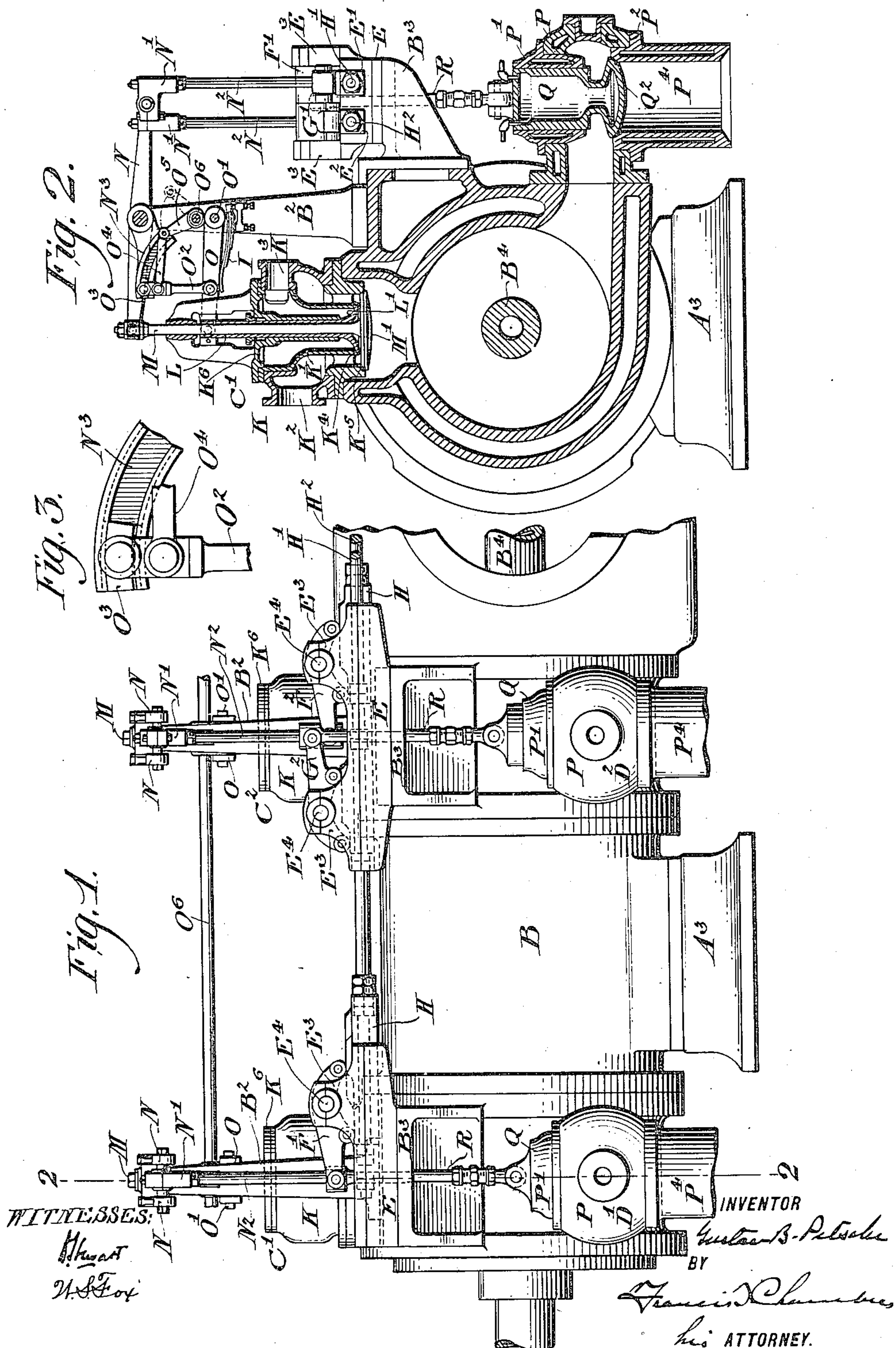


No. 870,125.

PATENTED NOV. 5, 1907.

G. B. PETSCHÉ.  
ADMISSION VALVE FOR GAS ENGINES.

APPLICATION FILED JAN. 9, 1905.





# UNITED STATES PATENT OFFICE.

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## ADMISSION-VALVE FOR GAS-ENGINES.

No. 870,125.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed January 9, 1905. Serial No. 240,153.

To all whom it may concern:

Be it known that I, GUSTAV B. PETSCHÉ, a subject of the Emperor of Germany, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Admission-Valves for Gas-Engines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction and operation of admission valves for gas engines, and has for its object to provide a simple and effective valve apparatus for this purpose.

The nature of my invention will be best understood as described in connection with the drawings in which it is illustrated and in which

Figure 1, is a side elevation of a gas engine cylinder equipped with my improved admission valves. Fig. 2, is a cross-sectional view through one end of the cylinder and through the admission and exhaust valves taken on the line 2—2, of Fig. 2, and Fig. 3, is an enlarged view showing the clearance preferably provided for between the slide block and its actuating segment for purposes which will be described.

A<sup>3</sup>, indicates the base supporting the cylinder B.

B<sup>2</sup>, B<sup>2</sup>, are standards supported on the cylinder, as shown, and B<sup>3</sup>, B<sup>3</sup>, brackets also supported on the cylinder.

C<sup>1</sup>, and C<sup>2</sup>, indicate the admission valves, D<sup>1</sup> and D<sup>2</sup>, the exhaust valves.

E, E, are guides supported on the brackets B<sup>3</sup>, and are provided with parallel guideways indicated at E<sup>1</sup>, and E<sup>2</sup>, cam supporting blocks and also with upwardly extending bearings E<sup>3</sup>, E<sup>3</sup>, which support the pivots indicated at E<sup>4</sup>, E<sup>4</sup>, etc.

F<sup>1</sup>, and F<sup>2</sup>, are pivoted rock levers working on the front row of cams, G<sup>1</sup>, and G<sup>2</sup>, similar levers working on the rear row of cams, these levers being pivoted on the pivots E<sup>4</sup>, as shown.

H<sup>1</sup>, and H<sup>2</sup>, are reciprocating rods driven by mechanism connected with the engine and not shown in the drawings, these rods being secured to and moving the cam blocks H, H, one set of which moves in the guideways E<sup>1</sup>, and the other set in the guideways E<sup>2</sup>, the cam being properly formed and arranged to give motion to the levers F<sup>1</sup>, and F<sup>2</sup>, and G<sup>1</sup>, G<sup>2</sup>, at proper times.

Referring now to the admission valves indicated in Fig. 1 at C<sup>1</sup>, and C<sup>2</sup>, these valves have casings K, which are divided by the partition indicated at K<sup>1</sup>, into air chambers K<sup>2</sup>, and gas chambers K<sup>3</sup>, the outlet port of the air chamber into the cylinder being indicated at K<sup>5</sup> and the outlet port of the gas chamber being formed just above the port K<sup>5</sup>, as indicated at K<sup>4</sup>.

L<sup>1</sup>, is a valve adapted to regulate the admission of gas

and working on the valve seated port K<sup>4</sup>, this valve having a sleeved stem L which extends up through the casing as shown and through which passes the stem M, of the valve M<sup>1</sup>, which is adapted to open and close the port K<sup>5</sup>, and which valve M<sup>1</sup>, I will refer to as the main admission valve. Valve M<sup>1</sup>, is actuated through its stem M, by a rock lever N, pivoted on one of the standards B<sup>2</sup>, and coupled through a head N<sup>1</sup>, and connecting rod N<sup>2</sup>, with one of the cam actuated rock levers already described. As shown the front admission valve is actuated by a cam in the front row through the rock lever F<sup>1</sup>, and the other admission valve is actuated by a cam in the rear row through the rock lever F<sup>2</sup>. The other two cams G<sup>1</sup> and G<sup>2</sup>, are coupled to actuate through rods R, the exhaust valves indicated at Q<sup>2</sup>, and working in the casings P, and P<sup>1</sup>, and an adjustable base P<sup>4</sup>.

I will state here that the cam mechanism for actuating the valves as shown and already described forms the subject matter of my application for Letters Patent filed December 30th, 1904, Serial Number 238,917, while the special construction illustrated for the exhaust valves forms the subject matter of my other application filed March 7th, 1906, Serial Number 304,626.

Referring again to the admission valve construction, it will be seen that the sleeved stem L, is attached at its top to the free end of a lever O, pivoted to the standard B<sup>2</sup>, at O<sup>1</sup>, and that this lever is connected through a link O<sup>2</sup>, and slide block O<sup>3</sup>, with a slotted segment N<sup>3</sup>, secured on the rock lever N, and it will also be seen in the enlarged view, Fig. 3, that the slide block is so coupled with the slotted segment as to have a certain crosswise freedom of motion therein, by preference an eighth of an inch or thereabout, the closing of the valve L<sup>1</sup>, being insured by a spring I, arranged to press the lever arm O, upward, and thus close the valve irrespective of the lost motion between the slide block and segment. The slide block is adjusted in the segment through the link O<sup>4</sup>, connected with the lever arm O<sup>5</sup>, secured to a rock shaft O<sup>6</sup>, which can be adjusted by a governor or otherwise to vary the position of the slide block in the segment and consequently to vary the extent of opening of the valve L<sup>1</sup>.

In operation, the valves being in the position shown in Fig. 2, the valve M<sup>1</sup>, is held tight to its seat by the direct action of the cam actuated mechanism described and the valve L<sup>1</sup>, is drawn close to its seat by its connection with the segment N<sup>3</sup>, and held to its seat by the action of the spring I. The degree to which the valve L<sup>1</sup>, will open will obviously be determined by the position of the slide block in the segment N<sup>3</sup>, and the lost motion provided for between the slide block and the segment will insure that the main valve M<sup>1</sup>, will always open in advance of the valve L<sup>1</sup>, so that a certain amount of air is admitted to the cylinder before the gas and gas and air mixture is admitted thereto.



Having now described my invention, what I claim as new and desire to secure by Letters Patent is,

1. In a gas engine an admission valve casing having an air admission port  $K^2$ , opening into the cylinder through a valve seat  $K^5$ , and a gas port  $K^3$ , opening into the air port close to the seat  $K^5$ , in combination with a main valve  $M^1$ , adapted to seat itself on seat  $K^5$ , and having an actuating stem  $M$ , extending through the casing, a valve  $L^1$ , adapted to act on the mouth of the gas port and having a sleeve stem  $L$ , surrounding the stem  $M$ , of the main valve, a valve actuating lever connected to valve stem  $M$ , and a shiftable connection from sleeve  $L$ , to said lever whereby the lever also imparts motion to the gas valve and whereby such motion can be varied.
2. In a gas engine an admission valve casing having an air admission port  $K^2$ , opening into the cylinder through a valve seat  $K^5$ , and a gas port  $K^3$ , opening into the air port close to the seat  $K^5$ , in combination with a main valve  $M^1$ , adapted to seat itself on seat  $K^5$ , and having an actuating stem  $M$ , extending through the casing, a valve  $L^1$ , adapted to act on the mouth of the gas port and having a sleeve stem  $L$ , surrounding the stem  $M$ , of the main valve, a valve actuating lever connected to valve stem  $M$ , a shiftable connection from sleeve  $L$ , to said lever whereby the lever also imparts motion to the gas valve and whereby

such motion can be varied, said connection being also of a character which permits a short movement of the main valve from its seat before the gas valve is opened, and a spring for holding the gas valve to its seat when the main valve is closed.

3. In a gas engine an admission valve casing having an air admission port  $K^2$ , opening into the cylinder through a valve seat  $K^5$ , and a gas port  $K^3$ , opening into the air port close to the seat  $K^5$ , in combination with a main valve  $M^1$ , adapted to seat itself on seat  $K^5$ , and having an actuating stem  $M$ , extending through the casing, a valve  $L^1$ , adapted to act on the mouth of the gas port and having a sleeve stem  $L$ , surrounding the stem  $M$ , of the main valve, a valve actuating lever connected to valve stem  $M$ , said lever having attached to it a segment  $N^3$ , a lever  $O$ , connected to the sleeve stem, a link and slide block connecting lever  $O$ , with segment  $N^3$ , the slide block forming a loose fit in the segment to permit a certain lost motion, a spring acting to press lever  $O$ , in the direction to close the gas valve, and means for adjusting the slide block in the segment.

GUSTAV B. PETSCHÉ.

Witnesses:

CHAS. F. MYERS,  
D. STEWART.