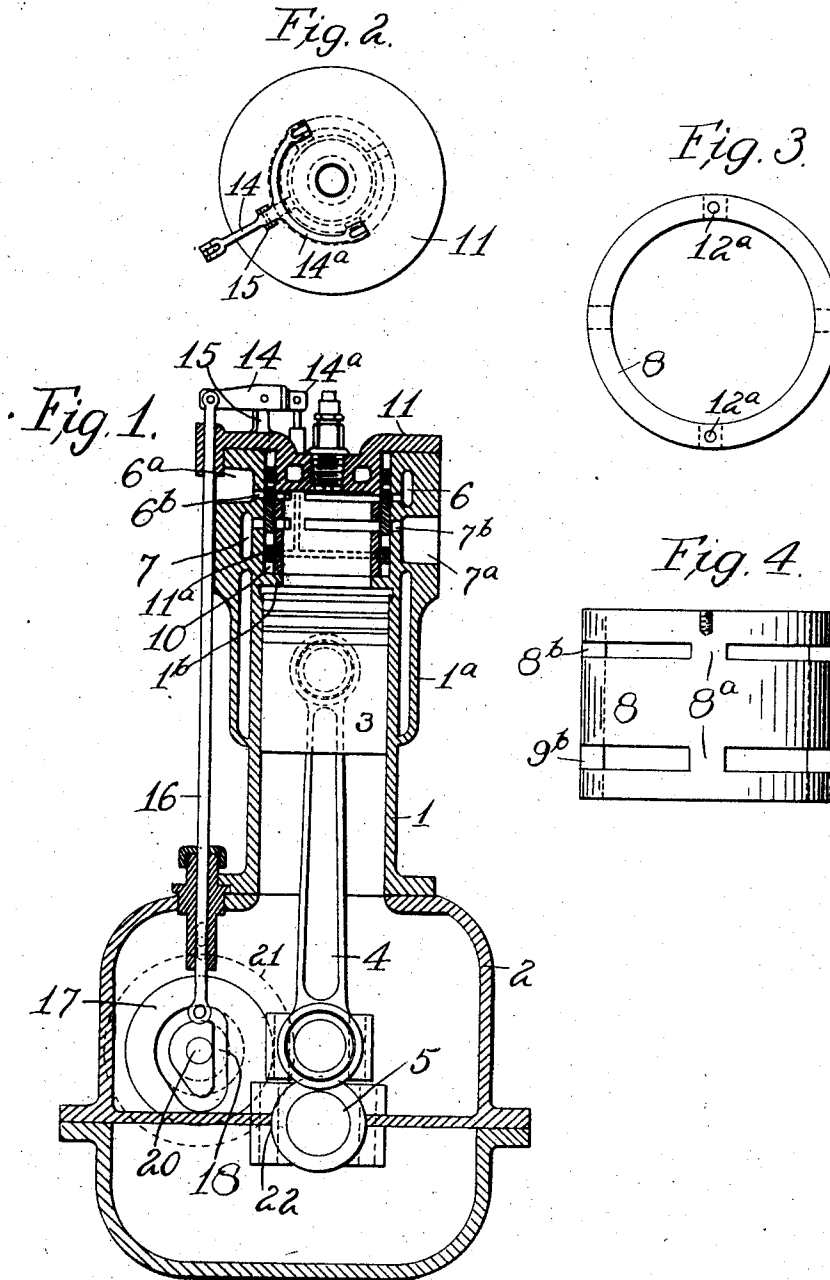


W. R. THOMAS, SR. & W. R. THOMAS, JR.
VALVE MECHANISM FOR INTERNAL COMBUSTION ENGINES.
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1,063,082.

Patented May 27, 1913.



Attest.
Centon M. Caff
Chas. F. Calhoun

Inventors
Wm. R. Thomas Sr.,
Wm. R. Thomas Jr.
BY *John Middleton Donaldson* Attorney

UNITED STATES PATENT OFFICE.

WILLIAM R. THOMAS, SR., AND WILLIAM R. THOMAS, JR., OF CATASAUQUA, PENN-
SYLVANIA; SAID THOMAS, SR., ASSIGNOR TO SAID THOMAS, JR.

VALVE MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM R. THOMAS, Sr., and WILLIAM R. THOMAS, Jr., citizens of the United States, residing at Catasauqua, Pennsylvania, have invented certain new and useful Improvements in Valve Mechanism for Internal-Combustion Engines, of which the following is a specification.

Our present invention relates to improvements in valve mechanism for internal combustion and like engines, and has, among others, for its objects to provide an extremely simple and economical construction which will provide ample port area for quick inlet and exhaust, will avoid the necessity of valve grinding and adjusting, in which all moving parts will be amply lubricated, in which the parts may be readily removed and replaced, and in which the valve will be practically a balanced valve and move with minimum friction and wear.

With these and other objects in view, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described and particularly defined by the appended claims.

An internal combustion engine embodying our improvements is illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section; Fig. 2 is a plan view of the cylinder head; Fig. 3 is a detail plan of the valve sleeve; and Fig. 4 is a side elevation thereof.

Referring by reference characters to this drawing, the numeral 1 designates the engine cylinder which, except as hereinafter described, may be of the ordinary four cycle type, and has the usual water jacket 1^a, and 2 the crank case. The piston is shown at 3 connected by the pitman 4 to the crank shaft 5. The upper end of the cylinder is provided with annular inlet and exhaust chambers 6 and 7 arranged one above the other which are designed to be placed in communication with the customary inlet and exhaust pipes or manifolds (not shown) through the inlet and exhaust passages 6^a and 7^a respectively. These chambers also communicate by annularly arranged ports 6^b and 7^b with the interior of the cylinder.

In order to control the passage of the combustible and burnt gases respectively through these ports, we provide the vertically movable valve sleeve 8 of cylindrical form having annular ports 8^b and 9^b corre-

sponding to the ports 6^b and 7^b. These ports may be in the form of two sets of elongated slots as shown in Fig. 4 extending around the greater portion of the ring and having only sufficient material at the points 8^a for the requisite strength.

The valve 8 is located in an annular chamber 10 which is provided between the inner wall of the end of the cylinder and a cylindrical extension 11^a of the head 11, this annular chamber being of greater height than the valve member to allow the latter to be moved vertically at the proper time to carry the ports therein into and out of alinement with the ports in the cylinder wall.

The cylinder head is removably secured to the cylinder, thus not only permitting ready insertion and removal of the valve, but enabling the interior of the cylinder to be readily cleaned without removal of the cylinder.

The annular chamber 10 is closed at its lower end preferably by providing the cylinder with an inwardly extending annular flange or rib 1^b against which the lower end of the extension 11^a of the head abuts. The provision of a complete annular or sleeve valve working in a closed chamber makes the valve practically a balanced valve, thereby reducing friction and increasing the life of the valve.

Vertical movement of the valve member is effected at the proper times by means of posts having their lower ends screwed into openings 12^a in the valve sleeve, which posts are connected at their upper ends to arms 14^a of a forked lever 14 pivotally mounted upon bracket 15. The lever is rocked to give proper motion to the valve by a rod 16 guided by the cylinder head and crank case, and operated by connections at the lower end with a disk 17 having a cam groove or channel 18 of irregular curvature which receives a pin or roller 19 on the lower end of the rod. The cam 17 is carried by a cam shaft 20 journaled in suitable bearings within the crank case and operated by two to one gearing indicated at 21 and 22 from the crank shaft 5.

It will be seen that the gearing and cams just described, being located in the crank case, will be thoroughly lubricated by the oil therein, while the valve member is easily lubricated through the provision of an oil supply pipe conveying oil from any

suitable source and delivering it to the space above the valve sleeve.

Having thus described our invention what we claim is:—

5 1. In an internal combustion engine, a cylinder having laterally opening superimposed inlet and exhaust ports and an internal annular flange, a piston working
10 in said cylinder below said flange, a removable head having a cylindrical portion projecting within the engine cylinder and abutting against said flange, and forming with said cylinder an annular chamber closed at
15 its lower end, said cylindrical portion having also superimposed inlet and exhaust ports, a cylindrical valve located within said chamber and having also superimposed inlet
20 and exhaust ports, oppositely disclosed operating rods connected to said valve and projecting through the head of the cylinder,
and means driven from a moving part of the engine for operating said rods, substantially as described.

25 2. In an internal combustion engine, a cylinder having in the wall thereof near

the upper end superimposed annular inlet and exhaust passages communicating by annularly disposed inlet and exhaust ports with the interior of the cylinder, said cylinder having also an annular longitudinally
30 extending chamber in the wall thereof closed to the cylinder at its lower end, a removable head for the cylinder exposing, when removed, said annular chamber, a
35 cylindrical valve member located in said annular chamber and capable of being lifted out upon removal of the head, said cylindrical valve having superimposed annularly
40 arranged inlet and exhaust ports coacting with the inlet and exhaust ports of the cylinder, and means acting through the head of the cylinder for operating said valve.

In testimony whereof, we affix our signatures in presence of two witnesses.

WILLIAM R. THOMAS, SR.
WILLIAM R. THOMAS, JR.

Witnesses:

J. DORVUS,
E. F. MATCHETTE.

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