

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in Rotary Inlet and Exhaust Valves for Internal Combustion Engines.

I, FRANCOIS ACHER, a citizen of the French Republic, residing at 165, Boulevard Saint Denis, Courbevoie, (Department of the Seine), France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 The present invention relates to improvements in rotary inlet and exhaust valves for internal combustion engines, the valves being of the type which are composed of a cylindrical body provided with as many chambers or cells for admission and exhaust as there are cylinders in the engine.

According to the present invention each of the chambers or cells is provided with one port, communicating with the cylinder at a point on the axis of the cylinder, and one or more ports communicating with the inlet and exhaust ports of the cylinder block, the latter port or ports being relatively displaced along the axis of the valve with regard to the first mentioned port, the displacement being such as to permit of simultaneous communication between the cylinder and the chamber and between the chamber and the inlet or exhaust port. The inlet and exhaust ports of the cylinder block are disposed in the portion disposed under a cover forming joint along a horizontal plane passing through the longitudinal axis of the rotary valve.

The valve constructed in this manner is particularly suitable for engines hav-

ing a single rotary valve provided at the upper end of the cylinders, the said valve being rendered accessible by means of a cover which makes joint with the cylinders in a horizontal plane passing through the longitudinal axis of the valve.

In the accompanying drawing is illustrated by way of example one form of construction according to the invention.

Fig. 1 is a vertical section of the rotary valve, said section passing through the axis of one of the cylinders on the line I, I of Fig. 3.

Fig. 2 is another vertical section of the distributor, said section being taken along the axis of the inlet and exhaust ports of one of the cylinders on the line II, II, of Fig. 3.

Fig. 3 shows a horizontal section of the rotary valve on the line III, III of Fig. 1. It also illustrates a sectional plan of the cylinder block on the line IV, IV of Fig. 1.

As will be seen in the drawing, the rotary valve consists of a cylinder 1, which is adapted to be turned at half the speed of the crank shaft. The cylinder is provided with as many chambers or cells as there are cylinders, two of these chambers being shown at 2^{II} and 2^{III} for the cylinders 9^{II} and 9^{III}. The chambers for the cylinders 9^I and 0^{IV} are not shown in the drawings but arranged at 90° relatively to the chambers 2^{II} and 2^{III}. Each chamber is sufficiently large enough to permit of the passage of the gases drawn into the respective cylinder and of the

passage of the exhaust gases from said cylinder. The port 3 connects the cylinder to the corresponding cell or chamber, this chamber being formed by a wall 4 extending into the passage 5 passing through the rotary member 1.

These arrangements collectively give the following results:—

1. The contact of the exhaust gases with the walls of the rotary member are reduced to a minimum owing to short space through which these gases pass from the cylinder to the exhaust. The heating effect is thus greatly reduced.

2. In consequence of the small capacity of the cells or chambers the storage of gases therein is reduced to a minimum.

3. The internal walls 4 add to the rigidity of the rotary valve, which is not weakened by the ports provided in its outer wall.

4. The passage 5 is of sufficient cross section to permit of the passage of a current of a cooling agent.

The rotary valve hereinbefore described is preferably placed above the cylinders under a removable cover 6, so as to facilitate its removal. This valve is applicable to explosion or internal-combustion engines provided with one or more pairs of cylinders arranged in the same plane. In the case of a four-cylinder motor the rotary valve and cylinders are arranged as shown in Fig. 3.

The exhaust port 7ⁱ and the inlet port 8ⁱ of the first cylinder 9ⁱ are situated between the cylinders 9ⁱⁱ, the exhaust port 7^{iv} and the inlet port 8^{iv} of the fourth cylinder 9^{iv} are situated between the third and fourth cylinders 9ⁱⁱⁱ, 9^{iv}, the exhaust port 7^m and the inlet port 8^m are provided at the middle of the series of cylinders, *viz.* between the cylinders 9ⁱⁱ and 9ⁱⁱⁱ and are common to both these cylinders.

The cylinder 9ⁱ, therefore, is adapted to co-operate with the ports 8ⁱ and 7ⁱ, the cylinder 9^{iv} with the ports 8^{iv} and 7^{iv} whilst the cylinders 9ⁱⁱ and 9ⁱⁱⁱ co-operate with the ports common to both, *viz.* 8^m and 7^m as the explosions in these two cylinders take place at an interval of half a revolution of the valve.

The operation of the rotary valve for any one of the cylinders is as follows:—

Admission. The large port 2 of the chamber passes in front of the port 3 of the cylinder whilst the small port 10 of the chamber is opposite the port communicating with the inlet pipe of the series of cylinders.

Compression and explosion. No communication takes place between the cylinders and the chambers as the ports

in the valve will be at the top of the latter.

Exhaust. The large port 2 of the chamber is adjacent the port 3 of the cylinder whilst the small port 2 is in communication with the exhaust pipe.

The operation described for one of the cylinders is the same for all the cylinders and it will be seen that the arrangement will be similar for any number of cylinders (6 to 8 for example).

The arrangement of the ports 7^m and 8^m so as to be common to a number of cylinders is necessary as the cylinders are placed close together; they operate as hereinbefore described.

As regards the construction of the cylinder forming the single rotary valve it may here be remarked that it adapts itself to the following arrangements of the engine.

1. The cover is arranged to fit along a horizontal plane passing through the longitudinal axis of the rotary valve.

2. Inlet and exhaust ports provided in the cylinder block underneath this horizontal plane.

These two arrangements can only be adopted when the ports of each chamber are disposed in two different transverse planes (Figs. 1 and 2).

This arrangement is necessary in consequence of the provision of ports below the horizontal plane of connection of the detachable cover, this position being more convenient for dismounting.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A single rotary valve rotating at half the speed of the crank shaft, composed of a cylindrical body provided with as many chambers or cells for admission and exhaust as there are cylinders in the engine and characterised by the fact that each of the chambers or cells is provided with one port, communicating with the cylinder at a point on the axis of the cylinder, and one or more ports communicating with the inlet and exhaust ports of the cylinder block, this latter port or ports being relatively displaced along the axis of the valve with regard to the first mentioned port, the displacement being such as to permit of simultaneous communication between the cylinder and the chamber and between the chamber and the inlet or exhaust port.

2. A single rotary valve according to

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Claim 1, wherein the inlet and exhaust ports of the cylinder block are disposed in the portion disposed under a cover forming joint along a horizontal plane passing through the longitudinal axis of the rotary valve.

5 3. A single rotary inlet and exhaust valve for a cylinder block constructed and

adapted to operate as a whole substantially as described.

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Dated this 9th day of October, 1920.

HY. FAIRBROTHER,
Chartered Patent Agent,
30 and 32, Ludgate Hill, London, E.C. 4.

[This Drawing is a reproduction of the Original on a reduced scale]

Fig. 1

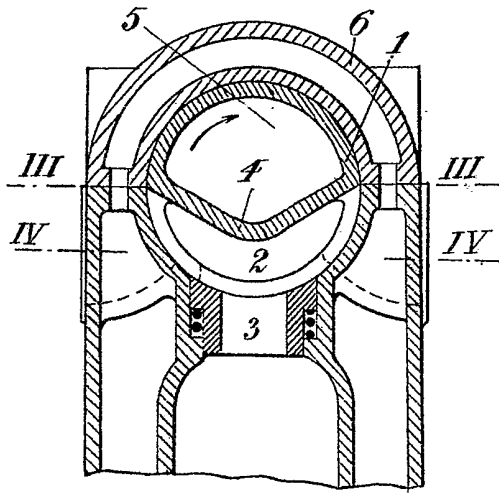


Fig. 2

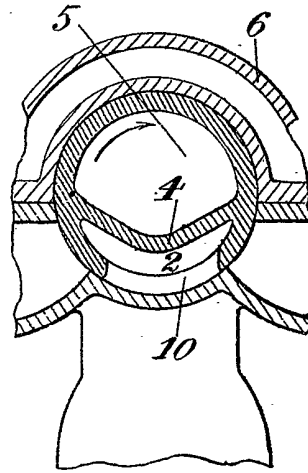


Fig. 3

