Sept. 4, 1962 R. C. KOCH 3,052,866

ELECTRICAL JACK

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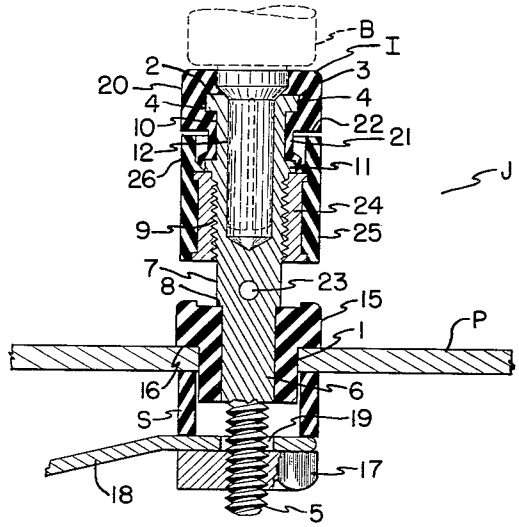


Fig. 1

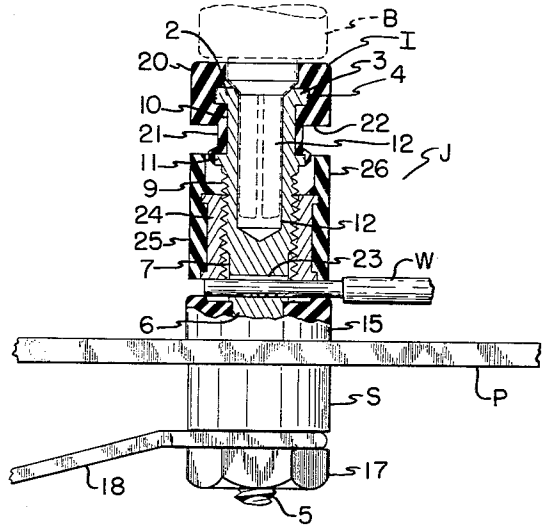


Fig. 2

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ELECTRICAL JACK

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This invention relates to improved electrical connecting means and more particularly to an improved electrical jack for not only receiving a plug forwardly of its panel attachment, but also for receiving another electrical conductor quickly and conveniently to establish several electrical connections without interfering in any respect with and independently of the plug connection. Reference is hereby made to my United States Patent No. 2,713,670, granted July 19, 1955, and entitled "Electrical Jack," and U.S. patent application Serial No. 516,894, filed June 21, 1955, now Patent No. 2,851,669, and entitled "Expansion Type Connector Plug," the present invention constituting an improvement thereover for reasons that will become apparent hereinafter.

In prior art jack structures, to the best of my knowledge, it has been difficult to connect an additional electrical conductor to that portion of the jack extending forwardly of the panel without interfering with the plug connection to the jack. Thus it is the primary object of this invention to provide improved jack structure whereby an additional wire conductor may be connected to the jack independently of and without interfering with the plug connection.

Another object is to provide a wire conductor connection of the type described in the preceding paragraph wherein there is provided a sleeve movable on said jack structure independently of the plug connection whereby the wire conductor connection may be made.

A further object is to provide a jack structure of the type described in the preceding two paragraphs that has its exterior surface substantially completely insulated regardless of the position of said sleeve whereby there are essentially no exposed parts of electrical conducting material.

Oher objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawing wherein a preferred embodiment is illustrated and wherein:

FIGURE 1 is an enlarged longitudinal view partly in section of an electrical jack structure embodying this invention, said jack being shown attached to a panel and with a wire lug connected thereto on the rearward side of the panel and a plug electrically connected thereto on the forward side of the panel; and

FIGURE 2 is an enlarged longitudinal view partly in section similar to that of FIGURE 1 but taken, insofar as the sectional part is concerned, on a vertical plane at substantially 90 degrees to the plane of FIGURE 1 and with the wire lug and plug of FIGURE 1 as well as an electrical conductor wire electrically connected thereto.

Perhaps it should be stated at the outset that the invention is not limited in its application to the details of construction illustrated on the drawing and the phraseology and terminology employed herein is for the purpose of description and not limitation.

Referring to the drawings in detail, there is disclosed a panel P having an aperture 1 whereby the improved electrical jack structure, generally shown at J, of this invention may be clamped to the panel. Numeral 2 represents an elongated body or member of suitable electrical conducting material having on one end an annular flange or enlarged portion 3, the latter preferably having its peripheral surface knurled or otherwise roughened as in my said patent and as shown at 4. The elongated member at its end opposite flange end 3 has external

threads 5 and between the flange 3 and threaded end 5 the body 2 is of varying cylindrical shape. The first cylindrical portion 6 extends from threads 5 to a second cylindrical portion 7, the first and second cylindrical portions being divided by shoulder means 8. Between portion 7 and flange 3 there are two additional substantially cylindrical sections, namely threaded portion 9 adjacent portion 7 and portion 10 divided from portion 9 by the annular rib 11. There is provided in body 2 a substantially cylindrical bore 12 extending through flange 3, portion 9 and part of portion 10, said bore forming a socket into which an electrical plug, such as of the banana type, may be inserted to make an electrical connection between two or more conductors, one of which has the plug attached to its end and the other of which is connected to the jack J. A typical plug is shown in dotted lines in FIGURES 1 and 2 and is indicated by the reference numeral B.

To effect mounting of jack J on panel P, there is provided on cylindrical portion 6 electrical insulating material 15 in the shape of a hollow bolt and having a head providing shoulder means 16 which abuts the forward side of panel P. This material is molded to portion 6 between flange 8 and threads 5 by means well known in the art and the material 15 may be plastic or any other suitable molded material, such as hard rubber. A nut 17 cooperates with threads 5 and there is provided a cylindrical hollow sleeve S of suitable insulating material such as plastic, rubber or fabric. The sleeve S will have internal and external diameters such that one end thereof will abut the rearward surface of the panel P and surround the hole 1. Numeral 18 represents a wire lug comparable to lug 16 of said patent and having an opening 19 whereby it may be slipped over the threaded area 5. The lug 18 is interposed between sleeve S and nut 17 and thus when the nut is threaded onto the elongated member 2 and moved toward the panel P, it will cause the lug 18 to be clamped between the nut and sleeve S and shoulder 16 of the insulating material to be clamped against the panel P, thus holding the jack J in position and establishing an electrical connection between the lug 18 and the member 2 since the nut 17 will be of electrical conducting material. Instead of lug 18, there could be employed a spade adapter of the type well known in this art. With the jack J thus mounted as shown in FIGURES 1 and 2, it will be firmly held on the panel P and the elongated member 2 will be fully insulated from the panel material, whereby it is not necessary that the panel P be of insulating material.

Surrounding portion 10, flange 3 and shoulder 16 is electrical insulating material I, the latter being molded thereon, and of plastic or any other suitable molded material, such as hard rubber. The portion 20 surrounding the flanged end 3 is so molded that part of it will extend outwardly beyond the end surface of the elongated member 2 and will be provided with an opening whereby to permit the plug B to be inserted in the socket 12 to make the electrical connection. Portion 20 is of larger diameter than downwardly depending portion 21, thus forming a shoulder 22. By having the insulating material extend outwardly beyond the end of the elongated member, the end surfaces of member 2 will be protected and when the molding is preformed, the knurled surface 4 will aid in making a strong union between the insulation and the elongated member.

From the description thus far, it will be noted and this is important, that there is no exposed metal from the front side of panel P to the front end of jack J except at cylindrical portions 8 and 9. Portion 8, substantially centrally thereof, is provided with opening 23 for receiving a wire conductor W, represented in solid lines in FIGURE 2. In the past when such an additional electrical connecting means was added to the jack, there would be

some interference with the normal connection of plug B to the jack. This obviously presented a difficulty which has been overcome by the present invention.

Surrounding threaded section **9** for engagement with the threads thereof is a metal cylindrical sleeve **24**, this sleeve being shown in its upward or furthest front position with respect to panel P in FIGURE 1. Bonded to sleeve **24** is suitable insulating material comparable to I, **15** and S and it will be noted that this material **25** is coextensive with sleeve **24** and further, considering FIGURE 1, has an upwardly extending portion **26** which extends from adjacent flange or rib **11** to adjacent shoulder **22**. It will be noted that the external diameter of portion **20** and sleeve **25** is substantially the same whereby as in FIGURE 1 they are practically coextensive with each other and essentially the entire exterior longitudinal periphery of jack J forms a substantial cylinder.

Now assuming wire W is inserted in opening **23** and all of the other elements of the jack J are as shown in FIGURE 1, then to electrically connect and mount wire W to jack J it is merely necessary to manually move insulation **25** and in turn sleeve **24** towards panel P until there is tight engagement with wire W, as shown in FIGURE 2. This movement is carried out without interference of and independently of the plug B or lug **18** connections described and such is very important for various reasons, such as insuring proper electrical connections. It will be noted that portion **26** similarly moves downwardly or towards the forward surface of panel P, but that it still covers or encompasses section **9** whereby essentially all portions of member **2** extending from the forward surface of panel P are encompassed by insulation material or in other words, no metal parts are readily exposed.

Being aware of the possibilities of modification in the particular jack structure shown as embodying my invention, all without departing from the fundamental principles of the invention, I desire it to be understood that the scope of the invention is not to be limited in any manner except in accordance with the structure claimed and equivalents thereof. For example, instead of portion **7** the latter could be modified in shape to receive a spade adapter which in turn would be held in place by sleeve **24**.

What is claimed is:

An electrical jack structure for mounting in an opening of a panel comprising an elongated member of electrical conducting material having an enlarged end portion with an externally threaded portion on said member in inner spaced relation to said end portion, said elongated member being provided on its exterior surface with a covering of insulating material surrounding said end portion and extending down to and terminating at said threaded portion, said covering having an enlarged portion at the upper end thereof and with an opening extending through said elongated member in inner spaced relation to said threaded portion for receiving an electrical conductor, the spacing between said enlarged covering portion and the threaded portion corresponding to the spacing between the opening and the threaded portion, said enlarged end portion including the covering together forming a socket for reception of an electrical plug therein; and an internally threaded sleeve of electrical conducting material disposed in outer concentric threaded engagement with said threaded portion, said sleeve corresponding in length with said threaded portion and including an outer covering of insulating material coextensive therewith together with an outer extension of insulating material terminating in abutting relation with said enlarged covering portion, said outer extension corresponding in length with the spacing between the opening and the threaded portion whereby upon movement of said sleeve member independently of said elongated member into connecting relation with the electrical conductor in the opening, said outer extension will prevent exposure of said threaded portion on said elongated member.

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