Claims

1. A telescopic joint for a marine drilling riser, said telescopic joint comprising:

an outer barrel;

an inner barrel received in the outer barrel, the inner barrel having a clearance fit with respect to the outer barrel for sliding of the inner barrel with respect to the outer barrel while maintaining the inner barrel in a coaxial relationship with respect to the outer barrel, and the inner barrel and the outer barrel defining a central lumen for passage of a drill pipe string through the telescopic joint; and

a tubular rolling elastomeric membrane disposed within the outer barrel and having a first end secured to an outer circumference of the inner barrel and a second end secured to an inner circumference of the outer barrel for sealing drilling fluid within the central lumen.

2. The telescopic joint as claimed in claim 1, further including a load ring mounted to the outer barrel for applying tension to the outer barrel.

3. The telescopic joint as claimed in claim 1, further including a pipe flange secured to the inner barrel and a drilling riser flange secured to the outer barrel, the drilling riser flange having connections for choke and kill lines.

4. The telescopic joint as claimed in claim 3, wherein the connections for the choke and kill lines include gooseneck pipes.

5. The telescopic joint as claimed in claim 1, wherein an end of the inner barrel received in the outer barrel has an enlarged outer diameter and a mechanical stop abutting against the outer barrel when the telescopic joint is in a fully extended configuration.

6. The telescopic joint as claimed in claim 1, wherein the first end of the tubular rolling elastomeric membrane is secured to one end of the inner barrel, and the second end of the tubular rolling elastomeric membrane is secured to a middle location of the outer barrel.

7. The telescopic joint as claimed in claim 1, wherein the first end of the tubular rolling elastomeric membrane is secured to the outer circumference of the inner barrel with adhesive, and the second end of the tubular rolling elastomeric membrane is secured to the inner circumference of the outer barrel with adhesive.

8. The telescopic joint as claimed in claim 1, wherein the first end of the tubular rolling elastomeric membrane is secured to the outer circumference of the inner barrel with a first clamping ring, and the second end of the tubular rolling elastomeric membrane is secured to the inner circumference of the outer barrel with a second clamping ring.

9. The telescopic joint as claimed in claim 1, wherein the tubular rolling elastomeric membrane includes reinforcements embedded in elastomer.

10. The telescopic joint as claimed in claim 9, wherein the reinforcements are aligned in an axial direction of the tubular rolling elastomeric membrane.

11. The telescopic joint as claimed in claim 9, wherein the reinforcements are aligned at selected positive and negative angles with respect to an axial direction of the tubular rolling elastomeric membrane.

12. The telescopic joint as claimed in claim 1, further including a tubular guide sleeve disposed in the outer barrel in a co-axial relationship with respect to the outer barrel, the tubular guide sleeve having a first end secured to the outer barrel, and the tubular guide sleeve having a second end received in the inner barrel.

13. The telescopic joint as claimed in claim 12, wherein the tubular guide sleeve is perforated.

14. The telescopic joint as claimed in claim 1, which includes a plurality of inner barrels having a coaxial relationship with respect to the outer barrel and arranged so that neighboring ones of the inner barrels have a clearance fit with each other for sliding with respect to each other while maintaining the coaxial relationship

with respect to the outer barrel, and the neighboring ones of the inner barrels have a respective tubular rolling elastomeric membrane secured to the neighboring ones of the inner barrels for sealing the drilling fluid within the central lumen.

15. A telescopic joint for a marine drilling riser, said telescopic joint comprising:

an outer barrel having a first end and a second end, the first end having a load shoulder;

a drilling riser flange secured to the second end of the outer barrel, the drilling riser flange having connections for choke and kill lines;

an inner barrel received in the outer barrel and having a clearance fit with respect to the outer barrel for sliding of the inner barrel with respect to the outer barrel while maintaining the inner barrel in a coaxial relationship with respect to the outer barrel, the inner barrel having a first end and a second end, the second end of the inner barrel having an enlarged outer diameter and a mechanical stop abutting against the outer barrel when the telescopic joint is in a fully extended configuration, and the inner barrel and the outer barrel define a central lumen for passage of a drill pipe string through the telescopic joint;

a pipe flange secured to the first end of the inner barrel; and

a tubular rolling elastomeric membrane disposed within the outer barrel, the tubular rolling elastomeric membrane having a first end secured to an outer circumference of the inner barrel at the second end of the inner barrel, and the tubular rolling elastomeric membrane having a second end secured to an inner circumference of the outer barrel at a middle location of the outer barrel for sealing drilling fluid within the central lumen.

16. The telescopic joint as claimed in claim 15, further including a load ring mounted to the load shoulder of the outer barrel for applying tension to the outer barrel.

17. The telescopic joint as claimed in claim 15, wherein the connections for the choke and kill lines include gooseneck pipes.

18. The telescopic joint as claimed in claim 15, further including a tubular guide sleeve disposed in the outer barrel in a co-axial relationship with respect to the outer barrel, the tubular guide sleeve having a first end secured to the outer barrel, and the tubular guide sleeve having a second end received in the inner barrel.

19. A telescopic joint for a marine drilling riser, said telescopic joint comprising:

multiple coaxial barrels nested in a coaxial relationship and defining a central lumen for passage of a drill pipe string through the telescopic joint, the multiple coaxial barrels including an innermost barrel and an outermost barrel, neighboring ones of the barrels having a clearance fit with respect to each other for sliding with respect to each other while maintaining the coaxial relationship between the neighboring ones of the barrels;

a pipe flange secured to the innermost barrel of the multiple barrels;

a drilling riser flange secured to the outermost barrel of the multiple barrels, the drilling riser flange having connections for choke and kill lines; and

a respective tubular rolling elastomeric membrane for each neighboring pair of the multiple coaxial barrels for sealing drilling fluid within the central lumen, the tubular rolling elastomeric membrane being disposed in an outermost one of the neighboring ones of the barrels in said each neighboring pair of the multiple barrels, the tubular rolling elastomeric membrane having a first end secured to an outer circumference of an innermost one of the neighboring ones of the barrels in said each neighboring pair of the multiple barrels, and the tubular rolling elastomeric membrane having a second end secured to an inner circumference of an outermost one of the neighboring ones of the barrels in said each neighboring pair of the multiple barrels.

20. The telescopic joint as claimed in claim 19, further including a load ring mounted to the outermost one of the multiple coaxial barrels for applying tension to the outermost one of the multiple coaxial barrels.

Claims

1. A telescopic joint for a marine drilling riser extending from a floating drilling vessel to a wellhead on a seabed, said telescopic joint comprising:

an outer barrel;

an inner barrel received in the outer barrel, the inner barrel having a clearance fit with respect to the outer barrel for sliding of the inner barrel with respect to the outer barrel while maintaining the inner barrel in a coaxial relationship with respect to the outer barrel, and the inner barrel and the outer barrel defining a central lumen for passage of a drill pipe string through the telescopic joint; and

a tubular rolling elastomeric membrane disposed within the outer barrel and having a first end secured to an outer circumference of the inner barrel and a second end secured to an inner circumference of the outer barrel for sealing drilling fluid within the central lumen.

2. The telescopic joint as claimed in claim 1, further including a load ring mounted to the outer barrel for applying tension to the outer barrel.

3. The telescopic joint as claimed in claim 1, further including a pipe flange secured to the inner barrel and a drilling riser flange secured to the outer barrel, the drilling riser flange having connections for choke and kill lines.

4. The telescopic joint as claimed in claim 3, wherein the connections for the choke and kill lines include gooseneck pipes.

5. The telescopic joint as claimed in claim 1, wherein an end of the inner barrel received in the outer barrel has an enlarged outer diameter and a mechanical stop abutting against the outer barrel when the telescopic joint is in a fully extended configuration.

6. The telescopic joint as claimed in claim 1, wherein the first end of the tubular rolling elastomeric membrane is secured to one end of the inner barrel, and the second end of the tubular rolling elastomeric membrane is secured to a middle location of the outer barrel.

7. The telescopic joint as claimed in claim 1, wherein the first end of the tubular rolling elastomeric membrane is secured to the outer circumference of the inner barrel with adhesive, and the second end of the tubular rolling elastomeric membrane is secured to the inner circumference of the outer barrel with adhesive.

8. The telescopic joint as claimed in claim 1, wherein the first end of the tubular rolling elastomeric membrane is secured to the outer circumference of the inner barrel with a first clamping ring, and the second end of the tubular rolling elastomeric membrane is secured to the inner circumference of the outer barrel with a second clamping ring.

9. The telescopic joint as claimed in claim 1, wherein the tubular rolling elastomeric membrane includes reinforcements embedded in elastomer.

10. The telescopic joint as claimed in claim 9, wherein the reinforcements are aligned in an axial direction of the tubular rolling elastomeric membrane.

11. The telescopic joint as claimed in claim 9, wherein the reinforcements are aligned at selected positive and negative angles with respect to an axial direction of the tubular rolling elastomeric membrane.

12. The telescopic joint as claimed in claim 1, further including a tubular guide sleeve disposed in the outer barrel in a co-axial relationship with respect to the outer barrel, the tubular guide sleeve having a first end secured to the outer barrel, and the tubular guide sleeve having a second end received in the inner barrel.

13. The telescopic joint as claimed in claim 12, wherein the tubular guide sleeve is perforated.

14. The telescopic joint as claimed in claim 1, which includes a plurality of inner barrels having a coaxial relationship with respect to the outer barrel and arranged so that neighboring ones of the inner barrels have a clearance fit with each other for sliding with respect to each other while maintaining the coaxial relationship with respect to the outer barrel, and the neighboring ones of the inner barrels have a respective tubular rolling elastomeric membrane secured to the neighboring ones of the inner barrels for sealing the drilling fluid within the central lumen.

15. A telescopic joint for a marine drilling riser, said telescopic joint comprising:

an outer barrel having a first end and a second end, the first end having a load shoulder;

a drilling riser flange secured to the second end of the outer barrel, the drilling riser flange having connections for choke and kill lines;

an inner barrel received in the outer barrel and having a clearance fit with respect to the outer barrel for sliding of the inner barrel with respect to the outer barrel while maintaining the inner barrel in a coaxial relationship with respect to the outer barrel, the inner barrel having a first end and a second end, the second end of the inner barrel having an enlarged outer diameter and a mechanical stop abutting against the outer barrel when the telescopic joint is in a fully extended configuration, and the inner barrel and the outer barrel define a central lumen for passage of a drill pipe string through the telescopic joint;

a pipe flange secured to the first end of the inner barrel; and

a tubular rolling elastomeric membrane disposed within the outer barrel, the tubular rolling elastomeric membrane having a first end secured to an outer circumference of the inner barrel at the second end of the inner barrel, and the tubular rolling elastomeric membrane having a second end secured to an inner circumference of the outer barrel at a middle location of the outer barrel for sealing drilling fluid within the central lumen.

16. The telescopic joint as claimed in claim 15, further including a load ring mounted to the load shoulder of the outer barrel for applying tension to the outer barrel.

17. The telescopic joint as claimed in claim 15, wherein the connections for the choke and kill lines include gooseneck pipes.

18. The telescopic joint as claimed in claim 15, further including a tubular guide sleeve disposed in the outer barrel in a co-axial relationship with respect to the outer barrel, the tubular guide sleeve having a first end secured to the outer barrel, and the tubular guide sleeve having a second end received in the inner barrel.

19. A telescopic joint for a marine drilling riser, said telescopic joint comprising:

multiple coaxial barrels nested in a coaxial relationship and defining a central lumen for passage of a drill pipe string through the telescopic joint, the multiple coaxial barrels including an innermost barrel and an outermost barrel, neighboring ones of the barrels having a clearance fit with respect to each other for sliding with respect to each other while maintaining the coaxial relationship between the neighboring ones of the barrels;

a pipe flange secured to the innermost barrel of the multiple barrels;

a drilling riser flange secured to the outermost barrel of the multiple barrels, the drilling riser flange having connections for choke and kill lines; and

a respective tubular rolling elastomeric membrane for each neighboring pair of the multiple coaxial barrels for sealing drilling fluid within the central lumen, the tubular rolling elastomeric membrane being disposed in an outermost one of the neighboring ones of the barrels in said each neighboring pair of the multiple barrels, the tubular rolling elastomeric membrane having a first end secured to an outer circumference of an innermost one of the neighboring ones of the barrels in said each neighboring pair of the multiple barrels, and the tubular rolling elastomeric membrane having a second end secured to an inner circumference of an outermost one of the neighboring ones of the barrels in said each neighboring pair of the multiple barrels.

20. The telescopic joint as claimed in claim 19, further including a load ring mounted to the outermost one of the multiple coaxial barrels for applying tension to the outermost one of the multiple coaxial barrels.

21. The telescopic joint as claimed in claim 1, wherein the central lumen extends through the telescopic joint with any obstruction from an opening at an end of the inner barrel to an opening at an end of the outer barrel.

22. The telescopic joint as claimed in claim 1, wherein the clearance fit of the inner barrel with respect to the outer barrel maintains the inner barrel in a coaxial relationship with respect to the outer barrel during sliding of the inner barrel with respect to the other barrel.