 having a plurality of similarly disposed non-circular openings 5 through each of which extends a female contact element 7. The female contact elements may be of the type shown in Fig. 37, constituted by a non-cylindrical prong-receiving portion 9 analogous in cross section and function to the contact elements shown in the Drazing Reissue Patent, 20,162, the upper end of the said portion being

provided with a plurality of diametrically opposite supporting ears 11 and the other end thereof being provided with a soldering lug 13. It will be noted from an inspection of Fig. 3, that the supporting ears 11 of the contact elements rest upon the upper surface of the bottom plate 4 and, from an inspection of Fig. 2 that the said ears are firmly clamped between the top and bottom plates.

For the purpose of clamping the said ears between the said plates, I provide a plurality of combined clamping and socket-supporting devices, each of the said devices having a downwardly extending clamping portion 17 and a supporting portion 19 extending at a right angle thereto.

The several plates of insulating material are provided with diametrically disposed pairs of rectangular openings 21 through which the clamping portions 17 may extend. The combined clamping and supporting devices may be formed from strip metal corresponding in width to the length of the said rectangular openings.

The supporting and clamping device per se is exemplified by Figs. 5, 6 and 7, from which it will be noted that the free end of the clamping portion thereof is provided with a notch 23 and that the supporting portion thereof is provided with a drawn eyelet 25. In the drawings, the walls of the eyelet are shown as being substantially as thick as the remainder of the device, but as a matter of fact, such walls in an actual device are materially thinner.

For the purpose of clamping the upper and lower plates together, at least two clamping devices are utilized, the clamping portions of the said devices extending downwardly, respectively, through one pair of the diametrically opposite rectangular openings as shown in Figs. 1 and 2. The free ends of the clamping portions are peened over as shown in Fig. 4, thus locking the insulating plates firmly in position with all of the openings therethrough in alignment.

The other pair of rectangular openings 21 may be utilized in the event that it is desired to have the tube socket disposed in a position 90 degrees away from the position shown.

Each of the insulating plates is provided with a large central perforation 27 for the purpose of accommodating the centering boss now utilized on many vacuum tube bases. The said perforation, however, forms no part of my present invention.

As shown in Fig. 12, the eyelet 25 drawn from the supporting portion of the clamping and supporting element may be inserted upwardly through a corresponding perforation in a radio receiver chassis 27 or the like and thereafter rivet or peened over.

It also lies within the scope of my invention as illustrated by Figs. 8, 9 and 10 to provide the free end of the clamping portion of my improved combination clamping device and support with a depending ear 29 which may be bent up into contact with the lower surface of the bottom plate 4 of the stack and with an ear 31 struck out from the angular diverging portion 19, which ear may be bent down against the upper surface of the top plate 1. The manner in which the last referred to device is utilized is clearly exemplified by Fig. 11 of the drawings.

Figs. 13, 14 and 15 are views of a still further modification of my invention, wherein the notch in the free end of the clamping portion of the device is replaced by a plurality of ears 33 that

may be pried apart or bent over to clamp the insulating plates together.

Although the clamping devices hereabove referred to and described are reasonably rigid, in some instances somewhat more rigidity is required. In such event, referring now to Figs. 16, 17, 20, 21, 22 and 23, instead of merely providing a downwardly extending clamping portion, I make the said clamping portion U shape. In use, as shown in Figs. 16, 17 and 26, one end 35 of each device, opposite the end that carries the riveting eyelet 25, extends upwardly through a pair of aligned rectangular openings in the insulating plates provided therefor and is peened over as shown in Fig. 23.

The free end of the U shape portion of the device shown in Figs. 20, 21, 22 and 23 is provided with a plurality of ears adapted to be peened over to clamp the insulating plates together but it is to be distinctly understood that such end may assume the configuration shown in Figs. 5, 6, 7, 8, 9, 10, 13, 14 and 15 if desired.

It is also to be understood that my invention is not limited to the specific contour of the clamping portion of the combined clamping and supporting device because, as a matter of fact, it might also be constituted by a drawn eyelet substantially the same as the eyelet shown for riveting and supporting the socket assembly. Since the last mentioned modification of my invention is reasonably apparent, no necessity has been seen for illustrating it.

It will be noted from an inspection of Fig. 19 that the long axis of each of the non-circular perforations in the bottom plate is tangential to a radius of the plate passing therethrough. Such arrangement provides more insulating material between adjacent contacts than would be the case if the long axes of the said openings were disposed at a right angle to the said radii. It, of course, is to be understood that the exact arrangement of the said openings is substantially immaterial insofar as my invention is concerned. It is also to be understood that female contact elements of any other desired type may be utilized if desired.

In the event that it is desired to ground the combined clamping and supporting device, a soldering lug 39 may be struck out therefrom as exemplified by Figs. 24 and 25.

As exemplified by Figs. 28, 29 and 34, my improved clamping and supporting device may be utilized in the assembly of a radio tube socket having a molded top plate 4 and a plain bottom plate 43.

A clamping device of any of the hereinbefore described types may be utilized but I prefer, as shown in Figs. 32 and 33, to utilize devices somewhat similar in configuration to the device shown in Figs. 20, 21 and 22. That is to say, in order to more rigidly clamp the molded top and bottom plates together, a combined supporting and clamping device having a U shape portion, the free end of which extends upwardly through aligned rectangular perforations provided in the several plates is preferable. The appearance of the said free end, before the peening operation is exemplified by Fig. 30 of the drawings, and after the peening operation is exemplified by Fig. 31.

As shown in Fig. 35 of the drawings, the top plate of molded material may be provided with a prong-guiding channel if desired, in the bottom of which channel are disposed the prong-re-

ceiving perforations, and the bottom plate may also be provided with non-circular contact-accommodating perforations 5 as shown in Fig. 36.

From a consideration of the foregoing description, it will be apparent that my combined plate-clamping and socket supporting device offers many advantages not heretofore obtainable. For example, it permits rapid assembly of a socket and, because the amount of insulating material in the several perforated plates is minimized, it greatly cheapens the cost of manufacture. Furthermore, the integrally formed eyelets eliminate the necessity, heretofore experienced, of providing separate eyelets for the purpose of securing the vacuum tube socket to a radio chassis.

Many other advantages of my invention will be apparent to those skilled in the art as well as additional modifications thereof, and, although I have shown and described a number of alternative forms of my improved clamping and supporting device, it is not to be inferred that my invention is limited thereto. On the contrary, my invention is only to be circumscribed by the prior art and limited by the spirit of the appended claims.

I claim as my invention:

1. A connector device comprising a lower plate and an upper plate parallel therewith, the said plates being made of insulating material and having a plurality of aligned prong-accommodating perforations, and means for clamping said plates together, said clamping means being constituted by at least one metallic element having a portion that extends through aligned perforations in the plates, and a portion having such configurations as to enable it to be affixed to a radio chassis or the like to support the connector device therefrom, the free end of the portion extending through the plates being so deformed as to exert a clamping action thereon independently of the portion adapted to be affixed to a radio chassis.

2. A connector device comprising a lower plate and an upper plate parallel therewith, the said plates being made of insulating material and having a plurality of aligned prong-accommodating perforations and a pair of diametrically opposite perforations adapted to accommodate plate clamping means, and means for clamping said plates together, said clamping means being constituted by at least two metallic elements one for each of the aforementioned opposite perforations, each metallic element having a portion that extends through the aligned perforations allotted thereto and a portion having such configuration as to enable it to be affixed to a radio chassis or the like, the free end of each portion that extends through the plates being so deformed as to exert a clamping action thereon independently of the portion adapted to be affixed to a radio chassis.

3. The invention set forth in claim 1 characterized in that the clamping portion of the metallic element diverges angularly from the supporting portion thereof and further characterized in that the supporting portion is provided with an integral drawn eyelet.

4. The invention set forth in claim 2 characterized in that the metallic elements are formed from flat metal strip and that the supporting portion of each element is provided with an integral drawn eyelet.

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