Apr. 3, 1923. 1,450,658

M. WARNICK

OIL WELL HEATER

Filed Dec. 6, 1921

Fig. 1.

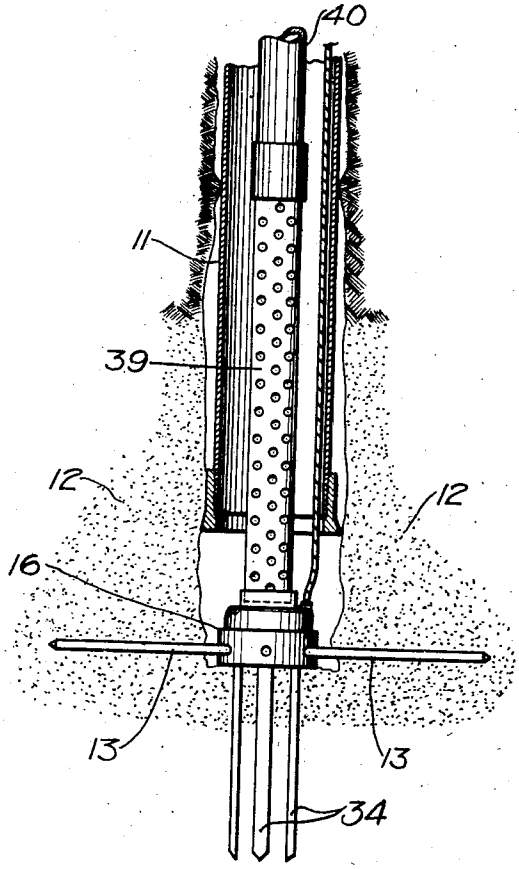


Fig. 2.

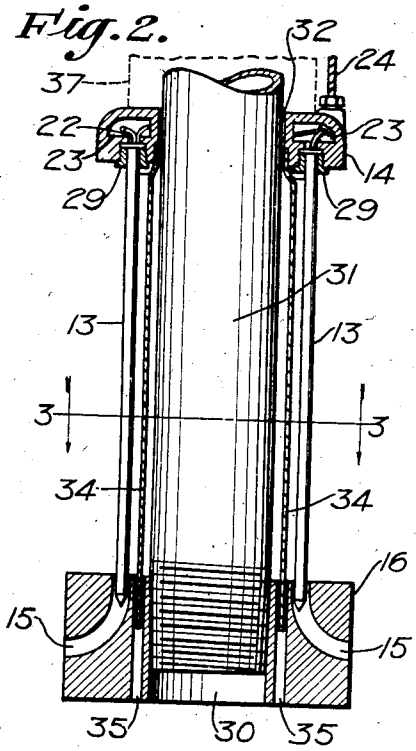


Fig. 3.

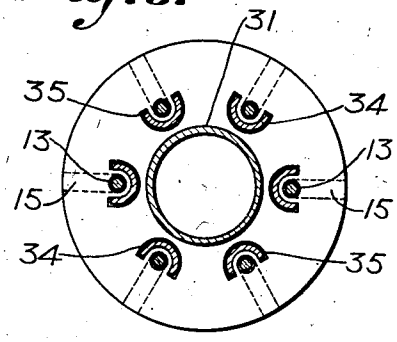
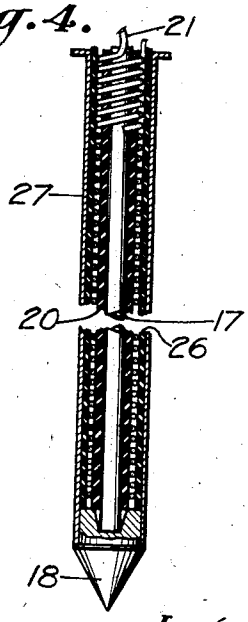


Fig. 4.



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UNITED STATES PATENT OFFICE.

MICHAEL WARNICK, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO WARNICK OIL HEATER SYNDICATE, OF LOS ANGELES, CALIFORNIA.

OIL-WELL HEATER.

Application filed December 6, 1921. Serial No. 520,424.

To all whom it may concern:

Be it known that I, MICHAEL WARNICK, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Oil-Well Heater, of which the following is a specification.

My invention relates to oil wells, being more particularly a heater which is placed in the bottom of a well to facilitate the pumping of the oil from the well. In many oil wells, the sands about the well become clogged by accumulation of the heavier constituents in the oil, resulting in a falling off of the capacity of the well; in other wells, the oil is of such heavy gravity that it is difficult to pump the well. In both cases mentioned, it has been determined that by the application of heat to the oil in the bottom of the well the well flows easier and the pumping operation becomes less difficult resulting in an increase of production from the well.

The principal object of my invention is to produce an electrical heating apparatus of simple form and construction, which may be placed in the bottom of the well in a simple manner.

Another object of my invention is to produce an apparatus of the class described provided with a plurality of flexible heating elements which are directed outwardly from the well into the oil sands about the well.

Other objects and advantages will appear hereinafter from the following description and drawings.

Referring to the drawings, which are for illustrative purposes only,

Fig. 1 is a diagrammatic vertical sectional view of an oil well showing an apparatus embodying a form of my invention, this view showing the apparatus in the position assumed during the pumping operation of the well.

Fig. 2 is an enlarged vertical sectional view of the heating apparatus with parts in position for lowering into the well.

Fig. 3 is a sectional plan view on line 3—3, Fig. 2, and

Fig. 4 is an enlarged vertical sectional view of one of the heating elements.

11 designates the casing of the well which is shown in Fig. 1 extending into the oil sands designated at 12.

The heater comprises a plurality of flexible heating elements 13, the upper ends of which are connected to a head or supporting member 14, their lower ends extending into curved holes 15 in a spreader shoe 16. Each heating element consists of a malleable iron pipe 17 which forms a core, the lower end of such pipe extending into a recess formed in a steel point 18. The pipe 17 is covered with a layer of insulating material 20, upon which is wound a wire coil 21 forming a conductor. The ends of the coil 21 extend through perforations 22 into a recess 23 in the head 14 being connected to a cable 24 which extends upwardly through the casing 11 to a suitable source of electric energy. The coil 21 is covered with a layer of insulation 26 arranged within a copper tube 27 which fits over the upper part of the steel point 18. The upper end of the tube 27 is flanged outwardly by means of which the heating element is secured into the head 14 by means of a threaded bushing 29.

The spreader shoe 16 is circular in form, having an interiorly threaded central opening 30 which receives the left hand threaded lower end of a tubing 31 which may be termed the installation tubing, such tubing extending upwardly and freely through a central opening 32 in the head 14.

The holes or guides 15 in the shoe 16 extend downwardly from the top and outwardly through the sides of the shoe, being curved as shown, the lower end of each heating element being in its associated hole as shown in Fig. 2.

For the purpose of protecting the heating elements during installation, guards for the heating elements are provided which consist of semi-cylindrical plates or bars 34 having their upper ends fixed in the head 14 and having their lower ends freely extending into semi-circular holes 35 which extend through the shoe 16.

The heater is used in the following manner:

The parts are assembled as shown in Fig. 2 and lowered through the casing 11 until the shoe 16 is resting upon the bottom of the well, a weight of any suitable kind, in-

dicated in dotted lines at 37 in Fig. 2, being allowed to strike blows on the head 14 until the head is driven down upon the shoe in the position shown in Fig. 1. The downward movement of the head 14 causes the heating elements 13 to be driven outwardly into the oil sand due to the shape of the holes 15 in the shoe, the guards moving straight downwardly into the sands.

After the heater is so arranged in the well, the installation tubing is removed and the pump placed in the well, that is, as shown in Fig. 1, the perforated tubing 39 rests upon the heater, the pump barrel 40 being connected to the tubing 39. Electricity is then supplied to the heating elements through the cable 24 and the pumping operation started.

The extension of the flexible heating elements outwardly into the oil sands permits the distribution of heat over a larger area than can be done when the heating element is retained in the casing or when a single element is placed in the bottom of the well.

I claim as my invention:

1. An oil well heater comprising a supporting member, and a plurality of flexible heating elements mounted on said supporting member.

2. An oil well heater comprising a head, a plurality of flexible heating elements mounted on said head and a shoe provided with guide means for said heating elements.

3. An oil well heater comprising a head, a series of flexible heating elements secured at their upper ends to said head, and a shoe having a guide opening therein for each heating element.

4. An oil well heater comprising a head, a series of flexible heating elements secured at their upper ends to said head, and a shoe having a guide opening therein for each heating element, said guide openings each extending downwardly and outwardly through said shoe.

5. An oil well heater comprising a head, a series of flexible heating elements secured at their upper ends to said head, a shoe having a guide opening therein for each heating element, and a guard for each heating element.

6. An oil well heater comprising a head, a series of flexible heating elements secured at their upper ends to said head, a shoe having a guide opening therein for each heating element, and a guard for each heating element, said shoe having openings therethrough through which said guards freely extend.

7. An oil well heater comprising a supporting member, a plurality of flexible heating elements mounted on said supporting member, each of said heating elements consisting of a pointed member, a copper tube on said pointed member, and an insulated coil in said tube.

8. An oil well heater comprising: a shoe having a series of holes extending from the top downwardly and outwardly through the sides thereof; a head; a series of heating elements secured at their upper ends to said head and having their lower ends extending into the holes in said shoe; and a guard for each heating element.

9. An oil well heater comprising: a shoe having a series of holes extending from the top downwardly and outwardly through the sides thereof; a head; a series of heating elements secured at their upper ends to said head and having their lower ends extending into the holes in said shoe; and a guard for each heating element, each guard consisting of a semi-cylindrical member attached at its upper end to said head, and having its lower end freely extending into holes in said shoe.

10. An oil well heater comprising: a shoe having a series of holes extending from the top downwardly and outwardly through the sides thereof; a head; a series of heating elements secured at their upper ends to said head and having their lower ends extending into the holes in said shoe; and a guard for each heating element, said head being movable toward said shoe to extend said heating elements outwardly from said shoe.

11. An oil well heater comprising a head, a series of heating elements secured at one end to said head and means for extending said heating elements radially from said head.

12. An oil well heater comprising a head, a series of heating elements secured at one end to said head and means for extending said heating elements outwardly from said head.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 29th day of November, 1921.

MICHAEL WARNICK.