Jan. 12, 1954 W. H. ELLIS 2,665,886

METHOD AND APPARATUS FOR DRILLING WELLS

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FIG. 1.

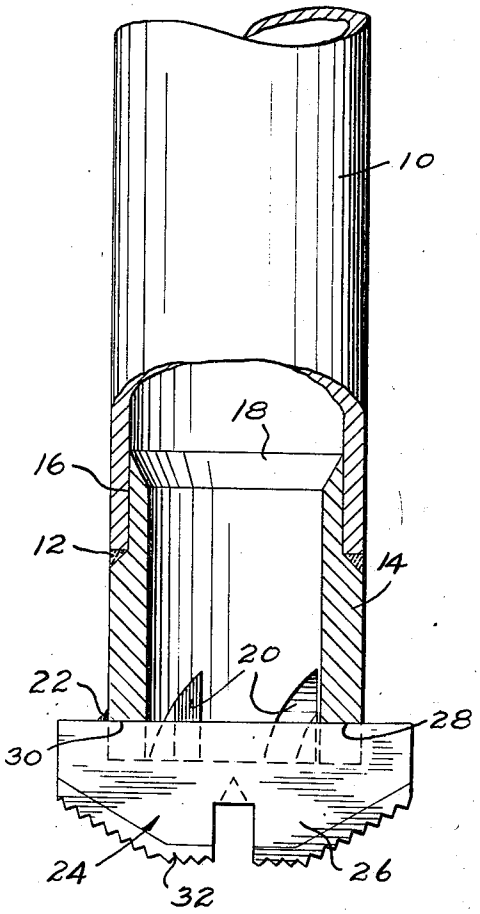


FIG. 2.

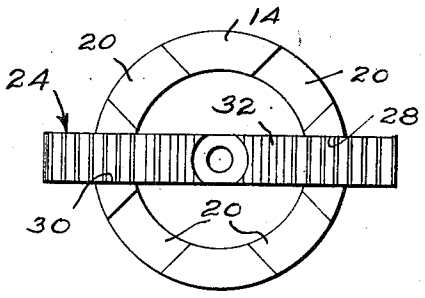
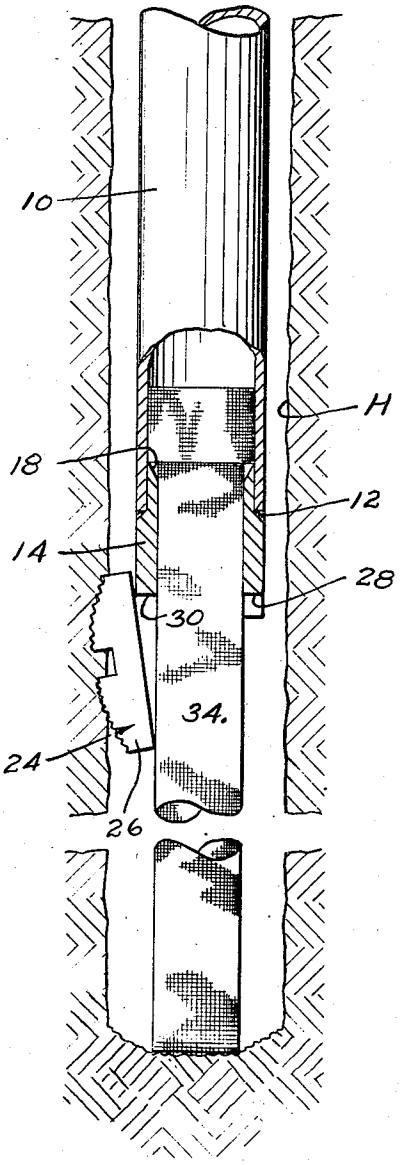


FIG. 3.



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METHOD AND APPARATUS FOR DRILLING WELLS

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4 Claims. (Cl. 255—1.8)

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This invention relates to a method and apparatus for drilling a well and has for its primary object to properly seat a strainer in a well between the well bottom and the well pipe.

Another object is to support on the end of a well pipe a drill bit which may be readily disconnected from drilling relation to the well pipe when the desired depth of well hole has been reached.

A still further object is to enable the well to be bailed by a conventional slush bucket should the desirability of such bailing of the well be indicated.

The above and other objects may be attained by employing this invention which embodies among its features advancing into the ground a well pipe carrying a drill bit in drilling relation thereto, when the desired depth of well hole has been reached knocking said drill bit out of drilling relation to the well pipe, advancing a strainer through the well pipe and into contact with the bottom of the well hole and moving the well pipe away from the bottom of the well hole a distance substantially equal to the length of the strainer.

Other features include holding the strainer against the bottom of the well hole during the movement of the well pipe away from the bottom of said well hole.

Still other features include a sleeve welded or otherwise permanently fixed to an end of a well pipe, a drill bit extending transversely across the sleeve at the end thereof remote from the well pipe, and a frangible weld joining the drill bit to the sleeve, whereby when the desired depth of well hole has been reached, the drill bit may be knocked out of drilling relation with the sleeve.

Still other features include notches in the end of the sleeve carrying a drill bit through which the well cuttings may be flushed out of the well hole, and an inwardly and downwardly tapering annular wall at the upper end of the sleeve to facilitate the introduction of a slush bucket thereinto.

In the drawings:

Figure 1 is an enlarged fragmentary side view of a well pipe showing this improved sleeve and drill bit in position thereon preparatory to drilling a well, certain portions of the figure being illustrated in section more clearly to illustrate certain details of construction;

Figure 2 is a bottom plan view of the drill bit and equipment illustrated in Figure 1, and

Figure 3 is a fragmentary sectional view through a well hole showing the drill bit moved out of drilling relation with the well pipe and the well pipe moved away from the bottom of a well hole a length substantially equal to the length of a strainer, and the strainer in place in the well hole.

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Referring to the drawings in detail a conventional length of well pipe 10 has welded thereto as at 12 a sleeve 14, the upper portion of which is reduced in diameter as at 16 to fit into the well pipe 10 as shown. The inner wall 18 of the sleeve 14 adjacent the upper end thereof is tapered as shown to facilitate the introduction of a slush bucket, well tools or the like into the sleeve should occasion require. Formed in the sleeve 14 at the end thereof remote from the reduced portion 16 are notches 20 to facilitate the flushing out of well cuttings as the sleeve advances into the ground to form the well hole and opening into the same end of the sleeve are diametrically opposite recesses 28 and 30 for the reception of the drill bit to be more fully hereinafter described.

Seated in the recesses 28 and 30 and extending across the end of the sleeve 14 is a drill bit 24 which as illustrated in Figures 1 and 2 comprises a substantially flat body 26 having a notched portion 32 which is hardened in order to provide a suitable cutter which will satisfactorily drill into the earth to form the well hole.

In employing the sleeve 14 and drill bit 24, the sleeve 14 is welded to an end of a length of well pipe 10 and the drill bit 24 is seated in the recesses 28 and 30 in the sleeve 14 and welded thereto adjacent to the recess 30 by a frangible weld 22. The parts thus assembled are then advanced into the ground in any conventional manner to form a well hole H (Fig. 3). When the desired depth is reached the pipe may be retracted slightly and the bit is struck through the pipe 10 to knock it out of the recess 28 and to cause it to hinge out into the earth at the side of the recess 30 by bending and breaking the weld 22. This will cause the drill bit 24 to swing downwardly and into the earth at the side of the sleeve or shoe 14 substantially as shown in Figure 3. In knocking out the bit use is made of a piece of pipe just small enough to go through the shoe or sleeve 14 and about three feet long and perforated throughout its length. Such pipe may have a solid, slightly pointed bottom welded into it and its top end has attached thereto by a suitable reducer, a sufficient length of small size pipe to reach the bottom of the well. By giving this knock-out pipe an up and down movement to apply one or two hard blows to the drill bit, the bit will be dislodged on the unwelded side and will swing downwardly and laterally by hinging

on the welded side so that it will swing to an out of the way position in the well hole as illustrated so as not to interfere with the introduction of the hereinafter described screen or strainer. In this action of breaking out the bit it does not matter whether the weld merely bends or whether it breaks entirely free, the principal object being to make the bit hinge out to one side so as to be out of the way of the screen or strainer. Also in this operation if no water is found the pipe 10 is drawn out and a new bit is welded in and the drilling can be proceeded with to a greater depth. If the bit 24 were merely knocked entirely free and permitted to drop into the bottom of the well hole difficulty would then be encountered in proceeding with the drilling, whereas by the above described operation the bit will be caused to lodge in the side of the well hole or may remain attached to the pipe and it will then be out of the way if it is stuck in the side of the hole, in the earth, or it can be removed when the pipe is withdrawn.

With the drill bit 24 thus moved out of the passage through the sleeve 14, a suitable strainer 34 is entered into the upper end of the well pipe 10 and lowered into contact with the bottom of the well hole H after which the well pipe 10 is moved upwardly away from the bottom of the well hole H a distance substantially equal to the length of the strainer 34. Obviously by so doing liquid in the well hole may flow through the strainer 34 and into the well pipe 10 in a conventional manner. While in the present instance, the strainer 34 is illustrated as a conventional screen, it is evident that any suitable strainer may be substituted that will pass through the interior of the well pipe 10. It is also evident that should it become necessary to bail the well, or otherwise introduce tools into the well hole at the bottom thereof, the beveled shoulder or wall 18 will in no way interfere with the introduction and removal of a slush bucket or the like tool. Also it is obvious that the strainer 34 may be held downwardly against the bottom of the well hole H during the upward movement of the pipe 10 by introducing suitable hold down implements through the upper open end of the well pipe and engaging the upper end of the strainer 34 therewith.

By employing the equipment above described it is obvious that the strainer 34 may be easily and quickly inserted in proper position in a well hole H and furthermore the distance that the sleeve 14 is moved away from the drill bit 24 may be varied to meet different depths of liquid in the well hole simply by using strainers of different lengths.

While in the foregoing there has been shown and described the preferred form of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

I claim:

1. The herein described method of drilling a well which comprises advancing into the ground a well pipe carrying an elongate drill bit disposed across the advancing end of the pipe, effecting the shifting of one end of the bit downwardly away from the pipe while maintaining the other end against such downward shifting to effect the swinging of the bit downwardly and laterally into the earth wall of the well hole, and then running a strainer through and beyond the lower end of the well pipe past the bit.

2. Drilling equipment of the character described, comprising a drill pipe, a sleeve secured to the lower end thereof, said sleeve having two diametrically opposite positioned notches in its bottom edge, an elongate flat drill bit having a length greater than the outside diameter of the sleeve and disposed transversely across said end of the sleeve with its top edge seated in said notches, a light weld coupling between said edge of the bit and the outer side of the sleeve at one notch only, the bit being removably maintained in the other notch, and said sleeve having additional notches in the bottom edge for the passage of wash fluid.

3. In well drilling equipment, a well pipe, a sleeve secured at one end to said well pipe at the lower end of the latter, a drill bit of a width materially greater than the diameter of the sleeve, the bit extending transversely across the end of the sleeve remote from the well pipe, and a frangible weld between the exterior of the sleeve and the top of the drill bit adjacent to one end only of the bit for securing the bit to the sleeve.

4. The invention according to claim 3, with said sleeve having notches in diametrically opposite positions in the lower end edge thereof and said bit having a top edge seated in said notches.

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