United States Patent [19]

Bromberg

[11] **3,920,304**

[45] **Nov. 18, 1975**

[54] **CONVERSION KIT FOR LIQUID TIGHT CONNECTOR**

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[73] Assignee: **Thomas & Betts Corporation,** Elizabeth, N.J.

[22] Filed: **Jan. 6, 1975**

[21] Appl. No.: **538,806**

[52] **U.S. Cl.** ..... **339/94 M;** 339/143 R; 339/186 R

[51] **Int. Cl.²** **H01R 7/02**

[58] **Field of Search** ... 339/94 R, 94 A, 94 M, 94 C, 339/177 R, 177 E, 217 R, 217 S, 60 R, 60 C, 60 M, 143 R, 186 R, 186 M; 174/78

[56] **References Cited**

UNITED STATES PATENTS

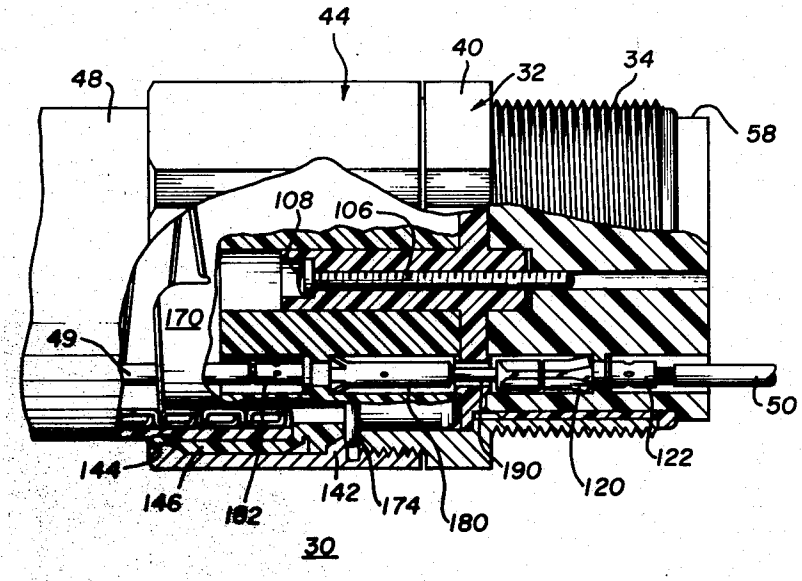
2,419,018	4/1947	Gudie	339/89 M
3,004,236	10/1961	Dickenson et al.	339/136 M
3,008,116	11/1961	Blanchenot	339/136 M
3,187,297	6/1965	Gluntz	339/217 S
3,493,672	2/1970	Bromberg	174/78

Primary Examiner—Joseph H. McGlynn
Assistant Examiner—James W. Davie
Attorney, Agent, or Firm—David Teschner; Jesse Woldman

[57] **ABSTRACT**

A conversion kit for converting to a multi-pin disconnect, a liquid tight connector of the type employed with a plastic sheathed, flexible, metallic conduit comprising a first insert body having a plurality of bores extending therethrough, a flange insert having an equal number of bores and means to fasten together the first insert body and flange insert in the connector body. Further, said kit includes a second insert body having a plurality of bores therethrough assembled to a ground cone positionable within the connector gland. Male or female pins are positioned in the various bores in any desired complementary order so that one female and one male pin unites whenever the connector body and gland are assembled. An assembly pin on the flange insert and a correspondingly shaped bore in the second insert body assure proper assembly of the body and gland.

9 Claims, 21 Drawing Figures



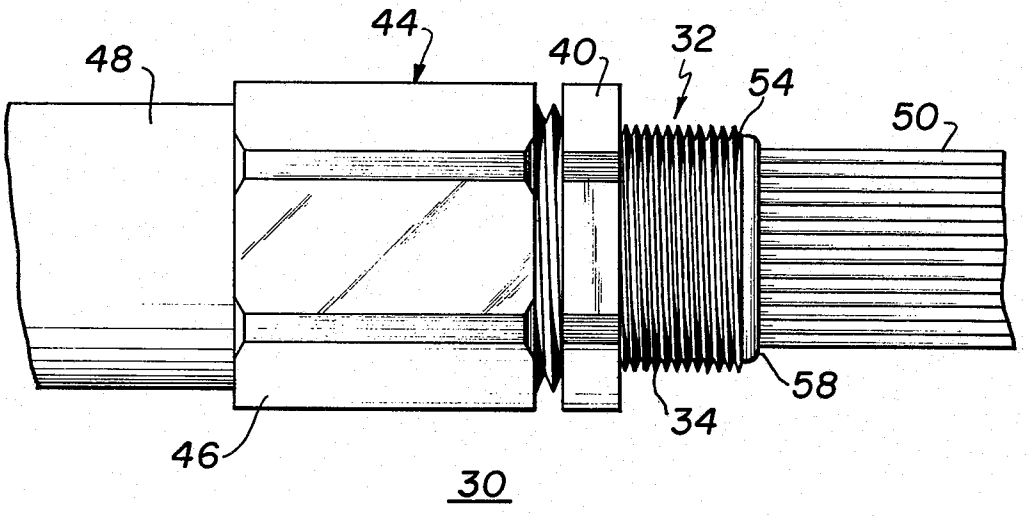


FIG. 1

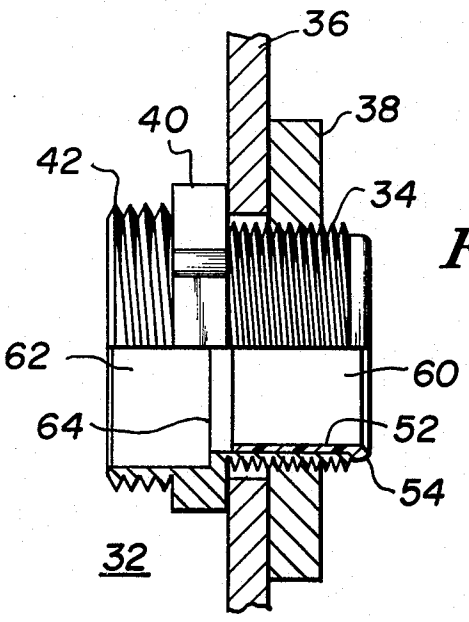


FIG. 2

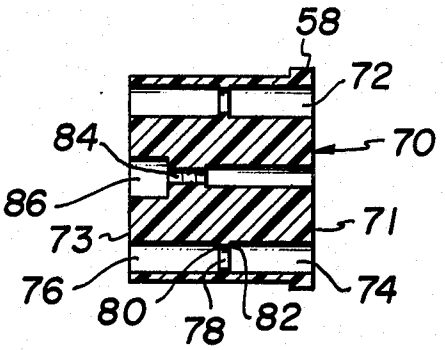


FIG. 3

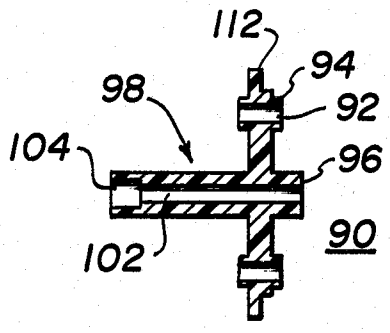


FIG. 4

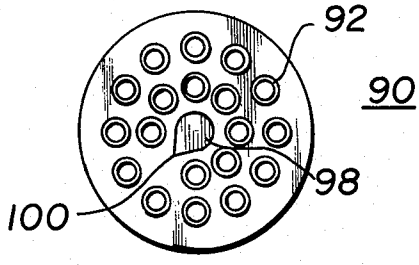


FIG. 5

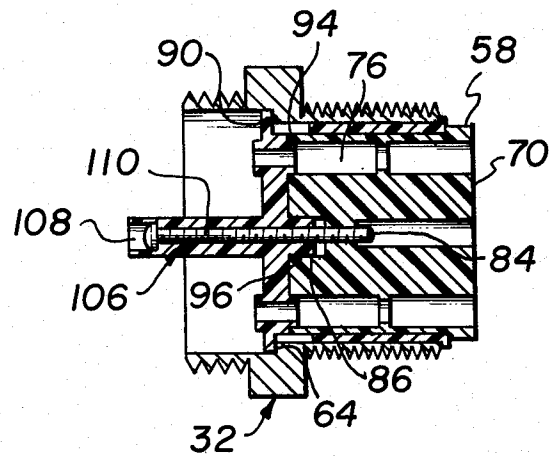


FIG. 6

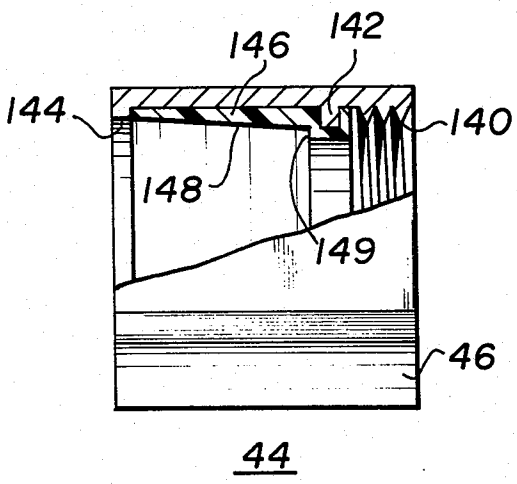


FIG. 7

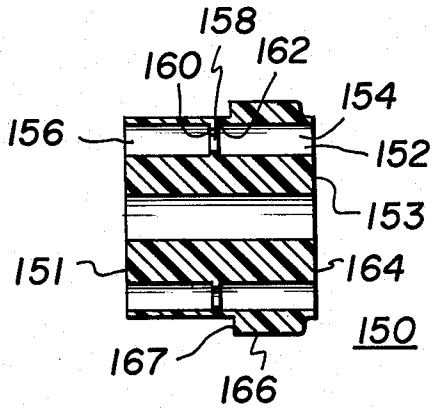


FIG. 8

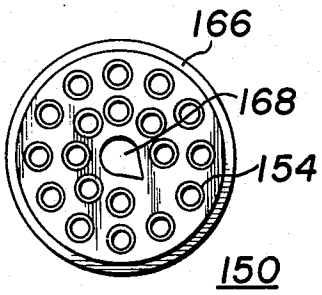


FIG. 9

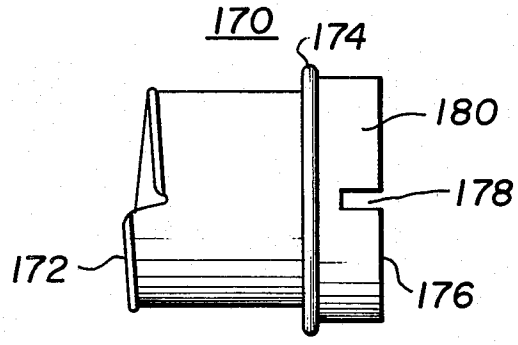


FIG. 10

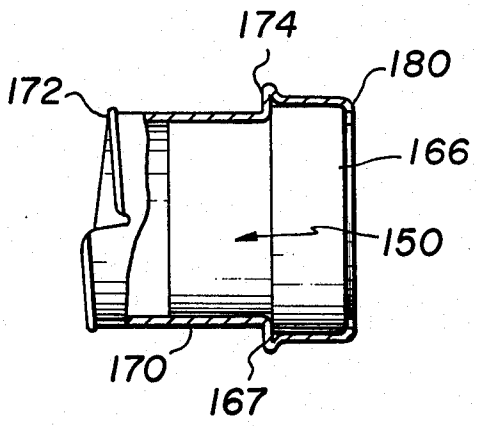


FIG. 11

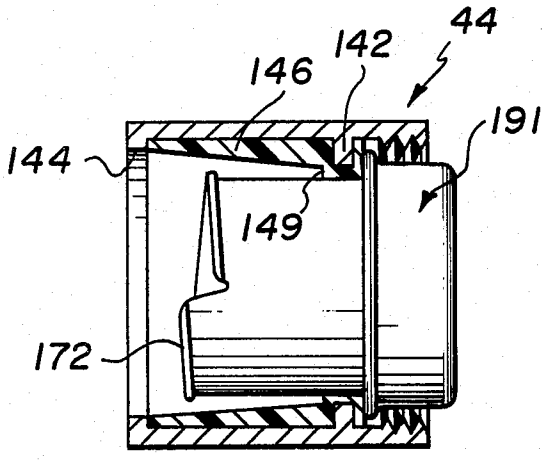


FIG. 12

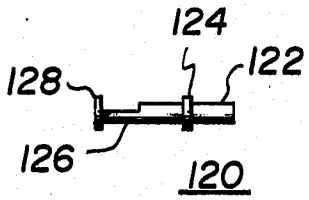


FIG. 13

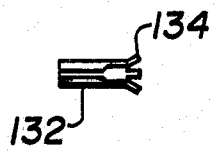


FIG. 14

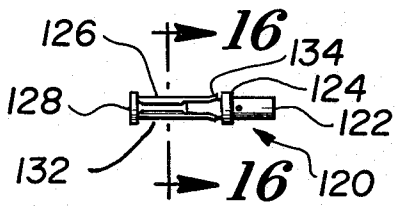


FIG. 15

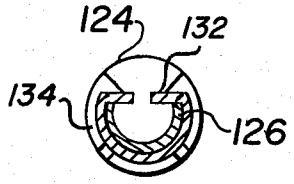


FIG. 16

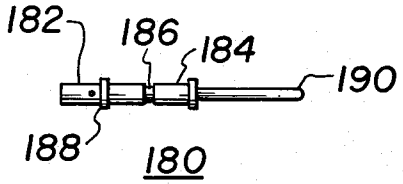


FIG. 17

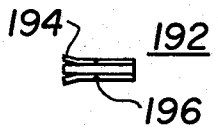


FIG. 18

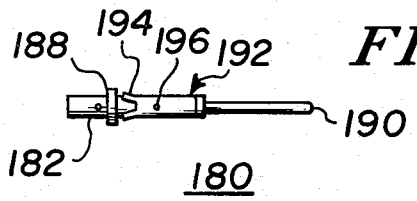


FIG. 19

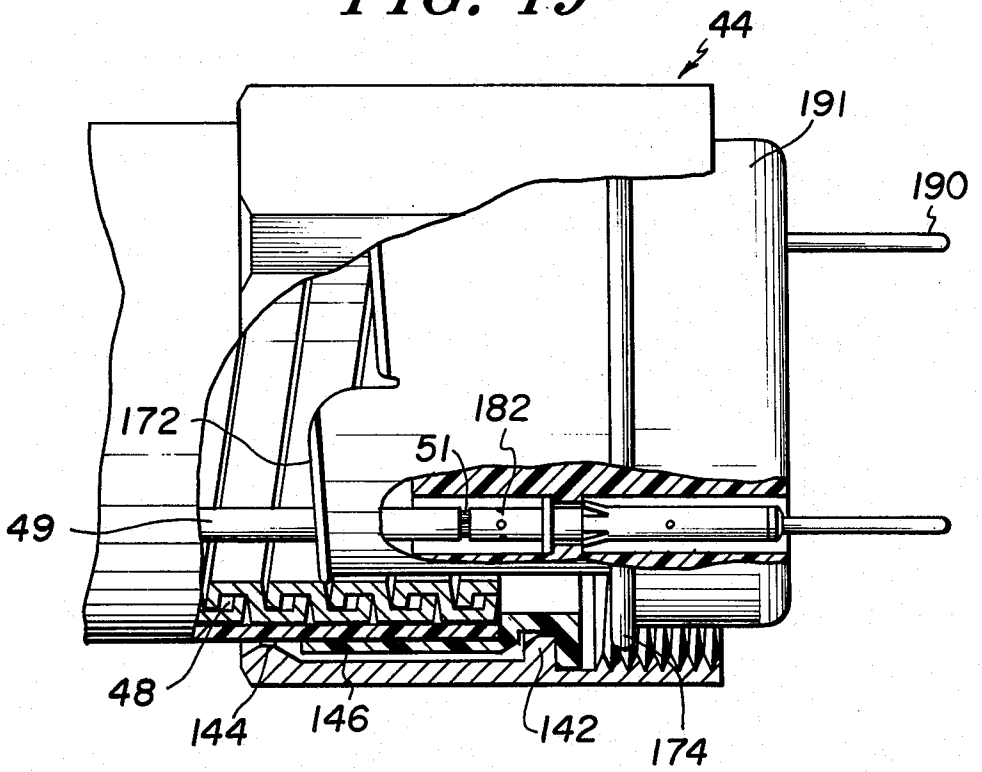


FIG. 20

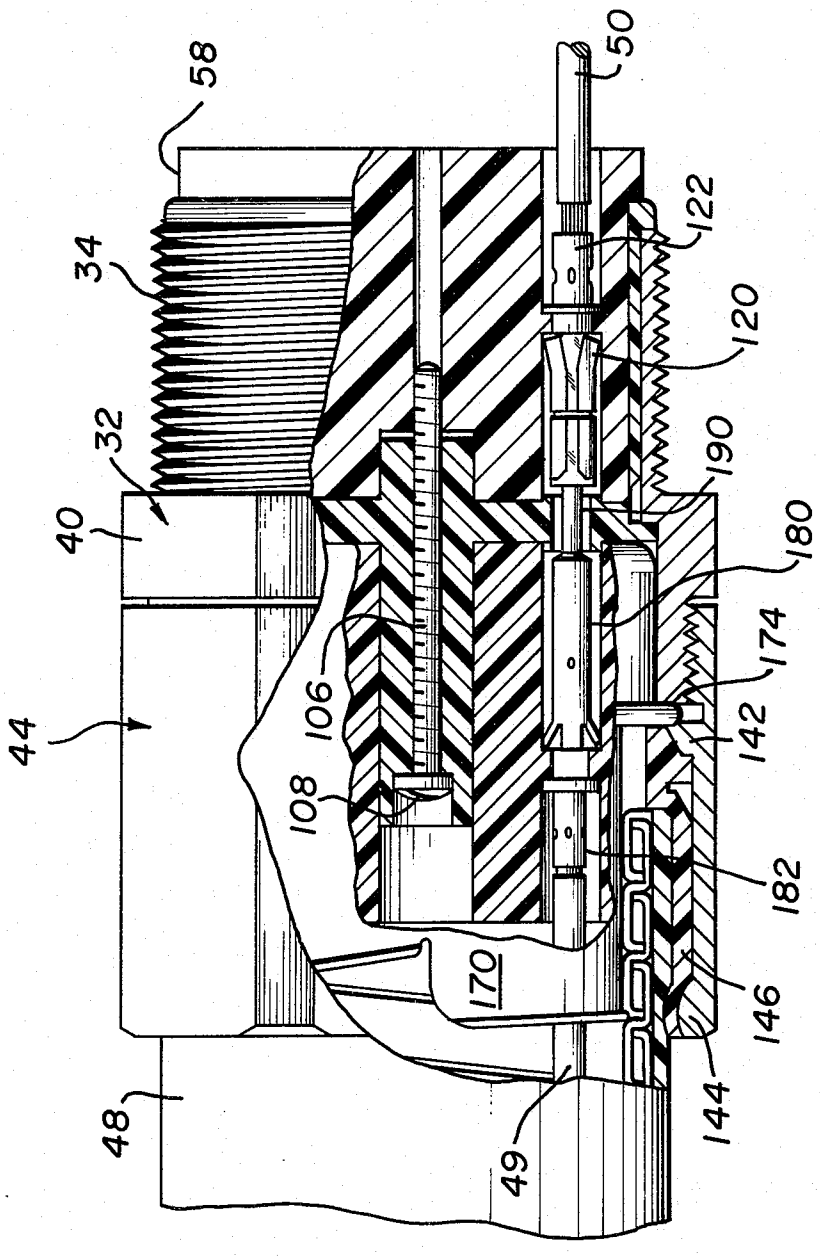

58
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108
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170
146
48
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49

FIG. 21

CONVERSION KIT FOR LIQUID TIGHT CONNECTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is employable wherever it is necessary to extend a number of individual signal and power conductors between two points in a moisture- free path. The invention finds particular utility in the machine tool field where such conductors extend between power supplies, numerical controllers and the equipment in an environment where oil, grease, cutting fluids and coolants are usually present. The presence of moisture or other contaminants on the conductor joints could lead to equipment malfunction or possibly dangerous conditions.

2. Description of the Prior Art

There are no known devices according to the prior art teachings which show a multi-pin disconnect employable with a plastic sheathed, flexible, metallic conduit. Known techniques in the prior art revolve about homemade adapters which permit the termination of the plastic sheathed, flexible, metallic conduit by use of available liquid type connectors, and then to provide some sort of adapting means for carrying the individual conductors from such liquid type connector to a further connector having multi-pin disconnect properties. Success or failure of such types of adapters depends quite often upon the degree of sophistication of the device and the expertise of the person producing such as adapter. Such adpaters generally were large and difficult to use and often required a great deal of space in what was otherwise a tightly packed piece of equipment. Further, one could not be sure as to the ability of the adapter to exclude moisture and other contaminates from within.

SUMMARY OF THE INVENTION

The invention makes possible the coupling of a plastic sheathed, flexible, metallic conduit directly to an electrical enclosure and which, for example, facilities the use of the multi-pin format to permit the connecting of a plurality of individual conductors, bearing signal and power, to various aspects of a machine tool. The invention consists of a conversion kit for converting to a multi-pin disconnect, a liquid tight connector of the type employed with plastic sheathed, flexible, metallic conduit. The adapter supplies a first insert body for placement within the body portion of the liquid type connector providing a plurality of bores extending therethrough, secondly, a flange insert having a corresponding number of bores also positionable within the body portion of the liquid type connector and finally a fastening means by which to fasten the flange insert and the body insert, so that the two portions are locked to such body portion to prevent unwanted withdrawal thereof. A plurality of individual pins, either male or female, are then placed within the bores within the body insert portion. The grounding cone, normally found as a portion of the liquid type connector, is discarded for one which has assembled thereto a second insert body portion having a plurality of bores extending therethrough and found as a part of the conversion kit. The number of bores in the second insert body are equal to the number of bores in the first insert body and pins are placed in such bores for mating connection with the pins placed in the bores of the first insert body portion. Shoulders provided within the bores themselves mate with shoulders upon each one of the individual pins at one side and with a skirt member on a second side to prevent the pins from being withdrawn except by means of proper tooling. The pins may be distributed in any desirable basis, that is, either the first or second body portion may receive the male or female pins or any combination of male and female pins. The gland portion of the liquid type connector can then be installed directly to the plastic sheathed, flexible, metallic conduit in the way it is normally employed and the individual conductors bearing the signal power lines may be brought through the conduit into the pins of the gland portion. The mating pins in the body portion may be then coupled directly to these pins as the gland portion is assembled to the body portion in a manner well known. It is therefore an object of this invention to provide a conversion kit for converting a liquid type connector to a multi-pin disconnect employing a liquid type connector.

It is another object of this invention to provide a means for adapting a liquid type connector to a multi-pin disconnect use.

It is yet another object of this invention to provide an adapter for converting a liquid type connector to a multi-pin disconnect employing as many of the available parts of the liquid type connector as is possible.

It is yet another object of this invention to provide a conversion kit which may make possible the adaptation of an available liquid type connector for multi-pin disconnect use.

Other objects and features of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention, and the best mode which has been contemplated for carrying it out.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

In the drawings in which similar elements are given similar reference characters:

FIG. **1** is a side elevational view of the connector constructed in accordance with the concepts of the invention, coupled to a plurality of individual conductors and to a plastic sheathed flexible metallic conduit.

FIG. **2** is a side elevational view, partly in section, of the body portion of the connector of FIG. **1** showing same to be installed to the wall of an electrical enclosure or the like.

FIG. **3** is a side elevational view, in section, of the first insert body of the connector of FIG. **1.**

FIG. **4** is a side elevational view, in section, of the flange insert of connector of FIG. **1.**

FIG. **5** is a front elevational view of the flange insert of FIG. **4.**

FIG. **6** is a side elevational view, in section, of the assembled body portion including the body insert portion and flange insert member.

FIG. **7** is a fragmentary side elevational view, partly in section, of the gland of the connector of FIG. **1.**

FIG. **8** is a side elevational view, in section, of the second insert body of the connector of FIG. **1.**

FIG. **9** is a front elevational view of the second insert body of FIG. **8.**

FIG. **10** is a side elevational view of the ground cone of the connector of FIG. **1** shown in the unassembled condition.

FIG. 11 is a fragmentary side elevational view, partly in section, of the ground cone of FIG. 10 shown assembled to the second insert body of FIG. 8.

FIG. 12 is a side elevational view, partially in section, of the assembled ground cone and second insert body assembled within the gland of FIG. 7.

FIG. 13 is a side elevational view of a female connector pin of the connector of FIG. 1.

FIG. 14 is a top plan view of the retainer skirt employed with the female pin of FIG. 13.

FIG. 15 is a top plan view of the female connector pin of FIG. 13 assembled with the retainer skirt of FIG. 14.

FIG. 16 is a front elevational view, in section, taken along the lines 16—16 of FIG. 15.

FIG. 17 is a side elevational view of a male connector pin of the connector of FIG. 1.

FIG. 18 is a top plan view of the retainer skirt employed with the male connector pin of FIG. 17.

FIG. 19 is a top plan view of the assembly of the male pin of FIG. 17 with the retaining skirt of FIG. 18.

FIG. 20 is a fragmentary, side elevational view, partly in section of the assembled gland portion of the connector of FIG. 1 assembled to a plastic sheathed, flexible, metallic conduit.

FIG. 21 is a fragmentary, side elevational view, partly in section, of the fully assembled connector of FIG. 1 assembled to a plastic sheathed, flexible, metallic conduit.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to FIGS. 1 and 2, there is shown a connector 30 constructed in accordance with the concepts of the invention. Connector 30 is composed of a body portion 32 having a first externally threaded portion 34, which, as is shown in FIG. 2, may be inserted through a knock-out in a wall 36 of an electrical enclosure or the like and fastened thereto by means of a lock-nut or other similar device 38. Wall 36 is thus entrapped between the lock-nut 38 and the wrench flats 40 which can be used for tightening of the body portion 32 against the wall 36. A further externally threaded portion 42 is provided for engagement by the internally threaded portion 140 of the gland portion 44 to assemble the connector 30. The outer surface of the gland portion 44 is formed with wrench flats 46 to make assembly of the component portions, that is, the body portion 32 with the gland portion 44, simple. Extending from the gland portion 44 is a plastic sheathed, flexible, metallic conduit 48 of a type commonly used for liquid tight applications. Extending from the body portion 32 are a plurality of individual conductors 50 which may be used to conduct signals and power to individual component portions of a device such as a machine tool. To shield individual conductors 50 exiting from the body portion 32 into the electrical enclosure a throat 50 terminating in an outwardly extending rib 54 is provided. Any rough or sharpened edge at the end of the body portion 32 will thus not be able to injure the insulation of conductors passed over such edge into the connector 30. As will be described below, an insert body member terminating in an outwardly extending rib 58 is also visible in FIG. 1.

Referring to FIG. 2 the internal details of the body member 32 may be better appreciated. A first bore 60 extends within the first threaded portion 34 and a second bore 62, larger than the bore 60, extends within the second externally threaded portion 42. At the joinder of the bores 60 and 62 a shoulder 64 is formed which will be useful in the manner to be described below. The main skirt of throat 52 extends within the bore 60, while rib 54 overlies the edge of body portion 32.

Turning now to FIGS. 3, 4, 5, and 6 details of the modification to convert the body portion 32 to handle multi-pin functions can be better appreciated. In FIG. 3, there is shown a first insert body 70 having a plurality of bores 72 extending therethrough. Each of the bores 72 has a first section 74 and a second section 76 of equal diameter and an intermediate section 78 of lesser diameter. The effect of this is to produce two shoulders 80 and 82. The shoulder 80 exists between the bores 76 and 78 whereas the shoulder 82 exists between the bores 74 and 78. A circular rib 58, described above with reference to FIG. 1, is employed in a manner described below to retain the first insert body 70 in a desired position within the body portion 32. Threaded portion 84 adjacent a further bore 86 is provided, as will be described, to receive a fastener to unite the first insert body portion 70 to a flange insert 90. A flange insert 90, generally circular in configuration, as is clearly visible in FIG. 5, has a plurality of bores 92 extending therethrough. Each of the bores 92 has a surrounding annular ring 94 which will be inserted within the bores 76 of the first insert body 70 in non-rotational alignment for proper positioning of the flange insert 90 with respect to the first insert body 70. A hub 96 is arranged to fit within bore 86 of the first insert body 70. Central hub 98, extending from the opposite face of flange insert 90, has a projection 100 thereon, as shown in FIG. 5, for aligning the body portion 32 with the gland portion 44, as will be described below. An aperture 102 having a counter bore 104 at its free end is arranged to receive a fastener 106, as is shown in FIG. 6. The head 108 of the fastener 106 will be fully contained in the counter bore 104 when fastener 106 is fully engaged, while the threaded body portion 110 of the fastener 106 engages the threaded portion 84 of the first insert body 70, as is clearly seen in FIG. 6. Initially, each of the hubs 94 will be positioned within an associated bore 76 of the first insert body 70. In this manner, flange insert 90 will be properly positioned with respect to the first insert body 70. Further, as is clearly visible in FIG. 6, rims 112 of the flange insert 90 positioned against the shoulder 64 of the body portion 32 prevents its movement towards the rear, that is, to the right in FIG. 6 of the body portion 32. Similarly, due to the presence of the rib 54 about the outer surface of the first insert body 70 the first insert body 70 cannot move to the left of FIG. 6 and thus component portions of the body portion 32 are assembled and unwanted withdrawal is prevented. In order to remove either one of the sections, that is, first insert body 70 or flange insert 90, it will be necessary to remove the fastener 106 then the first insert body 70 and the flange insert 90 may then be removed from the body portion 32.

In each one of the bores 72 may be placed a female contact, as shown in FIG. 15. Insert 120, as shown in FIG. 13, has a wire receiving barrel 122 arranged to receive the bared end of an electrical conductor and be mechanically crimped thereto to make a union therebetween. A shoulder portion 124 sits at the transition between the wire receiving barrel 122 and the projecting portion 126 which makes up the base of the male pin receiving portion and terminates in a circular throat 128. As is clearly visible in FIG. 16, projecting portion 126 is semi-circular. Placed about the projecting por-

tion 126 of the insert 120 is a skirt, as is shown in FIG. 14. The skirt is formed from flat stock rolled into a generally circular configuration with open seam. Adjacent one end the portions 130 adjacent the seam are inturned as is clear in FIG. 16 to provide a grip for the male inductive pin. At the opposite end it terminates in outwardly flared fingers 134, which as will be described below, permits the female contact to be retained within the bores of 72 of the first insert body 70. The skirt is assembled over the insert 120, as shown in FIG. 15. Female contacts assembled, as is shown in FIG. 15, will be inserted from the rear face 71 of the first insert body 70. The diameter of the bores 74 are slightly larger than the diameter of the throats 128 of the inserts 120, thereby making admission of the inserts 120 in the bores 74 simple. Further, the diameters of the reduced bore sections 78 are also larger than the diameters of the throats 128 of the inserts 120 permitting the throats 128 to pass therethrough. The diameters of the bores 78 are smaller than the diameter of the ends of fingers 34, and accordingly, the engagement of the shoulder 82 with the fingers 134 of the skirt will cause them to be slightly compressed towards projecting portion 126 of the insert 120. The fingers 134 will remain in the compressed condition until such time as the free ends thereof have passed beyond the shoulder 80 into the enlarged bore portion 76, at which time they will expand and engage the shoulder 80 to prevent rearward movement, that is, movement of the individual inserts 120 in the direction toward the rear face 71. The shoulder 124 engages the shoulder 82 of the bore union between the bores 74 and 78 and will prevent forward movement as in a direction towards the front face 73 of the first insert body 70. In this matter, once inserted, each one of the individual inserts 120 will remain until such time as a tool, well known in the art, is inserted from the front face 73 to cause the depression of the individual fingers 134 back toward the projecting portion 126, whereby the entire female contact may be moved beyond the shoulder 80 and removed from bores 72.

Turning now to FIG. 7, details of the gland nut 44 of a liquid tight connector can be better appreciated. Within the first end, that is, to the right of FIG. 7, the gland portion 44 has an internally threaded portion 140 which will mate with the externally threaded portion 42 of the body member 32. Internal annular rib 142 is provided intermediate the two ends of the gland 44 and an internal rib 144 is provided at the other extreme end, that is, to the left of FIG. 7. A sealing ring 146 of nylon or any other similar material is provided within the gland 44 and has a recessed portion to mate with the rib 142. Sealing ring 146 has a tapered surface 148 to engage the outer surface of the plastic sheathed, flexible, metallic conduit to compress and grasp such sheath assembly and make a good seal therewith, as is explained in U.S. Pat. No. 3,493,672, issued Feb. 3, 1970, entitled "FLUID TIGHT CONNECTOR," by M. Bromberg and assigned to the assignee of the present invention. Sealing ring 146 also provides a conduit stop 149 to limit the insertion of a conduit into gland portion 44. Upon assembly of the gland portion 44 to the body portion 32 the sealing ring 146 translates towards the left of FIG. 7, such that the end thereof moves over external rib 144 making a good liquid type seal with respect to the outer surface of the conduit. In such movement of the sealing ring 146, the edge of the sealing ring 146 towards the right of FIG. 7 leaves the front face of the rib 142 permitting a good metal to metal contact with the grounding cone, as will be described below.

Turning now to FIGS. 8 and 9, the second insert body 150 is shown. Insert body 150 has a plurality of bores 152 extending therethrough composed of larger bore sections 154 and 156 separated by a bore 158 of lesser diameter resulting in a first shoulder 160 between the bore 156 and the bore 158 and a second shoulder 162 between the bore 158 and the bore 154. Annular ridge 166 extends around the outer periphery of the second insert body 150 adjacent front face 164 thereof and provides a shoulder 167 between ridge 166 and the remainder of the insert body 150. Central bore 168 is provided to matingly receive the central hub 98, the flange insert 90 of FIG. 4. The aperture 168 will be properly proportioned to accept the projection 100 of hub 98 (FIG. 5) at only one location in order to properly assure alignment or polarization between the gland portion 44 and the body portion 32. A grounding cone of the type generally described is more fully described in the above cited patent and is shown as at FIG. 10. Grounding cone 170 has an outwardly extending rib 172, which makes approximately one helical turn and is able to engage the voids between the convolutions which make up the internal surface of a flexible metallic conduit or raceway. Intermediate its length is a rib 174 which will engage with the exposed rib 142 of the gland portion 44 when assembly of the connector 30 has been completed to make a good ground contact therebetween. Front end 176 of the ground cone 170 is bifurcated, as at 178, to permit the individual flap portions 180 to be bent about the annular ridge 166 of the second insert body 150 for assembly of the second insert body 150 to the ground cone 170. This is more clearly seen in FIG. 11 where the second insert body 150 is seated within the ground cone 170 so that its shoulder 167 butts up against the inner surface of the rib of 174 to prevent further movement of the second insert body 150 towards the rib 172. The individual flap portions 180 are then folded down to prevent withdrawal or movement to the right of FIG. 11 of the second insert body 150 with respect to the ground cone 170.

In FIG. 12 the assembly 191 of the ground cone 170 and the second insert body 150 is shown inserted within the gland portion 44, as it would be when employed with a plastic sheathed, flexible, metallic conduit in position. In practice, however, the conduit would first be inserted within the gland portion 44 and forced as far as it could in contact with the sealing ring 146. Sealing ring shoulder 149 acts as a stop for the front edge of the plastic sheathed, flexible, metallic conduit, not shown. The assembly 191 of the ground cone 170 and the second insert body 150 would then be screwed within the convolutions of the flexible metallic raceway to properly seat it, as was described in the above cited U.S. patent.

Within each one of the bores 152 of the second insert body 150 are placed a series of male contacts 180, as is shown in FIG. 19. Each of the male contacts 180 (see FIG. 17) has a wire receiving barrel 182 for receipt of the bared end of an electrical conductor which can thereafter be crimped to make a good mechanical and electrical union therewith. Central portion 184 has an annular recess 186 thereabout to receive dimple 196 the function thereof to later be described. A shoulder 188 extends between the wire receiving barrel portion

182 and central portion 184. Finally, a male blade in the form of a circular contact 190 is provided for engagement within the inturned portions 130 of the skirt of the female contact and projection 126 thereof, as described above. Placed about the central portion 184 of the male contact 180 is a skirt 192, as is shown in FIG. 18. Skirt 192 has outward extending fingers 194 and a dimple 196 therebetween. The dimple 196 is intended to ride within the recess 186 of male contact 180 and thereby provide assembly of the skirt 192 to the male contact 180, as is shown in FIG. 19. The completely assembled male contact 180 may then be inserted within the bores 152 of the second insert body 150, as is shown in FIG. 8. Male contacts 180 will be inserted from a rear face 151 of the second insert body 150 and towards a front fact 153 thereof. Movement of the male contacts 180 from the face 151 towards the face 153 will result in the shoulder 160 engaging and causing the depression of the outwardly extending fingers 194 of the skirt 192 of a male contact 180, until such time as the free ends of the fingers 194 have passed beyond the shoulder 162 into the larger diameter portion 154 of the bores 152. At this time, the fingers 194 will open outwardly and any attempt to withdraw the male contacts 180 in the direction of the face 151 will result in an engagement between the free ends of the fingers 194 and the shoulder 162 making such withdrawal impossible except when a proper tool has been inserted from the face 153 in the bores 152 to cause the displacement of the free ends of the fingers 194 back towards the central portion 184 of the male contact 180. The shoulder 188 will engage the shoulder 160 at the bore transition between the bores 156 and 158 to prevent movement of the male contacts 180 in the direction towards the front face 153. Although the body portion 32 has been described with reference to the female contacts and the gland portion 44 has been described with reference to male contacts 180, it should be appreciated that this has been done for convenience only and that male contacts may be inserted in either first insert body 70 or the second insert body 150, and that the same insert body may contain both male and female contacts in any combination that is desired, the only requirement will be, of course, that for each bore position one of the insert body members will contain a male contact, while the opposite insert body will contain a female contact.

Turning now to FIG. 20, there is shown a subassembly of the gland portion 44 with a length of plastic sheathed, flexible, metallic conduit and showing the individual conductors 49 extending through such conduit 48. Bared ends of the conductors 49, as is shown in 51, have been inserted within the wiring receiving barrels 182 of the male contacts 180 and crimped thereto. A sealing ring 146, positioned within the gland portion 44 is in a forward position, that is, with the rib 142 covered and the rib 144 uncovered.

As is shown in FIG. 21, the entire connector 30 of FIG. 1 is assembled such that the sealing ring 146 is caused to translate to the left in FIG. 21, so as to move over the lip 144 and thereby make a good moisture proof seal with respect to the outer surface of the plastic sheathed, flexible, metallic conduit 48, as is shown. Also, the front edge of the rib 142 has been exposed so that the lip 174 of the grounding cone 70 can make good contact therewith, male contact portions 190 of the male contacts 180 have been inserted within the female contacts to make a good union between the individual conductors 49 and 50.

It should be appreciated that grounding bores with other conduit engaging threads or configurations, different forms or arrangements of male and female contacts or assembly means, may also be employed.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to the preferred embodiment, it is to be understood that various omissions and substitutions and changes of the form and detail of the device illustrated and in the art, without departing from the spirit of the invention.

I claim:

1. A conversion kit for converting to a multi-pin disconnect a liquid tight connector of the type employed with plastic sheathed, flexible, metallic conduit and having a body member having a first threaded portion for insertion within the knockout of an electrical enclosure, a second threaded portion for receipt thereon in threaded engagement a gland, said body member having a bore therethrough and a bushing in said bore within said first portion, and a gland having a bore therethrough, a first end portion of said gland having internal threading to threadably engage said second threaded portion of said body member and a sealing ring in said bore of said gland at a second end portion of said gland, said kit comprising: a first insert body having first and second faces and a plurality of bores extending between said first and said second faces; a flange insert having a central hub and a circular skirt thereabout; a plurality of bores in said circular skirt equal in number and similar in location to the bores in said first insert body; fastening means for fastening said first insert body to said flange insert in said body member with said bores in said flange insert in alignment with said bores in said first insert body; a first plurality of pins, one for each bore in said flange insert, inserted in said aligned bores in said first insert body and said flange insert; a second insert body having third and fourth faces and a plurality of bores extending between said third and fourth faces; a grounding cone having an outwardly extending thread at a first end for engaging the voids between the convolutions of a metallic conduit inserted within said sealing ring within said gland, said grounding cone having an inturned second end engaging said second insert body to retain said second insert body within said ground cone; a second plurality of pins, one for each bore in said second insert body, each of said second plurality of pins being inserted within a corresponding bore in said second insert body, said first plurality and second plurality of pins engaging when said gland is threadably engaged with said second threaded portion of said body member.

2. A conversion kit as defined in claim 1, wherein said central hub of said flange insert has a projection thereon and said second insert body has a central aperture configured to receive said central hub of said flange insert in only one axial position to align said first plurality of pins with said second plurality of pins to assure engagement thereof.

3. A conversion kit as defined in claim 1, wherein each of said bores in said circular skirt of said flange insert has a shoulder thereabout, each of said shoulders having an outside diameter smaller than the inside diameter of each of the bores in said first insert body, each of said shoulders entering an associated bore of said first insert body to align said bores of said flange

insert with the corresponding bores of said first insert body.

4. A conversion kit as defined in claim **1,** wherein said first insert body has an external rib about one end thereof to prevent said first insert body portion from being removed from said body member in a first direction.

5. A conversion kit as defined in claim **1,** wherein said second insert body has a shoulder intermediate its ends, said shoulder engaging a corresponding shoulder on said grounding cone intermediate said first and second ends to prevent removal of said second insert body from said grounding cone in a direction towards said first end.

6. A conversion kit as defined in claim **1,** wherein each of said first plurality of pins is female and each of said second plurality of pins is male.

7. A conversion kit as defined in claim **1,** wherein said first plurality of pins comprises male and female pins and said second plurality of pins comprises male and female pins, a female pin being present in a corresponding bore of said second insert body for a male pin in a bore of said first insert body and a male pin being present in a corresponding bore of said second insert body for a female pin in a bore of said first insert body.

8. A conversion kit as defined in claim **1,** wherein each of said bores of said first insert body has a shoulder intermediate its first and second faces and said bores of said second insert body has a shoulder intermediate its third and fourth faces; each of said first plurality of pins and second plurality of pins having a corresponding shoulder, said pin shoulder engaging said bore shoulder in said first insert body to prevent said pins from being removed from said bore in the direction of said first face and said bore shoulder in said second insert body to prevent said pins from being removed from said bore in the direction of said third face.

9. A conversion kit as defined in claim **8,** wherein each of said pins has a deflectable skirt thereabout, said skirt engaging the back surface of said bore shoulders when said pins are positioned in said bores to prevent the movement of said pins in said bores of said first insert body in the direction of said second face and said pins in said bores of said second insert body in the direction of said fourth face.

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