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PROBE AND LEAD WIRE ARRANGEMENT**BACKGROUND OF THE INVENTION**

The present invention relates to a probe and lead wire arrangement which enables the lead wire to be firmly
5 secured to the probe for positive transmission of detected signal.

When an electronic circuit board is finished, the circuit of the circuit board must be inspected by an inspection apparatus through a probe. As illustrated in
10 Figures 1A and 1B, the probe is installed in a barrel, and connected to the inspection apparatus through a lead wire. The barrel comprises a coiled spring retained to the rod-like probe body of the probe. The lead wire has a cylindrical metal terminal capped on the endpiece of the
15 probe. When the probe is pulled forwards into contact with the circuit at the circuit board to be inspected, the coiled spring is compressed. When the probe is moved away from the circuit board, the coiled spring is released. This probe and lead wire arrangement has drawbacks.
20 Because the connection between the endpiece of the probe and the cylindrical metal terminal of the lead wire requires high precision, the manufacturing cost of the probe and the cylindrical metal terminal is high. Further, when the coiled spring is released during and
25 after an inspection operation, a spring force is imparted to

the connecting area between the endpiece of the probe and the cylindrical metal terminal of the lead wire, and the cylindrical metal terminal of the lead wire tends to be forced away from the endpiece of the probe by the spring
5 force.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide a probe and lead wire arrangement which is less critical on
10 precision, so that the manufacturing cost of the parts can be greatly reduced. It is another object of the present invention to provide a probe and lead wire arrangement which enables the cylindrical metal terminal of lead wire to be conveniently and firmly connected to the endpiece of
15 the probe. According to the present invention, the endpiece of the probe has a plurality of annular locating grooves, and the cylindrical metal terminal of the lead wire has a plurality of retainer means for engagement with the annular locating grooves to secure the connection
20 between the endpiece of the probe and the cylindrical metal terminal of the lead wire.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1A is a sectional view showing a probe and
25 lead wire arrangement according to the prior art.

Figure 1B is an enlarged view of a part of Figure 1A.

Figure 2 is an exploded view of the present invention.

5 Figure 3A is a sectional view taken along line IIIA-IIIA of Figure 2, showing the probe and the lead wire fastened together.

Figure 3B is an enlarged view of a part of Figure 3A.

10 Figure 4 is an exploded view of an alternate form of the present invention.

Figure 5 is an exploded view of another alternate form of the present invention.

15 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to Figure 2, the present invention comprises a barrel 1, a probe 2 inserted through the barrel 1, and a lead wire 3 connected to the probe 2.

20 The barrel 1 is comprised of a plastic tube 11, and a coiled spring 12 axially connected to the plastic tube 11 at one end. The coiled spring 12 has one end fastened to the plastic tube 11, and an opposite end terminating in a retaining portion 121 of reduced inner diameter. The
25 probe 2 comprises a rod-like probe body 21 inserted

through the barrel 1, an endpiece 22 axially extended from one end of the rod-like probe body 21, a plurality of annular locating grooves 23 spaced around the periphery of the endpiece 22, and a step 24 connected between the probe body 21 and the endpiece 22. The lead wire 3 comprises a cylindrical metal terminal 31 at one end for sleeving onto the endpiece 22 of the probe 2. The cylindrical metal terminal 31 comprises a plurality of retaining spring strips 32 for engagement with the annular locating grooves 23 at the endpiece 22 of the probe 2. The retaining spring strips 32 are formed of a part of the cylindrical metal terminal 31 by stamping.

Referring to Figures 3A and 3B, when the probe 2 is inserted through the barrel 1, the retaining portion 121 of the coiled spring 12 is retained to the step 24 of the probe 2 to secure the plastic tube 11 and the probe 2 together, then the cylindrical metal terminal 31 of the lead wire 3 is sleeved onto the endpiece 22 of the probe 2, enabling the retaining spring strips 32 to be respectively forced into engagement with the annular locating grooves 23 of the endpiece 22.

Figure 4 shows an alternate form of the present invention, in which the cylindrical metal terminal 31 has a plurality of inside annular flanges 33 for engagement with

the annular locating grooves 23 at the endpiece 22 of the probe 2.

Figure 5 shows another alternate form of the present invention, in which the cylindrical metal terminal
5 31 has a plurality of raised portions 34 on its inside wall for engagement with the annular locating grooves 23 at the endpiece 22 of the probe 2.



What is claimed is:

1. A probe and lead wire arrangement comprising a barrel, a probe mounted in said barrel, said probe having an endpiece, and a lead wire having a cylindrical metal terminal at one end connected to the endpiece of said probe, wherein said endpiece of said probe comprises a plurality of annular locating grooves spaced around the periphery thereof, and said cylindrical metal terminal of said lead wire comprises a plurality of retainer means respectively forced into engagement with said annular locating grooves of said endpiece to secure the connection between said endpiece and said cylindrical metal terminal.

2. The probe and lead wire arrangement of claim 1 wherein the retainer means of said cylindrical metal terminal are retaining spring strips integral with said cylindrical metal terminal and respectively forced into engagement with said annular locating grooves of said endpiece.

3. The probe and lead wire arrangement of claim 1 wherein the retainer means of said cylindrical metal terminal are inside annular flanges raised from an inside wall of said cylindrical metal terminal and respectively forced into engagement with said annular locating grooves of said endpiece.

4. The probe and lead wire arrangement of claim 1



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wherein the retainer means of said cylindrical metal terminal are raised portions raised from an inside wall of said cylindrical metal terminal and respectively forced into engagement with said annular locating grooves of
5 said endpiece.