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(54) **An electrical connector**

(57) An electrical connector (10) that is assemblable from a dismantled to an assembled condition comprises a pair of electrically conducting connector parts (11, 12) that are securable together to define the connector. Each connector part (11, 12) has formed therein a cable recess (13) for receiving a respective cable requiring connection; each said recess (13) communicating with the exterior of the associated connector part via a cable insertion aperture (14); each connector part (11, 12) including one or more cable clamps (18) that are operable in order to

clamp a cable inserted via the cable insertion aperture (14); and the said connector parts having respectively formed thereon or therein a mateable portion (21, 22), of a multi-part connection. The mateable portions (21, 22) are mutually engageable to prevent separation of the connector parts (11, 12) from one another in at least a first direction, one of the mateable portions (21, 22) being at least partly receivable within a recess formed in or defining the other mateable portion on assembly of the connector.

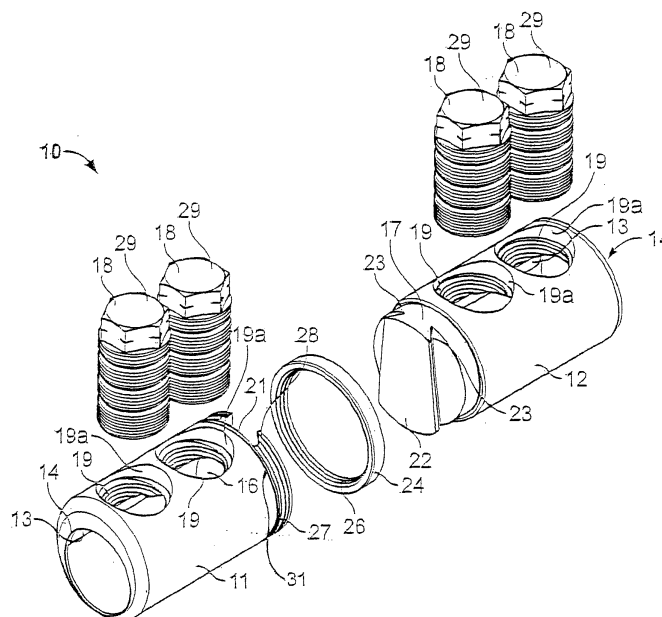


Fig. 1

Description

[0001] This invention relates to an electrical connector and to a method of assembling such a connector from disassembled parts. In particular but not exclusively the invention relates to a connector for connecting together electrical cables the conducting cores of which are made from solid or stranded aluminium or stranded copper. These cables typically convey high voltages in the range 240V-72kV. The cross-sectional area of such a cable might lie in the range 95mm²-1000mm², although the connector of the invention may be used with cables in a wider range of sizes if desired.

[0002] Such cable usually is supplied coated with an insulative material (e.g. a polymer of a kind that is well known in the art) coated over its length. As is extremely well known, the purpose of such a coating is to render the cable electrically safe so that those touching the cable suffer no risk of an electric shock; and the cable itself is protected against the short circuits that might occur were the cable to be grounded inadvertently.

[0003] It is commonly required to join lengths of the cable to one another so as to provide continuous electrical conduction across the resulting joint. Such joints may be needed e.g. in the event of an existing cable being cut or damaged; or when two cables connected to distinct apparatuses require connection.

[0004] The joining of cables under these circumstances is so commonplace that there is a need to render the joining process as efficient and consistently repeatable as possible. To this end manufacturers supply various forms of cable connector as kits using which it is possible to create reliable, safe joints.

[0005] One form of cable connector includes a cylinder of an electrically conducting material such as brass, copper or aluminium. The cylinder typically includes one or sometimes two hollow chambers extending along the length of its interior. At each end of the cylinder there is a respective mouth via which a respective pair of cables, requiring jointing, may be inserted into the interior of the connector such that one cable is inserted at each end of the cylinder.

[0006] The cylinder is formed with threaded cross bores communicating with the chamber(s). Threaded, conducting bolts may be screwed into the cross bores so as to protrude into the chamber(s) and thereby permit clamping of any cable inserted therein. A sufficient number of the cross bore and bolt combinations is provided as to permit clamping of two cables inserted as described.

[0007] During assembly of the connection to join two cables together the cables are prepared by stripping the usually-supplied insulation from their ends, so as to expose the wire strands inside the cables. Assuming the bolts are withdrawn sufficiently far from the interior of the cylinder as to permit free passage of the cable ends, the thus-stripped cable ends are inserted into the cylinder via the mouths described above. Then the bolts are tight-

ened so that the cable ends are firmly clamped. Electrical current may then flow via the bolts and the cylinder in order to create an electrically conducting connection between the cable ends.

[0008] Typically an insulative material in the form of a sleeve of an elastomeric, insulative polymer is then applied over the assembled connector in order to prevent short-circuiting of the cylinder (which is intended to become electrically live) with other objects. This type of connector is referred to herein as a "one-piece" connector, notwithstanding that the clamp and insulation components in fact mean that the device comprises several parts.

[0009] Cable connectors of the one-piece type are very widely used, but they suffer from a disadvantage in some circumstances.

[0010] This is that, typically, the cables requiring connection are in a "field" location, which may be (for example) within a constructional feature such as a wall, floor or ceiling; buried in the ground or in a roadway or hard standing; or contained within a machine or a housing.

[0011] In such locations access to the cable ends is usually limited, often severely so. Very commonly the materials and the thickness of the cables render them largely inflexible, and anyway attempting to bend the cables in order to gain access to them may damage the cables and compromise either their insulation or their current-carrying capacity. However, the cylinder types of cable connector described above call for equally good access to both ends of the cylinder, and equally good access to both the cable ends requiring jointing. These requirements render the one-piece connectors difficult or time-consuming to use in some circumstances.

[0012] A known proposal for solving this problem is to manufacture the conducting cylinder of the connector in two parts that are themselves joinable together. Using this solution it is possible to clamp one connector part to each cable end before joining the connector parts one to the other. Thereafter the insulation may be applied to the assembled connector in a similar manner to that described above.

[0013] GB-A-2 319 402 discloses one known connector of this type. In the connector of GB-A-2 319 402 a perforated tab protrudes forwardly of a first connector part and is receivable in a perforated recess formed in a second connector part. The recess is defined by a pair of forwardly projecting tabs. A bolt is used releasably to connect the two connector parts together following insertion of the tab into the recess such that the perforations in the respective parts are mutually aligned.

[0014] In a variant on this arrangement described in EP-A-0 669 044 the recess in the second connector part is replaced by a single, projecting tab. This tab has formed in an upper surface a V-profile depression. The tab of the first connector part is formed with a protruding V-profile ridge that is receivable in the depression. This enhances the rigidity of the assembled connector.

[0015] One problem however with these two-part con-

nectors is that they are longer than the one-piece cylinders. Extra length is needed purely to accommodate the areas of the connector that permit joining together of the two parts.

[0016] Aside from the fact that this may make the known two-part connectors difficult to fit in to a confined space, it also means that such connectors require non-standard insulation members in order to complete them to a safe, insulated condition.

[0017] The connectors are usually supplied (in large numbers) as kits including the insulative sleeves needed in their construction. The requirement to manufacture "non-standard" sleeves in the kits complicates their preparation and increases the chance of a kit being wrongly made up. In view of the danger associated with creating an inadequately insulated connector this can be a serious problem.

[0018] Thus there is in the art a need for a connector that provides the versatility of the two-part connectors of the prior art without suffering from the size and safety/reliability problems of the existing arrangements.

[0019] According to the invention in a first aspect there is provided an electrical connector that is assemblable from a dismantled to an assembled condition and comprises a pair of electrically conducting connector parts that are securable together to define the connector, each connector part having formed therein a cable recess for receiving a respective cable requiring connection; each said recess communicating with the exterior of the associated connector part via a cable insertion aperture; each connector part including one or more cable clamps that are operable in order to clamp a cable inserted via the cable insertion aperture; and the said connector parts having respectively formed thereon or therein a mateable portion, of a multi-part connection, which mateable portions are mutually engageable to prevent separation of the connector parts from one another in at least a first direction, characterised in that:

one of the mateable portions is at least partly receivable within a recess formed in or defining the other mateable portion on assembly of the connector; the mateable portions are respectively a male, tapered dovetail member and a female, tapered dovetail recess of complementary shape to the male dovetail member; the male dovetail member is formed on one said connector part of the pair and the female dovetail shape is formed in the other said connector part of the pair; and the said male dovetail member is insertable into the said female dovetail recess so as form-lockingly to prevent separation of the connector parts in the first direction.

[0020] The feature of providing mateable portions, on or in the connector parts, that are receivable one inside the other means that the overall length of the connector

may be no greater than that of a connector whose cylindrical body is a single piece.

[0021] This in turn means, firstly, that the connector of the invention is at least as easy to install in a confined space as such a connector, while offering the further benefit of a two-part construction.

[0022] Also the ability to make the connector the same size as the equivalent one-piece design means that the same insulative coverings may be used in kits for both the connector types. This allows economies in terms of the manufacture or provision of the insulative coatings; and also reduces the risk of a kit being wrongly packaged (i.e. with the wrong size of insulator), thereby in turn reducing the risk of incorrectly insulated installations.

[0023] It is possible to devise embodiments of the invention in which the mateable portions are releasably connectable. This feature permits disassembly of the connector should this be needed. It is however preferred to provide mateable portions that on assembly of the connector become permanently mated (for example through the employment of a friction fit between the mateable portions). The latter arrangement provides advantages since usually it is important to promote integrity of the connection such that it does not become disconnected in use.

[0024] The male dovetail member preferably is insertable into the female dovetail recess in a second direction that diverges from the first direction. In particularly preferred embodiments of the invention the first and second directions are mutually perpendicular.

[0025] The foregoing features of the invention assure that there is no risk of the connector disassembling in the direction of assembly, since it can be arranged in use of the connector that any strain on the connector tending to disassemble it acts in a different direction than the direction of insertion of the male member. This in turn reduces the risk of the connector coming apart in service.

[0026] Preferably the male dovetail portion and the female dovetail recess are each tapered in two mutually divergent directions. This feature may be used to ensure that the mateable portions may be moveable relative to one another, during assembly of the connector, in only one direction. This improves the strength of the connector.

[0027] Conveniently the connector includes a secondary lock comprising a ring having a ring thread and each said connector part includes a cylindrical portion at least in the vicinity of its associated mating portion, the cylindrical portion of one of the said connector parts including a connector thread whereby the ring thread is engageable with the connector thread to secure the connector parts one to the other following mating of the mateable portions.

[0028] Optionally the ring may be retained rotatably captive relative to one of the mateable portions. This may easily be achieved for example through the provision of an annular flange or an equivalent member on the mateable portion in question, whereby the ring is rendered

captive.

[0029] In such arrangements the ring may as a result be moveable translationally relative to the mateable portion, thereby facilitating engagement of the ring thread with the connector thread of the other mateable portion.

[0030] Preferably the female dovetail recess includes one or more external walls that are shaped to permit pressing of the female dovetail recess and the male dovetail member together so as to resist separation. This arrangement advantageously provides a secure connection between the connector parts. On assembly of the connector of the invention in a "field" situation an installer may use a tool such as but not limited to a pair of pliers for the purpose of pressing the external wall of the female connector part in order to achieve the above-described effect.

[0031] It is preferable that the connector parts are predominantly cylindrical and of the same diameter; and that the mateable portions are defined at ends of the resulting cylinders, the diameter of the cylinders being such that when the mateable portions are mutually engaged the resulting cylindrical shape extends further in any radial direction of the cylindrical shape than either of the mateable portions. This arrangement provides a "space-efficient" overall shape for the connector when assembled, since neither of the mateable portions protrudes beyond the outermost parts of the connector parts. This means that the connector of the invention may be easily assembled using an existing size and shape of insulative sleeve or other coating. This gives rise to the advantage described above.

[0032] Preferably the second direction is parallel to the longitudinal extent of the cylindrical shape. This allows the connector to be a neat construction that when assembled to connect two cables appears to be no more than a thickening of the line of the cables. The principles of the invention however may in theory be employed in cable joints that represent a change in direction in the line of the cables. In that case it would not be necessary for the second direction to be parallel with the longitudinal extent (if any) of the cylindrical shape.

[0033] Preferably each connector part includes a plurality of the cable clamps. An advantage of this arrangement, which is known *per se*, is to assure both effective securing of the cable ends and also to promote good current flow through the connector.

[0034] Conveniently each said cable clamp includes an actuator that is operable to cause clamping of a said cable, each said actuator being operable from outside the associated connector part. In preferred embodiments of the invention each said cable clamp includes a threaded bolt that is threadedly engaged in a threaded aperture passing through a wall of the connector part such that the bolt penetrates the cable recess thereof, the head of the threaded bolt defining the said actuator.

[0035] Such cable clamp features render the cable clamps straightforward to manufacture and use.

[0036] In particularly preferred embodiments each

connector part includes a pair of the threaded bolts engaged in a corresponding pair of threaded apertures. This has been found to provide a good effectiveness of the clamps in the space available in the connectors.

[0037] When assembled the connector preferably includes an insulative material (such as a "heat shrink" or "cold shrink" insulating tube) coated over the connector in its assembled condition.

[0038] According to the invention there is also provided a method of assembling an electrical connector (multi-part connection) as defined hereinabove including the steps of:

- a) inserting a respective cable into the cable recess of each connector part;
- b) clamping each said cable inserted into a said cable recess using at least one said cable clamp; and
- c) causing engagement of the mateable parts of the multi-part connection, and especially inserting the male dovetail member into the female dovetail recess so as to give rise to frictional engagement therebetween.

[0039] Such a method is advantageously quick and reliable to perform.

[0040] Conveniently when the electrical connector includes a lock for locking the mateable portions of the multi-part connection one to the other the method includes the step of operating the lock to lock the mateable portions of the multi-part connection one to the other.

[0041] It is also preferable that when the electrical connector includes an insulative material coated over the connector in its assembled condition the method includes the step of applying an insulative material as a coating over the assembled connector.

[0042] Such features of the method of the invention assure a secure, safe connection.

[0043] There now follows a description of a preferred embodiment of the invention, by way of non-limiting example, with reference being made to the accompanying drawings in which:

Figure 1 is an exploded view of one form of electrical connector according to the invention; and
Figure 2 is a side elevational view of the Figure 1 connector, in its assembled condition (minus the cable ends that would normally be clamped in the connector).

[0044] Referring to the drawings there is shown an electrical connector 10, according to the invention, that is assemblable from a dismantled to an assembled condition.

[0045] The connector 10 is formed from a pair of mutually connectable connector parts 11, 12 that in the embodiment shown are cylinders of essentially the same diameter and length.

[0046] Other shapes (such as rectangular or hexago-

nal prisms, or even irregular shapes) of the connector parts 11, 12 are possible within the scope of the invention.

[0047] The cylindrical connector parts are preferably made by machining from aluminium or a similar, conductive, soft metal; although in practice a wide range of conductive materials is possible.

[0048] Each of the connector parts 11, 12 has formed therein a cable recess 13 for receiving a respective cable end requiring connection. In the embodiment shown, each cable recess 13 extends from an in-use free end of the associated connector part 11, 12 towards the centre thereof that is defined when the connector parts are connected together.

[0049] Each recess 13 terminates at the free end of its associated connector part 11, 12 in a cable insertion aperture 14 permitting connection between the interior and the exterior of each respective connector part 11, 12.

[0050] In the preferred embodiment illustrated in the drawings the cable recesses 13 are themselves cylindrical bores extending parallel to the longitudinal axis of each connector part 11, 12. Other arrangements of cable recesses are possible within the scope of the invention. Examples include recesses of regular and irregular cross-section and recesses that do not extend parallel to the axis of the connector parts 11, 12. The cylindrical bores shown however are particularly preferred since they are easy to manufacture in a drilling operation following forming of the cylinders 11, 12 eg. by machining.

[0051] The recess 13 formed in connector part 11 terminates adjacent the centre of the assembled connector in an opening 16. The recess 13 formed in connector part 12 on the other hand terminates at the centre of the connector 10 in a cap 17.

[0052] Each of the connector parts 11, 12 includes a pair of cable clamps defined by respective threaded bolts 18 and corresponding, threaded apertures 19.

[0053] Each threaded aperture 19 perforates the material of the associated connector part 11, 12. The bolts 18 may be threadedly engaged in the threads formed in the apertures 19 such that on rotation of each bolt 18 its end penetrates into one or other of the cable recesses 13.

[0054] On the exterior of each connector part 11, 12 each threaded aperture 19 is chamfered as signified by numeral 19a in order to facilitate engagement of one of the bolts 18 therein. The ends of the bolts 18 that are in Figure 1 the lowermost ends are chamfered in a complementary fashion also for this purpose.

[0055] As shown in the drawings the bolts 18 are formed in the manner of grub screws in which the bolt heads are of approximately the same diameter as the shanks thereof. However, other designs of bolt and indeed other types of clamp altogether are possible within the scope of the invention.

[0056] Further features of the bolts 18 are described in more detail below.

[0057] Each of the connector parts 11, 12 has formed thereon at its end remote from cable insertion aperture 14 a portion that is mateable with a corresponding portion

of the other connector part.

[0058] In the case of the connector part 11 the mateable portion is a female dovetail recess 21 formed in the end of the connector part 11 adjacent the opening 16.

[0059] Female dovetail recess 21 is tapered in two directions.

[0060] At its end remote from cable insertion aperture 18 connector part 11 defines an outer annular wall 27 in which female dovetail recess 21 is formed.

[0061] Female dovetail recess 21 defines a truncated triangular shape that perforates the wall 27 at two essentially opposite locations on its circular exterior.

[0062] At one of these locations the female dovetail recess 21 is wider than at the other, whereby the recess tapers as a truncated triangular shape from one side of the end of connector part 11 to the other.

[0063] In a second sense recess 14 tapers inwardly from a location that is relatively proximal to the nearest aperture 19 towards the free end of connector part 11. Such tapering is in the embodiment shown present along the two diverging edges of the female dovetail recess 21 that are visible when viewing the end of connector part 11 in elevation.

[0064] Cap 17, which typically is integrally formed with connector part 12 as a result of a machining process, has protruding therefrom a male dovetail member 22 that is of complementary shape to female dovetail recess 21.

[0065] The profile of male dovetail member 22 is clearly evident in Figure 1. Thus the taper from side to side of the elevational view of the end of connector part that is remote from its cable insertion aperture 14 is shown as a narrowing of the dovetail member 22 from its lower to its upper extent.

[0066] A second direction of taper, along the edges of male dovetail member 22 from its free end towards the nearest threaded aperture 19, is represented by a pair of undercuts 23 that extend along the length of the edges of the member 22.

[0067] It will thus be apparent that on insertion of the narrower end of the male dovetail member 22 into the wider opening of the female dovetail recess 21 formed in the resulting wall at the end of connector part 11, the two connector parts 11, 12 may be joined together. The nature of the tapers of the respective dovetail formations 21, 22 is such that the connector parts 11, 12 may only be joined together by sliding them in a direction perpendicular to the longitudinal axis of the cylindrical shapes. Any attempt at pulling the connector parts 11, 12 apart along the longitudinal axis after their assembly together is reacted by the parts of the dovetail formations 21, 22 and in particular their respective tapers.

[0068] Thus the connector parts 11, 12 incorporate connector formations that strongly resist strain in the longitudinal direction of the connector 10 yet are easy to assemble by sliding transversely one relative to the other.

[0069] Since the male dovetail member 22 is inserted into the female dovetail recess 21 during assembly together of the connector parts 11, 12 the overall longitu-

dinal length of the parts securing the connector parts 11, 12 together is no greater than if the connector parts 11, 12 had been machined as a single, solid item having no joint between them.

[0070] In the embodiment shown, the male and female dovetail formations 21, 22 extend in a direction that is aligned with the direction of insertion of the bolts 18 into the threaded apertures 19.

[0071] This has been found to be convenient in use of the connector 10. However, in other embodiments the bolts 18 (or other, equivalent clamp mechanisms) may be offset relative to the direction of sliding together of the mateable portions defined by the male and female dovetail members 21, 22 (or their equivalent structures in another embodiment).

[0072] The exterior of female dovetail formation 22 is defined as a wall 27. The use of pliers or an equivalent tool, after insertion of the male dovetail formation 21 into the female formation 22, presses or squeezes the interior of the female dovetail formation 22 into gripping engagement with the exterior of the male dovetail formation 21. The resulting frictional forces prevent inadvertent separation of the dovetail formations 21, 22 one from the other.

[0073] Such frictional forces may in alternative embodiments be caused in alternative or additional ways (such as through judicious choice of the shapes of the engaging parts of the dovetail formations).

[0074] The electrical connector 10 includes a secondary lock for locking the mateable portions of the resulting, multi-part connection one to the other.

[0075] This secondary lock is in the form of a ring 24 that is threaded around its inner surface, the resulting thread being designated by numeral 26 in Figure 1.

[0076] In the vicinity of each end remote from its cable insertion aperture 14 each connector part 11, 12 is essentially cylindrical in shape.

[0077] When the male and female dovetail formations 21, 22 are engaged with one another as aforesaid to assemble the connector parts 11, 12 together an essentially continuous cylindrical surface is defined.

[0078] In the vicinity of wall 27 defined in the end of connector part 11 the cylinder is threaded as signified by numeral 28. Threads 26 and 28 are of complementary profile whereby ring 24 may be screwed onto wall 27. During assembly of the connector 10 as described below it is essential to assure that ring 24 is temporarily mounted onto the cylindrical portion of connector part 12 since away from the respective cylindrical portions the diameter of each connector part increases at a shoulder 31. The increase in diameter at the shoulder 31 means that when the dovetail formations 21, 22 are engaged the ring 26 may be retained loosely captive between the connector parts 11, 12.

[0079] The loose captivity of the ring 26 permits it to be screwed onto the thread 28 after assembling together of the connector parts 11, 12 thereby rendering the connection between the connector parts 11, 12 extremely robust, secure and electrically conducting.

[0080] The assembled connector is shown in Figure 2. As is evident from this figure, the outer diameter of each connector part 11, 12 is greater than the extent in any direction of the dovetail formations 21, 22 and associated features, whereby the connection between the connector parts 11, 12 is advantageously of "low profile" relative to the remainder of the connector 10. As stated hereinabove, in addition the use of male and female dovetail formations 21, 22 assures that the length of the connection between the connectors parts 11, 12 is not great.

[0081] Each of the threaded bolts 18 includes at its in-use free end an actuator in the form of a hexagonal head 29. The head 29 of each bolt 18 is essentially of conventional form, and need not be described in further detail herein. Other bolt head types are of course viable within the scope of the invention.

[0082] An option shown in Figures 1 and 2 is for each bolt 18 to be a so-called "shear" bolt, having formed at intervals along its length a series of annular shear grooves 31.

[0083] As is well known, the nature of a shear groove is to cause rupturing of the shear bolt once the torque applied to the shear bolt exceeds a threshold. Thus on clamping of a cable in one or other of the connector parts 11, 12 the bolts 18 are tightened until they each shear leaving only a bolt stump, that is essentially flush with the outer wall of the associated connector part 11, 12, in each threaded aperture 19.

[0084] This further reduces the overall dimensions of the connector 10 thereby facilitating the application of an insulative coating (not shown) of a *per se* known kind following assembly of the metal parts of the connector 10. Additionally the use of shear bolts renders the connection created by the connector "irreversible", since following removal of the actuator in the form of bolt head 29 from each shear bolt 18 it becomes impossible to unscrew the shear bolts from the threaded apertures 19.

[0085] In use of the connector 10 of the invention a length of insulative material may first be slid in the form of a sleeve onto one of two cables to be joined together by way of the connector 10. Thereafter any insulation on the ends of the cables may be stripped using conventional insulation stripping tools.

[0086] This results in a pair of cable ends having exposed, conducting cable strands that are inserted via the cable insertion apertures 14 into the recesses formed in the connector parts 11, 12.

[0087] Each of the pair of clamp bolts 18 visible in the figures may then be tightened, using a spanner engaged with the associated head 29, into the hollow interior of the associated connector part 11, 12.

[0088] As the free end of each bolt 18 penetrates the aforesaid interior it presses the cable strands into contact with the adjacent wall of the connector part interior. This clamps the cable strands and prevents them from being pulled out via the cable insertion apertures and at the same time promotes good electrical conduction between

the cable strands and the material of the connector part in question.

[0089] The torque at which the shear grooves 31 cause shearing of each connector bolt 18 may be set at a level consistent with these requirements. A series of the shear grooves is provided, whereby the connector 10 may accommodate cables of differing thicknesses in a single design. Following shearing of the shear bolts the separated parts thereof including the hexagonal heads 18 are discarded.

[0090] Thereafter the ring 24 may be slid temporarily over the cylindrical end of connector part 12 adjacent the male dovetail member 22 before the dovetail member 22 is slid transversely to the longitudinal axis of the connector 10 into the female dovetail recess 21, until the connector parts 11, 12 are aligned with one another as shown in Figure 2.

[0091] The next stage in the assembly process involves compressing the wall 27 of female dovetail formation 21 with pliers, grips or a similar tool, in order to promote frictional retention of the dovetail formations 21, 22 in engagement with one another. Thereafter thread 26 may be tightened onto thread 28 compressing the dovetail connection and thereby ensuring that separation of the connector parts 11, 12 in the aforesaid longitudinal direction is impossible.

[0092] At the end of the procedure the insulation sleeve is then slid from the cable on which it is stored over the resulting connector 10 which as noted has a "low" profile that is little thicker than the cables it secures. The result is a neat, effective two-part connector that does not suffer the disadvantages, set out above, of the prior art designs.

Claims

1. An electrical connector that is assemblable from a dismantled to an assembled condition and comprises a pair of electrically conducting connector parts that are securable together to define the connector, each connector part having formed therein a cable recess for receiving a respective cable requiring connection; each said recess communicating with the exterior of the associated connector part via a cable insertion aperture; each connector part including one or more cable clamps that are operable in order to clamp a cable inserted via the cable insertion aperture; and the said connector parts having respectively formed thereon or therein a mateable portion, of a multi-part connection, which mateable portions are mutually engageable to prevent separation of the connector parts from one another in at least a first direction, **characterised in that:**

one of the mateable portions is at least partly receivable within a recess formed in or defining the other mateable portion on assembly of the connector;

the mateable portions are respectively a male, tapered dovetail member and a female, tapered dovetail recess of complementary shape to the male dovetail member;

the male dovetail member is formed on one said connector part of the pair and the female dovetail shape is formed in the other said connector part of the pair; and

the said male dovetail member is insertable into the said female dovetail recess so as form-lockingly to prevent separation of the connector parts in the first direction.

2. An electrical connector according to Claim 1 wherein the male dovetail member is insertable into the female dovetail recess in a second direction that diverges from the first direction.
3. An electrical connector according to Claim 2 wherein the first and second directions are mutually perpendicular.
4. An electrical connector according to any preceding claim wherein the male dovetail member and the female dovetail recess are each tapered in two mutually divergent directions.
5. An electrical connector according to Claim 4 or any preceding claim depending therefrom including a secondary lock comprising a ring having a ring thread and wherein each said connector part includes a cylindrical portion at least in the vicinity of its associated mating portion, the cylindrical portion of one of the said connector parts including a connector thread whereby the ring thread is engageable with the connector thread to secure the connector parts one to the other following mating of the mateable portions.
6. An electrical connector according to any preceding claim wherein the female dovetail recess includes one or more external walls that are shaped to permit pressing of the female dovetail recess and the male dovetail member together so as to resist separation.
7. An electrical connector according to Claim 6 when dependent from Claim 5 wherein the one or more external walls have formed therein the connector thread.
8. An electrical connector according to any preceding claim wherein the connector parts are predominantly cylindrical and of the same diameter; and wherein the mateable portions are defined at ends of the resulting cylinders, the diameter of the cylinders being such that when the mateable portions are mutually engaged the resulting cylindrical shape extends further in any radial direction of the cylindrical shape

than either of the mateable portions.

9. An electrical connector according to Claim 2 and Claim 8 wherein the first direction is parallel to the longitudinal extent of the cylindrical shape. 5
10. An electrical connector according to any preceding claim wherein each connector part includes a plurality of the cable clamps. 10
11. An electrical connector according to any preceding claim wherein each said cable clamp includes an actuator that is operable to cause clamping of a said cable, each said actuator being operable from outside the associated connector part. 15
12. An electrical connector according to Claim 11 wherein each said cable clamp includes a threaded bolt that is threadedly engaged in a threaded aperture passing through a wall of the connector part such that the bolt penetrates the cable recess thereof, the head of the threaded bolt defining the said actuator. 20
13. An electrical connector according to Claim 12 wherein each connector part includes a pair of the threaded bolts engaged in a corresponding pair of threaded apertures. 25
14. An electrical connector according to Claim 12 or Claim 13 wherein one or more of the threaded bolts is a shear bolt. 30
15. An electrical connector according to any preceding claim including an insulative material coated over the connector in its assembled condition. 35
16. A method of assembling an electrical connector according to any preceding claim including the steps of:
 - a) inserting a respective cable into the cable recess of each connector part; 40
 - b) clamping each said cable inserted into a said cable recess using at least one said cable clamp; and
 - c) inserting the male dovetail member into the female dovetail recess so as to give rise to frictional engagement therebetween. 45
17. A method according to Claim 16 including the step of deforming the female dovetail recess in order to cause the said frictional engagement. 50
18. A method according to Claim 16 or Claim 17, wherein the electrical connector is according to Claim 5 or any preceding claim depending therefrom, the method including the step of operating the secondary lock to lock the mateable portions of the multi-part connection one to the other. 55
19. A method according to any of Claims 16 to 18 wherein the connector is according to Claim 20, the method including the step of applying an insulative material as a coating over the assembled connector.

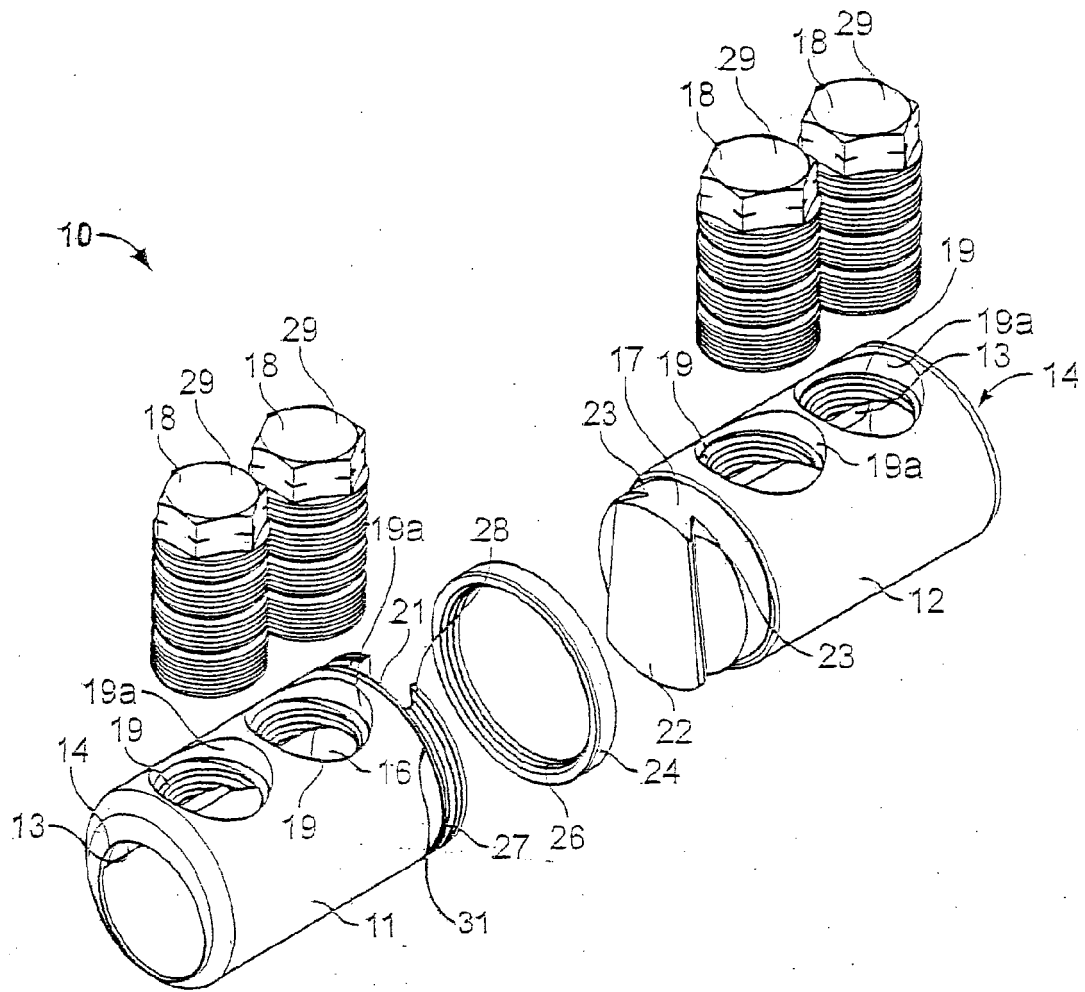


Fig. 1

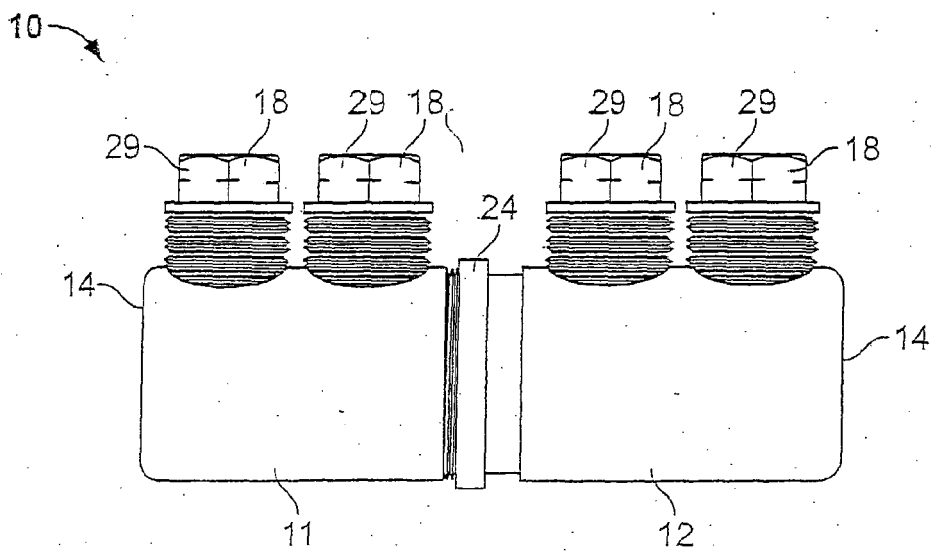


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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