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(54) Title: ROLLER CONE GAGE SURFACE CUTTING ELEMENTS WITH MULTIPLE ULTRA HARD CUTTING SURFACES ✓

(57) Abstract

A gage surface cutting element (22, 30, 50, 70, 100, 120) for a cutter (20) in a roller cone drill bit (10) has a generally cylindrical body (32, 52, 72, 102, 122) formed of a hard and wear-resistant material. The cutting end (34, 54, 74, 104, 124) of the cutting element (22, 30, 50, 70, 100, 120) has a generally conical cutting surface (38, 58, 78, 108, 128) substantially perpendicular to a longitudinal axis of the cylindrical body (32, 52, 72, 102, 122). A plurality of generally parallel shallow and elongated grooves (40-42, 60-63, 80-82, 110-112, 130-132) are formed in the conical cutting surface (38, 58, 78, 108, 128), and a plurality of elongated strips of an ultra hard material (44-46, 64-67, 84-86, 114-116, 134-136) is disposed in the grooves. The result is a conical cutting surface (38, 58, 78, 108, 128) that has alternating hard and ultra hard cutting surfaces that can be oriented at 0°, 90°, or any angle in between with respect to the rotational direction of the cutter cone (20).

