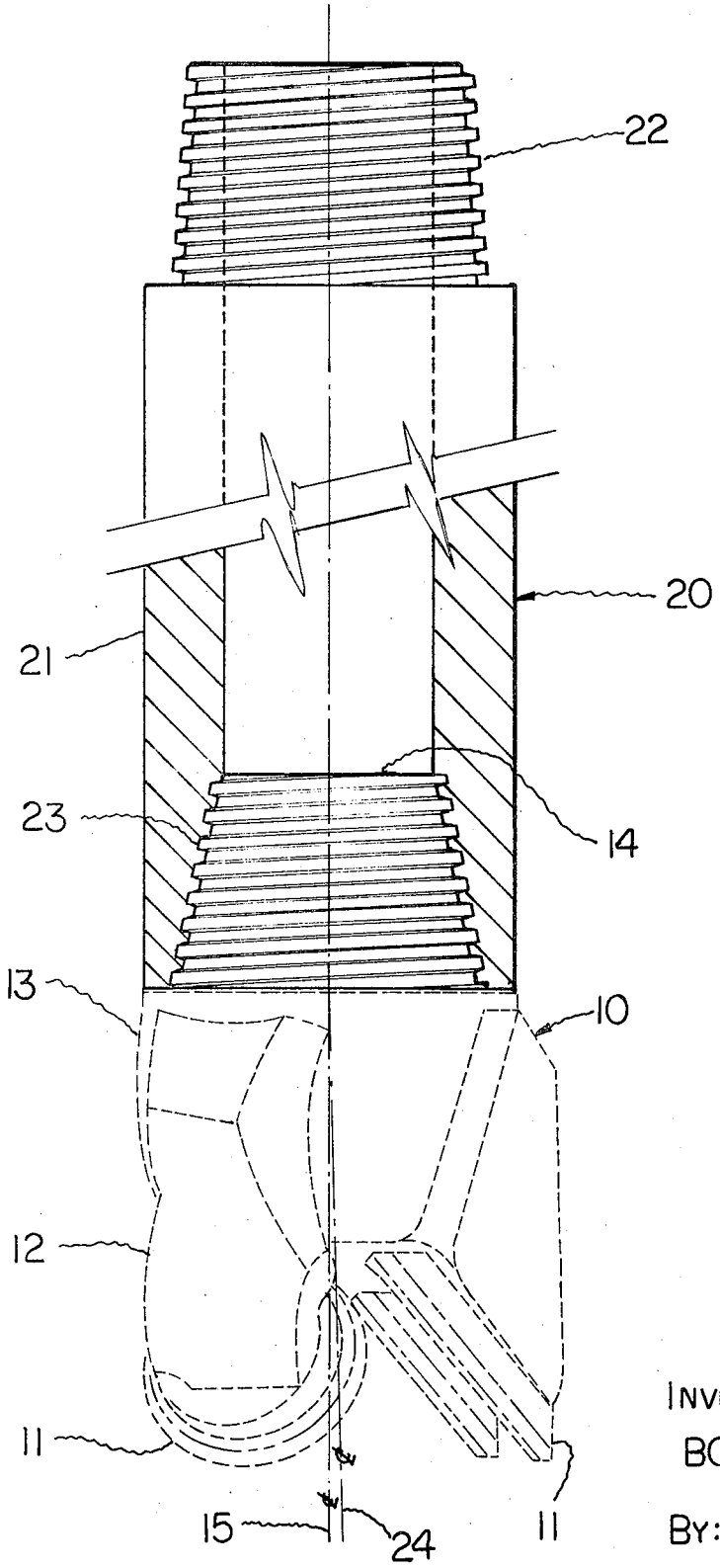
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STRAIGHT HOLE TOOL

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STRAIGHT HOLE TOOL

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ABSTRACT OF THE DISCLOSURE

It is not uncommon in the process of drilling an oil well, or the like, for the drill hole to go off vertical. In fact, a drill hole quite often will become offset to the extent of assuming a horizontal position relative to the earth's surface. The present invention is directed to a novel rotary drilling bit sub whereby an offset vertical hole can be readily reoriented to an essentially vertical direction.

BACKGROUND OF THE INVENTION

The present invention pertains to oil field drilling equipment and the like for changing the direction of a drill hole.

There are numerous drilling devices on the market today which are designed for reorienting a drill hole, e.g. see U.S. Pat. 2,710,170. However, such devices while not only are expensive, are quite often unsuitable for many operations. Consequently, many older techniques utilizing a whipstock are still employed to date. That technique usually involves removing the drill stem a number of times in order to turn the well hole, especially in the case where a well hole has become horizonally oriented and it thus becomes necessary to swing in downwards through a 90° arc. In such instance, it quite often becomes necessary to reorient the whipstock quite a few times, or install a number of whipstocks. In any event, this procedure necessitate the removal each time of the drill stem and the drill bit. The present invention provides novel means whereby a drill hole that has become reoriented even to a horizontal position can be easily reoriented downwards to a vertical position without having to remove the drill pipe an appreciable number of time.

Summary

The present invention provides a rotary drilling bit sub for reorienting an offset drilled hole back to an essentially vertical position comprising a tubular member adapted at one of its ends to mate with the drill casing. Its other end is provided with internal threads positioned askew such that its longitudinal axis forms an oblique angle of from about 1° to 3°, relative to the longitudinal axis of the tubular member.

Description of the drawing

The drawing depicts a side elevation view, partly in section, of the present rotary drilling bit sub showing the askew position of its internally threaded portion adapted to mate with a conventional rotary drilling bit.

Preferred embodiment

The drawing depicts, for example, a conventional rotary drilling bit **10** which is provided with the drilling cones **11** (quite often comprising 3, the third one in the drawing being hidden from view). As is well known

in the art, the drilling surface of the cones can comprise chisel-shaped teeth, a hardened metal compact, or the like.

The cones **11** are rotatably attached to and journaled within the leg portions **12** of the main frame portion **13**. The main frame portion **13** is quite often provided with nozzles through which a fluid can be circulated, e.g. gas, drilling mud, or the like. The rotary drill bit **10** further comprises the threaded portion **14** which is adapted for screwing within the subject matter of the present invention, namely the rotary drill sub **20**. The sub comprises the metal tubular portion **21** which is adapted at its end opposite that of the drill bit for connection to conventional drill pipe, usually by virtue of the external threaded portion **22**. Its other end is provided with the internal threaded portion **23** which is adapted to mate with and receive the threaded portion **14** of the rotary drill bit **10**.

The longitudinal axis **15** of the threaded portion **14** of the rotary drilling bit **10** forms an oblique angle with the longitudinal axis **24** of the internal threaded portion **23** of the member **21**. That is, this threaded portion **23** is drilled and threaded relative to the longitudinal axis of the member itself during its construction. This oblique or slanted angle between these relative longitudinal axes is critical and should range about 1° to about 3°, preferably about 1½°. If the angle is much less than 1°, it has been found that the drill bit **10** will not ream or whip sufficient to operate as described below. Correspondingly, it has been found that if the angle exceeds much more than 3°, excessive reaming or whipping will occur, also thereby defeating the objective of the present invention.

In operation, the rotary drill bit **10** is threadably connected to the present sub **20** which in turn is operably connected to a conventional drill pipe. The assembly is then lowered in a drill hole which, for example, has gone off on a horizontal direction. As the assembly is rotated, the rotary drill bit **10** is caused to ream or rotate eccentrically whereby it whips or impinges against the lowermost portion of the hole. This causes the hole to shift downwards toward a vertical position. Eventually the drill bit will assume an essentially vertical position at which time the reaming action of the bit **10** is no longer required. The sub **20** is thereupon removed and drilling operations continued as before.

It will be apparent to one skilled in the art that modifications can be made to the present rotary drilling bit sub without departing from the true scope and spirit of this invention. What is desired to cover by United States Letters Patent is set forth in the appended claims.

I claim:

1. A rotary drilling bit sub for reorienting an offset drilled hole back to an essentially vertical position comprising a tubular member adapted at one of its ends to mate with drill casing and its other end being provided with internal threads positioned askew such that the longitudinal axis of the threads forms an oblique angle of from about 1 to 3 degrees relative to the longitudinal axis of said tubular member.

2. The rotary drilling bit sub of claim **1** further characterized in that the longitudinal axis of the internal threads in said tubular member forms an oblique angle of about 1½ degrees relative to the longitudinal axis of said tubular member.

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