Dec. 4, 1934. G. A. ZEIDLER, JR 1,983,428

METHOD OF DRILLING WELLS

Filed June 20, 1933

Fig. 1.

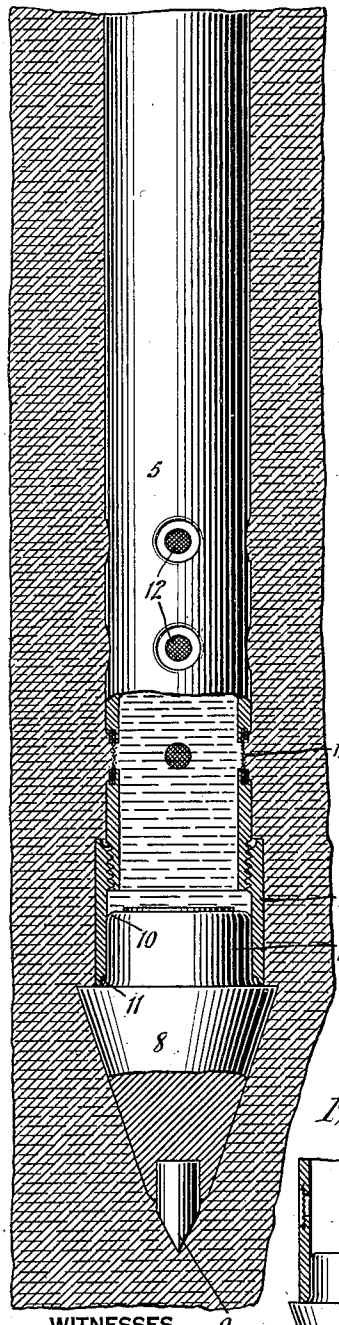


Fig. 2.

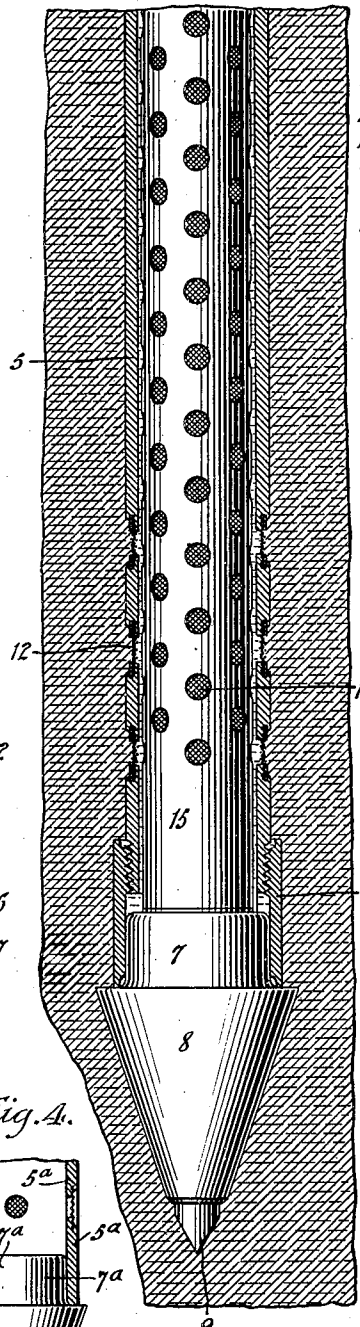


Fig. 3.

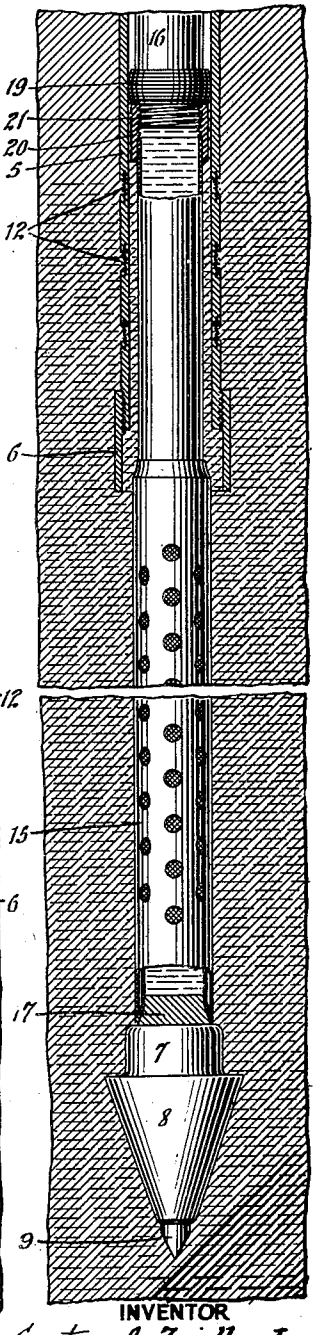
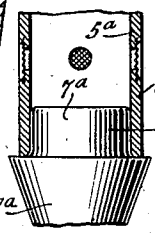


Fig. 4.



WITNESSES

Edw. Thorpe

Hugh W. Ott

INVENTOR

Gustav A. Zeidler Jr.

BY

Munn, Anderson, Stanley, Foster & Liddy

ATTORNEY

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METHOD OF DRILLING WELLS

Gustav A. Zeidler, Jr., Medford Station, N. Y.

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1 Claim. (Cl. 166—21)

This invention relates to the art of well drilling, and while not restricted to such use, is particularly designed as an improved method of and apparatus for drilling water wells.

Heretofore it has been the practice to first sink or drive an outer casing down to the water bearing stratum and then remove through the outer casing, which is open at the lower end, the sand or other material by sand bucketing or other methods of cleaning out the casing. A screen equipped with a point is then lowered through the casing and driven beyond the lower end thereof. Obviously, the yield of a well driven or sunk in this manner is largely a matter of guess work, as there is no gauge until the pumping mechanism has been installed.

The present invention aims for some of its principal objects to provide a method of and apparatus for drilling a well which eliminates the use of an outer casing; which affords means for gauging the yield from any particular stratum as the drilling operation is in progress; which eliminates any necessity of cleaning out the pipe; which admits of the installation of a screen through the well pipe and the removal of the same from within the well pipe so as to facilitate and reduce the expense of replacement of the screen when necessary, and which avoids the use of the screen as a means for transmitting the impact to the point, thereby allowing for the use of a lighter screen.

The invention further resides in an improved method of and apparatus for drilling wells, which simplifies the operations and the apparatus required, which consequently reduces the cost and which makes for a more efficient method and apparatus.

With the above recited and other objects in view, reference is made to the following specification and accompanying drawing, in which there are set forth several preferred embodiments of the invention, while the claim marks out and defines the actual scope thereof.

In the drawing:

Figure 1 is a vertical sectional view of a partially drilled well illustrating the initial step in the improved method and the improved apparatus employed in connection therewith.

Figure 2 is a similar view showing a subsequent step in the method and the apparatus employed.

Figure 3 is a similar view on a reduced scale, illustrating the final step and apparatus employed in the sinking of the well.

Figure 4 is a fragmentary detail view of a slightly modified form of apparatus used.

Referring to the drawing by characters of reference, 5 designates the lower section of a line of well pipe, which, as shown in Figures 1 to 3, inclusive, has its lower end fitted with a coupling or extension sleeve 6, on which is frictionally fitted the shank 7 of a driving point 8, which driving point, as shown, includes a separate hardened pointed plug 9. The shank 7 has a tapered upper end 10, and the lower end of the coupling or sleeve is formed with a correspondingly outwardly flared lower end 11 to facilitate the engagement of the point with the coupling or sleeve and the reengagement of these elements if separated.

The lower portion of the lower section of the line of well pipe 5 is, in accordance with the present invention, formed with screened pilot apertures 12, which apertures are relatively few in number and distributed over a limited portion of the lower end of the line of pipe so as to determine by soundings the yield of the various strata through which the pipe line is being driven. This obviously permits the operator to determine whether or not the yield is proper at any given depth.

When the proper yield at a given depth is determined, a screen 15 attached to and communicating with the lower end of a pump barrel 16 is lowered, together with the pump barrel, through the line of well pipe until the closed lower end 17 of the screen 15 rests upon the shank 7 of the driving point 8. The next operation consists in the elevation or upward movement of the line of well pipe while the screen 15 and pump barrel are held down by means of tools and against movement. Obviously, the initial upward movement of the line of pipe withdraws the lower end and the coupling 6, if it is provided with one, from over the shank 7, while continued upward movement of the line of pipe uncovers and exposes the screen 15. In the present instance, the screen 15 has a blank portion or section 18 interposed between the apertured body portion of the screen and the lower end of the pump barrel 16, said blank portion or section being of a length which approximately equals the length of the lower apertured portion of the pipe line. The pump barrel 16 is provided with the usual expansion ring 19 for sealing engagement within the pipe line 5, which sealing engagement is determined to take place above the pilot apertures 12. It will, of course, be appreciated that any standard form of pump barrel may be used, including the expansible sealing ring, which is expanded by virtue of turning of the barrel 16 with reference to

the coupling member 20 threaded over the lower threaded end 21 of the pump barrel, and which coupling member is secured to the upper end of the blank portion or section 18 of the screen structure. It is, of course, to be understood that the earth, sand, gravel or other material surrounding the apertured portion of the screen 15 sets up a sufficient frictional action to prevent turning thereof while the pump barrel is being turned to effect the expansion of the sealing ring.

From the foregoing, it will thus be gathered that the method includes the step of driving down a single line of well pipe with a point at the lower end temporarily closing the lower end, and in which the lower portion of the lower section of said line of pipe is formed with screened pilot apertures, by virtue of which soundings may be taken as to the amount of water admitted through the pilot apertures in a given length of time, so as to determine the yield at any given depth during the progress of the sinking or the driving of the well. The method further consists in lowering through the well pipe a pump barrel with a screen attached to the lower end until the screen rests on the upper end of the point. By holding the pump barrel and screen down through the medium of a line of tools and elevating the line of well pipe, the lower end of the well pipe is separated from the point and the screen exposed. The method then consists in establishing a seal between the lower end of the pump barrel and the lower part of the well pipe above the screen pilot apertures so that the water taken in through the screen is conveyed to the pump barrel and thence into the single well pipe line to the surface.

If for any reason it becomes desirable to do so, the screen may be fully removed from within the well pipe. It is also possible to lower the well pipe to again reengage the lower end of coupling 6 with the shank 7 of the point so as to pick up said point and drive the well deeper, after which it is obvious the steps of lowering the screen to the new point and exposing the same are repeated.

In Figure 4, there has been illustrated a slight modification of the invention, in which the lower end of the line of well pipe 5*a* is disclosed as directly receiving the shank 7*a* of a driving point 8*a*. In other respects, the apparatus and method are identical as previously described.

While there have been illustrated and described several preferred forms of the invention, it is to be understood that this is merely illustrative, and that variations and modifications of the method or apparatus which fall within the scope of the claim may be resorted to when desired.

What is claimed is:

A method of drilling wells including the steps of driving down a line of well pipe with a driving point at the lower end and with screened pilot apertures adjacent the lower end, taking soundings to determine the yield at any given depth during the progress of the driving operations and when the proper yield is attained at a given depth, lowering through the well pipe a pump barrel with the screen attached to the lower end thereof until the screen rests on the point, holding the pump barrel and screen stationary and then elevating the line of well pipe with reference to the pump barrel and screen to a point to expose the screen and finally establishing a seal between the lower end of the pump barrel and the lower part of the well pipe at a point above the screened pilot apertures.

GUSTAV A. ZEIDLER, JR.