T. J. LOVEGROVE.

BORER FOR WELLS.

No. 47,599. Patented May 2, 1865.

Fig. 1.

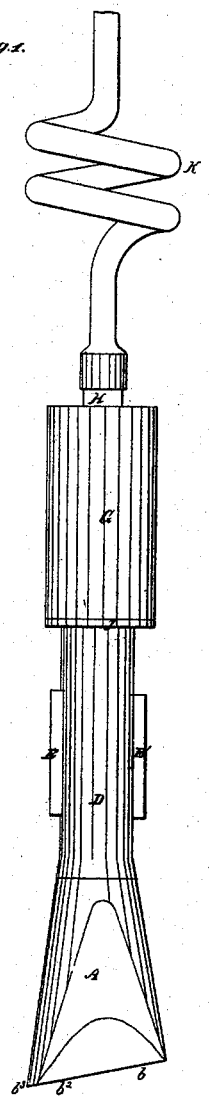


Fig. 2.

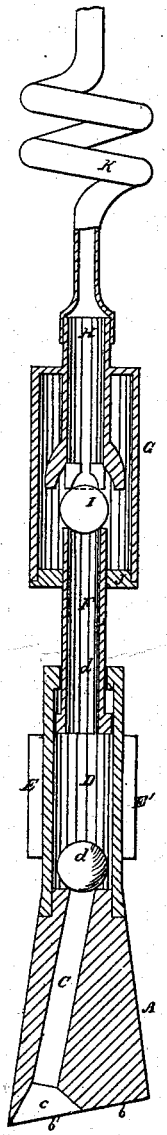


Fig. 3.

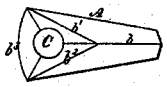


Fig. 4.

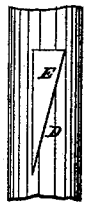
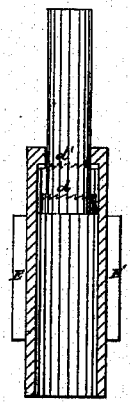


Fig. 5.

Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS J. LOVEGROVE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND HENRY BALDWIN, JR., OF SAME PLACE.

IMPROVED BORER FOR WELLS.

Specification forming part of Letters Patent No. **47,599**, dated May 2, 1865.

To all whom it may concern:

Be it known that I, THOMAS J. LOVEGROVE, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Tools for Boring Artesian Wells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view in elevation of my improved apparatus as it appears at the termination of its downward stroke. Fig. 2 represents a vertical central section through the same as it appears on the upstroke. Fig. 3 represents a view of the face or bottom of the drill. Figs. 4 and 5 represent views of the wings or wedges for rotating the drill; and Fig. 6 a view, partly in section, of the tubular jar.

It is the object of my invention to prevent the jamming or sticking of the drill in the well, to insure the turning of the drill between the strokes, and to facilitate the removal of the contents of the well while boring, to which ends the improvements herein claimed consist: First, in a drill whose edges are slanted from toe to heel at an angle to its line of vibration, whereby the drill, at every stroke, is caused to glance to one side, and thus, in its rotation, cut a hole larger than its diameter; secondly, in providing flanges or wedges on the jar-chamber or on the drill, these flanges being so arranged as to impart a rotary movement to the drill and, at the same time, serve as auxiliary cutting-edges; thirdly, in a tubular "jar," so constructed as to serve as a pump to remove the sand, detritus, &c.; fourthly, in a cylinder containing within itself a chamber which serves the double purpose of an air-space and a detritus-chamber; fifthly, in so combining a tubular jar and sand-pump that the jar shall form the induction-pipe of the pump; sixthly, in combining in an instrument for boring wells a hollow drill and a tubular jar; seventhly, in combining in an instrument for boring wells a hollow drill a tubular jar, a sand-pump, and a flexible and extensible discharge-pipe; eighthly, in combining with a drill flanges to turn it in one direction, and ratchets to prevent it from turning in the other.

In the accompanying drawings, which exemplify one mode of carrying out the objects of my invention, a hollow drill, A, is shown as constructed with its cutting edge or face sloped at an obtuse angle from toe to heel. The sides of the drill are sloped so as to form a chisel-edge, *b*, which extends from one edge nearly but not quite to the center, and is intersected by two similar but diverging cutting-surfaces, $b' b^2$, which are connected by a curved edge, b^3. The space included between the lines $b' b^2 b^3$ is hollowed out so as to form a chamber or recess, *c*, from which a channel, C, leads to the tubular stock D of the drill. The upper end of this channel is closed by a valve, *d*, of any suitable form, to prevent the return of anything which may enter it from below.

Wedges, wings, or flanges E E′ are attached to the sides of the jar-chamber D with their respective edges inclined in opposite directions, so as to impart a rotatory movement to the drill. These wings also serve to cut or shave down the sides of the hole so as to give it a round finish. Instead of being made rectangular, as shown in the drawings, the upper edges of the wings, may be rounded or sloped so as to prevent catching on their upward stroke. To prevent the drill from being turned backward on the upward stroke, a male ratchet, *d*, may be formed on the lower end of the tube F, and a corresponding female ratchet, *d′*, in the top of the jar-chamber D, as shown in Fig 1.

The jars heretofore used in boring wells consist simply of two links, which play within each other, and by their yielding and vibration prevent to some degree the jamming or sticking of the boring tools.

I have devised a jar of much improved construction, consisting of two tubes, one sliding within the other.

In the drawings the jar chamber D of the drill forms a barrel or cylinder, in which the tube or rod F reciprocates as a plunger. This rod projects through the bottom of a cylinder, G, of which it forms the induction-pipe. An eduction-pipe, H, extends through the top of this chamber, and is divided at bottom into branches or points, to serve as guides for a ball-valve, I, which prevents any return through the induction-pipe F. A flexible discharge-pipe, K, conducts the sand, water, or other substances to the surface of the ground or other place of discharge.

Owing to the peculiar construction of my

improved drill its liability to jam or stick is much diminished, and the facility for relieving the drill when jammed or stuck much increased.

In the drawings ball-valves only are shown. It is, however, obvious that valves of other forms may be substituted, and that the other details of construction of my invention may, likewise be modified in many ways without departing from the spirit of my invention.

The operation of my improved apparatus is as follows: The drill is vibrated vertically in the well by any suitable means, being caused to rotate slightly on its axis at each stroke by the action of the inclined wings E E′, and the ratchets *d d′* prevent any backward movement of the drill on the upstroke. As the drill falls the valves *d* and I rise, and any water, sand, or detritus in the well passes up into the jar-chamber D. At the same time the cylinder G and piston F descend, and the contents of the jar chamber D flow into the cylinder G, the lower portion of which forms a sand-chamber, (or space where the heavy detritus may settle,) while the upper portion forms an air-chamber, the pressure of the air contained in which upon the contents of the cylinder G forces the sand and water up through the eduction-pipe H and flexible hose I to the place of discharge. This constant pressure, of course, obviates the necessity of starting the contents of the cylinder at every stroke. On the upward stroke of the drill the valves close and prevent any return through them, while the retraction of the piston F leaves a vacancy in the chamber D to be filled on the next downward stroke.

The above-described operations are, of course, repeated at every reciprocation of the drill.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A drill with two or more cutting-edges, sloped from toe to heel at an angle to its line of vibration, substantially in the manner described, for the purpose of boring a hole of larger diameter than the drill, as set forth.

2. The combination, with the drill, of the inclined wings or flanges E E′, substantially as described, and for the purposes of turning the drill automatically, and of smoothing and rounding the hole, as set forth.

3. A tubular jar so constructed as to serve as a pump for removing the detritus from the well.

4. A cylinder containing a chamber which serves the double purpose of an air-cylinder and a detritus-chamber.

5. The combination of a tubular jar and a sand-pump in such manner that one of the tubes of the jar shall form the induction-pipe of the sand-chamber.

6. The combination, in an instrument for boring wells, of a hollow drill and a tubular jar.

7. The combination of a hollow drill, a tubular jar, a sand-pump, and a flexible hose or discharge-pipe.

8. The combination, with a drill, of flanges E E′ to turn it, and ratchets *d d′* to prevent its backward movement, substantially as described.

In testimony whereof I have hereunto subscribed my name.

THOMAS J. LOVEGROVE.

Witnesses:
WM. B. DAYTON,
H. G. OTIS, Jr.