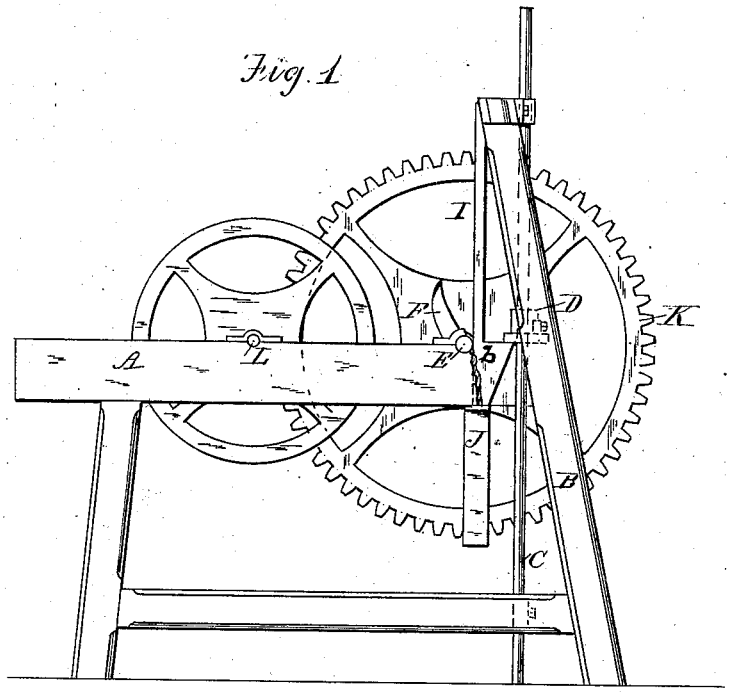
(No Model.) 2 Sheets—Sheet 1.

T. H. STONER.

ROCK DRILL.

No. 259,779. Patented June 20, 1882.

Fig. 1



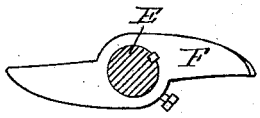


Fig. 2

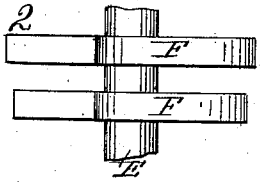
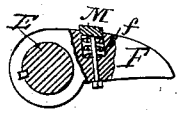


Fig. 3



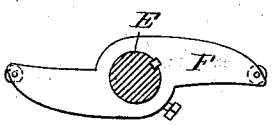


Fig. 4

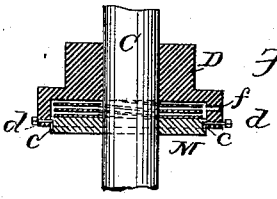


Fig. 5

Witnesses

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 6

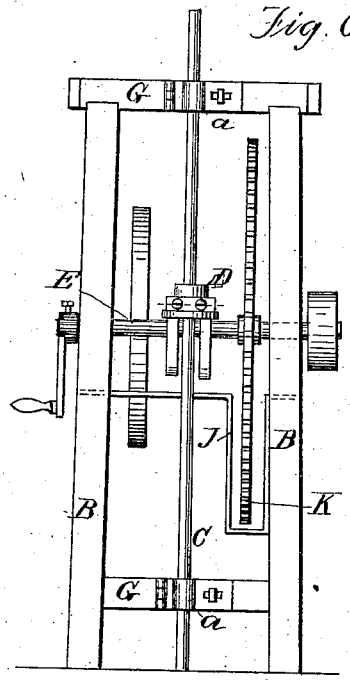


Fig. 7

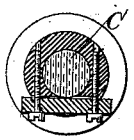
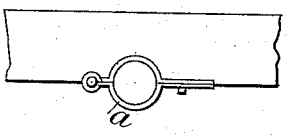


Fig. 8



Witnesses
M. P. Callan
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Inventor
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UNITED STATES PATENT OFFICE.

THOMAS H. STONER, OF MARION, PENNSYLVANIA.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 259,779, dated June 20, 1882.

Application filed February 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. STONER, of Marion, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Rock-Drills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to the class of rock-drills known as "self-operating stone drills or jumpers;" and its object is to simplify the construction and operation, insure greater durability, lessen the expense of first cost, and to facilitate the removal and replacement of parts for repairs, &c.

To this end, therefore, it consists in mounting the drill in such manner that by its reciprocating movement it will be relieved of the friction due to the working of ordinary drills; further, that said movement will automatically turn the drill for alternate cutting; and, further, that the thud or knock of the lifter or "toe" against the adjustable chuck or clutch will be materially reduced, and thereby tend to lessen the noise, avoid the great jar to the frame and working machinery, and, consequently, make a great saving in wear of all the parts. I will confine this description to self-acting free-falling tools liberated by reaction or rebounding of the tool itself.

Referring more particularly to the drawings, Figure 1 represents a side elevation, a portion of the frame being broken away, showing the stiffening and sustaining bar. Fig. 2 shows a section of the lifters and shaft, showing also a cross-section of the shaft and a side view of one of the lifters, they being double. Fig. 3 is a view of one of the lifter-cams provided with a cushion-spring, and also an air-cushion in the same cavity. Fig. 4 shows a double cam with a single friction-roller in each of its ends; Fig. 5, a clutch fitted to the drill-rod, having a recess or air-chamber in its head, in which is located a spring, outside of which spring is snugly fitted a piston-head. The interstices between the spring and the said piston-head form an air-chamber, so that when the piston-head is struck by the lifter it yields, thereby cushioning the blow and greatly lessening the thud or jar of the rapidly-rotating lifter-cams. Fig. 6 is a front elevation of my machine. Fig. 7 is a cross-section of the chuck or clutch and the mode of fastening it to the drill-shaft, and Fig. 8 shows a plan of hinged journal-strap for retaining the drill-shaft in position and for its ready removal when necessary.

The same letters of reference will indicate like parts in all the figures.

A is the frame, and B B the uprights thereof. C is the drill-shaft, and D the clutch. E is a rotating shaft, provided with cams or lifters F. G G are horizontal cross-bars, provided with hinged journals *a a*, for the ready removal of the drill-shaft.

I is an upright strengthening-bar, provided with a projection, *b*, for the reception of the clutch D, by which the drill-shaft is held in position while not in use. This vertical rod I is rigidly fixed to an angle-rod, J, running across the machine, and connected to both the uprights B B, thus bracing the frame and supporting the rod I, an important matter, since when the well becomes very deep the shaft C is of great weight, amounting to, sometimes, from twelve hundred to two thousand pounds. This rod I and its projection *b* bear the entire weight of the drill-shaft at times, so that it becomes an important factor in its use. K is a gear-wheel, which is attached to a pinion in the usual way, (not shown,) and which is mounted on a shaft, E, upon which shaft is also mounted a fly-wheel, and also a driving-pulley.

Upon the horizontal shaft E, I locate a pair of lifters, F. These lifters may be either single or double, according to the rapidity of the work desired and the kind of work to be performed. They are fastened by any well-known means. When the lifters revolve at a rapid motion they strike the clutch a severe blow, sometimes loosening and jarring the whole machinery. To prevent this thumping and jarring, I insert in the face of the lifter a compound or double cushioning device in such position that said device first comes in contact with the clutch, and by this means the very sudden and thumping jar is eased and lessened. This cushioning device will answer equally well in the clutch-head, as may be seen at M, Fig. 5. In this instance an air-

chamber is formed in the head. In this chamber I locate a spring, and outside the spring is a bearer or piston-head against which the lifters come in contact. On each side of the piston-head are elongated slots *e e*, into which work guide-screws *d d*, by means of which the said piston-head has a reciprocating motion, and it is at the same time held in position. An air-duct, *f*, is provided for the induction and eduction of the air, so that in the working of the machine I am always certain of a cushion, by which I avoid the evils before enumerated.

I provide two lifters, one on each side of the drill-shaft, for the reason that in rock-drills it is a great desideratum for the drill to be kept in a true line with the direction of the hole to be bored. When wells are to be drilled from twelve hundred to three thousand feet in a direct line the necessity of maintaining a true and straight hole is obvious, and to do this the drill must be kept true and straight.

Another important feature of my lifters is that while the drill-shaft is raised truly vertical, it is also automatically turned every time it is raised just sufficiently to cut in a new place every time it falls. I produce this action by lessening the force of contact just before the drill-shaft is liberated, and it is done by shortening the toe of one of the lifters, so that the longer toe of the longer lifter turns the bar before the drill-bar drops, adjusting the drill-point every time for an alternate cut in the bottom of the hole. Thus it will be seen that I have simplified the construction and operation and produced great economy in the working of drills of this character and added to them perfection and durability.

I am aware that lifting-drills similar to mine have heretofore been made, and also that cushioning devices have been used; but I am not aware that such devices have ever been made like mine, or producing the same perfection in results.

What I claim, therefore, and desire to secure by Letters Patent, is—

1. The combination, in an apparatus for boring wells or rocks, consisting of the drill-shaft C, rotating cam-shaft E, provided with a pair of cams of different lengths, the said shaft having a clutch, whereby the cams are made by their rotating action to automatically turn the drill-shaft for a new cut, substantially as described.

2. In an apparatus for boring wells and rocks, the combination of the drill-shaft and the rotary cam-shaft, the latter being provided with cams of different lengths, as described, whereby the revolving motion of said cams, imparts a turning movement to the drill-shaft, the said cams being provided with a combined spring and air-cushioning device in such manner that the thud or knock of the cams against the clutch is greatly lessened, all arranged and operating as shown.

3. The combination, in a well or rock boring machine, of the drill-shaft provided with a lifting clutch or chuck suitably attached thereto, the said chuck having in its face a cylindrical recess, a piston-head snugly fitting in said recess, a spring interposed between the piston-head and bottom of the recess, an air-duct, *f*, in the side of the clutch for induction and eduction of the air from said recess, the said piston-head forming a shoe or bearing for the cams to work against, and the spring and air forming a compound cushioning device, all arranged in the manner and for the purpose set forth and described.

4. In an apparatus for boring wells or rock, the drill-shaft C, provided with clutch D, hinged journals *a a*, rotating cam-shaft E, having cams F F, angle-iron J, having support or projection *b*, for the drill-shaft to rest upon when not in use, the said hinged journals being adapted for the ready removal of the drill-shaft, and the operating mechanism, all combined and arranged for joint operation in the manner set forth and described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

T. H. STONER.

Witnesses:
E. S. BLACKWOOD,
M. P. CALLAN.