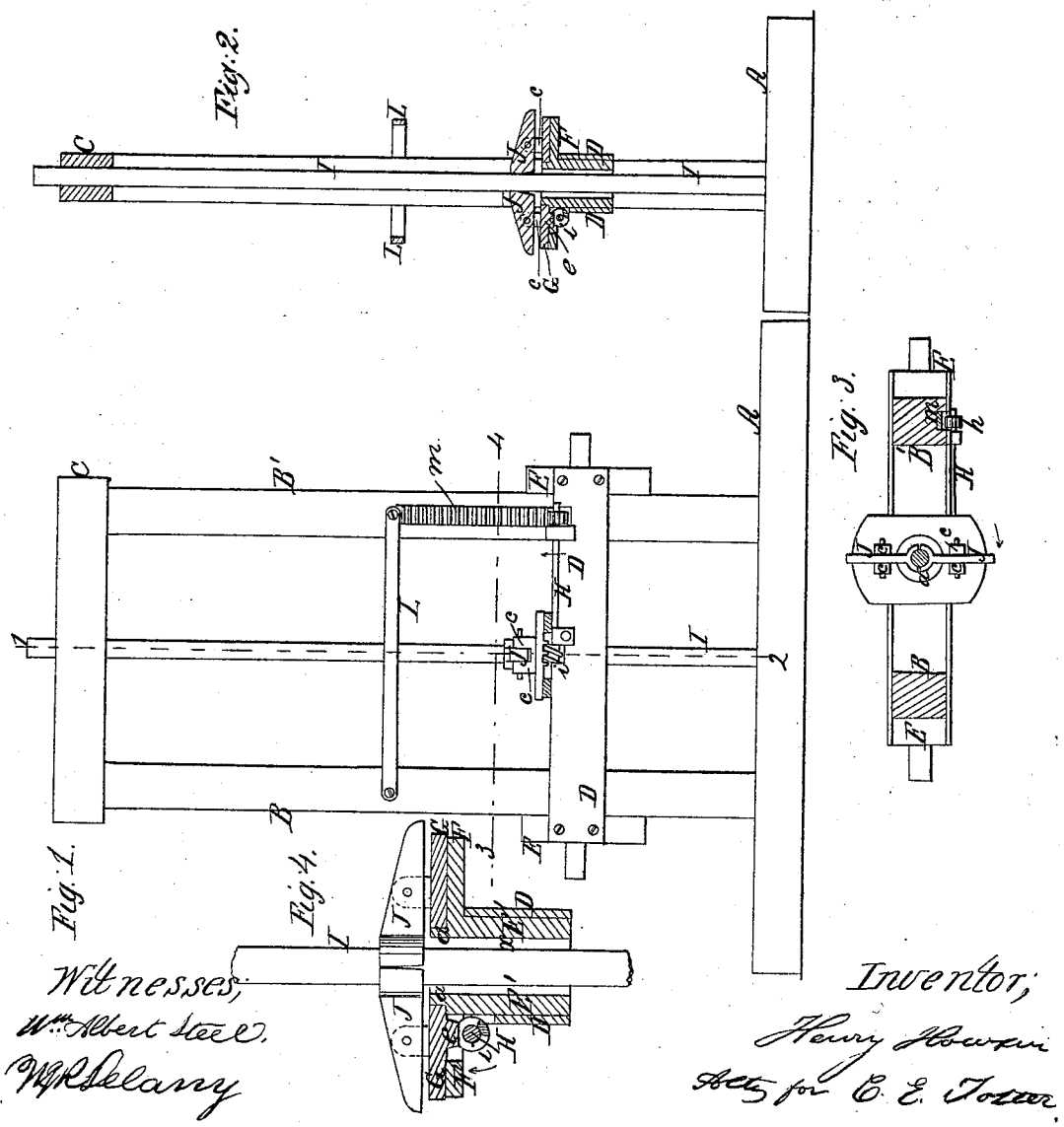
C. E. Foster,

Boring Artesian Wells.

No. 46,968. Patented Mar. 21, 1865.



Witnesses;
Wm. Albert Steel.
W. R. Delany

Inventor;
Henry Bowen
Acts for C. E. Foster

UNITED STATES PATENT OFFICE.

CHARLES E. FOSTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GEORGE O. EVANS AND W. S. HASSALL, OF SAME PLACE.

IMPROVEMENT IN BORING WELLS.

Specification forming part of Letters Patent No. **46,968**, dated March 21, 1865.

To all whom it may concern:

Be it known that I, CHARLES E. FOSTER, of Philadelphia, Pennsylvania, have invented certain Improvements in Apparatus for Boring Artesian Wells; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists of certain improvements, fully described hereinafter, in the well-boring machine for which Letters Patent were granted to Bolles and Knight, May 1, 1849, my improvements being such that the drilling-rod is turned partly round at intervals without being manipulated by the attendants.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a front elevation of my improved well-boring apparatus; Fig. 2, a vertical section on the line 1 2, Fig. 1; Fig. 3, a sectional plan on the line 3 4, Fig. 1, and Fig. 4 a detached sectional view drawn to an enlarged scale.

A is the base of the machine, to which are secured two uprights, B and B′, connected together at the top by a cross-piece, C. On each side of the uprights is a plate, D, the ends of which are secured to blocks E, the whole forming a cross-head, to which a reciprocating vertical motion is imparted in a manner similar to that shown in the apparatus patented by Bolles and Knight May 1, 1849.

Between the plates D is secured a block, E′, in which is a circular opening, *x*, and at the top of the block is a plate, F, in the center of which, round the opening *x*, is an annular projection, which fits into a circular opening in the center of a plate, G, the latter resting on the plate F.

On the under side of the plate G are a number of teeth, *e*, which project into an opening in the plate F and gear into a worm, *i*, on a shaft, H, the latter turning in lugs projecting from the side of the plate D, and having on its outer end a pinion, *h*, gearing into a rack, *m*, in a recess in the upright B′. Extending from one upright to the other on each side of the same is a plate, L, for a purpose described hereinafter.

Through the opening *x* passes a rod, I, to which the boring-tool is attached, and on the plate G, at each side of the said rod, are two lugs, *c c*, between which is hung a dog, J, the inner end of each dog being adapted to the rod I, against which it bears.

When the cross-head is raised, a rotary motion in the direction of the arrow, Figs. 1 and 4, will be imparted to the shaft H, and its worm and the plate G will thus be moved a part of a revolution in the direction of the arrow 2, Fig. 3. As the cross-head descends the motion of the shaft H will be reversed and the plate G be brought to its first position. As the cross-head begins to rise the rod I will be grasped by the dogs J and carried upward until the outer end of the dogs strike the plate L, when the rod will be released, as in the apparatus patented by Bolles and Knight, before alluded to. When the cross-head falls, the rod I, being free from the control of the dogs, it cannot be turned back by the backward movement of the plate G.

It will thus be seen that an intermittent rotary as well as vertical movement is imparted to the rod I, so that on releasing the same the edge of the cutter will strike the rock on a line at an angle to that struck at the previous blow, the necessity of constantly employing an attendant to impart the rotary motion to the rod being thus obviated.

When the well has to be bored through extremely hard rock, the rack *m* may be so adjusted as to be thrown out of gear with the wheel *h*, in order that the cutter may strike two or more blows at the same point.

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

1. The movable plate G, in combination with the dogs J J, or their equivalents, when combined and operating substantially as described, for the purpose specified.

2. The shaft H, with its worm *i* and pinion *h* and stationary rack *m*, in combination with the plate G, the whole being arranged and operating substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. FOSTER.

Witnesses:

JOHN WHITE,

CHARLES HOWSON.