

TWO WAY RELEASE HERMAPHRODITIC CONNECTORS

FIELD OF THE INVENTION

5

The present invention relates to a two way locking/release device on a hermaphroditic sub-assembly joined to a second and opposed hermaphroditic sub-assembly, all the sub-assemblies having a plurality of receptacle cavities and a plurality of plug cavities, wherein the two sub-assemblies can be separated by a single handed operation.

10

BACKGROUND OF THE INVENTION

A hermaphroditic electrical connector is comprised of a pair of identical sub-assemblies which consisting of a molded plastic housing and a plural of electrical contacts. Normally, the two sub-assemblies are arranged in upside down and opposite direction to electrically connect plural electrical contacts of one sub-assembly to respective electrical contacts of the other sub-assembly and for maintaining such electrical connections.

20 When a pair of sub-assemblies mated together, the latch of the first sub-assembly will lock on the latch boss of the second sub-assembly. Likewise, this also applies to the latch of the second sub-assembly. Therefore, releasing the pair of sub-assemblies would require both hands, one hand at each end of the sub-assemblies.

25 FIG 1 is an example of a hermaphroditic connector of the prior art. US 4 963 102 (William A Gettig et al) discloses a hermaphroditic connector for use in pairs to join a plurality of electrical conductors includes a block housing of integral construction containing one or more stacked rows of a plurality of adjacent isolated passageways. A horizontal shelf extends forwardly from each such row and includes an inner shelf surface having a front nose projecting forward of the housing side walls. Each
30 passageway is adapted to receive a conductor terminal having a planar tongue with adjacent lateral tangs and an integral, abutting spring arm. During insertion of each terminal into any one passageway, the tangs engage within lateral passageway slots and the spring arm is juxtapositioned the shelf inner surface with a lug on the terminal
35 blade deflecting and becoming entrapped by a lock finger in the housing. Proper alignment and positive juncture between an opposed, inverted pair of the connectors is

achieved in view of pairs of laterally spaced apart tongues projecting forwardly from the front face and which overlap opposed ones of the tongues to insure that continued closing will cause opposed shelves to be immediately juxtaposed one another. The resultant closure insures that each terminal tongue slidably contacts an opposed terminal tongue, intermediate its tongue and spring arm. Mating locking and catch members on each connector complete the connection of the housings. Lateral or horizontal alignment is provided by lock and catch means respectively disposed intermediate the two pairs of tongues 106 and 108. A lock tab 112 is disposed within a cut-out formed in the medial portion of each top wall 14 and comprises a cantilever member attached at its rear 114 to the connector body and having a vertically deflectable forward nose 116 provided with a top mounted lock ramp 118. The tab nose 116 projects forwardly the same distance as the two adjacent longer tongues 106 and is adapted to be inserted beneath a catch member 120 elevated above the plane of each connector bottom wall 16. An opening in the catch member forms a socket or catch 122 so that when two similar connectors are fully joined, the lock ramp 118 of the two tabs 112 are snap-fitted within the sockets 122 of the cooperating catch members 120. When thusly joined, the front edges 22 of the two connector side walls 10,12 are in abutment and a rigid assembly A is provided with positive electrical continuity being assured through the engaged conductor terminals. When the connector includes two or more rows of passageways and related shelves, these shelves also provide a degree of orientation between two such connectors, in view of the intermeshing thereof when joined.

Quick and easy separation of two joined connectors is readily achieved by grasping each connector between the thumb and a finger of each hand and then simultaneously depressing the two elevated release pads 124 on the lock tabs 112 to disengage the lock ramps 118 from the opposed catch member sockets 122. Then, a simple pulling action will separate the two connectors.

Despite having the characteristic features described above, separation of the first and second connectors disclosed in US 4,963,102 can only be achieved by grasping each connector between the thumb and a finger of each hand and simultaneously depressing the two elevated release pads on the lock pads to disengage the lock ramps from the opposed catch member socket. If one set of the sub-assembly is laid through a wall or panel board, separation or unlocking of the two joined sub-assemblies are not possible since the user cannot reach to the sub-assembly on the other side of the wall to reach the lock pads.

SUMMARY OF THE INVENTION

The present invention is proposed to resolve the problem of releasing two sub-assemblies by providing a two way locking/release device for each of the two joined sub-assemblies having a plurality of receptacle cavities and plug cavities that can be released from each other in a single handed operation. A single handed operation is necessary when one side of the sub-assembly is behind a panel and using two hands to release the pair of sub-assemblies cannot be carried out since one of the sub-assembly is situated behind the panel.

The present invention not only offers a single handed operation for release of the sub-assembly but release can be effected from any one of the two sub-assemblies. Therefore, no matter which sub-assembly is behind a panel, a single handed operation would separate one of the sub-assembly from the other sub-assembly, thereby allowing the hermaphroditic electrical connector to be separated even though it is not possible to access the sub-assembly behind the panel.

A first object of the invention is for a hermaphroditic electrical connector consisting of a first sub-assembly and second and opposed sub-assembly,

- the first sub-assembly having a housing with a plurality of receptacle cavities and a plurality of plug cavities;
- the second and opposed sub-assembly having a housing with a plurality of receptacle cavities and a plurality of plug cavities,
- the first housing having a first latching means,
- the first housing having a first catching means,
- the second and opposed housing having a second latching means;
- the second and opposed housing having a second catching means;

characterized in that in a joining operation of the first sub-assembly and second and opposed sub-assembly, the receptacle cavities of the first housing are received by the plug cavities of the second and opposed housing and the receptacle cavities of the second and opposed housing are pushed into the plug cavities of the first housing,

the catching means on the first housing catches the latching means in the second and opposed housing to form a first locking pair device;

the catching means on the second and opposed housing catches the latching means in
5 the first housing to form a second locking pair device;

the first and second locking pair device are of exactly the same design;

the orientation of first locking pair device being opposite that of the second locking pair
10 device;

thereby ensuring the first and second sub-assemblies are securely joined to form a hermaphroditic electrical connector.

15 Preferably, the first sub-assembly and second and opposed sub-assembly can be separated from each other by a single handed operation on the first two way locking/release device of the first housing and on the second two way locking/release device of the second and opposed housing.

20 Preferably, the first locking pair device consists of the latching means of the first sub-assembly and the catching means of the second and opposed sub-assembly and the second locking pair device consists of the catching means of the first sub-assembly and the latching means of the second and opposed sub-assembly.

25 Preferably, the first sub-assembly and second and opposed sub-assembly can be separated from each other through a single handed operation by using a thumb/finger to press on the first two way locking/release device of the first housing and by using a thumb/finger to insert into the angular portion of finger release on the second two way locking/release device of the second and opposed housing to dis-engage first
30 sub-assembly from the second and opposed sub-assembly.

Preferably, the housing has a latching means on one surface and a catching means on the opposite surface

35 Preferably, the latching means is a latch arm, with a finger release at one end and the other end forming a pinch surface.

Preferably, the latch arm is pivoted on a hinge on the surface of the housing.

Preferably, the finger release is formed at an angle to the housing, away from the
5 surface of the housing.

Preferably, the finger release has a lock ramp towards the surface of the housing.

Alternatively, the finger release can be operated by a thumb.

10

Preferably, the catching means is a chamfered latch boss.

Preferably, the chamfered latch boss is formed on the surface of a housing, opposite to
the latch arm of the same housing.

15

Preferably, the locking pair device is formed from the latching means of the first housing
and the catching means of the second and opposed housing.

Preferably, the locking pair device is formed when the lock ramp of the latch arm of the
20 first housing slides over the chamfered latch boss of the second and opposed housing
and at that point, the first housing and second and opposed housing is joined, the lock
ramp snaps onto the chamfered latch boss, thereby securing the first housing and
second and opposed housing.

25 Preferably, the locking pair device is operable by using one hand to lift the finger release
of the latch arm in the first housing and the same hand to press the pinch surface of the
second and opposed housing.

Preferably, the locking pair device is operable to lock the first housing and second and
30 opposed housing when the front of the latch arm of the first housing slides over the
chamfered latch boss on the second and opposite housing, the lock ramp of the first
housing would come into contact with the chamfered latch boss, locking the first housing
and the second and opposed housing.

35 A second object of the invention is for a hermaphroditic electrical connector consisting of
a first sub-assembly and second and opposed sub-assembly,

5 the first sub-assembly having a housing with a plurality of receptacle cavities
and a plurality of plug cavities;

the second and opposed sub-assembly having a housing with a plurality of
receptacle cavities and a plurality of plug cavities,

10 the first housing having a first latching means,

the first housing having a first catching means,

the second and opposed housing having a second latching means;

15

the second and opposed housing having a second catching means;

characterized in that in a joining operation of the first sub-assembly and second and
opposed sub-assembly, the receptacle cavities of the first housing are received by the
20 plug cavities of the second and opposed housing and the receptacle cavities of the
second and opposed housing are pushed into the plug cavities of the first housing,

the catching means on the first housing catches the latching means in the second and
opposed housing to form a first locking pair device;

25

the catching means on the second and opposed housing catches the latching means in
the first housing to form a second locking pair device;

the first and second locking pair devices are of exactly the same design;

30

the orientation of the first locking pair device being opposite that of the second locking
pair device.

such that the first and second locking pair devices in two sub-assemblies when joined
35 forms a two way locking/release device in which any one of the two sub-assemblies can
be unlocked by a single handed operation from any one of the two sub-assemblies

Preferably, the two way locking/release device is operable to dis-engage the first housing from the second and opposed housing by a single hand when a thumb/finger presses on the pinch surface, at the back of the two way locking/release device of the second and opposed housing, the lock ramp becomes disengaged from the chamfered latch boss of the first housing and at the same time, a thumb/finger is inserted into the angular portion of finger release of the first housing before the chamfered latch boss, thereby causing the lock ramp of the first housing to be dis-engaged from the chambered latch boss of the second and opposed housing.

BRIEF DESCRIPTION OF THE DRAWINGS

It will be appreciated that the two way release hermaphroditic electrical connectors according to the current invention may be implemented in various forms. A preferred embodiment of the invention will now be described, by way of example only and without intending to be limiting, and with reference to the accompanying drawings, wherein like numbers refer to like elements.

FIG. 1 is a perspective view of a connector of the prior art.

FIG. 2 is a perspective view of a receptacle contact.

FIG. 3 is a perspective view of plug contact.

FIG. 4 is a perspective view of the first housing, consisting of an upper row of plug cavity for plug contact and a lower row of receptacle cavity for receptacle contact.

FIG. 5 is a front view of the first housing.

FIG. 6 is a side view of the first housing.

FIG. 7 is a perspective view of the second and opposed housing, with an upper row of plug cavity for plug contact and a lower row of receptacle cavity for receptacle contact.

FIG. 8 is a front view of the second and opposed housing.

FIG. 9 is a perspective view of a sub-assembly consisting of a housing with upper row of plug cavity and a lower row of receptacle cavity for receiving the plug contact and receptacle contact respectively.

5

FIG. 10 is a perspective view of the first sub-assembly and second and opposed sub-assembly before being joined.

FIG. 11 is a perspective view of the first sub-assembly and second and opposed sub-assembly joined together.

10

FIG. 12 is a cross sectional view of the first sub-assembly and second and opposed sub-assembly joined together with an exploded cross sectional view of the locking pair device.

15

FIG. 13 is a perspective view of the first sub-assembly and second and opposed sub-assembly joined, with contacts, and fitted into a panel.

FIG. 14 is a cut away view of the first sub-assembly and second and opposed sub-assembly joined, with contacts, and fitted into the panel.

20

FIG. 15 is a cross section view of first sub-assembly and second and opposed sub-assembly fitted into a panel.

FIG. 16 shows a first step in separating the joined sub-assemblies and along with its separation, disconnecting of the hermaphroditic electrical connector.

25

FIG. 17 shows the second step when the second and opposed sub-assembly is separated from the first sub-assembly, which is still fixed on the panel.

30

FIG. 18 is a cut away perspective view of the hermaphroditic electrical connector as the second and opposed sub-assembly is being separated from the first sub-assembly, even as it remains fixed on the panel.

35 **DESCRIPTION OF THE PREFERRED EMBODIMENT**

The best mode embodiments of the present invention will be described hereafter with reference to the drawings. However, the embodiments illustrated below merely represent illustrative examples of the mating of two sub-assemblies having receptacle cavities and plug cavities for realizing the technical concept of the present invention and are not intended to limit the present invention since adaptations can be made to produce other equally valid embodiments without departing from the scope of the claims.

A description of the housing having plug and receptacle cavities is briefly given herein with reference to FIG 2 to FIG 8.

The hermaphroditic electrical connector of the invention consists of two sub-assemblies, a first sub-assembly (200) and a second and opposed sub-assembly (210). Both sub-assemblies (200, 210) are identical by having a housing with two types of cavities, opposite to each other. A typical sub-assembly may be constructed with any suitable pair of rows of passageways, one row stacked on another row. Typically, each row consists of a plurality of receptacle cavity (240) or a plurality of plug cavity (250). The receptacle cavity (240) would receive the receptacle contact (260) while the plug cavity (250) would receive the plug contact (270).

The first housing (220) has a plug cavities (250) are on the top row and a receptacle cavities (240) are on the bottom row. The second and opposed housing (230) being identical with first housing (220) and has upside down (opposite) orientation where receptacle cavities (240) on the top row and a plug cavities (250) on the bottom row.

FIG. 2 is a perspective view of a receptacle contact (260).

FIG. 3 is a perspective view of plug contact (270).

FIG. 4 is a perspective view of the first housing (220), consisting of an upper row of plug cavity (250) for plug contact (270) and a lower row of receptacle cavity (240) for receptacle contact (260). The two way locking/release device (280) is shown on top of the upper row. It should be pointed out that the second and opposed housing (230) is exactly the same design except that the second and opposed sub-assembly (210) is used in the upside down (opposite) orientation.

FIG. 5 is a front view of the first housing (220).

FIG. 6 is a side view of the first housing (220), with the two way locking/release device (280) shown. The two way locking/release device (280) consists of a latching means which operates in conjunction with a catching means. The latching means is a latch arm (300), hingely connected to the top row of the first housing (220). The front of the latch arm (300) consists of a finger release (310) which is angled upwards. The finger release (310) ends in a lock ramp (320). The back of the latch arm (300) ends in a pinch surface (340). The catching means which is a chamfered latch boss (330) located on second and opposed housing (230) is not shown.

FIG. 7 is a perspective view of the second and opposed housing (230) shown in an inverted position. This second and opposed housing (230) consists of a plurality of plug cavities (250) in an upper row and a plurality of receptacle cavities (240) in a lower row. The two way locking/release device (280) is shown on top of the plug cavities (250). When the first housing (220) is mated with the second and opposed housing (230), the second and opposed housing (230) would not be in the position as shown in Fig 7 but in an upside down orientation (opposite).

As pointed out earlier, both housings (220, 230) are exactly the same design except that any one of the housing must be joined to the other housing when the other housing is in an upside down position (opposite orientation). When the other housing is in an upside down (or opposite orientation), the plug cavities (250) in the first housing (220) would be joined to the receptacle cavities (240) of the second and opposed housing (230).

In operation, if the two way locking/release device (280) is on top of the first housing (220), the second and opposed housing (230) would be oriented so that the two way locking/release device (280) is at the bottom of the second and opposed housing (230). It is possible for the two housing (220, 230) to be fitted not in a top-bottom orientation but in a left-right orientation (or side by side orientation). The position of the both two way locking/release device (280) (one on each housing) opposite each other is to facilitate the use of the thumb and finger in a single handed operation to unlock the two way locking/release device (280) in the joined assemblies (200, 210).

FIG. 8 is a front view of the second and opposed housing (230).

FIG. 9 is a perspective view of a sub-assembly consisting of a housing with upper row of plug cavity (250) and a lower row of receptacle cavity (240) for receiving the plug contact (270) and receptacle contact (260) respectively.

5

FIG. 10 is a perspective view of the first sub-assembly (200) and second and opposed sub-assembly (210) before being joined. When the first sub-assembly (200) and second and opposed sub-assembly (210) are joined together, the latch arm (300) of the first sub-assembly (200) would slide over the chamfered latch boss (330) of the second and opposed sub-assembly (210). Likewise, the latch arm (300) of the second and opposed sub-assembly (210) (at the bottom) would slide over the chamfered latch boss (330) of the first sub-assembly (200).

The latching means is a latch arm (300), hingely connected to the top row of the first housing (220). The front of the latch arm (300) consists of a finger release (310) which is angled upwards. The finger release (310) ends in a lock ramp (320). The back of the latch arm (300) ends in a pinch surface (340). The catching means which is a chamfered latch boss (330) is shown on top of the second and opposed housing.

It can therefore be seen that the mated assembly has two of the two way locking/release device (280), in opposite orientation. The two way locking/release device (280) consists of a latch arm (300) fitted onto two hinges (350) on the top of the plug cavity (250) of the housing. A first end of the latch arm (300) is an angled finger release (310) and the other end is a pinch surface (340). The angled finger release (310) has a lock ramp (320) at its other end.

When the first sub-assembly (200) and the second and opposed sub-assembly (210) are brought together, the locking means on each housing would ensure both sub-assemblies (200,210) are securely connected. The mating of the two sub-assemblies (200, 210) using the locking means is easily accomplished.

In the prior art connectors, unlocking or separation of the two sub-assemblies would require the use of two hands. Using two hands is a problem when one side of the connector is mounted behind a wall panel or a partition, as a person cannot use the other hand to reach out to the sub-assembly behind the wall panel or partition.

The latch arm (300) is an example of a first class lever in which the hinge (350) is located at the middle of the cantilever, the load at one end and effort applied to the other end.

5 The two way locking/release device (280) differs from the lock mechanism of the prior art as exemplified in US 4,963,102 which is a second class lever. In the case of the locking mechanism of US 4,963,102, the load is applied on the middle of the cantilever, in order to unlock the two housings.

10 It can be seen that in the case of the two way locking/release device (280), release of each sub-assembly can be achieved using one hand. Installation of the two sub-assemblies (200, 210) would be made easier since there is no requirement for a particular sub-assembly to be fitted into a panel (370) or partition in a particular sequence in order for it to be separated later on.

15

FIG. 11 is a perspective view of the first sub-assembly (200) and second and opposed sub-assembly (210) joined together. The orientation of each sub-assembly is such that a plug cavity (250) of the housing must fit into the receptacle cavity (240) of the other housing. The two sub-assemblies (200, 210) are mated together by pushing each
20 housing towards each other. It can be seen that there is a locking pair device (290) formed on top of the assembly and another locking pair device (290) formed on the bottom of the assembly.

It is possible for the two sub-assemblies (200, 210) to be fitted not in a top-bottom
25 orientation but in a left-right orientation (or side by side orientation).

FIG. 12 is a cross sectional view of the first sub-assembly (200) and second and opposed sub-assembly (210) joined together with an exploded cross sectional view of the locking pair device (290). The front of the latch arm (300) of the first housing (220)
30 would slide over the chamfered latch boss (330) on the second and opposite housing (230). Once the front of the latch arm (300) of the first housing (220) slides over, the lock ramp (320) would come into contact with the chamfered latch boss (330), thereby becomes engaged. Once this is done, both sub-assemblies (200, 210) would be mated.

35 From the exploded cross sectional view, it can be seen that the front of the latch arm (300) of the second and opposite housing (230) had slid over the chamfered latch

boss (330) on the first housing (220). The lock ramp (320) is now engaged with the chamfered latch boss (330), thereby causing both sub-assemblies (200, 210) to be joined securely.

5 FIG. 13 is a perspective view of the first housing (220) and second and opposed housing (230) joined, with contacts, and fitted into a panel (370). The two way locking/release device (280) can be seen on either side of the panel (370). The stopper (360) (on the same surface which the latch arm (300) is fitted) and another stopper (360) (at the opposite side) of the same housing will prevent the housing from going
10 through the panel (370) or partition, allowing the housing to be installed on the panel (370). There is sufficient space in the sub-assembly to protrude slightly out of a partition to allow the second and opposed housing (230) to be joined to it.

FIG. 14 is a cut away view of the first sub-assembly (200) and second and opposed
15 sub-assembly (210) joined with contacts, and fitted into the panel (370). The two way locking/release device (280) can be seen on either side of the panel (370).

FIG. 15 is a cross section view of first sub-assembly (200) and second and opposed sub-assembly (210) fitted into a panel (370). It can be seen both sides of the
20 sub-assemblies (200, 210) have the two way locking/release device (280). The stopper (360) on the other side of the locking pair device (290) will prevent the sub-assembly from going through the panel (370).

FIG. 16 shows a first step in separating the joined sub-assemblies (200, 210) and
25 along with its separation, disconnecting of the hermaphroditic electrical connector. The two way locking/release device (280) at the top of the first sub-assembly (200) and the two way locking/release device (280) at the bottom of the second and opposed sub-assembly (210) allows a single handed operation to separate both sub-assemblies (200, 210). A thumb/finger presses on the pinch surface (340) of the two way
30 locking/release device (280) of the second sub-assembly (210) while a thumb/finger inserts into the angular portion of the finger release (310) of the first sub-assembly (200) before the chamfered latch boss (330).

When the thumb/finger presses on the pinch surface (340), which is at the back of the
35 two way locking/release device (280) of the second and opposed sub-assembly (210), the lock ramp (320) becomes disengaged from the chamfered latch boss (330) of the

first sub-assembly (200). At the same time, when a thumb/finger inserts into the angular portion of finger release (310) of the first sub-assembly (200) before the chamfered latch boss (330), the lock ramp (320) of the first sub-assembly (200) similarly becomes dis-engaged from the chamfered latch boss (330) of the second and opposed sub-assembly (210) which is located at the second and opposed housing (230).

FIG. 17 shows the second step when the second and opposed sub-assembly (210) is separated from the first sub-assembly (200), which is still fixed on the panel (370).

It can be seen from a description of the manner in which the two sub-assemblies (200, 210) are separated, when one of the sub-assembly is behind a panel (370), a single handed operation would enable the two sub-assemblies (200, 210) to be separated from each other.

FIG. 18 is a cut away perspective view of the hermaphroditic electrical connector as the second and opposed sub-assembly (210) is being separated from the first sub-assembly (200), even as it remains fixed on the panel (370). Once the second and opposed sub-assembly (210) has been separated, the two way locking/release device (280) on the first sub-assembly (200) will return to its normal position, ready to receive another second and opposed sub-assembly (210).

The use of the two way locking/release device (280) is advantageous when re-joining the two sub-assemblies (200, 210). A single handed operation is also needed in re-joining of the two sub-assemblies (200, 210) in situations where the hermaphroditic electrical connectors have to be joined together again, say after checking or repairs. In re-joining the two sub-assemblies (200, 210), the chamfered latch boss (330) in the incoming sub-assembly becomes engaged with the lock ramp (320) of the in-situ sub-assembly and the lock ramp (320) in the incoming sub-assembly becomes engaged with the chamfered latch boss (330) of the in-situ sub-assembly. Again, once the in-coming sub-assembly is pushed into the in-situ sub-assembly, both sub-assemblies (200, 210) becomes mated as the two way locking/release device (280) on top and at the bottom of both sub-assemblies (200, 210) becomes engaged with the chamfered latch boss (330) in the opposite sub-assembly.

As may be understood from the foregoing embodiment, it is possible to install the sub-assembly with both two way locking/release device (280) on opposite sides, in any

orientation to the vertical, and not necessarily one on top and the other at the bottom of the sub-assembly nor one on each side, at 90 degrees to the vertical.

While a preferred embodiment of the two way locking/release device (280) have
5 been described, it should be apparent, however, that various modifications, rearrangements, substitutions, alterations and adaptations to those embodiments may occur to persons skilled in the art with the attainment of some or all of the advantages of the present invention.

10 Accordingly, it should be clearly understood that the present invention is not intended to be limited by the particular features and structures hereinbefore described and depicted in the accompanying drawings. It is therefore intended to cover all such modifications, alterations and adaptations without departing from the scope and spirit of the present invention as defined by the appended claims.

15

ADVANTAGEOUS EFFECTS OF THE INVENTION

The present invention not only offers a single handed operation for release of the hermaphroditic electrical connector but release can be effected from any one side of
20 the hermaphroditic electrical connector. Therefore, no matter which side of hermaphroditic electrical connector is behind a panel (370), a single handed operation would release one hermaphroditic sub-assembly from the other hermaphroditic sub-assembly which cannot be accessed because it is behind the panel (370).

25

30

35

CLAIMS

1. A hermaphroditic electrical connector consisting of a first sub-assembly (200) and second and opposed sub-assembly (210),

5

the first sub-assembly (200) having a housing with a plurality of receptacle cavities (240) and a plurality of plug cavities (250);

10

the second and opposed sub-assembly (210) having a housing with a plurality of receptacle cavities (240) and a plurality of plug cavities (250),

the first housing (220) having a first latching means,

the first housing (220) having a first catching means,

15

the second and opposed housing (230) having a second latching means;

the second and opposed housing (230) having a second catching means;

20

characterized in that in a joining operation of the first sub-assembly (200) and second and opposed sub-assembly (210), the receptacle cavities (240) of the first housing (220) are received by the plug cavities (250) of the second and opposed housing (230) and the plug cavities (250) of the second and opposed housing (230) are pushed into the receptacle cavities (240) of the first housing (220),

25

the catching means on the first housing (220) catches the latching means in the second and opposed housing (230) to form a first locking pair device (290);

30

the catching means on the second and opposed housing (230) catches the latching means in the first housing (220) to form a second locking pair device (290);

the first and second locking pair devices (290) are of exactly the same design;

35

the orientation of the first locking pair device being opposite that of the second locking pair device.

thereby ensuring the first and second sub-assemblies (200, 210) are securely joined to form a hermaphroditic electrical connector.

2. The hermaphroditic electrical connector, as claimed in Claim 1 wherein the first
5 sub-assembly (200) and second and opposed sub-assembly (210) can be separated from each other by a single handed operation on the first two way locking/release device (280) of the first housing (220) and on the second two way locking/release device (280) of the second and opposed housing (230).

10 3. The hermaphroditic electrical connector, as claimed in Claim 1 wherein the first locking pair device (290) consists of the latching means of the first sub-assembly (200) and the catching means of the second and opposed sub-assembly (210) and the second locking pair device (290) consists of the catching means of the first sub-assembly (200) and the latching means of the second and opposed sub-assembly
15 (210).

4. The hermaphroditic electrical connector, as claimed in Claim 1 wherein the first sub-assembly (200) and second and opposed sub-assembly (210) can be separated from each other through a single handed operation by using a thumb/finger to press
20 on the pinch surface (340) of the two way locking/release device (280) of the second and opposed housing (230) and by using a thumb/finger to insert into the angular portion of finger release (310) on the two way locking/release device (280) of the first housing (220) to dis-engage first sub-assembly (200) from the second and opposed sub-assembly (210).

25

5. The housing as claimed in Claim 1 having a latching means on one surface and a catching means on the opposite surface

6. The latching means as claimed in Claim 5 consisting of a latch arm (300), with a
30 finger release (310) at one end and the other end forming a pinch surface (340).

7. The latch arm (300) as claimed in Claim 6 pivoted on a hinge (350) on the surface of the housing.

35 8. The finger release (310) as claimed in Claim 6, the said finger release (310) formed at an angle to the housing, away from the surface of the housing.

9. The finger release (310) as claimed in Claim 6, the said finger release (310) having a lock ramp (320) towards the surface of the housing.
- 5 10. The finger release (310) as claimed in Claim 8 which can be operated by a thumb.
11. The catching means as claimed in Claim 5 consisting of a chamfered latch boss (330).
- 10 12. The chamfered latch boss (330) as claimed in Claim 11 formed on the surface of a housing, opposite to the latch arm (300) of the same housing.
13. The locking pair device (290) as claimed in Claim 1 formed from the latching means of the first housing (220) and the catching means of the second and opposed
15 housing (230).
14. The locking pair device (290) as claimed in Claim 13 formed when the lock ramp (320) of the latch arm (300) of the first housing (220) slides over the chamfered latch boss (330) of the second and opposed housing (230) and at that point, the first housing
20 (220) and second and opposed housing (230) is joined, the lock ramp (320) snaps onto the chamfered latch boss (330), thereby securing the first housing (220) and second and opposed housing (230).
15. The locking pair device (290) as claimed in Claim 13 operable by using one hand
25 to lift the finger release (310) of the latch arm (300) in the first housing (220) and the same hand to press the pinch surface (340) of the second and opposed housing (230).
16. The locking pair device (290) as claimed in Claim 13 operable to lock the first housing (220) and second and opposed housing (230) when the front of the latch arm
30 (300) of the first housing (220) slides over the chamfered latch boss (330) on the second and opposite housing (230), the lock ramp (320) of the first housing (220) would come into contact with the chamfered latch boss (330), locking the first housing (220) and the second and opposed housing (230).
- 35 17. A hermaphroditic electrical connector consisting of a first sub-assembly (200) and second and opposed sub-assembly (210),

the first sub-assembly (200) having a housing with a plurality of receptacle cavities (240) and a plurality of plug cavities (250);

5 the second and opposed sub-assembly (210) having a housing with a plurality of receptacle cavities (240) and a plurality of plug cavities (250),

the first housing (220) having a first latching means,

10 the first housing (220) having a first catching means,

the second and opposed housing (230) having a second latching means;

the second and opposed housing (230) having a second catching means;

15

characterized in that in a joining operation of the first sub-assembly (200) and second and opposed sub-assembly (210), the receptacle cavities (240) of the first housing (220) are received by the plug cavities (250) of the second and opposed housing (230) and the receptacle cavities (240) of the second and opposed housing (230) are pushed
20 into the plug cavities (250) of the first housing (220),

the catching means on the first housing (220) catches the latching means in the second and opposed housing (230) to form a first locking pair device (290);

25 the catching means on the second and opposed housing (230) catches the latching means in the first housing (220) to form a second locking pair device (290);

the first and second locking pair devices (290) are of exactly the same design;

30 the orientation of the first locking pair device being opposite that of the second locking pair device.

characterized in that the first and second locking pair devices in two sub-assemblies when joined forms a two way locking/release device in which any one of the two
35 sub-assemblies can be unlocked by a single handed operation from any one of the two sub-assemblies.

18. The two way locking/release device (280) as claimed in Claim 17 operable to dis-engage the first housing (220) from the second and opposed housing (230) by a single hand when a thumb/finger presses on the pinch surface (340), at the back of the two way locking/release device (280) of the second and opposed housing (230), the lock ramp (320) becomes disengaged from the chamfered latch boss (330) of the first housing (220) and at the same time, a thumb/finger is inserted into the angular portion of finger release (310) of the first housing (220) before the chamfered latch boss (330), thereby causing the lock ramp (320) of the first housing (220) to be dis-engaged from the chambered latch boss (330) of the second and opposed housing (230).