

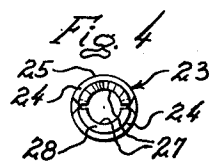
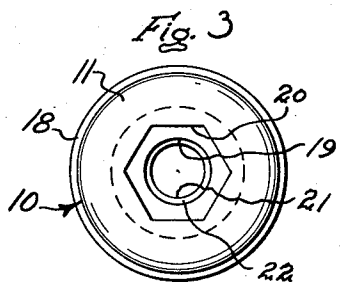
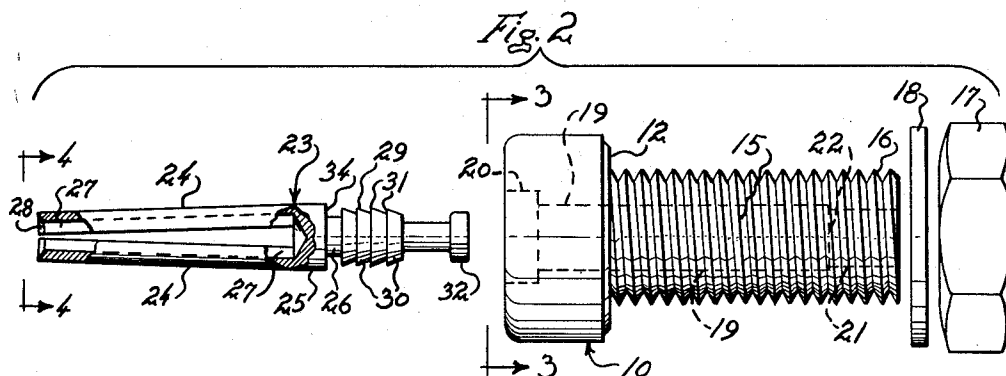
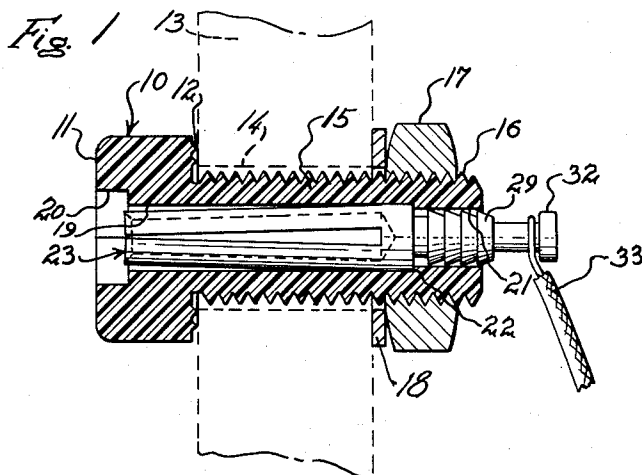
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E. F. JOHNSON

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ELECTRICAL JACK

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INVENTOR

Edgar F. Johnson

BY Williamson, Williamson
Schroeder & Adams ATTORNEYS

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ELECTRICAL JACK

Edgar F. Johnson, Waseca, Minn., assignor to E. F. Johnson Company, Waseca, Minn., a partnership

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This invention relates to electrical jacks and more particularly to an electrical socket structure containing a jack contact for terminal plugs in such apparatus as electronic equipment.

It is an important object of the invention to provide for an electrical jack which is cheap to manufacture, efficient in operation and can be quickly and easily installed as a unit in an opening through a panel, the outer electrically insulated portion serving to bind the device tightly in the panel and to hold rigidly the electrical contact therewithin.

It is another object of the invention to provide for an electrical jack which may be easily mounted, dismounted, or interchanged so as to form a hermetic seal at the panel, the invention thus being particularly suitable for electric panel boards in pressurized aircraft.

It is still another object of the invention to provide for an electrical jack in which the outer insulating portion is separately formed and the electrical jack contact portion may be quickly and easily inserted into the non-conducting portion for a permanent seal, the non-conducting portion being constructed of dielectric material which has good resistance to voltage breakdown, is strong and slightly yieldable yet tough and capable of withstanding temperatures in the range of those encountered adjacent points of soldering.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a vertical section taken through the center of my device in its mounted position within a panel;

Fig. 2 is an exploded view of the electrical jack, the mounting sheath and the washer and threaded nut in position prior to assembly. Certain portions of the jack are in vertical section to better show the internal structure thereof;

Fig. 3 is an end view of the mounting sheath taken on the line 3-3 of Fig. 2; and

Fig. 4 is an end view of the jack contact taken on the line 4-4 of Fig. 2.

Referring now more particularly to the drawing, my electrical jack comprises an insulated mounting sheath 10 which is preferably circular in shape and constructed of a tough insulating material having high dielectric strength, preferably moldable, while still at the same time having a slight quality of resilience. I have experimented with a number of dielectric materials and find that a suitable material is one having properties such as the plastic commonly known as nylon, which is a superpolymeric amide of protein-like structure. It is thermoplastic and is easily molded into a product having the desired qualities as will be more fully set forth hereinafter. The nylon sheath is formed with an abutment 11 somewhat in the nature of a head on a bolt. The inwardly facing surface of the abutment 11 preferably contains annular ribs 12 which form a seal against the outer surface of the panel 13 around the opening 14 which is formed through the panel. The cylindrical body portion 15 of the mounting sheath 10 is adapted to extend through the opening 14 and may be supplied with a threaded portion 16 at the opposite end which is adapted to protrude at the inner surface of panel 13. A threaded nut 17 is adapted to engage the threaded portion 16 of the mounting sheath 15 so that the entire sheath can be secured through the opening 14 of the

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panel and drawn up tightly thereagainst in a seal which will prevent the seepage of air and dust through the panel. A washer member 18 may be used in conjunction with the nut 17. The plastic material will yield slightly at the ribbed portion 12 so as to seat closely against the panel 13 but at the same time has sufficient rigidity so that the threads 16 will remain intact even when the nut 17 is drawn up tightly against the inner surface of panel 13. Centrally of the mounting sheath 10 is a passageway 19 which extends all the way through from the outside of the panel to the inside thereof. The passageway is preferably cylindrical in shape and concentric with the outer cylindrical surface of the mounting sheath 10. The outer portion of the passageway may be enlarged as at 20 and shaped to form a wrench receiving hexagonal socket. At the inner end of the passageway, the diameter is reduced so as to form a smaller concentric end portion 21. It is preferred that a shoulder 22 be formed at the union of the straight-sided passageway portion 19 and the reduced portion 21.

The internal part of my electrical jack comprises a jack contact 23 which is constructed of a conducting material such as steel or brass and may be coated with such metal as silver to decrease the electrical resistance between a plug and the jack contact. The jack contact comprises a resilient plug receiving portion 24 at its outer end, a short integrally formed body portion 25 and a reduced extension 26 disposed oppositely from the resilient portion 24. The resilient plug receiving means 24 may comprise a pair of bifurcated legs 27 formed by slitting a tubular structure and bending the semi-cylindrical parts toward one another as in Fig. 2. The appearance of the front of the bifurcated end is shown in Fig. 4. The curved inner surfaces of the legs 27 may be beveled as at 28 to assist in inserting an electrical plug (not shown). Combined anchoring and sealing means 29 may be secured to or formed integrally with the jack contact as at the reduced portion 26 and preferably constitute a plurality of individual wedge-shaped annular rings 30 having sharp edges 31 facing rearwardly with respect to the direction of insertion of the jack contact within the sheath. The extreme end of the reduced portion 26 constitutes a contact terminal 32 which is suitable for soldering thereto a conductor such as the wire 33 shown in Fig. 1. The sharp edged portions 31 have an effective diameter slightly greater than that of the reduced passageway 21 in the mounting sheath 10. It is preferred to assemble my electrical jack at the point of manufacture as a convenience for the purchaser. It is understood, however, that in certain situations it may be desirable to mold the sheath elements integrally in a prescribed pattern within a panel. In such instance the purchaser may have a panel bearing a multiplicity of sheaths in which he would desire to assemble his own jack contacts at the time of use. For such purpose the jack contacts would be furnished separately from the multiple sheaths.

In the assembly of the electrical jack, the jack contact 23 is arranged as shown in Fig. 2 with respect to the passageway 19 and is inserted until the anchoring and sealing means 29 engages the reduced cylindrical portion 21 at which point the jack contact is forcibly urged inwardly until the shoulder portion 22 of the inner passageway of the mounting sheath is contacted by the cooperating shoulder 34 formed at the body 25 of the jack contact 23. In this position the entire device has the appearance as shown in Fig. 1. The sharp edges 31 will engage the inner surface 21 of the reduced portion of the passageway and will resist outward movement such as may be caused by withdrawing a plug from the plug receiving portion of the jack contact. The device is designed to exert several pounds of resistance force when the plug is removed and therefore the jack contact must be anchored securely within the sheath to prevent its loosening.

An important feature of the invention is the two-piece structure of an electrical jack which may be quickly and easily assembled. The resilient plug receiving portion of the jack contact thus has clearance between the outer surfaces of the bifurcated legs and the inner surface of the sheath passageway. This clearance is

limited, however, so as to prevent stressing the metal legs beyond the yield point, as for example when it is accidentally attempted to insert an oversized electrical plug therein. Since the bifurcated legs can only yield up to the inner surface of the sheath 10 such plug may not be inserted and the legs will not be injured by undue spreading. The entire assembly is so constructed as to form a seal against the entrance of dust and moisture which may be detrimental to any delicate electrical works housed behind the panel 13, and can even be used on panels forming a part of a pressurized container such as might be used in aircraft.

The foregoing has been accomplished while still retaining the ability to solder a conductor to the inwardly projecting terminal contact 32. I have found that the nylon structure will not soften with ordinary soldering temperatures applied to the projecting terminal contact. For this reason a sheet constructed of a plastic material of lower softening temperature is not desirable. Nylon also is easy to color so that a multiplicity of jacks can be easily distinguished one from the other by their selectively colored sheaths.

It may thus be seen that I have devised an electrical jack which is manufactured in two parts, one part being formed of a non-conducting tough plastic material having a high softening point and slightly resilient in nature and the other part being constructed of a conducting metal, the entire device being capable of quick assembly into a permanent unitary jack which may then be mounted hermetically upon a panel by the simple expedient of tightening against the panel a threaded nut at the inner end of the jack.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. In an electrical jack adapted to be positioned through an opening in a panel, a plug receiving portion at the forward end thereof comprising a resilient socket within an electrically insulated mounting sheath, a body portion to which said resilient socket is attached said body portion having a close fitting relation with the medial inside portion of said sheath and an abutment means formed therewith, a reduced end portion secured to said body oppositely of said resilient socket and terminating in a contact for connection to an electrical conductor, said body portion having rigid therewith

anchoring and sealing means comprising a plurality of longitudinally spaced annular wedge-shaped members engaging in the inner surface of said sheath for retaining the jack contact within the sheath structure with said abutment in stopped position against the mounting sheath and with said terminal contact protruding inwardly of the panel and said mounting sheath.

2. In an electrical jack having a resilient mounting defining a passageway through a panel, a conductive plug-receiving member comprising an expansible and resilient end adapted to frictionally receive a terminal plug, a medial body portion providing an abutment facing in the opposite direction from said expansible plug-receiving end, frictional retaining members formed on the outer surface of said medial body portion and having annular sharp edges engaging with the inner surface of said passageway to maintain said abutment in firm engagement within the resilient mounting, and an end extension at the other end of said plug-receiving member for connection with a conductor, said plug-receiving member when mounted presenting its expansible end to one side of said panel and its conductor connecting end at the other side of the panel.

3. The combination with a panel having an opening therethrough of an electrical jack having a non-conducting and slightly yieldable tubular mounting sheath firmly mounted through said panel in the opening thereof and having a longitudinal bore from one end to the other, said bore having a reduced diameter adjacent one end, and a jack contact having an expansible socket portion lying within the bore at the larger diameter and having sharp-edged annular members rigid therewith adjacent the other end thereof the sharp edges of which are in anchoring engagement with the bore at the reduced diameter thereof, said other end being provided with means for connection to an electrical conductor.

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