CLAIMS

1. A seal arrangement (10, 21, 40, 60, 70, 80) characterized by:

a seal assembly (12, 48);

a seal subassembly (14, 16, 84) in operable contact with the seal assembly (12, 48), the seal subassembly (14, 16, 84) configured to impart energy to the seal assembly (12, 48) to promote sealing of the seal assembly (12, 48) with a mating surface (32), the seal subassembly further including a unidirectional seal member;

a non-sealing feature (18, 88) of the seal subassembly (14, 16, 84) depending from the seal subassembly (14, 16, 84) and interactive with a load shoulder (20, 90) of a structure adjacent the seal subassembly (14, 16, 84), the seal arrangement (10, 21, 40, 60, 70, 80) redirecting a mechanical load path through the seal subassembly (14, 16, 84) to the non-sealing feature (18, 88) such that a mechanical load is absent in the unidirectional seal member, during use.

2. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1 wherein the non-sealing feature (18, 88) is disposed on one of an outer diameter of the seal subassembly (14, 16, 84) or an inner diameter of the subassembly (14, 16, 84).

3. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the arrangement (10, 21, 40, 60, 70, 80) is disposed on a mandrel (24) and the load shoulder (20, 90) is a feature of the mandrel (24).

4. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the arrangement (10, 21, 40, 60, 70, 80) is disposed on a rod piston (82) and the load shoulder (20, 90) is in a housing (50, 92, 108) within which the arrangement (10, 21, 40, 60, 70, 80) is disposed.

5. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the non-sealing feature (18, 88) is the same material as the seal subassembly (14, 16, 84) but having different material property.

6. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the non-sealing feature (18, 88) is of a different material than the seal subassembly (14, 16, 84).

7. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 6, wherein the different material is a material possessing a greater structural load carrying capacity than the seal subassembly (14, 16, 84).

8. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the arrangement (10, 21, 40, 60, 70, 80) is a plurality of arrangements (10, 21, 40, 60, 70, 80) and wherein a pressure conduit (72) is disposed within one of the arrangements (10, 21, 40, 60, 70, 80) and ports (106) pressure to a location between the plurality of arrangements (10, 21, 40, 60, 70, 80).

9. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the seal assembly (12, 48) is a plurality of seal assemblies (12, 48) separated longitudinally, each of the plurality of seal assemblies (12, 48) being energized by one of a plurality of seal subassemblies (12, 48).

10. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the arrangement (10, 21, 40, 60, 70, 80) further includes a center bearing that aids in centralization of the arrangement (10, 21, 40, 60, 70, 80).

11. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the seal assembly (12, 48) has a cross sectional dimension that is diametrically larger than a cross sectional dimension of a unidirectional seal member of the seal subassembly (14, 16, 84).

12. The arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1, wherein the seal subassembly (14, 16, 84) includes a mechanically energized unidirectional seal.

13. A downhole tool characterized by:

a movable structure having a function related to the downhole tool;

an actuator (102, 122) for the movable structure; and

a seal arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1 operably connected to the actuator (102, 122).

14. A method of protecting a seal subassembly (14, 16, 84) as claimed in claim 1, from reverse loading by redirecting the load path through the seal subassembly (14, 16, 84) to the non-sealing feature (18, 88), while also permitting pressure energizing of the seal assembly (12, 48) by the seal subassembly (14, 16, 84) in a sealing direction.

15. A wellbore system (130) characterized by:

a borehole (132) in a subsurface formation (134);

a string (136) in the borehole (132); and

the seal arrangement (10, 21, 40, 60, 70, 80) as claimed in claim 1 disposed within or as a part of the string (136).