UNITED STATES PATENT OFFICE.

J. FRASER, OF BUFFALO, NEW YORK.

IMPROVED MODE OF TREATING OIL-WELLS TO REMOVE PARAFFINE, TAR, &c.

Specification forming part of Letters Patent No. 47,410, dated April 25, 1865.

To all whom it may concern:

Be it known that I, J. FRASER, of the city of Buffalo, in the county of Erie and State of New York, have invented a new and Improved Method of Treating Oil-Wells for Removing Obstructions of Paraffine; and I do hereby declare that the following is a full and exact description thereof.

The duration of the period of production in oil-wells is comparatively short, rarely exceeding one and a half or two years, and the quantity yielded gradually diminishes from the commencement. The paraffine, which is one of the largest constituents of petroleum, is held in solution by the naphtha and other light hydrocarbons at ordinary temperatures, but crystallizes and deposits rapidly from the intense cold produced in the oil-strata by the expansion of gas when the reservoirs are opened by the drill, and adheres to the oil-tube, the sides of the wells and the fissures of the rock, forming in time a solid accumulation, which closes by degrees the veins or crevices through which the well is supplied, and the production is consequently stopped, not because the oil is exhausted, but because it cannot pass the obstruction thus produced.

My method of treating oil-wells has for its object the removal of this deposit in old wells and preventing its further formation by producing a condition in the wells favorable to softening and dissolving the solid paraffine, and thereby opening and keeping open the veins of supply; and it consists in introducing water at a high temperature into the wells, when oil is present, to raise the heat of the naphtha to that point at which the paraffine will be dissolved by it and combine with the oil, and, where oil is not present in the wells, in introducing naphtha, crude oil, benzole, or other hydrocarbon fluid which possesses the property of dissolving paraffine when heat is present.

My method may be applied to unproductive wells in the following manner: The well should first be drained of water by the pump or any other means; and if, as is frequently the case, oil is present in the bottom of the well in a small quantity, it is only necessary to raise its temperature to that point at which it has the power of holding paraffine in solution (which is any degree of temperature above 55° Fahrenheit) to cause it to act upon and gradually dissolve the deposits of this substance. To effect this I introduce a pipe into the well by the side of the oil-tube, passing through the seed-bag and reaching into the oil at the bottom, and connect at the top, preferably with a steam-boiler, (though any other means of heating may be employed,) making the connection at the under side thereof, so as to conduct hot water down the pipe, which is driven into the well by the pressure of the steam in the boiler. This water, entering the oil at a temperature of 212° Fahrenheit, less the amount abstracted by its passage through the pipe, mingles with the oil and heats it readily to that point at which it rapidly dissolves the paraffine, and as the latter substance becomes fluid by heat at 112°, those parts which are reached by the hot water are melted, and thus immediately combine with the naphtha or oil, and remain fluid until again subjected to so low a temperature as to crystallize it; but it is a part of my process to prevent this condition by continuing the induction of hot liquid into the well, and at the same time removing it, with the oil and liquid paraffine, by the pump before it has parted with all of its caloric, and by continuing this process remove by degrees the deposits that have previously occurred, and repeating the operation afterward as often as occasion may require to prevent the same from again occurring.

Where wells have long been idle no oil may be present, in which case I introduce hot naphtha, crude oil, benzine, or other hydrocarbon, these having such an affinity for paraffine as to constitute its natural solvents at temperatures which admit of their entering into combination, and to maintain the requisite temperature I heat the same in retorts or closed vessels, which prevent evaporation by pumping them through such heater and thence into the well. These by coming directly in contact with the solid paraffine rapidly dissolve it and penetrate far into the fissures of the porous rock, unsealing them for the passage of the oil from the sources of its supply. This process is more expensive than when hot water is employed, but the well is more speedily restored to production. It is essential to use either in connection with a pump for removing the liquids, whether hydrocarbons or water, before they become cold enough to cause the paraffine to crystallize; but where petroleum is abundant the heat will generate gas sufficient to cause pressure enough within the

chamber of the well below the seed-bag to expel the oil and cause the well to flow spontaneously.

I am aware that it has been attempted to elevate the temperature of wells by forcing steam to the bottom; but this has failed, from the fact that the pipe must pass several hundred feet through cold water, by which the steam is condensed from it gaseous form and deposits as dew upon the sides of the pipe before reaching any considerable depth; but water, from its bulk and non-elastic as well as ponderable nature, is capable of being conveyed through a tube into deep wells so rapidly as to loose little of its heat on the passage. In this respect it is greatly superior to steam, air, or other gaseous bodies, which are more or less condensable, for conveying heat into Artesian wells.

I do not claim the employment of steam, air, or other aeriform fluids for conveying heat into oil-wells; but

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

The method of treating petroleum-wells with hot liquids for the removal of obstructions composed essentially of paraffine, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JEFFERSON FRASER.

Witnesses:
L. P. PERKINS,
JAY HYATT.