

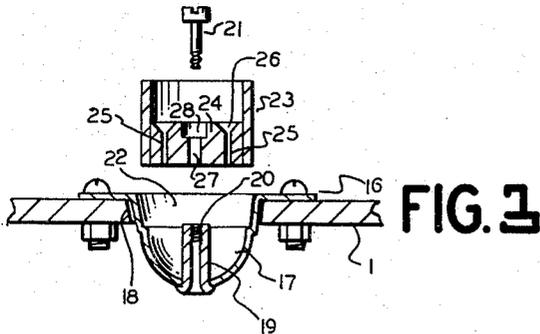
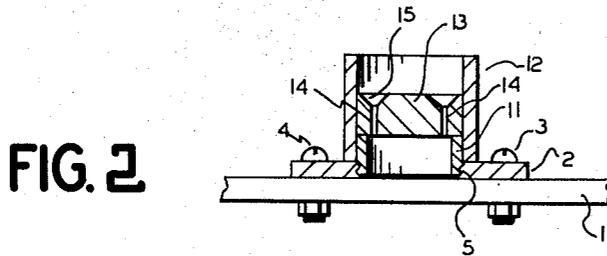
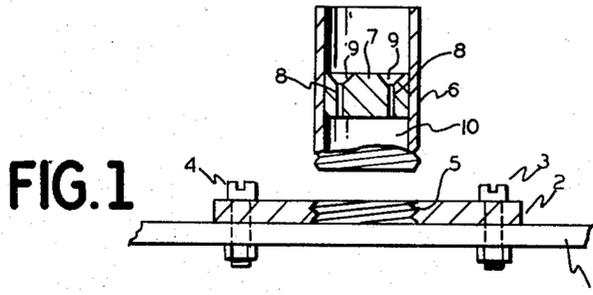
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2,696,746

STRAIGHTENING TOOL FOR TERMINAL PLUGS

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## STRAIGHTENING TOOL FOR TERMINAL PLUGS

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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, a gaseous tube or any plug-in type electrical elements commonly used in radio, television and other electronic circuits.

The present invention is an improvement over our invention claimed in our copending patent application, Serial No. 201,366, filed December 18, 1950, and issued as Patent No. 2,573,198 on October 30, 1951 for the same subject matter.

The present type of pin straightener is more particularly adaptable for panel type mountings, although it may be used in other connections insofar as the construction so permits.

The merits and advantages of the present invention will more readily be understood from the description in the specification below when taken in connection with the drawings illustrating an embodiment of the invention, in which:

Figure 1 shows the invention partially in section.

Figure 2 shows a modification of the arrangement of Figure 1 in which certain elements shown in Figure 1 may be replaced by other constructional forms.

Figure 3 shows a further arrangement of the modification shown in Figures 1 and 2.

Referring more particularly to Figure 1, 1 indicates a panel upon which a plate 2 may be mounted. This plate may be an oval or circular metal plate and may be mounted on the panel 1 which may be an instrument board for other electrical equipment, by means of bolts and nuts 3 and 4 which clamp the plate 2 to the instrument board or panel. The plate 2 has a threaded tap as indicated at 5 to receive a sleeve or cylindrical tube 6 which is screwed into the tap 5 and thereby mounted firmly on the panel. Within the tube 6 is a disc or plate 7 positioned away from the mouth of the tube so as to provide a recess to receive an electrical plug with pins projecting from its bottom. The space between the top surface of the plate or disc 7 and the top surface of the mouth of the tube 6 is such that the electronic tube or plug-in type unit which is to be received by the tube 6 will be properly guided and firmly held in place as the pins of the tube engage in the holes 8 of the plate 7. These holes 8 are positioned corresponding to the proper places of the pins at the base of the plug to be straightened. The holes 8 are also aligned vertically with the axis of the tube 6 and are of such a size as to form or provide a close fit with the pins. The holes 8 taper or chamfer outward as indicated at 9 to the surface of the disc 7 so that the pins will be properly guided to the close fitting walls of the holes or recesses 8. These holes have solid walls and are free from springs or sleeves or any other elements such as may be commonly found in the sockets into which the plugs are placed when used.

The panel board 1 should be continuous beneath the plate 2 so that there is no opening in the line with or beneath the tapped hole 5. Therefore when the tube 6 is put into position, the cavity or chamber 10 formed beneath the disc 7 provides room for holding broken pins which may fall through the holes 8 and the disc 7. In order to remove these pins the tube may be unscrewed and then the pins in the chamber may be dumped. This will prevent the pins from falling into the electrical wiring around the panel which may prove to be dangerous.

In the arrangement indicated in Figure 2, the panel 1 is provided with a similar plate 2 held by bolts and

nuts 3 and 4. Figure 2 however shows the use of a short inner sleeve 11 threaded into the tapped hole 5 and extending slightly beyond the surface of the plate 2 to form a collar to receive a close fitting tube 12 which is of a larger size than the tube of Figure 1 with an internal diameter adapted to fit snugly around the collar 11. The larger tube 12 is provided with an internal disc 13 positioned within the tube 12 and this disc may have properly positioned holes 14 axially parallel with the tube 12 for receiving the pins of the plug for which the disc or plate 13 is designed. These holes 14 are also tapered outward at their top surface as indicated at 15.

It will be seen that Figures 1 and 2 really go together since in order to modify the arrangement of Figure 1 to that of Figure 2, it is simply necessary to unscrew the sleeve 6, screw in place the collar 11 and then fit the outer sleeve 12 over the collar. In fact the collar 11 may be force fitted within the sleeve 12 and be permanently attached to the sleeve so that one simply needs to remove the sleeve tube 6 of Figure 1 and replace it with the complete assembly comprising the elements 11 and 12 and 13. In this manner a single plate mounting may be made to accommodate different types of pin straighteners as are commonly used for various types of plugs in electrical equipment.

In the arrangement indicated in Figure 3, the panel board 1 is provided with a plate 16 which is formed with an inverted dome-like recess 17 which projects through a hole 18 in the panel. The dome 17 is provided at its deepest point with an upstanding arm or projection 19 which is tapped and threaded centrally at 20 to receive a clamping screw 21. The dome 17 is provided with a substantially cylindrical rim section 22 into which the end of the tube 23 fits securely. The tube or sleeve 23 is provided with a plate 24 which has holes 25, 25, tapered at their top as indicated at 26 similarly as described in connection with Figures 1 and 2. A central hole 27 extends through the plate 24 and this has a counter-sunk shoulder 28, so that the bolt or stud 21 fits flush with the surface of the disc 24. When the elements of Figure 3 are assembled together the sleeve 23 is forced into place and the bolt 21 is inserted through the hole 27 and screwed tightly into the tapped hole 20. If desired the plate 24 and the stud 21 may be formed or joined as a single element in which case the threaded end of the stud will project beyond the lower surface of the disc 24 and the two sections of the pin straightener may be brought together simply by rotating the sleeve 23 until the threads of the projecting stud sit tightly in the tapped hole 20.

In all three of the figures the plate having the holes is held firmly in place within the sleeve, either through a forced fit, swedging pin or in some other suitable manner.

In each of the arrangements indicated, the sleeves may be readily removed for the removal of the broken pins and also may be replaced with various size sleeves corresponding to the different types of plugs which the operator may wish to test or straighten.

Having now described our invention, we claim:

1. An electronic plug pin straightener for a panel board comprising a mounting plate adapted to be secured to said panel and having a threaded tap therein, a cylindrical tube threaded at one end to screw into said tap, said tube having as an insert a plate set in the tube extending across the same having axially parallel holes corresponding to the proper positions of the pins on the electronic plug to be straightened and of a diameter to receive the pins in a snug fit, said last plate being set in the tube at a depth corresponding to the thickness of the electronic plug with the holes having a chamfer at the face of the plate.

2. An electronic plug pin straightener for a panel board comprising a mounting plate adapted to be secured to said panel and having a threaded tap therein, a cylindrical tube having a collar extending from one end of the inside thereof, said collar being externally threaded to engage and screw into said threaded tap, an insert plate in said tube above said collar extending across the said tube having axially parallel holes corresponding to the proper positions of the pins on the electronic plug

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to be straightened and of a diameter to receive the pins in a snug fit, said plate being set in the tube at a depth corresponding to the thickness of the electronic plug with the holes having a chamfer at the face of the plate.

3. An electronic plug pin straightener for a panel board comprising a mounting plate adapted to be secured to said panel and having an inverted hollow dome extending through an opening of the panel, a cylindrical tube of a diameter at the end to fit into the opening of said hollow dome adjacent the surface of the mounting plate, means attaching securely said cylindrical tube to said hollow dome, said tube having as an insert a plate set in the tube extending across the same having axially parallel holes corresponding to the proper positions of the pins on the electronic plug to be straightened and of a diameter to receive the pins in a snug fit, said plate being set in the tube at a depth corresponding to the thickness of the electronic plug with the holes having a chamfer at the face of the plate.

4. An electronic plug pin straightener for a panel board comprising a mounting plate adapted to be secured to said panel and having an inverted hollow dome extending through an opening in back of the panel, a cylindrical tube of a diameter at the end to fit into the opening of said hollow dome adjacent the surface of the mounting plate, means attaching securely said cylindrical tube to said hollow dome, said tube having as an insert a plate set in the tube extending across the same having axially parallel holes corresponding to the proper positions of the pins on

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the electronic plug to be straightened and of a diameter to receive the pins in a snug fit, said plate being set in the tube at a depth corresponding to the thickness of the electronic plug with the holes having a chamfer at the face of the plate, said means for attaching said cylindrical tube to said hollow dome comprising a threaded bolt element extending through the inserted plate in said tube and engaging a threaded projection extending inwardly from the bottom of the dome in alignment with said bolt element.

5. An electronic plug pin straightener for electronic tubes, comprising a mounting plate, a cylindrical tube secured to said mounting plate, means providing a chamber at the end of the cylindrical tube in combination with said mounting plate, said tube having an insert plate set therein extending across the same having axially parallel holes corresponding to the proper positions of pins on the electronic plug to be straightened and of a diameter to receive the pins in a snug fit, said last mentioned plate being set in the tube at a depth corresponding to the thickness of the electronic plug with the holes having a chamfer at the face of the plate.

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