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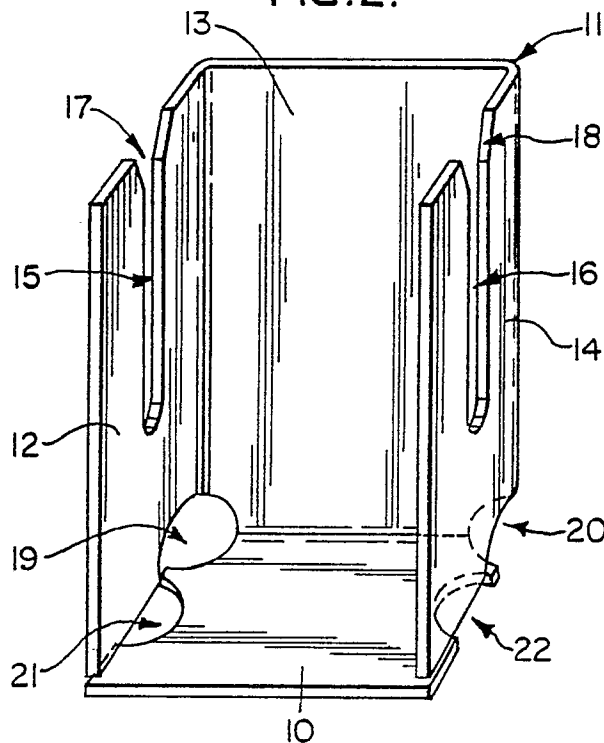
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54 **Electrical terminals.**

57 In surface mounting technology, electrical components can be located on one or both sides of a printed circuit board. External connection to the circuit may be provided by connections to pins set into the board or plug/socket members arranged to clip onto or to engage other parts of the board, for example edge connector sockets. These systems may be complex and hence add to the cost of manufactured articles. Described herein is an electrical terminal which can be surface mounted and to which external connections can easily be made. The terminal comprises a foot or base portion (10) which rests on a conductive area of a printed circuit board and an upstanding member (11) which has two insulation displacement slots (15, 16) formed in respective walls (12, 14) of the member (11). Connection is made by inserting wires or cables into the slots (15, 16), the wires or cables being retained there in electrical contact with the terminal.

FIG.2.



ELECTRICAL TERMINALS

This invention relates to electrical terminals.

Many electrical and electronic circuits are constructed as a set of discrete components assembled together on a common carrier member. A typical such carrier member is a so-called printed circuit board which consists of a rigid insulating sheet having conductive tracks or areas on one or both sides.

Clearly in order to be useful it is necessary to make connections to such electrical or electronic circuit units and a variety of methods has been used in the past. For example, the board may have pins set in it onto which sockets may be push fitted, or one edge of the board may have a number of conductive areas onto which a so-called edge connector socket may be fitted. Alternatively, plug or socket members may be themselves mounted on the board into which socket or plug members respectively may be fitted. All of these systems are fairly complex to operate and add to the cost of manufactured articles. Particular difficulties arise in connection with making connections to circuits where the components are "surface mounted" on the board. In surface mounting technology, electronic components are located on one or both sides of a printed circuit board or the like i.e. they do not have e.g. wire leads which pass through holes in the insulating substrate to give a mechanical locating and locking action.

We have now found that by careful design, it is possible to construct terminals which may be located on one side of a printed circuit board or the like and which may be used to make external electrical connection to the circuit.

In accordance with the present invention, there is provided an electrically conductive surface mounting component for use in an electrical circuit unit including a plurality of surface mounted electrical devices arranged on conductive areas on one surface of an electrically insulating substrate, the component is characterised by a flat foot for resting on a conductive area on one surface of the substrate and, extending from the foot, an upstanding member including at least one insulation displacement slot.

By the term insulation displacement slot is meant a slot having a configuration and size such that when an insulated wire or cable is pressed into the slot from one end, the sides of the slot act to cut through the electrical insulation to enable the opposite edges of the slot, or at least one of them, to come into electrical contact with the conductor in the wire or cable.

The preferred material for the manufacture of the component is brass, phosphor-bronze or alloy

having similar characteristics. Such materials are used because of their inherent resilience or springiness which allows a wire to be easily inserted into the insulation displacement slot and gripped therein.

Insulation displacement connectors are widely known for use in the electrical and electronics industry and have gained widespread acceptance in recent years. However, heretofore such connectors have required mounting in a suitable housing or other positive holding means which have surrounded part of the connector. In contrast thereto, the foot of the component of the present invention simply lies adjacent the electrically conductive area on the electrically insulating substrate.

The component of the present invention is of particular value in connection with the manufacture of circuits by surface mounting techniques since it may be placed and treated in the same way as other surface mounting components such as resistors, capacitors and the like. The components may be fed appropriately oriented by appropriate means and placed by appropriate placement means onto the surface of a deposit of solder paste which is formulated to be sufficiently adhesive to stick the component in place until it can be soldered in place by passing through a reflow soldering station.

The shape and configuration of the component according to the invention may vary widely. Two embodiments are illustrated by way of example only in the accompanying drawings:

Figure 1 shows in perspective view one embodiment of an insulation displacement terminal in accordance with the invention; and

Figure 2 shows in perspective view a further embodiment of an insulation displacement terminal in accordance with the invention.

Referring initially to Figure 1 of the drawings, the terminal shown there consists of a generally circular foot 1 connected via a bridge 2 to a cylindrically formed section 3. The cylinder is slotted and has two oppositely lying edges 4 defining a slot between them. The configuration of the edges 4 and the springiness of the material from which the component is made are chosen such that on inserting a wire vertically in between the opposite edges 4, the edges of the cylindrical portion 3 cut through its insulation allowing the edges to come into electrical contact therewith.

It is advantageous that a hole or slot (not shown) is provided in the centre of the circular foot 1 to allow the terminal to lie flat against a substrate on which it is to be mounted. The hole or slot prevents the build-up of excess solder between the terminal and the substrate. Such a build-up can

cause the terminal to tilt relative to the substrate during solder re-flow processes. Any excess solder between the terminal and substrate flows into the hole or slot to give maximum solder retention of the terminal against the substrate. For example, if a hole is provided in the foot 1, a typical diameter would be about a quarter that of the diameter of the foot itself.

The component as shown in Figure 1 may have a single slot to receive the wire or cable, or may have more than one slot, either of the same or of different sizes. Preferably the slot is formed with a tapering entry portion at its open end to facilitate guiding the insulated wire or cable into the slot.

Figure 2 illustrates further embodiment of an insulation displacement terminal according to the present invention. The terminal shown there is generally cuboid in shape and consists of a generally square base portion 10 from which extends perpendicularly a wall portion 11. The wall portion 11 comprises three walls, 12, 13, 14 which form three sides of a cuboid. Walls 12, 14 each have respective slots 15, 16 formed in them, these slots being equivalent to the slot defined by edges 4 in the embodiment of Figure 1. As shown each slot 15, 16 has an open end 17, 18 which is tapered to allow the wire or cable to be easily guided into the slots 15, 16 make the desired electrical connections. Holes 19, 20 formed at the junction of the base portion 10 with walls 12, 13 and 13, 14 respectively, and cut-out portions 21, 22 formed in the base portion 10 are provided to allow any excess solder to flow into the terminal preventing build-up between the substrate and the terminal.

The terminal of Figure 2 can be formed from a single piece of conductive material, for example a brass, phosphor-bronze, or other alloy which is punched and folded (using conventional techniques) to provide the cuboid configuration.

If desired more or less slots can be provided in the wall portion 11 of the terminal shown in Figure 2. For example, a further slot (not shown) may be provided in wall 13. Naturally, each slot can be used for more than one connection as the insulation on the wire or cable is only severed in the vicinity of the slot into which it is inserted.

upstanding member (3; 11) including at least one insulation displacement slot (4; 15, 16).

2. A component according to claim 1, characterised in that the foot (1; 10) has one or more holes or slots (19, 20, 21, 22) provided in it.

3. A component according to claim 2, characterised in that the foot (1) includes a single generally circular aperture.

4. A component according to claim 3, characterised in that the foot (1) is generally circular and has a diameter approximately four times that of the aperture.

5. A component according to claim 2, characterised in that the foot (1) includes a slot.

6. A component according to any one of claims 1 to 5, characterised in that the upstanding member (3) is generally cylindrical.

7. A component according to claim 1 or 2, characterised in that the upstanding member (11) is generally cuboid in shape, and in that the foot (10) is generally square.

8. A component according to claim 7 and characterised by holes (19, 20) extending into walls (12, 13, 14) of the upstanding member (11) at corners of the cuboid.

9. A component according to claim 8, and characterised by semicircular cut out portions (21, 22) formed in the foot (10).

10. A component according to any one of claims 7 to 9, characterised in that the upstanding member (11) is integrally formed with the foot (10), the component being formed from a single piece of sheet material.

11. A component according to any one of the preceding claims, characterised in that each insulation displacement slot (4; 15, 16) has a tapered entry portion (17, 18) at its open end remote from the foot (1; 10).

12. A component according to any one of the preceding claims, characterised in that the component is made from brass, phosphor-bronze or alloy having similar characteristics.

Claims

1. An electrically conductive surface mounting component for use in an electrical circuit unit including a plurality of surface mounted electrical devices arranged on conductive areas on one surface of an electrically insulating substrate, the component being characterised by a flat foot (1; 10) for resting on a conductive area on one surface of the substrate and extending from the foot (1; 10), an

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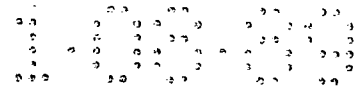


FIG.1.

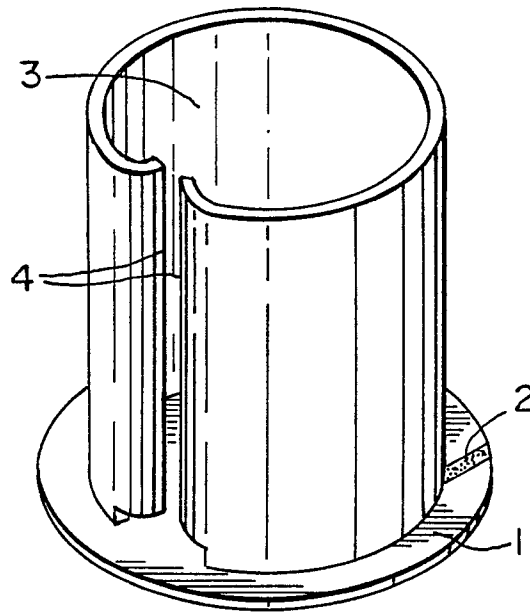


FIG.2.

