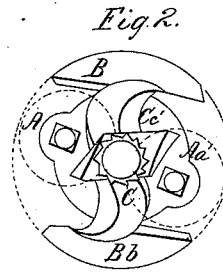
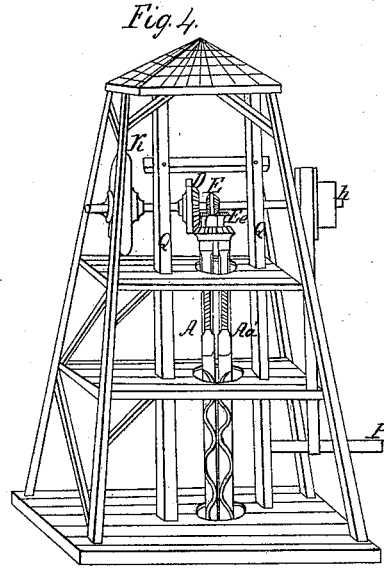
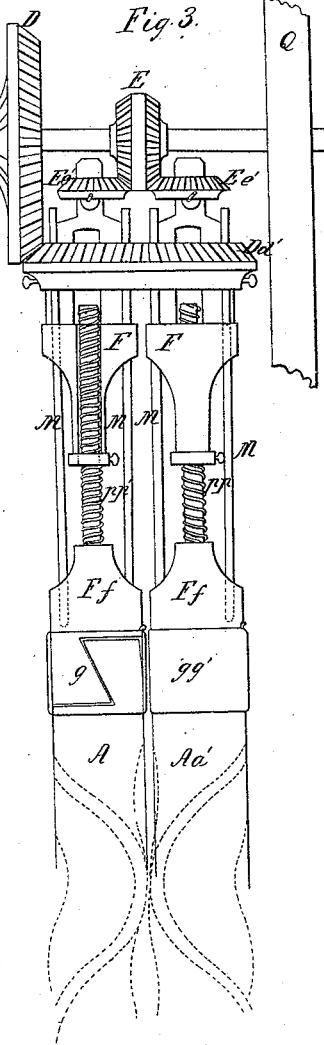
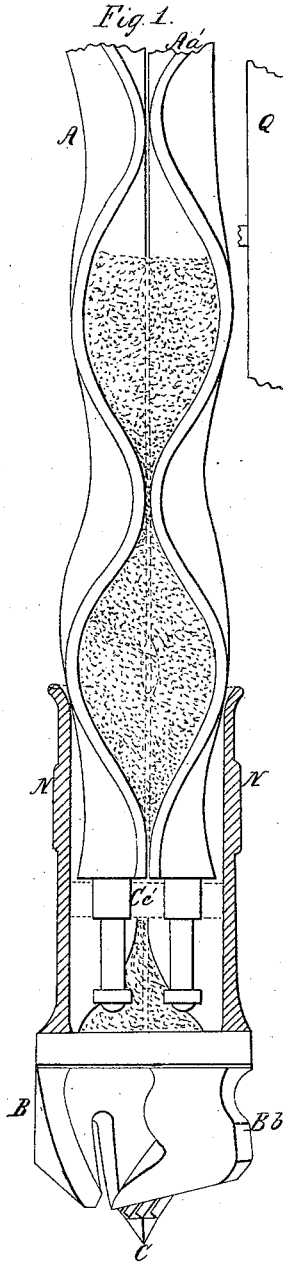


Nitsil & Burke.

Earth Auger.

N^o 46, 517.

Patented Feb. 21, 1865.



Witnesses;
Joseph Burke
J A Dennis.

Inventor;
Geo. L. Witell
and
Edward Purkef

UNITED STATES PATENT OFFICE.

GEORGE L. WITSIL AND EDWARD BURKE, OF PHILADELPHIA, PA.

IMPROVEMENT IN WELL-BORERS.

Specification forming part of Letters Patent No. 46,517, dated February 21, 1865.

To all whom it may concern:

Be it known that we, GEORGE L. WITSIL and EDWARD BURKE, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Machine for Boring Wells; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of our drill and discharging augers. Fig. 2 is a side elevation, in detail, of the mechanism for rotating the drill and also the augers. Fig. 3 is a perspective view showing the mechanism of Fig. 2 mounted in a frame-work, ready for operation.

Similar letters of reference indicate corresponding parts in the three figures.

The object of our invention is to combine with a central upward-discharging rock-drill a contrivance for elevating the fine débris and earth to the top of the well, and thus keeping the drill clear during the operation of boring, as will be hereinafter described.

In Fig. 1, A and A' are two auger-blades, right and left, both revolving at the same time. N is the chamber containing the reamer and cutting-plowshares. C is a conical drill, the lower part of which is four-square. The upper part of the cone is corrugated or ribbed deeply, like the cone of a coffee-grinder. C' is a solid base with two square slots in the same, connected permanently to the inside of the chamber N.

In Fig. 2, B and B' are two plowshare members attached permanently to the base of the chamber N, and forming a part of the same. C is a conical drill, the lower part of which is four-square, the section above a corrugated cone, the top of which connects permanently to the cutters B and B', which connection forms in shape a double ogee. The sides of same have cutters. C' is a solid connection in the chamber N, and has two square slots to receive the lower points of the auger-blades A and A'.

In Fig. 3, Q Q are substantial uprights to support the shaft and mechanical application of power. D is a bevel cog-wheel which acts upon bevel-wheel D'. E is a central double cog-wheel which acts upon wheels E'. E' are two bevel cog-wheels which put the blades A and A' in motion. F and F' are continua-

tions of F f, each having a cavity in the center to receive the rods M and M'. The bottoms of F' and F have a plate with a thread cut in same to receive the worm of the connecting-screw p p. F f are continuations of F, and are also the connecting-sections of the auger-blades A and A'. A and A' are two auger-blades of an elongated twist, one twisted to the right and the other twisted to the left. M are rods working in an aperture in F f and F, and also within the inner circle of the bevel wheel D d'. g shows the shape of the connection with auger-blades, and g' g' the shield or covering-slide over the same, tightened with a small wedge. p p are connecting-screws working in F and F', the thread of which are the reverse of augers A and A'.

In Fig. 4, Q and Q' are solid permanent uprights firmly braced to sustain the mechanical arrangement necessary to put the augers and borer in motion. K is the balance-wheel attached to the shaft. h is the belting-wheel. P is the shaft of the motive power. The other wood parts are the uprights or scaffolding and platforms that we consider convenient for working our machine, which may be used or omitted, as may be desired.

Method of operating our well-borer: The motive shaft P by belting puts in motion the shaft and the double bevel-wheel E, which acts upon and puts in motion the bevel-wheels E' and E', causing them to turn the augers A and A' reverse to each other, one turning right and the other left. The effect of the screws p p is to keep a continued pressure downward on the augers A and A'. Therefore the screws are cut the reverse of the augers to which they are attached. The rods M M' are merely stiffening and guiding rods, the whole of which revolve within the inner rim of the bevel-wheel D d'. The shaft also puts in motion wheel D, which causes the whole attachments, together with the cutters B and B' and all connected with the chamber N at the bottom of the augers to revolve, as they are connected by the member C' securely to the chamber N. It will be observed that while D d' is revolving E' and E' are also revolving, the two smaller revolutions within the larger revolution of D d', the effect of which will be, while the cutters B and B' and drill C are boring, the débris or core will be taken up by the action of the elongated

twist-augers A and A *a'*, one of which is twisted right and the other left. Should they not carry off the débris or core as fast as it accumulates, the action of D *d'* may be stopped by turning a thumb-screw on each side, which drops it to F and F, while the two auger-motions E *e'* and E *e'* are continued. Should the cutters B B *b* and C meet with a very hard substance, the action of the revolving augers may be stopped while D *d'* is revolving by pulling out the bolts below the bevel-wheels E *e'*. The blades or augers will then fall into the square slots in C *c'*, as shown in Fig. 2, thereby giving more strength and power to chamber N by the revolution of the bevel-wheel D *d'*, which arrangement and working will expedite the boring of wells and work up to the surface the débris or core without the aid of the sand-pump.

F *f* are the members in connections to which the augers are connected, being in the form of a half-dovetail or one side of a triangle, as shown in Fig. 3, (marked *g*), and the shield or covering-clasp is shown by *g g*, tightened by a wedge. The same form of connection is carried out with each bar or length of auger, to whatever length may be required to sink the well.

We do not confine ourselves to the mechan-

ical arrangement herein described for working our well-borer, as other contrivances may be employed for this purpose; but

What we do claim as new, and desire to secure by Letters Patent, is—

1. The employment of two or more augers, in combination with a central upward-discharging drill, substantially as described.

2. Connecting the augers A A *a'* to the drill-collar N, in such manner that the augers can be rotated independently of the drill, or can be made to rotate the drill at pleasure, substantially as described.

3. The center drill-point, C, plowing-cutters B B *b*, collar N, and the right and left twisted elevators A A *a'*, combined and operating substantially as herein described.

4. Feeding the augers down to their work by means of right and left screws *p p' p p*, applied and operating substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEO. L. WITSIL.
EDWARD BURKE.

Witnesses:

JOSEPH BURKE,
J. A. DENNISS.