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CONDUCTOR CONNECTED TO THE ALLOYING AREA OF A CRYSTALODE, E.G., A TRANSISTOR OF THE ALLOY TYPE

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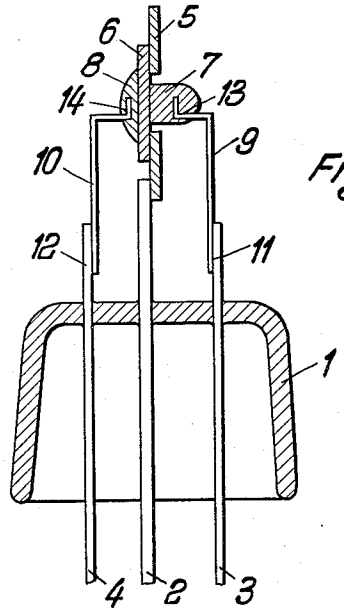


Fig. 1

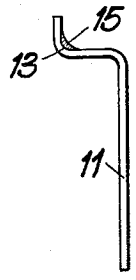


Fig. 2

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CONDUCTOR CONNECTED TO THE ALLOYING AREA OF A CRYSTALODE, e.g., A TRANSISTOR OF THE ALLOY TYPE

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This invention relates to a conductor connected to the alloying area of a crystalode, e.g. a transistor, and exerting but a negligible force on said area.

It is already known to provide thin wires as conductors for alloy-type transistors in view of preventing the occurrence of substantial forces due to vibrations or thermal stresses during the operation or the manufacturing process. For this reason, thin copper wires tinned at one end thereof for ensuring better contact have been used heretofore as conductors passing through the casing wall. It has been found, however, that such transistors are not reliable, because mechanical stresses still occur and may break the contact between conductor and alloying area. In many cases, this breakdown happens only after days or months.

According to the invention, the conductor is made of a thin strip which consists substantially of silver, at least on the surface thereof, is tinned, preferably fire-tinned, at least at both ends thereof, and is soldered at one end to the alloying area and at the other end to a rigid conductor passing through the casing wall. Experience has shown that contact breakdowns at the alloying area occur no longer with the type of conductor according to the invention.

A preferred form of embodiment is illustrated in the drawings.

In FIG. 1 there is shown an alloy-type transistor mounted on a casing **1**. The base conductor **2**, the emitter conductor **3** and the collector conductor **4** comprise thin copper coated wires passing through the casing wall. These conductor wires are tinned at the ends thereof. To the base conductor **2** there is welded a ring junction **5** which is in electrical (ohmic) contact with the germanium plate **6**. The emitter pellet **7** and the collector pellet **8** are surface-alloyed with the base plate **6**. The pellet **7** is connected to the conductor **9** which is constructed according to a preferred embodiment of the invention, and is tinned at both ends thereof. At **11**, the conductor **9** is attached to the conductor **3** by means of a spot-welding machine. As shown in the drawing, the conductor **9** is bent twice to a right angle. The bend **13** on the emitter side is so arranged that one leg lies parallel to the alloying surface and the germanium plate, and the other leg lies perpendicular

thereto. The strip **9** is thus represented with its narrow edge on the drawing. In a similar manner, a strip-shaped conductor **10** is connected at one end thereof to the collector pellet **8** and is spot-welded to the conductor **4** in the area **12** on the other end; it is likewise bent in **14**, so that one leg of the bend lies parallel to the alloying surface and the germanium plate while the other leg lies perpendicular thereto. As a material for the strip conductors, an alloy of about 80% of silver and 20% of copper has been found suitable.

The thin strip **9** of the FIG. 1 is shown again in FIG. 2. It is tinned at both ends thereof, namely at **11** and the bend **13**, by immersion into a tin bath. The width of the strip and the position of the bend **13** are so calculated that when dipped into a tin bath of predetermined temperature the strip bend **13** is filled with a predetermined amount of tin **15** owing to surface tension. It has been found that in this form of embodiment the amount of tin **15** was but very little dispersed in the various samples examined, which is advantageous for mass production. The strip conductor according to the invention can be suitably pressed on an alloy pellet by means of a pointed soldering iron, thus providing a permanent bond.

I claim:

1. In combination with an alloy pellet of a semiconductor device, a conductor which exerts but a negligible force on said pellet, said conductor being made of a thin strip which consists substantially of silver at least on the surface thereof and is tinned at least at both ends thereof, one end of said strip being soldered to a rigid conductor and the other end of said strip being immersed in said alloy pellet so that the full width of said strip is utilized.

2. A conductor according to claim 1 wherein the thin strip consists of an alloy of about 80% silver and 20% copper.

3. A conductor according to claim 1 wherein said thin strip is provided with a bend at the end connected to the alloying area, one leg of said bend being parallel to said alloying area while the other leg is perpendicular thereto.

4. A conductor according to claim 3 wherein the width of the strip and the position of the bend are such that when the bend is dipped into a tin bath of predetermined temperature the strip bend is filled with a predetermined amount of tin, owing to surface tension.

References Cited in the file of this patent

UNITED STATES PATENTS

2,784,300	Zuk	Mar. 5, 1957
2,794,846	Fuller	June 4, 1957
2,809,332	Sherwood	Oct. 8, 1957
2,882,462	Zierdt	Apr. 14, 1959