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(56) Documents Cited
US 5743769 A **US 4359258 A**

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INT CL⁶ **H01R 9/09 , H05K 3/30**
ONLINE DATABASES: EPODOC

(54) Abstract Title
Terminal connectors

(57) A terminal connector for use in mounting an electrical component such as the frame (6) of an inductance winding bobbin, on a printed circuit board (9), is formed by a pressing operation, such as from brass. The terminal connector comprises a first portion (8) in the form of a toothed finger, which may be inserted securely into a receiving aperture (7) of the electrical component, and a second portion (10) for insertion into the receiving aperture (16) of a printed circuit board (8).

The second portion (10) is resiliently compressible in one cross-sectional dimension, and is initially oversized in relation to the dimensions of the aperture (16), such that on insertion of the portion (10) into the aperture (16), the portion (10) is radially compressed, and by virtue of the resilience of the material from which it is formed, maintains good contact with the soldered walls bounding the aperture (16).

In this way it has been found that a connection may be made with the printed circuit board without the requirement subsequently to solder the terminal connector to the printed circuit board.

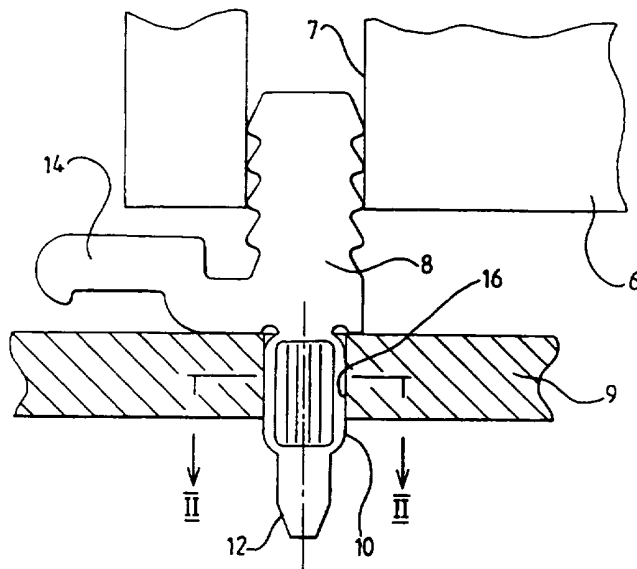


FIG 1

GB 2 341 280 A

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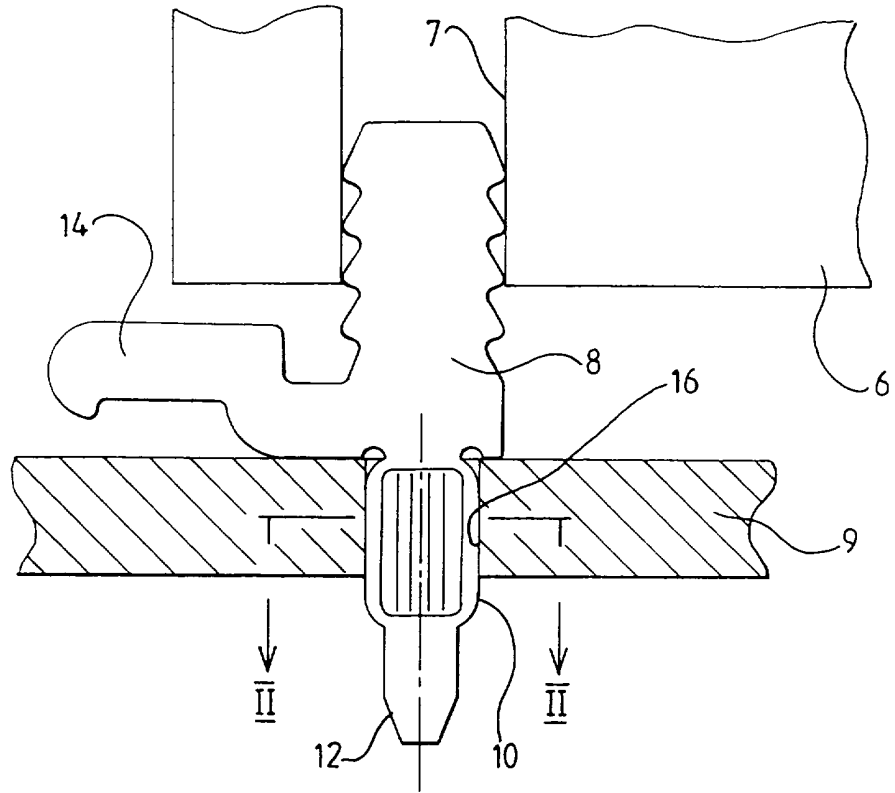


FIG 1

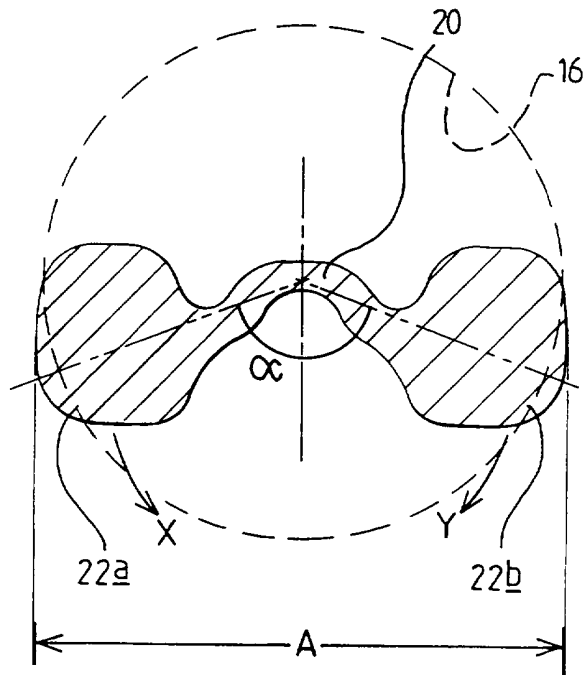


FIG 2

Title: Terminal Connectors

Description of Invention

This invention relates to terminal connectors for electrical components, particularly but not exclusively for inductance winding bobbins.

When it is desired to secure an electrical component such as an inductance winding bobbin to a printed circuit board, it is necessary to provide terminals connected interiorally of the component, for the exterior connection by eg. soldering to the printed circuit board.

Conventionally the frame of the bobbin is provided with a plurality of receiving apertures into which wire is inserted by a pressing operation: on completion of insertion, the wire is cropped to an appropriate length, and is formed as desired to provide a protruding pin for a convenient connection to a printed circuit board, and to provide a terminal portion to which electrical wiring (eg.) may be secured, again conveniently by soldering.

For connection of the bobbin to the printed circuit board, the pins are inserted from the front through appropriate receiving apertures in the printed circuit board, so that the pins protrude marginally from the back, and are secured in position by soldering.

The soldering operation is time consuming and requires that the back of the printed circuit board be cleaned, notwithstanding a number of components may already be mounted thereon.

According to this invention there is provided a method of connecting an electrical component to a printed circuit board involving the use of a terminal connector formed by a pressing operation to provide a first portion and a second portion, and the steps

a) pressing the first portion into a receiving aperture of the electrical component;

b) pressing the second portion into a receiving aperture of a printed circuit board, such that the second portion enters into acceptable conductive contact with the printed circuit board without the necessity for subsequent soldering.

Preferably said second portion is resiliently compressible in cross-section, and is compressed in cross-section in consequence of being inserted into the receiving aperture of the printed circuit board.

According to this invention there is also provided a terminal connector for securing an electrical component to a printed circuit board, comprising a first portion for location in a receiving aperture of the electrical component, and a second portion for location in a receiving aperture of a printed circuit board,

characterised in that said second portion is deformable in cross-section in consequence of being inserted into the receiving aperture of the printed circuit board.

Thus conveniently the second portion is made oversized in one cross-sectional dimension in comparison with the size of the receiving aperture of the printed circuit board, being reduced in said cross-sectional dimension in consequence of being pressed into said receiving aperture.

Preferably the second portion is of stretched cross-section, having lobes which extend on opposite sides of a narrower central region.

Preferably means is provided to assist partial folding of the cross-section during insertion. Thus conveniently two lines which extend from the centre of the cross-section centrally through each lobe subtend an angle of less than 180° , whereby when a compressive force is exerted on the lobes, they may move towards one another in a folding operation.

Preferably the terminal connector is formed, such as by a pressing operation, of a material which provides resilience when deformed, and thus causes a reaction force to be exerted against the walls of the aperture of the printed circuit board, thus ensuring good conductive contact therewith. For

example, the terminal connector may be stamped from brass, preferably being plated with nickel and/or tin/lead.

Conveniently the terminal connector provides a shoulder which limits the distance of insertion of the second portion into the aperture. Preferably the first portion is serrated, enabling it to be securely received within the receiving aperture of the component.

Preferably the first and second portions are generally in line, and preferably a connection portion protrudes generally at right angles to a line passing through the first and second portions.

Preferably the second portion is provided with a lead of smaller cross-section, ensuring a correct alignment of the second portion with the receiving aperture of the printed circuit board on insertion therein.

There will now be given a detailed description, to be read with reference to the accompanying drawings, of a terminal connector which is a preferred embodiment of this invention, having been selected for the purposes of illustrating the invention by way of example.

In the accompanying drawings:

FIGURE 1 is an elevational view showing the terminal connector in use in connecting an electrical component to a printed circuit board; and

FIGURE 2 is a sectional view through a second portion of the terminal connector, taken on the line II-II of Figure 1.

The terminal connector which is the preferred embodiment of this invention is specifically for use in connecting an electrical component, such as the frame 6 of an inductance winding bobbin, to a printed circuit board 9, and is formed by a pressing operation from brass, coated with convenient materials for assisting conductive contact with additional electrical components.

The terminal connector comprises a first portion 8, in the form of a toothed finger, which may be press-fitted into a receiving aperture 7 of the

component 6, and substantially in line with the first portion 8, a second portion 10 from which extends a tapered lead 12.

Extending from the first portion 8 is a connection portion 14, extending generally at right angles to the line extending through the first and second portions, to which electrical wiring or the like may be connected by soldering.

The terminal connector which is the preferred embodiment of this invention is for use with a printed circuit board of the kind provided with a plurality of receiving apertures 16, which in conventional manner are soldered on the interior walls bounding the aperture 16. The second portion 10 is compressible in cross-section in consequence of insertion into the aperture, and is thus marginally oversized in relation to the cross-sectional dimensions of the aperture. In particular, the cross-sectional dimension A is marginally bigger than the diameter of the receiving aperture 16, shown in dotted lines in Figure 2.

In cross-section the second portion is of stretched configuration, comprising an elongate central section 20 which is relatively narrow in cross-section, from which lobes 22_a, 22_b extend. Additionally the central section is so formed that the angle α , subtended by two lines passing from the central section through the centres of the two lobes 22_a and 22_b, is less than 180° , whereby, as radial compressive forces are exerted against the second portion 10, the two lobes move in the directions X, Y (Figure 2) in a folding operation, as they become accommodated within the aperture 16.

Being of a resilient material, the lobes by virtue primarily of the springiness of the central section 20, exert a significant continuous force against the walls 16 of the receiving aperture, thus ensuring a good conductive contact with the layer of solder provided on the walls 16.

It has been found that by the use of the present invention sufficient force is exerted by the second portion on the walls of the receiving aperture 16 to ensure a retention of the terminal connector therein throughout the normal

vibration testing. Notwithstanding, it is possible after completion of assembly to remove the component 6 from the printed circuit board, involving pulling of the terminal connector from the aperture 16, and allowing subsequent reinsertion of the portion 10 into the aperture 16, without any subsequent problem.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1 A method of connecting an electrical component to a printed circuit board involving the use of a terminal connector formed by a pressing operation to provide a first portion and a second portion, and the steps

a) pressing the first portion into a receiving aperture of the electrical component; and

b) pressing the second portion into a receiving aperture of a printed circuit board, such that the second portion enters into acceptable conductive contact with the printed circuit board without the necessity for subsequent soldering.

2 A method according to Claim 1 wherein the second portion is resiliently compressible in cross-section, and is compressed in cross-section in consequence of being inserted into the receiving aperture of the printed circuit board.

3 A terminal connector for securing an electrical component to a printed circuit board comprising a first portion for location in a receiving aperture of the electrical component, and a second portion for location in a receiving aperture of a printed circuit board.

characterised in that said second portion is deformable in cross-section in consequence of being inserted into the receiving aperture of the printed circuit board.

4 The invention according to any one of the preceding claims wherein the second portion is made oversized in one cross-sectional dimension in comparison with the size of the receiving aperture of the printed circuit board,

being reduced in said cross-sectional dimension in consequence of being pressed into said receiving aperture.

5 The invention according to any one of the preceding claims wherein the second portion is of stretched cross-section, having lobes which extend on opposite sides of a narrower central region.

6 The invention according to any one of the preceding claims wherein means is provided to assist partial folding of the cross-section of the second portion during insertion into the receiving aperture of the printed circuit board.

7 The invention according to Claim 5 wherein two lines which extend from the centre of the cross-section centrally through each lobe subtend an angle of less than 180° .

8 The invention according to any one of the preceding claims wherein the terminal is formed of a material which provides resilience when deformed.

9 The invention according to any one of the preceding claims wherein the terminal is stamped from brass.

10 The invention according to any one of the preceding claims wherein the terminal connector provides a shoulder which limits the distance of insertion of the second portion into the receiving aperture of the printed circuit board.

11 The invention according to any one of the preceding claims wherein the first portion is serrated, enabling it securely to be received within the receiving aperture of the component.

12 The invention according to any one of the preceding claims wherein the first and second portions are generally in line, and the terminal comprises a connection portion which protrudes generally at right angles to a line passing through the first and second portions.

13 The invention according to any one of the preceding claims wherein the second portion is provided with a lead of smaller cross-section.

14 Any novel feature or novel combination of features described herein and/or in the accompanying drawings.



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Claims searched: 1

Examiner: A J Rudge
Date of search: 9 February 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.Q): H2E(EEGKP,EEKD,EEKE,EEKH)
Int CI (Ed.6): H01R-9/09;H05K-3/30
Other: Online - EPODOC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 5,743,769 (DDK) - see the Fig at least	1
Y	US4,359,258 (TRW Inc.) - see the whole document	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.