March 11, 1952 R. E. MEYNIG 2,588,554

MEANS FOR REMOVING PARAFFIN FROM WELLS

Filed Oct. 25, 1946 2 SHEETS--SHEET 1

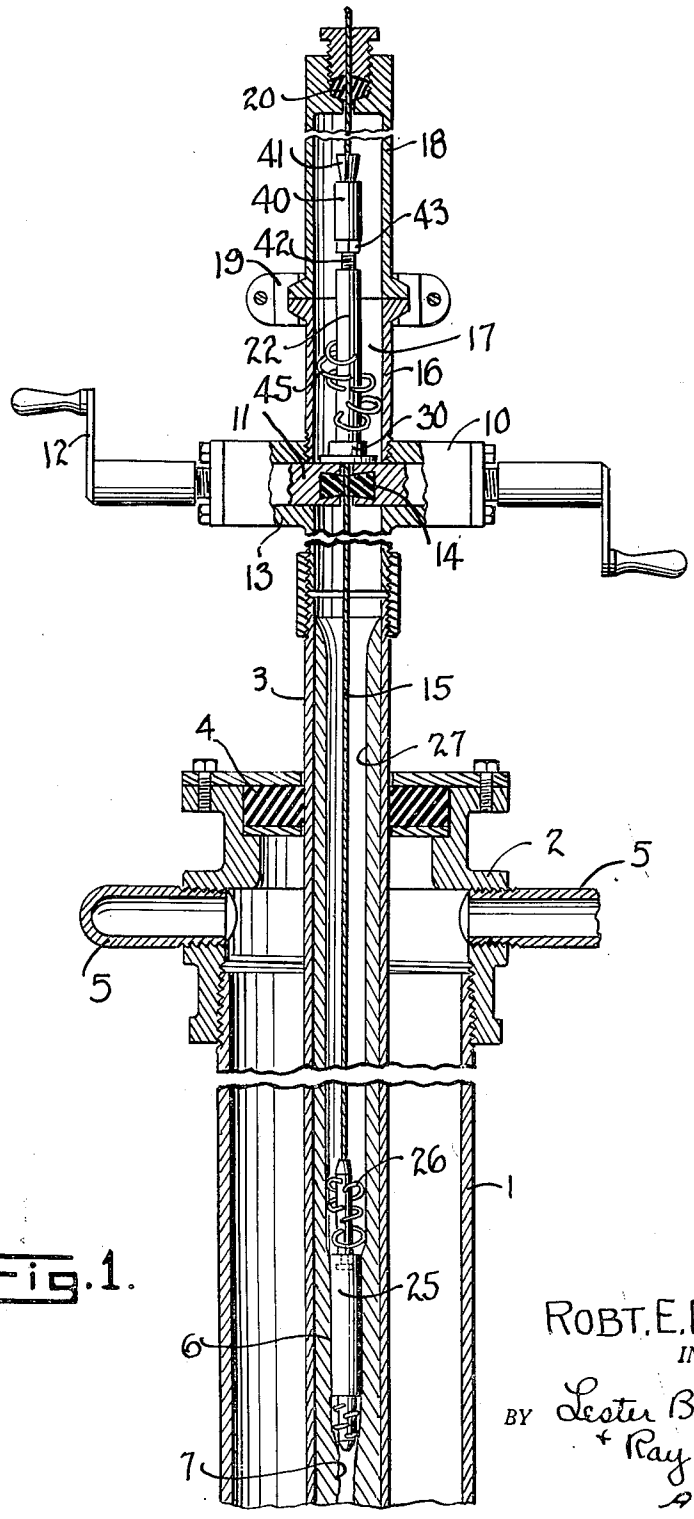


Fig. 1.

ROBT. E. MEYNIG
INVENTOR.

BY Lester B. Clark
& Ray L. Smith
ATTORNEYS

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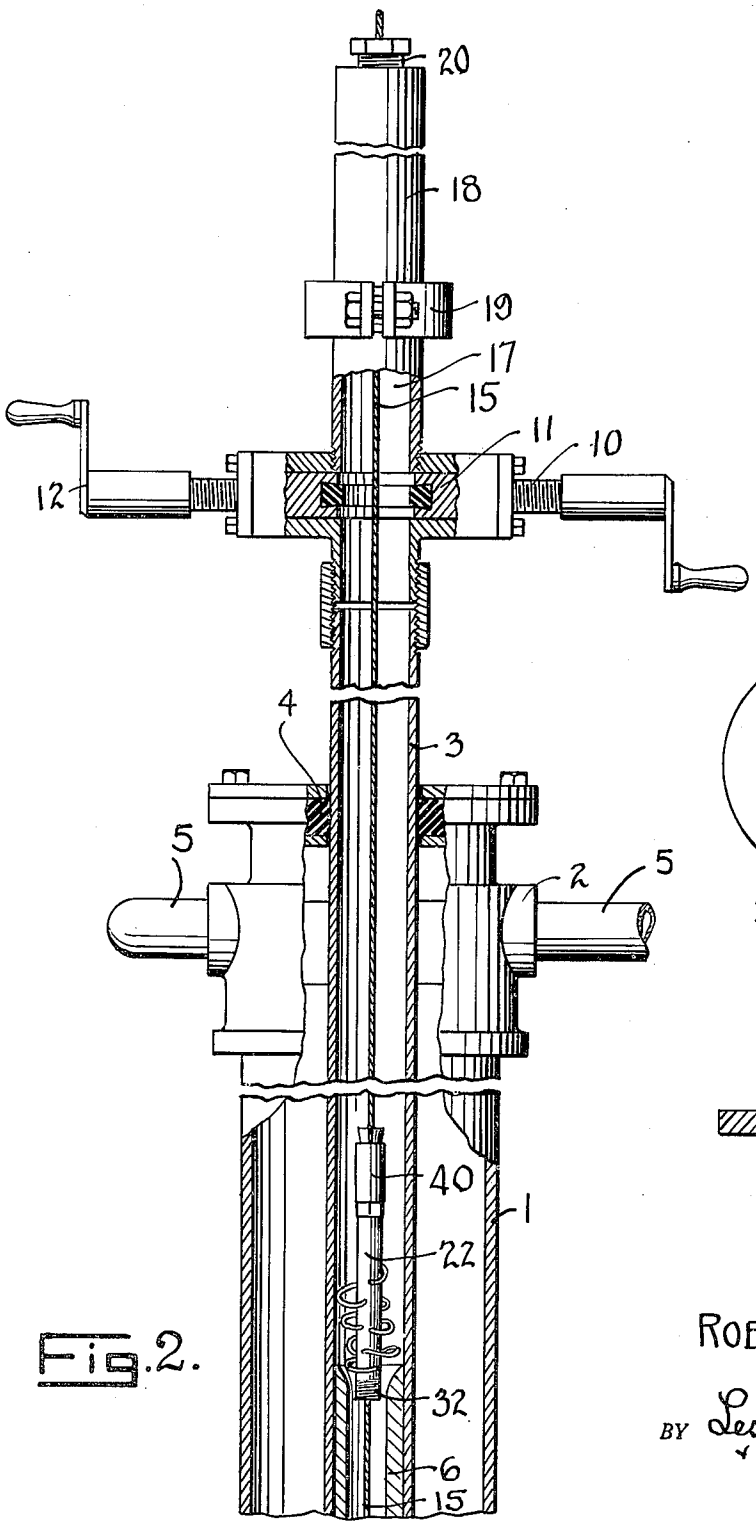


Fig. 2.

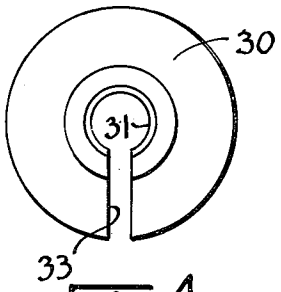


Fig. 4.

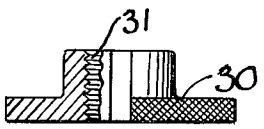


Fig. 3.

ROBT E. MEYNIG
INVENTOR.

BY Lester B. Clark
Ray L. Smith
ATTORNEYS

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MEANS FOR REMOVING PARAFFIN FROM WELLS

Robert E. Meynig, La Porte, Tex.

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1 Claim. (Cl. 166—18)

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The invention relates to a means for removing paraffin from wells, particularly where the well is flowing and under pressure.

It is objectionable to close in or kill a flowing well and the present invention directs itself to the apparatus employing a method of procedure whereby the well may continue to flow while the paraffin is being removed except for short periods of time.

It is one of the objects of the invention to provide a closure assembly for connection to the well head so that the paraffin scraper and other equipment may be introduced into the well or removed therefrom without releasing the well pressure.

It is another object of the invention to provide a weight member to be rammed through the paraffin and to act as a sinker bar in lowering the scraper member through the paraffin.

Another object is to provide a sinker bar to pull a paraffin scraper downwardly through the paraffin.

Still another object of the invention is to provide a means for conducting a paraffin scraper through the paraffin in a pipe in a well so as to facilitate the removal thereof.

Still another object of the invention is to provide a well head assembly wherein a weight member may be reciprocated in the well while a paraffin scraper is held in supported position to be thereafter affixed to the weight member so that the weight member tends to pull the scraper through the paraffin.

Other and further objects of the invention will be readily apparent when the following description is considered in connection with the accompanying drawings, wherein:

Fig. 1 is a vertical sectional view of a well head equipped for practicing the invention and showing the weight member moving through the paraffin while the scraper member is suspended in the well head.

Fig. 2 is a vertical sectional view of the well head equipped for practicing the invention and illustrating the sinker bar as having been forced through the paraffin, the scraper affixed to the sinker bar cable with the sinker bar about to pull the scraper into the paraffin.

Fig. 3 is a sectional view of the scraper support.

Fig. 4 is a plan view of the scraper support.

Fig. 1 illustrates a typical well having the casing 1, casing head 2, and the well tubing 3 therein. The head 2 has the flow line outlets 5 thereon and the seal 4 is arranged around the tubing.

The tubing 3 extends into the well to conduct the well liquid to the surface. As the oil enters the well from the formation, the pressure thereon is reduced and the temperature is usually lowered

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as the oil moves upwardly in the tubing so that it is not uncommon, where paraffin is in solution in the well, for the paraffin to solidify and cling to the tubing. In Fig. 1 the paraffin layer 6 is shown as having accumulated on the inside of the tubing 3. This paraffin is gradually deposited, becoming thicker and thicker and in many instances may practically close the openings in the tubing so as to leave but a very small passage 7. Eventually accumulation of paraffin may close the passage through the tubing entirely and in many instances interference with the production of oil from the well is incurred unless it is removed.

Various types of paraffin scrapers have heretofore been devised, such for instance as that set forth in my prior copending application, Serial Number 563,276, filed November 13, 1944, which has matured into Patent 2,433,955, January 6, 1948.

In connection with the present invention, however, a closure member 10 in the form of a valve or blow-out preventer having the removable valve portions 11 operable by the cranks or handles 12 have been illustrated. These members are arranged inside of a housing 13 and each has a resilient portion 14 thereon which is arranged to form a seal about the wire line or cable 15 passing therethrough.

This closure member 10 is mounted on the upper end of the tubing 3 and may have an extension 16 thereon which forms a chamber 17 therein. In order to have access to this chamber a nipple 18 is arranged to be affixed on the extension 16 by a clamp 19. A suitable stuffing box 20 forms a seal around the wire line 15 where it passes through a nipple.

Considerable difficulty is often encountered in moving the paraffin scraper such as the scraper 22 shown in Fig. 1 downwardly through the reduced opening 7 because of the fact that the paraffin scraper moves downwardly due to the force of gravity.

The present invention contemplates an arrangement whereby a weight member 25 will be first run into the tubing with the cable 15 connected thereto. For instance, the assembly above the tubing 3 may be connected, the valve 10 closed so as to close the tubing. The nipple 18 may then be released and the weight member 25 placed in the chamber 17. The nipple 18 can then be replaced so that the weight member will be in the chamber 17. The valve members 11 will now be retracted so as to allow the weight member 25 to move downwardly into the tubing. As soon as the weight member has passed, the valve members 11 will be again closed so that the resilient portions 14 form a seal about the cable.

In one form of procedure, the weight member

25 may be raised and lowered in the tubing 3 so as to cause the wires 26 thereon to scrape upon the surface of the paraffin and enlarge the opening 7 to the size of the passage 27 as seen in Fig. 1. This weight or sinker bar member 25 may be of any desired weight but it has been found that a weight of some forty or fifty pounds is sufficient to cause it to move downwardly through the paraffin. The cable may be raised and lowered so that the weight member may be dropped sharply to ram a hole through the paraffin or as generally termed, to spud it downwardly through the tubing. When the sinker bar has been lowered entirely through the area of accumulated paraffin, it will move more freely and the operator will be aware thereof.

If desired, the paraffin scraper 22 may have been previously positioned inside of the chamber 17 by removing the nipple 18 after the valve members 11 have closed. To insure that the scraper 22 will not move downwardly beyond the valve members 11, a support ring 30 best seen in Figs. 3 and 4 will be used. This ring is threaded at 31 to receive the threaded lower end 32 of the scraper 22 as best seen in Fig. 2. The ring is slotted at 33 so that it may be removed from the wire line as desired. By another procedure, the paraffin scraper may not be inserted in the chamber 17 until the reciprocation of the weight has been accomplished. This reciprocation may take some time because it is not uncommon for the accumulation of paraffin to extend as much as fifteen hundred feet downwardly from the surface in the tubing. This scraper 22, while shown as one cylindrical piece, may as a matter of fact be made in more than one piece so that it may be clamped around the wire line 15 when the line is in position. This scraper 22 as shown in Fig. 1 is fully disclosed in my above mentioned prior Patent #2,433,955.

When the operator is assured that the weight member will work freely in position below the paraffin, the valve members 11 will be tightly closed so as to provide a seal about the wire line and then the nipple 18 removed and the ring 30 removed from its position supporting the paraffin scraper and then the sleeve 40 can be manipulated so as to clamp the scraper to the wire line by clamping the collet chuck 41 thereon. This is accomplished by turning the sleeve 40 on the threaded portion 42 of the collet chuck 41 and locking it in position with the nut 43. In this manner, the paraffin scraper is now affixed to the wire line, the nipple 18 is now replaced so as to close the chamber 17, and the valve members are opened. With the parts in this position, the paraffin in the tubing is deposited below the scraper and above the weight of the sinker bar. Downward movement of the cable allows the paraffin scraper to move down into the paraffin area and the weight of the sinker bar moving freely in the tubing tends to pull the scraper downwardly so as to insure its rapid movement through the paraffin. When sufficient reciprocation has been carried on so that the wires 45 on the scraper effect the removal of the paraffin as seen in the upper part of Fig. 2, then the parts may be removed. The removal may be effected by raising the scraper above the valve members, closing them and removing the scraper. The nipple 18 can then be replaced, the valve members opened and the sinker bars raised above the valve members. The valve members can then again be closed and suitable connections made on the top of the tubing whereupon the well is again opened for production. Suitable flow nipples may be connected on the tubing 3 either below or above the closure member 10.

During the operation of loosening the paraffin, it may be desirable to permit the flowing of liquid upwardly through the tubing so as to flush out the loosened particles of paraffin.

It is believed that the operation and practicing of the invention will be obvious.

The invention contemplates broadly a means for quickly and efficiently removing paraffin from the well without killing the well and while continuing the production of oil therefrom.

The invention claimed is:

An apparatus for removing paraffin which has been deposited on the inside of a well tubing in the well for a distance adjacent the earth's surface because of the reduction in temperature and pressure, such apparatus including a closure device attached to the tubing above the head of the well and having means to confine the well pressure in the tubing while a wire line passes slidably therethrough, a tubing nipple connected to the upper side of the closure device, a wire line to be lowered and raised in the tubing and extending slidably through said closure and nipple, said closure, when closed, sealing around the wire line and confining the well pressure within the tubing, an upper seal member on said nipple spaced above said closure device to seal about said wire line to confine the well pressure in the tubing and nipple when the closure device is open, a sinker bar weight connected to the lower end of said wire line and of such weight as to exert a pull due to gravity on said wire line so that said weight may be dropped sharply to run through and below the paraffin deposit, a scraper of a size to slide in the tubing and including laterally extending scraper wires, a removable radially slotted support ring initially connected to the bottom of said scraper and supporting it on said closure device and within said nipple, said scraper being initially slidable on said wire line, releasable means on said scraper to stationarily connect it to said wire line at any position above said weight including a collet chuck mechanism connected to the scraper and clampable on said wire line, said closure device being closable to confine the well pressure in said well tubing and said nipple then openable for removal of said support ring from said scraper and clamping of said collet chuck mechanism on said wire line, said nipple being again connectible to said closure device and said closure openable to permit reciprocation of said weight, wire line and scraper in said well tubing to remove the deposited paraffin from the tubing walls.

ROBERT E. MEYNIG.

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The following references are of record in the file of this patent:

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