May 26, 1953 R. H. REESE 2,639,674

OIL WELL PUMP CLEANER

Filed June 13, 1949

Fig. 1a

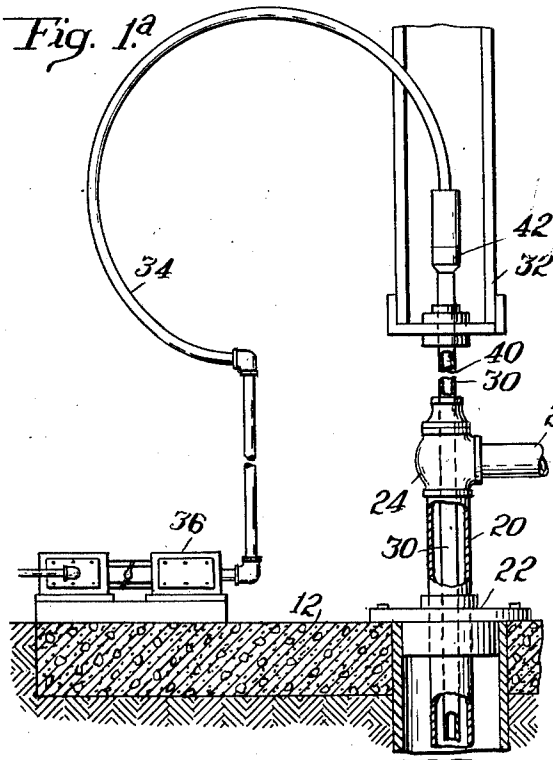



Fig. 1b

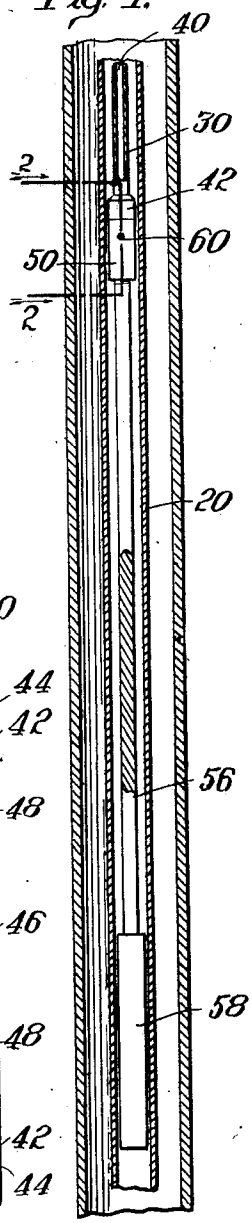



Fig. 2.

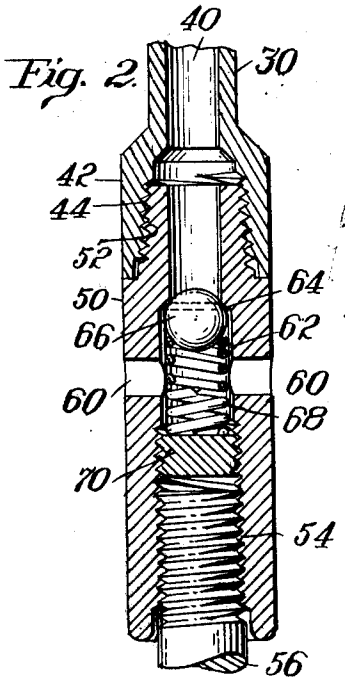
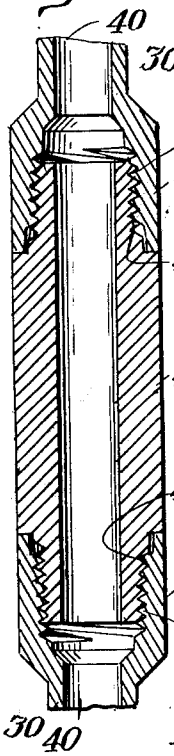



Fig. 3.




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# UNITED STATES PATENT OFFICE

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## OIL WELL PUMP CLEANER

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9 Claims. (Cl. 103—204)

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In many of our oil producing areas, the oil companies are very generally plagued by the formation of paraffin or wax on the walls of the pump columns. This wax or paraffin formation often builds up to an extent that the column becomes completely plugged, and will not permit the pump at the bottom of the well to continue its operation. Many explanations have often been made regarding why the wax or paraffin separates itself from the crude oil and becomes deposited in the pump column and/or on the sucker or pull rods. Perhaps one of the most commonly accepted explanations is, that as oil is pumped from the bottom of a well, the temperature changes as it nears the surface, and that at some point, usually between one thousand and five hundred feet from the surface, the wax or paraffin precipitates itself from the crude oil, and is deposited on the walls of the pump column or tubing and the pull or sucker rods.

In order to be assured of an efficient operation for pumping an oil well, the tubing or pump column, and the pull or sucker rods must be free of all obstructions.

This wax or paraffin can be removed by the use of chemicals and/or heat, provided that the chemicals and/or heat can be applied directly to the wax or paraffin. Various methods have been tried to accomplish this desired result, but thus far, little or no success has been attained. For example, attempts have been made by pouring a chemical down the outside of the pump column, but when this is done, it mixes with the oil in the well and must be pumped with the oil to the point at which the wax or paraffin has deposited itself. Furthermore, the chemical and the dissolved wax or paraffin must be pumped together with the crude oil, to the ground surface where the entire mixture must be subjected to further refinement.

Another method has been used involving the matter of pouring heated oil down the well itself. This will melt a portion of the wax or paraffin clinging to the walls or tubing of the pump column; but, this has been found to be unsatisfactory, and in fact, in many instances is dangerous. The danger lies in the fact that the heated oil comes into contact with the well casing which is generally set in cement or concrete around its outside to exclude water from the various water sands through which the pump column passes before reaching the oil producing sand. The use of such heat causes the well casing to expand which results in a breaking of the cement on the outside, and completely defeats its purpose by permitting the entry of water into the oil well.

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An object of my invention is to provide a hollow or pierced sucker or pull rod through which heated oil, or a chemical may pass to a desired point within the pump column or tubing.

A further object is to provide a hollow or pierced sucker or pull rod adapted to be connected directly to a source of heated oil or chemical.

A still further object is to provide a hollow or pierced sucker or pull rod connected directly to a source of heated oil or chemical, and adapted to discharge the said heated oil or chemical at any pre-determined and desired point within the pump column.

In the drawings:

Fig. 1–*a*, is a diagrammatic view in cross-section showing the upper portion of an oil well pump column with hollow sucker or pull rod;

Fig. 1–*b*, discloses the lower portion of the same pump column and sucker rod;

Fig. 2 is an enlarged cross-section taken on the line 2—2 of Fig. 1–*b*; and

Fig. 3 is an enlarged cross-section taken on the line 3—3 of Fig. 1–*a*.

The oil well having been drilled in customary fashion, is fitted with a conventional casing **10**, properly secured at the ground surface to a conventional cement block **12**. Within the casing **10**, an oil well pump column **20** is inserted, the same being extended within the casing **10**, a desired distance to be positioned within the oil producing sand in the well. The pump column **20** is conventionally secured and maintained in its proper position relative to a cement slab **12** by any conventional sustaining means **22**. Above this sustaining means, a conventional T-joint **24** is secured to the pump column **20**, and to which a conventional pipe **26** is secured, and is adapted to extend to a storage tank from which oil may be removed for purposes of refining.

Within the pump column **20**, and extending through the T-joint **24**, I provide a hollow or pierced pull or sucker rod **30**; it being understood that the hollow sucker rod **30** which passes through the T-joint **24**, will be in the form of a "polish rod," and will be satisfactorily packed within the T-joint **24** to prevent leakage. The pierced or hollow sucker or pull rod is conveniently secured to a conventional reciprocating motor **32** which is adapted to be raised and lowered by the conventional mechanism, not shown.

To the uppermost end of the pierced or hollow sucker rod **30**, a flexible hose **34** is secured. The other end of the hose **34** is properly secured to, and is in communication with a conventional

pump 36, through which heated oil or chemical may be continually pumped, as the oil well reciprocating motor 32 operates through its conventional means.

It is obvious that a plurality of hollow or pierced pull rods 30 will be needed in order that the same be extended a sufficient distance within the oil well pump column 20.

The hollow or pierced sucker rods 30 are cast and while hot and molten, are pierced with a punch or die to remove metal from the axial center thereof, forming the hollow channel 40. This procedure results in the production of a sucker rod having a very great tensile strength. At each end of the pierced or hollow rod 30 an expanded portion 42 is formed, and is later tapped with slightly tapering screw-threads 44. In order to properly secure together two hollow sucker rods 30, I provide a hollow coupling 46 (commonly called a "double pin sub") which is provided at its two ends with tapered screw-threads 48. The tapered threads 44 and 48 are complementary, and are tapered to facilitate their ease of proper connection.

At a predetermined point, the point within the pump column where it has been ascertained paraffin and/or wax precipitates out from the oil well being pumped, I provide a special coupling 50, which is screw-threaded to the bottommost expanded portion 42 of the lowest or deepest hollow, or pierced sucker rod 30. The special coupling 50 is screw-threaded at its uppermost end with male screw-threads 52 adapted to be secured to the bottommost end of the hollow sucker rod 30, and at its lower end, it is provided with female screw-threads 54 to which a conventional solid sucker or pull rod 56 may be secured. It will be understood that any desired number of sucker or pull rods 56 may be secured together until the lowest or deepest thereof, has reached the desired point of depth within the pump column 20 so that a proper pumping element 58 may be attached.

The special coupling 50 is provided in the approximate center of its length with transversely drilled holes 60 communicating with a longitudinally drilled opening 62. At the uppermost end of the longitudinally drilled opening 62, I provide a conventional valve seat 64, ground to fit a ball-cock 66. The ball-cock 66 is normally held in engagement with the seat 64 by a suitable spring 68, of which the tension may be suitably adjusted by the strength of the spring selected, and also by adjustment of the plug 70.

It will be understood that the hollow or pierced sucker or pull rods 30 will be of sufficient tensile strength so that a desired number of thereof may be secured together to be properly raised and lowered by the motor 32. Obviously a relatively small pierced interior 40 may be provided in the hollow sucker rods 30, since the feeding of heated oil or chemical may be properly assured by the pump 36, and thus the tensile strength of the rods 30 will be increased.

When an oil well is pumping some water with the oil, an alkaline deposit or scale accumulates on the pump column and rod in much the same manner as wax and paraffin. This alkaline accumulation comes from the water and may be likened to the alkaline deposit made in a household teakettle. Such a deposit may be removed, or prevented from forming by the application of chemicals at a proper point in much the same manner as their use for the removal of wax and paraffin.

Before allocating the coupling 50, it will have been determined that the depth at which it is added to the sucker rod will be the approximate point at which the wax or paraffin precipitation is the greatest. It has been found however, that it sometimes is advantageous to position the exhaust valve just above the pumping element. By so doing, a continuous circulation is maintained and emulsified and "dirty" oil may readily be pumped. Also, sand is kept from settling on the pumping unit and the serious problem of "electrolysis" may be eliminated.

I claim:

1. In an oil well pump: a pump column, a plunger therein, a sucker rod reciprocable therein and including a plurality of hollow sections providing a continuous passage therethrough, a coupling connecting two selected hollow sections of the sucker rod at a point above the plunger and formed with a chamber in communication with the passage in said sucker rod sections, said chamber having a closure at its lower end against flow of a fluid therebelow and having peripheral outlets above said closure, a normally closed valve in said coupling for regulating flow of a fluid from said sucker rod passage through said chamber and said outlets into the pump column, and other sucker rod sections connecting said coupling at a point below said closure with said plunger, whereby said valve will be opened and closed to discharge and prevent discharge respectively of a fluid into the pump column at corresponding strokes of the plunger.

2. In an oil well pump: a pump column, a plunger therein, a prime mover, and a hollow sucker rod for conducting a cleaning fluid from the surface to a point in the pump column above the plunger; a coupling unit connected to said hollow rod and having a valve chamber and a valve therein for controlling communication between said hollow rods and the pump column, a second sucker rod connecting said coupling unit with said plunger, said coupling unit having a closure for said chamber to prevent the flow of cleaning fluid from the coupling unit to said plunger.

3. In combination with a pump column, a plunger therein, a prime mover and a sucker rod operatively connecting the plunger with the prime mover: a coupling connecting two sections of the sucker rod at a point above the plunger and having a chamber intermittently open to the pump column, a valve at the top of said chamber to regulate communication between said chamber and the pump column, and a closure below said valve, sections of said rod above said coupling being hollow to provide a continuous passage therethrough, through to the chamber of said coupling, the sections of the sucker rod below said coupling being non-fluid-conducting toward said plunger because of said closure.

4. In an oil well pump: a pump column, a plunger therein, a prime mover, and a hollow sucker rod for conducting a cleaning fluid from the surface to a point in the pump column above the plunger; a coupling unit connected to said hollow rod and having a valve chamber and a valve therein for controlling communication between said hollow rods and the pump column, a second sucker rod connecting said coupling unit with said plunger, said coupling unit having a closure for said chamber to prevent the flow of cleaning fluid from the coupling unit to said plunger, and means at the surface for injecting a fluid into the passage of said rod for delivery

through said passage to said coupling chamber and discharge therefrom to the pump column at points adjacent to the coupling, under control of said valve as the plunger is reciprocated.

5. In an oil well pump having a pump column, a plunger therein, a prime mover at the surface of the well, and a sucker rod operatively connecting the plunger with the prime mover in which: said sucker rod includes a plurality of coupled hollow sections providing a continuous passage in the rod from the surface to a point of junction between two of said rod sections and above the plunger, a coupling unit connecting two of the rod sections at said junction point, said coupling unit having a chamber below the passage in said sucker rod closed at its bottom against flow of a fluid to points therebelow but open to the passage in said rod and lateral outlets in the wall of the coupling open to the pump column, and means at the surface for introducing a cleaning fluid at the upper end of the passage in the sucker rod for delivery to the chamber of said coupling unit for discharge through said outlets into the pump column as the plunger is reciprocated and at points in the pump column within the range of movement of said coupling unit.

6. In an oil well pump having a pump column, a plunger therein, a prime mover at the surface of the well, and a sucker rod operatively connecting the plunger with the prime mover in which: said sucker rod includes a plurality of coupled hollow sections providing a continuous passage in the rod from the surface to a point of junction between two of said rod sections and above the plunger, a coupling unit connecting two of the rod sections at said junction point, said coupling unit having a chamber below the passage in said sucker rod closed at its bottom against flow of a fluid to points therebelow but open to the passage in said rod and lateral outlets in the wall of the coupling open to the pump column, and means at the surface for introducing a cleaning fluid at the upper end of the passage in the sucker rod for delivery to the chamber of said coupling unit for discharge through said outlets into the pump column as the plunger is reciprocated and at points in the pump column within the range of movement of said coupling unit, and a valve in said coupling chamber normally urged to close communication between said sucker rod passage and said chamber but openable by pressure in the sucker rod passage on corresponding strokes of the plunger.

7. An oil well pump comprising: a pump column, a plunger reciprocable therein, a prime mover, a sucker rod including a plurality of coupled sections operatively connecting the plunger with the prime mover, a coupling connected between two adjacent sections of the sucker rod, the sucker rod sections above said coupling being hollow to provide a continuous passage from the upper end of an upper rod section to the interior of said coupling, said coupling having a chamber therein with lateral outlets to the pump column and a closure below said outlets, the sucker rod sections connecting said coupling with said plunger being prevented from conducting a fluid from the chamber of said coupling to said plunger by said closure.



8. An oil well pump comprising: a pump column, a plunger reciprocable therein, a prime mover, a sucker rod including a plurality of coupled sections operatively connecting the plunger with the prime mover, a coupling connected between two adjacent sections of the sucker rod, the sucker rod sections above said coupling being hollow to provide a continuous passage from the upper end of an upper rod section to the interior of said coupling, said coupling having a chamber therein with lateral outlets to the pump column and a closure below said outlets, the sucker rod sections connecting said coupling with said plunger being prevented from conducting a fluid from the chamber of said coupling to said plunger by said closure, and a valve in the chamber of said coupling to regulate discharge of a fluid from said coupling as the plunger is reciprocated.

9. An oil well comprising: a pump column, a plunger reciprocable therein, a prime mover, a sucker rod including a plurality of coupled sections operatively connecting the plunger with the prime mover, a coupling connected between two adjacent sections of the sucker rod, the sucker rod sections above said coupling being hollow to provide a continuous passage from the upper end of an upper rod section to the interior of said coupling, said coupling having a chamber therein with lateral outlets to the pump column and a closure below said outlets, the sucker rod sections connecting said coupling with said plunger being prevented from conducting a fluid from the chamber of said coupling to said plunger by said closure, and a second pump at the surface of the well operatively connected with said prime mover and having an inlet connected with a source of a supply for a cleaning fluid and outlet connected with an upper hollow section of the sucker rod for introducing the cleaning fluid into the passage in the sucker rod for delivery to the chamber of said coupling.

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