Aug. 9, 1960 H. W. BATCHELLER 2,948,876

CONNECTOR MEMBER WITH RESILIENTLY SUPPORTED CENTRAL BOSS

Filed April 5, 1956

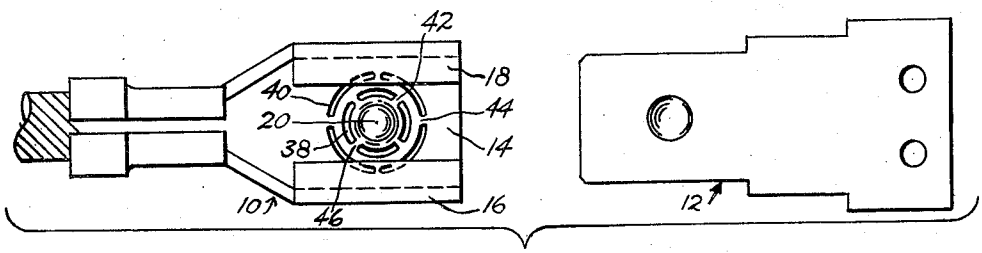

Fig. 1

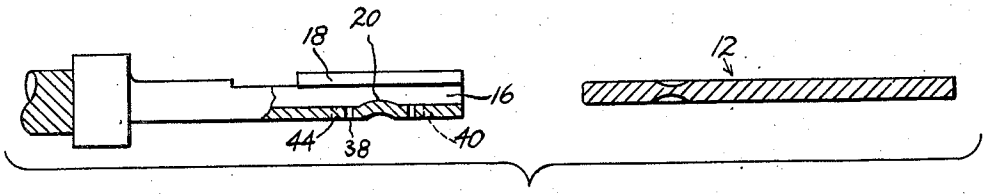

Fig. 2

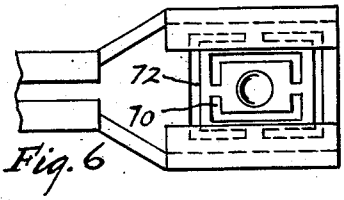

Fig. 6

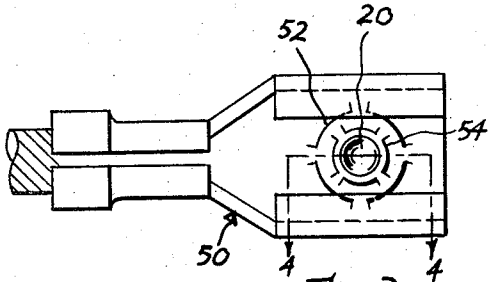

Fig. 3

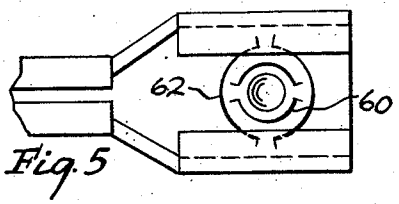

Fig. 5

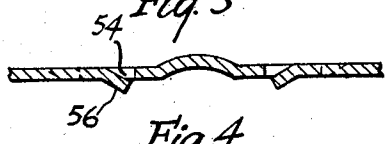

Fig. 4

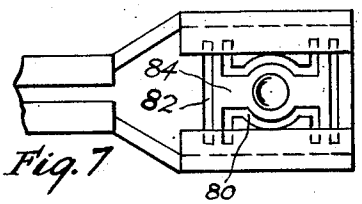

Fig. 7

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CONNECTOR MEMBER WITH RESILIENTLY SUPPORTED CENTRAL BOSS

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1 Claim. (Cl. 339—258)

This application is a continuation-in-part of my copending application Serial No. 443,902, filed July 16, 1954 and now Patent No. 2,747,170, issued May 22, 1956. The invention relates to an electric connector consisting of complementary members of the male and female type wherein the male member may be a simple plane metal tongue and the female is a channel shaped member adapted to receive and hold the tongue. The invention relates more particularly to improvements preferably in a female member of the type referred to. This member includes essentially a piece of metal strip stock bent to form a shallow channel having a floor with side walls rising from the side edges thereof and inturned flanges on said side walls overhanging the side margins of the floor. The channel is of a size and shape to be fitted by the tongue of a male member which should be tightly pressed between the floor and flanges of the female member in order to form a good electrical connection. Such pressure between the members is usually obtained by providing a resiliently yielding element on one or the other of the members so as to allow for slight variations which are liable to occur in the thickness of the stock of which members are made. The resilient element or elements are arranged to be sprung or distorted when the members are joined to make the connection. The force which tends to restore the distorted elements to their unstressed position is utilized to press interfaces of the members and thus to ensure a good electrical connection. According to the present invention an element of the floor of a female connector member is raised so as to be slightly above the floor level when unstressed. This raised element is mechanically connected to and supported by the main portion of the floor in such a way as to yield downwardly when sufficiently pressed. The connections between the raised element and the main portion of the floor are elements of the floor itself made by cutting or shearing slits or slots in the floor. The virtual length of these connecting elements must be sufficient to permit the raised element to yield downwardly when engaged by the male member of the connector as it is being thrust into the channel of the female member. Heretofore connecting elements between a central boss and the main portion of the floor have been made by means of two parallel cuts or slots which define a strip between them, the boss being formed in the middle of the strip. The length of such a strip is limited by the length of the connector member itself which, for reasons of economy and convenience, should not be longer than necessary. Since the degree of yielding of the boss under pressure is a function of the thickness and hardness of the stock as well as the length of the elements which mechanically connect the boss with the main portion of the floor, additional length can be had for the connecting elements, without enlarging the dimensions of the floor, by making the connecting elements non-straight, e.g., arcuate or dog-leg or both.

The present invention relates to new and improved structures of the resilient elements. These structures are hereinafter described in detail and are illustrated on the drawings, of which—

Figure 1 is a plan view of the members of an electrical connector embodying the invention;

Figure 2 is a longitudinal sectional view of the same;

Figure 3 is a plan view of a slightly modified form of the invention;

Figure 4 is a section on the line 4—4 of Figure 3; on an enlarged scale;

Figure 5 is a plan view of another modified form; and

Figures 6 and 7 are plan views of other modified forms of the invention.

A connector consisting of a female member **10** and a male member **12** is shown in Figure 1. The female member has a floor **14**, side walls **16** and inturned flanges **18** along the upper edges of the side walls.

A central boss **20** is formed in the floor and is connected to the main portion of the floor by elongated elements of the floor formed by cutting or shearing the floor around the boss. In the embodiment illustrated in Figures 1 and 2, the elements connecting the boss **20** to the main portion of the floor are formed by two or more circular series of long arcuate slots **38** and **40**, the slots in each series being staggered with respect to the slots in the other series. The slots in each series are few in number, preferably not over four, and are spaced from one another by narrow necks **42** and **44**, the former being between ends of slots of the inner series, the latter being between ends of slots in the outer series. The necks **42** are angularly offset from the necks **44** and are connected thereto by elongated arcuate elements **46** the width of which is determined by the radial spacing between the inner and outer series of slots. The necks **42** of the inner series are equally spaced around the boss **20**. The necks **44** are likewise equally spaced around the boss **20**, each of these necks being equally distant from the nearest necks **42**. The necks **42** and **44** and arcuate elements **46** which support the central boss **20** provide considerable resilient yielding the degree of which can be regulated by spacing the slots to determine the length and width of the necks **42** and **44** and the elements **46**.

The increase in resilience by the means described permits the boss **20** to be pressed down a greater distance without approaching too close to the elastic limit, as compared with a floor having simply a central boss and nothing more.

Instead of the series of slots shown in Figure 1, other arrangements of slits or slots can be used for the same purpose, that is, to provide sufficient length for the supporting elements connecting the central boss to the main portion of the floor so as to ensure sufficient yielding by the boss when pressed by a male connector member as it is thrust into the channel between the side walls of the female member.

Figures 3 and 4 illustrate a connector member **50** with arcuate shearing cuts **52** and **54** arranged similarly to the slots shown in Figure 1, the metal along one side edge of each cut being forced downward as at **56** so that the metal will be completely sheared for the full length of each cut.

Figure 5 shows slits **60** and **62** similar to the slits shown in Figures 3 and 4, except that in this case there are only two arcuate slits to each series, making the boss more yielding than in the form shown in Figures 1 or 3, other factors being the same.

Figure 6 shows an arrangement of slots **70** and **72**

arranged substantially as the slits in Figure 5, but consisting of straight sections instead of arcs.

Figure 7 shows slots **80** and **82** in an H array, forming non-straight, elongated elements **84** connecting the central boss to the main portion of the floor and yieldingly supporting the central boss.

Various other arrangements of slots or slits can be made to form non-straight supporting elements for the central boss. By thus making non-straight supporting elements, their virtual length is thus increased with no increase of the overall dimensions of the connector member itself. This added flexibility is provided where desired, as, for example, when thicker and more rigid stock is employed in making the connector member.

I claim:

An electrical connector member consisting of a single piece of strip metal shaped to have a floor, side walls, and inturned flanges along the tops of these side walls, said floor having a central boss projecting up above the level of the otherwise flat floor, said floor having two circular series of arcuate slots concentric with said boss, the slots of the inner of said two series defining narrow radial necks equally spaced about said boss, the slots of the outer of said two series defining an equal number of narrow radial necks equally spaced from the nearest necks of the inner series and equally spaced from one another.

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