C. E. Foster,

Boring Artesian Wells.

No. 46,420. Patented Feb. 14, 1865.

Fig. 1.

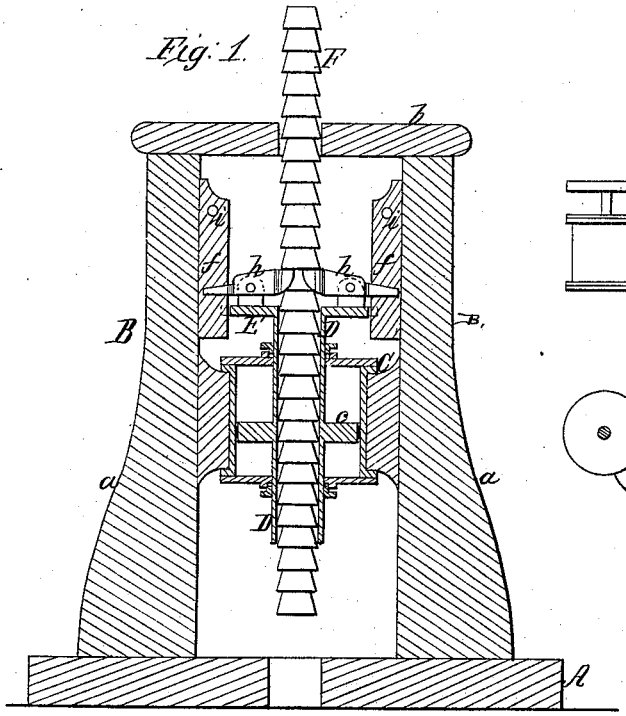


Fig. 3.

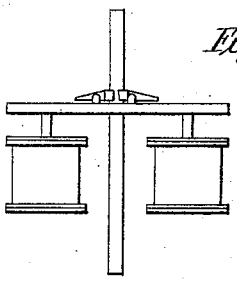


Fig. 4.

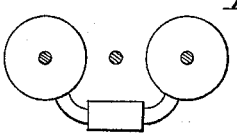
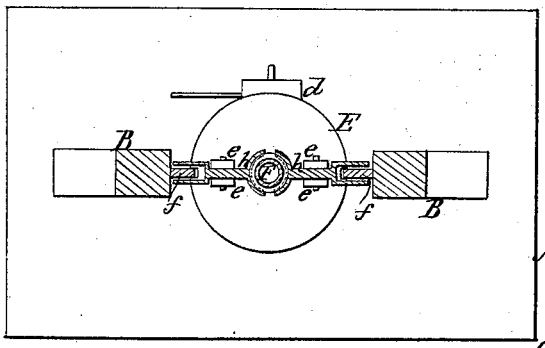


Fig. 2.



Witnesses;
W. P. Delany
Wm. Albert Stuart

Inventor;
C. E. Foster
by his Attorney
Henry Howson

UNITED STATES PATENT OFFICE.

CHARLES E. FOSTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE ROCK DRILL AND MINING COMPANY OF PENNSYLVANIA.

IMPROVEMENT IN WELL-BORING APPARATUS.

Specification forming part of Letters Patent No. **46,420**, dated February 14, 1865.

To all whom it may concern:

Be it known that I, CHARLES E. FOSTER, 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 combining a direct-action engine with boring apparatus, in the manner fully described hereinafter, so that the use of the usual walking-beam and complex system of straps and gearing may be dispensed with.

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 sectional elevation of my improved well-boring apparatus; Fig. 2, a plan view; Fig. 3, a modification of my invention, and Fig. 4 a plan view of Fig. 3.

The frame-work of the machine consists in the present instance of the base A, uprights B B, and cross-piece *o'*. Between the uprights is secured a cylinder, C, and through the latter passes a tube or trunk, D, to which is secured a piston, *c*, adapted to the cylinder, the covers of which are provided with the usual stuffing-boxes. On the cylinder is an ordinary steam-chest containing a slide-valve, which, together with the openings on the valve-face and passages in the cylinder, may be such as are used in direct-acting engines to impart a reciprocating motion to the piston. To the upper end of the trunk D, is attached a plate, E, and at each side of the plate is a recess into which project the guide-plates *f*, secured to the uprights B. From the side of each plate *f*, near the top of the same, projects a pin, *i*, for a purpose described hereinafter. On the plate E are hung two levers, *h h*, the outer forked ends of which embrace the guides *f*, the inner forked ends embracing the rod F, which extends through and is guided by the trunk and cross-bar *b*. The rod F may be formed into a rack throughout its entire length by making a succession of depressions inclined on one side and abrupt on the other. The upper end of the rod to which the drill or cutter is attached is secured to the lower end of the rod F, and the drill is brought to bear on the rock to be cut. Steam or compressed air is then admitted into the cylinder so as to raise the piston and trunk, when the inner ends of the levers *h* will be brought against the rod and under one of the teeth in the same, so that the rod will be carried upward. As it approaches the limit of its upward motion the outer forked ends of the levers *h* will be brought in contact with the pin *i*, by which the levers are depressed and their inner ends released from contact with the rod F, which is allowed to fall, the drill being brought against the rock and cutting or breaking the latter. As the rod F falls the trunk also descends, so that the rod may be immediately caught by the levers and carried upward, when the trunk again rises, as before.

Although the rod F has been shown and described as being in the form of a rack, the surface may be perfectly plain and the lever *h* may have corresponding plain surfaces for bearing against that of the rod.

In place of the single cylinder shown in Figs. 1 and 2, two or more cylinders may be used, as shown in Fig. 3, the plate E being connected directly to the piston-rods, and one valve-chest being common to both rods, as seen in Fig. 4.

The pins *i i* may be made adjustable vertically, so that the extent to which the bar is raised before it is released may be regulated at pleasure.

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

1. The combination, substantially as described, of one or more direct-acting steam or compressed-air cylinders with a plate carrying the lever, *h*, or their equivalents, and with a boring-bar, for the purpose specified.

2. The combination of the cylinder C, trunk D, levers *h*, or their equivalents, and bar F.

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

CHARLES E. FOSTER.

Witnesses:

WM. ALBERT STEEL,

CHARLES HOWSON.