

[54] **ELECTRICAL CONTACT ASSEMBLY**

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[51] Int. Cl. **H01r 13/62**

[58] Field of Search **339/64, 253-255, 339/259, 262**

[56] **References Cited**

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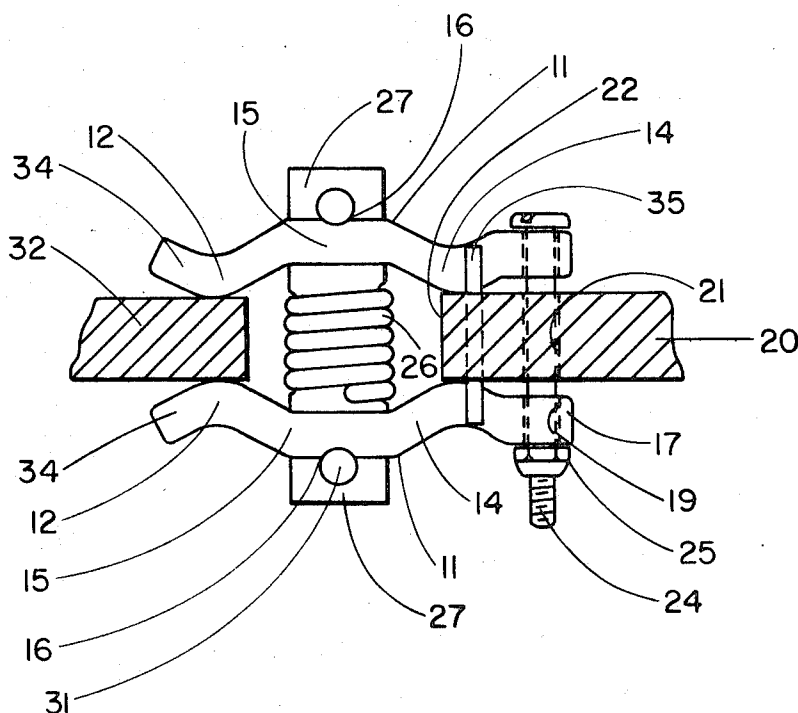
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[57] **ABSTRACT**

The assembly comprises a plurality of aligned pairs of spaced apart contact fingers directly attached at one end on opposite sides of a conductive bar without the use of intermediate connectors or alignment frames. The contact fingers of adjacent pairs are biased toward each other intermediate of their ends by a tension spring disposed between the pairs and secured to a pair of connecting links each having outwardly extending pins overlying the outer surfaces of adjacent fingers. The free ends of the contact fingers are convex toward each other and the convex portions of each pair of contact fingers are arranged to grip directly on opposite sides of a second conductive bar.

9 Claims, 3 Drawing Figures



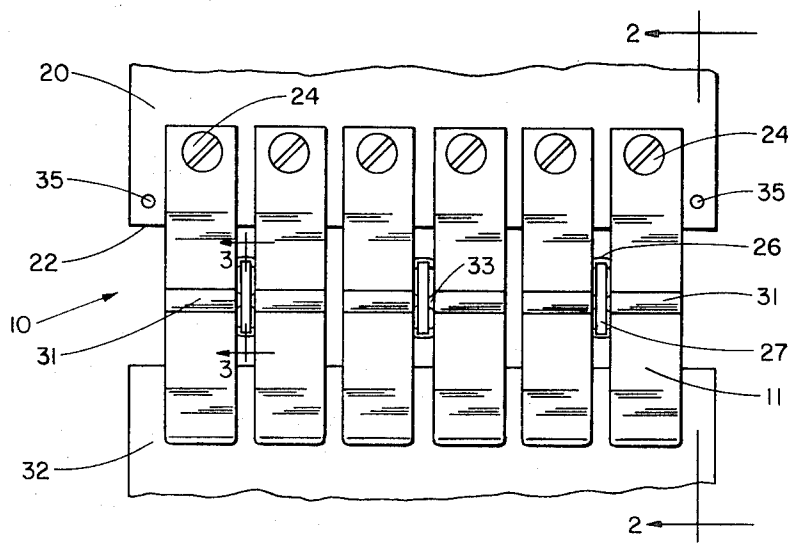


FIG. 1

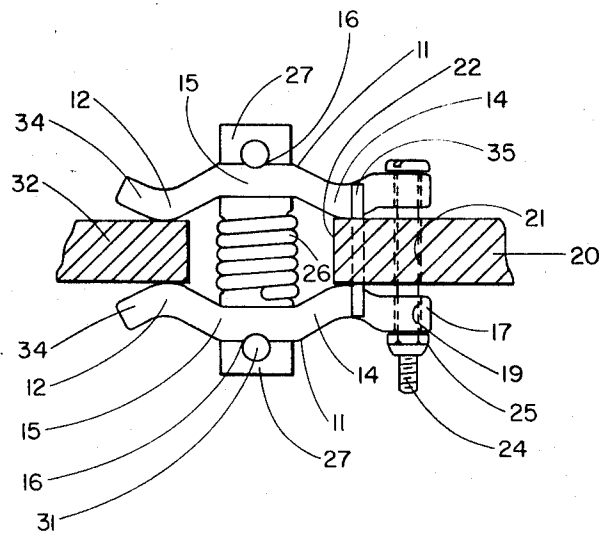


FIG. 2

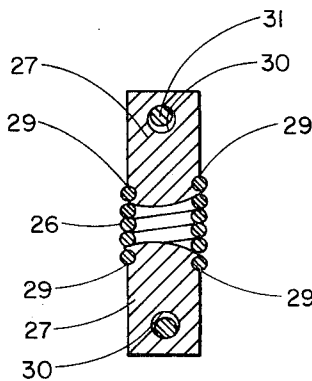


FIG. 3

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ELECTRICAL CONTACT ASSEMBLY

This application is a continuation of Ser. No. 58,906, filed July 28, 1970, and now abandoned.

SUMMARY OF THE INVENTION

The present invention relates to a disconnecting contact assembly for electrical apparatus. Prior art contact devices of this general type are excessively complex in construction, generally using two compression springs per pair of fingers with complicated spring holders. The contact fingers are usually attached to an intermediate holder which is in turn attached to the conductive bar. To avoid these limitations, prior art devices have to be provided with specially grooved conductive bars or with frames for structural support and alignment.

The present invention overcomes these disadvantages by providing contact fingers directly secured at one end on opposite sides of a conductive bar. The fingers are biased toward each other by tension springs secured between and acting upon adjacent pairs of contact fingers. The contact fingers are arranged to have rocking surfaces on the conductive bar and the spring holders are simple metal stampings each with a pin extending through it. Only one spring is required for two pairs of contact fingers.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a connector made in accordance with this invention;

FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, a contact assembly 10 in accordance with this invention comprises a plurality of spaced pairs of contact fingers 11. The upper and lower contact fingers 11 may be identically formed from substantially flat pieces of conducting material so that each has a bowed portion 12 and a similarly bowed portion 14. An intermediate planar portion 15 of each contact finger 11 may be provided with a transverse notch or indentation 16, and an end portion 17 of each, outwardly of its bowed portion 14, has an aperture 19 extending therethrough.

A movable conductive bar 20 is provided with a plurality of apertures 21 aligned in spaced apart relationship along, and a uniform distance from, an outer edge face 22 of the conductive bar 20. A pair of the fingers 11 is affixed on the conductive bar 20 at each aperture 21, one contact finger 11 being positioned on each side of the conductive bar 20 with the convex side of the bowed portions 12 and 14 directed inwardly and the apertures 19 aligned with the aperture 21 as shown in FIG. 2. Securing means such as a bolt 24 may be inserted respectively through the aligned apertures 19 and 21 and secured by a releasable fasteners such as a nut 25.

Adjacent pairs of the contact fingers 11 are biased inwardly by a tension spring assembly including a tension spring 26 and a pair of identical spring links 27. Each spring link 27 is a flat, substantially rectangular plate and is provided with grooves 29 in its opposite

side edges near one end for threaded securement to an end portion of its associated tension spring 26. An aperture 30 is punched near the other end of each of the links 27 to receive a bias pin 31. Each bias pin 31 is preferably of a length equal to the distance across a mounted spaced pair of the contact fingers 11 and has a central portion 33 of diminished cross section. Each bias pin 31 is fitted into its associated aperture 30 until the central portion 33 is loosely held within the aperture 30. Tensioning of the spring 26 between adjacent pairs of contact fingers 11 locks the central portion 33 within the aperture 30 and prevents longitudinal motion of the bias pin 31.

Each tension spring assembly is held between two adjacent pairs of contact fingers 11 by the positioning of the bias pins 31 in the indentations 16 on the intermediate planar portions 15 of the fingers 11. The inward surfaces of the bowed portions 14 of the contact fingers 11 abut the conductive bar 20 near the outer edge face 22 and serve as fulcrums for pivotal motion of the contact fingers 11. The inward biasing of the tension spring 26 thus causes outward motion of the end portions 17 of the upper and lower contact fingers 11 of each pair which is limited by abutment with the head of the bolt 24 and the nut 25, respectively.

The inwardly bowed portions 12 are adapted to grasp a fixed conductive bar 32, such as a bus bar, therebetween. Thus, the distance between the bowed portions 12 of each pair of contact fingers 11 should normally be less than the thickness of the fixed conductive bar 32. This distance can be selected by adjustment of the bolts 24 and nuts 25.

Insertion of the fixed conductive bar 32 in the contact assembly 10 spreads apart the upper and lower contact fingers 11 of each pair at the inwardly bowed portions 12, the contact fingers 11 pivoting on the bowed portions 14 causing inward motion of the end portions 17. The fixed conducting bar 32 is preferably of the same thickness as the movable conducting bar 20. The spread of the bowed portions 12 increases the tension of the spring 26. This force is applied substantially equally to the bowed portions 12 and the bowed portions 14 and enhances the electrical contact with the fixed conductive bar 32 and the movable conductive bar 20, respectively.

Open end portions 34 of the contact fingers 11 are flared outwardly to facilitate insertion of the conductive bar 32. The flared open ends 34 and independent action of the contact fingers 11 enable the contact fingers 11 to be fitted in electrical contact on a fixed conductive bar 32 when it is not in perfect alignment with the movable conductive bar 20. End pins 35 in the movable conductive bar 20 may be provided to prevent any inadvertent rotation of the contact fingers 11 about the axis of their associated bolts 24.

In this manner a disconnecting contact assembly is provided, having a simplified mounting and tension spring assembly. The contact fingers function without the use of frames or special alignment apparatus. It should be noted that the contact assembly of the present invention is similarly operable when secured to the fixed conducting bar 32 and used to grasp the movable conducting bar 20.

I claim:

1. A disconnecting contact assembly for effecting an electrical connection between first and second conductive members upon relative movement of substantially coplanar, generally flat connecting portions of the members toward each other, said assembly comprising one of the members, the connecting portion of said one of the members having apertures therethrough aligned in a row substantially parallel to and spaced inwardly from an edge thereof, a plurality of laterally spaced pairs of contact fingers aligned in a row along said edge with the fingers having respective outer end portions extending outwardly in the same direction from said edge, the contact fingers of each pair being disposed respectively on opposite sides of the connecting portion of said one member and having respective holes at their inner end portions substantially coaxially aligned with a respective one of the apertures, each of the contact fingers having a first contact surface in electrically conductive engagement with the connecting portion of said one member and a second contact surface at its outer end portion for electrically conductive engagement with the connecting portion of said other member upon movement of the members toward each other, a plurality of fastening means, each of said fastening means extending through one of the apertures and the pair of contact finger holes aligned therewith, and tension spring means disposed respectively between adjacent pairs of the contact fingers and biasing the contact fingers of each adjacent pair toward each other.

2. A contact assembly as in claim 1 wherein said first contact surface is in electrically conductive engagement with the connecting portion of said one member between the row of apertures and said edge.

3. A contact assembly as in claim 1 wherein said

fastening means is adjustable for varying the distance between the second contact surfaces of each pair of contact fingers.

4. A contact assembly as in claim 1 wherein said fastening means comprises bolts inserted respectively through the pairs of holes at the inner ends of the pairs of contact fingers and through the respective aligned apertures in said one conductive member and a releasable fastener secured to the bolt.

5. A contact assembly as in claim 1 wherein said edge of said one conductive member is straight and said pairs of contact fingers are aligned substantially perpendicular to said edge.

6. A contact assembly as in claim 1 wherein the first contact surface of each contact finger is a convex surface.

7. A contact assembly as in claim 6 wherein the second contact surface of each contact finger is a convex surface.

8. A contact assembly as in claim 1 wherein each tension spring means includes a tension spring and a pair of spring links each connected to an opposite end portion of the tension spring and wherein engaging means extending from the spring links engage the contact fingers of adjacent pairs of contact fingers for biasing the contact fingers of each pair toward each other.

9. A contact assembly as in claim 8 wherein each of the contact fingers has an outer surface provided with a groove, each spring link has an aperture and said engaging means comprises pin means held in the respective apertures in the spring links, each pin means having opposite end portions received respectively in the grooves of adjacent contact fingers.

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