

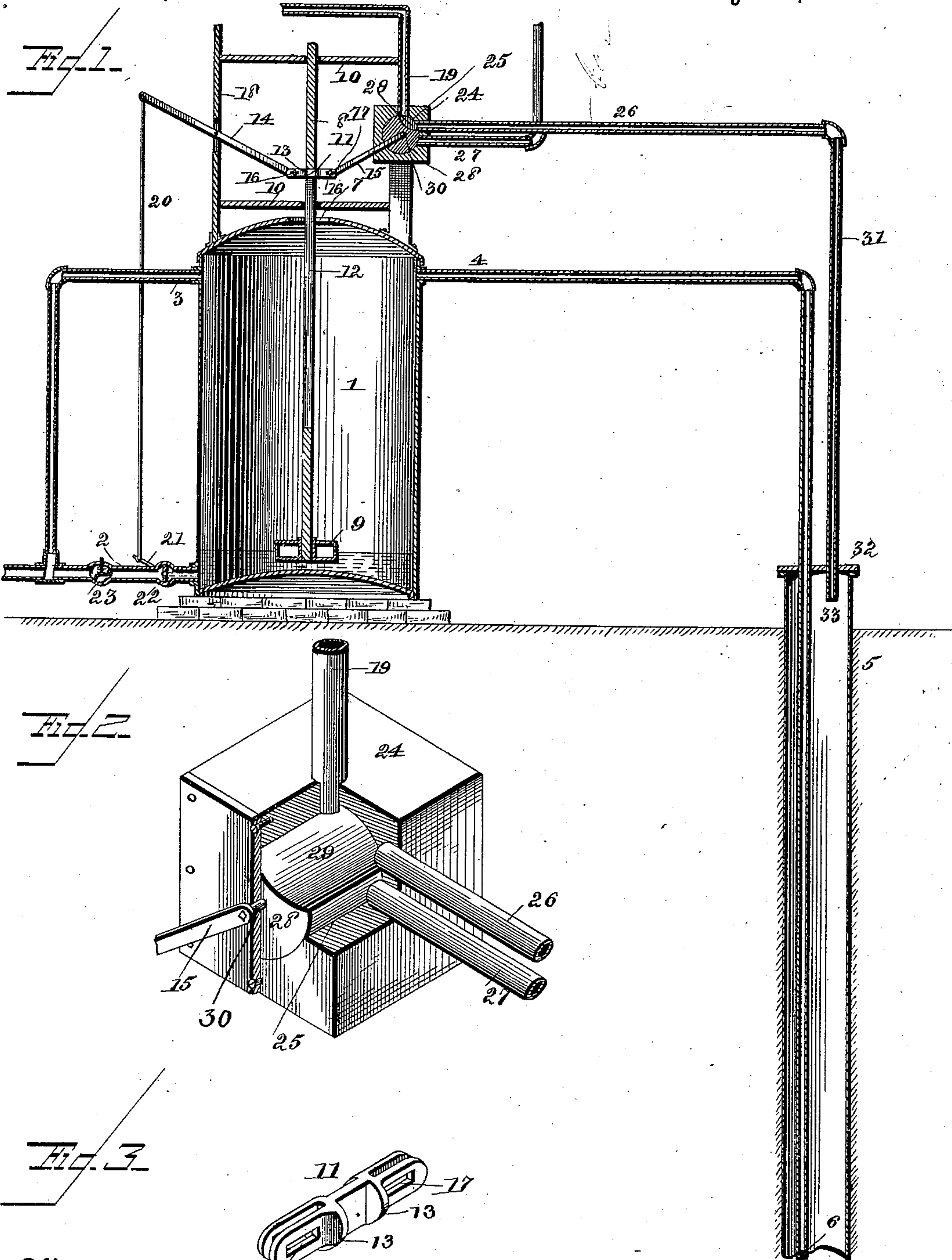
(No Model.)

J. A. BOALS.

DEVICE FOR RAISING OIL FROM OIL WELLS.

No. 364,084.

Patented May 31, 1887.



Witnesses
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UNITED STATES PATENT OFFICE.

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DEVICE FOR RAISING OIL FROM OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 364,084, dated May 31, 1887.

Application filed January 21, 1887. Serial No. 225,030½. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BOALS, a citizen of the United States, and a resident of McDonald, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Raising Oil from Oil-Wells; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a sectional view of my improved device for raising oil from oil-wells, showing the device in operation. Fig. 2 is an enlarged perspective detail view of the distributing-valve, showing portions of the casing broken away; and Fig. 3 is a similar view of the sliding link connecting the valve-operating arms or levers.

Similar numerals of reference indicate corresponding parts in all the figures.

My invention has relation to that class of devices for raising oil from oil-wells in which a fluid medium—such as natural gas or compressed air—is brought to bear upon the surface of the oil in the well, raising the oil through a pipe; and it consists in the improved construction and combination of parts of such a device, in which the oil rising in a tank and arriving at its highest level will cut off the supply of the forcing medium, and in which the emptying of the tank will again cause the supply of the forcing medium to be automatically let on, as hereinafter more fully described and claimed.

In the accompanying drawings, the numeral 1 indicates a tank having an outlet-pipe, 2, extending from its bottom, and having an overflow-pipe, 3, at its top, opening into the outlet-pipe with its lower end, and having an inlet-pipe, 4, entering it at its top, the said inlet-pipe extending down into the well 5, and having an upwardly-opening valve, 6, at its lower end.

The tank is formed with an aperture, 7, in its top, and the longitudinally-slotted stem 8 of a float, 9, projects through this aperture, the stem being guided outside of the tank by

guide-bearings 10. The stem of the float has a link, 11, or cross-head sliding in its slot 12, the said link having shoulders 13 bearing against the edges of the slot, and the ends of two levers or arms, 14 and 15, are pivoted to the bifurcated ends of the link, the ends of the arms or levers having pins 16 sliding in longitudinal slots 17 in the bifurcated ends of the link.

The lever 14 is fulcrumed at its middle upon an upright, 18, supporting one end of the guide-bearings, the other ends of the guide-bearings being supported by an upright supply-pipe, 19, and a rod, 20, is pivoted with its upper end to the outer end of the lever, and has its lower end pivoted to the lever or handle, 21, of a valve, 22, upon the outlet-pipe, the said valve being near to the tank. An outwardly-opening check-valve, 23, is secured in the outlet-pipe between the tank and the joint, at which the overflow-pipe enters the outlet-pipe, and serves to prevent any backflow of the oil into the tank.

A valve-casing, 24, having a cylindrical bore, 25, is supported above the tank, and has the lower end of the upright supply-pipe 19 entering its upper side, and a horizontal force-pipe, 26, and an outlet-pipe, 27, entering its side, the outlet-pipe entering below the force-pipe.

A cylindrical valve, 28, fits and revolves in the valve-casing, and has a portion of its upper side cut away to form a rounded recess, 29, and the lever or arm 15 has its inner end secured to the stem 30 of the valve, turning the valve as it is rocked.

The horizontal force-pipe is formed with a downwardly-bent portion, 31, which portion enters the cover 32, which closes the casing 33 of the well, the supply-pipe and the force-pipe entering the casing and passing through the cover, being secured air-tight in the same.

The forcing medium is preferably natural gas, as this medium is generally found in the neighborhood of oil-wells; but compressed air may also be employed instead of the gas, where the gas is not accessible, and this forcing medium is admitted through the supply-pipe and through the recess in the distributing-valve to the forcing-pipe, through which it passes down

into the well-casing, the valve being in the position shown in the drawings, the float being at the bottom of the tank, and the upper end of the slot in the stem of the float bearing against the link, forcing the levers down and causing them to respectively turn the distributing-valve in position to admit the forcing medium into the forcing-pipe and raise the connecting-rod, turning the outlet-valve in the outlet-pipe, closing the same.

The forcing medium entering the well-casing will force the oil up through the inlet-pipe or raising-pipe, raising the valve at the lower end of the said pipe and forcing the oil into the tank. The float will be raised upon the surface of the oil in the tank, and the stem of the float will slide with its slot upon the link connecting the operating-levers, as the float rises, until the lower end of the slot in the rising stem of the float strikes the link, when the distributing-valve will be tilted so as to bring its recess to gradually cut off the supply of forcing medium, and at the same time bring the forcing-pipe and the outlet-pipe in communication with each other, allowing the forcing medium in the well-casing to escape and make room for the rising oil in the same. The valve upon the outlet-pipe will at the same time be opened by the lever and connecting-rod, so that the oil will flow out of the tank, and when all the oil is out of the tank and the float has fallen to its lowermost position the forcing operation may again take place.

The tank is preferably smaller or of a less capacity than the well-casing, so that the float will shut off the supply of forcing material and open the outlet before all the oil collected in the well-casing has been forced up, the surplus forced into the tank flowing out through the overflow-pipe, and the tank being smaller than the well-casing will insure the prompt working of the distributing-valve and of the outlet-valve, the said valves being gradually closed and opened as the float arrives to the extremes of its stroke.

By this device oil may be raised out of wells in which the pressure of the natural gas in the well is not sufficient to raise the oil, and it will be seen that instead of using the device in an oil-well the forcing-pipe and the raising-pipe or inlet-pipe may be inserted into a tank or receptacle immersed in water in a pond or stream, and having suitable means for letting in the water, compressed air, or even steam, being suitable for the forcing medium.

The float is of a sufficient size to cover the aperture in the top of the tank for the passage of the stem, the upper side of the float fitting against the aperture and covering it when the tank is filled and the oil would otherwise flow out through the aperture, the upper side of the float and the under side of the top of the tank around the aperture having their surfaces prepared to form a tight fit.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a device for raising oil out of oil-wells, the combination of a receiving-tank having an inlet-pipe at the top and an outlet-pipe at the bottom, a casing in the well having its top tightly closed, and having the inlet-pipe for the tank extending to its bottom, a forcing-pipe for conveying a forcing medium into the well-casing, a float in the tank, and suitable connections from the float to a distributing-valve for the forcing medium and to a valve for the outlet-pipe, the said valves being respectively closed and opened, and vice versa, at the uppermost and lowermost extremes of the stroke of the float, as and for the purpose shown and set forth.

2. In a device for raising oil out of oil wells, the combination of a receiving-tank having an inlet-pipe at the top and an outlet-pipe at the bottom, a casing in the well having the top tightly closed, and having the inlet-pipe for the tank extending to its lower end, a forcing-pipe entering the well-casing and supplying a forcing medium, and means for automatically opening and closing the supply of forcing medium and closing and opening the outlet-pipe as the tank is emptied or filled, as and for the purpose shown and set forth.

3. In a device for raising oil out of oil-wells, the combination of a receiving-tank having an inlet-pipe at its top and an outlet-pipe at its bottom, provided with a valve, a casing in the well formed with a closed top, and having the lower end of the inlet-pipe for the tank extending into it to the bottom, a supply-pipe for the forcing medium entering the closed top of the well-casing, a valve, an outlet-pipe, a float having a stem sliding through an aperture in the top of the tank, and suitable means for connecting the stem to the distributing-valve upon the supply-pipe and to the outlet-valve, closing the former and opening the latter at the upstroke, and vice versa at the downstroke, as and for the purpose shown and set forth.

4. In a device for raising oil out of oil-wells, the combination of a receiving-tank having an inlet-pipe at its top and an outlet-pipe at its bottom, provided with an outlet-valve, a casing in the well having its top closed, and having the inlet-pipe for the tank passing through the closed top toward the bottom, a supply-pipe for the forcing medium, a valve, an outlet-pipe, a float having its longitudinally-slotted stem sliding in an aperture in the top of the tank, a link sliding in the slot, a lever or arm pivoted to one end of the link and secured at its other end to the stem of the distributing-valve, and a lever pivoted above the top of the tank, and having its inner end pivoted to the other end of the link, and having a connecting-rod pivoted to its outer end and to the handle of the outlet-valve, as and for the purpose shown and set forth.

5. In a device for raising oil out of oil-wells, the combination of a receiving-tank having an inlet-pipe at its upper end and an overflow-pipe at the upper end, and having an outlet-

pipe at the bottom, provided with an outlet-valve and with an outwardly-opening check-valve, and having the overflow-pipe entering it outside of the check-valve, a casing in the
5 well having its top closed, and having the inlet-pipe for the tank extending through the top toward the bottom and provided with an upwardly-opening valve, a valve-casing having a supply-pipe entering its upper side, and
10 having a force-pipe extending from the side down into the well-casing, an outlet-pipe, a cylindrical valve within the valve-casing, and having a recess in its upper side registering with the openings of the pipes, a float having
15 a longitudinally-slotted stem sliding through an aperture in the top of the tank and in suitable vertical guides, a link in the slot having

shoulders fitting against the edges of the slot, a lever pivoted with a pin sliding in slots to one end of the link and secured at the other 20 end to the stem of the cylindrical valve, a lever fulcrumed above the top of the tank, and having its inner end pivoted with a pin sliding in the end of the link, and a connecting-rod pivoted to the outer end of the lever and 25 to the handle of the outlet-valve, as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

JAMES A. BOALS.

Witnesses:

WILLIAM WRIGHT,
WILLIAM HERRON.