

Nov. 6, 1923.

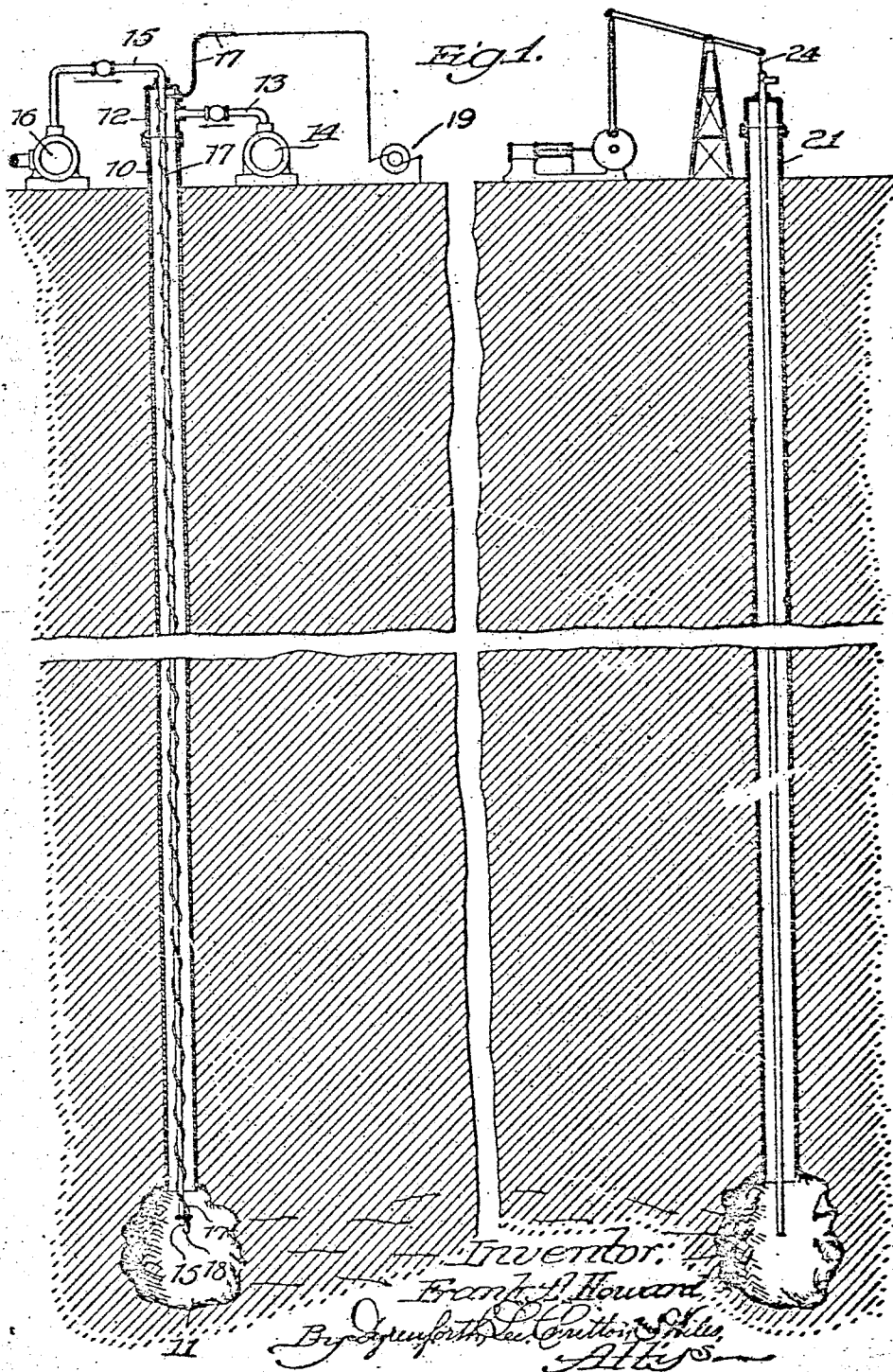
F. A. HOWARD

1,473,348

METHOD OF OPERATING OIL WELLS

Filed Aug. 9, 1920

2 Sheets-Sheet 1



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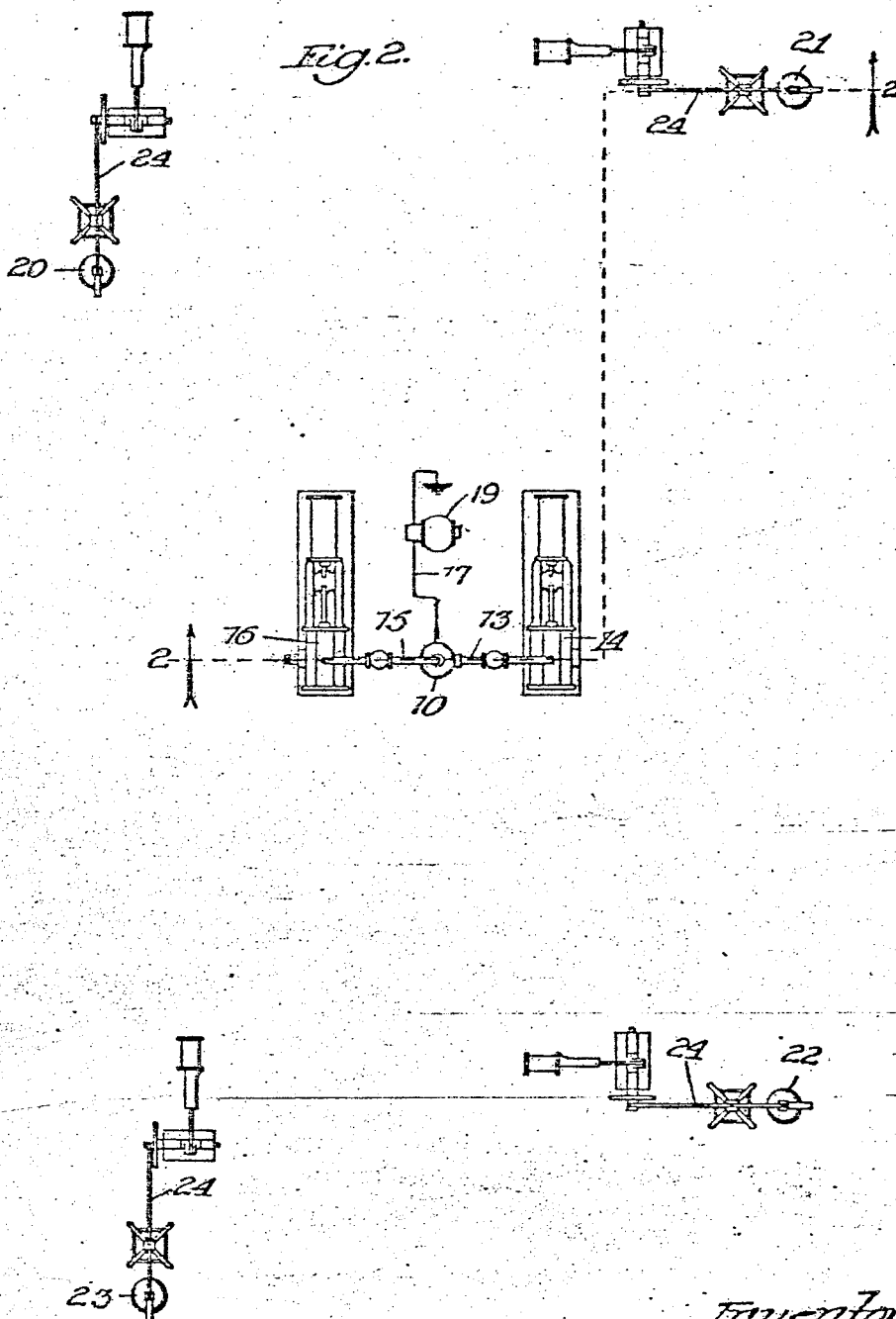
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METHOD OF OPERATING OIL WELLS

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2 Sheets-Sheet 2



Inventor.
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UNITED STATES PATENT OFFICE.

FRANK A. HOWARD, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO STANDARD DEVELOPMENT COMPANY, A CORPORATION OF DELAWARE

METHOD OF OPERATING OIL WELLS.

Application filed August 9, 1920. Serial No. 402,334.

To all whom it may concern:

Be it known that I, FRANK A. HOWARD, a citizen of the United States, residing at 183 Stiles Street, Elizabeth, in the county of Union and State of New Jersey, have invented a new and useful Improvement in the Methods of Operating Oil Wells, of which the following is a specification.

This invention relates to a method of operating exhausted oil wells and is fully described in the following specification and shown in the accompanying drawings, in which:

Figure 1 is a vertical sectional view of an oil well and Figure 2 is a plan view of this oil well showing its relation to surrounding oil wells.

I have illustrated as an embodiment of my invention a central oil well 10 extending from the surface of the ground downwardly and terminating at the bottom in a blasted out pocket 11. The well casing is closed at the top by means of a cap 12. A pipe 13 extends thru this cover and connects the top of the well casing with the air pump 14, which may be of any desired form.

A pipe 15 passes thru the cover 12 and extends preferably beyond the well casing 10 and into the pocket 11 at the bottom. This pipe is connected to a gas pump or compressor 16 which receives gas from any suitable source of supply.

An insulated wire 17 passes down the well and terminates in a resistance element 18 near the lower end of the gas pipe 15. This wire is supplied with current from any suitable source 19.

In Fig. 2 is shown a plan view of the central well 10 surrounded by a number of near-by wells, such as 20, 21, 22 and 23, which preferably go down to the same stratum of oil bearing sand. These surrounding wells have pumps 24 which are operated in any desired manner. It will be understood, of course, that the drawings are diagrammatic only.

The method of operation is as follows:

The air pump 14 is started and air pumped down the well casing 10. The gas pump 16 is subsequently started and a combustible gas pumped down the pipe 15. This gas mixes with the air and forms a combustible mixture which is ignited by the heated resistance element. An increased pressure is thus exerted in the pocket 11,

due to the action of the pump, and to the expansion of the burning gases. The pressure thus generated forces the burned gases out thru the walls of the pocket 11 into the surrounding oil bearing sand and this gas eventually finds its way to the surrounding wells 20, 21, etc. together with some oil vapors with which it has become saturated.

After combustion has once been started and the walls of the pocket 11 become heated, combustion will in some cases be maintained without further use of the igniter 18. Owing to the presence too of the combustible oil and the residue left in the sand from the distillation or evaporation of the oil, it will not be necessary in many cases to keep on pumping in fuel gas thru the pipe 15. It is necessary, however, that a constant supply of air shall be maintained.

The high temperature of the pocket 11 will distill out of the surrounding sand some of the oily constituents which would then move away from the central well as vapor to recondense in the cooler sand beyond, thus tending to supersaturate the outlying sands and permit recovery of liquid oil from the neighboring well. This action will take place in a progressive fashion as the zone of combustion sweeps outwardly from the central well. In addition to the boiling and distilling action of the oil in the surrounding sands which would progress outwardly, as these became heated farther from the central well, the heated products of combustion pumped from the outer wells carry a high content of oil vapors which are recoverable by well known methods of absorption and condensation.

While I have shown and described but a single embodiment of my invention, it will be understood that it is capable of many modifications. Changes therefore in the construction and arrangement may be made which do not depart from the spirit and scope of my invention as disclosed in the appended claims, in which it is my intention to cover this invention as broadly as possible, in view of the prior art.

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

1. The method of operating oil wells consisting of closing the top of a central well, pumping air and a combustible gas into said well, producing combustion therein and pumping the surrounding wells.

2. The method of operating oil wells consisting of closing the top of a central well, pumping air and a combustible fluid into said well, producing combustion therein and pumping the surrounding wells.
3. The method of operating oil wells consisting of closing the top of a central well, pumping air into the top of the well casing, pumping a combustible fluid into the bottom of the well, producing combustion therein, and pumping the surrounding wells.
4. The method of operating oil wells consisting of closing the top of a central well, pumping air into the top of the well casing, pumping a combustible fluid directly into the bottom of the well, producing combustion therein, and pumping the surrounding wells.
5. The method of operating oil wells consisting of closing the top of a central well, pumping air into the top of the well casing, pumping a combustible fluid directly into the bottom of the well, producing combustion therein by means of hot wire ignition and pumping the surrounding wells.

FRANK A. HOWARD: