# United States Patent [19]

**Hague**

[11] **3,850,496**

[45] **Nov. 26, 1974**


[54] **CONNECTOR BLOCK FOR HERMETIC MOTOR COMPRESSOR**


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[73] Assignee: **General Electric Company**, Louisville, Ky.



[22] Filed: **June 28, 1973**

[21] Appl. No.: **374,529**

[52] **U.S. Cl.** ..... **339/64 M**, 339/192 RL

[51] **Int. Cl.** ..... **H01r 13/62**, H01r 21/02

[58] **Field of Search** ..... 339/176 R, 176 M, 191 M, 339/192, 193, 218, 221, 276 F, 64



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*Attorney, Agent, or Firm*—Francis H. Boos



[57] **ABSTRACT**

An electrical terminal assembly for use in conducting current through the wall of a sealed motor compressor unit and more particularly to a connector block for effecting an electrical connection between the terminal assembly and the motor compressor unit wherein the terminals in the connector block are held in axial alignment relative to the cooperating terminals on the terminal assembly.


**10 Claims, 7 Drawing Figures**

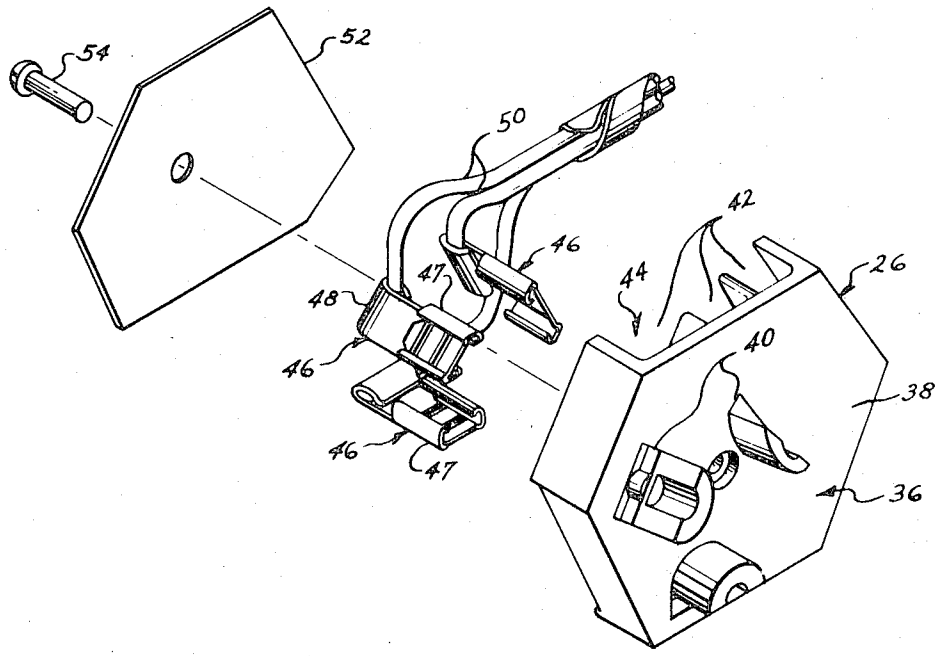
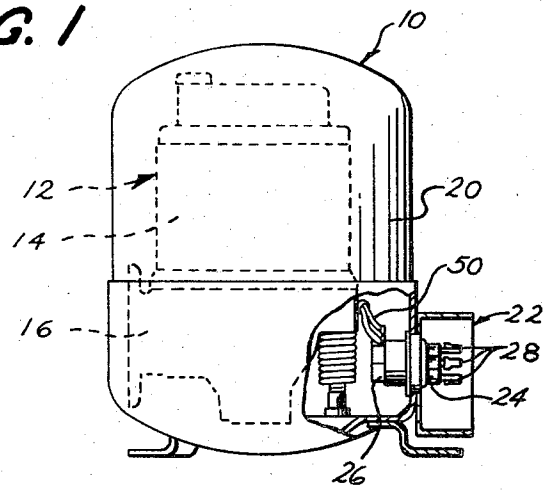


FIG. 1



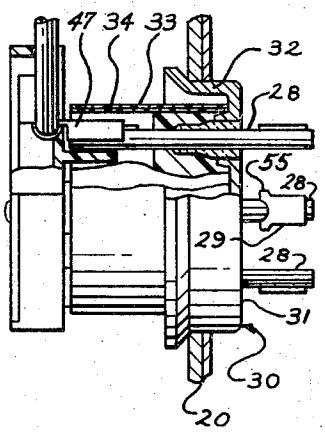




FIG. 2

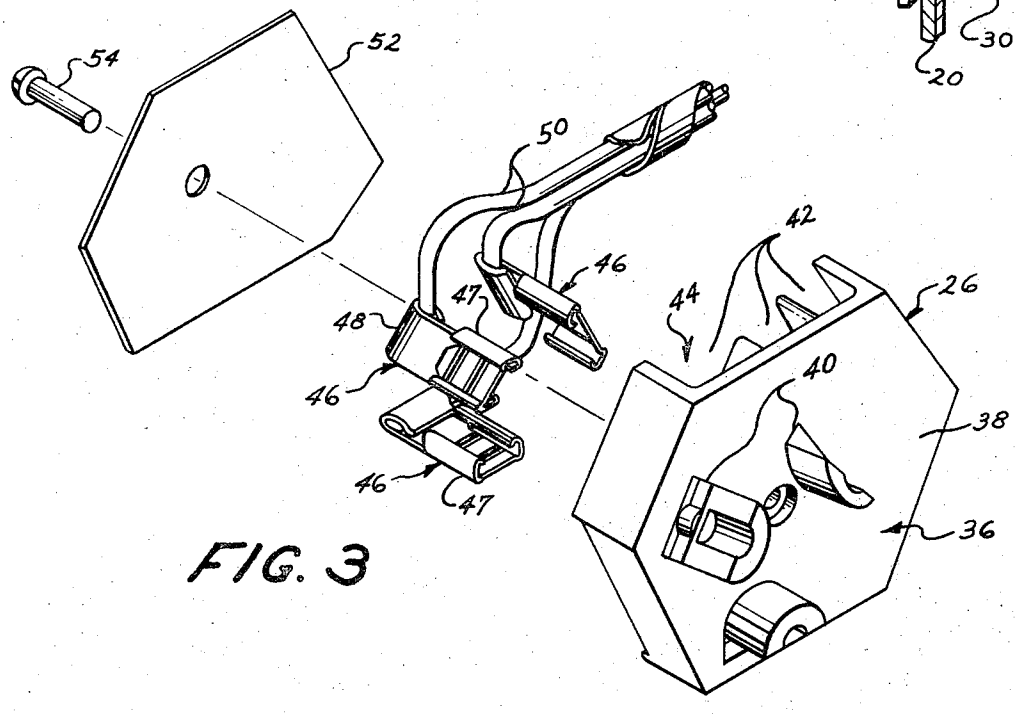



FIG. 3

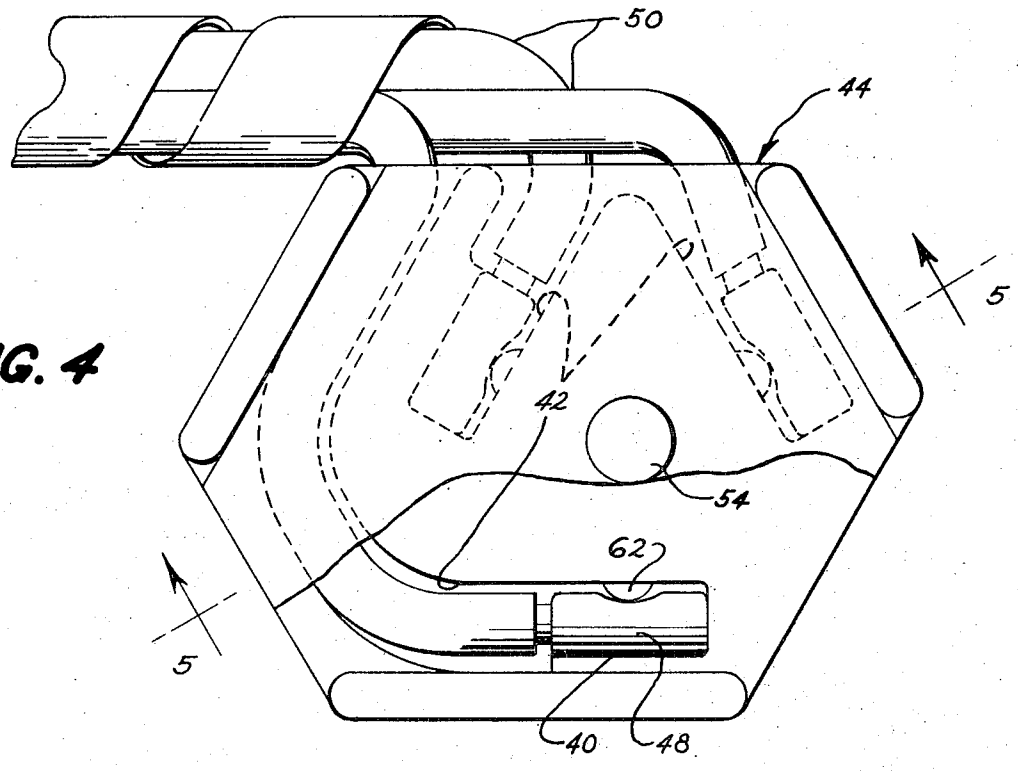



FIG. 4

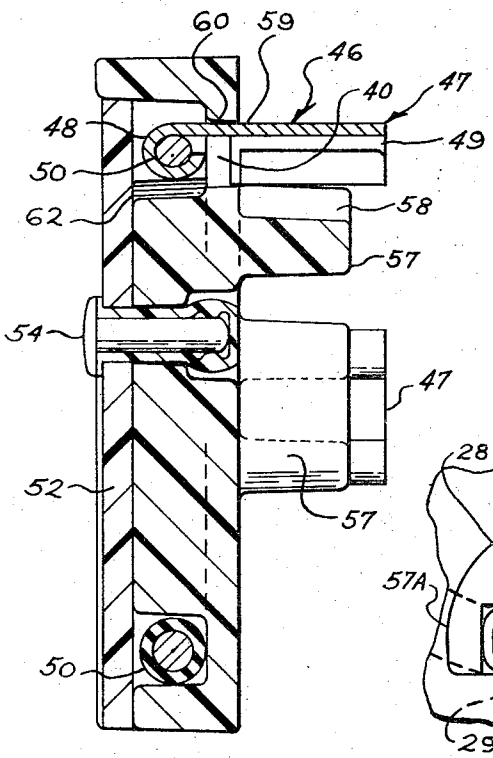



FIG. 5

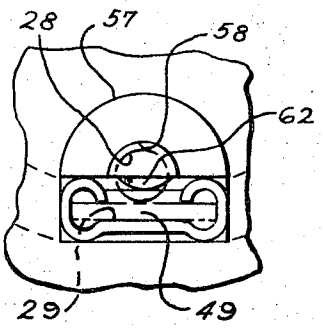



FIG. 6

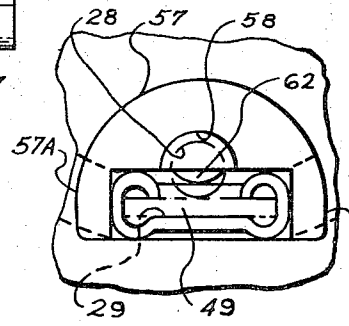



FIG. 7

# CONNECTOR BLOCK FOR HERMETIC MOTOR COMPRESSOR

## BACKGROUND OF THE INVENTION

This invention relates conductor to terminal assemblies for making electrical connection between a motor component of a hermetic motor compressor unit and a plurality of conductor pins projecting into the compressor casing and more particularly to a connector block for engaging the conductor pins for effecting an electrical connection with the conductr pins.

Motors used in the manufacture and assembly of hermetic compressor units generally are supplied with the conductors attached to the motor and terminal clips attached to the free ends of the conductors. Some of the current devices used to maintain electrical integrity between the motor and terminal assembly such as described in U.S. Pat. No. 3,160,460 Wyzenbeek are devices that are designed specifically for particular applications and are fabricated around specially designed terminal clips and as a result are costly. As such, the parts of these devices must be manufactured and assembled in the limited quantities needed for each application.

In other applications such as described in U.S. Pat. No. 3,206,715 — Skony wherein a plurality of conductors, in the present instance three are required to effectively connect the motor to the terminal assembly, terminal clips that are pre-assembled on the conductors are utilized in fabricating a connector. However, in this type of connector the terminal clips are disposed within the body of the connector which make the installation of the connector to the terminal assembly difficult in that a visual observation is not always possible. Other methods of effecting electrical connection between a case mounted terminal assembly and a moveable motor unit is to individually place each conductor terminal clip on the terminal assembly. In these installations if during the normal operation vibrations one of the clips becomes displaced from its cooperating conductor pin of the terminal assembly, the motor compressor unit is electrically disconnected from the terminal assembly and the entire hermetic unit must be replaced.

This condition is especially critical where the individual clips have been forced or distorted when they are mounted on the pins and the frictional engagement has in effect been weakened so that the integrity of the connection is questionable.

## SUMMARY OF THE INVENTION

In accordance with the illustrated embodiment of the present invention, there is provided an electrical connector block member adapted to be mounted on a terminal assembly of a hermetic compressor unit. The connector block is arranged to hold a plurality of flag receptacles in alignment with corresponding connector pins on the terminal assembly. The flag receptacles are positioned to project perpendicular to the connector block body and are arranged in the connector block such that clearances in the vicinity of the crimp area adjacent the conductor at the base of the flag limit movement of the flag in one direction, while the alignment of projections formed adjacent the free ends of the flag, limit the rotation of the flag receptacles in the other direction thereby maintaining the flags in relative alignment with respect to the connector pins. The conductor leading to the motor assembly from the flag receptacles are routed inside the connector block in such a manner as to emerge at one outlet so that their routing to the motor is as a single wire bundle that is easily positioned away from the internal parts of the motor compressor unit to eliminate frictional wearing of the wire insulation.



## DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary elevational view of a hermetic motor compressor unit showing the present embodiment of the invention mounted internally of the hermetic casing;

FIG. **2** is a fragmentary partially sectional view illustrating the terminal assembly including the connector block of the present invention;

FIG. **3** is an exploded perspective view showing the details of the connector block;

FIG. **4** is a plan view of the assembly of the connector block;

FIG. **5** is a sectional view taken substantially along lines **4—4** of FIG. **4**;

FIG. **6** is a plan view showing the details of one receptacle of the connector block; and

FIG. **7** is a plan view showing the details of another embodiment of the receptacle of the connector block.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein a preferred embodiment of the invention has been shown and more particularly to FIG. **1**, the basic components of the refrigerant compressor assembly **10** are of conventional construction and include a motor compressor unit **12** comprising an upper motor section **14** and a lower compressor section **16.** The entire unit is supported on spring assemblies **18** connected to the compressor case or shell **20.** In order to electrically connect the motor **14** to an electrical power source there is provided a connector assembly **22** consisting of a terminal assembly **24** mounted directly on the side wall of the case **20** and a connecting block **26** for electrically connecting the terminal assembly **24** to the motor **14.** The terminal assembly **24** used in connection with the present invention is provided with a plurality of conductor pins **28,** three such pins being used in the present application of the invention. The terminal assembly as shown in FIGS. **1** and **2** of the drawing comprises a metal body member **30** including a flat end wall **31** bounded by a cylindrical side wall **32** which can be welded to the compressor case **20.** The conductor pins **28** extend through the body **30** and are electrically insulated therefrom. The conductor pins **28** are positioned to project through the terminal **24** in both directions with each of the ends thereof being provided with a flat tab **29.**

The terminal assembly thus far described is of the general structure illustrated for example in the aforementioned U.S. Pat. No. 3,160,460. The present invention, however, is illustrated in its use in conjunction with the terminal assembly shown and described in detail in U.S. Pat. No. 3,721,948 — Brandt et al., assigned to the General Electric Co., assignee of the present invention. In the terminal assembly disclosed in the Brandt et al. U.S. Pat. No. 3,721,948 the individual pins **28** are isolated from each other by sleeves **33** which are enclosed by and wedged within a tubular

member 34 encompassing all of the terminal conductor pins 28.

In accordance with the present invention means are provided for electrically connecting the motor 14 to the inner side of the terminal assembly 24 and more specifically to the inwardly projecting ends of the conductor pins 28. This means comprises, as shown in FIGS. 3, 4, 5 and 6 of the drawings, the connecting block 26 which is fabricated from any suitable dielectric material and includes a body portion 36 having an outer face or wall 38 which is provided with a plurality of sockets or openings 40 corresponding in location and in number to the conductor pins 28 of the terminal assembly 24.

The body portion 36, FIG. 4, is provided with channels 42 leading from each of the openings 40 to a common exit or outlet 44 formed on one end of the body member 36. Arranged to extend through each of the openings 40 is a female terminal clip or flag receptacle 46, FIG. 5, which engages a tab 29 of a corresponding connector pin 28. The flag receptacles 46 are of the standard 90° or right angle type widely used in many appliances, and are sold by suppliers of electrical terminals such as the "American Pamcor Inc." The flag receptacle 46 as customarily used is crimped at its base 48 to a suitable conductor wire 50 so that the flag or receptacle end 47 extends substantially perpendicular to the axis of the conductor 50. The receptacle end 47 is formed to provide a receiving area 49, FIG. 6, which engages and holds the tabs 29 of the conductor pins 28.

As can easily be seen with reference to FIGS. 4 and 5, the connector block assembly 26 is completed with the insertion of the receptacle end 47 into the openings 40 and their respective conductors 50 placed in its corresponding channel 42. In order to maintain the conductors 50 and flag receptacles 46 in the assembled connector block 26 a cover or holding member 52 is provided. The cover 52 may be secured as by a plastic expansion rivet 54 to the body portion 36.

To axially locate the receptacle ends 47 for receiving the conductor pins 28 the tabs 29 are provided with ears 55. The connecting block 26 as shown in FIG. 2 is positioned on the terminal assembly 24 so as to be spaced from the free end of the tubular member 34 with the receptacle ends 47 located within the corresponding sleeves 33. This spacing between the free end of the tubular member 34 and the face 36 of the connecting block 26 is such that any contaminants that may be present would not be trapped within the confines of the sleeves 33.

Means are provided in the present embodiment of the invention to maintain the flag receptacles 46 in a substantially perpendicular mode with reference to the face 38 of the body member 36 so that all of the receptacle ends 47 are axially aligned with their respective parallel connector pins 28 to insure the smooth engagement of the receptacle end 47 with the pins 28. Formed on the face 38 of the body member 36 in the area defined by the openings 40 and adjacent each of the openings 40 are projections or stops 57 which extend substantially perpendicular to the body member 36 and substantially parallel to a properly aligned receptacle end 47. Each of the stops 57 is provided with a recess portion 58 which in the present embodiment receives the conductor pins 28 as illustrated by broken lines in FIG. 6. With reference to FIG. 5 it will be seen that any movement in a clockwise direction by the receptacle end 47 is limited by its engagement with the stop 57. The receptacle end 47 is dimensioned to fit snugly in the openings 40 so that rotation of the receptacle 47 towards the projection 57 causes the back side 59 of the receptacle 47 to engage the wall 60 of the opening 40 opposite the projection 57 thereby restricting movement of the receptacle 47 in the clockwise direction as viewed in FIG. 5. In effect the clockwise rotation of the receptacle end 47 is limited between the stop 57 and the wall 60 of the opening 40. Movement of the receptacle 46 in the opposite or counterclockwise direction as viewed in FIG. 5 is restricted by a projection 62 formed in each of the channel areas 42 below each of the stops 57.

With reference to FIGS. 4 and 5 it will be seen that a portion of the cross-sectional dimension of the crimp area 48 may be less than that of the receptacle end 47. Predictably this narrower cross-section is generally in the central portion of the crimp area 48 and the projection 62 is located and dimensioned to engage this generally narrow cross-sectional portion.

In effect, counterclockwise rotation as viewed in FIG. 5 is limited by the engagement of wall 60 by the back side 59 of the flag receptacle 46 and of the projection 62 by the crimp area 48.

Referring now to FIG. 7 it will be noted that in the embodiment shown therein the stop 57 is provided with extension 57*a* that extends along the end of the openings 40 to restrict movement of the flags 47 to the right or left as viewed in FIG. 7.

It is possible in installations of this type that the electrical integrity of the connection between an individual flag receptacle 46 and its corresponding conductor pin 28 may be effective, while at the same time the frictional engagement may not be sufficient to maintain the connection of an individual connection during the operation of the motor compressor 12 and the resultant vibration and relative movement between it and the case 20.

As can easily be understood from the foregoing description of the present embodiment that electrical connection would be maintained, in the event one or even two of the flag receptacles 46 are damaged or somewhat expanded so that the frictional integrity is no longer effective to maintain them on the conductor pins 28, the remaining or undamaged flag receptacles would be sufficient to maintain the damaged receptacles in their effective engaged positions on the conductor pins.

The construction of the block 26 and resulting assembly are such that alignment of the flag receptacles 46 and the tabs 29 is assured during assembly. Individual flag receptacles can be damaged by improper insertion angle or side to side movement during assembly.

While in accordance with the Patent Statures, there has been described what, at present, is considered to be the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made thereto without departing from the invention, and it is intended therefore in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed as new and is desired to be secured by letters Patent of the United States is:

1. In a hermetically enclosed motor compressor assembly having a housing provided with an opening in which is disposed a terminal assembly having a plurality of spaced metal conductor pins projecting through and extending beyond the inner and outer sides of said terminal assembly, the improvement comprising:

a connector block having a body portion of dielectric material for electrically connecting said motor compressor to said internally projecting conductor pins;

said body portion having openings formed in one face thereof equal in number and spacing to the number of said conductor pins;

channel means formed in said body portioncommunicating from each of said openings to a common outlet; portion communicating

conductors disposed in said channel means having flag receptacles secured on one end thereof for insertion through said openings and having the other ends extending through said outlet to be connected to said motor compressor;

said flag receptacles including a crimped portion located in said channel means and a flag portion projecting through said openings substantially perpendicular to said conductor element;

projections formed on the body portion adjacent one side of each of said openings and extending substantially parallel to the flag portion of said receptacle to engage said flag portion and restrict movement thereof in one direction, the side of said openings opposite each of said projections being left open;

second projections formed in each of said channel means in alignment with and below each of said first projections to engage said crimped portion of said flag receptacle to restrict movement of said flag receptacle in an opposite direction thereby maintaining said flag receptacle in relative alignment with a cooperating conductor pin for insuring the axial insertion of all of said flag receptacle on corresponding conductor pins.

2. The invention of claim 1 wherein a cover member being secured to said connector block to retain the said conductor elements in said channel means and to control the distance the flag portion of said terminal clips project through the openings in said connector block thereby insuring proper axial alignment of said flag portion on said conductor pin.

3. The invention of claim 2 wherein said first and second projections are located in the area formed by said openings in said body portions.

4. The invention of claim 3 wherein said conductor pins are provided with tab portions at their free ends thereof for engagement with said flag receptacles.

5. The invention of claim 4 wherein said first projections are provided with a recess area for receiving said conductor pins when said tab portion is in engagement with said flag receptacles.

6. In a hermetically enclosed motor compressor assembly having a housing provided with an opening in which a terminal having a cup-shaped metal body member including a side wall and an end wall and having a plurality of spaced apertures therein, metal conductor pins projecting through said aperture and having their terminal portions projecting at opposite side walls of said body member, a tubular member of insulating material positioned in said cup-shaped member with one end portion engaging said end wall, sleeves of insulating material surrounding and in spaced relationship with each of said pins within said tubular member, the improvement comprising:

a connector block having a body portion of dielectric material for electrically connecting said motor compressor to said internally projecting conductor pins;

said body portion having openings formed in one face thereof equal in number and spacing to the number of said conductor pins;

channel means formed in said body portion communicating from each of said openings to a common outlet;

conductors disposed in said channel means having flag receptacles secured on one end thereof for insertion through said openings and having the other ends extending through said outlet to be connected to said motor compressor;

said flag receptacles including a crimped portion located in said channel means and a flag portion projecting through said openings substantially perpendicular to said conductor element;

projections formed on the body portion adjacent one side of each of said openings and extending substantially parallel to the flag portion of said receptacle to engage said flag portion and restrict movement thereof in one direction, the side of said opening opposite each of said projections being left open;

second projections formed in each of said channel means in alignment with and below each of said first projections to engage said crimped portion of said flag receptacle to restrict movement of said flag receptacle in an an opposite direction thereby maintaining said flag receptacle in relative alignment with a cooperating conductor pin for insuring the axial insertion of all of said flag receptacles on corresponding conductor pins.

7. The invention of claim 3 wherein said terminal assembly includes a tubular member of insulating material positioned in said cup-shaped member with one end engaging said end wall, sleeves of insulating material surrounding and in spaced relationship with each of said pins within the said tubular member,

the free ends of said tubular member and sleeves engaging said connector block to axially position said block in its engaged position on said terminal.

8. The invention of claim 7 wherein said first and second projections are located in the area formed by said openings in said body portions.

9. The invention of claim 8 wherein said conductor pins are provided with tab portions at their free ends thereof for engagement with said flag receptacles.

10. The invention of claim 9 wherein said first projections are provided with a recess area for receiving said conductor pins when said tab portion is in engagement with said flag receptacles.

* * * * *

# UNITED STATES PATENT OFFICE

# CERTIFICATE OF CORRECTION

Patent No. 3,850,496 Dated November 26, 1974

Inventor(s) Joe T. Hague

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 16

After outlet; delete "portion communicating"

Column 5, line 45

After said, delete "terminal clips", substitute

--receptacle--

Signed and sealed this 11th day of March 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks