Title (en)

STEERING AND CONTROL SYSTEM FOR PERCUSSION BORING TOOLS

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Application

EP 86302534 A 19860404

Priority

- US 72058285 A 19850405
- US 72280785 A 19850412
- US 72379285 A 19850416

Abstract (en)

[origin: EP0202013A2] A steering and control system is disclosed for percussion boring tools for boring in the earth at an angle or in a generally horizontal direction. The steering mechanism comprises a slanted-face nose member attached to the anvil of the tool to produce a turning force on the tool and movable tail fins in the trailing end of the tool to be selectively positioned relative to the body of the tool to negate the turning force. The fins assume a netural position relative to the housing of the tool when the tool is allowed to turn and to assume a spin inducing position relative to the housing of the tool to cause it to rotate when the tool is to move in a straight direction. The tool optionally has a cylindrical body with overgage sleeves located over a portion of the outer body affixed so that they can rotate but cannot slide axially. The overgage areas at the front and back of the tool, or alternately, an undergage section in the center of the tool body permits a 2-point contact (front and rear) of the outer housing with the soil wall as opposed to the line contact which occurs without the undercut. The 2-point contact allows the tool to deviate in an arc without distorting the round cross-sectional profile of the pierced hole. Thus, for a given steering force at the front and/or back of the tool, a higher rate of turning is possible since a smaller volume of soil needs to be displaced. A control system guides the tool in a borehole in response to control signals. The control system includes an axial electromagnetic source for generating an axial alternating magnetic field directed along an axial source axis. A sensing assembly remote from the source means includes first and second pickup coils for sensing the alternating magnetic field. Each of the first and second pickup coils has a respective coil axis and is rigidly mounted in respect to the other with their respective axes at a substantial angle with respect to each other, defining a sensing assembly axis substantially normal to both coil axes. Each coil generates a respective null electrical signal when the lines of magnetic flux at the respective coil are normal to the respective coil axis. Either the source or the sensing assembly is rigidly mounted on the tool, preferably the source. The outputs of the sensing coils are used to determine the direction of lines of magnetic flux at the sensing assembly, and indicate the attitude of the source relative to the sensing assembly.

[origin: EP0202013A2] A controllable percussion tool for drilling holes in the soil comprises a hollow cylindrical housing with a tapered front end, an anvil having a striking surface inside the housing and a boring surface outside the housing and a cylindrical nose portion with a slanted face, a reciprocally movable hammer in the housing, and guide fins positioned on the exterior of the rear end of the housing. The fins are movable between two positions which permit non-rotative movement through the soil and rotation of the housing as it moves through the soil. A control system for guiding the tool in a borehole includes an axial electromagnetic source for generating an axial alternating magnetic field. A sensing assembly includes pick up coils for sensing the magnetic field.

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IPC 8 full level

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CPC (source: EP US)

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