A prior art example of a slip joint which is specifically designed to operate at much higher operating pressures is disclosed in US 2003/0111799.

Embodiments of t~~T~~he present invention relate~~s~~ to an alternative configuration of high pressure slip joint.

According to a first aspect of the invention, there is provided a slip joint having a tubular inner barrel and a tubular outer barrel, the inner barrel lying at least partially within the outer barrel, the slip joint further comprising two sealing assemblies which are operable to provide a substantially fluid tight seal between two sealing surfaces comprising an interior surface of the outer barrel and an exterior surface of the inner barrel, the sealing assemblies each including an actuator and a seal, the actuator being movable to push the seal into engagement with one of the sealing surfaces, the two sealing assemblies being displaced with respect to one another generally parallel to a longitudinal axis of the inner and outer barrels, wherein the sealing assemblies are mounted in a housing on the outer barrel, there being a fluid flow passage in the housing which provides fluid communication between the exterior of the housing and the space between the inner and outer barrels and between the two seals.

~~According to the first aspect of the invention we provide a slip joint having a tubular inner barrel and a tubular outer barrel, the inner barrel lying at least partially within the outer barrel, the slip joint further comprising a sealing assembly which is operable to provide a substantially fluid tight seal between two sealing surfaces comprising an interior surface of the outer barrel and an exterior surface of the inner barrel, the sealing assembly including an actuator and a seal, the actuator being movable to push the seal into engagement with one of the sealing surfaces.~~

The actuator may comprise a piston which is located in a chamber in a slip joint housing, the piston being movable in response to fluid pressure in the chamber, to push the seal into engagement with one of the sealing surfaces.

In this case, the sealing assembly may further comprise an annular packing element which is mounted with the piston in the housing and which is arranged radially outwardly of the seal, the piston in use engaging with the annular packing element so that movement of the actuator to push the seal into engagement with one of the sealing surfaces causes the annular packing element to constrict around the seal. Preferably, the annular packing element is caused to constrict around the seal by virtue engagement of the annular packing element with the housing.

The piston may be movable generally parallel to a longitudinal axis of the inner and outer barrels to push the seal into engagement with one of the sealing surfaces.

According to a second aspect of the invention, there is provided ~~we provide~~ a method of operating a slip joint according to the first aspect of the invention, ~~where provided with two sealing assemblies and one fluid flow passage,~~ wherein the method comprises supplying fluid to the fluid flow passage at a pressure which is between the pressure of fluid inside the slip joint and the pressure of fluid outside the slip joint.

The three sealing assemblies may be arranged in the order of first sealing assembly, second sealing assembly and third sealing assembly when travelling in the direction along the longitudinal axis of the slip joint towards the end of the outer barrel.

According to a third aspect of the invention, there is provided ~~we provide~~ a method of operating a slip joint according to the first aspect of the invention ~~where provided with three sealing assemblies and two fluid flow passages~~, wherein the method comprises supplying fluid to the first fluid flow passage at a pressure which is between the pressure of fluid inside the slip joint and the pressure of fluid outside the slip joint, and supplying fluid to the second fluid flow passage at a pressure which is less than the pressure of fluid in the first fluid flow passage, and greater than the pressure outside the slip joint.

Alternatively, the method may comprise supplying fluid to the second flow passage at a pressure which is greater than the pressure inside the riser. In this case, the method may further comprise supplying fluid to the first flow passage at a pressure which is greater than the pressure inside the riser but less than the pressure at the second flow passage.

Embodiments of the invention will be described, by way of example only, with reference to the accompanying figures, of which

FIGURE 1 shows a longitudinal cross-section through a first embodiment of riser slip joint according to the invention,