

L. J. Crans,

Boring Artesian Wells.

No 51,806.

Patented Jan. 2. 1866.

Fig. 1.

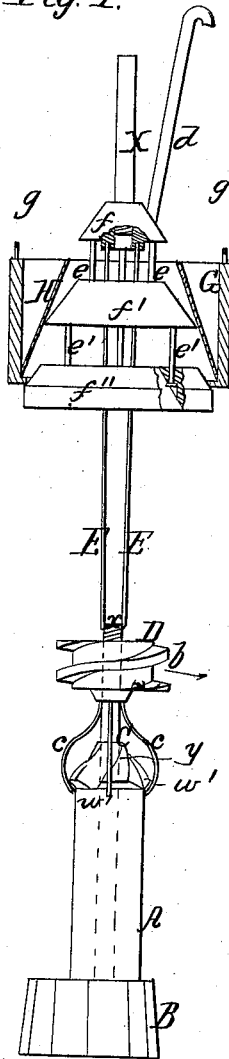


Fig. 2.

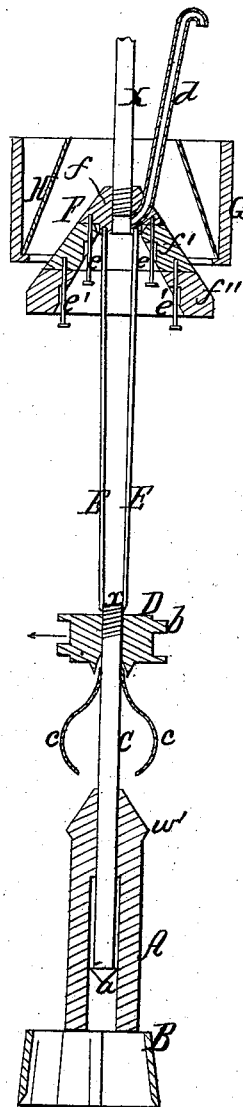
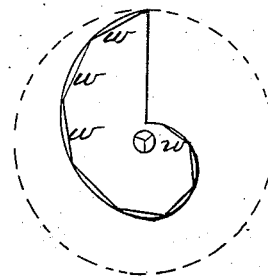


Fig. 3.



Witnesses;
Mr. Albert Steel.
John Parker

Inventor;
L. J. Crans
By his attorney
J. H. Horn
per C. V. Foster

UNITED STATES PATENT OFFICE.

L. J. CRANS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WELL-BORING MACHINES.

Specification forming part of Letters Patent No. **51,806**, dated January 2, 1866; antedated December 21, 1865.

To all whom it may concern:

Be it known that I, L. J. CRANS, of Philadelphia, Pennsylvania, have invented certain Improvements in Well-Boring Apparatus; 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 in certain devices, fully described hereinafter, for operating the drill of a well-boring apparatus and for raising the detritus from the well and depositing it in a suitable receptacle.

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 side elevation of my improved well-boring apparatus; Fig. 2, a sectional elevation, and Fig. 3 an inverted plan view of the drill or cutter.

Similar letters refer to similar parts throughout the several views.

A is a drill-stock, to which is attached a drill, B, and which slides on a rod, C, the upper end of the latter having a thread, *x*, cut upon the same, and the lower end being provided with a head, *a*, which limits the movement of the stock on the rod. The cutting-edge of the drill consists of a series of straight edges, *w*, arranged to coincide, as nearly as may be, with a curve of a shape similar to that shown in Fig. 3. On the thread *x* turns a nut, D, on the outer side of which is a broad screw-thread, *b*, and to the rod C, a short distance below its upper end, are secured springs or clamps *c c c c*, a portion of the nut D next the rod C being cut away, so that when it is depressed it will cover the upper ends of the springs and press them toward the rod. The upper end or head of the drill-stock A is cone-shaped, and in the same are cut a series of spiral grooves, *y*, for a purpose described hereinafter.

The rod C is hung by two slender rods or chains, E E, to a conical block of wood, *f*, which is attached to the lower end of the rope or rod X, which operates the apparatus, and

in this block is an opening, with which communicates a tube, *d*, of any suitable material. From the lower side of the block *f* extend guide-rods *e*, on which slides an annular block, *f'*, and from the under side of the latter extend similar guide-rods, *e'*, on which slides an annular block, *f''*, the blocks, when together, as shown in Fig. 2, forming a hollow wooden cone, F, the base of which is nearly equal in diameter to that of the well to be bored. Within the well, at any suitable distance below the end of the pipe *d*, is hung, by ropes or wires *g*, a case, G, which is open at the bottom, and in which is a wire casing, H, for a purpose described hereinafter.

When the apparatus is suspended within the well, as shown in Fig. 2, the cutter resting on the rock, a vertical reciprocating motion is imparted to the drill rod or rope, when the operation of the apparatus will be as follows: As the apparatus descends the action of the water on the screw *b* of the nut D will cause the latter to revolve in the direction of its arrow, the rods or chains E E turning with the nut, and being twisted together to a certain extent. After they become stationary, however, the nut will continue to turn until lowered sufficiently for it to cover the upper ends of the springs *c c c c*, the lower ends of which are thus forced inward toward the rod. As the rod descends the ends of the springs *c* will be brought into the grooves *y* on the head of the drill-stock, and the rod C, with the parts attached to the same, will be turned in the direction of its arrow until the ends of the springs pass from out the grooves *y* and bear on the outside of the drill-stock. The rod X is now raised, together with the rod C, so that the ends of the springs *c* shall engage with the shoulder *w'* of the drill-stock, grasping the latter and raising the same with the drill, the blocks *f*, *f'*, and *f''* being separated, as shown in Fig. 1. As the apparatus is raised the action of the water upon the screw-nut D will cause it to turn in the direction of the arrow, Fig. 1, so that it is raised from contact with the springs *c*, the ends of the latter ceasing to bear on the drill-stock, which slips from the same, the drill being brought smartly against the rock and cutting or breaking it. As the apparatus is again raised the rods or chains

E E are untwisted, the motion being assisted by the revolution of the screw-nut D, and are twisted in the opposite direction, the drill being by this operation turned, so that on each descent it strikes the rock at a new point. As the apparatus again descends the blocks *f*, *f'*, and *f''* are all brought together, as shown in Fig. 2, so as to almost close the well, the water beneath the blocks, as the latter descend, being by this means forced upward through the tube *d*, and from the latter into the casing G, from which it runs freely through the wire-cloth casing H, the detritus carried by the water being retained between the two casings. As the apparatus descends the rods or chains E E are twisted and the drill-stock is grasped, as before. It is then again elevated and released, the extended surface presented by the drill cutting and breaking the rock rapidly away. When the casing G has been filled with detritus it can be raised independently of the remaining portion of the apparatus, and the contents may be discharged, after which it is again lowered.

In many of the devices now used there are so many parts connected to the drill that the descent of the same through the water in the well is considerably retarded, and the effect of its operation is proportionately lessened. The drill also, owing to the inefficiency of the means of turning the same, is brought to bear too frequently on one spot, the well being cut unequally, and much time thus lost.

It will be apparent that by the above-described devices the drill is disconnected from any parts that would interfere with its operation, and falls freely in the well, and that it

is effectually turned so as to descend at each blow onto a fresh portion of the rock.

If desirable, the cutting-edge of the drill may be of a regular curve, instead of a series of straight lines, *a*, as shown in Fig. 3.

Without desiring to confine myself to the precise construction of the parts herein described,

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

1. The drill B, in combination with the within-described devices, or equivalents to the same, whereby the said drill may be caught, raised from the rock, and then released from the raising device, substantially as and for the purpose specified.

2. The drill B, drill-stock A, with its conical grooved head, in combination with the rod C, springs *c*, and screw-nut D, substantially as described.

3. The rods or chains E E, combined with the rod C, its screw-nut D, and the operating rod or bar X, substantially as and for the purpose set forth.

4. The blocks *f*, *f'*, and *f''* and the tube *d*, constructed and operating in combination with the casings G and H, substantially as described.

5. The cutter B, with a cutting-edge of the shape substantially as shown and described.

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

L. J. CRANS.

Witnesses:

CHARLES E. FOSTER,
W. J. R. DELANY.