Jan. 24, 1956 G. J. GIEL 2,732,534

ELECTRICAL CONNECTOR

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Fig. 1.

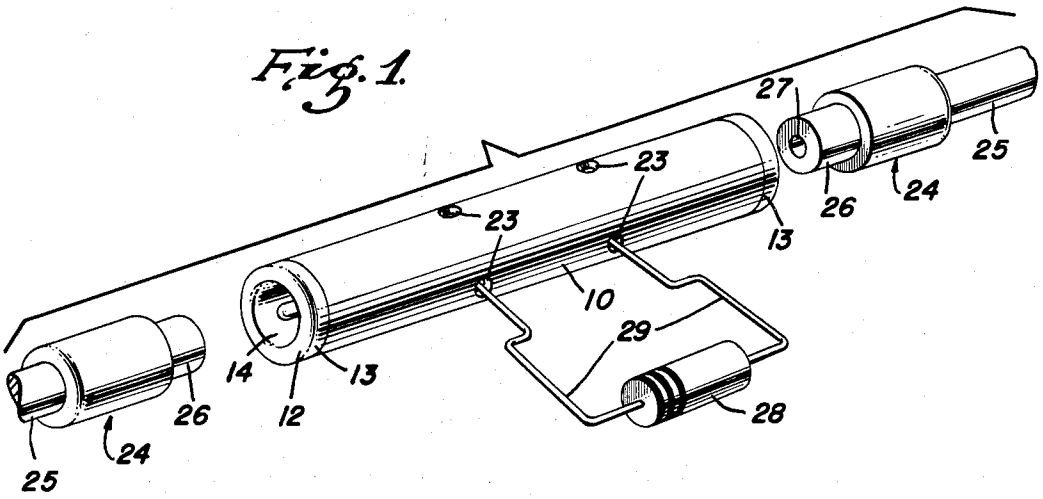


Fig. 2.

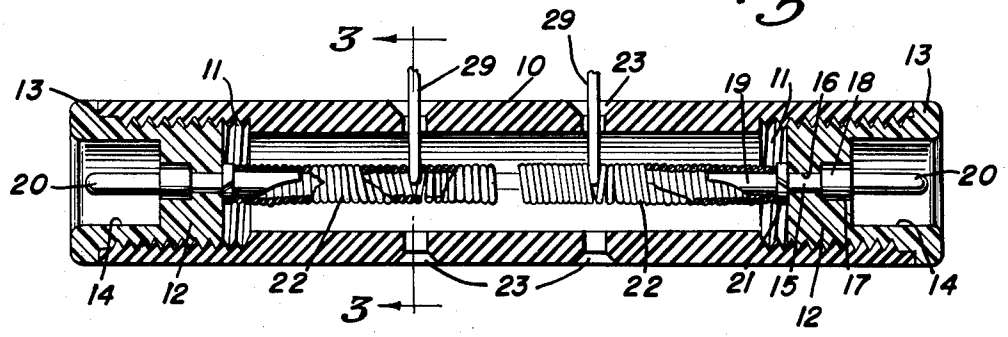
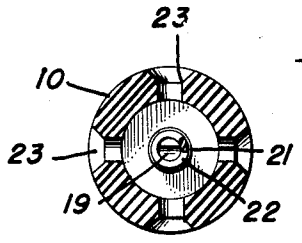


Fig. 3.



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ELECTRICAL CONNECTOR

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6 Claims. (Cl. 339—176)

The present invention relates generally to electrical connectors, and is more specifically concerned with a connector of the plug and socket type by means of which one or a plurality of circuit component devices may be inserted into or removed from an electric circuit.

The connector of the present invention has been found to be especially advantageous in connection with conductors or commonly designated "patchcords" by which electronic circuits may be interconnected for testing and other purposes, where it is very often desirable to be able to insert coupling impedances such as capacitors, resistors, crystal diodes, and the like into a line or patchcord connecting the circuits.

It is one object of the herein described invention to provide a connector of simple construction, which is so arranged that two patchcords, or conductor sections may be mechanically interconnected, and at the same time make electrical connection with electric terminal structures in the connector, these terminal structures being so arranged that circuit component devices may be bridgingly connected between the terminal structures to vary the circuit characteristics.

A further object is to provide such connector in which the terminal structure is so arranged that it will automatically grip the terminal leads of the circuit component when inserted through openings of the connector body.

For accomplishing the above, the connector of the present invention in its broad concept provides a tubular body of insulating material which supports terminal structures at its ends, these terminal structures each being provided with a contact portion for electrically connecting with an associated conductor or patchcord. The terminal structure also incorporates a contact which will automatically grip a terminal of the circuit component to be connected into the circuit, when the contact lead is inserted through an opening in the body endwise into its interior.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

Fig. 1 is an exploded perspective view showing a connector embodying the features of the present invention, and the manner in which it is connected into a circuit and utilized for the connection of one or a plurality of circuit components into the circuit;

Fig. 2 is an enlarged longitudinal section through the connector; and

Fig. 3 is a transverse section through the same, taken substantially on line 3—3 of Fig. 2.

Referring more specifically to the drawings, the connector is shown as comprising an elongate tubular wall 10 of suitable material, shown in this instance as insulation. This tubular wall forms the body of the connector and at its ends is internally threaded, as indicated

at 11, to receive in threaded relation thereto an end closure 12, in each case.

Since the end closures are similarly constructed, it is believed that it will suffice for descriptive purposes to describe the detail construction of one of these closures only. The closure is in the form of a plug which is arranged to be screwed into an end of the connector body until restrained by an end abutment flange 13. Various materials may be utilized for the construction of the end closure, nylon having been found to be admirably suited for such purpose. As shown, the plug or closure is axially recessed to form a socket 14 which opens in the outer end of the closure.

Mounted in each closure is a terminal structure which embodies a conducting bar 15 which is supported in an axially extending passage 16 in the inner end of the closure. The passage 16 is expanded, as shown in 17, to form a seat for a seating flange 18 which restrains the conducting bar against inward movement.

The conducting bar 15 has an end portion 19 which projects beyond the innermost end of the closure member into the interior of the body, while the opposite end portion projects into the socket 14 and constitutes a male contact 20. The conducting bar is locked in mounted position by means of a locking ring 21 having snap engagement with the end portion 19 of the conducting bar.

The end portion 19 forms a support and anchor for a contact member 22 which is shown as consisting of an elongate coiled spring of suitable conducting material, one end of this spring being inserted over the end portion 19 and secured as by soldering or other suitable means. As thus mounted, the contact member 22 extends axially of the connector body, the free end of the spring being resiliently deflectable.

With the construction described above, and as shown in Fig. 2, it will be observed that the contact members 22 are respectively in electrical contact with the male contact pins at the ends of the connector, but that the contact members 22 are insulated with respect to each other, their free ends being spaced apart and out of electrical contact with each other.

The wall 10 of the connector body is circumferentially provided with a plurality of wall openings 23, shown as being arranged in 90 degree spaced relation circumferentially around each of the contact members 22. The openings associated with one of the contact members 22 are spaced from the openings of the other contact member 22 longitudinally of the tubular body of the connector.

The connector as described above therefore embodies a construction in which the connector ends are adapted to receive companion plugs, as generally indicated by the numeral 24, which are connected to conductor sections or patchcords 25. These patchcords may be mechanically interconnected by the connector of the present invention by plugging reduced end projecting portions 26 of each plug into a socket 14 of the connector. The projecting portions 26 have end openings or passages 27 which are adapted to receive the adjacent end portion or male contact 20 of the connector and make electrical connection with the associated conductor section.

It will be noted, however, that with the conductor sections 25 mechanically interconnected by the connector of the present invention, the respective sections will be in electrical conducting relation with respect to the contact members 22—22, but the circuit will not be completed between these contact members. It is a simple operation to place circuit components, as exemplified by the resistor 28, into the circuit formed by the conductor sections 25 and the connector of the present invention. As shown, the resistor has pigtails or connection leads 29—29. In order to place the resistor into the circuit, it is only necessary to insert the ends of the re-

spective leads **29** through the proper openings **23** so that they will enter the interior of the tubular body of the connector. The leads are automatically gripped by the coils of the spring which forms each of the contact members **22**. The circuit component is thus bridgingly connected between the contact members **22** of the connector. Although only one component is shown, it is believed that it will be evident that a plurality of components may be bridgingly connected between the contact members **22**.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and, hence, I do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. An electric connector, comprising: a wall defining an elongate tube, said tube having a side opening; a closure in an end of said tube, said closure having a recess defining a socket opening into the outer end thereof adapted to receive a companion connection plug therein; a male contact member projecting into said socket; a closely coiled and substantially noncompressible spring electrically connected with said male member and projecting from the inner end of said closure into the interior of said tube, adapted to grippingly engage the end of a conductor when inserted endwise through said side opening and pushed between coils of said spring.

2. An electric connector, comprising: a wall defining an elongate tube, said tube having a plurality of circumferentially spaced side openings adjacent an end thereof; a closure closing said end of said tube, said closure having a recessed outer end defining a socket adapted to receive a connection plug therein; a male contact member projecting into said socket; a contact member connected with said male member and projecting from the inner end of said closure into the adjacent interior of said tube, said contact member including a closely coiled and substantially noncompressible spring adapted to have its coils spread by and into gripped relation with conductors inserted endwise through said openings into the tube interior.

3. An electric connector, comprising: an elongate tube of insulating material; members closing the ends of said tube; and a terminal structure carried by each of said members including an exterior portion, and an interior closely coiled and substantially noncompressible spring member forming a conductor gripping element positioned within said tube, said tube having a side opening adjacent each of said elements adapted to receive a conductor endwise therethrough, and which may be pushed between the coils of said element to spread the coils and establish gripping engagement thereby.

4. A connecting device for mechanical and electrical interconnection of sections of an electrical conductor, comprising: an elongate tubular body; means at the ends of said body releasably connectable with ends of conductor sections, whereby said body forms a mechanical interconnection between said sections; and current conducting structures at the ends of said body respectively having releasable electrical contact with adjacent mechanically connected conductor sections and including a gripping member, the gripping members of said conducting structures being insulated with respect to each other, said body having side openings adjacent said gripping members adapted to receive terminal connections of circuit components into gripped relation with said gripping members, and enable electrical connection of said components in a bridging circuit between said conducting structures.

5. A connecting device for mechanical and electrical interconnection of sections of an electrical conductor, comprising: an elongate tubular body; means at the ends of said body releasably connectable with ends of conductor sections, whereby said body forms a mechanical interconnection between said sections; and current conducting structures at the ends of said body respectively having releasable electrical contact with the adjacent mechanically connected conductor sections, including a gripping member, the gripping members of said conducting structures being insulated with respect to each other, said body having a plurality of circumferentially spaced side openings surrounding each of said gripping members, whereby a plurality of circuit components may be bridgingly connected in circuit between said structures by inserting one terminal conductor of each component through an opening adjacent one gripping member for gripping thereby, and another terminal conductor of each component through an opening adjacent the other gripping member for gripping thereby.

6. A connecting device for mechanical and electrical interconnection of adjacent ends of two conductors: an elongate tubular body; a removable plug closure at each end of said body, each of said closures being recessed to form an open socket in the tubular body end adapted to receive an electric connection plug therein; a male contact member anchored in the bottom of the socket of each of said plugs; a closely coiled and substantially noncompressible spring contact projecting into said tubular body from the bottom of each socket, in an opposite direction to said male member; and said tubular body having at least one side opening adjacent each of said coiled spring contacts adapted for the insertion of a connector into the tubular body between coils of the adjacent spring contact, whereby the connector is gripped and an electric circuit formed therewith.

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