

CLAIMS

What is claimed is:

1. An apparatus, comprising:
 - a mandrel defining a mandrel groove circumferentially extending along an outer surface of the mandrel;
 - a retaining ring defining a ring groove circumferentially extending along an inner surface of the retaining ring and an access opening to the ring groove from an outer surface of the retaining ring, the retaining ring positionable around the mandrel to cooperatively define a channel with the ring groove and the mandrel groove; and
 - a plurality of retention segments insertable through the access opening into the channel for axially securing the retaining ring to the mandrel.
2. The apparatus of claim 1, further comprising a spring insertable through the access opening into the channel to place the plurality of retention segments in circumferential compression within the channel.
3. The apparatus of claim 1, further comprising:
 - a closure removably securable to the retaining ring to close the access opening and secure the plurality of retention segments in the channel.
4. The apparatus of claim 3, wherein the plurality of retention segments comprise two end segments disposed in the channel on opposing sides of the access opening, and the closure extends radially into the channel between the two end segments.
5. The apparatus of claim 4, wherein at least one of the end segments has an interlocking end that interlocks with the closure extending radially into the channel.
6. The apparatus of claim 5, wherein the end of the at least one of the end segments circumferentially overlaps with a portion of the closure.

7. The apparatus of claim 1, further comprising a key formed along one or both of the ring groove and the mandrel groove to limit circumferential movement of the retention segments along the channel.
8. The apparatus of claim 1, wherein the plurality of retention segments span at least 180 degrees of the channel.
9. The apparatus of claim 1, wherein one or more of the retention segments comprise a stepped cross section including a radially-inner portion and a radially-outer portion, the radially-outer portion having a width greater than a width of the radially-inner portion.
10. The apparatus of claim 1, wherein one or more of the retention segments has a beam-shape cross section including one or both of a flanged end slidably captured within the ring groove and a flanged end slidably captured within the mandrel groove when inserted in the channel.
11. The apparatus of claim 1, further comprising:
a sealing member secured to the mandrel by the retaining ring and configured for deploying outwardly from the mandrel.
12. A downhole tool, comprising:
a mandrel defining a mandrel groove circumferentially extending along an outer surface of the mandrel;
a retaining ring defining a ring groove circumferentially extending along an inner surface of the retaining ring and an access opening to the ring groove from an outer surface of the retaining ring, the retaining ring positionable around the mandrel to cooperatively define a channel with the ring groove and the mandrel groove;
a plurality of retention segments insertable through the access opening into the channel for axially securing the retaining ring to the mandrel;
a spring insertable through the access opening into the channel to place the plurality of retention segments in circumferential compression within the channel; and
a sealing member secured to the mandrel by the retaining ring and configured for deploying outwardly from the mandrel.

13. The downhole tool of claim 12, further comprising:
- a closure removably securable to the retaining ring to close the access opening and secure the plurality of retention segments in the channel;
- wherein the plurality of retention segments comprise two end segments disposed in the channel on opposing sides of the access opening, and the closure extends radially into the channel between the two end segments; and
- wherein each end segment has an interlocking end that interlocks with the closure by circumferentially overlapping with a portion of the closure when in compressive engagement from the compression spring.
14. A method of securing a component to a well tool, comprising:
- positioning a retainer ring on a mandrel of the well tool; and
- inserting a plurality of retention segments through an access opening on a retainer ring and into a channel defined between a ring groove on the retainer ring and a mandrel groove on the mandrel.
15. The method of claim 14, further comprising:
- securing a closure to the retaining ring to close the access opening after inserting the plurality of retention segments into the channel.
16. The method of claim 14, further comprising inserting a compression spring through the access opening into the channel to place the plurality of retention segments in circumferential compression within the channel.
17. The method of claim 14, further comprising filling at least 180 degrees of the channel with the plurality of retention segments.
18. The method of claim 14, further comprising securing a sealing member to the mandrel with the retaining ring.

19. The method of claim 18, further comprising:

further securing the sealing member to the mandrel by positioning a second retainer ring about the mandrel and inserting a second plurality of retention segments through an access opening on the second retainer ring and into a channel defined between a ring groove on the second retainer ring and another mandrel groove on the mandrel.

20. The method of claim 14, wherein each retention segment comprises a circular cross-section, a stepped cross section, or a beam-shaped cross section.