

Description

Device for the mutual fixing of ferromagnetic cores and carriers for electrical conductors in inductive components.

5 The present invention relates to a device for the mutual fixing of ferromagnetic cores and carriers for electrical conductors in inductive components.

10 In the case of pin-type designs of inductive components, the core and the coil former are clamped by means of plastic insulating discs for the purpose of mutual fixing, the core being additionally soldered into a circuit board via a clip for permanent fastening. This presents the difficulty that plastic insulating discs do not have long-term stability and are unsuitable for
15 temperatures which occur during soldering operations.

 Furthermore, the core and the coil former can also be fixed relative to one another by adhesive bonding, this being the case particularly in SMD inductors. However, this is comparatively expensive and is not
20 reliable in terms of the process employed and, furthermore, there is no possibility of remachining or recycling.

 The first-mentioned possibility of clamping the core and coil former in pin-type designs by means of plastic insulating discs is illustrated in Figure 7 of
25 the drawings. A design of this kind is known, for example, from the applicant's manual "Ferrite und Zubehör" ["Ferrites and Accessories"], 1994 edition, page 215.

30 Figure 7 shows the essential parts of an inductive component in the form of an exploded illustration. The component possesses a coil former 1 and two magnetic-core halves 2, 3 which are placed onto the coil former 1 and are held on the coil former by means of clips 5. A
35 first insulating disc 4 is inserted between the coil former 1 and the upper core half 2. A second insulating disc 6 is placed onto the underside of the lower core half 3. When the component is being assembled by means of



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the clips 5 and when the component is being fitted, for example, into a circuit board, the coil former 1 and the core halves 2, 3 are fixed relative to one another so as to be secure against mutual rotation.

5 The object on which the present invention is based is to provide a fixing of the abovementioned type which is free of play and secure against mutual rotation and which has long-term stability and is still resistant even to high temperatures, such as occur, for example, during soldering.

10 In a device of the type mentioned in the introduction, this object is achieved, according to the invention, by means of the measures according to the characterizing clause of Patent Claim 1.

15 Developments of the invention are the subject of subclaims.

 The invention is explained in more detail below by means of exemplary embodiments illustrated in the figures of the drawing. In this, Figures 1 to 6 show, in each case, an embodiment of a fixing spring according to the invention, and Figure 7 shows the already explained pin-type design of an inductive component.

20 According to Figure 1, an annular spring 10 having a slot 11 is provided. This annular spring 10, 11 is produced from metallic material. The metallic material may be a non-ferromagnetic or slightly ferromagnetic material. The slot 11 is essential for an electrical interruption of the spring body.

 The spring 10 has an externally slotted toothing 12, Figure 1 indicating a rotation of the toothing about an axis running in the radial direction, thereby bringing about the spring effect.

 In the case of an annular spring 20 having a slot 21 according to Figure 2, an internally slotted toothing 22 is provided, a rotation of the toothing being provided once again for the purpose of implementing the spring effect.

 In the embodiment of a spring 30 having a slot 31 according to Figure 3, a toothing 32 in the form of a

toothed ring is provided, the teeth likewise being rotated again in order to implement the spring effect.

Figures 4A and 4B show an annular spring 40 having a slot 41 in the form of a cup spring with a curvature which is evident from Figure 4B and which ensures the spring effect.

Figures 5A and 5B show an annular spring 50 having a slot 51, in which spring the spring body is rotated in the annular plane in the way evident from Figure 5B.

Figure 6 shows a cup spring 60 having a slot 61 in the form of annular segments which are connected to one another at one end and which have a curvature (not illustrated in any more detail) perpendicularly to the drawing plane for the purpose of implementing the spring effect.

The springs illustrated in Figures 1 to 6 can be used, for example instead of the insulating disc 4 according to Figure 7, for fixing the coil former 1 and the coil halves 2, 3 relative to one another.

It must be pointed out that the carrier for electrical conductors does not have to be exclusively a coil former of the type illustrated in Figure 7. It may also be a single-layer or multi-layer printed board.



Patent Claims

1. Device for fixing ferromagnetic cores (2, 3) and carriers (1) for electrical conductors in inductive components, particularly in inductors designed for SMD assembly, characterized in that a slotted annular spring (10; 20; 30; 40; 50; 60) made from metallic material is provided in a gap between the ferromagnetic core (2, 3) and the carrier (1) for electrical conductors.
2. Device according to Claim 1, characterized in that the material of the annular spring (10; 20; 30; 40; 50; 60) is a non-ferromagnetic material.
3. Device according to Claim 1 and/or 2, characterized in that the annular spring is an externally toothed annular spring (10, 11, 12; 30, 31, 32).
4. Device according to Claim 1 and/or 2, characterized in that the annular spring is an internally toothed annular spring (20, 21, 22).
5. Device according to one of Claims 1 to 4, characterized in that the tothing (12; 22) of the annular spring (10, 11, 12; 20, 21, 22) is a slotted tothing.
6. Device according to one of Claims 1 to 4, characterized in that the tothing (32) of the annular spring (30, 31, 32) is a toothed-ring tothing.
7. Device according to Claim 1, characterized in that the annular spring is a cup spring (40, 41; 50, 51).
8. Device according to Claim 7, characterized in that the cup spring is an annular spring (40, 41) curved in the annular plane.
9. Device according to Claim 7, characterized in that the cup spring is an annular spring (50, 51) rotated in the annular plane.
10. Device according to Claim 7, characterized in that the cup spring (60, 61, 62) is formed from two curved annular segments (62) connected to one another at one end.
11. Device according to one of Claims 1 to 10, characterized in that the carrier (1) for electrical conductors is a coil former.



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12. Device according to one of Claims 1 to 10, characterized in that the carrier for electrical conductors is an at least single-layer printed board.

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