July 16, 1940.

C. J. SOMERS

2,208,087

ELECTRIC HEATER

Filed Nov. 6, 1939

Fig. 1.

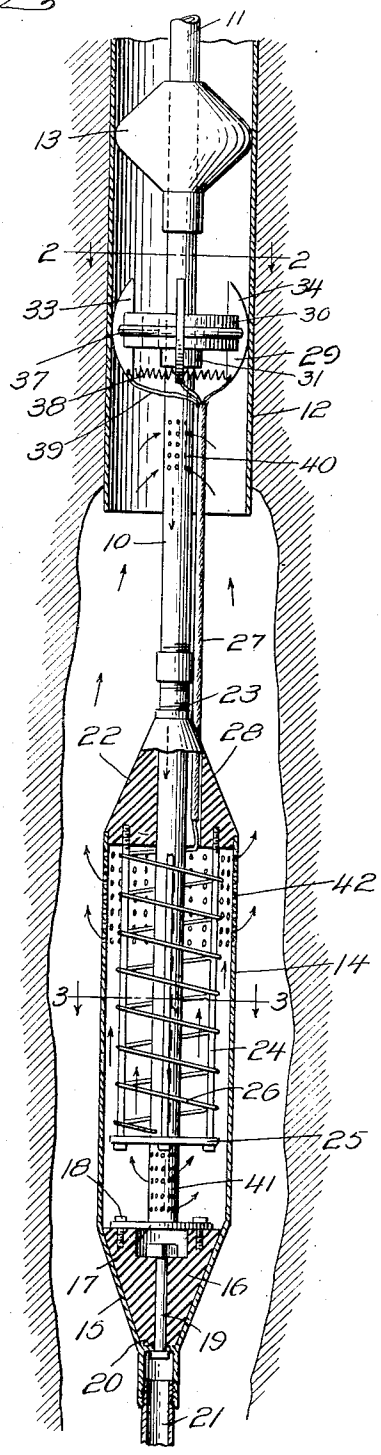


Fig. 2.

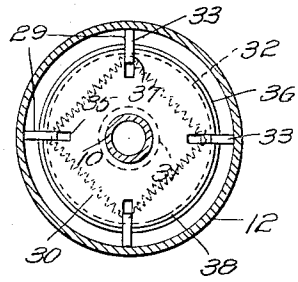
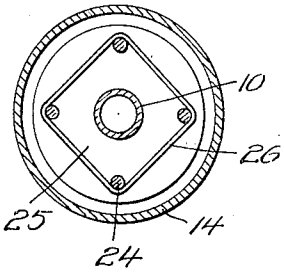


Fig. 3.



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ELECTRIC HEATER

Carlton J. Somers, Osage, Wyo.

Application November 6, 1939, Serial No. 303,148

1 Claim. (Cl. 219—33)

This invention relates to electric heaters and has for an object to provide a simplified device of this character adapted to economically create circulation in an oil well to accelerate production.

A further object is to provide a device of this character which will be so constructed that the heat element will be protected from contact with sand and thus short circuits will be eliminated.

A further object is to provide a device of this character which may be used as a permanent heater in a pumping well without interfering with the pumping operation.

A further object is to provide a device of this character which will be formed of a few strong simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claim without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming a part of this specification:

Figure 1 is a longitudinal sectional view of an electric heater constructed in accordance with the invention and disposed in an applied position at the bottom of an oil well.

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, 10 designates a metal tube which may be connected to the bottom of a metal tube 11 to be let down into the oil well below the well casing 12. An insulating block 13 is secured to the tube 11 and engages the casing to center the tube 10 in the casing.

A metal cylinder 14 surrounds the lower end of the tube 10 and is provided with a funnel-shaped bottom 15 in which is disposed a block 16 of insulating metal. The lower end of the tube 10 is provided with a flange 17 which is bolted as shown at 18 to the insulating block 16 which latter is secured by a bolt 19 to a metal diaphragm 20 which extends across the funnel-shaped bottom of the casing. A tube 21 is screwed into the funnel-shaped bottom to elevate the cylinder to the lowest point to be heated.

The cylinder 14 is closed at the top by a conical block 22 of insulating material which may be screw threadedly engaged as shown at 23 with the tube. A plurality of rods 24 of insulating material are threadedly engaged at the upper ends in the bottom of the insulating block 22 and are connected at their lower ends by an insulating flange 25 spaced above the bottom flange 17 of the tube 10. A resistance wire 26 is connected at one end to the tube 10 and is coiled longitudinally around the rods 24 in the form of a helix. The upper end of the resistance wire is connected to a conductor 27 which extends through a guide opening 28 in the insulating block 22 and is connected at the upper end to a grounding device 29 which will now be described.

The grounding device comprises a disk 30 which is supported on an insulating collar 31 formed on the tube. A plurality of metal contact arms 33 having rounded contact edges 34 are mounted in slots 35 formed in the disk 30 and are pivotally secured to the disk by a ring 36 engaged in the groove 32 in the disk and in openings 37 in the contact arms 33. Helical springs 38 are connected to the contact arms below the disk, as best shown in Figure 2, and hold the upper ends of the arms rocked outwardly to engage the casing 12 and maintain good electrical contact with the casing. The conductor 27 is insulated wire of stranded type and the strands 39 are separated and connected to respective contact arms 33.

The tube 10 is provided with a plurality of perforations 40 below the contact arms 33 and also the tube is provided with a plurality of perforations 41 just above the bottom flange 17. The cylinder 14 is provided near the top with perforations 42.

In operation the tube 11 is connected to one terminal of a source of electricity so that the current for actuating the heater will pass from the tube 10 through the heating coil 24, conductor 27 and contact arms 33 to the well casing 12 of the oil well. The coil when heated will cause a circulation of oil, as indicated by the arrowheads in Figure 1, the oil entering the tube 10 through the upper perforations 40, leaving the tube 10 through the lower perforations 41, then rising through the cylinder 14 of the heater and emerging therefrom through the perforations 42.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

An electric heater for oil wells including a length of tube adapted to be inserted within the

casing of an oil well and lowered to a point below the casing, an electric heating element surrounding the tube and insulated therefrom, a cylinder housing the heating element secured to the lower end of the tube and insulated therefrom, there being oil inlet perforations in the tube above the cylinder and oil outlet perforations in the cylinder near the upper end thereof, a conductor extending from the heating element to the exterior of the cylinder, an insulated disk surrounding the tube in the well casing, metal contact arms pivotally connected to the disk and connected to said conductor, and springs connecting the contact arms at the lower ends thereof together to hold the upper ends of the contact arms in good electrical contact with the casing.

CARLTON J. SOMERS.