

UNITED STATES PATENT OFFICE

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METHOD FOR CLEANING OIL WELLS

No Drawing.

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The present invention relates to a method of cleaning oil wells and has for its object the provision of a safe, expeditious, and relatively inexpensive procedure in the removal of paraffin and/or asphalt content deposits forming obstructions to the proper flow of oil in the well.

Another object is to provide a method which is easy to practice with the equipment normally on hand at the wells and one which will work no harmful effects upon the equipment after a well has been cleaned thereby.

Another object is to provide a method of cleaning oil wells which is exceptionally free of waste and which is not harmful to the well.

These and other objects are attained by the method hereinafter described.

The method of cleaning oil wells according to our invention consists broadly in preparing a mixture which will react with water to produce high exothermic heat and pressure. The nature of the ingredients are such as are normally arranged in dry or powdered form and therefore are difficult to place at the exact position of the obstruction in an oil well due to the bridging over of dry material in the bore of the well and to the adhesion of the material to the sides of the bore. Moisture on the sides of the bore is also detrimental to the disposition of such dry compounds in the proper places. Such dry compounds are also injurious to the skin and very dangerous to the eyes of workers in the field.

The present invention consists in the steps forming a mixture of the dry compound with a water-free mineral possessing a suitable pourpoint and viscosity, e. g. 5° F., viscosity 52 Saybolt seconds at 70° F. The mixture forms a liquid which may readily be poured into a well after the removal of the tubing, and which will at once flow to the seat of obstruction either directly through the bore of the well, or through an inserted tube or which may be alternatively positioned by means of a suitable container lowered into the well and having a bottom discharge cap or closure releasable or removable after the device has been lowered to the approximate location of the obstruction. In this way the charge is placed in position in a liquid oil medium and

is protected against insufficient quantities of water which may cause crystallization of the alkali. The quantity of this mixture used will depend upon the diameter of the well and the thickness of the producing strata. The mixture is then capable of being positioned at the seat of obstruction without loss or waste and without danger in the handling or positioning and then the water necessary to produce the exothermic reaction is added in the proportion of approximately one or more barrels of water to each one hundred pounds of the mixture. In the presence of the water, the oil separates from the reaction mixture and a resultant temperature and pressure is produced and the paraffin and/or asphaltic contents are melted and will admix with the oil which also becomes heated during the reaction. When the reaction is complete, the oil with the obstructing paraffin and/or asphaltic compounds may be pumped out of the well. Under normal conditions the water alkali mix dissipates itself by being absorbed in the producing area. However, if necessary, this may also be pumped out of the well, after re-introduction of the tubing which was initially pulled.

The mixture which we preferably employ comprises an alkali metal hydroxide, an oxidizing agent such as a nitrate, and a substance capable of reacting with the first-mentioned components in the presence of water, all retained in a suspended state in oil so that the mixture is capable of being conveniently shipped in metal containers and stored for indefinite periods without danger of deteriorating and so that it may be conveniently shipped to the fields and then placed as needed with greater safety and less expense than is possible with the use of granular or dry mixtures. It will be appreciated also that the introduction of the mixture in this form permits a variable technic in the application of the water.

The method of our invention may be conservatively estimated as being less than half as expensive as previously practiced methods of cleaning wells and is absolutely devoid of any danger of ruining the well which sometimes happens when an explosive charge is

detonated in the well. The method of our invention is also speedier because it requires only a short time to place the mixture either directly or through a tube or by means of bottom discharge bail structures, pump or pour the necessary water onto it after it is safely deposited in the well, wait for the reaction to cease, and then remove the oil and the obstructing substances with a pump. The entire method is one in which safety and simplicity are accompanied by speed and comparatively low cost.

What is claimed is:

1. The method of cleaning oil wells of paraffin and/or asphaltic compound obstructions which consists in depositing in the well a composition which will react in the presence of water to produce heat and pressure, said composition being first rendered safe and fluid by mixture in substantially water-free oil vehicle, then pouring water into the well and finally pumping the oil and the melted obstruction materials from the well.

2. The method of cleaning paraffin and asphaltic compound obstructions from oil wells which consists in pulling the tubing, placing in the well a mixture of water-free crude oil and substances that will react with water to produce exothermic heat and pressure, then placing water on top of said mixture whereupon the oil will separate from the reacting substances, and said substances and the water will evolve heat and pressure and the paraffin and/or asphaltic compounds will be melted and admixed with the oil, then replacing the tubing and pumping the oil and the said obstructing materials in a fluid state from the well.

3. The method of cleaning oil wells of paraffin and/or asphaltic compound obstructions which consists in first pouring into the well a mixture of substances which will react with water to produce heat and a fluid which will not react with said substances but which will admix with melted paraffin and asphalt, then placing water in the well whereupon the first-mentioned fluid vehicle separates from said substances and exothermic heat and pressure are produced through the action of said substances and said water and whereby the paraffin and asphaltic compounds are rendered fluid for admixture with said first-mentioned fluid, then pumping the fluid mixture including the obstruction materials from the well.

In testimony whereof, we have hereunto subscribed our names this 29th day of February, 1932.

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