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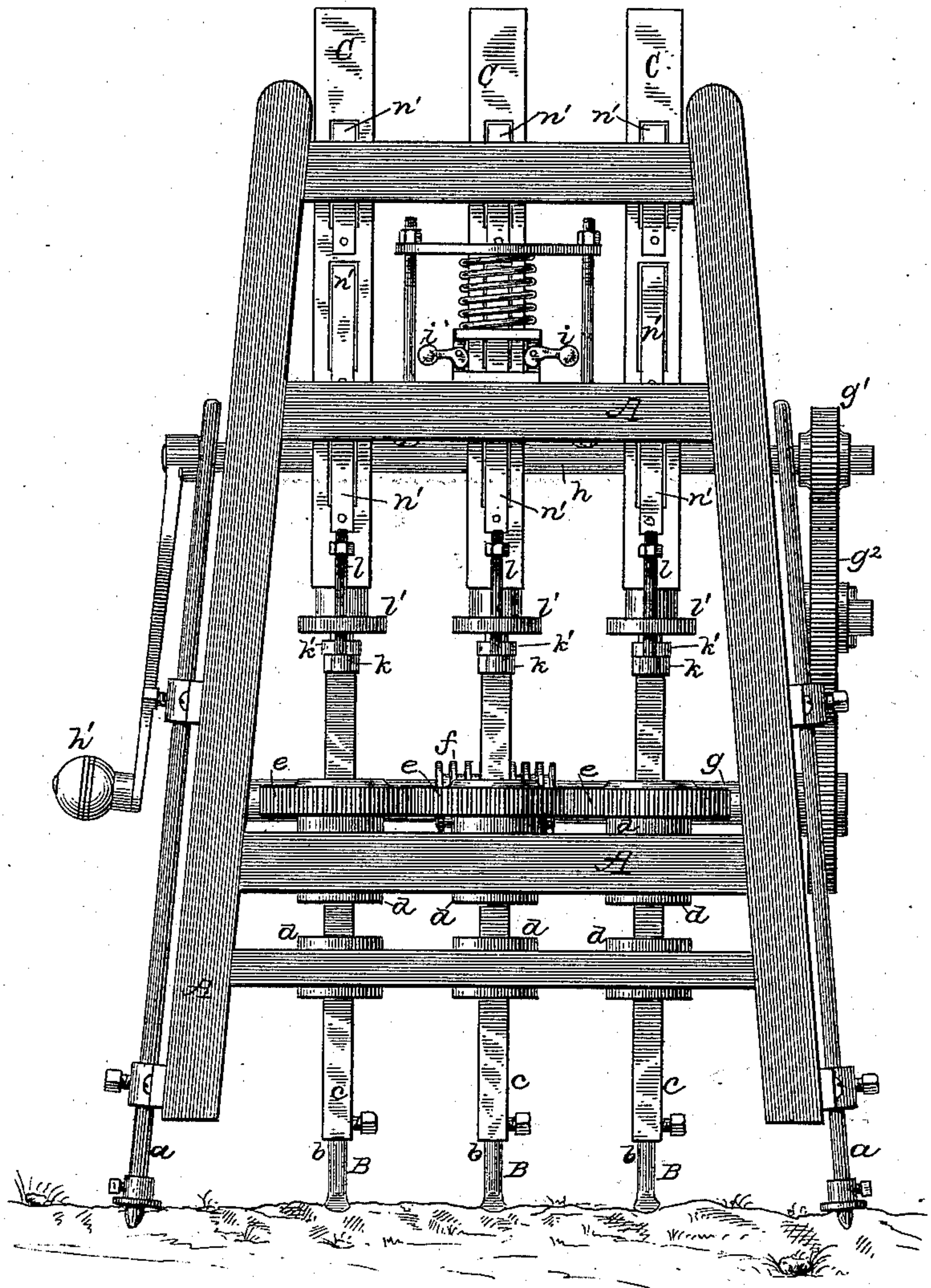
4 Sheets—Sheet 1.

L. McMURRAY.
STONE DRILLING MACHINE.

No. 311,082.

Patented Jan. 20, 1885.

Fig. 1.



Attest:

Philip F. Larnet.
Lowell Bartle

Inventor:

Louis M^c Murray.

By *Wm. O. Wood*
Attorney.

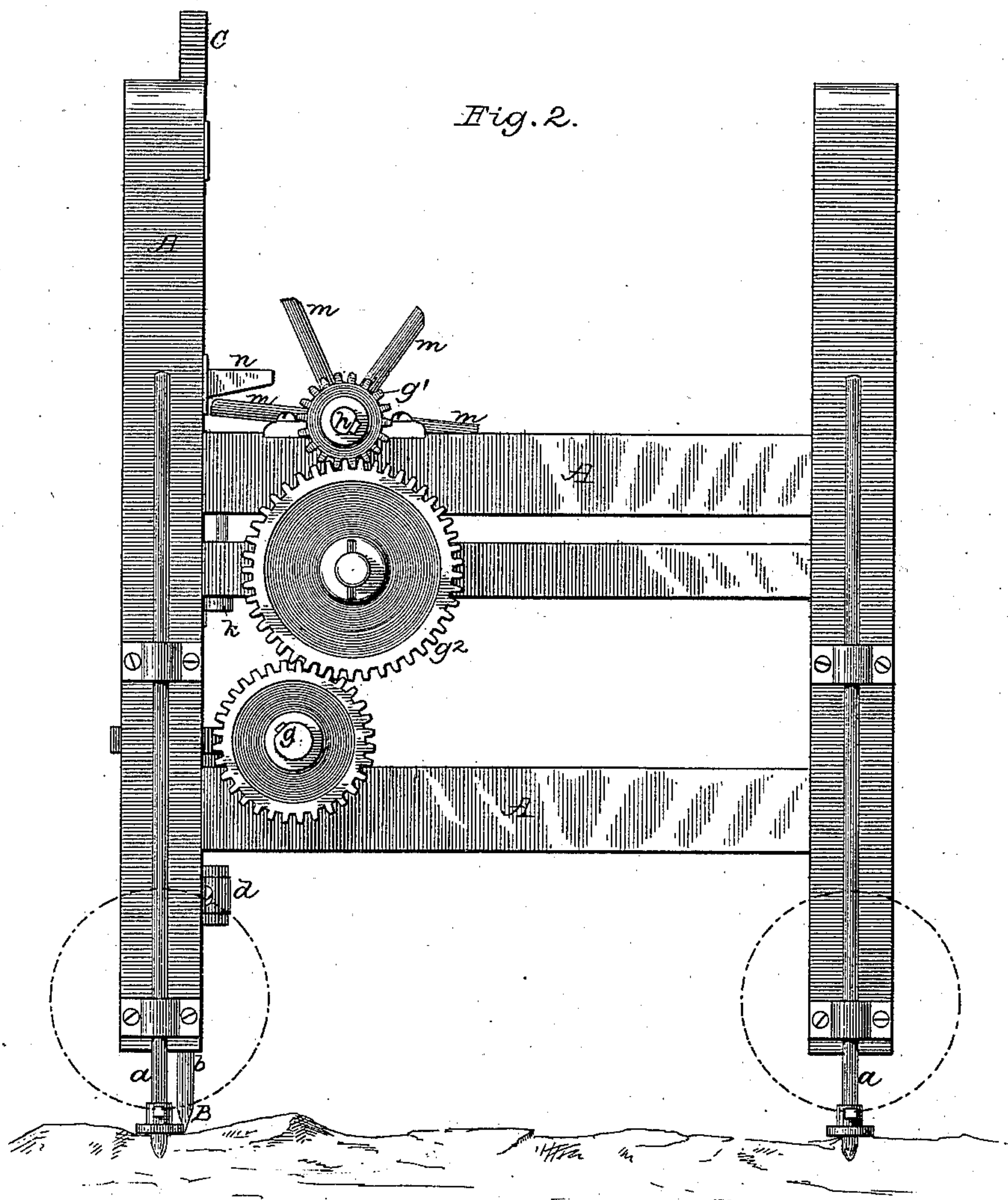
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Attorney.

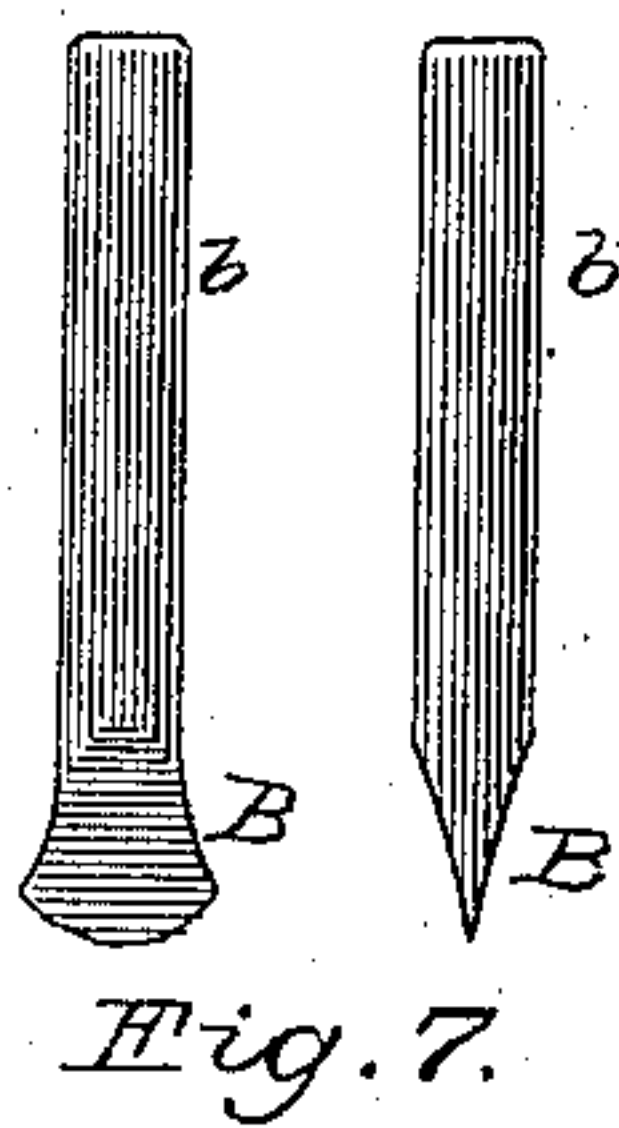
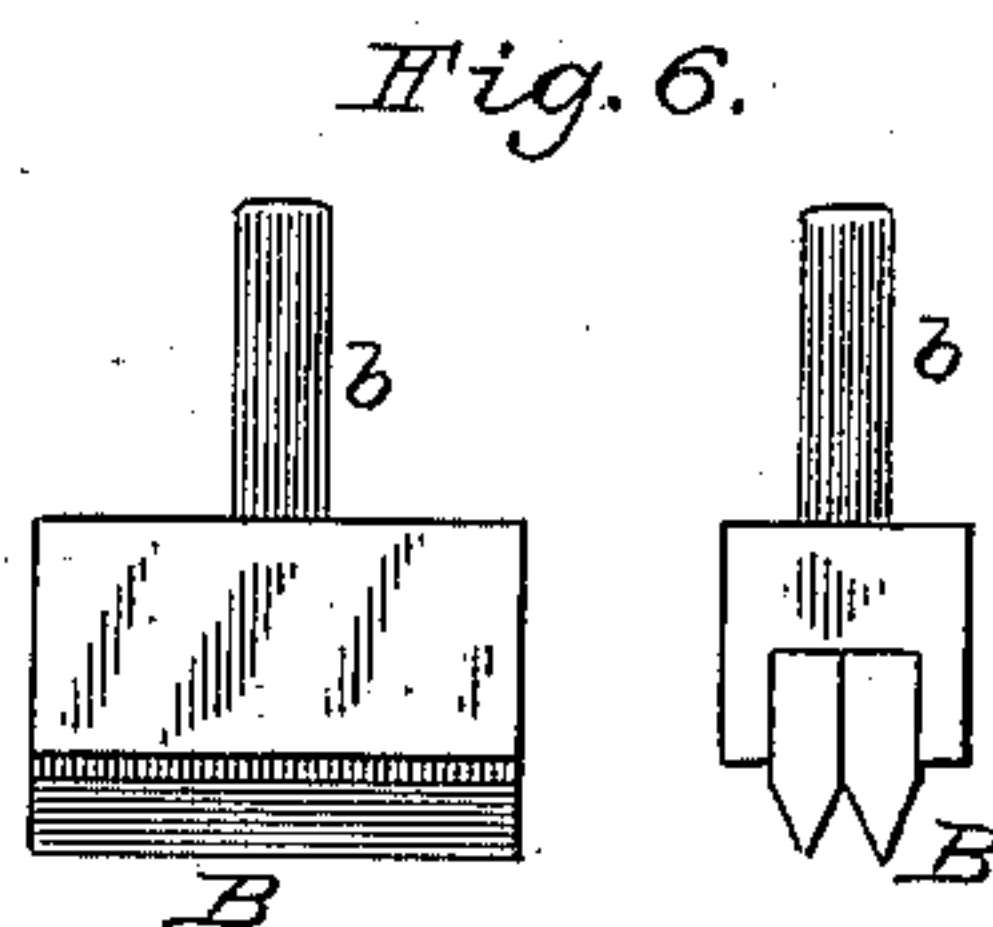
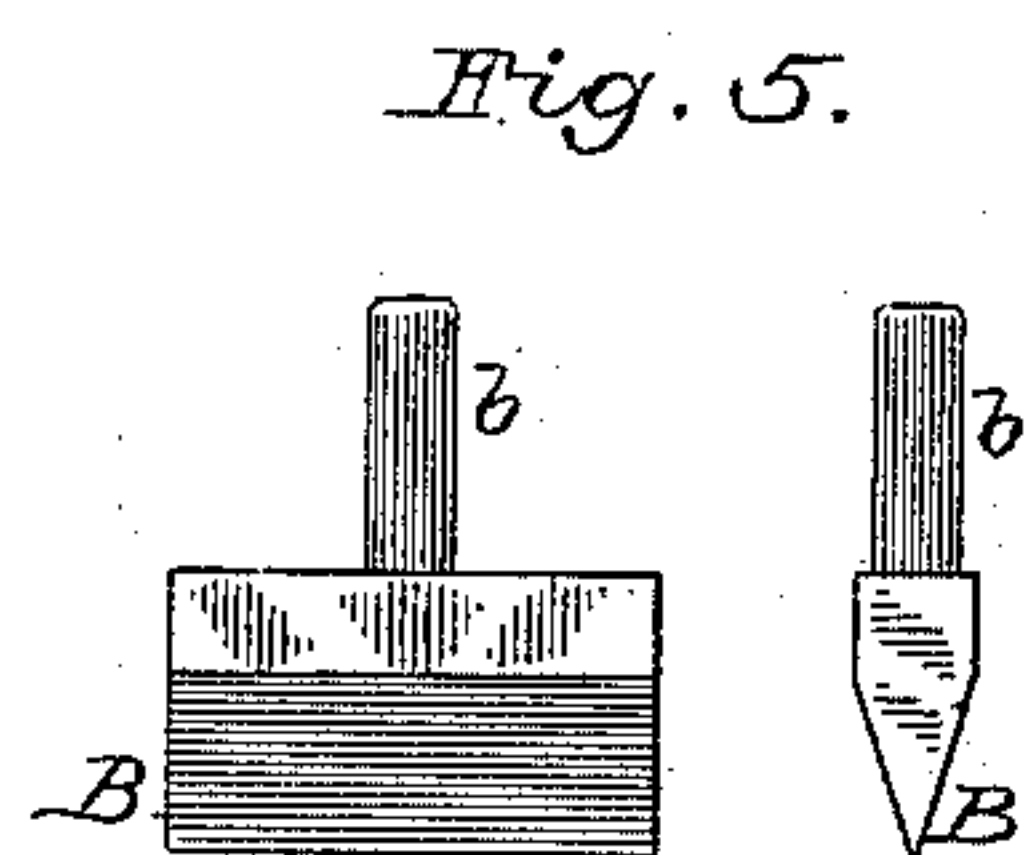
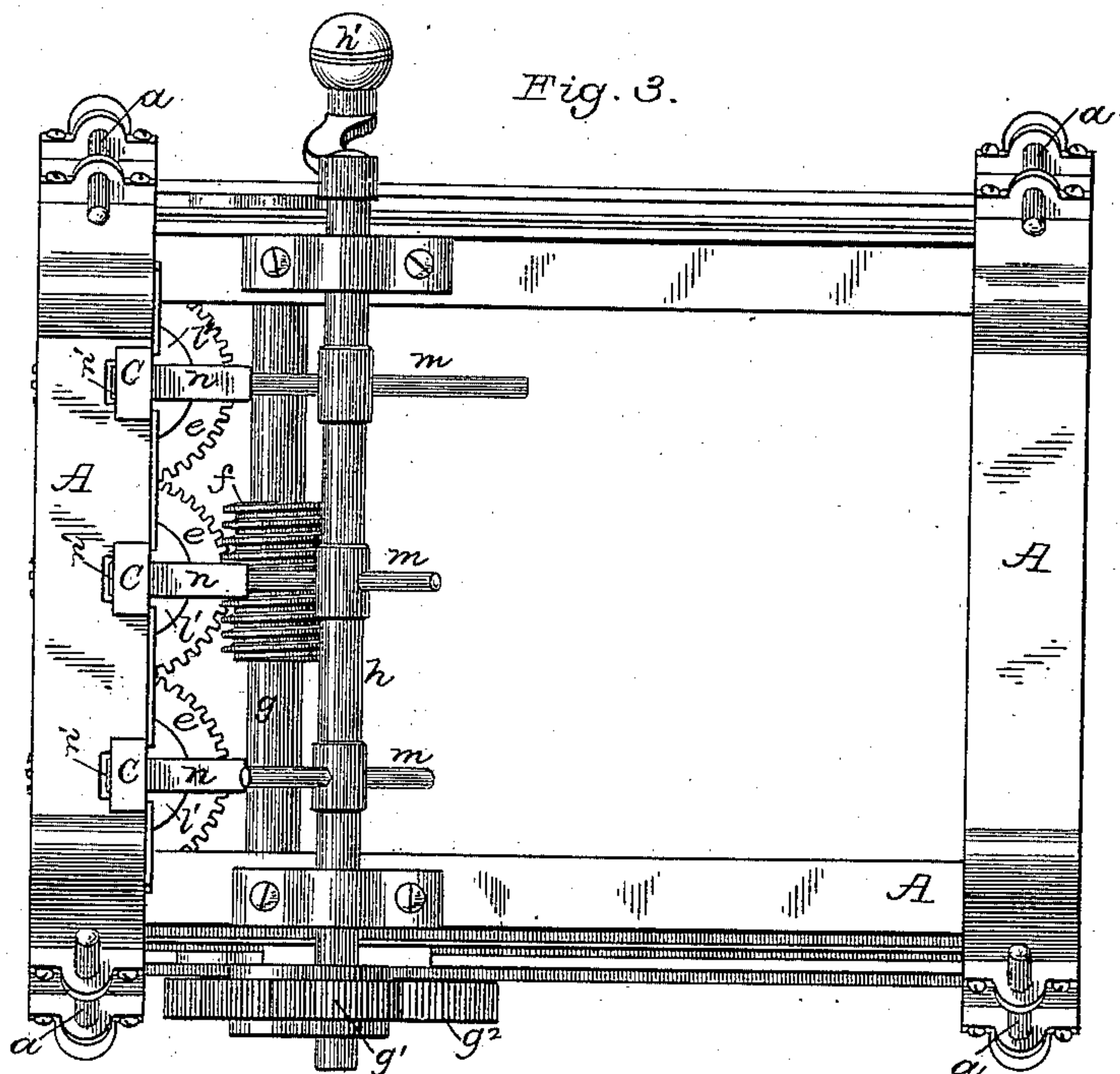
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Attest:

Philip F. Larnet.
Nowell Bartle.

Inventor:

Louis M^c Murray.
By Wm. B. Munn
Attorney.

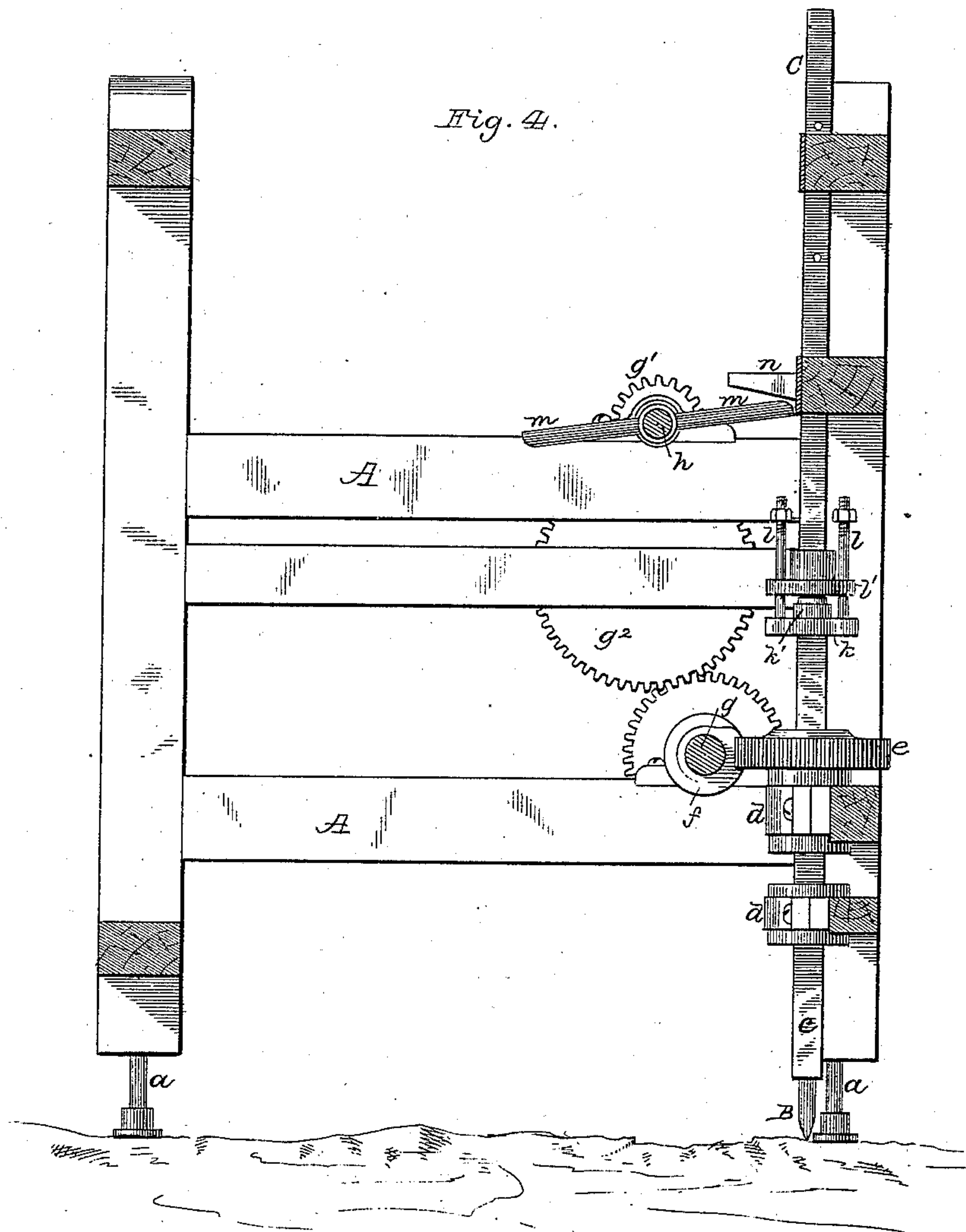
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Philip F. Larnet.
Lowell Bartlett.

Inventor:

Louis M^c Murray.
By Wm M^c Murray
Attorney.

UNITED STATES PATENT OFFICE.

LOUIS McMURRAY, OF BALTIMORE, MARYLAND.

STONE-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 311,082, dated January 20, 1885.

Application filed August 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, LOUIS McMURRAY, of the city and county of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Stone-Drilling Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of the several features of my invention.

The objects of my improvements are to provide a simple and effective rock-drilling machine especially adapted for use by farmers and others upon rocks obstructive to cultivation preparatory to blasting or wedge-splitting, although my machines are capable of a more general service in stone-working.

After describing a machine embodying my invention, one form of which is illustrated in the drawings, the features deemed novel will be specified in the several claims hereunto annexed.

Referring to the drawings, Figure 1 is a front view of one of my machines. Fig. 2 is a side view of the same. Fig. 3 is a top or plan view. Fig. 4 is a vertical central section of the same in line with the axis of one of the drills. Figs. 5, 6, and 7 in each instance illustrate in several views different forms of drills as employed by me in this machine.

The frame A may be variously constructed, provision being properly made for the mounting of the several bearings for the operative mechanism. As here shown, the frame has four corner-posts, each of which is provided with longitudinally-adjustable legs *a*, composed of iron or steel, or having pointed tips of metal, whereby the machine may be properly mounted for service over or upon a rock which is to be drilled. As a rule, the corner-posts are to be provided with wheels, as indicated in dotted lines, to enable it to be readily moved from place. The drills B here shown are three in number; but more or less of them may be employed without departure from my invention. Said drills may be variously formed as to the character of their cutting-edges; but each has a shank, *b*, by which it is secured to its helve *c*. A straight-edged drill is shown in Fig. 5. Two similar drill-bits inserted into a drill-socket are shown in Fig. 6,

and in some cases three or more of such bits are desirable, and in Fig. 7 a drill of a more common form is shown. Each drill-helve *c* has a socket at its lower end for receiving the shank of a drill, and it also has a set-screw for confining said shank. The helves *c* are polygonal in cross-section, but may be splined in a well-known manner, if desired, and each helve has two rotatable guide-bearings, *d*, one above the other, mounted in suitable boxes provided therefor in horizontal portions of the frame A, by which the drills are accurately guided during their reciprocating movements. The upper rotating guide-bearings, *d*, are each encircled by and keyed to a gear, *e*, and the several gears successively mesh with each other, so that when the central gear is rotated both of the others are also rotated, it being obviously immaterial in what direction either drill is rotated while drilling. This rotative movement is imparted to the drills by a worm-gear, *f*, on a shaft, *g*, which is coupled to a gear, *g'*, on a crank-shaft, *h*, by an intermediate gear, *g''*.

Each drill is provided with a reciprocating hammer, C, which is guided in line with the axis of the drill by suitable bearings in horizontal portions of the frame A. These hammers, being of considerable weight, may operate in striking by gravity alone; or, if desired, they may be supplemented by a spring, as shown in connection with the central hammer. The spring so used can be provided with a vertically-adjustable head-plate, or organized, as shown, with weighted lever-cams *i* in the lower or bearing sleeve of the spring, so that as the hammer is lifted the spring will be compressed, and then exercise its force when the hammer is dropped, and at the same time freely permit the hammer to progressively descend according to the descent of the drill into the rock. Each hammer is coupled to its drill-helve, so as to permit the drill to be positively lifted with the hammer, and still afford ample intervening space between the top of the helve and the striking face or foot of the hammer to enable the desired shock or blow to be given to the drill. This is done by means of a sliding swiveled coupling composed of a cross-head, *k*, swiveled to the helve near its upper end, and secured thereon by a collar, *k'*, and two vertical rods, *l*, which slide

freely in holes in a flange, l' , at or near the foot of the hammer. These rods, being vertically adjustable in their cross-head, or having nuts on their upper ends, as shown, enable any desired adjustment of the lift of the hammer with relation to the head of the helve. In some cases, when operating upon some kinds of rock, the vertical rods l should be short enough to allow a mere clearing-space
 10 between the drill-helve and the hammer.

The lifting of the hammers and drills is performed by means of the driving-shaft h , having in this instance a crank, h' , and a tappet-arm, m , for each hammer, which engages with
 15 a tappet-stud, n , projecting from the coincident side of the hammer.

It is obvious that as the drills descend in the performance of their work the relative positions of the tappet-studs and crank-shaft will
 20 vary, and that said studs should be variable in position.

Instead of having a removable stud, as heretofore, I have provided each hammer with several pivoted studs arranged in a vertical line
 25 thereon, and have located them in recesses in the hammer, so that only the one stud required for service will project therefrom, the others being housed in their recesses so as to be wholly out of the way, and for confining said
 30 studs both in their projected and in their retired positions each is controlled by a flat spring, n' , which bears upon the flat rear end of the stud near its pivot when the stud is projected, and upon a flat surface on the lower
 35 side of the stud when it is retired.

I am aware that rotative reciprocating drills have heretofore been operated by tappet-arms and gearing, and also that reciprocating sliding hammers have heretofore been employed
 40 with rotative drills; but I believe I am the first to so organize a separate hammer with a drill or drill-helve that the drill will be lifted

by the hammer and yet be freely rotative, and also so that in operation the drill can drop into contact with the stone a little in advance of the delivery of a blow thereon by its hammer, thus providing for an effective cutting action of the drills upon the stone, similar to that involved in hand-drilling. It will be seen that the rotation of the drills is very gradual, and that, although they are rotatively moved while in contact with the stone, the degree of such movement is so slight as to not adversely affect the cutting-edges of the drills to any material extent.

It is obvious that it is not essential that the crank be applied directly to the tappet-shaft, and it is equally obvious that the machine can be operated by horse-power or other motor by the use of belts and pulleys, which can readily be applied, without in any manner affecting my invention.

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

1. The combination of the driving-shaft and its one or more tappet-arms, the one or more sliding hammers, one or more drills coupled to but capable of rotation independently of their hammers, and gearing coupled to said driving-shaft for rotating the drills, substantially as described.

2. The drill-hammer longitudinally recessed, in combination with the series of stud-arms pivoted in said recesses, and provided with controlling-springs, substantially as described.

3. The combination of the reciprocating hammer, the drill-helve, and a sliding swiveled coupling for connecting them, substantially as described.

LOUIS McMURRAY.

Witnesses:

PHILIP F. LARNER,
 HOWELL BARTLE.