W. VON HACHT, C. R. TAYLOR & W. F. CLEWE.

ROTARY VALVE.

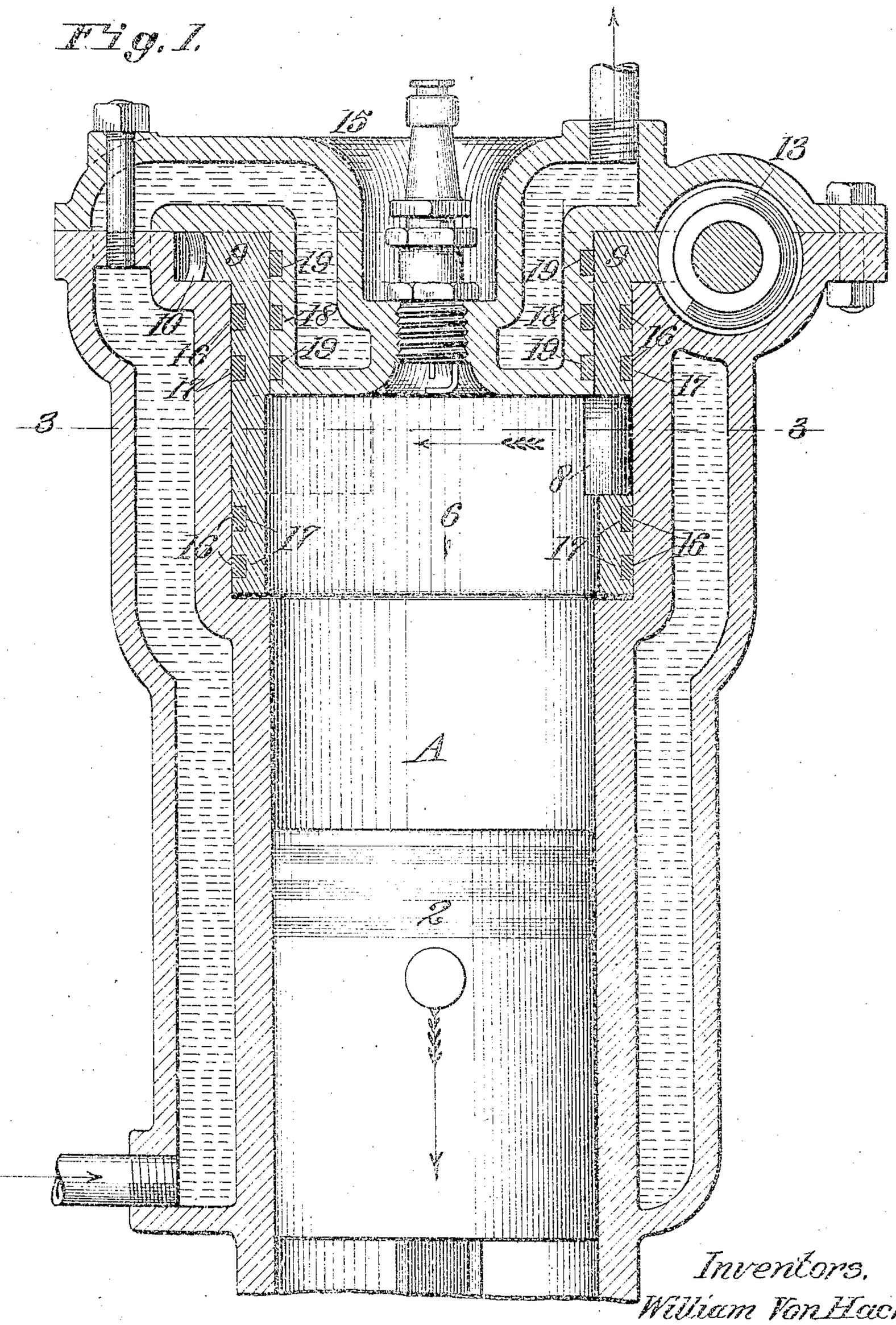
APPLICATION FILED DEC. 9, 1914.

1,154,899.

Patented Sept. 28, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Charles Pickles

Thos Eastberg

Inventors,

William Von Hacht

Charles R. Taylor

William F. Clewe,

BY G. H. Shorey.

ATTORNEY

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3 SHEETS—SHEET 2.

Fig. 2.

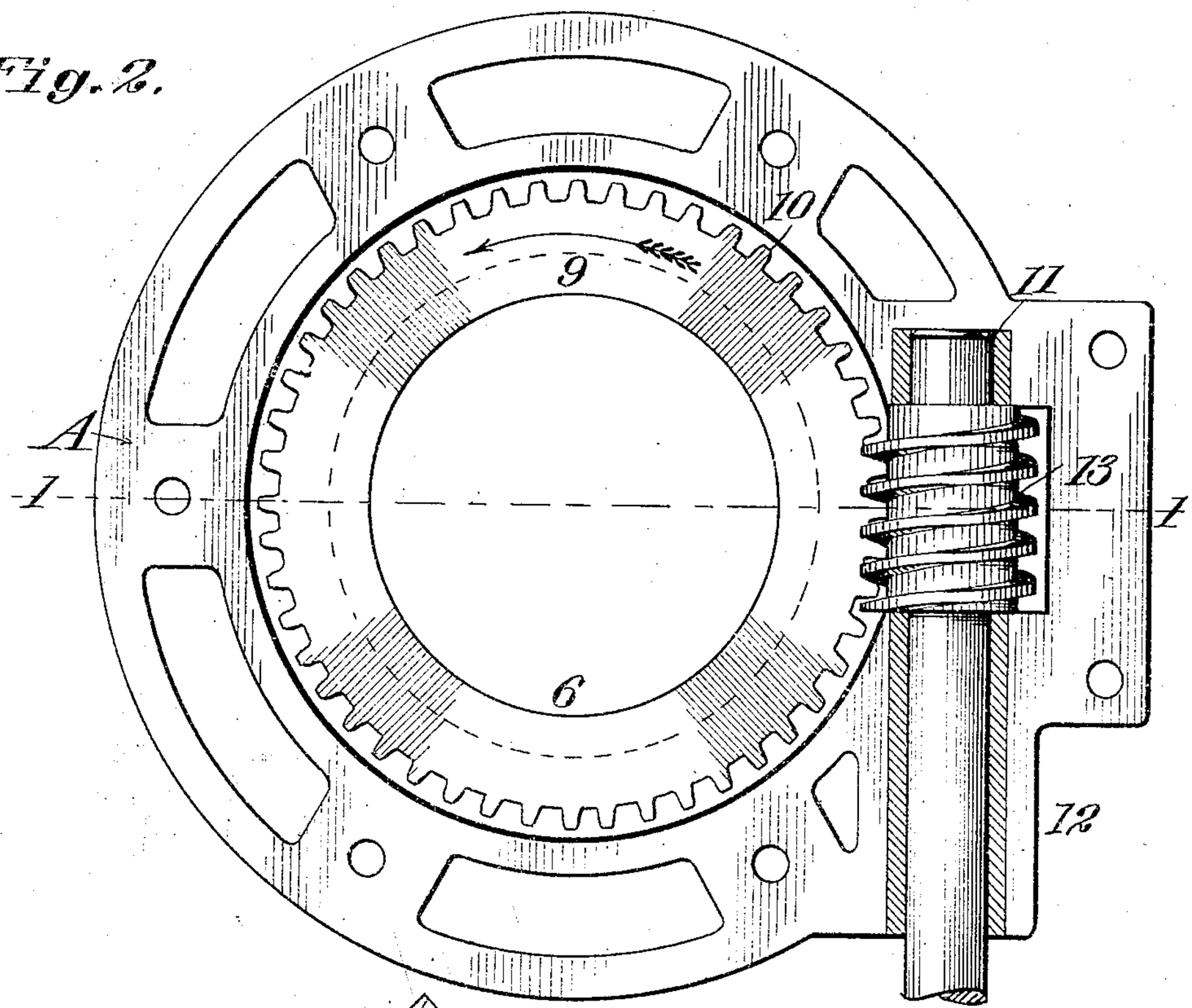
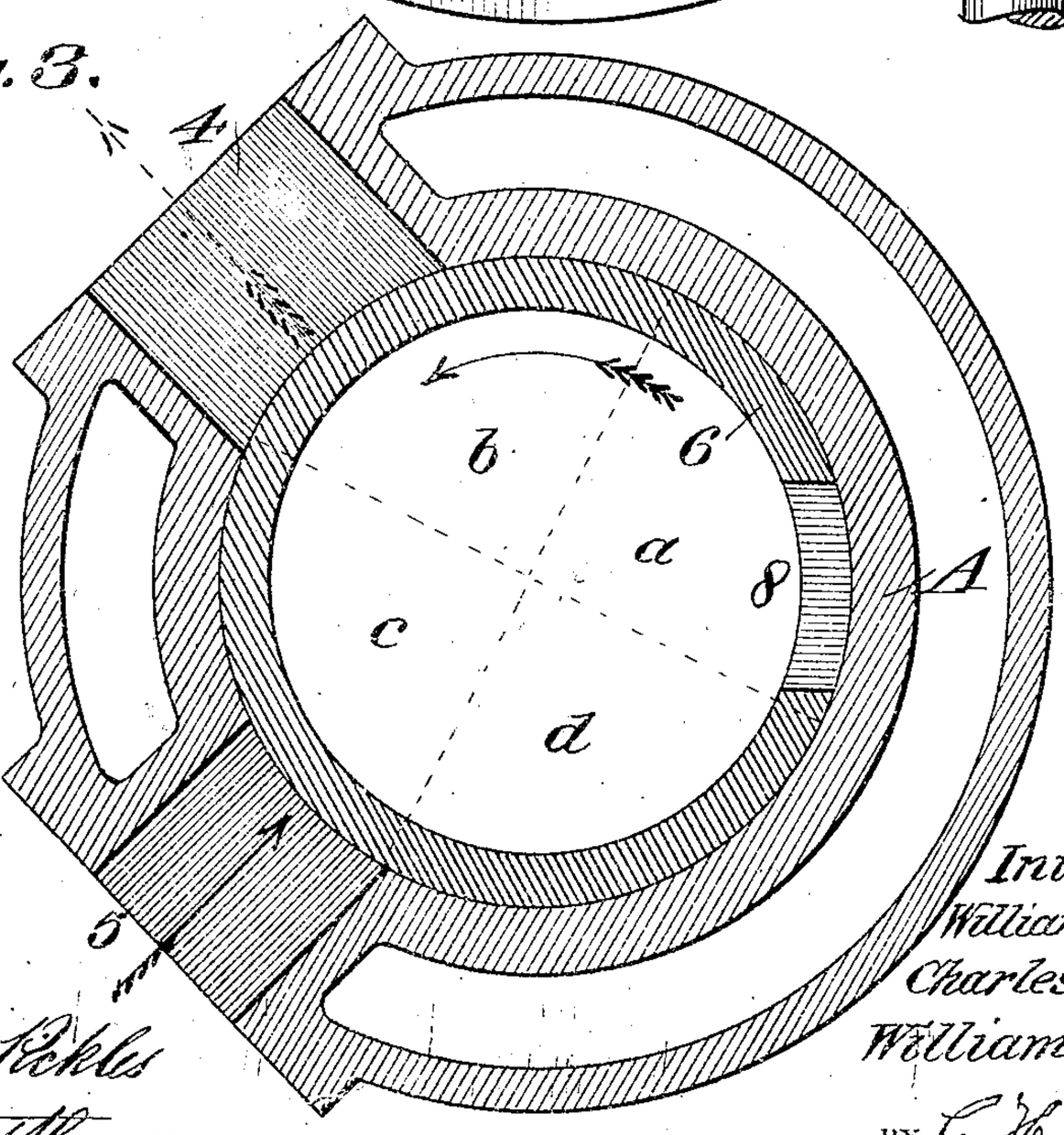


Fig. 3.



WITNESSES:

Charles Pickles

Thos. Cuthbert

Inventors

William Von Hacht

Charles R. Taylor.

William F. Clewe.

BY G. H. Strong.

ATTORNEY

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3 SHEETS—SHEET 3.

Fig. 4.

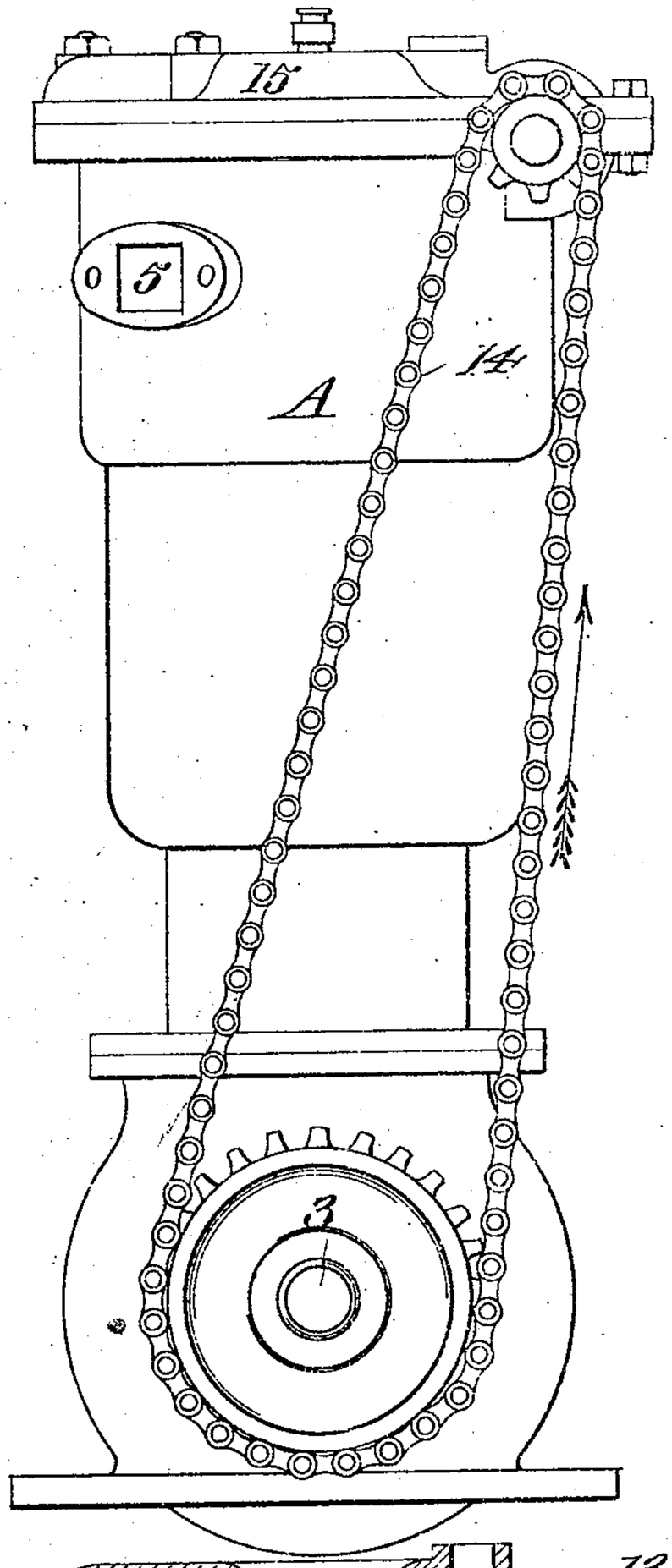

Fig. 5.

WITNESSES:

Charles Pickles

Thos. Eastberg.

Inventors,
William. VonHacht
Charles R. Taylor
William F. Clewe.

BY G. H. Strong,

ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM VON HACHT, CHARLES R. TAYLOR, AND WILLIAM F. CLEWE, OF SONOMA, CALIFORNIA.

ROTARY VALVE.

1,154,899. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed December 9, 1914. Serial No. 876,305.

To all whom it may concern:

Be it known that we, WILLIAM VON HACHT, CHARLES R. TAYLOR, and WILLIAM F. CLEWE, citizens of the United States, residing at Sonoma, in the county of Sonoma and State of California, have invented new and useful Improvements in Rotary Valves, of which the following is a specification.

This invention relates to a rotary valve for internal combustion engines.

One of the objects of the present invention is to provide a simple, substantial, easily operated valve of the rotary type which is especially adapted for use on internal combustion engines.

Another object of the invention is to provide a novel means for driving or operating the valve in unison with the movements of the piston, and to provide against leakage between the cylinder and valve.

Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical section on line 1—1, Fig. 2. Fig. 2 is a plan view with the cylinder head removed. Fig. 3 is a horizontal section on line 3—3, Fig. 1. Fig. 4 is a detail side elevation of the engine complete. Fig. 5 is a section of a modification.

More particularly described, A indicates the cylinder of a four cycle internal combustion engine, 2 the piston, and 3 the crank shaft to which the piston is connected in the usual manner. Formed in the cylinder casting in direct alinement with the compression space is an exhaust port 4 and an inlet port 5. Mounted interior of the cylinder and adapted to open and close said ports is the rotary valve which forms the subject-matter of the present application.

Referring to Fig. 1, it will be seen that the valve consists of a sleeve-like member 6 in which is formed a port 8. The upper end of the sleeve terminates in a flange 9, the outer edge of which is cut to form a worm gear 10. Journaled on top of the cylinder, as at 11 and 12, is a worm pinion 13. This intermeshes with the worm gear and is driven directly from the crank shaft by suitable means, as the silent chain 14; the gear ratio or drive being such that the valve will rotate once to two revolutions of the crank shaft. The valve and driving worm is in this instance entirely inclosed by the cylinder head 15, and the center of said head is extended down into the valve and is provided with annular grooves 16, in which are inserted expansion rings 17 to prevent leakage at this point. Similar grooves 18 and rings 19 are provided on the exterior of the valve to prevent leakage between the cylinder and valve.

In Fig. 1 a construction is shown which permits the formation of the compression chamber directly interior of the valve.

In Fig. 5 the same principle of operation is involved, the only difference being that the valve proper is mounted to revolve in an annular groove 20 formed between the main cylinder wall and the water jacket. The valve is in this instance more protected and is easily cooled. In either instance a water jacket 21, or other suitable means, may be employed for cooling the valve and engine as a whole.

Fig. 3 shows the position of the valve during the four cycles of operation; the quadrant shown by dotted lines at *a* indicating the explosive or expansion stroke, *b* the exhaust stroke, *c* the suction stroke, and *d* the compression stroke. The exhaust port is preferably longer than the intake as this permits the exhaust to open before the piston reaches the lower dead center on the power stroke. The area and length of the ports, together with the materials and finish of the several parts of the invention are such as the experience and judgment of the manufacturer may dictate.

We wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claim and that we do not wish to limit ourselves to the specific design and construction here shown.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

In combination, a cylinder having a piston chamber and a valve chamber being in the form of a counter-bore to the piston chamber to provide a shoulder at the junction of the chambers, the top of the cylinder being further provided with a worm gear chamber concentric with the valve chamber and a tangential worm pinion chamber communicating with the gear chamber, a piston

operable in the piston chamber, a sleeve valve terminating substantially at the shoulder and arranged in the valve chamber for rotary movement, the inner face of the sleeve valve being substantially in alinement with and forming a continuation of the inner wall of the piston chamber, an integral peripheral worm gear formed on the upper edge of the valve and operating in the gear chamber, a worm pinion journaled horizontally in the pinion chamber and meshing with the worm gear for rotating the same, and a cylinder head having a central portion extending down into the valve to the opening thereof, the center of the head depending portion being formed with a plug-receiving opening and the under face of the portion being flat whereby, with the insetting of the valve, a substantially uninterrupted interior wall is provided for the explosion of the gases.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

WILLIAM VON HACHT.
CHARLES R. TAYLOR.
WILLIAM F. CLEWE.

Witnesses:
ROBERT A. POPPE,
JOSEPH P. RYAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."