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STRAIGHTENING TOOL FOR VACUUM TUBE TERMINAL PLUGS

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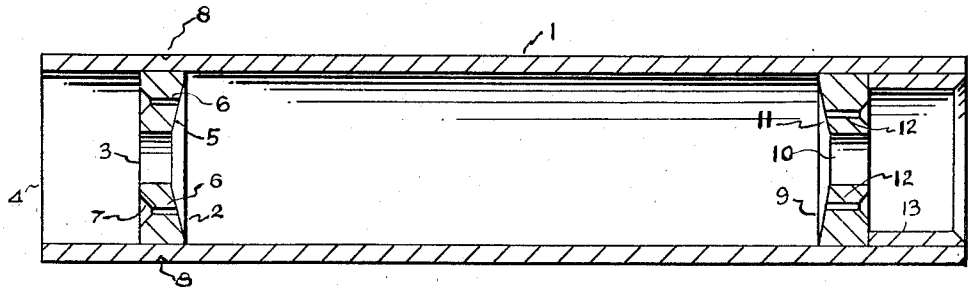


Fig. 1

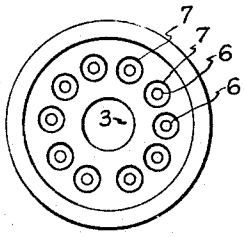


Fig. 2

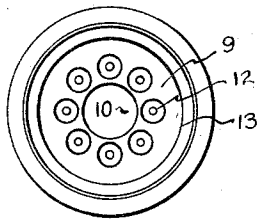


Fig. 3

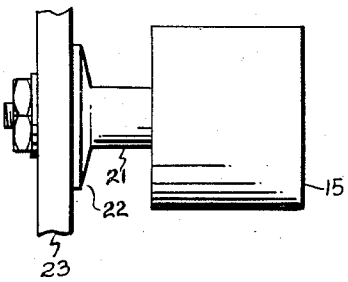


Fig. 4

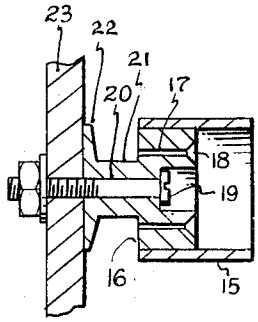


Fig. 5

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STRAIGHTENING TOOL FOR VACUUM TUBE TERMINAL PLUGS

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3 Claims. (Cl. 81—15)

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The present invention relates to a tool to be used for straightening the pins of an electronic tube such as a vacuum tube or a gaseous tube commonly used in radio circuits, television apparatus and other electronic equipments. Pins extend from a base terminal plug of the tube and usually are mounted in electrical apparatus simply by plugging the tube in a corresponding socket which is provided with contact receptacles to make the proper connections for the tube. It commonly happens that these pins become bent either through careless handling in assembly or after assembly because somebody takes the tube out of its socket and tries to force it back into place in an incorrect position.

The present invention is concerned with a simple device whereby the pins of the terminal plug of the tubes may be properly straightened so that it will fit the socket in which it is intended to go and make good electrical connections.

The tool of the present invention may be made for carrying in a tool box and be used as a hand tool or it may be mounted on some convenient frame or board. An advantage in the construction as a hand tool is that at least two styles of terminal plugs may be provided, one in each end of the tool by making the tool long enough to provide a good grip.

Further advantages and merits of the present invention will be more readily understood from the following description in the specification when taken in connection with the drawings illustrating embodiments of the invention in which:

Figure 1 shows an axial section through the tool.

Figure 2 shows an end view as viewed from the left end of Figure 1.

Figure 3 shows a view as viewed from the right end of Figure 1.

Figure 4 shows a modification of the tool for attachment to a support; and,

Figure 5 shows a section through a modification corresponding generally to that shown in Figure 4.

In the arrangement shown in Figures 1 to 3, the tool comprises a hollow tube 1 which may be made of aluminum or other suitable metal and may be provided with a knurling or roughened surface around its central region to permit a firm grip. In the left end of the tube there is mounted a plate or disk 2 which may be held inside the tube perpendicular to the axis of the tube by any suitable means. In an aluminum tube, this may be accomplished by using an inner disk

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which closely fits the inner diameter and then making several punch holes on the outside of the tube as indicated by 8, 8 or any other method may be employed, such as providing a forced fit or spot welding.

The plate 2 will be set in the end 4 of the tube a sufficient depth so that the vacuum tube with its terminal plug will fit and be guided straight into the holes 6 in the plate, which holes are spaced to conform to the pin spacing in the terminal plug of the vacuum tube. The plate 2 is provided with a central hole 3 which is flared outwardly at 5 on the inner side of the plate, that is the unexposed side. This flaring may extend practically to the inner edge of the disk, the purpose being so that any pins which may fall inside of the tool may readily be shaken out. The holes 6, it will be noted, are chamfered at the top as seen at 7. These terminal plugs are, of course, of a standard size so that the tool of the present invention corresponds to regular standard sizes of terminals which are used. The chamfering on the face of the plate is for the purpose of guiding the pins into the holes 6 so that as the vacuum tube is inserted in the open end 4 of the tool, the pins in the terminal plugs will be forced by the chamfering to enter into the holes and thereby be straightened out. If one of the pins should break in this condition and fall through into the center of the tool, it will drop out through the center hole 3. At the other end of the tube 1, a similar plate 9 is secured and this is provided in a similar fashion with a center hole 10 and a flared out inner wall 11. The plate 9 is also provided with holes 12 arranged according to a standard vacuum tube socket differing from the standard vacuum tube socket at the other end of the tool. As indicated in Figure 3, which corresponds to the right end of the tool, there are eight holes in the plate 9, whereas in the plate 2 on the left end of the tool, there are ten holes in the plate. An inner sleeve 13 is provided within the tube 1 so that the inner wall of the tool at the right end corresponds in dimensions to the usual vacuum tube or other type of socket that is to be inserted in that end.

In the arrangement shown in Figures 4 and 5, a short sleeve 15 is used in which is mounted an end cap 16, having properly standard spaced holes 17 corresponding to a vacuum tube terminal. The holes go entirely through the cap and at their inner face within the sleeve are chamfered at 18.

The cap 16 is provided with a mounting bolt 19,

the head end of which is recessed in the inner face of the cap 16 and the shank of which passes through an axial hole 20 in a back support 21 for the cap which terminates in a flange 22 by means of which the tool may be clamped to a bench, box or other suitable support 23.

As shown in Figure 5, the bolt 19 passes through the support 23 and is drawn tightly to it by a nut and washer on the other side of the support.

The device of Figures 4 and 5 is convenient where the tool may be fixed as in a shop, while the device of Figures 1 to 3 is intended to be carried in a tool kit or used at a bench.

In the construction of Figures 4 and 5, the back support 21 is made sufficiently long so that if the pins break off in the holes 17, they may fall out clear of the flange 22. This is also the purpose of making the holes 17 through the plate and the support 21 entirely within the ring of holes.

It will also be noted that by flaring the inside of the plates 2 and 9 in Figure 1 out to the very edge of the plate as indicated by the drawing in Figure 1, that when a pin which has broken off and fallen inside the tube hits this inclined section as the tube is held vertical, that the pin will slide down to the center hole and come out through the tube.

Having now described our invention, we claim:

1. A tool for straightening out the terminal pins on the terminal end of an electronic tube comprising a sleeve having a diameter to fit the terminal end of the electronic tube for which it is to be used, a plate set in said sleeve normal to the axis thereof at a depth greater than the thickness of the terminal end of said electronic tube and having a circle of holes therethrough spaced in a desired pattern and of a desired size to provide a close sliding fit corresponding to the diameter of the pins projecting from the terminal of the electronic tube, said holes being chamfered on the face of the plate directed to the open end of the sleeve and means for supporting said tool spaced from said plates in a direction opposite to the first mentioned end of the tube.

2. A tool for straightening out the terminal pins on the terminal end of an electronic tube comprising a sleeve having a diameter to fit the terminal end of the electronic tube for which it is to be used, a plate set in said sleeve normal to the axis thereof at a depth greater than the thickness of the terminal end of said electronic tube and having a circle of holes therethrough spaced in a desired pattern and of a desired size to correspond to the pins projecting from the terminal of the electronic tube, said holes being chamfered on the face of the plate directed to the open end of the sleeve, said plate having an axially positioned support within the circle of holes extending in the direction opposite to the face having the chamfered holes with a flange on the end of the support spaced from the ends of the holes through the plate, a bolt hole extending axially through the plate and support with a recessed shoulder on the inner face and a bolt and nut adapted for clamping the tool.

3. A tool as set forth in claim 1 in which the plate has a large central hole flared outward on the rear of the plate for permitting broken-off pins to fall out of said tool.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,033,405	Triplett	Mar. 10, 1936
2,343,675	Kenyon	Mar. 7, 1944
2,359,634	Franklin	Oct. 3, 1944