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Landers

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[54] **METHOD OF AND APPARATUS FOR HORIZONTAL WELL DRILLING**

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[*] Notice: This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

[63] Continuation-in-part of application No. 08/624,438, filed as application No. PCT/US94/10896, Sep. 26, 1994, which is a continuation-in-part of application No. 08/131,526, Oct. 1, 1993, Pat. No. 5,413,184.

[51] **Int. Cl.**[7] **E21B 7/08**

[52] **U.S. Cl.** **175/62**; 175/75; 175/424

[58] **Field of Search** 175/61, 62, 75, 175/420, 80, 89; 299/16, 17; 166/117.6

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[57] **ABSTRACT**

A method and apparatus for penetrating a well casing and surrounding earth strata includes the insertion of a flexible shaft having a ball cutter on an end thereof into upset tubing within a well casing. The upset tubing is provided with an elbow at its lower extremity for receiving the ball cutter therein. The flexible shaft is then rotated and the ball cutter cuts a hole in the well casing. The flexible shaft and ball cutter are then removed and a flexible tube having a nozzle blaster on an end thereof is then inserted into the upset tubing in the channel. A fluid of surfactant and water at high pressure is then pumped into the tube wherein the high pressure fluid passes through orifice in the spiral drill thereby cutting an extension into the previously cut channel. The tube is continually feed into the channel as the high pressure fluid continues to blast away the earth's strata. The channel is then cut a preselected distance from the well up to 200 feet and beyond.

39 Claims, 7 Drawing Sheets