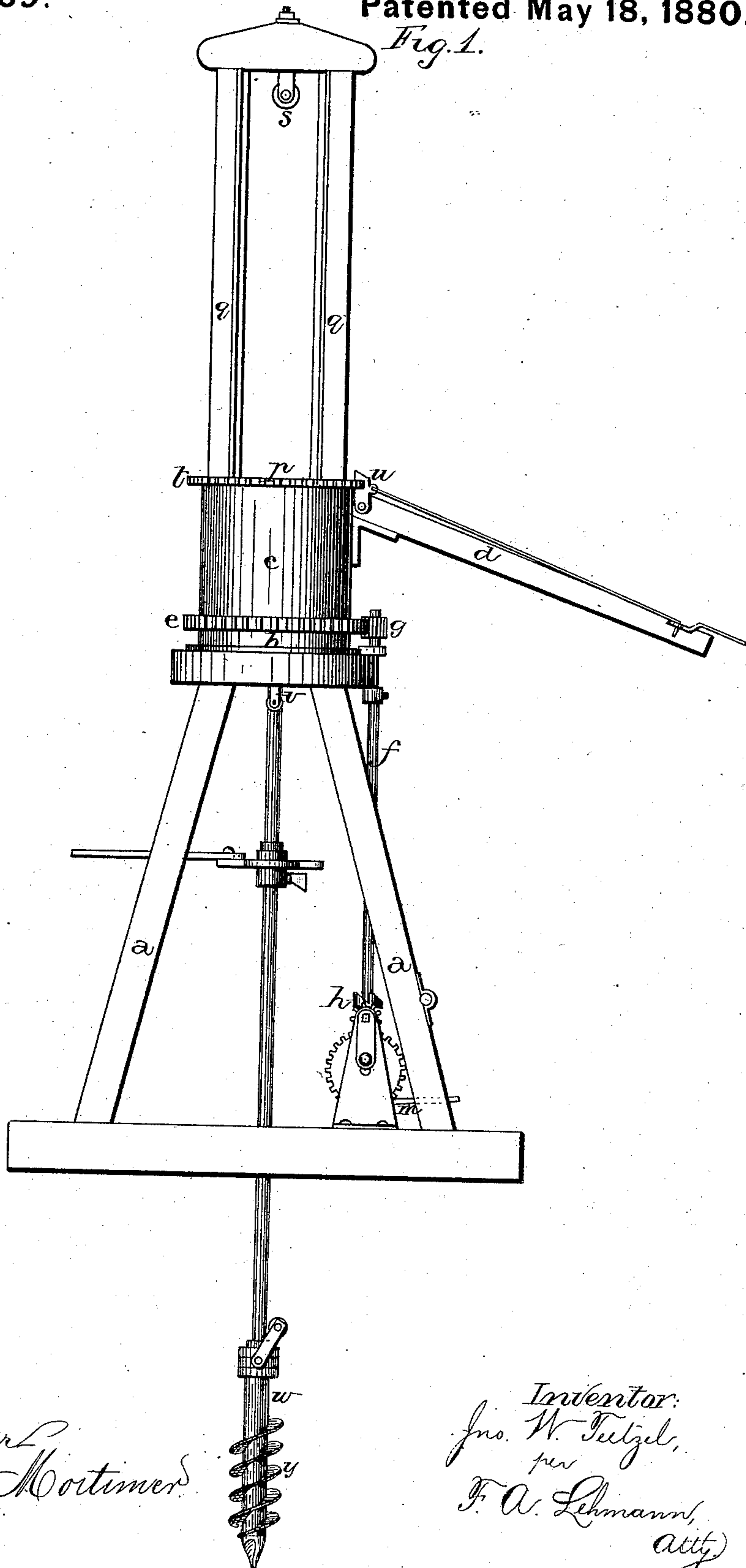


J. W. TEETZEL.
Well-Boring Machine.

No. 227,859.

Patented May 18, 1880.

Fig. 1.



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Fig. 2.

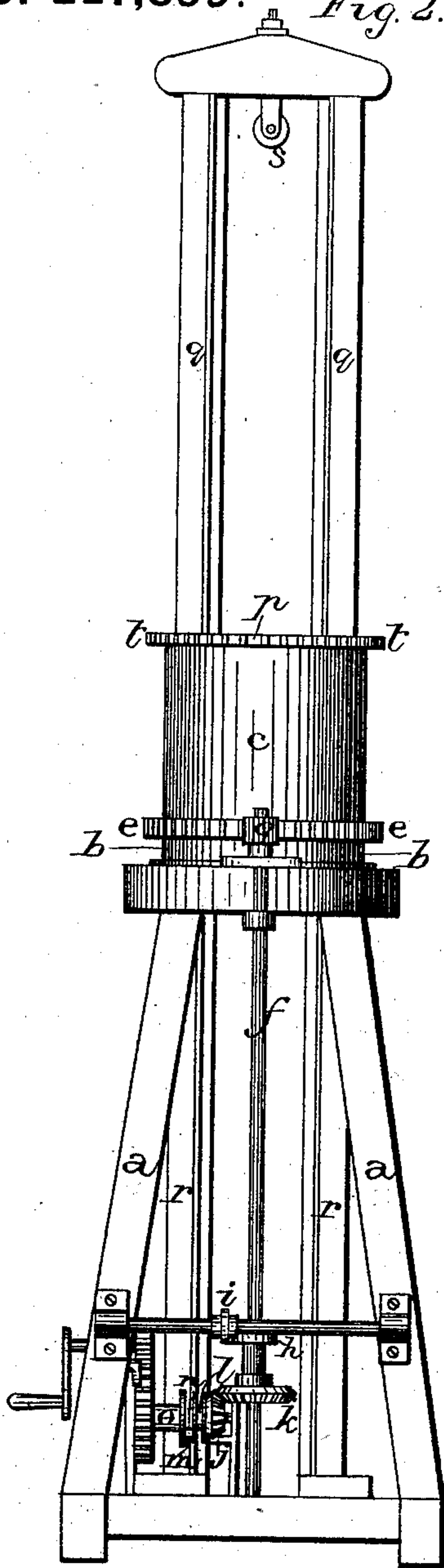
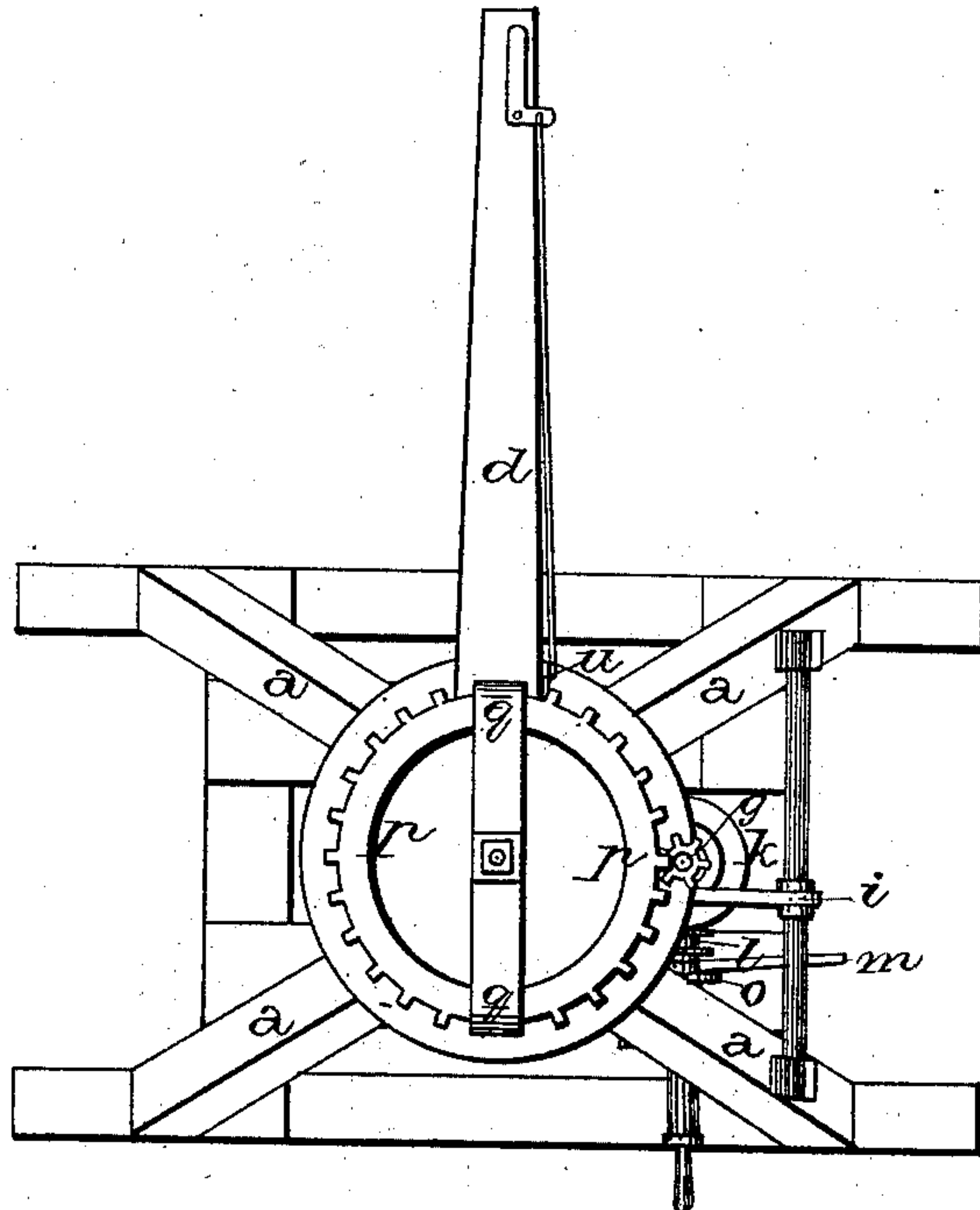


Fig. 3.



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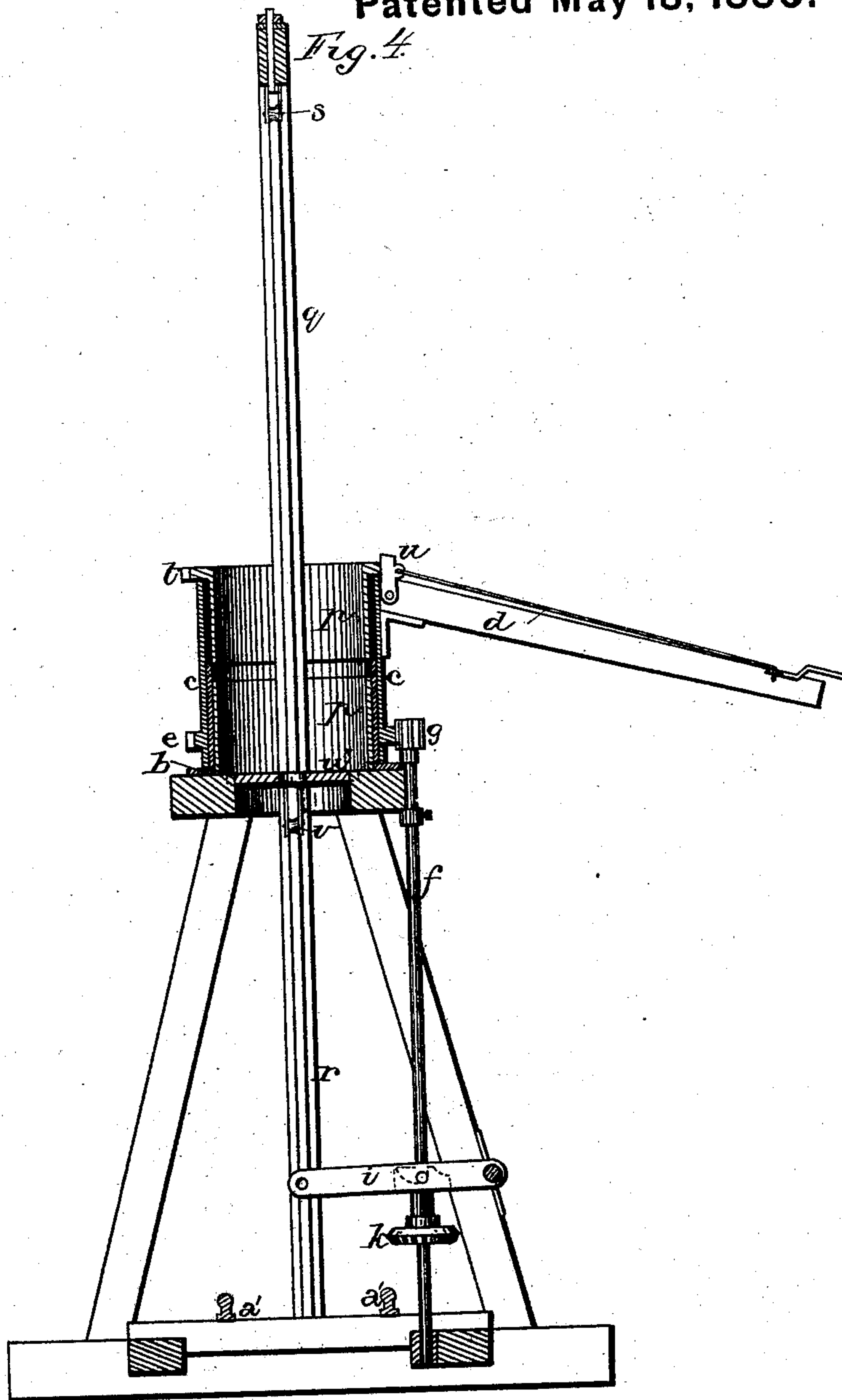
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Fig. 5.

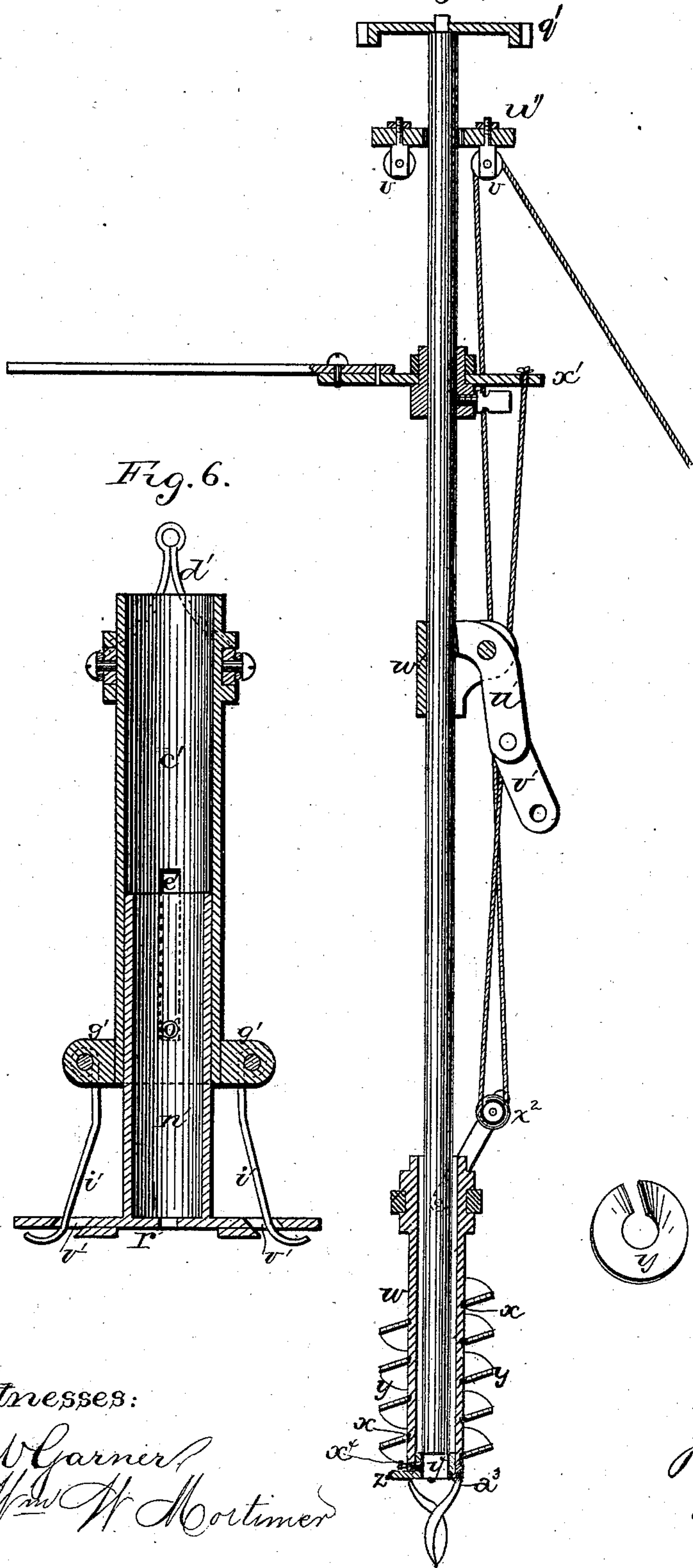
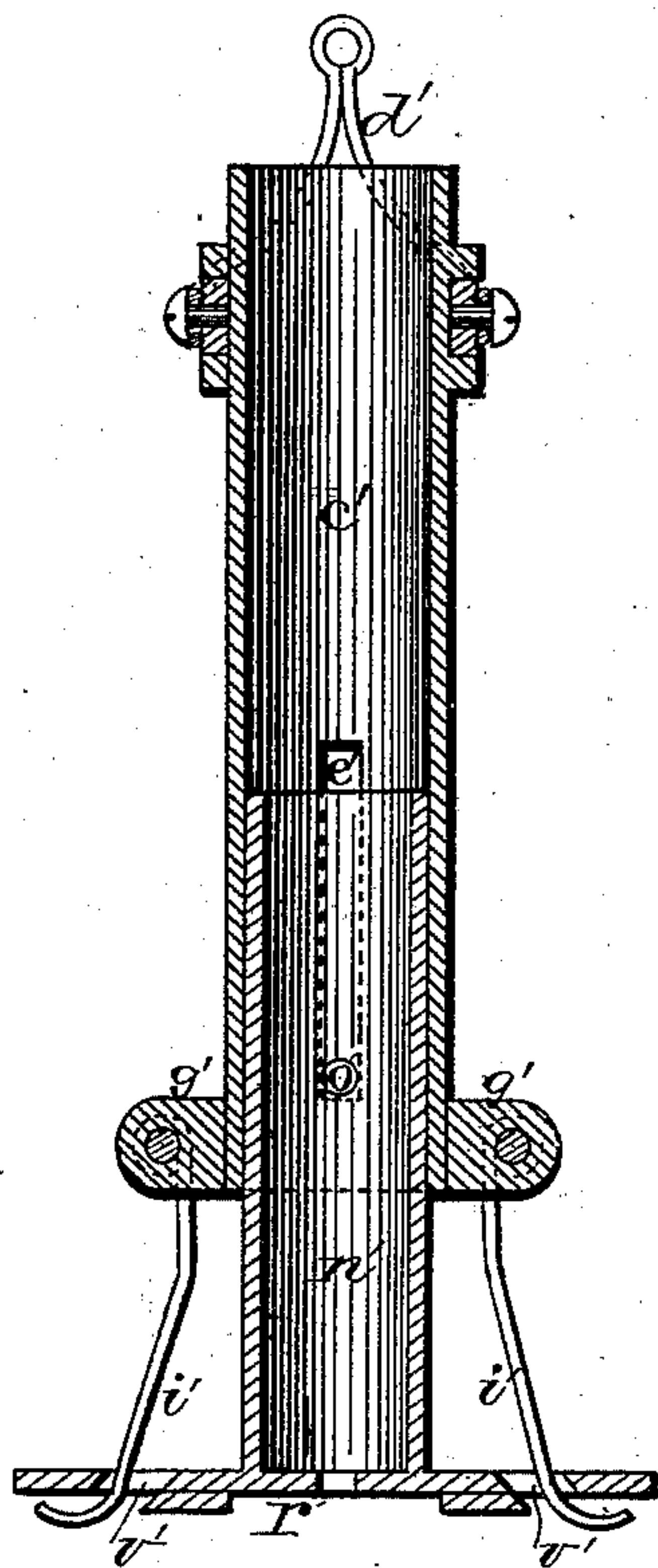


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN W. TEETZEL, OF BENTON HARBOR, MICHIGAN.

WELL-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 227,859, dated May 18, 1880.

Application filed October 24, 1879.

To all whom it may concern:

Be it known that I, JOHN W. TEETZEL, of Benton Harbor, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in Well-Boring Machines; and I 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 it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in well-boring machines; and it consists in the peculiar construction and arrangement of parts that will be more fully described hereinafter.

Figure 1 is a side elevation of my machine. Fig. 2 is an end view of the same. Fig. 3 is a plan view. Fig. 4 is a vertical section. Figs. 5 and 6 are detail views.

a represents a suitable derrick of any desired construction, and upon the top of which is secured the permanent cylinder *b*, which acts as a guide, around which the driving-cylinder *c* revolves. This driving-cylinder has the sweep *d* secured to its upper end, so that it can be revolved by a horse or other animal, and around the lower end of the cylinder is formed the continuous row of teeth *e*, which mesh with the pinion *g* on the upper end of the shaft *f*. Near the lower end of this shaft is secured the double cam *h*, which operates the rod *i*, which raises and drops the drill while the drill is being turned by the mechanism which will be described hereinafter. Below this double cam is secured the beveled wheel *k*, which operates the pinion *j* on the short shaft *l*. The inner end of this pinion is formed into a clutch, so as to engage with the loose pulley *n* on the shaft *l*, and which pulley is moved in and out of gear by the lever *m*. To this pulley is fastened the rope for operating the drop, and which rope is wound up by the horse until the drop is raised high enough, when the pulley is at once thrown out of gear by its lever and the drop falls. The pulley is then moved in gear again and the drop again raised. The lower end of the rope is fastened to the drill-rod by means of a swiveled collar or any of the known means for this purpose, and which collar allows the drill-rod to be freely turned around without the rope wrap-

ping around it. On this shaft *l* is also placed a drum, *o*, which is operated by hand without any regard to any of the other operating parts, and is provided with a suitable dog or catch to hold it in any desired position.

Inside of the driving-cylinder *c* is placed a second revolving cylinder, *p*, or two separate rings, inside of which are secured the two tall standards *q*, which have suitable guides on their inner sides for the drop to slide upon. In the derrick are also placed the two standards *r*, which are made removable, so that when the machine is not to be used for driving piles or tube-wells these standards can be taken out of the way. These two sets of standards *q* *r* form the guides in which the drop moves, the rope fastened to the drop being passed up over the pulley *s* in the upper standard, and from thence down to the sliding pulley *n* on the shaft *l*. The revolving cylinder *p* is provided with teeth around its top edge, where it projects above the cylinder *c*, and into these teeth *t* catches the latch *u* on the sweep. This latch is operated by a hand-lever and connecting-rod that reach down, so that the latch is readily operated from below.

By making this latch catch in the teeth *t* the cylinder may be revolved just far enough around to bring the standards *q* in line with the ones *r*, or it may be made to revolve continuously with the cylinder *c*, for the purpose of operating a drill or an auger.

As long as the machine is being used for driving piles the perforated plate *w* is not used; but when a drill or the auger is being used the plate is used as a guide and for the sake of the two pulleys *v* suspended from its under side. The drill-rod is passed down through this guide-plate, and then the rod is arranged to be vertically guided by the two standards *q* by means of a cross-bar, *q'*, so that when the cylinder *p* is revolved by the sweep the standards will cause the drill-rod to turn also, and as the drill will always be connected to the lever *i* to receive a striking motion, a compound movement is thus given the drill—that is to say, the drill-rod is being constantly turned around by the action of the sweep and at the same time that it is given a reciprocating motion by the lever *i*.

By fastening a rope or ropes to the drill-rod and passing the rope over the pulleys on the

under side of the guide-plate, and then fastening the rope to the sliding pulley *n* on shaft *l*, the horse can be made to raise the drill-rod out of the well.

5 The auger *w* is made of a piece of gas-pipe, which has a pulley swiveled upon its top, to attach an elevating-rope to, and a continuous groove, *x*, made in its side around its lower portion, to receive the removable curved sections of the auger-blade *y*. These sections of
10 the blade are made of boiler-iron, and are just long enough for each one to reach once around the tube, so that when the various pieces are put in place they make one continuous spiral
15 blade.

Secured inside of the lower end of the auger-pipe *w* by means of a set-screw, *x*⁴, is the ring *a*³, which has the cutter *z*, for cutting the earth loose, formed with it. This ring *a*³ has a
20 square hole formed through it, so as to fit over the square portion *y*⁴ of the drill-rod when the auger is lowered into position ready to bore, as shown in Fig. 5. This ring also serves as a stop to prevent any of the sections of the
25 auger-blade from becoming displaced. As this square opening through the ring fits over the square part of the drill-rod, when the rod is revolved around the ring and auger of course revolve with it. When the auger is
30 drawn upward with its load the ring *a*³ is carried along, leaving only the drill-rod down in the hole which has been bored. After the auger has again been lowered the ring settles down over the square part of the rod, and thus
35 locks the auger to the rod, so as to cause them to revolve together. After this auger has been filled with earth it is drawn up on the drill-rod out of its hole, the rod remaining in place and serving as a guide upon which the auger
40 slides. The elevating-rope is fastened in one end of the lever *x*¹, is passed down under the pulley *x*² on the upper end of the auger, up over the pulley *u*, and is then fastened to the
45 pulley *n* on the shaft *l*, so that the action of the sweep enables the auger to be drawn up with the greatest ease. The contents of the auger is then emptied into a car that is run on the track *a*¹ to receive it.

While the auger is in operation, as shown in
50 Fig. 5, the swiveled lever *x*¹ on the rod and the swiveled pulley *x*² on the auger prevent the rope from twisting or wrapping around the rod.

The reamer consists of a tube, *c*¹, having a
55 bail or handle, *d*¹, swiveled upon its upper end, a slot, *e*¹, in two of its opposite sides, and a collar, *g*¹, clamped upon its lower end. This collar *g*¹ is made in two parts, and between its ends are pivoted the two cutters *i*¹. Sliding
60 up and down in the lower end of this tube *c*¹, and guided by the set-screws *o*¹, which pass through the slots *e*¹, is a second tube, *n*¹, which has a plate, *r*¹, secured to its lower end. Through each end of this plate is made a hole,
65 *v*¹, for the two cutters *i*¹ to pass through, and

these holes are so shaped that when the tube *n*¹ is forced up into the outer tube the cutters will be extended outward to their full length, so as to cut under a curb. Both this reamer and the auger have a square hole cut through
70 their lower end, so as to fit upon the square portion of the drill-rod at its lower end, so that when the drill-rod is revolved by the sweep either one of these two implements that is upon it will be revolved with it. The reamer
75 is raised in the same manner as the auger. The rod *x*¹ having been clamped to the drill-rod by means of its set-screw, the end of the rope is fastened in the short end of the rod *x*¹, then passed down through the bail *d*¹, then
80 up over a pulley, *v*, on the plate *u*¹, to the drum.

While either the auger or the reamer are in use the drill has simply a rotary motion; but when the drill alone is in use it has both a rotary and a dropping motion.

The dropping motion is imparted by means of a slide, *w*¹, which passes over the rod, and in which is pivoted the clutch-lever *w*¹, which catches against the side of the rod as the slide is drawn upward by the lever *i*, and draws the
90 rod upward with it, but lets the rod slip freely downward through as soon as the lever lets it drop. To the lower end of the lever *w*¹ is fastened the connecting-link *v*¹, for the purpose of operating the lever more easily.

Having thus described my invention, I claim—

1. The combination of the cylinder *c*, sweep *d*, cylinder *p*, and a means of connecting the sweep to the cylinder *p* so as to cause it to
100 revolve with the one *c*, and the standards *q*, for revolving the drill or auger, substantially as described.

2. The combination of the revolving cylinder *p*, standards *q*, and perforated guide-plate
105 *u*, provided with the pulleys *v*, substantially as set forth.

3. An auger consisting of a body having a continuous spiral groove, *x*, made in its outer surface and a blade that is made in sections,
110 each section being placed in position by having its inner edge made to engage with the groove at the lower end of the body and then moved spirally upward, substantially as specified.

4. A reamer composed of the tubular body *c*¹, having the collar *g*¹ and cutters *i*¹ fastened to its lower end, in combination with the tube
120 *n*¹, which is attached to the body *c*¹ by means of slots and set-screws, and which has the perforated plate *r*¹ secured to its lower end, for expanding and closing the cutters, substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of
125 October, 1879.

JOHN WILLIAM TEETZEL.

Witnesses:

G. M. VALENTINE,
A. PLUMMER.