Oct. 14, 1941. H. H. EBY 2,259,157

THERMIONIC TUBE SOCKET

Filed June 16, 1937 2 Sheets-Sheet 1

Fig. 1

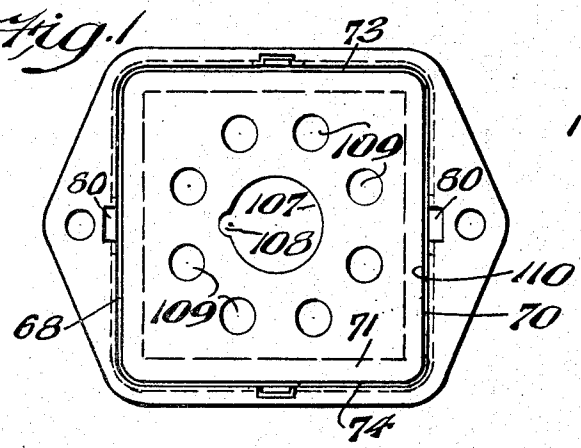


Fig. 2

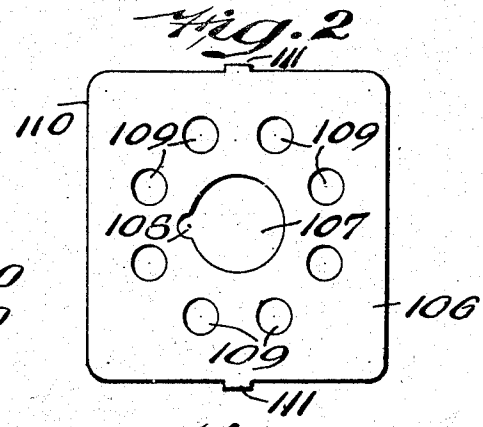


Fig. 3

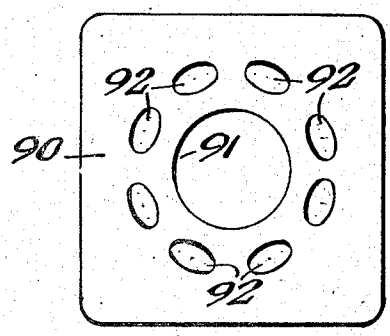


Fig. 4

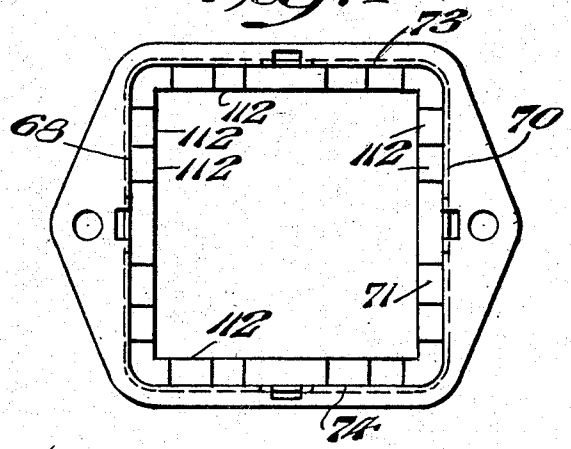


Fig. 5

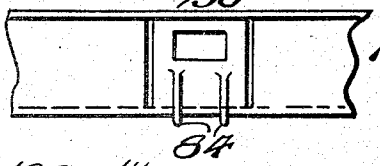


Fig. 6

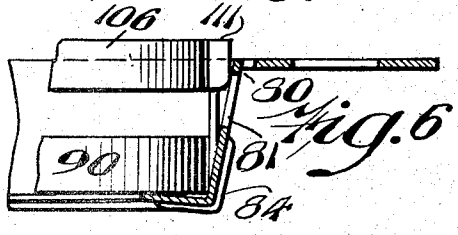


Fig. 7

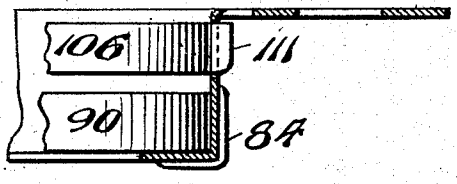


Fig. 8

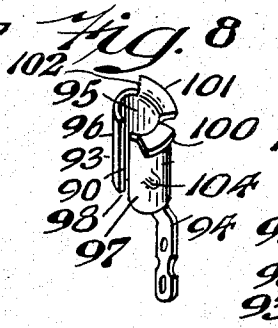
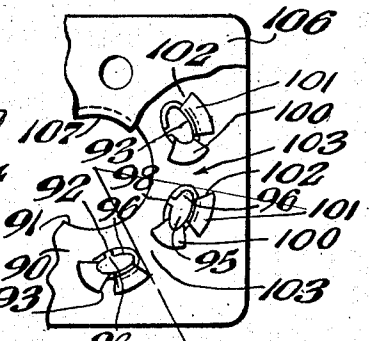


Fig. 9



INVENTOR
HUGH H. EBY,
BY
Frank H. Borden
ATTORNEY

Oct. 14, 1941. H. H. EBY 2,259,157

THERMIONIC TUBE SOCKET

Filed June 16, 1937 2 Sheets-Sheet 2

Fig. 12.

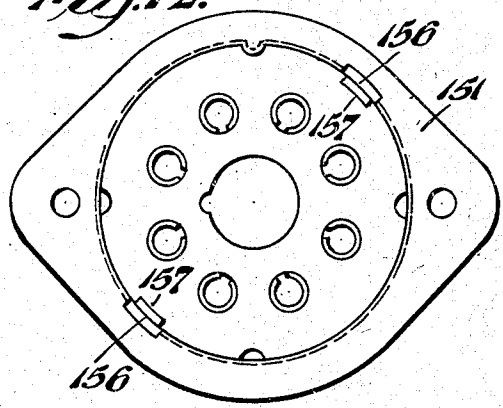


Fig. 10.

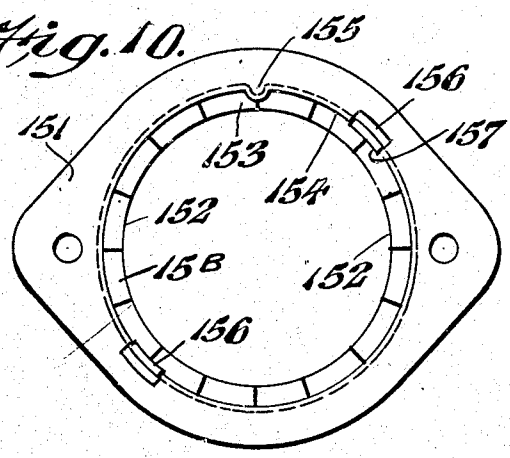


Fig. 11.

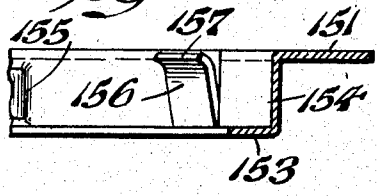


Fig. 13.

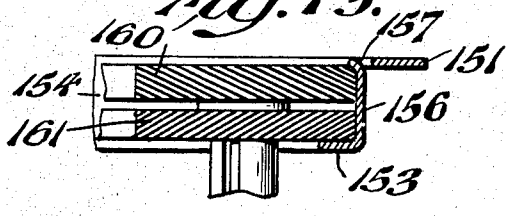


Fig. 10A.

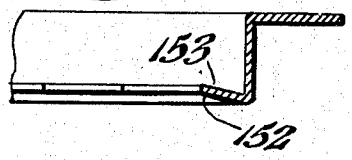
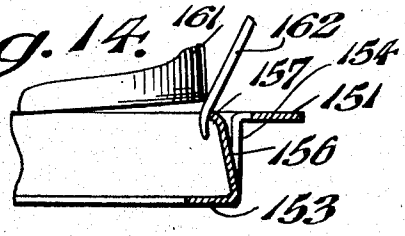


Fig. 14.



INVENTOR
HUGH H. EBY,
BY
Frank H. Borden
ATTORNEY

Patented Oct. 14, 1941

2,259,157

UNITED STATES PATENT OFFICE

2,259,157

THERMIONIC TUBE SOCKET

Hugh H. Eby, Philadelphia, Pa., assignor to Hugh H. Eby, Inc., Philadelphia, Pa., a corporation of Pennsylvania

Application June 16, 1937, Serial No. 148,546

2 Claims. (Cl. 173—339)

This invention relates to thermionic tube sockets, and particularly to receptacles for radio tubes.

The general theoretical requirements for such devices are well known and include uniform and low contact resistance, uniform and tight prong engagement, strength, attractiveness of appearance, as an attribute of sales appeal at least, even if mechanically of small moment, and extreme economy in production cost. This latter manifests itself in susceptibility to mass production, in the reduction in amount and expense of material used, and, of probably greatest moment, in reduced labor costs. Other advantageous attributes include easy and cheap installation, susceptibility of the receptacle to changed contact relation, ease of attachment of the connectors, etc.

It is among the objects of this invention; to secure each one of the foregoing advantages in socket receptacles; to provide a radio socket receiving housing, for mounting the sockets on a panel, of novelty and high utility; to provide a socket housing in which either a laminated or molded socket receptacle is interchangeably mountable; to improve molded sockets; to improve laminated sockets; to improve contacts for receptacles; to provide a metal stamping in which parts have a snap or push fit to assemble a complete socket without eyeletting or riveting and with a minimum of labor; to improve radio socket contacts; to provide improvements on my earlier filed applications Ser. Nos. 25,369 matured into Patent #2,127,556, August 23, 1938, and 25,055, which matured into Patent No. 2,196,697, April 9, 1940; to provide a radio tube socket and mounting plate so arranged that after positioning the plate on a chassis the socket can be removed, either in whole or in part, to rotate it for variation of indexing; and many other objects and advantages as will become more apparent as the description proceeds.

In the preferred embodiment of the invention a metal stamping is provided as the mounting support for the socket, within which a socket device is mounted, there being cooperating portions of socket and stamping to anchor the socket within the stamping.

In the accompanying drawings forming part of this description;

Fig. 1 represents an assembly of base and mounting support in plan constituting an exemplification of the invention,

Fig. 2 represents a plan of the upper insulating plate of the assembled base shown in Fig. 1,

Fig. 3 represents a plan of the bottom insulating plate of the assembly of Fig. 1.

Fig. 4 represents a plan of the mounting support of the invention shown in Fig. 1.

Fig. 5 represents a fragmentary elevation of the pan of Fig. 4 showing the resilient tongue thereof.

Figs. 6 and 7 represent successive stages of the mounting assembly of the plates of Figs. 2 and 3 in the pan or mounting support of Fig. 4 indicating the action of the resilient tongue with the boss on the upper plate.

Fig. 8 represents a perspective of a contact such as may be associated with the plates of Figs. 2 and 3.

Fig. 9 represents a fragmentary plan partially broken away to show the relation of the upper and lower plates with associated contacts, in the assembly of Fig. 1.

Fig. 10 represents a plan of a still further modified form of mounting support or stamping,

Fig. 10A represents a fragmentary section through the pan of Fig. 10 applicable also to Fig. 4.

Fig. 11 represents a fragmentary section of the pan of Fig. 10.

Fig. 12 represents a fragmentary section through the assembly of Fig. 10.

Fig. 13 represents a fragmentary vertical section through the pan shown in Fig. 10 with the assembled insulating supporting plates mounted therein.

Fig. 14 represents a fragmentary section through the pan of Fig. 10, with a removable tool engaging the resilient anchoring device to facilitate seating of the base in the stamping.

An important factor in the invention is the facilitation of under panel or over panel mounting, and some preliminary consideration may be given to this part of the development. The panel of a radio receiving chassis, of suitable material, is provided with an aperture, usually circular, within which the socket receptacle is to be disposed. An annular opening is not necessary as oval, square, or any other desired contour may be provided, according to the particular demands. The radio socket receptacle is to be mounted either directly in the aperture, supported by the edges of the panel surrounding the aperture, as will later be discussed, or by means of a sub-surface support will be mounted on the panel in alignment with the aperture.

The stamping, cage, mounting support, or pan, is preferably formed of resilient sheet metal, although molded metal or insulating materials

may be used. The mounting support or supporting frame is obviously a cheap and relatively inexpensive item, using a minimum of material and labor in its production.

It being desired to mount radio socket receptacles within the supporting pan easily and cheaply, it is desired to provide some means for facilitating the entry of the sockets, while acting to anchor the parts securely against undesired withdrawal after positioning. While it will be evident that if desired suitably independent fastening means, such as staples, eyelets, screws, bolts and the like may be resorted to in securing the broader advantages of the pan support, yet this is not preferred, and it is preferred to so form the pan that automatic locking assembly follows the mere association of the elements.

It will be recognized that in its broader aspects it makes no particular difference what sort of radio socket is associated with the metal stamping or mounting frame, whether molded as described, or molded in part and laminated in part, or whether it comprises two insulating sheets of elements including the type normally called "laminated." An illustration of the utilization of the metal pan which is arranged with a laminated radio tube socket of novelty and utility, is shown in Figs. 1 to 9 inclusive.

In its preferred embodiment an insulating plate **90** such as either a laminated sheet or a molding of suitable dielectric material, is provided with a large center opening **91**, through which the guide prong of the tube may pass, if used, and with a plurality of oval contact apertures **92** disposed concentrically of the opening with the lateral smallest dimension substantially radial of the central aperture or axis. This plate or sheet is substantially square so as to drop into the square pan to disposition upon flange **71**, and held against any material or appreciable lateral shift by the walls **68**, **70**, **73** and **74**, and may be inserted either before or after the association with the contacts to be described. Obviously a different shape of pan will utilize a correspondingly different shape of plates.

The contact **93** comprises the tail piece or element **94**, the backing portion **95**, from which the side arms or wings **96** and **97** are bent outwardly and then toward each other with their side edges slightly spaced by the slot **98**, and forming in cross section the generally oval contact substantially according to the said Draving patent, although in the broader aspects of the contact any other cross sectional form may be resorted to that is possessed of reduced contact resistance and a tight grip. The end of the contact is slit longitudinally so that arm **97** has an integral substantially perpendicular flange **100** arranged to overlie the upper surface of the plate or sheet **90** adjacent the aperture **92** in which the contact is disposed and connected to the arm throughout an appreciable extent, preferably, although it is enough if support of the arm at a point on the plate spaced from the flanged lip **101** on the backing portion is provided. Flange **100** extends generally longitudinally of the contact aperture and toward the adjacent contact and its aperture. The backing portion **95** has the integral substantially perpendicular flange **101** extending arcuately for an appreciable extent but spaced somewhat from the flange **100**. Supporting flange **101** on the backing portion overlies the plate and has an edge **102** which substantially extends no closer to the edge of the supporting flange **100** on the arm of the contact in the adjacent contact aperture, than does the closest point of the other contact arm **96**, which has no supporting lug. Another mode of description is that substantially no portion of supporting flange **101** extends past a radius line of the plate tangential to the outer surface of unflanged arm **96**.

Obviously the contacts just described can be replaced by other contact and contact apertures arrangement.

It will be apparent that contacts as just described in the plate disclosed will enable the close association of the contacts to comport with the grouping of the contact prongs on the radio tube, without the leakage between contacts that occurs in other types of sockets. A clearance **103** is secured on the supporting plate.

In the sub-assembly of the articles it is sometimes desirable that the contacts be inserted in the plate and frictionally secured against falling out before a succeeding assembly step. This is not necessarily by a positive locking, as it is preferably merely by a detent, as the upper plate, to be described, completes the positive locking. Such a detent might comprise the lateral pimple or bump **104** or a resilient tongue **105**, suitably located below the supporting flanges, so as to be easily pushed past the opening **92**, and to exert frictional resistance (at least) to withdrawal.

Assuming the sheet or plate **90** and the contained contacts **93** mounted in the pan of Fig. 10, or in any other shape of pan that might be desired, as a result of manual assembling operations only, it is ready for the cover plate. The cover plate **106** has an axial guide recess **107**, proper to receive the axial guide of a radio tube, and of smaller diameter than aperture **91** of the bottom plate. Guide groove **108** is formed as a construction of guide recess **107**, and the plate has a plurality of prong contact apertures **109**, an outer periphery **110** to conform to the shape of the pan, and is provided with a pair of locking lugs or ears **111** substantially diametrically spaced apart. The plate being pushed downwardly on the assembled bottom plate and contacts, as shown in Fig. 6, lugs **111** push out selected spring lips **80**, until the lugs enter and seat in windows or apertures **81** therein, as shown in Fig. 7.

A feature of interest in connection with the use of laminated sheets in contrast to molded sheets lies in the fact that as provided to the trade the laminated sheets may vary somewhat in thickness. With a fixed predetermined pan construction there may be situations in which because of the thickness variation the parts will be loose and not sufficiently tightly held. In this contingency it is contemplated that flange **71** may be provided with radial slots to provide a series of fingers **112**, which are initially bent slightly upwardly to receive the bottom plate, and which are susceptible to resilient deflection downwardly to such point as may be necessary to enable proper seating and locking of the top plate.

It will be readily appreciated that the assembly of sheets, contacts and pan is one that permits easy and quick withdrawal of the cover plate to rotate same to change the indexing by 90° or other predetermined intervals.

In Figs. 10 to 14 inclusive, there is disclosed a further modification of the pan and laminated sheet base assembly utilizing another form of anchoring device. The metal stamping **151** may have the fingers **152** formed in the flange **153**, as has already been described in connection with

Fig. 4, and has an indented rib **155** formed in the vertical wall **154**. At suitable diametrically spaced points there are formed the locking tongues **156** cut from the wall of the cylinder **154**, and terminating at the upper end in the inturned angular lip **157**, spaced from the flange at such distance as to hook over and engage the uppermost edge surface of the two insulating sheets or plates **160** and **161**, of any desired construction. As indicated in Fig. 14, a tool **162** engages over the inturned lip of a locking lug or tongue **156**, in a sort of "shoe horn" relation, acting as a guide down which the descending plate **160** or **161** is pushed to retract the lock, to enable the plates to seat upon the flange or on the fingers of the flange. Obviously as shown the indexing is by means of the rib **155**. In this illustration the locking is largely a frictional matter rather than a positive lock as in certain of the other cases described or to be described, and this in some cases facilitates reindexing by the ultimate assembler or manufacturing user.

I claim:

1. In radio tube sockets a mounting support comprising a metal stamping having a panel attaching ear, a wall portion angularly divergent from the attaching ear, a flange angularly divergent from the wall and including a resilient finger forming a yielding seat for a radio tube socket.

2. In radio tube sockets a mounting support comprising a metal stamping having a panel attaching ear, a wall portion angularly divergent from the attaching ear, a flange angularly divergent from the wall and including a resilient finger forming a yielding seat for a radio tube socket, and means on said stamping engageable with such radio tube socket to urge same against the finger to anchor the socket in the stamping.

HUGH H. EBY.