(No Model.)

3 Sheets—Sheet 1.

G. W. SMITH.

PNEUMATIC MOTOR.

No. 591,018.

Patented Oct. 5, 1897.

Fig. 1.

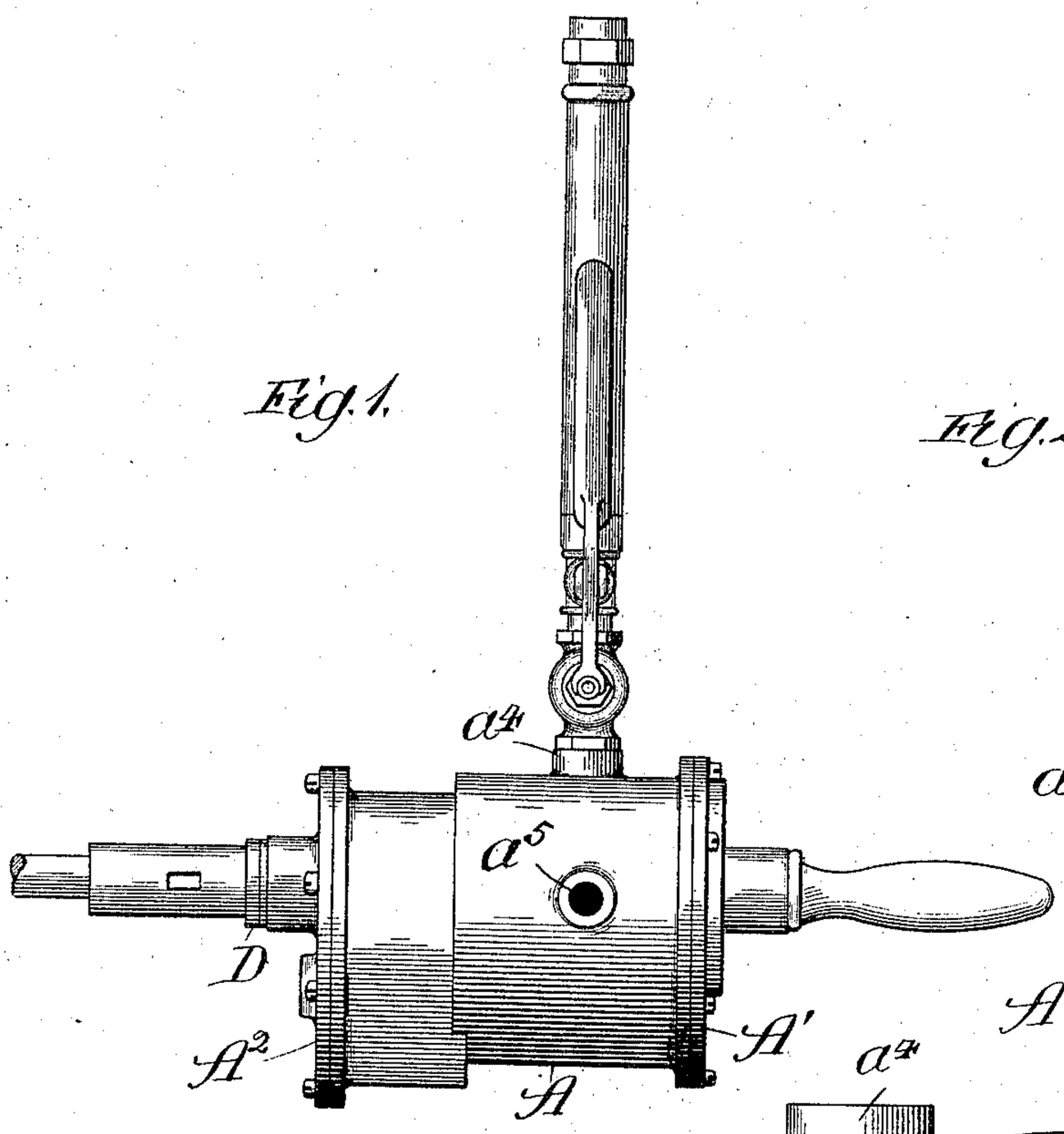


Fig. 2.

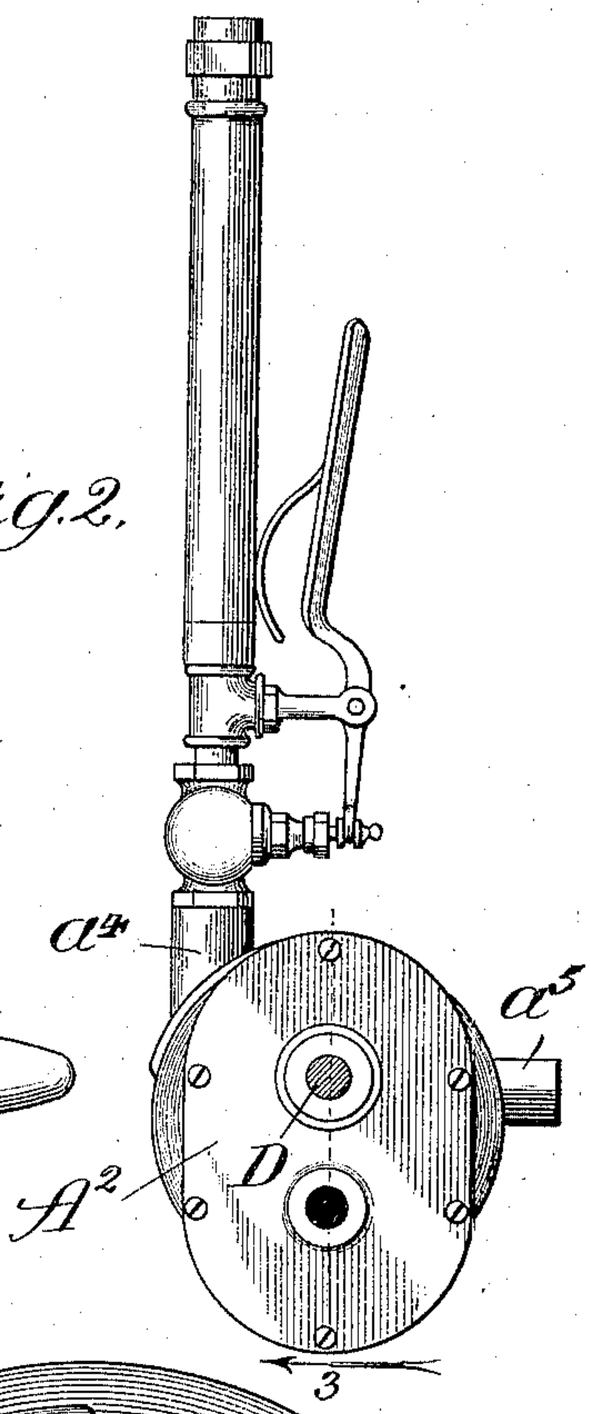


Fig. 7.

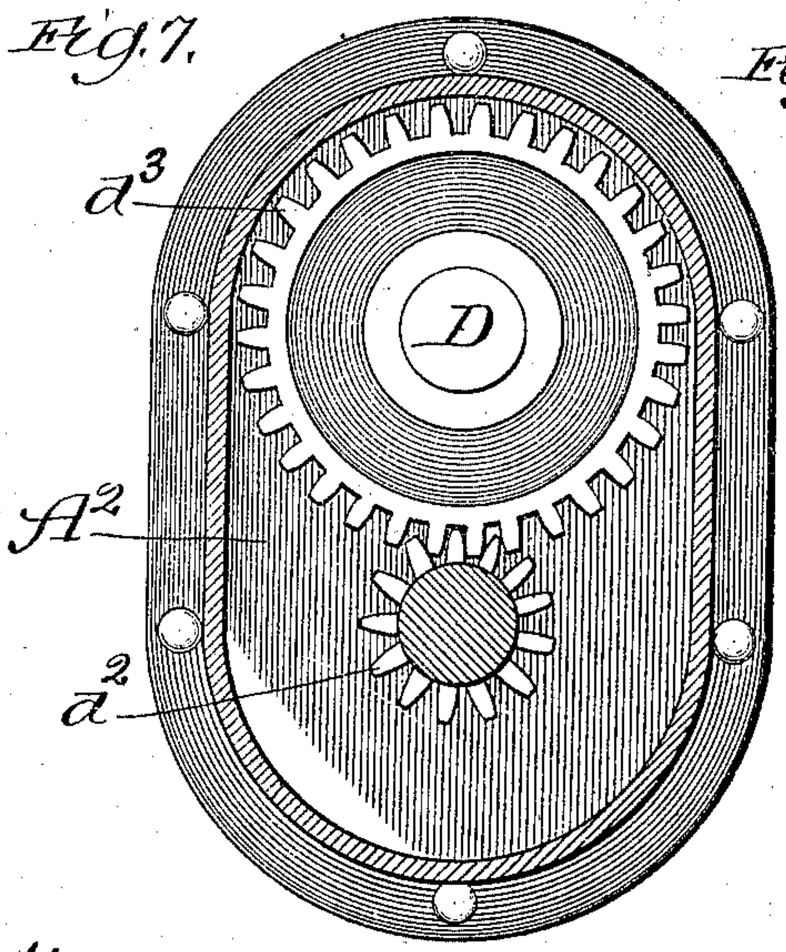
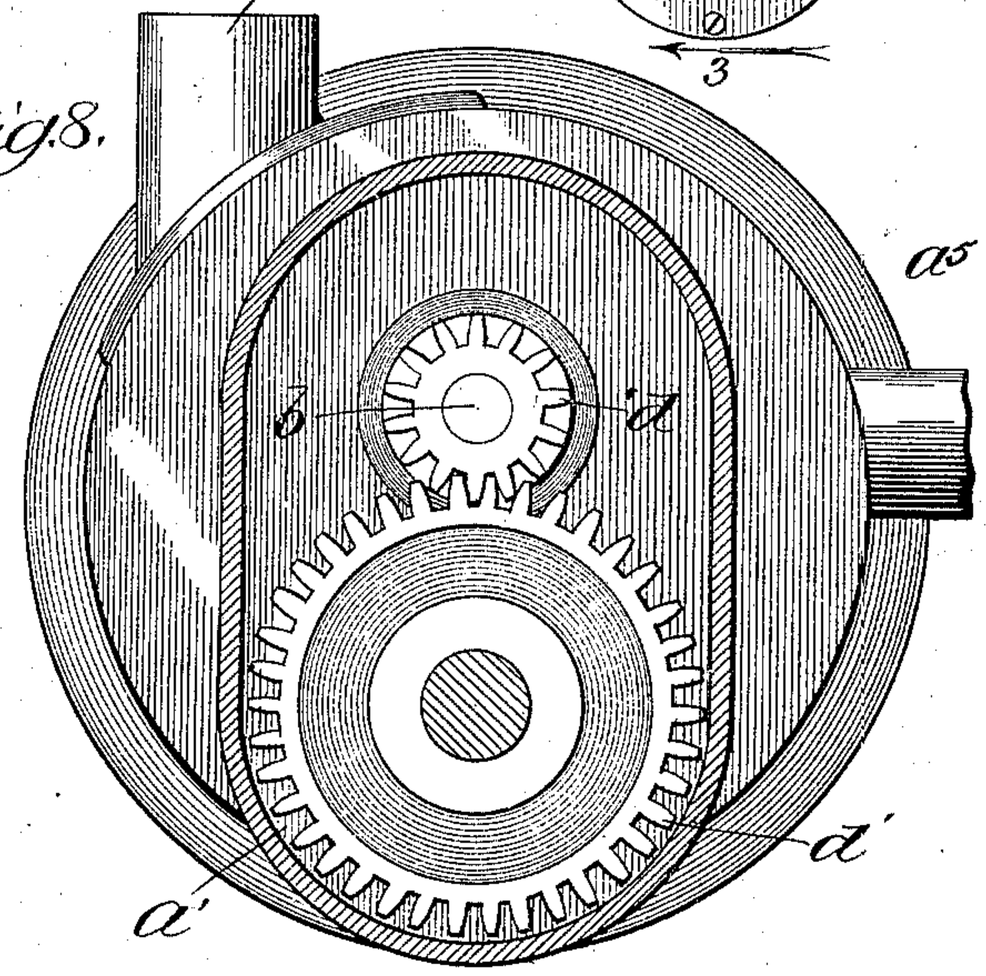


Fig. 8.



Witnesses:
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Lute J. Webb.

Inventor:
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By Banning & Banning & Sheridan,
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(No Model.)

3 Sheets—Sheet 2.

G. W. SMITH.

PNEUMATIC MOTOR.

No. 591,018. Patented Oct. 5, 1897.

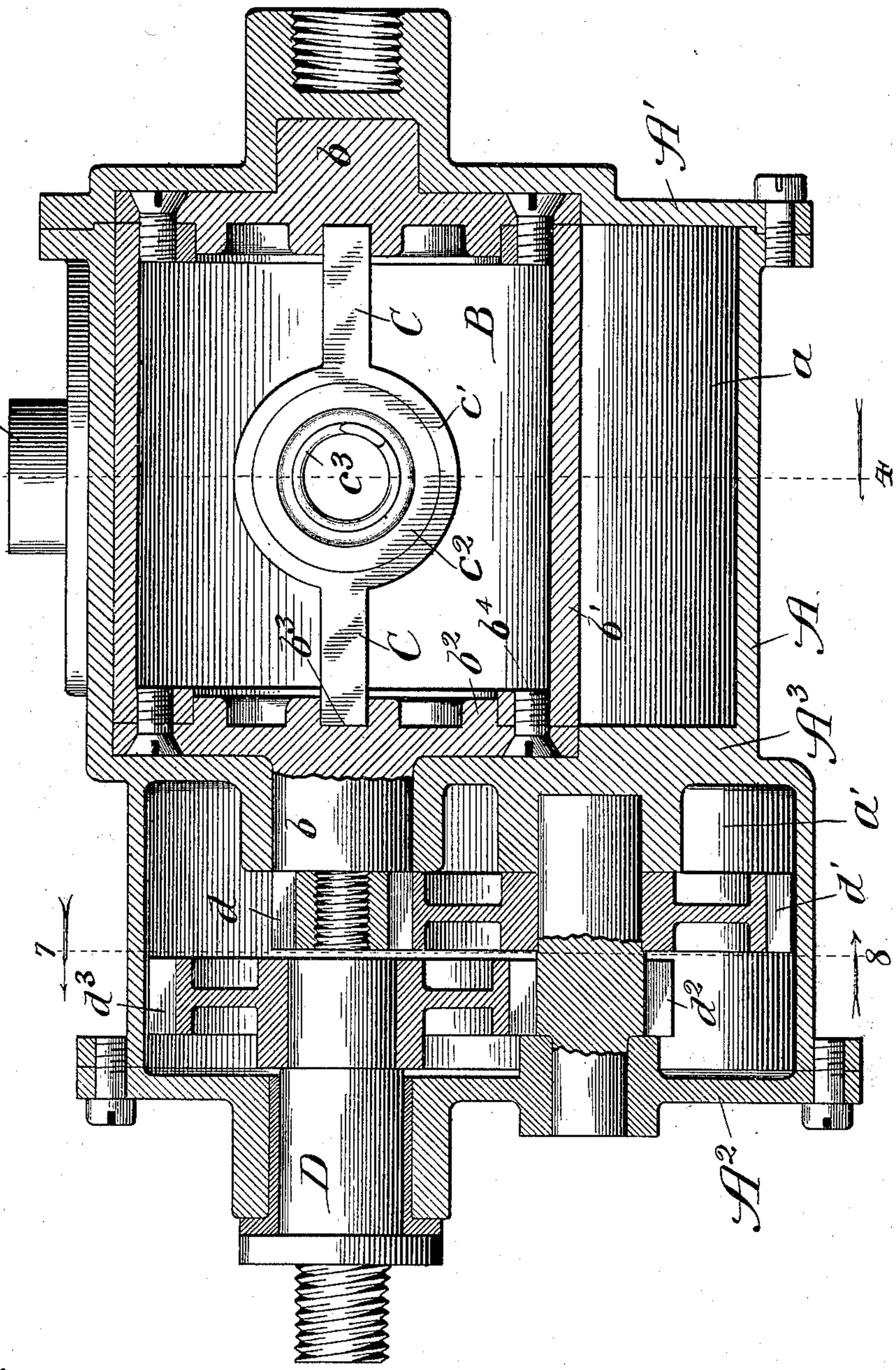

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3

G. W. SMITH.

PNEUMATIC MOTOR.

No. 591,018. Patented Oct. 5, 1897.

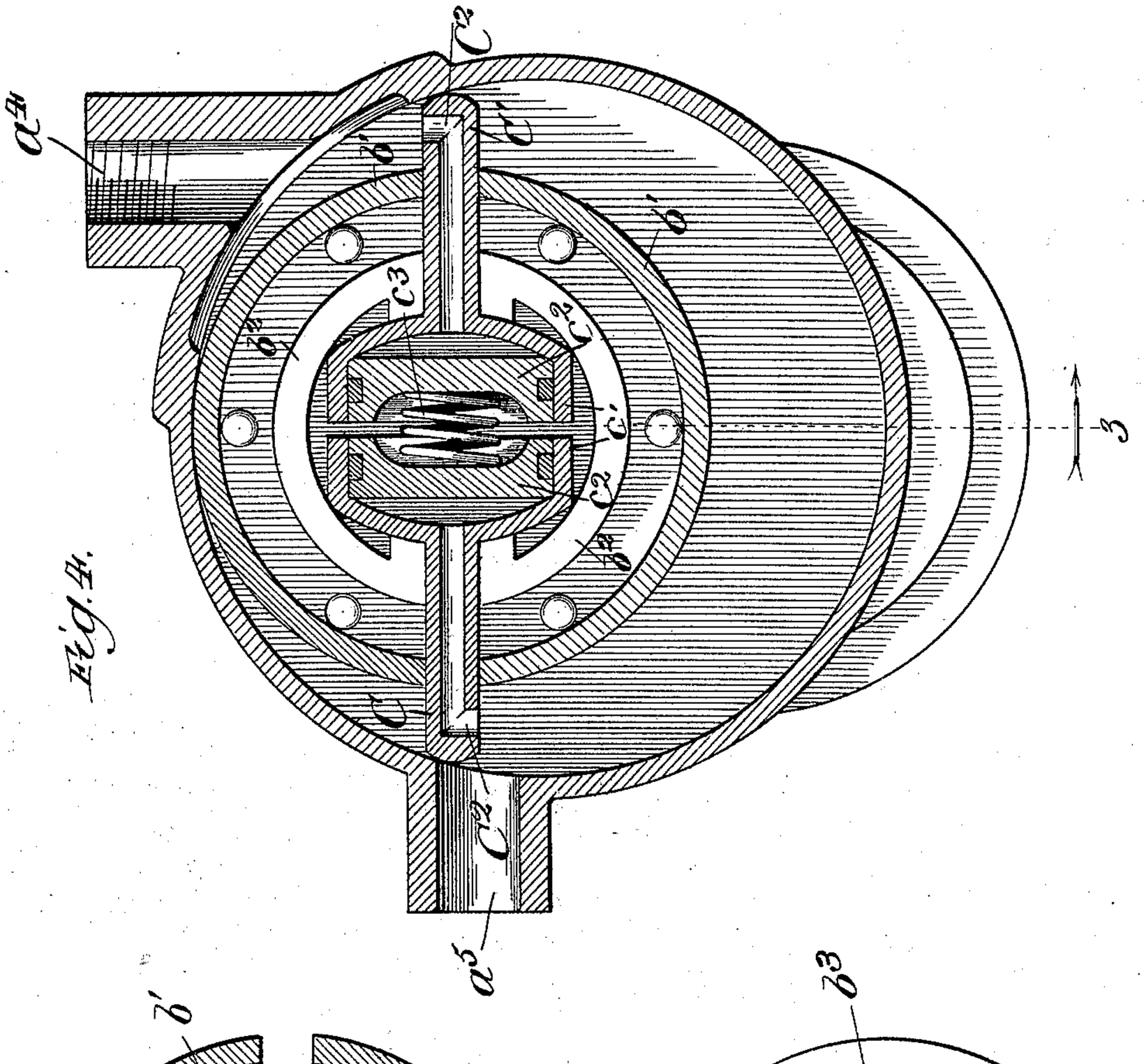

Fig. 4.

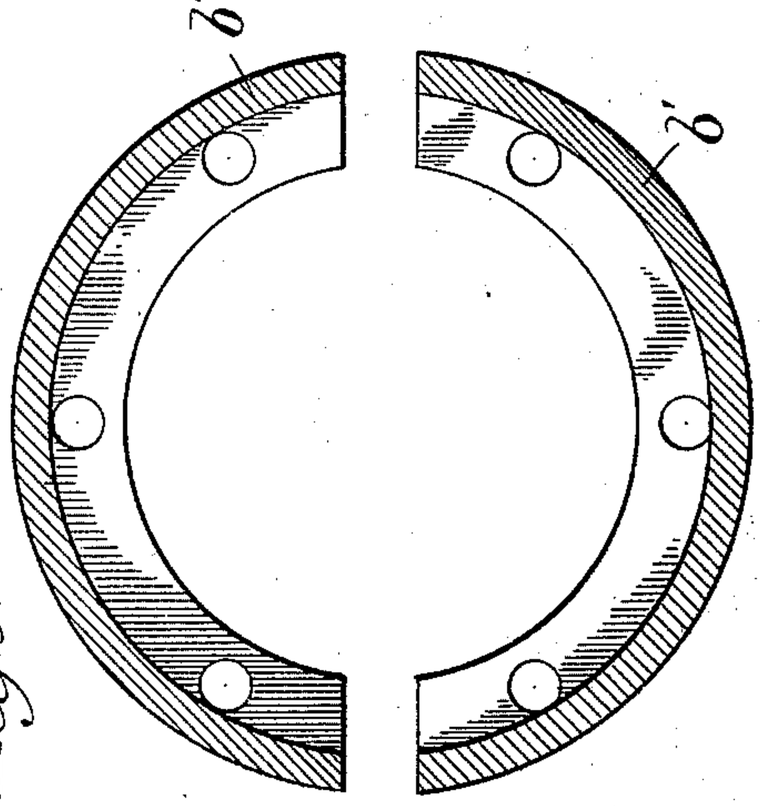

Fig. 5.

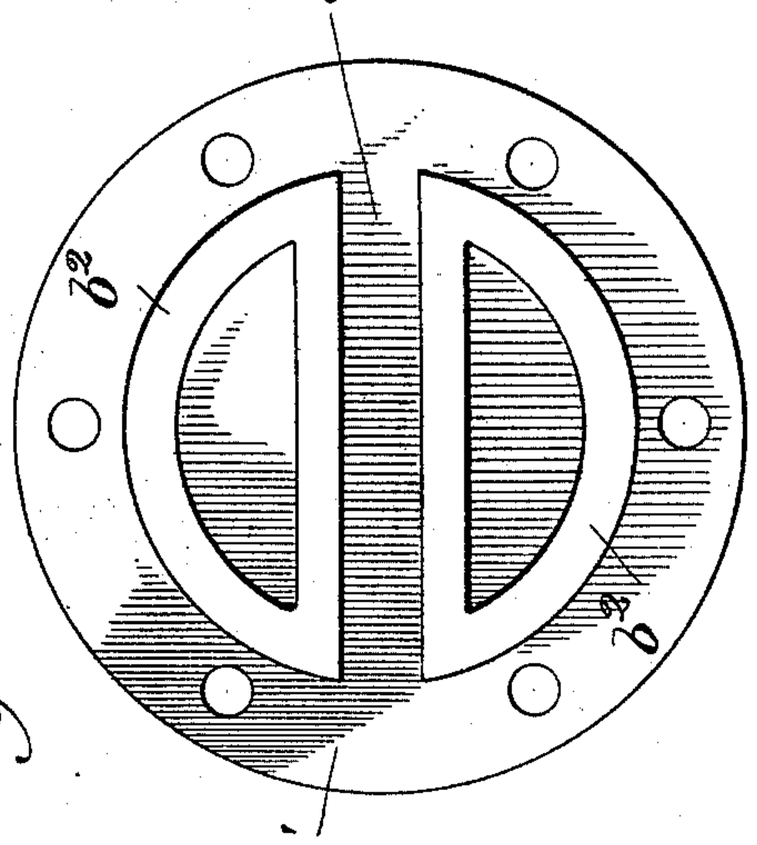

Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE W. SMITH, OF TOPEKA, KANSAS.

PNEUMATIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 591,018, dated October 5, 1897.

Application filed February 13, 1897. Serial No. 623,271. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. SMITH, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in a Combined Portable Pneumatic Motor and Drilling and Tapping Machine, of which the following is a specification.

My invention relates to that class of pneumatic drills and tapping machines in which the prime mover is a rotary spindle having sliding blades in the piston adapted to be spread apart by the action of the fluid-pressure acting within the same; and the object of the invention is to provide a simple, economical, and efficient pneumatic drilling and tapping machine.

The invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a complete machine or tool constructed in accordance with my improvements; Fig. 2, an end elevation of the same; Fig. 3, an enlarged sectional elevation taken on line 3 of Figs. 2 and 4, looking in the direction of the arrow; Fig. 4, a transverse sectional view taken on line 4 of Fig. 3; Fig. 5, a sectional view of the rotating piston; Fig. 6, a plan view of one of the piston ends; and Figs. 7 and 8, section views taken on lines 7 and 8, respectively, of Fig. 3, looking in the direction of the arrows.

In constructing a tool in accordance with my improvements I make a casing A of the desired size and shape adapted to hold, contain, and inclose the operative parts of the mechanism. This casing is made preferably in one integral portion, so as to provide a substantially cylindrical fluid-pressure chamber a and a mechanism-box a', and is provided with caps A' A^2, one at each end thereof. A partition A^3 divides the mechanism-box from the the fluid-pressure chamber.

Rotatably mounted in the fluid-pressure chamber is a piston B, having bearing portions b at each end thereof, one in the cap of the casing and the other in a suitable boss or hub in the partition. This piston is preferably made of two semicylindrical portions b b', held together at each end by means of the piston ends B', which have semicylindrical bosses b^2, and provide a channel b^3, in which the piston-blades C are held and may reciprocate when desired. The piston ends are secured to the semicylindrical portions of the piston by means of screws b^4, though any other desired means may be used.

To receive the direct and expansive force of the fluid-pressure so as to rotate the piston, I provide two piston-blades C C', and each of such blades with a cylinder c' at the inner end thereof. These blade-cylinders are open at their inner ends and have each a movable piston in the same arranged adjacent to each other, so that a helically-coiled spring c^3 may be inserted between the same and normally hold such pistons apart and allow the blades to bear with the least possible friction against the cylindrical pressure-chamber. The blades are provided with passages C^2, leading to the blade-cylinders, so that fluid-pressure may enter the same and, acting against the pistons in the blade-cylinders, force the same inwardly, and by such action keep the blades in proper contact with the inner surface of the fluid-pressure chamber, so that they may compensate automatically for the wear of such parts.

The fluid-pressure chamber is provided with an inlet-passage a^4 and an exhaust-passage a^5, (shown particularly in Fig. 4,) so that as fluid-pressure enters the chamber it impinges against the blade C' and tends to rotate the piston until the blade reaches the position shown by the blade C and allows the expanded pressure to escape. A portion of the pressure enters through the passage C^2 in the blade-piston and forces the piston inwardly, so as to create a reactionary force against the blade and tend to keep it in close contact with the wall of the cylinder and prevent leakage.

To transmit power and motion from the rotary spindle to a shank D, I provide a set of compound gears d, d', d^2, and d^3, which serve to decrease the speed and increase the power, though of course any arrangement of gears may be used to accomplish the same result.

I claim—

1. In a portable pneumatic drilling-tool, the combination of a casing provided with a fluid-pressure chamber and inlet and outlet passages, a rotatable piston mounted therein

composed of two hollow semicylindrical portions and two end portions having semicircular projections forming transverse channels on their inner faces adapted to receive and guide the blade mechanism, two reciprocating blades movably mounted in the rotating piston, and a cylinder and piston on the inner end of each of the blades having communication with the fluid-pressure chamber of the casing so that fluid-pressure may operate the blade-pistons, substantially as and for the purpose described.

2. In a portable pneumatic drilling-tool, the combination of a casing provided with a fluid-pressure chamber and inlet and outlet passages, a rotatable piston mounted therein composed of two hollow semicylindrical portions and two end portions having semicircular projections forming transverse channels on their inner faces adapted to receive and guide the blade mechanism, two reciprocating blades movably mounted in the rotating piston and provided with pressure-cylinders on their inner ends, a piston in the pressure-cylinder of each of the blades having communication with the fluid-pressure chamber of the casing so that fluid-pressure may operate the blade-pistons, and spring mechanism inserted between the blade-pistons to hold the same apart, substantially as described.

GEORGE W. SMITH.

Witnesses:
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D. WHITMER.