

PATENT SPECIFICATION

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275,557

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COMPLETE SPECIFICATION.

Improvements in Rotary Valves, particularly for Internal Combustion Engines.

I, CHARLES LUYCKX, of 83, rue du Canal, Louvain, Belgium, a subject of the King of the Belgians, 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:—

This invention relates to rotary valves and particularly to rotary valves adapted for use in internal combustion engines, of the type which consists of a hollow cylinder driven by the crank shaft with a suitable speed and provided with lateral ports for suction and exhaust and adapted to rotate between an inner and an outer fixed water cooled casing. It has for its object an improved rotatory valve of this type.

According to this invention, I provide a rotary valve of the type described, characterised in that the central fixed body is provided with diametral pipes adapted to connect the suction and the exhaust ports of the motor cylinders with the carburetter and exhaust passages, respectively. The casing is preferably in two parts.

Owing to this arrangement of the pipes inside the fixed valve body and of the diametral ports in the wall of the rotating valve, the latter will permit, for instance, the distribution of a four-stroke engine to be obtained by rotating the valve, at one-fourth of the speed of the crank shaft of the engine.

A circulation of cooling water is provided internally of the fixed valve body, so as to continually cool the pipes serving for the exhaust gases, while the pipes serving for the admission gases and these gases themselves are warmed by the heat of the water of circulation.

The admission ports of the valve chamber are connected on one side to the suction passage fed by the carburetter and on the other side to the admission ports of the cylinders of the engine. Similarly, the exhaust ports are connected on one side to the exhaust pipe or silencer, and on the other side to the exhaust ports of the engine.

The driving of the rotary valve by the crank shaft can be made by means of any

suitable transmission device, chain, gear, etc.

As an example, a form of construction of the valve applied to an explosion engine is represented on the appended drawings, in which:

Fig. 1 is a longitudinal section of one of the cylinders of the engine, transversely of the valve, the lower half of the casing of which is constituted by the cover of the said cylinder.

Fig. 2 is a longitudinal section of the engine, at right angles to that of Fig. 1, that is, longitudinally of the valve, the valve itself and the upper half of its casing being removed.

Fig. 3 is a longitudinal section of a valve with a casing in one piece.

In the example represented in Figs. 1 and 2, the valve casing $a^1 a^2$ is provided longitudinally above the group of the engine cylinders, the lower half a^1 being formed in the cover and the upper half a^2 being applied thereto.

The lower portion a^1 of this valve casing communicates with each cylinder by an admission port b^1 and an exhaust port c^1 . The upper portion of the same casing communicates by a port b^2 with the suction pipe f connected to the carburetter g and by a port c^2 with the exhaust pipe h .

In the valve casing $a^1 a^2$ is disposed, concentrically, the fixed tubular body i provided with vertical pipes such as $j k$ which are disposed, respectively, opposite the suction ports $b^1 b^2$ and the exhaust ports $c^1 c^2$ of the said casing.

An internal water circulation is provided longitudinally through the said fixed body.

Between the fixed body and the casing is provided an annular space in which is adapted to turn freely a cylindrical valve l driven round by the crank shaft, by any suitable transmission, with an angular speed equal to the quarter of the speed of this crank shaft for a four-stroke engine.

The valve has along its length diametrically disposed ports $m n$ which, at the required instants, put in communication each engine cylinder with the suction and the exhaust pipes.

As it has been shown in Fig. 3, the

boring of the valve casing can be slightly conical. The external surface of the fixed central body has also a certain taper in the opposite direction to that of the bore of the casing, so as to provide between the casing and the said fixed body a recess the longitudinal section of which is an elongated trapezium.

The cylindrical valve rotating between the two above mentioned members has the shape of the said recess.

Owing to the tapers so provided, the degree of looseness of the cylindrical valve with respect to the surfaces between which it rotates can be readily adjusted.

Such an adjustment can be effected, for example, by means of a resilient tightening collar of wedge-shaped section, such as *o*, resting on one side against the end of the valve casing and on the other side against a collar provided towards the end of the valve cylinder or, preferably, against the hub of the gear wheel *p* keyed on this cylinder for the purpose of driving it from the crank shaft, by means of a chain or otherwise.

Two or three washers *q* will be preferably inserted between this collar and the body of the said gear wheel to ensure the tightness of the joint.

The collar *o* may be provided, on its two faces, with teeth (not shown) adapted to engage freely in grooves provided in the end of the valve casing and in the adjacent washer so as to prevent this collar from being driven round by the rotation of the valve cylinder.

The fixed central body has at its two ends flanges *r* and *s* for connecting it with the piping of the water circulation, the flange *r* being, besides, adapted to be secured to a flange *t* provided at one end of the valve casing.

It will be understood that the valve casing can be completely independent of the cover of the engine cylinder and that it may be designed so as to be applied laterally to the group of cylinders, to fit between the said cylinders and the suction and exhaust piping.

A transverse section of a valve so constructed is shown in Fig. 4, the admission ports of the valve cylinder being shown in full lines while the exhaust ports, which are suitably out of step with respect to the admission ports, are shown dotted, as if seen by transparency.

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 rotary valve of the type described disposed longitudinally above or laterally to the head of the aligned cylinder group, so as to control simultaneously all the working cylinders, characterised in that it is provided with diametral distinct pairs of admission and exhaust ports, the central fixed body being provided with diametral parallel pipes adapted to connect the suction and the exhaust ports of the motor cylinders with the carburetter and exhaust passages, respectively.

2. A rotary valve as claimed in Claim 1, further characterised in that the valve casing and the central fixed body, are bored with a slight taper, the said tapers being in opposite directions, and that the hollow rotary valve fits into the space left between the casing and central body for the purpose of obtaining an easy adjustment and perfect tightness, by means of a resilient member or members of suitable design, bearing on the one hand against the valve casing and on the other hand against a shoulder provided at one end of the rotary valve.

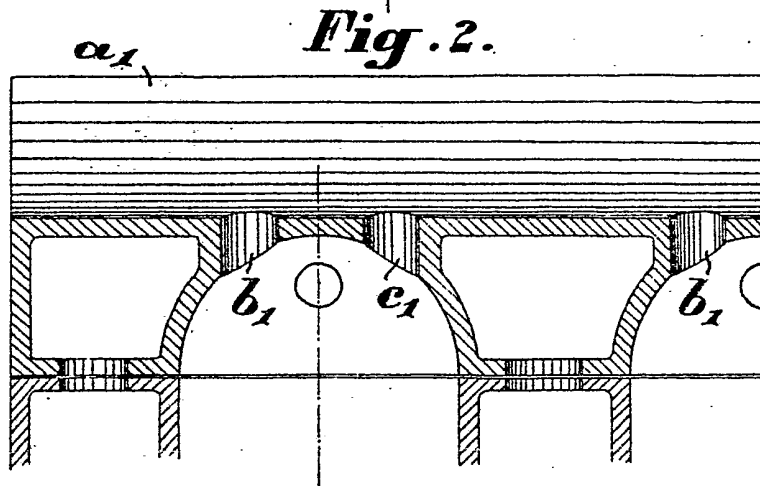
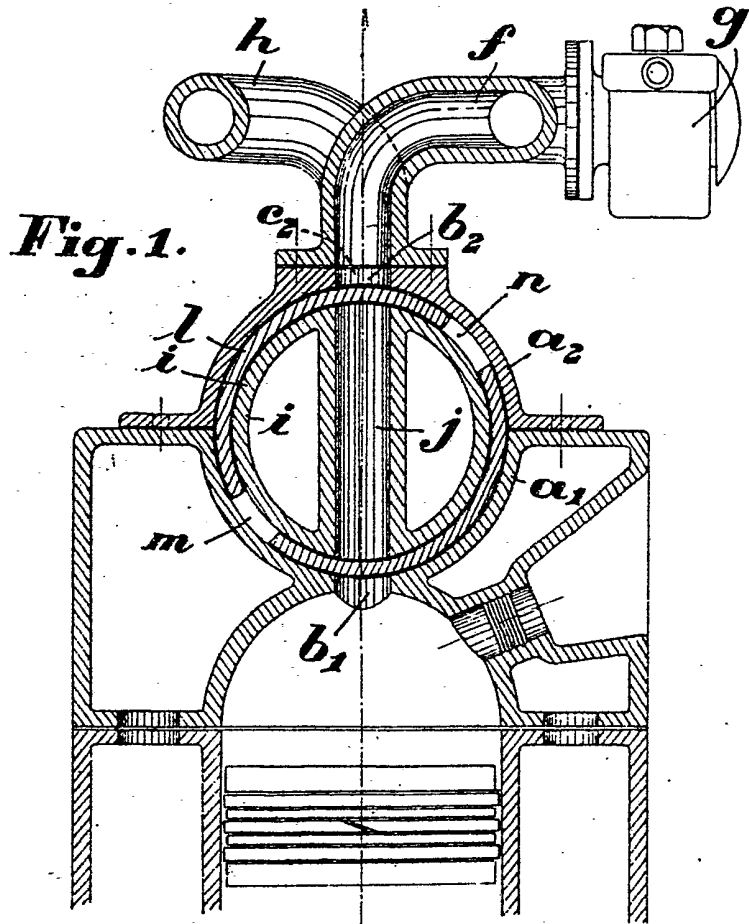
3. A rotary valve as claimed in the preceding claims, further characterised in that the valve casing is in two parts.

4. The rotary valve for internal combustion engines, substantially as described and as illustrated in the accompanying drawings.

. Dated this 1st day of April, 1927.

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Chartered Patent Agents.

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



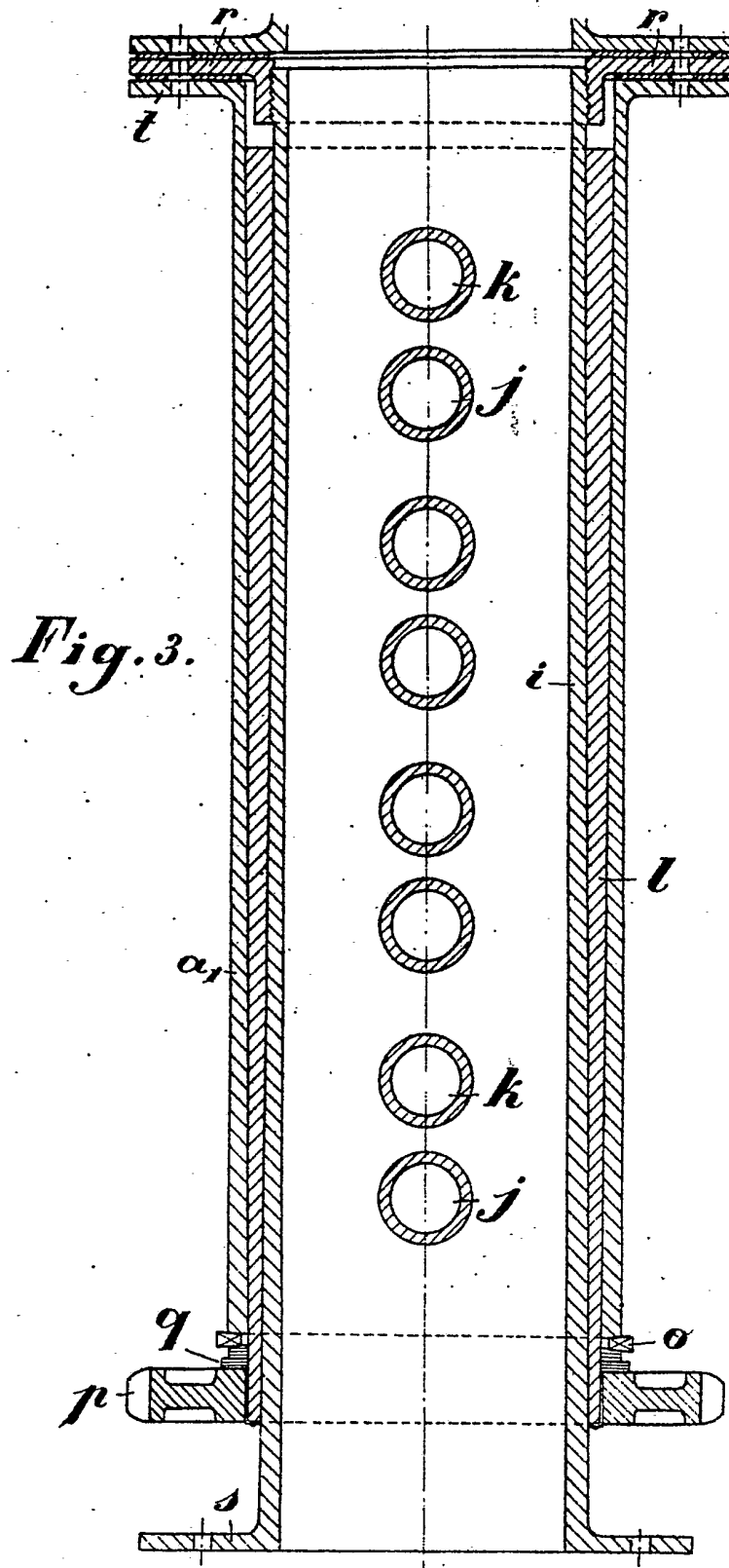


Fig. 3.

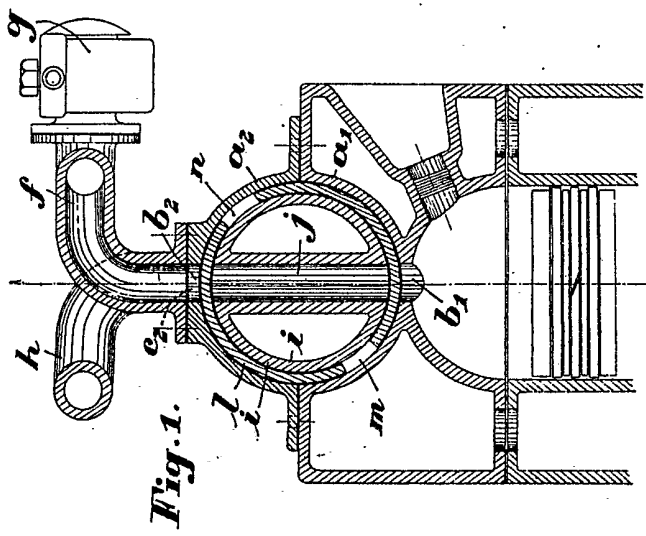


Fig. 1.

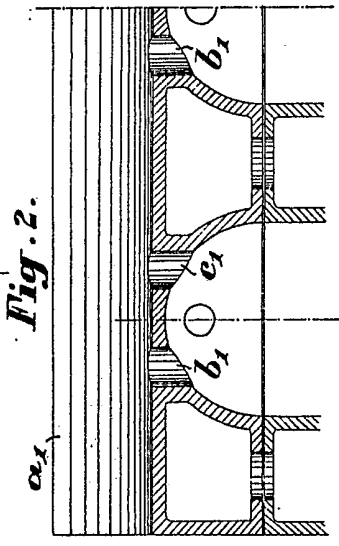


Fig. 2.

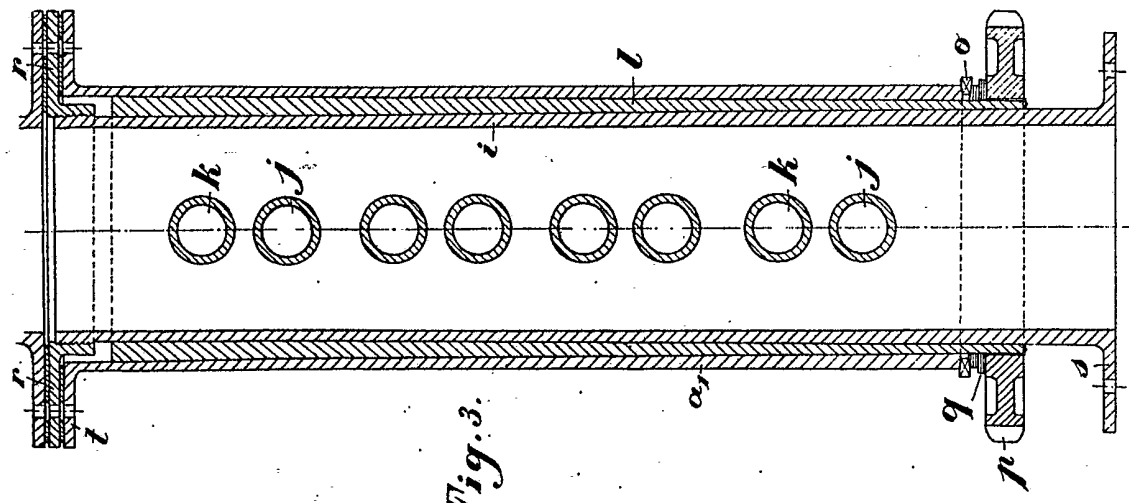
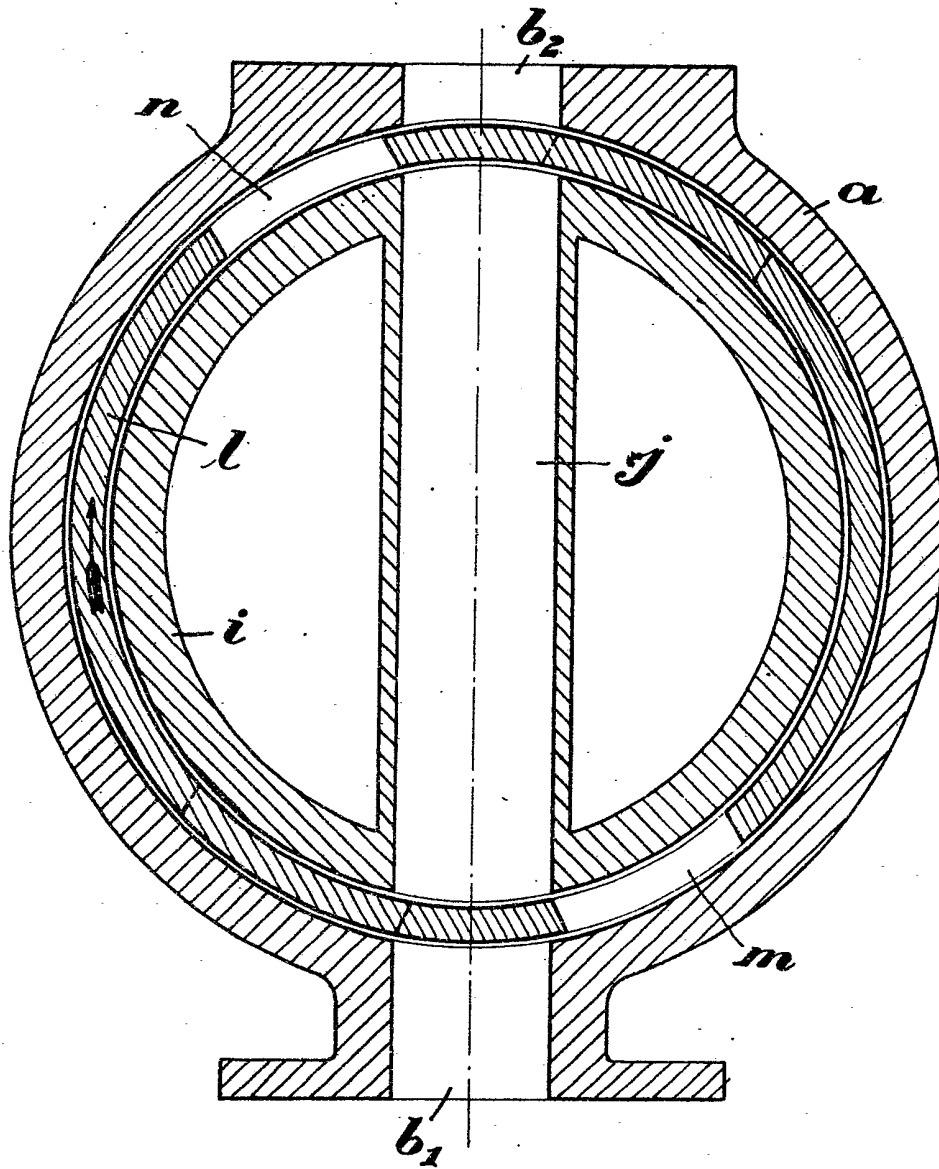


Fig. 3.

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

Fig. 4.



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