No. 665,364. Patented Jan. 1, 1901.

C. M. ENGSTROM.

HAND DRILLING MACHINE FOR DRILLING STONE.

(Application filed Feb. 17, 1900.)

(No Model.) 3 Sheets—Sheet 1.

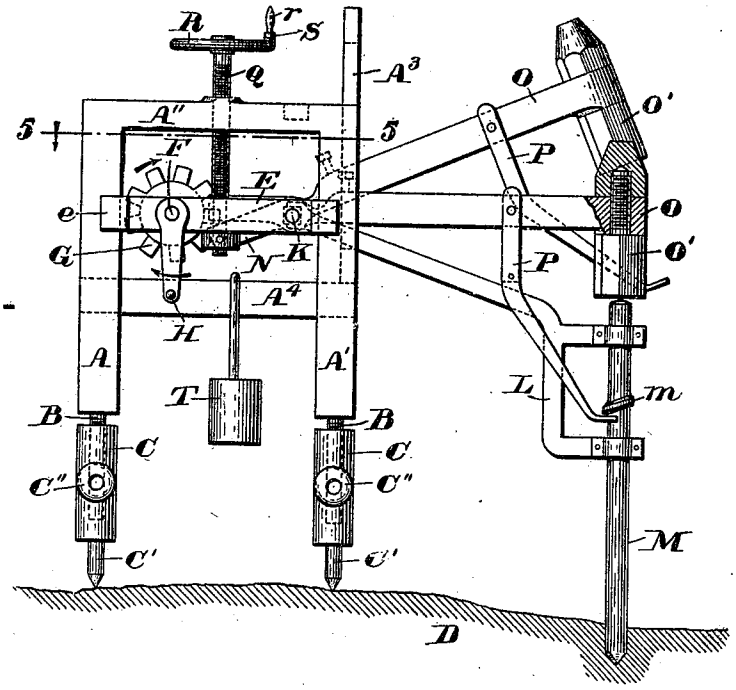


Fig. 1.

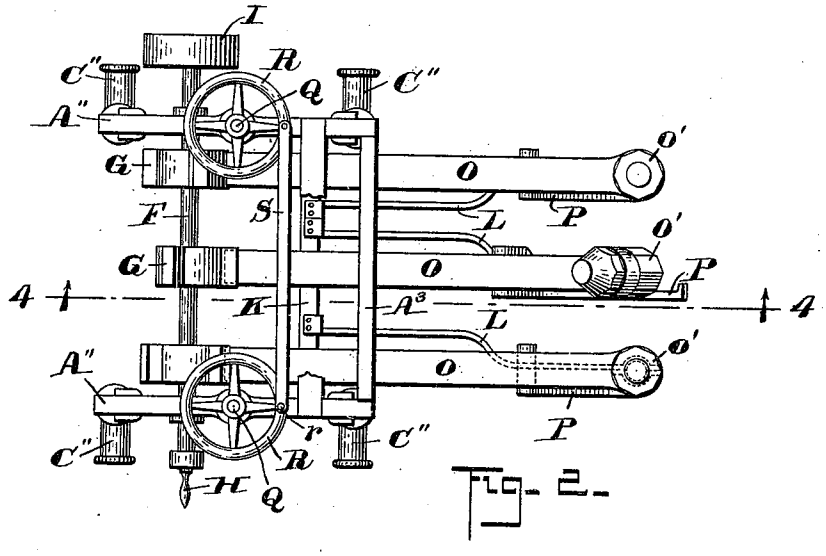


Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

Fig-3-

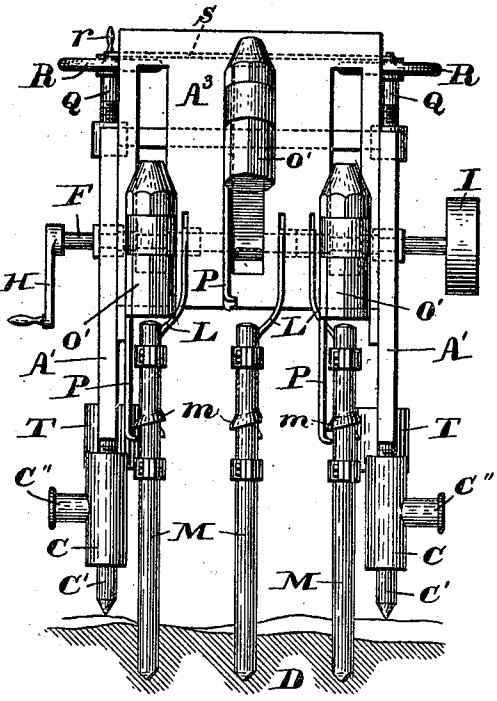
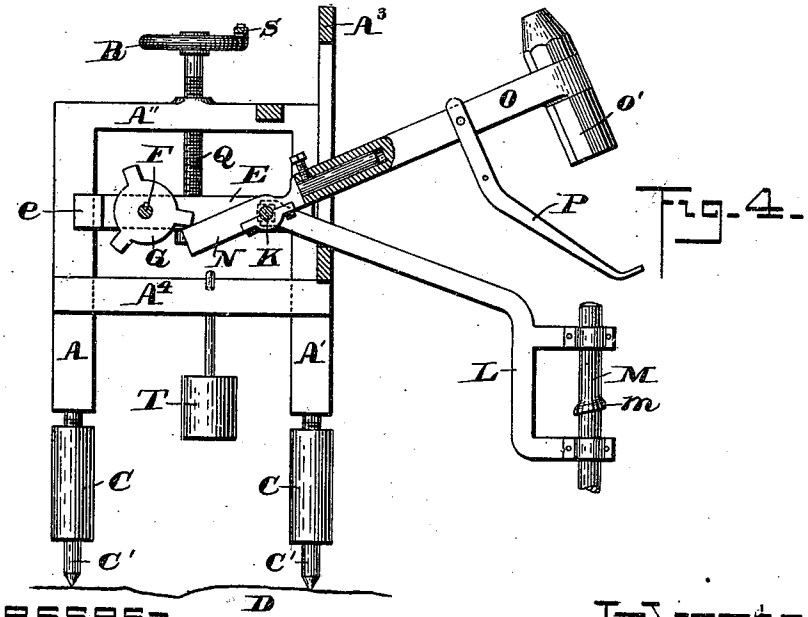


Fig-4-



Witnesses=

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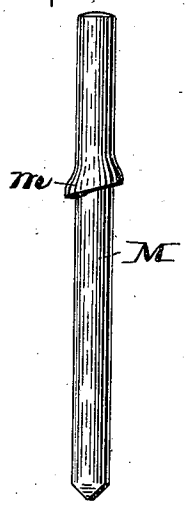
C. M. ENGSTROM.

HAND DRILLING MACHINE FOR DRILLING STONE.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 6.



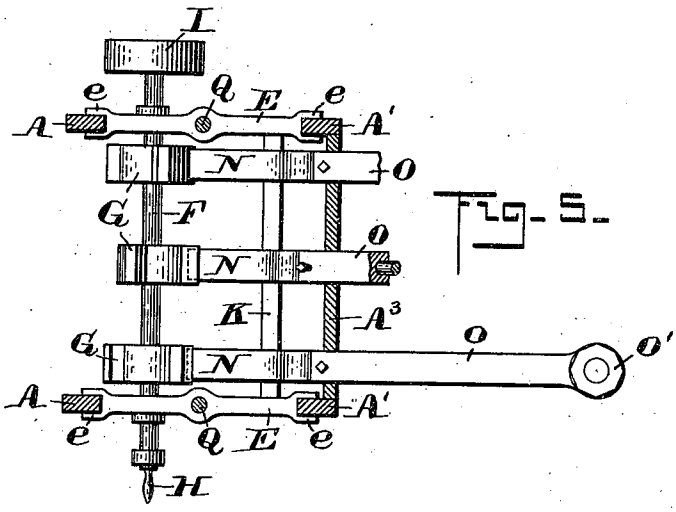


Fig. 5.

Fig. 7.

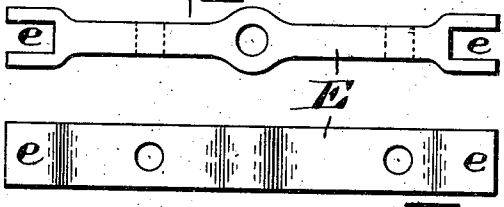


Fig. 8.

Fig. 11.

Fig. 12.

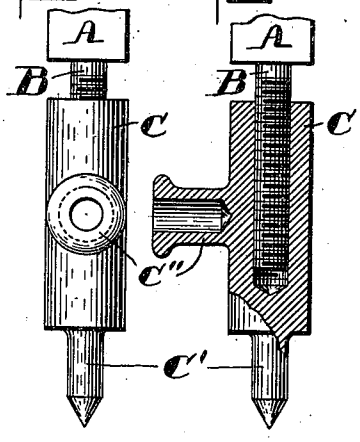


Fig. 9.

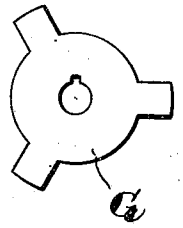


Fig. 10.



Witnesses=

Charles F. Logan.

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Inventor=

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UNITED STATES PATENT OFFICE.

CARL M. ENGSTROM, OF OSSIPEE, NEW HAMPSHIRE.

HAND DRILLING-MACHINE FOR DRILLING STONE.

SPECIFICATION forming part of Letters Patent No. 665,364, dated January 1, 1901.

Application filed February 17, 1900. Serial No. 5,588. (No model.)

To all whom it may concern:

Be it known that I, CARL M. ENGSTROM, a citizen of Sweden, residing at Ossipee, in the county of Carroll and State of New Hampshire, have invented new and useful Improvements in Hand Drilling-Machines for Drilling Stone, of which the following is a specification.

This invention relates to improvements in hand drilling-machines for drilling holes in stones to be split or for other similar purposes; and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a side elevation of the improved drilling-machine. Fig. 2 represents a top plan view of the same. Fig. 3 represents a front elevation. Fig. 4 represents a vertical section on the line 4 4, shown in Fig. 2. Fig. 5 represents a horizontal section on the line 5 5, shown in Fig. 1. Fig. 6 represents a detail side elevation of the drill. Fig. 7 represents a detail top plan view of one of the movable shaft and hammer supports. Fig. 8 represents a side elevation of Fig. 7. Fig. 9 represents a detail side elevation of one of the toothed hammer-lifter wheels. Fig. 10 represents a top plan view of Fig. 9. Fig. 11 represents a detail side view of one of the adjustable supports for the drilling-machine frame, and Fig. 12 represents a partial side elevation and section of such support.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In the drawings, A A′ represent the uprights of a suitable frame, preferably made of metal, the lower portions of which are provided with screw-threaded shanks B B, which are received in internally-screw-threaded adjustable sleeves C C, having rest projections C′ C′ in their lower ends, adapted to rest upon the stone D that is to be drilled, as shown in Figs. 1, 2, 3, and 4.

The upper surface of the stone to be drilled may not always be horizontal, and it is therefore necessary to adjust the sleeves C C on the screws B B so as to maintain a vertical position, or nearly so, of the uprights A A of the frame of the machine. In practice I prefer to provide each of the nuts or screw-threaded sleeves C with a horizontal socket C″, into which a suitable rod may be inserted when it is desired to turn the screw-threaded sleeves C for the purpose of adjusting the same, so as to maintain an upright position of the drilling-frame.

A″ A″ are horizontal stays or braces forming parts of the frame of the machine, said stays or braces being made integral with or secured to the upper ends of the uprights A A′ on the two opposite sides of the frame, as shown.

A^3 is a slotted plate secured in a suitable manner to the uprights A′ A′, as shown.

E E are vertically-adjustable guide-plates adapted to slide up and down on the respective uprights A A′ A A′ and having for this purpose their ends forked, as shown at *e e* in Figs. 7 and 8. In said guide-plates is journaled the shaft F, to which are secured the toothed hammer-lifter wheels G G G, as shown. Said shaft may be rotated by hand-power by turning a crank H, secured to one end of it, or it may be rotated by belt-power applied to a pulley I, secured to one of the ends of said shaft F, as may be desired.

To the vertically-adjustable guides E E is secured a horizontal shaft K, to which are secured in a suitable manner the drill-guides L L L, in which the drills M M M are vertically movable, as shown. On the said shaft K are pivotally arranged a series of levers N N N, on the outer ends of which are adjustably secured the hammer-helves O O O, provided at their extremities with hammer-heads O′ O′ O′, as shown. During the rotation of the toothed wheels G G G in the direction of the arrow shown in Fig. 1 the hammers O′ O′ O′ are intermittently raised. By turning the crank H and the toothed disks G in the direction of arrow shown in Fig. 1 the hammer-levers are intermittently depressed and liberated, causing the hammer-heads O′ to be intermittently raised and released and to drop by gravity upon the upper ends of the respective drills M M M, as shown in the drawings.

For the purpose of partially rotating the drills M during the swinging motion of the hammer-helves O O O, I secure to each one of the latter an arm P, the lower end of which comes in contact with an inclined or spiral projection *m* on the drill M during the upward motion of the hammer-head, and in so

doing causes a partial rotation to be given to the drill. In practice I prefer to make the upper side of said inclined or spiral projection slightly conical or curved, as shown in Fig. 3, so as to permit the lower end of the arm P to slide by the said incline during the downward motion of the latter without turning the drill during such downward motion of the said arm P; but I do not wish to confine myself to such exact operation of the device, as the said arm P may cause the drill to be slightly rotated during the downward motion of said arm without departing from the spirit of my invention.

For the purpose of regulating the rise and fall of the hammers during the progress of the drilling operation I regulate from time to time the vertical position of the guide-plates E E relative to the uprights A A'—that is, in the ratio as the drilling operation proceeds I lower the said plates E E by a suitable feed-device, as represented in Figs. 1, 2, 3, and 4, the same consisting of a pair of vertical screw-shafts Q Q, adjustable in nuts in the upper frame portions A'' A'' and having their lower ends suitably connected to the guide-plates E E, so as to turn freely in perforations in the latter, but prevented from moving longitudinally therein. In practice I secure to the upper ends of said feed-shafts Q Q the hand-wheels R R, pivotally connected by means of a link S, so as to cause both of said screw-shafts Q Q to be turned when turning one of said hand-wheels R. Any other suitable device, such as gears, may be used for connecting the said screw-shafts so as to cause both to be equally rotated when one of such screw-shafts is turned. If so desired, each of said hand-wheels R may be provided with a crank-handle *r* for turning it during the drill-feeding operation.

For the purpose of the better securing of the drilling-machine frame upon the stone to be drilled I may prefer to weight such frame by suspending from a cross-bar or cross-bars A^4 suitable weights T, as shown in Figs. 1 and 4.

What I wish to secure by Letters Patent and claim is—

1. In a rock-drilling machine, the combination with a frame of guide-plates adjustable thereon, a series of hammer-helves pivotally arranged thereon, a series of toothed wheels for operating said hammer-helves, a series of drills mounted in drill-guides on said plates, each drill having a spiral projection and arms pivoted on the hammer-helves, the lower ends of said arms being adapted to engage said spiral projections and partly rotate the drills, substantially as described.

2. In a rock-drilling machine, the combination with a series of hammer-helves pivotally mounted and provided at one end with hammers, of toothed wheels to operate said hammers, a series of drills having spiral projections on their shanks, the surfaces of said projections being inclined, relatively to the axes of said drills, and a series of arms pivoted to the hammer-helves, their lower ends lying under said projections and engaging their lower faces as the hammers are raised, whereby said drills are partly turned, the inclination of the spiral projections preventing an operative engagement of said arms with their upper faces on the downward stroke of the hammers, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CARL M. ENGSTROM.

Witnesses:
ALBAN ANDRÉN,
MARGARET E. DALEY.