May 2, 1950 J. R. SHONNARD ET AL 2,505,840

CLAMPING DEVICE FOR ELECTRON TUBES AND THE LIKE

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FIG. 1.

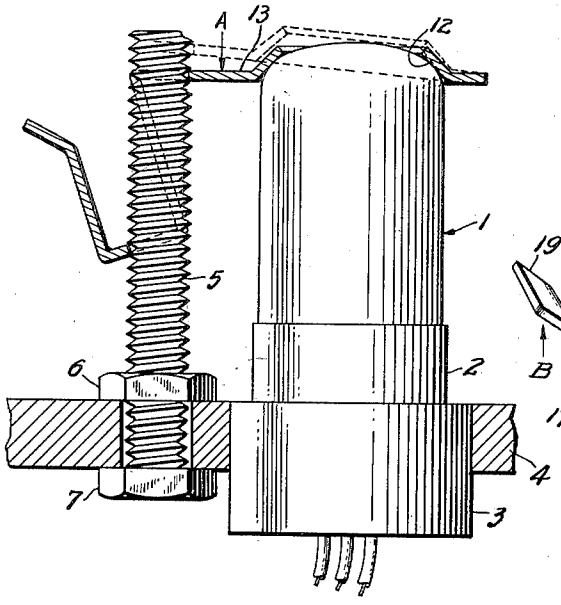


FIG. 2.

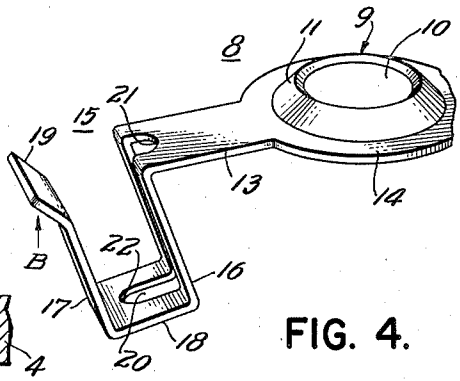


FIG. 4.

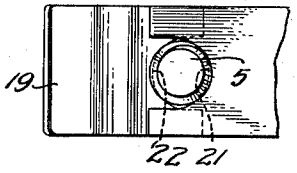


FIG. 3.

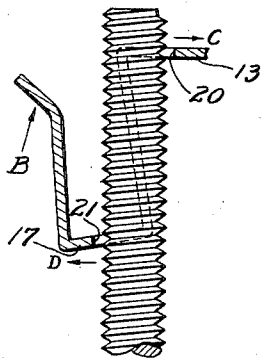


FIG. 5.

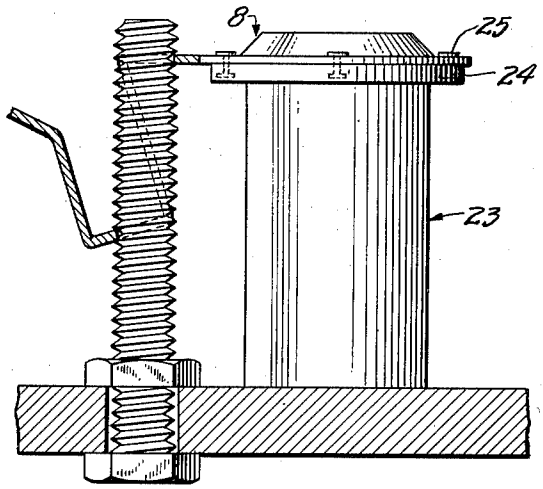
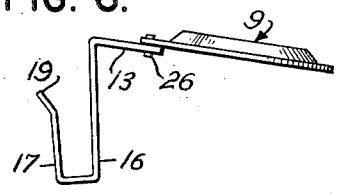


FIG. 6.



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CLAMPING DEVICE FOR ELECTRON TUBES AND THE LIKE

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Application April 13, 1949, Serial No. 87,222

4 Claims. (Cl. 248—361)

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This invention relates to clamping devices, and more especially it relates to devices for clamping in place, replaceable electric units of the plug-in type.

A principal object of the invention is to provide an improved and simplified clamp for holding electron tubes and the like in their plug-in sockets, so that they are incapable of being loosened by shocks, jars or vibrations.

A feature of the invention relates to a clamp which is so constructed that such devices as electron tubes can be readily replaced and clamped in their socket receptacles without requiring special tools such as wrenches or screwdrivers to release the clamp.

Another feature relates to an electron tube clamp which can be slidably adjusted in a vertical direction and locked in a definite vertical position without the use of thumb screws, set screws, or the like, which tend to become loose after continued vibration of the parts.

A still further feature relates to the novel organization, arrangement and relative location of parts which cooperate to provide an improved clamping arrangement for electron tubes and similar units which are arranged to be plugged into a receptacle or socket.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detailed descriptions and the appended claims.

In the drawings, which show, by way of example, certain preferred embodiments,

Fig. 1 is a view, in elevation, and partly sectional, showing the clamp arrangement according to the invention.

Fig. 2 is a perspective view of one of the clamp members of Fig. 1.

Fig. 3 is a view of part of Fig. 1, showing the clamp elements in released relation.

Fig. 4 is a top plan view of Fig. 1.

Fig. 5 is a view similar to that of Fig. 1, but showing a modification of the clamp.

Fig. 6 is a view, in elevation, of a further modification of the clamp.

In Fig. 1, there is shown by way of example, a typical plug-in device such for example as a radio tube 1, carrying the usual base 2 that is provided with the usual contact prongs (not shown), whereby the tube can be plugged into a socket or receptacle 3 carried by chassis 4. To facilitate the plugging in and out of the tube, the socket 3 is usually of the spring contact type, the contact springs of which frictionally engage the pins carried by the base 2. However it very

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frequently happens that the tube may become loose in its socket, preventing the proper electrical contact between the tube elements and the associated circuits. There is disclosed in U. S. Patent No. 2,461,198 a clamping arrangement which overcomes the objectionable features of the usual type of clamp which requires set screws or thumb screws to lock the clamp elements in position. The present invention is in the nature of an improvement on the type of clamp disclosed in said patent.

Referring to the drawing, the clamp comprises in general, a pedestal or rod 5 which is arranged to be fastened in any suitable manner, for example by nuts 6, 7, engaging opposite sides of chassis 4. If desired, the rod 5 can be riveted or permanently attached to chassis 4. In any case, it is anchored to the chassis at a point adjacent the socket 3. Arranged to be vertically adjusted and locked to rod 5, is a clamp member 8 of springy sheet metal or alloy, such for example as a beryllium-copper alloy. It comprises a cap portion 9 which is preferably, although not necessarily, of circular shape and provided with a central opening 10. Preferably, the inner margin 11 of the cap opening is struck-up so as to form a tapered rim which may conform to the curved top 12 of tube 1.

The flat rim 14 of cap 9 has an arm 13 which is bent downwardly to form a U-shaped portion 15 comprising substantially parallel side walls 16, 17, and bottom wall 18. The side wall 17 terminates in a bent end portion 19 which forms a finger pressure lug for unlocking the clamp, as will be described hereinbelow. The U-shaped portion 15 is provided with a slot 20 which extends the full length of wall 16, and also extends along the arm 13 a distance which is slightly greater than the diameter of rod 5. Likewise, the slot 20 extends along the bottom 18 a distance which is slightly greater than the diameter of rod 5. The slot 20 has a width which is slightly greater than the diameter of rod 5, as shown in Fig. 4. Preferably, the end edges 21, 22, of the slot are rounded to conform to the curvature of rod 5. It will be understood, of course, that the rod 5 is not necessarily of round cross-section, and may be of any desired cross-sectional shape, but has its surface grooved, threaded, or otherwise roughened, so as to form an interlock with the edges 21 and 22 when the member 8 is in clamping relation with the tube 1, as will be described hereinbelow.

In the normal or untensed condition of member 8, the arm 13 is at slightly less than 90° with

respect to wall 16, as represented by the dotted line position of Fig. 1. In this condition, the horizontal distance between the end edges 21 and 22 of slot 20 are just sufficient to allow the rod 5 to pass freely through the vertically aligned end sections of slot 20, until the cap 9 engages the top of tube 1. Then by pressing downwardly on portion 13, as indicated by the arrow A, the effective horizontal distance between the slot ends 21, 22, is decreased, causing these ends firmly to grip the opposite sides of rod 5, as shown in Fig. 1. Thus the member 8 resiliently and firmly presses downwardly upon the tube 1, and at the same time the ends 21 and 22 of the slot 20 are firmly interlocked with the opposite sides of rod 5.

When it is desired to release the clamp, it is merely necessary to press upon the lug 19, as indicated by the arrow B. As a result of this pressure, the horizontal distance between the ends 21 and 22 of slot 20 is increased, as shown in Fig. 3, thus providing a clear passage for the rod 5 with respect to the slot 20. In other words, the arm 13 moves slightly in the direction of the arrow C, and the bottom 18 moves slightly in the direction of the arrow D, as shown in Fig. 3. It should be observed that this pressure releases both ends 21 and 22 from engagement with the rod 5, and the clamp can be easily raised and lowered while maintaining the pressure on lug 19.

In some cases the clamp may be required for use in clamping metal units, such for example as can-type electrolytic condensers and the like, such as represented by the device 23 (Fig. 5). In that event, the cap member 9 may have attached to its under surface an insulator sheet or washer 24 by means of rivets 25, or the like, thus effectively electrically insulating the metal body of the clamp member 8 from the metal casing or can of the device 23.

It will be understood, of course, that the invention is not limited to the fabrication of the member 8 from a single strip or sheet of springy metal. Thus as shown in Fig. 6, the cap 9 can be made as a separate unit and attached to the arm 13 by suitable rivets 26, or the like.

While certain particular embodiments have been disclosed herein, it will be understood that changes and modifications may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A clamp for a plug-in unit such as an electron tube and the like, comprising a flexible metal blank carrying at one end a portion arranged to engage the top of the unit to be clamped, said blank having another portion bent back on itself and having a continuous slot therein with the end portions of the slot in spaced alignment to receive a rod, said slot having its length correlated with the thickness of said rod to cause at least one of the slot ends to tightly engage the surface of said rod.

2. A clamp for a plug-in unit such as an electron tube and the like, comprising a flexible metal strip carrying at one end a portion for engagement with the top of the unit to be clamped, a rod to which said strip is releasably locked, said strip having a slot to receive said rod and being bent back to bring the end portions of said slot into spaced vertical alignment and with the horizontal distance between the slot ends approximately the same as the thickness of said rod when one end of said slot is in interlocking engagement with the surface of said rod.

3. A clamp for a plug-in unit such as an electron tube or the like, comprising a flexible metal strip carrying at one end a cap for engaging the unit to be clamped, said strip having a portion bent to a substantial U shape, said portion having a slot with the ends of the slot in spaced vertical alignment, an anchoring rod passing through said aligned slot ends and maintained in locking engagement with the ends of the slot by reason of the flexible engagement between said cap and the top of said unit.

4. A member for clamping an electric unit such as an electron tube or the like, comprising a metal strip having a substantially straight part and another part doubly bent back to form a section having substantially parallel spaced side walls joined by a bottom wall, said straight part carrying at one end a cap to engage the top of said unit, a slot extending along the length of one side wall of said bent section and having one end portion partially extending along said straight part of the strip, said slot having its opposite end portion extending along the said bottom wall, said straight part of the strip being bent with respect to said one of said side walls to bring the ends of said slot into substantial vertical alignment to interlock with an anchoring post passing therethrough.

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