

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements relating to Valve Gear for Internal Combustion Engines

We, NORTON MOTORS LIMITED, a British Company of Bracebridge Street, Aston, Birmingham 6, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in valve gear for internal combustion engines and relates particularly to valve gear for high speed engines of the kind in which poppet valves are positively operated in both directions.

Our invention comprises valve gear for an internal combustion engine having poppet valves positively operated in both directions, in which the valve operating mechanism incorporates no resilient elements and a valve is opened by a pusher substantially in line with the valve stem and closed by a rocker, the pusher and rocker being actuated by cams on parallel driven shafts which are geared together and the cams and rocker being in a single plane containing the axis of the valve so that couples are eliminated and stresses in the mechanism are reduced to a minimum.

This provides a very efficient and compact valve gear.

One practical arrangement of valve gear in accordance with our invention is illustrated by way of example in the accompanying drawing, which is a vertical section of the cylinder head of an overhead valve high speed engine, the section being in a plane containing the axes of the valves.

The two valves 10, 11 are inclined in opposite directions relative to the axis of the cylinders. As the operating mechanism for the two valves are identical, only one need be described.

The stem of the valve 10, which is an ordinary poppet valve having a head co-operating with an inserted seating 12 in the cylinder head 13, is guided in a tubular guide 14 mounted in the head which is of aluminium alloy.

The outer end of the valve stem is engaged by a pusher 15 guided in a sleeve 16 fixed in the cylinder head, the axis of the sleeve being offset slightly from the axis of the valve stem. The pusher is moved axially in a direction to open the valve by a cam 17 on a shaft 18 of which the axis is in the same plane as the axis of the pusher. The shaft 18 carries a gear-wheel 19 meshing with a gear-wheel 21 on a parallel shaft 22 which carries a second cam 23 complementary to the cam 17. The cam 23 acts on one arm 24 of a rocker of which the other arm 25 is bifurcated and engages a collar 26 secured on the valve stem by means of a split sleeve 27. The rocker 24, 25 is mounted by means of an eccentric bush 28 on a spindle 29, and any convenient means are provided for moving the bush angularly to adjust the position of the rocker and for locking the bush in its adjusted setting.

The gear wheels 19 carrying the closing cams 23 for the two valves mesh with a common gear wheel 31 on a parallel shaft 32 located midway between the valves and driven from the engine crankshaft in any convenient manner as for example by a chain or by a shaft and bevel gears.

The cams, rockers, and valves are all located in a common transverse vertical plane so that couples are eliminated and stresses in the mechanism are reduced to a minimum.

Our improved valve gear can be used in single cylinder engines or in engines having any number of cylinders. In a multi-cylinder engine having the cylinders in line, the corresponding cams for the valves of all the cylinders may be mounted on common camshafts parallel to the engine crankshaft.

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WHAT WE CLAIM IS:—

1. Valve gear for an internal combustion engine having poppet valves positively operated in both directions, in which the valve operating mechanism incorporates no resilient elements and a valve is opened by a pusher substantially in line with the valve stem and closed by a rocker, the pusher and rocker being actuated by cams on parallel driven shafts which are geared together, and the cams and rocker being in a single plane containing the axis of the valve so that couples are eliminated and stresses in the mechanism are reduced to a minimum.
2. Valve gear for an overhead valve engine

having opposed inclined valves each operated by mechanism as claimed in Claim 1, in which gear wheels on the shafts of the second cams mesh with a common gear wheel on a parallel shaft located between the valves and driven from the engine crankshaft.

3. Valve gear for an internal combustion engine having poppet valves positively operated in both directions substantially as described with reference to the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements relating to Valve Gear for Internal Combustion Engines

We, NORTON MOTORS LIMITED, a British Company, of Bracebridge Street, Aston, Birmingham 6, do hereby declare this invention to be described in the following statement:—

- This invention relates to improvements in valve gear for internal combustion engines and relates particularly to valve gear for high speed engines of the kind in which poppet valves are positively operated in both directions.

- According to our invention, a poppet valve is opened and closed by cams on parallel driven shafts which are geared together, one cam operating the valve through a rocker pivoting about an adjustable axis, and the cams rocker and valve being located in a single plane so that couples are eliminated and stresses in the mechanism are reduced to a minimum.

- This provides a very efficient and compact valve gear.

In one preferred practical arrangement the cam by which the valve is opened is mounted on a spindle of which the axis is at right

angles to and in the same plane as or slightly offset from the axis of the valve. The cam operates the valve through a guided pusher interposed between the cam and the end of the valve stem. The spindle of the cam carries a gear-wheel meshing with a similar gear on a parallel spindle which carries a second cam acting on one arm of a rocker of which the other arm is bifurcated and engages a collar on the valve stem for closing the valve. The rocker is mounted on an eccentric bush or equivalent means providing adjustment.

In an overhead valve engine having oppositely inclined valves the gear wheels on the spindles of the second cams may mesh with and be driven by a common gear wheel on a parallel shaft located midway between the valves and driven from the engine crankshaft in any convenient manner.

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