

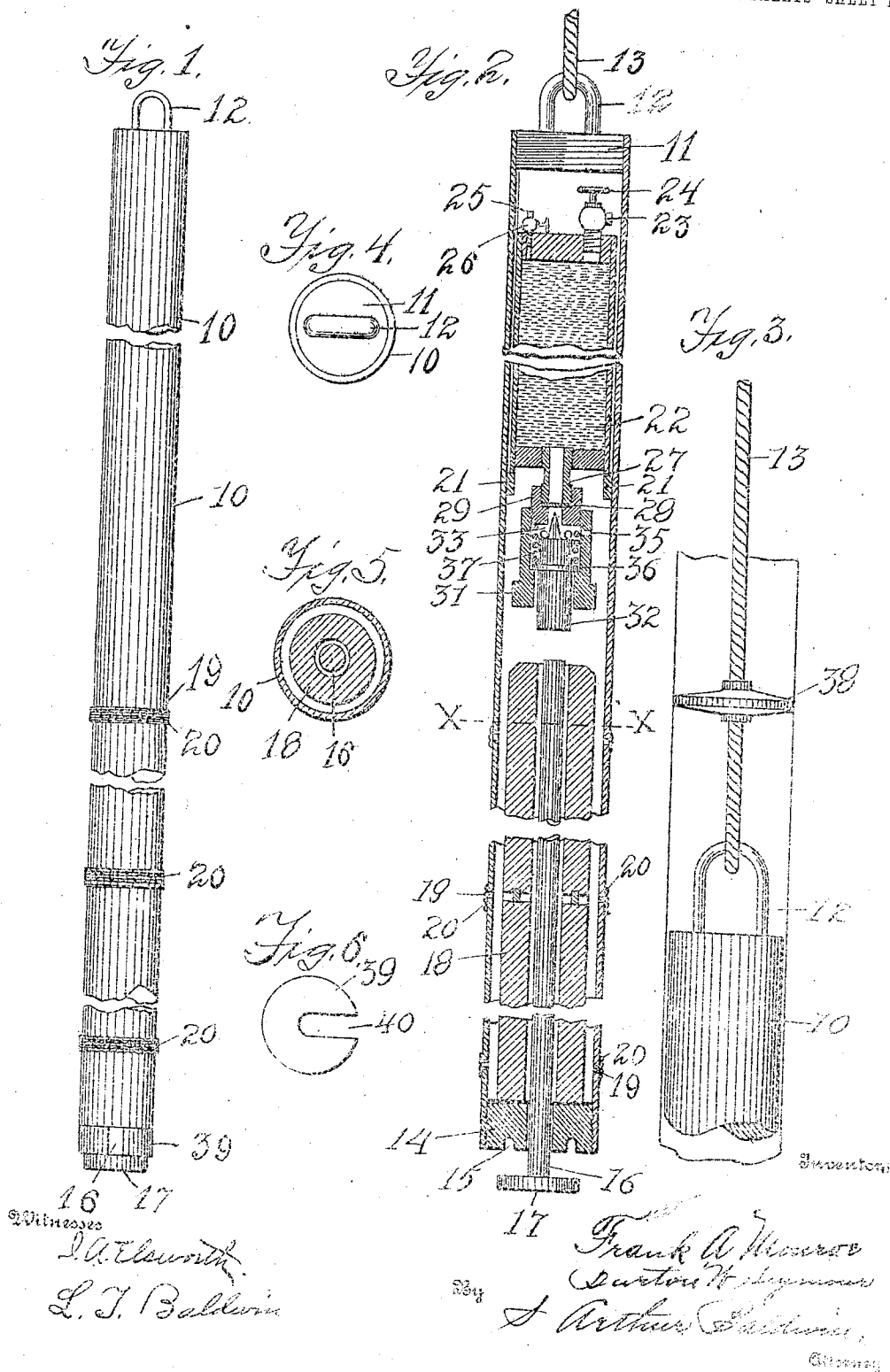
No. 894,675.

PATENTED APR. 14, 1908.

F. A. MONROE & B. W. SEYMOUR.
 DEVICE FOR CLEANING OIL WELLS.

APPLICATION FILED SEPT. 26, 1907.

2 SHEETS—SHEET 1



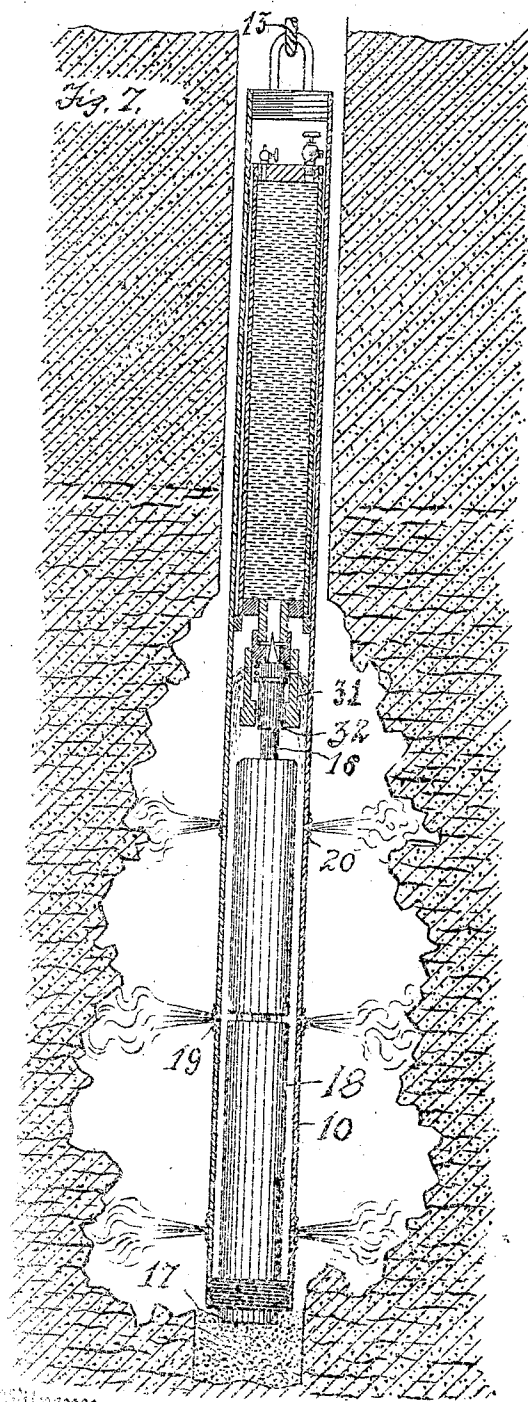
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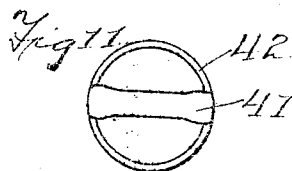
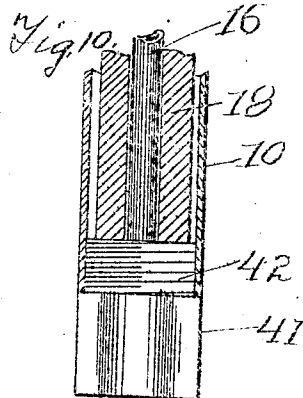
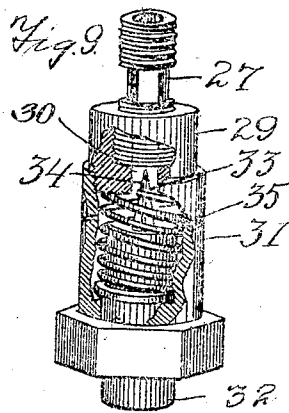
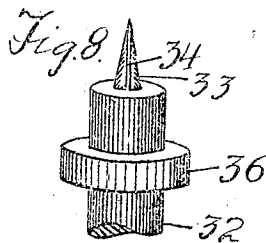
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK A. MONROE, OF BEMUS POINT, AND BURTON W. SEYMOUR, OF FALCONER,
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DEVICE FOR CLEANING OIL-WELLS.

No. 884,675.

Specification of Letters Patent.

Patented April 14, 1908.

Application filed September 26, 1907. Serial No. 394,618.

To all whom it may concern:

Be it known that we, FRANK A. MONROE and BURTON W. SEYMOUR, citizens of the United States, and residents, respectively, of Bemus Point, in the county of Chautauqua and State of New York, and of Falconer, in the county of Chautauqua and State of New York, have invented a new and useful Device for Cleaning Oil-Wells, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The invention relates to improvements in the method of and means for the removing of paraffin, the thickened product of the petroleum, or other deleterious substances together with the accumulated debris from the oil bearing portion of the well. In order to increase the flow of oil wells the customary practice is to discharge a quantity of explosive, such as nitro-glycerin, within the well at the oil bearing portion, thereby shattering the walls and opening up innumerable fissures or crevices which after years of oil flow become coated over with paraffin or the thickened product of petroleum, thereby retarding the flow of the oil and in some cases almost cutting off the flow of oil from the well. There is often also an accumulation of sand at the bottom of the well caused by the caving of the sides of the well, which sand hardens so as to resist the action of the sand pump for its removal, often requiring the reinstalling of the drilling tools together with all the equipments of an oil well drilling outfit in order to remove the same.

The object of the present invention is to provide means for the removal of paraffin or thickened product of the petroleum from the walls of the well by providing means for forcibly projecting jets of steam against the surface of the walls and into the crevices of the oil bearing portion of the well thereby melting the paraffin or thickened product of petroleum so that while in a fluid state it may be removed from the well by means of a bailer, sand pump or other suitable means; and second, to provide means on the steam producing device for breaking up the hardened sand and other debris at the bottom of the well so that it may be removed.

In the drawings, Figure 1 is a side elevation of the steam producing heater, the central portions being broken away. Fig. 2 is a vertical sectional view of the heater showing

the construction of the same. Fig. 3 is a sectional view of a portion of the oil well showing the upper portion of the heater and means on the supporting line for closing the lower portion of the well. Fig. 4 is a top plan view of the heater. Fig. 5 is a sectional view at line X X in Fig. 2. Fig. 6 is a plan view of the locking piece for holding the perforating rod. Fig. 7 is a sectional view of the lower portion of the oil well showing the steam producing heater in action within the same. Fig. 8 is an enlarged view of the grooved perforating point. Fig. 9 is an enlarged perspective view of the perforating valve of the heater, a portion of the casing being broken away to show the action of the same. Fig. 10 is a sectional view of the lower end of the heater casing with the drilling bit attached thereto; and Fig. 11 is a plan view of the lower end of said bit.

Similar numerals refer to corresponding parts in the several views.

The numeral 10 indicates the casing or outer jacket of the heater which is preferably formed of a tube of the desired length which is somewhat less in diameter than the casing of the oil well so that the tube may be easily raised and lowered within the same. Casing 10 has a screw plug 11 inserted in the upper end, which plug has a loop staple 12 thereon for the support line 13. The lower end of the casing 10 is closed by means of a screw plug 14 which is preferably inserted by means of a spanner in holes 15. Plug 14 has a hole through the center within which the rod 16 is inserted, which rod has the large flat disk-shaped lower end 17 to rest upon the sand or other soft material which usually fills the bottom of an oil well so that the rod 16 can get a broad bearing at the bottom of the well. Rod 16 extends upward within casing 10 through a number of hollow metal tubes or billets 18 which billets are somewhat less in diameter than the casing 10. A number of series of perforations 19 are provided through casing 10, the outer surface of the perforations being covered with a wire gauze 20 for the purpose hereinafter set forth. In the upper end of casing 10, supported upon ring 21, is a long tubular reservoir 22 which has in its upper end the inlet pipe 23 with valve 24 to control the same, and the escape pipe 25 with valve 26. The lower end is provided with a tubular exten-

sion 27 which has a soft sheet metal closure 28 at its lower end in the form of a sheet metal disk which is so arranged as to be held by a screw collar so that a new disk can be placed from time to time whenever the reservoir 22 is newly charged.

Attached to tubular extension 27 is a second tubular extension 29 having a circular opening 30 therewithin. A third tubular extension 31 is secured on to the lower end of extension 29 and contains therein a perforating bolt 32, which bolt 32 extends below extension 31 a sufficient distance to be engaged by the rod 16 when moved upward by pressure upon the bottom of the well. The upper end 33 of the bolt 32 is made conical in form and has the vertical grooves 34 extending up the sides to the point. Conical point 33 is made the correct size to fit within circular opening 30 when pressed upward and the extreme point is pressed through the soft sheet metal disk 28 thereby perforating the same and allowing the fluid to escape down the grooved sides 34 of the cone-shaped point. A series of holes 35 are provided around the base of said cone in extension 31, through which the fluid escapes and falls upon the billets 18, which are superheated before insertion in the casing 10, thereby producing a high steam pressure within the casing, which steam escapes through the openings 19. The wire gauze 20 is placed over said openings in order that the gas or other inflammable products of the well may not be exploded or set on fire by the extremely hot billets. A projecting flange 36 is provided on bolt 33 to support said bolt within extension 31 and also to support on its upper side the coiled spring 37, which forces the bolt downward when the heater is raised so that rod 16 and bolt 32 may pass downward. It is apparent therefore, that if a larger amount of steam is desired than the grooves 34 will provide the heater may be raised a short distance sufficient to allow the bolt to drop down, thereby leaving the entire size of the perforation in metal disk 28 for the fluid to pass through. It is apparent also that the heater can thus be passed up and down the sides of the well melting off the paraffin and other products in the lower portion of the well after which they may be removed by any suitable means.

In order to inclose the steam within the lower portion of the well and thereby keep it in a super-heated condition, a disk 38 is placed on support line 13 above the heater which fills the well. This disk is preferably made of felt, leather, or some such pliable material, which will close the well and at the same time will bend in either direction in case of obstructions. A second disk shaped piece 39 is provided having a slot 40 in one side, which disk is of the proper thickness to be inserted around rod 16 between the disk-

shaped end 17 and closure 14 at the lower end of casing 10, as shown in Fig. 1 and thereby prevent the rod 17 from moving upward to perforate the sheet metal disk 28 while charging the reservoir 22. A flat bit 41 is provided with threaded upper end 42 to fit the lower end of casing 10, as shown in Fig. 8, so that plug 14 and rod 16 may be removed and the bit 41 inserted. It is apparent that this bit will then receive the pressure of the heavy metal billets 18 as well as the casing 10 and reservoir 22 and may be used to agitate and drill out the hardened sand at the bottom of the well, the same as though it were a regular drilling bit. In using this heater, the hot billets 18 are first inserted in tubing 10 after which the reservoir 22 is inserted and filled preferably with hot water, though it is apparent that it may be filled with steam or any fluid which would produce steam. The reservoir 22 is filled through inlet pipe 23 after which it is closed by valve 24. The plug 11 is then secured into place after which the heater may be lowered to the bottom of the well. As the disk-shaped end 17 strikes the bottom of the well it presses upward on rod 16 which comes in contact with the lower end of bolt 32 thereby causing the point 33 to perforate the sheet metal disk 28 and allow the fluid to pass down as above described upon the superheated or white-hot billets 18, thereby producing the steam from the liquid, or superheating the fluid steam should that be used, and creating a high degree of steam pressure within casing 10, which steam is forced out through the minute openings 19 upon the face of the rock, as shown in Fig. 5. It is apparent that any number of billets desired may be used and the capacity of the reservoir 22 may be enlarged so that almost any desired quantity of steam may be produced within the shot cavity or lower end of the well. It is apparent that rod 16 might be attached to billets 18 and the upward moving billets would operate bolt 32. The present arrangement is preferred however on account of the great weight of the billets. The hollow billets are greatly preferred as they give a much larger heating surface for producing steam when the liquid flows down over the hot billets.

When the sheet metal disk 28 is perforated by the grooved point 33 of bolt 32, it is obvious that the grooves 34 on the sides of the conical point will form small interstices through which the liquid percolates slowly running down upon the hot billets 18 until point 33 is withdrawn from the soft metal disk. When so withdrawn the entire opening in the disk 28 is uncovered so that the liquid runs in a stream through said opening. Should it be deemed desirable to reclose the opening, it is only necessary to press the bolt back into the orifice in the sheet metal and so prolong the heating process. In this

spontaneous production of steam at the bottom of the well the main precaution is not to deluge the hot billets with the liquid in such quantity that they are too rapidly cooled.

5 The size of the point 33 and the grooves 34 may be so regulated as to allow the correct amount of liquid to percolate through the same upon the hot billets to make the desired pressure of steam within the casing 10 and
10 continue said pressure for the greatest length of time.

In cleaning a well the well is first pumped as dry as possible so that the steam will have free action upon the coated sides of the well
15 without having to heat any of the liquid products of the well. The action of the jets of steam striking against the gum coated sides is found exceedingly advantageous in melting the same. It is also found advantageous to
20 turn the heater, also moving it upward and downward during the operation of cleaning the well so that all parts of the surface will receive the steam jets.

We claim as new:—

25 1. In a device for cleaning oil wells, a tubular casing, a removable metal billet in the lower part of said casing, a reservoir for fluid in the upper part of said casing, means for starting the slow passage of said fluid from
30 said reservoir on said billet, said casing having a series of minute openings for the egress of said fluid.

2. In a device for cleaning oil wells, a tubular casing, removable tubular metal billets in the lower part of said casing, a reservoir for fluid in the upper part of said casing, means for producing the slow passage of said fluid from said reservoir on said billets, said casing having a series of openings for the outlet of said fluid.
40

3. In a device for cleaning oil wells, a tubular casing, a plurality of hollow metal billets in the lower part of said casing, a reservoir for fluid in the upper part of said casing,
45 a soft metal disk at the lower end of said reservoir, and means for perforating said soft metal to allow the passage of said fluid from said reservoir on to said billets, said casing having openings for the egress of said fluid.

50 4. In a device for cleaning oil wells, a tubular casing, hollow metal billets in the lower part of said casing, a reservoir for fluid in the upper part of said casing, means for filling

the same, a removable soft metal disk closing the lower end of said reservoir, a perforating
55 bolt suspended below the said disk, a bolt slidably mounted in and extending up through said casing and hollow billets to actuate said perforating bolt, substantially as and for the purpose specified.

5. In a device for cleaning oil wells, a tubular casing, metal billets in the lower part of said casing, a reservoir for fluid in the upper end of said casing having suitable means for filling the same, a removable soft metal disk
60 closing the lower end of said reservoir, a perforating bolt below said disk having a grooved point, and means of actuation for said bolt to cause it to perforate said disk, substantially as and for the purpose specified. 70

6. In a device for cleaning oil wells, a tubular casing, means in said casing whereby steam may be produced, said casing having openings therein, and gauze wire coverings for said openings to shut the gases of the well
75 from said steam producing means.

7. In a device for cleaning oil wells, a tubular casing 10 having closures 11 and 14, hollow metal billets 18 in the lower part of said casing, a reservoir 22 supported in the
80 upper part of said casing, an intake pipe 23 for said reservoir having a valve 24 to control the same, a vent pipe 25 for said reservoir having a valve 26 to control the same, a tubular projection 27 in the lower end of said
85 reservoir, a second tubular projection 29 screwed over the end of said projection 27, a soft sheet metal disk 28 held over the end of tube 27 by tube 29, a third tubular extension 31 screwed over the end of tubular extension
90 29 and having openings 35 therein, a spring bolt 36 supported in said tubular extension 31 having a grooved point 33 at its upper end, a rod 16 extending up through said casing and hollow billets to actuate said perforating bolt, substantially as and for the purpose specified. 95

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANK A. MONROE.
BURTON W. SEYMOUR.

Witnesses:

A. L. FURLOW,
S. A. BALDWIN.