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G. R. CURTIS ET AL

3,077,571

KEY FOR CONNECTOR

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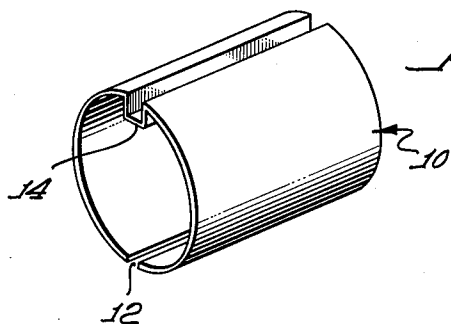


FIG. 2.

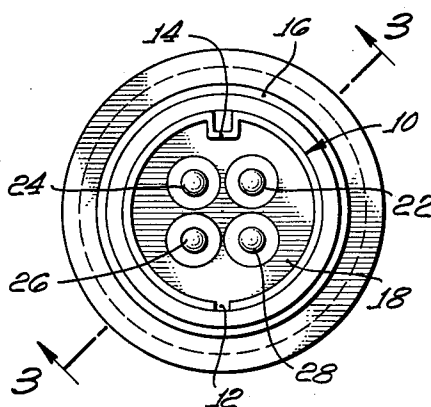


FIG. 4.

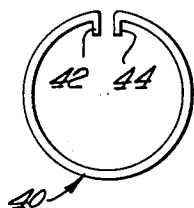


FIG. 5.

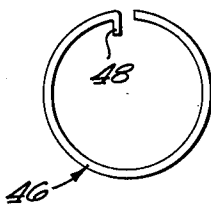
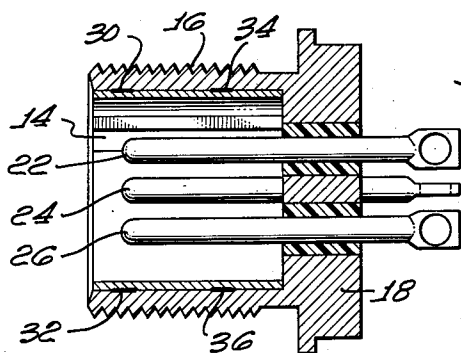


FIG. 3.



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KEY FOR CONNECTOR

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This invention relates to connectors of the type having a receptacle into which there is inserted a plug and, more particularly, to an improvement in the key structure employed with such connectors.

A common arrangement for connecting two cables is one wherein a receptacle is provided comprising a shell which effectively has a cylindrical cavity at one end of which there are supported a plurality of pin contacts. Into this receptacle is inserted a plug which usually comprises a barrel in which an insulator is inserted. The insulator, in turn, holds a plurality of contact sockets which are to be mated with the pin contacts in the base of the shell. In order to insure that a proper connection takes place between the corresponding ones of the pin contacts and pin-contact sockets, or to effectively polarize the plug, a key is usually formed inside the shell, usually when the shell is made by casting. A corresponding keyway is formed in the barrel which is inserted into the shell.

In order to insure that a good contact is made between socket and pins, and, further, to insure that such contact is maintained, a fairly tight fit between socket and pins is provided for, in addition to any other mechanical arrangements, such as a coupling nut on the outside of the barrel which can be screwed on threads on the outside of the shell. When it is necessary to separate the plug from the receptacle, usually the person performing this task will take the respective plug and receptacle in his two hands, and, besides trying to pull these apart, will also twist them back and forth for the purpose of loosening the contacts between pins and sockets. Oftentimes as a result the key breaks off, since it is weak in shear. As a matter of fact, even without the shaking action, if the pull between plug and receptacle is at an angle other than 180°, the key very often breaks in the process. This renders the receptacle substantially useless, and it is then necessary to connect the cable leads to a new receptacle in order to insure the proper interconnection of the cables by the coupler.

An object of this invention is to provide a key structure for a receptacle shell which will not break.

Another object of this invention is to provide a key structure for a receptacle shell which is simpler to manufacture than heretofore.

Yet another object of the present invention is the provision of a novel and useful key structure for a receptacle shell.

These and other objects of the invention are achieved by the provision of a key structure comprising a spring metal insert which is inserted in the cylindrical cavity formed by the walls of the receptacle shell. This insert has a cylindrical shape for conforming to the shell walls. A key is formed in the insert which extends inward. Further, the insert is slotted to enable its being inserted into the shell, as well as to bear against the shell walls. The insert is thereafter spotwelded to the inside of the receptacle shell. Just a few spotwelds are required to maintain the insert immovable against the shear forces exerted when the plug and receptacle are pulled apart. The keyway is made long enough to not only insure the proper polarization of the plug relative to the receptacle, but also to assist in guiding the two into contact with one another.

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The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention itself, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawings, in which:

FIGURE 1 is a view in perspective of an embodiment of the invention;

FIGURE 2 is a view of an embodiment of the invention inserted in a receptacle shell;

FIGURE 3 is a cross section, showing the embodiment of the invention in position in a receptacle shell; and

FIGURES 4 and 5 show other locations and shapes of a key in the embodiment of the invention.

Reference is now made to FIGURE 1, where there is shown a view in perspective of the embodiment of the invention. This comprises a suitable spring metal 10, which is bent to have substantially a cylindrical form. A slot 12 extends in the cylinder to enable it to be reduced in diameter for insertion into a receptacle shell, and also so that it may thereafter expand to bear against the walls of the shell and be in intimate contact therewith. A key 14 is formed in the cylinder wall and extends radially inward.

As shown in FIGURES 2 and 3, the embodiment of the invention is inserted into the cylindrical cavity provided by a receptacle shell 16. One end of the cylindrical cavity is closed as by the base member 18. In the base member 18, there may be insulatingly mounted pin contacts exemplified, respectively, by 22, 24, 26, and 28.

In the manufacturing operation, first the key member 10 is inserted into the receptacle shell 16. The key member is then spotwelded at several points, as at 30, 32, 34, 36, to the inside of the receptacle shell. It has been found that twelve to eighteen spotweld connections are usually adequate. Thereafter, the key 14, which is formed in the key member, may be used for locating the positions of the holes which are drilled in the base 18 for receiving the pins 22 through 28.

It will be appreciated that the manufacture of the key insert is an extremely simple process. Likewise, its insertion in a receptacle shell, alignment and spotwelding, is also a simple manufacturing process. It should be noted that the key provided in accordance with this invention extends substantially the length of the receptacle shell. Thus, total guidance is provided for the plug in being inserted into the receptacle. The keys heretofore provided in shells extend for only a short distance in the shell. The long keyway of the present invention insures that the plug will be pulled straight out of the receptacle, and not on an angle relative thereto. The few spotweld connections are sufficient to insure the permanency of the key in the receptacle shell.

The key member described herein is suitable for use with all types of receptacles, such as plate mount, weld mount, etc. Other forms of mechanically fastening the key member into the receptacle shell may be used besides spotwelding, such as brazing or soldering, and still be within the scope of this invention. Further, other key shapes and/or locations than the preferred arrangement shown may be used and also still be within the scope of this invention. By way of example, some alternative key shapes are shown in FIGURES 4 and 5. FIGURE 4 shows a key member 40 with the ends 42, 44 bent inward to form a key. FIGURE 5 shows a key member 46, with one end 48 bent inward to form a key. There has accordingly been described and shown herein a novel and useful key member, as well as an improved receptacle wherein said key member is employed.

We claim:

1. The combination with an electrical connector, of the type having a receptacle shell with walls defining a hollow cylindrical member with a base member at one end, and having pin connector means mounted in said base member, of a key member comprising a spring metal insert being substantially cylindrically shaped and having a radially inwardly extending key formed therein and extending in an axial direction along substantially the axial length of the insert, the key being formed to define an indentation in the external periphery of the key member, a slot in said spring metal insert for enabling the insertion thereof in said hollow cylindrical member, and spotweld connections between said insert and said hollow cylindrical member.
2. The combination as recited in claim 1, wherein the spring metal insert extends substantially the length of the cylindrical member.
3. In combination in a connector, a receptacle shell having walls defining a hollow cylindrical member, a key member having a cylindrical shape with dimensions to fit snugly within the hollow cylindrical member, the key member being provided with an inwardly extending key indented in the external periphery of the key member and extending in an axial direction along substantially the length of the key member, the key member being made from a resilient material and being slotted along substantially the axial length of the key member at a position removed from the key, the key member being disposed within the hollow cylindrical member and being affixed to the hollow

cylindrical member by a plurality of spotwelds provided at spaced positions in the axial direction along the length of the key member.

4. The connector set forth in claim 3, in which the hollow cylindrical member is closed at one end and in which a plurality of pin contacts extend through the closed end of the hollow cylindrical member in insulating relationship to one another and to the hollow cylindrical member.
5. The combination with an electrical connector of the type having a receptacle shell with walls defining a hollow cylindrical member with a base member at one end, and having pin connector means mounted in said base member, of a key member comprising a spring metal insert being substantially cylindrically shaped and having a radially inwardly extending key formed therein and extending in an axial direction along substantially the axial length of the insert, the key being formed to define an indentation in the external periphery of the key member, a slot in said spring metal insert for enabling the insertion thereof in said hollow cylindrical member, and means connecting said insert to said hollow cylindrical member.

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Dedication

3,077,571.—*Gerald R. Curtis*, Duarte, *Glen Robinson*, Pasadena, and *Richard W. Baugh*, Duarte, Calif. **KEY FOR CONNECTOR**. Patent dated Feb. 12, 1963. Dedication filed June 3, 1970, by the assignee, *Physical Sciences Corporation*.

Hereby dedicates the entire term of said patent to the Public.
[*Official Gazette November 10, 1970.*]