No. 676,328. Patented June 11, 1901.

M. LATTA.

WELL DRILLING APPARATUS.

(Application filed Nov. 9, 1900.)

(No Model.)

Fig. 1.

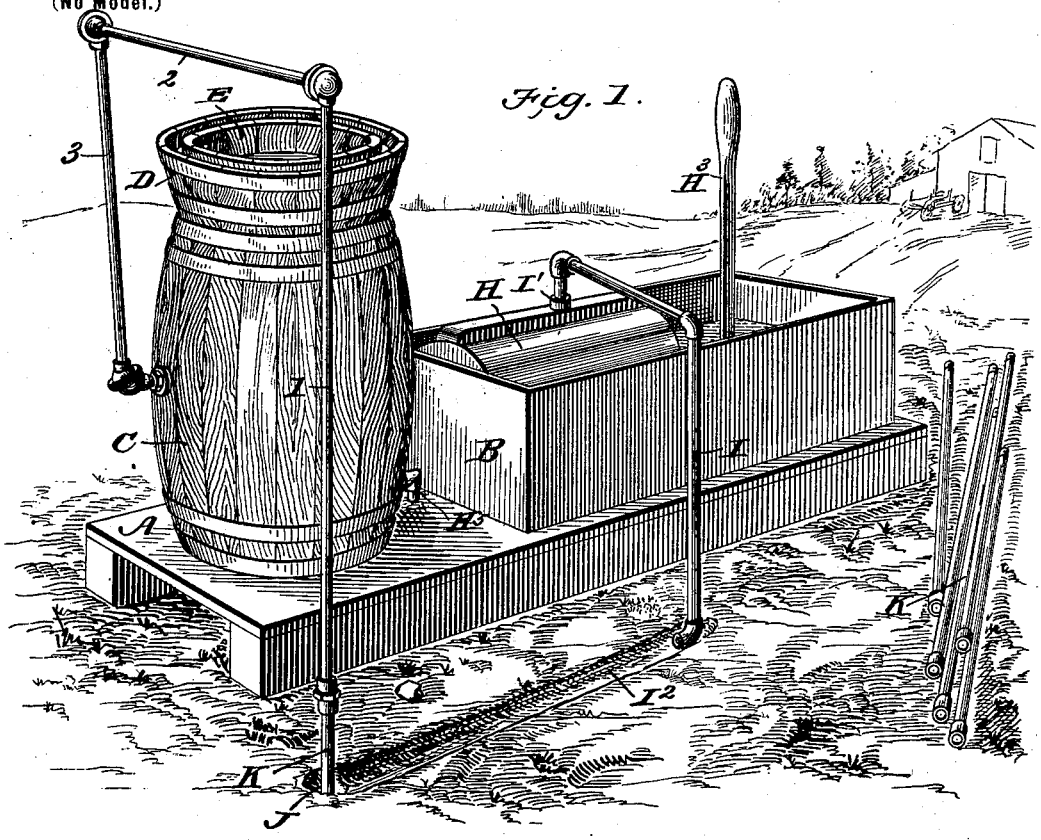
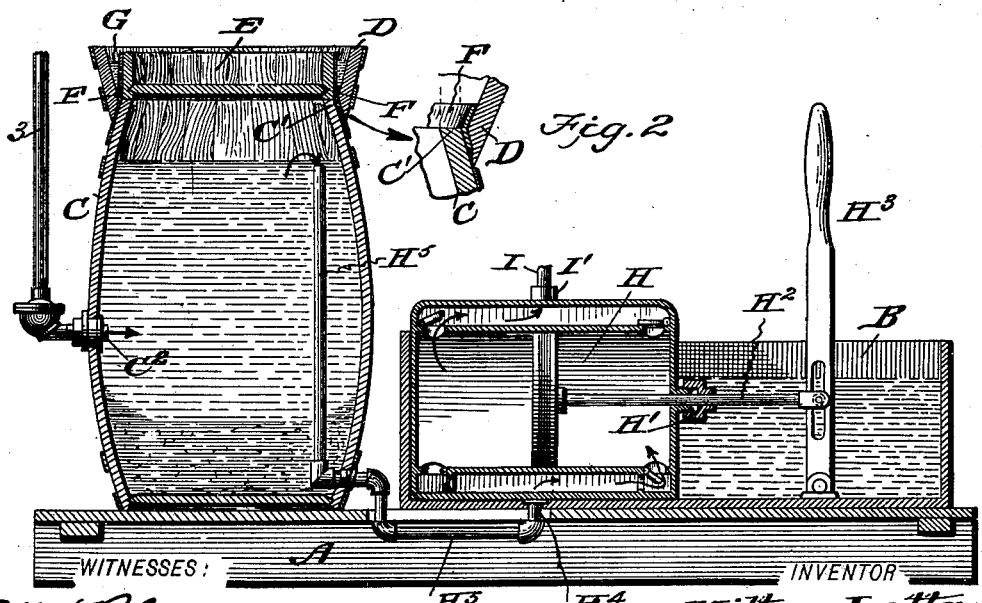


Fig. 2.



WITNESSES:

M. D. Blondell.

Perry B. Turpin.

INVENTOR

Milton Latta.

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

MILTON LATTA, OF BURWELL, NEBRASKA.

WELL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 676,328, dated June 11, 1901.

Application filed November 9, 1900. Serial No. 35,940. (No model.)

To all whom it may concern:

Be it known that I, MILTON LATTA, residing at Burwell, in the county of Garfield and State of Nebraska, have made certain new and useful Improvements in Well-Drilling Apparatus, of which the following is a specification.

My invention is an improvement in apparatus for drilling wells, and has for an object, among others, to provide an apparatus which will be light and easily transported; can be operated by hand, thus avoiding the necessity of horse-power or the like; in the use of which the pump-valve will not be subjected to the action of the mud, dirt, and gravel drawn up through the well-tube; in which the receiving-chamber or settling-chamber is closed by a construction which can be readily removed for the purpose of cleaning it out; in which the current up through the drill-tube will be fast and strong enough to draw up gravel and the like; which can be furnished at a small cost; in the use of which operation can be suspended at any time and for any period and resumed at will; in which all work is performed on the ground surface, and in which the strain or suction is always inward, so that in case of breakage or a leak at any point the mud, water, &c., will not be thrown outward upon the operator.

The invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a perspective view of my invention, and Fig. 2 is a vertical longitudinal section thereof.

My apparatus comprises, as shown, a suitable base A, on which is mounted the pump-box B and the settling-chamber C. The settling-chamber C is shown in the form of a barrel or cask whose upper end is open, and upon and around the open end of the cask I secure an outwardly-flaring rim D, which provides a hopper-like rim to the upper end of the settling-chamber to receive the lid E. At the upper end of the chamber C and within the rim D, I provide a hoop F, which projects at its upper end above the end C′ of the chamber C and flares outwardly to aid in guiding the lid E to its seat upon the upper end C′ of the chamber C. This lid E forms a close joint with the upper end C′ of the chamber, closing such end air-tight, and by preference I supply water at G within the rim D to close the joint in the operation of the apparatus.

The pump H is a double-acting pump, seated in the box B, so the stuffing-box H′ of its piston-rod H^2 may be immersed in operation, as shown in Fig. 2, to avoid any leakage. The pump may be operated by the handle-lever H^3, and it has its inlet at H^4 connected with a pipe H^5, which leads into the chamber C and opens within said chamber at a point preferably near the top thereof, so the clear water at the top of the chamber will be fed to the pump. The tube I, leading from the discharge I′ of the pump, discharges in turn into a ditch I^2, which leads to the well J and delivers the water from the pump to the outside of the well-tube K, as will be understood from Fig. 1. This drill-tube K discharges into the settling-chamber C and is preferably connected with said chamber by means of sections 1, 2, and 3, universally jointed together, the discharge from the drill-tube being into the chamber C at C^2, as shown in Fig. 2. It will be understood that the drill-tube K may be in sections, as shown at the right in Fig. 1, and sections supplied at intervals as the drill-tube sinks into the ground. In operation when the pump is worked it will produce a vacuum or suction within the chamber C, the latter being closed by the lid and water-sealed, and the earth, gravel, &c., loosened at the drill end of the tube K will be drawn forcibly up through the said tube into the chamber C, the mud, gravel, &c., settling to the bottom of the said chamber and the clear water being drawn from the top of the chamber into the pump and then discharged to the ditch I^2, which directs it to the outer side of the drill-tube K, down which it passes to the bottom of the well. When the mud, &c., has accumulated within the chamber C′, the operation can be suspended, the lid E removed, and the chamber cleaned out, when the lid may be replaced and the operation proceed as before. It may be necessary in some instances in starting to supply water to the chamber C.

I have found in practice that with one man operating the handle-lever H^3 a well can be readily sunk to, say, a depth of three hundred feet, cutting its way with facility through

any formation that may be encountered. It should be noticed that the mud, gravel, and the like do not pass to or through the pump, the valves of the latter being thus free of any obstruction or injury from such cause, so they can operate properly at all times and will not be rapidly worn. By arranging the pump-box and chamber C on the same platform and fixing them thereto the apparatus can be readily handled and transported and is always ready for use.

It will be understood that the current downward outside the drill-tube is slow, thus avoiding injury to the walls of the well, while the upward current within the drill-tube is rapid and operates efficiently to elevate the stones and other material loosened by the drill at the bottom of the tube.

In operation from time to time the drill-tube can be oscillated or turned by a pair of tongs or otherwise, as is usual in the operation of drilling wells.

In the operation of my invention it will be noticed that the current of water outside the well-pipe is continuous in its motion, secured in a simple way, and the upward current within the well-pipe is also continuous because of the double action of the pump and the suction produced thereby within the settling-chamber, which operation is aided by the construction and arrangement described, whereby the earth-cuttings, gravel, &c., never get to the pump, and therefore do not interfere with the proper performance of the functions of said pump in the operation of the pump. I thus secure a continuous even current which operates to carry up the water, cuttings, and the like and discharge the same within the settling-chamber.

In the operation of the invention the water is maintained in the well-hole at the level of the ground and the water has the corresponding level within the tube. Gravel and the like is but slightly heavier than water, and when the current is started by the pump the difference in weight between the water and the gravel will be overcome by the rapidity of the current and the gravel will yield to the current and rise in the well-tube, to be discharged into the settling-chamber. It will be understood that the water is just as heavy outside the well-tube as within it. Of course in operation water may be supplied from time to time to compensate for the slight absorption of the water by the ground. It is also to be considered that the construction of the settling-chamber with a conveniently-removable lid and the provision of means for water-sealing such lid are important features in connection with the pump, producing a suction in said chamber and the tube discharging into such chamber, as it facilitates the removal of the deposit in the said chamber.

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

1. A well-boring apparatus comprising the drill-tube, the pump the discharge from which is directed to the outer side of the drill-tube, a closed settling-chamber into which the drill-tube discharges, and the inlet-tube to the pump, said inlet-tube opening into the settling-chamber above the bottom of the latter and such chamber forming a closed connection between the drill-tube and the pump whereby the latter will produce suction within the chamber to draw material up through the drill-tube substantially as set forth.

2. The combination of the closed settling-chamber, the drill-tube, the jointed tube-sections connecting the drill-tube with the settling-chamber, the pump, and the feed connection between the pump and closed settling-chamber, such connection opening into the settling-chamber above the bottom thereof substantially as set forth.

3. A well-boring apparatus consisting of the drill-tube, the closed settling-chamber into which the drill-tube discharges, the pump-feed tube communicating with the settling-chamber above the bottom of the latter, and the double-acting pump whereby a constant suction is exerted in the settling-chamber to maintain a continuous upward circulation in the drill-tube, substantially as set forth.

4. An apparatus substantially as described comprising the settling-chamber, the pump connected therewith and having a piston-rod and stuffing-box for same, means whereby such stuffing-box can be submerged, the feed connection between said pump and settling-chamber, the drill-tube, and means whereby the drill-tube discharges into the settling-chamber substantially as set forth.

5. A well-drilling apparatus comprising a closed settling-chamber, a double-acting pump whereby a constant suction may be exerted within said chamber, and a drill-tube arranged to discharge into the closed settling-chamber, the pump being arranged to discharge to the well outside the drill-tube, all substantially as described, whereby the stone dirt and the like from the drill can be sucked into the settling-chamber by the action of the pump and the latter can supply water to the well outside the drill-tube substantially as set forth.

MILTON LATTA.

Witnesses:
SOLON C. KEMON,
PERRY B. TURPIN.