L. J. R. HOLST.

VALVE FOR INTERNAL COMBUSTION ENGINES.

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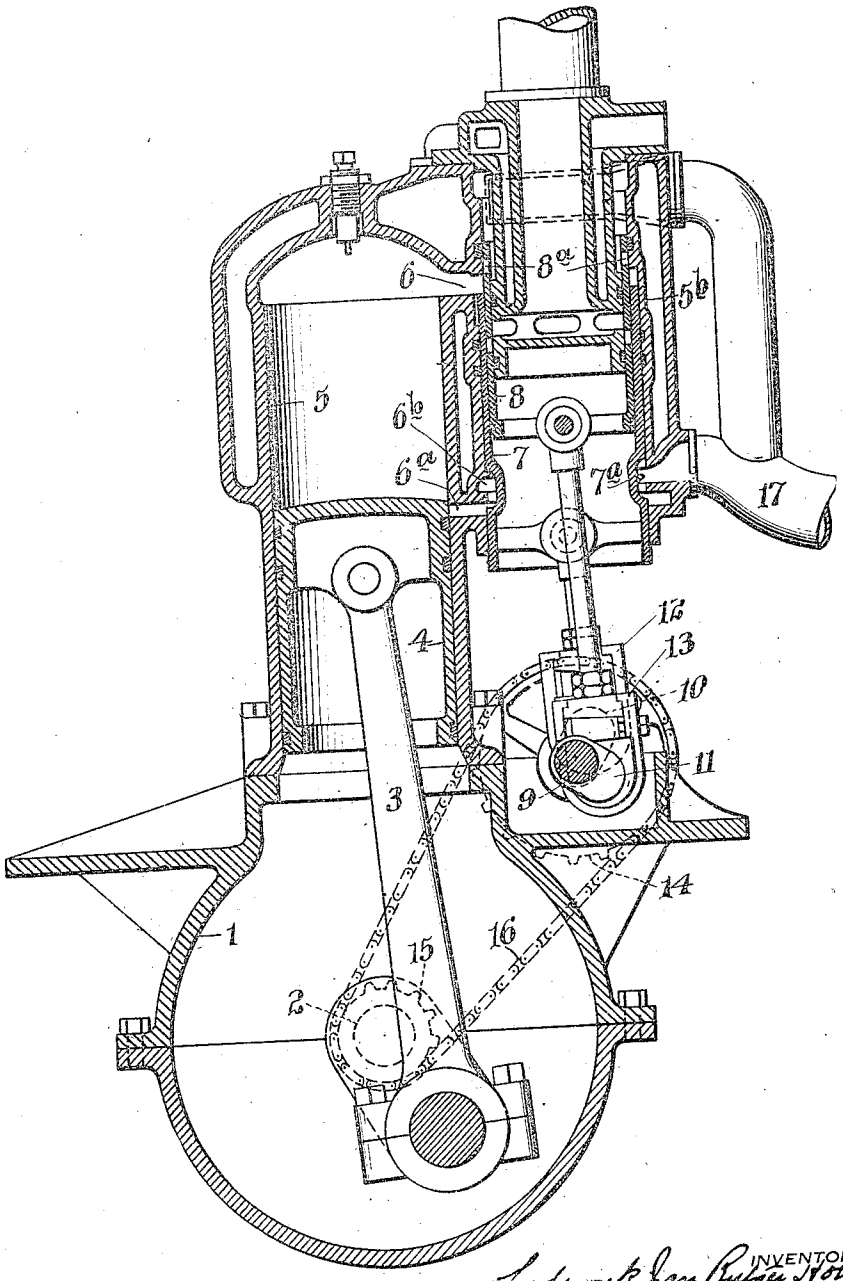

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VALVE FOR INTERNAL-COMBUSTION ENGINES.

1,052,436. Specification of Letters Patent. Patented Feb. 4, 1913.

Original application filed March 6, 1912, Serial No. 681,929. Divided and this application filed April 30, 1912. Serial No. 694,070.

To all whom it may concern:

Be it known that I, LODEWYK JAN RUTGER HOLST, a citizen of the United States, residing at Lansdowne, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Valves for Internal-Combustion Engines, of which the following is a specification.

The principal object of my present invention is to further improve the valves of four cycle internal combustion engines of a type as described in an application for United States Letters Patent Serial No. 677,382, filed by me February 13, 1912, by adapting such valves to operate an auxiliary exhaust-port located in the cylinder-wall slightly above the lowest point uncovered by the top of the piston, thereby providing for an immediate efflux of exhaust gases directly after they have furnished their useful work to thus prevent undue heating up of the cylinder-walls, and also to reduce back pressure caused by the exhausting through the main exhaust-port of the engine only. This result is obtained by providing the cylinder near its open end with an auxiliary exhaust-port, which is uncovered by the piston as soon as it reaches on the downward stroke that point of its course at which the exhaust is to begin. As, however, this point is reached and passed also during the suction stroke means are provided to maintain this auxiliary-port closed during the suction period or during that part of it where the piston uncovers said auxiliary-port.

My present invention is Division B, of an application for United States Letters Patent filed by me under date of March 6th, 1912, Serial No. 681,929. The nature, scope and characteristic features of my said invention will be more fully understood from the following description taken in connection with the accompanying drawing forming part hereof, which shows in cross-sectional elevation an adaptation of my invention to an engine provided with tubular valves.

Referring to the drawing, 1, is the crank-case supporting the cylinder-casting 5, to which is attached the valve-chest 5^b, in which the telescopic fluid distributing members 7 and 8, are adapted to be guided in the reciprocating movement transmitted to them by the connectors 12 and 13, respectively. These connectors connect the members 7 and 8, with the eccentrics 10 and 11, mounted on the half-time shaft 9. This shaft is driven by any suitable system of transmission, as for instance, the gears 14 and 15, and chain 16. The smaller gear 15, is secured to the crank-shaft 2, which derives movement from the piston 4, by means of the connector 3. The lower end of the member 7, is provided with a recessed passage-way 7^a, adapted to establish and interrupt connection between the auxiliary exhaust-port 6^a, in the cylinder 5, and the auxiliary exhaust passage 6^b, in the lower part of the valve-chest 5^b.

Whenever the engine during its operation arrives in the position illustrated in the drawing, which represents the beginning of the exhaust period, the piston 4 uncovers the port-opening 6^a, and the spent products of combustion find a direct free passage to the exhaust pipe 17, through the annular recesses 7^a, in the member 7, and the auxiliary exhaust passage 6^b, in the valve-chest 5^b. The continued rotation meanwhile brings the piston to and through its lower dead center, and when in the upward exhaust stroke it reaches again the position shown in the drawing, it closes the auxiliary exhaust-port 6^a, and continues to clear the cylinder from the remainder of the exhaust gases through the principal exhaust-port 6, and the ports 8^a, in the upper part of the inner sleeve 8, which has by such time descended below the upper edge of the port 6, in the explosion chamber of the cylinder 5. As shown, the sleeve 7, is at the beginning of the exhaust, slightly past the upper limit of its motion; thus when the piston on the following stroke again reaches the point where it uncovers the auxiliary port 6^a, the eccentric operating the sleeve 7, will be 180°, farther down, and hence the port 6^b, in the sleeve 7, will not be at this stroke, in co-operative position with the auxiliary port 6^a, and thereby will be prevented any loss or dilution of the fresh charge introduced into the said cylinder 5.

Having thus described the nature and objects of my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In an internal combustion engine working on the four cycle principle, completing a cycle during two revolutions of the main-shaft, a cylinder fitted with a valve-chest, said valve-chest containing reciprocating members for the regulation of the suction and exhaust periods, said cylinder provided near its open end with an auxiliary exhaust-port adapted to communicate with an auxiliary exhaust opening provided in said valve-chest, one of said reciprocating members provided with a recess extending around said member and adapted to establish a connected passage from said auxiliary exhaust-port to the engine exhaust-piping, substantially as and for the purposes set forth.

2. In an internal combustion engine working on the four cycle principle, completing a cycle during two revolutions of the main-shaft, a cylinder fitted with a valve-chest, said valve-chest containing reciprocating members for the regulation of the suction and exhaust periods, said cylinder provided near its open end with an auxiliary exhaust-port adapted to communicate with an auxiliary exhaust opening provided in said valve-chest one of said reciprocating members provided with a recess extending around said member and adapted to establish a connected passage from said auxiliary exhaust-port to the engine exhaust-piping before and after the beginning of the exhaust period of said engine, substantially as and for the purposes set forth.

In witness whereof, I have hereunto set my signature in the presence of the two subscribing witnesses hereto.

LODEWYK JAN RUTGER HOLST.

Witnesses:
THOMAS M. SMITH,
HELEN F. MILLER.