

C. P. ALYEA.
EXPLOSIVE ENGINE.
APPLICATION FILED JUNE 4, 1912.

1,061,653.

Patented May 13, 1913.

2 SHEETS—SHEET 1.

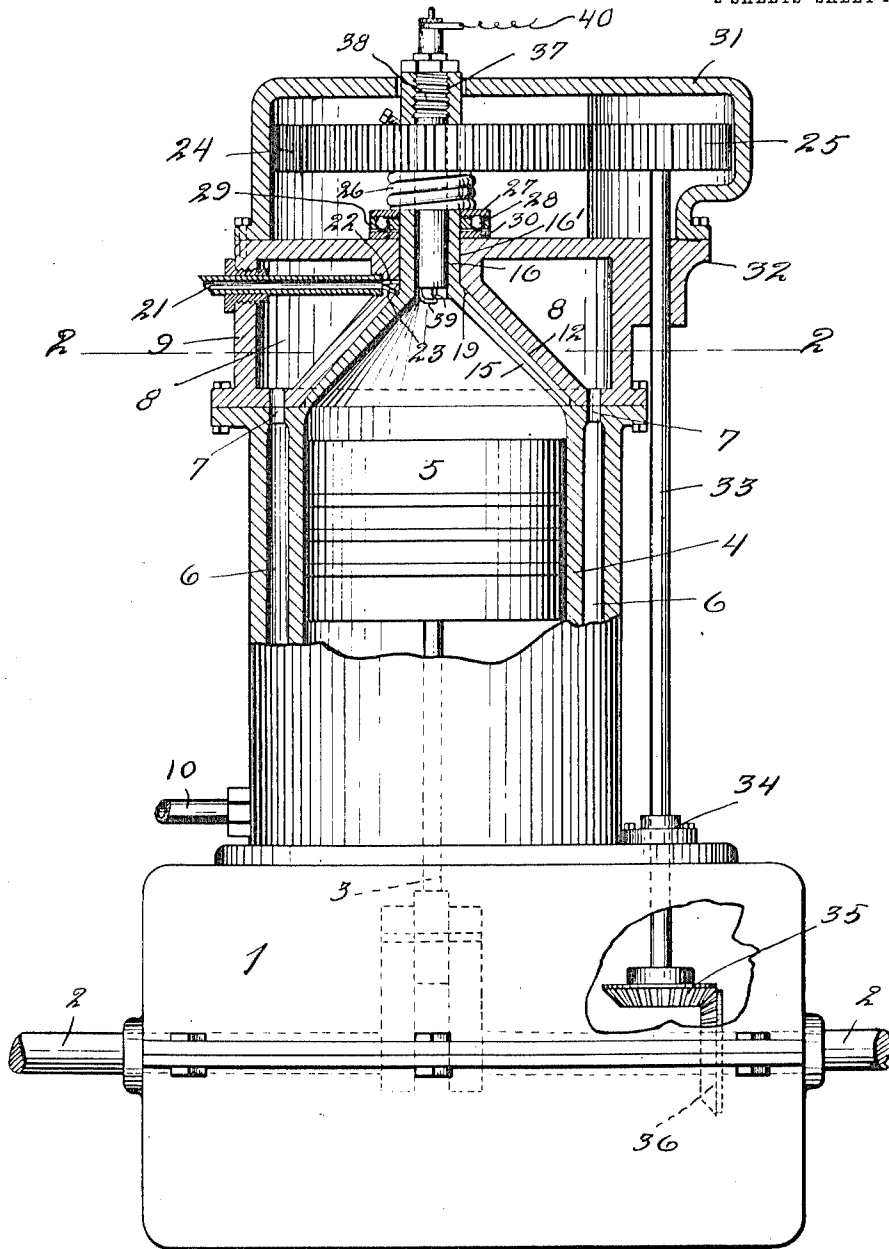


Fig. 1.

Inventor
C. P. Alsea

Witnesses
J. Milton Jester
B. W. Schumme

By

C. H. Parker.
Attorney

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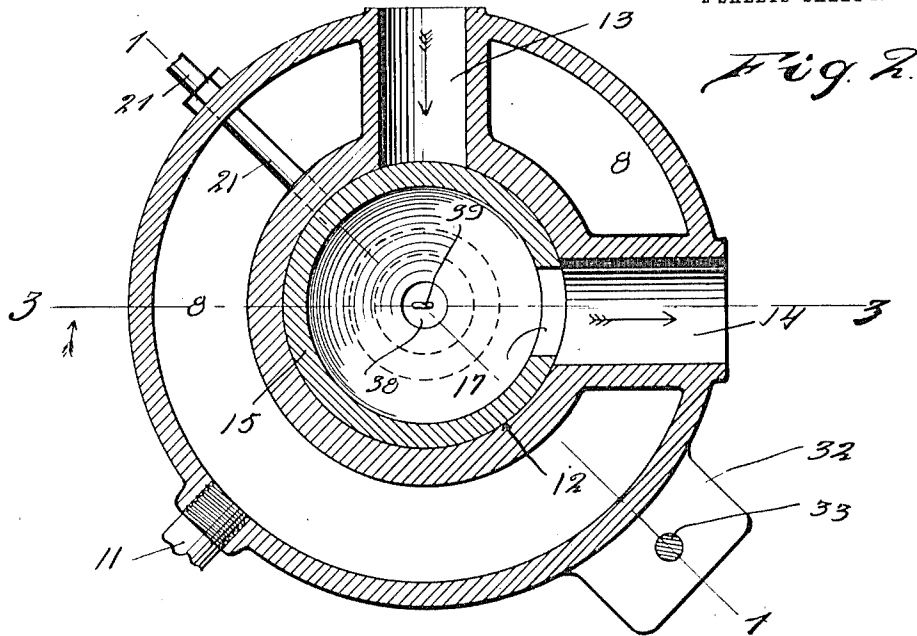
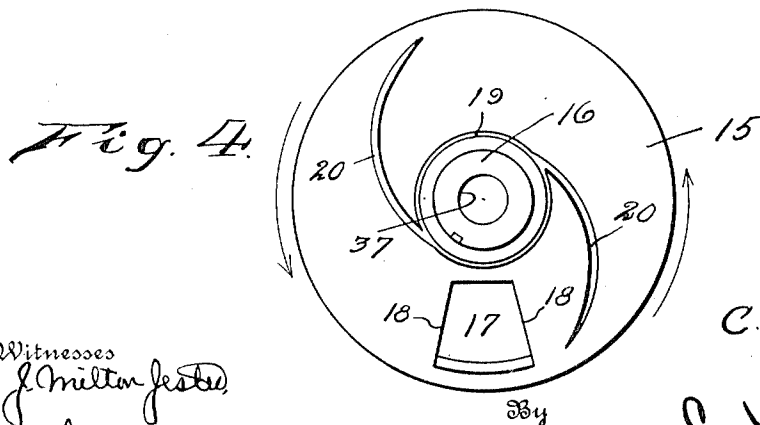
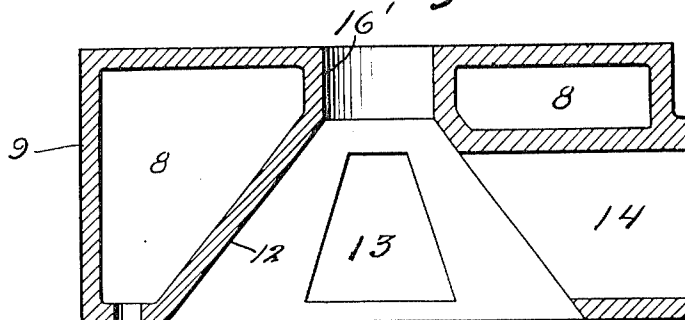


Fig. 3.



Witnesses
J. Milton Foster
B. W. Hickman

Inventor
C. P. Alyea

By
C. H. Parker
Attorney

UNITED STATES PATENT OFFICE.

COURTLAND P. ALYEA, OF JACKSONVILLE, FLORIDA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO GEORGE W. SPAULDING AND ONE-HALF TO CHARLES N. GRIFFIN, BOTH OF JACKSONVILLE, FLORIDA.

EXPLOSIVE-ENGINE.

1,061,653.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed June 4, 1912. Serial No. 701,499.

To all whom it may concern:

Be it known that I, COURTLAND P. ALYEA, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification.

The present invention relates to explosive engines and has particular reference to an engine provided with novel means for controlling the inlet and exhaust of gases to and from the explosion cylinder.

An important object of this invention is to provide a novel form of valve for controlling the intake and exhaust of gases to and from the explosion cylinder, such valve being unaffected in its operation when the same expands during the operation of the engine.

A further object of the invention is to provide novel means for supplying oil to the valve and its seat without the employment of force feed means.

A further object of the invention is to provide means of the above mentioned character, which are simple in construction, cheap to manufacture, and durable.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a side elevation of the engine complete, the upper portion thereof being shown in central vertical section, Fig. 2 is a horizontal sectional view taken on line 2—2 of Fig. 1, Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2, and, Fig. 4 is a plan view of the valve removed.

In the drawings wherein for the purpose of illustration, I have shown a preferred embodiment of my invention, the numeral 1 designates a crank case, in which is journaled a horizontal crank shaft 2, operated by a pitman 3, extending upwardly into an explosion cylinder 4, which is rigidly mounted upon the crank case 1. The pitman 3 is pivotally connected with a piston 5, which, when in its uppermost position, is disposed near and spaced from the upper end of the cylinder 4, as shown in Fig. 1.

The cylinder 4 is provided with a water space 6 which, through the means of openings 7, is in free communication with a water space 8 formed in a hollow head 9. This hollow head 9 is rigidly bolted to or otherwise suitably connected with the upper end of the cylinder 4. Water is supplied into the lower end of the space 6 through a pipe 10, and is discharged from the space 8 through a pipe 11, as shown.

The head 9 includes an inner conical valve seat 12, having communication with intake and exhaust ports 13 and 14, as clearly shown in Fig. 2. Disposed for rotation within this conical valve seat is a hollow conical valve 15, provided at its reduced end with an upstanding tubular stem 16, which extends through an opening 16' in the upper portion of the valve seat 12. The hollow conical valve 15 is provided with a large opening 17, adapted to be brought into registration with the ports 13 and 14. The longitudinal side walls 18 of the opening 17 are in the form of sharp cutting edges which scrape or shear off any deposits of carbon which may be formed upon the valve seat 12.

The hollow conical valve 15 is provided upon its outer face and adjacent the lower end of the tubular valve stem 16, with an annular oil receiving groove 19, which leads into the upper ends of involute grooves 20, as shown. The numeral 21 designates an oil supply pipe, which passes through the hollow head 9 and discharges into ports 22 and 23 formed in the upper portion of the valve seat 12. The port 22 supplies oil to the opening 16' to lubricate the tubular valve stem 16 while the port 23 supplies oil to the annular groove 19. By providing the involute grooves 20 upon the outer face of the conical valve 15, the valve being rotated in the direction as shown by the arrows in Fig. 4, I have found that such involute grooves will draw the oil downwardly into the same to thoroughly lubricate the valve and its seat without the use of force feed means to supply oil through pipe 21. This is a particularly important feature of the invention as it dispenses with a pump and other expensive and complicated devices ordinarily employed to force the lubricating oil under pressure to the valve and its seat, which are to be lubricated.

Rigidly mounted upon the upper portion of the valve stem 16 is a large pinion 24, which is rotated by a small pinion 25 having one-half the circumference of the large pinion. The valve 15 is held in proper engagement with its seat and allowed to partake of slight longitudinal movements due to expansion, by means of a compressible coil spring 26, of suitable stiffness. The spring 26 is disposed between the pinion 24 and a ring 27, which engages bearing balls 28, suitably held within openings formed in a ring 29. The bearing balls 28 also engage a lowermost ring 30, which engages the upper end of the head 9, as shown. All of these rings surround the tubular valve stem 16, as shown. The pinions 24 and 25 are inclosed by a casing 31, which is bolted or otherwise rigidly connected with the head 9 and a laterally extending casting 32 formed thereon, as shown.

The pinion 25 is rigidly connected with the upper end of a vertical shaft 33, extending through an opening formed in the casting 32. This shaft is journaled through a stationary bearing 34 and extends into the crank case 1. Within this crank case the shaft 33 is rigidly connected with a bevel gear 35 driven by a bevel gear 36, which is rigidly mounted upon the crank shaft 2.

The tubular valve stem 16 is internally screw-threaded near its upper end, as shown at 37, for engagement with the upper externally screw-threaded end of a spark plug 38. This spark plug is made sufficiently long so that its sparking points 39 are disposed at the upper contracted end of the compression chamber formed within the hollow valve 15. The numeral 40 designates a wire included in the sparking circuit and having a suitable swivel connection with the upper portion of the spark plug 38. The wire 40 is connected with one pole of the source of current (not shown), the other pole of which is grounded to the engine, as is customary. Any well known or preferred type of sparking circuit may be employed.

In the operation of the engine, the hollow conical valve 15 is rotated in the direction indicated by the arrows in Fig. 4. The opening 17 is rotated into and out of registration with the ports 13 and 14. The space formed within the conical valve 15 serves as a compression chamber for the charge, such charge being also fired in this chamber. When the hollow conical valve 15 expands, due to the heat generated in the operation of the engine, the same being hollow, all parts thereof expand uniformly whereby the entire valve will move downwardly per-

ceptibly but will still remain perfectly seated. The involute grooves 20 draw the oil into the same and keep the engaging surfaces of the valve and its seat thoroughly lubricated. By forming the head 9 hollow and providing the water space therein, the valve and valve seat are properly cooled. The spring 26 retains the valve in proper slidable engagement with its seat and yet permits of the slight longitudinal movement of the same. The ball bearing prevents undue friction between the spring and the upper end of the head 9.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that certain changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

Having thus described my invention, I claim:—

In an engine of the character described, an explosion cylinder, a piston operating therein, a head mounted upon the cylinder and provided with a conical valve seat having inlet and exhaust ports arranged at substantially a right angle with relation to each other, a hollow conical valve rotatably mounted within the conical valve seat and provided upon its periphery with an opening to be moved into and out of registration with the inlet and exhaust ports, said opening having its vertical sides in the form of sharp cutting edges to prevent deposits upon the inner surface of the conical valve seat, a tubular stem connected with the conical valve, a spark plug disposed in the tubular stem to provide a spark adjacent the lower end of the tubular stem, spring means to yieldingly hold the conical valve in engagement with the conical valve seat, means to rotate the valve stem, said conical valve having its material formed comparatively thin and provided upon its exterior surface with a suitable number of involute grooves having their upper ends leading with respect to the direction of rotation of the conical valve, and a conduit to constantly supply a lubricant to the upper ends of the involute grooves, whereby such lubricant is worked downwardly within the involute grooves during the rotation of the conical valve.

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

COURTLAND P. ALYEA.

Witnesses:

EDWARD L. HARRISON,
CLAUDIUS C. KIRBY.