

[54] FURCATE CONTACT

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[58] Field of Search..... 339/217, 258, 259

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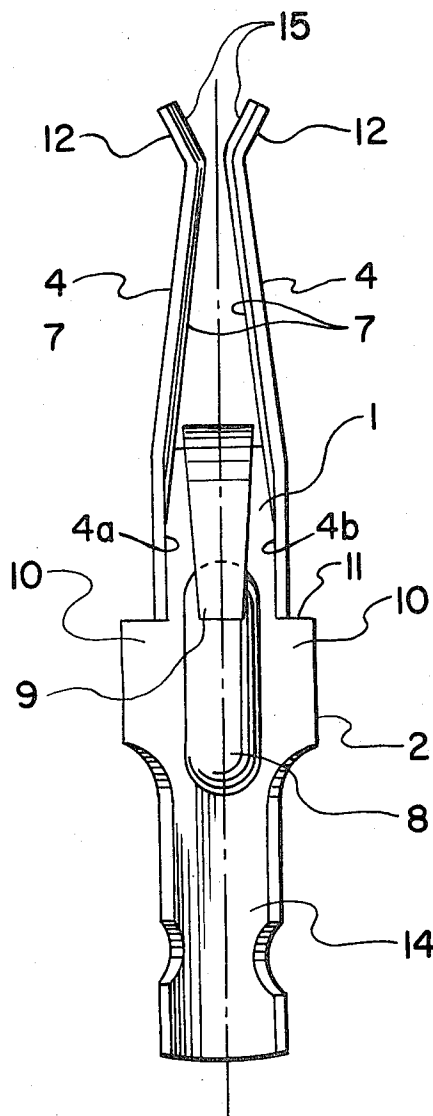
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[57] ABSTRACT

A furcate contact with at least two resilient contact arms. The contact has a body portion supporting the contact arms which converge toward one another adjacent the tip of the contact. Each contact arm is concavely arched perpendicular to its longitudinal axis and toward the opposite contact arm, the arched portion extending over essentially the entire length of each contact arm. In a preferred embodiment of the invention, each contact arm is divided into two arched contact fingers, each of the fingers being concavely arched perpendicular to its longitudinal axis and toward the opposite finger.

2 Claims, 5 Drawing Figures



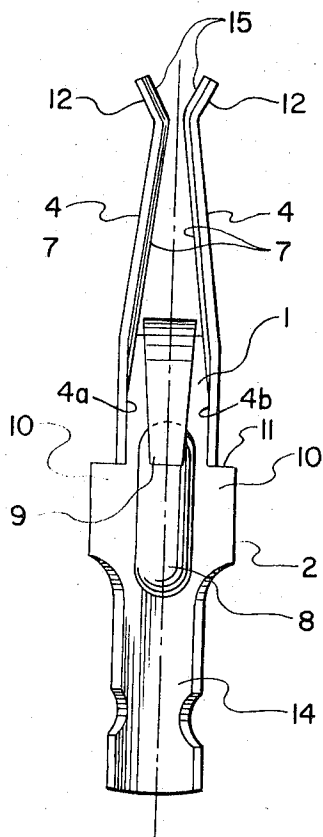


FIG. 1.

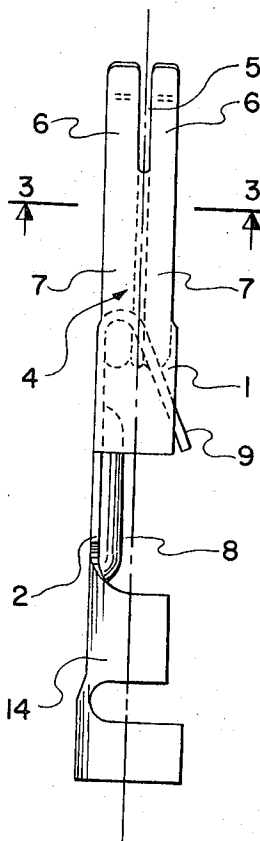


FIG. 2.

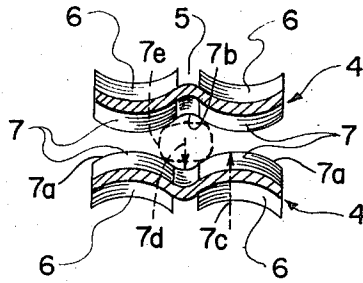


FIG. 3.

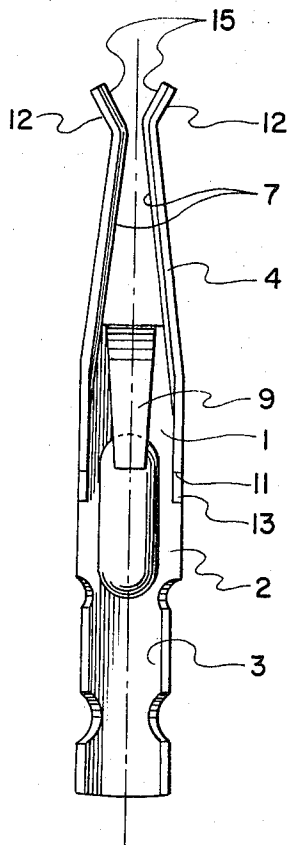


FIG. 4.

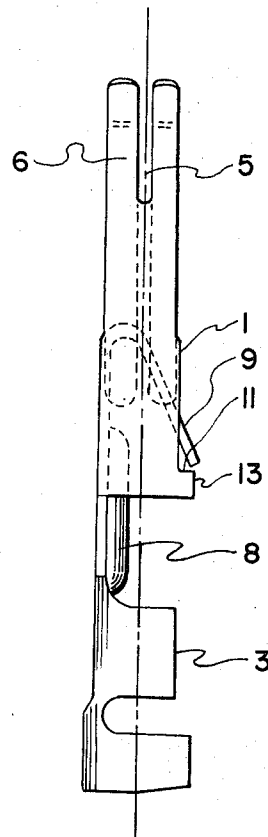


FIG. 5.

FURCATE CONTACT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The field of art to which the invention pertains is that of electrical connectors, and more particularly electrical receptacle-type contacts which are adapted to receive blade or pin contacts for making electrical connection.

2. Description of the Prior Art

Prior art furcate contacts generally have contact arms which are provided with opposing contact sections biased toward one another. The contacting arms of the prior art contacts have a generally rounded, elongated appearance. Modifications of basic prior art receptacle-type contacts have been made for the purposes of receiving both plate-like and pin-like mating connector plug contacts. One such arrangement provides four protruding contact arms arranged in pairs, one above the other. Another known arrangement provides contact arms which are divided into two contacting fingers in side-by-side relationship. In such arrangements, both plate-like and pin-like connector plug contacts can be received and guided into the receptacle. A variety of disadvantages of such prior art arrangements, however, have been demonstrated. The known configurations require careful insertion of the contact plugs, making it difficult to insert the plug in the central position of the receptacle. Further, close manufacturing tolerances in the arrangement of the contact arms of the receptacle and the mating contacts of the plug are encountered.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a furcate contact of the above-described type which is of simple design, facilitates the insertion of mating contacts, and assures good electrical connection.

In accordance with the invention there is provided a contact receptacle having contact arms which are concavely arched perpendicular to the longitudinal axis and in the direction of the opposite contact arm, the arched portion extending over essentially the entire length of each contact arm.

One of the main advantages of utilizing concavely arched contact arms is the fact that such construction results in improved rigidity of the contact arms. Thus, with the same thickness of material for construction of the contact, the length of the contact arms can be increased. Moreover, the contact pressure with the mating plug contact is increased, thereby enhancing the electrical connection therebetween. These properties permit looser tolerances for the manufacture of the contacts and hence reduce the production costs. At the same time, an improved receptacle contact results from the fact that they are not damaged when the mating plug contact is inserted, even when the plug is not exactly positioned in the center of the receptacle. Further, both plate-like and pin-like mating contacts can be more readily inserted between the arched contact arms than with the flat contact arms of prior art devices.

Preferably, each of the opposing contact arms is formed having two axially aligned parallel concavities extending in the same direction, that is, toward the opposite contact arm. Such a configuration again results in increased rigidity of the contact and improved the

guiding effect for receiving pin-like plug connector contacts.

In one embodiment of the invention, each contact arm is divided into two concavely arched contact fingers adjacent the free end of each of the contact arms. The contact fingers are formed by providing a slit extending from the free end of the contact arm inwardly toward the body of the contact.

Since the increased rigidity of the contact arms and contact fingers in accordance with the invention allows the application of increased forces when mating contacts are inserted, the body portion of the contact must also be sufficiently strong to accept such forces. Thus, in a modification of the furcate contact of this invention, the body portion is provided with a reinforcing depression or dimple extending in longitudinal direction of the contact in the area of the contact joining the arms and the body portion.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in detail with reference to the accompanying drawings representing preferred embodiments of furcate contact according to the present invention. In the drawings:

FIG. 1 is a front elevation view of a furcate contact in accordance with the invention.

FIG. 2 is a side elevation view of the furcate contact shown in FIG. 1.

FIG. 3 is a cross-section of the furcate contact taken along the lines 3—3 of FIG. 2.

FIG. 4 is a front elevation view of a second embodiment of a furcate contact according to the invention.

FIG. 5 is a side elevation view of the furcate contact of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The furcate contact shown in FIGS. 1-3 is provided with a body portion having a U-shaped carrier mid-section 1 leading longitudinally into a flat resilient ridge 2 leading to a connecting terminal end section 14 again having a U-shaped cross-section. Two contact arms 4 extend longitudinally from and are carried by the carrier mid-section 1, the two arms 4 facing one another. One end of each arm 4 is integrally formed along a respective edge 4a and 4b of the body portion with the juncture of the edges of the upper surface of the body portion lying in a common horizontal plane and one surface of the integrally formed portion of each arm lies in a respective transverse plane extending along a respective edge 4a and 4b of the body portion. The arms 4 each has a cantilever portion extending from the respective transverse plane and longitudinally from one end of the body portion toward each other arm to form cantilever spring arms to locate the ends of the arms spaced from the body portion in adjacent positions for receiving a male contact between the ends. The two contact arms, beginning at the carrier mid-section 1, extend inclined toward each other to the free end of the contact arms 4. Adjacent the free end, the contact arms 4 are bent outwardly at an obtuse angle, thereby forming end sections 12 having internal camming surfaces 15 adapted to readily position and easily accept a mating pin or plate type plug contact.

As viewed in FIG. 2, each contact arm 4 may be provided with a slit 5 which extends from the free end of

the contact arm 4 toward the terminal end 14 over approximately one-third of the entire length of the contact arm 4. Each slit 5 divides the end section of the contact arm 4 into two contact fingers 6 bent in a direction from each other with the angle between the fingers less than 180° to form guiding fingers for guiding a pin contact member between the arms 4.

The cross-section of each contact arm 4 below the slit 5 is in the form of a pair of parallel and adjacent concavely arched portions 7 which are arched perpendicular to the longitudinal axis of each of the fingers 6. Each of the arched portions 7 has a width approximately equal to that of a contact finger 6. The concave portions extend over substantially the entire length of the contact arm 4 and reach the area of the carrier mid-section 1. Below the area of the slit 5 and in the area between the arched portions 7, contact arm 4 is bent in a direction opposite to that of the arched portions 7 and extends beyond the axis of the slit 5. This can best be seen by reference to FIG. 3. It will be noted from FIG. 3 that the arms 4 and fingers 6 each have a cross section forming or defining an undulating curve perpendicular to the longitudinal axis of the respective arm with each undulating curve including a pair of end curves 7a. Curves 7a extend from a respective opposite edge of each arm to a position intermediate the edges and each curve 7a has a radius of curvature, whose respective axis, indicated by dashed line 7b, is located adjacent the respective transverse plane of the arm, which extends along a respective opposite edge 4a and 4b. A curve 7c is located intermediate each pair of end curves 7a. The intermediate curve 7c, as seen in FIG. 3, has a radius of curvature, indicated by dashed lines 7d, extending from an axis located intermediate the arms and the radius is smaller than the radius of curves 7a. The fingers 6 each have a cross section defined by a respective one of the end curves 7a and continuous with the respective end curve of the respective arm to stiffen the fingers. When a male contact member is received between the arms 4, as indicated by dashed lines 7e, the curved portions 7a provide at least two points of engagement between each arm 4 and the pin or blade contact, despite considerable variations in dimensional tolerances.

In order to strengthen the mid-section 1 of the contact, a depression or dimple 8 is formed on the rear side of the contact. The dimple 8 makes rigid the otherwise resilient ridge 2.

A resilient catch 9 is provided on the carrier mid-section 1 so that the downwardly bent end of catch 9 can be pressed into the U-shaped carrier mid-section 1 upon insertion of the contact in a terminal block.

FIG. 1 shows that the ridge 2 is provided with wings 10 extending along both sides of ridge 2. At least one of the edge sections is provided with a stop shoulder 11.

The furcate contact of FIGS. 4 and 5 differs from the embodiment shown in FIGS. 1-3 in the shape of the carrier mid-section 1 and the ridge 2. The other parts of the contact are unchanged and are denoted by the same reference symbols as in FIGS. 1-3. No protruding edges are provided at the ridge 2. However, the U-shaped carrier mid-section 1 is provided with protruding lugs 13 in the area adjacent the ridge 2. At least one of the lugs 13 is provided with a stop shoulder 11.

From the foregoing, it can be readily realized that this invention can assume various embodiments. Thus, it is to be understood that the invention is not limited to the specific embodiments described herein, but is to be limited only by the appended claims. For example, it is within the scope of this invention that the contact arms 4 not be provided with slits 5 and that each contact arm 4 may only have a single concavely arched portion 7. Further, two parallel concavely arched portions 7 can be provided in each arm 4 without a slit 5. The carrier mid-section 1 and the ridge 2 can have uniform cross-sections over their entire lengths. Additionally, the carrier mid-section 1 and ridge 2 may be U-shaped, flat, or slightly arched, and the carrier mid-section 1 may be provided with a separate reinforcing dimple from that of the ridge 2.

What we claim is:

1. A furcate contact for establishing a plurality of electrical connections to a male contact comprising:

a body portion including opposite edges;

a pair of cantilever spring contact arms each having an integrally formed portion on said body portion with one surface of each integrally formed portion lying in a respective transverse plane extending along a respective one of the opposite edges of said body portion, said arms each extending longitudinally in one direction from one end of said body portion toward each other arm and from the respective transverse plane to locate the ends of said arms spaced from said body portion in adjacent positions for receiving a male contact between the ends of said arms spaced from said body portion, a pair of spaced guiding fingers formed on each end of each arm spaced from said body portion with each pair of fingers formed in a direction extending from each other pair of fingers for guiding said male contact for receipt between said arms;

each arm having a cross section defining an undulating curve perpendicular to the longitudinal axis of the respective arm with each undulating curve including a pair of end curves with each end curve extending from a respective opposite edge of each arm and formed along a radius of curvature extending from an axis spaced adjacent a respective transverse plane; each finger having a cross section defined by and continuous with a respective one of said end curves defining the cross section of a respective arm; and

a curve for each arm intermediate each pair of end curves with each intermediate curve formed along a radius of curvature having an axis intermediate said arms whereby said arms and fingers are substantially rigidified and the end curves of each arm provide at least two positions of engagement with said male contact for establishing a plurality of electrical connections to said male contact in response to the receipt of said male contact between said arms.

2. A furcate contact as claimed in claim 1 in which each guiding finger extends toward the respective transverse plane with the angle between said fingers less than 180° and each intermediate curve has a radius of curvature smaller than the radius of curvature of the respective end curves.

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