

Oct. 11, 1927.

B. SCHWEIGER

1,644,748

APPARATUS FOR RAISING OIL FROM WELLS

Filed Dec. 15, 1926

2 Sheets-Sheet 1

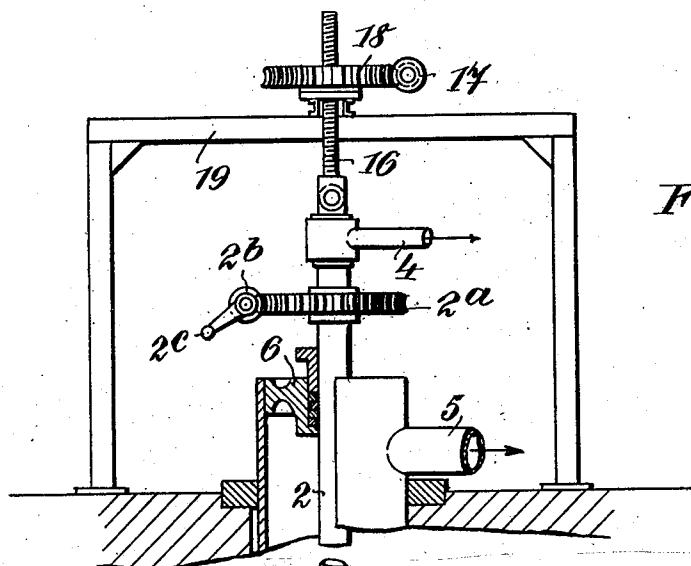


Fig. 1.

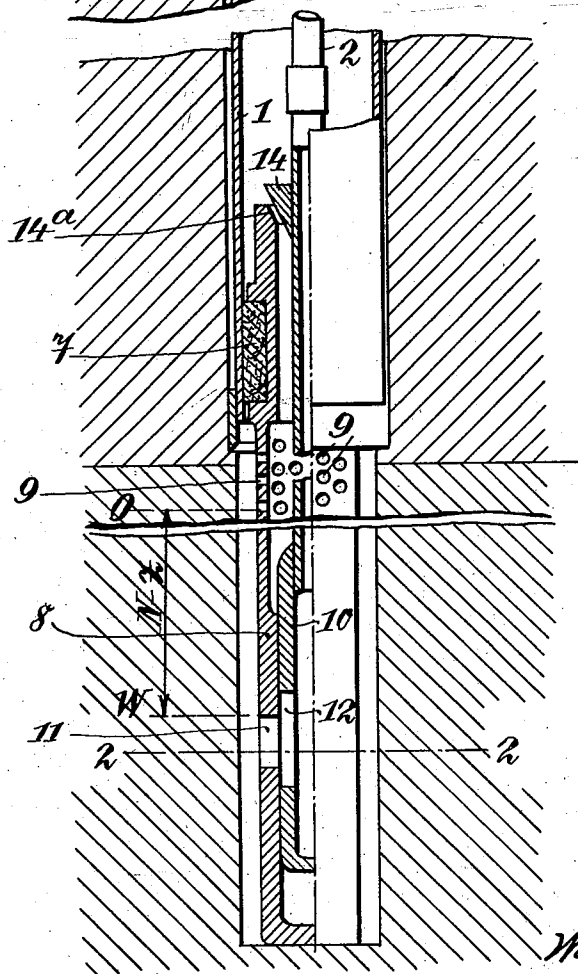
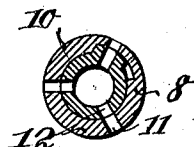


Fig. 2.



Inventor:
Bruno Schweiger,
by
Watson, Coit, Morse
& Grindle Attorneys.

Oct. 11, 1927.

B. SCHWEIGER

1,644,748

APPARATUS FOR RAISING OIL FROM WELLS

Filed Dec. 15, 1926

2 Sheets-Sheet 2

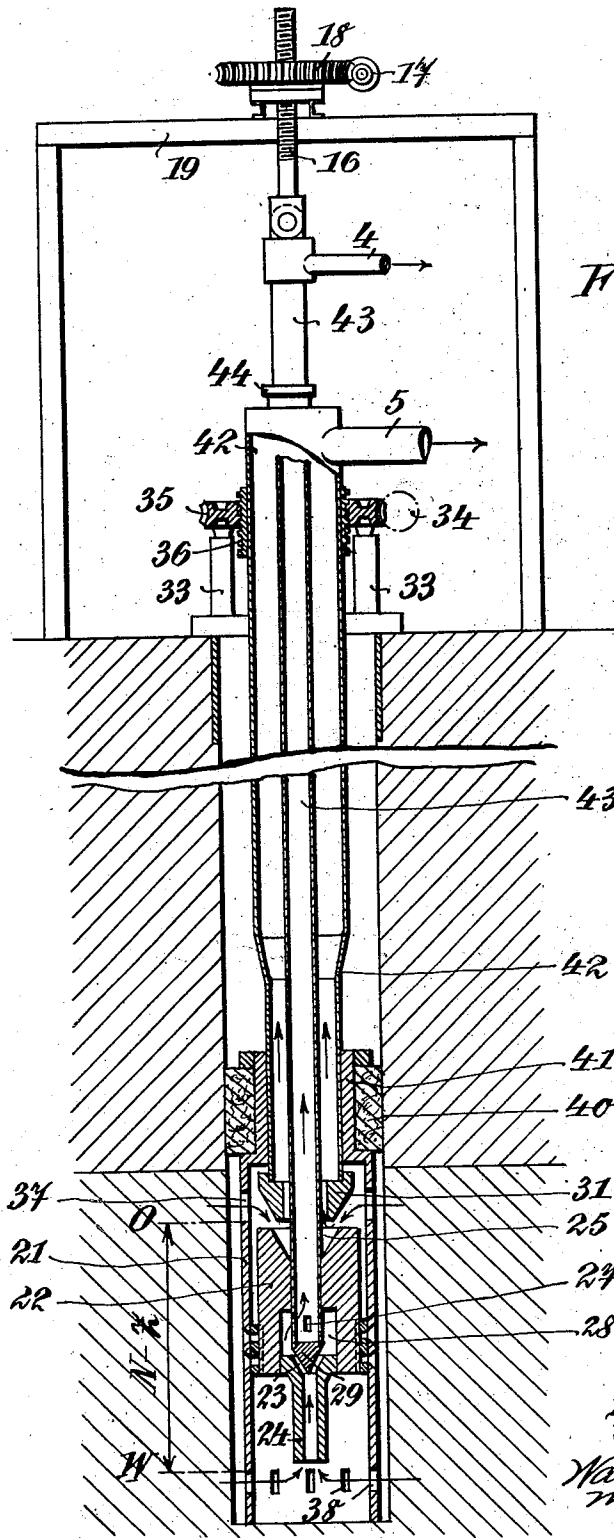


Fig. 3.

Inventor:
Bruno Schweiger.
by
Watson, Critt-
more & Grindle,
Attorney.

Patented Oct. 11, 1927.

1,644,748

UNITED STATES PATENT OFFICE.

BRUNO SCHWEIGER, OF ERKELENZ, GERMANY.

APPARATUS FOR RAISING OIL FROM WELLS.

Application filed December 15, 1926, Serial No. 155,042, and in Germany April 6, 1925.

My invention relates to improvements in apparatus for raising oil from wells, and more particularly in apparatus of the type in which concentric pipes are provided for separately raising the oil and the water. The object of the improvements is to provide an apparatus of this type in which intermingling of the oil and water being raised is effectively prevented, and with this object in view my invention consists in providing valves or similar regulating means at the bottom of the pipes which are so located that oil and water flow separately to the pipes designed for raising the same.

For the purpose of explaining the invention two examples embodying the same have been shown in the accompanying drawings, in which the same letters of reference have been used in all the views to indicate corresponding parts. In said drawings,

Fig. 1, is a sectional elevation showing my improved apparatus,

Fig. 2, is a sectional plan view taken on the line 2—2 of Fig. 1, and

Fig. 3, is a sectional elevation similar to the one shown in Fig. 1 and showing a modification.

Referring to the example shown in Figs. 1 and 2, oil is assumed to be located at the level indicated by the line O, while the water is assumed to be at the level of the line W, and oil and water may be under a pressure sufficient to raise the same through the well. The well is lined by means of a tube 1 extending downwardly to the level of the oil. The oil is raised through the said tube, while the water is raised through a pipe 2 located concentrically within the tube 1, a stuffing box 6 being provided at the top end of the tube 1, and the pipe 2 and tube 1 having pipes 4 and 5 connected thereto for delivering respectively water and oil.

Into the bottom part of the tube 1 there extends the top end of a cylinder 8 which is tightened relatively to the tube by means of a packing medium 7, the said cylinder being closed at its bottom end and provided below the bottom end of the tube 1 with holes 9. Further, the said cylinder is provided with slots 11. Within the cylinder 8 there is a tubular plunger 10, which is fixed to the bottom end of the pipe 2, and which is formed with slots 12 corresponding in position to the slots 11 made in the cylinder 8, the construction and operation of the said slots being illustrated in Fig. 2. In the po-

sition of the parts shown in Figs. 1 and 2 the slots 11, 12 are perfectly open to permit the flow of the water through the same and into the plunger 10. However, when rotating the plunger 10 in clockwise direction the slots 11 and 12 are gradually closed, such rotary movement being imparted to the plunger 10 by rotating the pipe 2. Suitable means are provided for rotating the pipe. To show what may be done, a worm gearing 2^a is keyed to the top end of the pipe which worm gearing is engaged by a worm 2^b provided with hand-operated means such as a crank 2^c for rotating the same.

At its top end the cylinder is formed with a conical valve seat 14^a cooperating with a valve cone 14 fixed to the pipe 2, Fig. 1 showing the valve in a median position. By elevating the pipe 2 the valve is opened, and by lowering the same it may be completely closed. Suitable means may be provided for thus elevating and lowering the pipe. To show what may be done the pipe 2 is suspended from a screw-threaded rod 16 having a worm gearing 18 screwing thereon, the said worm gearing being supported on a frame 19 and adapted to be rotated by means of a worm 17. The length of the slots 12 is such that they are adapted to register with the slots 11 in any vertical position of the pipe 2.

The distance N—Z between the lowermost oil-intake hole 9 and the top ends of the slots 11 will be different according to the distribution of the oil and water, and it can in any case be so great that intermingling of oil and water is avoided.

If simultaneously oil and water are raised from the bottom of the well, the pipe 2 is set in the position in which the valve 14, 14^a and the slots 11, 12 are open. If only oil is to be raised, the pipe 2 is rotated so far that the plunger 10 closes the slots 11. In a similar way, by lowering the pipe 2, the valve 14, 14^a may be closed and the slots 11, 12 opened for exclusively raising water from the well. By setting the valves and slots in intermediate positions the amounts of water and oil can be regulated.

In Fig. 3 I have shown a modification in which the tube 1 lining the well is dispensed with. At the bottom of the well there is a cylinder 21 which is tightened relatively to the wall of the well by means of a packing ring 40, and which is formed near its top and bottom with slots 37 and 38. In the

reduced top part 41 of the cylinder 21 the bottom end of a pipe 42 is guided, and concentrically of the said pipe there is a pipe 43, the pipe 42 being designed for raising the oil, while the pipe 43 is designed for raising the water. Within the cylinder 21 there is a tubular body 22, which is formed at its top with a conical valve seat 25 and at its bottom with a cylindrical chamber 28.

10 To the bottom part of the said chamber a pipe 24 is fixed which is provided at its top with a conical valve seat 23. To the bottom end of the pipe 42 a tubular valve cone 31 is fixed which cooperates with the valve seat 25 for opening and closing the top part of the cylinder 21 relatively to the pipe 42. The bottom end of the pipe 43 is guided within the tubular body 22 and it extends into the chamber 28 thereof. It is formed with a conical valve 29 cooperating with the valve seat 23 for closing the bottom part of the cylinder 21 relatively to the chamber 28 and the pipe 43, the said pipe and chamber communicating with each other through slots 27.

At their top ends the pipes 42 and 43 are closed relatively to each other by means of a stuffing box 44. The pipe 43 is suspended in the manner described with reference to the pipe 2 shown in Fig. 1 by means of a screw-threaded rod 16 and a worm gearing 17, 18 adapted to lower and elevate the said pipe. Means for rotating the said pipe are not needed. The pipe 42 is adapted to be shifted in vertical direction by means of a worm gearing 34, 35 supported on a frame 33, the gear wheel 35 screwing on an externally screw-threaded bushing 36 fixed to the pipe 42.

The distribution of the oil and the water at the bottom of the well has been indicated by the dotted lines O and W, and the distance between the bottom part of the slots 37 and the top of the slots 38 has been indicated by the line N—Z.

In the position of the parts shown in Fig. 3 both valves 25, 31 and 23, 29 are open, so that oil is raised by the pressure of the rock bearing thereon through the slots 37, the top part of the cylinder 21, the valve 25, 31 and the pipe 42. Further, water is raised by the pressure bearing thereon through the slots 38, the tubular member 24, the valve 23, 29, the chamber 28, the slots 27 and the pipe 43.

55 By shifting either one of the pipes 42 or 43 or both pipes in vertical direction the flow of water and oil can be regulated in the manner described above.

By means of the apparatus described herein in the flow of oil and water through the well can be entirely shut off. Therefore, the apparatus can be used in wells having exclusively a supply of oil for closing the well at

its bottom. Further, the apparatus can be used in such wells in which pumps are used for raising the oil, or in which the oil, or the oil and water are raised by means of compressed air.

While in describing the invention reference has been made to two particular examples embodying the same I wish it to be understood that my invention is not limited to the constructions shown in the drawings, and that various changes may be made in the general arrangement of the apparatus and the construction of its parts without departing from the invention.

I claim:

1. An apparatus for raising oil from wells, comprising concentric pipes extending downwardly into the well and communicating respectively with the parts of the rock containing oil and water, and means located at the bottom parts of said pipes for selectively closing and opening the same.

2. An apparatus for raising oil from wells, comprising concentric pipes disposed within the well and communicating respectively with the parts of the rock containing oil and water, a cylinder projecting downwardly from the bottom end of the outer pipe and formed with openings respectively at the parts passing through the oil and through the water, a valve cone connected with the inner pipe and adapted to close said cylinder at its top end, and a slotted plunger rotatably mounted within said cylinder and connected to the inner pipe, the slots of said plunger being located in position for opening and closing said lower openings of said cylinder.

3. An apparatus for raising oil from wells comprising concentric pipes extending to the bottom of said well, means to shift one of said pipes, a cylinder extending downwardly from said outer pipe, spaced openings in said cylinder for oil and water respectively, and valves operated by pipe movement for selectively regulating the flow of fluid from said openings through said pipes.

4. An apparatus for raising oil from wells, comprising concentric pipes extending downwardly into the well and communicating respectively with the oil and water strata, the outer of said concentric pipes including spaced openings at the oil and water strata respectively, means to prevent communication between said openings, and valve means located adjacent the lower ends of each of said pipes for selectively opening and closing said pipes to the flow of fluid from said openings.

In testimony whereof I hereunto affix my signature.

B. SCHWEIGER.