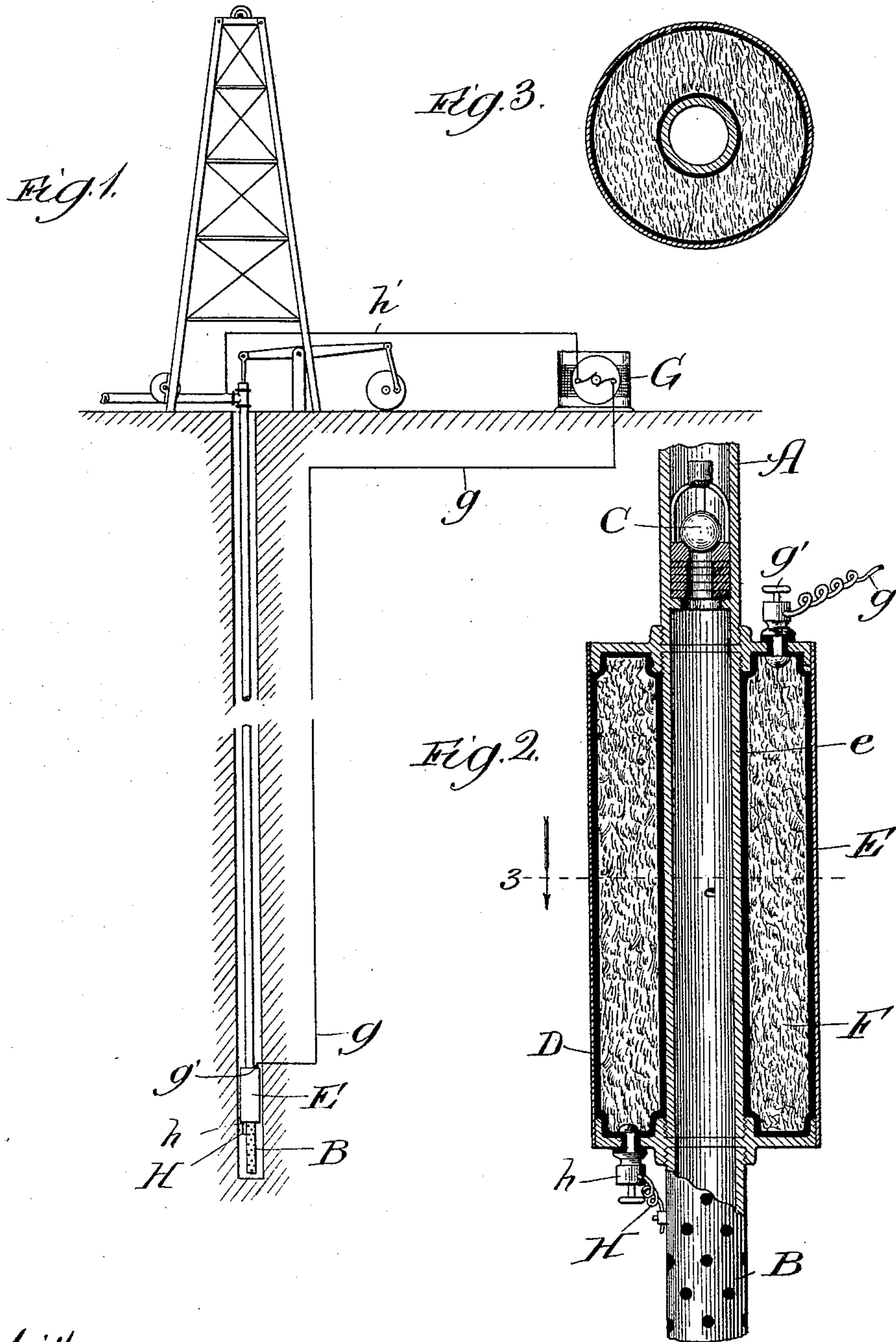


(No Model.)

F. GARDNER.  
APPARATUS FOR PREVENTING OBSTRUCTIONS TO THE FLOW OF OIL  
IN OIL WELLS.

No. 495,936.

Patented Apr. 18, 1893.



Witnesses:  
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Attys



# UNITED STATES PATENT OFFICE.

FULTON GARDNER, OF CHICAGO, ILLINOIS, ASSIGNOR OF NINE-TENTHS TO DAVID S. LOWDER AND WILLIAM E. GARDNER, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR PREVENTING OBSTRUCTIONS TO THE FLOW OF OIL IN OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 495,936, dated April 18, 1893.

Application filed June 20, 1892. Serial No. 437,351. (No model.)

*To all whom it may concern:*

Be it known that I, FULTON GARDNER, a citizen of the United States, residing at Chicago, Illinois, have invented a certain new and useful Apparatus for Preventing Obstructions to the Flow of Oil in Oil-Wells, of which the following is a specification.

The object of my invention has more particular reference to removing the obstruction to the flow of oil in oil wells by the accumulation of paraffine or similar substances which clog and obstruct the fissures and interstices in the oil bearing strata of rock or sand in oil wells; and my invention consists in the process and features of construction hereinafter described and claimed.

In the drawings, Figure 1 is a diagrammatic view of an oil well with my invention applied to use. Fig. 2 is a longitudinal section of a portion of the apparatus; and Fig. 3 is a plan view of a section taken in the line 3 of Fig. 2, looking in the direction of the arrow.

As is well known, one of the great difficulties in securing a full and free flow of oil in oil wells grows out of the fact that paraffine and similar substances accumulate about the point from which the oil is drawn, so as to fill up and obstruct the fissures and interstices in the sand or rock through which the oil flows to the well, whence it is pumped to the surface of the ground. Many devices have been employed to overcome this difficulty, among which may be suggested the use of torpedoes, which are lowered to the oil bearing strata of rock or sand, and then exploded, so that the shock of the explosion would cause a re-opening of the channels or fissures through which the oil flows, and the creation of new ones. This method of removing the obstructions caused by the formation of paraffine was attended with a great deal of trouble, expense and danger. I propose to free oil wells from the obstruction caused by the paraffine by applying at the proper point a sufficient amount of heat to melt the paraffine already formed, and to prevent the formation of more, so that the flow of oil will be constant, full and uninterrupted.

In carrying out my process I take the working barrel A, the anchor B, the standing valve

C, and other parts as they are now in use, and which need not be described in detail. I arrange, however, what I will term a heater, D, near the bottom of the working barrel, to impart the desired amount of heat to the bottom of the well. In arranging this heater in position for work, I prefer to disconnect the working barrel and the anchor, and to screw the heater onto the working barrel and anchor, between them, as shown in Fig. 2. The heater is intended to be operated by electricity, and to that end it consists preferably of an annular case E, provided with an inner tube e, of a diameter corresponding to that of the working barrel.

Between the case E and the tube e of the heater is an annular space, which I fill with a resistant, preferably pulverized charcoal. This resistant is insulated, as shown in Fig. 2, from the case and tube.

Arranged at the surface of the ground, and in any convenient position with relation to the mouth of the well is a dynamo G, or other source of electrical energy, capable of producing the desired electrical current, and a wire g leads from the dynamo and enters a binding screw, g' on the heater. The wire g may run loosely down the well, and connect with the binding screw g'. It thus carries the current generated by the dynamo into the resistant of the heater. In order to complete the circuit, I carry a wire H from the binding screw h, and connect it with the metal of the anchor, which has metallic connection through the tube e with the metal working barrel and tubing to the top of the well, whence a wire, h', completes the circuit to the opposite brush of the dynamo. The heater is intended to be of a diameter to almost fill the bore of the well, and it may be made as long or as short as may be most desirable in the particular locality in which it is intended to be used. It remains permanently in the well with the working barrel, and by turning the current on it may be heated at intervals or continuously to as high a temperature as desired to radiate a sufficient quantity of heat to melt paraffine and prevent its formation or the formation of other residue of petroleum that would clog and obstruct the interstices and fissures in the



oil bearing strata. The heat also radiating inward as well as outward, keeps the oil sufficiently heated to prevent the formation of waxy or sticky petroleum residuum in the  
5 working valves, the joints of the rods and other places where it may accumulate and interfere with the flow of the oil. Where there are a number of oil wells adjacent to each other, they may all be equipped with heaters  
10 having connection with one central dynamo, so that they may be operated either simultaneously or at successive intervals, as may be necessary to prevent the accumulation of obstructive matter in the wells.

15 What I regard as new, and desire to secure by Letters Patent, is—

1. The combination of an electric heater adapted to be placed in the bore of an oil well and remain therein, consisting of a double  
20 hollow cylinder, the inner cylinder forming a section of the oil channel and the space formed between the inner and outer cylinders filled

with resistant material, and an electric circuit extending from the source of electric energy to the heater and thence through the  
25 pipe to the surface of the ground, substantially as described.

2. The combination of an electric heater adapted to be placed in the bore of an oil well and remain therein, consisting of a double  
30 hollow cylinder, the inner cylinder forming a section of the oil channel and the space formed between the inner and outer cylinders filled with resistant material, an electric circuit extending from the source of energy to the  
35 heater and thence through the pipe to the surface of the ground, and a source of electric energy to supply electricity to the circuit, substantially as described.

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Witnesses:

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