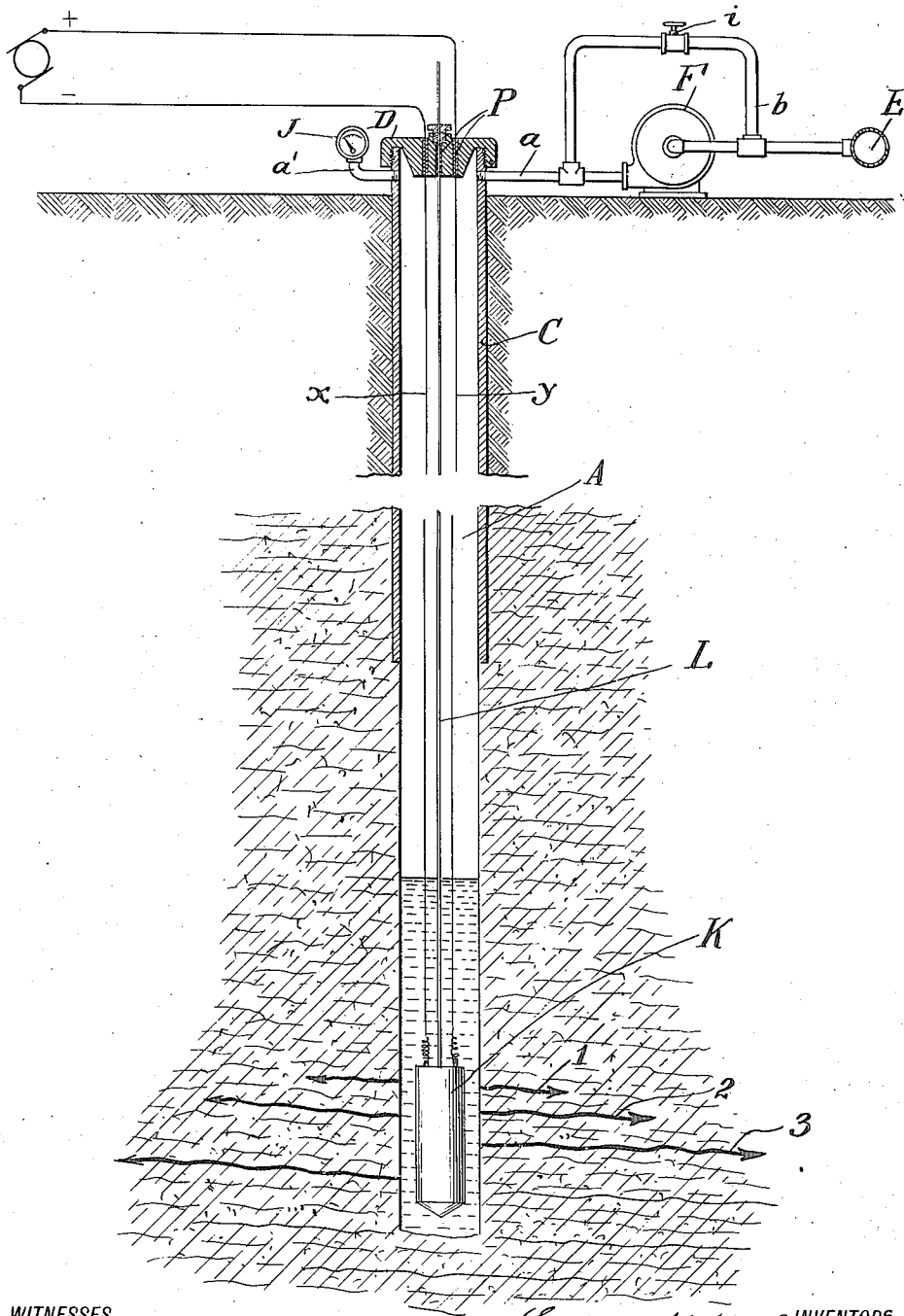


E. N. BREITUNG & A. PICK.
METHOD OF TREATING SUBTERRANEAN WELLS.
APPLICATION FILED FEB. 10, 1914.

1,152,392.

Patented Sept. 7, 1915.



WITNESSES
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UNITED STATES PATENT OFFICE.

EDWARD NICKLAS BREITUNG, OF MARQUETTE, MICHIGAN, AND ALFRED PICK, OF NEW YORK, N. Y., ASSIGNORS TO SUBTERRANEAN HEATER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

METHOD OF TREATING SUBTERRANEAN WELLS.

1,152,392.

Specification of Letters Patent.

Patented Sept. 7, 1915.

Application filed February 10, 1914. Serial No. 817,746.

To all whom it may concern:

Be it known that we, EDWARD NICKLAS BREITUNG, a citizen of the United States of America, and a resident of Marquette city, county of Marquette, and State of Michigan, and ALFRED PICK, a subject of the Crown of Austria, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Methods of Treating Subterranean Wells, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

Our invention relates to methods of treating subterranean wells for the purpose of increasing their yield of mineral substances from the earth.

In carrying out this invention we utilize a heater of any suitable type such for example as that disclosed in the patent No. 1,082,971 granted to Alfred Pick, one of the applicants herein, on the 30th day of December, 1913.

The single figure of the accompanying drawing is a diagrammatic view of a subterranean well equipped with suitable apparatus for practising our invention.

The specific object of this invention is to cause the material in a subterranean well, preferably after having been heated, to enter the openings of the strata, thereby clearing the passages by which the material enters the well and conveying heat produced by a heater in the well to considerable distances from the hole. To accomplish this end we close the casing head C of the well A as shown in the drawing, by means of a cap D and provide air-tight packing P in holes therein for the supporting cable L and the electric cable conductors $x-y$ leading to the heater near the bottom of the well. The pipe connection a connects the casing head to the compressor F, and the pipe connection a' of the casing head has attached a pressure gage J to indicate the pressure in the well. The valve i controls the passage b directly between the well and a gas main, for the purpose of releasing the pressure, and in order to allow the gas to return back to a low pressure gas line E. The system of operation we apply is as follows:—upon lowering the heater K to, or near the bottom of the hole of the well by means of the cable L, together with the electric cables, heating

proceeds for several hours, whereupon the compressor F is set into operation, forcing gas into the well until the pressure rises to and above the natural rock pressure of the well, thus causing the heated fluid to return back into the rock, which fluid then communicates its heat to its surrounding strata. The valve i is opened and the gas from the well returns to the gas main, the natural rock pressure will force the oil, now at lower temperature, back into the hole to be heated again. This operation may be repeated as many times as advisable, and it is evident that by means of this process, heat may be conveyed to considerable distances from the hole.

In the drawing, the arrows 1, 2 and 3 diagrammatically illustrate the progress of heating the strata at the first, second and third,—compression and releasing,—of the gas in and from the well. It is evident that the heat is transmitted first from the heater to the fluid,—then after compression, from the fluid to the surrounding medium. After releasing the pressure, the fluid entering the hole is heated again, while at the same time, new fluid taking its place will receive the heat from the strata which heat was previously communicated thereto by the oil now in the hole.

The distance of penetration of heat from the hole into the strata is dependent not only upon the time of the entire heating period by the heater, but also upon the number of alternate changes of pressure as herein above described.

When a gas-pumped well is treated the material in the well is heated while it is subjected to the suction of the pump and the pressure increased to drive the heated material into the surrounding medium by admitting atmospheric pressure to the well. It is only necessary to get alternate changes of pressure in any suitable manner and to apply the heat at such time that the pressure conditions are such that the material to be heated is in the well.

We intend no limitations other than those in the following claims.

What we claim is:

1. The method of treating subterranean wells which consists of heating a closed well and alternately forcing a gas into the well under pressure and releasing the pressure.

2. The method of treating subterranean wells which consists of heating the material in the well, applying a continued artificial pressure to the material greater than the natural pressure thereon for a substantial period of time to thereby force said heated material into the openings of the surrounding medium and in then releasing the artificial pressure to allow the material to again enter the well.

3. The method of treating oil wells which consists of closing the well, heating the oil in the well, alternately forcing a gas into the well under pressure to force the heated oil

into the openings of the surrounding medium to thereby melt such liquefiable materials as clog said openings and releasing the gas pressure to allow the oil to again enter the well.

In witness whereof, we have hereunto set our hands this 6th day of February, 1914, in the presence of two subscribing witnesses.

EDWARD NICKLAS BREITUNG.
ALFRED PICK.

Witnesses:

R. B. BECHEALLO,
R. M. DE VOE.