July 2, 1929. J. H. BOOTH ET AL 1,719,388

VALVE AND VALVE ACTUATING MECHANISM OF TWO-STROKE CYCLE INTERNAL COMBUSTION ENGINES

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Fig. 1.

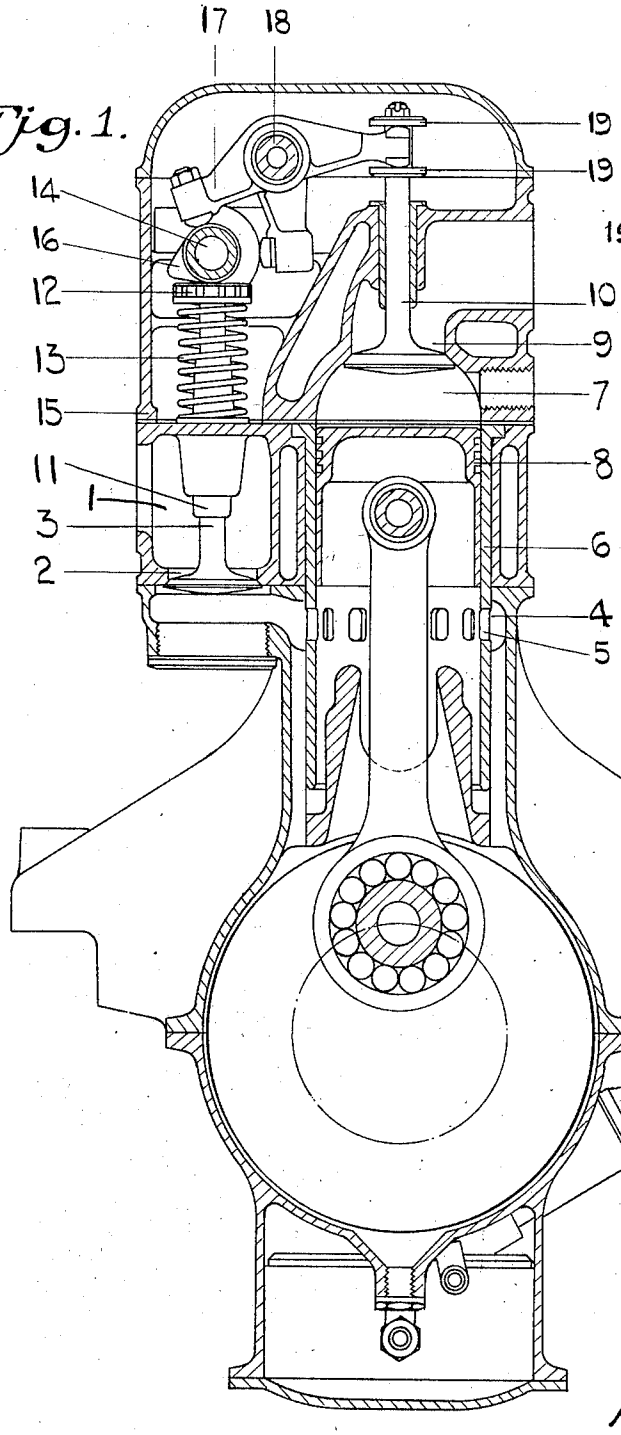
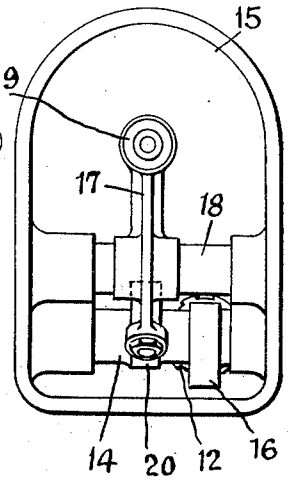


Fig. 3.



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Fig. 2.

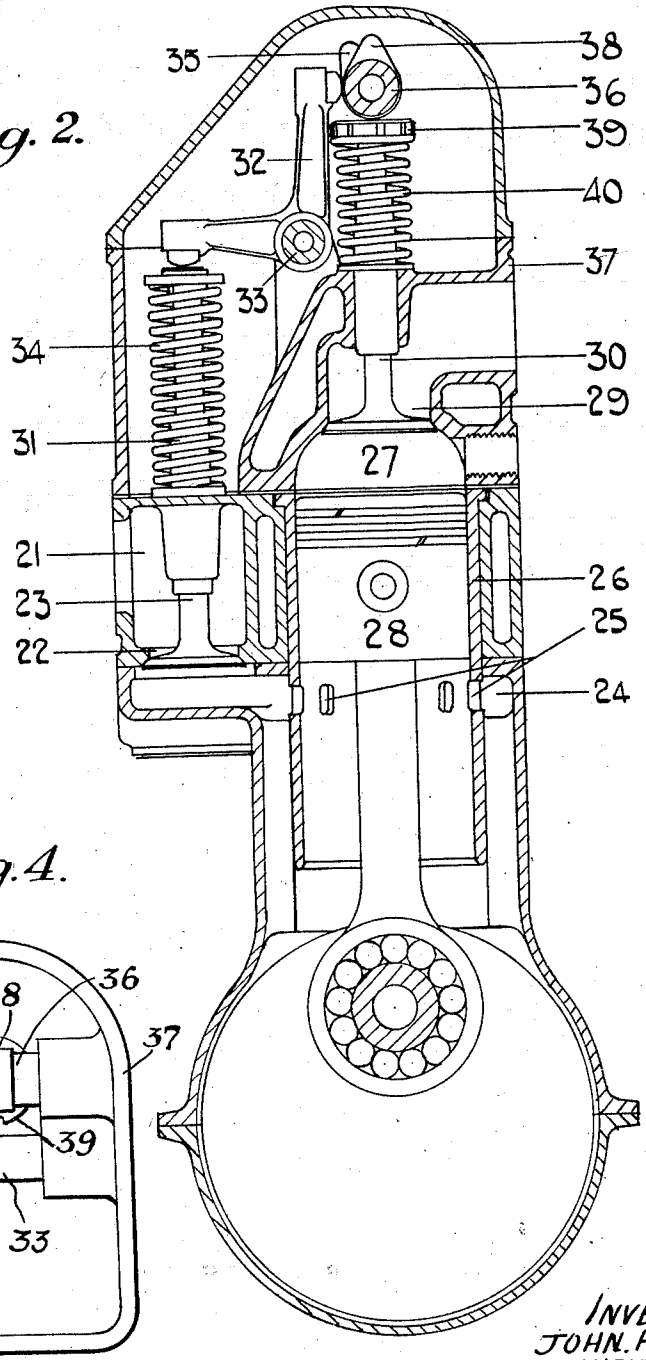
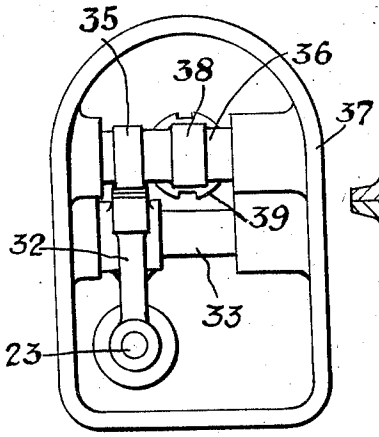


Fig. 4.



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UNITED STATES PATENT OFFICE.

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VALVE AND VALVE-ACTUATING MECHANISM OF TWO-STROKE CYCLE INTERNAL-COMBUSTION ENGINES.

Application filed July 12, 1927, Serial No. 205,201, and in Great Britain July 12, 1926.

The invention relates to internal combustion engines working on the two-stroke cycle in which charge is admitted to the combustion chamber through ports in the cylinder wall controlled by the engine piston, and in which access for the charge to the port or ports is through a further port controlled by a mechanically operated valve, and in which burnt charge is exhausted through a port in the combustion chamber head controlled by a mechanically operated valve.

In such engines the invention provides for the disposal of the valves, valve operating members, and the cams, in such a manner that a neat, economical and efficient engine arrangement is obtained, one cam shaft only being used for the operation of inlet and exhaust valves and the use of push rods being eliminated.

The invention comprises primarily an exhaust valve (or valves) in the head of each cylinder, the valve stem passing upwards through the cylinder roof: a valve (or valves) situated in a gas passage to control communication between a carburetor and a chamber either below or above the top of each piston and of which chamber the piston top forms either the roof or the floor, this valve stem also passing upwards through the roof of the gas passage; a cam shaft the axis of which is parallel with the crank shaft axis revolving above the end of this inlet valve stem, a cam on which engages directly or through a tappet or through a rocking arm with a contact piece on the end of the inlet valve; and a rocking lever pivoted parallel with and above the axis of the cam shaft engaging at its one end with a cam on the cam shaft and at its other end either directly or through a tappet with the exhaust valve stem.

With the valves arranged as described the invention provides for an alternative disposal of the cam shaft, which may be arranged to revolve on an axis parallel with that of the crank shaft as before but above the top of the exhaust valve stem, the cam engaging directly or through a tappet with a contact piece or similar suitable member on the exhaust valve stem; the inlet valve being operated by a rocking lever pivoted parallel with and either above or below the axis of the cam shaft, engaging directly or through a tappet with said inlet valve.

The accompanying drawings illustrate the invention:

Fig. 1 is a cross sectional end elevation of an engine in which the cam shaft revolves above the end of the inlet valve.

Fig. 2 is a sectional end elevation of an engine in which the cam shaft revolves above the end of the exhaust valve.

Figure 3 is a part top plan view of the engine as shown in Figure 1.

Figure 4 is a part top plan view of the engine as shown in Figure 2.

In Figs. 1 and 3, 1 is an inlet passage for charge, 2 is an inlet port controlled by the valve 3, 4 is a chamber surrounding ports 5 in the cylinder liner 6, these ports opening and closing the chamber 4 to the combustion chamber 7 by means of the engine piston 8. In the head of the combustion chamber is a port 9 controlled by the exhaust valve 10 for the exit of burnt charge. The valves 3 and 10 are mechanically operated to work in timed relation to the piston 8.

The valve 3 guided in the bush 11 has the adjustable contact piece 12 secured to the end of its stem. Spring 13 functions as an agent for returning and holding the valve to its seat. The cam shaft 14 borne in the cylinder head casting 15 carries a cam 16 which contacts with contact piece 12 and operates valve 3.

The cam shaft 14 also carries a cam 20 (see Fig. 3) for the operation of rocking lever 17 pivoted on shaft 18 and operating valve 10 by engaging between flanges 19 secured to the stem of valve 10.

In Figs. 2 and 4, 21 is an inlet gas passage for charge, 22 is an inlet port controlled by the valve 23; 24 is a chamber surrounding ports 25 in the cylinder liner 26, these ports opening and closing the chamber 24 to the combustion chamber 27 by means of the engine piston 28. In the head of the combustion chamber is a port 29 controlled by exhaust valve 30 for the exit of burnt charge. The valves 23 and 30 are mechanically operated to work in timed relation to the piston 28. The valve 23 guided in bush 31 is operated by rocking lever 32 pivoted on shaft 33 contact-

ing with its end. The spring 34 functions as an agent for returning and holding the valve to its seat. Rocking lever 32 is operated by cam 35 on cam shaft 36 borne in the cylinder head 37.

Also on cam shaft 36 is cam 38 operating the valve 30 through adjustable contact piece 39 secured to the end of the valve stem. The spring 40 acts as an agent for returning and holding the valve to its seat.

We claim:

1. In a two-stroke cycle internal combustion engine of the type in which charge is admitted to the combustion chamber through a port or ports in the cylinder wall controlled by the engine piston, and in which access to the port or ports is through a further port controlled by a mechanically operated inlet valve, and in which burnt charge is exhausted through a port in the combustion chamber roof controlled by a mechanically operated exhaust valve and in which the stems of these two said valves project in guides through the roofs of a gas passage and the combustion chamber respectively substantially in the same direction and substantially parallel, an actuating cam revolving at right angles to the axes of the valves and over the end of the inlet valve stem, an inlet valve operated thereby, a second cam co-axial with the first cam, a pivoted rocking lever operated by this second cam, an exhaust valve operated by this rocking lever.

2. In a two-stroke cycle internal combustion engine of the type described and with valves disposed as described in claim 1, an actuating cam revolving at right angles to the axes of the valves and over the end of the exhaust valve stem, an exhaust valve operated thereby, a second cam co-axial with the first cam, a pivoted rocking lever operated by this second cam, an inlet valve operated by this rocking lever.

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