

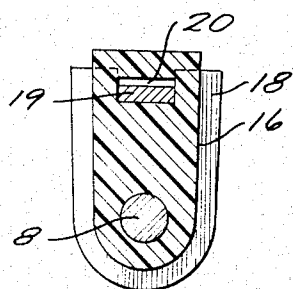
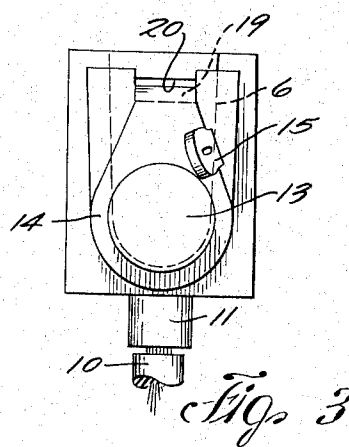
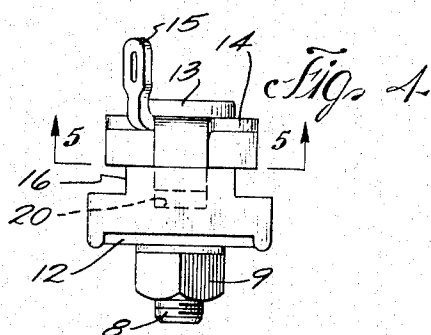
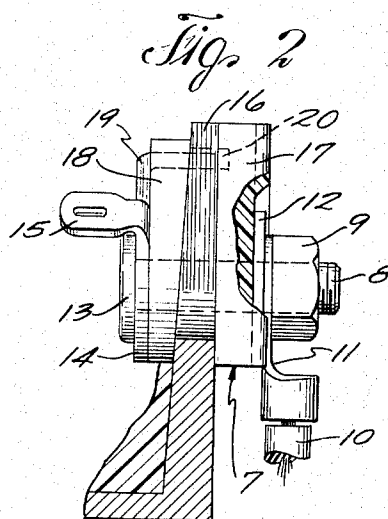
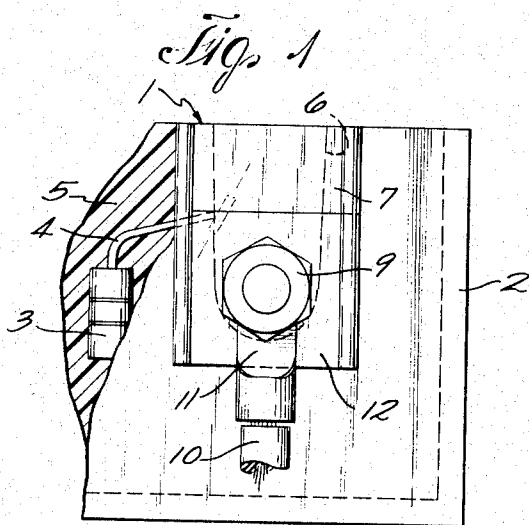
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ELECTRICAL TERMINAL UNIT

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ELECTRICAL TERMINAL UNIT

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This invention relates to a terminal unit and particularly to a terminal unit mounted in a housing wall for connection to an internal potted electronic system.

In the construction of electronic assemblies, potted constructions may be employed wherein the circuit components are embedded within a plastic mass. For example, in applicant's copending application entitled, Solid State Ignition System, filed on Apr. 1, 1966, with Ser. No. 539,533, and assigned to the same assignee as the present application, a highly improved capacitor discharge ignition system is mounted within a metal housing which is then filled with a suitable potting material to seal the components and physically support the components and electrical connections within the housing. The external connections to the circuit are made through terminal units mounted to the side of the terminal box with the connections being made through a bolt-type connection.

The present invention is particularly directed to the terminal units as shown and described in such application.

In the interconnection of the components through a bolt-type connection, the turning force applied to the terminals exerts a turning force on the internal connection and tend to disrupt the material and connection.

The terminal unit of this invention has been found to provide a highly improved interconnection means whereby the terminal connection can be made without disruption of the internal connection.

Generally, in accordance with the present invention, the terminal unit includes a body formed of a suitable insulating material and fitted within an edge slot or opening in the housing. The terminal unit is provided with a specially formed mating groove adapted to tightly mesh with edge walls of the housing opening. Generally, the groove is formed with a generally U-shaped base wall which tapers inwardly toward the bottom or web portion such that as the body is inserted into the housing, a compressive lateral force is exerted on the body between the base. Further, the width of the base varies from the upper end of the arms to the lower portion with the one wall being generally planar, a vertical type wall, and the other disposed at an angle thereto such that the width of the groove increases from the top to the bottom portion in accordance with the configuration of the wall of a die cast housing. The terminal bolt or the like is secured within the body with an outer connecting end which receives a nut or other similar rotating clamping member and an inner terminal plate abutting the inner face of the body. An outer clamping plate is disposed over the bolt adjacent the body and is of a width in excess of the width of the groove. The terminal plate is also shaped to extend beyond the edges of the opening and further includes laterally outwardly bent lip mating with a groove or slot provided in the plastic body. The lip extends outwardly with an outer portion disposed between the two edges of the housing opening.

The terminal member also includes an appropriate integral tab connection or the like to receive a connection to an internal potted component.

A force applied to the bolt member by the nut compresses the body between the inner and outer plates. A turning force is also applied to the inner plate and transmitted through the laterally extending tab or lip to the

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body member. The location of the tab between the edge slots results in compression forces on the body existing between the slot edge and the tab.

In the present invention, the supporting body is therefore essentially only under compressive forces. The material of the body is capable of withstanding relatively large compressive forces and consequently exceptionally large turning forces can be applied with minimal danger of damage to the internal connection. Further, as a result of creating only compressive forces cracking of the body will not effect the strength of the connection. The tapered surfaces of the groove provide an initial compressive force on the body to produce a firm physical interconnection. As a result, the terminal is adapted to employment in potted components and the like.

The drawing furnished herewith illustrates a preferred construction of the present invention in which the above advantages and features are clearly disclosed as well as others which will be clear from the following description.

In the drawing:

FIG. 1 is a fragmentary elevational view of a housing employing the terminal unit of the present invention;

FIG. 2 is an enlarged side elevational view of the terminal unit shown in FIG. 1;

FIG. 3 is an inner view of the terminal unit;

FIG. 4 is a top view of the unit shown in FIGS. 1-3; and

FIG. 5 is a view taken generally on line 5-5 of FIG. 4.

Referring to the drawing, a terminal unit 1 constructed in accordance with the present invention is shown secured in a wall of an open top box-like housing 2. An electrical component 3 is disposed therein connected to the terminal unit 1 by a lead 4. A potting material 5 fills the housing 2 to totally cover the inner portion of the terminal unit 1, component 3 and the connection therebetween. The housing 2 may for example include the components of an internal-combustion engine such as disclosed in the previously referred to application. The housing 2 is a die-cast member having the wall tapered generally as shown in FIG. 2 and includes a U-shaped upper edge slot or opening 6 having tapered edges within which the terminal unit 1 is secured.

The terminal unit 1 of this invention as shown in a preferred construction generally includes a body 7 of plastic or other similar insulating material secured within the opening 6.

A connection bolt 8 extends through the body with the outer end threaded to receive a clamping nut 9 or the like. An exterior lead 10 terminates in an eyelet terminal 11 which is clamped between the nut 9 and a bearing plate 12 for interconnection to an external circuit. The bearing plate 12 is a width in excess of the width of the groove.

The inner end of the bolt 8 is provided with a clamping head 13 with a terminal plate 14 welded or otherwise secured thereto and abutting the inner face of the body 7. The plate 14 generally conforms to the interior configuration of the body and in particular extends beyond the edges of the wall opening 6. Plate 14 includes a lead connecting tab 15 to which the lead 4 is soldered or otherwise connected to form an interconnection to the internal circuit component 3. In assembly, the terminal unit 1 is assembled with the housing 2 and interconnected to the internal circuitry. The housing 2 is filled with the suitable potting material 5 to enclose the component 3 and particularly the interconnection to the terminal unit 1. As a result, it is highly important that the terminal unit be so constructed that the external connection is made without disruption of the internal circuit connection, or the like.

As most clearly shown in FIGS. 2-4, the body 7 of the present invention is a generally rectangular member having a pair of outer vertical edge flanges within which the plate 12 is mounted on the bolt 8 for firm interconnec-

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tion of the terminal 11 by turning of nut 9. Plate 12 is particularly important to prevent damage to the body when making high current circuits.

The plastic body 7 is thicker than the housing wall and is provided with a generally U-shaped edge groove extending along the sides and bottom portion of the body 7 to mate with the opening 6.

As shown most clearly in FIGS. 2-4, the bottom wall 16 of the groove tapers inwardly from the outer side arm portions to the bottom connecting portion. Further, the outer wall 17 of the groove is a generally vertical wall abutting the exterior surface of the housing adjacent the opening 6. The interior wall 18 of the groove is formed at a slight angle to that of the outer wall 17 such that the groove width increases generally in accordance with the increasing thickness of the housing wall. When body 7 is inserted within the housing, the tapered construction permits ready assembly to the opening while establishing a tight fit. A suitable adhesive may also be employed to firmly lock the terminal unit to the housing.

In accordance with the present invention, the interior plate 14 is generally a tear-drop member with the lower portion conforming to the lower U-shaped configuration of the inner portion of the body 7 such that it extends laterally of the edges of opening 6. The upper end or neck of the plate 14 includes the connecting tab 15 and also includes a locking tab 19 which projects laterally and outwardly into a recess 20 formed in the upper end of the body 7. The recess 20 extends outwardly into the exterior portion of the body 7 and the tab 19 extends outwardly at least into the intermediate portion between the edges of opening 6. The width of tab 19 and of the recess 20 generally corresponds.

In operation, tightening of the nut on the bolt 8 compresses the body between the plates 12 and 14 and also between the tab 19 and a corresponding edge of the opening 6. The resistance of the plastic body to a compressive force is very substantial and consequently large turning forces can be accommodated without pulling of the connecting bolt from the housing or turning of the plate 14 and disruption of the connection. As a result, the exterior interconnection can be made many times and by unskilled labor.

The present invention thus provides a highly improved terminal unit for interconnecting of electrical components to internally mounted and potted units secured within a housing.

Various modes of carrying out the invention are contemplated as being within the scope of the following invention particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. A terminal connector for connection to a support having a mounting opening, comprising

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a body of insulating material having a central opening, said body having edge grooves at opposite sides of the central opening which include side walls and a bottom wall, said grooves generally corresponding to the mounting opening for mating therewith,

a contact pin extending through the opening and having an inner plate-like member abutting the inner face of the body, said member extending laterally outwardly of the bottom wall of the groove and including a tab, the outer end of the tab extending laterally into a slot in the body, the opposite end of said pin being adapted to receive a clamping member for securing a contact member to the pin, and an outer plate-like member engaging the outer face of the body and aligned with the inner plate-like member, said outer plate-like member extending laterally outwardly of the bottom wall.

2. The terminal connector of claim 1 wherein said tab projects between edges of the opening.

3. In the terminal connector of claim 1 wherein the inner plate-like member includes a circular head integral with the pin and a plate welded to the pin, said plate having said tab extending therefrom.

4. The terminal connector of claim 1 wherein the mounting opening is an edge slot in a wall which increases in thickness from the top inwardly and the edges of the slot taper inwardly to a curved bottom portion and the groove continuously increases in width and tapers inwardly in accordance with the edge slot.

5. The terminal connector of claim 1 wherein the edge grooves are connected at the inner end to form a U-shaped groove, and the inner plate is a tear-drop shaped member having a portion corresponding to the inner wall portion of the groove and having said tab integrally formed as the upper end of the tear-drop shaped member and extending between the edges of the opening.

6. The terminal connector of claim 1 in combination with a housing forming said support, and a potting material filling said housing and covering the interior portion of said terminal connector and the connection to the plate-like member.

References Cited

UNITED STATES PATENTS

1,888,384	11/1932	Hyde	339-126 X
2,672,500	3/1954	Bondon	339-94
2,788,386	4/1957	McCarty	339-126 X
3,138,418	6/1964	Dazley et al.	339-125 X

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