United States Patent

Gomez

[15] **3,701,084**

[45] **Oct. 24, 1972**

[54] **MULTIPOLAR CONNECTOR FOR TELEPHONE SETS**

[72] Inventor: **Lorenzo Martinez Gomez,** Malaga, Spain

[73] Assignee: **International Standard Electric Corporation,** New York, N.Y.

[22] Filed: **Jan. 6, 1971**

[21] Appl. No.: **104,408**

[52] **U.S. Cl.** .....**339/66 M,** 339/75 M, 339/184 M, 339/196 M

[51] **Int. Cl.** **H01r 13/62**

[58] **Field of Search**....339/65, 66, 75, 176, 184, 191, 339/192, 195, 196

[56] **References Cited**

UNITED STATES PATENTS

538,327 4/1895 Gilliland.....339/176 P

771,410 10/1904 Beerwald.....339/176 P

FOREIGN PATENTS OR APPLICATIONS

1,023,038 3/1966 Great Britain .....339/184 M

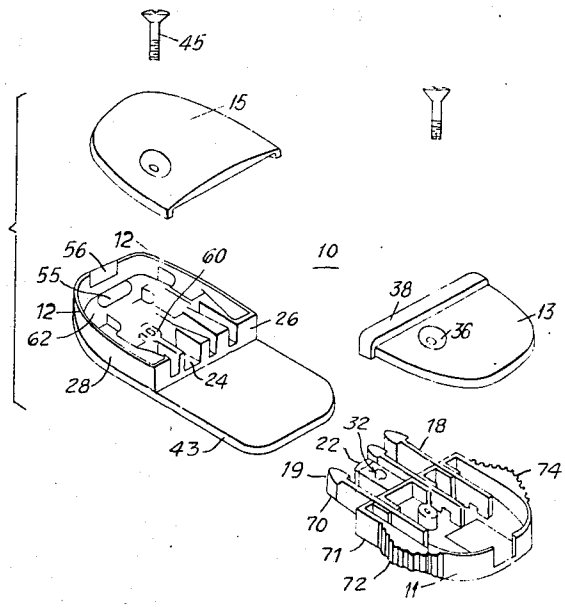
Primary Examiner—Joseph H. McGlynn

Attorney—C. Cornell Remsen, Jr., Walter J. Baum, Paul W. Hemminger, Charles L. Johnson, Jr., James B. Raden, Delbert P. Warner and Marvin M. Chaban

[57] **ABSTRACT**

A flat multiple contact connector including a plug and mating socket. The plug contactor springs are paired and the contactor springs of a pair are mounted on opposite sides of an insulating tongue. The tongues are aligned asymmetrically for mating with like openings in the socket bearing individual receiver springs for each contactor spring.

2 Claims, 5 Drawing Figures



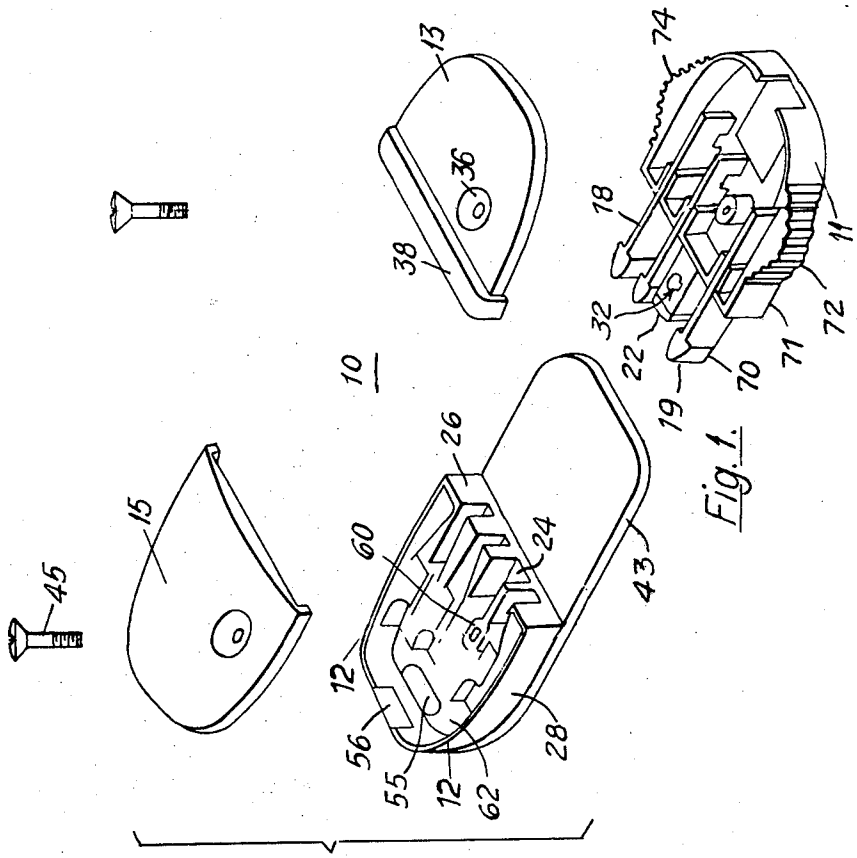

13
74
36
18
38
11
32
72
22
71
70
19
10
26
15
60
24
45
43
12
56
28
55
12
62

Fig. 1.

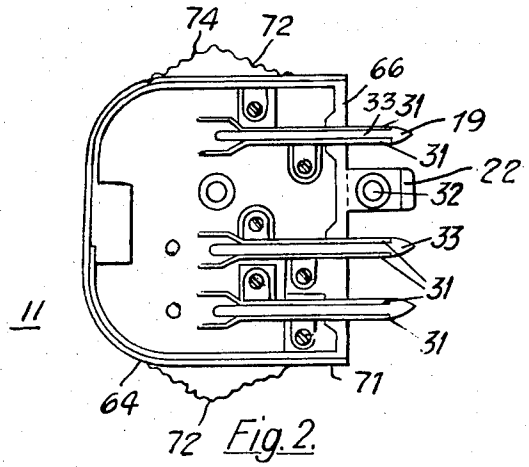


Fig. 2.

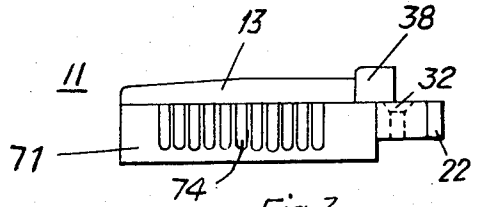


Fig. 3.

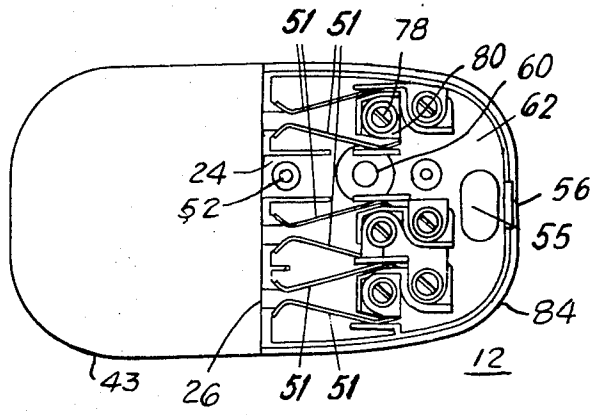


Fig.4.

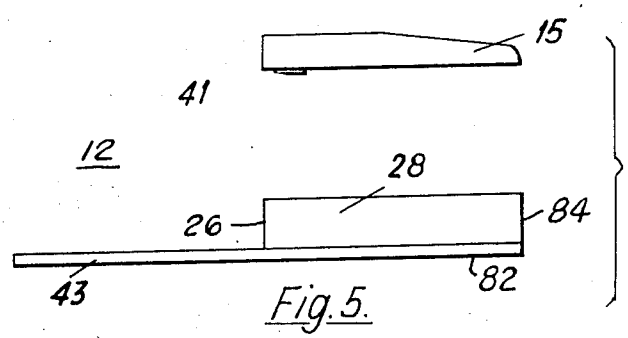


Fig.5.

MULTIPOLAR CONNECTOR FOR TELEPHONE SETS

The main object of this invention is to provide an improved multiple contact connecting unit including a plug and a socket for use in apparatus adapted for telephone installations. By using the plug and socket shown, the installation time and the number of parts necessary to form the connecting unit can be substantially reduced.

Jacks and plugs made of thermostable or thermoplastic material of various colors are well known in many forms. These devices may be used as produced or with various added substances added such as talcum, powdered glass. Further, the prior art is replete with construction variations such as molded metal inserts, electrodeposited, inserted and fitted contacts affixed to the connection by various means such as set screws, washer and pressure screws. The latter may be thread-cutting or may screw on to the metal insertions or metallic terminals, or may be clipped or soldered to the ends of the conductors that form the connecting cord or extension.

However, such mechanisms are inconvenient when assembling metal contactor springs with insulators which must have a minimum weight and must provide six metallic contact points, preferably in a flat form. The major purpose of the present invention is to obviate these inconveniences and provide an improved design more suited to light-weight telephone apparatus.

These features of the invention are effected by using:

a. A plastic plug basically made of other suitable thermostable material such as phenolic resins, polyester polystyrene butadene, polyamides or any other type of material capable of being injected or molded by compression with or without additives. The plug is provided with six metallic laminated contacts or springs made of brass, bronze or nickel-silver alloy, light in weight, in pairs grouped one on each side of the three extending tongues or plastic appendages, each with its head in the form of an arrow. The plug is designed to be inserted into a jack.

b. The jack or socket is fabricated of the same plastic material as the plug, and the connecting points formed by metal springs in brass, bronze or nickel-silver alloy or other material of high electric conductivity for completing a connection to the telephone line.

c. Means are provided to prevent disassembly of the plug and socket once joined by means of an appendage incorporated into the plug which, on being introduced into the socket, stays in front of the drill hole on the socket itself. The plug and socket are thus joined and form a rigid block when joined by means of a screw threaded into the walls. This construction prevents accidental disconnection.

d. Further, there are provided two matching half-covers for the protection of the contacts against atmospheric conditions; these two half-covers overlap each other forming a small overhang.

In the drawings:

FIG. 1 is an exploded perspective view of a connector employing the invention;

FIG. 2 is a side view in elevation of the plug unit of FIG. 1;

FIG. 3 is a plan view of the open plug of FIG. 2;

FIG. 4 is a plan view of the open socket of FIG. 1;

FIG. 5 shows the socket of FIG. 4 and exploded therefrom a cover element as shown in FIG. 1.

Hereafter is described in detail the construction and assembly of the plug and socket comprising the new connector.

FIG. 1 shows a perspective of the connector assembly **10**, in which can be seen the two main parts, the plug **11** and the socket **12**. These join together by lightly sliding them together and thereby closing the multiple electric circuit by means of the mating contact of each set of two contactor pins **31** of the plug **11** with the two mating springs **51** of the socket **12**; this sliding movement being guided by the isolating and insulating ridges **18** in the form of arrow-shaped tongues **19**. These arrow heads facilitate and ease the entry of the plug into the socket and connection of the plug contactors **31** to the springs **51** of the socket.

To provide the assembly with a self-fastening device, the plug has an appendage or projecting finger **22** with a drill hole **32**. A suitable mating recess **24** is provided in the adjoining wall **26** in the housing **28** of the socket **12**. By tightening a screw (not shown) through drill hole **32** into the mating recess **24** within the socket cavity **62** at **52**, the accidental disconnection of the connector unit is prevented.

FIGS. **2** and **3** show the sub-assembly of the plug **11** formed by a molded base **64** of any of the thermostable or thermoplastic materials as mentioned previously herein, including as one major element the projecting finger **22**.

The use of the projecting finger prevents:

a. The connection of the plug into the socket in an incorrect position due to the assymetry of its position in the plug front wall **66**.

b. The incorrect plugging of plug into socket so that the electrical connection of the insulating and guiding tongues **33** cannot be broken.

The use of the projecting finger **22** also ensures that the housing is locked by means of the mounting of the screw into drill hole **32**.

The three appendages or fingers for the plug contactors are molded in the form of arrows and serve:

1. To position the metal contacts or springs on both sides thereof in pairs;
2. To prevent incorrect insertion of the insulating fingers and the contactor springs **31** borne thereon.
3. To ease the entry of the plug into the socket housing so that only the stationary, contactor springs **51** of the socket exert lateral pressure on the movable contactor springs **31** of the plug; these can then be made of a lighter material as they are only subject to lateral pressure on the contacts.

The contact tongues **33** terminate at the end of the plug designed to enter the interior cavity **62** of the body of the socket **12**, and the tongues are spade-shaped in the form of an arrowhead to allow insertion of the terminal plug or similar plug into the socket.

For this reason the arrowhead or spade ends **70** must be reinforced and are enlarged and molded thicker as seen in FIG. **1**. These heads protect the ends of the contactor springs **31** from being spread during insertion of the plug into the socket.

The outer lateral walls **71** of the plug **11** are configured with opposed protruding members **72** having serrations **74** to facilitate handling of the plug when connecting and disconnecting.

The whole sub-assembly is covered with a plastic molded cover **13**, fastened by means of a screw **36**, that has a small overhang **38** (shown in FIG. **3**) so that once assembled with the socket, no foreign particles can penetrate into the assembly and thereby impede the normal functioning either because of dust on the contacts or short circuits, etc.

FIGS. **4** and **5** show the sub-assembly of socket **12** in greater detail. In the same way as the plug, the sub-assembly socket is molded by compression of thermoplastic or thermo-stable material. The body of socket **12** is formed so that the corresponding recesses **24** allow the passage of the appendages such as tongues **33** and finger **22** of the plug housing into the socket cavity **62**. In the molding process, the stationary springs **51** are positioned in the cavities of the mold, and fastened by thread-cutting screws **78** adapted for use with plastic material, that also serve to provide the contact by pressure between the head of these screws **78** and the offset surface **80** of the springs, to thereby provide a connection to the connecting wires of the system.

In the bottom wall **82** of the socket and in the rear wall **84** there are provided two narrow molded slots **55** and **56** that permit the entrance of respective conductors (not shown) permitting the possibility of entry of the connecting wires from below or from the rear. The entire sub-assembly is covered by a molded lid **15** of the same material and color as the body, and held by means of a thread-cutting screw **86** in the plastic body of the socket.

In order to protect the wall on which the plug is mounted, a plate **43** molded in the same insulating plastic material (protecting plate) has been provided. This is fixed to the socket and extends from below the confronting wall **26** below the socket proper as part of the socket.

This system of plug and socket has in fact been specially developed for our light telephone sets.

It is understood that the preceding description of an example of this invention must not be considered as limitative.

I claim:

1. A plug and socket connector for an electric circuit, said socket comprising a case having a removable cover enclosing a central cavity, a plurality of pairs of mutually insulated leaf contact springs within said cavity, an end wall in said socket, openings in said end wall providing access to said cavity, each of said pairs of springs bordering an opening in said end wall; said plug comprising a case having a removable cover and an end wall, a plurality of pairs of blades projecting through the end wall of said plug, each said pair of blades being separated by a strip of insulating material having the shape of an arrow, said strip including a separating body portion and a head portion at the projecting end, said head portion including tapered edges extending laterally beyond the lateral extent of the plug blades to protect said blades on entry into said socket, an alignment lug projecting from the blade plug end of the case, said lug being constructed to slide into an opening of cooperating shape in the end wall of said socket, means for securing said lug in said opening of cooperating shape and for preventing thereby the accidental dislocation of the connector, the cover for the plug having a lip overhang for covering the intersection of the socket and plug when the connector is assembled, thereby protecting the connector from entry of foreign particles, and said socket further including a plate on the backside thereof, extending beyond the end wall of the socket to provide a backing for said plug when the latter is engaged with said socket, the back plate providing a protective guard for the surface to which the connector is mounted from marring etc. upon assembly and disassembly of the connector.

2. A plug and socket connector for an electric circuit, said socket comprising a case having a removable cover enclosing a central cavity, and plug-entrances thereto at one end, a plurality of pairs of leaf contact springs within said cavity with one spring of each pair having one end part offset from the main body thereof, said offset part having an inset flange with a hole therein, the other spring of each pair having a flange on one end with a hole therein, the length of both said springs from the offset part of said one spring and the flange of said other spring being substantially the same, the springs of each pair being secured by screws positioned in tandem and separated by a partition, said plug comprising an open top case having a removable cover and having a plurality of pairs of blades projecting through the other end, each said pair of blades being separated by a strip of insulating material, said insulating strip including a divider portion separating said blades and a lead end portion, said lead end portion configured into the shape of an arrowhead extending beyond and covering said blades and extending laterally beyond the lateral extent of said blades to protect said blades from separation during insertion of said plug, the cover for the plug having a lip overhang for covering the intersection of the socket and plug when the connector is assembled, thereby protecting the connector from entry of foreign particles, and said socket further including a plate on the backside thereof, extending beyond the end wall of the socket to provide a backing for said plug when the latter is engaged with said socket, the back plate providing a protective guard for the surface to which the connector is mounted from marring etc. upon assembly and disassembly of the connector.

* * * * *