not possible with a panel socket where the main body of the panel socket will normally be concealed behind a surrounding panel or face plate.

It is an object of the present invention to provide a locking power connector apparatus having a panel socket.

SUMMARY OF THE INVENTION

According to the invention there is provided a locking panel socket for making an electrical connection with a line plug, the locking panel socket comprising:

- a socket connection portion, the socket connection portion having an end face and the end face having a plurality of recesses for receiving corresponding power pins of a line plug;
- a plug insertion channel, the plug insertion channel extending around the socket connection portion;
- a panel portion, the panel portion defining a plane and extending around the plug insertion channel;
- a locking mechanism for restraining a power pin of a line plug from being withdrawn from at least one of said recesses, the locking mechanism being provided within the socket connection portion;
- a release mechanism for releasing the locking mechanism to permit said power pin to be withdrawn from said recess, the release mechanism including an actuation portion and a linking portion that links the actuation portion with the locking mechanism;

wherein

- the socket connection portion, plug insertion channel and panel portion share a common main body, and the actuation portion is manually accessible on said panel portion and the linking portion extends from the actuation portion to the locking mechanism; and
- the linking portion includes on opposite sides of the plug insertion channel a first portion located within the panel portion of the panel socket and a second portion located within the socket connection portion of the panel socket, said first

portion being a rod that terminates with the actuation portion, and the linking portion being separated from the plug insertion channel by walls in the main body, namely a base wall of said channel and two opposite side walls on opposite sides of said channel such that the linking portion extends around said walls from the actuation portion to the locking mechanism, and the first portion extending away from the actuation portion in a first direction transverse to the plane of the panel portion and the second portion extending in a second direction opposite to the first direction towards the locking mechanism, the arrangement being such that the actuation portion, when manually pushed, causes the rod and the second portion both to slide in parallel directions against respective ones of said side walls to disengage the locking mechanism from the power pin of a line plug.

In a preferred embodiment of the invention, the locking mechanism is a pivoting latch plate that has edges that allow a power pin to enter the ~~receptacle~~recess but which dig in to the power pin when this is pulled in the opposite direction. The power pin, and hence the rest of the line plug, are therefore locked to the panel socket.

When a user plugs a line plug into the panel socket, the locking mechanism will therefore lock the pin, and hence the plug, in place. When the user wishes to disconnected the line plug from the panel socket, the user can use the actuation portion on the panel to disengage the locking mechanism and then remove the line plug. The actuation portion is preferably a button that extends proud of the panel.

The panel portion in general defines a plane, at least in the locality of the panel socket, and the first portion extends away from the actuation portion in a first direction transverse, and most preferably perpendicular, to the plane of the panel portion. The second portion then extends in a second direction opposite to the first direction towards the locking mechanism.

The linking mechanism may include a third portion that extends between the first and second portions beneath a base of the plug insertion channel. It is preferred if

the linking portion is not of a unitary construction, but is composed of separate pieces. The third portion may be integral with either the first or second portions of the linking portion, but is preferably integral with the second portion.

The first portion ~~may be~~is a rod that terminates with the actuation portion. The actuation portion, when manually pushed, causes the first portion to act on the third portion and thereby pull the second portion in a direction parallel to the motion of the first portion to disengage the locking mechanism from the power pin of a line plug.

The invention also provides a locking power connector apparatus, comprising a locking panel socket and a line plug for electrical connection with the locking panel socket, in which the locking panel socket is according to the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

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

Figure 1 is a front view of a locking panel socket according to a preferred embodiment of the invention, showing three recesses in a socket connector portion bounded by a plug insertion channel which is itself surrounded by a panel;

Figures 2A and 2 B show cross-sections through the panel socket, taken along line II-II of Figure 1, showing a locking mechanism and release mechanism in, respectively, locked and open states;

Figure 3 is a side view of the panel socket of Figure 2A;

Figure 4 is an exploded view of the panel socket of Figure 1; and

CLAIMS

1. A locking panel socket for making an electrical connection with a line plug, the locking panel socket comprising:

- a socket connection portion, the socket connection portion having an end face and the end face having a plurality of recesses for receiving corresponding power pins of a line plug;
- a plug insertion channel, the plug insertion channel extending around the socket connection portion;
- a panel portion, the panel portion defining a plane and extending around the plug insertion channel;
- a locking mechanism for restraining a power pin of a line plug from being withdrawn from at least one of said recesses, the locking mechanism being provided within the socket connection portion;
- a release mechanism for releasing the locking mechanism to permit said power pin to be withdrawn from said recess, the release mechanism including an actuation portion and a linking portion that links the actuation portion with the locking mechanism;

wherein

- the socket connection portion, plug insertion channel and panel portion share a common main body, and the actuation portion is manually accessible on said panel portion and the linking portion extends from the actuation portion to the locking mechanism; and
- the linking portion includes on opposite sides of the plug insertion channel a first portion located within the panel portion of the panel socket and a second portion located within the socket connection portion of the panel socket, said first portion being a rod that terminates with the actuation portion, and the linking portion being separated from the plug insertion channel by walls in the main body, namely a base wall of said channel and two opposite side walls on opposite sides of said channel such that the linking portion extends around said walls from the actuation portion to the locking mechanism, and the first portion extending away from the actuation portion in a first direction transverse to the plane of the panel

portion and the second portion extending in a second direction opposite to the first direction towards the locking mechanism, the arrangement being such that the actuation portion, when manually pushed, causes the rod and the second portion both to slide in parallel directions against respective ones of said side walls to disengage the locking mechanism from the power pin of a line plug.

2. A locking panel socket as claimed in Claim 1, in which the actuation portion is a button that extends proud of the panel.

3. A locking panel socket as claimed in any preceding claim, in which the first portion extends away from the actuation portion in a first direction perpendicular to the plane of the panel portion

4. A locking panel socket as claimed in any preceding claim, in which the locking mechanism is a pivoting latch plate that has edges that allow a power pin to enter ~~the receptacle~~said recess but which dig in to the power pin when this is pulled in the opposite direction.

5. A locking panel socket as claimed in any preceding claim, in which the linking portion is not of a unitary construction, but is composed of separate pieces.

6. A locking panel socket as claimed in any preceding claim, in which the plug insertion channel has a base, and the linking portion includes a third portion that extends between the first and second portions beneath the base of the plug insertion channel.

7. A locking panel socket as claimed in Claim 6, in which the third portion is integral with the second portion.

~~8. A locking panel socket as claimed in any preceding claim, in which the first portion is a rod that terminates with the actuation portion.~~

~~9~~8. A locking panel socket as claimed in ~~Claim 8~~any preceding claim, in which the actuation portion, when manually pushed, causes the first portion to act on the third portion and thereby pull the second portion in a direction parallel to the motion of the first portion to disengage the locking mechanism from the power pin of a line plug.

~~10~~9. A locking power connector apparatus, comprising a locking panel socket and a line plug for electrical connection with the locking panel socket, in which the locking panel socket is as claimed in any preceding claim.

~~11~~10. A locking power connector apparatus as claimed in Claim ~~10~~9, in which:

- the actuation portion stands proud of the panel when the line plug is connected and locked with the locking panel socket; and
- the actuation portion, when depressed, causes the linking portion to disengage the locking mechanism from the power pin of the line plug to unlock the line plug from the locking panel socket.

~~12~~11. A locking panel socket substantially as herein described, with reference to or as shown in the accompanying drawings.

~~13~~12. A locking power connector apparatus substantially as herein described, with reference to the accompanying drawings.