(No Model.) 2 Sheets—Sheet 1.

W. W. VAUGHN & G. VINCENT.

Hydraulic Boring Apparatus for Oil and Other Wells.

No. 243,015. **Patented June 14, 1881.**

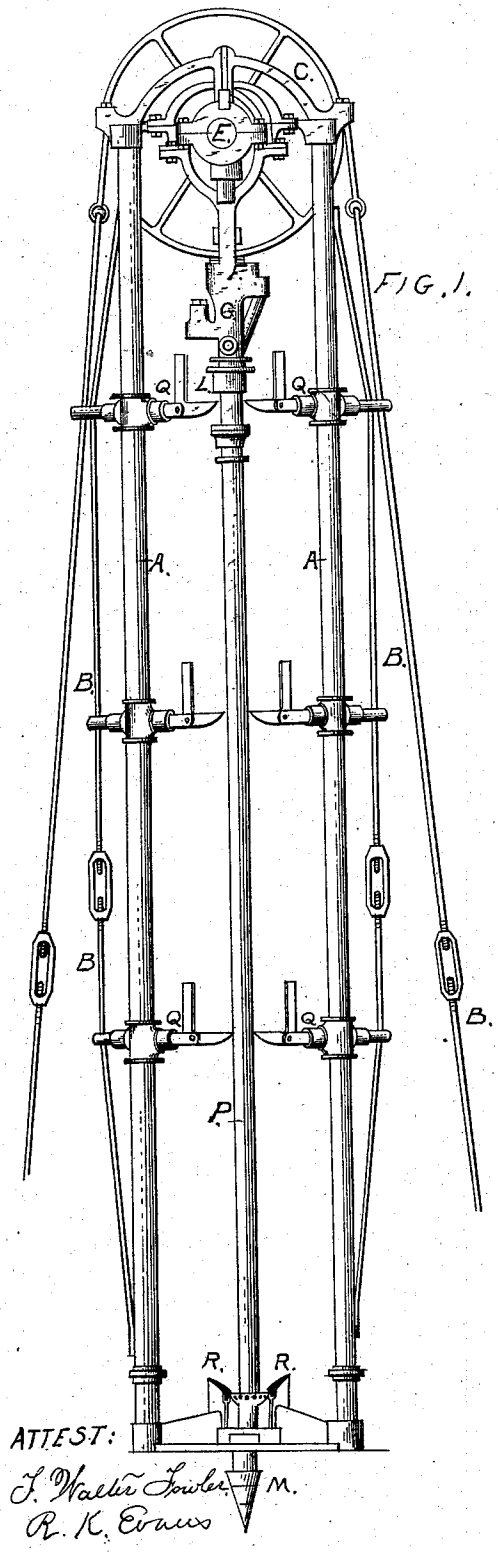


FIG. 1.

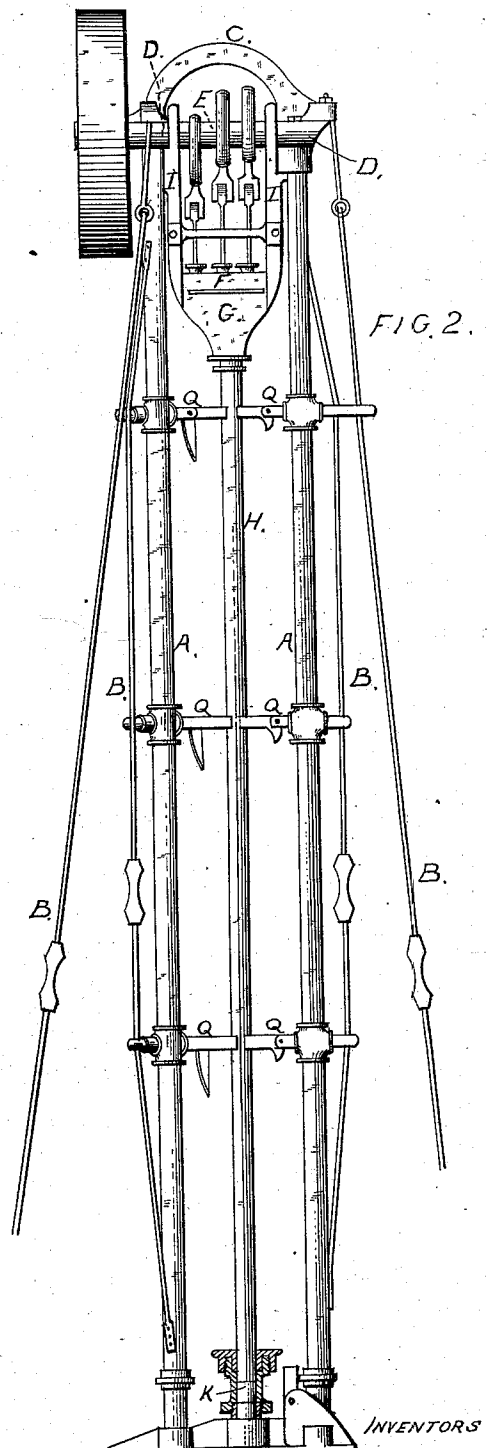


FIG. 2.

ATTEST:

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(No Model.) 2 Sheets—Sheet 2.

W. W. VAUGHN & G. VINCENT.

Hydraulic Boring Apparatus for Oil and Other Wells.

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Fig. 3.

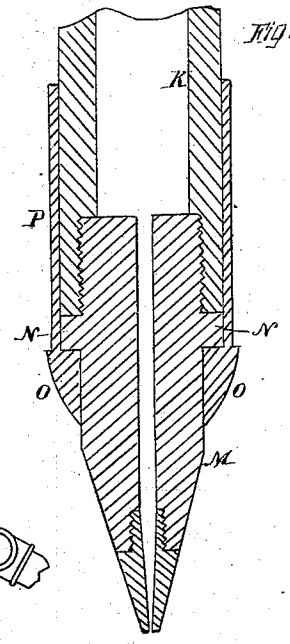


Fig. 6

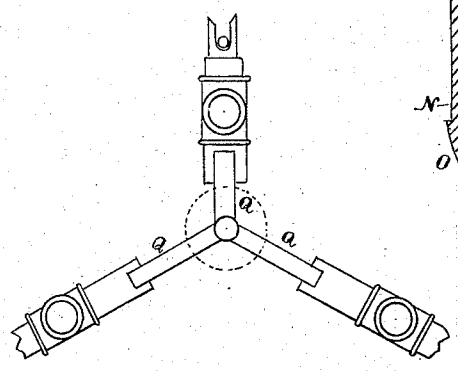


Fig. 5.

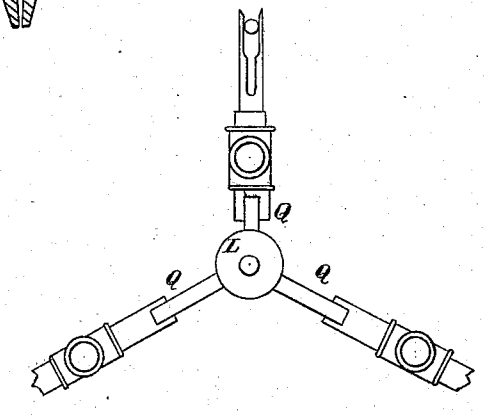


Fig. 4

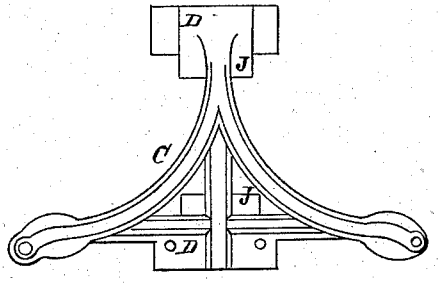
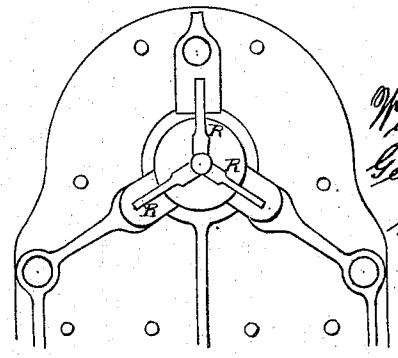


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

WALTER W. VAUGHN, OF STOCKTON, AND GEORGE VINCENT, OF SAN FRANCISCO, ASSIGNORS OF ONE-HALF TO ASA CLARK, OF STOCKTON, AND CALEB DORSEY, OF OAKDALE, CALIFORNIA.

HYDRAULIC BORING APPARATUS FOR OIL AND OTHER WELLS.

SPECIFICATION forming part of Letters Patent No. 243,015, dated June 14, 1881.

Application filed October 26, 1880. (No model.)

To all whom it may concern:

Be it known that we, WALTER W. VAUGHN, of Stockton, county of San Joaquin, and GEORGE VINCENT, of the city and county of San Francisco, both of the State of California, have invented a Hydraulic Boring Apparatus for Oil and other Wells; and we hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to a hydraulic boring or sinking apparatus, the principle of which is to employ the pressure of water upon the bottom of the pipe to force it into the ground, so that we are enabled to sink the pipes or casing of Artesian wells by means of a power applied to the bottom of a pipe instead of the top.

It consists of an upright frame-work of posts or pillars supporting the shaft and fly-wheel operating a series of force-pumps, whereby the pressure of water is obtained. An upright stationary hollow pipe, supported by steadying-dogs fastened to the pillars, is fastened to the nozzle of the pump-pressure chamber and extends to the ground. Fitting around this hollow pipe is a hydraulic pipe, to the upper end of which a stuffing-box and collar is screwed, while to the lower end is screwed a solid metal point having a steel tip to penetrate the earth. The upper end of this point presents a resisting-surface to the water which is forced down through the central stationary pipe. Around this hydraulic pipe fits another pipe or outside casing, the top of which fits under the collar of the stuffing-box, and is pressed down by it. This outside casing or pipe extends about half-way down the point, and has a flange or collar, on which a corresponding projection on the point rests. The supporting frame-work or pillars are braced and strengthened by truss-braces and anchor-rods, and appropriate pawls support the pipe when hoisting. Both the hydraulic pipe and the outside-casing pipe are forced down outside the stationary pipe and are forced into the ground their entire length, after which another length of each may be screwed on and forced down, and when the well or hole is of the required depth the hydraulic pipe, with its point, is hoisted out, leaving the outside casing in the ground. All this will hereinafter more fully and particularly appear, reference being now had to the accompanying drawings, in which—

Figure 1 is a side view of our apparatus. Fig. 2 is a front view. Fig. 3 is an enlarged view of the lower end of the driving pipe and casing and the point. Fig. 4 is a plan view of the top of the frame and the journal-boxes. Figs. 5 and 6 are plan views of the pipe-guides. Fig. 7 is a view of the bottom pipe-clutches.

A A are the pillars or posts forming a tripod or support for the pumps and pipe-driving apparatus. These posts form a frame which is properly stayed and braced by rods B, which serve to secure the frame and hold it down where pressure is brought upon the apparatus. At the top of the posts is a frame, C, which is secured to them and carries the journal-boxes D, within which the crank or eccentric shaft E of the pumps is journaled.

The pumps F may be three or more in number, and of any ordinary or suitable pattern for forcing water. They all discharge into a common receiving-chamber, G, from the lower part of which the pipe H leads downward. The pump-frame I extends upward from the receiver at each side to the shaft-journal boxes, and it is provided with caps which fit over the flanges J of the journal-boxes, and thus resist the upward thrust of the pumps and relieve the strain upon the shaft. This method of supporting the pump-frame also allows it, with the pipe H, to be swung outward, so that the exterior pipes and casing may be slipped over it when new ones are to be added. The pumps are supported at a considerable height from the surface of the ground, this height being sufficient to allow pipes of the length which are to be used to stand between the surface of the ground and the pumps, as shown.

The inner pipe, H, is permanently secured to the lower part of the pump-chamber G, and is surrounded by the driving-pipe K, which is provided with a stuffing-box, L, so that this pipe may be forced down to the bottom of the pipe H and at the same time maintain a close joint at L.

The pipe K has a solid point, M, which is screwed or otherwise secured to the pipe, and so formed as to enter the ground with the greatest ease. This point has a projecting flange, N, around it, which receives a ring or flange, O, formed on the lower end of the casing or permanent well-tube P, and when the pipe K is forced down it will also carry the casing-tube with it. The flange O also projects outwardly a little beyond the casing-tube, so that when forced down it will make an opening slightly larger than the tube, and thus insure its moving down easily and with but little friction.

The operation will then be as follows: The pipe K and the casing-tube P surrounding it are slipped over the pipe H, this being turned or swung outward, as before described, sufficiently for the purpose. When in place the pipes will stand vertically, the inner permanent pipe, H, reaching nearly or quite to the ground, the driving-pipe K surrounding it and fitting closely at the top by means of the stuffing-box L, while the tube P, which will form the permanent casing of the well, incloses the whole, and is connected with the driving-tube K by the flanges N and O, as before described, while the stuffing-box rests upon the top of the casing. The point M rests upon the ground, ready to be forced into it. The pumps are then started, and water will flow from the chamber G down the pipe H, filling it and the pipe K below the pipe H. The pressure of the water will then be exerted upon the upper flat part or head of the point M, and will force it, with the tubes K and P, into the ground until the stuffing-box has reached a point near the bottom of the tube H. It may then be unscrewed from the tube K and slipped up to the top of the tube H again. Another length of pipe and casing may be slipped over the pipe H and connected with those already in the ground. The stuffing-box is screwed upon the new section K, and its exterior flange will rest upon the top of the casing, when the whole will be ready for the pumps to be started and pressure again applied.

By this construction and apparatus we are enabled to apply the pressure for driving the well to the very bottom of the tube to be driven, instead of forcing it down by a pressure upon the top, which is liable to crush or break the pipe. The pressure which may be exerted by our method is only limited by the strength of the materials and the ability of the pipe to resist the bursting-pressure.

The tip of the boring-point should generally be made of steel, and it may be found useful in some cases to make a small central hole through the point M, as shown. This hole serves to convey a small quantity of water to the extreme point, where it will be allowed to escape, and it will soften the ground so as to both direct the point and render its progress easier, as the hydraulic pressure will be so great that it will cause this small stream to enter the ground in advance of the point. It also serves to lubricate and soften any dry and hard soil in the line of the pipe. This opening also serves to show when the pipe has reached any considerable body of water, in the following manner:

A pressure indicator is connected with the pump-chamber or the upper part of the conducting-pipe, and whenever the point reaches any place where there is water the pressure-indicator will show a change at once. A cock or faucet is also connected with the pipe, and when the indicator shows this change the pumps may be stopped and the cock opened. If the pipe has reached a flowing stream it will be indicated by a slight overflow through the faucet after the surplus from the pumps has escaped, and this will show that the sinking may cease, or a further test be made to determine whether it shall be done or not.

After the well has been driven to the proper depth the pipe K and the point M may be withdrawn, leaving the casing in the well, and this withdrawal is rendered practicable by the construction of the flanges N and O, as before described.

Q are guiding-arms, which are hinged to the posts A, and are formed like bell-crank levers. Before the pipe H begins to move down these arms stand with the guiding portion vertical, while a short arm projects toward the pipe. As the latter moves down the projecting stuffing-box strikes the projecting arm and causes it to tilt, so that the guiding-arms will be brought to a horizontal position standing radially to the pipe, which is thus steadied and kept in line. A similar set of arms, R, at the bottom of the frame may be turned so as to clasp the pipe K between their ends, and while they allow the pipe to be raised they will clutch it if it attempts to descend. These clutches are used when the pipe K is being raised, after the outer casing has been sunk as far as desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The improvement in driving wells, consisting in applying the pressure of a column of water to the bottom of the pipe or tube to be driven, by means of a mechanism substantially as herein described.

2. The vertical tube H, receiving water under pressure from pumps F or other source of supply, in combination with the pipe K surrounding the pipe H, and having a movable water-tight joint, L, at the top, and the point M at the bottom, said point being adapted to receive the pressure of water upon its interior head, so that the tube K will be forced down by pressure upon its bottom, substantially as herein described.

3. The supply-pipe H, receiving water under pressure at its upper end and discharging it into the surrounding pipe K, which is provided with the point M, in combination with the ex-

terior casing P, so connected with the point that it will be carried down with the point M and pipe K, substantially as herein described.

4. The point M, secured to the driving-tube K, and provided with the exterior flange, N, in combination with the corresponding flange O, formed with or attached to the casing and engaging with the flange N, so that the casing may be carried down with the driving-pipe, and the latter detached from the casing and drawn up after the proper depth has been attained, substantially as herein described.

5. The forcing-pumps F, with their receiving-chamber G, supported by the pump-frame I, the caps of which fit over the journal-box flanges J, so as to relieve the crank or eccentric shaft of strain and allow the pumps to be turned about it as an axis, substantially as herein described.

6. The bell-crank-lever arms Q, pivoted to the supporting-frame, and constructed so as to be turned by the movement of the pipe, to steady and guide it, substantially as herein described.

7. The pipes K, adapted to be forced into the ground by the pressure of a column of water, as shown, in combination with the point M, having a central hole or perforation, substantially as and for the purpose herein described.

In witness whereof we have hereunto set our hands.

WALTER W. VAUGHN.
GEO. VINCENT.

Witnesses:
S. H. NOURSE,
FRANK A. BROOKS.