J. E. WILLIAMSON.

OIL WELL HEATER.

APPLICATION FILED AUG. 30, 1909. RENEWED OCT. 11, 1913.

1,095,365. Patented May 5, 1914.

Fig. 2.

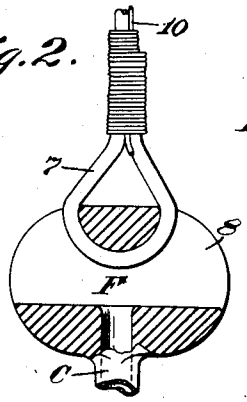


Fig. 1.

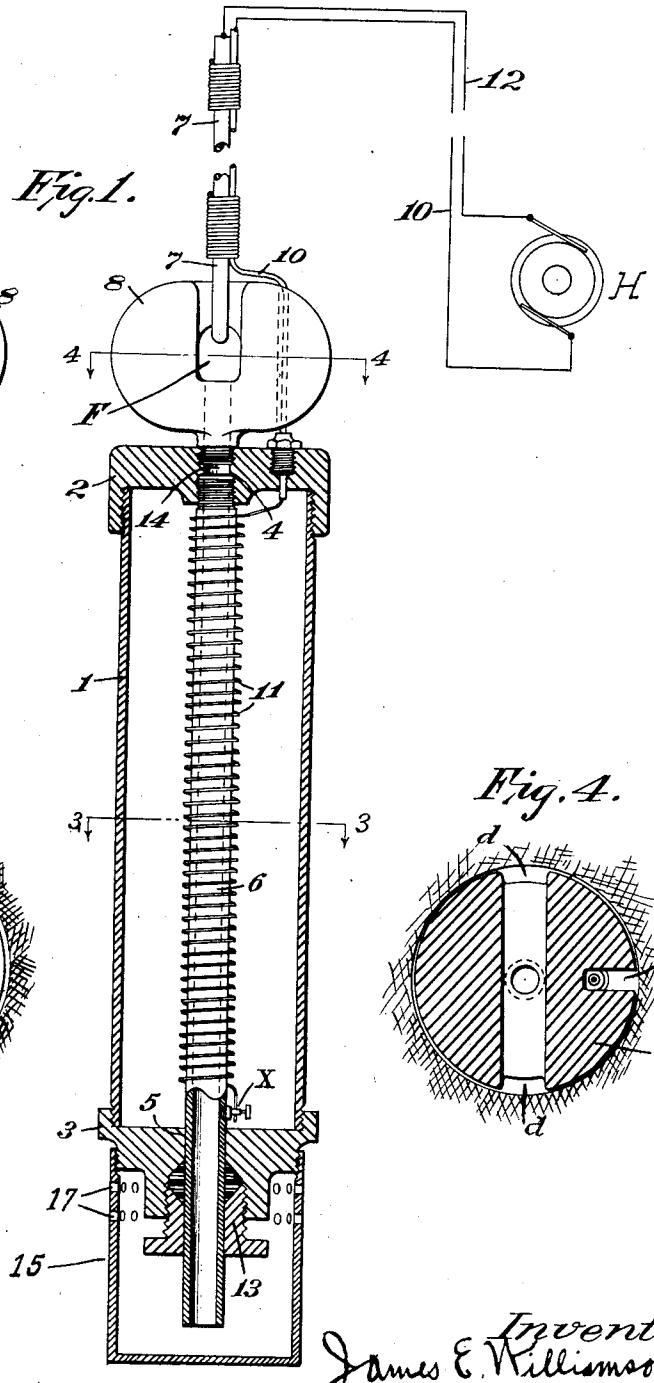


Fig. 3.

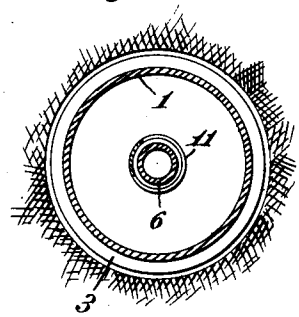


Fig. 4.

Witnesses;
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UNITED STATES PATENT OFFICE.

JAMES E. WILLIAMSON, OF PITTSBURGH, PENNSYLVANIA.

OIL-WELL HEATER.

1,095,365. Specification of Letters Patent. Patented May 5, 1914.

Application filed August 30, 1909, Serial No. 515,250. Renewed October 11, 1913. Serial No. 794,716.

To all whom it may concern:

Be it known that I, JAMES E. WILLIAMSON, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Oil-Well Heaters, of which improvement the following is a specification.

My invention relates to improvements in oil well heaters, and to means for lowering the heater into and elevating the same from the well, and for transmitting electric current to the heater.

The object of my invention is to produce an efficient and simple electric heater for oil wells capable of being quickly lowered into and elevated from the well and positioned therein at any desirable points, and the use in lowering and elevating the same and of conveying electric current thereto of practically but one cable or line, and other novel features of construction hereinafter described, reference being had to the accompanying drawings, forming part hereof, in which—

Figure 1 is a vertical central section of my improved heater, showing the supporting line and the electric conductor connected therewith. Fig. 2 is a central section of the line connecting cap. Fig. 3 is a section on line 3—3 of Fig. 1. Fig. 4 is a section on line 4—4 of Fig. 1.

Referring to said drawings, 1 is the outer shell or case of a cylindrical heater, the ends of which are sealed water-tight by the closures 2 and 3; the said closures are provided with orifices 4, 5 through which the inner tube or fluid passage 6 projects. The said heater is lowered into and elevated from the well and supported when in the well by sand line 7 which is suitably secured thereto; in the drawings it is shown as being attached to the cap 8, which is preferably spherically shaped and has projecting therefrom a tubular portion C which is connected to the cap 2. The said cap 8 is provided with a central opening longitudinally thereof corresponding with opening in tube 6, and with recesses *d* and E and with a transverse hole F. The said line is inserted or seated in one of the recesses *d* and the free end passes through the hole F up through the opposite recess *d* and is secured to the main portion of the line. The electric conductor 10, preferably the positive conductor, is coupled to said sand line as shown for the purpose of producing a single cable or line attached to the heater, thereby avoiding the trouble and the inconvenience of separately employing a number of lines in the use of the heater. The conductor 10 extending from the electric generator H passes down through a notch E in the cap 8 and thence through a suitable insulator in the closure 2 and is connected to one terminal of the resistance coil 11, suitably insulated from and disposed about the fluid passage 6, said resistance coil constituting the heat element, the other terminal thereof being connected on the ground to the said tube 6 at X, the said tube, the outer shell or casing 1, cap 8, sand line 7 and conductor 12 connecting said sand line to the said generator, constituting the return circuit. The said heater is provided with a stuffing box 13 constituting an expansion joint to take up the expansion and contraction in said heater, and at the same time producing a water-tight chamber between the outer and inner tubes in which the resistance coil is located. The said orifice 4 in said cap 2 is screw-threaded a portion of its length from the top downwardly, and from the bottom upwardly, leaving a portion at the center which constitutes an abutment 14 against which on one side the tubular portion C of the cap 8 abuts, and the upper end of the inner tube 6 abuts against the other side so that the inner tube at the upper end is held fixed, and the lower end slides freely through the stuffing box 13. The outer shell 1 slides freely on the inner tube whereby expansion and contraction within the heater is permitted and is provided for without danger to the joints. The said heater is also provided with a box 15 screwed to the lower end thereof. The box is provided with perforations 17 to permit the oil or other liquid to circulate through the inner tube of the heater. The cap 8 is preferably shaped as shown so as to present a rounded surface against the walls of the casing and thus avoid all possible obstruction to the heater in its descent into the well. It also coincides in diameter with the widest part of the heater and thus serves as a guide for the heater.

The path followed by the current is substantially as follows. From the generator H, the current is conveyed by means of the conductor 10 to the upper end of the resist-

ance coil 11. From the lower end of the resistance coil the current passes upwardly through both the tube 6 and the casing 1 to the end cap 8 which has the sand line or conductor 7 attached thereto. From the conductor 7 the current is carried to the generator 8 by means of a suitable lead 12. The conductors 7 and 10 are necessarily insulated from each other, and this may be accomplished in any well known manner such as by using insulated wire for the conductor 10. It will also be obvious that the conductor 10 would necessarily be insulated from the cap 8 and end closure 2. After the heater had been lowered in the well, the oil could enter the box 15 through the perforations 17 and rise through the tube 6, the lower end of the cap 8 being formed with a tubular neck which is screwed into the upper end closure 2 of the casing and communicates with the pipe 6. The oil could thus pass upwardly through the tubular neck C and transverse opening F of the cap 8.

Having described my invention, what I claim and desire to secure by Letters Patent is—

1. In a device for heating oil wells, the combination of a tubular outer casing provided with end closures, a central member extending through the casing, the said central member being carried by one of the end closures and slidably engaging the opposite end closure, a heating element arranged within the casing and mounted upon the central member, and means for manipulating the device in an oil well.

2. In a device for heating oil wells, the combination of a tubular outer casing provided with end closures, a central tube extending through the outer casing, the said central tube being carried by one of the end closures and passing slidably through the opposite end closure, a heating element arranged within the casing and mounted upon the tubular member, and means for manipulating the device in an oil well.

3. In a device for heating oil wells, the combination of a tubular outer casing provided with end closures, an inner tube extending through the outer casing, the said tube being carried by the upper end closure and passing slidably through the lower end closure, a box applied to the lower end of the outer casing and receiving the lower end of the inner tube, a heating element arranged within the outer casing and mounted upon the inner tube, and means for manipulating the device in an oil well.

4. An electric heater for oil wells comprising an outer and an inner shell, the ends of the outer shell being water-sealed, and having a stuffing box at the lower end through which the lower end of the inner tube is adapted to slide, the lower closure of the outer shell having an orifice in which the lower end of the inner shell is slidably secured, a ball cap to which the sand line is secured, and a resistance coil, wound around the inner tube.

5. In a device for heating oil wells, the combination of a tubular outer casing provided with end closures having openings therein, an inner tube extending through the outer casing and having the upper end thereof fitted rigidly in the opening of the upper end closure and passing slidably through the opening in the lower end closure, a heating element arranged within the outer casing and mounted upon the inner tube, a perforated box applied to the lower end of the casing and loosely receiving the projecting end of the inner tube, a cap provided with a tubular neck and an opening communicating with the tubular neck, the said tubular neck being fitted in the opening of the upper end closure so as to communicate with the before mentioned tube, and means connected to the cap for manipulating the device within an oil well.

6. In an electrical device for heating oil wells, a heater casing, a resistance heat medium inclosed thereby and connected at one terminal thereto, a flexible metallic sand line connected to said casing, and an electric generator connected to said sand line and to the other terminal of said resistance medium.

7. In an electrical device for heating oil wells, a closed heater casing having a fluid passage extending longitudinally thereof, a resistance heat medium inclosed therein about said passage, a flexible metallic sand line connected to said casing, and an electrical generator connected to said sand line and to the other terminal of said resistance medium.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES E. WILLIAMSON.

In the presence of—
CLARENCE A. WILLIAMS,
JOHN M. RONEY.