(No Model.)

2 Sheets—Sheet 1.

T. M. YERKES.

STONE DRILL.

No. 308,454. Patented Nov. 25, 1884.

Fig. 1.

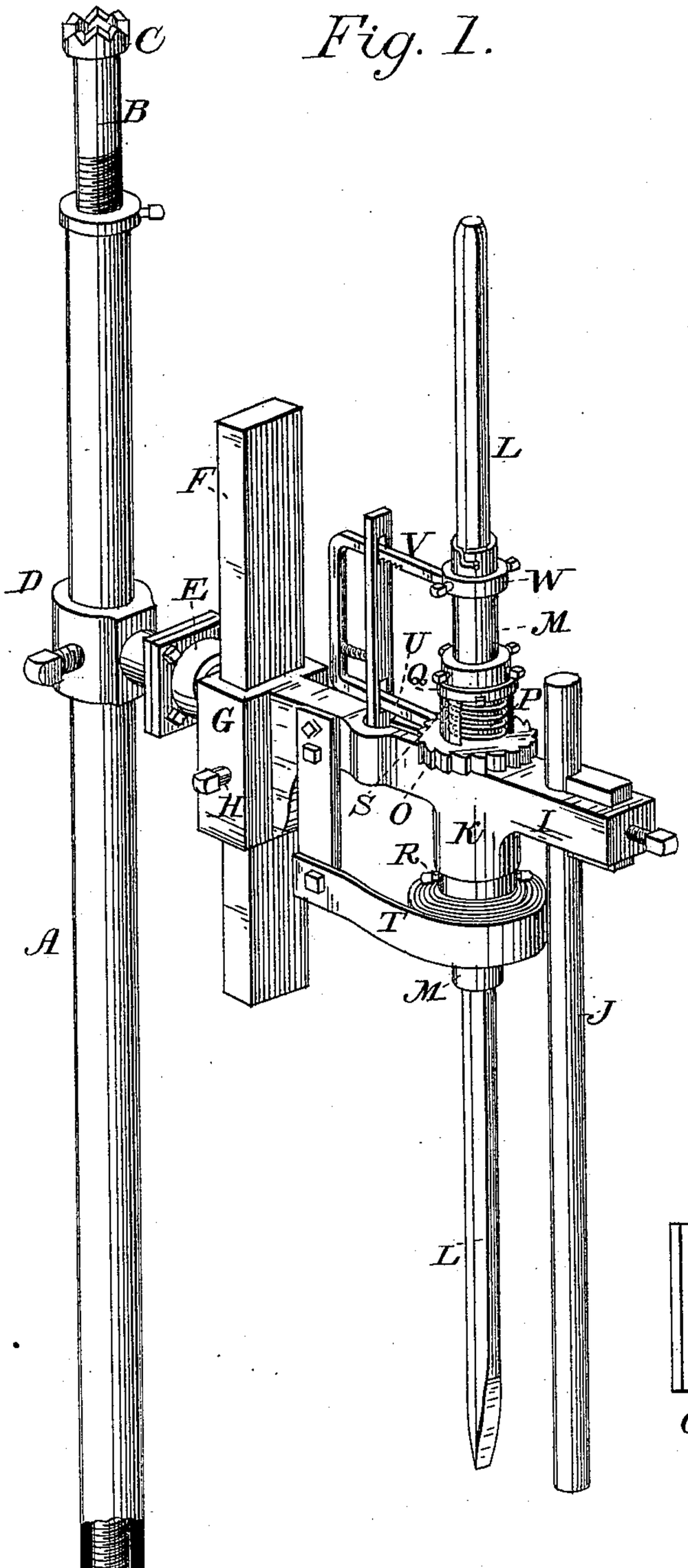


Fig. 3.

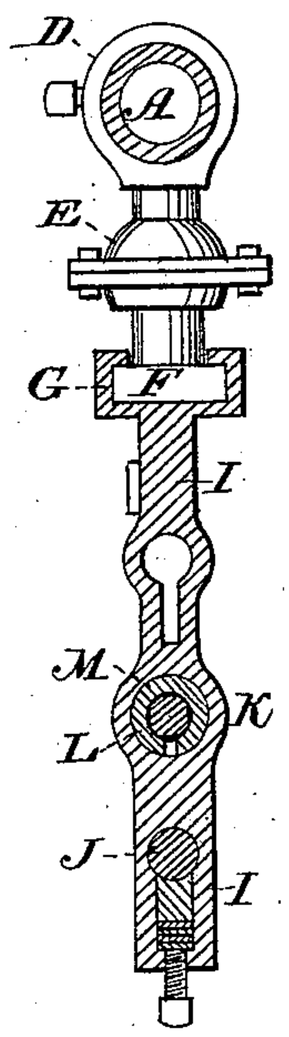
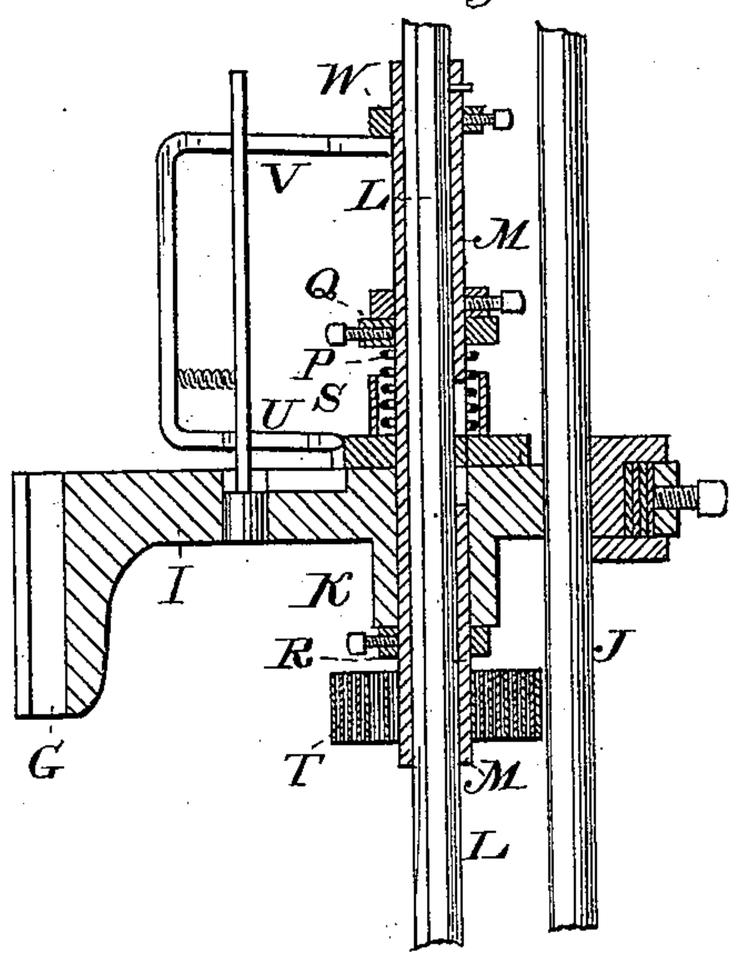


Fig. 2.



Witnesses,
Geo. H. Strong.
J. L. Wiese

Inventor,
Thos M. Yerkes
By Dewey & Co.
Attorneys

(No Model.) 2 Sheets—Sheet 2.

T. M. YERKES.

STONE DRILL.

No. 308,454. Patented Nov. 25, 1884.

Fig. 5.

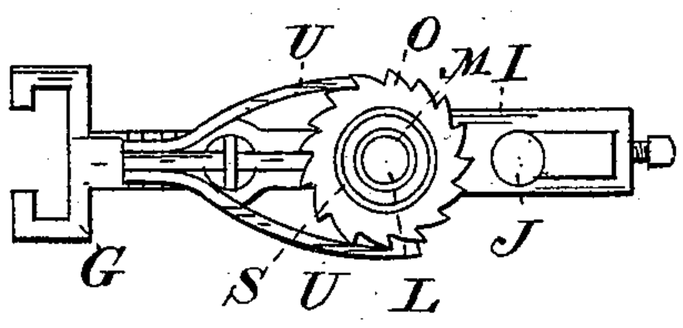


Fig. 4.

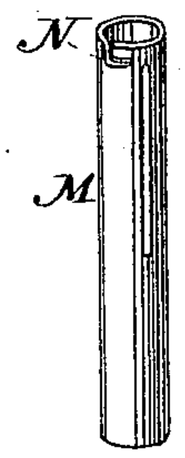


Fig. 6.

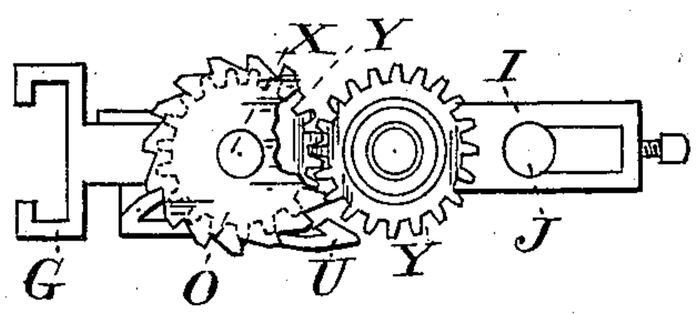


Fig. 8.

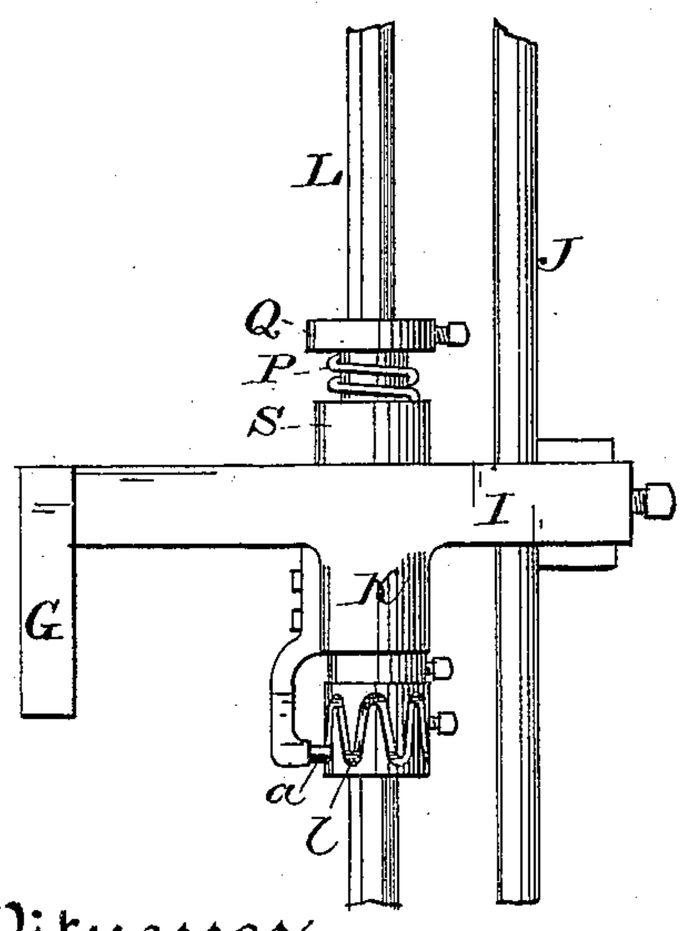


Fig. 7.

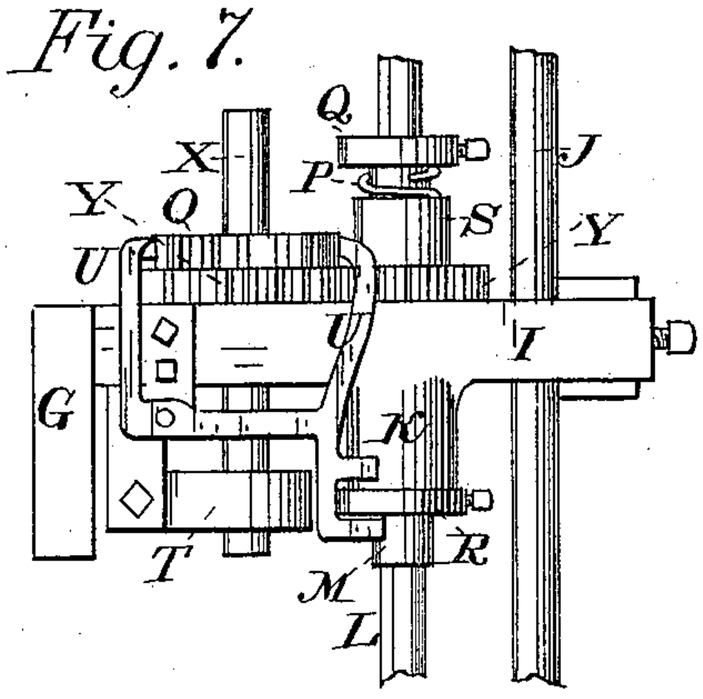
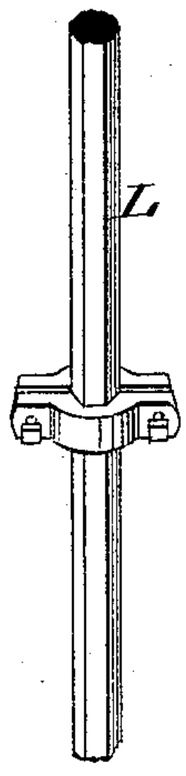


Fig. 9.



Witnesses,
Geo. H. Strong.
J. L. Morse

Inventor
Thos M. Yerkes
By Dewey & Co.
Attorneys

UNITED STATES PATENT OFFICE.

THOMAS M. YERKES, OF SAN FRANCISCO, CALIFORNIA.

STONE-DRILL.

SPECIFICATION forming part of Letters Patent No. 308,454, dated November 25, 1884.

Application filed March 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. YERKES, of the city and county of San Francisco, and State of California, have invented an Improvement in Stone-Drills; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in rock-drills and the mechanism by which they are operated; and it consists of a means by which the drill may be held in position and returned after each stroke of the hammer, and by which it is partially rotated before the next stroke without the aid of a second person.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1, Sheet 1, is a perspective view of my apparatus. Fig. 2 is an enlarged vertical section. Fig. 3 is a horizontal section viewed from above. Figs. 4, 5, 6, 7, 8, and 9, Sheet 2, are detailed views, showing parts and modifications of the apparatus.

A is a standard, having extensions B, which screw in and out of the ends, and have feet C, which may be thus pressed outward against the rocks so as to hold the standard firmly in place. A sleeve, D, is fixed to the standard, and has an arm projecting from it and supporting one part of a ball-and-socket joint, E. The other part is connected with a bar, F, which serves to support the mechanism, and which may be adjusted to any desired angle by means of the before-mentioned joint. This bar F is preferably of a shape which will receive a sleeve, G, and prevent its turning around. The sleeve is provided with a screw, H, or other device, by which it may be held in place with a frictional pressure, which will hold it until the drill reaches such a point that blows struck upon it will act upon the arm I, which has one end supported by this sleeve and the other by a standard, J, having a similar frictional device. The arm I and the attached mechanism will then be slightly advanced, slipping upon the standards F and J.

K is a cylindrical portion or extension below the arm I, and having a hole through which the drill L passes.

In Figs. 1 and 2 the drill is shown inclosed within a sleeve, M, which passes through the part K, and it may have one or more pins or projections which enter slots N, Fig. 4, and thus unite the two with a bayonet-joint. This sleeve is slotted at one side to receive a feather from the ratchet-wheel O, which surrounds it, and by which the rotation of the drill is controlled.

The mechanism thus far described holds the drill at any angle desired by means of the universal joint, and thus dispenses with a helper for that purpose.

In order to raise the drill after each stroke with the hammer, a spiral spring, P, surrounds it above the ratchet-wheel O, and a collar, Q, is fixed to the drill on the sleeve M, just above it. When the drill is struck, it is forced down until its point strikes the rock, and when released the spring acts to raise it again. The movement is limited by a collar, R, secured to the drill or the sleeve M, so as to strike the lower part of the part K. By adjusting this collar the vertical movement may be made greater or less at will. The spring P is surrounded by a cup, S, upon the top of which the collar Q strikes on the downward stroke when the drill has entered the rock sufficiently. When this occurs the arm I will be caused to slide down upon the standards F and J, thus allowing a downward movement as fast as the drill advances. A spring, T, is coiled around the lower end of the sleeve M, to which its inner end is attached, while the outer end is secured to an arm which extends downward from I. This spring is coiled, so that its tension acts to turn the drill around; but the ratchet-wheel O is engaged by a pawl, U, which prevents this. This pawl is disengaged each time that the drill is forced down by means of a bent arm, V, connected with it, the upper end of which approaches near the drill above, so that it may be struck by a collar, W, which is fixed to the drill at that point. It will be manifest that a double arrangement of pawls may be employed, as shown in Fig. 5; or the ratchet-wheel and spring may be secured to a separate shaft, X, and motion transmitted to the drill by means of spur-gear wheels Y Y, one of which is fixed to the drill-supporting sleeve and the other to the supplemental shaft X. The spiral spring P, with its cup S, and the collars Q and R, by which the length of the stroke is regulated, will remain in this case connected with the drill, as before.

In Fig. 8, Z is a serpentine channel in a collar fixed to the drill, and an arm, *a*, projects into the channel. A coiled spring surrounding the drill within the collar, or otherwise connected, acts to rotate the drill as it rises and falls, the serpentine channel moving along the point *a*, limiting its movement. This arrangement, however, is not as good as that first mentioned, because the drill must be lifted too high from the rock to be turned. If desired, the drill, instead of passing through a sleeve, as at M, might pass through a holder or clamp, as shown at *b*, Fig. 9, in which case it would slip through the clamp as the blows caused it to enter the rock. This arrangement provides a very complete means for holding and turning a drill automatically as it is struck by a sledge or hammer, and but one person is needed to operate it.

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

1. In a drilling apparatus, a standard having a guide-arm connected with it by a universal joint, a drill-holding arm or frame clamped to this, and another guide at the opposite end, a spiral spring by which the drill is raised, and a coiled spring by which it is turned, together with a ratchet-and-pawl mechanism by which the amount of rotation of the drill at each stroke is regulated, substantially as herein described.

2. In a drilling apparatus, the drill-support clamped to guides F J, so as to be capable of movement upon them when struck, the drill passing through the support, and having the elevating-spring P, the rotating spring T, pawl-and-ratchet mechanism, and the collars Q, R, and W, substantially as herein described.

3. A means for operating hand-drills, consisting of a holder which may be advanced with the advance of the drill, a coiled spring by which the drill may be rotated with each stroke, and a ratchet mechanism by which the amount of rotation may be controlled, a spring by which the drill may be raised after each stroke, and collars by which the amount of vertical movement may be regulated, substantially as herein described.

In witness whereof I have hereunto set my hand.

THOS. M. YERKES.

Witnesses:
S. H. NOURSE,
H. C. LEE.