

No. 716,884.

Patented Dec. 30, 1902.

R. W. FROST.
DRILLING MACHINE.

(Application filed Apr. 17, 1902.)

(No Model.)

Fig. 1.

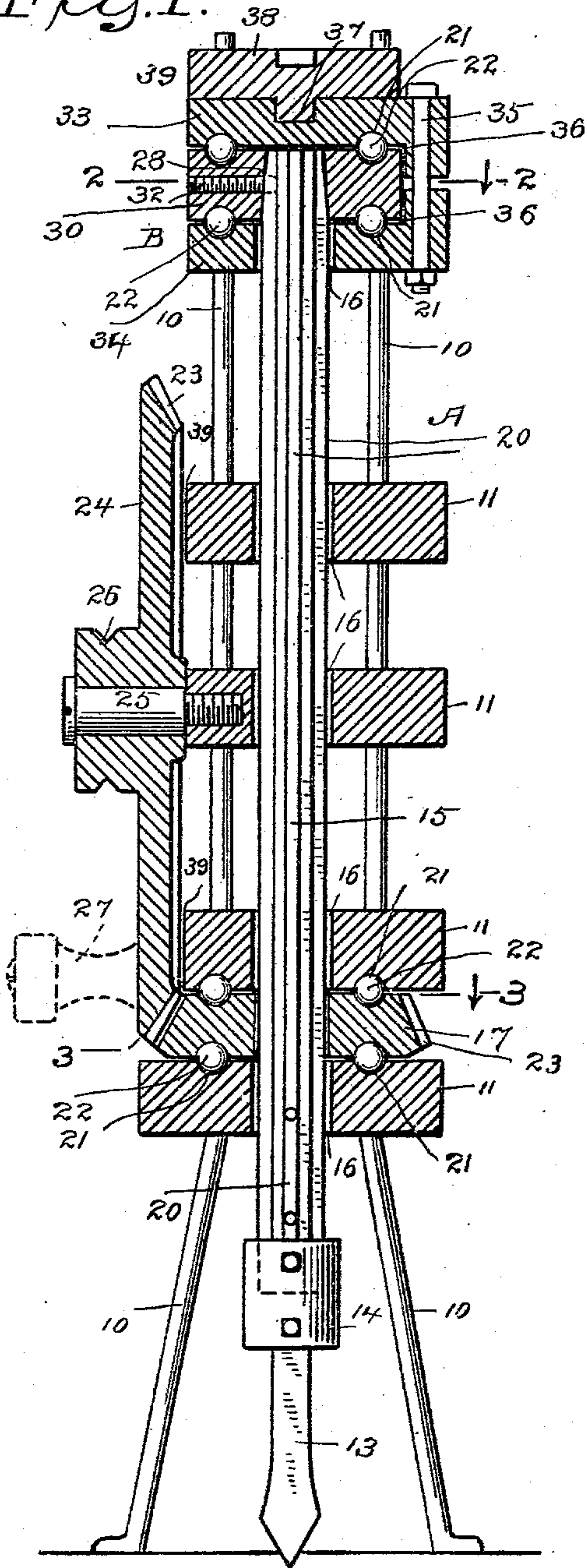


Fig. 2.

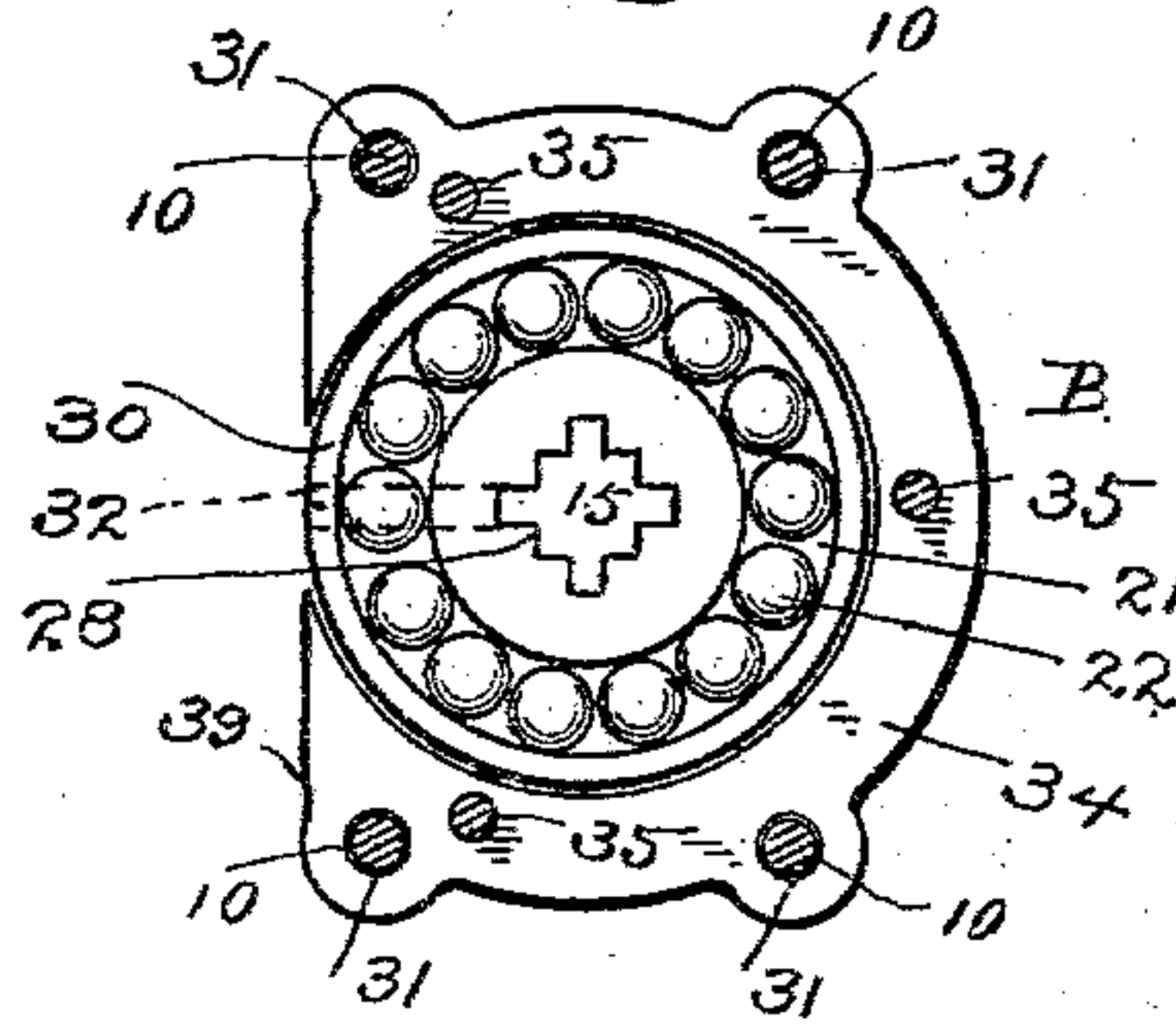


Fig. 3.

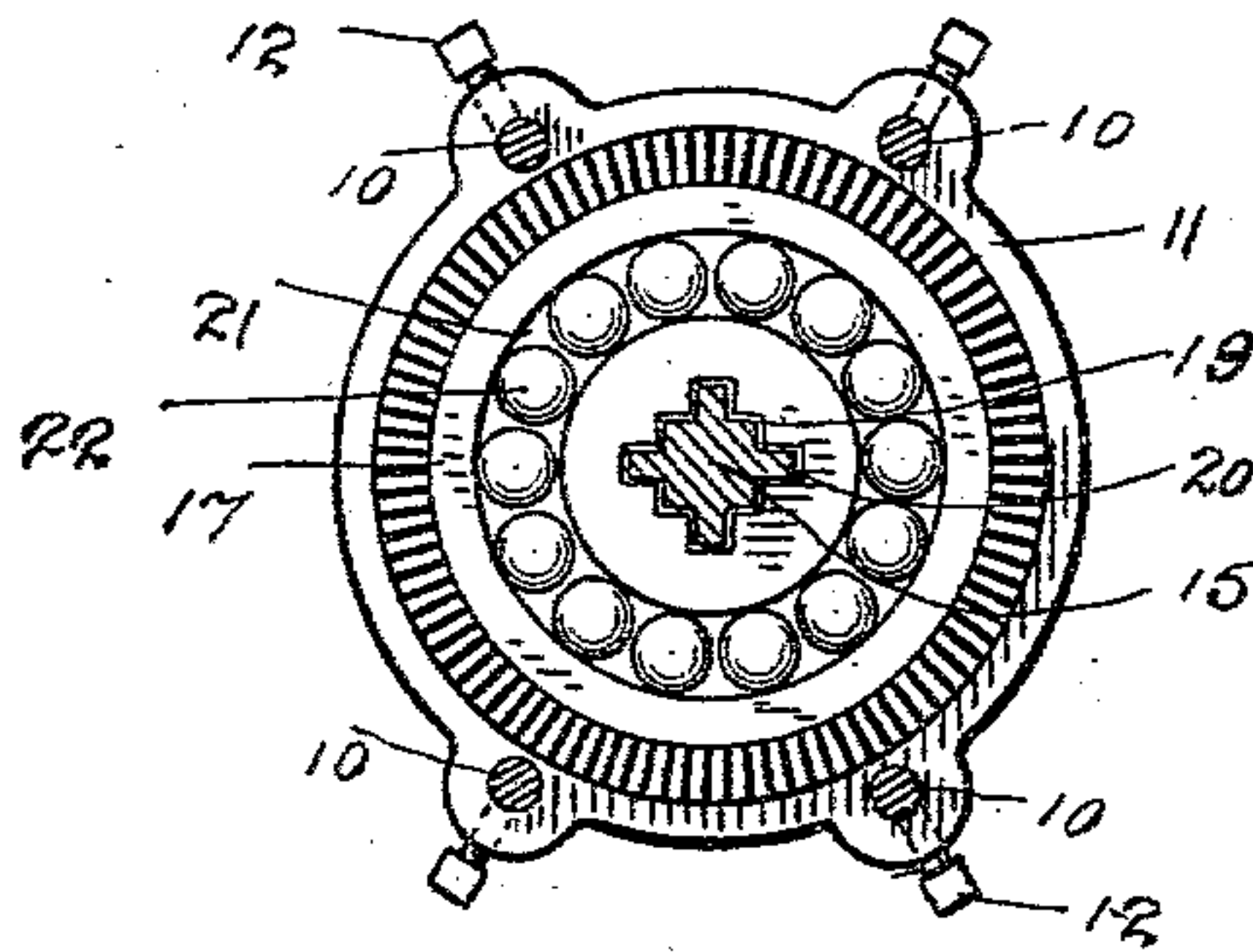


Fig. 4.

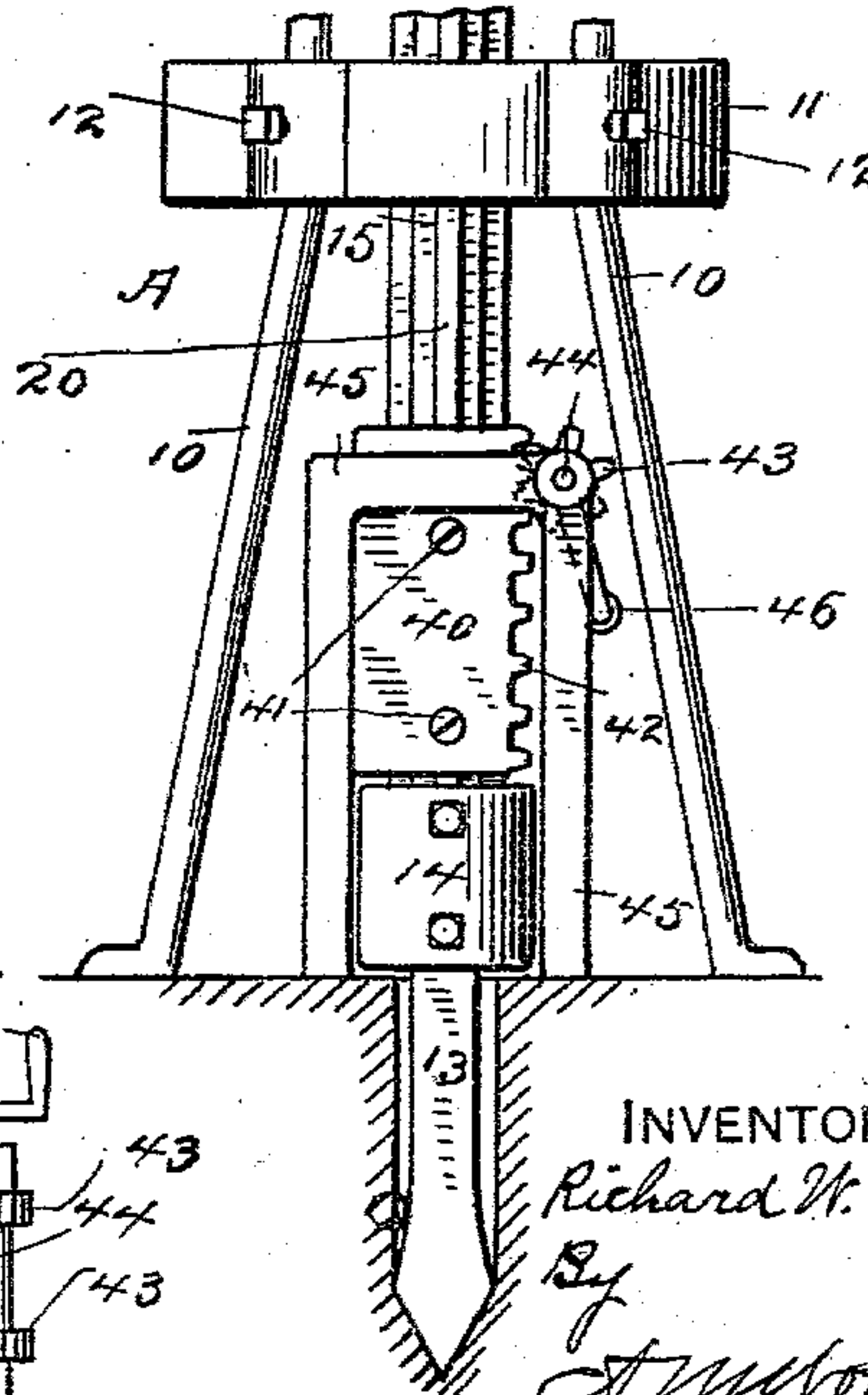
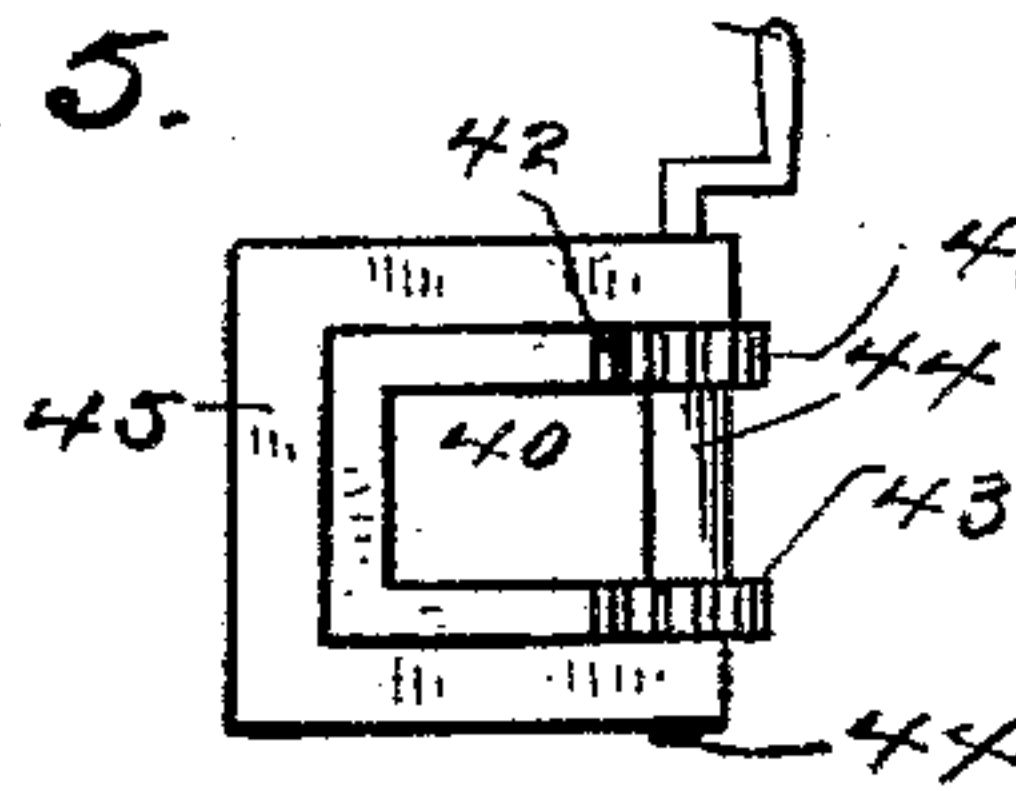


Fig. 5.



WITNESSES.

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UNITED STATES PATENT OFFICE.

RICHARD W. FROST, OF DARIEN, CONNECTICUT.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 716,884, dated December 30, 1902.

Application filed April 17, 1902. Serial No. 103,358. (No model.)

To all whom it may concern:

Be it known that I, RICHARD W. FROST, a citizen of the United States, residing at Darien, county of Fairfield, State of Connecticut, have invented a new and useful Drilling-Machine, of which the following is a specification.

My invention has for its object to provide a simple, durable, and inexpensive portable drilling-machine adapted for general use, as upon stone, metal, or wood, and to be operated either by power or by hand, and which is also provided with simple and easily-operated means for removing a drill from a hole by power.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations which will be hereinafter described, and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical section of my novel drilling-machine as in use, the drill and drill-shaft appearing in elevation; Fig. 2, a section on the line 2 2; Fig. 3, a section on the line 3 3; Fig. 4, an elevation illustrating my novel means for removing a drill by power, if required; and Fig. 5 is a plan view of the lifting mechanism detached.

A denotes the framework of my novel drilling-machine, which may comprise simply uprights which also serve as legs, and horizontal plates 11, rigidly secured thereto. I have shown four uprights and four horizontal plates in the drawings, although the number of either is of course not of the essence of my invention. The uprights are shown as passing through holes in the plates, which may be rigidly locked thereto in any suitable manner, as by set-screws 12, but in such a manner as to enable the entire machine to be easily taken apart for transportation or storage and set up wherever it may be required to use it.

13 denotes a drill which is detachably secured to a head 14, which in turn is detachably secured to the drill-shaft 15, set-screws 12 being shown as a means of attaching the drill to the head and the head to the shaft. The shaft extends upward freely through

holes 16 in the horizontal plates, in which it rotates. The drill-shaft is made polygonal in form, so as to engage and be carried by a carrier 17. This carrier is provided with an opening 19, corresponding in shape with the cross-section of the drill-shaft, so as to engage it closely, but leaving the shaft free to move vertically in the opening. In the drawings I have shown the drill-shaft in cross-section as a square having angular ribs 20 between the corners. The carrier lies between the two lower horizontal plates, the inner faces of said plates and the faces of the carrier being provided with circular grooves 21, which serve as ball-races to receive balls 22, interposed between the carrier and the plates. Rotary motion may be imparted to the carrier in any ordinary or preferred manner. I have shown the periphery of the carrier as provided with bevel-gear teeth 23, which are engaged by corresponding gear-teeth on a driving-wheel 24, mounted to turn on a stud 25, carried by one of the horizontal plates. The hub of the driving-wheel is shown as provided with a groove 26 to receive a belt to drive the machine, or, if preferred, the driving-wheel may be turned by hand, a crank-handle 27 being indicated by dotted lines. The upper end of the drill-shaft engages a correspondingly-shaped opening 28, preferably tapered, as shown, in a guide-wheel 30, carried by a guide B, which is provided with holes 31, through which the uprights pass freely. I have shown the guide-wheel as secured to the drill-shaft by means of a set-screw 32 and have shown the guide as consisting of upper and lower plates 33 and 34, which are rigidly secured together by bolts 35, the lower plate having an opening 16, through which the drill-shaft passes freely. The upper and lower plates of the guides are shown as provided in their inner faces with recesses 36, which partly inclose the guide-wheel and the bottoms of the recesses, and the faces of the guide-wheel are provided with circular grooves 21, which form ball-races to receive balls 22; interposed between the guide-wheel and the plate. The outer face of the upper plate 33 of the guide is shown as provided with a recess to receive a lug 37 upon a weight 38. Any number of these weights may be superposed above the guide to give the required amount of pres-

sure to the drill, it being noted that the entire weight of the guide-wheel, guide, and weights if used rests upon the drill-shaft and drill. I have shown one side of the guide
 5 and all of the horizontal plates except the lower one as cut away on one side, as at 39, to accommodate the driving-wheel, it being obvious that in use the guide may drop down until it comes into engagement with the upper
 10 per horizontal plate. It will of course be understood that in drilling a deep hole as soon as the drill has been run down far enough so that the guide is in contact with the upper horizontal plate the drill-shaft and the drill
 15 are raised, the drill removed, and a longer one attached to the shaft. In drilling deep holes it is sometimes quite difficult to remove the drill from the hole.

In order that a long drill may be quickly
 20 and conveniently removed from the hole, I provide a lifter 40, which may be placed upon the drill-shaft above the head and secured, as by set-screws 41, or may be attached to the shank of the drill below the head, if there is
 25 room for it. I have shown the lifter as made trough-shaped and provided on its edges on the open side with rack-teeth 42. These rack-teeth are adapted to be engaged by corresponding teeth on a pinion 43, carried by a
 30 shaft 44, journaled in a suitable frame 45 and provided with a crank 46 for convenience in operation. It will be obvious that a long drill may be quickly lifted out by placing the lifter upon the drill-shaft, then setting the
 35 frame in position, mounting the pinion thereon, the teeth thereof being in engagement with the rack-teeth, and rotating the pinion by means of the crank.

The operation of my novel drilling-machine
 40 will be so obvious from the description already given that further description can hardly be required. The drill-shaft is raised, a drill attached thereto in the manner described, and then placed in position for use,
 45 and the guide, with weights thereon, if required, is placed in position on the upper end of the drill-shaft, and the machine is ready for work either by hand or by the application of power to the driving-wheel, as by a
 50 belt.

Having thus described my invention, I claim—

1. A drilling-machine comprising a frame formed of spaced-apart rods, removable plates
 55 adjustably secured to said rods, an angular drill-shaft working in said plates, and a rotary driving-pinion having an opening corresponding to said shaft, said pinion being mounted between said plates.

60 2. A drilling-machine comprising a frame formed of spaced-apart rods, removable plates adjustably secured to said rods, an angular drill-shaft working in said plates, a rotary driving-pinion having an opening corresponding
 65 ing to said shaft, said pinion being mounted

between said plates, and a guide arranged to work loosely on said rods and engaging said shaft.

3. A drilling-machine comprising a frame formed of spaced-apart rods, removable plates
 70 adjustably secured to said rods, an angular drill-shaft working in said plates, a rotary driving-pinion having an opening corresponding to said shaft, said pinion being mounted between said plates, and a guide arranged to
 75 work loosely on said rods, said guide having a rotary member in engagement with said shaft.

4. In a drilling-machine, the combination with uprights which also serve as legs and
 80 horizontal plates detachably secured to said uprights and having central openings, of an angular drill-shaft adapted to turn freely in said openings and a rotary carrier having an opening corresponding with the cross-section
 85 of the drill-shaft through which the drill-shaft may slide while receiving rotary motion therefrom.

5. A drilling-machine comprising a supporting-frame, an angular drill-shaft having a tapered end, a rotary driving-pinion for said
 90 shaft, and a guide for said shaft having a rotary member provided with a tapered opening arranged to receive the end of said shaft, said guide being free to slide upon said frame,
 95 whereby said shaft is fed by gravity.

6. A drilling-machine comprising a supporting-frame, an angular drill-shaft, a rotary driving-pinion therefor having an opening
 100 corresponding to the cross-section of said shaft, a vertically-movable guide comprising upper and lower plates, and a guide-disk mounted on said shaft and interposed between said plates.

7. A drilling-machine comprising a supporting-frame, an angular drill-shaft, a rotary driving-pinion therefor having an opening
 105 corresponding to the cross-section of said shaft, a vertically-movable guide comprising upper and lower recessed plates, means for uniting said plates, and a guide-disk mounted on said shaft between said plates and
 110 working in the recessed portions of the latter.

8. In a drilling-machine the combination with framework, an angular drill-shaft vertically movable therein and a rotary carrier mounted to turn in the framework and having an opening through which the drill-shaft may slide while receiving rotary motion therefrom, of a guide vertically movable in the
 120 framework and carrying a guide-wheel engaged by the drill-shaft and a weight detachably secured to the guide for applying additional pressure to the drill.

In testimony whereof I affix my signature
 125 in presence of two witnesses.

RICHARD W. FROST.

Witnesses:

A. M. WOOSTER,

S. W. ATHERTON.