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ELECTRIC OIL WELL TUBING HEATER

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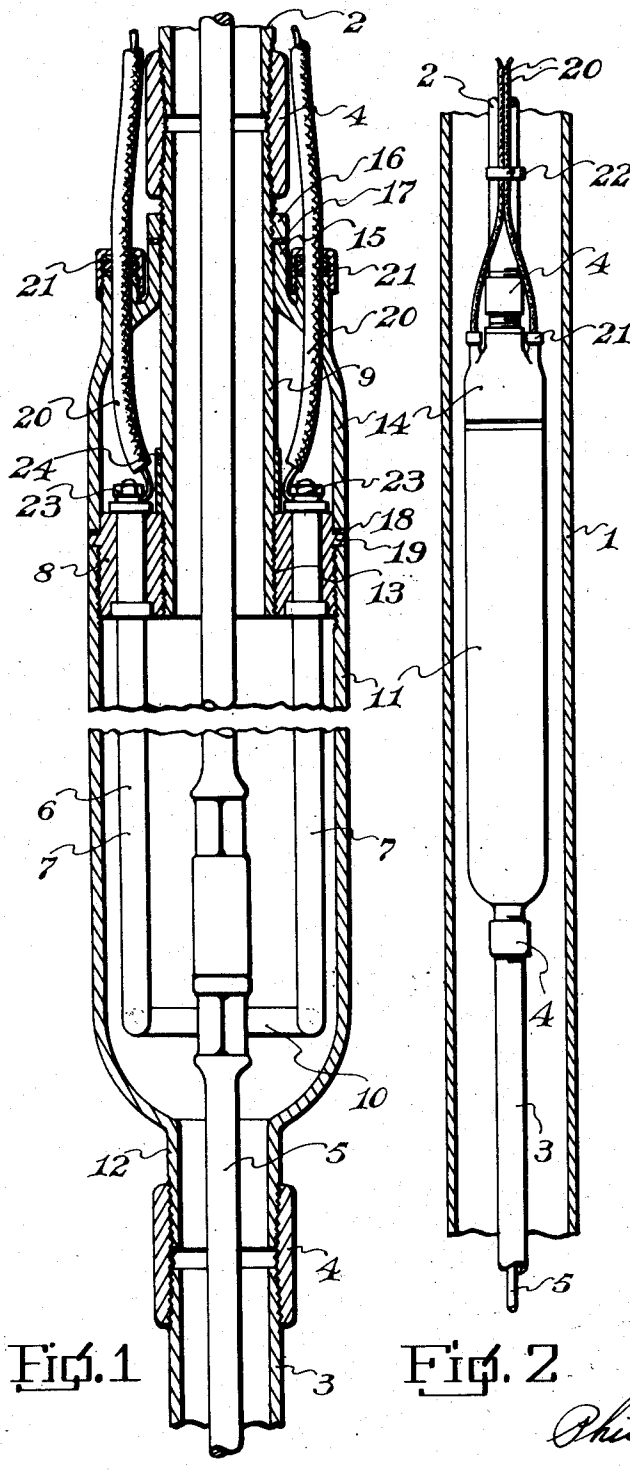


Fig. 1

Fig. 2

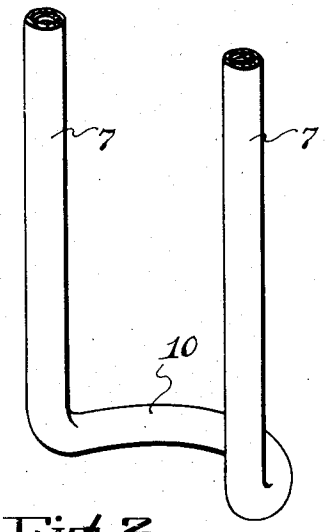


Fig. 3

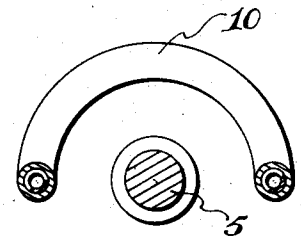


Fig. 4

Thomas A. Rial
INVENTOR

BY Philip A. Fennell
ATTORNEY

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ELECTRIC OIL WELL TUBING HEATER

Thomas A. Rial, Tulsa, Okla.

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3 Claims. (Cl. 219—33)

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The invention relates to oil well tubing heaters, adapted to be inserted at various positions in a tubing string, particularly at the congealing zones for preventing the congealing of paraffin, asphalt and the like, which congealing interferes with the pumping operation. The device is particularly adapted for use in connection with smaller wells, where there is limited pumping, and where the well is shut down for various periods, consequently the paraffin congeals and blocks the tubing. The heater liquefies the paraffin so it will pass out with the oil, and the heated oil, passing over the heater during the pumping operation, prevents the congealing.

A further object is to provide a tubing heater disposed in an enlarged section interposed in the tubing string and comprising a heating unit of U-form, and having its transverse portion arched around one side of the sucker rod in spaced relation thereto so as not to interfere with the reciprocation of the sucker rod during the pumping operation.

A further object is to mount the ends of the U-shaped heating unit in a collar within the enlarged insert member, and to extend conductor wires upwardly from said arms of the heating unit and through the upper end of the enlarged section to the outside of the tubing string to a source of electric supply and conventional control mechanism for regulating the temperature of the heating unit.

A further object is to so construct the device that it can be easily and quickly placed in the tubing string as a unit without varying the conventional connections between the tubing string sections.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing:

Figure 1 is a vertical transverse sectional view through the heating device, showing the same inserted between tubing sections.

Figure 2 is a front elevation of the heating device, showing the same in a well casing.

Figure 3 is a detail perspective view of the lower end of the heating unit, showing the loop carried thereby.

Figure 4 is a horizontal sectional view through

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the lower end of the heating unit and through the sucker rod.

Referring to the drawing, the numeral 1 designates a conventional well casing, and 2 and 3 spaced tubing sections of a well casing, having threaded thereon sleeves 4, of conventional structure used for connecting well casing sections.

Extending axially through the tubing is a conventional sucker rod 5, reciprocated during the pumping operation. Only one heating unit has been shown, however it is to be understood that any number may be used in the tubing string, according to the zones to be heated. The heating element 6 is of the Calrod or Korox type both trade names, wherein there is a Nicrome resistance wire inside the tubing, and this resistance wire is insulated from its enclosing metallic tubing usually insulated by a compound in the tubing. The heating unit 6 comprises spaced arms 7 which depend from the supporting bushing 8, threaded on the intermediate tubing section 9, and to the outside of the periphery of the tubing section 9, so it is spaced a substantial distance from the sucker rod. The lower ends of the arms 6 are connected together by a transverse arched portion 10, which arches one side of the sucker rod, therefore it will be seen that the heating unit will not interfere with the movement of the sucker rod, and the oil, passing upwardly through the tubing, will be heated for preventing congealing and formation of paraffin at the selected zone. Threaded on the bushing 8 is an enlarged lower casing section 11, which terminates, at its lower end, in a reduced threaded extension 12 which threads into the connecting sleeve 4. The short tubing section 9 is threaded at 13 into the bushing 8 and extends upwardly, and threaded into the upper tubing sleeve 4, hence it will be seen that the tubing string will be supported throughout its length.

Surrounding the short tubing section 9 is the upper casing section 14, the reduced portion 15 of which engages around the short tubing section 9, and is forced downwardly by the jam nut 16, acting against a gasket 17 resting on the reduced portion 15. When the jam nut 16 is tightened, the lower end of the upper casing section 14 is forced downwardly on the sealing gasket 18, which rests on the annular flange 19 carried by the bushing 8, hence it will be seen that a rigid structure is provided.

Current is supplied to the heating element 6 by means of conductor wires 20, which extend through packing glands 21 carried by the upper end of the casing section 14, therefore it will be

seen that leakage is prevented from the device, and the bushing 8 will exclude oil from the chamber of the upper casing section 14. Conductor wires 20 extend upwardly and are clamped at intervals to the tubing string as at 22, and it will be understood that the current supplied may be regulated to heat the heating element to the desired temperature.

Surrounding the tubing section 9, adjacent the wire sections 23, is an insulation band 24 for preventing any possibility of short circuit at this point. It is not necessary, with this type of heating unit, to form the member 8 from insulating material, as the resistance from this type of heating element is insulated, from the outside casing.

From the above it will be seen that a tubing heater is provided, which is simple in construction, the parts reduced to a minimum and one which may be easily and quickly inserted at any desired position in a tubing string, without varying the construction of the tubing string section.

The invention having been set forth what is claimed as new and useful is:

1. An electric heater for oil wells comprising an enlarged chambered casing connected to and interposed between well tubing sections and through which casing oil is forced upwardly from one tubing section to the other incident to the reciprocation of a suction rod axially disposed within the tubing sections and casing, said heater comprising a heating element supporting collar within the casing and extending around the sucker rod, a downwardly extending heating element carried by the collar, said heating element comprising spaced arms at opposite sides of the sucker rod within the chamber of the casing and spaced inwardly from the inner periphery of the chamber and also spaced outwardly from the axis of the sucker rod out of contact with the sucker rod, the lower ends of said heating unit arms being connected together by a transverse off-set portion extending around one side of the sucker rod and in spaced relation thereto and also in spaced relation to the inner periphery of the casing, said heating unit being entirely immersed in the upwardly flowing oil and out of the path of the sucker rod as the sucker rod is reciprocated during a pumping operation.

2. A device as set forth in claim 1 wherein the heater casing is larger than the tubing sections to which the heater casing is connected, said casing being formed from a lower section and an upper section, said heating element supporting collar overlapping the inner adjacent ends of said casing sections, the upper tubing section extending downwardly through the upper casing section and threaded into the heating element supporting collar and conductor members extending downwardly through the upper end of the upper casing section and connected to the upper ends of the heating unit arms.

3. A device as set forth in claim 1 wherein the transversely off-set portion of the heating unit extends around one side of the sucker rod and is arcuately shaped.

THOMAS A. RIAL.

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