March 24, 1936. J. M. BOWMAN 2,035,295

RADIO TUBE SOCKET

Filed April 23, 1932

Fig. 1.

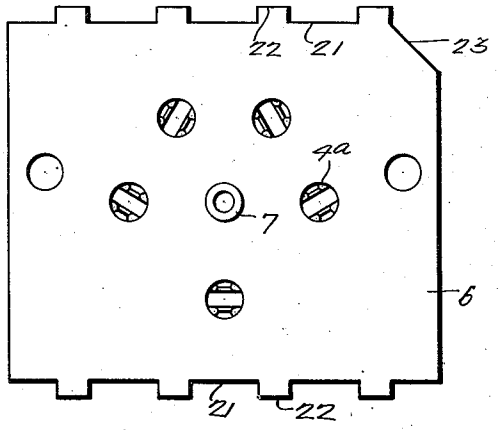


Fig. 6.

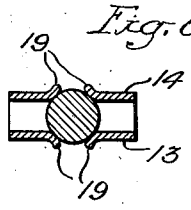


Fig. 7.

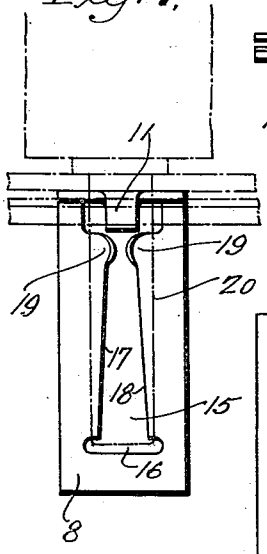


Fig. 2.

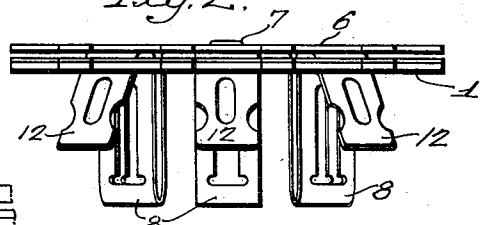


Fig. 5.

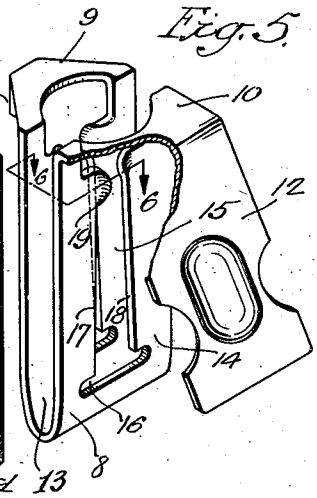


Fig. 3.

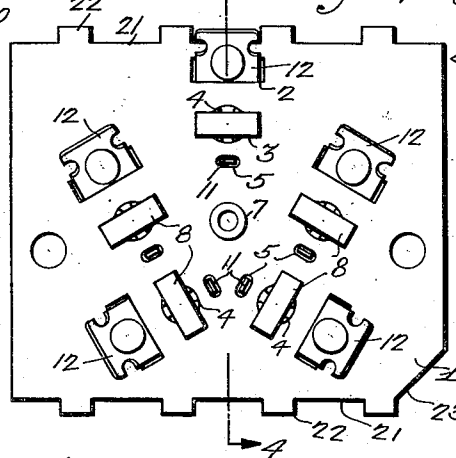
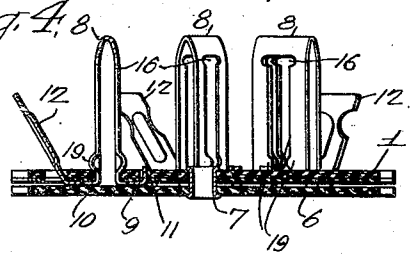


Fig. 4.



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UNITED STATES PATENT OFFICE

2,035,295

RADIO TUBE SOCKET

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Application April 23, 1932, Serial No. 607,197

11 Claims. (Cl. 173—328)

This invention relates to electrical sockets and more particularly to radio sockets, the principal object being to provide a more efficient socket than known devices of this class.

Another object of the invention is to provide a socket of simple construction which readily lends itself to economic commercial manufacture and assembly.

A further object of the invention is to provide a novelly constructed resilient clip which is adapted to receive, firmly hold, and effectively contact a prong, such as those of a vacuum tube.

A still further object of the invention is to provide a novelly constructed base having identifying means whereby correct assembly of the device is assured and which means also serves to facilitate movement of the base during assembly.

Other objects and features will appear hereinafter. The invention in its application to a preferred embodiment may be clearly understood from the following detailed description and accompanying drawing.

In the drawing:

Fig. 1 is a plan view of a socket constructed in accordance with the invention;

Fig. 2 is an elevational view of the device;

Fig. 3 is a bottom plan view of the device;

Fig. 4 is a sectional view along line 4—4 of Fig. 3;

Fig. 5 is a perspective view of one of the resilient clips of the device;

Fig. 6 is a sectional view along line 6—6 of Fig. 5; and

Fig. 7 is an elevational face view of one of the clips illustrating clearly the manner in which it cooperates with a prong of a vacuum tube.

Referring to the several views of the drawing, there is illustrated a device which is adapted for use with a five-prong conventional vacuum tube, but it will be understood that the invention is not thus limited but is applicable to any vacuum tube or similar device having one or more contact prongs. In its preferred form, the device comprises a relatively thick and rigid base 1, which may be formed of any suitable insulating material such as fiber. To give it the desired strength and rigidity, the base may be formed of several layers, as illustrated. The base is provided with suitably arranged substantially rectangular apertures 2, similar apertures 3 having a circular portion 4 for the reception of a contact prong, and relatively small apertures 5. These various apertures are arranged in sets, there being one set for each of the resilient clips as illustrated. The clips are mounted upon the base, free of mechanical connection therewith, in a manner fully set forth hereinafter. A cover or retaining plate 6 having prong receiving apertures 4a therein overlies the various clips and is firmly secured to base 1 by means of one or more rivets. In the present instance, a centrally located rivet 7 is provided for this purpose. Plate 6 is substantially co-extensive with the base and serves to retain the clips in place. The plate may be formed of any suitable insulating material such as fiber and is relatively thin as compared to the base. The reason for this is that a thin and less expensive sheet of insulating material serves the purpose of the cover plate and, therefore, it is not essential nor even desirable that this plate be of the same rigid construction as the base. Accordingly the plate may be formed of a single thin layer of material. By having the base and cover plate formed as above described, another advantage is had which will clearly appear later.

Each of the prong-receiving and contact clips is formed of a resilient metallic strip which is bent as illustrated more clearly in Figs. 4 and 5 to provide a looped portion 8, transversely extending portions 9 and 10 and end portions 11 and 12. The opposed sides 13 and 14 of the loop portion 8 are each provided with a longitudinal slot 15 which terminates at its lower end in a transverse slot 16 and which tapers upwardly, as is clearly illustrated in Figs. 5 and 7. The loop portion of each clip is of such dimension relative to aperture 3, in which it is to be inserted that this portion of each clip may be readily inserted through the base. When thus assembled, the loop portion of the clips depend from base 1, as shown in Fig. 2 and the transverse portions 9 and 10 of the clips overlie the base. The end portion 12 of each clip is formed as a terminal to which a lead-in conductor may be connected, while the other end portion 11 is formed as a projection. These end portions are inserted through apertures 2 and 5, respectively, of the base during assembly, the projecting end portion 11 extending downward into aperture 5 and serving as a guide and locking means for the clip. It will be apparent that this construction assures proper disposition of the clips and prevents displacement thereof.

The oblique edges 17 and 18 of each of the slots 15 are provided at the upper ends of the slots adjacent base 1 with projections 19, these projections being formed so as to define generally a circular space through which the tube prong is inserted, as illustrated clearly in Fig. 6. It will be apparent that these projections serve to guide

the tube prong and to facilitate its insertion in the particular clip. The sides of the loop portion 8 of each clip are spaced from each other a distance which is substantially less than the diameter of the tube prong and these sides are subjected to a spreading action by the prong during its insertion, tending to oppose insertion of the prong. The projections 19, however, defining a substantially circular space, as above noted, facilitate insertion of the end of the prong and render its complete insertion in the clip less difficult.

It will be apparent that the slot edges 17 and 18 engage the tube prong and, by virtue of the tapered shape of these slots, the edges each clean and contact the prong longitudinally over a peripheral portion thereof of substantial width. This will be more readily apparent from consideration of Fig. 7, wherein the tube prong is illustrated at 20 by broken lines. As the prong is inserted in its clip, the oblique or slanting contact edges each scrape and contact a relatively wide longitudinal portion of the prong, the width of which is defined by the distance, circumferentially of the prong, between the ends of each contact edge. Since there are four such edges on each clip, there are four relatively wide longitudinal areas of the prong which are cleaned and contacted by the edges. The slot 16 at the lower end of each of the slots 15 serves to decrease the resiliency of the lower bent portion of each clip, thereby enhancing the resilient spreading action of sides 13 and 14. It will be seen then that the contact edges of each clip grip the prong as it is inserted in the clip and hold it firmly, making very good electrical contact with the prong at the same time. It is by virtue of the tapered shape of slots 15 that the efficient gripping action of the clips is had. The socket is particularly adapted to installations where the tubes or like devices are mounted in inverted or substantially inverted fashion and where there is a possibility of them becoming displaced or falling from the sockets.

In constructing and assembling the socket, a continuous strip of material which is to form a plurality of bases is punched to provide therein spaced successive sets of apertures, one for each base. At the same time, the successive bases are defined by weakening the material along spaced lines, preferably by cutting away portions, as at 21, to provide narrow connecting portions 22. The continuous strip thus punched is moved along for the purpose of assembly and as each set of apertures moves to the position of an operator, he inserts the proper clips in the various apertures of the particular base. The strip is provided with spaced cut-away portions at the corner of each base portion to provide a slanted edge 23 on each such base portion. During assembly, this edge facilitates movement of the strip by permitting the engagement of successive edges of the strip by suitable propulsion apparatus. The slanted edge also serves as an identifying means, whereby the operator is at all times clearly apprized of the particular clip to be inserted in each set of apertures of the base. In other words, by constant reference to edge 23, the operator is enabled to identify the various base apertures to properly assemble the device. This becomes very important in the manufacture of devices which are adapted for use with tubes having prongs of different diameters, it being necessary, of course, in such instances to provide different sized clips. As the base strip passes along and after the clips for a particular device are inserted in their openings, a second strip, formed similarly to the base strip and providing the successive cover plates 6, is placed upon and riveted to the successive base portions of the base strip. A plurality of successive completed devices are thus formed in a continuous strip-like assembly, the successive bases and cover plates being held by connecting portions 22. The successive devices are now segregated from each other by merely breaking or severing the base and cover plate portions along the spaced weakened lines, resulting in devices such as that illustrated herein. The previously mentioned added advantage of having the bases and cover plates formed as described will now be apparent. Due to their structural difference the base and cover plates strip break independently, thereby facilitating this step of manufacture. If the cover plate strip were formed structurally the same as the base strip, it would be difficult to break these strips along the weakened lines, as will be appreciated.

It will be apparent that the invention provides a simple and very efficient device which readily lends itself to large quantity production and assembly. The invention also involves features which facilitate production and assembly, as will be quite obvious. While the device as disclosed herein constitutes a preferred form, any modifications or changes as come within the appended claims are deemed to be a part of the invention.

I claim:

1. In an electrical socket for contact prongs, a resilient contact element for each of said prongs, said element comprising a resilient metallic strip extending longitudinally of the prong when the latter is in cooperative relation with the element, said strip having a tapered longitudinal slot therein to provide oblique prong-cleaning and contacting edges.

2. In an electrical socket for contact prongs, a resilient contact element for each of said prongs, said element comprising a resilient metallic strip extending longitudinally of the prong when the latter is in cooperative relation with the element, said strip having a tapered longitudinal slot therein to provide prong-cleaning and contacting edges extending at an acute angle toward each other.

3. In an electrical socket for contact prongs, a resilient contact clip for each of said prongs, said clip comprising a resilient metallic strip having opposed portions extending longitudinally of the prong on opposite sides thereof when the prong is in cooperative relation with the clip, said portions each having a tapered longitudinal slot therein to provide oblique prong-cleaning and contacting edges.

4. In an electrical socket for contact prongs, a resilient contact clip for each of said prongs, said clip comprising a resilient looped metallic strip having opposed portions extending longitudinally of the prong on opposite sides thereof when the prong is in cooperative relation with the clip, said portions each having a tapered longitudinal slot therein to provide oblique prong-cleaning and contacting edges.

5. In an electrical socket for contact prongs, a base having an aperture therein for receiving a contact prong, a resilient looped metallic strip clip having opposed portions depending from said base and adapted to receive said prong, said portions each having a tapered longitudinal slot therein to provide oblique prong-cleaning and

contacting edges, and projections formed on said edges adjacent to said base and adapted to guide and contact said prong.

6. In an electrical socket for contact prongs, a base having apertures therein, one for receiving a contact prong, a resilient metallic strip clip having a looped portion extending through said one aperture, transversely extending portions overlying said base, and end portions extending through other of said apertures, one of said end portions being formed to constitute a terminal and the other being formed as a detent projection to prevent displacement of said clip, said looped portion having opposed sides adapted to receive said prong, said sides each having a tapered longitudinal slot therein to provide oblique prong-cleaning and contacting edges, and a plate secured to said base and overlying said transversely extending portions.

7. In an electrical socket for contact prongs, a base having apertures therein, one for receiving a contact prong, a resilient metallic strip clip having a looped portion extending through said one aperture, transversely extending portions overlying said base, and end portions extending through other of said apertures, one of said end portions being formed to constitute a terminal and the other being formed as a detent projection to prevent displacement of said clip, said looped portion having opposed sides adapted to receive said prong, said sides each having a tapered longitudinal slot therein to provide oblique prong-cleaning and contacting edges, projections formed on said edges adjacent to said base and adapted to guide and contact said prong, and a plate secured to said base and overlying said transversely extending portions.

8. In an electrical socket for contact prongs, a base having apertures therein, one for receiving a contact prong, a resilient metallic strip clip having a looped portion extending through said one aperture, transversely extending portions overlying said base, and end portions extending through other of said apertures, one of said end portions being formed to constitute a terminal and the other being formed as a detent projection to prevent displacement of said clip, said looped portion having opposed sides adapted to receive said prong, said sides each having a tapered longitudinal slot therein to provide oblique prong-cleaning and contacting edges, said slots being enlarged at their lower ends to render said looped portion less resilient, projections formed on said edges adjacent to said base and adapted to guide and contact said prong, and a plate secured to said base and overlying said transversely extending portions.

9. In an electrical socket for contact prongs, a resilient contact element for a prong, said element comprising a resilient metallic member extending longitudinally of the prong when the latter is in cooperative relation with the element, said member having an oblique prong-cleaning and contacting edge.

10. In an electrical socket for contact prongs, a resilient contact element for a prong, said element comprising a resilient metallic member extending longitudinally of the prong when the latter is in cooperative relation with the element, said member having an oblique prong-cleaning and contacting edge making an acute angle with the inserted prong.

11. In an electrical socket for contact prongs, a resilient contact element for a prong, said element comprising a resilient metallic member extending longitudinally of the prong when the latter is in cooperative relation with the element, said member having opposed oblique prong-cleaning and contacting edges.

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