March 15, 1949. H. V. KNAUF, JR 2,464,405

METHOD OF ATTACHING A PIN TYPE TERMINAL TO A BASE

Filed July 22, 1944

Fig. 1.

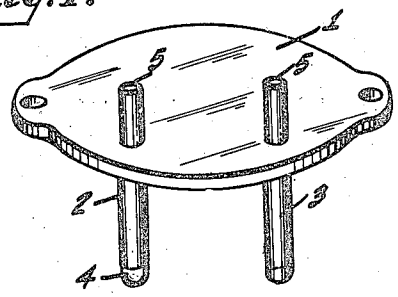


Fig. 2.

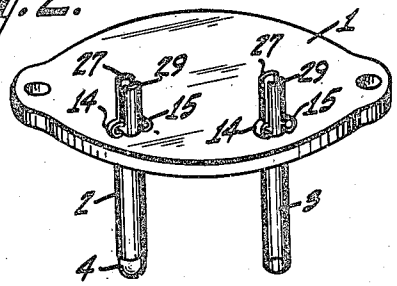
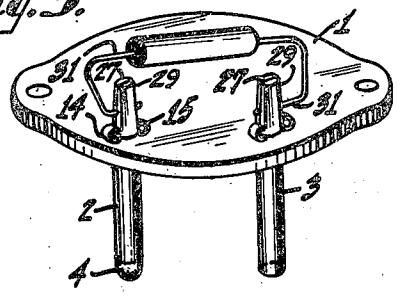


Fig. 3.



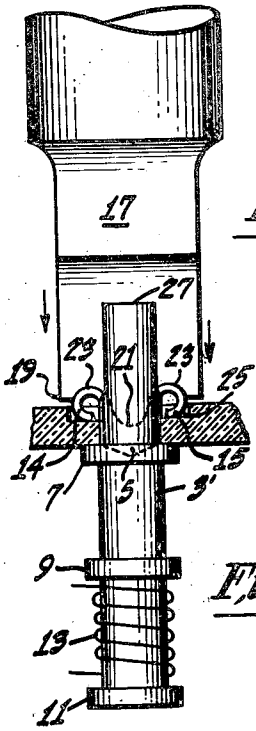
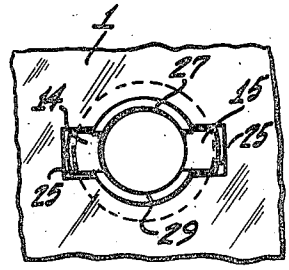


Fig. 4.

Fig. 5.



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METHOD OF ATTACHING A PIN TYPE TERMINAL TO A BASE

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4 Claims. (Cl. 29—155.55)

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The invention covered herein may be manufactured and used by or for the Government of the United States for any governmental purposes without payment to me or assigns of any royalty thereon.

This invention relates to electrical connectors of the so-called "pin type" and to improvements in the art of attaching such terminals to a panel, socket or other base.

It may be said, generally, that hollow pin type connectors, especially those made from sheet metal, are less costly to manufacture than solid connectors of similar dimensions made from rod or bar stock. The advantage of low initial cost enjoyed by the hollow pin is, however, offset to a considerable extent by the expense of entering and soldering a lead therein and in rounding and polishing the soldered end of the assembly. Furthermore, hollow pins are not as strong as solid pins and simply cannot be used in certain installations. On the other hand, pins made from rod or bar stock are difficult to attach to a panel or other base and the riveting or peening force heretofore used in their attachment may shatter the support to which the pins are being affixed. This latter difficulty is also frequently encountered in the attachment, by present day methods, of hollow pin type connectors.

Accordingly it is among the objects of the present invention to provide a pin type connector which shall possess the strength and other advantages of a solid pin, and one nevertheless capable of being affixed to a socket, panel or other base without danger of shattering the said support.

Another and important object of the present invention is to provide an improved method of attaching a pin type connector to a support, said method being applicable to conventional hollow type pins as well as to the "solid" type connector hereinafter described.

Still another object of the present invention is to provide an improved connector of the general character described and one incorporating an anchor, clamp, or the like, for securing a wire or other lead to the inner terminal thereof.

The foregoing and other objects are achieved in accordance with the invention by the provision of a pin type connector sufficiently long to extend beyond the "top" or inner (as well as the "bottom" or outer) surface of the supporting panel or base, at least the inwardly extending part of the pin being hollow and capable of being cut and distorted in the manner later described.

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In attaching the pin to a panel or other base, a tool of special design is pressed down on the hollow end of the pin and cuts two oppositely located strips or tongues in its tubular wall. As these tongues are formed, the free ends thereof are curled outwardly and urged downwardly by the tool into contact with the base and thus serve to affix the pin to the said base. Since the attaching force is applied steadily, rather than abruptly, and is exerted upon and cushioned by the curled-up metal tongues, the panel is not subject to any force capable of shattering or breaking it. The parts of the walls of the pin which remain standing after the tongues are formed may serve, in accordance with the invention, as the jaws of a clamp in which a wire or other lead may be secured.

Certain preferred details of construction and procedure together with other objects and advantages will be apparent and the invention itself will be best understood by reference to the following specification and to the accompanying drawing, wherein:

Figures 1, 2 and 3 are views in perspective of a wafer-type socket or base showing two pin-type connectors at three successive stages of attachment,

Figure 4 is an elevational view, partly in section, of a panel and an alternative "solid" form of pin and showing the tool used in the attachment of a pin type terminal to a panel, and

Figure 5 is a top plan view of the base and terminal assembly shown in Fig. 4.

In the drawing, wherein like reference characters designate the same or corresponding parts in all figures, 1 designates an apertured base, panel or socket having two pin type connectors 2 and 3, respectively, which extend through the base and well beyond its "top" and "bottom" surfaces. The connector which is designated 2 comprises a relatively long but otherwise conventional hollow pin type connector formed of sheet metal, open at the top and closed at its lower end as by means of a plug 4 constituted of solder. The pin 3, on the other hand, is formed, as on a screw machine, from rod or bar stock and has a bore 5 (see Fig. 4) which extends from the inner or top end of the pin to a point adjacent to the level of the base 1. Each of the pins 2 and 3 is provided with a stop or shoulder 7 which abuts the lower surface of the panel 1 when the pins are entered into the apertures with which the said base is provided. In the embodiment of the invention shown in Fig. 4, the pin type connector, which is here designated

31 comprises a binding post and is provided with two "extra" shoulders 9 and 11 between which a wire 13 may be wound without danger of its slipping off the end of the "pin."

As previously indicated, at least that portion of each pin which extends above the base 1 is hollow and the tubular wall of said portion of each pin is thin enough and flexible enough to permit a pair of oppositely located tongues 14 and 15 to be struck out therefrom by a tool 17, of special design, and curled downwardly through an arc of more than 180° into engagement with the said base. As shown in Fig. 4, the tool 17 for forming the curled-up tongues 14 and 15 may comprise a shank having a thin end 19 and provided at its center with a rounded protuberance 21, which enters the open end of the terminal, and a pair of oppositely located rounded cut-away portions 23 which serve to curl the metal outwardly and downwardly into contact with the base 1.

Since the only force applied to the socket or base 1 by the tool 17 is cushioned by the spring-like curled-metal tongues 14 and 15, it is apparent that there is no danger of shattering the base in attaching the terminals thereto.

In order to prevent the terminals from being turned, subsequent to their attachment, it is preferable to provide the upper surface of the base with a preformed non-circular depression 25 (see Figs. 4 and 5) within which the curled-up tongues 14 and 15 are received.

As shown in Fig. 3, the oppositely located parts 27 and 29 of the terminal which remain standing after the tongues 14 and 15 have been struck out, may be employed as an anchor or clamp for one or more lead wires 31. These leads 31 may be secured to the terminals by pinching the upstanding arms or jaws 27 and 29 together.

It will now be apparent that the present invention provides an improved method of attaching a pin type connector to a support, and that said method is applicable to conventional hollow type pins as well as to the "solid" type connector.

What is claimed is:

1. In the attachment, to a base, of a pin type terminal having an end portion which extends beyond said base, the steps which comprise cutting a tongue from the end of said extended portion of said terminal, curling said tongue downwardly from said end through an arc of more than 180° before reaching engagement with said base and continuing said curling until said tongue is forced into engagement with said base.

2. In the attachment, to a base, of a pin type metal terminal having a hollow end portion which extends beyond said base, the steps which comprise cutting a plurality of axially extending slits from the end of the wall of said extended hollow end portion of said terminal, curling the metal between said slits downwardly through an arc of more than 180° before reaching engagement with said base and continuing said curling until said tongue is forced into engagement with said base.

3. In the attachment, to a base, of a pin type terminal having a hollow end portion which extends beyond said base, the steps which comprise cutting a tongue commencing at said end in the wall of said extended hollow portion of said terminal and simultaneously curling said tongue downwardly from said end through an arc of more than 180° before reaching engagement with said base and continuing said curling until said tongue is forced into engagement with said base.

4. Method of attaching a pin type terminal having a hollow end portion at one end thereof to a base having an aperture therein and a non-circular depression about said aperture, said method comprising passing said hollow end portion of said terminal through said aperture, cutting a tongue commencing at said end in the wall of the extended hollow portion of said terminal, curling said tongue downwardly from said end through an arc of more than 180° before reaching engagement with said base and continuing said curling until said tongue is forced into engagement with the bottom of said depression.

HARRY V. KNAUF, JR.

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