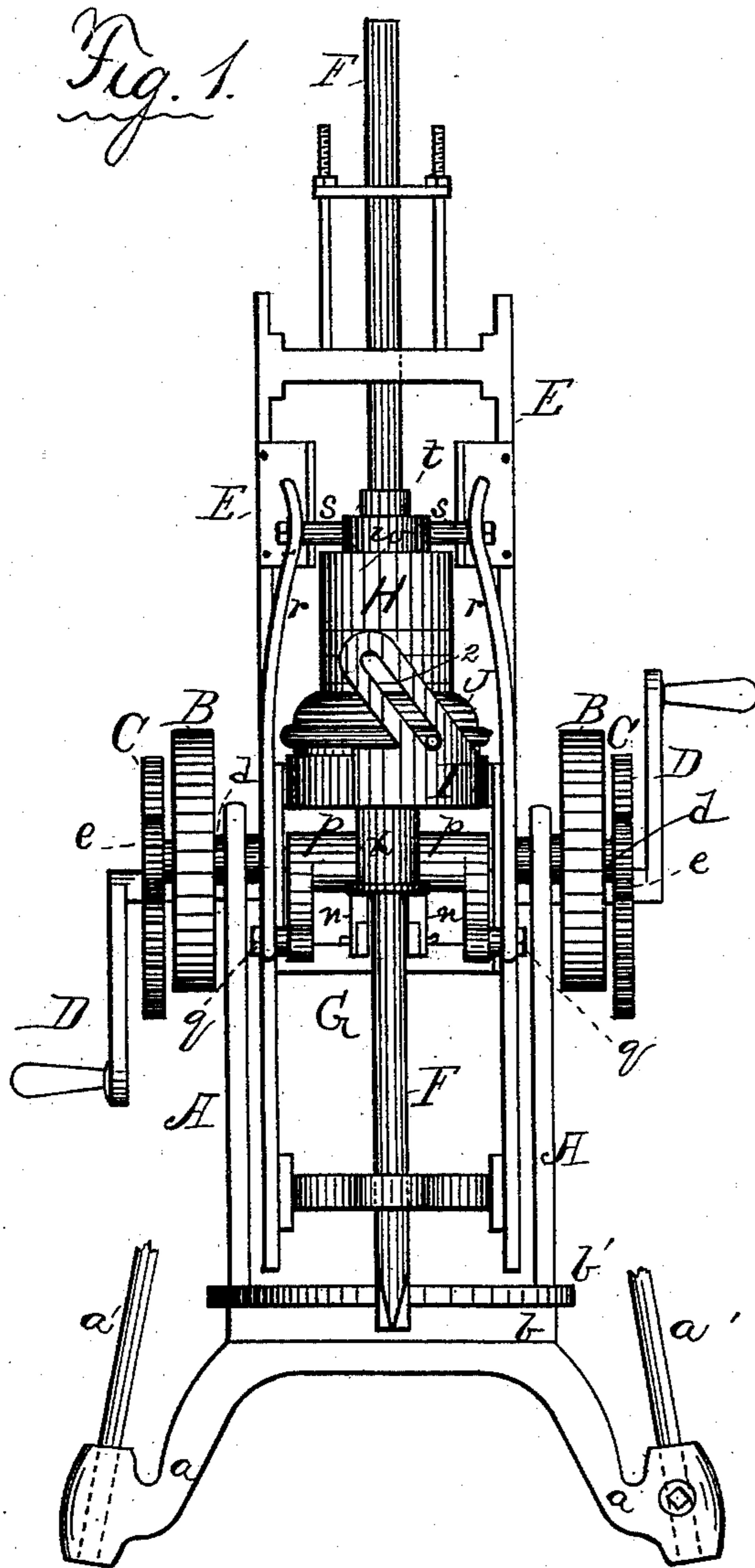


S. HUSSEY.
Rock Drill.

No. 232,609.

Patented Sept. 28, 1880.



Sylvanus Hussey,
Inventor by
J. R. Drake,
Atty.

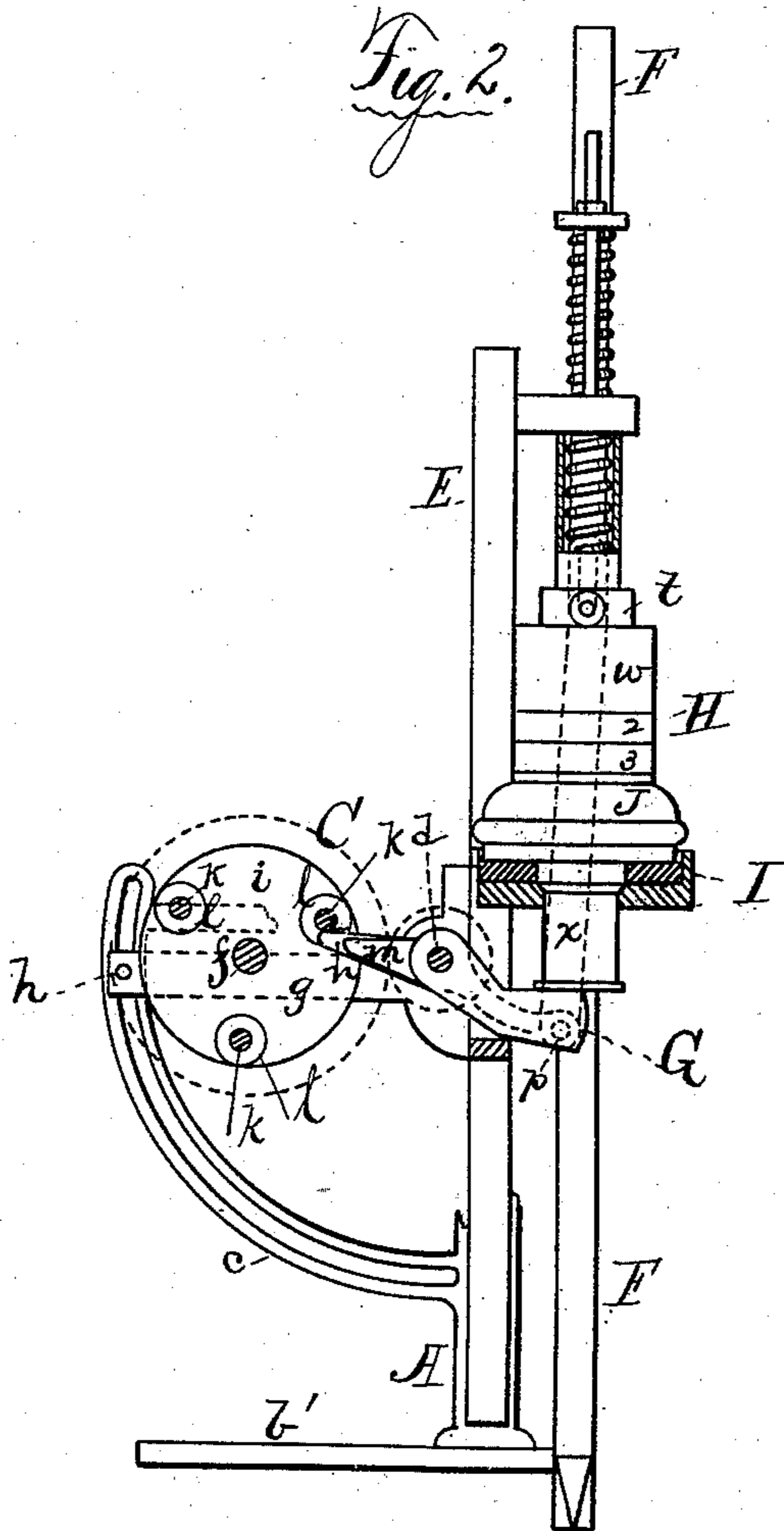
Witnesses:
J. A. Larsons.
J. R. Drake.

S. HUSSEY.
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3 Sheets--Sheet 2.

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Witnesses:
T. H. Parsons.
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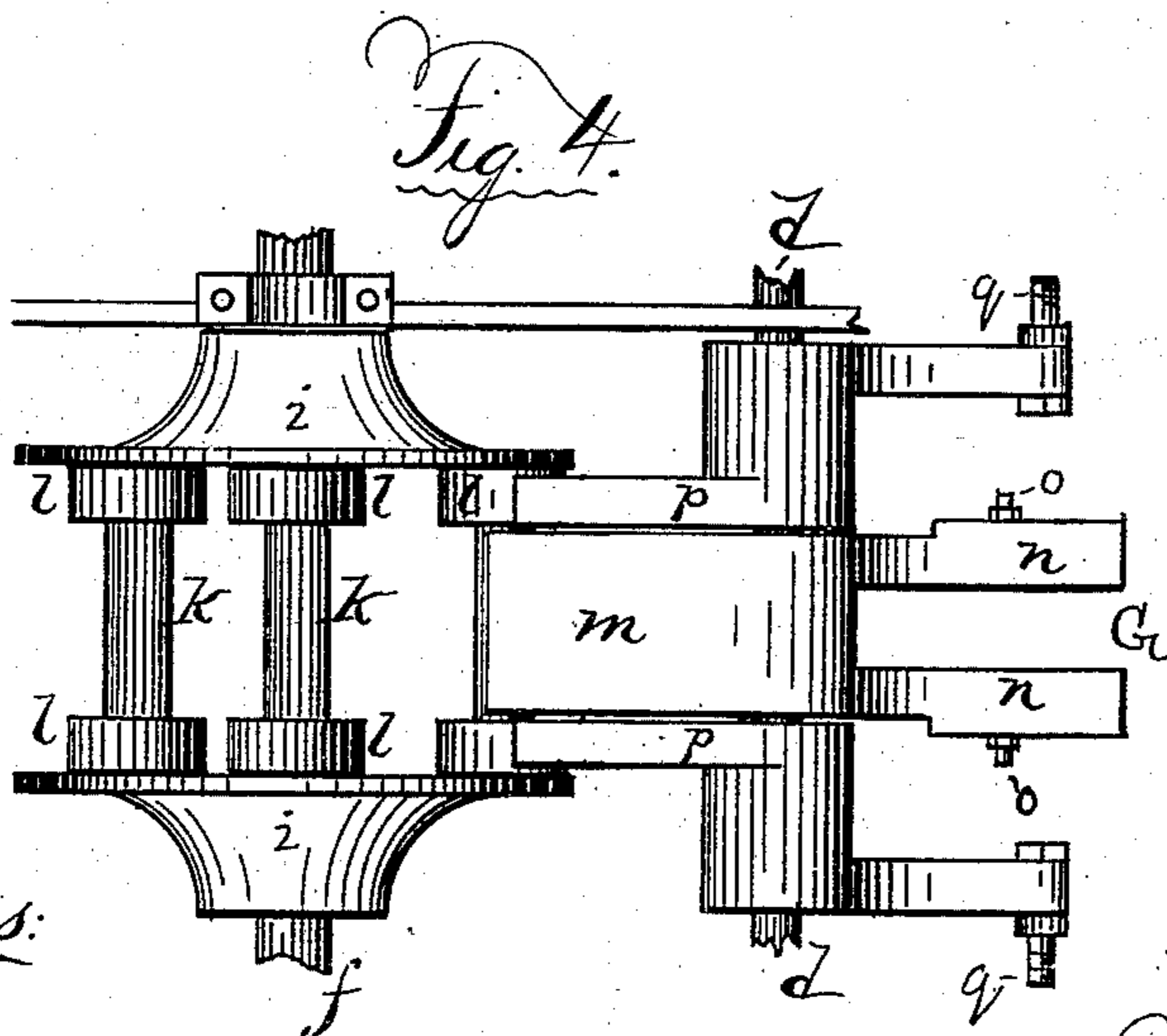
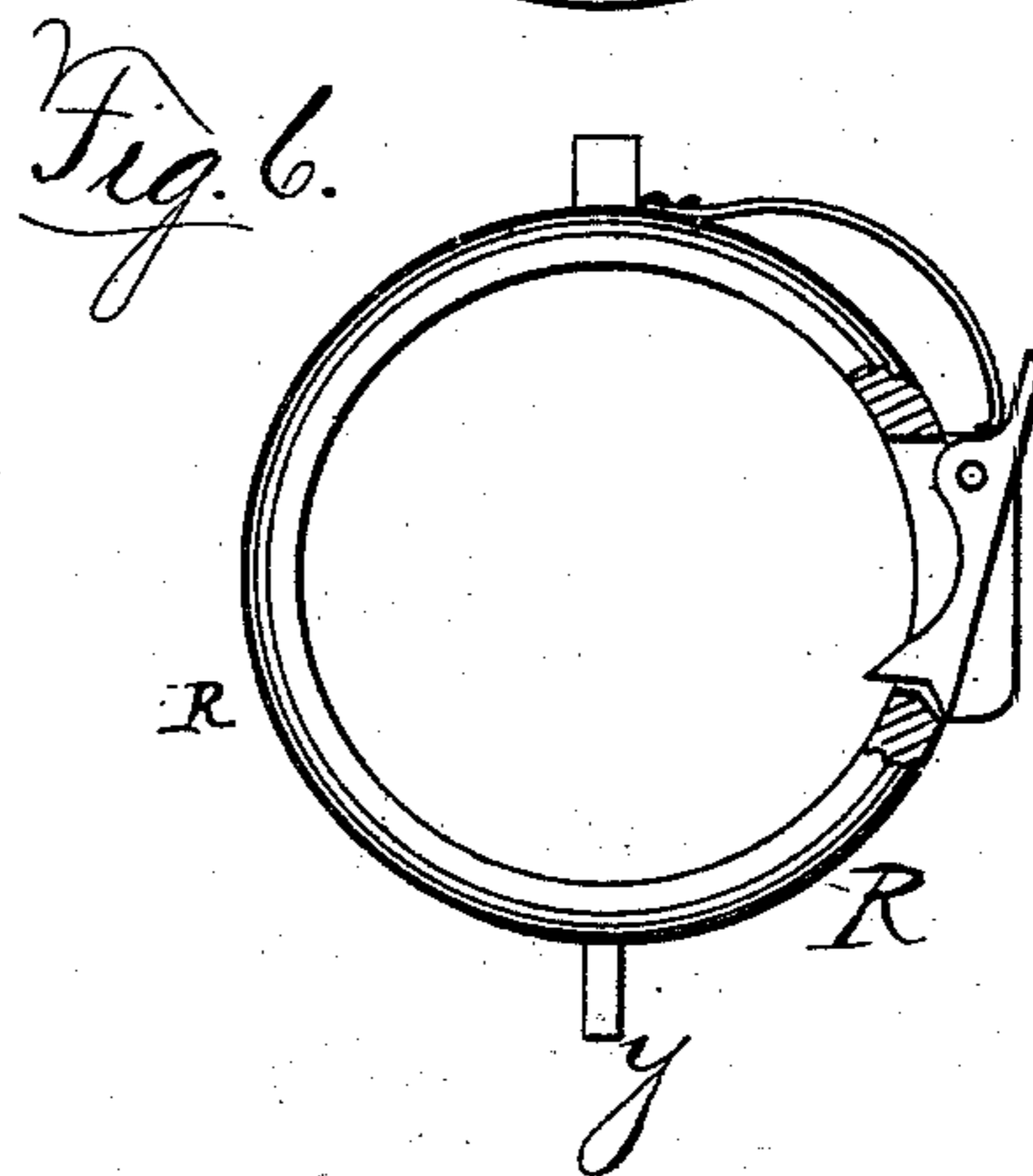
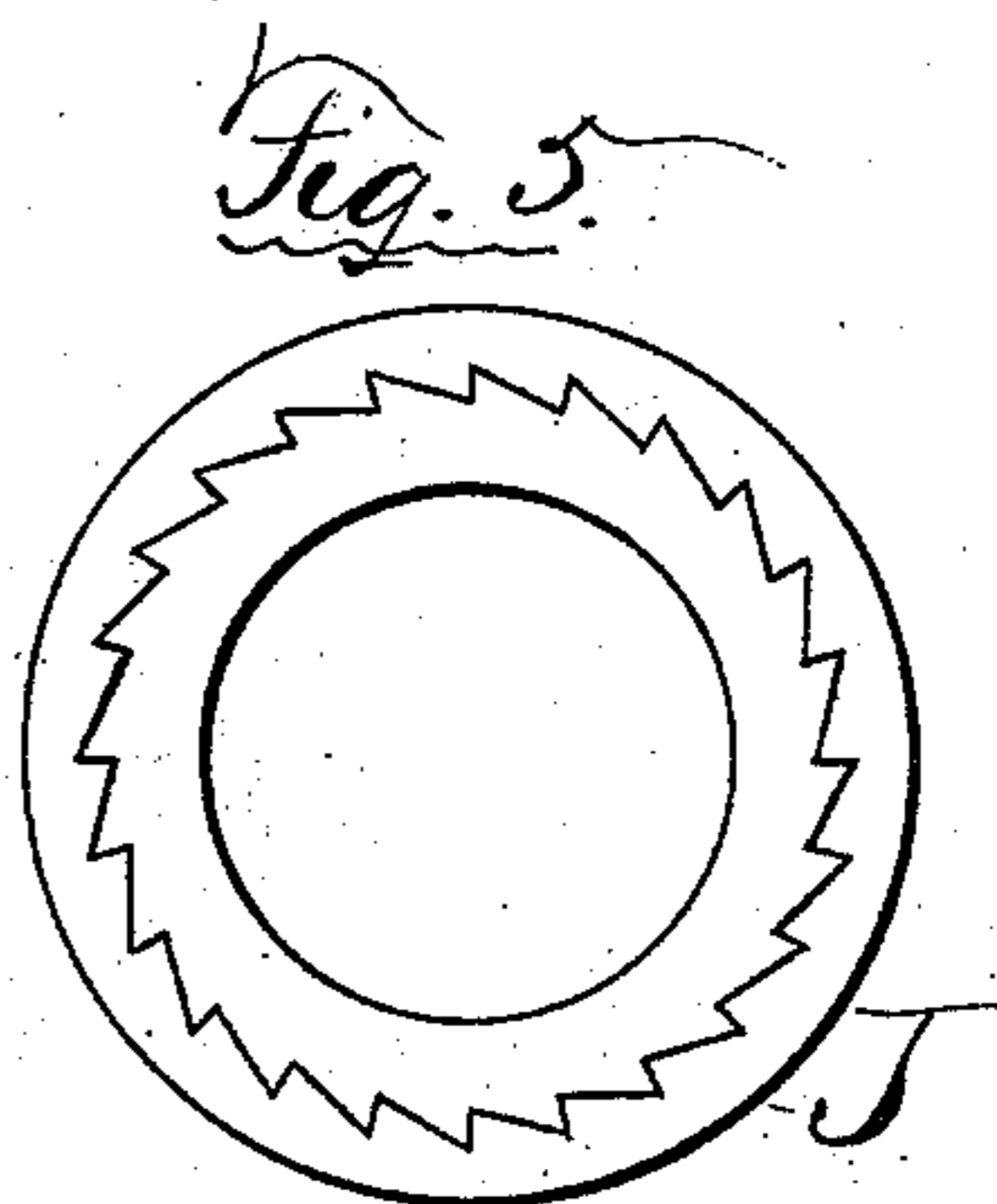
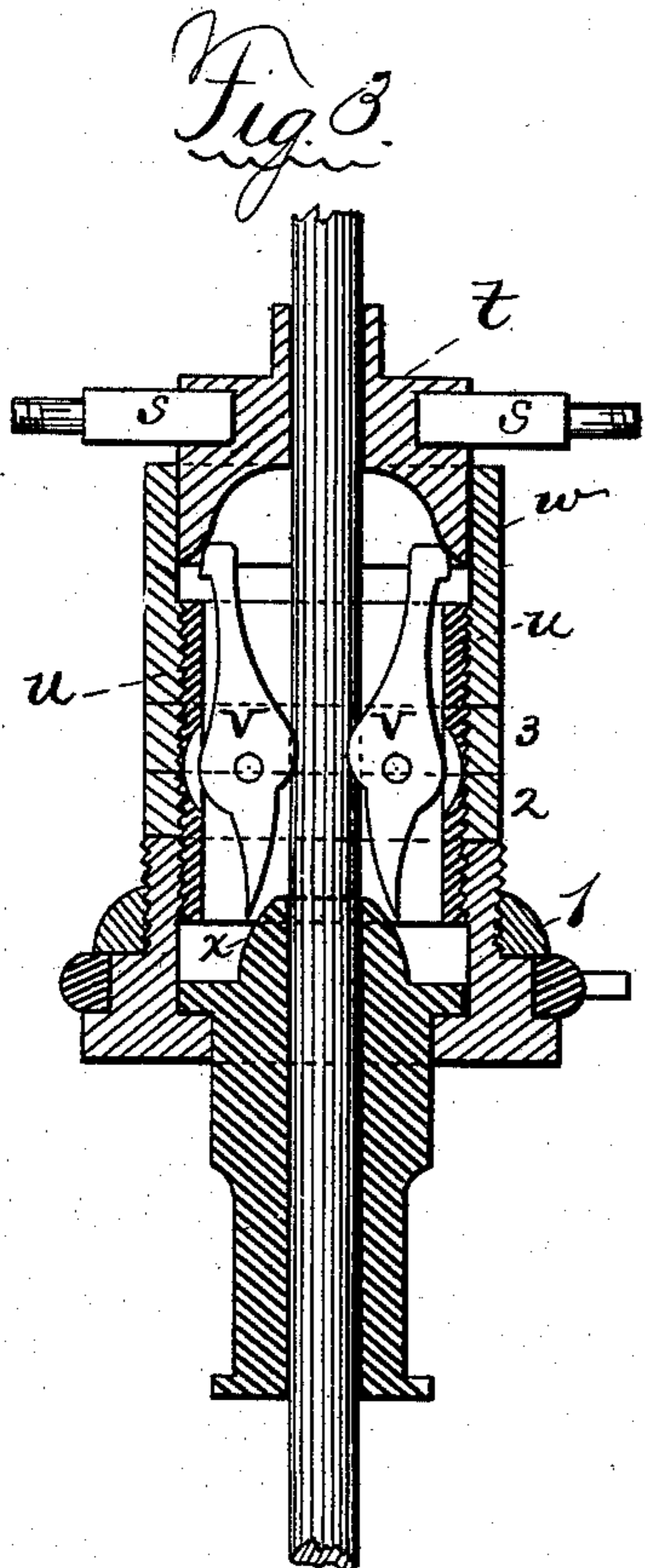
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UNITED STATES PATENT OFFICE.

SYLVANUS HUSSEY, OF GOWANDA, NEW YORK.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 232,609, dated September 28, 1880.

Application filed January 21, 1880.

To all whom it may concern:

Be it known that I, SYLVANUS HUSSEY, of Gowanda, in the county of Cattaraugus and State of New York, have made certain Improvements in Rock-Drills, of which the following is a specification.

This invention relates more particularly to drills operated by hand for mining purposes, although power may be applied, if desired; and the object of this invention is to get a more rapid stroke or blow on the rock than is now had by hand-drills, and obtained, also, with greatly less power, also, combining in one machine drilling and tunneling by the movement of the operating parts in any direction desired; and the invention consists in the use and application of two or more peculiar double combination gripes for operating the drill-bar; also, in a circular frame, which carries a series of friction-rollers and friction-wheels which operate the levers, they operating the gripes, &c.; also, in the construction of the frame by which the operating parts are turned in any desired direction; also, in adjustable jaws for adjusting the down-feed of the drill-bar on the rock; also, in the construction of the parts containing the gripes and the devices for operating them, and the ratchet device on the lower part for turning the drill-bar and drill; and, finally, in the arrangement of the crank-gears and fly-wheels by which the whole machine is operated and the motion facilitated and made regular and even, all as fully hereinafter explained.

In the drawings, Figure 1 is a front elevation. Fig. 2 is a side elevation. Fig. 3 is a vertical cross-section through the parts that inclose and operate the drill-bar; Fig. 4, a plan of the cat-head and operating-levers; Figs. 5 and 6, details of ratchet-rings.

a a a are the legs or tripod, each foot being hollow to receive the extension-legs *a' a' a'*, as usual.

The top of the tripod is a disk, *b*, on which rests another disk, *b'*, with side projections, to which the side pieces, *A A*, are bolted or otherwise fastened. These frames consist of two pieces of casting with segmental ways *c c*, which form guides for the turning of the drilling parts. In the upper part of this frame sets a loose shaft, *d*, on the outside ends of which, and outside the frame, are fly or bal-

ance wheels *B B*, with cog-wheels *e e* attached thereto. Meshing into these are large gear-wheels *C C*, with cranks *D* for operating them. They are on the ends of a shaft, *f*, with bearings in arms *g g*, that project back from the drill-frame *E*. The outer ends of these arms are connected by a rod, *h*, the ends of which run in the segmental guides *c*, and which, by nuts on the ends, hold the drill-frame when tilted in any desired rotary position. The disks *b b'*, at the bottom, permit the turning of the frame and drilling parts longitudinally, so by these devices any angle or position desired in drilling or tunneling can be had.

On the operating-shaft *f* is a cat-head, consisting of two circular frames, *i i*, and in them, on the connecting-rods of the frames, are set loose friction-rollers *k k k'*, (three or more.) Running loose on these rollers, and next the frames *i i*, are friction-wheels *l l*, of greater circumference than the rollers, the latter having shoulders to prevent a side movement of the wheels.

Setting loosely on the shaft *d* are three operating-levers, as follows: In the center is the wide lever *m*, which is bent, and its center inclosing the shaft *d*. Its inner end is just wide enough to work between the two side friction-wheels, *l l*, and strike on all the friction-rollers *k k* at every revolution of the cat-head. The front end of this lever is bifurcated, so as to inclose the drill-rod *F*, and has a supplementary slanting piece, *n*, set on each, thereby forming adjustable jaws *G*. These pieces are slotted on the outside, and have a set-screw, *o*, in each to adjust them, so as to gage correctly the down-feed of the drill-bar on the rock. (See Figs. 4 and 1.) Each side of this center lever, *m*, (on the same shaft *d*,) are two other bent levers, *p p*, (see Fig. 1,) working loosely on the shaft, the inner ends being shorter than the end of lever *m*, and are operated by the friction-wheels *l l* of the cat-head. To the front ends of these levers are connected, by wrist-pins *q q*, pitmen *r r*, which are slotted at their upper ends and connected to the studs *s s*, which raise an inverted cone-shaped or inwardly-rounded piece, *t*, surrounding the drill-bar, and which is loose in an outside frame, *w*, screwed onto a central frame, *u*.

The devices to raise and hold the drill-bar are as follows: In the central hollow frame, *u*,

which is screw-threaded on the outside, are arranged vertically two or more gripping devices, *v v*, pivoted below their centers to the case *u*. These gripes are of peculiar construction. (See Fig. 3.) The lower ends are beveled off and slide over a cone-shaped or rounded lifting-piece, *x*, loose on the drill-rod *F*, which, by the working of the lever *m* and jaws *G*, gripes the rod and raises it up at the same time.

Previous to this, however, the upper part of the gripes *v v*, which were held by the inverted cone-piece *t*, have been released by the action of the levers *p p* and pitmen *r r*. When the parts reach their highest point the release of the levers from the friction-rollers *l* and *k* drops the parts down. The inverted cone part *t*, just previous to this, catches the tops of the gripes *v v*, and holding them tightly, and also holding the drill on the rock, so that there is no rebound. This movable part *H* falls only so far every time, being regulated by the feed; but if it slips it strikes on an india-rubber bed in base *I*, attached to the drill-frame, to take off the shock and prevent noise. (See Fig. 2.)

In order to get the rotary movement of the bar, a circular section, *J*, is screwed onto the lower part of the frame *u*, with ratchet-teeth around it. Another circular frame, *R*, surrounds this, with a ratchet to engage with the teeth. On the periphery of the frame *R* is a pin, *y*, which sets in a slotted slanting guide, *z*, and as the drill-bar is raised the slanting slot turns the whole bar and gripe-frame every time just as much as required, the turning regulated by setting the slotted guide *z* at a greater or less angle.

A circular ring, *1*, acting as a jam-nut, keeps the ratchet-frame *R* in place. Circular rings *2 3* are secured on the frame *u*, also act as jam-nuts, and regulate the exact position of the upper and lower parts.

The operation of the machine is as follows: When set in proper position to drill, one or two persons will turn the crank-wheels revolving the cat-head frame with its friction rollers and wheels, which act on the levers *m* and *p p*. The lever *m*, raising the lifting-piece *x*, its cone top pushes the lower ends of the gripes slightly apart, and by their eccentric shape they at once seize the drill-bar and raise it and the entire surrounding frame. The jaws of the lever *m*, by the supplementary pieces *n n*, give greater or less feed to the bar, according to whether they are set out or in—that is, they raise the bar and frame more or less, as desired. At every up movement of the bar it is seized a little higher up by the top of the gripes being acted on by the up-and-down movement of the inverted cone-shaped part *t*, independently operated by the levers *p p* and pitmen *r r*.

This gives the down-feed to the drill. At a certain point in the movement of the drill-bar holding the parts *H* the gripes are not on the bar, so that if the stone should be soft or a hole struck the bar would drop itself. This is an important point in its construction. This up-feed of the drilling parts by the eccentric supplementary jaws *n n*, also preventing the striking or pounding of the parts at every down movement of the drill-case *H*, is also important.

I claim—

1. The frame for the working parts, consisting of the side frames, *A A*, having the segmental ways or guides *c c* formed therein, the side arms, *g g*, and drill-frame *E*, and rod *h*, the latter swinging in the ways *c c*, all constructed and arranged substantially as hereinbefore specified.

2. In connection with the operating-shaft *f* and devices for turning it, the cat-head, consisting of the two disks *i i*, with the three or more loose friction-rollers *k k* and wheels *l l*, working therein, in combination with the levers *m p p* and shaft *d*, all substantially as and for the purpose specified.

3. In combination with the hollow lifting-piece *x*, having the cone-shaped top and flanged base, the lever *m*, with bifurcated ends forming the jaws *G*, either square or rounded, the supplementary slotted slanting pieces *n n*, and set-screw *o*, for adjusting the feed of the drill-bar, all substantially as specified.

4. The side levers, *p p*, on shaft *d*, the slotted pitmen *q q*, connected thereto and to studs *s s*, for raising the inverted cone *t*, all substantially as specified.

5. The combination of the two or more peculiar-shaped pivoted gripes, *v v*, the central frame, *u*, case *w*, the loose lifting-piece *t*, and lifting-piece *x*, all arranged and operating substantially as and for the purpose specified.

6. The devices for rotating the drill-bar, consisting of the ratchet-toothed ring-section *J*, the surrounding spring ratchet-ring *R*, pin *y*, and slotted slanting guide *z* on base *I*, and in combination with lever *m* and the lifting-piece *x*, all substantially as specified.

7. The lifting-piece *t*, operating independently and loosely in the frame by means of the levers *p p* and pitmen *r r*, and in combination with the gripes *v v*, substantially as and for the purpose specified.

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

S. HUSSEY.

Witnesses:

J. R. DRAKE,
T. H. PARSONS.