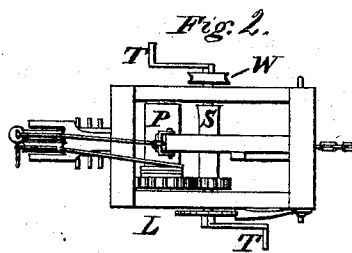
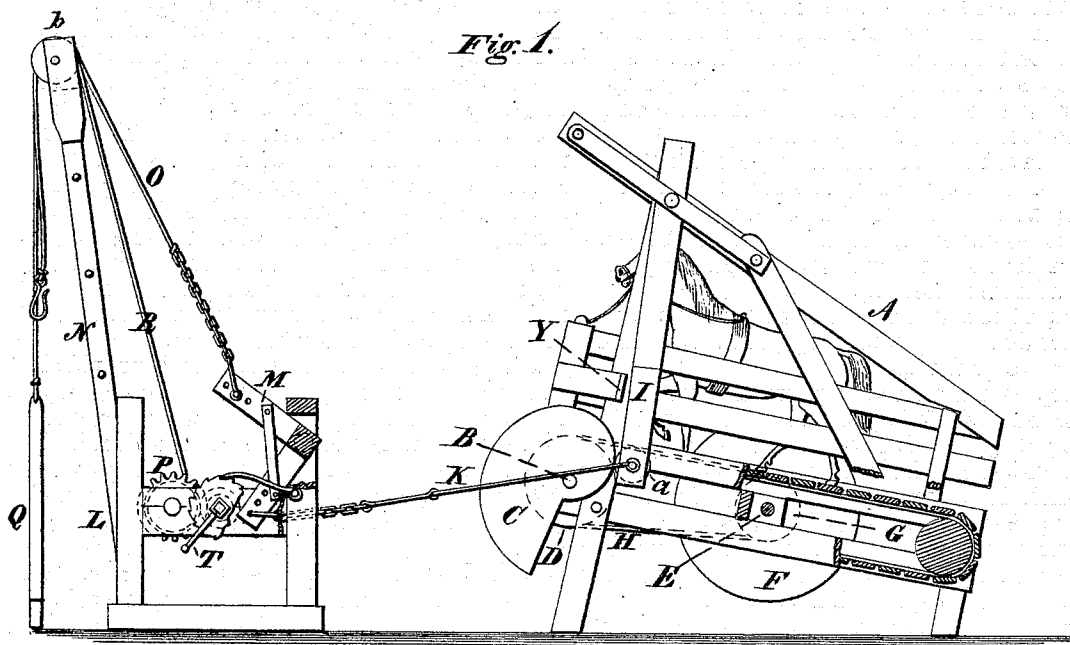


F. S. WARD & E. COOPER.

Improvement in Apparatus for Drilling Wells.

No. 125,355.

Patented April 2, 1872.



Witnesses.

Harry King
Phil. T. Dodge

Inventors

Fred. S. Ward
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UNITED STATES PATENT OFFICE.

FRED S. WARD AND EMMETT COOPER, OF THERESA, NEW YORK.

IMPROVEMENT IN APPARATUS FOR DRILLING WELLS.

Specification forming part of Letters Patent No. 125,355, dated April 2, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that we, FRED S. WARD and EMMETT COOPER, of Theresa, in the county of Jefferson and State of New York, have invented certain Improvements in Portable Apparatus for Drilling Wells, &c., of which the following is a specification, reference being had to the accompanying drawing.

Our invention relates to a portable apparatus for drilling wells, and for similar purposes; and it consists in a novel construction and combination of an animal tread-power, and devices for supporting and operating the drill, as hereinafter explained.

Figure 1 is a side elevation of our apparatus in operation. Fig. 2 is a top-plan view of the drill-frame or derrick.

A represents an ordinary tread-power having its main shaft B provided with a cam, C, and a pulley, D. E is a transverse shaft provided with a fly-wheel, F, and a small pulley, G, which is driven by a belt, H, from the larger pulley D, whereby a very rapid motion is given to the fly-wheel, so that it serves to steady and equalize the motion of the various parts. I is a pendulum-bar suspended to the side of the body A above the cam-wheel, and provided in its lower end with a roller, *a*, which bears against the edge of the cam, as shown, so that, as the cam rotates, it shoves or swings the end of the bar backward to one side, and then allows it to swing suddenly back again. To the lower end of the bar I there is attached a yoke, K, which extends around or incloses the cam, in the manner shown, so as to prevent the bar from moving sidewise, and the roller from slipping off from the edge or face of the cam. L represents a frame containing a strong elbow-lever, M, and provided with a rigid upright beam or derrick, N, having two pulleys, *b*, in its upper end. A chain, O, is passed over one of the pulleys *b*, and has one end connected to the drill or drill-rod, Q, and the other to one arm of the elbow-lever M, the other end of said lever being connected by a chain with the link of the swinging bar of the horse-power, as shown in Fig. 1.

When, therefore, the tread-power is set in motion, so as to vibrate the bar I, motion is communicated, through the link and chain, to the elbow-lever, and thence through chain O to the drill; the drill being raised each time the bar is moved out, and then permitted to drop when the bar swings back. It will thus be seen that, at each revolution of the cam, the drill is raised and permitted to fall; and that, as the cam rotates at a high speed, the drill is caused to cut very rapidly. The drill should be provided with suitable devices for feeding or lowering it as fast as it cuts its way. These devices, however, constitute no part of my invention, but may be arranged in any of the common and well-known ways, and need not, therefore, be described.

The elbow-lever M has its arms provided with several holes, by which the chains may be attached thereto at different points, and thereby the height to which the drill is raised varied at will, thus giving a blow of greater or less force, according to the nature of the rock or other material being operated upon. As a means of hoisting the drill when necessary, a drum, P, is mounted in the frame L, and provided with a rope or chain, R, which passes over the derrick and has a hook attached to its end, as shown. The drum is provided with a cog-wheel, and operated by a pinion on a second shaft, S, which is provided with hand-cranks T, and with a pulley, W, which may be driven by a belt from the horse-power. To prevent the bar I from striking violently against the cam when it swings inward, a buffer, Y, of rubber or other elastic material, is secured to the side of the frame A for the bar to fall against.

We are aware that drilling-machines have heretofore been made, in which a horizontal lever is operated by tappets or arms, after the style of a trip-hammer, and we do not claim such. By the use of the horizontal swinging lever and the cam-wheel C, we are able to produce a machine in which we avoid the sudden jar and concussion incident to those operated by tappets in the old style, as our cam-wheel comes into operation far more gradually, and

thus greatly reduces the sudden strain brought upon the operating parts of the machine, which sudden jars and concussions have heretofore been the great objection to this class of machines.

Having thus described our invention, what we claim is—

A drilling apparatus, consisting of the cam-wheel C, swinging lever I, having the yoke K

attached, and the elbow-lever M, all constructed and arranged to operate substantially as described.

FRED S. WARD.
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Witnesses:

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