WHAT IS CLAIMED IS:

1. A drill tool, comprising:

a bit body;

at least one bearing shaft extending from the bit body;

a cone mounted for rotation on the bearing shaft;

a radial thrust bearing from which cone pumping pressure pulsation originates;

a lubricant sealing system comprising an annular seal gland and a seal ring retained within the annular seal gland; and

a lubricant cone pumping pressure restrictor system comprising an annular gland separate from the annular seal gland and a pressure restricting ring retained within the annular gland, wherein the lubricant cone pumping pressure restrictor system is positioned between the radial thrust bearing system and the lubricant sealing system is adapted to attenuate cone pumping lubricant pressure pulsation from acting on the seal ring retained within the annular seal gland.

2. The drill tool of claim 1, further comprising a ball raceway and a set of balls retained within the ball raceway to form a ball bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned between the lubricant sealing system and the ball bearing and adapted to attenuate cone pumping lubricant pressure pulsation originating from the radial thrust bearing.

3. The drill tool of claim 2, further comprising a roller raceway and a set of rollers retained within the roller raceway to form a roller bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned between the ball bearing and the roller bearing and adapted to attenuate cone pumping lubricant pressure pulsation originating from the radial thrust bearing.

4. The drill tool of claim 2, further comprising a friction journal bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned between the ball bearing and the friction journal bearing and adapted to attenuate cone pumping lubricant pressure pulsation originating from the radial thrust bearing.

5. The drill tool of claim 2, further comprising a roller raceway and a set of rollers retained within the roller raceway to form a roller bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned between the lubricant sealing system and the roller bearing and adapted to attenuate cone pumping lubricant pressure pulsation originating from the radial thrust bearing.

6. The drill tool of claim 2, further comprising a friction journal bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned between the lubricant sealing system and the friction journal bearing and adapted to attenuate cone pumping lubricant pressure pulsation originating from the radial thrust bearing.

7. The drill tool of claim 2, wherein the lubricant cone pumping pressure restrictor system is positioned between the radial thrust bearing and the ball bearing and adapted to attenuate cone pumping lubricant pressure pulsation originating from the radial thrust bearing.

8. The drill tool of claims 2-7, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

9. The drill tool of claims 2-7, wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant between the lubricant sealing system and the ball bearing.

10. The drill tool of claim 9, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

11. The drill tool of claim 9, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

12. The drill tool of claim 3, wherein the annular gland of the lubricant cone pumping pressure restrictor system is an extension of the roller raceway for the roller bearing.

13. The drill tool of claim 12, wherein the pressure restricting ring retained within the annular gland is positioned in adjacent contact with the set of rollers retained within the roller raceway.

14. The drill tool of claim 5, wherein the annular gland of the lubricant cone pumping pressure restrictor system is an extension of the roller raceway for the roller bearing.

15. The drill tool of claim 14, wherein the pressure restricting ring retained within the annular gland is positioned in adjacent contact with the set of rollers retained within the roller raceway.

16. The drill tool of claim 1, further comprising: an internal radial lubricant channel between a bearing surface and an internal central lubricant channel; and a pressure restrictor inserted within that internal radial lubricant channel.

CLAIMS

1. A drill tool, comprising:

a bit body;

at least one bearing shaft extending from the bit body;

a cone mounted for rotation on the bearing shaft;

a radial thrust bearing from which cone pumping pressure pulsation originates;

a lubricant sealing system comprising an annular seal gland and a seal ring retained within the annular seal gland; and

a lubricant cone pumping pressure restrictor system comprising an annular gland separate from the annular seal gland and a pressure restricting ring retained within the annular gland,

wherein the lubricant cone pumping pressure restrictor system is positioned along the bearing shaft between the radial thrust bearing system and the lubricant sealing system,

wherein the lubricant cone pumping pressure restrictor system functions to attenuate cone pumping lubricant pressure pulsation from acting on the seal ring retained within the annular seal gland; and

wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant both towards and away from the seal ring.

2. The drill tool of claim 1, further comprising a ball raceway and a set of balls retained within the ball raceway to form a ball bearing, and wherein the lubricant cone pumping

pressure restrictor system is positioned along the bearing shaft between the lubricant sealing system and the ball bearing.

3. The drill tool of claim 2, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

4. The drill tool of claim 1, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

5. The drill tool of claim 1, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

6. The drill tool of claim 2, further comprising a roller raceway and a set of rollers retained within the roller raceway to form a roller bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned along the bearing shaft between the ball bearing and the roller bearing.

7. The drill tool of claim 6, wherein the annular gland of the lubricant cone pumping pressure restrictor system is an extension of the roller raceway for the roller bearing.

8. The drill tool of claim 7, wherein the pressure restricting ring retained within the annular gland is positioned in adjacent contact with the set of rollers retained within the roller raceway.

9. The drill tool of claim 6, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

10. The drill tool of claim 6, wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant between the lubricant sealing system and the ball bearing.

11. The drill tool of claim 10, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

12. The drill tool of claim 10, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

13. The drill tool of claim 2, further comprising a friction journal bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned along the bearing shaft between the ball bearing and the friction journal bearing.

14. The drill tool of claim 13, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

15. The drill tool of claim 13, wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant between the lubricant sealing system and the ball bearing.

16. The drill tool of claim 15, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

17. The drill tool of claim 16, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

18. The drill tool of claim 1, further comprising: an internal radial lubricant channel between a bearing surface and an internal central lubricant channel; and a pressure restrictor inserted within that internal radial lubricant channel.

19. The drill tool of claim 2, further comprising a roller raceway and a set of rollers retained within the roller raceway to form a roller bearing, and wherein the lubricant cone

pumping pressure restrictor system is positioned along the bearing shaft between the lubricant sealing system and the roller bearing.

20. The drill tool of claim 19, wherein the annular gland of the lubricant cone pumping pressure restrictor system is an extension of the roller raceway for the roller bearing.

21. The drill tool of claim 20, wherein the pressure restricting ring retained within the annular gland is positioned in adjacent contact with the set of rollers retained within the roller raceway.

22. The drill tool of claim 19, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

23. The drill tool of claim 19, wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant between the lubricant sealing system and the ball bearing.

24. The drill tool of claim 23, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

25. The drill tool of claim 23, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

26. The drill tool of claim 2, further comprising a friction journal bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned along the bearing shaft between the lubricant sealing system and the friction journal bearing.

27. The drill tool of claim 26, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

28. The drill tool of claim 26, wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant between the lubricant sealing system and the ball bearing.

29. The drill tool of claim 28, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

30. The drill tool of claim 28, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

31. The drill tool of claim 1, further comprising a ball raceway; and a set of balls retained within the ball raceway to form a ball bearing, and wherein the lubricant cone pumping pressure restrictor system is positioned along the bearing shaft between the radial thrust bearing and the ball bearing.

32. The drill tool of claim 31, wherein the annular gland of the lubricant cone pumping pressure restrictor system is formed in an inner surface of the cone.

33. The drill tool of claim 31, wherein the pressure restricting ring retained within the annular gland does not provide a seal with respect to a flow of lubricant between the lubricant sealing system and the ball bearing.

34. The drill tool of claim 33, wherein the pressure restricting ring includes a slot opening permitting restricted passage of lubricant.

35. The drill tool of claim 33, wherein the pressure restricting ring includes a passage extending through the ring permitting restricted passage of lubricant.

36. The drill tool of claim 1, wherein the seal member is an o-ring seal.