

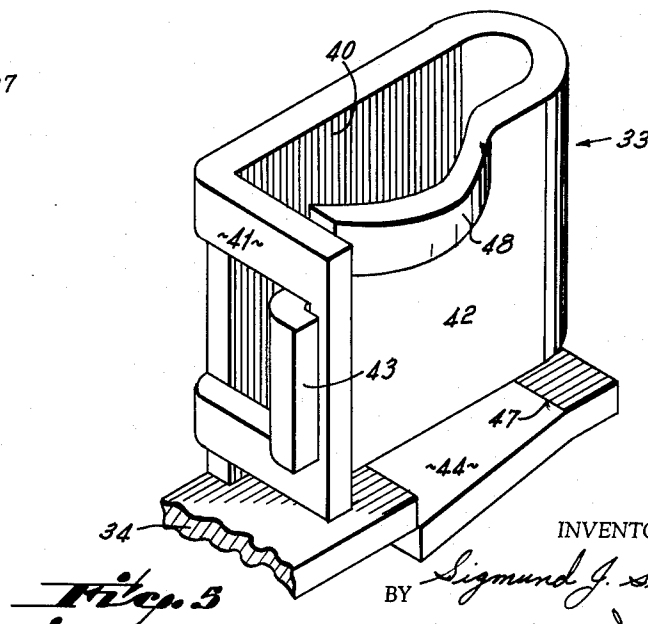
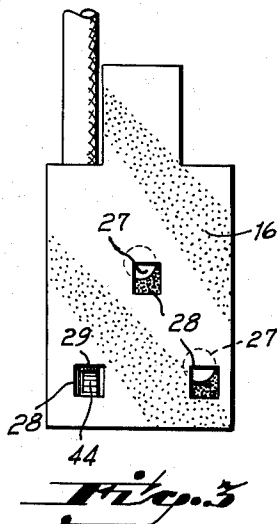
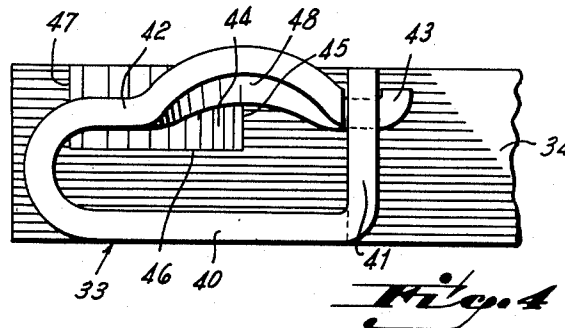
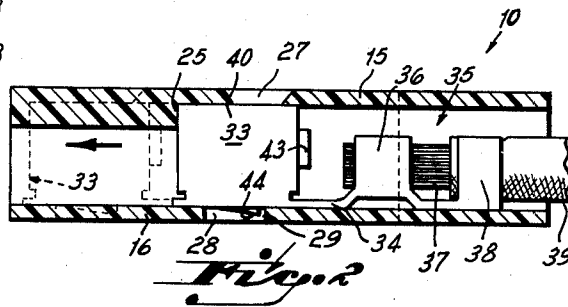
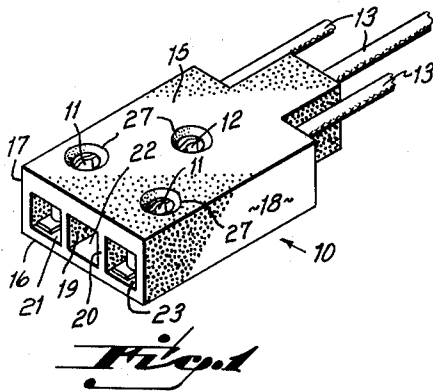
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S. J. SKONY

3,206,715

CLUSTER ASSEMBLY AND CONNECTOR CLIP THEREFOR

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INVENTOR.

BY *Sigmund J. Skony*
Wood, Herron & Evans
 ATTORNEYS

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3,206,715

CLUSTER ASSEMBLY AND CONNECTOR CLIP THEREFOR

Sigmund J. Skony, Cincinnati, Ohio, assignor to Van Products, Inc., Cincinnati, Ohio, a corporation of Ohio
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This invention relates to a cluster assembly constituted by an insulative block and a plurality of connector clips disposed in said block in spaced relation to each other, the assembly being adapted to be applied to a plurality of conductive terminal pins.

Cluster assemblies of this type are used principally inside of a hermetically sealed compressor. The compressor is a compact device having a motor driven compressor unit disposed in a hermetically sealed casing the device normally being used in refrigerators and air-conditioners. The cluster assembly is one of the important elements used in the compressor for it forms the connection of the compressor motor to an external power supply. Obviously, it must make a good electrical connection with the pins to which it is applied or the complete refrigerator or air-conditioner will not function.

Because of the continuing effort to reduce the size of the compressor casing, it is desirable that the cluster assembly be as compact as possible. Production line methods of manufacturing the compressor require further that the cluster assembly be easily applied to the terminal pins and that rejects, occasioned by the failure to make proper electrical connection, be minimized or eliminated.

There are other considerations involved in the manufacture of a cluster assembly as will appear from the following discussion of certain manufacturing steps involving the cluster assembly. In practice, the supplier of the cluster assembly manufactures, or has made for him, an insulative block into which connector clips are adapted to be disposed. That supplier manufactures a ribbon of connector clips which will be separated one at a time from the ribbon at such time as conductor leads are applied to the clips.

These blocks and clips are shipped to an intermediate manufacturer as for example, a motor manufacturer. There, the clips are crimped onto conductor leads and then the clips are inserted into the insulative blocks and the free ends of the leads are soldered or welded to the stator windings of a motor. Normally, the motor manufacturer will apply the cluster assembly to test pins in order to test the stator windings. The tested stators with leads and cluster assemblies attached, are shipped to the compressor manufacturer and, during the final assembly of the compressors, the cluster assembly is applied to a three pin header inside of the compressor casing.

In my earlier cluster assembly disclosed in application Serial No. 91,182, now Patent 3,101,985, issued August 27, 1963, I have employed a connector clip in which the receptacle or pin receiving portion is formed by a strip of metal whose ends are butted together to form a closed socket. This connector clip has been used successfully for many years and is the subject of my Patent No. 2,559,174. It has been subject to the disadvantage, however, that, if improperly applied to a terminal pin, the butting ends of the strip can become spread apart so that the clip does not engage the pin as tightly as will a properly applied clip. If the clip and pin connection is not tight enough and fails to meet requirements as to electrical conductivity, the clip must be removed and a new one applied. If for any reason it is necessary to remove the connector clip from the cluster assembly, that removal is made difficult because of the somewhat rigid detent at

the end of the clip receptacle which is employed to retain the clip in the connector block.

It has been an objective of the invention to provide a connector clip which is able to withstand the rigors of misapplication to terminal posts without becoming sprung and unable to form a proper electrical connection.

It has been still another objective to provide a cluster assembly combination in which the terminal clip is adapted to be removed easily from the insulative block in which it is mounted for the purpose of replacement and repairs.

It has been yet another objective of the invention to provide a connector clip in which the receptacle is formed by a U-shaped strip of metal having its free ends locked against that spreading apart which would result in an improper electrical connection.

It has been still another objective of the invention to provide a connector clip having a flat shank overlying one end of the receptacle, the shank having a resilient detent struck from it for the purpose of holding the connector clip in the insulative block. Cooperating with the detent is a hole in the connector block, the edge of which forms the abutment which the resilient detent engages, the hole further providing access to the detent by a pointed instrument so that the detent can be bent sufficiently to permit the easy removal of the connector clip from the insulative block.

These and other objectives of the invention will become more readily apparent from the detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a cluster assembly employing my invention.

FIG. 2 is a cross-sectional view taken longitudinally through the center of the cluster assembly.

FIG. 3 is a bottom plan view of the cluster assembly with two of the connector clips removed.

FIG. 4 is a top plan view of the receptacle portion of the cluster assembly.

FIG. 5 is a perspective view thereof.

The cluster assembly comprises an insulative block 10 in which two lateral connector clips 11 and one central connector clip 12 are disposed. Each connector clip is crimped to a lead conductor 13.

The insulative block has a top wall 15, which faces in the direction of application of the assembly to terminal pins, and a bottom wall 16. The top and bottom walls are joined by transverse side walls 17 and 18 and transverse internal walls 19 and 20. The transverse walls 17 to 20 form three longitudinal passageways 21, 22 and 23. As illustrated in FIG. 2, within each longitudinal passageway is a shoulder 25 against which the connector clip bears to restrict its movement in one direction. The shoulder in the central longitudinal passageway 22 projects more deeply into the insulative block than do the shoulders in the side passageways 21 and 23 in order to dispose the connector clips equi-angularly about the insulative block. The top wall of the cluster block has three holes 27 through which terminal pins project when the cluster assembly is applied to the terminal pins. The bottom wall has three holes 28 through which access may be had to the connector clips with purpose of removing them. One edge 29 of each hole provides a detent surface or abutment cooperating with the connector clip to restrict the movement of the connector clip when it is properly disposed in the insulative block.

Each connector clip has a receptacle 33 joined by a shank 34 to a ferrule portion 35, the ferrule portion having a first pair of arms 36 to be crimped to the bared end of a conductor 37 and the second pair of arms 38 to be crimped to the insulation 39 on a conductor.

The receptacle is formed by a U-shaped strip having a flat wall 40 terminated in a female latch tab 41 and a

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second wall 42 terminated in an L-shaped male latch tab 43. The male latch tab 43 projects into the female latch tab to secure the free ends of the U-shaped receptacle from spreading apart.

The shank 34 is integral with the flat wall 40 and lies at right angles to the wall 40 to overlie one end of the receptacle. The shank has a resilient detent 44 struck from it, the detent being cut along edges 45 and 46 and being bent outwardly away from the receptacle along the line 47.

The second wall 42 is flared outwardly as at 48 to provide a mouth which facilitates the introduction of the terminal pins into the receptacles.

In the operation of the invention, the connector clips are introduced into the insulative blocks in the direction of the arrow shown in FIG. 2. The resilient detent 44 struck from the shank 34 rides along the inside surface of the bottom wall 16 until it reaches the hole 28. The resilience of the detent then springs it into the hole 28, the edge 29 of which, engaged by the detent, blocks removal of the connector in the opposite direction. The forward end of the receptacle is engageable with the shoulder 25 in the longitudinal passageway and consequently further movement in the direction of the arrow is blocked. The combined shoulder 25 and the detent 29 position the connector immediately below the pin receiving openings 27 in the top wall of the insulative block.

When the three connector clips with their leads attached have been positioned in the insulative block as described above, the cluster assembly is ready for application to three equiangularly spaced terminal pins. When applied to the pins, the flexibility of the metal from which the clips are formed permits the pins to slide into the opening of the receptacle. The resilience of the metal causes the pins to be tightly gripped between the walls 40 and 42 of the receptacle. The latch tabs 41 and 43 cooperate to prevent spreading away of the wall 42 from the wall 40 to such an extent as might tend to reduce the effectiveness of the connector clip. Even if the terminal pin is not applied precisely parallel to the walls 40 and 42 during insertion, the walls will not spread away from each other to too great an extent.

Further, the application of the terminal pins to the connector clips is facilitated in another respect by the flat shank 34. That flat shank, bearing against the bottom wall 16 of the insulative block tends to maintain the pin receptacles in proper alignment, that is, tends to prevent their twisting within the respective longitudinal passageways when the terminal pins are applied.

In the event that it becomes necessary to remove one or more of the connector clips from the insulative block, a pencil, small screwdriver or the like can be introduced through the opening 28 to bear against the detent 44 to bend it back to the plane of the shank 34 from which it was struck. When the detent 44 is pushed into the plane of the shank, the connector clip can easily be slid out of the insulative block in a direction opposite to that of the arrow in FIG. 2. Thus, there is no problem presented by the need for replacement of the insulative block or any of the connector clips.

Having described my invention, I claim,

1. A cluster assembly comprising, a connector block having opposed top and bottom walls, three longitudinal passageways in said block, said top wall having three holes through which terminal pins may pass, said bottom wall having three holes defined by edges which form detent surfaces, connector clips in said passageways, each having a receptacle adapted to receive terminal pins, said receptacle being formed by a U-shaped strip having its free ends latched, each receptacle having a shank integral with one leg of said U-shaped strip and overlying one end of said receptacle,

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a detent projecting from said shank and engageable with a detent surface in a respective hole in said bottom wall to restrict movement out of said passageway in one direction,

and a shoulder in each said passageway engageable by a receptacle to block movement of a clip in an opposite direction.

2. A cluster assembly comprising, a connector block having opposed top and bottom walls, three longitudinal passageways in said block, said top walls having three holes through which terminal pins may pass, said bottom walls having three holes defined by edges which form detent surfaces, connector clips in said passageways, each having a receptacle adapted to receive terminal pins, each receptacle having a shank integral therewith and overlying one end of said receptacle, a detent projecting from said shank and engageable with a detent surface in a respective hole in said bottom wall to restrict movement out of said passageway in one direction, and a shoulder in each said passageway engageable by a receptacle to block movement of a clip in an opposite direction.

3. A cluster assembly comprising, a connector block having opposed top and bottom walls, three longitudinal passageways in said block, said top walls having three holes through which terminal pins may pass, said bottom walls having three holes defined by edges which form detent surfaces, connector clips in said passageways, each having a receptacle adapted to receive terminal pins, each receptacle having a shank integral therewith and overlying one end of said receptacle, and a detent projecting from said shank and engageable with a detent surface in a respective hole in said bottom wall to restrict movement out of said passageway.

4. A cluster assembly comprising, a connector block having opposed top and bottom walls, three longitudinal passageways in said block, said top walls having three holes through which terminal pins may pass, said bottom walls having three holes defined by edges which form detent surfaces, connector clips in said passageways, each having a receptacle adapted to receive terminal pins, each receptacle having a flat shank integral therewith and overlying one end of said receptacle, a resilient detent struck from said shank and engageable with a detent surface in a respective hole in said bottom wall to restrict movement out of said passageway in one direction, and a shoulder in each said passageway engageable by a receptacle to block movement of a clip in an opposite direction.

5. A connector clip comprising, an elongated flat shank having a ferrule portion at one end of said shank and having side edges, a receptacle-forming strip projecting perpendicularly from said shank and integrally from one of said side edges, said strip being bent upon itself to provide two generally parallel walls joined by a bent portion of said strip and disposed perpendicularly with respect to said shank, one of said walls having a free end portion extending perpendicularly toward said other wall, said free end portion having a hole therein whereby said free end portion forms a female latch tab, the other of said walls having a male latch tab projecting from its free end, said male latch tab being

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inserted in the hole in said female latch tab to lock the free ends of said walls together, and said shank having a detent struck from it and projecting away from said receptacle.

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JOSEPH D. SEERS, *Primary Examiner.*