CLAIMS

1. 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.

2. A slip joint according to claim 1 wherein the actuator comprises 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.

3. A slip joint according to claim 2 wherein the sealing assembly further comprises 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.

4. A slip joint according to claim 3 wherein the annular packing element is caused to constrict around the seal by virtue engagement of the annular packing element with the housing.

5. A slip joint according to any one of claims 2 to 4 wherein 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.

6. A slip joint according to any preceding claim wherein the actuator is movable to push the seal into engagement with the exterior surface of the inner barrel.

7. A slip joint according to claim 6 wherein the actuator is mounted in a housing on the outer barrel.

8. A slip joint according to any preceding claim wherein the slip joint includes two sealing assemblies displaced with respect to one another generally parallel to a longitudinal axis of the inner and outer barrels, both of 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.

9. A slip joint according to claim 8 wherein the sealing assemblies are preferably 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.

10. A slip joint according to any preceding claim wherein the slip joint includes three sealing assemblies displaced with respect to one another generally parallel to a longitudinal axis of the inner and outer barrels, each of 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.

11. A slip joint according to claim 10 wherein the sealing assemblies are mounted in a housing on the outer barrel, there being two fluid flow passages in the housing the first one of which provides fluid communication between the exterior of the housing and the space between the inner and outer barrels and between the two seals of the first and second sealing assemblies, and the second one of which provides fluid communication between the exterior of the housing and the space between the inner and outer barrels and between the two seals of the second and third sealing assemblies.

12. A slip joint according to claim 11 wherein the sealing assemblies are 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.

13. A method of operating a slip joint according to claim 9 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.

14. A method of operating a slip joint according to claim 11 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.

15. A method of operating a slip joint according to claim 11 wherein the method comprises supplying fluid to the second flow passage at a pressure which is greater than the pressure inside the riser.

16. A method of operating a slip joint according to claim 14 wherein the method comprises 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.

17. A slip joint substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

18. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

CLAIMS

1. 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.

2. A slip joint according to claim 1 wherein the actuator comprises 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.

3. A slip joint according to claim 2 wherein the sealing assembly further comprises 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 piston to push the seal into engagement with one of the sealing surfaces causes the annular packing element to constrict around the seal.

4. A slip joint according to claim 3 wherein the annular packing element is caused to constrict around the seal by virtue engagement of the annular packing element with the housing.

5. A slip joint according to any one of claims 2 to 4 wherein 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.

6. A slip joint according to any preceding claim wherein the actuator is movable to push the seal into engagement with the exterior surface of the inner barrel.

7. A slip joint according to claim 6 wherein the actuator is mounted in a housing on the outer barrel.

8. A slip joint according to any preceding claim wherein the slip joint includes three sealing assemblies displaced with respect to one another generally parallel to a longitudinal axis of the inner and outer barrels, each of 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.

9. A slip joint according to claim 8 wherein the sealing assemblies are mounted in a housing on the outer barrel, there being two fluid flow passages in the housing the first one of which provides fluid communication between the exterior of the housing and the space between the inner and outer barrels and between the two seals of the first and second sealing assemblies, and the second one of which provides fluid communication between the exterior of the housing and the space between the inner and outer barrels and between the two seals of the second and third sealing assemblies.

10. A slip joint according to claim 9 wherein the sealing assemblies are 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.

11. A method of operating a slip joint according to claim 1 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.

12. A method of operating a slip joint according to claim 9 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.

13. A method of operating a slip joint according to claim 9 mounted in a riser wherein the method comprises supplying fluid to the second flow passage at a pressure which is greater than the pressure inside the riser.

14. A method of operating a slip joint according to claim 13 wherein the method comprises 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.