CLAIMS

1. A subsea riser assembly comprising:

an upper tubular member having an end and an axis;

a lower tubular member having an end, the lower tubular member coaxial with the upper tubular member;

wherein the end of the upper tubular member is proximate to the end of the lower tubular member;

a radially contractible member partially engaged with the end of at least one tubular member while in an initial position;

wherein the radially contractible member has threads on an outer diameter of the radially contractible member;

an outer sleeve having threads on an inner diameter that fully engage the threads on the outer diameter of the radially contractible member in the initial position, the outer sleeve threaded onto the radially contractible member;

wherein rotation of the outer sleeve relative to the radially contractible member in a first direction causes radial displacement between the threads on the inner diameter of the outer sleeve and the threads on the outer diameter of the radially contractible member, thereby partially disengaging the threads on the outer diameter of the radially contractible member from the threads on the inner diameter of the outer sleeve, and moving the radially contractible member inward to a made up position that secures the lower tubular member to the upper tubular member, and

wherein the radially contractible member comprises:

a radially contractible collet circumscribing the ends of the upper and lower tubular members;

an upper portion of the collet coaxial with the upper tubular member while in an initial position;

a lower portion of the collet partially engaged with the lower tubular member in the initial position;

the rotation of the outer sleeve and the collet relative to each other causes the collet to fully engage the upper and lower tubular members; and

the rotation causes the outer sleeve thread to move from a fully engaged position to a partially engaged position, thereby retaining the collet in the made up position that secures the lower tubular member to the upper tubular member, and

wherein,

the lower tubular member has grooves formed on an outer diameter portion of the lower tubular member end;

the collet is landed in the initial position on an upward facing collet shoulder formed on the outer diameter portion of the lower tubular member end, the shoulder axially below the lower tubular member end outer diameter grooves;

wherein the collet has lower inner diameter collet grooves formed on an inner diameter lower portion of the collet, and upper inner diameter collet grooves formed on an inner diameter upper portion of the collet;

wherein the lower inner diameter collet grooves partially engage the lower tubular member end outer diameter grooves in the initial position;

the upper tubular member end having outer diameter grooves formed on an outer diameter portion of the upper tubular member end, the upper tubular member end inserted into the collet so that the outer diameter grooves on the lower tubular member end and the outer diameter grooves on the upper tubular member end are adjacent to the inner diameter grooves of the collet in the initial position; and

wherein the upper and lower inner diameter grooves of the collet engage the outer diameter grooves of the upper and lower tubular member ends after the rotation moves the collet to the made up position, thereby securing the lower tubular member to the upper tubular member in the made-up position.

2. The subsea riser assembly of claim 1, wherein a gap is formed between the collet and the upward facing collet shoulder in the made-up position.

3. The subsea riser assembly of claim 1, wherein the outer diameter grooves of the lower tubular member end comprises threads, and the lower inner diameter collet grooves comprise threads.

4. The subsea riser assembly of claim 1, wherein the outer diameter grooves of the upper tubular member end comprises threads, and the upper inner diameter collet grooves comprise threads.

5. The subsea riser assembly of claim 1, wherein the lower tubular member end outer diameter grooves include a tip and a planar lower flank partially engaged with the groove of the lower inner diameter collet groove.

6. The subsea riser assembly of claim 1, comprising a nose seal interposed between the ends of the lower and upper tubular members.

7. The subsea riser assembly of claim 1, wherein:

   each thread on the outer diameter of the radially contractible member has an outer shallow flank at a shallow angle to the axis;

   each thread on the inner diameter of the outer sleeve has an outer shallow flank adapted to mate with the outer shallow flank of the thread on the outer diameter of the radially contractible member; and

   wherein rotation of the outer sleeve relative to the radially contractible member along the shallow angle generates a radial inward force causing radial contraction of the radially contractible member and an axial preload.

8. The subsea riser assembly of claim 7, wherein

   the outer shallow flank of the thread on the outer diameter of the radially contractible member has a portion at a greater angle to the axis than the shallow angle to increase the radial contraction of the radially contractible member; and

   the portion at a greater angle to the axis is spaced away from a crest of the thread.

9. The subsea riser assembly of claim 1, wherein a rotation of less than 360 degrees of the outer sleeve relative to the radially contractible member causes radially outer flanks of the

threads on the inner diameter of the outer sleeve and the threads on the outer diameter of the radially contractible member to engage one another to thereby cause the radially contractible member to move to the made-up position.

10. A subsea riser assembly comprising:

a first tubular member having a central bore with an axis and an end with outer diameter grooves formed on an outer diameter portion of the first tubular member end;

a collet landed in an initial position on an upward facing collet shoulder formed on the outer diameter of the first tubular member end, the shoulder axially below the first tubular member end outer diameter grooves;

wherein the collet has lower inner diameter collet grooves formed on an inner diameter lower portion of the collet partially engaged with the outer diameter grooves of the first tubular member in the initial position, upper inner diameter collet grooves formed on an inner diameter upper portion of the collet, and outer diameter collet threads formed on an outer diameter portion of the collet that extend an axial length of the collet;

wherein the collet is radially contractible from the initial position to a made-up position;

an outer annular sleeve having sleeve threads formed on an inner diameter surface of the outer annular sleeve, the sleeve threaded onto the outer diameter collet threads in the initial position;

a second tubular member having a central bore and an axis coaxial with the first tubular member central bore and axis, the second tubular member having an end with outer diameter grooves formed on an outer diameter portion of the second tubular member end inserted into the collet so that the outer diameter grooves on the first tubular member end and the outer diameter grooves on the second tubular member end are adjacent to the lower and upper inner diameter grooves of the collet, respectively, in the initial position;

wherein a rotation of less than 360° of the outer annular sleeve relative to the collet causes radial displacement between the threads on the inner diameter surface of the outer annular sleeve and the outer diameter collet threads to move the collet to the made-up position;

wherein the threads on the outer diameter of the collet are partially engaged with the inner diameter threads of the outer annular sleeve in the made-up position so as to retain the collet in the made-up position; and

wherein the upper and lower inner diameter grooves of the collet engage the outer diameter grooves of the first and second tubular member ends, thereby securing the first tubular member to the second tubular member in the made-up position.

11. The subsea riser assembly of claim 10, wherein:

each thread on the outer diameter of the collet has an outer shallow flank at a shallow angle to the axis;

each thread on the inner diameter of the outer annular sleeve has an outer shallow flank adapted to mate with the outer shallow flank of the thread on the outer diameter of the collet; and

wherein rotation of the outer annular sleeve relative to the collet along the shallow angle generates a radial inward force causing radial contraction of the collet and an axial preload.

12. The subsea riser assembly of claim 11, wherein

the outer shallow flank of the thread on the outer diameter of the collet has a portion at a greater angle to the axis than the shallow angle to increase the radial contraction of the collet; and

the portion at a greater angle to the axis is spaced away from a crest of the thread.

13. The subsea riser assembly of claim 10 wherein the outer diameter grooves of the first and second tubular member ends comprise threads, and the upper and lower inner diameter collet grooves comprise threads.

14. A subsea riser assembly comprising:

a tubular member having tubular member threads on an outer surface;

an annular collet circumscribing a portion of the tubular member and comprising:

an inner surface with inner collet threads that selectively engage the tubular member threads on the outer surface of the tubular member,

an outer surface having outer collet threads that project radially outward and that each have an outer radial surface that lies in a plane that is oblique to an axis of the tubular member; and

an annular outer sleeve that circumscribes the collet and has an inner surface with sleeve threads that have an inner radial surface that is complimentary to and in contact with the outer radial surface of the outer collet threads, so that when the outer sleeve is rotated, the sleeve threads move axially into radial interfering contact with the outer collet threads and urge the collet radially inward and into engaging contact with the tubular member.

15. The subsea riser assembly of claim 14, wherein the tubular member comprises a first tubular member, the riser assembly further comprising a second tubular member coaxial with the first tubular member and having second tubular member threads on an end adjacent the first tubular member, wherein the second tubular member threads are engaged with the inner collet threads thereby coupling the first and second tubular members.

16. The subsea riser assembly of claim 15, further comprising a shoulder on an outer surface of the second tubular member that is in interfering contact with an oppositely facing shoulder on an inner surface of the outer sleeve.