

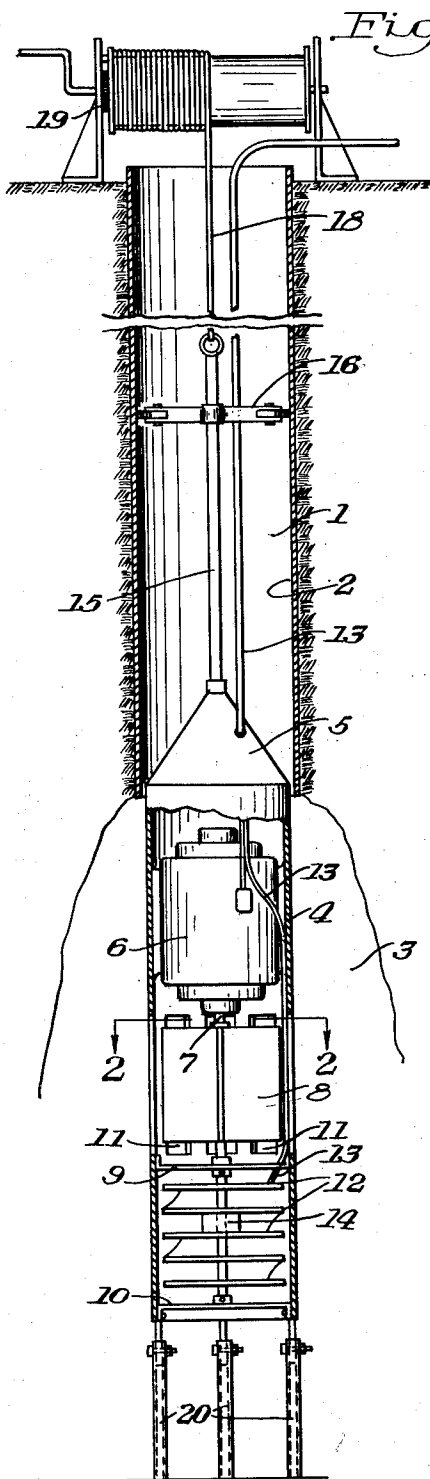
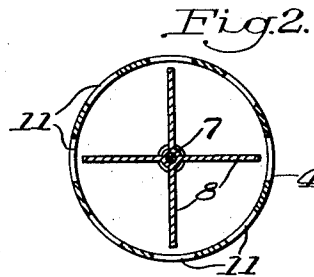
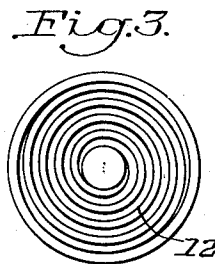
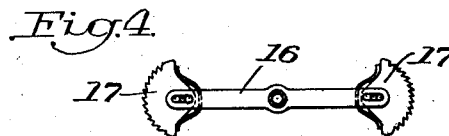
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WELL HEATER

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WELL HEATER

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1 Claim. (Cl. 166—17)

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This invention relates to a well heater intended for clearing oil wells of paraffin and other like 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 of the well.

Important objects and advantages of the invention are to provide a well heater of the character described, which is effectively operable to quickly liquify any congealed constituents of petroleum that may have accumulated around the bottom of the well, which embodies a circulator member for expediting the process of reducing the accumulated congealed mass to a liquid state over a considerable area surrounding the bottom of the well, which includes novel means for preventing the device from rotating within the well, which is simple in its construction and arrangement, durable and efficient in its use, and comparatively economical in its manufacture, operation and maintenance.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in 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 claim 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 and the application of the latter.

Figure 2 is a sectional view on line 2—2, Figure 1.

Figure 3 is a top plan view of a heating element embodied in the invention.

Figure 4 is a top plan view of device employed for preventing the rotation of the heater in the well.

Referring in detail to the drawing 1 denotes a well lined with a casing 2 in the usual manner. At the bottom of the well is the sump 3 in which congealed constituents of petroleum frequently accumulate to retard or stop the normal production.

The improved well heater comprises an elongated, vertically disposed, cylindrical shell 4 having an open lower end and a closed, cone-shaped upper end 5. An electric motor 6, including a

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shaft 7, is fixedly mounted in the upper end portion of the shell.

A circulator member 8 is mounted in the central portion of the shell 4 on the shaft 7, which has its free end journaled on a cross bar 9 secured in the shell 4, and by which the circulator member is rotated by the operation of the motor 6.

The side wall of the shell is formed with a plurality of vertically extending openings 11. The openings 11 are disposed in the central portion of the side wall of the shell directly outward of the circulator member 8.

A plurality of electric heating elements 12, of any suitable construction, are mounted on a cross bar 10 in the lower end portion of the shell 4. Suitable electric current conductors 13 are provided for supplying the motor 6 and the heating elements 12 with the operating current from the source of electrical supply. A suitable thermostatic device 14 is connected in the electric circuit within the shell 4 for controlling the operation of the heating elements during the operation of the heating apparatus.

A vertically extending pipe 15 has its lower end fixed to the cone-shaped upper end 5 of the shell 4. The upper end of the pipe supports fixed cross arms 16. Each free end of the cross arms carries a spring controlled gripping member 17, which has a pivotal eccentric connection with respective cross arms. The gripping members function automatically to grip the side wall of the casing or well to prevent the rotation of the heating apparatus in either direction within the well 1.

A suspension cable 18 is connected with the upper end of the pipe 15 and winds on a suitable winch 19, which is operable for lowering and elevating the heating apparatus in the well.

A plurality of adjustable supporting legs 20 are carried by and depend from the lower end of the shell 4, and are intended to rest upon the bottom of the sump 3 to space the heating apparatus from the sump bottom and thereby promote the more efficient operation of the heating apparatus.

When the apparatus is in the operative position within the well, the shell 4 may be partly or entirely immersed in the congealed mass to be liquified in the sump 3 depending on the depth of the latter. The pipe is of such length that at least the upper portion thereof remains in the well 1. When the sump is of greater depth several joined units of heating apparatus may be employed to meet conditions found in practice. The cone-shaped upper end 5 of the shell 4 is

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provided to direct the heating apparatus into the well when initiating the elevation of the apparatus.

In practice, the heating elements 12 are energized to liquify the congealed mass in the sump 3. Such liquefaction is greatly accelerated by the simultaneous operation of the circulator member 8. The liquified matter will rise in the lower portion of the shell, and upon reaching the circulator member this heated liquid will be driven by centrifugal force through the openings 11 by the operation of the circulator member to thereby expedite further liquefaction over a considerable area surrounding the heating apparatus in the sump 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:

In a well heating apparatus of the class described, in combination, an elongated cylindrical shell having an open lower end and a closed cone-shaped top, a cross-bar fixed in said shell, an electric motor mounted in the upper end of said shell and including a shaft, said shaft provided with a depending extension having its lower end

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journaled in said cross bar, a plurality of electric heating elements mounted in the lower end of said shell below said cross-bar, a fluid circulator secured to said extension to rotate with the latter, said shell provided with a plurality of openings positioned directly outward of said circulator, a vertically projecting member having the lower end thereof fixed to said top, a transversely extending cross-arm fixed to said member, a pair of gripping mechanisms having pivotal eccentric connections with respective ends of said cross-arm and being operable for engaging the wall of the well for preventing the rotation of said shell in the well, and means connecting with the upper end of said member operable for lowering and elevating the apparatus in the well.

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