system for providing pressurised riser assembly is disclosed in US 2008/0105434. In this system, a universal riser section (OURS) is placed in the riser below the slip joint. The OURS includes, amongst other things, at least one rotating control device (RCD), together with all the usual connections and attachments required to operate the RCD, and at least one outlet for the fluid returns.

It is also known to replace a conventional slip-joint system with a specialised rotating control head system which includes one or more long “flow crosses” – conduits which extend horizontally from the riser, a flow spool or the rotating control device (RCD) housing. Valving and flexible hoses hang from each of the flow crosses, and the mud is returned from the riser annulus via the flow crosses and hoses.

Where fluid lines are connected to riser below the slip joint, the flexibility of the hoses accommodates the heave of the rig floor relative to the riser.

~~The~~Embodiments of the present invention relate~~s~~ to an improved connector assembly for connecting hoses to a drilling riser, via a flow spool or the like, as is required in the systems mentioned above.

~~According to a first aspect of the invention we provide a connector assembly for connecting a hose to a tubular element, the connector assembly comprising a tubular housing which encloses a main passage extending generally parallel to a longitudinal axis of the housing and which is provided with a side passage extending through the housing from the exterior of the housing into the main passage, the side passage further extending through a connector tube which is mounted on the exterior of the housing, the connector further being provided with a hose connector adapted to be secured to an end of the hose and to engage with the connector tube for connecting the hose to the tubular element, the hose connector comprising a pipe portion which is adapted to mate with the connector tube so that the interior of the hose is connected to the side passage, wherein the assembly is further provided with a latch which is operable to urge the connector tube and pipe portion into engagement and to prevent separation of the connector tube and pipe portion when the two are mated to connect the interior of the hose with the side passage.~~

According to a first aspect of the invention, there is provided a connector assembly for connecting a hose to a tubular element, the connector assembly

including: a tubular housing comprising a main passage which extends substantially parallel to a longitudinal axis of the tubular housing and which is enclosed in the tubular housing, and a side passage which extends through the tubular housing from an exterior of the tubular housing to the main passage so as to form a continuous passage together therewith, the side passage further extending through a connector tube which is mounted on the exterior of the tubular housing; a hose connector configured to be secured to an end of the hose and to engage with the connector tube for connecting the hose to the tubular element, the hose connector comprising a pipe portion which is configured to mate with the connector tube so that an interior of the hose is connected to the side passage; and a latch operable to urge the connector tube and the pipe portion into engagement and to prevent a separation of the connector tube and the pipe portion when the connector tube and the pipe portion are mated to connect the interior of the hose with the side passage, wherein the latch is movable between an open position in which the connector tube and pipe portion are separable, and a closed position in which the latch prevents the separation of the connector tube and pipe portion, the latch being configured so that, on a movement of the latch from the closed position to the open position, the latch pushes the connector tube and pipe portion apart.

According to a second aspect of the invention, there is provided a connector assembly for connecting a hose to a tubular element, the connector assembly including: a tubular housing comprising a main passage which extends substantially parallel to a longitudinal axis of the tubular housing and which is enclosed in the tubular housing, and a side passage which extends through the tubular housing from an exterior of the tubular housing to the main passage so as to form a continuous passage together therewith, the side passage further extending through a connector tube which is mounted on the exterior of the tubular housing; and a hose connector adapted to be secured to an end of the hose and to engage with the connector tube for connecting the hose to the tubular element, the hose connector comprising a pipe portion which is adapted to mate with the connector tube so that the interior of the hose is connected to the side passage, wherein, the connector tube and pipe portion of the hose connector are both circular in a transverse cross-section and are both provided with a plurality of teeth which are configured to be engaged to assist in retaining the connector tube and pipe portion in a desired angular orientation relative to one another, one of the connector tube and the pipe portion is adapted to extend into the other of the pipe portion or connector tube when the two parts mate to connect the interior of the hose with the side passage, and the one of the connector tube or pipe portion which is located outside the other when the two mate to connect

the interior of the hose with the side passage is provided with a radially outwardly extending flange at its free end, the teeth being provided in a surface of the flange, the surface in which the teeth are provided being configured to extend so as to be substantially perpendicular to a longitudinal axis of the connector tube

The latch may be hydraulically operated.

The latch may be movable between an open position in which the connector tube and pipe portion may be separated, and a closed position in which it prevents separation of the connector tube and pipe portion, and configured such that, on movement of the latch from the closed position to the open position, the latch pushes the connector tube and pipe portion apart.

Advantageously the pipe portion is adapted to be placed over the connector tube so that the connector tube extends into the pipe portion when the two parts mate to connect the interior of the hose with the side passage.

In this case, the pipe portion is provided with a radially outwardly extending flange at its free end, and the latch is provided with a lowermost catch part and an uppermost catch part and is configured such that when the latch is in the closed position the uppermost catch part bears down on the flange thus preventing the pipe portion of being lifted off the connector tube, and as the latch is moved to the open position, the lowermost catch part pushes the flange up to commence lifting the pipe portion off the connector tube.

~~According to a second aspect of the invention we provide~~Disclosed herein is a connector for connecting a hose to a tubular element, the connector comprising two generally parallel pipe portions connected by a intermediate pipe portion, the connector being provided with a mounting part on which is located a first suspension part and a second suspension part to each of which a flexible elongate element such as a wire, chain or rope may, in use, be secured for lowering the connector into engagement with the tubular element, the two suspension parts being spaced relative to one another, wherein one or both of the suspension parts is movable relative to the mounting part so that the separation of the suspension parts generally perpendicular to the two generally parallel pipe portions may be varied.

In one embodiment, only one of the suspension parts is movable relative to the mounting part so that the separation of the suspension parts generally perpendicular to the two generally parallel pipe portions may be varied.

In one embodiment, the intermediate portion is curved. In this case, the intermediate portion may be generally semicircular.

One or both of the suspension parts may comprise a loop which is pivotally mounted on the mounting part of the connector.

The or each movable suspension part may be mounted on a slider which can slide along a slot provided in the mounting part, each suspension part also including a fastener which is operable to releasably lock the slider in a desired location relative to the slot.

The or each movable suspension part may be provided with a ratchet mechanism which is operable to assist in retaining the or each suspension part in the desired position relative to the mounting part.

~~According to a third aspect of the invention we provide~~Disclosed herein a drilling riser and hose assembly, the hose being connected to the riser using ~~a~~ the above disclosed connector ~~according to the first aspect of the invention~~.

The tubular element may be part of a flow spool mounted on the riser.

~~According to a fourth aspect of the invention we provide~~Disclosed herein is a connector assembly for connecting a hose to a tubular element, the connector assembly comprising a tubular housing which encloses a main passage extending generally parallel to a longitudinal axis of the housing and which is provided with a side passage extending through the housing from the exterior of the housing into the main passage, the side passage further extending through a connector tube which is mounted on the exterior of the housing, wherein the connector assembly is further provided with an alignment structure which has a top part which extends radially outwardly relative to the tubular housing above a free end of the connector tube so that the longitudinal axis of the connector tube passes through the top part of the alignment structure.

In one embodiment the connector tube is mounted on the exterior of the housing such that a longitudinal axis of the connector tube is generally parallel to the longitudinal axis of the housing.

In one embodiment, the connector tube extends from a first end of the housing and the top part of the alignment structure extends from the housing between the connector tube and a second end of the housing.

The top part of the alignment structure may be inclined relative to the housing such that the portion closest to the housing is nearest to the connector tube, and the portion furthest from the housing is further away from the connector tube.

The alignment structure may further include two side parts which extend generally parallel to the longitudinal axis of the connector tube and which are arranged either side of the connector tube so that at least part of the connector tube is located between the two side parts.

In one embodiment, the connector assembly further comprises a hose connector adapted to be secured to an end of the hose and engaged with the connector tube for connecting the hose to the tubular element, the hose connector comprising two generally parallel pipe portions connected by a intermediate pipe portion, the connector being provided with a mounting part on which is located at least one suspension part to which a wire may, in use, be secured for lowering the hose connector into engagement with the connector tube, the space between the top part of the alignment structure and the connector tube being greater than the length of the hose connector generally parallel to the two generally parallel pipe portions.

The hose connector may have any of the features of the above disclosed connector ~~according to the first aspect of the invention~~.

The tubular housing may be configured to be mounted on a drilling riser.

~~According to a fifth aspect of the invention we provide~~ Disclosed herein is a connector assembly for connecting a hose to a tubular element, the connector assembly comprising a tubular housing which encloses a main passage extending generally parallel to a longitudinal axis of the housing and which is provided with a side passage extending through the housing from the exterior of the housing into the main passage, the side passage further extending through a connector tube which is mounted on the exterior of the housing, the connector further being provided with a hose connector adapted to be secured to an end of the hose and to engage with the connector tube for connecting the hose to the tubular element, the hose connector comprising a pipe portion which is adapted to mate with the connector tube so that the interior of the hose is connected to the side passage, wherein the connector tube and pipe portion of the hose connector are both circular in transverse cross-section and are both provided with a plurality of teeth which may be engaged to assist in

retaining the connector tube and pipe portion in a desired angular orientation relative to one another.

Advantageously one of the connector tube and the pipe portion is adapted to extend into the other of the pipe portion or connector tube when the two parts mate to connect the interior of the hose with the side passage. In one embodiment, the pipe portion is adapted to be placed over the connector tube so that the connector tube extends into the pipe portion when the two parts mate to connect the interior of the hose with the side passage.

In this case, the one of the connector tube or pipe portion which is located outside the other when the two mate to connect the interior of the hose with the side passage may be provided with a radially outwardly extending flange at its free end, the teeth being provided in a surface of the flange which, in use, extends perpendicular to the longitudinal axis of the connector tube.

The assembly may further be provided with a latch which is operable to urge the teeth of the connector tube and pipe portion into engagement and to prevent separation of the connector tube and pipe portion when the two are mated to connect the interior of the hose with the side passage.

The latch may be hydraulically operated.

The latch may be movable between an open position in which the connector tube and pipe portion may be separated, and a closed position in which it prevents separation of the connector tube and pipe portion, and configured such that, on movement of the latch from the closed position to the open position, the latch pushes the connector tube and pipe portion apart.

The tubular housing may be adapted to be secured to a drilling riser.

~~According to a sixth aspect of the invention we provide~~Disclosed herein is a riser flow diversion assembly having a main passage, a side port connecting the main passage with the exterior of the flow spool, and mounting parts suitable for mounting the assembly on a riser so that the main passage forms a continuous passage with the riser, the assembly further including a hose connector assembly comprising a connector tube through which the side passage extends, and which is mounted on the exterior of the housing such that the a longitudinal axis of the connector tube is generally parallel to the main passage.

The riser flow diversion assembly may be provided with a plurality of side ports, each of which has an associated hose connector assembly. In this case, the hose connectors may be spaced around the circumference of the flow spool in a substantially regular array.

Advantageously, the outer diameter of the flow spool and associated hose connector(s) does not exceed 46.5 inches.

The hose connector assembly of the riser flow diversion assembly may have any feature or any combination of features of the connector assembly according to the ~~third, fourth or fifth~~above aspect of the invention.

~~An e~~Embodiments of the invention will now be described, by way of example only, with reference to the following figures, of which

FIGURE 1 shows a first perspective view of a hose connector according to third aspect of the invention,

FIGURE 2 shows a second perspective view of the hose connector shown in Figure 1,

FIGURE 3 shows a perspective view of a hose and gooseneck assembly for use in connection with the hose connector illustrated in Figures 1 and 2, and according to the second aspect of the invention,

FIGURE 4 shows a perspective view of the hose and gooseneck assembly shown in Figure 3 mounted on the hose connector shown in Figures 1 and 2,

FIGURE 5 shows a schematic illustration of an offshore drilling rig including a hose, gooseneck assembly and hose connector.

FIGURE 6 shows an exploded illustration of the hose and gooseneck assembly shown in Figure 3,

FIGURE 7a, 7b and 7c show the gooseneck assembly of Figures 3 and 6 with the adjustable support part in a a) first position, b) second, intermediate, position, and c) third position,