L. M. Gilmore,

Stone Drill.

No. 30,023. Patented Sep. 11, 1860.

Fig: 5

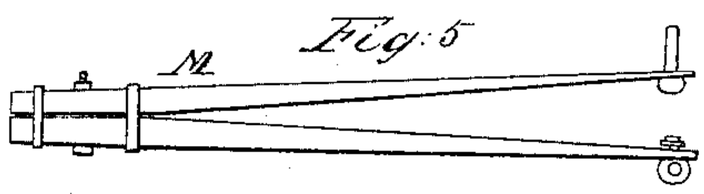

Fig: 1

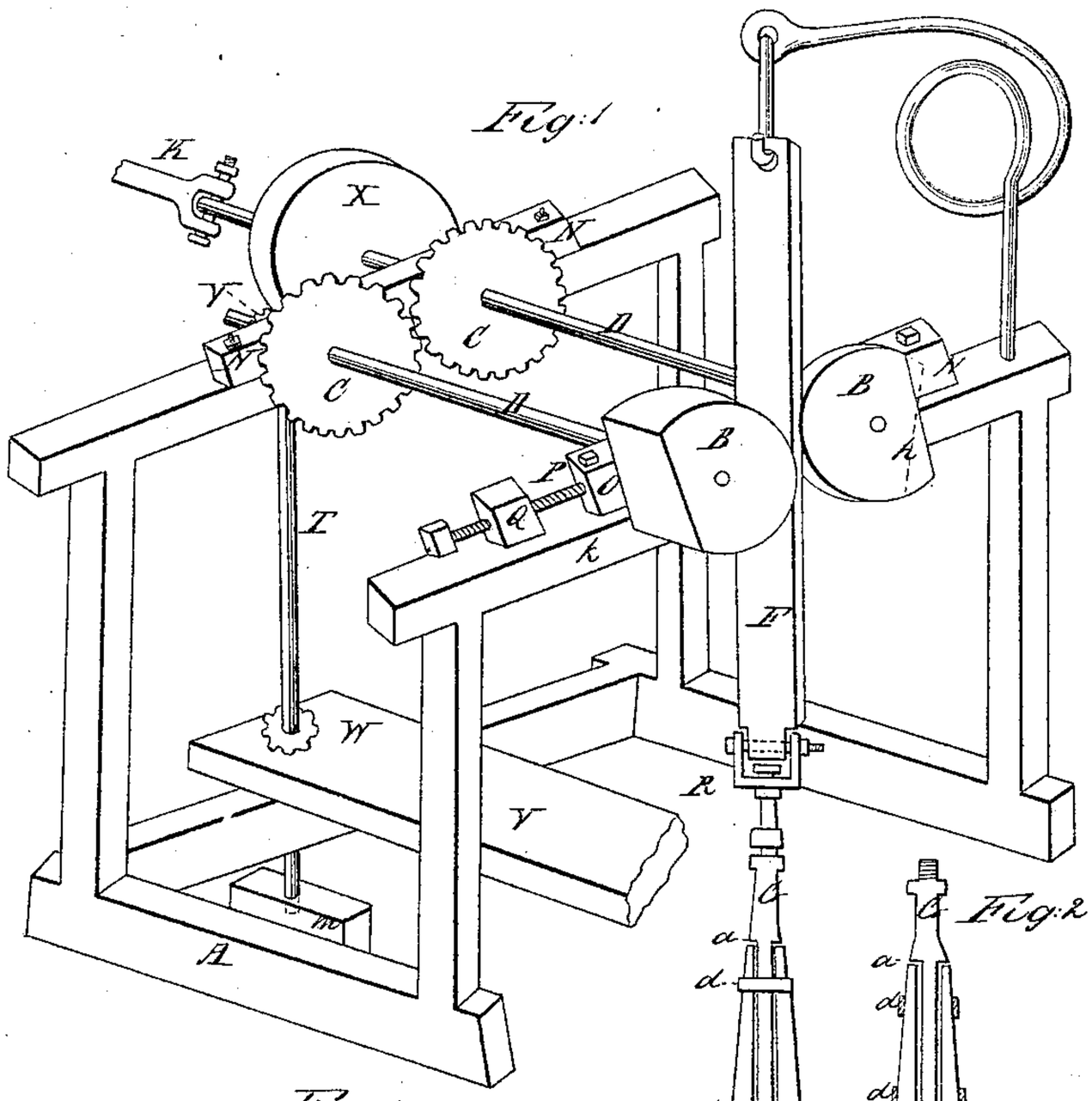

Fig: 4

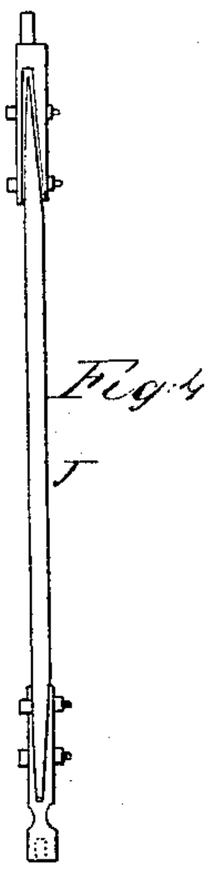

Fig: 2

Fig: 3

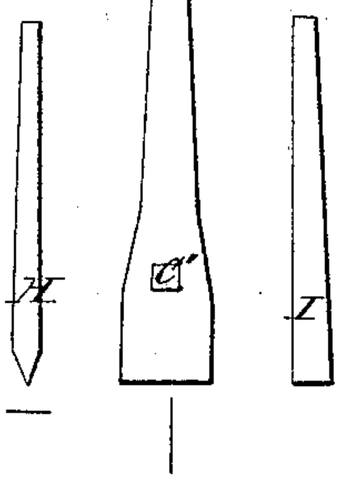

Fig: 6

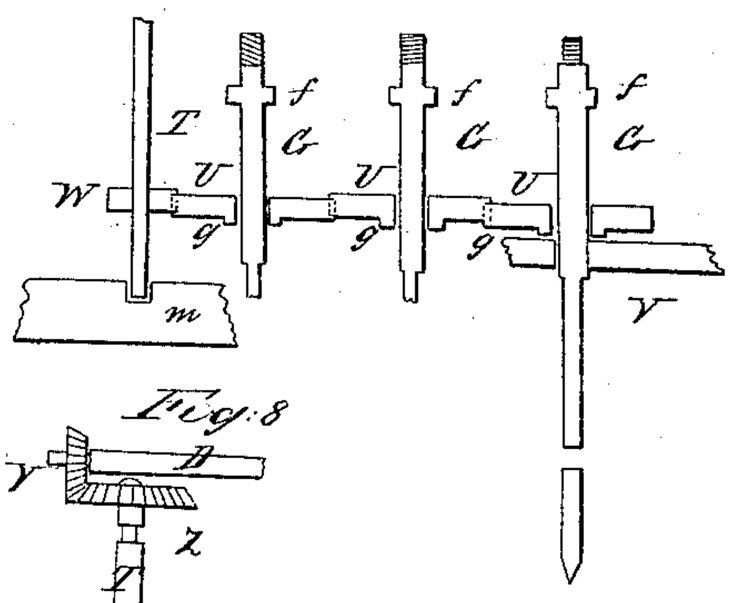

Fig: 9

Fig: 7

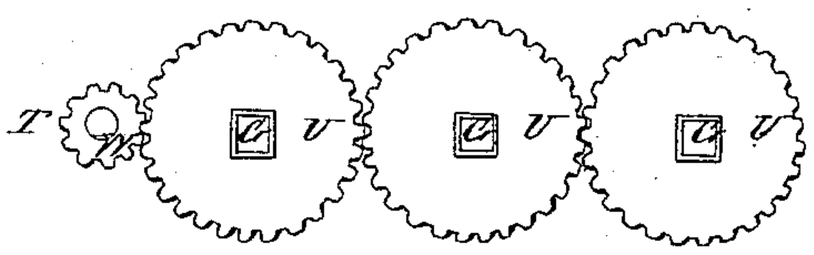

Fig: 8

Witnesses
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UNITED STATES PATENT OFFICE.

LUCIUS M. GILMORE, OF JANESVILLE, WISCONSIN, ASSIGNOR TO HIMSELF AND I. M. MAY, OF JANESVILLE, WISCONSIN.

ROCK-DRILLING MACHINE.

Specification of Letters Patent No. 30,023, dated September 11, 1860.

To all whom it may concern:

Be it known that I, LUCIUS M. GILMORE, of the city of Janesville, Rock county, and State of Wisconsin, have invented a new and useful Improvement in Machines for Drilling Rock and Dressing Stone, and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and letters of reference marked thereon, the same letters representing the same part in each figure.

My invention relates to certain improvements in drills for drilling or dressing stone, and adapting the same to be used with great advantage in boring great depths in rock for water or for analogous uses.

The nature of my improvements and manner of constructing and using the same, are hereinafter fully described.

Figure 1, is a perspective view. Figs. 2, 3, 4, 5, 6, 7, 8, and 9, represent the different parts of the drill, and devices for operating the same.

A in Fig. 1, is the frame having bearings N, and O, for the shafts D, D, to which shafts the broad surfaced cams B, B, are fastened, and are revolved by gears C, C.

F, is a wide elastic strap, or band, of proper width for the necessary surface pressure, between the cams, is made of leather, india rubber or other suitable material, and has the center member, G, of the drills attached to its lower end by means of the swivel R, while at its upper end is the spring E, or M, or other suitable spring to keep the strap F, in its proper position between the cams.

As the cams are revolved, and the flat or plane surfaces thereof are reached, the space between the cams, allows the strap and drill to descend of their own weight, with sufficient force for rock drilling or stone dressing purposes or for crushing rock, when a hammer, or pestle, or stamper, is substituted for the drill.

When the flat surfaces of the cams are passed as they revolve, the circular or periphery surfaces of the cams seize the strap with sufficient pressure to elevate the strap and drill, or hammer, until the flat surfaces of the cams are again reached, when the strap and drill are again set free and descend of their own weight—thus the drill or hammer is alternately lifted and set free by means of the wide strap and broad surfaced cams, with great rapidity—the drill, cams, strap spring and working part of the machine operating in harmony without jarring.

The strap F, may be made of sufficiently non-elastic material to be kept in an upright position by means of guides instead of springs.

The distance the drill is raised is regulated by changing the position of gears C, C, relatively to each other so that the cams will occupy relatively to each other a position indicated by the dotted line, *h*, by which it is obvious that the cams as they revolve elevate the strap (and consequently the drill or hammer) a less distance before it is relieved from the pressure and allowed to descend.

The degree of pressure of the cams on the strap is regulated by set screw, P, pressing against box bearing, O, which box bearing is allowed to move longitudinally on beam, *k*, of the frame, thereby bringing the surfaces of the cams nearer together, and giving any desired degree of pressure to the strap; or a wedge may be used for that purpose; or perhaps a better plan than either the set screw or wedge, is to employ a bolt extending through both box bearings, N, and O, the head of the bolt pressing one box bearing and the nut of the bolt pressing, as it is turned, the other box bearing.

The machine and drill may be operated by horse, or other power applied to the shafts D, through tumbling K, or otherwise. On shaft, D, a pulley may be placed; and to equalize the motion a fly wheel, X, may be used.

G, H, and I, are the principal members that constitute the drill, or it may be made of more members by properly shaping the center member, G, (as, in a hexagonal or octagonal form) to receive more members than H and I. G, is made with shoulders at, *a*, to receive the upper ends of H, and I, and with a mortise C″, to receive the tenons or projections, *b*, *b*, of the members H and I, and are all held firmly together by the bands or rings *d*, *d*, which are driven down on the wedge or taper form of the drill, by which it is obvious that the shoulders, *a*, mortise C″, tenons, *b*, as well as the center member, G, receive the shock of the descending blow,—thus forming a compact and firm

"tool," whether as a drill, or with the cutting edges of the members made broad to form a compound chisel for dressing stone.

By removing the rings, *d*, *d*, the members of the drill, or chisel, are readily separated to facilitate sharpening; thereby the inconvenience and often the impossibility of properly sharpening the drills in common use, whether made in a Z form, or otherwise, is overcome.

As drills become worn by use, their cutting edges become narrower, and as a consequence the drilled hole in the rock becomes less in diameter as greater depth is reached. This difficulty is obviated in my drill by expanding or spreading the cutting edges of the members H and I, by means of thin pieces, *e*, *e*, which are composed of plate or sheet metal, or other suitable material, and are inserted between the members H and I, and member, G, before the rings *d*, *d*, are fully driven to their places.

The thickness of the plates, *e*, *e*, and their position, will indicate the necessary expansion to preserve the diameter of the hole to be drilled—the members H and I, being kept steadily in their places by the tenons *b*, *b*, and the mortise C″, as H and I, are separated or expanded the proper distance by means of the plates, *e*, *e*.

The member I, of the drill, has its cutting edge made in the form of the segment of a circle to correspond with the circumference of the hole drilled and by revolving the drill in the path of a horizontal circle as the work progresses the sides of the drilled hole are trimmed smooth and round,—the points of the cutting edges of the members of the drill are represented by S, in Fig. 9.

It is evident that by the mode herein described for constructing and operating a drill, the advantages are gained, of readily separating the members for accuracy of sharpening—trimming the drilled hole smooth and true—and of maintaining a uniform size of the drilled hole however great the depth; and in addition thereto the advantages of, a greater durability of the drill, and a greater amount of work performed in a given period of time, are also gained. As the work of drilling progresses, sections or joints of connecting rods, J, (Fig. 4,) of suitable length are used to connect the drill with swivel, R.

When used in drilling wells, the drill can most conveniently, be revolved by hand, but when the members, G, H, and I, are made broad, as a compound chisel, or "built tool," suitable for dressing stone, it is revolved by gear wheels, as in Figs. 6, and 7, or by bands or pulleys occupying the same, or similar position as the gear wheels, and driven by shaft, T, at the upper end of which are gears Y, and Z, in Fig. 8, the power being communicated from shaft D. The gears Y, and Z, are located in the rear of C, in Fig. 1.

The gear wheels, or pulleys, or band wheels U, resting on sill V, are made with a square aperture in the center to receive the corresponding square part of the member G, as shown in Figs. 6 and 7. Dressing stone level is done by placing the stone to be dressed on a carriage or frame, on "ways," and caused to pass slowly beneath the chisels, by feed works similar to saw-mill feed works—the dress, or even surface of the stone being regulated by collars *f*, in Fig. 6.

When more than one drill or chisel is used at the same time, a corresponding number of cams on the shafts D, or an additional number of shafts with cams thereon must be employed.

The mode herein described of operating chisels or drills by means of cams, B, B, and strap F, I also use in operating a trip hammer, hammers for driving piles, and pestles or stampers for crushing quartz and other rock, and for analogous purposes.

I am aware that a removable pick or drill has been described, and therefore do not claim a removable pick or drill independently of the mode herein described, of constructing, and connecting together the members or parts, so as to make a safe, economical and efficient drill or built tool. I am also aware that revolving cams have been used to elevate drills—the cams having around their circumference grooves to receive an iron rod or spindle attached to the drill, the grooved cams alternately lifting and setting free the spindle of the drill. I do not therefore broadly claim cams for operating a drill, &c., independently of the elastic strap as herein described.

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

1. Constructing and combining members G, H, and I, of a drill, and rings, *d*, *d*, or their equivalent, when arranged substantially as described, and for the purposes set forth.

2. The devices consisting of plates, *e*, *e*, or their equivalent, in combination with members G, H and I, and rings, *d*, *d*, when used for adjusting the diameter of a drill substantially as described.

3. The use of the elastic strap, E, and cams, B, B, when arranged for operating a drill, and for analogous purposes, substantially as described.

LUCIUS M. GILMORE.

Witnesses:

HARVEY S. GILMORE,

C. E. HARWOOD.