WHAT IS CLAIMED IS:

1. A wellhead assembly with an axis, characterized by:

an outer wellhead member (10) having a bore (12);

an inner wellhead member (18) adapted to be located in the bore (12);

opposing seal surfaces (14, 20) in the bore (12) and on an exterior portion of the inner wellhead member (18);

a seal ring (22, 26) between the inner and outer wellhead members (18, 10) having an inner annular member (22) and an outer annular member (26) circumscribing a portion of the inner annular member (22);

an annular energizing ring (41) having a lower end insertable between the inner and outer annular members (22, 26) of the seal ring, so that when the lower end of the energizing ring (41) is inserted between the inner and outer annular members (22, 26) of the seal ring, outer walls of the inner and outer annular members (24, 28) of the seal ring are urged radially outward into sealing engagement with the inner and outer wellhead members (18, 10); and

an annular extension (51) extending downwards and located below the seal ring, the extension (51) having a lower surface (53) for landing on a portion (19) of the inner wellhead member (18) and having an upward facing shoulder (55) in contact with the inner annular member (22) of the seal ring to prevent downward deflection of the inner annular member (22) as the energizing ring (41) is inserted between the inner and outer annular members (22, 26) of the seal ring.

2. The assembly according to claim 1, wherein the seal ring comprises a downward extension (50) extending from below the outer annular member (26) of the seal ring.

3. The assembly according to claim 2, wherein a gap (64) exists between a lower end (60) of the downward extension (50) and an upward facing shoulder (62) on the annular extension (51), prior to setting.

4. The assembly according to claim 2, wherein the annular inner member (22) of the seal ring is rigidly secured to the inner wellhead member (18) after the seal is set.

5. The assembly according to claim 4, further comprising a locking member (52) having at least a portion retained within a recess (54) formed in an upper interior portion of the annular extension (51) to hold the seal ring to the annular extension (50) and allow for axial movement of the annular extension (50) relative to the downward extension of the seal ring.

6. The assembly according to claim 1, wherein the inner and outer annular members (22, 26) of the seal ring form a U-shaped pocket (30).

7. The assembly according to claim 4, wherein the inner wellhead member (18) comprises a set of wickers (20) formed on the seal surfaces, wherein the annular inner member (22) of the seal ring is rigidly secured to the inner wellhead member (18) by the

sealing engagement of the annular inner member (22) of the seal ring with the set of wickers (20) formed on the seal surface of the inner wellhead member (18).

8. The assembly according to claim 6, wherein the inner wellhead member (18) comprises a shoulder (19) projecting radially outward to allow the annular extension (51) below the seal ring to land, the shoulder (19) providing a reaction point during setting operations.

9. The assembly according to claim 3, wherein the gap (64) is between 0.020 to 0.050 inches.

10. A method for sealing an inner wellhead member (18) to an outer wellhead member (10), characterized by:

landing a seal assembly between the inner and outer wellhead members (18, 10); the seal having an inner leg (22) and a separate outer leg (26), a slot (30) therebetween, and a an extension (51) extending downward from the seal for landing;

driving an energizing ring (41) into a slot (30) in the seal assembly to urge inner and outer legs (22, 26) of the seal assembly into engagement with the inner and outer wellhead members (18, 10),

supporting the inner leg (22) of the seal assembly with an upward facing extension (55) to prevent buckling of the inner leg (22) during setting operations.

11. The method according to claim 10, further comprising the step of securing the extension (51) to the seal with a locking member (52) having at least a portion retained within a recess (54) formed in an upper interior portion of the extension (51) to hold the seal to the annular extension (51) and allow for axial movement of the extension relative to the seal ring.

CLAIMS

WHAT IS CLAIMED IS:

1. A wellhead assembly with an axis, comprising:

an outer wellhead member having a bore;

an inner wellhead member adapted to be located in the bore;

opposing seal surfaces in the bore and on an exterior portion of the inner wellhead member;

a seal ring between the inner and outer wellhead members having an inner annular member and an outer annular member circumscribing a portion of the inner annular member, wherein the seal ring comprises a downward extension extending from below the outer annular member of the seal ring;

an annular energizing ring having a lower end insertable between the inner and outer annular members of the seal ring, so that when the lower end of the energizing ring is inserted between the inner and outer annular members of the seal ring, outer walls of the inner and outer annular members of the seal ring are urged radially outward into sealing engagement with the inner and outer wellhead members;

an annular extension extending downwards and located below the seal ring, the extension having a lower surface for landing on a portion of the inner wellhead member and having an upward facing shoulder in contact with the inner annular member of the seal ring to prevent downward deflection of the inner annular member as the energizing ring is inserted between the inner and outer annular members of the seal ring; and

a locking member having at least a portion retained within a recess formed in an upper interior portion of the annular extension to hold the seal ring to the annular extension and allow for axial movement of the annular extension relative to the downward extension of the seal ring.

2. The assembly according to claim 1, wherein a gap exists between a lower end of the downward extension and an upward facing shoulder on the annular extension, prior to setting.

3. The assembly according to claim 1, wherein the annular inner member of the seal ring is rigidly secured to the inner wellhead member after the seal is set.

4. The assembly according to claim 1, wherein the inner and outer annular members of the seal ring form a U-shaped pocket.

5. The assembly according to claim 4, wherein the inner wellhead member comprises a set of wickers formed on the seal surfaces, wherein the annular inner member of the seal ring is rigidly secured to the inner wellhead member by the sealing engagement of the annular inner member of the seal ring with the set of wickers formed on the seal surface of the inner wellhead member.

6. The assembly according to claim 4, wherein the inner wellhead member comprises a shoulder projecting radially outward to allow the annular extension below the seal ring to land, the shoulder providing a reaction point during setting operations.

7. A seal assembly, comprising:

a seal ring between inner and outer wellhead members, the seal ring having an inner annular member and an outer annular member circumscribing a portion of the inner amnular member;

an annular energizing ring having a lower end insertable between the inner and outer annular members of the seal ring, so that when the lower end of the energizing ring is inserted between the inner and outer annular members of the seal ring, outer walls of the inner and outer annular members of the seal ring are urged radially outward into sealing engagement with opposing seal surfaces on the inner and outer wellhead members;

an annular extension extending downwards and located below the seal ring, the extension having a lower surface for landing on a portion of the inner wellhead member and having an upward facing shoulder in contact with the inner annular member of the seal ring to prevent downward deflection of the inner annular member during setting operations; and

a locking member having at least a portion retained within a recess formed in an upper interior portion of the annular extension to hold the seal ring to the annular extension and allow for retrieval of seal assembly.

8. The assembly according to claim 7, wherein the inner and outer annular members of the seal ring form a U-shaped pocket.

9. The assembly according to claim 7, wherein a set of wickers is formed on at least one of the seal surfaces.

10. The assembly according to claim 7, wherein the inner wellhead member comprises a shoulder projecting radially outward to allow the annular extension below the seal ring to land, the shoulder providing a reaction point during setting operations.

11. The assembly according to claim 7, further comprising a downward extension extending from below the outer annular member of the seal ring.

12. The assembly according to claim 11, wherein a gap exists between a lower end of the downward extension and an upward facing shoulder on the annular extension, prior to setting.

13. The assembly according to claim 12, wherein the gap is between 0.020 to 0.050 inches.

14. A method for sealing an inner wellhead member to an outer wellhead member, comprising:

landing a seal assembly between the iner and outer wellhead members;

the seal having an inner leg and a separate outer leg, a slot therebetween, and an extension extending downward from the seal for landing;

driving an energizing ring into a slot in the seal assembly to urge inner and outer legs of the seal assembly into engagement with the inner and outer wellhead members;

supporting the inner leg of the seal assembly with an upward facing extension to prevent buckling of the inner leg during setting operations; and

securing the extension to the seal with a locking member having at least a portion retained within a recess formed in an upper interior portion of the extension to hold the seal to the annular extension and allow for axial movement of the extension relative to the seal ring.