Jan. 16, 1923. 1,442,698

V. W. PAGÉ.
INTERNAL COMBUSTION MOTOR VALVE.
ORIGINAL FILED MAY 6, 1921.

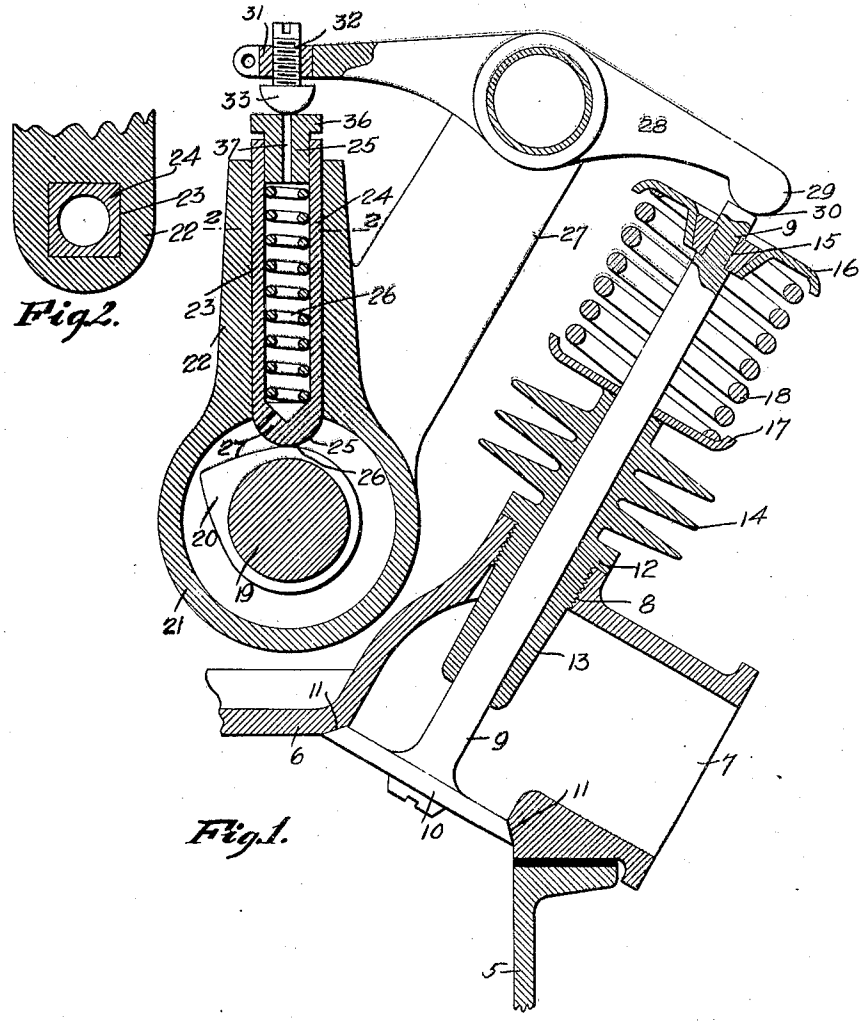


Fig. 2.

Fig. 1.

WITNESSES
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INTERNAL-COMBUSTION-MOTOR VALVE.

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To all whom it may concern:

Be it known that I, VICTOR W. PAGÉ, a citizen of the United States, and a resident of the city of New York, Kew Gardens, borough of Queens, in the county of Queens and State of New York, have invented a new and Improved Internal-Combustion-Motor Valve, of which the following is a full, clear, and exact description.

The present invention relates to new and useful improvements in internal combustion motors, and it pertains more particularly to a valve mechanism therefor.

It is one of the objects of the invention to provide a new and improved valve mechanism of the overhead type especially adapted for use in connection with air-cooled motors.

It is a further object of the invention to provide an adjustable mechanism by means of which the throw of the valve may be varied.

It is a further object of the invention to so construct a mechanism of this character that the valve stem may be properly cooled during the operation of the motor.

It is a further object of the invention to provide a valve-controlling mechanism in which the noise incident to the operation of the same is greatly reduced.

It is a still further object of the invention to provide a valve mechanism in which certain of the parts will be thoroughly lubricated at all times.

Referring to the drawings—

Figure 1 is a sectional view of the upper portion of a motor cylinder showing the cam shaft, cam shaft housing, and valve structure in section;

Fig. 2 is a detail sectional view of a portion of the cam shaft housing, taken on the line 2—2 of Fig. 1.

Referring more particularly to the drawings, the reference character 5 designates one of the cylinders of a motor and 6 designates the cylinder head. This head 6 is formed with a passage 7, which for the sake of illustration, will be referred to hereinafter as the passage of an intake valve, it being understood that exhaust valves may be constructed in a similar manner to that described in this case and the invention is not limited to intake valves alone. The intake valve passage 7 is provided in one of its walls with a screw-threaded recess 8, and mounted in said recess 8 and having screw-threaded engagement therewith, is a valve guide 12. This valve guide 12 comprises a tubular member which projects inwardly into the passage 7 as indicated by the reference character 13, and that part lying exteriorly of the intake passage 7 is provided with a plurality of heat radiating vanes 14.

Mounted for sliding movement in the valve guide 12, is the stem 9 of a valve 10, and the head of said valve 10 is formed with an angular face adapted for engagement with an angular face 11 formed in the head 6, which last-mentioned angular face forms a seat for the valve head 10.

Secured to the outer end of the valve stem 9, as at 15, is a washer 16, and resting upon the outer end of the valve stem guide 12, is a washer 17. Interposed between the washers 16 and 17, is a coil spring 18, and said coil spring 18 serves to maintain the valve 10 in engagement with its seat 11 under normal conditions.

The reference character 19 designates the cam shaft and 20 designates one of the cams thereof. This cam shaft is suitably supported within a cam shaft housing 21, and said cam shaft housing is provided with a vertical tubular integral extension 22. The passage 23 of this tubular extension 22 is preferably rectangular in form as more clearly indicated in Fig. 2, and slidably mounted in said passage is a tubular member 24. The lower end of this tubular member 24 is rounded as at 25, and is adapted to contact as at 26, with the working face of the cam 20. Passing through the lower end of this tubular member 24, is an opening 27, and said opening establishes communication between the interior of the cam shaft housing 21 and the tubular member 24.

Slidably mounted in the upper end of the tubular member 24, is a resiliently mounted block or shoe 25, and interposed between the lower end of said block or shoe 25 and the bottom of the tubular member 24, is a coil spring 26.

The reference character 27 designates a bracket carried by the cam shaft housing 21 or the cylinder head 6 and mounted in said bracket 27 in such a manner as to oscillate with respect thereto is a rocker arm 28. One end of this rocker arm 28 is provided with a head 29, and said head has a curved face 30 adapted for engagement with the outer end of the valve stem 9. The opposite

end 31 of this rocker arm 28 is disposed over the resiliently mounted block or shoe 25, and adjustably carried by the end 31 of the rocker arm 28, is a bolt or the like 32, the head 33 of which is adapted at all times to engage the block or shoe 25 through the medium of the coil spring 26, which forces the block or shoe 25 into contact with the head 33 of the bolt 32.

The block or shoe 25 heretofore mentioned is provided with a flange 36 and said flange 36 is adapted to engage with the upper marginal edge of the tubular member 24 as said tubular member is moved longitudinally of the recess 23 of the tubular extension 22. This block is further provided with a centrally-disposed passage 37, the purpose of which will be hereinafter described.

The device operates in the following manner:

With the parts in the position shown in Fig. 1, the valve is closed. As the cam shaft rotates, the cam 20 engages the lower curved end of the tubular member 24 and raises the same. As this tubular member 24 rises, the coil spring 26 is placed under compression and the compression of this spring serves as a cushion between the cam 20 and the head 33 of the bolt 32 carried by the rocker arm 28. Upon further rising of the tubular member 24, its upper marginal edge will engage the flange 36 of the block or shoe 25, at which time the positive connection is established between the cam 20 and the block or shoe 25. Upon further rotation of the cam and further rising of the tubular member 24, the rocker arm 28 will be moved about its pivotal support and the end 29 thereof is caused to move the valve stem 9 longitudinally of the guide member 12 against the influence of the spring 18, to unseat the valve 10 and permit of ingress to and egress from the motor. As the cam 20 passes the curved end 25 of the tubular member 24, the tubular member 24 drops and under the influence of the spring 18, the valve 10 is returned to engagement with the seat 11, thus closing the passage 7. Owing to the high speed at which the cam shaft 19 rotates, the cam 20 in its wiping engagement with the lower curved end 25 of the tubular member 24, will constantly introduce oil to the interior of the tubular member 24, through the passage 27, it being understood that the cam shaft 20 operates more or less submerged in the cam shaft housing 21. As this cam continuously feeds lubricant to the tubular member 24, said lubricant rises therein, and through the medium of the passage 37, will be presented to the head 33 of the bolt 32, at its point of contact with the block or shoe 25. Due to the contraction of the guide member 12, which latter is provided with its heat-radiating vanes 14, the valve stem and its guide will at all times be sufficiently cooled to permit of perfect operation, and owing to the interposition of the radiating vanes 14 between the cylinder head 6 and the spring 18, said spring is prevented from overheating and consequent deleterious results therefrom avoided.

Owing to the threaded engagement of the screw 32 with the rocker arm 28 adjustment of the throw of the valve is obtained, and owing to the resilient connection between the head 33 of the screw 32 and the tubular member 24, ample provision is made for expansion and contraction of the several parts under operating conditions.

While in the present instance but one valve mechanism has been described, it is understood that the number of mechanisms employed is dependent only upon the number of valves required for the particular type of motor used.

I claim:

1. In combination with a motor valve and a rocker arm for operating the same, a cam shaft, a cam shaft housing provided with tubular extensions, the passage of which is of rectangular form, a reciprocating rectangular tubular member mounted in said extensions, a shoe mounted in said tubular member, a spring interposed between said shoe and the bottom of the tubular member, means carried by the rocker arm for engagement with said shoe whereby movement of the tubular member under the influence of its respective cam causes a movement of the rocker arm to operate the valve, and means whereby said reciprocating member and said shoe are automatically lubricated from the cam shaft housing.

2. In combination with a motor valve and a rocker arm for operating the same, a cam shaft, a cam shaft housing provided with tubular extensions, the passage of which is of rectangular form, a reciprocating rectangular tubular member mounted in said extensions, a shoe mounted in said tubular member, a spring interposed between said shoe and the bottom of said tubular member, means carried by the rocker arm for engagement with said shoe whereby movement of the tubular member under the influence of its respective cam causes a movement of the rocker arm to operate the valve, and means whereby said reciprocating tubular member and shoe are automatically lubricated from the cam shaft or housing, said lubricating means comprising a passage formed in the lower end of the reciprocating member in the path of the cam and a passage extending through said shoe.

3. In a device of the character described, a cam shaft, a cam shaft housing, a rocker arm, a tubular member carried by the cam shaft housing and having an opening in its lower end adapted to permit of the passage

of lubricant from the interior of the cam shaft housing to the interior of the tubular member, and a shoe carried by the tubular member and in engagement with the rocker arm, said shoe having a passage to permit of the flow of lubricant from the tubular member to its point of contact with the rocker arm, substantially as described.

4. A valve operating mechanism comprising a cam shaft, a cam shaft housing, a tubular extension projecting from the cam shaft housing, tubular means reciprocatively mounted in said tubular extension, a rocker arm, means carried by the tubular extension for engagement with the rocker arm, and means for introducing lubricant to the point of contact between the rocker arm and the means with which it is engaged through the medium of the tubular member mounted in the tubular extension of the cam shaft housing.

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