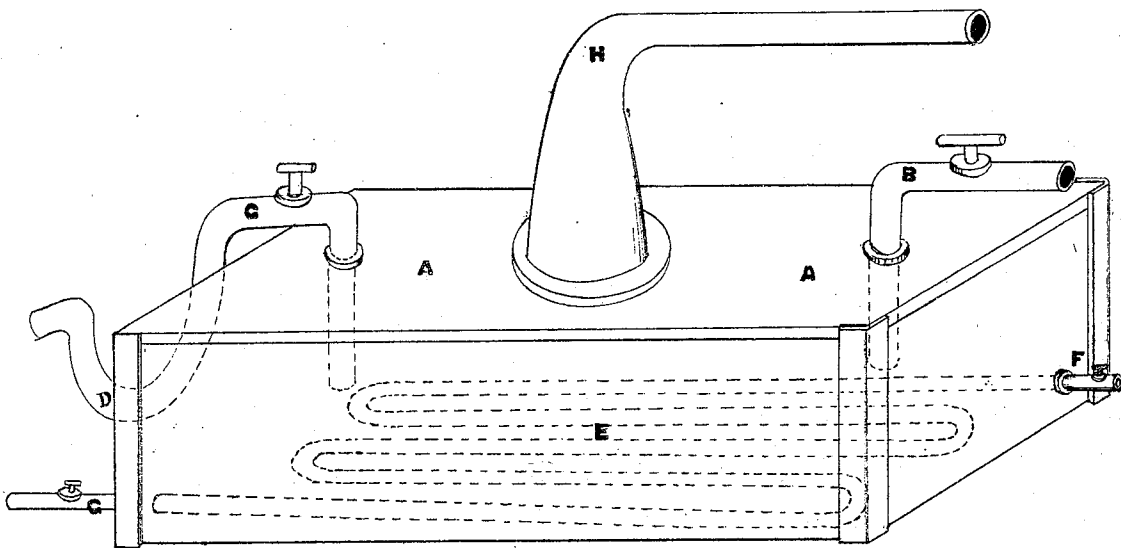


EDWARD A. L. ROBERTS.

Improvement in Process of Cleaning Oil Wells when
Clogged and Preventing them from Clogging.

No. 119,884.

Patented Oct. 10, 1871.



Witnesses.

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UNITED STATES PATENT OFFICE.

EDWARD A. L. ROBERTS, OF TITUSVILLE, PENNSYLVANIA.

IMPROVEMENT IN PROCESSES OF PREVENTING THE CLOGGING OF OIL-WELLS.

Specification forming part of Letters Patent No. 119,884, dated October 10, 1871.

To all whom it may concern:

Be it known that I, EDWARD A. L. ROBERTS, of Titusville, in the county of Crawford and State of Pennsylvania, have invented a new and useful improvement in process of preventing clogging of oil-wells and of cleaning them when clogged; and I do hereby declare the following to be a full, clear, and exact description thereof.

It is well known by those experienced in the operation of petroleum-wells that the pores or seams in the oil-bearing rock become gradually choked up or clogged by the accumulation of paraffine or other substance or substances contained in or deposited by the oil, so that the yield of wells after a time gradually decreases, and, unless efficient means are employed for removing the obstruction or opening new seams or veins, they yield so small a quantity of oil as to be practically non-producing.

Various means have been employed, with more or less success, to remove these obstructions, such as the generation of sufficient heat in the region of the oil-bearing rock to melt the matter which clogs the wells or to inject boiling water or steam down the well for the same purpose. These methods are attended with numerous difficulties which it is not necessary to describe or enumerate, the use of hot water or steam being particularly objectionable, owing to the fact that their mixture with the oil causes the production of a large quantity of a thick substance well known to oil producers as "B. S.," which is itself a source of serious obstruction to the production of the oil-wells. Benzine has also been employed for a like purpose, by pouring it into the well and pumping it out again.

My improved process consists in extracting the benzine from the oil as it is pumped from the well and returning the benzine to the well either constantly or at such intervals as may be found desirable. The effect of this process, so far as the well is concerned, is to furnish an excess of benzine to the oil in the bottom of the well, which serves as a solvent to the matter which would otherwise be deposited in the pores or seams of the oil-bearing rock and causes it to remain in the oil, so that it is pumped out with it; and it also improves the oil, as the removal of the benzine (whether it be completely or only partially extracted) from the oil at the wells improves its quality and saves the cost of the transportation

with the oil of the benzine, which has always to be removed in the operation of refining, and is an almost worthless product.

To enable others skilled in the operation of oil-wells to use my improved process, I will proceed to describe it more fully, referring to the accompanying drawing, which represents the apparatus I employ.

In the vicinity of the oil-well I place a tank or receiver, A, made of iron or other suitable material, into which the oil is pumped or allowed to flow as it is yielded by the well through a pipe, B, entering the receiver at any suitable point. The receiver is also furnished with a discharging-pipe, C, which enters the tank at the top or at one side a short distance below the top, the inner extremity of which pipe is turned downward nearly to the bottom of the tank so as to dip into the oil. This pipe has a bend in it outside of the tank, so as to form a trap, D, and prevent the entrance of air into the tank or the escape of gas or vapor from the tank in that direction. At or near the bottom of the tank A is placed a coil or series of steam-pipes, E, into which steam from the boiler is admitted through pipe F, which connects with the steam-coil at one end, and is discharged through the pipe G, which connects with the steam-coil at the other end. These pipes are furnished with suitable cocks or valves to regulate the admission of steam. From the top of the tank is a pipe, H, through which the benzine vapor escapes, which connects directly with the oil-well by a pipe leading down the inner tubing of the well, and should have a branch pipe leading to a condenser in which the benzine vapor is condensed, and from which it runs into a suitable vessel, to be ready for use in wells or otherwise.

The apparatus which I have described and represented in the drawing may be varied in size, shape, or arrangement to suit the convenience of the operator and the number and locality of the wells to be served by it.

The operation is carried on as follows: The oil is pumped from the wells into the tank or receiver A through the pipe B and passes out through the discharge-pipe C, the main portion of which, beyond the trap D, is low enough to prevent the oil quite filling the tank A, so as to leave a space above the surface of the oil to allow of the free escape of the benzine vapors from

the oil. If preferred, the pipe C may enter the side of the tank at the proper level of the surface of the oil instead of at the top, as represented in the drawing. Through the steam-pipe F steam is admitted into the coil E in such quantity and at such temperature as to cause the benzine contained in the oil to distill off in vapor, care being taken not to distill over any of the heavier constituents of the oil. The benzine vapor passes through the rising head H and passes through the pipe I directly to the well, the pipe extending so far down the well between the casing and the tube that the benzine vapors will not rise again and pass off. Ordinarily by this arrangement the well will serve as a condenser of the benzine vapor, and the benzine will run down between the tubing and casing of the well and mingle with the oil in the bottom. If preferred, the benzine vapors may be passed through a refrigerating-worm attached to the benzine-pipe I, so that they may be condensed before entering the well. By this means a constant supply of benzine will be returned to the well, which will have the effect, as before stated, of preventing the solidifying of the paraffine and other substances yielded by the oil, which clog up the seams and pores of the oil-rock. If the benzine should be returned in such quantities as to be in excess, the flow of benzine into the well may be

stopped for a time and the benzine collected in a separate receiver.

This process may with advantage be carried on continuously until the amount of benzine is in excess, or it may be returned to the well intermittently, as occasion may require.

This process has the advantage over the ordinary mode of "benzining" wells that it is done without any interruption to the working of the well; that the benzine is procured directly from the oil at the well, instead of having to be transported from the oil-refinery to the wells in barrels; and also that the oil as sent from the wells is of better quality, being in a great measure freed from the benzine before it is put on the market.

What I claim as my invention, and desire to secure by Letters Patent, is—

The mode hereinbefore described of preventing the clogging of oil-wells by extracting the benzine from the oil at the well and returning it into the well, substantially as and for the purposes hereinbefore described.

In testimony whereof I, the said EDWARD A. L. ROBERTS, have hereunto set my hand.

EDWARD A. L. ROBERTS.

Witnesses:

GEO. NEUBERT,

ALLAN C. BAKEWELL.