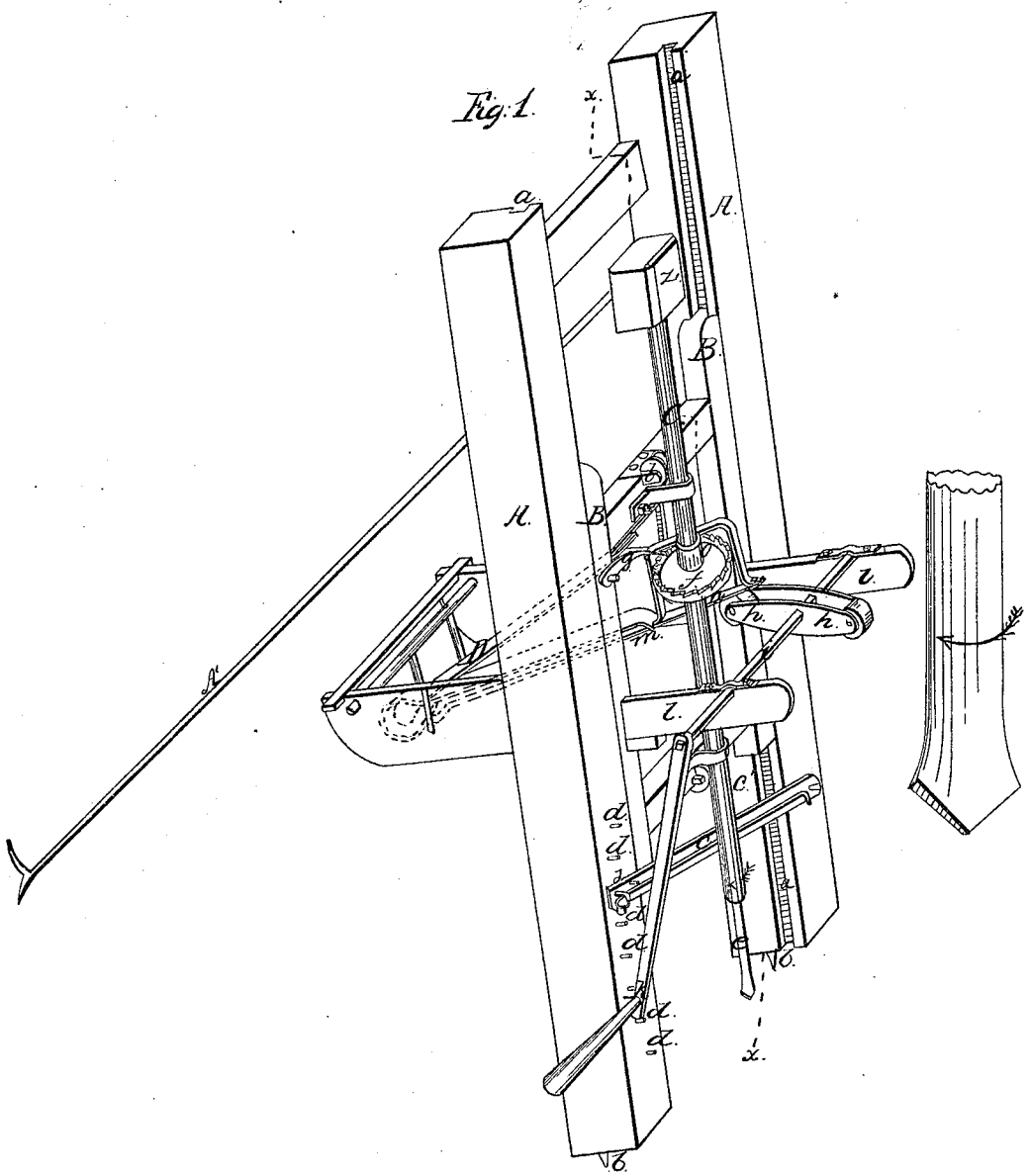
2 Sheets-Sheet 1.

G. N. Doan,

Stone Drill.

No. 6,675. Patented Aug. 28, 1849.

Fig. 1.

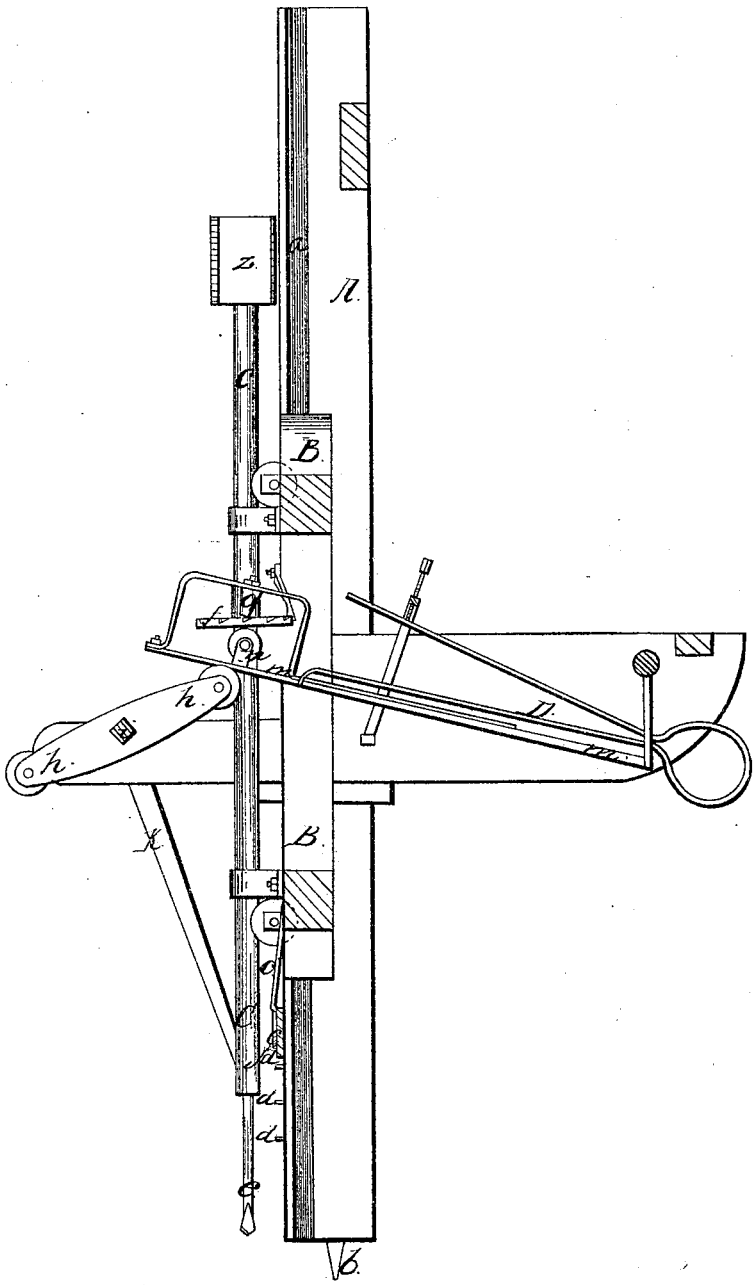


2 Sheets-Sheet 2.

G. N. Doan,

Stone Drill.

No. 6,675. Fig. 2. Patented Aug. 28, 1849.



UNITED STATES PATENT OFFICE.

G. N. DOAN, OF MILLERSTOWN, PENNSYLVANIA.

COMBINED CONSTRUCTION AND OPERATION OF THE DRILL IN ROCK-DRILLING MACHINES.

Specification of Letters Patent No. 6,675, dated August 28, 1849.

To all whom it may concern:

Be it known that I, GEORGE N. DOAN, of Millerstown, in the county of Perry and State of Pennsylvania, have invented certain new and useful Improvements in Machinery for Drilling Holes in Rocks and for other Purposes, of which the following is a full, clear, and exact description, reference being had to the annexed drawings of the same, making part of this specification, in which—

Figure 1 is a perspective view of the machine in operation, and Fig. 2 is a vertical section through the line *x x* of Fig. 1.

The same letters indicate the same parts in all the figures.

The drill I employ has an alternating motion given to it like the churn drill in common use for boring rocks.

My invention consists in turning this drill on its axis as it descends to strike the rock, and forming the bit, so as to adapt it to this particular motion by beveling each half of its cutting edge in opposite directions like the bit of the drill in ordinary use for boring metal. It is plain that if a common drill with its edges beveled on both sides alike were operated in this manner, it would strike the part of the stone intended to be detached at an obtuse angle, and would crush it to powder, and at the same time its edge would by a very few such blows, be completely blunted. My bit on the contrary having its straight sides advancing will strike the stone at an acute angle, and raise up a large flat chip, instead of crushing it to powder, and the edge being well supported by the bevel will retain its sharpness long enough to bore a greater depth much quicker, because the amount of force required to crush the small chips or lumps into powder is saved in my machine by expelling them from the hole uncrushed.

In the accompanying drawings A is a strong rectangular oblong frame, in the inner edge of the side pieces of which, parallel grooves *a* are made, to receive corresponding tongues or ribs in the carriage B, which slides up and down therein, for the purpose of projecting the drill so as to bore the hole of the required depth. The frame A can be placed at any angle to the horizon, and is secured in such position by means of the hinged prop A′ the foot of which is either inserted into some convenient crevice, or placed in a shallow hole drilled in the surface of the rock for the purpose, the foot spikes *h* in the lower end of the frame A are likewise placed in either crevices or holes. Upon the carriage B is mounted the drill with all the machinery for operating it.

The carriage is raised, lowered, and adjusted by a lever *c* which is connected with it by a link *c′*; one end of this lever is hinged to one side of the frame A and the other end made to hook upon the pins *d*, on the opposite side of the frame, to hold the carriage in whatever position it may be placed.

The shank *e* of the drill slides in suitable bearings on the carriage, and has a socket in its lower end to receive the bit *e*, and a ratchet wheel *f* near its upper end by which it is revolved more or less at each stroke, by its teeth catching the end of an adjustable spring pawl *g*. The upper end of the bar *e* has a weight *z* secured upon it by means of which the momentum with which it strikes the stone is increased. The drill is raised by the tappets or wipers *h* mounted on a shaft *i* and turned by a winch *k*, the shaft *i* being supported in suitable bearings in the upper ends of the standards *l* projecting from the face of the carriage. After being raised by the tappets the drill descends by its gravity, aided by the tension force of a spring D acting through a vibrating lever *m* the upper end of which is bent into the form of a rectangular frame large enough to embrace the ratchet wheel *f*. Studs *o* and *n* extend from the top and bottom of this frame to the upper and under side of the disk of the ratchet wheel *f*, against which they rest but do not press hard enough to prevent it from turning freely. When the wipers *h* strike the lever *m* the stud *n* is pressed against the disk of the wheel *f*, and the drill by the continued revolution of the wiper is raised, and the spring at the same time compressed; when the drill reaches the upper extremity of its motion the wiper by moving on, releases the lever *m*, and the spring acting thereon presses the stud *o* upon the disk *f* on that part of its surface where the radii are at right angles to the lever *m*. Now as this lever *m* turns in a curve to which the plane in which the drill moves is a tangent, it is plain that if the friction between the stud and the disk be sufficient to prevent the latter from slipping on the former, the drill must be turned on its

axis (every time the lever *m* moves it forward by pressing the stud *o* against the disk *f*) a distance equal to that of the extremity of the arc of vibration of the stud *o* below the plane in which the drill moves, and this is just what happens at every stroke of the drill.

The tappets while raising the drill *c* also compress the bent spring D which expands the moment the tappet releases the lever *m*, throwing the drill down with great suddenness and force; and being thus slowly raised by the tappet, and thrown down again quickly by the spring it works with greater effect, and especially when it has the compound twisting and turning motion, and a beveled bit, than it would by the mere velocity gained by its gravity in descending through the same space.

The several parts of the foregoing machine may be made of such materials, and in such proportions as may be deemed most suitable by the contractor.

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

Giving to a drill having its cutting edges beveled as herein described, a compound longitudinal and rotary motion, substantially in the manner and for the purposes herein described but irrespective of the devices by which said compound motion is produced.

In testimony whereof I have hereunto signed my name this tenth day of March 1849.

G. N. DOAN.

Witnesses:
P. H. WATSON,
HAZARD KNOWLES.