P. A. CUENOT & L. G. FISCHER.

DRILL FEED MECHANISM.

APPLICATION FILED AUG. 17, 1914.

1,167,274.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

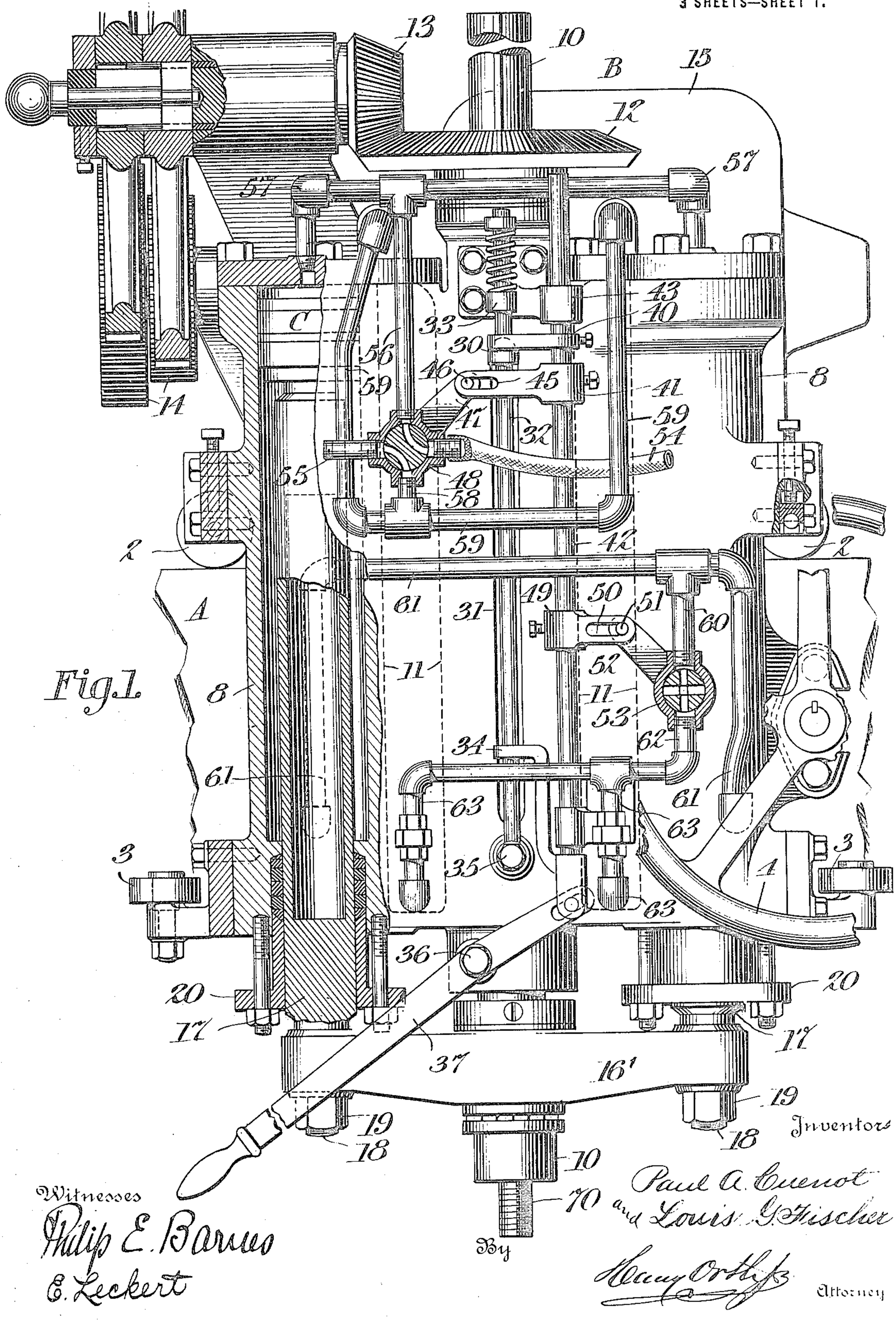

Fig. 1.

Witnesses

Philip E. Barnes

E. Leckert

Inventors

Paul A. Cuenot

and Louis G. Fischer

By

Attorney

P. A. CUENOT & L. G. FISCHER.

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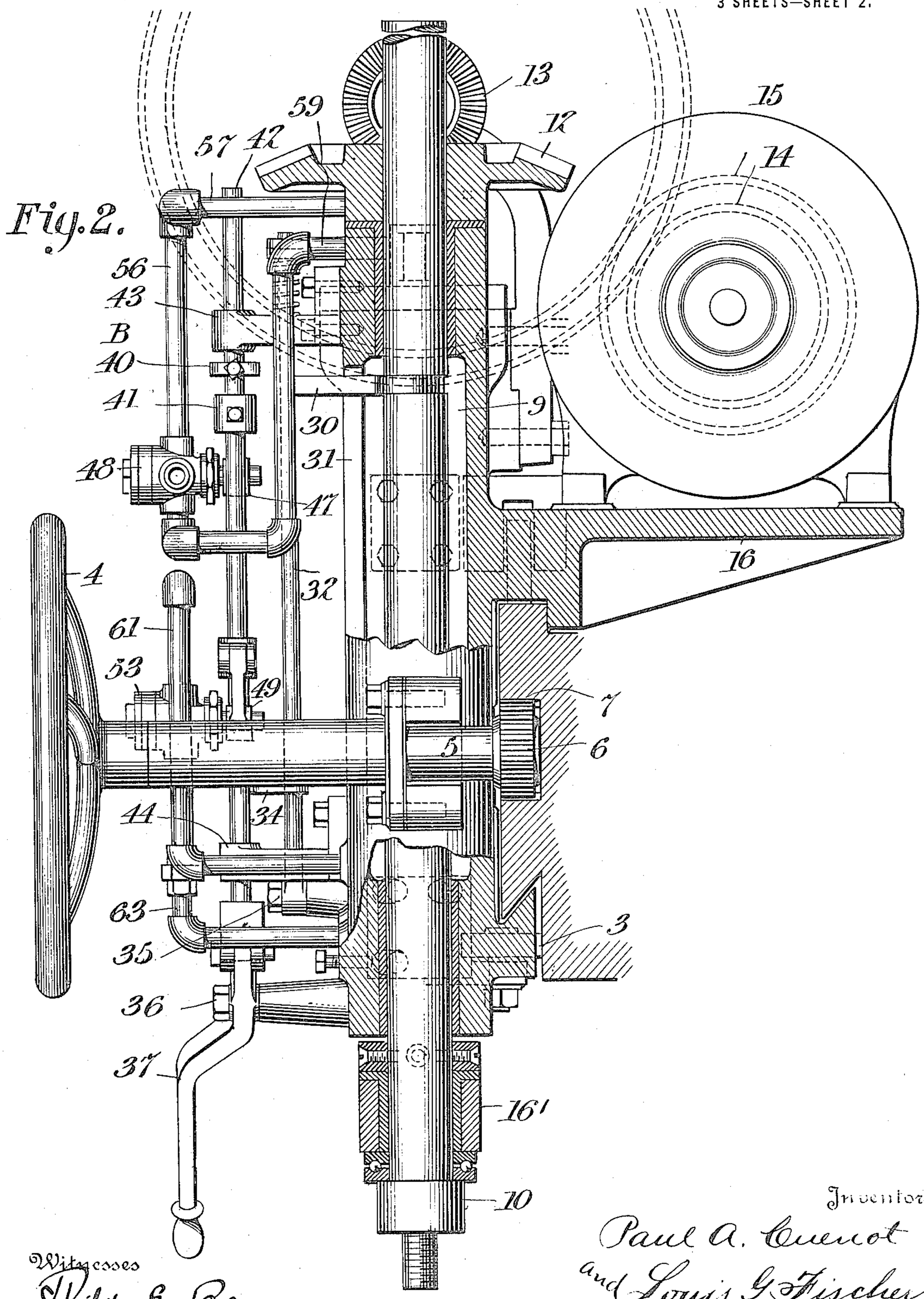
3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

Philip E. Barnes.

E. Leckert

Inventors

Paul A. Cuenot

and Louis G. Fischer

By Henry Orth Jr

Attorney

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3 SHEETS—SHEET 3.

Fig. 3.

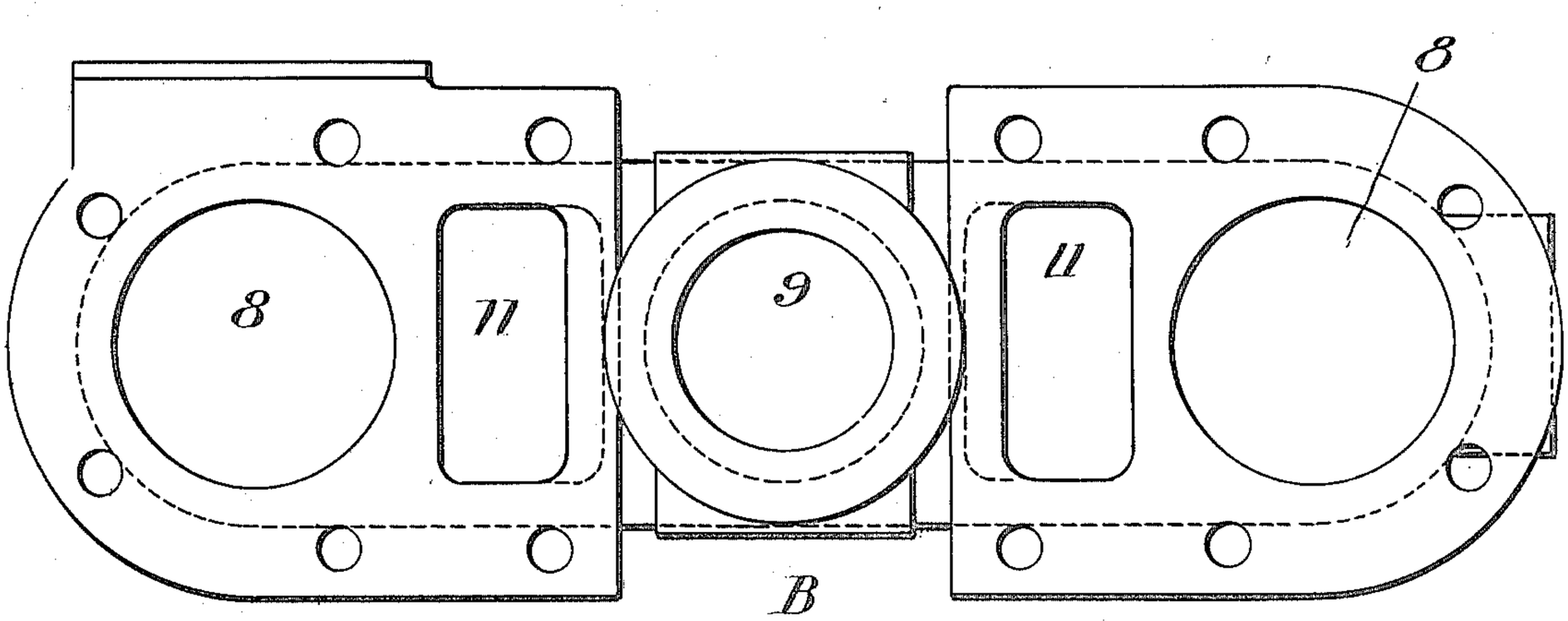
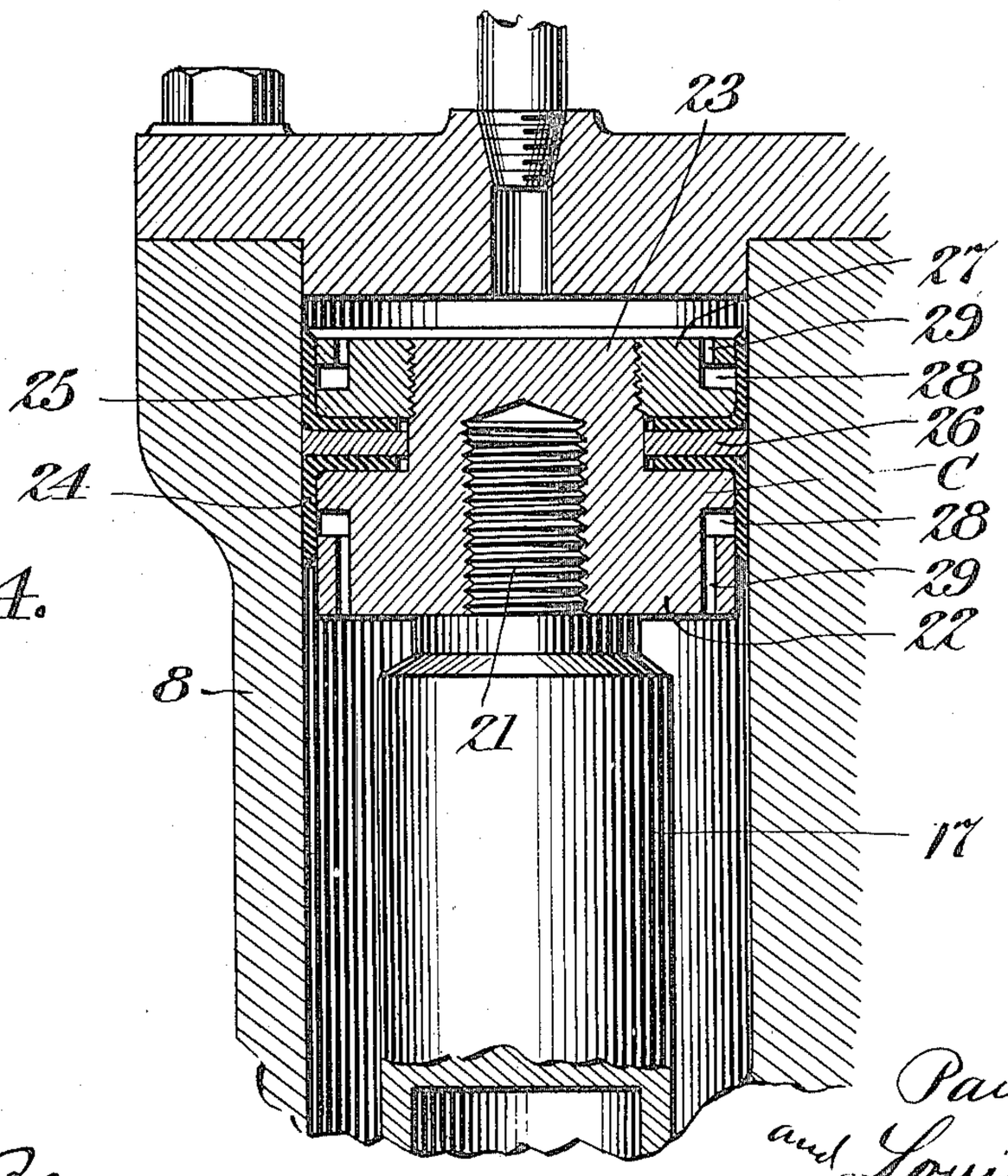


Fig. 4.



Witnesses

Philip E. Barnes

C. Leckert

Inventors

Paul A Cuenot

and Louis G. Fischer

By Henry Orth & Co

Attorney

UNITED STATES PATENT OFFICE.

PAUL A. CUENOT, OF HARRISBURG, AND LOUIS G. FISCHER, OF CAMP HILL, PENNSYLVANIA.

DRILL-FEED MECHANISM.

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Application filed August 17, 1914. Serial No. 857,241.

To all whom it may concern:

Be it known that we, PAUL A. CUENOT and LOUIS G. FISCHER, citizens of the United States, residing respectively, at Harrisburg, Dauphin county, and Camp Hill, Cumberland county, Pennsylvania, have invented certain new and useful Improvements in Drill-Feed Mechanism; 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 its appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Our invention relates to feeding devices for drills and similar rotating cutting tools, and has for its object to provide a fluid pressure feeding mechanism which will cause the reciprocation of the tool without taking part in its rotation and at the same time permit all the variable control of the tool due to the use of both an elastic and an inelastic fluid for operating and controlling the feeding mechanism.

Referring to the drawings, in which like parts are similarly designated—Figure 1 is an elevation partly in section of so much of a drill press that is necessary for an understanding of our invention. Fig. 2 is a side view partly in section. Fig. 3 is a top plan view, and Fig. 4 is a view partly in section of one of the piston heads.

A represents a portion of an arm or rail on which the drill head B travels. The drill head is supported on the rail by rollers 2 which ride on top thereof and rollers 3 which engage the arm slightly beneath the guideways of the rail.

The drill head is traversed on the rail by means of a hand wheel 4 whose stem 5 carries a gear wheel 6 that engages a rack 7 cut into the slideway in the arm A.

The above general features are common to most drill presses having sliding drill heads and the above description thereof is deemed sufficient for an understanding of our invention which is illustrated by way of example as applied to or carried by such a drill head.

The drill head B is provided with two cylinders 8 identical in structure, one on each side of the head and centrally in the head and parallel to the cylinders is a passage-way 9, Fig. 3, for the rotating drill spindle 10. Between the passage-way 9 and each cylinder 8 is a closed oil receptacle or reservoir 11.

On top of the passage-way 9 is mounted a beveled gear wheel 12 driven by pinion 13 from a suitable speed reducing or speed changing mechanism 14, driven from an electric motor 15 carried on a bracket 16, Fig. 2, on the drill head B. The particular speed reducing or speed changing mechanism and the manner in which it is driven form no part of our invention as such mechanisms are common in the art.

The spindle 10 is slidably and rotatably connected to the beveled gear wheel 12, passes through the passageway 9 in the head B and is rotatably, but not slidably secured to a cross head 16′ below the head. The cross head 16′ is connected to the lower ends of a pair of pistons 17 by means of bolt extensions 18 and nuts 19. These pistons move through packing glands 20 in the cylinders 8. The upper ends of these pistons are provided with heads C that are screwed onto threaded extensions 21 on the upper ends of the pistons 17. These heads, Fig. 4, consist of a member 22 having a threaded, reduced, upper end 23, packing leathers 24 and 25, spaced apart by a washer 26 and are held in place on the portion 22 by means of a nut-like member 27. Both the nut-like member 27 and the portion 22 are provided with annular grooves 28, over which the packing leathers lap. These grooves communicate with the interior of the cylinder by means of suitable holes or ports 29 so that the pressure existing on the opposite side of the heads of the pistons will be communicated to the packing leathers or equivalent and force them against the sides of the cylinder to make a tight joint.

Acted on by and carried with the spindle 10 is a tappet 30 which projects through a slot 31, and slides on a vertical rod 32, said rod at its upper end passing through a bearing or eye 33, and at its lower end is secured to a bolt or pin 35.

In the path of tappet 30 is a tappet 40 secured to a movable rod 42 parallel to rod 32, the upper end of which rod 42 is guided in a bearing 43 and the lower end in a bearing 44. The rod 42 has secured to it an arm 41 provided with a slot 45 in which takes a

pin 46 on a crank arm 47 of a four-way-air-cock 48. Secured to the rod 42 is a second arm 49 provided with a slot 50 engaged by pin 51 on a lever 52 of a four-way oil cock 53.

Secured to the lower end of the rod 42 is a tappet 34 whose forked end is slidable on the rod 32 and the lower end of the rod 42 is connected by a pin and slot connection to a hand lever 37 fulcrumed on a pin 36.

Air is admitted to the four-way air cock 48 through a hose or other flexible connection 54 and is exhausted therefrom through a short pipe 55. The air cock 48 is connected by a pipe 56 and branches 57 to the upper ends of the cylinders 8. The four-way air cock 48 is also connected by pipe 58 and branches 59 to the tops of the oil containers 11.

The four-way oil cock 53 is connected by a pipe 60 and branches 61 to the bottoms of the cylinders 8 and is also connected by pipe 62 and branches 63 with the bottoms of the oil reservoirs 11. A suitable tool holder is connected to the threaded or other suitably shaped end 70 of the spindle 10.

The rod 42 is actuated by hand lever 37.

The operation of the drill is as follows: Assuming that the motor 15 has been started, and by it, through the mechanism 14, 13, the gear wheel 12 has been set in rotation, thereby causing the spindle 10 to rotate. The handle of lever 37 being placed in the lowered position as shown causes rod 42 to be raised and establish connection between the air supply 54 and pipe 56 and a through passage through the oil cock 53 between pipes 60 and 62, thus admitting air on top of the piston C and venting air from the oil reservoirs 11 through pipes 59, 58, and exhaust 55. The air pressure on top of the piston C forces the oil contained in cylinders 8 below the piston head C out of the cylinders through pipes 61, 60, oil cock 53, pipes 62 and 63, into the bottoms of the oil reservoirs 11. Both pistons descend simultaneously under the dominant air pressure, thereby causing the cross head 16′ to descend and carry with it the rotating spindle 10. The descent of the pistons, cross head and spindle, continues until tappet 30 comes in contact with the forked end of tappet 34 which is connected to the hand lever 37 and thus closes the cocks 48 and 53, whereupon the cocks cut off and the descent of the pistons is arrested. The handle 37 is then moved up to initiate the reverse flow of fluids through the cocks 48 and 53, whereupon air will be vented from above the pistons C and forced on top of the oil in the reservoirs 11. As soon as the pistons and their spindles have returned to their upper position, the tappet 30 strikes the tappet 40 and moves rod 42 to initial cut off position.

We claim—

1. In a drill feed mechanism, a drill head comprising a passage way, a drill spindle movable therein, a cylinder on each side of said passage parallel to the latter, pistons in the cylinders connected to the spindle, an oil reservoir interposed between the passage way and each cylinder, and means for establishing communication between the reservoirs and cylinders.

2. In a drill feed mechanism, a drill head comprising a passage way, a drill spindle movable therein, a cylinder on each side of said passage parallel to the latter, pistons in the cylinders connected to the spindle, an oil reservoir interposed between the passage way and each cylinder, a pipe connecting the bottom portions of said cylinders, a pipe connecting the bottom portions of the reservoirs, and a valved by-pass connecting said pipes to simultaneously connect the cylinders and reservoirs at the bottoms.

3. In a drill feed mechanism, a drill head comprising a passage way, a drill spindle movable therein, a cylinder on each side of said passage parallel to the latter, pistons in the cylinders connected to the spindle, an oil reservoir interposed between the passage way and each cylinder, a pipe connecting the bottom portions of said cylinders, a pipe connecting the bottom portions of the reservoirs, a valved by-pass connecting said pipes to simultaneously connect the cylinders and reservoirs at the bottoms, a pipe communicating with the cylinders above the pistons, a pressure air supply connected with the last named pipe, a pipe communicating with the reservoirs at their tops, a by-pass connecting the two last named pipes, and a valve in the last mentioned by-pass adapted to connect the cylinders with the air supply and to simultaneously vent the reservoirs.

4. The combination with a rotatably, longitudinally movable tool spindle, a cylinder on each side of said spindle, pistons in said cylinders, a cross head connecting the pistons and spindle and in which cross head said spindle is rotatable, but not slidable, an oil chamber adjacent each cylinder, a cock controlling the entrance and exit of oil below the pistons on both of said cylinders, a cock controlling the exit and entrance of compressed air to said cylinders and oil chambers, and mechanism controlled from said spindle for simultaneously actuating said cocks.

5. The combination with a rotatably, longitudinally movable tool spindle, a cylinder on each side of said spindle, pistons in said cylinders, a cross head connecting the pistons and spindle and in which cross head said spindle is rotatable but not slidable, an oil chamber adjacent each cylinder, a cock controlling the entrance and exit of oil below the pistons in both of said cylinders, a cock controlling the exit and

entrance of compressed air to said cylinders and oil chambers, mechanism controlled from said spindle for simultaneously actuating said cocks, and manual means to independently effect the control of said compressed air and liquid.

In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

PAUL A. CUENOT.
LOUIS G. FISCHER.

Witnesses:
GEO. W. PARSONS,
CHAS. R. HOLTON.