

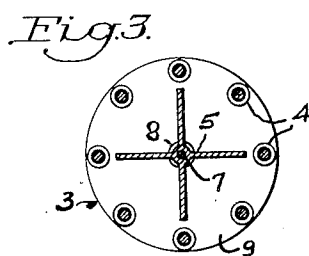
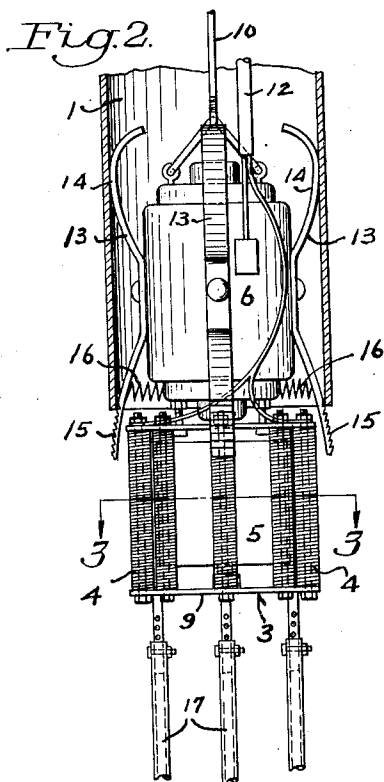
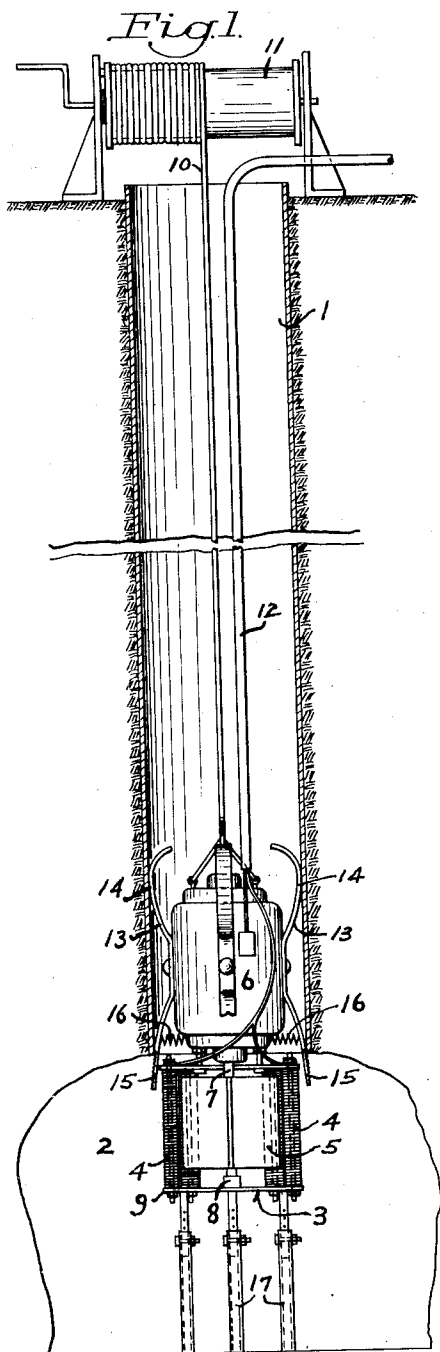
March 14, 1950

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2,500,513

WELL HEATER

Filed March 22, 1946



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2,500,513

WELL HEATER

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Application March 22, 1946, Serial No. 656,247

2 Claims. (Cl. 166—17)

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This invention relates to a well heater designed and intended for clearing oil wells of paraffin and other analogous congealed constituents of petroleum, that may have accumulated around the bottom of the well to such an extent as to partially or entirely stop the flow of oil to the pumping apparatus.

Important objects and advantages of the invention are to provide a well heater of the character described, which is electrically operated and controlled, which will function effectively to quickly liquefy any congealed constituents of petroleum that may have accumulated around the bottom of the well, and thereby reestablish and increase the oil production, which embodies a motor operated agitator for expediting the process of reducing the accumulated congealed mass to a liquid state over a considerable area surrounding the well bottom, which includes novel means for stabilizing the apparatus within the well during its operation, which is simple in its construction and arrangement, durable and efficient in its use, compact, and comparatively economical in its manufacture, operation, and maintenance.

To the accomplishment of these and such other objects as may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts herein specifically described and illustrated in the accompanying drawing, but it is to be understood that changes in the form, proportions and details of construction may be resorted to that come within the scope of the claims hereunto appended.

In the drawing wherein like numerals of reference designate corresponding parts throughout the several views:

Figure 1 is a view partly in section and partly in elevation and diagrammatically illustrating the improved apparatus.

Figure 2 is an enlarged side elevational view of the heater apparatus.

Figure 3 is cross sectional view on line 3—3, Figure 2.

Referring in detail to the drawing 1 denotes a well casing positioned vertically in the earth in the usual manner. Below the well casing 1 is the sump 2 in which congealed constituents of petroleum frequently accumulate to retard or stop normal oil production.

The improved well heater comprises an open heater cage 3 which carries a plurality of electrically operated heating elements 4. The heating elements are suitably insulated, and surround

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an agitator 5 that is mounted for rotation within the cage structure.

The heater cage 3 is secured to the lower end of an electric motor 6, which is employed for driving the agitator 5. The motor shaft 7 extends through the agitator and is suitably journaled for rotation in a bearing 8 mounted on the bottom plate 9 of the heater cage.

The apparatus is attached to a suspension cable 10, which winds on a suitable winch 11 that is operable for lowering or elevating the device in the well casing 1. Suitable electric current conductors 12 are also provided for supplying the motor 6 and the heating elements 4 with the operating current from the source of electrical supply.

A plurality of resilient stabilizing members 13 are secured to the frame of the motor 6 and extend vertically. The upper portions of the stabilizing members are curved, as indicated at 14, to frictionally engage the inner wall face of the well casing 1. The upper ends of the stabilizing members are disposed inwardly toward each other to prevent their interference when the device is elevated from the well casing.

The lower portions of the stabilizing members 13 normally flare outwardly, and the lower outer faces thereof are provided with teeth 15 for engaging the lower end of the well casing 1 when the device is in the operating position in the latter, as shown in Figure 1. The flaring action of said lower portions is augmented by springs 16, which are interposed between the motor frame and the lower portions of the stabilizing members.

A plurality of telescopically adjustable supporting legs 17 are carried by and depend from the heating cage 3. The legs 17 are primarily intended to rest upon the bottom of the sump 2 when the device is in the operative position, and thereby ease the load strain on the suspension cable 10.

When the apparatus is in the operative position, the heating cage 3 is immersed in the congealed mass to be liquefied in the sump 2, and the motor 6 is disposed at the lower end of the well casing 1, as shown in Figure 1. The apparatus is stabilized for minimum vibration, by the legs 17, which latter either rest upon the bottom of the sump 2 or depend into the congealed mass without engaging said bottom. The device is further stabilized by the engagement of the curved portions 14, of the members 13, with the inner face of the well casing 1, and by the engagement of the toothed ends 15 with the lower edge of the well casing. It will be noted that the spaced distance between the heating cage 3 and the motor 6 may

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be varied to best meet conditions found in practice, without departing from the principle of the invention.

In practice, the heating elements 4 are energized to liquefy the congealed mass in the sump 2. Such liquefaction is greatly accelerated by the simultaneous operation of the agitator 5. The heating elements 4 are arranged in spaced relation to each other, and in consequence the liquefied matter may flow freely through the open cage 3, and will be violently stirred by the operating agitator 5. Such agitation of the heated liquefied matter will expedite further liquefaction over a considerable area surrounding the heating cage 3.

The present invention provides a most efficient device of its kind, which may be economically manufactured and operated, and successfully employed for the purposes and in the manner herein set forth.

What I claim is:

1. A well heating apparatus of the class described, comprising the combination of an electric motor including a frame and a revoluble shaft, an open cage carried by and depending from the motor frame, an agitator mounted in said cage and being fixed to the motor shaft to rotate with the latter, electrically energized heating elements mounted on said cage and surrounding said agitator, a mechanism operable for lowering and elevating the apparatus in the well, and resilient means carried by the motor frame and

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extending outwardly from the latter to frictionally engage the wall of the well to stabilize and center the apparatus in the well.

2. A well heating apparatus of the class described comprising the combination of an electric motor including a frame and a revoluble shaft, an open cage carried by and depending from the motor frame, an agitator mounted in said cage and being fixed on the motor shaft to rotate with the latter, electrically energized heating elements mounted on said cage and surrounding said agitator, a mechanism operable for lowering and elevating the apparatus in the well, resilient means carried by the motor frame and extending outwardly from the latter to frictionally engage the wall of the well to stabilize and center the apparatus in the well, and adjustable legs carried by and depending from said cage for spacing the apparatus from the bottom of the well.

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