United States Patent [19]

Hollander et al.

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[54] **CONNECTORS**

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[30] **Foreign Application Priority Data**

June 18, 1973 United Kingdom..... 28830/73

[52] **U.S. Cl.**..... **339/259 R**

[51] **Int. Cl.²**..... **H01R 13/16**

[58] **Field of Search** 339/191, 192, 195, 196, 339/206–208, 210, 256, 258, 259, 262

[56] **References Cited**

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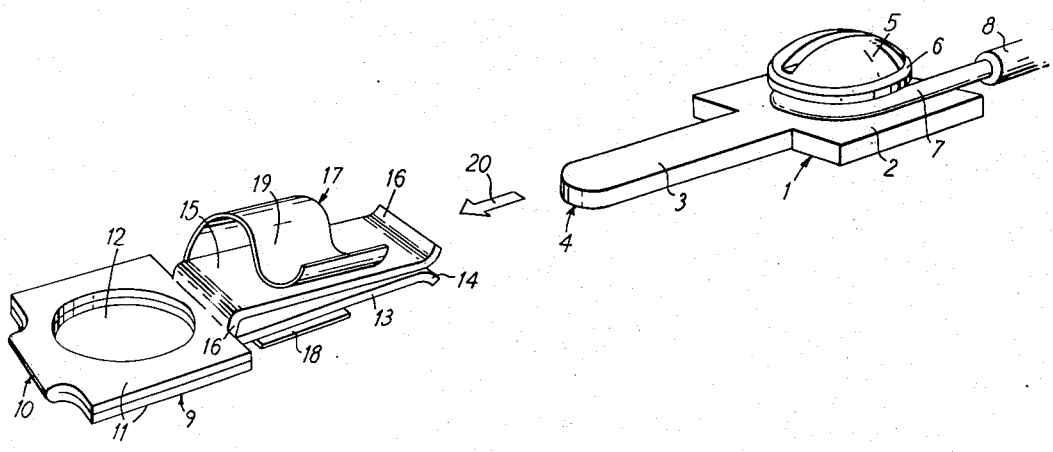
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[57] **ABSTRACT**

A female plug assembly, for an electrical connector, comprising a female connector member with a single-fold metal element including two leaves, each of said leaves having a base area and a tongue area extending from said base area, said base areas of said leaves being superposed and said tongue areas of said leaves being superposed, one said leaf having said tongue area lying in the same plane as said base area, the other said leaf having said tongue area bent out of the plane of said base area, said tongue areas being spaced at least adjacent to said base areas to receive a plane metal male stem between them.

7 Claims, 4 Drawing Figures



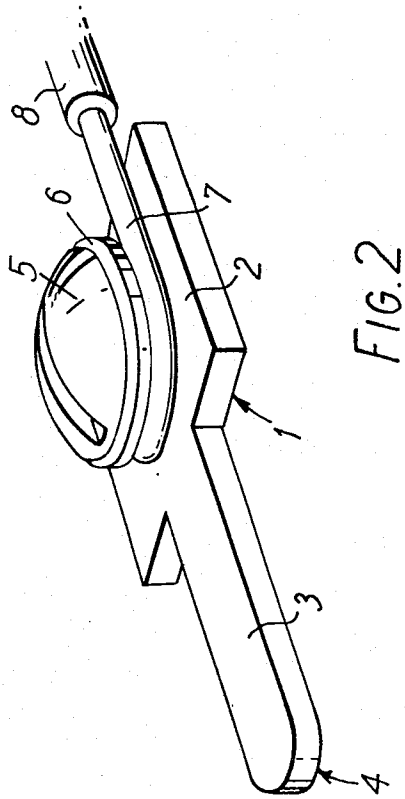


FIG. 2

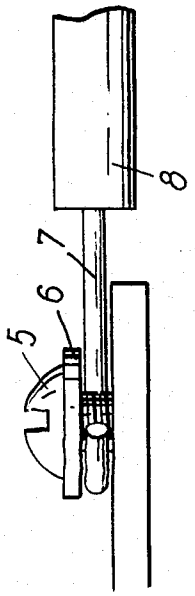
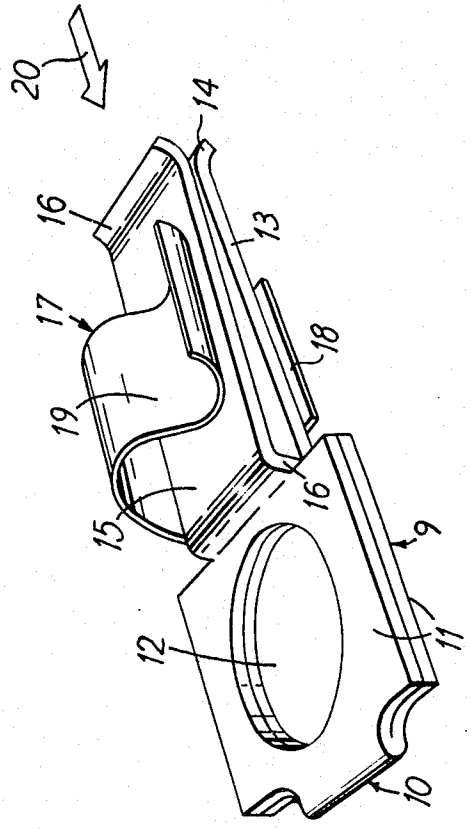


FIG. 1



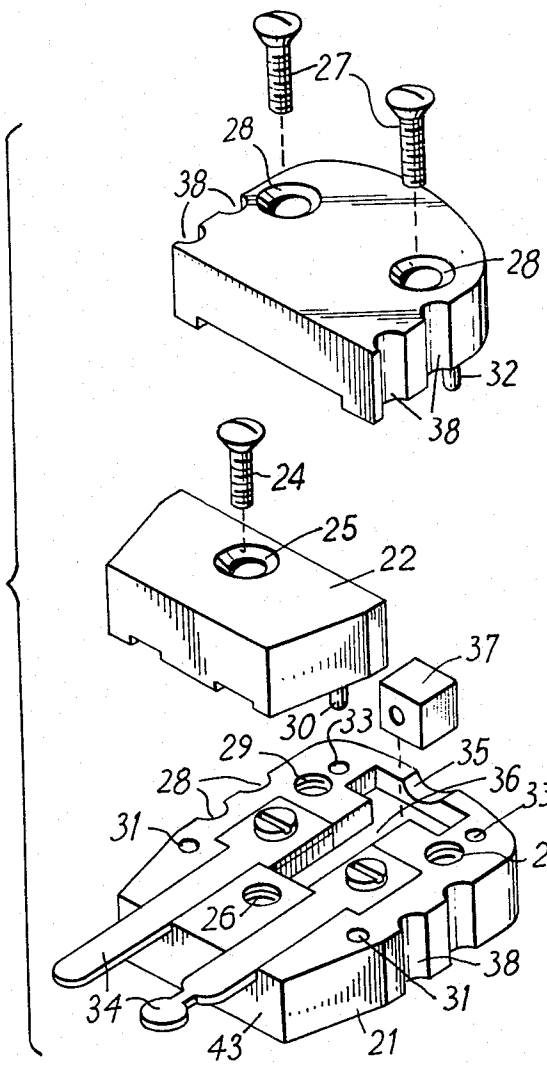

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FIG. 3

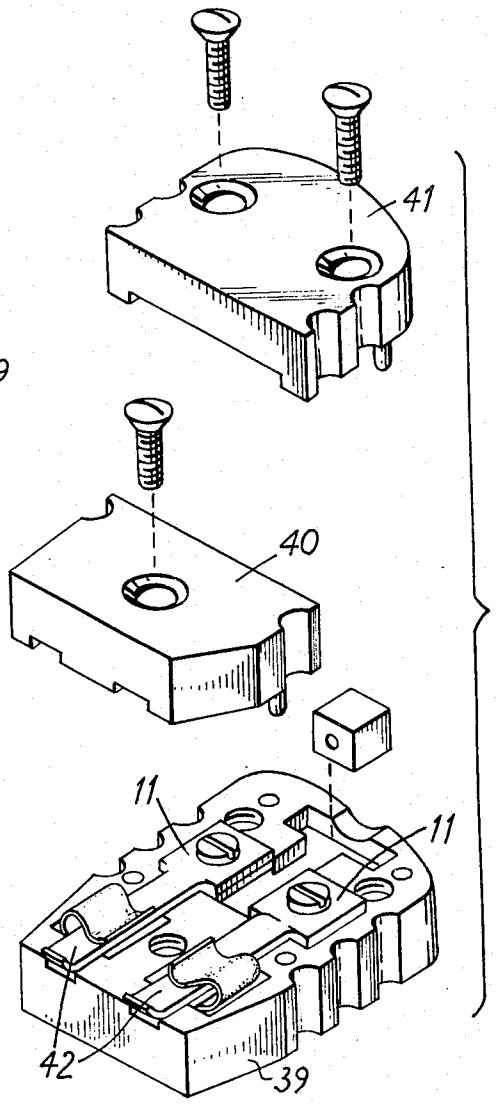

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FIG. 4

CONNECTORS

This invention relates to electrical connectors, and more especially though not restrictedly to so-called "miniature" connectors.

The object of the invention is to provide improvements applied to two-pole lead connectors.

According to a first aspect of the present invention, in an electrical connector for use with a male plug assembly, there is provided a female connector member with a single-fold metal element including two leaves each of which has a base area and a tongue area extending from said base area, the base areas of the two leaves being superposed and the tongue areas of the two leaves being superposed, one of said leaves having its tongue area in the same plane with its base area, the other of said leaves having its tongue area bent out of the plane of its base area, such that the tongue areas are spaced at least adjacent to the base areas and may receive a plane metal stem between them.

In a preferred construction means are provided for urging the two tongue areas resiliently towards each other, e.g. as by a C-spring clip passing about a lateral edge of the tongue areas.

A male plug assembly for use therewith may have a male connector member including a plane metal stem for engagement between the tongue areas, and may further include a base, the base and stem being in the same plane.

According to a second aspect of the invention there are provided in combination two such female plug assemblies and a body for receiving them, the body including a first lower portion, a second front upper portion, a third rear portion, and means for securing the second and third portions being independently on the first portion, e.g. screws, the first and second portions and the first and third portions being recessed at their respective meeting faces to receive and retain said connector members in spaced relationship.

The connector members may advantageously each include a respective terminal positioned for access when said third portion is removed from said first portion of the body.

The second and third body portions are advantageously located on the first body portion by locating means, e.g. pins on the second and third portions to seat into holes in the first portion of the body.

The bodies as a whole are preferably shaped so as to reduce forwardly and thereby provide a clear line of demarcation where the front walls meet, thereby facilitating disengagement of the assemblies by hand.

The first body portion, and at least the third body portion, may be recessed laterally to improve hand-grip on the assembly.

The internal recessing of the body is advantageously so shaped that each of the male and female connector members is locked in position by its own shaping, when the body portions are secured in position.

The first and third body portions define a channel to receive wiring leads, and advantageously a rear end portion of said channel may be enlarged and provided in transverse position to receive a block for securing leads in position. The first and third body portions preferably define a cable entry hole at the rear end of the connector.

In order that the nature of the invention may be readily ascertained, a construction of miniature electrical connector embodying both of the aforementioned aspects of the invention is hereinafter particularly described with reference to the figures of the accompanying drawings, wherein:

FIG. **1** is a perspective diagrammatic showing of the manner of introduction of a male connector member into a female connector member;

FIG. **2** is a side elevation to show a manner of connection of a conductor to the male member;

FIG. **3** is a perspective elevation, with the parts shown in separated condition, of a male plug assembly;

FIG. **4** is a perspective elevation, with the parts shown in separated condition, of a female socket assembly.

Referring to FIGS. **1** and **2**, a male connector member is in the form of a sheet metal element **1** having a substantially rectangular plane base portion **2** and an elongated plane stem portion **3** rounded at its leading end for ease of insertion. In the base portion **2** there is provided a threaded hole to receive a screw **5** having a washer **6** to clamp a wire lead **7** of a conductor **8.**

The female connector member comprises a sheet metal element **9** which is single-folded at **10** so that two similar leaves lie one above the other. Each leaf has a base area **11** in which there is provided a bore **12** to receive a fastening screw. The bore **12** is shown in the drawing larger than it would be in the practical construction of the member, and the bore would be threaded. The base area **11** of the lower leaf is continued forwardly by a tongue **13** in the same plane, the leading end of the tongue being splayed at **14.** The base area **11** of the upper leaf is continued forwardly by a tongue **15** which is bent upwardly at **16** and then is inclined towards the other leaf forwardly, and is splayed at **16** at its leading end. Passing about a lateral edge of the two tongues **13** and **15** there is disposed a generally C-shaped clip member **17** having a substantially flat base **18** and a doubly curved upper part **19.**

In use, the engagement together of the two portions of the connector would result in the insertion of the stem **3** between the tongues **13, 15,** in the direction of the arrow **20.**

The tongues **13, 15** are themselves resilient, but their grip on the inserted stem **3** is increased by the action of the C-clip **17.**

Referring now to FIGS. **3** and **4**, the male plug assembly comprises a lower body portion **21,** a front upper body portion **22,** and a rear upper body portion **23.** Portion **22** can be assembled onto portion **21** by means of a screw **24** to engage through a bore **25** into a threaded hole **26.** Portion **23** can be assembled onto portion **21** by means of two screws **27** engaged through bores **28** into threaded holes **29.**

Portion **22** is located, with respect to portion **21,** by means of two pins **30** seating into holes **31.** Portion **23** is located with respect to portion **21** by means of two pins **32** seating into holes **33.**

The portions **21, 22, 23** are recessed internally to provide seatings for two of the male connector members **34** described in detail in relation to FIGS. **1** and **2.** The male elements may have differently shaped leading ends, as shown, for the purpose of assisting engagement of the connector with correct polarity.

The portions **21, 22, 23** are also recessed to provide a cable entry **35** and a channel **36** for accommodation of leads. In the rear end of the channel **36** there is accommodated a block **37** used for securing the leads.

The side walls of the portions **21** and **23** are recessed at **38** to provide a better handgrip on the item.

Referring now to FIG. **4**, the construction of the female socket assembly is very similar, in that it comprises body portions **39, 40** and **41** which are shaped and assembled in the same manner as the portions **21**, 22, 23. The only difference is that the internal recessing is made somewhat modified to accommodate the somewhat larger base area **11** of the two female connector members **42**, each of which is as described in relation to FIG. **1**.

When the plug and socket assembly have been fully interconnected, they exhibit a clear line of demarcation at the meeting faces **43**, and can readily be disengaged and engaged again by hand.

We claim:

1. A female plug assembly for an electrical connector comprising: a female connector member having at least one single-fold metal element which includes two leaves, each of said leaves having a base area and a tongue area extending from said base area, said base areas of said leaves being superposed and said tongue areas of said leaves being superposed, one said leaf having said tongue area in the same plane as said base area, the other said leaf having said tongue area out of the plane of said base area, said tongue areas being spaced at least adjacent said base areas to receive a male element between them, and a clip member passing around the lateral edges of said tongue areas, said clip member having two arms including a substantially flat arm engaging the entire width of one tongue and a curved arm engaging the outside opposite surface of the other tongue to press the contact areas of the tongues together.

2. A female plug assembly, as claimed in claim **1**, comprising means resiliently urging said tongue areas towards each other.

3. In combination:

i. a female plug assembly as claimed in claim **1**, and

ii. a male plug assembly having a male connector member including a plane metal stem for engagement between said tongue areas of said female plug assembly.

4. In combination:

a. two of the female plug assemblies claimed in claim **1**, and

b. a body for receiving said plug assemblies, said body including:

a first lower portion, and

a second front portion, and

a third rear portion, and

means for securing said second and third portions independently on said first portion,

said first and second portions and said first and third portions being recessed at their respective meeting faces to receive and retain said connector members of said female plug assemblies in spaced relationship.

5. The combination of claim **4** wherein said connector member of each said female plug assembly includes a respective terminal positioned for access when said third body portion is removed from said first body portion.

6. The combination of claim **4**, and means for locating said second and third body portions on said first body portion.

7. An electrical connector comprising:

a. the combination of claim **6**, and

b. a male plug assembly comprising:

two male connector members each including a metal base and a plane metal stem extending in the same plane from said base;

a body receiving said male connector members and including a first lower portion, a second front upper portion, a third rear portion, and means securing said second and third portions independently on said first portion, said first and second portions and said first and third portions being recessed at their respective meeting faces to receive and retain said male connector members in spaced relationship.

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