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SPRING LOADED SIDE CONTACT

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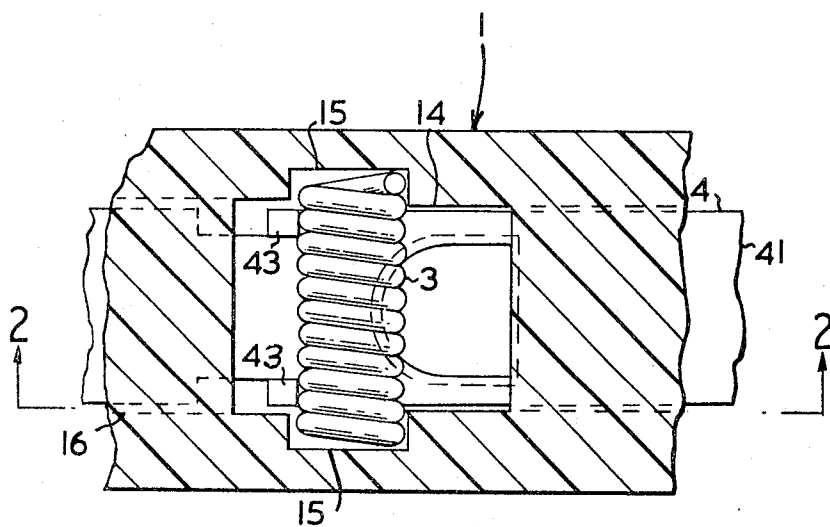


FIG. 1

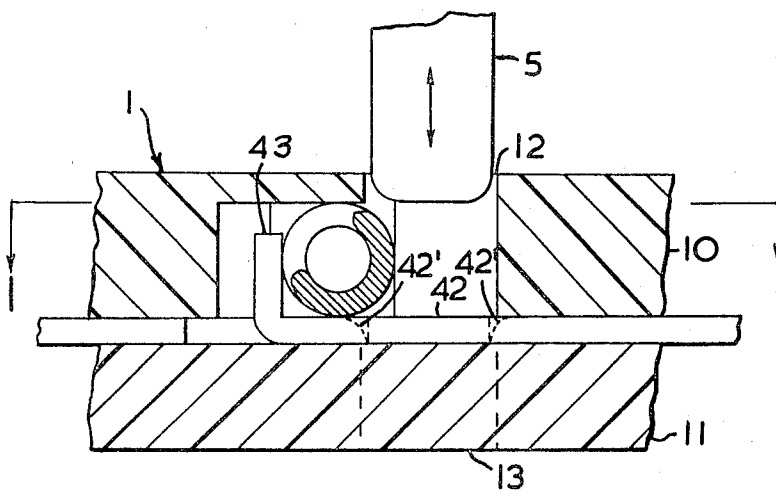


FIG. 2

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SPRING LOADED SIDE CONTACT

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ABSTRACT OF THE DISCLOSURE

An electrical receptacle for receiving a plug wherein electrical connection is effected by means of a coil spring the center section of which is laterally deflected from its axis by said plug, while the ends of the spring are prevented from movement by abutment with tabs forming the means of electrical connection with the circuit with which the receptacle is energized.

This invention relates to spring loaded side contacts and in particular it relates to a side contact incorporating a helically wound coil spring member.

It is known to use helically wound springs for spring loaded contacts. Of the known contacts of this type most have utilized the interior cylindrical surface formed by such springs for the reception and electrical connection with male prongs. It is known to form the helical type spring into the form of a toroid and to receive into the centre of the toroid a male prong which is making its entry to the toroid temporarily increases the nominal diameter of the toroid and stretches the spring thereby to maintain electrical contact. Again, it has been known to use straight helically wound springs embedded in resilient insulating material whereby the spring is held against a contacting electrical member not by the resilience of the spring per se but purely by virtue of the resilience of the supporting insulating material.

In all the above discussed known techniques all have required that primary electrical connections to the spring be made by standard wiring methods, i.e. the use of soldering, crimping or screw devices passing through locally formed eyes in the end coils of the springs.

The present invention contemplates the employment of simple helical springs that are supported solely at opposite ends thereof by local support means in a cooperating body member thereby leaving the centre of the spring free to bow when a cooperating contact member is engaged therewith.

The invention also contemplates providing no other electrical connection with the helical spring other than its engagement with the above mentioned supports whereby reception of and subsequent deformation by a cooperating prong increases the electrical and mechanical connection between the spring and the support. Thus, the invention provides an extremely simple and inexpensive quick connect device which is compact and which during assembly thereof, requires no more than the insertion of the spring into a suitable recess in the body of an insulated housing. The invention has particular application in miniature electrical connection devices although the principle of the invention may be utilized in connecting devices covering a wide range of current carrying capacities.

It is a feature of one aspect of the invention to provide a spring loaded side contact.

In accordance with the foregoing aspect the invention comprises: an electrically conducting member including a pair of spring abutments coextensive and spaced apart in a selected plane; a coil spring having its longitudinal axis disposed parallel to said plane and having its opposite

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ends restrained against movement in a selected direction transverse to said plane by, and disposed for making electrical contact with, said abutments, said spring being further disposed for electrical connection with, and resilient deformation in said selected direction at substantially its midlength, by the insertion of said male contact inserted into said male contact receiving aperture.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

FIGS. 1 and 2 show respectively, a plan and side elevation of a spring loaded side contact assembly, part of an associated body member, and a portion of a male contact for reception against the side contact.

Referring now to FIGS. 1 and 2, there is shown a portion of a housing 1 comprising a cover 10 and a base 11. The cover 10 and the base 11 are separable for assembly purposes and held together by means not shown, but which may include the assembly screws in a standard duplex receptacle. The cover 10 includes a contact guide hole 12 which is coaxially disposed with a corresponding hole 13 in the base 11. The underside of the cover 10 includes a rectangular recess 14 which recess includes a pair of slots 15 adapted to loosely receive a helical spring 3 to be discussed hereinafter. On the underside of the cover 10 there is provided a longitudinally disposed slot 16 having a width substantially equal to the width of the rectangular recess 14. The depth of the slot 16 and the aforementioned width of the slot may be selected to provide substantially free sliding movement to a conducting member 4 to be discussed hereinafter.

The conducting member 4 includes a strip portion 41 from which is punched an aperture 42 adapted to receive a male contact member 5 and a pair of tabs 43 are formed by locally forming lines of severance and bending portions of the strip 41 as shown. If the male plug 5 has non-rounded ends, the edges of aperture 42 may be rounded as shown at 42'.

The spring loaded side contact as a whole is assembled by placing the spring 3 into the slots 15 in the recess 14, followed by the placement of the conducting member 4 into the slot 16 so that the tabs 43 bear against opposite ends of the spring 3. The base 11 is then placed under the cover 10 thereby to hold the conducting member 4 in position.

In operation, the male contact member 5 is inserted into the contact guide hole 12 until the contact member displaces the centre of the spring 3 outwardly in order to provide a space for the male contact 5. In so doing, the ends of the spring 3 are urged into closer mechanical and electrical contact with the tabs 43. Further insertion of the male contact 5 brings it into contact with the sides of the aperture 42 in the contact conducting member 4 thus, increasing the rigidity and electrical conductivity between the male contact 5 and the conducting member 4. When the male contact 5 is fully inserted a portion of it will be received in the aperture 13 in the base 11.

While the above discussed embodiment provides for the conducting member 4 to be a sliding fit within the slot 16 on the underside of the cover 10, it will be obvious that the invention will work just as well without such a sliding fit. However, the pressure of the sliding fit does permit of wider tolerances in the manufacture of either the cover 10, the conducting member 4, the base 11 or the male contact 5. Again, it will be appreciated that once the male contact 5 has been inserted far enough to bend the spring 3, electrical connection between the spring 3 and the tabs 43 is increased and that for some applications no further electrical connection is necessary between the male contacts 5 and the sides of the aperture 42 in the conducting member 4. It will be appreciated in the case of this latter embodiment that the

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conducting member 4 should be rigidly held within the slot 16 so that the tabs 43 are not free to move in a direction away from the male contact 5 during the insertion of the latter.

It will be obvious from the foregoing that assembly of the novel spring loaded side contact follows the simplest of procedures and requires manufacturing tolerances of a substantially low order. The invention further provides an extremely reliable electrical connection both between the inserted male contact and the spring, but also between the spring and the tabs 43. It will be further appreciated that since the spring 3 is loosely restrained in the slot 15 it is substantially free to rotate about its axis of generation during portions of the insertion or withdrawal of the male contact 5, so that the spring will be subject to a cleaning action during each insertion or withdrawal and such cleaning will occur not only at the centre of the spring 3 at which comes into contact with the male contact 5 and also those portions of the spring 3 which bear against the tabs 43. While the invention has been described with reference to an embodiment including the base 11, it will be obvious to those skilled in the art that the aperture 13 in the base 11 could be dispensed with always providing that means are provided for retaining the conducting member 4 within the slot 16. It is envisaged that the novel spring loaded side contact will find application not only in duplex receptacles and the like, but also in any temporary terminal connections such as they may be found on domestic electrical equipment, patch work boards, radio terminal boards, and automobile electrical equipment.

We claim:

1. An electrical receptacle comprising a flat strip conductor, a housing encasing said conductor, a transversely spaced pair of tabs struck up from an intermediate portion of said conductor strip, a plug receiving and guiding aperture extending through said housing and said strip conductor, said conductor aperture being longitudinally

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spaced from said tabs, an elongated coil spring mounted in said housing and restrained by said housing from more than limited endwise movement, said spring having its axis disposed transversely of said conductor, said tabs being positioned on one side of said spring and said conductor aperture on the other side of said spring, the end portions of said spring engaging said tabs, the axis of said conductor aperture passing closely adjacent the central section of said spring, whereby a plug contact inserted into the aperture engages and displaces the central section of said spring towards said tabs, making firm electrical contact between said tabs and said plug.

2. An electrical receptacle as defined in claim 1, wherein the aperture in said strip conductor is offset slightly in the direction of said tabs from the entry end of the housing aperture, whereby its edge is positioned to engage a plug inserted into the entry end of the housing aperture and divert it in the direction of said spring end tabs.

3. An electrical receptacle as defined in claim 1, wherein said strip conductor is fixedly encased within said housing.

References Cited

UNITED STATES PATENTS

25	1,175,311	3/1916	Sherman	339—277
	2,153,176	4/1939	Douglas	339—254
	2,533,763	12/1950	Cacciotti	339—254
	2,711,524	6/1955	Beaver	339—256
	2,775,746	12/1956	Young	339—256
30	2,882,514	4/1959	Krantz	339—256
	3,032,738	5/1962	Bonanno	339—256
	3,072,879	1/1963	Crowther	339—253

FOREIGN PATENTS

35	242,391	11/1925	Great Britain.
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