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OIL EXTRACTING DEVICE

Filed March 17, 1930

FIG. 1.

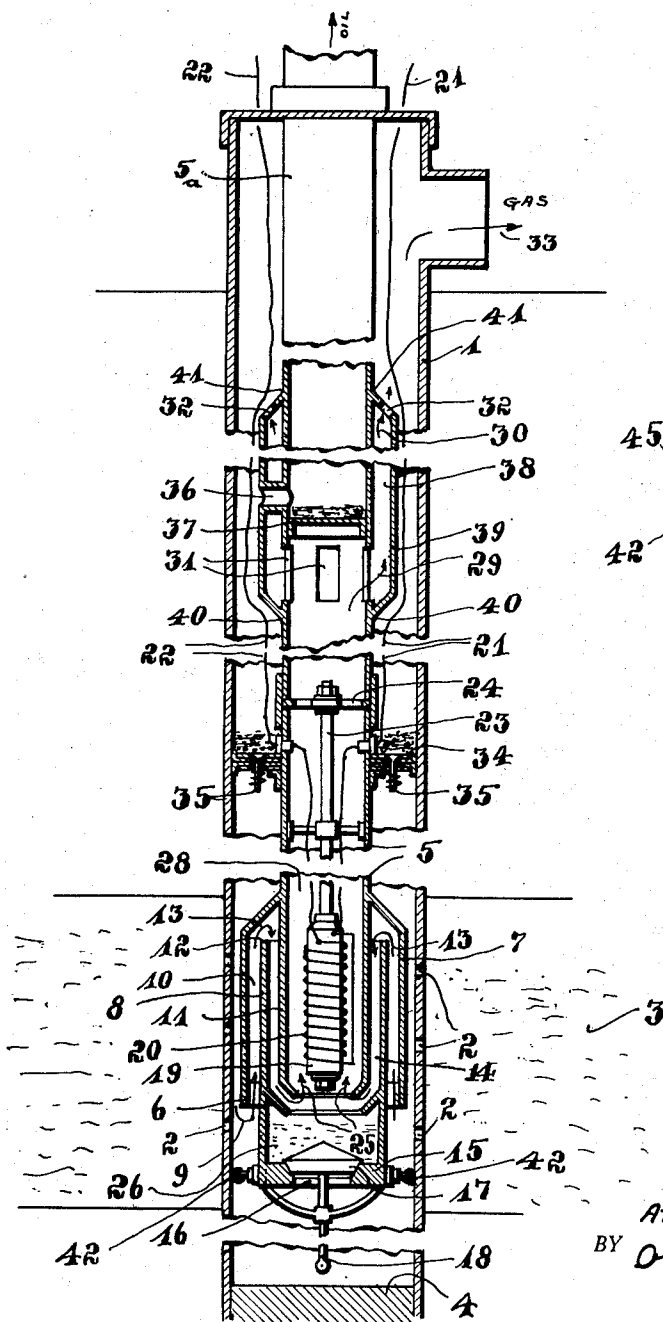
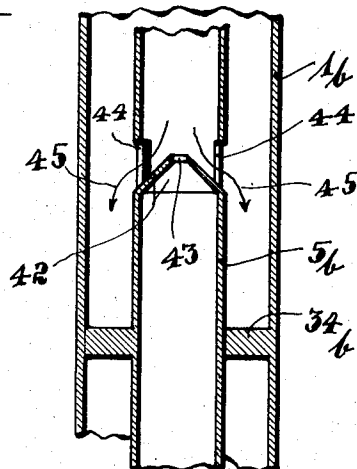


FIG. 2.



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OIL EXTRACTING DEVICE

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This invention relates to devices used for extracting oil from the ground.

One of the objects of this invention is to facilitate an extracting of oil from petroleum formations that have been exhausted to a great extent by other means or processes.

Another object is to provide a device in which a heating element is disposed so that it can raise the temperature in the ground to an extent to cause a rising of oil in its liquid or in a gaseous state to a higher level and ultimately to the surface of the ground.

Another object is to provide a transforming apparatus by which oil from its crude state in the ground is transformed into a state in which it will rise to the surface of the ground.

Another object is to provide a transforming apparatus by which oil in one state is prevented from entering any section of the apparatus in which oil in another state is maintained.

Another object is to provide a transforming apparatus designed so that any oil in an unsuitable state or condition cannot reach or contact with the heating element of the apparatus.

Another object is to provide means by which undesirable matter can be drained from certain compartments.

Another object is to provide means whereby condensed oil is prevented from returning to the heating elements or below a certain predetermined level after it once has been lifted from the point below the heating element of the whole apparatus.

Other objects will appear from the following description and appended claims as well as from the accompanying drawings, in which—

Fig. 1 is a general vertical midsectional view of a perforated well casing in surrounded ground, the perforated section of the casing being preferably within the oil-bearing strata, a heating element being inserted within the inner compartment of the partitioned and sectioned lower end of a structure, the whole arrangement being designed to result in an operation for extract-

ing oil from the ground according to this invention.

Fig. 2 is a fragmentary vertical midsectional view of a slightly modified form of interconnection between the principal tubing members of the structure by which oil may be extracted from the ground according to this invention.

As illustrated in the drawings, the casing 1 is inserted into the ground to bring the perforations 2 to the level within the oil bearing strata at 3, the lower end of the casing and therewith the strata below the oil-bearing strata being plugged off as indicated at 4.

The inserted oil extracting tubing 5 is provided with a partitioned portion at its lower end, so that oil from the oil-bearing strata may pass between the lower end 6 of the outermost partition 7 and the middle or intermediate partition 8, as indicated by the arrow 9, into the space or compartment 10.

The intermediate partition 8 is disposed between the outermost partition 7 and the innermost partition 11, this being the straight extension or continuation of the tubing 5, with the intermediate partition terminating short before the joining-point of the innermost and outermost partitions as indicated at 12, so that any matter disposed in the compartment 10 may eventually pass in the direction of the arrow 13 into the compartment 14.

Inasmuch as this whole device is preferably placed in a well in such a manner that the upper end or termination 12 of the intermediate partition becomes disposed above the oil-bearing strata 3 so that the level of the oil in the compartment 10 would remain below this end 12 and thereby normally prevent any oil from entering the compartment 14 or furthermore the inside of the innermost partition 11, oil is normally not expected to enter the compartment 14 nor the centermost compartment 28.

A bottom portion 15 is provided in the lowermost end of the intermediate partition 8, so that any matter passing into or accumulating in the compartment 14 is deflected in the direction of the arrow 25 into the compartment 28.

However, some particles or small quantities of oil may enter the compartment 14 and thereby accumulate in the bottom end of the compartments 14 and 28 above the bottom-portion 15 as indicated at 26, to the extent to eventually interfere with the proper or desired operation or functioning of the whole apparatus, and therefore a draining opening 16, closed by the valve 17, is provided, which facilitates a draining by a contacting of the downwardly extending stem 18 with the bottom plug 4 of the well which may be accomplished by a lowering of the whole device to this effect.

A heating element principally consisting of the center core 19 and the heating coil 20 serves to heat the oil to a point that gas will be formed to rise from the compartment 10, descending into the compartment 14 by way of the arrow 12, and then rise again into the center compartment 28 by way of the arrow 25, to finally rise through the tubing 5 as indicated at 27, to the surface, where it may be condensed or used in any desired form.

The leads 21 and 22, connected to the coil 20 on the core 19, extend upwardly through the well tubings up to the surface from where a suitable current may be applied to the heating element.

The whole heating element is firmly mounted in and supported by the extracting tubing by means of a web or spider-like member 24 to which the rod 23 of the heating element is connected.

Any matter brought to a gaseous state is made to rise and pass in the direction of the arrows 29 and 30 through the apertures 31 and 32 to finally escape through the well casing 1, and therefrom at the top end in the direction of the arrow 33.

Whether the oil is fully evaporated or brought to a gaseous state or volatilized sufficiently to cause a rising of the gaseous or partly gaseous matter to the surface; or the oil is merely heated sufficiently to cause a rising of matter through a suitable changing of the temperature of the oil to a point to result in a bringing of the oil to the surface is rather a matter of choice of the operator and is therefore not detailed here at length.

Matter at one time or once brought to a gaseous state may, on the other hand, also recondense back to its original oil form, especially in deep wells.

To not let this recondensation interfere with the preferred gas extraction, a bottom or plug 34 is provided between the gas-extracting tubing 5 and the well casing or oil-extracting tubing 1. Though small valves 35 are provided in the plug, they are merely to facilitate a lowering of the whole device through the oil-extracting tubing 1 in order that oil, that may have accumulated in a well while not pumped or otherwise exhausted for some time before the combined gas and oil-

extracting device came into use, can enter the device to allow a lowering of the device to a desired level. As soon as the device is brought to its operating position, however, this plug may be sealed off more tightly by clay or other similar suitable matter.

Any recondensation can then accumulate in this compartment between the gas extracting tubing 5 and the oil extracting tubing 1 above the plug 34 until this matter rises to a level to make it pass through the conduit 36 into the upper end 5_a of the inner tubing, to be extracted by a pump or any other apparatus; while the gas which escaped through the apertures 31 and 32 passes through the upper end of the outer tubing 1 as indicated at 33.

A second plug 37 is provided in the inner tubing 5 above the apertures 31 whereby the recondensed oil is prevented from getting mixed with the rising gas, the gas continuing to rise through the compartment 38 formed by the shell 39, which is firmly sealed at 40 and 41 to the outside of the tubing 5, the compartment 38 having communication with the tubing 5 below the plug 37 through the apertures 31 and with the upper part of the outer tubing 1 through the apertures 32.

In the slightly modified form illustrated in Fig. 2, any rising evaporated matter passes out of the lower portion of the tubing 5, to above the conical member 42 through the aperture 43; while any recondensation, naturally occurring close to the wall of the tubing 5, more than anywhere else, passes downwardly through the apertures 44 in the direction of the arrows 45 to accumulate above the stop or bottom 34, in a similar manner as set forth above with reference to the illustration in Fig. 1.

The evaporated matter, in this case will then pass out of the whole structure to the surface of the ground straight upwardly through the tubing 5, through the top end of the structure instead of through the side as referred to with reference to Fig. 1; and the recondensation will, of course, pass through the side connection in this case instead of through the top, as will easily be understood without further illustration.

Having thus described my invention, I claim:

1. In a device of the class described, a separating structure adapted to extend from the surface of the ground into a strata containing desired matter, a heating element in said structure adapted to cause matter to evaporate and rise through the structure to the surface of the ground, and a stop in said structure to retain recondensation in a compartment separate from evaporated and from the original matter.

2. In a device of the class described, a separating structure adapted to extend from the surface of the ground into a strata con-

taining desired matter, a heating element in
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the surface of the ground, a stop in said
5 structure to retain recondensation in a com-
partment separate from evaporated and from
the original matter, means for extracting the
separate evaporated matter, and other means
for extracting the accumulated recondensa-
10 tion.

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