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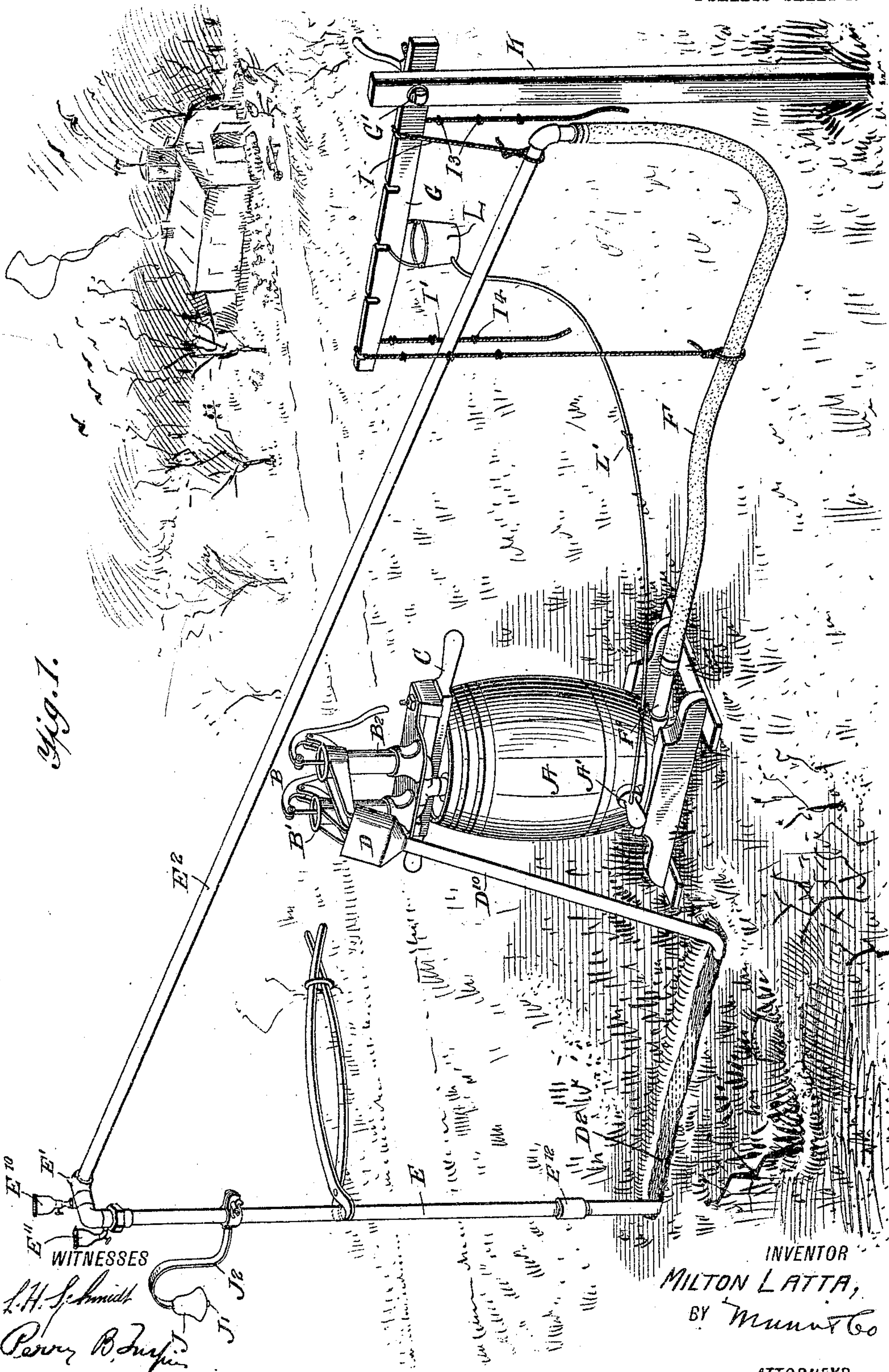
255-24

955,813.

M. LATTA.  
WELL DIGGING APPARATUS.  
APPLICATION FILED DEC. 28, 1908.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 1.



rotation of  
pipe E causes  
to  
believe when  
certain form  
is reached

5001

X 2242

X 2233

Fig. 1.

WITNESSES  
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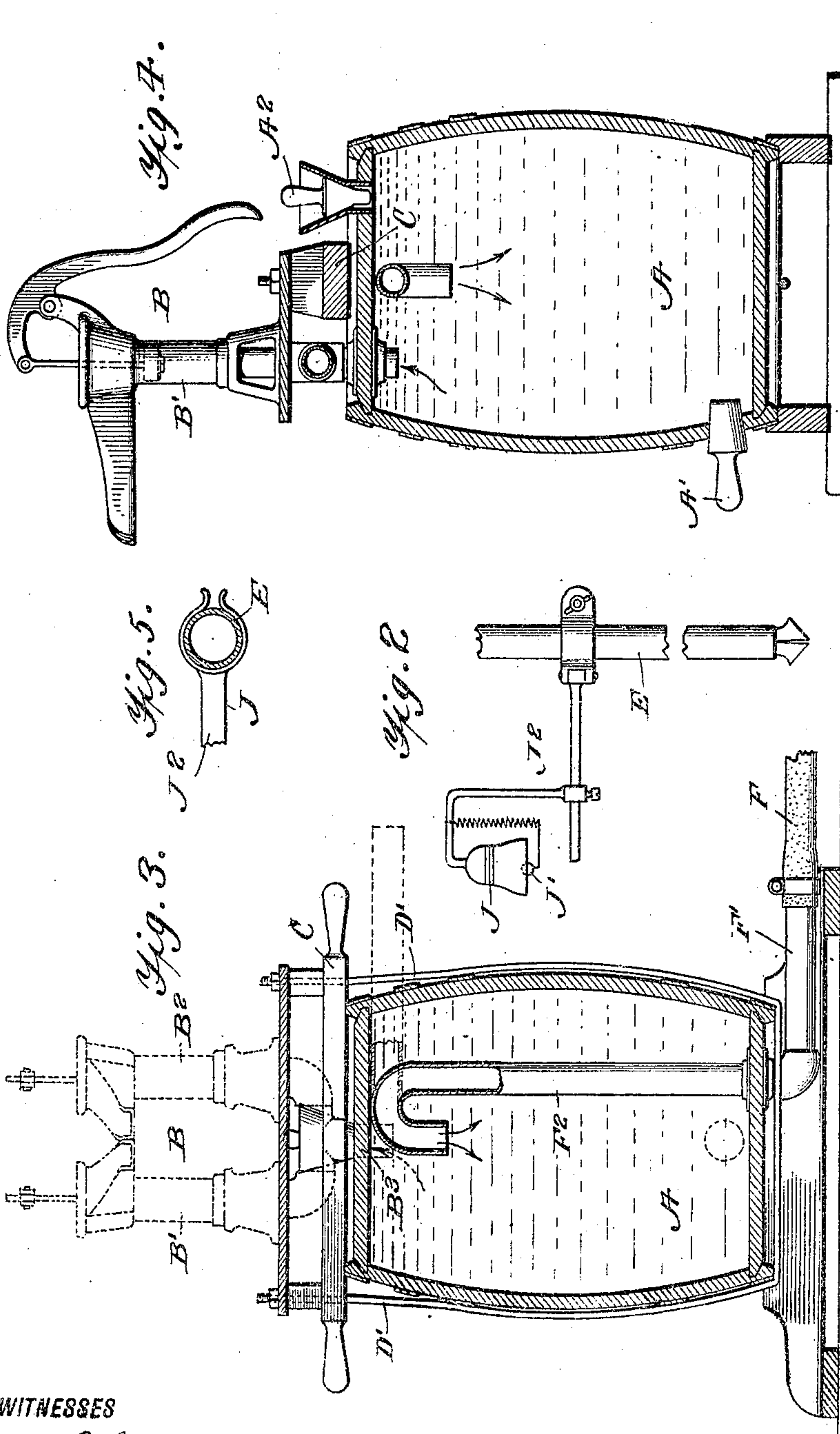


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2 SHEETS—SHEET 2.



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## UNITED STATES PATENT OFFICE.

MILTON LATTA, OF VALENTINE, NEBRASKA.

## WELL-DIGGING APPARATUS.

955,813.

Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed December 28, 1908. Serial No. 469,673.

*To all whom it may concern:*

Be it known that I, MILTON LATTA, a citizen of the United States, and a resident of Valentine, in the county of Cherry, in the State of Nebraska, have made certain new and useful Improvements in Well-Digging Apparatus, of which the following is a specification.

This invention is an improvement in well digging apparatus and especially in that character of such apparatus represented by my former Patent No. 676,328, issued June 11, 1901, and the invention consists in certain novel constructions and combinations of parts as will be hereinafter described and claimed.

In the drawing—Figure 1 is a perspective view of my apparatus as in use. Fig. 2 is a detail view illustrating the bell connection with the suction pipe. Fig. 3 is a vertical section illustrating the means for securing the pumps and handle in connection with the settling chamber. Fig. 4 is a vertical section at a right angle to Fig. 3, and Fig. 5 is a detail view illustrating a clamp construction for securing the alarm bell in place.

By my invention I provide a settling chamber A, pumping mechanism B, by which to exert a constant suction in the settling chamber and a suction pipe discharging to the settling chamber, and to this extent in a broad way the present invention is similar to the apparatus shown and claimed in my former patent before referred to, but in my present invention I provide novel features which will be hereinafter described in detail.

In the drawing the settling chamber A has mounted thereon a pair of single acting pumps B' and B<sup>2</sup>, which have a common supply pipe B<sup>3</sup> leading through the top of the settling chamber. The settling chamber is preferably in the form of a keg or barrel, this being a simple, inexpensive strong construction, which can be readily secured at almost any place. In securing the pumping devices I prefer to mount upon the settling chamber a handle bar C and to extend the arms D' of a metallic bail from below the settling chamber up through the handle bar and thence through the base plates of the pumps B', B<sup>2</sup> and secured above the said base plates by suitable nuts. This secures the pumps firmly in place and also provides a handle by which the apparatus may be

conveniently moved from point to point and lifted into and out of a wagon.

The spouts of the pumps B' and B<sup>2</sup> discharge into a funnel D having a pipe D<sup>10</sup> discharging to a trench D<sup>2</sup> which leads to the well hole surrounding the suction pipe E, the blades of which are made sufficiently large to cut a hole somewhat larger than the suction pipe to give plenty of passage room for the water to pass from the trench down around the supply pipe without requiring too much waste force on the pumps to draw the water down, the hole permitting the water to drop by gravity in the operation of the invention.

In the use of the apparatus the pumps are operated by one standing directly between them, and as one handle is pulled up the other is pushed down thus securing a steady outpour of water so the cuttings will be brought up and into the chamber A by a continuous pumping operation whereas with one pump the water will start and stop and the operation would not be continuous, and the current would not be maintained in an unbroken flow up the pipe and into the chamber A.

Near the bottom of the chamber A I provide a discharge opening closed by a plug A' which may be removed to permit the discharge of mud and other settling in the chamber, and in the top of the chamber I provide an opening closed by a bung or plug A<sup>2</sup>, which may be removed and a funnel applied for the introduction of fresh water to the settling chamber to wash the sediment out through the discharge opening near its bottom when desired.

In the operation of the described construction it will be noticed that the pumps, while single acting, are designed to be operated alternately in such manner as to produce a constant suction of the settling chamber and the pumps being mounted upon the settling chamber are arranged for operation in a vertical direction by an operator standing in such a position as to enable him to secure the maximum force upon the pump handles in the easiest manner possible. This vertical arrangement of the pump cylinders is also advantageous as compared to the horizontal arrangement shown in my patent before described, as in practice the water from the suction pump will contain at best a small quantity of gritty material, which, when a horizontal pump cylinder is used,



will settle to the bottom thereof and operate to cut the suction leathers in a short time, while in the use of a perpendicular cylinder the gritty particles will float loosely throughout the water and do not accumulate at any one point.

The suction pipe E may be made in sections suitably jointed together and is lowered into the well hole and sections may be supplied from time to time as desired. To the upper end of the vertical suction pipe I connect by a joint E' one end of a pipe section E<sup>2</sup>, to the other end of which is connected a flexible hose F, which leads thence to the inlet F' of the settling chamber. The pipe section E<sup>2</sup> and the hose F are supported above the ground by a carrier arm G foldably connected at one end at G' to an upright stake K, which may be driven in the ground, the joint G' including a bolt and clamp nut so the carrier arm may be held in position for use as shown in Fig. 1, or the nut may be loosened and the arm folded alongside the upright for convenience in transportation. The arm G is provided with a series of notches and ropes I and I' connecting respectively with the pipe section E<sup>2</sup> and the hose F and are knotted at I<sup>3</sup> and I<sup>4</sup> to interlock with the notched carrier arm in order to hold the parts E<sup>2</sup> and F above the ground and avoid the injury thereto resulting from resting and dragging upon the ground in the operation of the invention.

The joint E' is provided with an oil cup E<sup>10</sup>, in which a stiff greasy oil may be used to lubricate the joint E' and thus render the movement thereof easy and aid in maintaining an air-tight joint at such point, and I also find it advisable to provide an oil cup E<sup>11</sup> in the suction pipe E a short distance below the joint E' to aid in lubricating the said joint and securing an air-tight connection at the joint E' as will be understood from Fig. 1 of the drawing. This suction pipe E may be coupled at E<sup>12</sup> to the pipe sections extending down into the well and these latter pipe sections may be added from time to time as will be readily understood by those skilled in the art.

In order to supply an alarm when water is struck, I support a bell J rigidly in connection with the suction pipe in such manner that the clapper J' of the bell may be operated by the vibration of the suction pipe. I prefer to connect the bell detachably with the suction pipe and this may be effected by a stout spring clamp J<sup>2</sup>, as shown in Fig. 5, or by a bolted construction, as shown in Fig. 2 of the drawing.

In digging wells through some sections of the western portion of this country, it has been found by the applicant in his extended experience as a well digger that at times a sand is struck which the applicant designates,

for the purpose of reference, a hidden sand because its characteristics are not fully appreciated by all well diggers. This sand is a very fine sand which does not have the appearance of being a water bearing sand as it is discharged from the well in digging the same. Because of this fact, this sand is frequently overlooked by well diggers whereas, as a matter of fact, it is a water bearing sand of a fine quality and if when reached the well point were applied, it would, in many cases, give an ample supply of water. On the other hand, if this sand is passed in the operation of digging the well, it always happens that the well must be dug very much deeper in order to secure a supply of water. This so-called hidden sand is found to possess the quality of setting up a vibration in the pipe to such an extent as to impart to the bell a ringing operation, the bell being caused to flutter with steady regularity and uniformity on the operating movement in one direction of the well tube and with a corresponding steady regularity and uniformity on the return movement of the well tube as the tube is oscillated back and forth in the digging operation. It is found by practical experience in the operation of digging wells that the sand referred to will cause the bell to ring in the peculiar manner described and give warning to the digger that a water bearing sand of high quality has been struck so the tube may be removed and the sand point applied in order that the supply of water may be availed of. It is found, also, in practice that the water bearing sands other than that referred to as the hidden sand, will not give the described characteristic regular and uniform flutter to the bell to indicate the discovery of the desired water bearing strata.

From the connection at F' a supply pipe F<sup>2</sup> leads into the settling chamber and upwardly therein and has its upper end returned, discharging the water downwardly at about the center of the settling chamber near its upper end. This returned nozzle or discharge end of the supply pipe starts the water and sediment toward the bottom of the chamber while the current spreads and turns outwardly toward the walls of the chamber and then rises slowly in response to the suction of the pumping devices connected with the upper end of the chamber A as before described.

The bell will ordinarily ring in the usual operation of drilling, the ringing on striking the peculiar sand before described being different and clearly distinguishable from the ordinary ringing of the bell.

In operation it may be necessary, in some instances, in starting, to work the apparatus, to supply water to the chamber C, and it will be understood that from time to time the well tube or suction pipe can be oscillated or



turned by a pair of tongs or suitable devices as is usual in the operation of drilling wells.

As in the operation of the invention covered in my former patent, it will be noticed  
5 that the current of water outside the well pipe is continuous in its motion and is secured in a simple way and the upward current within the well tube is also continuous because of the alternate operation of the  
10 single acting pumps and the suction produced thereby within the settling chamber, the arrangement being such that the earth, cuttings, gravel, etc. will not get to the pumping devices and therefore will not interfere with the proper operation of said devices when arranged as before described, and  
15 in operation water may be supplied from time to time to compensate for the slight absorption of the water by the ground.

It will be understood that the in-take of the chamber A may come in at various points, and I have indicated in dotted lines, Fig. 3, the said pipe coming in from the side of the chamber near the top. In Fig.  
25 1, I show a bucket L suspended from the carrier arm G, and adapted to contain water which may be conducted through a little hose L', to the sand dump hole closed by the plug A', so that when the plug is pulled  
30 out, if the settlings dump slowly the little hose L' may be utilized to discharge a jet of water into the dump hole which will at once loosen the muddy contents, and start them to discharge through the dump hole, the bucket being supported at a sufficient  
35 height to secure the fall necessary to this operation.

I claim—

1. The herein described well boring apparatus consisting of a settling chamber  
40 having a supply pipe leading therein and having a downwardly directed discharge end or nozzle within the said chamber, the chamber having a discharge opening near  
45 its lower end and a closure therefor, a pair of single acting pumps having a common supply pipe leading into the upper end of the settling chamber, and the discharge from said pumps being directed to the outer

side of a drill tube, a suction drill tube, a  
50 pipe section jointed to the said drill tube, an oil cup in connection with the joint between the drill tube and the pipe section, a hose connected with the pipe section and leading thence to the supply pipe of the  
55 settling chamber, a carrier arm, means for suspending the hose and the pipe section from said arm, and an alarm bell connected with the drill tube or suction pipe, substantially as and for the purpose set forth. 60

2. The combination in a well boring apparatus substantially as described, of a drill tube or suction pipe, pumping devices for producing a suction in said pipe, and an alarm bell connected with the pipe and arranged for operation by the vibration thereof under certain circumstances when the tube is turned in the operation of the apparatus, substantially as set forth. 65

3. In a well digging apparatus, a drill tube adapted to be turned in the operation of drilling and a bell carried by said tube and arranged for operation by the vibration of the tube when turned under certain circumstances, substantially as set forth. 70 75

4. The combination in a well boring apparatus, of a settling chamber, a drill tube, connections between the settling chamber and the drill tube, means operating in connection with the settling chamber for producing suction in the drill tube and a bell carried by the drill tube and adapted to be sounded by the vibration of said tube under certain circumstances, substantially as set forth. 80 85

5. The combination in a well digging apparatus, of a settling chamber, a handle bar thereon, a pumping device having a base plate above the said handle bar, and a bail extending upwardly from below the settling chamber and having its arms extended through the handle bar and base plate and secured to the base plate, substantially as set forth. 90

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Witnesses:

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