

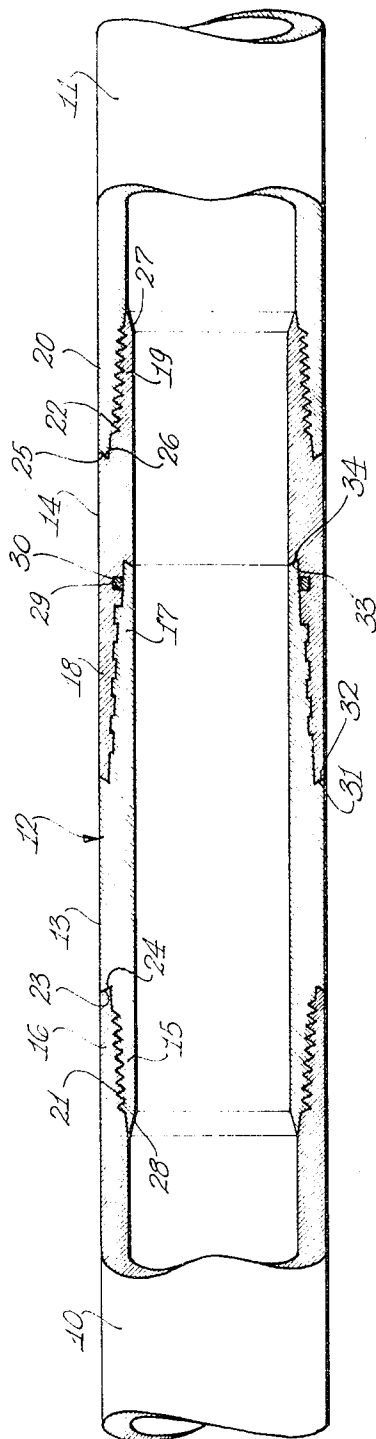
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DRILL ROD STRUCTURE

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DRILL ROD STRUCTURE

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1 Claim

ABSTRACT OF THE DISCLOSURE

The invention relates to a drill rod structure having aluminum alloy drill pipe and steel couplings. The joints between the pipe and couplings are threaded and the drill rod has substantially uniform inside and outside diameters. The invention relates to drill rods of substantially large size, say, exceeding about two inches in outside diameter.

This invention relates to drill rod structures and more particularly to a drill rod structure comprising aluminum alloy drill pipe sections and steel couplings.

The drill rod structure of the present invention is intended to have its prime use in exploratory oil and gas well drilling. Such drilling is usually carried out with rotary drills and the hole produced is relatively large, for instance, 10 to 16 inches in diameter. The present invention seeks to provide a drill rod structure for use with diamond drilling equipment in such exploratory drilling. Aluminum alloy drill pipe with steel couplings has heretofore been used with diamond drilling equipment but only, it is believed, in hard rock drilling and with relatively small diameter drill rods of somewhat less than two inches outside diameter. The present invention contemplates the use of drill rods of aluminum alloy pipe and steel couplings of relatively large outside diameter of, say, greater than two inches.

The drill pipe and couplings of the present invention have substantially flush inside and outside diameters. The joint connections are threaded and a thread locking compound is employed on the mating threads of the joints between the aluminum alloy pipe sections and the steel coupling. This compound hardens on maturation thus binding and sealing the joint connection as well as inhibiting possible steel to aluminum electrolytic action under extreme conditions. Use of such threaded connections eliminates problems of heat treatment in sweating on drill joints and problems of welding of aluminum to steel, which problems are frequently present in conventional aluminum to steel drill rod joints.

The invention will be described with reference to the accompanying drawing, in the single figure is a side elevation of a drill rod, partly in section.

Referring to the drawing, drill pipe sections of aluminum alloy are indicated at 10 and 11, each being of uniform inside and outside diameter, and a connecting coupling of steel is indicated at 12.

The coupling 12 is also of uniform inside and outside diameter and comprises two parts 13 and 14. Part 13 has a pin 15 at one end for threaded engagement with internally threaded end portion 16 of pipe 10 and a pin 17 at its other end for threaded engagement with a box 18 at one end of part 14. Part 14 has a pin 19 at its other end for threaded engagement with internally threaded end portion 20 of pipe 11.

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The mating thread surfaces 21 and 22 between the aluminum alloy pipes and the steel coupling are provided with a thread locking compound, such as that available under the trademark "Bakerloc" of Baker Tools Limited or that available under the trademark "Weld-A" of Haliburton Company.

Preferably, the threaded connection between the aluminum alloy pipe and each coupling part includes mating torque shoulders 23, 24 and 25, 26 inclined at an acute angle to the axis of the rod.

The end of each pin 15 and 19 is preferably bevelled at 27, 28 to provide a lead-in surface between the inner surfaces of pipe and coupling.

The coupling parts 13 and 14 also have mating torque shoulders 31, 32 and 33, 34 inclined at an acute angle to the axis of the rod.

It will be apparent that each coupling part becomes firmly attached to the respective aluminum pipe section by means of the threaded connection described with use of a thread locking compound. Preferably, as shown, each of these threaded connections is of V thread type.

The pipe sections are separated at the threaded joint between the coupling parts. As shown, this joint is preferably of square thread type. Additional sealing effect may be provided by an O-ring 29 seated in groove 30.

What is claimed is:

1. A drill rod structure for unconsolidated earth formations comprising a plurality of aluminum alloy drill pipe sections each of substantially uniform inside and outside diameters and having internally threaded end portions, a plurality of steel couplings for connecting said pipe sections each consisting of two parts in detachable end to end engagement with square type threads, the coupling parts defining a pair of mating torque shoulders one on the outside and one on the inside of the structure each making an acute angle to the axis of the structure, a sealing ring positioned at one end of the mating surfaces of the square type threaded coupling parts, each said coupling part having a V type threaded end portion for mating engagement with a threaded end portion of one of said drill pipe sections to form a joint connection between said coupling and said pipe section, a thread locking compound on the mating surfaces of said threaded end portions of said drill pipe sections and couplings, each of said drill pipe sections and adjoining coupling part having mating torque shoulders at an acute angle to the axis of said structure, said steel coupling having a uniform outside diameter substantially equal to that of said drill pipe and a uniform inside diameter substantially equal to that of said drill pipe to provide substantially flush inside and outside surfaces of said drill rod structure.

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