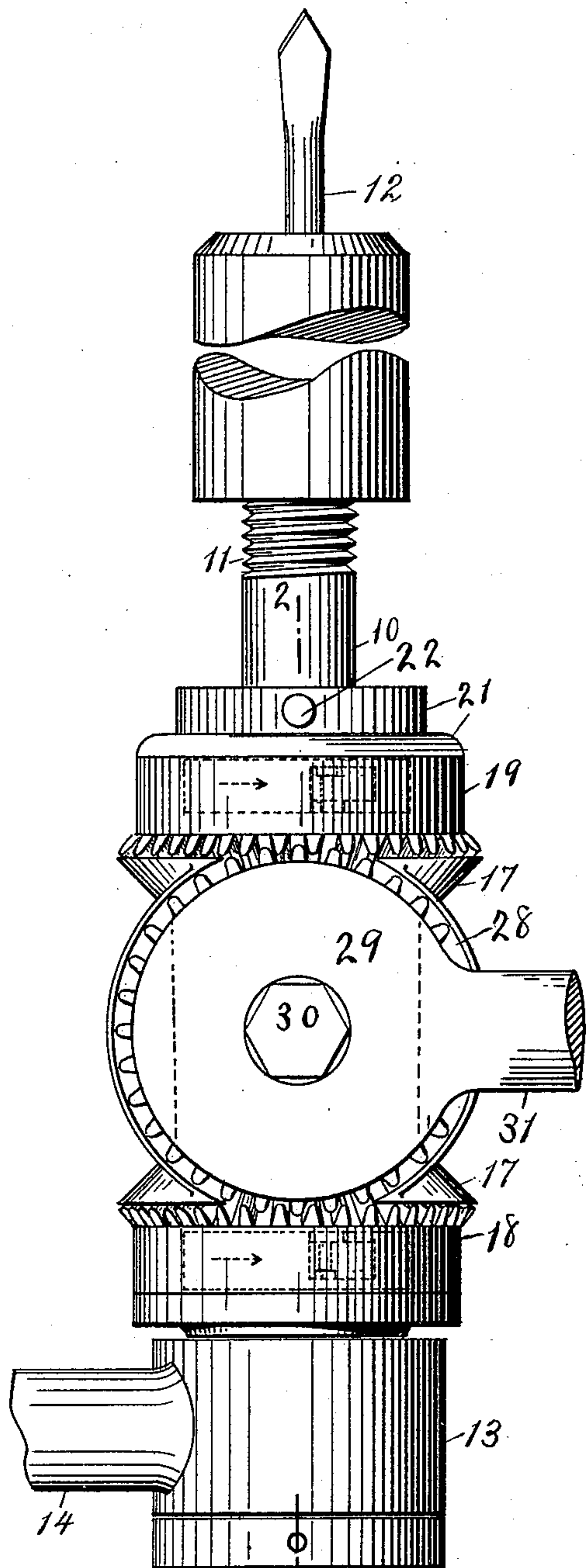


(No Model)

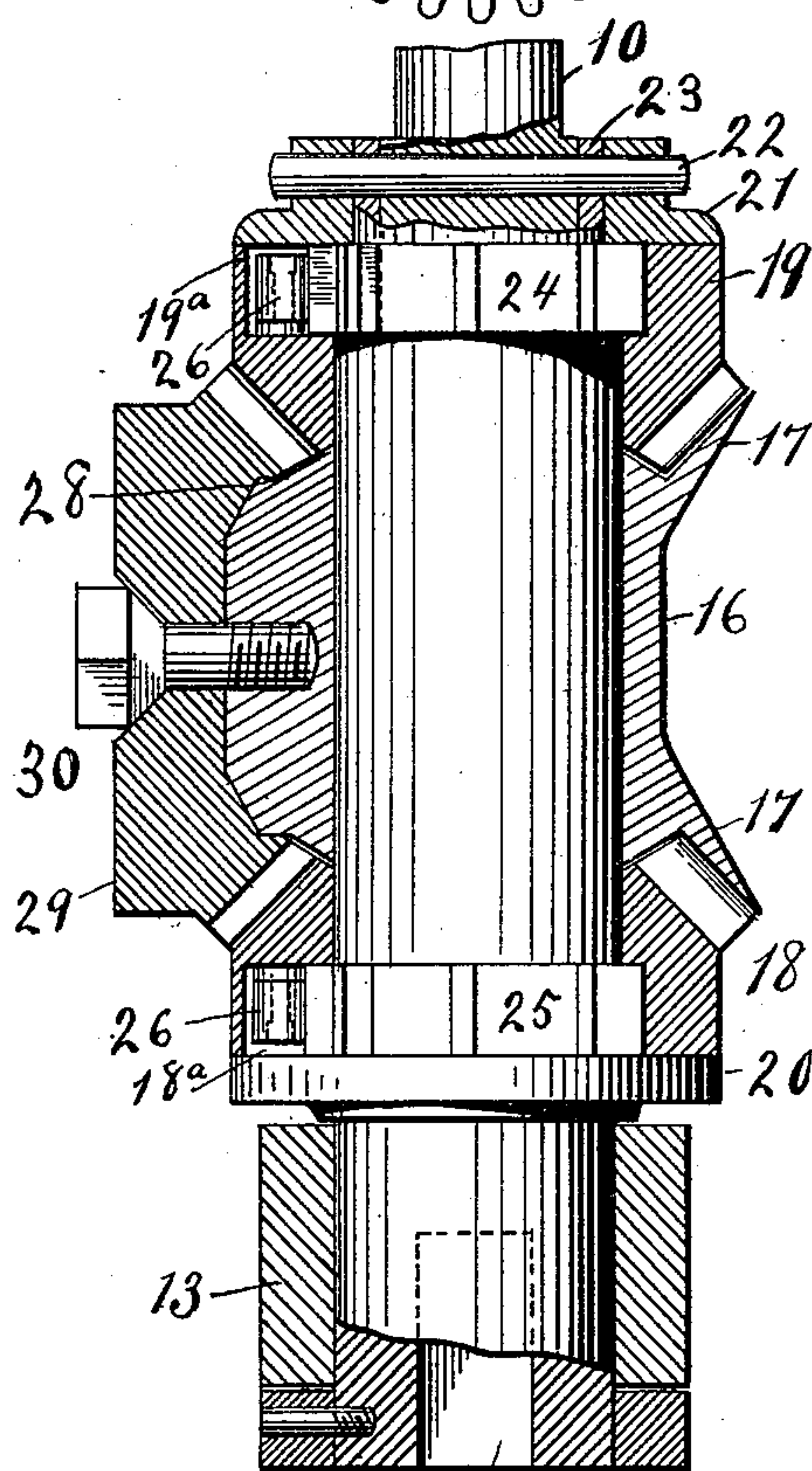
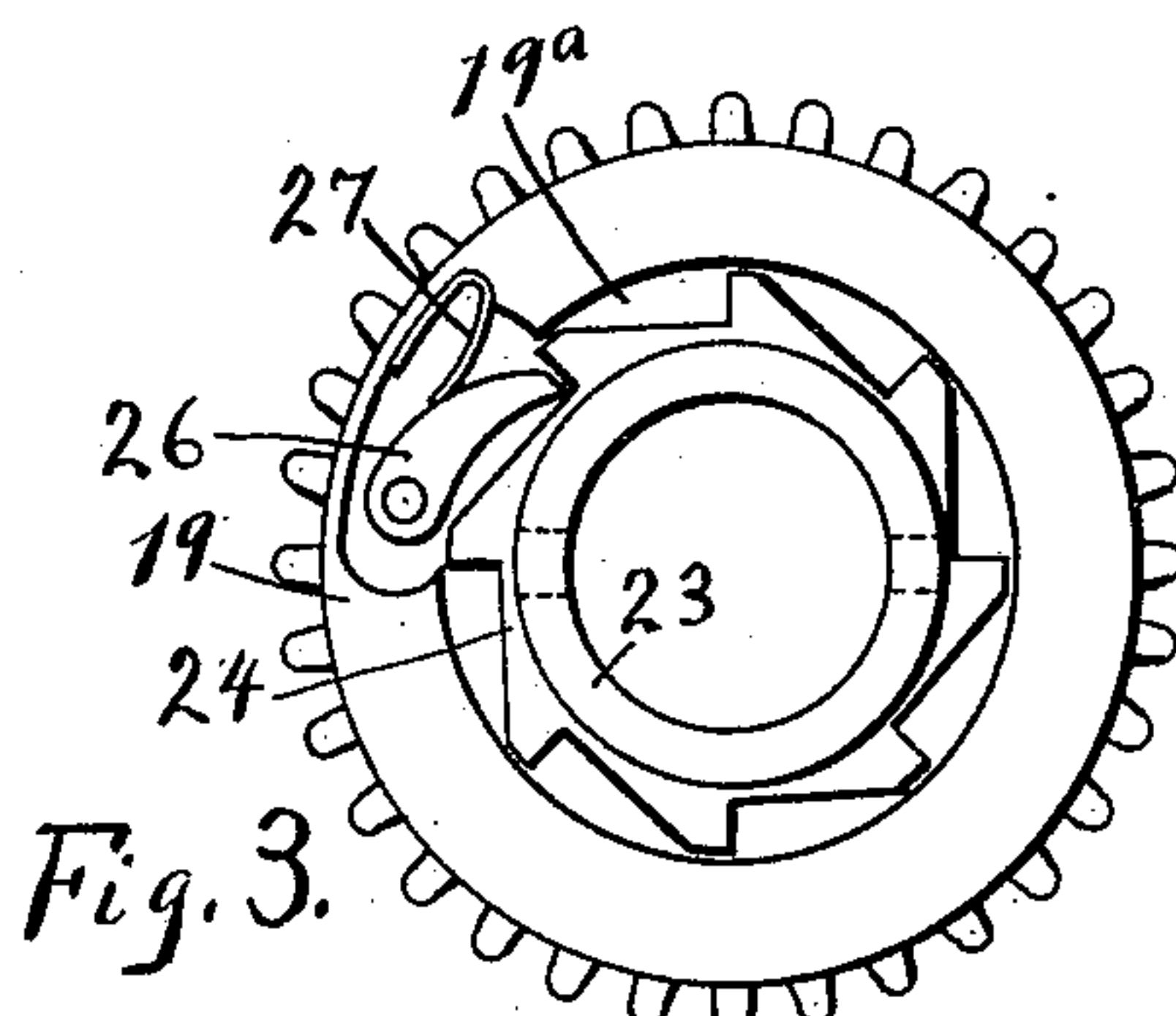
F. A. REYNOLDS.  
DOUBLE ACTING RATCHET DRILL.

No. 583,659.

Patented June 1, 1897.



WITNESSES: 2 *Fig. 1.*  
*Bertram H. Saunders*  
*Henry C. Heuser.*



*Fig. 2.* 15 INVENTOR  
*Frank A. Reynolds*  
BY *W. B. Hutchinson*  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

FRANK ARTHUR REYNOLDS, OF LEWISTON, MAINE, ASSIGNOR OF ONE-HALF TO STEPHEN H. MANNING, OF SAME PLACE, AND HERSCHEL C. PARKER, OF BROOKLYN, NEW YORK.

## DOUBLE-ACTING RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 583,659, dated June 1, 1897.

Application filed October 30, 1896. Serial No. 610,540. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK ARTHUR REYNOLDS, of Lewiston, in the county of Androscoggin and State of Maine, have invented  
5 certain new and useful Improvements in Double-Acting Ratchet-Drills, of which the following is a full, clear, and exact description.

My invention relates to improvements in  
10 drills and bits, and particularly to the mechanism for operating such tools.

The object of my invention is to produce a device of the greatest possible simplicity, having an oscillating lever like the ordinary  
15 ratchet-drill, but having a simple means of transmitting a constant motion to the drill by the oscillations of the lever, and, further, to construct the device so that the drill can be worked either by oscillating the lever in  
20 a plane parallel with the drill or by oscillating or turning it in a plane at right angles to the drill.

To these ends my invention consists of a universal bit or drill, the construction, arrangement, and organization of which will  
25 be hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate  
30 corresponding parts in all the views.

Figure 1 is a broken longitudinal view of my improved apparatus. Fig. 2 is a longitudinal section on the line 2 2 of Fig. 1, and Fig. 3 is an end view of one of the gears and  
35 the ratchet-wheel which it incloses.

The tool has a suitable drill-shaft 10, the outer end of which is screw-threaded, as shown at 11, so that a drill 12 of any approved construction can be readily attached  
40 to the drill-shaft, but it is obvious that other means can be employed for fastening the drill to the shaft, and it will of course be understood that any usual bit can be substituted for the drill. At the opposite end of the drill-  
45 shaft is a loose collar 13, which connects with a handle 14, and this handle is not shown in detail, because it is like the ordinary bit-brace, but the tool can be supported from a collar 13 in any convenient way without affecting the principle of the invention. The drill-

shaft has also at its end a socket 15, in which a tool may be inserted to turn the shaft in case it cannot be turned to advantage in any other way.

On the drill-shaft is journaled a sleeve 16, 55 which serves to support a pinion, hereinafter referred to, and which at its ends is flared outward and recessed, as shown at 17, so as to receive the teeth of the gears 18 and 19, which are journaled on the drill-shaft at the 60 ends of the sleeve 16 and which are recessed, as shown at 18<sup>a</sup> and 19<sup>a</sup>, to receive the ratchet-wheels 24 and 25, to be referred to presently. The gear-wheel 18 abuts against a fixed collar 20 on the drill-shaft, and the gear-wheel 65 19 abuts with a collar 21, which is also rigid on the drill-shaft, being held by a pin 22 or equivalent fastening device. These collars thus prevent the gear-wheels and sleeve 16 from slipping endwise. The pin 22 also 70 passes through the sleeve 23, which forms a prolongation of the hub of the ratchet-wheel 24, which is held in the recess 19<sup>a</sup> of the gear-wheel 19.

The gear-wheel 25 at the opposite end of 75 the sleeve 16 is also rigid on the shaft, and the ratchet-wheels 24 and 25 connect with the gear-wheels 18 and 19 by means of pawls 26, which are pivoted to the gear-wheels and pressed by suitable springs 27 into engage- 80 ment with the ratchet-wheels. Both of the pawls point in the same direction, and the ratchet-wheels have also the same pitch, the reason for which will presently appear.

The sleeve 16 has a generally circular re- 85 cess 28 on one side to receive the teeth of the pinion 29, which is journaled on a bolt 30 or equivalent pivot, the pivot serving to fasten the pinion to the sleeve 16. The teeth of the pinion lie in the recess 28 and engage the 90 teeth of the gear-wheels 18 and 19. The pinion has a suitable handle or lever 31, corresponding to the ratchet-lever of an ordinary ratchet-drill, and by turning this lever backward and forward the gear-wheels 18 and 19 95 are turned, the gear-wheels turning in opposite directions, one turning forward when the other turns backward, and vice versa.

The operation of the tool is as follows: The drill or bit is guided in the usual way, and un- 100



der ordinary circumstances the ratchet-lever 31 is worked backward and forward. When the lever is moved in one direction, the pinion 29 turns forward the gear-wheel 19, as shown 5 by the arrow in Fig. 1, and the pawl 26 on the gear-wheel engages the teeth of the ratchet-wheel 24 and so turns the ratchet-wheel, drill-shaft, and drill. During this operation the gear-wheel 18 will turn back and its pawl 10 26 will slide over the teeth of the ratchet-wheel 25. When the lever 31 is reversed, the reverse action takes place, the gear-wheel 19 being turned back, carrying its pawl over the teeth of the ratchet-wheel 24 and the gear- 15 wheel 18 moving forward and by the pawl turning the ratchet-wheel 25 and drill-shaft and drill.

If the tool is being used in a place where the lever 31 cannot be worked backward and 20 forward on a plane parallel with the drill-shaft 10, then the lever can be swung up and down at right angles to the aforesaid plane, in which case the sleeve 16 is oscillated on the drill-shaft, and during one stroke of the 25 lever the pawls 26 engage the ratchet-wheels 24 and 25 and turn the drill-shaft, while during the back stroke of the lever the pawls travel back over the teeth of the ratchet-wheels ready for the next forward stroke. It 30 will be seen, therefore, that this tool can be used in almost any work where the drill can be brought to bear and that the drill can be turned under ordinary circumstances with great speed and under unfavorable circum- 35 stances can be turned substantially like the ordinary ratchet-drill.

I do not limit my invention to the precise

construction and arrangement of parts which the drawings show, as it is obvious that the style of gears, the particular connections, 40 &c., can be changed considerably without affecting the principle of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters 45 Patent—

1. A device of the character described, comprising a drill-shaft, ratchet-wheels having teeth of similar pitch secured to the drill-shaft, gear-wheels journaled on the drill-shaft, said gear-wheels being recessed to fit 50 over the ratchet-wheels and provided with pawls to engage the ratchet-wheels, a sleeve journaled on the drill-shaft between the gear-wheels, said sleeve having recessed ends to receive and shield the teeth of the gear- 55 wheels, and a lever-pinion journaled on the sleeve and engaging the two gear-wheels, substantially as described.

2. A device of the character described, comprising a drill-shaft, a pair of ratchet-wheels 60 of similar pitch secured thereto, gear-wheels journaled on the drill-shaft and provided with pawls to engage the ratchet-wheels, a bearing-sleeve journaled on the drill-shaft and having its ends recessed to receive and 65 shield the teeth of the gear-wheels, and a lever-pinion journaled on the sleeve and engaging the gear-wheels, substantially as described.

FRANK ARTHUR REYNOLDS.

Witnesses:

RALPH W. CROCKETT,  
FLORENCE M. RAILEY.