

Title (en)

A rotating bit with junk slots in its gage.

Title (de)

Rotierender Meissel mit Brockennuten in seinem Umfang.

Title (fr)

Trépan de forage rotatif avec des rainures pour des morceaux dans sa périphérie.

Publication

EP 0452999 A2 19911023 (EN)

Application

EP 91111602 A 19870910

Priority

US 90616986 A 19860911

Abstract (en)

An improved rotating drag bit for cutting plastic, sticky, water reactive and shale formations is devised by providing a plurality of large diamond cutters having a circular cutting face in excess of a three quarter inch in diameter. Each large cutter is provided with at least one hydraulic nozzle which in turn provides a directed hydraulic flow at the corresponding cutter face. The directed hydraulic flow is positioned to apply a force to the chip which tends to peel the chip away from the cutter face. In addition, the hydraulic flow is positioned with respect to the chip so as to apply an off-center torque to the chip which is used to peel the chip away from the cutter face and toward the gage of the bit. In particular, the nozzle defines a jet which is characterized by a direction and velocity of hydraulic fluid determined by the jet characteristics. The core is generally symmetric about its longitudinal axis and has a length along the longitudinal axis and width perpendicular thereto. The point of the jet most distant from the nozzle defines an impact point of the jet against the chip and cutter face. The longitudinal axis of the jet is chosen so that at least a portion of the jet axis lies between the cutter face and the chip as it is being peeled from the cutter. Hydraulic removal of the chips is further facilitated by a plurality of junk slots having a contained compound surface. The junk slot is characterized by having at least two distinct cross-sectional profiles, namely an asymmetric profile at its lower portion nearest the bit face and a symmetric profile along its upper portion. The asymmetric and symmetric profiles are connected by a surface providing a smooth hydrodynamic transition.

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