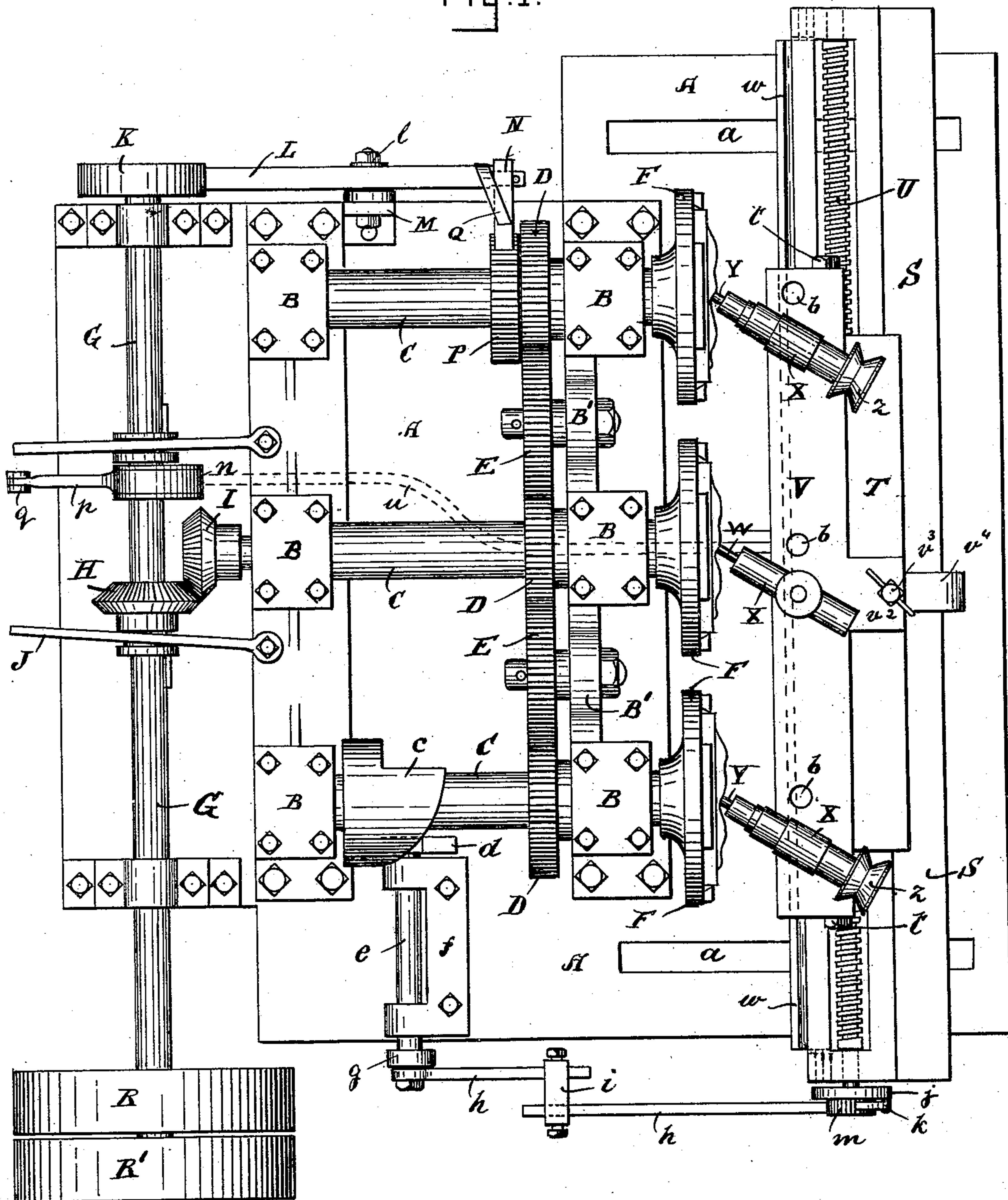


2 Sheets—Sheet 1.

Patented July 23, 1889.

No. 407,736.

Fig.1.



Inventor.

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(No Model.)

2 Sheets—Sheet 2.

W. A. N. LONG.
CARVING MACHINE.

No. 407,736.

Patented July 23, 1889.

Fig. 2.

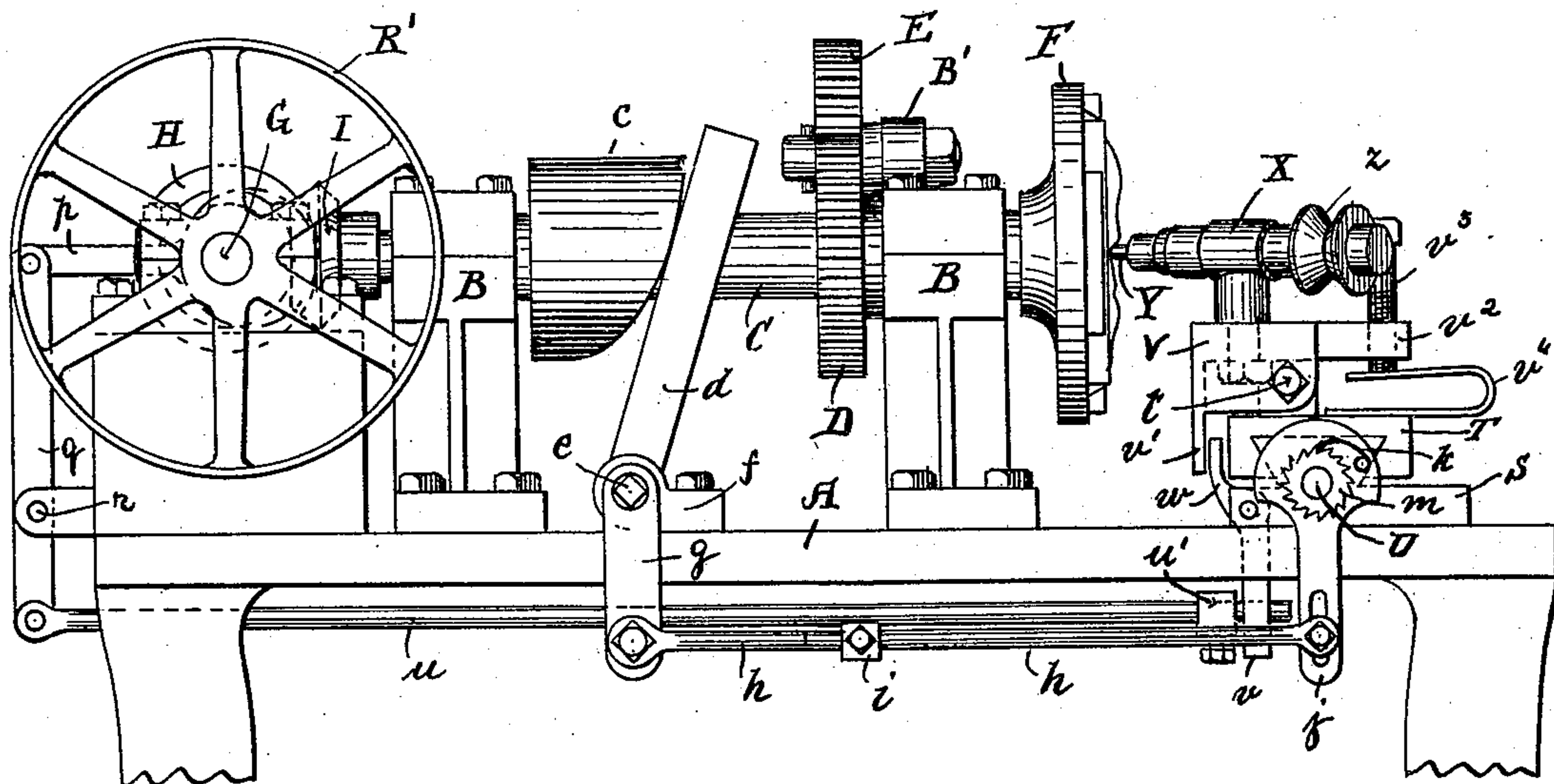
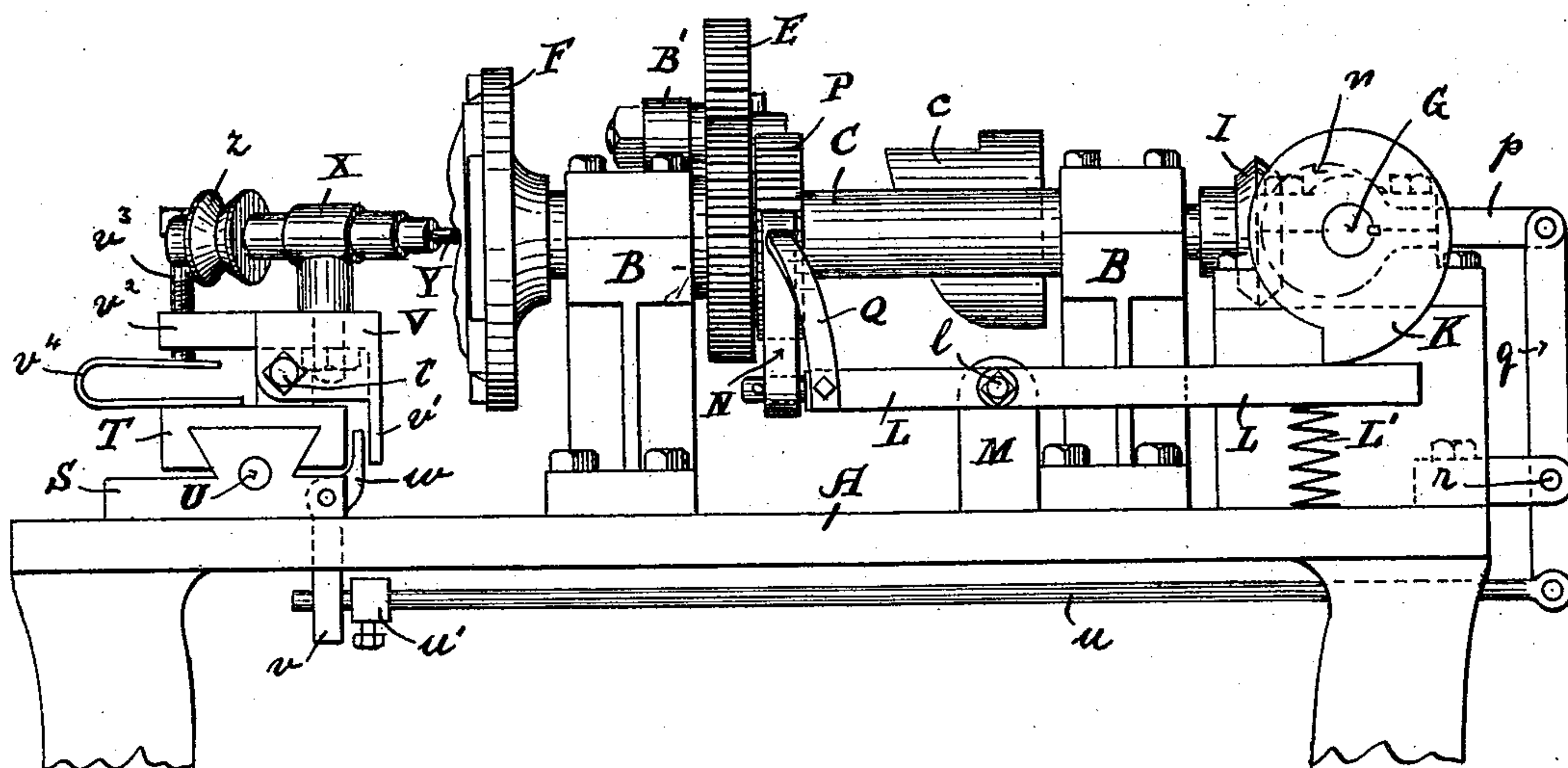


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM A. N. LONG, OF BOSTON, MASSACHUSETTS.

CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 407,736, dated July 23, 1889.

Application filed October 10, 1888. Serial No. 287,714. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. N. LONG, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Carving-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

10 The object of my invention is to produce a machine for carving or engraving wood, metal, marble, or stone, so as to produce a fac-simile or fac-similes of any pattern, cast, or mold placed in the machine.

15 The invention consists of two or more shafts mounted in suitable bearings upon a bed-plate and caused to rotate in the same direction, and each provided with face-plates, one of which carries the pattern which it is desired to reproduce in wood, metal, marble, or stone, the other face-plates carrying the material to be carved or engraved; and the invention further consists in the peculiar method of mounting and operating the cutters and feed, all as hereinafter fully set forth, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a plan or top view of a carving or engraving machine embodying my invention. Fig. 2 is a view of one side of the machine, and Fig. 3 is a view of the other side of same.

A represents a table or bed-plate, upon which are secured bearings B, in which shafts CC are free to rotate. These shafts are geared together, so as to rotate in the same direction by means of cog-wheels D, mounted upon the shafts C, and intermediate cog-wheels E, mounted upon studs secured in flanges B', cast in one with the bearings B. The outer ends of the shafts C are provided with face-plates F, to one of which the pattern or mold is secured, and to the others are secured the blocks of wood, metal, marble, or stone to be carved or engraved.

A rotary motion is imparted to the shafts C C from the main shaft G, which motion may be continuous or intermittent, according to the design or material to be operated upon. When the motion is to be continuous, it is imparted from the shaft G to the central shaft C through bevel-gears H I, the gear H be-

ing mounted loosely upon the shaft G, so that it is free to be thrown into or out of gear with the wheel I by means of the hand-lever J, as may be required.

When it is desired to have an intermittent motion imparted to the shafts C, the wheel H is thrown out of gear with the wheel I, and the motion is imparted from the shaft G by a cam K, secured on the end of the shaft, and as the cam rotates it operates one end of a lever L, fulcrumed at l to a bracket M on the bed-plate A. On the outer end of this lever is secured a pawl N, that takes into a ratchet-wheel P, mounted upon one of the shafts C, a spring Q keeping the pawl N in contact with the ratchet-wheel, so that as the cam K depresses one end of the lever L the other end is thrown up, and through pawl N causes the ratchet-wheel P to be partly rotated. The lever L is kept in its normal position by a spring L'. On the shaft G is also mounted a fast and loose pulley R R', to which motion is imparted from any convenient source.

S is an adjustable slide-bed, which can be secured in any desired position in front of the face-plates F by bolts passing through slots a in the bed-plate A, and upon this slide-bed S is mounted a slide T, provided on its under side with a nut or nuts, through which passes the screw U in the bed S, similar to the screw-feed in an ordinary lathe.

Upon the slide T is mounted a tool-carrier plate V, which is secured thereto by screws t, passing through the end of the tool-carrier plate and into lugs formed on the slide T, so that the front portion of the tool-carrier plate is free to be tilted up, for the purpose hereinafter described. On the tool-carrier plate V are mounted tool-carriers X. In the center one a pointer or tracer W is secured, and in those at either end are secured cutting-tools Y. The tools Y are each mounted on a spindle that passes through the tool-carrier X, the outer end of the spindle being fitted with a grooved pulley Z, to which a quick rotary motion is imparted by a cord from any suitable source.

The tool-carrier plate V is provided with two or more holes b, for the adjustment of the position of the tool-holders.

An intermittent feed is imparted to the slide T from a cam c, mounted upon one of

the shafts C, which cam actuates a lever *d* on one end of a rod *e*, mounted in bearings *f*, secured to the bed-plate A. On the outer end of the rod *e* is secured a lever *g*, which, by rods *h h* and block *i*, is connected to a lever *j*, mounted loosely upon the end of the screw-shaft U, and which is provided with a spring-pawl *k*, that operates a ratchet-wheel *m*, secured on the end of the screw-shaft U.

The object of having the connecting-rod in two parts connected together is, that the feed of the screw U can be readily adjusted according to the design or thickness of the material to be engraved.

Upon the shaft G is mounted an eccentric *n*, to the band of which is secured an arm *p*, the outer end of which is pivoted to one end of a lever *q*, fulcrumed at *r* (see Fig. 3) to a bearing secured to the bed-plate A. To the lower end of the lever *q* is connected a rod or bar *u*, the outer end of which passes through a tail *v* on what I call a "kick-out" bar *w*, which extends across the machine and is mounted in lugs or ears formed on the ends of the slide-bed S. On the rod *u* is secured, by means of a screw, a block *u'*. The tool-carrier plate V is provided along its edge with a small downwardly-projecting lip or flange *v'*, which comes directly in front of the kick-out bar *w*. The object of this kick-out arrangement is to raise the tracer and cutters periodically from the face of the material being operated upon, so that should there be any sharp angles or projection that the tracer would not ride over, it, together with the cutters, is first raised from and then again brought into contact with the face of the material, for as the eccentric *n* throws out the arm *p* the upper portion of the lever *q* is thrown out, while the lower part is thrown in and causes the block *u'* on rod *u* to strike the tail *v* and throws out the kick-out bar, which, coming in contact with the lip *v'*, causes the slide V to turn on its fulcrums *t*, thereby carrying the tracer and cutters away from the face of the material being operated upon, and as the eccentric *n* rotates it allows the kick-out bar and slide to resume their normal position, bringing the tools again in contact with the face of the work.

The tool-carrier plate V is provided with a projection *v²*, through which a screw *v³* passes, and a spring *v⁴* is placed between the projection *v²* and the slide T. The object of this spring and screw is to regulate the pressure of the tools upon the face of the material, as well as to assist in returning the tool-carrier plate to its normal position after being raised by the kick-out.

The operation is as follows: The pattern, cast, or mold that it is desired to reproduce is secured to the central face-plate F, and the material to be engraved is secured to the other face-plates. The tracer W and tools Y are then set on a line with each other and at the desired angle, which must be all alike. The

machine is then started, the cutters being rotated at a high rate of speed, while the face-plates are rotated slowly, continuously, or intermittently, as before described, and the slide T is fed forward intermittently by the cam *c*, through lever *d*, shaft *e*, lever *g*, rods *h*, pawl-lever *j*, pawl *k*, ratchet-wheel *m*, and screw U. At each revolution of the shaft G the kick-out plate *w* is operated, thereby raising the tracer and tools from the face of the material. This operation is continued until the cutters come to the center of face-plates when all the material has been operated upon and fac-similes of the pattern have been produced. When the feed of the face-plates is intermittent, then the kick-out and slide-feed must be so timed that they are operated, while the face-plates remain stationary.

It will be seen that by having the tools set on an angle the cut is on the corner or edge of the tool. Consequently a tool of comparatively large diameter can be employed and yet cut in the finest parts, while the round faces of tracer and tools present an incline to the material, whereby they freely ride over any projection.

What I claim as my invention is—

1. A carving-machine comprising face-plates for carrying the pattern and material to be operated upon, means for intermittently rotating same, substantially as described, a tracer and rotating tools mounted in tool-carriers and arranged to stand horizontally but on an angle to the face of the material to be operated upon, and means for periodically raising the tools and tracer from the face of the material, substantially as shown and described.

2. The shafts C, mounted in suitable bearings and to which rotary motion is imparted, the gears D E, and face-plates F, in combination with the slide-bed S, slide T, pivoted tool-carrier plate V, having a lip *v²*, the spring *v⁴*, screw *v³*, tool-carriers X, tools Y, and tracer W, substantially as and for the purposes set forth.

3. The combination of the shaft G, the cam K, mounted thereon, the lever L, fulcrumed on the frame and having its outer end in contact with the cam K, and a pawl N, mounted upon its inner end, the shafts C, and face-plates F, gears D, mounted upon said shafts, and ratchet-wheel P, mounted upon one of the shafts C, and the intermediate gears E, for imparting an intermittent rotary motion in the same direction to said shafts C and face-plates F, substantially as shown and described.

4. The cam *c*, mounted upon shaft C, in combination with shaft *e*, having a lever *d* mounted on one end, and a lever *g* on its other end, the slide-bed S, slide T, and screw U, passing along the slide-bed and under the slide, ratchet-wheel *m*, and lever *j*, mounted upon one end of the screw, pawl *k* on lever *j*, the rods *h h*, connecting the levers *g* and *j*,

and adjustable block *i*, for connecting the rods *h h* together, substantially as and for the purposes set forth.

5 5. The shaft *G*, eccentric *n*, mounted thereon, lever *q*, fulcrumed to the frame, arm *p*, connecting lever *q* with eccentric *n*, and rod *u*, having an adjustable block *u'*, in combination with the kick-out lever *w*, fulcrumed on the slide-bed *S*, and tool-carrier plate *V*, piv-
10 oted at each end to the slide *T*, and having a lip *v'*, substantially as and for the purposes set forth.

15 6. The spring *v⁴* and screw *v³*, in combination with the slide *T* and tool-carrier plate *V*, pivoted at each end to the slide *T*, for throwing the plate *V* back after it has been raised, substantially as set forth.

7. In a carving-machine, a series of rotating face-plates for supporting the material to be operated upon and the pattern to be re-
20 produced, and a tracer and cutting-tools, the axes of which are on a plane parallel to the axes of the face-plates, but on an angle to the face of the plates, so that the cut is made
25 by the side of the tool, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of July, A. D. 1888.

WILLIAM A. N. LONG.

Witnesses:

L. W. HOWES,
E. PLANTA.