No. 819,080. PATENTED MAY 1, 1906.

J. R. PEIRCE.

STONE WORKING MACHINE.

APPLICATION FILED NOV. 14, 1904.

3 SHEETS—SHEET 1.

FIG. 1.

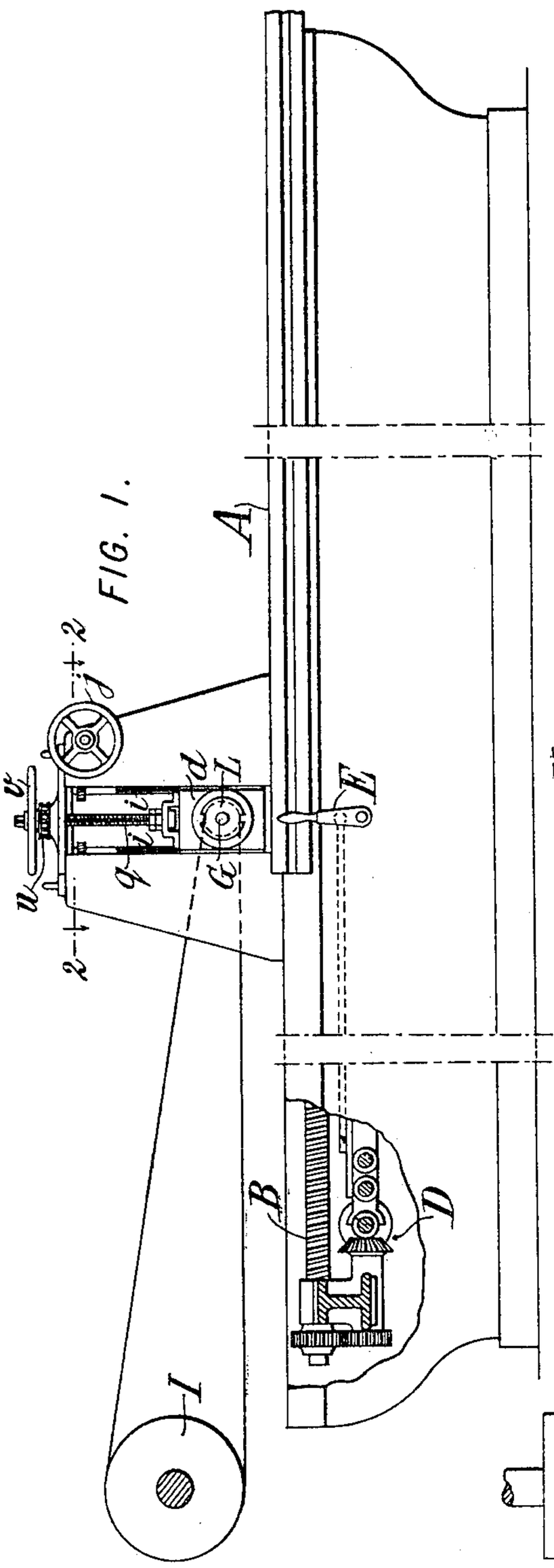
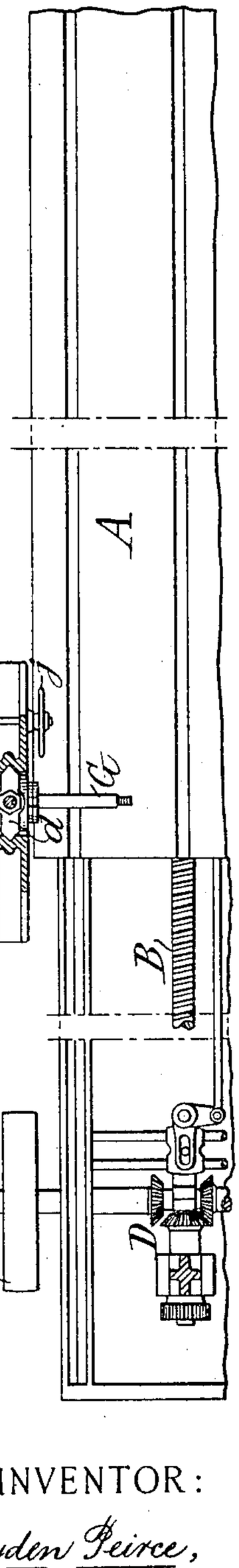


FIG. 2.



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3 SHEETS—SHEET 2.

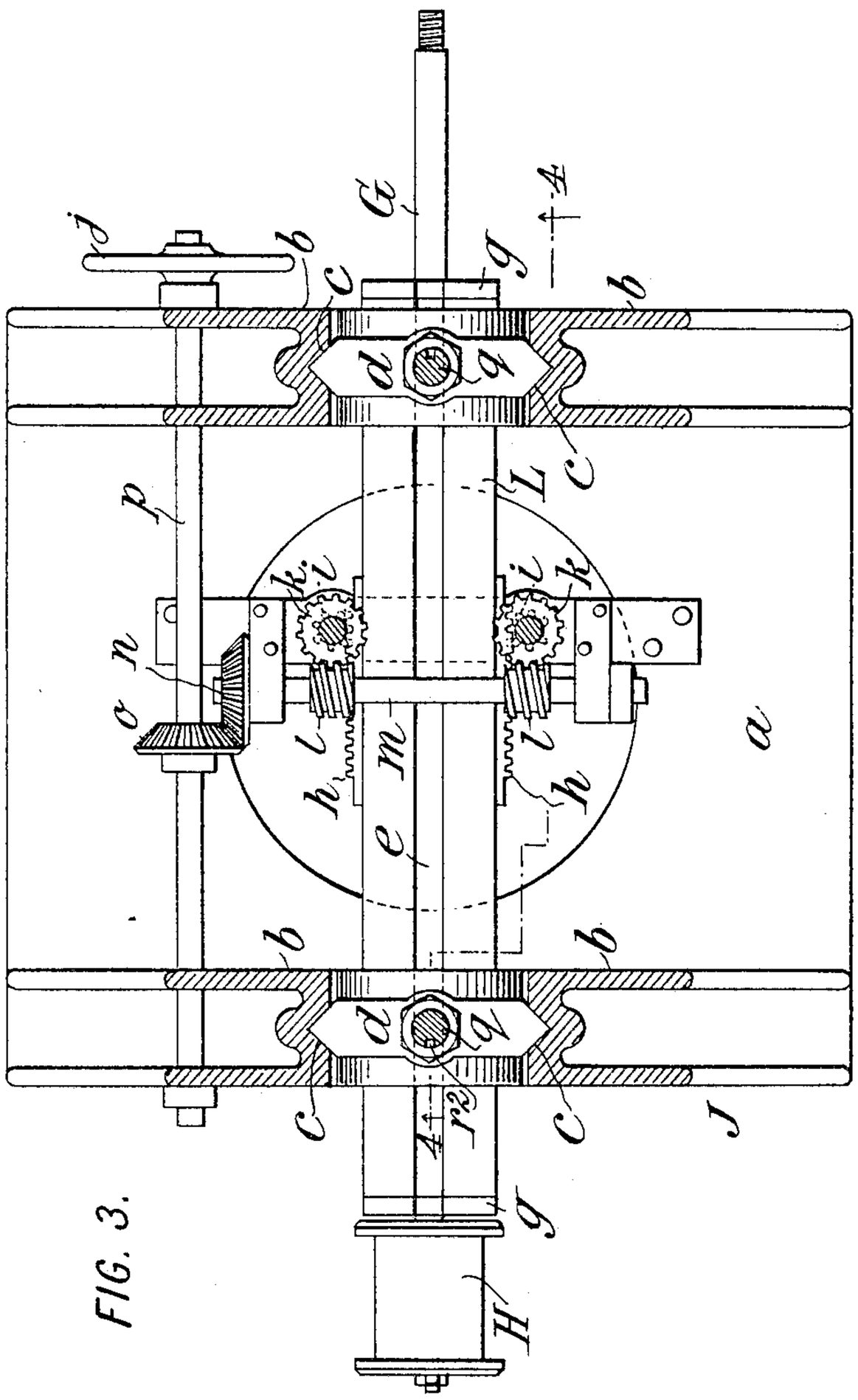

FIG. 3.

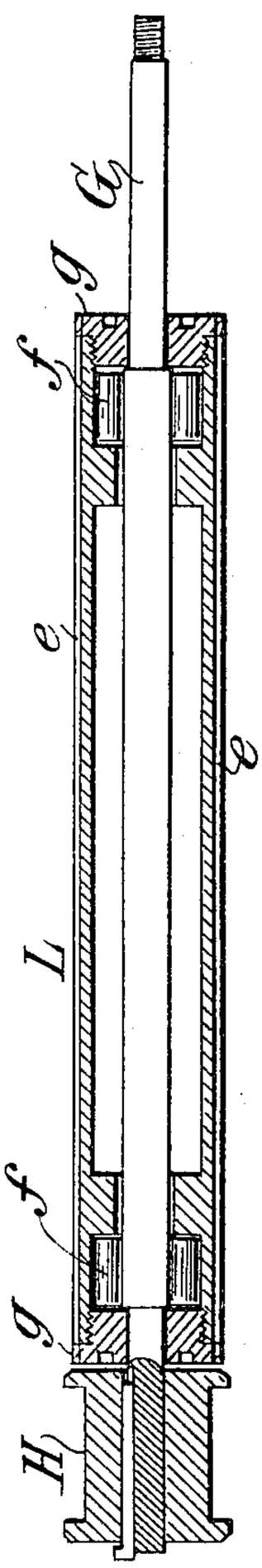

FIG. 5.

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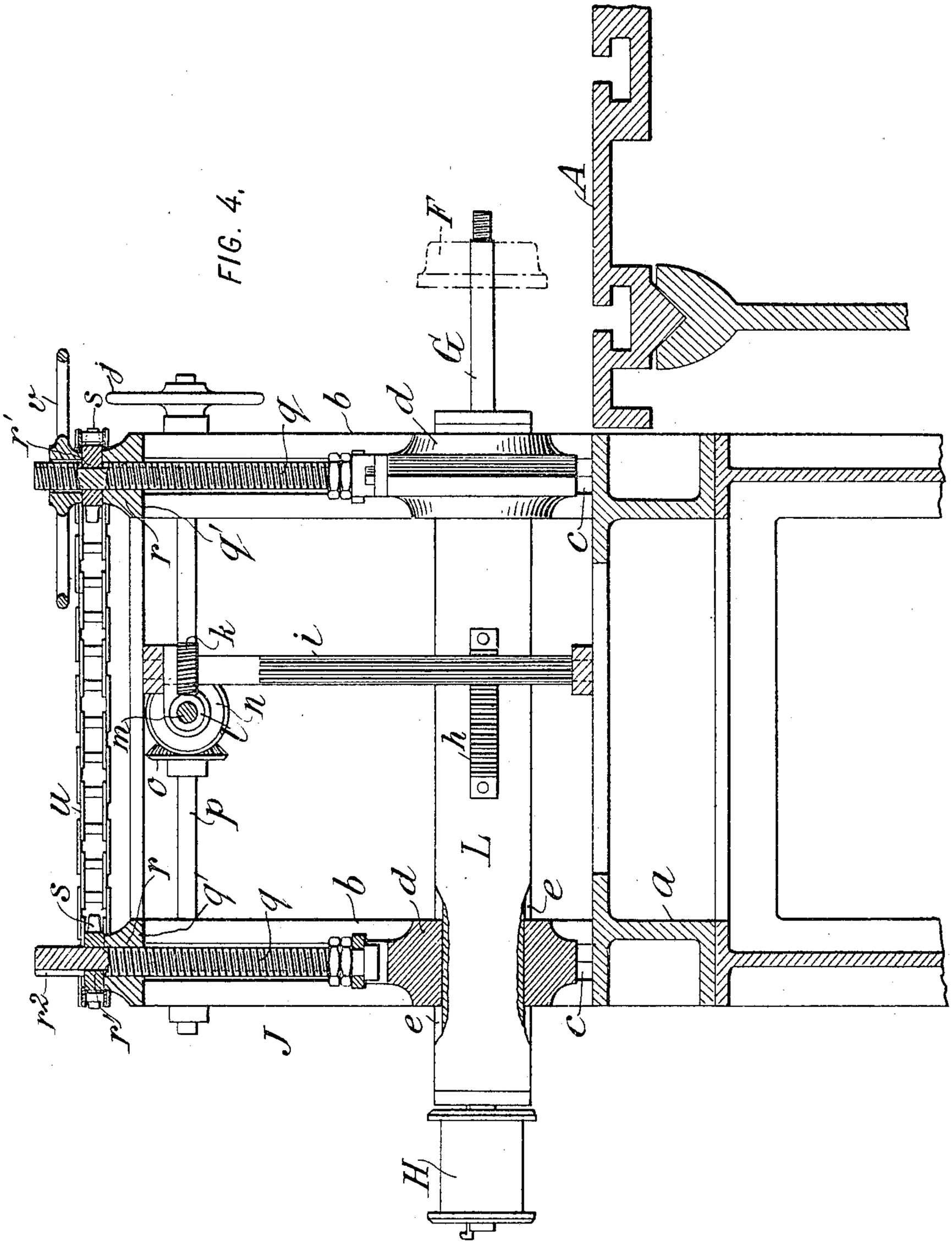
3 SHEETS—SHEET 3.

FIG. 4.



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UNITED STATES PATENT OFFICE.

JOHN ROYDEN PEIRCE, OF NEW YORK, N. Y.

STONE-WORKING MACHINE.

No. 819,080. Specification of Letters Patent. Patented May 1, 1906.

Application filed November 14, 1904. Serial No. 232,630.

To all whom it may concern:

Be it known that I, JOHN ROYDEN PEIRCE, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Stone-Working Machines, of which the following is a specification.

This invention relates to machines for working marble or other stone and aims to provide certain improvements therein.

In an application filed by me on the 10th day of October, 1904, Serial No. 227,841, I have described a novel process of working marble or other stone by cutting the marble with a rotating wheel of agglomerated hard crystalline material, such as carborundum.

My present invention is directed to the production of a machine which is adapted for using such a cutter which is so simple as to permit of its being made as an attachment to an ordinary planer, which is specially adapted for operating upon slabs of small sizes, and in which the various operating parts are of simple and economical construction and compactly arranged.

My invention in some of its features of construction is also adaptable for use with other cutting means than the wheel hereinbefore referred to.

In the accompanying drawings, which illustrate the preferred form of my invention, Figure 1 is a side elevation, partly in section, showing my invention as applied to an ordinary planing-table. Fig. 2 is a plan, partly in horizontal section, on the line 2 2 in Fig. 1, the planing-table being shown as partly broken away. Fig. 3 is an enlarged view of Fig. 2 with the planing-table removed. Fig. 4 is a vertical section on the line 4 4 in Fig. 3, a part of the planing-table being shown in section. Fig. 5 is a sectional view of the operating-shaft and its carrier.

Referring to the drawings, A is a longitudinally-movable bed such as is usually employed in planers and similar apparatus. It is driven by means of a screw B, operated from a pulley C, and the direction of which is determined by means of a reversing-gear D, operated by means of a lever E at the central portion of the machine, where the operator stands. This is the usual type of longitudinally-moving bed in machines of this general class and may be replaced by any other suitable type of holder for the stone. The cutter F (indicated in dotted lines in Fig. 4) is carried upon an operating-shaft G, extending transversely of the bed and carrying at its rear end a pulley H, which is belted to a driving pulley or drum I, arranged some distance from the machine, so as to permit transverse and vertical adjustments of the shaft G. It is to the mechanism for supporting and adjusting the shaft G that my present invention principally relates. The entire mechanism is mounted in a frame J, which preferably comprises a bed-plate *a*, having at front and rear suitable vertical guides *b*, such guides being arranged in pairs and having their opposing faces grooved at *c* to receive slide-boxes *d*, which support the carrier L for the shaft G. The shaft G may be rotatively held in the carrier L in any suitable manner; but I prefer to provide roller-bearings *f* at each end of the shaft, and thrust-collars *g* are preferably arranged to prevent longitudinal movement of the shaft, as shown in Fig. 5. The carrier L is adapted to move longitudinally through the slides *d*, but is prevented from rotating therein by ribs or splines formed on the slides which fit in corresponding grooves *e* formed in the carrier. The mechanism which I have provided for longitudinally adjusting the carrier L in the slides *d*, whereby to move the cutter F to varying positions transversely of the bed A, comprises a rack or racks *h*, arranged at the side of the carrier L, which racks are engaged by pinions *i*, which are of a length equal to the vertical adjustment desired for the cutter F. By this means the pinions *i* remain in operative connection with the racks *h* irrespective of the vertical position of the cutter. The pinions *i* may be rotated by a hand-wheel *j* through any suitable connection. I prefer, however, to provide a worm *k* at the upper end of each of the pinions *i*, said worms being rotated by worm-wheels *l*, mounted on a common shaft *m*, which carries a bevel-gear *n*, meshing with a similar gear *o*, mounted upon the shaft *p* of the adjusting-wheel *j*. This mechanism forms a simple and convenient method of rotating both of the pinions *i* at the same rate of speed and also provides an efficient lock for the pinions, so that the carrier L and consequently the shaft G are firmly held in their adjusted positions without the necessity of providing any special locking means.

My invention also provides means for ver-

tically adjusting the cutter F, so as to accommodate the apparatus to different thicknesses of stone. To each of the slides *d* is fixed a screw *q*, said screws at their upper ends passing out through brackets or cross-pieces *q'* at the top of the frame, as best shown in Fig. 4. The brackets *q'* are formed with threaded holes *r*, so as to permit the screws to screw therethrough and to hold the carrier and cutter down to the stone. Upon the projecting end of each of the screws *q* is placed a gear or sprocket wheel *s*, said sprockets being provided with splines *r'*, fitting in grooves r^2 of the screws. The sprockets *s* are preferably connected by a chain *u*, so as to move in unison, and to one of said sprockets (preferably that at the front of the machine) is fixed a hand-wheel *v*. Upon rotation of the latter the sprockets *s* act upon the screws *q* to raise or lower the slides *d* and with them the shaft-carrier L.

It will be observed that the mechanism provided by my invention may be used in combination with any suitable moving table without alteration of the latter and that such mechanism is extremely compact and simple in its construction, while performing all of the functions which are requisite in a device of this character. The adjusting-wheels occupy fixed positions with relation to the frame and do not partake of the movements of the cutting mechanism. The device may be easily taken apart and assembled, the shaft-carrier being removable by merely moving it lengthwise out of its slides after disengagement of the racks *h* and pinions *i*.

The worm *k* holds the cutting-wheel rigidly in the desired position of lateral adjustment, and the two elongated pinions or gears *i* prevent the swinging of the shaft in a horizontal plane by the pressure of the stone as it is fed against the cutter. Notwithstanding the rigid manner in which the cutter-shaft is held, the particular combination of worm-gear and elongated pinions is stationary. From this construction two special advantages flow: First, the bearings for the parts described being in the fixed portions of the machine may be made very heavy and solid, and, second, the shaft is disconnected from the mechanism for laterally adjusting it and can be easily raised or lowered, as it carries substantially no weight but that of its bearings. Consequently a perfectly rigid machine of minimum weight is obtained.

I do not claim herein, broadly, a machine having a carborundum cutter as described, the same being claimed in my application, Serial No. 227,842, filed October 10, 1904.

Though I have described with great particularity of detail a certain embodiment of my invention, yet it is not to be understood that my invention is limited to the specific construction disclosed. Various modifications thereof in detail and in the construction and arrangement of the parts may be made by those skilled in the art without departure from the invention.

I claim as my invention—

1. In a stone-cutting machine, a shaft and means for moving it including a rack connected to the shaft and an elongated gear meshing with said rack.

2. In a stone-cutting machine, a shaft, a carrier having bearings therefor, and means for moving said carrier comprising a rack connected with the latter and an elongated gear meshing with said rack.

3. In a stone-cutting machine, a shaft, and means for moving it comprising a rack connected with said shaft, an elongated gear meshing with said rack, a hand-operated member, and a worm and worm-wheel connection between said member and said gear.

4. In a stone-cutting machine, a shaft, a carrier having bearings therefor, and means for moving said carrier comprising a pair of racks mounted on opposite sides of said carrier, a pair of elongated gears meshing with said racks, worm-wheels fixed upon said gears, and a shaft having worms meshing with said worm-wheels.

5. In a stone-cutting machine, a shaft, a carrier therefor, means for longitudinally moving said carrier comprising a rack connected therewith and an elongated gear meshing with said rack, and means for moving said carrier laterally comprising a screw connected to said carrier, and an operating member engaging said screw to move it in a lengthwise direction.

6. In a stone-cutting machine the combination of a rapidly-rotating cutter-shaft adapted to carry a cutting-wheel of agglomerated coarse crystalline hard material, a frame comprising a bed-plate *a* and front and rear guides *b* a pair of slides *d* moving vertically in said guides, and a shaft-carrier L moving axially in said slides.

7. In a stone-cutting machine, a frame having front and rear guides, a pair of slides moving in said guides, a shaft-carrier moving longitudinally in said slides, a rack on said carrier, an elongated gear meshing with said rack, an operating-shaft having bearings in said frame, and connected with said gear to move the latter, a screw connected with said carrier, and an operating member adapted to move said screw.

8. In a stone-cutting machine, the combination of slides *d*, carrier L, racks *h*, gears *i*, worm-wheels *k* on said gears, worms *l*, transverse shaft *m* for said worms, bevel-gear *n* on said shaft, bevel-gear *o* meshing with said gear *n*, and operating-shaft *p*.

9. In a stone-cutting machine, the combination of slides *d*, carrier L, racks *h*, gears *i*, worm-wheels *k* on said gears, worms *l*, trans-

verse shaft *m* for said worms, bevel-gear *n* on said shaft, bevel-gear *o* meshing with said gear *n*, operating-shaft *p*, screws *q* connected to said slides, sprockets *s* for operating said screws, and chain *u* connecting said sprockets.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN ROYDEN PEIRCE.

Witnesses:
DOMINGO A. USINA,
THEODORE T. SNELL.