Aug. 8, 1939. A. A. HALDEMAN 2,168,707

WELL DRILLING APPARATUS

Original Filed March 28, 1936

Fig. 1.

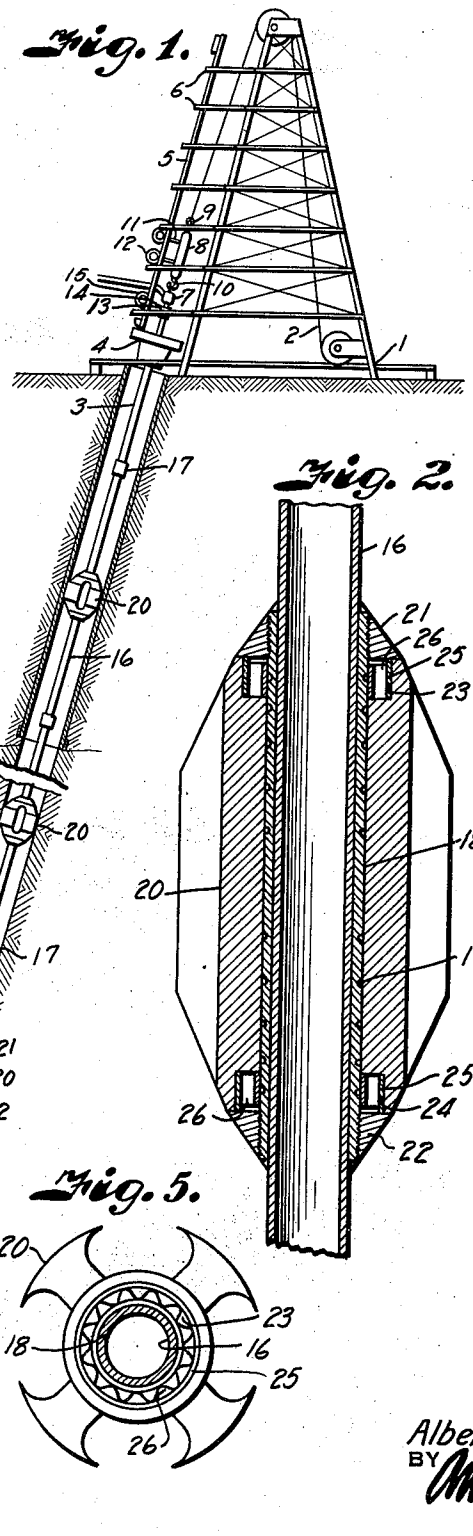


Fig. 4.

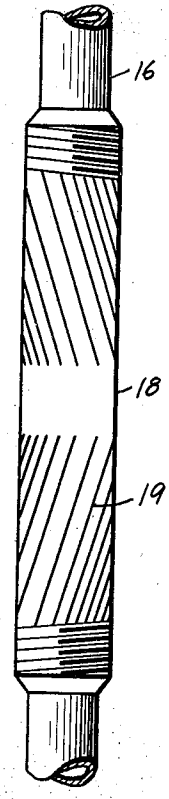


Fig. 2.

Fig. 3.

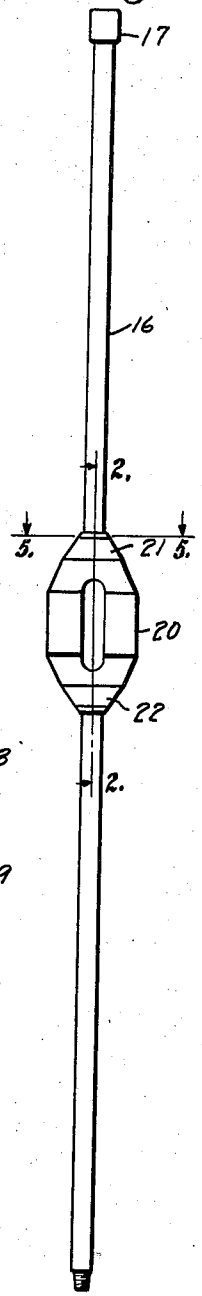


Fig. 5.

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WELL DRILLING APPARATUS

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Original application March 28, 1936, Serial No. 71,472. Divided and this application January 28, 1937, Serial No. 122,779

5 Claims. (Cl. 308—4)

This invention relates to well drilling apparatus and more particularly to an attachment for said apparatus whereby the drilling of a well at an angle to the perpendicular may be readily and easily accomplished, the present invention being a division of the invention disclosed in Patent No. 2,079,449, granted to me May 4, 1937, upon application, Serial No. 71,472, filed March 28, 1936.

As is well known because of certain restrictions and other physical inaccessibilities it is impossible, when drilling wells in restricted areas to place the derrick and drilling equipment directly over the point of well production, and where this is the case it is necessary to drill at an angle to the perpendicular from the available surface area of the ground to the producing strata of the well.

It is the object of the present invention to provide means adapted for engagement with a well string for guiding and supporting the drilling tools in such a manner as to enable the operator to drill the well at an angle to the perpendicular.

In accomplishing this and other objects of the present invention, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing, wherein:

Fig. 1 is a side elevational view illustrating the application of the invention for drilling a well hole.

Fig. 2 is a detail sectional view on the line 2—2, Fig. 3, particularly illustrating the construction of my improved drilling stem bearing guide.

Fig. 3 is an elevational view of one of the sections of a drill string and showing the guide applied thereto.

Fig. 4 is an elevational view showing oil sleeves applied to one of the sections of the drill string.

Fig. 5 is a sectional view on the line 5—5, Fig. 3.

Referring more in detail to the drawing:

1 generally designates a conventional drill rig which is equipped with suitable cable means 2 for raising and lowering a "Kelly" or similar rod 3 which, as in conventional practice operates through a turntable or similar device 4 forming part of the mechanism for rotating the "Kelly" rod during the drilling operation.

In accordance with the invention there is provided a trackway 5 which is supported at a desired angle to the perpendicular at one side of the rig through a series of spaced brackets 6, the sides of which are suitably secured to the corner posts of the rig.

For connecting the swivel 7 at the upper end of the "Kelly" rod with one end of the cable 2 there is provided a connector 8 consisting of a body member provided at its ends with hooks 9 and 10, the hook 9 engaging in a suitable eye or loop formed in one end of the cable 2, and the hook 10 engaging in an eye forming part of the swivel 7 as shown in Fig. 1.

Projecting from one side of the connecting member are suitable arms 11, the outer ends of which are preferably equipped with rollers 12 that ride on the rails 5.

Further, in accordance with the invention the "Kelly" rod 3 is provided with a clamp assembly 13 having a radially projecting arm 14 on the free end of which are suitably mounted rollers 15 which also ride on the tracks 5 as shown in Fig. 1.

The clamp assembly 13 is mounted relative to the track and "Kelly" rod in such a manner that the clamp and rollers may move with the "Kelly" rod 3 during the raising and lowering of the latter, but at the same time rotative movement of the "Kelly" rod and the drill string connected thereto may be accomplished without any interference on the part of the rollers and clamp assembly.

Further, in accordance with the present invention to insure the drilling of a straight hole of uniform diameter and thereby prevent bends or "crooks" occurring in the hole during the drilling operation, each section 16 of the drill string, which sections are coupled together in the usual manner indicated generally at 17, is equipped with a guide device of the character shown in Fig. 2.

As illustrated in the preferred embodiment thereof the entire device comprises a sleeve 18 that is fixed on a drill string section 16 and disposed substantially intermediate the ends of the section. The sleeve 18, as shown in Fig. 4, is externally provided with diagonally disposed lubricant grooves 19.

Disposed about the sleeve 18 is a substantially cylindrical body member 20 which is preferably of cross sectional and end elevational shape, as shown respectively in Figs. 2 and 5. The member 20 is clamped on the sleeve 18 through the medium of upper and lower fastening devices such as the nuts 21 and 22 that are threaded on the respective opposite ends of the sleeve 18 as shown in Fig. 2, in order to maintain the longitudinal position of the member 20 relative to the sleeve, yet permit its turning relative to the sleeve in response to the reciprocation and twist of the sections 16 during the drilling operation.

The upper and lower ends of the member 20 are provided with circular recesses 23 and 24,

and arranged in each recess is an annular oil retainer **25** of any suitable material held in set position about an adjacent portion of the sleeve **18** through the medium of a corrugated spring **26** as best shown in Fig. 5. It will thus be seen that oil from the recesses **23** and **24** will be permitted to circulate along the grooves **19** for lubricating the sleeve and body member to reduce friction during the drilling operation.

The member **20** which is preferably made of fiber or other suitable material fits snugly within the drill hole and serves to maintain the sections of the drill string centered with respect to the hole as it is being bored, thus insuring the boring of a straight hole free of any bend or the like.

Further, in actual practice it will be apparent that with the rollers riding along the trackway disposed at the desired incline or angle relative to the perpendicular, the drilling of a hole at an angle to the perpendicular may be efficiently accomplished.

What I claim and desire to secure by Letters Patent is:

1. In a well drilling apparatus, a well drill string section, and a guide structure therefor including a member sleeved thereon provided with grooves, a sleeve disposed about said member, means for holding the sleeve on said member, means in said sleeve communicating with said grooves for receiving a lubricant, and lubricant retaining means within said lubricant receiving means, and means within said lubricant receiving means bearing against said lubricant retaining means for retaining the same snugly about said member.

2. In a well drilling apparatus, a well drill string including a plurality of sections, and a guide structure on each section including a tubular member sleeved on said section and provided with lubricant grooves, a guide sleeve disposed about said tubular member, means threadedly engaged with said tubular member for holding the guide sleeve on said tubular member, means in said guide sleeve communicating with said lubricant grooves for receiving a lubricant, and lubricant retaining rings within said communicating means.

3. In a well drilling apparatus, a well drill string including a plurality of sections, and a guide structure on each section including a tubular member sleeved on said section and provided with lubricant grooves, a guide sleeve disposed about said tubular member, means threadedly engaged with said tubular member for holding the guide sleeve on said tubular member, means in said guide sleeve communicating with said lubricant grooves for receiving a lubricant, lubricant retaining rings within said communicating means, and springs within said communicating means bearing against said rings for retaining the same snugly about said tubular member.

4. A device of the character described including a substantially cylindrical section, and a guide structure for said section including a tubular member sleeved on said section and provided with lubricant grooves, a guide sleeve disposed about said tubular member, means for holding the guide sleeve on said tubular member, means in said guide sleeve communicating with said lubricant grooves for receiving a lubricant, and lubricant retaining rings within said communicating means.

5. A device of the character described including a substantially cylindrical section, and a guide structure for said section including a tubular member sleeved on said section and provided with lubricant grooves, a guide sleeve disposed about said tubular member, means for holding the guide sleeve on said tubular member, means in said guide sleeve communicating with said lubricant grooves for receiving a lubricant, lubricant retaining rings within said communicating means, and means within said communicating means bearing against said rings for retaining the same snugly about said tubular member.

ALBERT A. HALDEMAN.