PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements in and relating to the Valve Gear of Internal Combustion Engines.

I, JOHN GODFREY PARRY THOMAS, of 29, Spring Gardens, London, S.W. 1, Engineer and British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to the valve gear of internal combustion engines its object being to obtain in effect a positively operated valve.

The speed of internal combustion engines is limited chiefly due to the fact that the closing of valves is dependent on spring operation and it is clear that if a reliable positively operated valve were used much higher engine speeds would be possible.

This invention is particularly applicable to that type of engines in which an overhead camshaft is provided with one cam per cylinder for the opening of the inlet and exhaust valves by two independent levers, a single semi-elliptic spring being disposed between the two valves and the spring centre mounted on a rocking pivot.

According to this invention a second camshaft is disposed beneath the rocking pivot, the profile of the cam on the second camshaft being such that as each valve is opened by means of the main camshaft, the rocking pivot is allowed to fall so as to maintain a constant stress in the aforesaid laminated spring. The cam on the second camshaft will then itself close each valve through the medium of the spring and provided the two cam profiles are correctly made there will be no change in stress and therefore no variation in the energy stored in the spring. It is clear therefore that instead of making the spring of a large number of thin leaves it will be possible to construct it of a small number of very much thicker leaves or even to replace the spring by a solid lever.

Dated this 15th day of March, 1923.

SEFTON-JONES, O'DELL & STEPHENS,
Patent Agents,
285, High Holborn, London, W.C. 1,
Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in and relating to the Valve Gear of Internal Combustion Engines.

I, JOHN GODFREY PARRY THOMAS, of 29, Spring Gardens, London, S.W. 1, Engineer and British subject, 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 internal combustion engines in which the inlet and exhaust valves of a cylinder are opened in proper succession by cam operated rocking levers, and are pressed toward their seatings by a laminated spring, common to them both, engaged with the valve stems at its ends and bearing upon an abutment between them.

According to the invention this abutment instead of being fixed is arranged to slide in a fixed guide under the action of a second cam. This enables a relatively stiff spring or substantially rigid lever to be employed, and so gains for this construction of engine the advantage

now commonly sought after of substantially positive closing of the valves.

The invention is illustrated in part sectional elevation in the accompanying drawing.

Only a part of a single cylinder 1 is shown, but it will be understood that the engine will usually be a multi cylinder engine. In the head 2 are inlet and exhaust valves 3, 4, held upon their seatings by a laminated spring 5, which bears on the one hand upon cotter pins 6, 7 in the valve stems, and on the other hand against an abutment 8. The valves are opened by rocking levers 9, 10 actuated by a common cam 11 on the overhead cam shaft 12.

According to the invention the abutment 8 is made movable, for instance, as shown, slidable in a guide 13; and it is oscillated in correspondence with the movements of the levers 9, 10 by a cam 14 on an auxiliary cam shaft 15.

It will be seen that the cam 14 is so shaped as to allow the spring abutment 8 to fall twice during each revolution, namely at the times when the cam 12 is operating lever 9 and lever 10 respectively. Between those times the cam 14 closes the valves by lifting the abutment 8.

By suitable design of the profile of the cams 12 and 14 variation in the stress on spring 5 may be substantially avoided. The spring need not, therefore, be made of many laminations, but may have quite thick leaves, or may even be replaced by a very slightly yielding lever. The spring ought always to be under some stress to keep the valves firmly on their seating when closed; and generally the cam 14 will be so shaped as to close the valve slightly before its part of maximum diameter contacts with the abutment upon it, the remaining motion serving to stress the spring to give a tight closure.

In the drawing the spring 5 is shown for this purpose as consisting of a thick and therefore stiff central leaf with a thinner resilient leaf 16 above it. When the spring is unstressed the extreme end of the leaf 16 bearing upon the cotter pin 6 stands up a little above the forked end of the central leaf. Under inertia force the end of spring 16 yields and the valve is accelerated and brought to its seating by the relatively stiff central lamination. It is pressed and held upon its seating by the resilience of the leaf 16.

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. In an internal combustion engine having the inlet and exhaust valves of a cylinder opened by cam operated rocking levers, and pressed toward their closed position by a common leaf spring or resilient lever having an abutment at its middle, mounting said abutment to be oscillated by another cam in timed relation with the movements of the rocking levers.

2. A construction of valve gear according to Claim 1 in which the common leaf spring or resilient lever comprises a substantially rigid portion for effecting acceleration of the valves and bringing them to their seatings and a relatively yielding portion which presses and holds the valves upon their seatings.

3. The improved construction of valve operating gear for internal combustion engines substantially as described with reference to the accompanying drawings.

Dated this 15th day of January, 1924.

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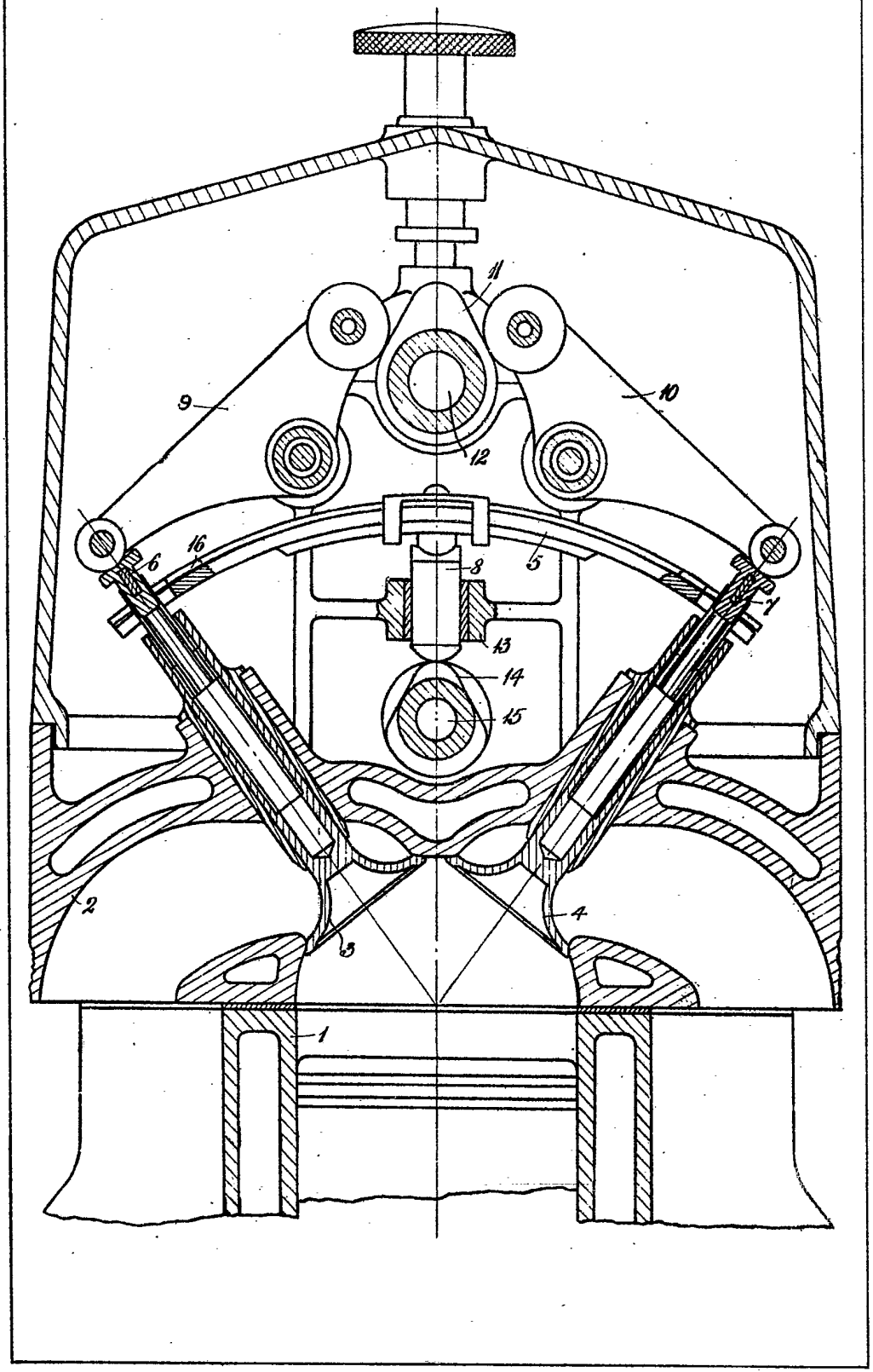

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