It is an object of particular embodiments of the present invention to provide for a connector that can meet the stringent safety requirements even if both parts remain connected to a source of electrical energy after separation.

According to the present invention there is provided a connector for interconnecting or mutually isolating two or more electrical circuits, comprising first and second inter-engageable connector parts, the first part comprising a spigot extending along an axis and at least one first contact for connection to a respective electrical circuit, the second connector part comprising a socket into which the spigot is to be inserted and at least one second contact for connection to a respective electrical circuit, the second part supporting at least one member projecting radially into the socket, the first part defining at least one groove for receipt of the member, a first contact holder of electrically insulating material carrying the at least one first contact and a second contact holder of electrically insulating material carrying the at least one second contact, wherein the first contact holder has a first shroud disposed around the at least one first contact, the first shroud extending axially beyond the at least one first contact, and the second contact holder has a second shroud disposed around the at least one second contact, the second shroud extending axially beyond the at least one second contact, the contact holders being arranged such that when the spigot is received in the socket, the connector parts are moveable between a first axial position in which one of the first and second shrouds is received within the other of the first and second shrouds but the first and second contacts are axially separated and a second axial position in which one of the first and second shrouds is received within the other and the first and second contacts are engaged, wherein one of the first and second shrouds is in the form of a male shroud spigot that is receivable within a female recess defined by the other of the first and second shrouds, and wherein a first part of the female recess is a channel in which at least a leading end of the male shroud spigot is received when the connector parts are in the first axial position, the channel at least partially circumscribing the axis so as to accommodate relative rotation of the connector parts about the axis.

The provision of first and second shrouds as part of the electrically insulating first and second contact holders ensures the contacts are protected from inadvertent contact with a user. This allows the contacts to remain live after separation. The shrouds are such that the electrical contacts cannot be reached by a human finger.

When separating the two connector halves they are moved from the second axial position to the first axial position before they are separated. In the first axial position the contacts are disengaged but any arc or spark is contained within the first and second parts which are still engaged.

The connector parts may be rotatable about the axis between the first and second axial positions. This provides a delay in the separation of the first and second connector parts as they are pulled (or blown apart). Such a delay may allow any arc or spark to be extinguished prior to the complete separation of the two connector parts. There may be provided a clearance between the first and second shrouds in the first axial position to allow for relative rotation of the connector parts about the axis.

The first and second contact holders may be separate bodies that are insertable (preferably removably insertable) into outer bodies of the first and second connector parts. They are preferably wholly received within the outer bodies.

~~One of the first and second shrouds may be in the form of a male shroud spigot that is receivable within a female recess defined by the other of the first and second shrouds.~~ Thus there may be mechanical engagement of the first and second contact holders but no engagement of the first and second electrical contacts such that the electrical circuits are not connected.

The first shroud may define the female recess and may be substantially annular. The second shroud may define the male shroud spigot. The at least one first contact may be a male contact and the at least one second contact may be a female contact, the at least one male contact being received in the at least one female contact when the connectors are in the second axial position. The male and female contacts may be defined by contact pins and may be defined on the ends of the contact pins.

~~A first part of the female recess may be a channel in which at least a leading end of the male shroud spigot is received when the connector parts are in the first axial position. The channel may at least partially circumscribe the axis so as to accommodate relative rotation of the connector parts about the axis.~~ The channel may be approximately or substantially annular or partially annular. It may comprise substantially circular openings interconnected by arcuate passages. Alternatively it may comprise multiple channel portions. The first contact does not, preferably, extend into the channel.

A second part of the female recess may comprise a bore or socket for receipt of the male shroud spigot. The first contact has an end for engagement with an end of the second contact and preferably the end is wholly received within the bore or socket. The

CLAIMS

1. A connector for interconnecting or mutually isolating two or more electrical circuits, comprising first and second inter-engageable connector parts, the first part comprising a spigot extending along an axis and at least one first contact for connection to a respective electrical circuit, the second connector part comprising a socket into which the spigot is to be inserted and at least one second contact for connection to a respective electrical circuit, the second part supporting at least one member projecting radially into the socket, the first part defining at least one groove for receipt of the member, a first contact holder of electrically insulating material carrying the at least one first contact and a second contact holder of electrically insulating material carrying the at least one second contact, wherein the first contact holder has a first shroud disposed around the at least one first contact, the first shroud extending axially beyond the at least one first contact, and the second contact holder has a second shroud disposed around the at least one second contact, the second shroud extending axially beyond the at least one second contact, the contact holders being arranged such that when the spigot is received in the socket, the connector parts are moveable between a first axial position in which one of the first and second shrouds is received within the other of the first and second shrouds but the first and second contacts are axially separated and a second axial position in which one of the first and second shrouds is received within the other and the first and second contacts are engaged, wherein one of the first and second shrouds is in the form of a male shroud spigot that is receivable within a female recess defined by the other of the first and second shrouds, and wherein a first part of the female recess is a channel in which at least a leading end of the male shroud spigot is received when the

connector parts are in the first axial position, the channel at least partially circumscribing the axis so as to accommodate relative rotation of the connector parts about the axis.

2. A connector according to claim 1, wherein in the first axial position there is a clearance between the first and second shrouds to allow for relative rotation of the connector parts about the axis.

~~3. A connector according to claim 1 or 2, wherein one of the first and second shrouds is in the form of a male shroud spigot that is receivable within a female recess defined by the other of the first and second shrouds.~~

~~4. A connector according to claim 3, wherein a first part of the female recess is a channel in which at least a leading end of the male shroud spigot is received when the connector parts are in the first axial position, the channel at least partially circumscribing the axis so as to accommodate relative rotation of the connector parts about the axis.~~

~~5~~3. A connector according to either of claims 14 or 2, wherein a second part of the female recess comprises a bore or socket for receipt of the male shroud spigot.

~~6~~4. A connector according to any preceding claim ~~4 or 5~~, wherein the male shroud spigot has at least one recess on its outer surface to accommodate its receipt in the channel.

~~7~~5. A connector according to any preceding~~one of~~ claim~~s 3 to 6~~, wherein the male shroud spigot extends from a main body of one of the first or second contact holders.

~~8~~6. A connector according to any preceding claim, wherein there is a plurality of first contacts within the first shroud.

~~9~~7. A connector according to any preceding claim, wherein there is a plurality of second contacts, each contact having a second shroud.

~~10~~8. A connector according to claim ~~9~~7, wherein at least some of the second shrouds are joined together around two or more second contacts.

~~11~~9. A connector according to any preceding claim, wherein the at least one first and second contacts are in the form of electrically conductive pins.

~~12~~10. A connector according to any preceding claim, wherein the first contact holder supports male contacts and the second contact holder supports female contacts, the male contacts being received within the female contacts in the second axial position.

~~13~~11. A connector according to claim ~~11~~9, wherein the electrically conductive pins of the at least one first contact have a male end portion and the electrically conductive pins of the at least one second contact have a female end portion, the male end portion being received in the female end portion for electrical contact in the second axial position.