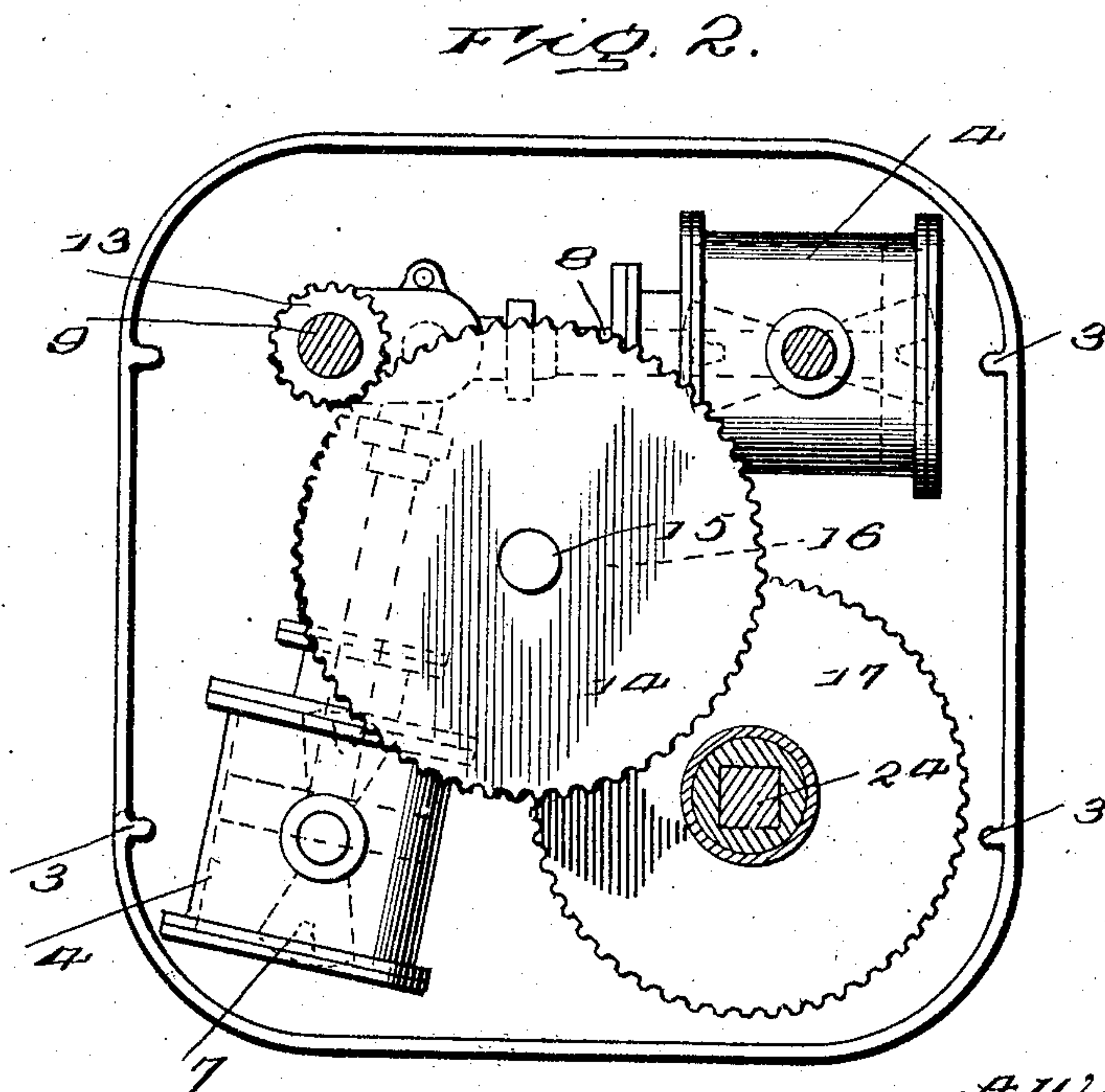
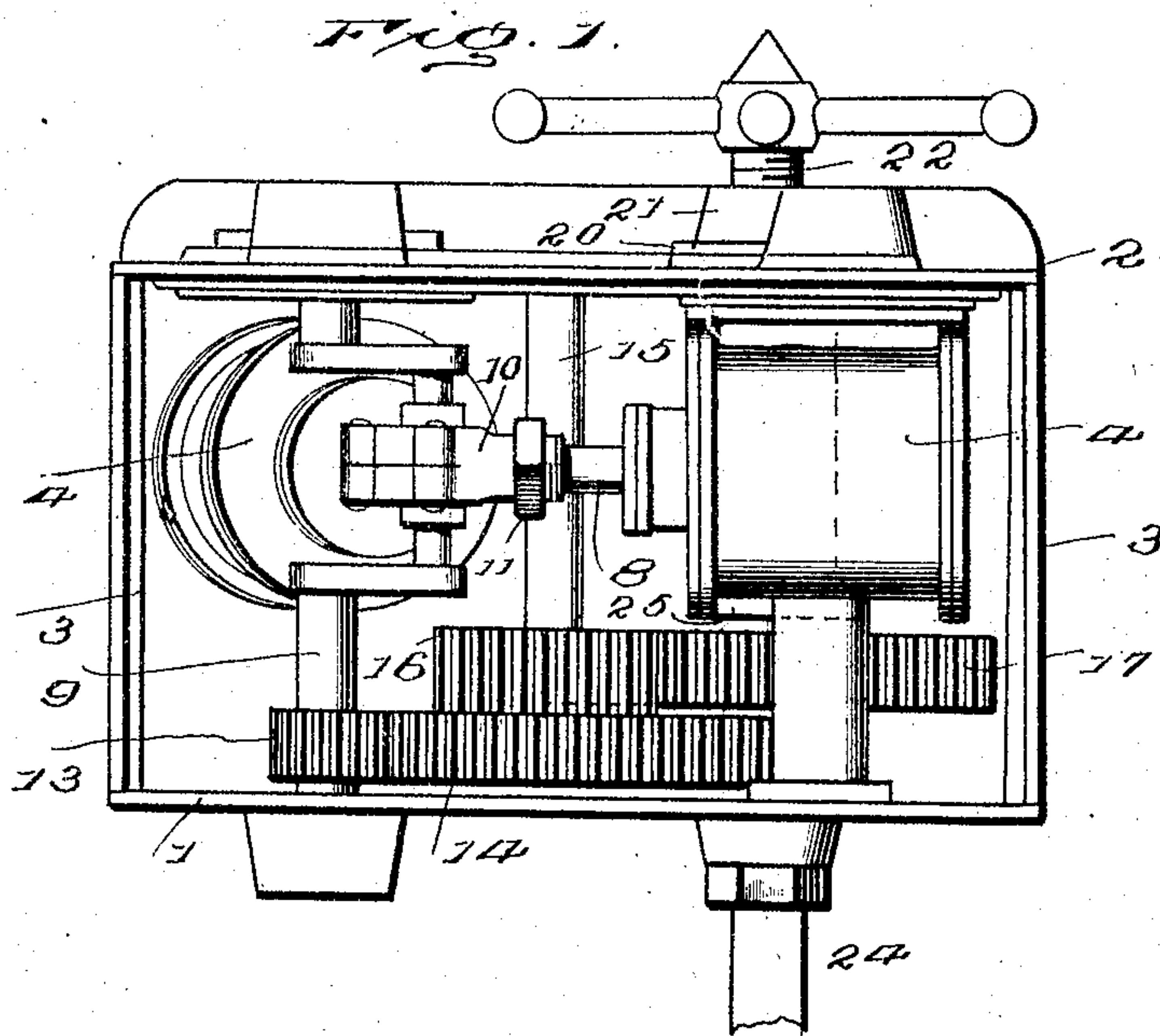


No. 780,695.

PATENTED JAN. 24, 1905.

A. W. WHITEFORD.
DRILLING MACHINE.
APPLICATION FILED DEC. 21, 1903.

2 SHEETS—SHEET 1.



Witnesses

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By

A. W. Whiteford
Thos. B. Lacy, Atty.

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2 SHEETS—SHEET 2.

FIG. 3.

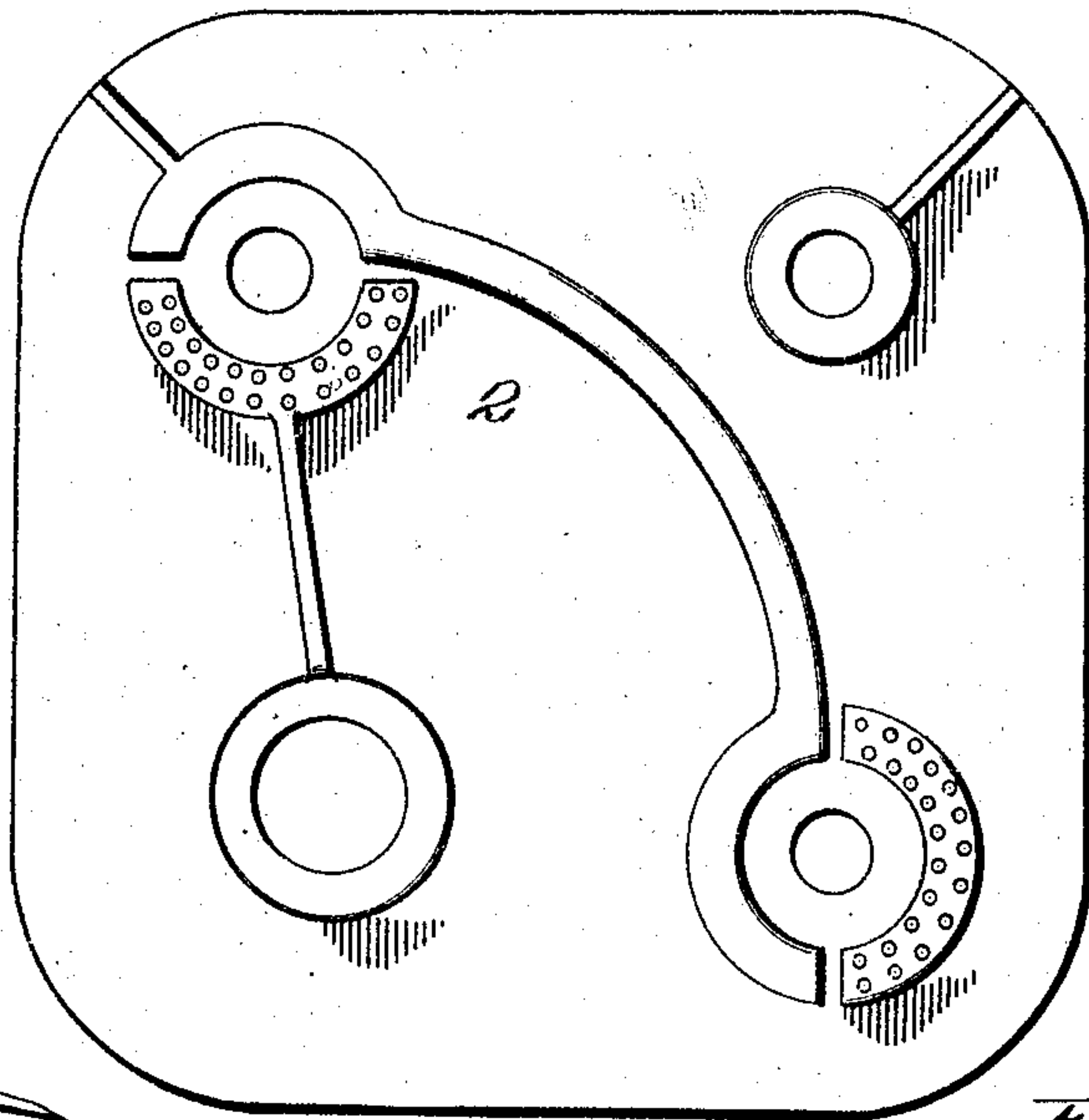


FIG. 6.

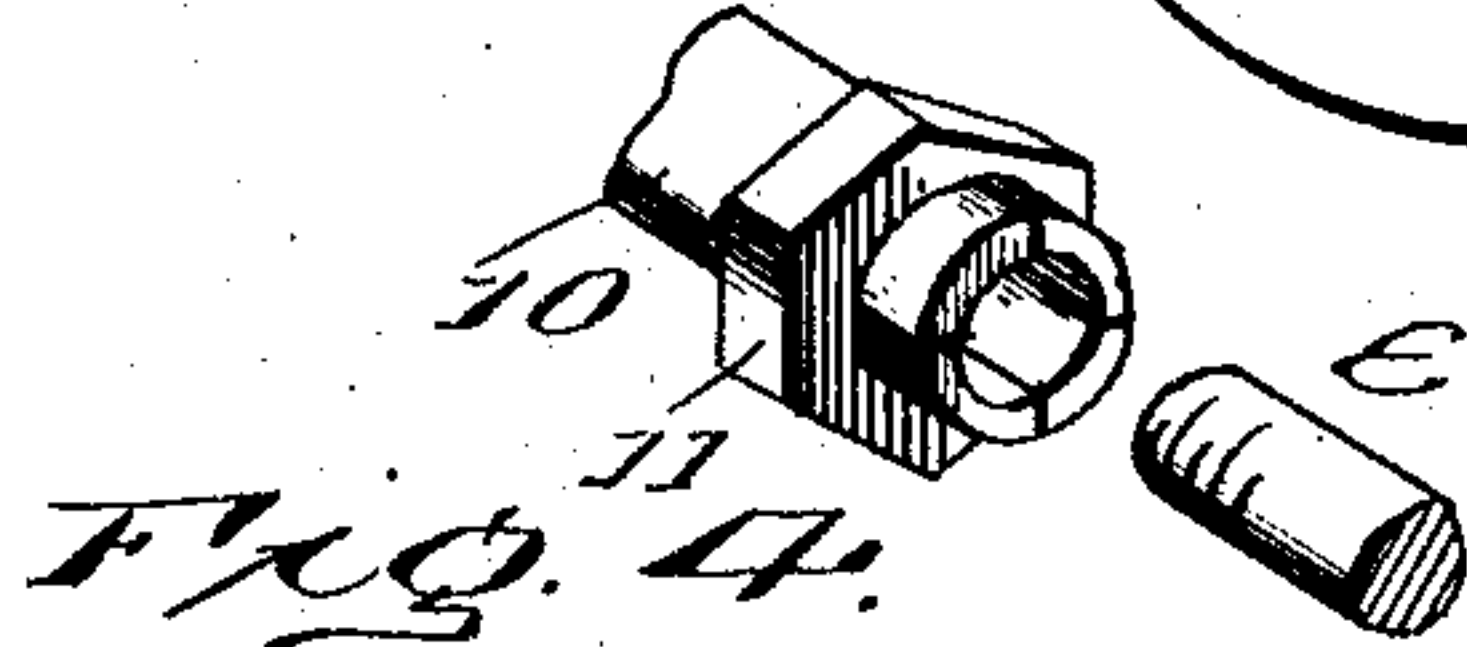


FIG. 4.

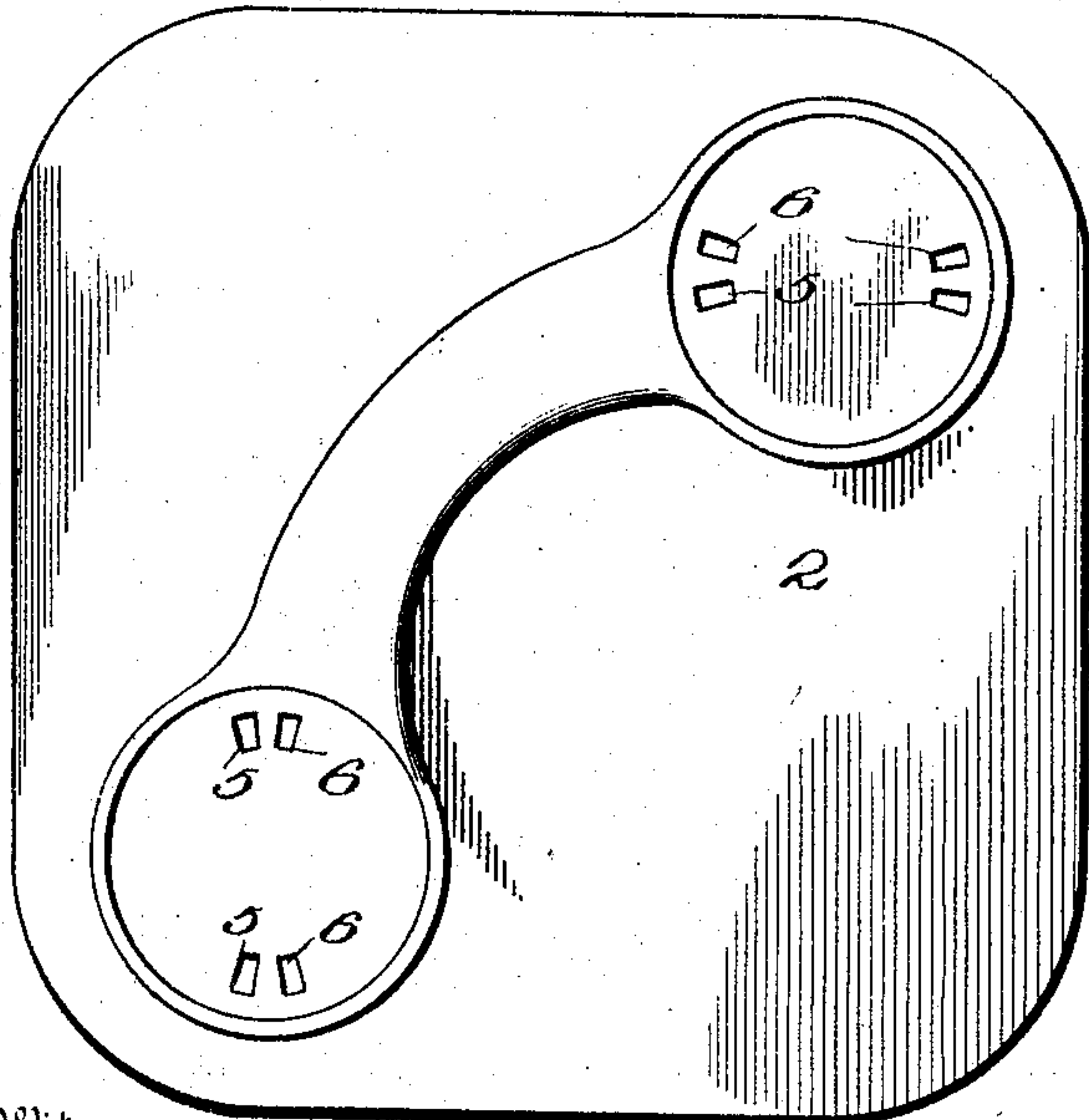
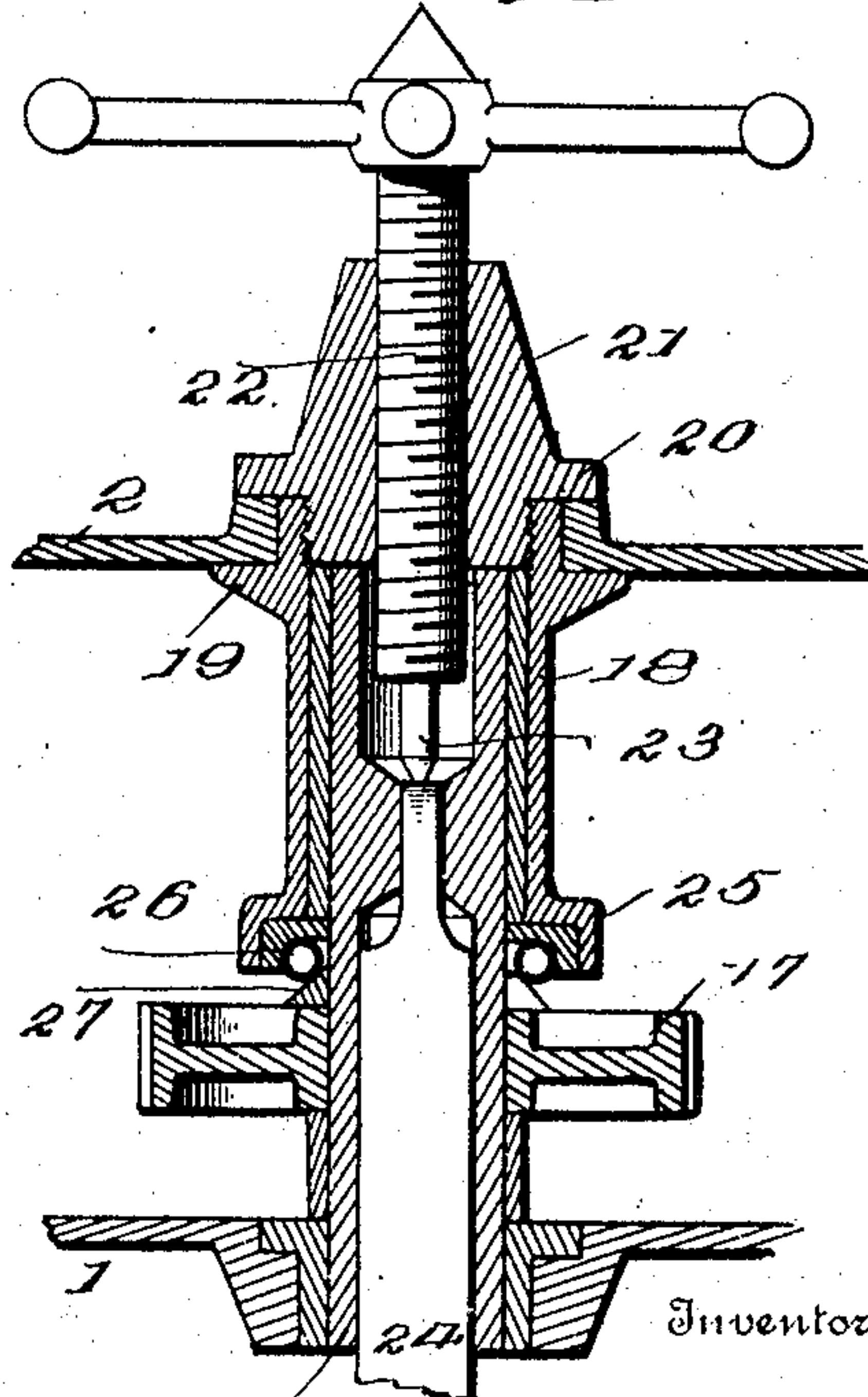


FIG. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER W. WHITEFORD, OF OMAHA, NEBRASKA, ASSIGNOR OF ONE-HALF TO H. W. JACOBS, OF OMAHA, NEBRASKA.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 780,695, dated January 24, 1905.

Application filed December 21, 1903. Serial No. 186,097.

To all whom it may concern:

Be it known that I, ALEXANDER W. WHITEFORD, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification.

This invention provides a drill of novel formation for utilization of compressed air or other fluid medium as the motive agent, the tool being operated by engines of the oscillatory type, each arranged to supplement the action of the other. Compactness in the arrangement of the parts is an essential feature in the construction of the engine, as well as the relative location of the crank-shaft and tool-stock, whereby it is possible to employ an ejector for forcibly removing the tool with the greatest ease and despatch.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a top view of a drilling-machine embodying the invention. Fig. 2 is a side view thereof, the cap-plate being removed and the tool-stock in section. Fig. 3 is a detail view of the valve-plate as seen from the upper side. Fig. 4 is a view of the valve-plate as seen from the inner side. Fig. 5 is a longitudinal section of the tool-stock, ejector, mountings therefor, and the adjunctive parts. Fig. 6 is a detail perspective view of the means for connecting the piston-rod to the crank-shaft.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The drill is designed most especially for utilizing compressed air as the motive me-

dium. However, steam or other compressible fluid may constitute the motive agent. The framework for supporting the operating parts may be of any design, according to the capacity and style of the machine. The frame comprises, essentially, a cap-plate 1 and a valve-plate 2, spaced apart the required distance and connected by ties 3 in any substantial manner. The plates 1 and 2 are provided with corresponding openings to constitute bearings for the several parts, and these openings are reinforced by outwardly-projected bosses, as indicated most clearly in Figs. 1 and 5.

The motive power for operating the tool-stock is derived from companion engines 4 of the oscillating type, provided at opposite sides with trunnions suitably mounted in bearings of the plates 1 and 2. The valve-plate 2 is provided with the inlet-ports 5 and exhaust-ports 6, with which the ports 7 of the engines alternately register in the well-known manner. The cylinders are pressed against the valve-plate so as to maintain a steam-tight joint and prevent waste of the motive power. The piston-rods 8 are connected to the crank portion of the crank-shaft 9 by the coupling 10, which is composed of companion interlocking parts, the ends being threaded and longitudinally split and supplied with clamp-nuts 11 for contracting or binding the ends of the coupling upon the threaded ends of the piston-rods after the parts have been connected. The crank-shaft 9 is journaled at its ends in bearings of the plates 1 and 2 and is located at one corner of the frame, the diagonally opposite corner receiving the tool-stock 12. A pinion 13 is secured to an end portion of the crank-shaft and meshes with the gear-wheel 14 on the shaft 15, paralleling the crank-shaft and tool-stock and journaled at its ends in the plates 1 and 2. A gear-wheel 16 of less diameter than the gear-wheel 14 is keyed to the shaft 15 and meshes with the gear-wheel 17, secured to the tool-stock 12, so as to rotate therewith. By having the tool-stock and the crank-shaft located at diagonally opposite corners of the frame the parts are compactly arranged and

provision is had for combining an ejector with the tool-stock for positive removal of the tool when required.

5 A bearing-sleeve 18 is secured to the plate 2 and is held in place by the flange or shoulder 19 near one end and a corresponding flange 20 of the clamp-nut 21. The clamp-nut 21 is internally threaded and receives a pressure-screw 22, provided at its inner end with a
10 point 23 to be brought into forcible contact with the inner end of the drill or tool 24, so as to remove the same from the tool-stock when required. The inner end of the bearing-sleeve 18 is enlarged to form a cup 25, in
15 which are located balls 26, arranged to travel upon a cone 27, coöperating with the tool-stock and gear-wheel 17, so as to sustain the end thrust incident to the operation of the drill.

20 The compressed air or other motive agent is supplied to the engine and exhausted therefrom in the manner well understood in the operation of engines of the oscillating type, and the power developed is transmitted directly
25 to the crank-shaft by means of the piston-rods 8 and from said crank-shaft to the tool-stock

by means of the intermediate gearing, substantially as herein disclosed, thereby imparting rotation to the drill or other tool applied to the stock or holder 12.

Having thus described the invention, what is claimed as new is—

In a drill, the combination of spaced plates, a tool-stock journaled therebetween and having a cone, a bearing-sleeve for the tool-stock
35 having a cup at its inner end and a flange near its outer end, a clamp-nut having a flange acting jointly with the flange of the bearing-sleeve to clamp one of the aforesaid plates and threaded to said bearing-sleeve, balls ar-
40 ranged between the cone and cup of the tool-stock and bearing-sleeve, and a pressure-screw threaded into the clamp-nut and having a point at its inner end for engagement with the tool
45 to be ejected, substantially as specified.

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

ALEXANDER W. WHITEFORD. [L. s.]

Witnesses:

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