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MEANS FOR CLEANING OIL AND GAS WELLS

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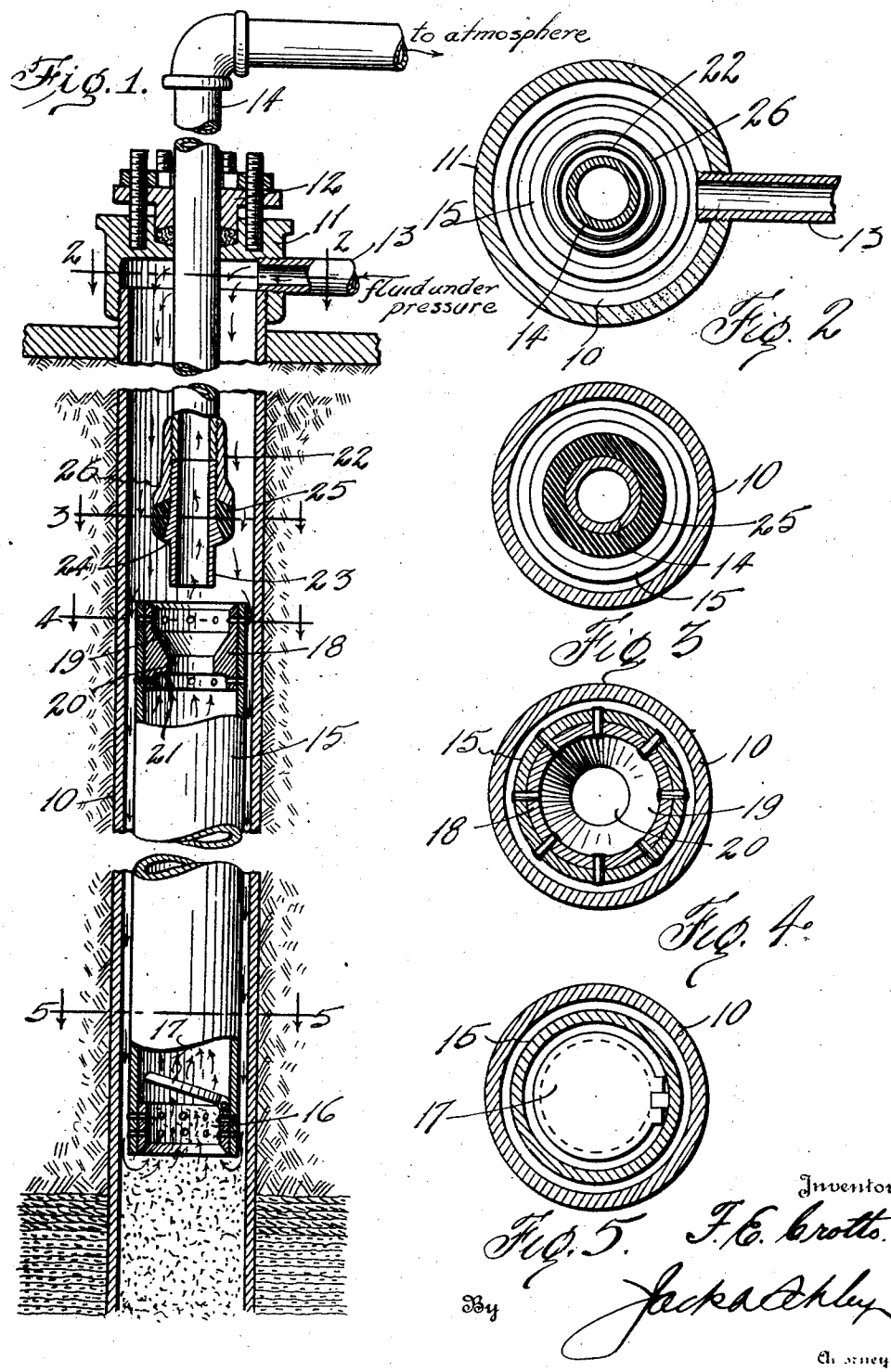


Fig. 1.

Fig. 2

Fig. 3

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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MEANS FOR CLEANING OIL AND GAS WELLS.

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This invention relates to new and useful improvements in means for cleaning oil and gas wells.

In drilling and maintaining wells it is customary, where cable tools are used, to remove the deposits from the bottom of the well by means of a bailer. Where it becomes necessary to clean a well it is the common practice to agitate the deposits, such as sand, mud, shale, shell, B. S. and the like, by dropping cable tools to stir up the deposits and then removing, either with the sand pump, or an ordinary bailer. This process is slow and expensive, particularly where the pump is used.

The object of my invention is to clean a well in a more effective, expeditious and economical manner.

A particular object of the invention is to clean a well by sinking a receptacle in the bottom of the well and forcing the deposits into the receptacle by means of a fluid under pressure delivered to the casing outside the receptacle and then trapping the deposits in the receptacle and subsequently elevating the receptacle for dumping.

The advantage of such a method is the rapidity with which the work may be carried out as well as the small equipment required; the compressed fluid serving not only to elevate the deposits into the receptacle, but to agitate them, thus avoiding running tools into the well.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Fig. 1 is a vertical sectional view of a well equipped for carrying out my invention,

Fig. 2 is an enlarged cross-sectional view taken on the line 2—2 of Fig. 1, and

Figs. 3, 4 and 5 are enlarged cross-sectional views taken on their respective lines on Fig. 1.

In the drawings the numeral 10 designates the casing of a well. At the upper end of the casing a head 11 is screwed or otherwise fastened thereon so as to be readily removed. The head extends upwardly from the casing and has a stuffing box 12 at its upper end. A fluid supply pipe 13 enters the side of the head between the box and the upper edge of the casing. A string of pump tubing 14 extends down through the stuffing box into the well.

A tubular receptacle 15, which for convenience may be called a bailer, is lowered through the casing to the bottom of the well. The bailer is less in diameter than the internal diameter of the casing, so as to leave a space therebetween. The bailer has a valve ring 16 fastened in its lower end, the lower edge of said ring being beveled. A foot valve 17, in the form of a disk, is hinged to the upper edge of the ring so as to seat thereon.

In the upper end of the bailer is fastened a sleeve 18 having its upper edge beveled. The sleeve has a conical seat 19 formed with a counter bore 20, whereby an annular inwardly directed lip 21 is formed at the bottom of the sleeve. In order to raise and lower the bailer in the well an ordinary trip hook (not shown) is lowered into the well and dropped through the counter bore 20 and engaged with the lip 21. After the bailer has been set the hook is tripped and elevated leaving the bailer to settle of its own weight into the deposits at the bottom of the well.

Fluid under pressure is delivered from a suitable source, such as an air compressor, to the casing 10. As the casing is filled and the pressure is built up, the fluid passes down between the bailer and the casing and stirs up the deposits in seeking an outlet through the bailer. In order to prevent the fluid entering the upper end of the bailer and to provide an escape for the fluid passing into the bottom of the bailer, the tubing 14 is lowered to the bailer. On the lower end of the tubing is screwed a coupling 22 which is internally screw threaded to receive a nipple 23 having a downwardly flared collar 24.

On the collar is mounted an annular packing ring 25 confined by a sleeve 26 on the lower end of the coupling. The tubing is lowered so that the nipple enters the bore 20 and the packing ring 25 engages the seat 19 of the sleeve 18, thus packing off the top of the bailer. The fluid flowing up through the bailer escapes through the tubing 14. The upward movement of the fluid carries the deposits into the bailer past the foot valve 17. When the bailer is filled, the tubing 14 is removed from the well and the

bailer is then elevated and dumped, as hereinbefore explained. If necessary the bailer is again lowered into the well and the operation repeated. The supply of compressed fluid is of course shut off after the bailer is filled and while it is being raised and lowered.

Various changes in the size and shape of the different parts, as well as modifications and alterations may be made within the scope of the appended claims.

What I claim, is:

1. Means for cleaning a well comprising, a receptacle adapted to be set at the bottom of a well, means for supplying fluid under pressure to elevate deposits into the receptacle, a valve for closing the bottom of the receptacle, and means for conveying the fluid from the receptacle.

2. Means for cleaning a well comprising, a receptacle adapted to be set at the bottom of the casing, a closure for the casing above the receptacle, means for supplying a compressed fluid to the casing below the closure, and means for conducting the fluid from the receptacle.

3. In a well cleaning equipment, a bailer adapted to be set at the bottom of a well, a valve at the bottom of the bailer, a seat at the top of the bailer, a conductor entering the seat, and a packing carried by the conductor engaging the seat.

4. In a well cleaning equipment, a bailer adapted to be set at the bottom of a well, a valve at the bottom of the bailer, a seat at the top of the bailer, a conductor entering the seat, a packing carried by the conductor engaging the seat, and a closure for the casing through which the conductor passes.

5. In a well cleaning equipment, a bailer adapted to be set at the bottom of a well, a valve at the bottom of the bailer, a seat at the top of the bailer, a conductor entering the seat, a packing carried by the conductor engaging the seat, a closure for the casing through which the conductor passes, and a pipe entering the closure for supplying a fluid under pressure.

6. In a well cleaning equipment, a casing head for mounting on the upper end of the casing, a stuffing box carried by the head, a fluid supply entering the head, a discharge tubing passing through the stuffing box, and a receptacle adapted to be set at the bottom of the well having fluid tight connection with the tubing and provided with a foot valve.

7. As a sub-combination in a well cleaning equipment, a tubular receptacle chamber having a foot valve opening into the chamber at its lower end, and an internal sleeve at the upper end of the receptacle including a packing seat and a lip for a trip hook.

8. As a sub-combination in a well cleaning equipment, a tubular receptacle having a seat in its upper end, an escape pipe, a nipple on the lower end of the tubing for passing through the seat in the receptacle, and a packing ring carried by the nipple and engaging in the seat of the receptacle.

In testimony whereof I affix my signature.

FRANK E. CROTTO.