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ELECTRO-THERMIC OIL WELL PROCESSOR

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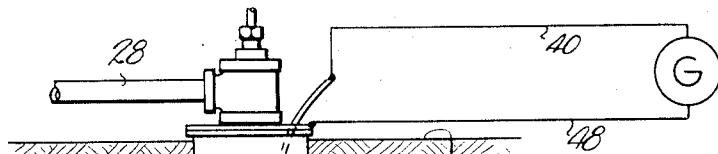


Fig. 1.

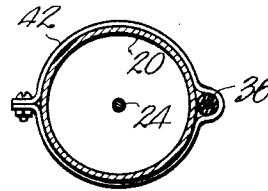


Fig. 2.

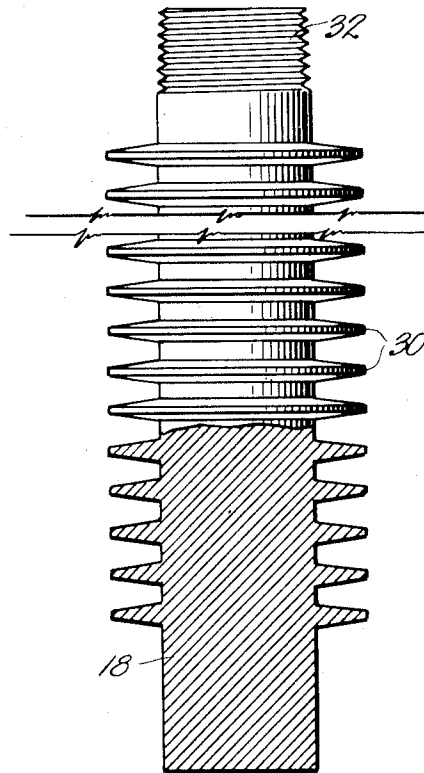
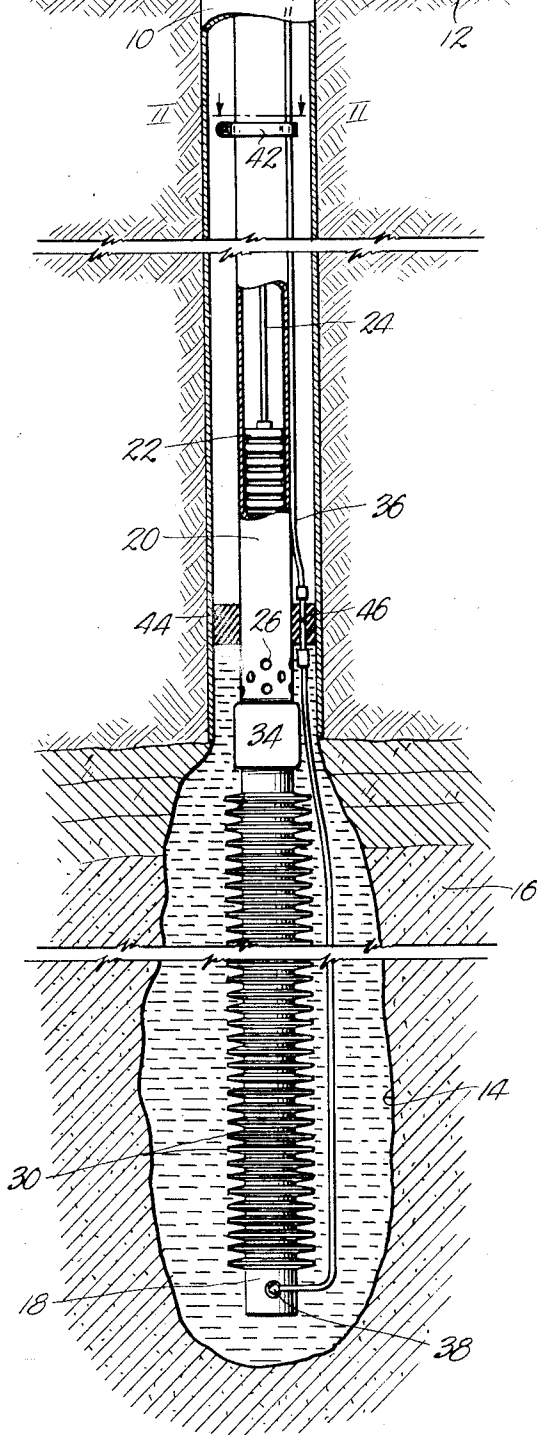


Fig. 3.

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UNITED STATES PATENT OFFICE

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ELECTROTHERMIC OIL WELL PROCESSOR

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1 Claim. (Cl. 219—33)

The present invention relates generally to the treatment of oil wells, and particularly to processors for such wells as have ceased to flow to the desired extent, and the primary object is to provide an electro-thermic oil well processor that may be employed to liquefy solidified pitch, paraffins and tars that may be lodged in the oil sand or structure.

One of the salient objects of this invention is to provide an oil well processor that is efficient in operation, inexpensive to manufacture and employ, and capable of attachment to conventional oil well equipment without special devices in order that it may be positioned to act as aforesaid to render the otherwise non-productive oil well, capable of having oil pumped therefrom.

A yet further aim of this invention is the provision of a specially designed and constructed processor body capable of inclusion in an electric circuit for the purpose of generating heat without glowing and as it is completely submerged within liquid at the bottom of the oil well.

Minor objects will appear during the course of the following specification, referring to the accompanying drawing wherein:

Fig. 1 is a condensed vertical longitudinal sectional view through an oil well having an electro-thermic processor therein, made in accordance with the present invention.

Fig. 2 is a cross sectional view taken on line II—II of Fig. 1; and

Fig. 3 is a fragmentary elevational view of the processor body illustrating the manner of forming the same.

It has heretofore been customary to employ heating elements which are encased and that are a part of an electric circuit. These elements are usually heated to incandescence and the heat transfer effected through the case for the purpose of raising the temperature of the hydrocarbon or hydrocarbon derivatives that are clogging the oil sand and structure. This invention eliminates the employment of such heat units, not only because the expense of operation is exceedingly high, but for the reason that the amount of heat generated with such equipment is not sufficient to accomplish the desired purpose.

The processor embodying the broad concepts of this invention is readily adaptable for use in oil wells of conventional type wherein is included the case 10 extending from the ground surface 12 to the shot hole 14, that may be a considerable distance below surface 12. This hole 14 is usually formed in oil sand or oil structure 16 and

therefore, flow is stopped when solidification in the spaces of the oil sand and structure occurs.

To obtain the most efficient result, body 18 is disposed in hole 14 at the lower end of pump barrel 20 within which reciprocates piston 22. Sucker rod 24 extends upwardly through pump barrel 20 to the upper end of casing 10 and while intake ports 26 receive the oil being pumped through barrel 20, conduit 28 conducts the same to a point of storage.

Body 18 is formed of conducting material having silicon carbide, carbon and a suitable binder, mixed in proper proportions to affect the resistance which creates the greatest amount of heat without producing flow. The proportions of carbon and other conducting materials must be such as to affect heating without utilizing an objectionable amount of current.

It has been found in practice, that temperatures ranging from 300 to 375° F. are satisfactory where the length of body 18 is substantially 5 ft.

This body has a number of spaced apart fins 30 integral therewith and extending radially from the outer face to increase the surface area thereof. The upper end of body 18 is externally threaded as at 32 to engage coupling 34 on the lowermost end of pump barrel 20.

A cable 36 of conducting material is attached as at 38 to the lower end of body 18 and passes upwardly through casing 10 to the ground surface where it is joined to a generator G, or other source of electrical energy by conduit 40.

Suitable clamps 42 arranged at spaced apart intervals along the length of pump barrel 20, hold cable 36 in place.

Packer 44 forms a seal to prevent the oil in hole 14 from passing upwardly through casing 10 and this packer has a rod 46 extending there-through to serve as a connection for cable 36.

When body 18 is heated by electrical energy passing through cable 36 and thence back to generator G through ground connection 48, the temperature of body 18 will be raised and all of the surrounding oil and oil bearing formation, will have the temperature thereof elevated to such a degree that hydrocarbon solids will be liquefied and rendered fluid to the extent of being able to pass into hole 14 and thence out through intake ports 26. Directly emerging body 18 in the liquid in hole 14 insures high efficiency and low consumption of energy.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

55 An electro-thermic processor for oil wells hav-

ing a pump barrel terminating at a point spaced above the bottom of the bore of the oil well, said processor comprising a molded resistance body including a mixture of silicon carbide, carbon and a suitable binder; means for attaching said body to the lower end of the pump barrel; a source of electrical energy; and conductors join-

ing the said source of energy and said body whereby to pass current through the latter to heat the same, said body being beneath the surface of liquid in the well bore, said body having a series of integral, spaced apart concentric fins 5 for radiating heat uniformly from said body.

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