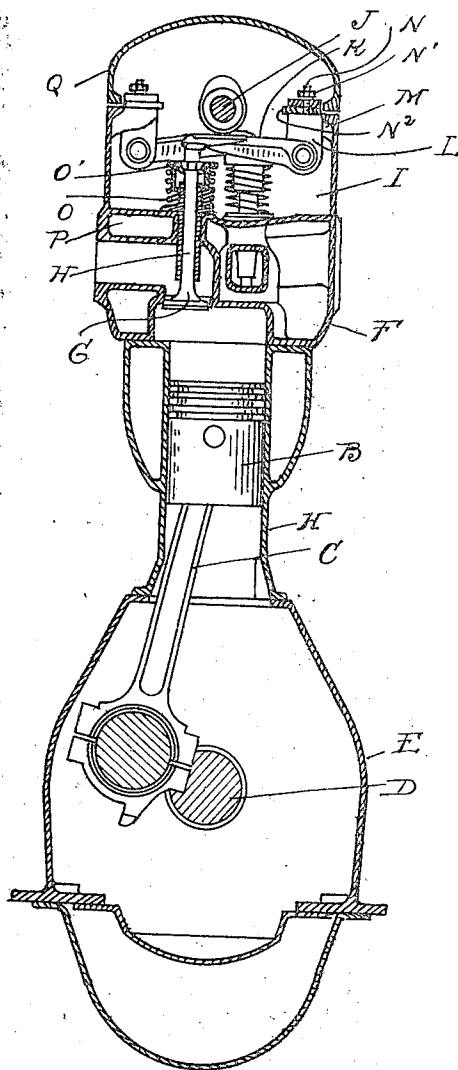


1,165,858.

G. W. DUNHAM.
EXPLOSION ENGINE.
APPLICATION FILED AUG. 7, 1914.

Patented Dec. 28, 1915.
2 SHEETS—SHEET 1.

Fig. 1.



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Fig. 2.

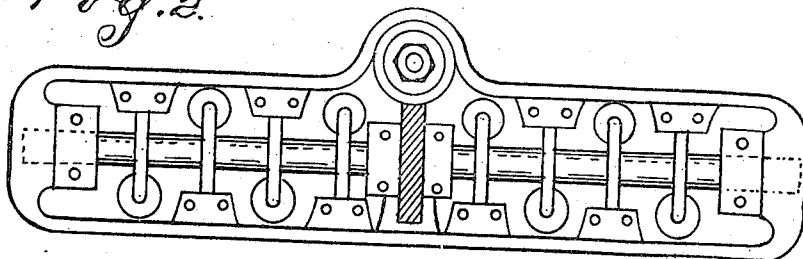
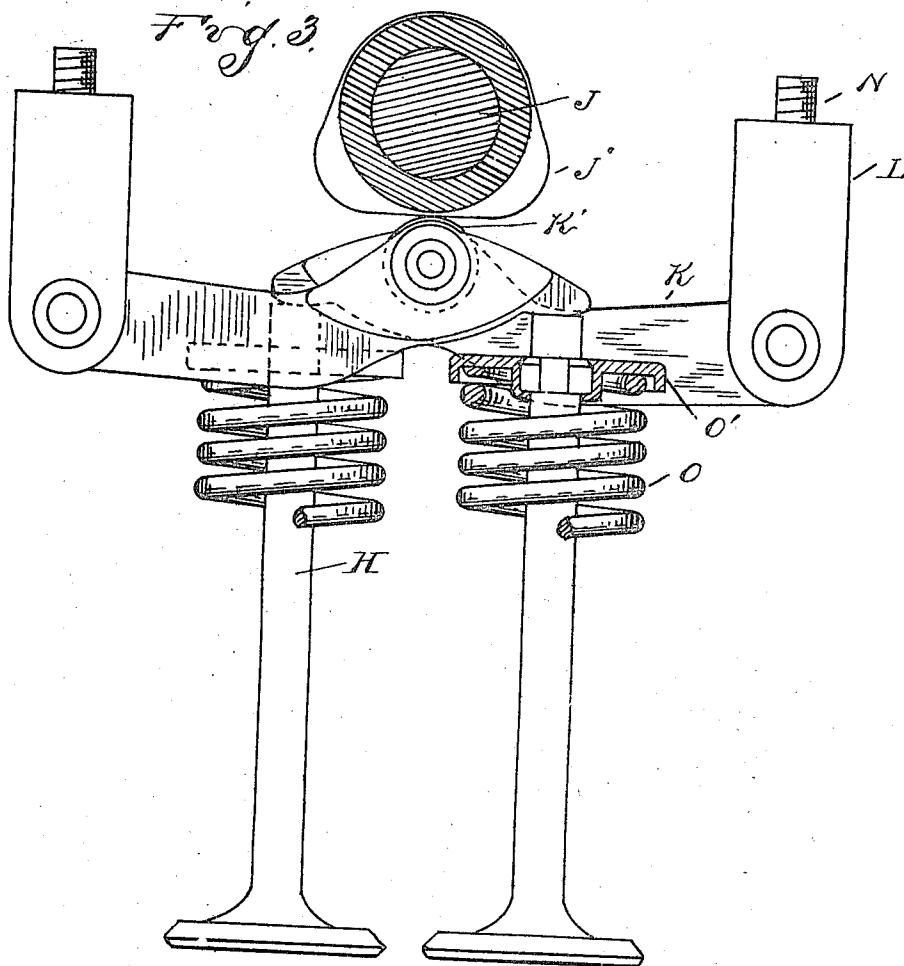


Fig. 3.



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EXPLOSION-ENGINE.

1,165,858.

Specification of Letters Patent.

Patented Dec. 28, 1915.

Application filed August 7, 1914. Serial No. 855,609.

To all whom it may concern:

Be it known that I, GEORGE W. DUNHAM, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Explosion-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to explosion engines and has particular reference to the construction and arrangement of the valve operating mechanism therefor.

In the drawings: Figure 1 is a cross section in the plane of one of the cylinders; Fig. 2 is a plan view of the head showing the valve mechanism arranged therein; and Fig. 3 shows a slightly modified construction.

A are the cylinders of a multi-cylinder explosion engine preferably of the mono-block type, B is the piston, C the pitman, D the crank and E the crank case; all of any suitable construction. The cylinder A is formed with an open end, and is provided with a detachable head F having the inlet and exhaust ports therein and the valves for controlling said ports. These valves G are preferably of the puppet type, having outwardly-extending shanks H, and preferably arranged in staggered relation to each other on opposite sides of the central plane of the cylinder.

I is a chamber formed in an upward extension of the head F, in which is arranged the valve-operating mechanism. This comprises a cam shaft J, preferably arranged in the central plane of the head, and valve-actuating rocker arms K engaging cams on said shaft and the respective valve stems H. The arms K are pivotally connected at their outer ends to heads L which are detachably secured to brackets M formed on the sides of the case. This connection is preferably formed by providing the heads L with threaded shanks N passing through apertures in the brackets and secured by clamping nuts N', while shims N² arranged between the head and the bracket form a means of adjustment for the rocker arms.

O are springs sleeved upon the valve shanks H and engaging collars O' thereon.

The head F is preferably formed with an integral water jacket P for surrounding the inlet and exhaust ports, and separating the explosion chamber from the valve chamber.

There is also preferably a detachable cap Q at the upper end of the head F, which when removed provides access to the valve-operating mechanism.

In the modification shown in Fig. 3, the rock-arms K are shown as provided with rollers K' for engaging the cams J' on the cam shaft J, the construction being otherwise the same as shown in Fig. 1.

With the construction as described, it will be observed that all of the valve-operating mechanism is housed within the head F, which is both oil-tight and dust-proof. Furthermore, this mechanism is readily accessible by merely removing the cap Q, and all lost motion may be taken up by removing the shims from between the heads L and brackets M. And furthermore, by removing the head F both the valves and the operating-mechanism therefor will be detached as a unit.

What I claim as my invention is:—

1. In an explosion engine, the combination with a cylinder, of a head therefor containing a port and a chamber above said port, a valve controlling said port having a stem projecting upward into said chamber, a rocker arm for actuating said valve stem, a cam engaging said rocker arm, and a fulcrum for said rocker arm adjustable to take up lost motion.

2. In an explosion engine, the combination with a cylinder of a ported head therefor, a valve controlling the port in said head provided with an upwardly-extending stem, a cam shaft, a rocker arm engaging said cam shaft and said stem, a fulcrum block pivotally engaging said rocker arm, a bracket for supporting said fulcrum block, and shims for adjusting said block upon said bracket to take up lost motion.

3. In an explosion engine, the combination with a cylinder, of a ported head therefor provided with a water jacket surrounding the port and a chamber above said water jacket, a valve for controlling said port having an upwardly-extending stem projecting into said chamber, a rocker arm engaging said stem, a cam for actuating said rocker arm, a fulcrum block for said rocker arm, a bracket projecting inward in said chamber forming a support for said fulcrum block, and shims between said fulcrum block and bracket forming a means of adjustment for taking up lost motion.

4. In an explosion engine, the combination with a cylinder, of a head therefor having ports and a chamber above said ports, valves for controlling said ports having stems projecting upward into said chamber, rocker arms for engaging said valve stems and projecting oppositely therefrom, a central cam shaft having cams for actuating said rocker arms, fulcrum blocks for said rocker arms, brackets projecting inward in said chamber to which said fulcrum blocks are secured, and shims forming a means of adjustment between said fulcrum blocks and brackets.

5. In an explosion engine, the combination with a cylinder, of a ported head therefor, a valve controlling said port having an upwardly-extending stem, a rocker-arm engaging said stem, a cam for actuating said rocker arm, a fulcrum block pivotally engaging said rocker-arm and provided with a threaded shank, a bracket arm apertured

for engaging said threaded shank, a clamping nut, and shims upon said threaded shank between said fulcrum block and bracket forming a means of adjustment for the valve.

6. In an explosion engine, the combination with a cylinder, of a head therefor containing ports and a chamber above said ports, valves independent of each other for controlling said ports having stems projecting upward into said chamber, rocker arms for actuating said valve stems, a cam shaft for engaging said rocker arms, and fulcrums for said rocker arms adjustable to take up lost motion.

In testimony whereof I affix my signature in presence of two witnesses.

GEO. W. DUNHAM,

Witnesses:

ENOS R. JACOBY,
C. E. GREGORY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."