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 aforementioned 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 16th day of March, 1923.

SEPTON-JONES, O'DELL & STEPHENS,
Patent Agents,
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 substan-
tially 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 seat-
ings 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 abut-
ment 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 respec-
tively. Between those times the cam 14
closes the valves by lifting the abut-
ment 8.

By suitable design of the profile of the
cams 12 and 14 the 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 dia-
meter 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 laminations.
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 inven-
tion 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 resi-
lient lever having an abutment at its
middle, mounting said abutment to be
oscillated by another cam in timed rela-
tion with the movements of the rocking
levers.

2. A construction of valve gear accord-
ing to Claim 1 in which the common leaf
spring or resilient lever comprises a sub-
stantially 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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