G. Mulhaupt,

Stone Drill.

No. 48,301. Patented June 20, 1865.

Fig: 1

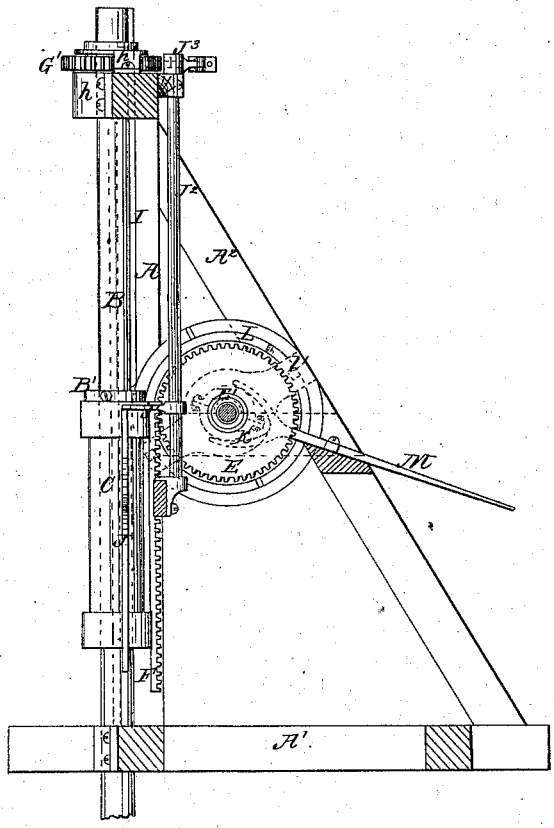


Fig: 2.

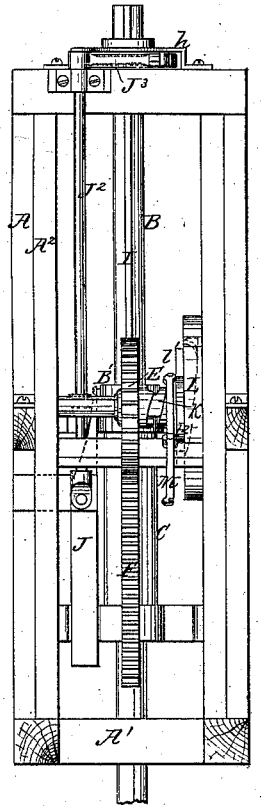


Fig: 4.

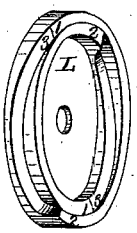
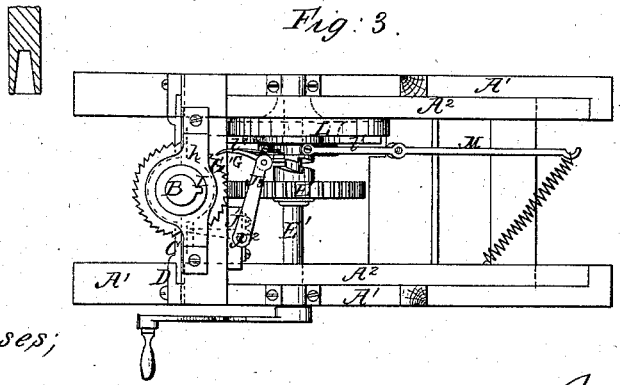


Fig: 3.



Witnesses;
C. Kyus
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Inventor;
Gregory Mülhaupt

UNITED STATES PATENT OFFICE.

GREGORY MÜLHAUPT, OF BUFFALO, NEW YORK.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **48,301**, dated June 20, 1865.

To all whom it may concern:

Be it known that I, GREGORY MÜLHAUPT, of the city of Buffalo, county of Erie, and State of New York, have invented a certain new and Improved Rock-Drilling Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a sectional elevation of my said machine. Fig. II is a rear elevation, and Fig. III is a top plan, of same. Fig. IV is a detailed view of cam.

Letters of like name and kind refer to like parts in each of the figures.

The nature of this invention consists in so supporting the drill-stock in a vertically-reciprocating gate or cross-head (the upward movement of which is produced by a rack and pinion or other similar means, and the downward motion by gravity) that while the motion of such cross-head is fixed and definite the drill-stock is so only in its upward movement, its downward movement being governed entirely by the drill striking the rock, so that as the hole being drilled increases in depth the drill feeds itself, (within certain limits,) and strikes quick, hard, and effective blows.

The frame-work of the machine, which supports the operating parts, consists, principally, of the vertical posts A, horizontal bed-frame A′, and oblique braces A^2.

The drill-stock (represented at B) is supported in the frame or cross-head C, which moves in slides D, secured to the vertical posts A. The upward motion of the cross-head, and with it the drill-stock, is produced by the action of the pinion E upon the rack F, secured to the cross-head, and the downward movement thereof is produced by the action of gravity, the pinion being disengaged from its shaft E′, as hereinafter described, on the completion of its upward movement, and allowed to run backward as the cross-head descends. The drill-stock is fitted loosely in the cross-head, but has a collar, B′, which bears against the top of the cross-head and causes it to move therewith in its upward motion. The downward motion of the cross-head is definite and uniform, but that of the drill-stock coincides therewith only until such time as the drill strikes, when it stops, and the cross-head completes its downward motion alone. The drill-stock remains stationary until the cross-head in the next upward motion strikes the collar B′, after which it is carried with the cross-head to the completion of its upward motion. In this manner the drill is made to feed itself just as fast as and no faster than it cuts, until a depth in the hole being drilled equal to the movement of the cross-head or such part thereof as will give a sufficient blow to the drill is reached. At such time by moving the collar B′ up on the drill-stock a renewed capacity to feed may be obtained. An intermittent rotary motion is given to the drill-stock, which causes the drill to strike each time a little in advance of its former cut, so as to drill a round and uniform hole. This motion is produced by the action of a pawl, G, on a ratchet-wheel, G′, through which the drill-stock passes, said ratchet-wheel turning in bearings in the upper cross-piece of the framing, as shown at *h*. In its up-and-down motion the drill-stock moves freely through the ratchet-wheel, but is provided with a feather, I, which causes the rotary motion of the ratchet-wheel to be imparted thereto. The pawl G is operated and the ratchet-wheel and drill-stock rotated at each upward movement of the cross-head by the wedge or cam J on the cross-head striking the arm J′ on the lower end of a rock-shaft, J^2, to the upper end of which is secured the arm J^3, carrying the pawl G.

I will now describe the manner in which the pinion E is engaged and disengaged with its shaft E′ to produce the upward motion of the cross-head, &c., and permit the downward motion thereof. The movement of the shaft E′ is continuous and uniform, and is given by any convenient motive power in a common manner. It carries a sliding clutch, K, having its counterpart (with which it engages) on the pinion E. The sliding motion of the clutch out and in gear with the pinion is effected by the combined action of the cam L and spring-lever M, the spring-lever throwing it out of gear and the cam in gear. The cam L is placed upon the shaft E′, which runs loose therein and is held stationary and prevented from turning therewith by being bolted to the framing A A′. It acts upon the clutch through the

clutch-arms l' l^2, which are kept continually in contact therewith by the action of the lever M. The proportions of the cam are determined by the assumed diameter of the pinion E, which in this instance is such that two-thirds of its revolution will give the required upward movements to the cross-head. This proportion requires the cam to be capable of holding the clutch in gear with the pinion through just two-thirds of a revolution, and then to allow the spring-lever to immediately throw the clutch out of gear and give the remaining third of the revolution to the descent of the cross-head by gravity.

By special reference to Fig. IV it will be seen that the cam consists of two circular cam-tracks concentric with the shaft E, the plane of whose surface is at right angles to the shaft through two-thirds of their circumference, or from 1 to 2, and inclined thereto through the remaining third, or from 2 to 3, the inclined parts acting on the clutch-arms to throw the clutch in gear and the straight parts to hold it in gear until the upward motion of the cross-head is completed, at which time it will be forced out, the clutch-arms passing onto the inclined parts again by the action of the spring-lever, thus throwing the clutch out of gear and allowing the cross-head to drop. This operation is repeated at each revolution of the shaft E′, and a uniform reciprocating motion given to the cross-head and drill.

By the combination of parts and the motion thereof above described it is believed a rock-drilling machine of unequaled efficacy is produced, and possessing the further advantages of simplicity and durability.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the drill-stock B with a vertically-reciprocating frame or cross-head C, the upward motion of which is produced by the action of the pinion E upon the rack F, or other equivalent means, and the downward motion thereof by gravity, in the manner and for the purposes substantially as described.

2. The combination of the cam L, clutch K, pinion E, and rack F, arranged and operating as described, to produce the reciprocating motion of cross-head C, for the purposes set forth.

3. Giving an intermittent rotary motion to the drill-stock B by the upward motion of the cross-head acting on the ratchet-wheel G′ through the medium of the cam-wedge J, rock-shaft arms J' J^3, and pawl G, in the manner substantially as described.

GREGORY MÜLHAUPT.

Witnesses:
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C. S. PRINCE.