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MATING TOOL

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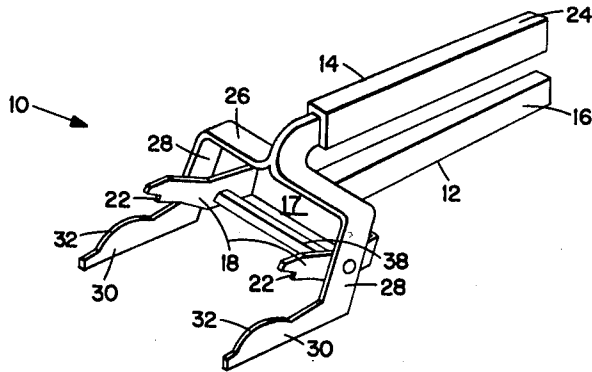


FIG. 1

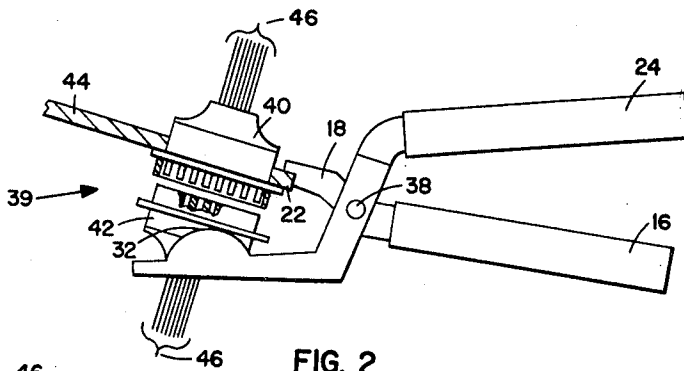


FIG. 2

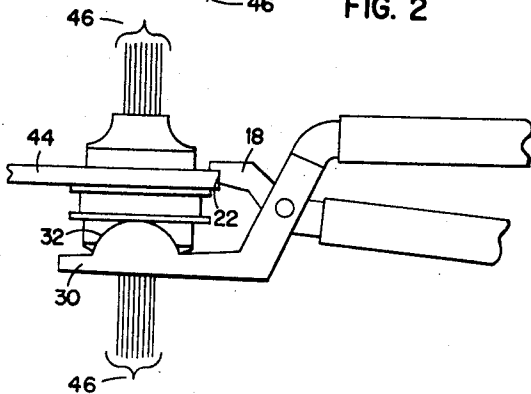


FIG. 3

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1

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6 Claims. (Cl. 29-206)

This invention relates to mechanical advantage devices and more particularly to a mechanical advantage device as may be used to facilitate the mating and unmating of electrical connectors.

Multi-pin electrical connectors are extensively used in the ground control components of various missile systems. The circuits carried by these connectors must be checked periodically to insure trouble-free operation. These circuits are checked by disconnecting the electrical connectors from their respective chassis and inserting each connector into a test board. As each connector may contain a great number of pins, as for example, 98 in one type of connector, mating and unmating of the connector to the test board chassis is difficult unless aided by a mechanical advantage device.

It is an object of this invention to provide a mechanical advantage device for use in the mating of electrical connectors.

A further object of this invention is to provide a pivoted lever type mechanical advantage tool to aid in the mating of multi-pin electrical connectors.

Another object of this invention is to provide a simple quick acting electrical connector mating tool.

A still further object of this invention is to provide a connector mating tool which distributes connecting force over a relatively large area of the electrical connector.

A yet further object of this invention to provide for unmating of the mated connector, accomplished by inserting an end portion of the device between the flanges of the mated connector, and causing the male and female members to separate.

These and other objects of this invention will become more apparent upon consideration of the following detailed description and accompanying drawings, in which:

FIGURE 1 is a perspective view of the connector mating tool;

FIGURE 2 is a view of the tool before connector mating; and

FIGURE 3 is a view of the tool after connector mating.

Referring to the drawings, FIGURE 1 shows the connector mating tool 10 including a pair of pivotally connected elements or members 12 and 14 respectively.

Element or member 12 includes a handle portion 16 and a forked shaped portion 17 having a pair of tines 18 provided with downward opening notches 22 formed in the ends thereof for purposes explained hereinbelow.

Element or member 14 includes a handle 24 and a downward projecting U-shaped portion 26 formed integral with one end of handle 24. Portion 26 is provided with a pair of inclined arms 28 which extend downwardly to straddle tines 18 of element 12. Arms 28 are provided with end portions 30 which extend substantially parallel with handle 24. Each of end portions 30 is provided with a cam surface 32 for purposes explained hereinbelow. Elements 12 and 14, respectively, are pivotally connected by an axial member 38 extending between the arms 28 and forked shaped portion 17.

As shown in FIGURE 2, an electrical connector 39 is respectively provided with male and female members 40 and 42 disposed in aligned relationship for mating. Male member 40 is affixed to and extends through a wall 44 of an electrical chassis (not shown). The male member is located adjacent an edge of the chassis to convey electric

2

circuitry 46 through chassis wall 44 to the interior of the chassis.

In operation, the mating tool is placed with cam surface 32 abutting electrical connector member 42 and with notches 22 engaging the edge of chassis wall 44. Force is then applied at handles 24 and 16 to supply a mechanical advantage through pivot 38 to the cam surfaces and notched ends of tool element 14 and 12 respectively. This mechanical advantage then forces tines 18, carrying notches 22, and cam surfaces 30 to be rotated to the position shown in FIGURE 3, thus mating the male-female electrical connector 39.

The spread of spaced tines 18 and the forked shaped configuration of element 26 insures the distribution of mating force over a large area of the electrical connector eliminating the possibility of mating only a partial section of the electrical connector.

During the mating process, cam surfaces 32 are rotated from a position shown in FIGURE 2 to that shown in FIGURE 3. During this process a continuous application of force is applied by cam surface 32 to electrical connector element 42. Thus it will be appreciated that this invention provides a means of effectively mating a multi-pin electrical connector.

It is to be understood that various modifications of the connector mating tool described herein can be resorted to without changing the size and scope of the invention as claimed.

The invention claimed is:

1. A mating tool comprising:

- (a) a member including a handle disposed for application of a force thereto;
- (b) a pair of arms disposed on said member, each of said arms having portions provided with an operating cam surface;
- (c) an element provided at one end thereof with tines, said element and member being pivotally connected together intermediate the ends thereof, and said element provided at its other end with a handle for application of a force thereto;
- (d) gripping means formed integral with each of said tines at the ends thereof;
- (e) said gripping means and said cam surface disposed in spaced apart facing relationship for arcuately moving toward and away from each other in response to application of appropriate force to each of said handles to adapt said gripping means and each said operating cam surface for performing a clamping function.

2. A device as set forth in claim 1 in which said pivot includes an axial member extending between said tines to connect said tines with said arm portions.

3. A device as set forth in claim 1 in which said arm portions each have a horizontally extending portion having said cam surface formed integral therewith.

4. A device as set forth in claim 1 in which said gripping means comprises a notch formed adjacent one end of each of said tines.

5. A mating tool disposed for mating male and female sections of an electrical connector comprising:

- (a) a member including a pair of downwardly extending leg portions each provided with a horizontally extending arm having a cam surface thereon for engagement with one of said connector sections;
- (b) an element pivotally connected to said member and provided with a pair of inclined leg portions each having a horizontally extending tine; and
- (c) gripping means carried adjacent the ends of each of said horizontally extending tines of said element and disposed for engagement with the other of said connector sections,

3

- (d) said gripping means and said cam surface disposed for movement in an arcuate path to grip said connector sections therebetween for mating said sections responsive to application of a force to said member and said element. 5
6. A mating tool for mating male and female sections of an electrical connector comprising:
- (a) a first member having a handle portion at one end and a pair of arms at the other end thereof, each of said arms having portions provided with a cam surface thereon; 10
- (b) a second member having a handle portion at one end and fine means at the other end, said fine means having gripping means integral therewith; 15
- (c) said first and second members being pivotally con-

4

- nected together at an intermediate portion of each of said members; and
- (d) said gripping means and cam surfaces being spaced apart and facing each other for arcuately moving toward and away from each other upon the appropriate application of forces to said handles so that said gripping means and cam surfaces are adapted to clamp a device.

References Cited by the Examiner

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WHITMORE A. WILTZ, *Primary Examiner*.THOMAS H. EAGER, *Examiner*.