Sept. 1, 1959 A. F. D'AMICO 2,902,665

POLARIZED ELECTRICAL CONNECTORS

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Fig. 1.

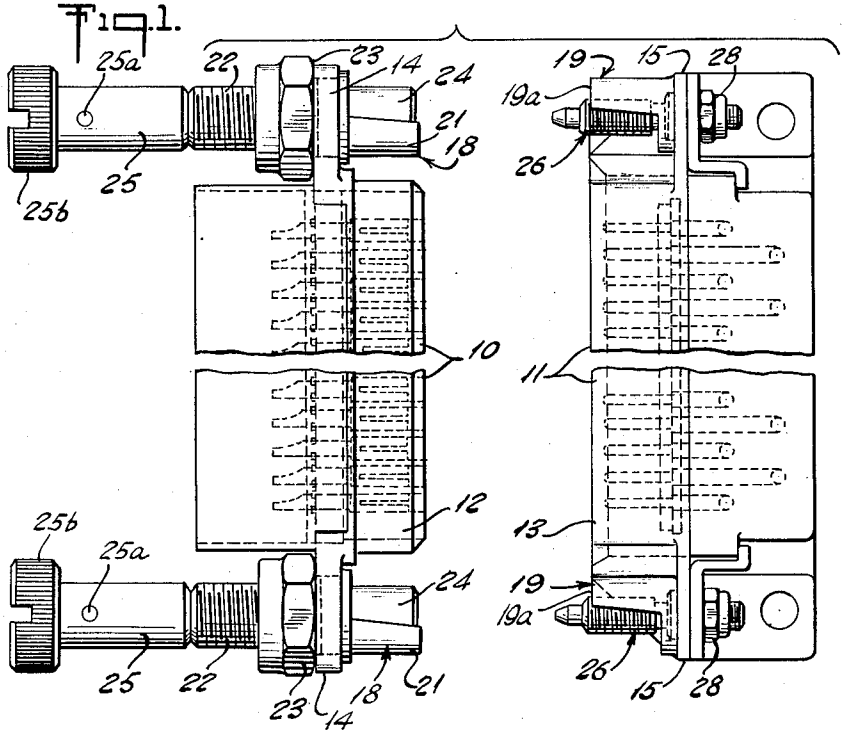


Fig. 2.

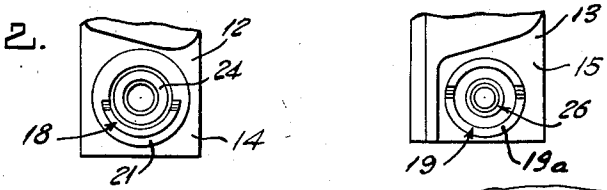


Fig. 4.

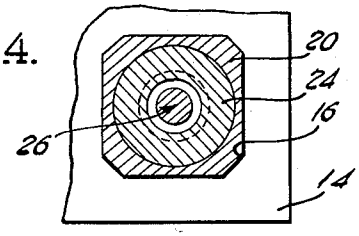


Fig. 5.

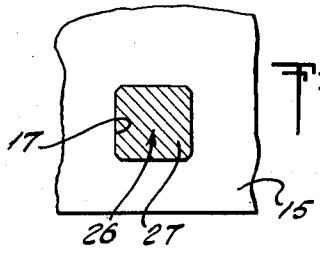
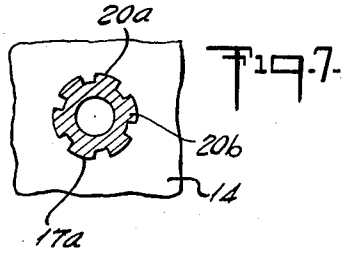


Fig. 7.



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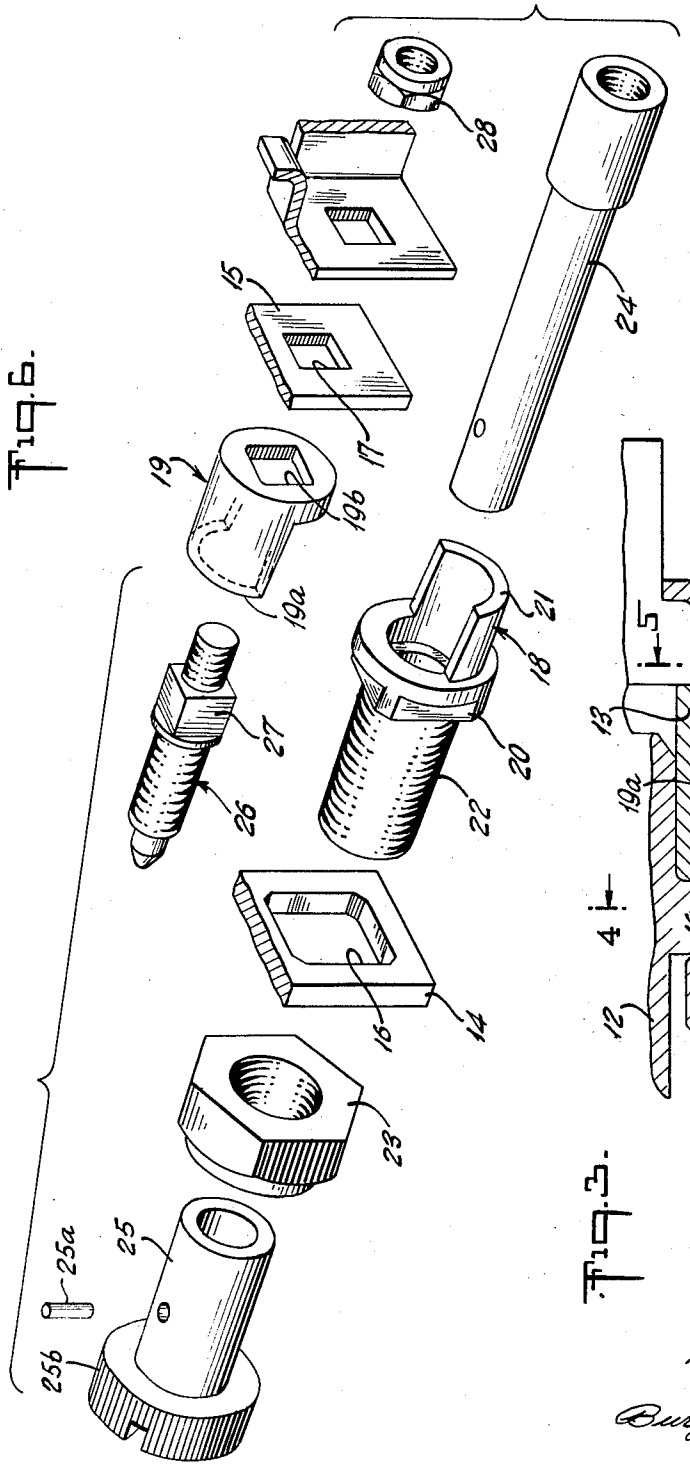


Fig. 6.

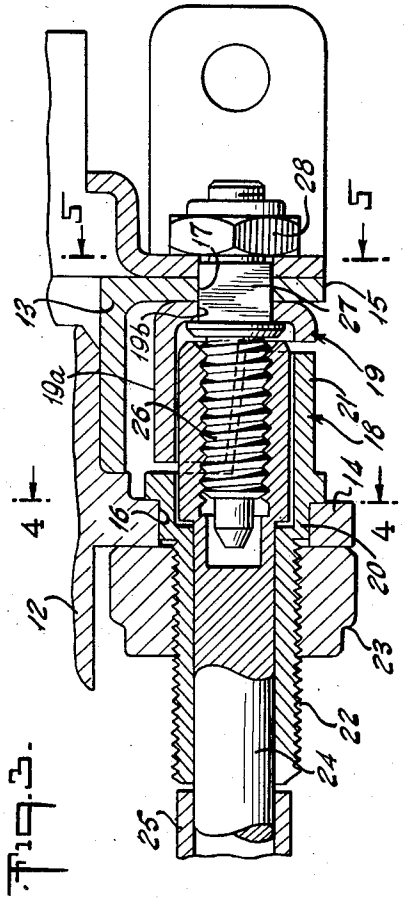


Fig. 3.

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United States Patent Office 2,902,665 Patented Sept. 1, 1959

2,902,665

POLARIZED ELECTRICAL CONNECTORS

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Application July 25, 1958, Serial No. 751,033

5 Claims. (Cl. 339—184)

The present invention relates to polarized electrical connectors and relates, more particularly, to separable electrical connectors which are provided with polarizing means for controlling engagement of the connectors.

The present invention relates to separable electrical connectors in which male contacts carried by a plug are brought into engagement with female contacts carried by a receptacle. In installations where a number of similar plugs and receptacles are employed, it is necessary to polarize the various connectors so that improper connections which could cause damage and improper operation of the circuit components cannot be made.

An object of the present invention is to provide means whereby a pair of separable electrical connectors may be polarized as desired at the time the connectors are installed. Another object of the present invention is to provide means for polarizing separable electrical connectors which permits a number of different polarizations to be obtained as desired without changes in the structure and thus, reduces the inventory required to supply connectors of different polarizations.

A further object of the present invention is to simplify the manufacture of polarized separable electrical connectors by eliminating the need for special tooling and the like for the manufacture of connectors of different polarizations.

Other objects and advantages of the invention will be apparent and better understood from the following description and the accompanying drawings, in which:

Fig. 1 is a side view in partial section of a pair of separable electrical connectors embodying the present invention;

Fig. 2 is a fragmentary plan view of portions of the connectors shown in Fig. 1;

Fig. 3 is a fragmentary view in vertical section of portions of the connectors shown in Fig. 1 in an assembled relation;

Fig. 4 is a section view taken along the line 4—4 of Fig. 3;

Fig. 5 is a section view taken along the line 5—5 of Fig. 3;

Fig. 6 is an exploded view in perspective of the polarizing members for the connectors shown in Fig. 1; and

Fig. 7 is a fragmentary view in section corresponding to Fig. 4 illustrating a modification of the polarizing members.

Referring to the drawings in detail, and to Fig. 1 in particular, there is a pair of separable electrical connectors **10** and **11**. The connectors **10** and **11** comprise a plug and receptacle of the miniature type having spaced interengaging male and female contacts on their mating faces. The connectors are of conventional construction and hence, need not be described in detail.

The connectors **10** and **11** are mounted in protective shells **12** and **13**, respectively, which telescope with each other when the contacts on the mating faces of the connectors are brought into engagement. The protective

shells **12** and **13** have flanges **14** and **15**, respectively, which extend outwardly from the ends thereof and, as shown best in Fig. 3, the flanges on the respective shells are in opposing spaced relation when the contacts are in engagement.

The opposing flanges have aligned openings **16** and **17** formed therein and the aligned openings in the flanges are shaped so as to engage with and position polarizing members **18** and **19** carried by the respective flanges. The polarizing members which extend inwardly toward each other from the opposing surfaces of the flanges, are shaped so that they complement each other and move past each other without interference when they are positioned in complementary relation to each other on the opposing surfaces of the flanges. As will be seen, the ends of the polarizing members will strike and thus, prevent engagement of the male contacts of the plug with the female contacts of the receptacle if the polarizing members are not positioned so that they complement each other.

As shown in Figs. 4 and 5, the openings **16** and **17** in the respective flanges are rectangular in shape. The polarizing member **18** mounted on the flange **14** is tubular and has a rectangularly shaped boss **20** formed on its outer surface intermediate its ends which fits into the rectangular opening **16** in the flange. A semi-cylindrical cup **21** formed at the inner end of the polarizing member extends beyond the front face of the flange on which it is mounted. By means of the rectangular opening, the semi-cylindrical cup can be placed in four different angular or polarizing positions. The rear portion **22** of the polarizing member which extends beyond the rear face of the flange, is threaded and receives a nut **23** which holds the polarizing member in a selected polarizing position. The position of the polarizing member may be readily changed by loosening the nut so that the rectangular boss can be moved out of the rectangular opening in the flange and turned to a new position.

A rod **24** having an internally threaded jack socket formed at the inner end thereof extends through the bore of the tubular polarizing member and is rotatable therein. The jack socket rod is held in place by an enlarged portion on the rod which engages with a shoulder in the bore of the polarizing member and a sleeve **25** which fits over the end of the rod extending beyond the rear of the tubular polarizing member. The sleeve is held in place by a pin **25***a* and is provided with a knurled knob **25***b* at its outer end by means of which the jack socket rod can be rotated for engagement with the threaded end of a jackscrew **26** carried by the opposing flange **15**.

The polarizing member mounted on the opposing flange also has a semi-cylindrical cup-shaped portion **19***a* which complements the semi-cylindrical cup of the opposing polarizing member. The jackscrew **26** has a rectangular shank **27** which fits a rectangular opening **19***b* in the bottom of the polarizing member **19** and the positioning opening **17** in the flange on which said member is mounted. The rear end of the jackscrew which extends beyond the rear face of the flange and is threaded, is engaged by a lock nut **28** which holds the jackscrew and the polarizing member in a selected position. When the semi-cylindrical portions of the polarizing members are positioned in complementary relation so that they can move past each other, turning of the jack socket in engagement with the jackscrew draws the contacts of the connectors into engagement in the usual manner.

As will be seen from the foregoing, the rectangular openings in the flanges permit the polarizing members to be placed in four different polarizing positions where they will complement each other. By providing similar polarizing members on the opposing flanges at the other

ends of the connectors which can likewise be placed in four different polarizing positions, a total of sixteen different polarizations may be obtained.

It will be understood that various multi-sided openings which are congruent or correspond in shape may be employed for positioning the polarizing with respect to each other so that a different number of possible polarizations can be obtained if desired. For example, the openings in the flanges may have serrations which engage with corresponding serrations in the polarizing member as illustrated in Fig. 7, where the opening **17***a* in the flange **14** has serrations formed therein which engage corresponding serrations **20***a* in the outer surface of the boss **20***b* of the polarizing member to position the polarizing member. The shank of the jackscrew and the openings through which it extends will be constructed in the same manner.

Adjustment and setting of the polarizing members may be readily accomplished by loosening the nuts **23** and **28** which hold the respective polarizing members in place and shifting the polarizing members to a desired position before tightening the nuts. It will thus be seen that the full range of polarizaton may be achieved in accordance with the present invention by a single structure and thus, it is not necessary to carry a different connector in stock for each polarization desired.

It will be understood that various changes and modifications may be made in the embodiments of the invention which have been described and illustrated herein without departing from the scope of the invention as defined by the claims appended hereto.

I claim:

1. In a pair of separable electrical connectors of the type having a plurality of spaced interengaging contact members on the opposing faces thereof, the improvement which comprises a set of opposing flanges extending from said connectors at one end thereof, said flanges being spaced apart and having shaped openings therein, a pair of polarizing members, said members having mating portions which complement each other, and means for mounting said members in a plurality of different angular positions on the respective flanges with the mating portions thereof in complementary relation, said means including members connected to the polarizing members and fitting the shaped openings in the flanges.

2. In a pair of separable electrical connectors, the improvement as defined in claim 1 wherein the openings in the flanges and the members fitting therein are multi-sided and correspond in shape.

3. In a pair of separable electrical connectors, the improvement which comprises a set of opposing flanges extending from the connectors at opposite ends thereof, the flanges of each set being spaced apart and having shaped openings therein, a pair of polarizing members extending inwardly from opposing surfaces of the flanges of each set, each pair of polarizing members having mating portions which oppose and complement each other, and means for positioning the polarizing members of each pair in a plurality of different angular positions on the flanges, said means including members connected to the polarizing members and fitting the shaped openings in the flanges.

4. In a pair of separable electrical connectors of the type having insulating bodies with a plurality of spaced male and female contacts on opposing faces thereof, the improvement which comprises a flange extending from each of the connectors at one end thereof, the flanges on the respective connectors being in spaced opposing relation and having shaped openings therein, a tubular member extending through the opening on one of the flanges, said member having a portion shaped to fit the opening in the flange in a number of different angular positions, a member extending through the opening in the opposing flange and having a portion shaped to fit said opening in a number of different angular positions thereof and a pair of polarizing members carried by the members extending through the openings in the flanges, said polarizing members extending from opposing faces of the flanges and having opposing portions which complement each other.

5. In a pair of separable electrical connectors, the improvement as defined in claim 4 wherein a jack socket is rotatably mounted in the tubular member and a jackscrew is carried by the member extending through the other flange, said jack socket and jackscrew being in opposing relation for engagement with each other.

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Notice of Adverse Decision in Interference

In Interference No. 92,175 involving Patent No. 2,902,665, A. F. D'Amico, Polarized electrical connectors, final judgment adverse to the patentee was rendered Mar. 25, 1964, as to claims 1 and 3.

[*Official Gazette August 25, 1964.*]