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2,802,997

CONNECT AND DISCONNECT MECHANISM FOR ELECTRICAL UNITS

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Fig. 1.

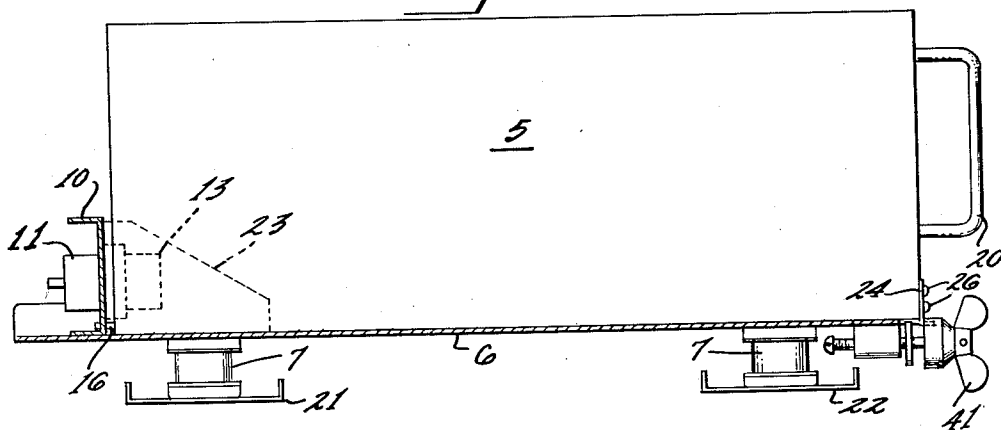


Fig. 2.

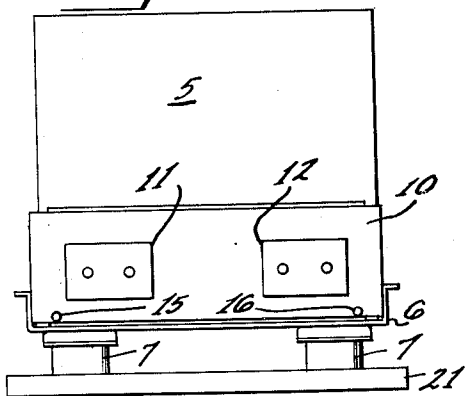


Fig. 3.

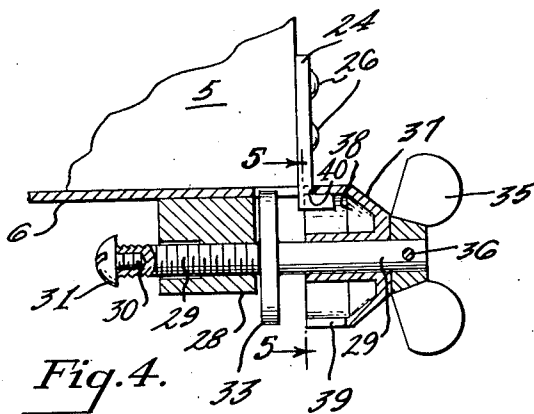
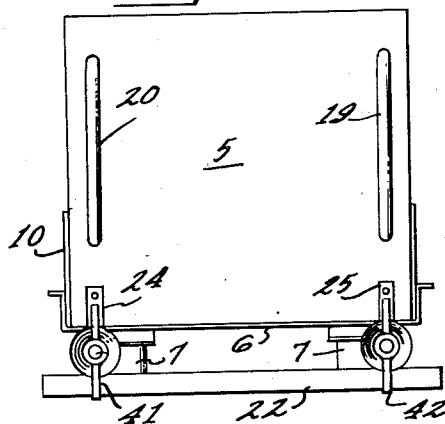
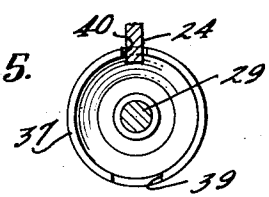


Fig. 4.

Fig. 5.



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1

2,802,997

CONNECT AND DISCONNECT MECHANISM FOR ELECTRICAL UNITS

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The terminal fifteen years of the term of the patent to be granted has been disclaimed

7 Claims. (Cl. 339-92)

This invention relates to electrical apparatus of the unit type wherein a group of elements are assembled into integral units which are then connected into a system by multiple pin connector plugs and sockets.

It is well known that radio, radar, and other communication apparatus utilize groups of elements providing certain functions, such as amplification, oscillation, etc., in the form of units, which may be connected into the systems as units. These units utilize multiple pin plugs and connector sockets which introduce a great deal of friction when connected and disconnected, thus requiring considerable manual effort. A system of this general type is disclosed and claimed in Knox Patent No. 2,514,246 of July 4, 1950.

In this patent, an amplifier or radio chassis unit is moved into position by means of a U-shaped handle mounted on the side of the unit and which functions as a lever, the handle remaining in an upright position after the unit is in place. Disconnection is started by moving the handle toward a horizontal position. Although such a device is suitable for certain apparatus, it has been found that in airborne radar and other communication equipment where space is at a premium, and where the number of pins being simultaneously connected is in the neighborhood of one hundred, a connector and disconnector device must be provided which has the power to make the connection and disconnection while not increasing the overall dimensions of the unit. The present invention is such a connecting and disconnecting device, and one which permits not only a straightline movement of the unit with respect to the base on which the unit is mounted and the cooperating plugs on the base, but also permits a sidewise action to aid in making both the connection and disconnection.

The principal object of the invention, therefore, is to facilitate the connecting and disconnecting of a multiple pin electrical unit to a base member of an electrical system.

Another object of the invention is to provide an improved connector and disconnector for a multiple pin electrical unit.

A further object of the invention is to provide an improved mechanism for moving a multiple plug electrical unit into and out of connection with a base member of an electrical system and for holding the unit in connected position on its base.

The novel features which are believed to be characteristic of this invention, both as to the manner of its organization and the mode of its operation, will be better understood from the following description when read in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevational view of an electrical unit embodying the invention;

Fig. 2 is one end view of the unit shown in Fig. 1;

Fig. 3 is the other end view of the unit shown in Fig. 1;

Fig. 4 is a cross-sectional view of one of the connecting and disconnecting units embodying the invention; and

2

Fig. 5 is a view taken along the line 5-5 of Fig. 4.

Referring now to the drawings in which the same numerals identifying like elements, an electrical unit is enclosed in a rectangular housing 5. The unit may house the electrical elements of an oscillator, an amplifier, or similar electrical unit used in electrical apparatus, such as a radar system. The unit is adapted to be attached and detached to and from a U-shaped base member 6 supported on anti-vibration mounts 7 attached to supports 21 and 22. The rear of base member 6 has a U-shaped plug bracket 10 attached thereto in any suitable manner, such as by welding, riveting or bolting, the bracket being provided with end braces such as shown at 23. Mounted on the bracket 10 are two male plugs 11 and 12 which may have in the neighborhood of thirty-five to fifty connector pins each, a portion of one plug being shown by the dotted lines 13.

To insure alignment of the connecting plugs, two pins 15 and 16 project from the member 10 and are accommodated in suitable holes in the frame of unit 5 when the proper alignment is made between unit and base. The pins 15 and 16 also aid in holding the unit on the base 6 when the unit is in final position on its base. Handles 19 and 20 are provided for the unit 5.

At the front of the unit 5 are two L-shaped brackets 24 and 25 which may have their long legs attached to the unit 5 by bolts or rivets shown at 26 in Fig. 4. The short legs of the brackets extend below the base 6 and have their upper surfaces flush with the lower surface of the base. Attached to the lower surface of the base 6 in any suitable manner are blocks, one of which is shown in cross-section at 28 in Fig. 4. These blocks are internally threaded to accommodate threaded rods or screws such as shown at 29. Referring to Fig. 4, screw 29 is threaded along half its length for threading in block 28. One end of the screw is internally threaded to accommodate a screw 30 having a head 31 which extends beyond the outside surface of the screw. In this manner, the shoulders of the head 31 serve as a stop for the screw 29 when moved to the right. Fixedly mounted on the rod 29 is a disc 33, while on the end of the rod is a wing nut 35 pinned to the shaft by pin 36. Loosely mounted on the rod 29 is a conical washer 37 which has an annular opening 38, a large opening or notch 39, and a smaller opening or notch 40 opposite opening 39 in the large diameter flange portion of the washer.

As mentioned above, two of the fastening units are employed at each front corner of the base 6, the wing nuts being shown at 41 and 42. Thus, to operate the fastening devices, the unit 5 is placed on the base 6 and the pins 15 and 16 aligned with their holes in the unit 5, which will align the pins of respective male and female connecting plugs. When the unit 5 is positioned on the base 6, the large notches in washers 37 are at the top so that the short legs of the brackets 24 and 25 may easily pass into the annular openings 38. The conical washers are then rotated to the positions shown in Fig. 4 so that the smaller notches 40 accommodate the longer legs of the brackets 24 and 25. This prevents the washers from rotating when the wing nuts are rotated. The wing nuts 41 and 42 are then rotated and the washers 37 move the unit 5 along base 6 to complete connecting positions of the plugs. Since the applied power is determined by the pitch of the threads of the bolt 29, a very powerful pressure may be brought to bear on the unit 5. Furthermore, if any side action is desired to aid in making the connection or disconnection, each wing nut may be operated individually to move each corner of the unit a small distance.

Now, to remove the unit from the base, the wing nuts

35 need only be rotated on the reverse direction and the discs 33 will contact the rear sides of the brackets 24 and 25. The necessary amount of pull may now be applied to the unit to disconnect the pins and the unit from its base. The wing nut fasteners require a small amount of space, do not increase the dimensions of the unit in the directions where space is at a premium, and they are sufficiently powerful to make connection and disconnection with the combined number of pins in the neighborhood of one hundred. Furthermore, in association with pins 15 and 16, the fastening devices serve to hold the unit in a fixed position on its base since the washers 37 are tightly locked to their respective brackets.

We claim:

1. A device for connecting and disconnecting an electrical unit having multiple pin connectors to and from a base comprising a pair of brackets attached to the lower corners of one side of said unit, screws having an enlarged disc at approximately the centers thereof, means for attaching said screws to said base, washers rotatable on said screws, said washers having openings therein for accommodating said brackets, and manual means for moving said washers into contact with said brackets for locking said washers to said brackets and moving said unit in one direction when said screws are rotated in one direction, said discs contacting the other sides of said brackets and moving said unit in the opposite direction when said screws are rotated in the opposite direction to their first mentioned direction of rotation by said manual means.

2. A device in accordance with claim 1, in which said manual means are wing nuts attached to the ends of said screws, and said brackets have right angled projections therefrom for holding said unit in position on said base.

3. A device in accordance with claim 1, in which said washers are conical with annular openings therein and peripheral openings, said last mentioned openings permitting entrance of said brackets to said annular openings and for locking said washers to said brackets.

4. A device in accordance with claim 1, in which said brackets are L-shaped, one leg of each bracket being positioned in one of said annular openings.

5. A device for moving a unit into and out of a certain

position and to hold said unit in said position comprising a rod threaded over a portion thereof, a disc fixedly attached to said rod approximately at the center thereof, means at one end of said rod for manually rotating said rod, a mount for the threaded portion of said rod, rotation of said rod moving said rod axially, a hollow washer rotatable on said rod, and a member fixedly attached to said unit and having a portion positionable within said washer and adapted to contact said washer, rotation of said said rod in one direction moving said washer in contact with said member for moving said member, and rotation of said rod in the opposite direction moving said disc in contact with said member for moving said member in the opposite direction.

6. A device in accordance with claim 5, in which said hollow washer is conical in shape, means being provided at one end of said rod for limiting the axial movement of said rod in one direction.

7. A device for moving a unit into and out of a certain position comprising a rod threaded over a portion thereof, a disc fixedly attached to said rod approximately at the center thereof, means at one end of said rod for manually rotating said rod, a mount for the threaded portion of said rod, rotation of said rod moving said rod axially, a washer rotatable on said rod, and a member fixedly attached to said unit and positioned between said disc and washer, rotation of said rod in one direction moving said washer in contact with said member for moving said member, and rotation of said rod in the opposite direction moving said disc in contact with said member for moving said member in the opposite direction, said washer being conical and having an annular opening therein and peripheral openings, said member being L-shaped, one leg of said member being adapted to pass through one of said peripheral openings into said annular opening and the other leg of said member being accommodated in said other peripheral opening to prevent rotation of said washer during rotation of said rod.

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