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E. WHINNEN

DRILLING APPARATUS

Filed April 3, 1924

Fig. 1.

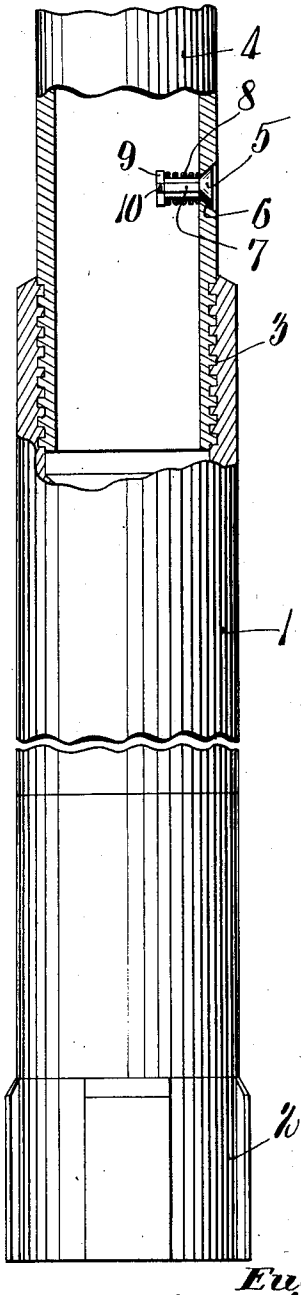
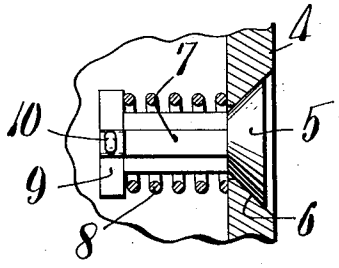


Fig. 2.



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EUGENE WHINNEN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

DRILLING APPARATUS.

Application filed April 3, 1924. Serial No. 703,958.

My invention relates to drilling apparatus.

It has for its object to provide an improved construction whereby when a bit carrying, liquid supplying rod line is clogged, the sticking of the bit and rod line, which ordinarily would follow from the cessation of liquid flow, is minimized. More particularly my invention has for its object to provide an improved means whereby when a core barrel or the like is clogged, a circulation of liquid such as water, and more particularly mud fluid, may be maintained along a considerable portion of the rod line in such manner as to confine the possible resulting sticking to a limited area rather than permitting the whole rod line to be stuck as may now result.

In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume.

In these drawings,—

Fig. 1 is a side elevation of a core barrel and connected rod line equipped with my improvement, a portion of the rod line being shown in section.

Fig. 2 is an enlarged detail view of the valve mechanism.

In this illustrative construction I have shown a core barrel 1 which may be of any suitable construction carrying a suitable bit 2 on its inner end and connected in any suitable manner as by threading 3 to a rod line 4, improved means hereinafter described being provided whereby the fluid which ordinarily passes down through the rod line may be by-passed around the portion clogged.

More specifically, I have shown a valve 5 normally seated on a suitable seat 6 formed in the rod line at a point adjacent the core barrel and herein just above the same and have provided this valve with a fluted shank 7 around which is carried a coiled spring 8 operating against a fluted abutment 9 suitably attached to the shank, as for example on a reduced portion thereof by a cotter pin 10. In my improved construction the strength of the spring is such that the valve 5 is normaly held closed thereby against the normal pressure of the liquid in the rod line, as for example, mud fluid supplied by pressure to the core barrel and normally passing through the same and up along the exterior thereof and the rod line to maintain a circulation in the hole. However, the strength of this spring is also such that when for any reason the core barrel is clogged, the pressure in the rod line will act against the abutment 9 and the shank of the valve and project the same outward in such manner as to open the valve 5 and permit the liquid or mud fluid to pass out through the several flutes in the abutment 9 and shank 7 and upward in the hole in such manner as by the circulation thus permitted, maintain the rod line from sticking, the core barrel alone thus being susceptible to sticking and its release thus constituting the only problem, as distinguished from the much more difficult problem of releasing the whole rod line and core barrel as would otherwise be necessary.

Attention is here directed to the fact that the valve mechanism as a whole may be located in different positions relative to the length of the rod line and core barrel, my invention herein contemplating any suitable disposition of the same calculated to minimize sticking. It will of course also be understood that the abutment 9 may be attached to the shank in any suitable manner other than by the cotter pin construction shown. It will also be evident that the form of valve and valve seat may be varied.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

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

1. Drilling apparatus comprising a hollow tool carrying rod line through which flushing fluid is supplied to the cutting tool, and an automatic relief valve in the rod line controlled directly by abnormal pressure existing within the rod line, said valve acting to permit fluid flow externally of the rod line when flow through the latter to the cutting tool is interrupted.

2. Drilling apparatus comprising a hollow tool carrying rod line through which flushing fluid is supplied to the cutting tool, and a normally closed automatic spring pressed relief valve in the rod line controlled directly by abnormal pressure existing within the rod line, said valve acting to permit fluid flow externally of the rod line when flow

through the latter to the cutting tool is interrupted.

3. Drilling apparatus comprising a hollow rod line adapted to carry a cutting bit, said rod line being adapted to conduct flushing fluid therethrough to said cutting bit, and an automatic relief valve in the rod line controlled directly by abnormal pressure existing within the rod line and disposed adjacent the bit carrying end of the rod line, said valve acting to permit fluid flow externally of the rod line when flow through the latter to the cutting tool is interrupted.

4. Drilling apparatus comprising a hollow rod line adapted to carry a cutting tool, and a relief valve within the rod line controlled directly by abnormal pressure existent within the rod line, said valve acting to by-pass liquid around the cutting tool when flow through the latter is interrupted.

5. Drilling apparatus comprising a core barrel carrying rod line and a relief valve therein operated by abnormal pressure therein, said valve acting to by-pass liquid around the core barrel when flow through the latter is interrupted.

6. Core drilling apparatus comprising a cutter bit carrying core barrel, a hollow rod line connected thereto through which flushing fluid is supplied to the cutting tool, and means in the rod line comprising a normally closed relief valve operative to automatically open communication between the interior of the rod line and a space surrounding the latter when pressure in the rod line builds up beyond a predetermined amount, said valve acting to permit fluid flow externally of the rod line when flow through the latter to the cutting tool is interrupted.

In testimony whereof I affix my signature.

EUGENE WHINNEN.