W. E. TAFT.

VALVE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED AUG. 17, 1912.

**1,115,987.** Patented Nov. 3, 1914.

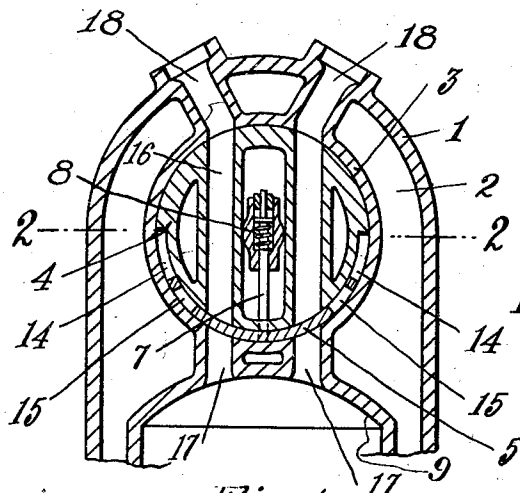



Fig. 1.

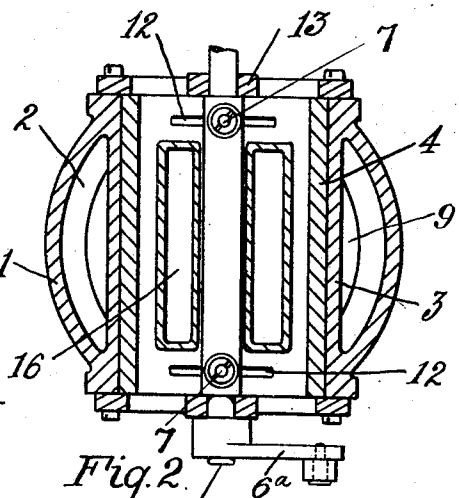



Fig. 2.

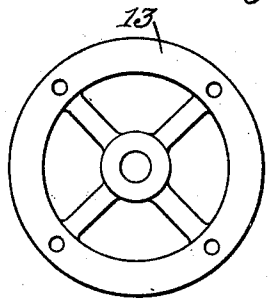



Fig. 3.

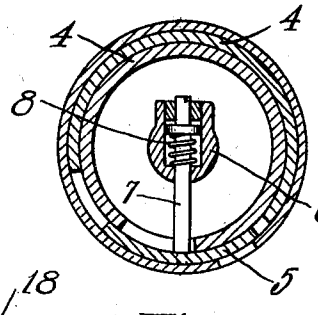



Fig. 4.

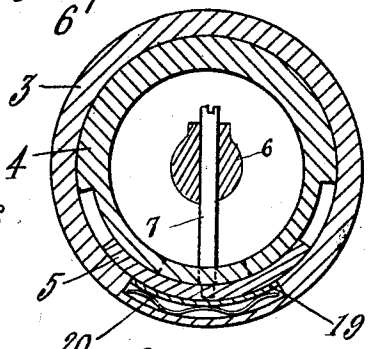



Fig. 5.

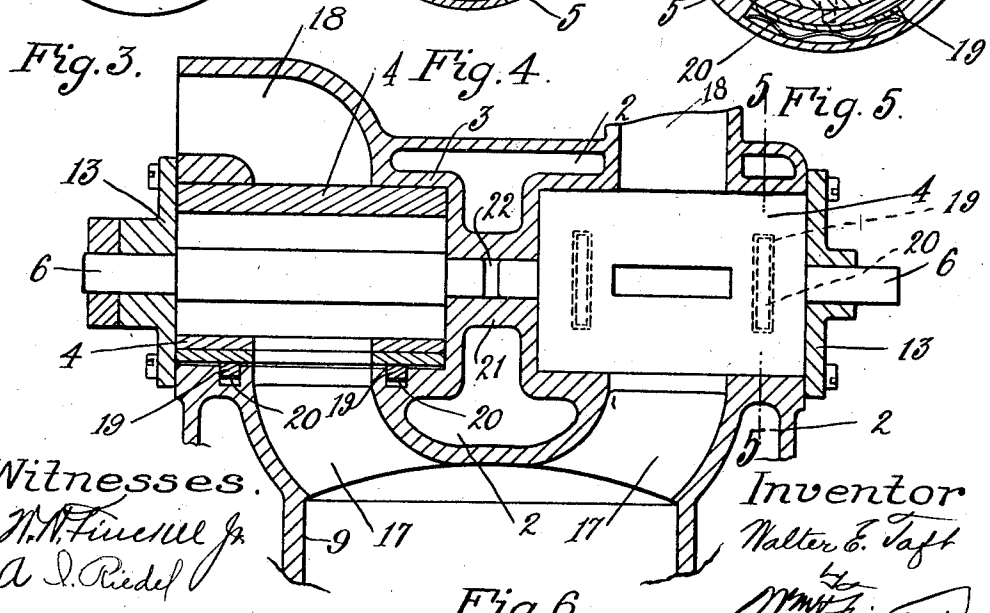



Fig. 6.

Witnesses.
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# UNITED STATES PATENT OFFICE.

WALTER E. TAFT, OF PROVIDENCE, RHODE ISLAND.

## VALVE FOR INTERNAL-COMBUSTION ENGINES.

1,115,987. Specification of Letters Patent. Patented Nov. 3, 1914.

Application filed August 17, 1912. Serial No. 715,568.

*To all whom it may concern:*

Be it known that I, WALTER E. TAFT, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Valves for Internal-Combustion Engines, of which the following is a specification.

This invention relates to the cylindrical type of valves; and has for its object the elimination of friction, the promotion of structural and operative simplicity, the attainment of ease of assembling and disassembling, and the avoiding of carbon deposits.

The invention consists of an oscillating valve of the form of a segment of a hollow cylinder, mounted in a tubular ported lining, which in turn is arranged in a casing, said valve being oscillated by connections with a spindle or shaft mounted in the casing, as I will proceed now to explain and finally claim.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a vertical transverse section, partly broken out, showing the upper part of an engine cylinder and the valve connected therewith, the plane of section being deflected to take in one of the valve-connecting pins and its mounting in the valve shaft. Fig. 2 is a horizontal section of the same, showing the valve shaft in plan. Fig. 3 is an elevation of a cap or cover for the ends of the valve chamber. Fig. 4 is a sectional view of a modification. Fig. 5 is a sectional view, on line 5—5, Fig. 6, of another modification. Fig. 6 is a longitudinal section of a modification as partly shown in Figs. 4 and 5.

Referring to Figs. 1 and 2, 1 is the cylinder casing; 2 is the water cooling chamber; 3 is the valve casing; 4 is the lining arranged within the valve casing; and 5 is the valve, made as a segment of a cylinder, or, in other words, in the form of an arcuate plate. This valve is connected with the spindle or shaft 6 by means of pins 7 which are slidingly or yieldingly applied to the spindle, with interposed springs 8.

9 may indicate the engine cylinder.

The spindle or shaft 6 is given a rocking motion by any suitable means, such as a crank $6^a$ connected with a moving part so as to impart an oscillating movement to the valve 5. The springs 8 serve primarily to press the valve toward its seat on the casing 3. The pins 7 move in slots 12 in the lining 4. The shaft 6 is journaled in the caps 13. The valve 5 is located in a recess 14 in the lining 4 and this recess is large enough to permit the oscillation of the valve to cover and uncover the cylinder ports presently described. This valve is provided with ports 15 which are adapted to be brought into and out of register with the ports 16 in the lining and the ports 17 in the casing leading to the cylinder 9. The ports 16 and 17 may be used either as inlet or exhaust ports as may be required. Ports 18 lead from outside into and through the valve lining 4.

The springs 8 in the spindle 6 are depended upon to hold the valve 5 to its seat until there is pressure on the back of the valve from the force of the compression; and hence very light springs are used, thus obviating any excessive friction between the valve and its seat when the valve is in motion.

By the construction shown in Figs. 1 and 2, the inlet charge is kept separate from the exhaust at all times, since the ports in the lining 4 are separately incased therein.

In Fig. 4 is shown a valve in which the incased ports in the lining are done away with. The lining 4 is composed of two cylindrical members, one fitted within the other, thus simplifying the construction of the chamber in the lining for the valve to work in.

In Figs. 5 and 6 the valve 5 is held to its seat by means of complementary segmental plates 19, which are fitted in recesses in the casing 3 so as to be capable of movement toward and from the valve, and these plates are backed up by springs 20, preferably of sheet steel, to keep them in yielding contact with the valve. The valve is connected with the spindle 6 by pins 7 as before, excepting that no coiled springs 8 are used.

The individual valves as shown in Figs. 4, 5 and 6 may be used to control either the admission or exhaust, but not both.

The invention is not limited to any particular position for the valve casing with relation to the cylinder.

In the construction shown where the ports are incased, there is space around these ports

for through air-circulation, and if desired, water-cooling may be used by closing the ends of the casing.

What I claim is:—

1. In an internal combustion engine, a cylinder having inlet and outlet ports, a valve casing ported to register with the cylinder ports, a lining in said casing also ported to register with the ports in the cylinder and casing, a valve on the outside of said lining interposed between the casing and lining and having a seat in said lining and provided with ports to register with the ports in the cylinder and lining, said valve being held to its seat by spring action and the force imparted from the compression and also from the force of the explosion of the charge exerted upon the back of the valve, and operative means for imparting movement to the valve to cover and uncover the ports in the cylinder and lining when the engine is in action.

2. In an internal combustion engine, a cylinder having inlet and outlet ports, a valve casing ported to register with the cylinder ports, a lining in said casing having separately incased ports registering with the ports in the cylinder and casing, a valve on the outside of said lining interposed between the casing and lining and having a seat in said lining and provided with ports to register with the ports in the cylinder and lining, said valve being held to its seat by spring action and the force imparted from the compression and also from the force of the explosion of the charge exerted upon the back of the valve, and operative means for imparting movement to the valve to cover and uncover the ports in the cylinder and lining when the engine is in action.

3. In an internal combustion engine, the combination with a ported cylinder, a ported valve casing, and a stationary valve lining all of which are provided with alined ports, the lining being provided with an outside recess, of a segmental valve arranged in said recess, a rocking spindle, movable means connecting the valve and spindle, and springs acting upon the valve to aid the force of the compression and explosion in the cylinder to hold the valve to its seat, said valve having ports adapted to be brought into and out of register with the ports in the cylinder and lining as the valve is oscillated.

4. In an internal combustion engine, the combination with a ported cylinder, a ported valve casing, and a stationary valve lining, all of which are provided with alined ports, the lining being provided with an outside recess, of a segmental valve arranged in said recess, a rocking spindle, spring-pressed pins connecting the valve and spindle, and springs acting upon the valve to aid the force of the compression and explosion in the cylinder to hold the valve to its seat, said valve having ports adapted to be brought into and out of register with the ports in the cylinder and lining as the valve is oscillated.

In testimony whereof I have affixed my signature, in presence of two witnesses.

WALTER E. TAFT.

Witnesses:

FRANK B. WHITE,

R. MCCAUGHEM.

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