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J. E. WILLIAMSON & C. E. COLLINS.

ELECTRIC HEATER FOR OIL WELLS.

APPLICATION FILED JAN. 23, 1896.

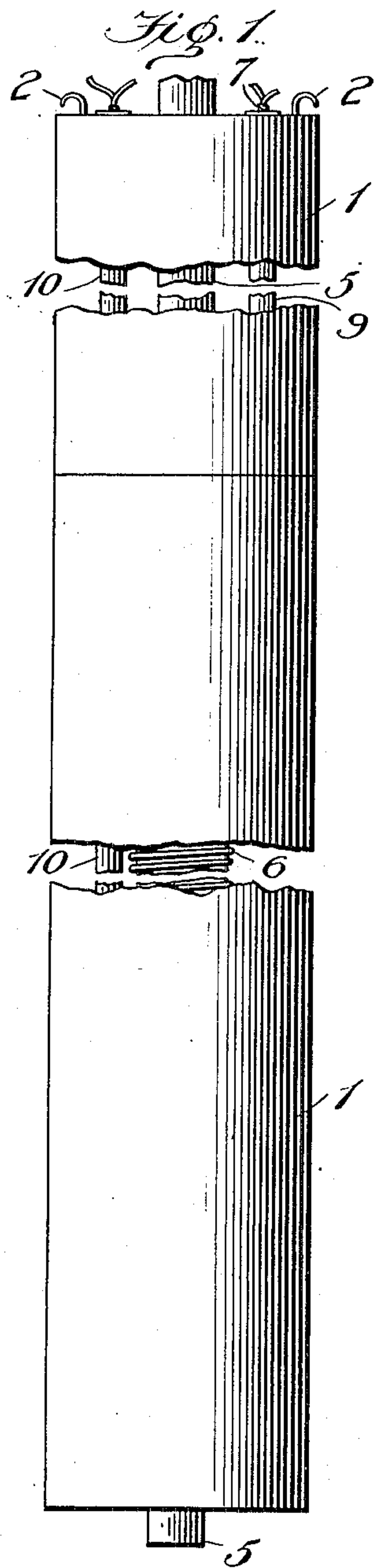
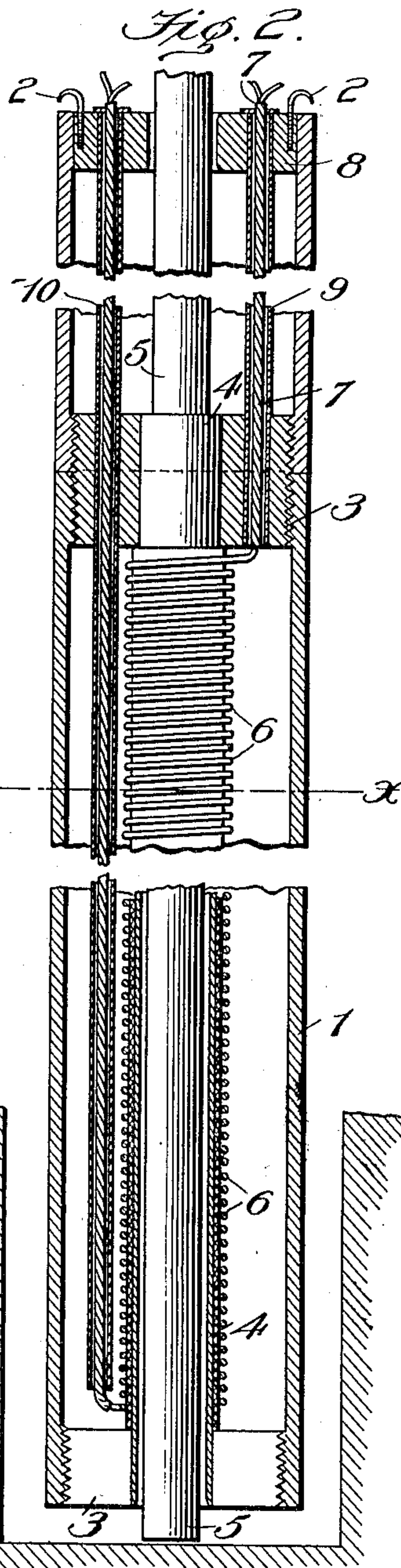
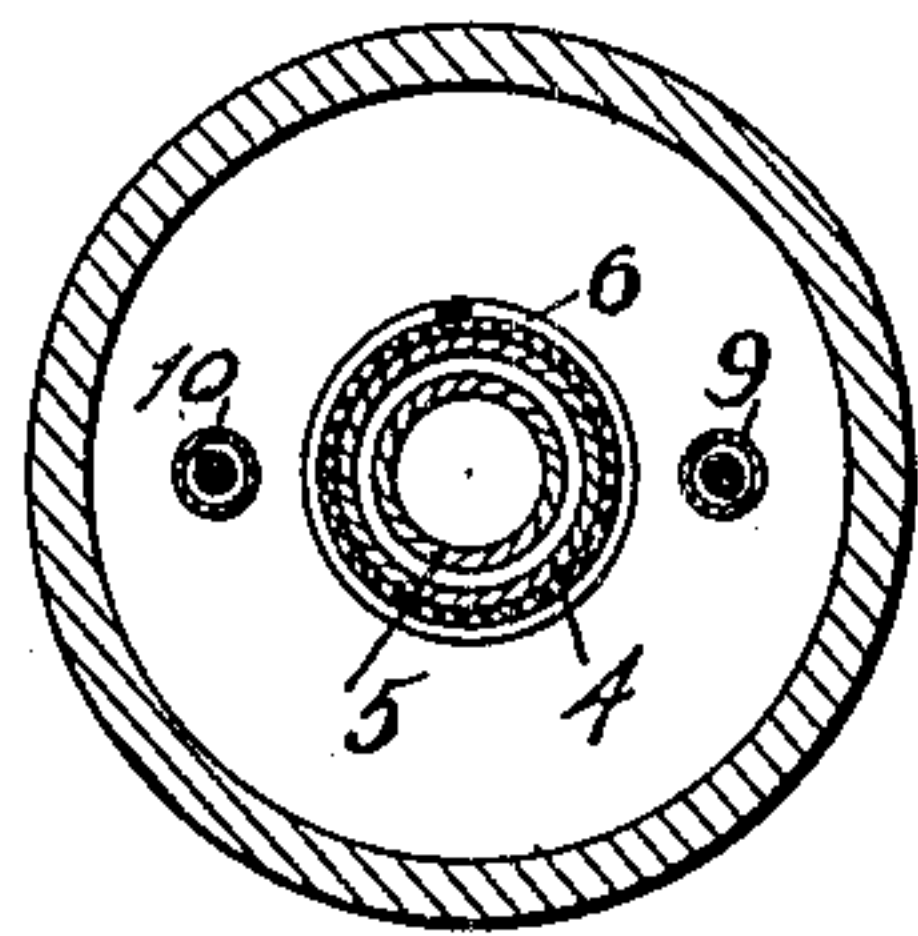


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES E. WILLIAMSON AND CHARLES E. COLLINS, OF ALLEGHENY,
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ELECTRIC HEATER FOR OIL-WELLS.

No. 806,039

Specification of Letters Patent.

Patented Nov. 28. 1905.

Application filed January 23, 1896. Serial No. 578,551.

To all whom it may concern:

Be it known that we, JAMES E. WILLIAMSON and CHARLES E. COLLINS, citizens of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Electric Heaters for Oil-Wells; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a partial side elevation of our improved heater. Fig. 2 is a vertical-section. Fig. 3 is a transverse section on the line *x x* of Fig. 2.

It has been heretofore proposed to heat the lower parts of oil-wells by means of a section of electric circuit of relatively high resistance to be placed at or near the bottom of the well; but serious difficulties have been experienced in using any of the devices for this purpose with which we are acquainted. The earlier plans for this purpose have required the removal of the pump-tubing from the well to permit of the entrance of the heating devices or have secured the heater rigidly to the lower part of the pumping-tube. The first-mentioned of these earlier plans is objectionable, because as soon as the heater is withdrawn the previously-liquefied paraffin and viscid materials tend to harden, so that by the time the pumping apparatus is again introduced into the well all the beneficial results incident to the use of the heater have been lost; and when the second of said earlier plans is followed the heater, being permanently fixed at the lower end of the pumping-tube, is adapted to operate only at the bottom of the well, and it is impossible to withdraw the heater for any purpose or vary its vertical location in the well without removing or lifting the entire pumping-tube.

The object of the present invention is to provide an electric heater which can be readily introduced at any time to the bottom or any desired portion of a well and as readily withdrawn therefrom without requiring the withdrawing of any of the pumping apparatus.

In the drawings, 1 indicates a tube or cylinder adapted to constitute the external casing of the body part of the heater. It is screw-

threaded at the ends and by the threads is connected with a plug 3 at the bottom and a plug 3 at the top. These plugs are provided with central apertures, and in these apertures a central tube 4 is tightly fitted in such way as to make a water-tight joint at each end. These parts 1 3 3 4 when secured together inclose a water-tight chamber, within which the parts of the heater proper are arranged.

The inner tube or cylinder 4, which is of such diameter as to fit loosely about and adapted to move longitudinally of the pump-tube 5, is electrically insulated on its outer surface in any suitable way and has coiled around it or otherwise applied to it a resistance-coil 6, for which at present we prefer to use German-silver wire. The terminals of this resistance-coil are carried through the upper plug 3. For this purpose the latter has two apertures, in which are tightly fitted porcelain or equivalent tubes 9 10. The tube 10 passes through the upper plug 3 and downward into the chamber formed by the tube 1 and the plugs 3 3 in order to insure the complete insulation of the long terminal wire leading from the lower end of the resistance-coil through said tube.

The tubes 9 10 are extended upward a suitable distance above the upper plug 3 in order to give a prolonged support for the wires they contain, and said tubes in turn are supported on an upwardly-projecting extension of the casing 1, formed of a supplemental cylinder or tube 11, which is screw-threaded at its lower end and engages also with the upper plug 3. At the upper end of this supplemental tube 11 there is a cap or plug 8, which is provided with an aperture or passage for the pump-tube 5 and serves as a support for the upper ends of the insulating and bracing tubes 9 10 and may have stuffing-boxes or packings to fit the upper ends of said tubes.

2 2 are hooks or equivalent devices projecting from said supplemental cylinder or casing for attaching the carriers, cords, wires, or the like by which the implement is supported and by which it is lowered and raised in the well.

The method of operation of these devices will be readily understood. The heat generated by the current when passing through the resistance-coil 6 is radiated from the chamber within which said resistance-coil is mounted and through the tube 1 to the surrounding

parts of the well, resulting in the liquefying of the paraffin and viscid elements of the petroleum and permitting the oil to flow more freely not only from the well into the pump-tube, but also from the crevices of the earth around the well.

From the above description it will be seen that our improved heater can be readily adjusted upon the pump-tube 5 to permit of its being removed from or inserted into the well without varying the position of said pump-tube, and the heater can be held at any desired point in the length of the tube 5. It will also be noticed that the terminals of the resistance-coil are protected by the tubes 9 10 and the supplemental casing surrounding the upper portions of said tubes for a considerable distance. This latter construction prevents the conductors from bending at points adjacent to the coil 6, and they are also thereby held away from and out of contact with the walls of the well, whereby any danger of rubbing off the insulation during the adjustments of the heater is prevented.

What we claim is—

1. In an electric heater for oil-wells, the combination, with the oil-pumping tube, of a heater separate and separately removable therefrom, and having a casing and an inner

tube surrounding said pumping-tube, means 30 connecting said casing and inner tube and forming a closed annular chamber, an electric resistance in said chamber, having suitable terminals leading out of the same and means for raising and lowering the heater around 35 the pumping-tube, whereby different sections of said tube may be heated.

2. In an electric heater for oil-wells, the combination with the pump-tube of an electric resistance in an electric circuit arranged 40 to surround said tube and adapted to be adjusted longitudinally thereof to heat said tube at whatever point desired, substantially as set forth.

3. In an electric heater for oil-wells, the combination with the tube or pipe adapted to 45 conduct the oil from the well, of an electric resistance adapted to be adjusted longitudinally of said tube to heat the tube at whatever point desired. 50

In testimony that we claim the foregoing we hereunto affix our signatures this 20th day of June, A. D. 1895.

JAMES E. WILLIAMSON. [L. S.]
CHARLES E. COLLINS. [L. S.]

In presence of—

JAS. J. McAFEE,
C. O. WILLIAMS.