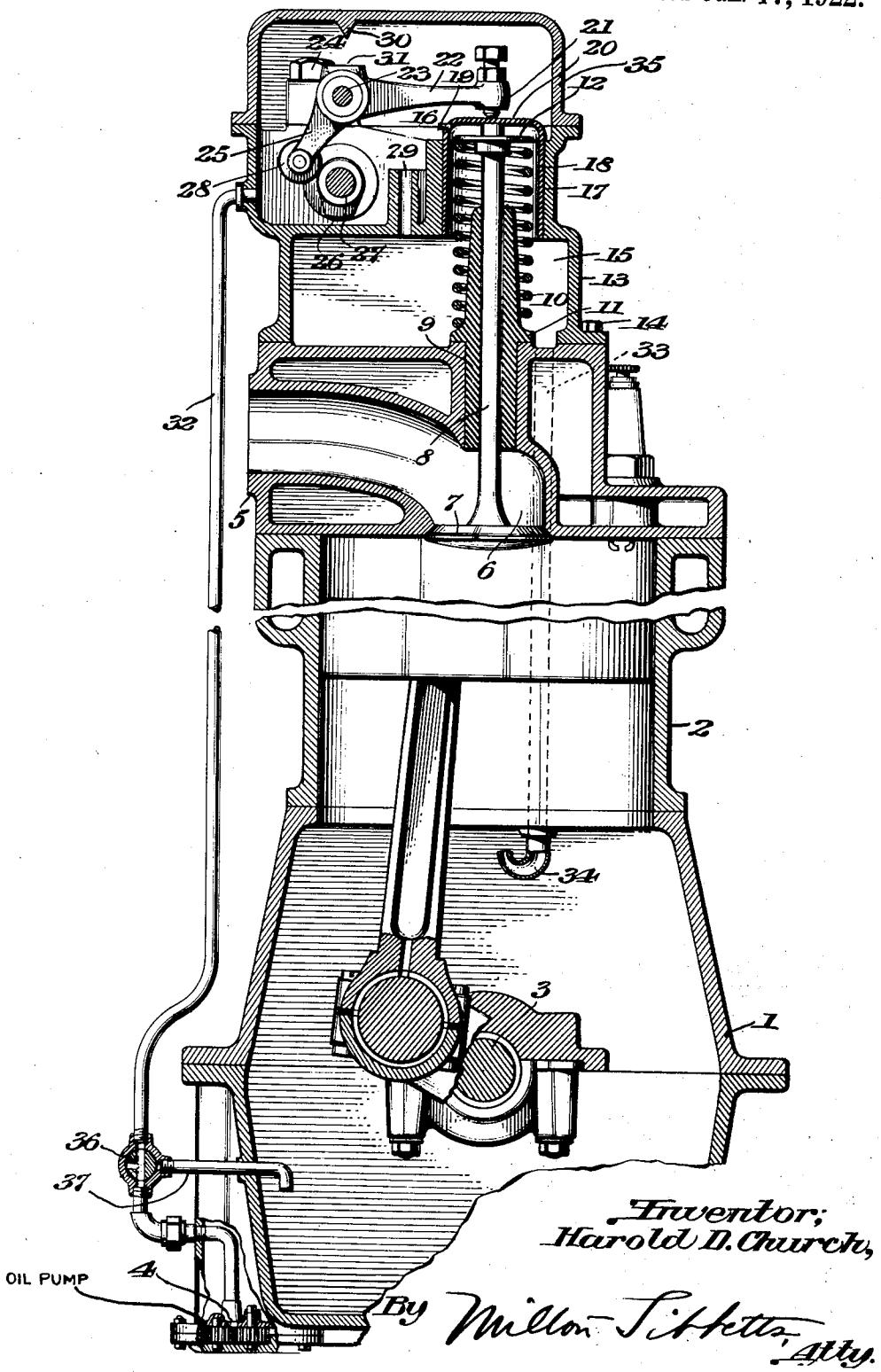
H. D. CHURCH.

HYDROCARBON MOTOR.

APPLICATION FILED MAR. 22, 1918.

1,403,540. Patented Jan. 17, 1922.



Inventor;
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UNITED STATES PATENT OFFICE.

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HYDROCARBON MOTOR.

1,403,540. Specification of Letters Patent. Patented Jan. 17, 1922.

Application filed March 22, 1918. Serial No. 223,950.

To all whom it may concern:

Be it known that I, HAROLD D. CHURCH, a citizen of the United States, and resident of Detroit, Wayne County, State of Michigan, have invented certain new and useful Improvements in Hydrocarbon Motors, of which the following is a specification.

This invention relates to hydrocarbon motors and particularly to valve mechanism therefor.

One of the objects of the invention is to provide a hydrocarbon motor with a system of lubrication of the valve mechanism that will insure the various moving parts running in oil, while preventing oil from leaking around the valve stems into the combustion chamber.

Another object of the invention is to provide an overhead valve mechanism in which the cam shaft will operate in a bath of oil without at the same time flooding the valve stem.

Another object of the invention is to provide a valve operating mechanism that may be separately assembled, except as to the valve spring, and placed upon the motor and there adjusted.

Other objects of the invention will appear from the following description taken in connection with the drawings which form a part of this specification, and in which the figure is a transverse vertical section through a hydrocarbon motor embodying the invention.

Referring to the drawing, 1 is the base or crank case of a hydrocarbon motor and 2 is a cylinder or cylinder block mounted thereon. A crank shaft 3 is mounted in suitable bearings in the crank case and is connected through gearing to operate an oil pump 4.

The upper end of the cylinder or cylinder block 2 is shown as formed with a detachable head 5 and a series of valves, one only of which is shown in the drawing, are mounted in the head to control the inlet and exhaust ports of the motor. One of these ports is shown at 6 and one of the valves at 7, and it will be understood that there are two such ports and valves for each cylinder, it being immaterial whether the port and valve shown are for inlet or exhaust, so far as this invention is concerned. The details of the valve mechanism will be described in connection with one valve only.

The valve 7 has its stem 8 operating in a guide 9 and both the stem and the guide extend upwardly above the upper surface of the head 5. A valve spring 10 arranged between a flange 11 on the guide 9 and a washer 12 at the upper end of the valve stem, yieldingly retains the valve 7 against its seat to close the port 6.

A casing 13 is arranged over the valve and is detachably secured to the cylinder head as by the bolts 14. This casing principally comprises two compartments 15 and 16, the former of which may be termed a valve stem compartment and the latter a cam shaft compartment. The valve stem compartment surrounds the upper end of the valve stem and the latter extends upwardly through an opening or passage 17 formed in the partition between the two compartments. The walls of this passage 17 form a guideway for a sleeve 18 which surrounds the upper end of the valve stem 8 and is provided with a pin 19 adjacent its upper end to prevent the sleeve from dropping out of its guideway when the casing is removed from the motor. The upper end of the sleeve 18 is closed by a substantially flat wall 20 which rests against the extreme upper end of the valve stem, and a bolt 21 in a rock arm 22 rests against the upper side of the wall 20 to thereby operate the valve. The rock arm 22 is mounted on a bearing shaft 23 supported in the casing 13, and in fact detachably supported therein as by the bolt 24, and it is operated by another arm 25 which is rocked by a cam 26 on a cam shaft 27 mounted in suitable bearings in the upper compartment of the casing 13. The cam shaft 27 is preferably located in the lower part of the upper compartment 16 and the opening or passage 17 is so formed in the casing that the upper end thereof is somewhat above the cam shaft so that any oil that might leak through the passage 17 past the sleeve 18 would not cause a lowering of the oil level in the upper compartment to a point beyond the cam shaft. In fact provision is made for retaining the oil level in the upper compartment somewhat above the center of the cam shaft so that a roller 28 mounted on the end of the arm 25 will run in a bath of oil against the cam shaft 27. Thus a conduit 29 extends through the partition between the compartments 15 and 16 with its upper or inlet end slightly above the center of the cam shaft 27. This causes

the oil fed to the compartment 16 to drain into the compartment 15 without flooding the bearing of the sleeve 18, while at the same time sufficient oil mist is stirred up in the compartment 16 to lubricate the other bearing parts therein. Some of this mist may be collected by the upper wall of the compartment and caused by the lug 30 to drop down into an oil pocket 31 in the rock arm 22 above its bearing on the bearing shaft 23.

Oil may be constantly fed to the upper compartment 16 as by the pump 4, above referred to, and a pipe 32 leading therefrom to said compartment. Also one or more conduits 33 may be provided leading from the valve stem compartment 15 to the crank case 1. The lower end 34 of this conduit 33 is preferably U-shaped, as shown in the drawing, to form a trap and prevent oil mist in the crank case from rising through the conduit into the valve stem compartment 15.

From the above description it will be seen that the entire valve operating mechanism, except the spring 10, may be assembled in the casing 13 separately from the motor and the assembly may then be applied to the motor and the bolt 21 adjusted relatively to the valve stem. This latter adjustment is permitted by removal of a detachable cover 35 which forms the upper part of the casing 13, and a three-way valve 36 and bypass 37 permit the oil from the pump 4 to be temporarily fed back into the crank case without going to the casing 13. Otherwise the constant flow of oil into the compartment 16 would make it difficult to effect the required adjustment.

It will be understood that various modifications may be made within the scope of the claims without departing from the spirit of the invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a hydrocarbon motor, in combination, a crank case, a cylinder thereon, a valve having its stem extending upwardly above the cylinder, a casing over said valve stem and comprising two compartments separated by a partition, a cam shaft in one of said compartments positioned below and at one side of said valve stem, means for feeding oil to the cam shaft compartment, and means extending through said partition for operating said valve from said cam shaft.

2. In a hydrocarbon motor, in combination, a crank case, a cylinder thereon, a valve having its stem extending upwardly above the cylinder, a casing over said valve stem and comprising two compartments separated by a partition, a cam shaft in one of said compartments, means extending through said partition for operating said valve from said cam shaft, means for feeding oil from the crank case to the cam shaft compartment, an outlet from said compartment to the other compartment disposed below the valve operating means extending through the partition, and means for draining the oil from the latter said compartment to the crank case.

3. In a hydrocarbon motor, in combination, a cylinder head, a poppet valve mounted therein and having its stem extending upwardly therethrough, a casing secured to the cylinder head and having a valve stem compartment and a cam shaft compartment, said casing having an oil outlet from the cam shaft compartment above the bottom of said compartment and a valve stem opening above said oil outlet, a cam shaft arranged in the cam shaft compartment below said oil outlet, and means independent of said oil outlet for operating said valve from said cam shaft.

4. In a hydrocarbon motor, in combination, a cylinder head, a poppet valve mounted therein and having its stem extending upwardly therethrough, a casing secured to the cylinder head and having a valve stem compartment and a cam shaft compartment, said casing having an oil outlet from the cam shaft compartment to the valve stem compartment above the bottom of said cam shaft compartment, a cam shaft arranged in the cam shaft compartment below said oil outlet, and means independent of said oil outlet for operating said valve from said cam shaft.

5. In a hydrocarbon motor, in combination, a cylinder head, a poppet valve mounted therein and having its stem extending upwardly therethrough, a casing secured to the cylinder head and having a valve stem compartment and a cam shaft compartment, said casing having an opening between said compartments through which the valve is operated and having an oil conduit between the compartments independent of said opening, and a cam shaft in the cam shaft compartment, the inlet end of said oil conduit being above the center of said cam shaft and below the upper end of said opening.

6. In a hydrocarbon motor, in combination, a cylinder head, a valve having a stem extending upwardly therethrough, a casing secured to said head and comprising a valve stem compartment and a cam shaft compartment, means including a sleeve surrounding the upper end of said valve stem for operating the valve from said shaft, means for feeding oil to said cam shaft compartment, and oil outlet means located below the upper end of said sleeve.

In testimony whereof I affix my signature.

HAROLD D. CHURCH.