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54 Circuit board edge connector.

57 A circuit board edge connector (10) comprises an insulating housing (12) having a cavity (14) for receiving a daughter circuit board, and a plurality of electrical terminals (32) each mounted in a respective passage (22) in the base (26) of the cavity (14), and each having a mating portion (34) in the cavity, a laterally offset portion (36) adjacent to the inner face (39) of the base (26), and a connecting tail (40) located beyond the outer face (41) of the base (26).

For mounting the connector (10) on a mother circuit board (44), each mating portion (34) is spaced from the adjacent wall (19) of the cavity (14) to permit the insertion of a tool member (54) into the cavity (14) to engage the offset portion (36) of the terminal (32) to drive an enlarged laterally resilient mounting portion (38) of the terminal (32) into a hole (42) in the mother circuit board (44).

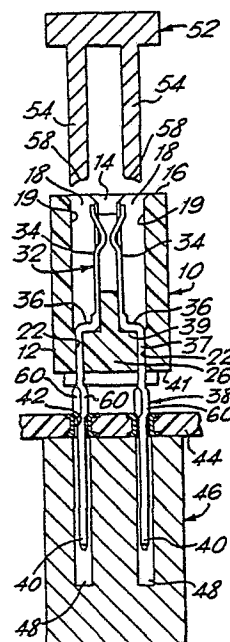


FIG.2.

Circuit board edge connector.

We have described in US-A-3,397,381 a circuit board edge connector comprising an insulating housing defining an elongate cavity for receiving a daughter
5 circuit board, the cavity having a base, a pair of parallel rows of passages extending through the base and communicating with the cavity on opposite sides thereof, and a plurality of electrical terminals each mounted in a respective passage and each having
10 a mating portion in the cavity, a laterally offset portion adjacent to the inner face of the base, and a connecting tail located beyond the outer face of the base and being laterally offset, by virtue of the offset portion, from the mating portion.

15 We have also described in US-A-4,186,982, an electrical terminal provided with an enlarged laterally resilient mounting portion adapted to be force fitted into an internally metalically plated hole in a circuit board to make permanent electrical contact with the
20 internal plating of the hole. Such mounting portions are usually provided only on rectilinear pin or post terminals, in view of the high insertion force required to drive the mounting portions into the holes.

The present invention concerns the problem
25 of employing such mounting portions to secure a circuit board edge connector to a mother circuit board, given that the terminals of such connectors have contact portions which are insufficiently robust for the application thereto of a high axial force.

30 According to the present invention, a circuit

board edge connector as defined in the first paragraph of this specification is characterised in that each mating portion is spaced from that wall of the cavity, which is adjacent to the mating portion, to permit the insertion of a tool member between the wall and the mating portion to engage the offset portion of the terminal, and in that each terminal is provided between its connecting tail and the outer face of the base, with an enlarged laterally resilient mounting portion adapted to be force fitted into a hole in a mother circuit board by driving the tool member against the offset portion of the terminal.

The general state of the art is further exemplified by US-A-3,348,191, US-A-3,601,782 and US-A-3,725,842.

For a better understanding of the invention an embodiment thereof will now be described by way of example to the accompanying drawings in which:-

Figure 1 is a perspective view, shown partly in section, of a first circuit board edge connector, exploded from a mother circuit board, and showing a second such connector mounted on the mother board;

Figure 2 is a cross-sectional view of a connector of Figure 1 in association with tooling positioned to mount the connector on the mother circuit board; and

Figure 3 is a similar view to that of Figure 2 but showing the connector after having been mounted on the mother circuit board.

A circuit board edge connector 10 comprises a rigid insulating housing 12 of plastics material, having a slot 14 opening into a mating face 16 of the housing along substantially its full length, for receiving a daughter circuit board (not shown).

Two parallel rows of aligned terminal receiving recesses

18 each having a side wall 19 (Figure 2) open into the slot 14 from respective sides thereof. The housing 12 has a base 26 (Figures 2 and 3) through which extend passages 22 each communicating with one of the recesses 18. Mounting flanges 28 are provided at the ends of the housing 12.

Each of electrical terminals 32 in the housing 12 comprises a mating portion in the form of a cantilever contact blade 34 for engaging the daughter circuit board, an intermediate offset portion 36 providing a shoulder, an enlarged resilient mounting portion 38 connected to the portion 36 by a rectilinear shank 37 extending substantially parallel to the mating portion 34 and a connecting tail 40 extending from the portion 38. Each terminal 32 is mounted in one of the recesses 18, with its shank 37 extending through the corresponding passage 22, the mounting portion 38 of the terminal lying beyond the outer face 41 of the base 26 of the housing 12 and the portion 36 engaging the inner face 39 of the base 26.

In order to mount the connector 10 on a mother circuit board 44 having internally metallicallly plated holes 42 therein, corresponding in spacing and arrangement to the connecting tails 40, the board 44 is positioned on a tool base 46, having spaced longitudinal grooves 48 therein, so that each hole 42 is aligned with one of these grooves. The connector 10 is then aligned with the base 46 and is moved theretowards to insert each tail 40 of each terminal 32 through a respective hole 42 into the groove 48 aligned therewith, the portion 38 of the terminal resting on the plating of the hole 42, as shown in Figure 2.

A terminal driving tool 52 has legs 54, each

leg 54 terminating in a shoulder 58 shaped snugly to engage the portion 36 of the corresponding terminal 32. Each mating portion 34 is spaced from the adjacent wall 19 to permit the insertion of one of
5 the legs 54 between the portion 34 and the adjacent wall 19.

The legs 54 of the tool 52 having been inserted into the recesses 18' so that each shoulder 58 thereof engages the shoulder portion 36 of a
10 respective terminal 32, a downward axial force is applied to the tool 52 to drive the mounting portions 38 of the terminals into the holes 42 as shown in Figure 3, so as to be resiliently force fitted therein. The tool 52 is then withdrawn from the connector 10.

15 Each mounting portion 38, which may be formed according to the teaching of US-A-4,186,982, comprises a pair of legs 60 joined at their ends and having surfaces which face and abut one another in a shear plane between the legs and with respect to which the
20 legs are mutually laterally offset. The legs 60 are compressed resiliently towards one another as the portion 38 is forced into the hole 42, in mutually contiguous frictional relationship.

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Claims:

1. A circuit board edge connector (10) comprising an insulating housing (12) defining an elongate cavity (14) for receiving a daughter circuit board, the cavity having a base (26), a pair of parallel rows of passages (22) extending through the base (26) and communicating with the cavity on opposite sides thereof, and a plurality of electrical terminals (32) each mounted in a respective passage (22) and each having a mating portion (34) in the cavity, a laterally offset portion (36) adjacent to the inner face (39) of the base (26), and a connecting tail (40) located beyond the outer face (41) of the base (26) and being laterally offset, by virtue of the offset portion (36), from the mating portion (34); characterised in that each mating portion (34) is spaced from that wall (19) of the cavity (14), which is adjacent to the mating portion (34), to permit the insertion of a tool member (54) between the wall (19) and the mating portion (34) to engage the offset portion (36) of the terminal (32); and in that each terminal (32) is provided between its connecting tail (40) and the outer face (41) of the base (26), with an enlarged laterally resilient mounting portion (38) adapted to be force fitted into a hole (42) in a mother circuit board (44) by driving the tool member (54) against the offset portion (36) of the terminal (32).

2. A connector according to Claim 1, characterised in that it is arranged in combination with a tool (52) having tool members (54) each dimensioned to be inserted between the adjacent wall (19) of the cavity (14) and the mating portion (34) adjacent thereto, a tool base (46), and a mother circuit board (44) having a row of internally

metallically plated holes (42) into each of which a respective mounting portion (38) can be force fitted, the number and arrangement of which holes (42) corresponds to the number and arrangement of the connecting tails (40) of the terminals (32), the tool base (46) having openings (48) for receiving the tail portions (40); whereby the connector (10) can be mounted on the mother board (44) by disposing the latter on the tool base (46) with each hole (42) of the mother board (44) in alignment with an opening (48) in the tool base (46), inserting each connecting tail (40) through a respective hole (42) in the mother board (44) to extend into the opening (48) aligned therewith, inserting the tool members (54) into the cavity (14) of the housing (12) to engage the offset portions (36) of the terminals (32), and applying a force to the tool members (54) to drive the mounting portions (38) into the holes (42) in the mother board (44).

20 3. A connector according to Claim 1 or 2, characterised in that each mating portion (34) is in the form of a cantilever beam extending substantially normally of the base (26) of the cavity, each mounting portion (38) comprising a pair of legs (60) joined at their ends and having surfaces which face one another in a shear plane between the legs (60) and with respect to which the legs (60) are mutually laterally offset, the legs (60) being such as to be resiliently compressed towards one another in mutually contiguous frictional relationship, as the mounting portion (38) is forced into the hole (42) in the mother circuit board (44).

35 4. A connector according to Claim 1 or 2, characterised in that the mating portion (34) of each terminal (32) extends substantially perpendicularly

with respect to the offset portion (36) and is connected
to one side thereof, the mounting portion (38) of
the terminal (32) being connected to the offset
portion (36) by a rectilinear shank portion (37) which
5 is received in the respective passage (22) and
is connected to the opposite side of the offset portion
(36), the shank (37) and the connecting tail (40)
of the terminal being in axial alignment with one
another and being parallel to the mating portion (34)
10 and extending perpendicularly with respect to the offset
portion (36).

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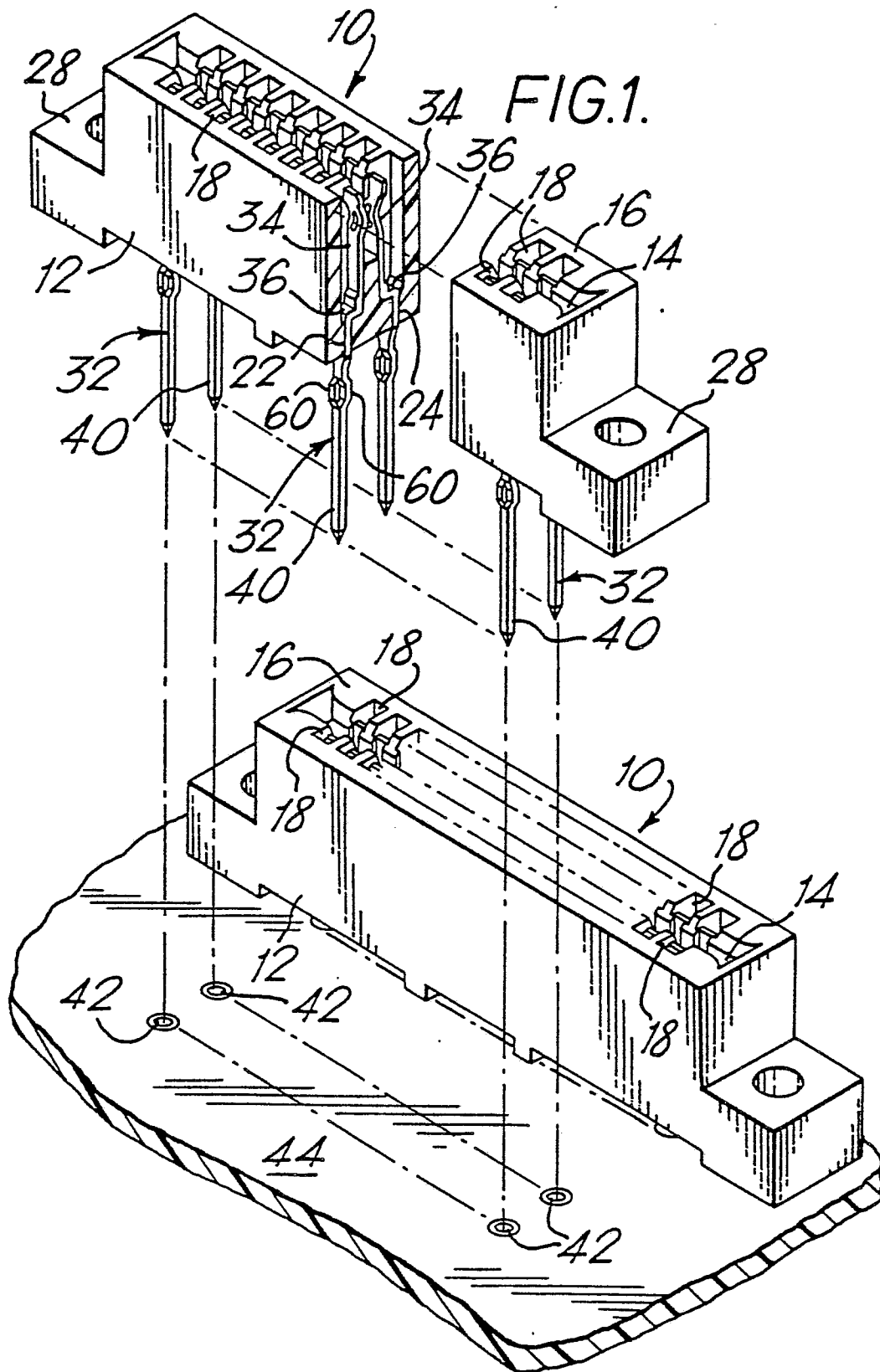
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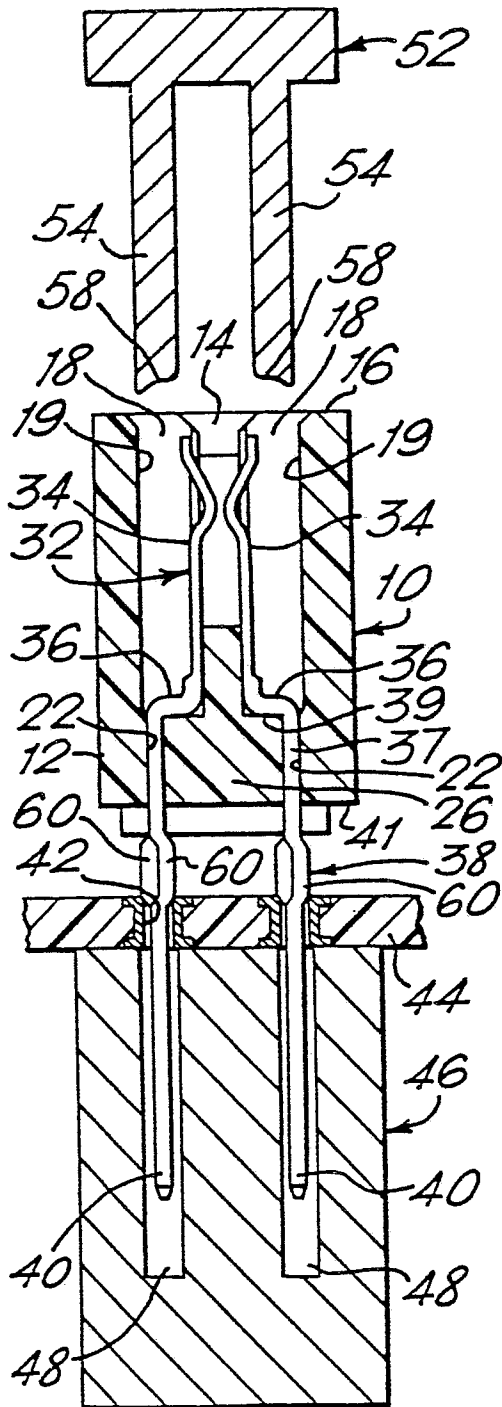


FIG. 2.

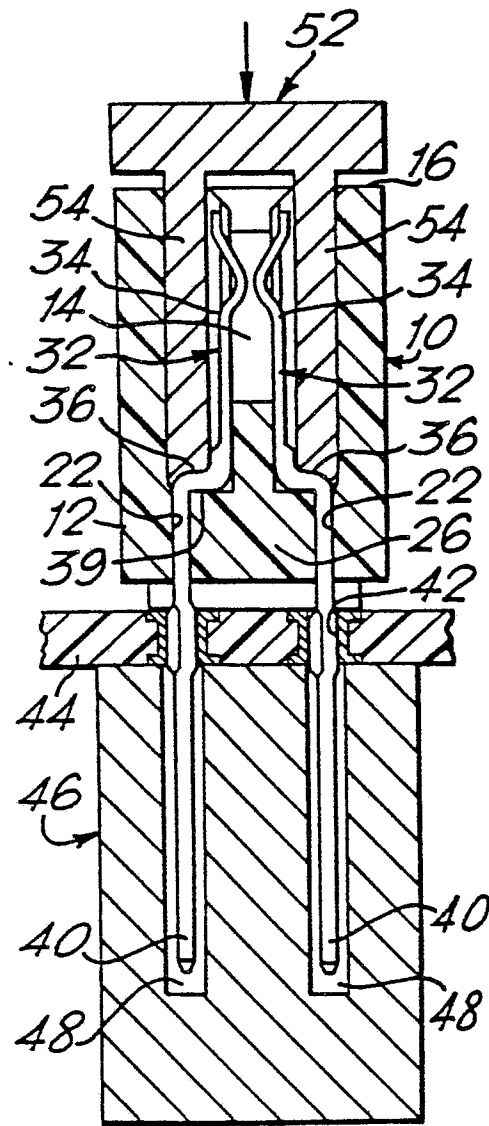


FIG. 3.




European Patent
Office

EUROPEAN SEARCH REPORT

0042692

Application number

EP 81 30 2566

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>US - A - 4 089 581 (LITTON)</u> * Column 4, lines 22-35; figures * ---	1	H 01 R 13/436
A	<u>US - A - 4 127 935 (ELFAB)</u> * Column 4, lines 24-60; figures * ---	1	
A	<u>US - A - 4 083 101 (AMP)</u> * Abstract; figures 13-15 * ---	1,3	
P	<u>FR - A - 2 445 631 (ELCO)</u> * Figures * & DE - A - 2 950 097 (10.07.1980) & GB - A - 2 043 364 (01.10.1980) ---	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) H 01 R 13/41 13/415 13/436 13/438 H 05 K 7/10 H 01 R 9/09 H 01 R 43/00 H 01 R 23/68 23/70 23/72
A	<u>US - A - 4 156 553 (ELFAB)</u> * Column 7, line 65 to column 8, line 23; figures * ---	1,4	
D/A	<u>US - A - 4 186 982 (AMP)</u> * In its entirety * ---	3	
A	<u>DE - A - 1 590 006 (AMP)</u> * Figures * & GB - A - 1 096 839 -----	4	CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons &: member of the same patent family. corresponding document
 The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 01.10.1981	Examiner RAMBOER