

914,864.

R. McMYERS.  
EXPLOSIVE ENGINE.  
APPLICATION FILED DEC. 4, 1907.

Patented Mar. 9, 1909.  
3 SHEETS—SHEET 1.

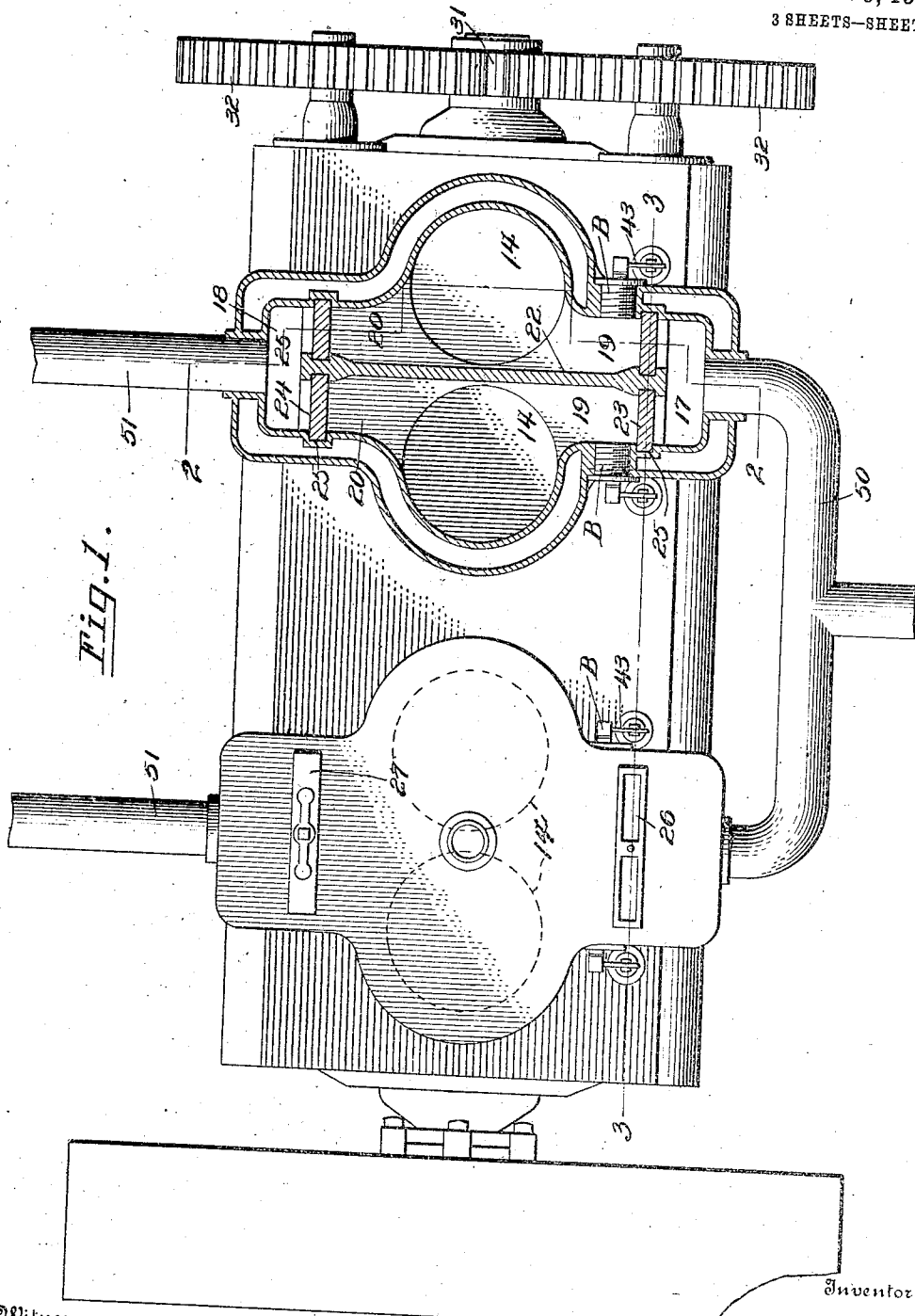


Fig. 1.

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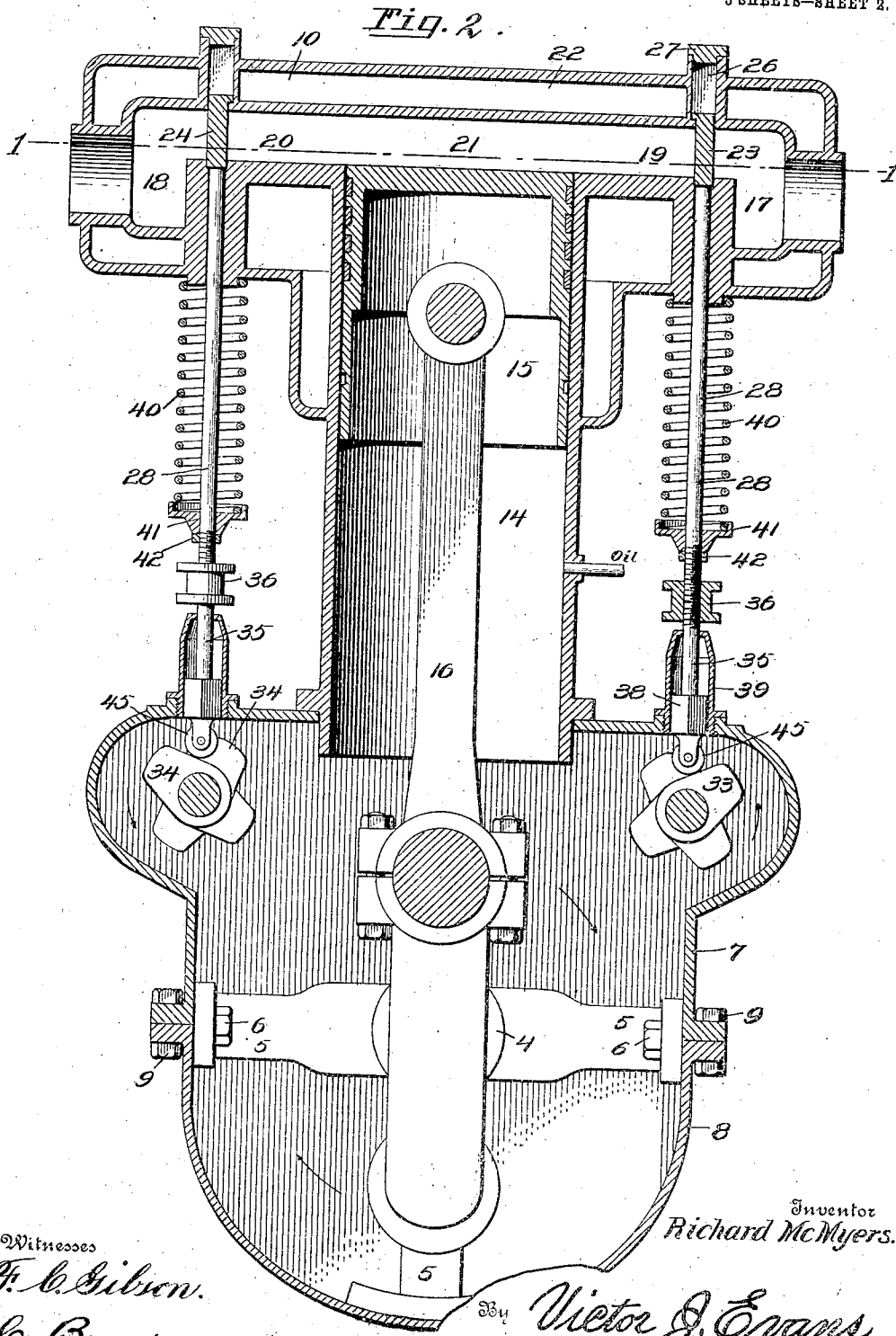
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3 SHEETS—SHEET 3.

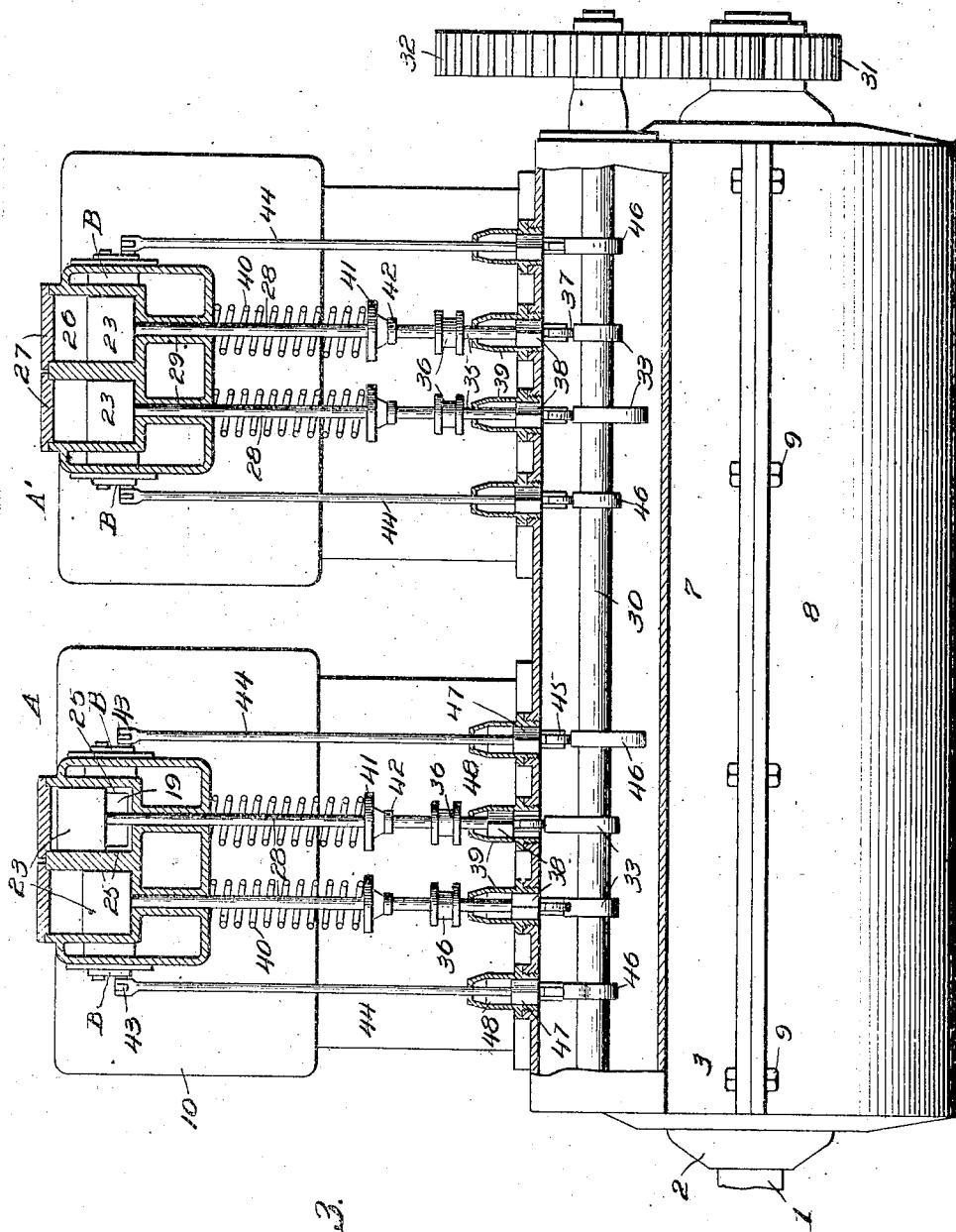


Fig. 3.

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# UNITED STATES PATENT OFFICE.

RICHARD McMYERS, OF NEW YORK, N. Y.

## EXPLOSIVE-ENGINE.

No. 914,864.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed December 4, 1907. Serial No. 405,057.

*To all whom it may concern:*

Be it known that I, RICHARD McMYERS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Explosive-Engines, of which the following is a specification.

This invention relates to internal combustion engines intended more particularly for use in automobiles.

The invention has for one of its objects to improve and simplify the construction and operation of apparatus of this character so as to be comparatively easy and inexpensive to manufacture and keep in repair, efficient in service, and composed of few parts.

A further object of the invention is the provision of an improved valve mechanism for controlling the admission of fuel charges to the cylinder or cylinders and exhaust of the spent gases.

Another object of the invention is the provision of a high powered engine composed of one or more pairs of cylinders having common admission and exhaust chambers and valve-controlled passages between each chamber and cylinder, the valves of the passages being flat and mounted to slide transversely to the passages for controlling the admission of the charges and the exhaust of the spent gases from the cylinders.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawings, which illustrate one of the embodiments of the invention, Figure 1 is a plan view of the engine with the head portion of one of the pairs of the cylinders in horizontal section on line 1—1, Fig. 2. Fig. 2 is a vertical transverse section taken on line 2—2, Fig. 1. Fig. 3 is a front view of the engine showing the parts in section on the line 3—3, Fig. 1.

Similar reference characters are employed to designate corresponding parts throughout the several views.

Referring to the drawings, 1 designates the crank shaft of the engine which is mounted in bearings 2 in the end of the crank casing 3 and in a central bearing 4 formed in a spider 5 secured to the walls of the casing by bolts 6, as shown in Fig. 2. The casing is

composed of two sections 7 and 8 divisible in a horizontal plane coinciding with the bearings 2, and the sections are secured together by bolts 9 whereby a liquid-tight housing is formed for containing lubricant, if splash lubricant is required. The crank shaft in the present instance is of the four-throw type and arranged with the crank pins disposed ninety degrees apart so as to produce an even torque.

Mounted on the crank casing are twin cylinder castings A and A' formed with water jackets 10, whereby the walls of the cylinders are kept at the proper temperature. The four cylinders 14 are, in the present instance, arranged with their axes parallel, and reciprocating in the cylinders are trunk pistons 15 connected by rods 16 with the crank pins of the shaft 1. Each pair of cylinders is provided with a common admission chamber 17 and a common exhaust chamber 18, and between the cylinders and chambers are passages 19 and 20, the passages and compression chambers 21 of the cylinders being separated by a straight, transverse partition 22 extending from the admission chamber to the exhaust chamber 18. Communication between the cylinders and the admission and exhaust chambers is controlled by inlet and exhaust valves 23 and 24. Each valve is in the form of a rectangular plate or slide and has its vertical edges engaged in grooves 25 in one wall of the passage controlled by the valve, and in the partition 22, and the valve is adapted to move into a pocket 26, formed in the wall above the valve. The pockets are open at the top of the castings A and A' and are closed by cover plates 27, and through these pockets, the valves can be removed for repair or inspection. The valves are provided with stems 28 that pass downwardly through the bores 29.

For operating the valves, two longitudinally extending half speed shafts 30 are mounted in the crank chamber and these shafts are driven by a pinion 31 on the crank shaft and gear wheel 32 on the secondary shafts 30. On the secondary shafts are cams 33 for the admission valves, and 34 for the exhaust valves. Each valve stem 28 has a removable section 35 that is connected with the upper section by a threaded sleeve or nut 36, whereby the upper section can be removed from the lower section for permitting the valve and section attached thereto to be removed upwardly through the pockets or

openings 26. Each lower section 35 carries a roller 37 for engaging the adjacent cam 33 and the portion above the roller is formed into a square or non-circular head, as indicated at 38, and reciprocates in a correspondingly shaped hollow guide 39 that is screwed into the top wall of the crank casing, as shown in Figs. 2 and 3. On each valve stem is a valve closing spring 40 which bears at its upper end against a suitable part of the engine, and at its lower end on a collar 41 which is removably and adjustably held on the upper section of the stem by a nut 42. This spring tends to hold the valve closed and to return the valve after the same has been open by its respective cam. By screwing the nut 36 downwardly off the upper section of the stem and by unscrewing the nut 42, the valve and its stem can be readily taken out for the purpose of inspection or repair.

Any suitable ignition device may be employed for firing the compressed charges in the cylinders, and in the present instance, the ignition devices B are of the mechanically actuated type and each includes a swinging arm 43 for actuating the movable electrode (not shown). Engaging each arm 43 is a vertically-extending rod 44 that has its lower end extending into the crank casing and provided with a roller 45 adapted to be engaged by one of the ignition controlling cams 46, as shown in Fig. 3. The rods 44 are provided with squared portions 47 that move in guides 48 so as to steady the rods and hold them in proper position.

In practice, the charges of mixture are supplied from a suitable carbureter to the chamber 17 through the supply pipe 50, Fig. 1, while the exhaust products are conducted away from the engine through the exhaust pipes 51. After the engine is cranked or started into motion, the movement of the pistons causes the charges of mixture to be drawn into the cylinders and after the first charge is exploded, the engine continues to operate. The valve operating cams and cams for operating the ignition devices are so related to each other and to the movements of the pistons that the explosions occur in regular order in the successive cylinders and the engine operates on the well-known four-cycle principle.

Referring to Fig. 2, the operation of an individual cylinder will be described. The piston is represented as having reached the end of the discharge stroke and the exhaust valve 24 has closed by the action of its spring, it being noted that the cam 34 has passed from under the valve stem. The admission valve 23 is about to be opened by the cam 33 so that as the piston moves downwardly, a new charge will be drawn into the cylinder. As soon as the piston reaches the end of its out-stroke the admission valve will

be closed and on the succeeding in-stroke the charge of explosive mixture will be compressed for ignition. At about the time the inner dead center is reached, the charge is exploded so as to give an impulse to the piston and drive the same outwardly, thereby rotating the crank shaft, and upon the succeeding in-stroke, the exhaust valve will be opened by the cam 34 so as to permit the exhaust gases to be driven out of the cylinder. In this way, the several cylinders operate and produce an impulse for every half revolution of the crank shaft.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims.

Having thus described the invention, what I claim is:—

1. In an engine, the combination of a cylinder having a passage communicating with the compression space of the latter, said passage having oppositely-disposed parallel recesses in opposed walls and a pocket arranged between and in line with the recesses, a flat plate-like valve having opposite sides slidably disposed in the recesses and arranged to move into and out of the pocket, a stem connected with the valve and extending out of the passage, means for reciprocating the stem, and a water jacket for the cylinder and for the walls of the said pocket.

2. In an engine, the combination of a cylinder provided with a passage, said passage having oppositely-disposed recesses and a pocket arranged in line with the recesses, a flat plate-like valve slidable in the recesses and movable into and out of the pockets for opening and closing the said passage, a removable cover for the said pocket, a stem connected with the valve and provided with a screw thread, an abutment on the stem, a spring on the stem and bearing on the abutment for holding the valve in closed position, a nut on the threaded end of the stem for adjusting the abutment, a cam shaft, a stem having a non-circular head adjacent one extremity and threaded at its opposite extremity, a connecting sleeve screwed on the threaded extremities of the stems for connecting them together, a hollow guide in which the head slidably moves, means supporting the hollow guide, and a roller mounted on the second stem below the head thereof and arranged to be engaged by the cam shaft.

3. The combination of a pair of cylinders disposed side by side and having a common admission chamber at one side and a common exhaust chamber at the opposite side  
5 and communicating with the compression spaces of the cylinders; a wall extending from one chamber to the other and disposed between the cylinders for separating the compression spaces thereof and providing  
10 passages between the chambers and compression spaces, each passage having parallel recesses in oppositely-disposed walls, and a pocket arranged between the recesses, there being an opening in the wall opposite from

that having the pocket, flat plate-like valves 15 extending transversely across the passages and each valve being slidably disposed in the recesses and pockets; stems connected with the valves and slidably in the openings of the said passages; and means for reciprocating 20 the valve stems to open and close the valves.

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

RICHARD McMYERS.

Witnesses:

THOMAS JETER,  
CHARLES LEGATO.