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Obeissart

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[54] **ELECTRICAL CONNECTORS**

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June 15, 1970 France 7021908

[52] **U.S. Cl.** ..... **339/90 R**

[51] **Int. Cl.** **H01r 13/54**

[58] **Field of Search** 339/31, 89, 90

[56] **References Cited**

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[57] **ABSTRACT**

The connector consists of a male plug and a female plug, one of the plugs having a pin for penetrating into the socket of the outer plug. The pin and socket are borne by insulating blocks mounted in metallic supports adapted for mutual penetration. The insulating blocks and their supports have mechanical fastening means to fasten them together. An outer ring can lock the two plugs together. Two types of mechanical supports are provided for a same connector, distinguished from each other by different lengths of mutual penetration without other changes in the structure and assembly of the other parts.

2 Claims, 2 Drawing Figures

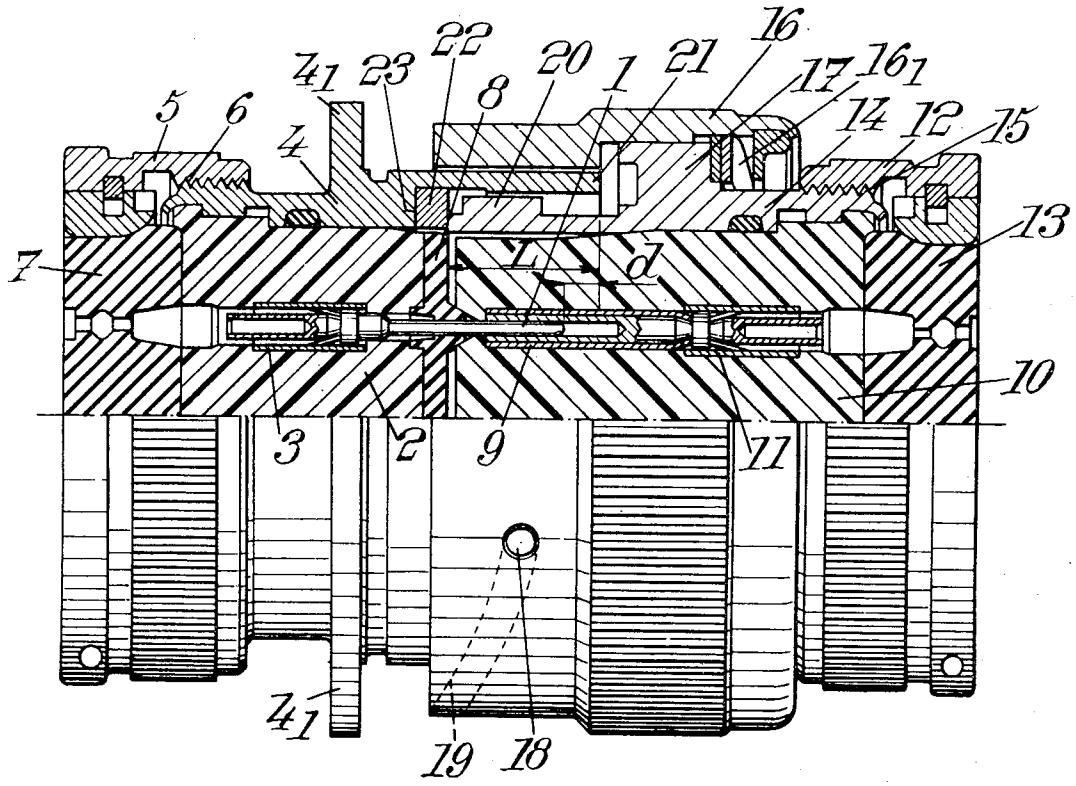
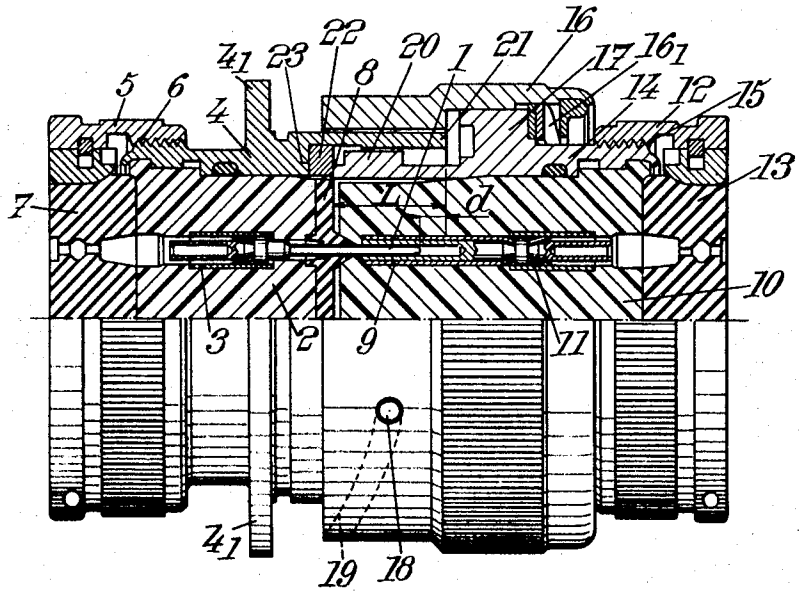


Fig. 1.


16
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4
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7
d
10
3
2
9
11
41
19
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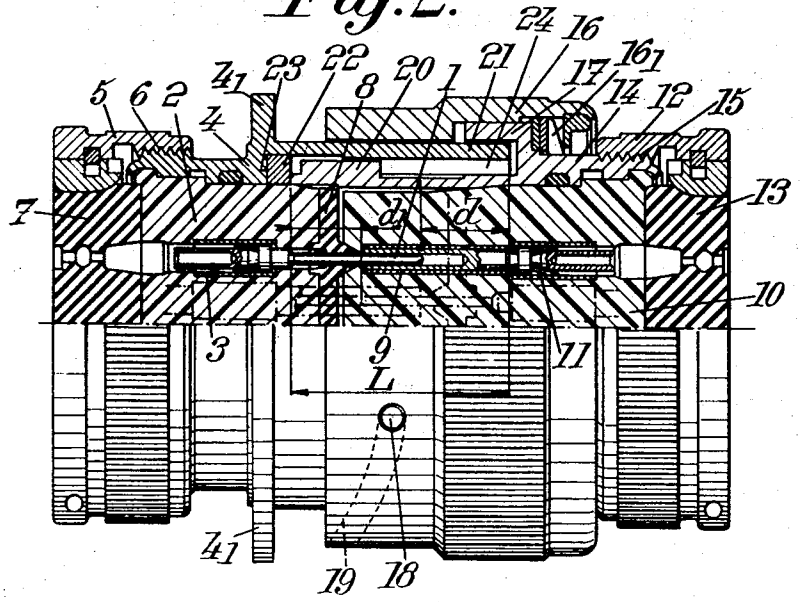
Fig. 2.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ELECTRICAL CONNECTORS

The invention relates to electrical connectors, of the type comprising pins adapted to penetrate into sockets, both being borne respectively by suitable insulating blocks, which in their turn are mounted respectively inside two hollow outer supports generally metallic, of the male and female type, that is to say adapted, on establishing the connection, to penetrate into one another, with if necessary locking means to hold them there ; the assembly therefore having the form of a male plug and a female plug. It relates more especially to multiple pin micro-connectors.

In connectors of this type, the free ends of the pins are presented , outside their insulating block, at a certain distance from the mouth of the outer metallic support of the corresponding plug. For certain types of connectors which are called "non scoop-proof," this distance is rather small, so that the risk of a short-circuit and even mechanical damage between the pins and the support is not excluded, by the presentation of a metallic body in front of said support, especially through the skew presentation of the end of the metallic support of the other plug of the connector. For other types on the contrary, which are called "scoop-proof," the abovesaid distance is greater, which excludes the above-mentioned risks.

It is an object of the invention to ensure, by a simple arrangement, the passage of one to the other of the two above-mentioned types, without modifying essentially the structure of the said connectors.

It consists, to this end, in providing, to constitue connectors of the type concerned, two different types of outer metallic supports, which only differ from one another by their own lengths and the different lengths of reciprocal penetration, without any change in the structure or in the mounting, inside the said support, of the insulating blocks supporting the sockets and pins and without changing either the outer parts of the said supports, effecting especially the functions of fastening and of locking.

It consists, apart from this principal feature, in certain other features which are preferably used at the same time and which will be more explicitly discussed below.

It relates, more particularly, to certain methods of application (especially those for which it is applied to miniature connectors, in particular for aviation), as well as to certain methods of production, of the said features ; and it relates, more particularly again, and this by way of new industrial products, to connectors of the type concerned comprising application of these same features, as well as the special elements adapted for their construction.

The invention will in any case be well understood with the aid of the supplementary description which follows, as well as of the accompanying drawing, which supplement and drawing are, of course, given merely by way of illustrative but non-limiting example.

FIGS. 1 and 2, of this drawing, show respectively, each in half section and half elevation, one embodiment of a connector of the non scoop-proof type and a connector of the scoop-proof type, constructed according to the invention.

According to the invention, and more particularly according to those of its methods of application, as well as according to those of the methods of production of its various parts, to which it would seem that preference should be given, in order for example to convert a "non scoop-proof" connector into a "scoop-proof" connector, procedure is as follows or in analogous manner.

The procedure is such that the outer metallic supports, of male and female type, adapted to contain the insulating block supporting the pins and sockets, are brought to interpenetrate one another differently according as it relates to one or other of the two above-mentioned types, but without modification of the structure and of the assembly of the said blocks, nor of the means employed for their fastening and their locking.

There will now be shown, in the following, by way of example, one of the procedures.

There is shown , in FIG. 1, a connector of the "non scoop-proof" type.

In this connector, the pins of the male connector are borne by an insulating block 2, where they are for example held in place by a clip device 3. The said block, which is especially of thermosetting plastics material, is introduced and held in place inside a metallic support 4 (especially with a clamping ring 5 screwing at 6 on the said support), and with the interposition of a sealing part of rubber or other elastomeric material 7. An interfacial joint is provided at 8. A flange 4_1 is included by the support 4, to ensure fastening on one wall.

It is seen that, in this embodiment, the distance *d* between the end plate of pins 1 and the mouth of the support 4 is slight : the connector is "non scoop-proof."

The female part, bearing sockets 9, is devised in analogous manner, with the block 10, the clip device 11, the ring 12, the elastic part 13 and the outer metallic support 14 on which the said ring is screwed at 15.

It should be noted lastly that outer locking means are provided to hold the two plugs in connected position. Thus these means can include a ring 16 borne by a shoulder or boss 17 provided on the outer metalluc support 14, so as to be rotatable around the axis of the plug. By rotating, this ring, cooperating with a peg 18 and helicoidal groove 19, tends to bring together and lock the two plugs, in combination with a spring such as 161.

For the said connected position, the free end 20 of the metallic support 14 —which is assumed here to be of male type, penetrating into the corresponding female part 21 of the support 4— is supported on a sealing washer 22, itself resting against an inner ledge 23 of support 4.

This being the case, to convert, according to the inventin, the connector which has just been described, into a "scoop-proof" connector, there is effected, without any change in the assembly, a modification only of the manner in which the two supports 4 and 14 are interpenetrated into one another.

It is seen firstly, as regards support 4, that its active portion 21 is extended, so that the distance *d* (FIG. 2) is increased, ensuring the protection sought.

Through this fact, and since it is desired to change nothing in the various functions of the other support 14, especially as regards its portion 17 or boss receiving the part 16 and its thread 15 cooperating with the ring 12, it is necessary to provide a greater interpenetration of the two supports 4 and 14 ; to this end, a cavity is provided at 24, under the portion 17, to receive the end of the cylindrical portion 21.

Similarly, the terminal portion **20** of the support **14**, has been extended, and the support **4** is advantageously hollowed, so that the above-mentioned ledge **23** is all the more withdrawn.

By thus extending the male portion **20** of the support **14**, as was done for the female portion **21** of the support **4**, so that the two supports interpenetrate one another over a sufficient length L, the advantageous result is obtained that, even if the respective positions of blocks **2** and **10** are reversed in the supports **4** and **14** —that is to say the block **10** coming into the position of the block **2** and conversely— the "scoop-proof" condition remains respected.

In fact, when the block **2** occurs mounted in the support **14**, the increase at **20** of the length of this support ensures said condition.

This is to be seen in FIG. **2**, where there has been shown, in discontinuous line, how the joint **8** and the ends of the pins **1**, are presented, when the male portion is presented at the right instead of being at the left (and conversely for the female portion). It is to be noted that the distance d_1 between the ends of the pins and the edge of the free end **20** of support **14** is large and ensures the "scoop-proof" condition.

In any case, it is seen that, due to the invention, there is a possibility of creating two respective ranges of "non scoop-proof" and "scoop-proof" connectors, with the same parts, the same assemblies, and only by differentiating the two types through the nature of supports **4** and **14**.

As a result of which, whatever the embodiment adopted, there can be constructed connectors whose operation and assembly emerge sufficiently from the foregoing for it to be unnecessary to dwell on this subject and which have, with respect to preexisting connectors, the main advantage of greater simplicity of manufacture.

As it is self-evident, and as emerges already from the foregoing, the invention is in no way limited to those of its methods of application and production which have been more especially considered ; it encompasses, on the contrary, all variations.

I claim:

1. Electrical connector, with a male plug and a female plug, of the type comprising, in one of the plugs, pins intended to penetrate into sockets of the other plug, said pins and sockets being borne by insulating blocks, themselves mounted inside metallic supports adapted for mutual penetration, in combination with mechanical means for ensuring fastening together of the insulating blocks and their supports, and with means, actuated by an outer ring, to ensure locking together of the two plugs, characterised by the fact that there are provided, for a same connector, two types of metallic supports, distinguished from each other by a different length of mutual penetration, without other changes in the structure and assembly of the other parts, wherein one of the supports has a boss on which the outer locking ring is supported, said ring being identical for scoop-proof and non scoop-proof plugs, and said boss, in the case of supports of maximum mutual penetration, is channelled to enable the penetration of the free end of the other support.

2. Connector according to claim **1**, wherein the two supports of maximum mutual penetration are both covered over a sufficient length so that, if the position of the two insulating blocks bearing the pins and sockets respectively is reversed, there still remains, between the free end of the pins and the edge of the corresponding support, a sufficient distance to ensure protection against short-circuits and against mechanical damage.

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