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[54] **CIRCUIT BOARD WITH FLUID PRESSURIZED INSERT STRIP**
 2 Claims, 4 Drawing Figs.

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 339/74 R, 339/117 R, 339/176 MP

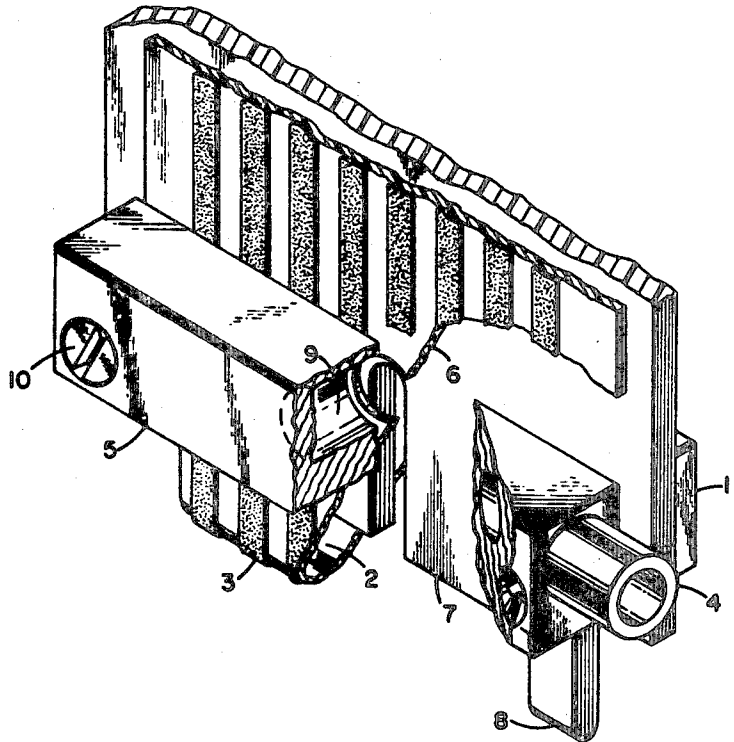
[51] Int. Cl. H014 33/82

[50] Field of Search 339/17, 74,
 75, 176, 117; 317/101

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ABSTRACT: An electronic circuit board having a collapsible insert strip with a sealed pressurizable pocket between the insert strip conductors, by varying the amount of fluid in the pocket being able to contract thinner for insertion into a connector and expanding thicker to make electrical contact. A system having a multitude of these circuit boards to connect to a multitude of connectors of an electronic assembly.



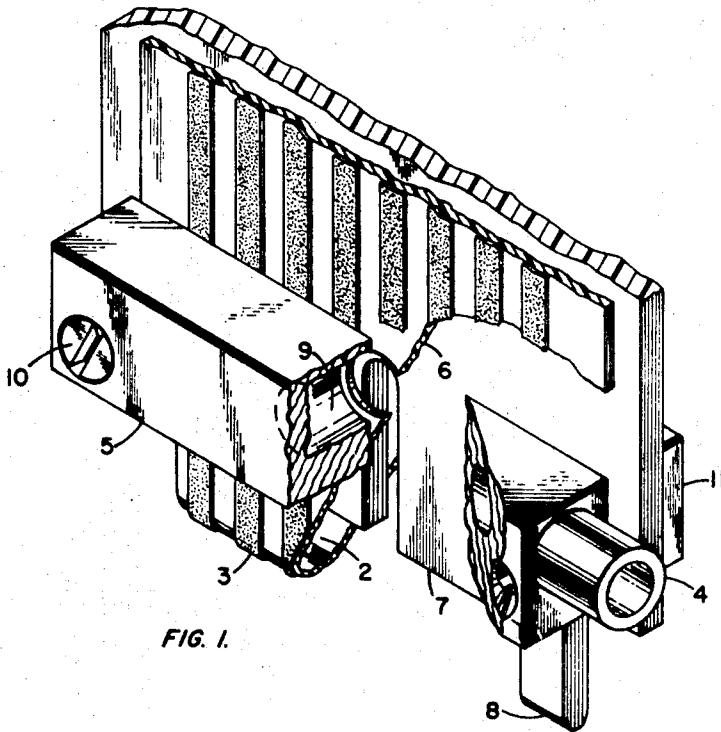


FIG. 1.

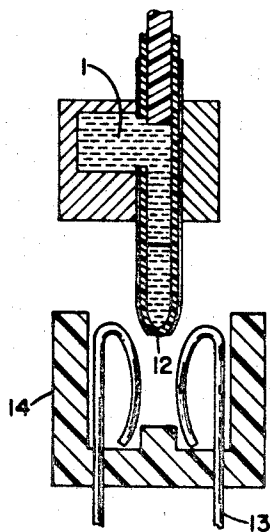


FIG. 2.

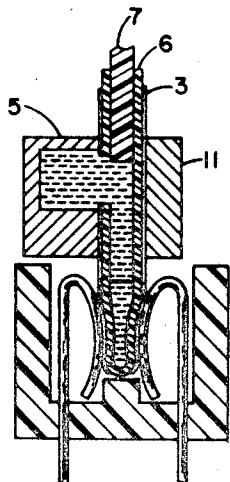


FIG. 3.

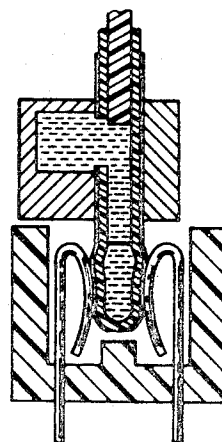


FIG. 4.

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CIRCUIT BOARD WITH FLUID PRESSURIZED INSERT STRIP

BACKGROUND OF THE INVENTION

The present invention relates to a need for being able to quickly connect an automatic test system or system wiring analyzer to a multitude of connectors of a complex wired assembly. Two methods are presently being used to accomplish this connection requirement. One method is using a multitude of spring-loaded contact pins mounted on a press, each pin being wired to the wiring analyzer. The connection is made by forcing all of the pins against conduction surfaces within the assembly to be tested. The other method is inserting conventional circuit boards singularly, each board being wired to the test system.

The invention enables semiconventional circuit boards to be inserted in large groups. This is possible by using the invented circuit board, having a collapsible insert strip, which requires a much lower force for insertion into a connector.

SUMMARY OF THE INVENTION

The present invention relates to making an electrical contact between a unique circuit board insert strip (the male member, and an ordinary connector (the female member). The invention provides that the male member contract thinner for insertion into a connector and expand thicker to make electrical contact after insertion. The expansion is caused by forcing a fluid into a sealed pressurizable pocket between the insert strip conductors. The fluid is inserted via a manifold on one side of the circuit board. Because of the ease of insertion obtained, a multitude of circuit boards can be connected simultaneously to a multitude of connectors. By interconnecting the individual fluid manifolds, all of the insert strips of the circuit boards can be expanded together. When a disconnection is desired, the fluid causing the expansion is extracted thus causing the insert strips to again contract and allow extraction of the circuit board insert strips from the connections with little force.

The collapsible insert strip is constructed of inherently flexible materials or materials so thin they are relatively flexible even though not normally considered flexible. Because of the thinness of a circuit board structure, difficulty occurs in attempting to incorporate a homogeneous fluid bladder, thus the fluid pocket is formed by three faces of the circuit board filler, and three faces of the flexible conductor supporting material. Sealing of the pocket occurs by bonding the perimeter of the three faces of the flexible conductor supporting material to the circuit board filler. Various fluids can be used for pressurizing within the insert strip, air will probably be most advantageous because of its availability and also minor leaks which might occur would not be detrimental. The shape of the insert strip is controlled by leading edge segments of the board

filler.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the insert end of the circuit board, having a section cut away to show the fluid passages in the manifold, board base, and insert strip.

FIG. 2 is a sectional view taken through the fluid passageway of the circuit board and a corresponding location of a typical circuit board connector. The insert strip is shown in its typically normal configuration.

FIG. 3 illustrates the insertion of an insert strip into the socket as shown in FIG. 1. The insert strip is shown collapsed with fluid removed allowing the insert strip to be inserted causing no deflection of the conductors of the connector which deflections and its associated frictional resistance attributes to the insert resistance of normal circuit board insertion.

FIG. 4 illustrates the establishment of electrical contact of an insert strip and socket as shown in FIG. 1. The insert strip is shown expanded with fluid pressure applied. The conductors of the connector are shown deflected as also occurs in a normal circuit board insert strip insertion as the leading edge of the circuit board is wider than the normal distance between connector conductors.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fluid 1 is carried to the pocket 2 between the insert strip conductors 3 via a tube 4 to the manifold 5 through a hole in the flexible conductor supporting material 6 and through a slot in the rigid circuit board filler 7. The fluid pocket 2 has six sides consisting of the slotted edge of the board filler 7 two sides of the leading edge segments 8 of the board filler 7 and three sides from the conductor-supporting material 6. The conductor-supporting material 6 is bonded to the board filler 7, 8 to prevent leaks. A sealant is also used at the manifold fluid passageway 9 and the surface around the hole through the conductor-supporting material 6. The insert strip conductors 3 are bonded to the support material 6. The manifold 5 is attached with two screws 10 which pass through the assembly into a back support block 11. Where interconnection is required between directly opposite conductors 3 of the two sides of the circuit board, the conductors 3 will not be broken as shown at the leading edge 12.

A typical circuit board connector is shown consisting of spring contact connectors 13 imbedded into a plastic structure 14.

I claim:

1. In a pressure actuated connector assembly, an electric circuit board comprising a board filler, a flexible insert strip extending around one edge of said board filler and forming a sealed pressurizable pocket therewith, said strip having flexible conductors mounted on the outer surface thereof.

2. The connector assembly of claim 1 and further including means for inflating said pocket.

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