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Data connector locking mechanism.

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Proprietor: THE WHITAKER CORPORATION
4550 New Linden Hill Road,
Suite 450
Wilmington, Delaware 19808 (US)

Inventor: Pitts, Terry Lee
4336-E Edith Lane
Greensboro, North Carolina 27409 (US)

Representative: Warren, Keith Stanley et al
BARON & WARREN
18 South End
Kensington
London W8 5BU (GB)

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Description

The invention relates to electrical connectors for use in terminating shielded multicore cables and more specifically to a data connector having a locking mechanism for locking the data connector in a latched configuration.

U.S. Patent No. RE32,760 discloses a local area network connector specifically intended for use in the data communications industry. These connectors can be employed in a closed loop data communication links in which various equipment, such as computer terminals, can be interconnected in a system. These connectors are specifically adapted for use in interconnecting numerous micro- or mini-computers in a computer network in an office environment. Connectors of this type have standard interface dimensions and configurations.

There exists within the industry, a need for retaining such electrical connectors in a latched configuration with other electrical connectors when connected. In particular, the connectors need to be held in a latched configuration with electrical connectors mounted in a patch panel, so-called panel mounted connectors, where a plurality of electrical connectors are positioned in a common panel for cross connect between various locations.

In the connector assembly shown in U.S. Patent RE32,760, a discrete locking member is available which is movable laterally between the latching arms and the top of the housing, filling the void between the latching arms and the housing on both sides of the integral web forming the hinge, thereby preventing the pivotal movement of the latching arms while the locking member is in place.

Another embodiment of locking mechanism is shown in U.S. Patent 4,711,511 wherein each latching mechanism includes a locking bar between the pivotal latching arm and the housing, and wherein each locking bar is longitudinally movable to perform a wedgelike function thereby preventing the pivotal movement of the latching arms when the locking bars are in the fully forward position.

The present invention consists in an electrical connector comprising an insulative housing having a mating face and a wire receiving face, latching members integral with opposite side surfaces of said housing via molded webs of material medially positioned between opposite ends of said latching members thereby forming hinges for said latching members, one end of each of said latching members having a latching mechanism thereon for mating with a complementary electrical connector, and the opposite end being free to move upwardly and downwardly during pivoting of said latching member, and a locking latch slidably receivable over each of said latching members, said locking latch comprising two opposite sidewalls having an upper wall spanning therebetwen, rear rod means extending between the sidewalls and a pair of front bars extending from the sidewalls and facing each other in spaced apart relation, said rod means and said bars being located in the same plane which is generally parallel to a plane extending through the upper wall, the locking latch being positioned on the latching member with the upper wall positioned above said latching member and with the bars positioned forwardly of said hinge, and the locking latch being movable longitudinally between a position where said bars abut the hinge and a position where said rod means abuts the hinge.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

FIGURE 1 is an isometric view of an electrical data connector showing one of the locking members exploded from the rear thereof.

FIGURE 2 is a front elevational view of the locking member shown in FIGURE 1.

FIGURE 3 is a cross-sectional view through lines 3-3 of FIGURE 2.

FIGURE 4 is a side elevational view showing the locking mechanism in cross-section installed on the data connector.

FIGURE 5A shows the locking member in a position allowing the latching members to be pivoted towards the data connector for insertion in a panel opening.

FIGURE 5B is a view similar to that of FIGURE 5A showing the data connector inserted in the panel opening and the locking mechanism in a position preventing the disconnection of the data connector from the panel.

FIGURE 6A shows a mating data connector poised for receipt within the data connector positioned in the panel with the locking mechanism in a position allowing the latch members to be pivoted outwardly for receipt within the mating data connector.

FIGURE 6B shows the two data connectors in mated engagement with the locking mechanism in a position preventing the disconnection of the two connectors.

FIGURE 7 is a front isometric view of a second embodiment of locking latch.

FIGURE 8 is a lower isometric view of the second embodiment of FIGURE 7.

FIGURE 9A is a cross-sectional view similar to that of FIGURE 5A showing the second embodiment locking latch.

FIGURE 9B is a cross-sectional view similar to that of FIGURE 5B showing the second embodiment locking latch.

With reference first to FIGURE 1, a data connector is shown generally at 2 which is of the type generally shown in U.S. Patent RE 32,760. The data connector includes a central body portion 4 having a plurality of electrical contacts 6 adjacent to a front mating face.
where the contacts 6 are reversely bent for intercon-
nection with like contacts in a corresponding her-
maphroditic connector. Connector 2 includes an up-
later member 8 and a lower latch member 10 where each of the latch members 8 and 10 are pivotal
relative to the central body portion 4 by means of an
integral web of material 12 (Figure 4) thereby forming
a hinge. The latch member 8 includes a C-shaped slot
14 whereas the latch member 10 includes a T-shaped
bar 16 where the C-slot 14 is adapted to receive a T-
bar 16 of a corresponding connector when the front
face of the corresponding hermaphroditic connector
is rotated 180° about a longitudinal axis.

As shown now in Figure 1, the data connector fur-
ther comprises a locking latch shown generally at 20
comprising an upper wall portion 22 profiled to span
the latch members 8 and 10 of the data connector,
and side wall portions 24 and 26 adapted to flank side
edges of the latch members 8 and 10. The locking
latch 20 includes two locking bars 28 extending from
the side walls 24 and 26 where the bars extend only
part way between the two side walls, the two bars 28
being spaced apart a distance less than the width of
the hinge 12. The bars 28 include, at the forward
sides of their ends, ramped surfaces 30 in order that
the locking latch 20 can be moved forwardly to a posi-
tion where the ramps contact the outer edges of
the hinge 12 thereby flexing the side walls 24, 26 out-
wardly to a position where the bars 28 pass the hinge
12 and thereafter resiliently snap back to a position
where the bars 28 are longitudinally beyond the hinge
12.

As shown best in Figure 2, the locking latch 20
further comprises a lower surface 40 for bearing en-
gagement against an upper surface of either the latch
member 8 or 10 as will be described in greater detail
herein. The locking latch 20 also comprises a cylin-
drical rod 34 extending continuously along the oppo-
site side walls 24 and 26. With reference now to Fig-
ure 3, the upper wall 22 includes a forward detent 36
and a rearward detent 38 extending downwardly from
the lower surface 40 of the upper wall 22. The detents
36 and 38 cooperate with the transverse recesses or
grooves 42 and 44 in the upper surface of the latch-
ing members 8, 10 (Figure 1).

With reference now to Figure 4, as positioned on
either the latch member 8 or 10, the locking latch 20
has its lower surface 40 adjacent to an upper surface
46 of the latch member 10 and adjacent to surface 48
of latch member 8. Both the bars 28 and the rod 34
are positioned intermediate lower surface 50 of the
latch member 10 and the upper surface 52 of the cen-
tral body portion, whereas the opposite locking latch
20 is positioned intermediate lower surface 54 of the
latch member 8 and between surface 56 of the central
body portion.

With reference now to Figure 5A, the locking
latches 20 are moveable to their rearwardmost position
where the bars 28 abut the hinge 12. In this position,
the locking latches 8, 10 and the locking latches 20
are pivotal together about the hinge 12, the bars 28
of the locking latch 20 having a radiused surface 59
allowing the bars 28 to pivot against the housing. The
latching members 8, 10 pivot to a position where the
locking shoulders 60 and 62 on the latch members 10
and 8, respectively, clear an opening 64, such that the
connector is insertable through the opening 64 of the
panel 66. The connector 2 is insertable into the open-
ing 64 to a position where side edges 68 of the central
body portion abut a side edge 70 of the opening 64.
At this position, the latch members 8 and 10 can be
released whereby the latching shoulders 60 and 62
resiliently spring back to their normal position and
abut the front surface of the panel 66.

With reference now to Figure 5B, the locking latch
20 is now movable forwardly to a position where the
rod 34 abuts the back side of the hinge 12 thereby
placing the bars 28 forwardly of the hinge 12. The
bars 28 thereby prevent downward movement of the
latch members 8 and 10 preventing disconnection of
the connector 2 from the panel 66.

With reference now to Figure 6A, the data con-
nectors 2 is shown in the locked configuration within
the panel 66 and poised for receiving an identical data
connector 2'. With the locking latch 20' fully forward
such that the cylindrical rod 34' abuts the hinges 12',
the latches 8' and 10', and the locking latches 20', are
pivotal about the hinges 12' to position the T-bar 16'
in registration with the corresponding C-slot 14 and
the C-slot 14' in registration with the T-bar 16 for mat-
ing interconnection. As shown in Figure 6B, when the
two data connectors 2 and 2' are fully mated, the lock-
ing latch 20' is moveable to its rearwardmost position
where the bars 28' abut the hinge 12' thereby pre-
venting disconnection of the connector 2' from the
connector 2.

With reference now to Figure 7, a second em-
bodyment of locking latch is shown at 120 comprising
an upper wall 122 extending between two sidewalls
124 and 126. Two wedge-like bars 128 extend inward-
ly from the sidewalls and have inner beveled edges
130 to assist in the insertion of the latch over the
hinge 12. The bars 128 also have cantilevered locking
arms 131, which will be described in greater detail
herein. With reference now to Figure 8, the lower
isometric view shows the underside structure of the
locking latch 120. The rear rod 134 is discontinu-
ous, thereby adding greater flexibility to the sidewalls
124, 126 during the insertion of the locking latch over
the hinge. In a similar nature to the locking latch 20,
the locking latch 120 includes detents 136 and 138
having an identical function as the detents 36 and 38
of the locking latch 20.

As shown in Figure 9A, with the locking latch 120
pulled all the way back, the latches 8, 10 are pivotal
about the hinge as the cantilevered locking arms
have tapered surfaces 139 (Figure 8) allowing the cantilevered arms 131 to fit within the void created between surfaces 50,52 of the latch 10, and between the void created between the surfaces 54,56 of the latch arm 8. When the locking latch is positioned all the way forward however, (Figure 9B) the cantilevered arms extend forwardly of the sidewalls 124,126 and help to support the forward ends of the latch arms 8,10, preventing the inward pivoting of the latch arms 8,10.

Claims

1. An electrical connector comprising an insulative housing (4) having a mating face and a wire receiving face, latching members (8,10) integral with opposite side surfaces of said housing via molded webs of material medially positioned between opposite ends of said latching members (8,10) thereby forming hinges (12) for said latching members, one end of each of said latching members having a latching mechanism (14,16) thereon for mating with a complementary electrical connector, and the opposite end being free to move upwardly and downwardly during pivoting of said latching member (8,10), and a locking latch (20,120) slidably receivable over each of said latching members (8,10), said locking latch comprising two opposite sidewalks (24,26; 124,126) having an upper wall (22,122) spanning therebetween, rear rod means (34,134) extending between the sidewalks and a pair of front bars (28,128) extending from the sidewalks (24,26) and facing each other in spaced apart relation, said rod means (34,134) and said bars (28,128) being located in the same plane which is generally parallel to a plane extending through the upper wall (22,122), the locking latch being positioned on the latching member (8,10) with the upper wall (22,122) positioned above said latching member (8,10) and with the bars (28,128) positioned forwardly of said hinge (12), and the locking latch being movable longitudinally between a position where said bars abut the hinge (12) and a position where said rod means (34) abuts the hinge (12).

2. The electrical connector of claim 1, wherein the front bars (28,128) have a spacing therebetween less than the width of the hinge (12), and the sidewalks (24,26;124,126) are resiliently flexible to allow the bars (28,128) to pass beyond the hinge.

3. The electrical connector of claim 2, wherein the bars (28,128) have ramped lead in surfaces (30,130) on their facing ends, positioned to engage the hinge (12) upon positioning of the lock-

4. The electrical connector of claim 1, 2 or 3, wherein the latching members (8,10) having transverse grooves (42,44) in upper surfaces.

5. The electrical connector of claim 4, wherein the upper wall (22,122) of the locking latch (20,120) includes detents (36,38;136,138) on a lower surface (40) thereof for engagement with at least one of the grooves (42,44).

6. The electrical connector of claim 5, wherein a forward detent (36,136) engages a forward groove (42) when the locking latch (20) is in the fully forward position.

7. The electrical connector of any preceding claim, wherein the rear rod means comprises a cylindrical rod (34) extending continuously between the sidewalks (24,26).

Patentansprüche

1. Elektrischer Verbinde mit einem isolierenden Gehäuse (4), das eine Fügefläche und eine Drahtaufnahmefläche hat, mit Verriegelungsgliedern (8,10), die einstücksig mit gegenüberliegenden Seitenflächen des Gehäuses über angeformte Materialübergänge ausgebildet sind, die etwa in der Mitte zwischen entgegengesetzten Enden der Verriegelungsglieder (8,10) angeordnet sind, wodurch sie Scharniere (12) für die Verriegelungsglieder bilden, wobei ein Ende jedes der Verriegelungsglieder einen Verriegelungsmechanismus (14,16) zum Zusammenfügen mit einem komplementären elektrischen Verbinde trägt, und wobei das entgegengesetzte Ende frei ist, sich während des Verschwenkens des Verriegelungsglieds (8,10) nach oben und nach unten zu bewegen, und wobei eine Verriegelungsraste (20,120) gleitfähig über jedem der Verriegelungsglieder (8,10) aufnehmbar ist, wobei die Verriegelungsraste zwei entgegengesetzte Seitenwände (24,26;124,126) aufweist, die durch eine dazwischenliegende obere Wand (22,122) überspannt sind, wobei sich eine hintere Stange (34,134) zwischen den Seitenwänden erstreckt und ein Paar vorderer Zapfen (28,128) sich von den Seitenwänden (24,26) erstrecken und in voneinander beabsichteter Beziehung aufeinander zu weisen, wobei die Stange (34,134) und die Zapfen (28,128) in der gleichen Ebene angeordnet sind, die allgemein parallel zu einer Ebene ist, die sich durch die obere Wand (22,122) erstreckt, wobei die Verriegelungsraste auf dem Verriegelungsglied (8,10) angeordnet ist, wobei
die obere Wand (22, 122) oberhalb des Verriegelungsglieds (8, 10) angeordnet ist und die Zapfen (28, 128) vor dem Scharnier (12) angeordnet sind, und wobei die Verriegelungsraste in Längsrichtung bewegbar ist zwischen einer Stellung, in der die Zapfen an dem Scharnier (12) anliegen, und einer Stellung, in der die Stange (34) an dem Scharnier (12) anliegt.

2. Elektrischer Verbinde nach Anspruch 1, bei dem die vorderen Zapfen (28, 128) zwischen sich einen Abstand haben, der kleiner ist als die Breite des Scharniers (12), und wobei die Seitenwände (24, 26; 124, 126) nachgiebig flexibel sind, um es den Zapfen (28, 128) zu gestatten, an dem Scharnier vorbeizugehen.

3. Elektrischer Verbinde nach Anspruch 2, bei dem die Zapfen (28, 128) rampenartige Einführungsflächen (30, 130) an ihren nach vorne weisenden Enden haben, die so angeordnet sind, daß sie beim Positionieren der Verriegelungsraste an dem Scharnier (12) angreifen.

4. Elektrischer Verbinde nach Anspruch 1, 2 oder 3, bei dem die Verriegelungsglieder (8, 10) Quernuten (42, 44) in oberen Oberflächen haben.

5. Elektrischer Verbinde nach Anspruch 4, bei dem die obere Wand (22, 122) der Verriegelungsraste (20, 120) an einer ihrer unteren Oberflächen (40) Vorsprüinge (36, 38; 136, 138) zum Eingriff mit wenigstens einer der Nuten (42, 44) aufweist.


7. Elektrischer Verbinde nach einem vorhergehenden Anspruch, bei dem die hintere Stange eine zylindrische Stange (34) aufweist, die sich kontinuierlich zwischen den Seitenwänden (24, 26) erstreckt.

**Revisions**

1. Connecteur électrique comportant un boultier isolant (4) ayant une face d’accouplement et une face de réception de fils, des éléments d’accrochage (8, 10) réalisés d’une seule pièce avec des surfaces latérales opposées, dudit boultier auxquelles ils sont reliés par des voiles de matière moulée, placés à mi-distance entre des extrémités opposées desdits éléments d’accrochage (8, 10) afin de former des charnières (12) pour lesdits éléments d’accrochage, une extrémité de chacun desdits éléments d’accrochage portant un mécanisme d’accrochage (14, 16) pour l’accouplement avec un connecteur électrique complémentaire, et l’extrémité opposée étant libre de monter et de descendre pendant le pivôtement dudit élément d’accrochage (8, 10), et un verrou d’accrochage (20, 120) étant reçu de façon coulissante sur chacun desdits éléments d’accrochage (8, 10), ledit verrou d’accrochage comportant deux parois latérales opposées (24, 26 ; 124, 126) entre lesquelles s’étend une paroi supérieure (22, 122), un moyen à tige arrière (34, 134) s’étendant entre les parois latérales et deux barres avant (28, 128) s’étendant depuis les parois latérales (24, 26) et étant dans une disposition face à face et espacée, ledit moyen à tige (34, 134) et lesdites barres (28, 128) étant placées dans le même plan qui est globalement parallèle à un plan passant par la paroi supérieure (22, 122), le verrou d’accrochage étant positionné sur l’élément d’accrochage (8, 10) de façon que la paroi supérieure (22, 122) soit positionnée au-dessus dudit élément d’accrochage (8, 10) et que les barres (28, 128) soient placées en avant de la dite charnière (12), et le verrou d’accrochage pouvant être déplacé longitudinal en une position dans laquelle lesdites barres butent contre la charnière (12) et une position dans laquelle ledit moyen à tige (34) bute contre la charnière (12).

2. Connecteur électrique selon la revendication 1, dans lequel les barres avant (28, 128) sont écartées d’une distance inférieure à la largeur de la charnière (12), et les parois latérales (24, 26 ; 124, 126) peuvent fléchir élastiquement pour permettre aux barres (28, 128) de passer au-delà de la charnière.

3. Connecteur électrique selon la revendication 2, dans lequel les barres (28, 128) présentent des surfaces d’entrée (30, 130) en rampes sur leurs extrémités face à face, positionnées de façon à porter contre la charnière (12) lors du positionnement du verrou d’accrochage.

4. Connecteur électrique selon la revendication 1, 2 ou 3, dans lequel les surfaces supérieures des éléments d’accrochage (8, 10) présentent des gorges transversales (42, 44).

5. Connecteur électrique selon la revendication 4, dans lequel la paroi supérieure (22, 122) du verrou d’accrochage (20, 120) comporte des pièces d’arrêt (36, 38 ; 136, 138) sur une surface inférieure (40) de cette paroi, destinées à réaliser un engagement avec au moins l’une des gorges (42, 44).
6. Connecteur électrique selon la revendication 5, dans lequel une pièce d'arrêt avant (36, 136) engage une gorge avant (42) lorsque le verrou d'accrochage (20) est dans la position totalement avancée.

7. Connecteur électrique selon l'une quelconque des revendications précédentes, dans lequel le moyen à tige arrière comprend une tige cylindrique (34) s'étendant en continu entre les parois latérales (24, 26).