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ROCK BIT WITH MECHANICAL SEAL

Abstract of the Invention

A mechanical seal for use in a rotary rock bit comprises a leg seal ring positioned within a recessed portion of a leg forming a seal cavity. The leg seal comprises one surface partially engaged by a resilient material and an opposite surface comprising a first sealing surface. The mechanical seal also comprises cone seal ring positioned within a portion of a cone forming the seal cavity. The cone seal comprises one surface positioned within and attached to a recessed portion of the cone and another surface comprising a second sealing surface engaging the first sealing surface. The portion of the leg seal ring engaged by the resilient material engages a back face of the leg which includes a ramp, serving to urge the first sealing surface against the adjacent second sealing surface and create a sealing engagement. The first and second sealing surfaces are made from different hard materials each having a similar hardness of greater than 1000, and each material selected has a Knoop hardness difference of about 400 or less. The first and second sealing surfaces may be formed from materials the same as or different than materials forming the leg seal ring and cone seal ring, respectively.

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