

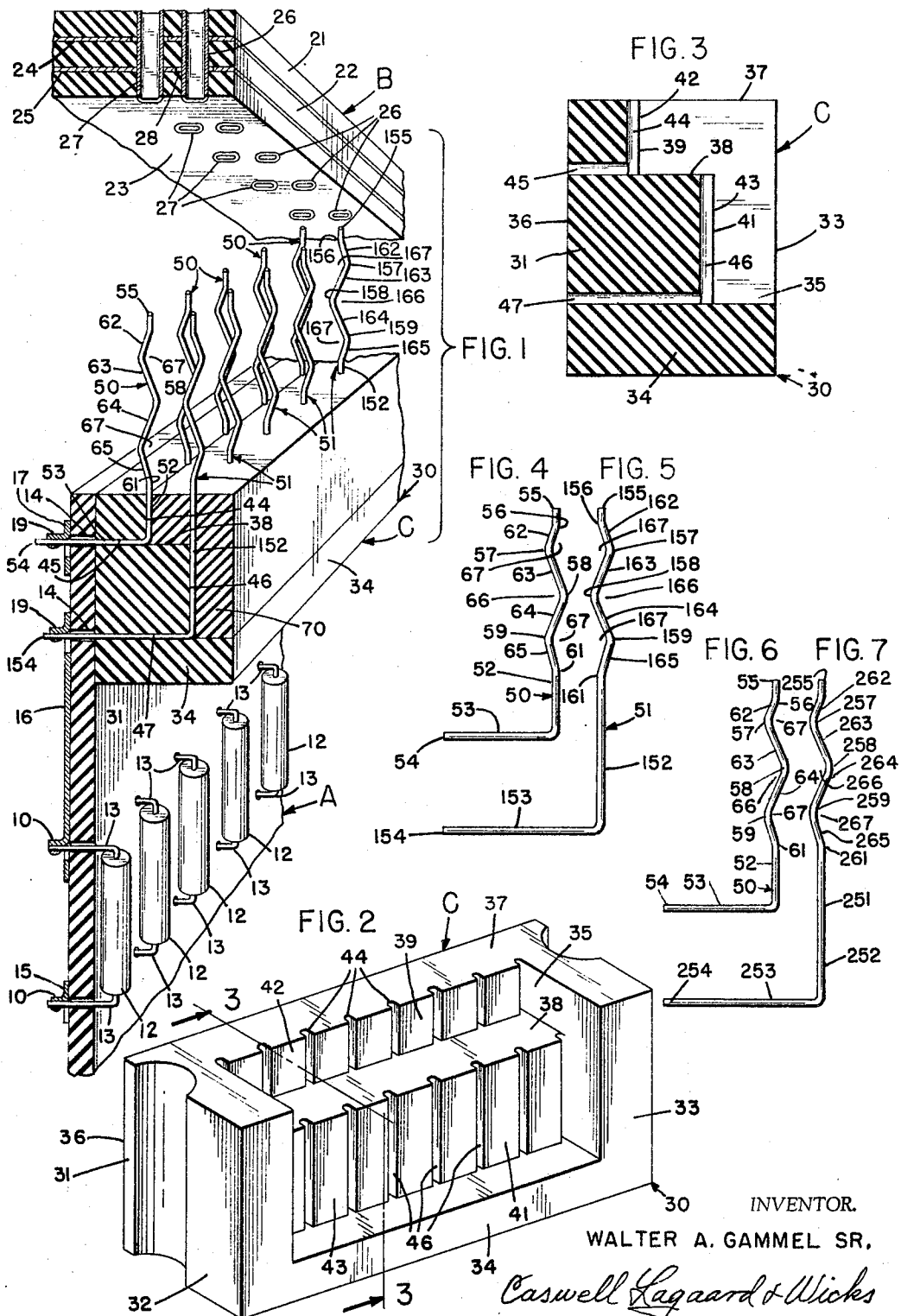
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MULTI-PRONG ELECTRICAL CONNECTOR

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1

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MULTI-PRONG ELECTRICAL CONNECTOR

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The herein-disclosed invention relates to electrical connectors and has for an object to provide a connector extremely compact in construction and which will make positive contact with the contacts of the receptacle with which it is used.

Another object of the invention resides in providing a connector which may be used in multiple with similar connectors and which will make proper contact irrespective of slight inaccuracies in the manufacture of the parts or in the assembly thereof.

An object of the invention resides in providing a connector having prongs and capable of being used with a tubular socket and in which the spring action required to procure suitable contact is due to the construction of the prongs.

Another object of the invention resides in providing a prong which may be constructed of resilient wire.

A still further object of the invention resides in providing the connector with a body constructed of insulating material and having front, end and bottom walls defining a cavity within the body open at the top and back.

Another object of the invention resides in constructing the front wall with an offset forming therein a lower portion and an upper portion of lesser thickness than the lower portion to provide on said front wall a first outer face and on the interior of the body a first inner face on the lower portion thereof and a second inner face on the upper portion thereof and to form on said body a second outer face at the upper ends of the front and end walls.

A still further object of the invention resides in constructing both inner faces with parallel grooves substantially normal to the second outer face and in providing holes in said front wall at the inner ends of said grooves.

An object of the invention resides in constructing the connector elements with legs extending angularly with reference to each other, one of the legs of each element having a soldering lug formed thereon and the other having the prong formed thereon.

Another object of the invention resides in disposing the legs with prongs in said grooves and the legs with soldering lugs in said holes.

A still further object of the invention resides in the use of contacts for engagement with the prongs having ovaloid openings therein for the reception of the prongs.

An object of the invention resides in filling the cavity in said body with a plastic insulating material for closing the cavity and holding the connector elements in proper spaced relation and with the prongs in position to be received within the contacts of the receptacle.

Other objects of the invention reside in the novel construction and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings:

FIGURE 1 is a perspective view of a socket, partly in section, an etched circuit board and a connector illustrating an embodiment of the invention together with a socket with which the connector is to be used.

FIGURE 2 is a perspective view of the body of the connector without the connector elements applied thereto.

FIGURE 3 is a cross sectional view of the connector body without the connector elements mounted thereon and taken on line 3-3 of FIGURE 2.

2

FIGURES 4 and 5 are elevational views of the two connector elements of the invention.

FIGURES 6 and 7 are elevational views of a modified form of connector element.

For the purpose of illustrating the invention, an etched circuit board A has been shown having a number of conductors 15, 16 and 17. Lugs 10 extending outwardly from conductors 15 and 16 are connected to the terminals 13 of certain of a number of resistors 12 by means of soldering or welding.

In addition to the board A, a multiple socket B has been shown which consists of three sheets of insulating material 21, 22 and 23. Between these sheets are arranged two conductors 24 and 25 which have connected to them a number of tubular contacts 26 and 27 arranged in pairs. These contacts are soldered or otherwise secured to the conductors 24 and 25. The conductors 24 and 25 may be connected to a suitable power supply or example and certain of the contacts 26 and 27 secured thereto. Where the contact 26 for instance is to be attached to the conductor 24, the conductor 25 is provided with a space 28 clearing the said contact 26.

The instant invention provides a connector C for connecting the leads of socket B to the terminals of the components of the etched circuit board A by means of the etched conductors thereon. The invention proper consists of a body 30 constructed as best shown in FIGURES 1 and 2. This body comprises a front wall 31, end walls 32 and 33 and a bottom wall 34. This construction provides a cavity 35 within the interior of the body, the said body being open at the top and back to give access to the cavity 35. Wall 31 is formed with an outer face 36 while the upper ends of the walls 31, 32 and 33 form a second outer face indicated by the reference numeral 37. The wall 31 is formed intermediate its height with an offset 38 which forms in the wall an upper portion 39 and a lower portion 41, said lower portion being of greater thickness than the upper portion. The upper portion 39 has an inner face 42 while the lower portion 41 has an inner face 43. These faces are substantially parallel to one another and to the face 36 and the face 37 is at right angles to the face 36.

The face 42 of the upper portion 39 of wall 36 is formed with a number of grooves 44 which extend through the face 37 and down to the offset 38. Communicating with these grooves are a number of holes 45 (FIG. 3) which are located at the ends of said grooves adjacent offset 38 and which are substantially at right angles to the face 36 and which extend through the same. In a similar manner, a number of grooves 46 are formed which are parallel with the grooves 44 and which extend through the offset 38 and terminate adjacent the bottom wall 34. In addition to these grooves, holes 47 are drilled which are located at the ends of said grooves adjacent the bottom 34 and which extend through the lower portion 41 of the wall 31 and through the face 36 thereof. The arrangement of the various parts are such that the grooves 44 and 46 lie in pairs which pairs of grooves are disposed in planes substantially at right angles to the face 36.

Mounted in the body 30 are a number of wire connector elements 50 and 51 shown in FIGURES 4 and 5. The connector element 50 is bent to form two legs 52 and 53 which are at substantially right angles to one another. The legs 53 are adapted to be inserted in the holes 45 in the upper portion 42 of the front wall 31 and protrude outwardly therefrom to provide extensions 54 beyond the face 36 of front wall 31 and which serve as soldering lugs. The soldering lugs 54 are in axial alignment with the legs 53. The legs 52 are adapted to be received in the grooves 44 and extend up and through

the face 37. These legs have extensions 55 which serve as prongs for insertion in the sockets 26 and 27. The sockets 26 and 27 may be circular in form or ovaloid as shown. The prongs 55 are constructed with bends 56, 57, 58, 59 and 61 which result in an undulating structure. The bends are connected together by means of arms 62, 63, 64 and 65 resulting in an undulating structure having the crests at the bends 57 and 59 facing in one direction and the crest of the bend 58 facing in the other direction with valleys 66 and 67 therebetween.

The connector elements 51 are constructed in the same manner as the connector elements 50 and due to the similarity thereof, these elements will not be described but the same reference numeral preceded by the digit 1 will be used to designate corresponding parts. These connector elements differ from the connector elements 50 in that the bends 157 and 159 extend outwardly from the legs 153 while the bends 57 and 59 extend toward the legs 53. These connector elements also differ in that the legs 152 and 153 are longer than the legs 52 and 53 for a purpose which will readily become apparent.

In the assembly of the parts the soldering lugs 54 are inserted into the holes 45 with the prongs 55 extending upwardly. These elements are then pushed through the holes until the soldering lugs appear as extending beyond the face 36 and the legs 52 become received in the grooves 44. The prongs 55 will then be disposed entirely outwardly of the face 37. The connector elements 51 are assembled in the same manner by inserting the extensions 154 into the holes 47 and until the said extensions project outwardly beyond the face 36 and the legs 152 become received in the grooves 46. The legs 152 and 153 are of suitable length so that the extensions 54 and 154 extend outwardly beyond the face 36 about the same amount. Also, the legs 152 are of the proper length so that the crests of the bends 157 and 159 lie directly opposite the crests of the bends 57 and 59. With the parts so arranged, a plastic insulating filler indicated by the reference numeral 70 is poured into the cavity 35 to fill the said cavity and embed the various connecting elements within the same. This plastic filler lies flush with the face 37 of the body 30 and also with the sides of the walls 32 and 33 and the bottom wall 34.

The connector body 30 is attached to the board A in any suitable manner as by cementing or by means of bolts not shown. The board A is drilled with holes 14 and through which the soldering lugs 54 and 154 extend. Conductors 16 and 17 are formed with lugs 19 adjacent the holes 14 which are soldered or otherwise connected to certain of the soldering lugs 54 and 154.

In FIGS. 6 and 7 a modification of the connector element 51 is shown. This element differs from that shown in FIG. 5 in that the crests and valleys of the same extend in the same direction as those of the element 50. Said element will hence not be described and the same reference numerals as used in FIG. 5 for element 51 will be employed with the digit 2 instead of the digit 1. The operation of this form of the invention is similar to that shown in FIG. 5 and is advantageous in that the parts are substantially identical.

The advantages of the invention are manifest. The connector and sockets can be constructed at an extremely economical cost. The socket contacts being tubular and the prongs constructed of wire, the parts occupy a minimum amount of space permitting of compact construction, particularly advantageous in computer circuits.

Having described the invention, what is claimed as new and desired to be protected by Letters Patent is:

1. An electrical connector comprising a preformed insulating body having a first outer face and a second outer face angularly disposed relative to one another, said body having an L-shaped cavity therein and forming a first inner face substantially parallel with said first outer face and falling short of said second outer face, and a second inner face disposed substantially parallel to said first

outer face and disposed closer to said first outer face than said first inner face, and extending up to said second outer face, said first inner face being formed with grooves substantially parallel with one another and extending in a direction substantially normal to said second outer face, said body further having holes formed therein communicating with said grooves and extending through said first outer face, said second inner face being formed with grooves substantially parallel with one another and extending in a direction substantially normal to said second outer face, said body further having holes formed therein communicating with said last-named grooves and extending through said first outer face, first connector elements each having two legs angularly disposed relative to one another, one of said legs of each connector element being disposed in one of said grooves and the other of said legs extending through the hole communicating therewith, second similarly constructed connector elements having angularly disposed legs with one leg of each connector element disposed in one of the grooves in said second inner face and the other of the legs of each of said second connectors extending through the hole communicating therewith, terminal means on said legs and insulating means disposed in said cavity for enclosing said legs and holding the same in position.

2. An electrical connector comprising a preformed insulating body having exterior walls, one forming a first outer face and another forming a second outer face angularly disposed relative to one another, said body having a cavity therein extending through two of the walls of said body and forming a first inner face substantially parallel with said first outer face and falling short of said second outer face, said body having a second inner face disposed substantially parallel to said first outer face and spaced from said first inner face and lying closer to said first outer face than said first inner face, and extending up to said second outer face, said first inner face being formed with grooves substantially parallel with one another and extending in a direction substantially normal to said second outer face, said body further having holes formed therein communicating with said grooves and extending through said first outer face, said second inner face being formed with grooves substantially parallel with one another and extending in a direction substantially normal to said second outer face, said body further having holes formed therein communicating with said last-named grooves and extending through said first outer face, first connector elements each having two legs angularly disposed relative to one another, one of said legs of each connector element being disposed in one of said grooves and the other of said legs extending through the hole communicating therewith, second similarly constructed connector elements having angularly disposed legs with one leg of each connector element disposed in one of the grooves in said second inner face and the other of the legs of said second connectors extending through the hole communicating therewith, soldering lugs on the legs extending to said first outer face and prongs on the legs extending to the second outer face and insulating means for enclosing said legs and holding the same in position.

3. An electrical connector comprising a preformed insulating body having an upper section, an intermediate section and a lower section, said lower section being of the full width of the body, said intermediate section being of a width less than the width of the lower section, and said upper section being of a width less than the intermediate section to form a cavity in said body, said body having a first outer face common to all three sections, a second outer face for the upper section angularly disposed relative to the first outer face, a first inner face for the upper section substantially parallel to the first outer face, a second inner face for the intermediate section also substantially parallel to said first

5

6

outer face, said upper section having a series of parallel grooves in the same substantially perpendicular to said second outer face extending through said first inner face and through said second outer face, holes in said body extending through the upper section and the first outer face and communicating with said grooves, said holes being substantially perpendicular to said first outer face, said intermediate section having grooves extending through said second inner face and substantially parallel to said first-named grooves, and holes in said body extending through said second inner face, the intermediate section and the first outer surface and parallel to said first-named holes, angular shaped connector elements having legs received in said grooves and legs received in said holes, terminal means on said legs disposed outwardly of said outer faces of said body, and insulating means disposed in said cavity for enclosing the legs in said grooves and holding the same in position.

4. An electrical connector comprising a preformed insulating body having an upper section, an intermediate section and a lower section, said lower section being of the full width of the body, said intermediate section being of a width less than the width of the lower section, and said upper section being of a width less than the intermediate section to form a cavity in said body, said body having a first outer face common to all three sections, a second outer face for the upper section angularly disposed relative to the first outer face, a first inner face for the upper section substantially parallel to the first outer face, a second inner face for the intermediate section also substantially parallel to said first outer face, a third inner face for the intermediate section substantially parallel to the second outer face, a fourth inner face for the lower section substantially parallel to the second outer face, said upper section having a series of parallel grooves in the same substantially perpendicular to said second outer face and extending through said first inner face and through said second outer face, holes in said body extending through the upper section and

the first outer face and communicating with said grooves, said holes being substantially perpendicular to said first outer face, said intermediate section having grooves extending through said second inner face and substantially parallel to said first-named grooves and holes in said body extending through said second inner face, the intermediate section and the first outer face and parallel to said first-named holes, said first-named grooves extending down to the third inner face, said second-named grooves extending down to said fourth inner face, said first-named holes being disposed immediately above said third face and said second-named holes being disposed immediately above said fourth face, angular shaped connector elements having legs received in said grooves and legs received in said holes, terminal means on said legs disposed outwardly of said outer faces of said body, and insulating means disposed in said cavity for enclosing the legs in said grooves and holding the same in position.

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