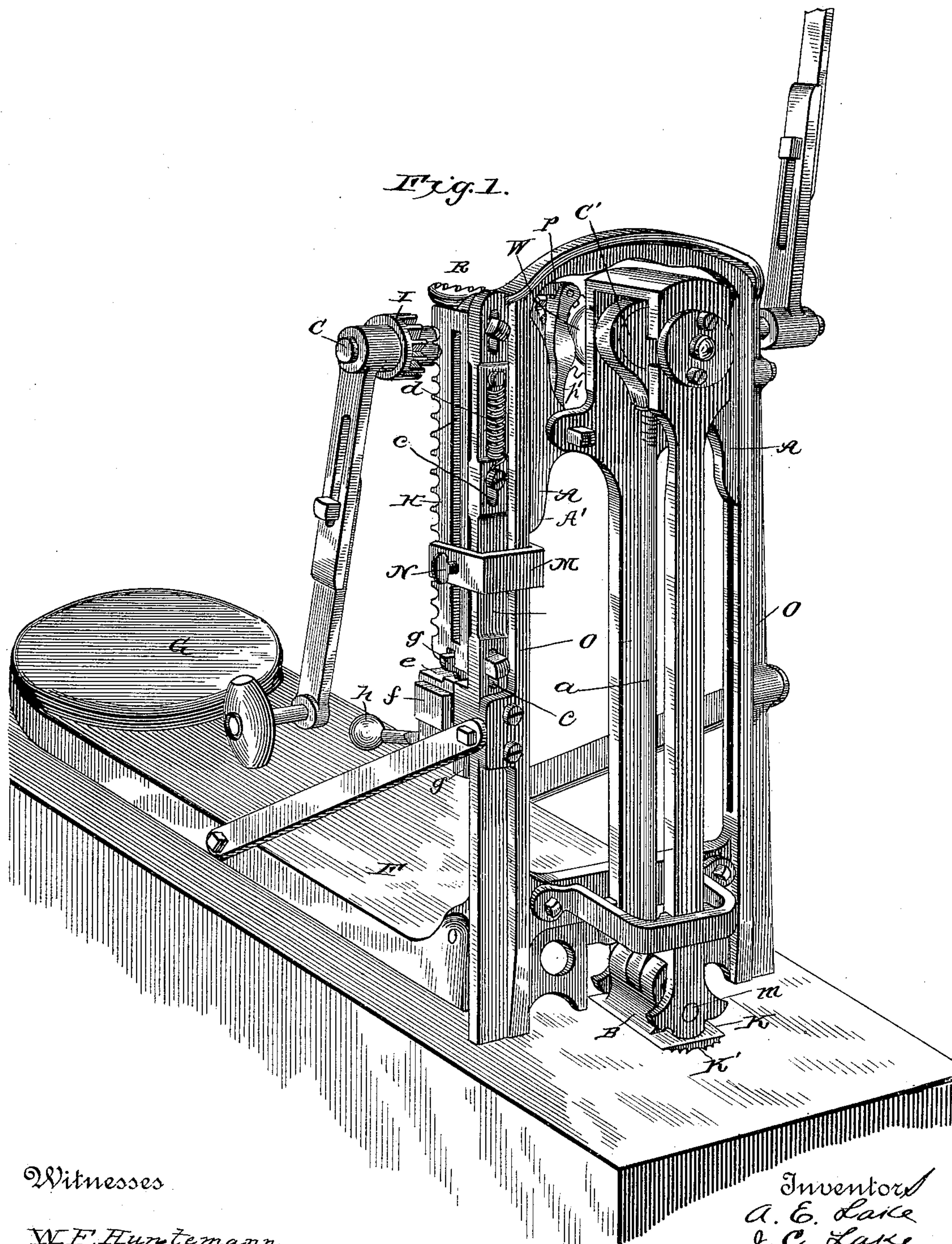


5 Sheets --Sheet 1.

SQUARE HOLE AUGER.

Patented Jan. 31, 1888.



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Jos. A. Ryan

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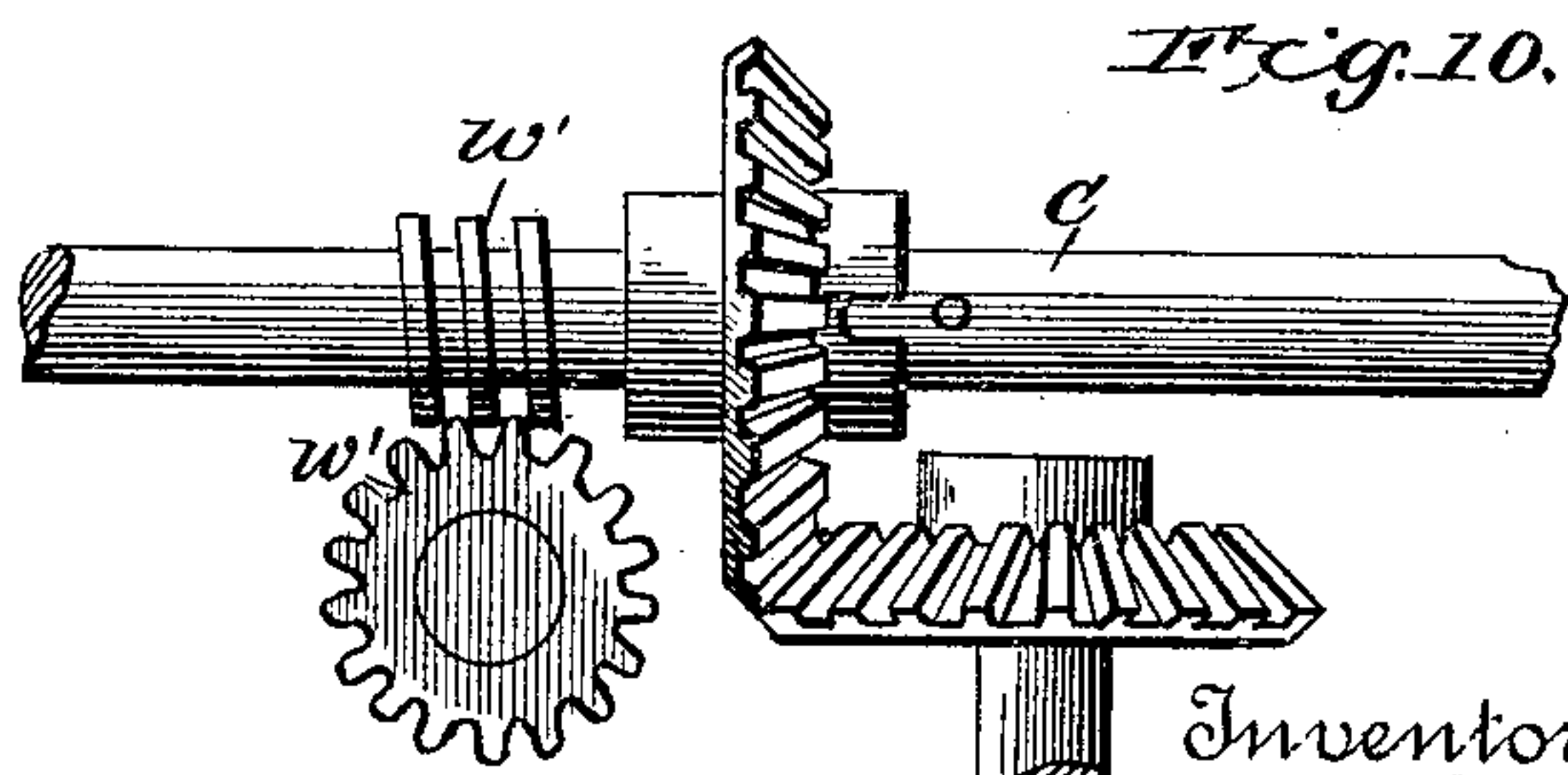
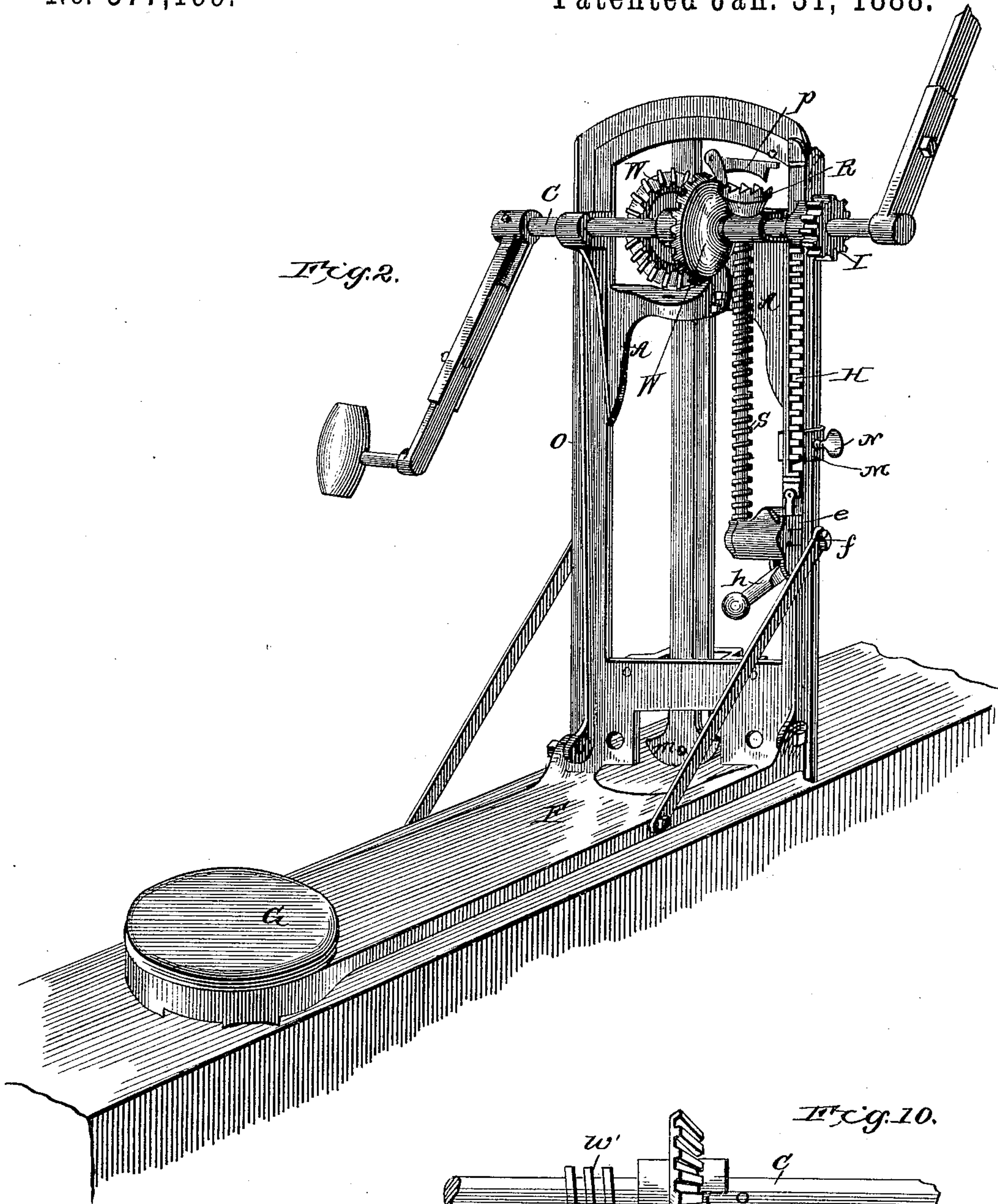
(No Model.)

5 Sheets—Sheet 2.

R. HUGHES & A. E. & J. C. LAKE.
SQUARE HOLE AUGER.

No. 377,199.

Patented Jan. 31, 1888.



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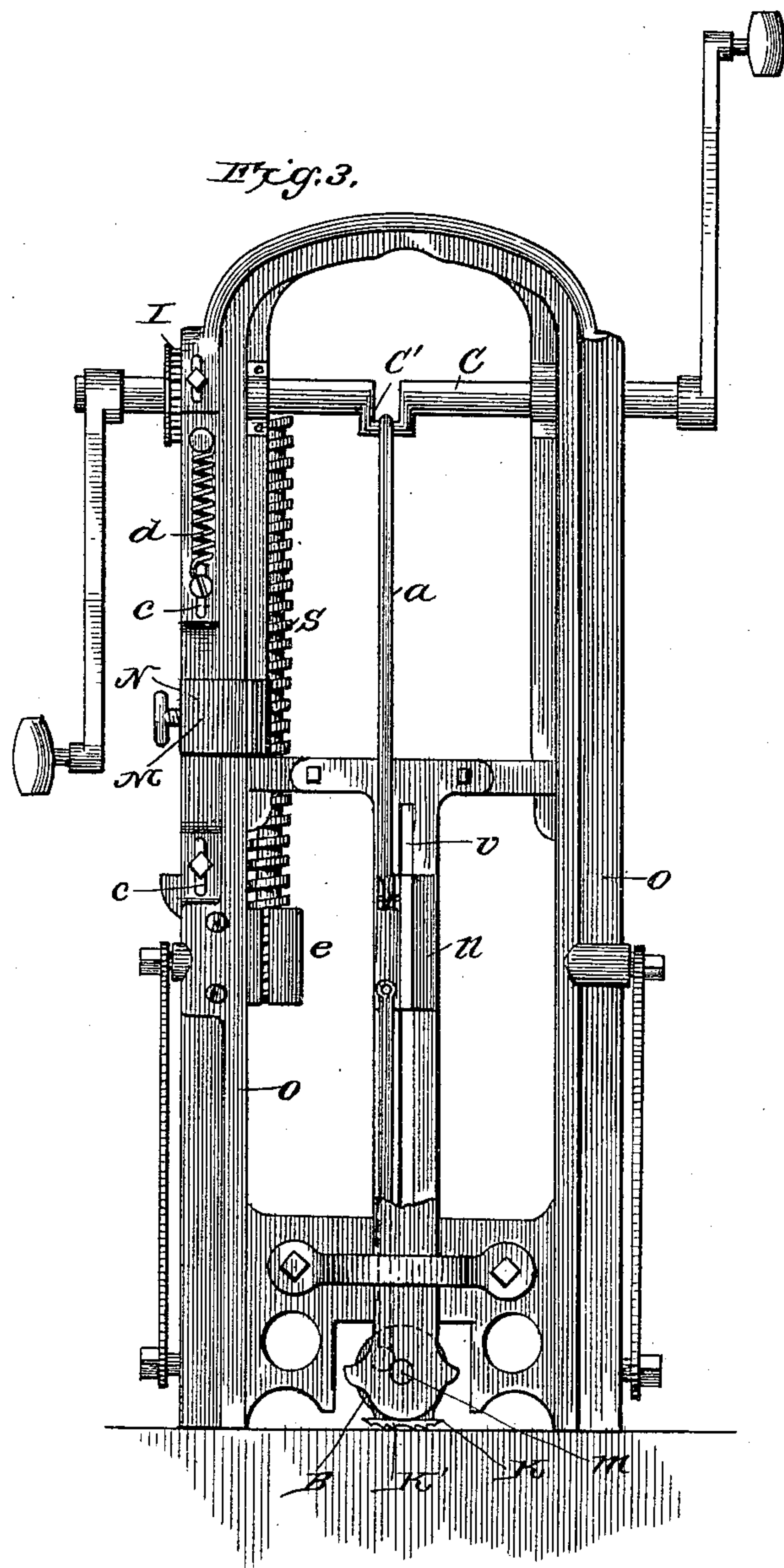
(No Model.)

5 Sheets—Sheet 3.

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5 Sheets—Sheet 4.

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SQUARE HOLE AUGER.

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Fig. 4.

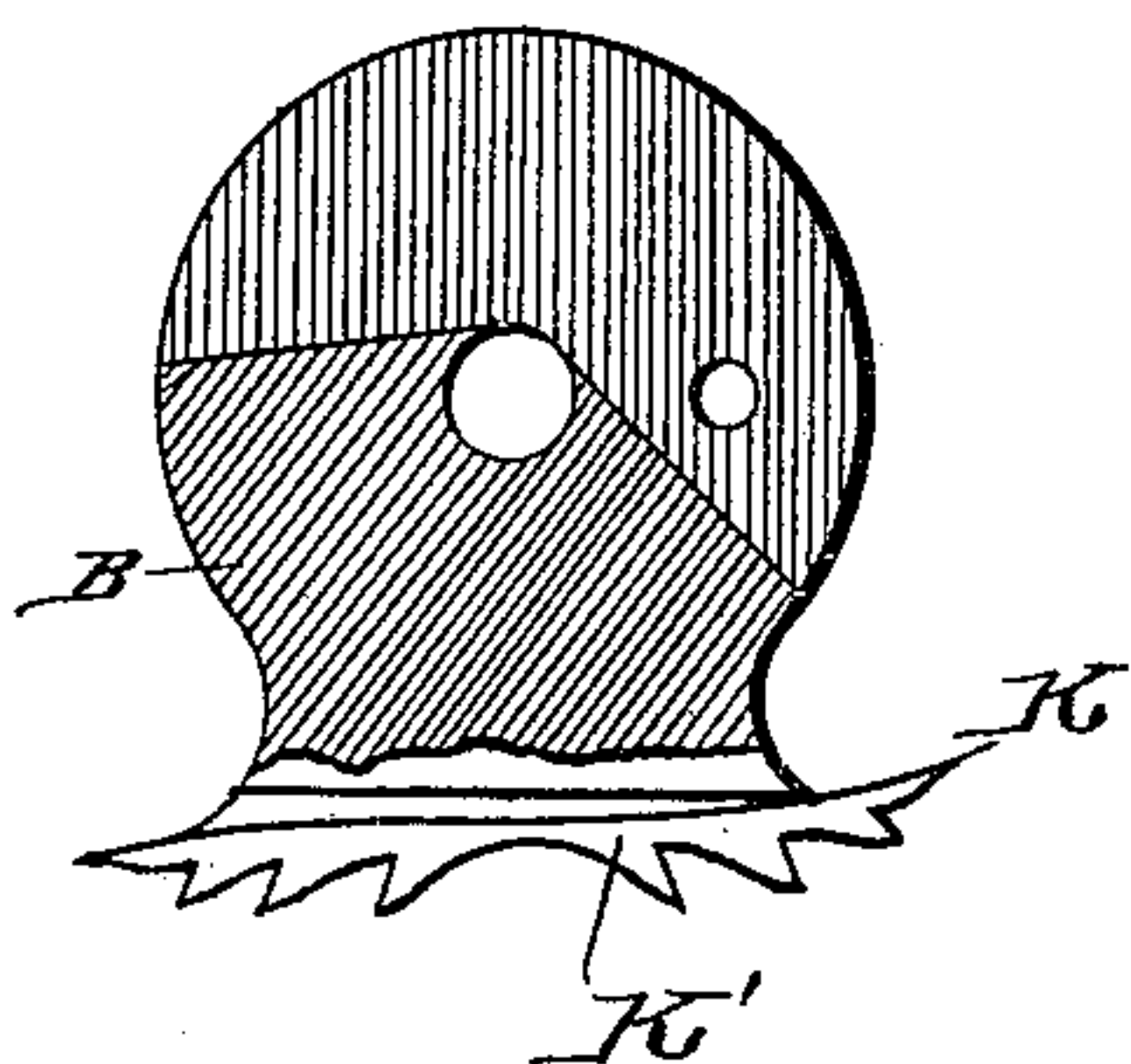


Fig. 5.

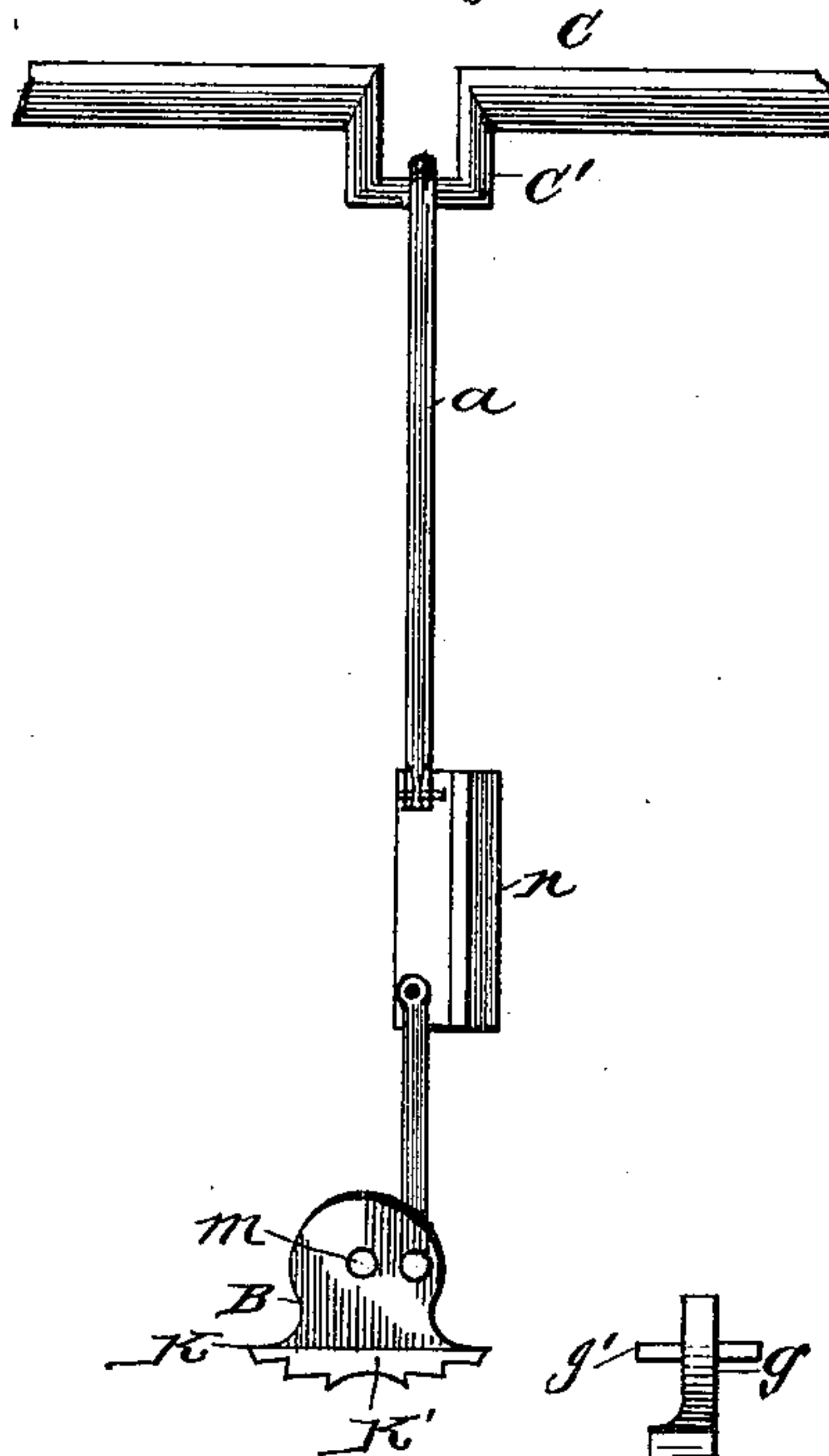


Fig. 6.

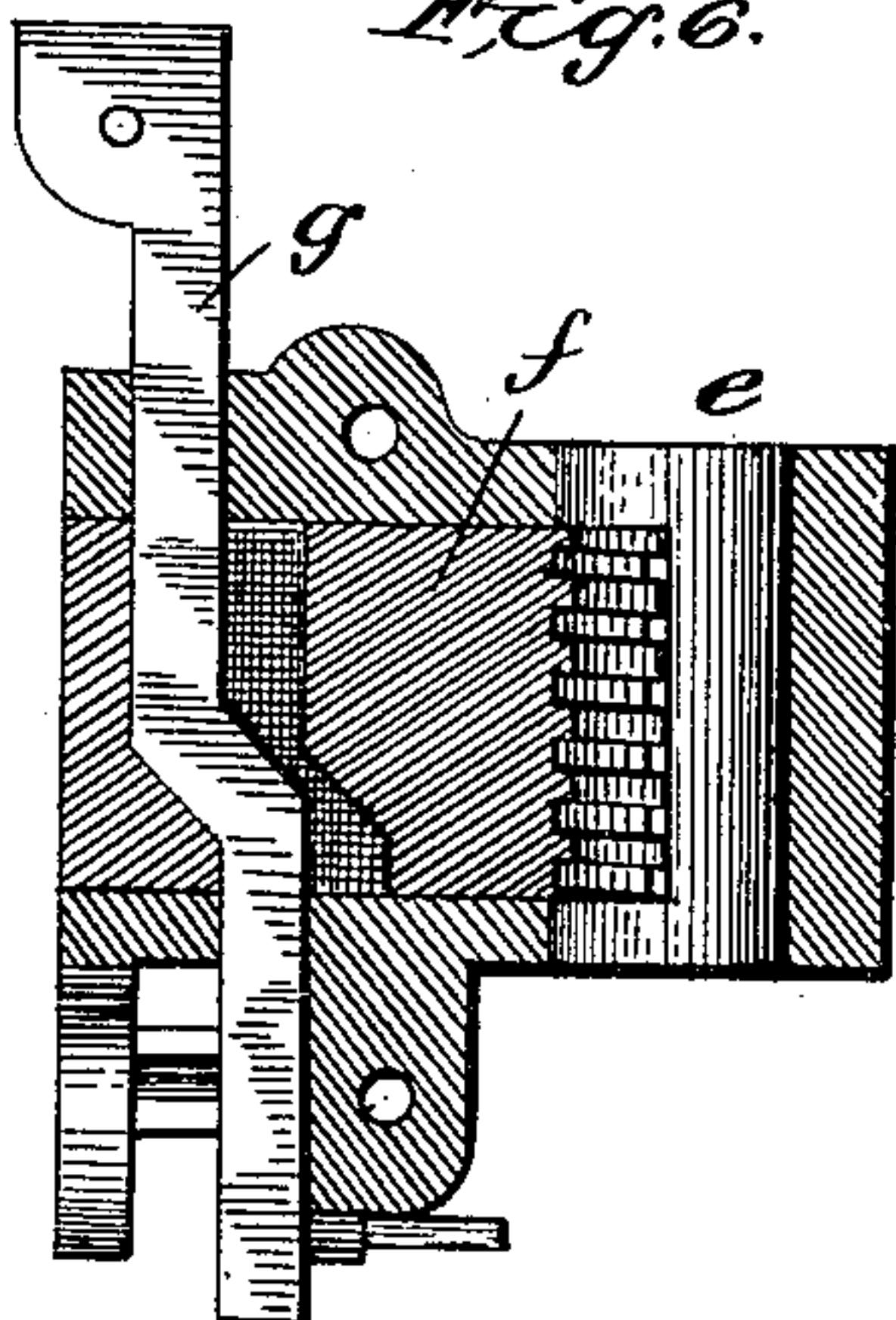
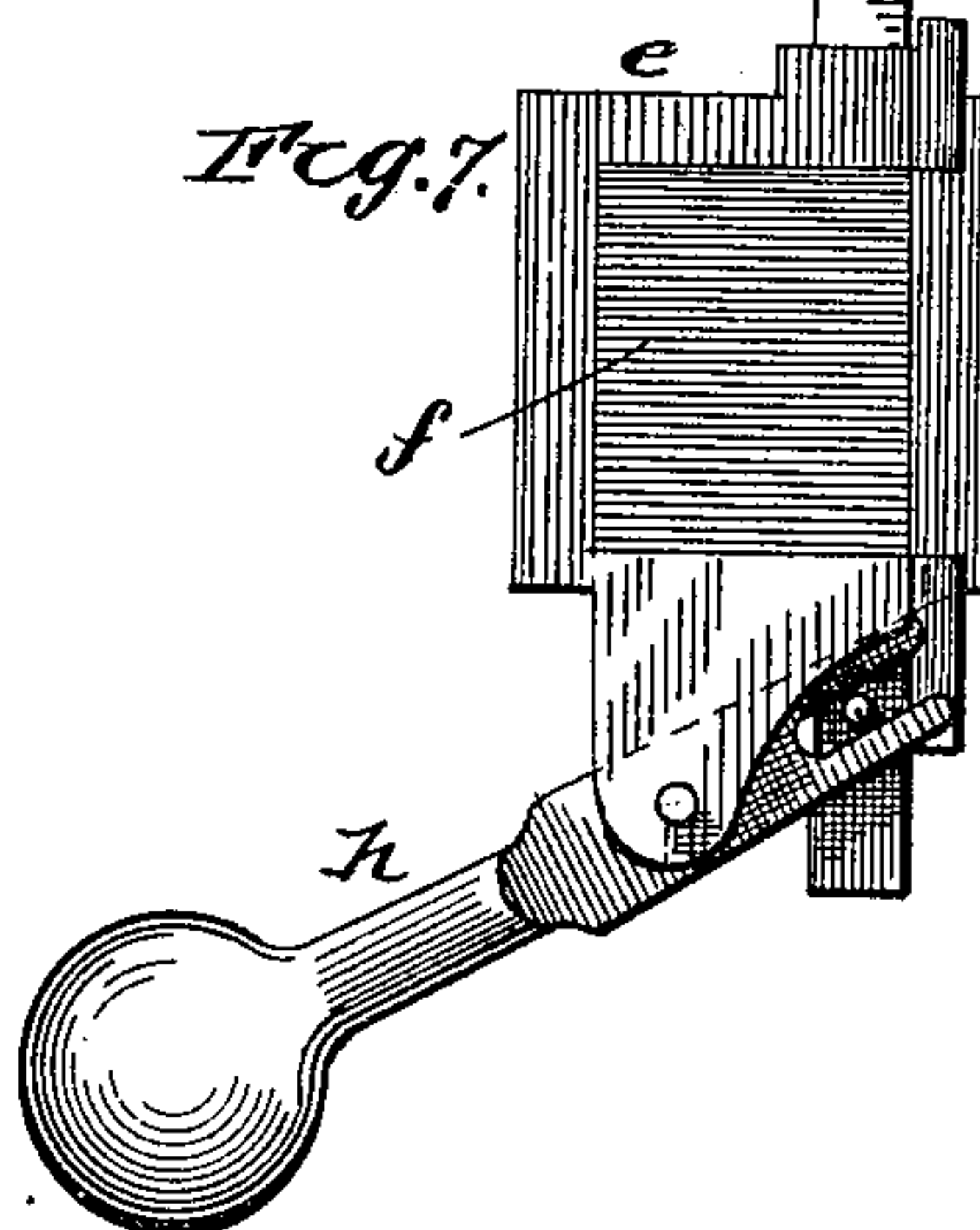


Fig. 7.



Witnesses

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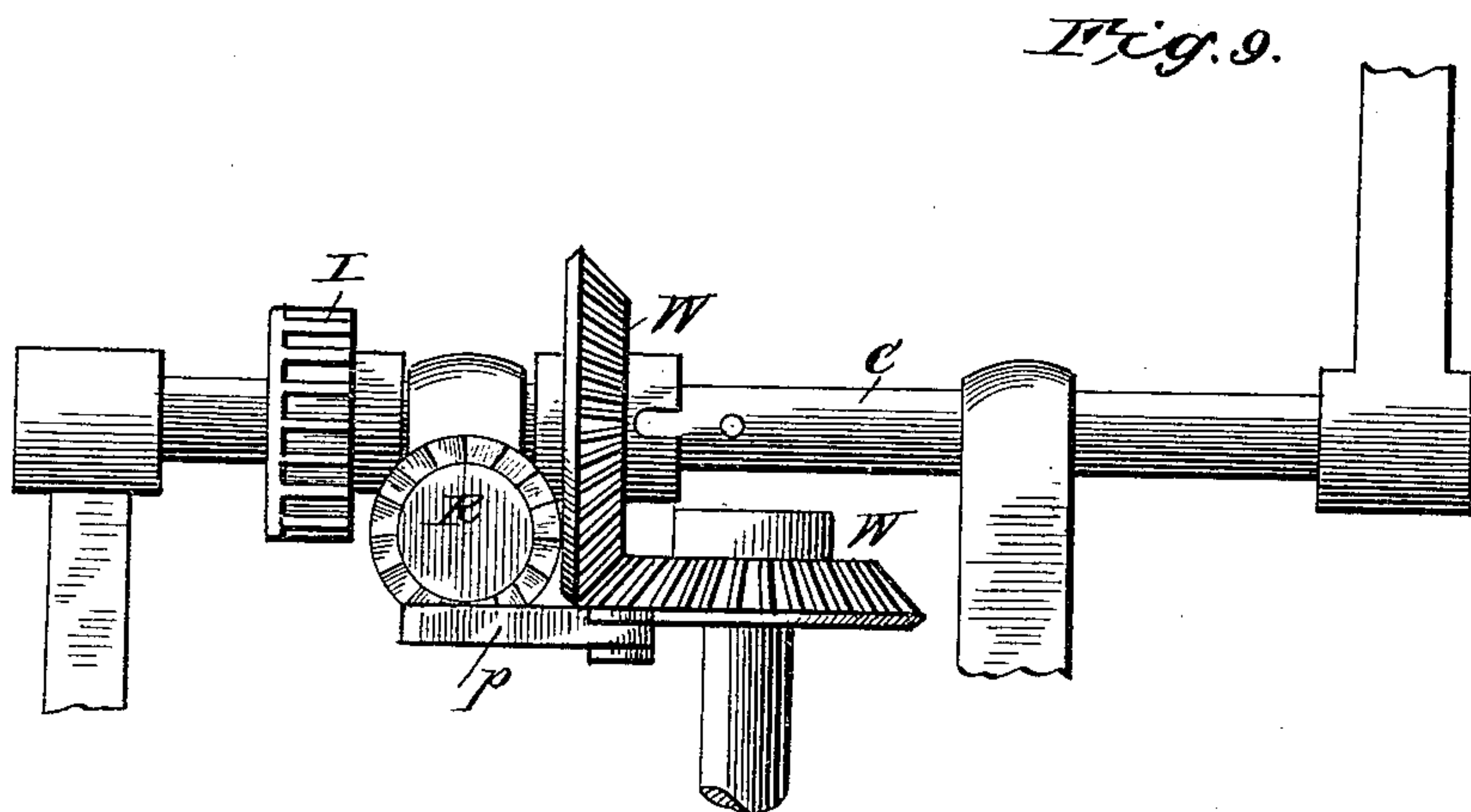
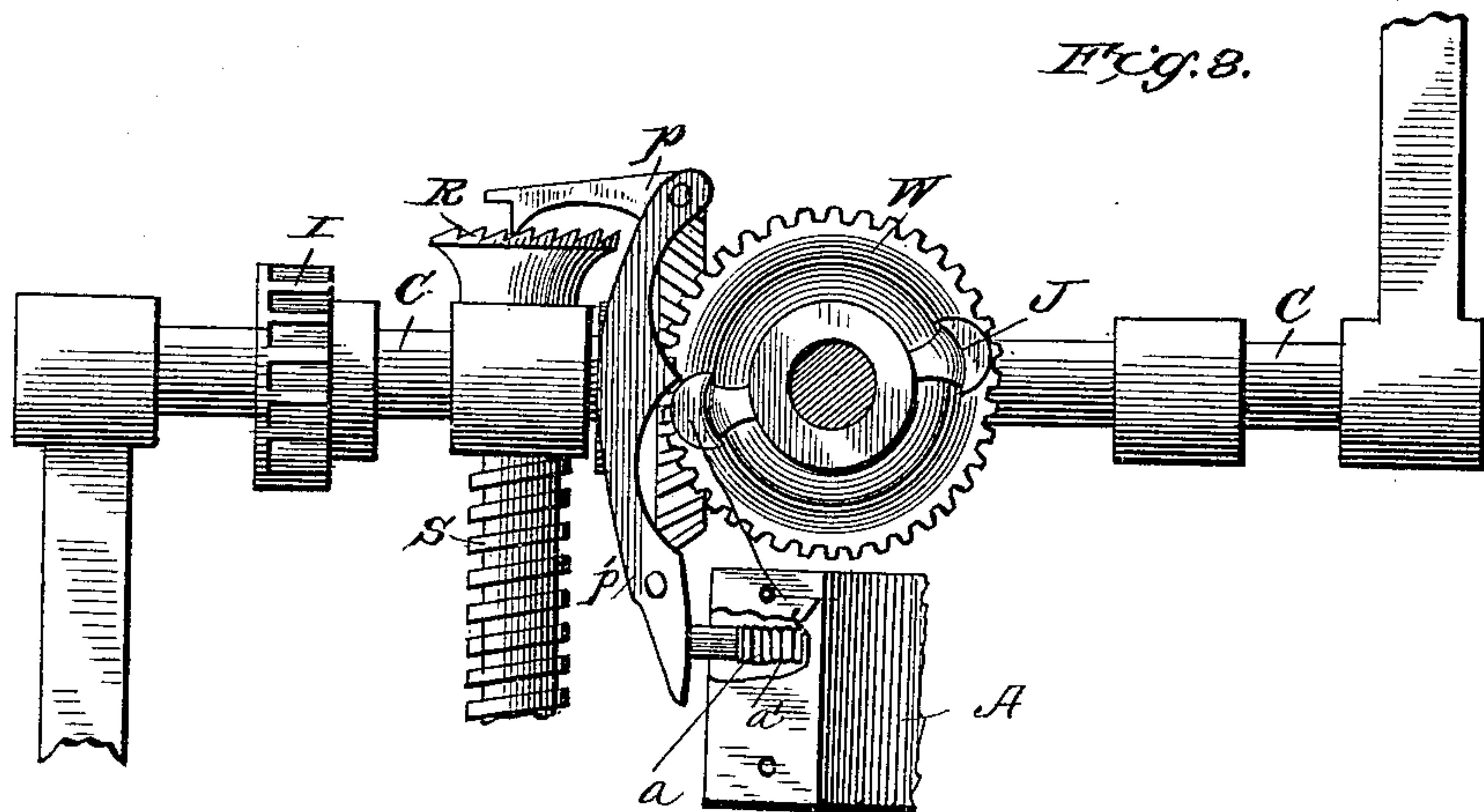
(No Model.)

5 Sheets—Sheet 5.

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No. 377,199.

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UNITED STATES PATENT OFFICE.

RICHARD HUGHES, OF WOOSTER, AND ABRAHAM E. LAKE AND JOHN C. LAKE, OF BIG PRAIRIE, ASSIGNORS TO THE SQUARE HOLE AUGER COMPANY, OF WOOSTER, OHIO.

SQUARE-HOLE AUGER.

SPECIFICATION forming part of Letters Patent No. 377,199, dated January 31, 1888.

Application filed June 9, 1886. Serial No. 204,824. (No model.)

To all whom it may concern:

Be it known that we, RICHARD HUGHES, of Wooster, in the county of Wayne and State of Ohio, and ABRAHAM E. LAKE and JOHN C. LAKE, of Big Prairie, in the county of Wayne and State of Ohio, have invented certain new and useful Improvements in Mortising-Machines or Square-Hole Augers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to mortising-machines or square-hole augers, the object being to improve several of the features and details of construction of the machine patented to A. E. and J. C. Lake, April 6, 1886, No. 339,195.

The invention consists in substituting for journal-bearings solidly connected with the cutter-head an axle passing through the longitudinal axis of the cutter-head bored to receive the same, said axle either pivoted upon the stock or solidly connected therewith, as may be preferred.

The invention consists in substituting for two rods, as heretofore used to oscillate the cutter-head, a single rod pivoted on one side of the longitudinal axis of the cutter-head, said rod either continuous from the oscillating head to the operating-crank or broken at the center by a slide-coupling where necessary to change the gearing of the machine.

The invention further consists of a vertically-movable rack to throw the feed into and out of gear, either automatically or at the will of the operator.

The invention further consists of improved mechanism for regulating the downward feed of the cutter-head.

The invention further consists in the various details of construction and combinations of parts, hereinafter fully described, and pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a machine embodying our improvements, (taken from the front of the machine.) Fig. 2 is a similar view taken from the rear of the machine. Fig. 3 is a front elevation showing a form of gearing different from that seen

in the other figures. Fig. 4 is a detail view illustrating the construction and arrangement of our cutter-head and its axial support. Fig. 5 shows the two-part operating-rod detached. Figs. 6, 7, 8, and 9 illustrate in detail other features of the machine, which will be fully described; and Fig. 10 is a modification.

Similar letters indicate like parts in all the figures.

F G are the frame and seat, respectively.

O is a frame carrying the sliding stock A (which may be either solidly or separably connected therewith) and the operating-gear of the machine. The stock A is fitted to slide vertically upon the supporting-frame within suitable guides therein.

Within the lower end of the stock A is hung the oscillating cutter-head B. The cutter-head is similar to those heretofore used, being provided with a cutting device having opposite side cutters, K, and end cutters, K'. The latter may be removably secured to the cutter-head, if preferred, instead of solidly connected with the blades.

For the purpose of obtaining a shear cut the side cutters are set at an angle with the axis of the cutter-head, and are bent about the head spirally, as shown.

The cutter-head is perforated with a bore along its longitudinal axis to receive a shaft or axle, *m*, upon which the head oscillates. This axle may be solidly connected to the stock or pivoted therein, as preferred. The cutter-head is made to oscillate upon the axle by means of a rod, *a*, pivoted thereto on one side of the axle, instead of using a rod on each side, as heretofore. For the purpose of using a direct instead of a bevel gear, the rod is parted at or near its longitudinal center, and the middle ends are pivoted to a head or bar, *n*, fitted to slide vertically along suitable guideways, *v*, in the stock.

O is the main shaft of the operating-gear. It is provided with a beveled gear, W, so as to utilize the gear for driving a round-hole auger, which may be used as heretofore, thus making it a combined machine. The gearing may, however, be direct, or the rod *a* may be operated by means of a crank upon the main

shaft, as shown in Fig. 3. In such case the operating-rod is in two parts and united by a slide-head, *n*, as aforesaid.

C' is a crank or eccentric for driving the rod *a*, and may be connected by suitable gear, *W*, with the main shaft *C*, or may be formed on the main shaft, as aforesaid. The gearing may of course be varied, and no claim is made thereon.

S is a vertical screw for feeding the auger. It is pivoted upon the sliding frame *A* and surmounted with a ratchet-wheel, *R*. The gear-wheel *W* is provided with a series of teeth or lugs, *J*, which contact with an arm, *p'*, carrying a pawl, *p*, at its upper end, and provided at its lower end with a pin, *a*, projecting into an opening in the frame *A* and surrounded by a coil-spring, *a'*, said pawl operating to turn the feed-screw. If preferred, the screw may be driven by a worm-thread gear, *w' w'*, instead of the ratchet and pawl, thereby producing a continuous downward feed.

H is a vertical rack which coacts with the pinion *I*. It is attached to the frame *F* by means of headed bolts which pass through elongated slots *c*.

d is a spiral spring, secured at one end to the frame *O* and at the other end to one of the projecting bolts of the rack-bar, serving to hold the rack in its normal elevated position. It may be thrown downwardly by the action of the pinion *I*, which is caused to mesh with the rack *H*, by sliding the shaft *C*, which movement at the same time throws the gear-wheel *W* out of gear. At the lower end of the rack *H* is a support, *e*, which sustains a threaded nut-section, *f*, fitted to slide therein. The screw *s* passes downwardly through this support. The nut section *f* is provided with a crooked slot, through which a bent bar, *g*, is fitted to slide vertically, and by such movement press the nut toward and into threaded contact with the screw when the bar is drawn upwardly, and out of gear when it is pressed downwardly. The upper end of the bar *g* is situated immediately under the lower end of the rack *H*, and by its downward movement the feed is thrown out of gear. By connecting the upper end of the bar *g* with the lower end of the rack *H* by a pin or bolt, *g'*, Fig. 7, the same is elevated with it, and the feed thereby thrown into gear automatically. A handle-lever, *h*, connected with the lower end of the bar *g*, enables the operator to throw the feed into and out of gear at pleasure.

M is a stop which is fitted to slide in a vertical slot formed in the rack *H* to receive the same, and is secured at any elevation therein by means of a set-screw, *N*. This stop engages one of the projecting sides *A'* of the sliding stock, and throws the feed out of gear automatically at any desired depth of bore by drawing down the rack *H*, and thus withdrawing the threaded nut *F* from the screw *S*, as aforesaid.

By the construction thus described we pro-

vide a machine which may be readily controlled in all its functions.

The sliding stock carrying the cutter-head may be fed either continuously or intermittently by the improved mechanism described—viz., the sliding rack-bar and adjustable nut and bearing arranged below the nut. The feed-screw is thrown out of gear to permit the withdrawal of the cutter-head from the cut hole without liability of breakage or accidental derangement of the mechanism.

We do not limit ourselves to all the details of construction herein described and illustrated in the drawings, but reserve the right to make all such alterations and modifications as may properly fall within the scope of the following claims.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a mortising machine or square-hole auger, the combination, with a cutter-head, of a single two-part rod secured at its lower end to the cutter-head and at its upper end to the operating mechanism, the parts of said rod being connected by a slide-coupling, substantially as described.

2. In a mortising-machine or square-hole auger, the combination, with a cutter-head, of a two-part rod pivoted thereto and to the operating mechanism, the two sections of said rod being pivotally secured to a coupling, which latter is adapted to slide in guideways of the stock, substantially as described.

3. In a mortising-machine or square-hole auger, the combination, with a supporting-frame and a nut arranged thereon, of a sliding stock carrying the cutter-head, and a feed-screw passing through said nut, and a pawl-and-ratchet device operated by the driving-gear of the machine to impart an intermittent movement to the screw to feed the stock downward, substantially as described.

4. In a mortising-machine or square-hole auger, the combination, with a supporting-frame and a nut arranged thereon and a sliding stock carrying a cutter-head, of a feed mechanism consisting of a vertical screw supported to move downwardly with the stock, and mechanism for automatically turning the screw from the gearing which oscillates the cutter-head, and a nut upon the supporting-frame coacting with the screw, substantially as described.

5. In a mortising-machine or square-hole auger, the combination, with a supporting-frame and a nut arranged thereon, of a sliding stock carrying the cutter-head, a feed-screw passing through said nut and provided with a ratchet-wheel, and a spring-actuated pawl adapted to be intermittently thrown into engagement with said wheel, substantially as described.

6. In a mortising-machine or square-hole auger, the combination, with a supporting-frame and with the sliding stock, of a nut arranged upon said frame, a feed-screw passing

through said nut and provided at its upper end with a ratchet-wheel, a spring-pawl pivoted upon the stock, and a wheel provided with projections adapted to strike said pawl to cause the latter to rotate the screw, substantially as described.

7. In a mortising-machine or square-hole auger, the combination, with a supporting-frame and a sliding stock, of a feed-screw, a movable rack arranged upon the frame, a bearing arranged below said rack-bar to receive the feed-screw and provided with a screw-nut section, and a device secured to said rack-bar for throwing said nut-section into and out of gear with the feed-screw, substantially as described.

8. The combination, with the main frame and the operating-shaft, of a sliding spring-actuated rack-bar, a pinion mounted upon said shaft, a feed-screw, a nut device to receive said screw, and a device connected with said rack-bar for throwing said nut into and out of en-

gagement with the screw, substantially as described.

9. The combination, with the main frame and feed-screw, of a movable spring-actuated rack-bar, a bearing secured below said rack-bar to receive the feed-screw and provided with an adjustable threaded section, and a bent bar for throwing said threaded section into and out of gear with the feed-screw, substantially as set forth.

In witness whereof we hereunto set our hands.

RICHARD HUGHES.

ABRAHAM E. LAKE.

JOHN C. LAKE.

Witnesses to signing of Richard Hughes:

HIRAM B. SWARTZ,

LUCAS FLATTERY.

Witnesses to signing of A. E. Lake and J. C. Lake:

F. S. ODELL,

JOHN B. ODELL.