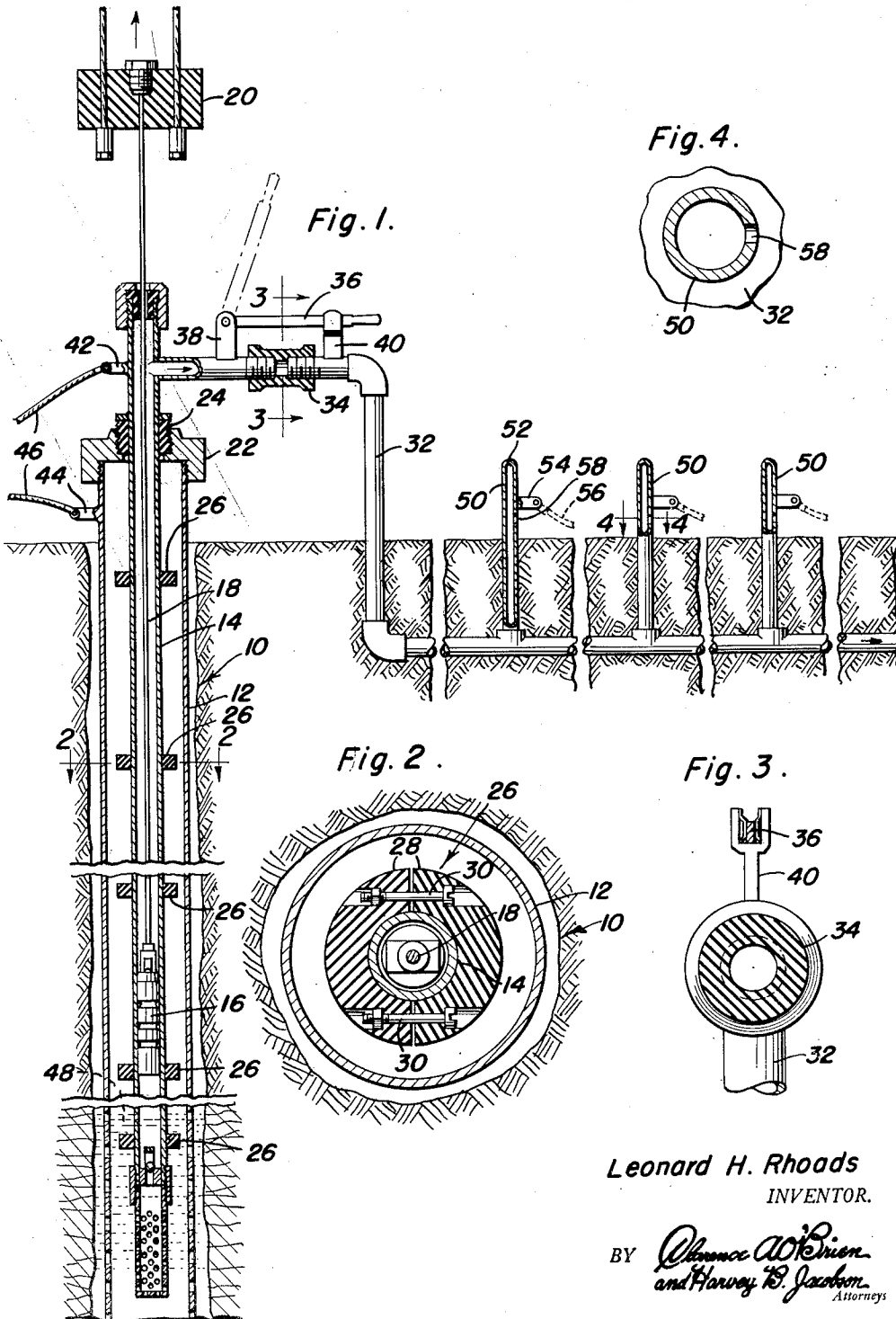


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WELL CLEARING APPARATUS

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WELL CLEARING APPARATUS

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1 Claim. (Cl. 219—39)

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This invention relates to new and useful improvements and structural refinements in apparatus for clearing wells, and the principal object of the invention is to facilitate convenient and expeditious liquidation of paraffin, asphalt, or similar substances which, in a congealed condition, impair the flow of oil through pipe lines and lead lines, as well as obstruct the gathering of oil in the well itself from subterranean strata.

This object is achieved by passing electric current through the pipe line, lead line, as well as the casing of the well, the electric current being of appropriate strength to substantially raise the temperature of these different conduits and thereby maintain the paraffinic and sulphatic substances therein in a free-flowing condition.

An important feature of the invention resides in the structural arrangement of the pipe line, lead line, and casing which enables them to become part of an electric circuit, while some of the advantages of the invention lie in its simplicity of construction, in its efficient and dependable operation, and in its adaptability for use in oil wells of different types.

With the above more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially in the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view of a well including the casing, line, etc., and showing the invention applied thereto;

Figure 2 is a cross-sectional detail, taken substantially in the plane of the line 2—2 in Figure 1;

Figure 3 is a cross-sectional detail, taken substantially in the plane of the line 3—3 of Figure 1; and

Figure 4 is a cross-sectional detail, taken substantially in the plane of the line 4—4 in Figure 1.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the general reference character 10 designates an oil well provided with a casing 12 of conductive material which, in turn, contains a pipe line 14, also of conductive material, having therein a reciprocable piston 16 actuated by a piston rod 18 projecting outwardly from the pipe line for connection to the usual pump jack 20 as will be clearly understood.

The upper end of the casing 12 is provided with a cap 22 having a bushing 24 of insulating ma-

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terial through which the pipe line 14 passes, it being noted that by virtue of this arrangement the pipe line is electrically insulated from the casing.

A plurality of insulating collars 26 are affixed to the pipe line 14 at longitudinally spaced points so as to prevent the pipe line from coming in contact with the interior of the casing, particularly in instances where the pipe line, being of considerable length, may be subjected to lateral deflection, bending or swaying.

Each of the collars 26 is preferably formed from a pair of complementary half sections 28 which are clamped together and on the pipe line by transversely extending screws 30, this being best illustrated in Figure 2.

The upper end portion of the pipe line 14 which projects from the casing 12 has connected thereto the usual lead line 32 extending to a storage tank, and in accordance with the instant invention a coupling 34 of insulating material is provided in the lead line at a point adjacent the pipe line 14, substantially as shown. In this manner, the lead line is electrically insulated from the pipe line, at least all but the portion of the lead line between the coupling 34 and the pipe line, but an electric switch is provided for bridging the insulating coupling, thus facilitating electrical connection between the two lines. This electric switch is indicated at 36 and is preferably in the form of the conventional "knife blade" type including a pair of switch members 38, 40 secured to the lead line 32 at opposite sides of the coupling 34.

A terminal 42 is provided adjacent the upper end of the pipe line 14, while a second terminal 44 is provided on the casing 12, these two terminals being connected by suitable conductors 46 to a source of electric current of appropriate strength so that the casing and the pipe line are maintained at a difference of potential. It is to be noted that both the casing and the pipe line extend into the liquid 48 at the bottom of the well and since the liquid contains a certain amount of salt, it is capable of conducting electricity. Accordingly, the liquid in the bottom of the well will actually become a part of an electric circuit through the casing 12 and pipe line 14, and the pipe line, being of substantially lesser cross section than the casing, will become heated by the passage of electricity therethrough and the paraffinic or asphaltic substances in the liquid 48 will be maintained in a free flowing condition while passing through the pipe line. Moreover, the liquid 48 at the bottom of the well will itself

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become heated by the passage of electricity there-through, and the well itself will thus be prevented from becoming obstructed by congealing substances.

The aforementioned pump jack block 20 is preferably constructed from insulating material so that the electric current does not reach the pump jack unit, and similarly, the lead line 32 may be isolated from the pipe line 14 by simply opening the switch 36.

However, to prevent obstruction of the lead line 32 by congealing substances, one or more electrodes, so to speak, may be installed on the lead line, these electrodes simply assuming the form of an upright tube 50 having a closed upper end 52 and connected at its lower end to the lead line 32, while a terminal 54 is provided on the tube 50 at a point spaced downwardly from its upper end, substantially as shown.

Since a substantial portion of the lead line 32 is usually under ground, the electrode tubes 50 preferably extend above ground as shown so that an electric cable may be connected to the terminal 54, as indicated at 56.

Assuming that a portion of the lead line between the pipe line 14 and the electrode closest to the coupling 34 is to be cleared of obstruction, electric conductors are connected to the terminal 42 and the terminal 54 as at 56, and by simply closing the switch 36, that particular portion of the lead line will become heated and freed of obstruction. The lead line 32 is customarily of substantial length and for this reason several of the electrode tubes 50 may be provided thereon at longitudinally spaced points, it being apparent that by simply establishing a difference of potential between any two electrodes, the particular portion of the lead line between them may be heated and cleared.

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It is to be noted that the tubes 50 may be provided at a point spaced downwardly from the terminal 54 with a small vent opening or aperture 58, so as to prevent accumulation of vapor and moisture in the tubes.

It is believed that the advantages and use of the invention will be clearly apparent from the foregoing disclosure and, accordingly, further description thereof at this point is deemed unnecessary.

Having described the invention, what is claimed as new is:

The combination of a pipe line, and an electrode of the class described, said electrode comprising a substantially vertical tubular body secured at its lower end to and communicating with said pipe line, the upper end of said body being provided with a relatively small vent aperture, and an electric terminal provided adjacent the upper end of said body.

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