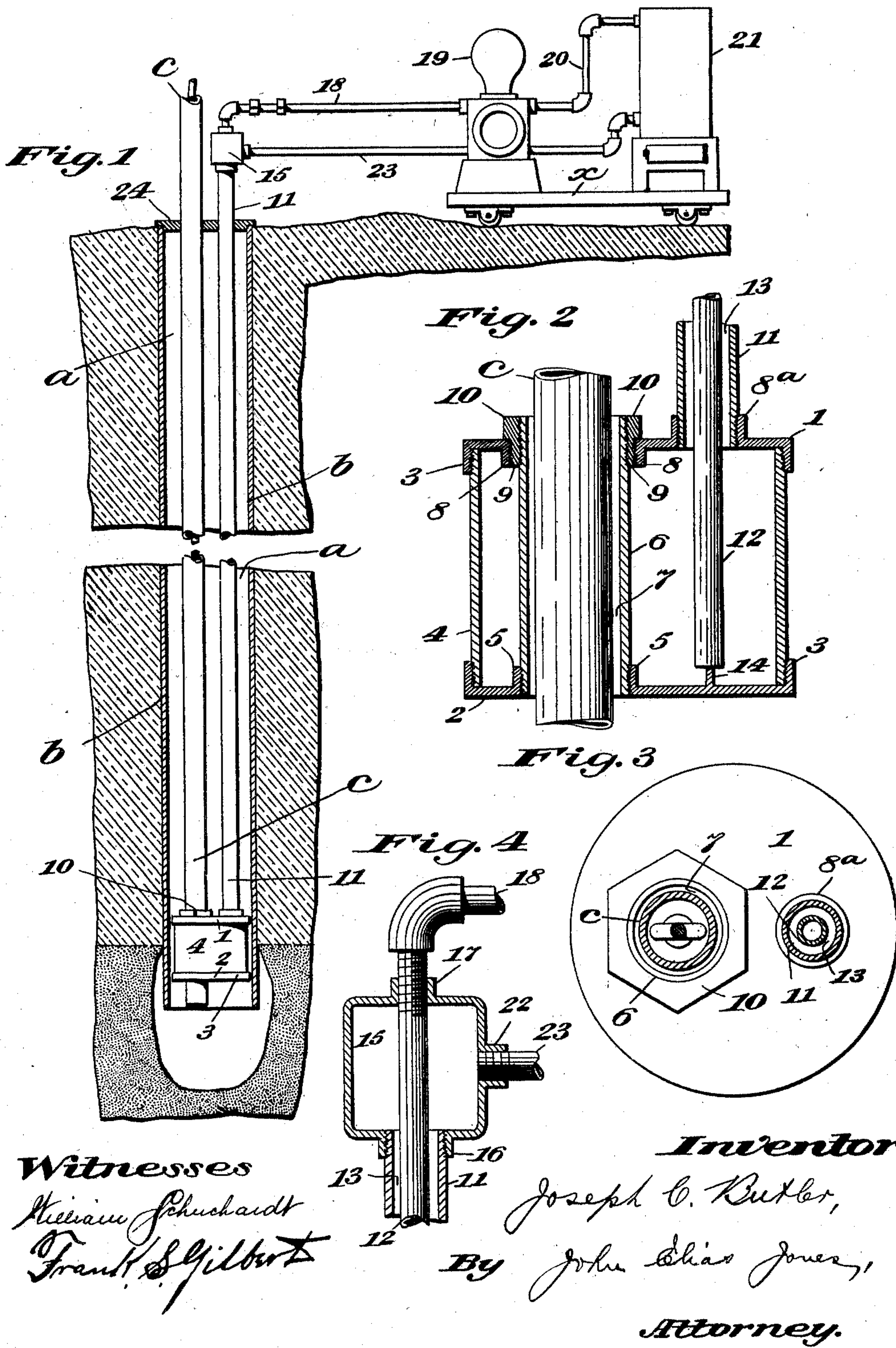


No. 760,304.

PATENTED MAY 17, 1904.

J. C. BUTLER.  
HEATER FOR OIL WELLS.  
APPLICATION FILED OCT. 24, 1903.

NO MODEL.





# UNITED STATES PATENT OFFICE.

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## HEATER FOR OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 760,304, dated May 17, 1904.

Application filed October 24, 1903. Serial No. 178,340. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH C. BUTLER, a citizen of the United States of America, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Heaters for Oil-Wells, of which the following is a specification.

This invention relates to certain improvements in heaters, such as are more especially designed for use in connection with oil-wells or the like for heating the same sufficiently to prevent the hardening or solidification of paraffin or similar solid and semisolid hydrocarbons, which are otherwise apt to collect and clog the suction-pipe; and the object of the invention is to provide a device of this general character of a simple and inexpensive nature and of a compact and durable structure which is capable of being readily transported from one well to another, so as to be adapted for use in heating a number of wells successively.

The invention consists in certain novel features of the construction, combination, and arrangement of the several parts of the improved heating apparatus whereby certain important advantages are attained and the device is made simpler, cheaper, and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which serve to illustrate my invention, Figure 1 is a general view, drawn to a small scale and representing, somewhat diagrammatically, an oil-well provided with a heating apparatus constructed according to my invention; and Fig. 2 is a sectional view, drawn to a larger scale and showing certain features of construction of the heater located in the well. Fig. 3 is a plan view showing the improved heater seen in Fig. 2. Fig. 4 is a sectional detail view showing the water connections at the upper ends of the feed and return pipes.

As shown in the views, *a* represents the well, and *b* the casing thereof, commonly formed from metal pipe, while *c* represents the suction-pipe through which the oil is with-

drawn from the well. In Fig. 1 the central portion of the well is broken out for lack of space.

The improved heating apparatus constructed according to my invention comprises a heater in the form of a closed drum or receptacle adapted for location at the bottom of the oil-well *a* and means for supplying hot water or similar heating medium to said heater and comprising feed and return pipes extended in the well and connected at the ground-level with a water heating and pumping apparatus, and in the accompanying drawings I have illustrated the heating drum or receptacle as being made in circular or cylindrical form, with upper and lower ends or heads 1 and 2, each formed from cast metal in circular form with a marginal interiorly-screw-threaded flange 3, with which flanges of the respective upper and lower heads 1 and 2 are engaged the screw-threaded upper and lower ends of the peripheral portion 4 of the drum or receptacle. At one side of its central portion the lower head 2 is formed with a circular opening of a diameter sufficient to receive the suction-pipe *c* of the oil-well, and said circular opening is surrounded by an upwardly-extended annular flange 5, interiorly screw-threaded to receive the threaded lower end of a pipe-section 6, the interior diameter or bore 7 of which forms a passage vertical in the drum and through which the suction-pipe *c* is adapted to extend. The upper end of the pipe-section 6 is also exteriorly screw-threaded to receive and engage screw-threads on an annulus 9, having at its upper portion a head 10, adapted to receive a tool or wrench whereby it may be turned; and also provided at its lower end with exterior screw-threads which are adapted to engage corresponding threads on a flange 8 produced on the upper head 1 of the drum, which upper head is of course perforated to receive the annulus 9 and to permit the pipe-section 6 to be passed through it. The flange 8 of the upper head 1 will of course correspond in location to the flange 5 of the lower head 2. In this way it will be seen that the heating-drum may be made in a very inexpensive and simple form and is capable of be-



ing readily repaired; but I do not wish to be understood as limiting myself to the employment of this detailed structure exclusively, since it is evident that the drum may be made  
 5 in various other ways without material departure from the invention.

At the side of the drum opposite to the passage 7, produced in the pipe-section 6 for the suction-pipe *c*, I provide the upper head 1 of  
 10 the drum with an opening surrounded by a screw-threaded flange 8<sup>a</sup>, with which is engaged the threaded lower end of the water discharge or return pipe 11, which is extended vertically in the oil-well and is adapted for  
 15 conveying the water from the drum upward in the well to the ground-level and for returning it to the heating and pumping or forcing means, as will be hereinafter explained, and within the said return-pipe 11 is inclosed the  
 20 water supply or feed pipe 12, which is, as shown in the drawings, of an exterior diameter less than the internal diameter or bore of the return-pipe 11, whereby an annular space or passage 13 is produced within the return-  
 25 pipe for the upward flow of the water from the drum. In this way it will be seen that the water traversing this annular passage 13 will form a jacket surrounding the supply or feed pipe 12, whereby the same will to a certain  
 30 extent be protected and prevented from becoming unduly cooled, so as to disadvantageously effect the operation of the apparatus. The lower end of the return-pipe 11 is arranged at the flange 8<sup>a</sup> and is not extended  
 35 within the drum; but the lower end of the feed or supply pipe 12 is extended down within the drum to a point near the bottom thereof, as shown in Fig. 2, and may be rested upon a support 14, if desired or necessary, integral  
 40 with and extended up from the lower head 2 of the drum. By this arrangement of the pipes it will be seen that the water is drawn into the return-pipe from the upper part of the drum, while the water is fed into the drum  
 45 at the lower part thereof, whereby the hot water supplied to the drum is caused to circulate through the same before being discharged therefrom, so that as much as possible of the heat of the water will be radiated from the  
 50 drum to keep the oil and other substances at the lower part of the well sufficiently warm to prevent the solid constituents from congealing and clogging the suction-pipe *c*. At the ground-level the upper ends of the re-  
 55 turn-pipe 11 and of the feed-pipe 12 may have connection in any desired way with the water heating and pumping or forcing means; but I have herein shown the upper end of the return-pipe 11 as having screw-threaded con-  
 60 nection with a nipple 16 at the base of a shell 15, through which the feed-pipe 12 passes in an upward direction, said feed-pipe 12 having its upper end screwed through a nipple 17 on the shell and having above the shell a connec-  
 65 tion, as seen at 18, with the pump or other

water-forcing device 19, which is in turn supplied with hot water by means of a pipe 20 leading from a water-heater 21. From one side of the shell 15 projects a nipple 22, with which is connected a pipe 23, leading also to  
 70 the heater 21, so that the water supplied from the drum at the bottom of the well by way of the return-pipe 11 to the shell 15 will be discharged by pipe 23 to the heater, and at the same time the hot water from the heater will  
 75 be forced by the pump through pipe 18 and down the feed-pipe 12 to the drum for heating the oil and other substances in the well. I have also shown a perforated cover 24 extended across the mouth of the well with its  
 80 perforations adapted for the passage of the suction-pipe *c* and of the combined feed and return pipes of the heating apparatus.

The connections of the pipes 18 and 23 with the heating and pumping devices will be, by  
 85 preference, readily detachable, so that the several parts of the apparatus may be readily separated to permit of conveniently removing the said heating and pumping devices on the truck *x* (seen in Fig. 1) from one well when  
 90 no longer needed for use and of transporting the same (said heating and pumping devices) to another well, to which they may then be readily applied. In this way a single apparatus may  
 95 be made to serve several or a number of wells to keep them in proper order and prevent clogging or choking of the suction-pipes by the solidified hydrocarbons; but by preference I transport nothing but said heating and  
 100 pumping devices (seen on the truck in Fig. 1) from one well to the other, leaving the remainder in each well.

The improved heating apparatus constructed according to my invention is of an  
 105 extremely simple and inexpensive nature and is especially well adapted for use, since it is capable of being manufactured at but slight cost and may be readily transported from one well and quickly and effectively applied for  
 110 use to another well, and it will also be obvious from the above description that the device is capable of considerable modification without material departure from the principles and spirit of the invention, and for this reason I  
 115 do not wish to be understood as limiting myself to the precise form and arrangement of the several parts of the device herein set forth in carrying out my invention in practice.

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

1. An apparatus of the character described comprising a water-receptacle in the form of a closed cylindrical drum adapted for location  
 125 at the bottom of an oil-well and having at one side of its central portion a vertical passage extended through it to receive a suction-pipe, a return-pipe connected with the upper part of the drum at the side opposite to said pas-  
 130 sage, a feed-pipe inclosed in the return-pipe



and having its lower end extended down in the drum adjacent to the bottom thereof and means for supplying hot water to said pipes.

2. An apparatus of the character described  
5 comprising a closed receptacle for containing a heated medium and adapted for location at the bottom of an oil-well and means for heating and circulating a medium to and through said receptacle and comprising a return-pipe  
10 extended in the well and a feed-pipe inclosed within said return-pipe.

3. An apparatus of the character described comprising a water-receptacle in the form of a closed cylindrical drum adapted for location  
15 at the bottom of an oil-well and having at one side of its central portion a vertical passage extended through it to receive a suction-pipe,

a return-pipe connected with the upper part of the drum at the side opposite to said passage, a feed-pipe inclosed in the return-pipe 20 with its lower end extended down in the drum adjacent to the bottom thereof, a wheeled truck located at the ground-level, heating and pumping means adapted to be carried on said truck and detachable connections between the 25 heating and pumping means and the feed and return pipes.

Signed at Cincinnati, Ohio, this 10th day of October, 1903.

JOSEPH C. BUTLER.

Witnesses:

JOHN ELIAS JONES,  
WILLIAM SCHUCHARDT.