

A. SCOTT.
 END SPINDLE AIR DRILL.
 APPLICATION FILED DEC. 27, 1910.

1,052,521.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 1

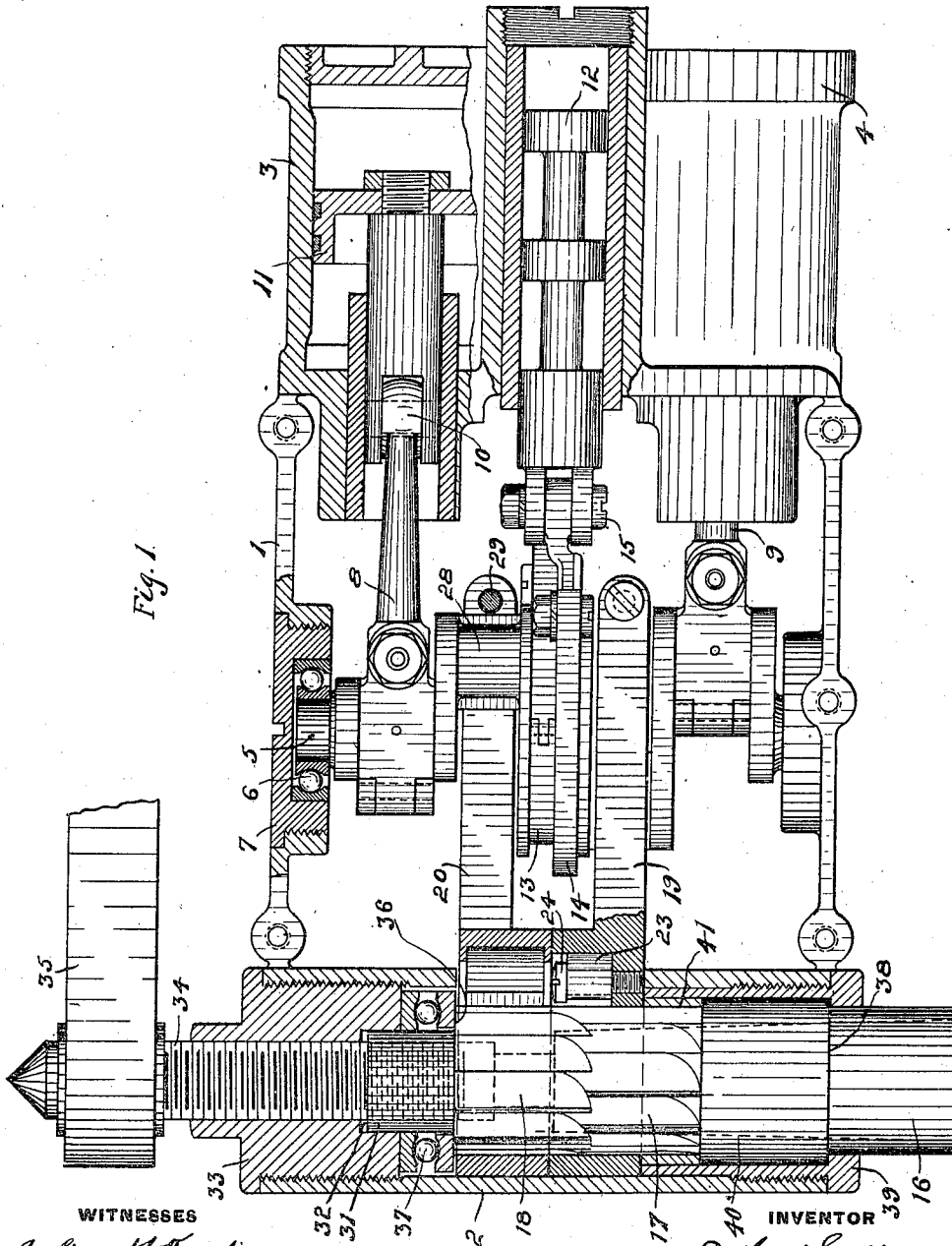


Fig. 1

WITNESSES
Julian H. Hendig
Harvey L. Lechner

INVENTOR
Arthur Scott
By atty Paul Symonds

A. SCOTT.
END SPINDLE AIR DRILL.
APPLICATION FILED DEC. 27, 1910.

1,052,521.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 2.

Fig. 3

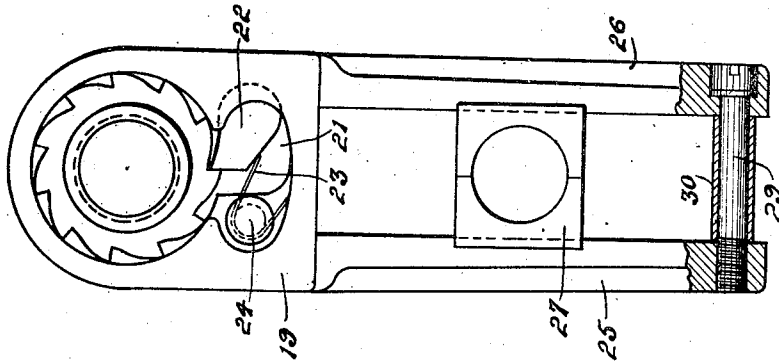
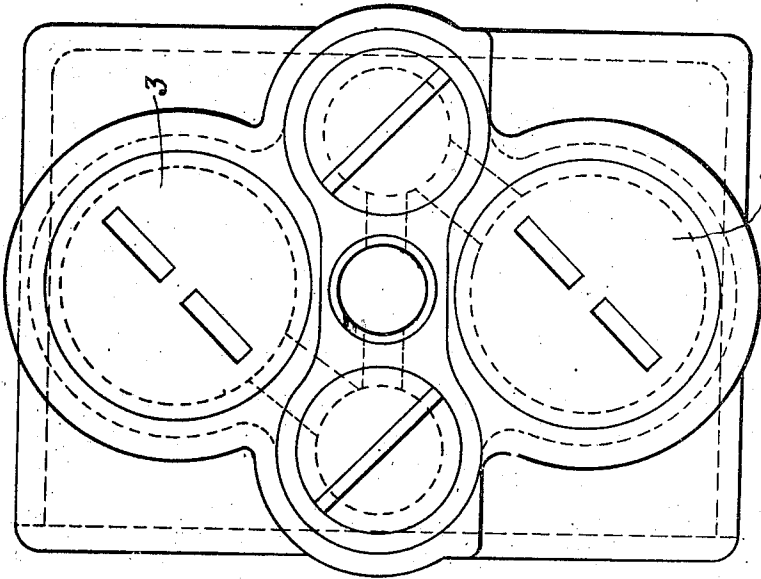


Fig. 2



WITNESSES

Julian H. Hendley
Harvey L. Leckner

INVENTOR

Arthur Scott
By atty
Paul Synnistrup

UNITED STATES PATENT OFFICE.

ARTHUR SCOTT, OF CLEVELAND, OHIO, ASSIGNOR TO THE CLEVELAND PNEUMATIC TOOL COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

END-SPINDLE AIR-DRILL.

1,052,521.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed December 27, 1910. Serial No. 599,562.

To all whom it may concern:

Be it known that I, ARTHUR SCOTT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in End-Spindle Air-Drills, of which the following is a specification.

The invention relates to that class of drills designed to drill close to a side wall or between two pieces of metal. It has for its primary objects; the provision of a drill of the character specified where in the construction is simplified and the number of parts reduced to a minimum; the provision of an improved construction for operating the spindle direct from the power shaft and without the use of the spindle shaft heretofore employed; and the provision of an improved and simplified frame construction having the piston cylinders integral therewith.

One embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a sectional view taken longitudinally through the machine, Fig. 2 is an enlarged end view of the right hand end of the machine shown in Fig. 1, and Fig. 3 is an enlarged detail view of one of the ratchet arms employed, the main spindle and ratchet being shown in end elevation in position in the ratchet arm.

Briefly stated the embodiment of the machine illustrated comprises a framework or casting having at one end a plurality of power cylinders, and at the other end and extending transversely with respect to the cylinders a drill spindle. Intermediate the drill spindle and the cylinders is the crank shaft, which shaft is provided with a crank for each of the cylinders, with eccentrics for operating the controlling valves for the cylinders, and with cranks for operating the ratchet arms employed. A plurality of ratchets are provided upon the drill spindle, and coöperating with each ratchet is a pawl carried by a ratchet arm mounted upon the crank shaft.

Referring to the drawings, 1 is the framework of the machine, which framework has at one end the sleeve 2 for carrying the drill spindle, and at the other end the pair of power cylinders 3 and 4, the portion of the framework lying between the sleeve 2 and

cylinders 3 and 4 constituting a protecting shell or casing in which the crank shaft and operating parts carried thereby are mounted. The sleeve 2, cylinders 3 and 4, and the intermediate shell or casing preferably consist of one integral casting instead of being in separate parts bolted together as has heretofore been customary. This arrangement is advantageous as the various parts of the framework are rigidly maintained in their relative positions, the cost of machining and fitting is reduced, and the entire construction is simplified.

Intermediate the sleeve 2 and the cylinders 3 and 4 is the crank shaft 5. This shaft is mounted at its ends in the antifriction bearings 6 carried by the plugs 7 screwed into the frame, and is provided adjacent its ends with crank portions carrying the connecting rods 8 and 9, each of which is pivoted at its rear end as indicated at 10 direct to the trunk of one of the pistons 11. By the use of this direct connection between the cranks on the crank shaft and the pistons the necessity of using cross heads is avoided. A piston valve 12 is provided for controlling the supply of air to each of the cylinders, and these valves are operated by the eccentric straps 13 and 14 carried upon eccentrics upon the crank shaft 5, the straps being pivotally connected to the ends of the valves by means of the bolts 15 as shown.

The drill spindle 16 is provided with two sets of ratchet teeth 17 and 18, and these ratchets are operated to rotate the spindle by means of the ratchet arms 19 and 20, one of which is shown in detail in Fig. 3. As here shown the ratchet arm is recessed at 21, and in this recess is mounted a pawl 22 held in operative position by means of a spring 23, which spring 23 fits about the screw 24. The ratchet arm is provided with a pair of spaced arms 25 and 26, between which is slidably mounted the cross head 27, such cross head being rotatively mounted upon one of the cranks 28 as shown in Fig. 1. The outer ends of the arms 25 and 26 are held securely in their relative positions by means of the tie bolt 29 and the spacing sleeve 30. The use of two sets of teeth 17 and 18 staggered with respect to each other in place a single set of teeth of double fineness is desirable inasmuch as the larger teeth are stronger and more durable, and each

tooth is acted upon by the pawl coöperating therewith instead of dragging over the intermediate unused teeth as is the case where a plurality of pawls are used upon a single ratchet having fine teeth.

The ratchet mechanism as just described is not claimed in the present application, the said subject matter being embodied in a divisional application.

10 The inner end of the spindle 16 is provided with a reduced bearing portion 31 fitting in bearing recess 32 in the plug 33, and as indicated in dotted lines the interior of this reduced portion 31 is recessed to slidably receive the inner end of the feed screw 15 34. The threads upon this feed screw 34 engage corresponding threads in the plug 33, and the screw is actuated by means of the usual ratchet lever 35, the inner end of the screw sliding freely into and out of the recess in the reduced portion 31 of the spindle. The spindle is also provided with a shoulder 36 which opposes the inner end of the plug 33, and an antifriction bearing between these parts is secured by means of the 25 balls 37 interposed between the pair of plates illustrated. Another shoulder 38 is provided adjacent the other end of the spindle, and the thimble 39 screw-threaded into the sleeve 2 serves to hold the spindle against outward movement. The thimble 39 thus coöperates with the portion 40 of the spindle to provide a bearing for this end of the spindle, so that the spindle is securely supported 35 in bearings at both ends with the ratchet operating means intermediate the points of support. A filler piece 41 is provided intermediate the ratchet arm 19 and the enlarged portion 40 of the spindle.

40 Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. In combination in a drilling machine, a 45 frame, a plurality of cylinders carried thereby, a spindle mounted transversely of one end of the frame, and provided with a ratchet, a single crank shaft intermediate the cylinders and the spindle and provided 50 with cranks, pistons in the said cylinders,

connecting rods for operating the crank shaft pivoted at their front ends to the said pistons, and at their rear ends mounted on the said cranks, and a ratchet arm mounted on the crank shaft and adapted to coöperate 55 with the said ratchet to rotate the spindle.

2. In combination in a drilling machine, a frame, a plurality of cylinders carried thereby, a spindle mounted transversely of one end of the frame, and provided with a 60 ratchet, a single crank shaft intermediate the cylinders and the spindle, and provided with a crank for each cylinder and with a crank for a ratchet arm, pistons in the cylinders, connections between the said pistons 65 and the first mentioned cranks, and a ratchet arm mounted on the other crank and provided with means for operating the said ratchet to rotate the spindle.

3. In combination in a drilling machine, a 70 frame, a cylinder at one end thereof, a spindle mounted transversely of the other end of the frame and provided with a ratchet, a single crank shaft intermediate the cylinder and spindle and provided with an operating 75 crank, and a ratchet arm crank, a piston in the cylinder, connecting means between the piston and operating crank, and a ratchet arm mounted on the ratchet arm crank and provided with means for operating the said 80 ratchet to rotate the spindle.

4. In combination in a drilling machine, a frame, a cylinder at one end thereof, a spindle mounted transversely of the other end of the frame and provided with a ratchet, a 85 crank shaft intermediate the cylinder and spindle and provided with an operating crank, a piston in the cylinder, a connecting rod having one end pivoted to the piston and the other to the operating crank, and a 90 ratchet arm mounted on said crank shaft and having its end in operative driving engagement with the spindle.

In testimony whereof I have hereunto signed my name in the presence of the two 95 subscribing witnesses.

ARTHUR SCOTT.

Witnesses:

J. F. CONNELLY,
GEO. H. HALL.