C. RORABECK.

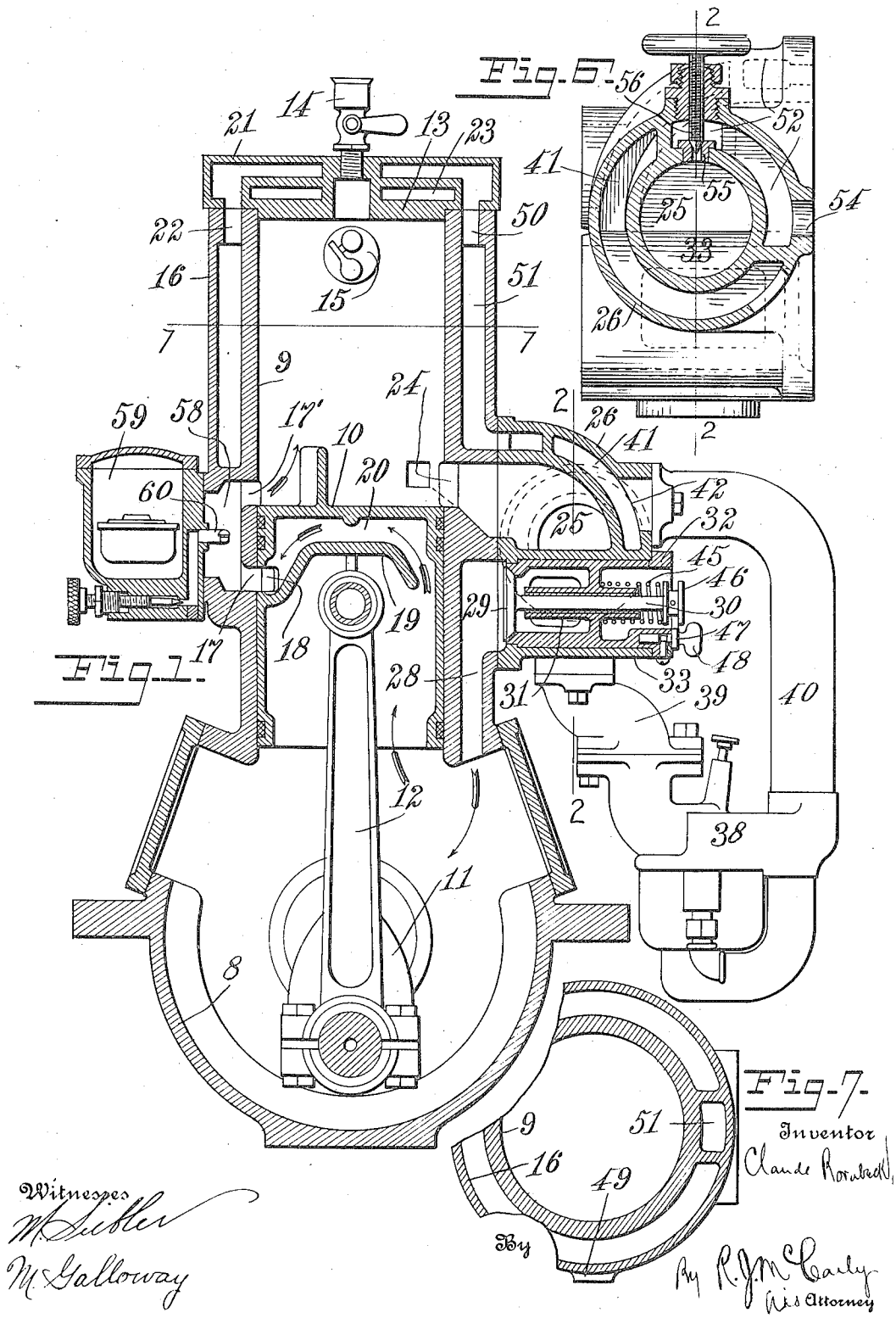
GAS ENGINE.

APPLICATION FILED JAN. 2, 1915.

1,190,591.

Patented July 11, 1916.

2 SHEETS—SHEET



Witnesses

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Fig. 2.

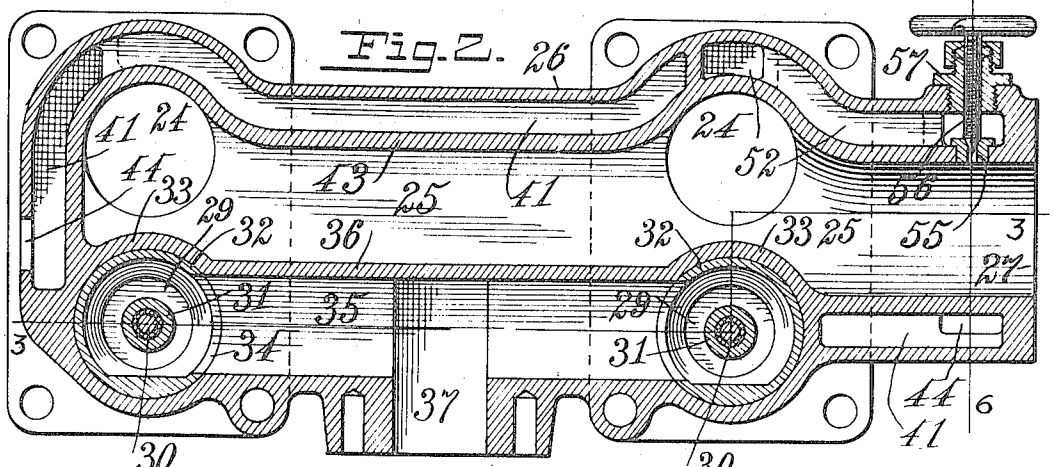
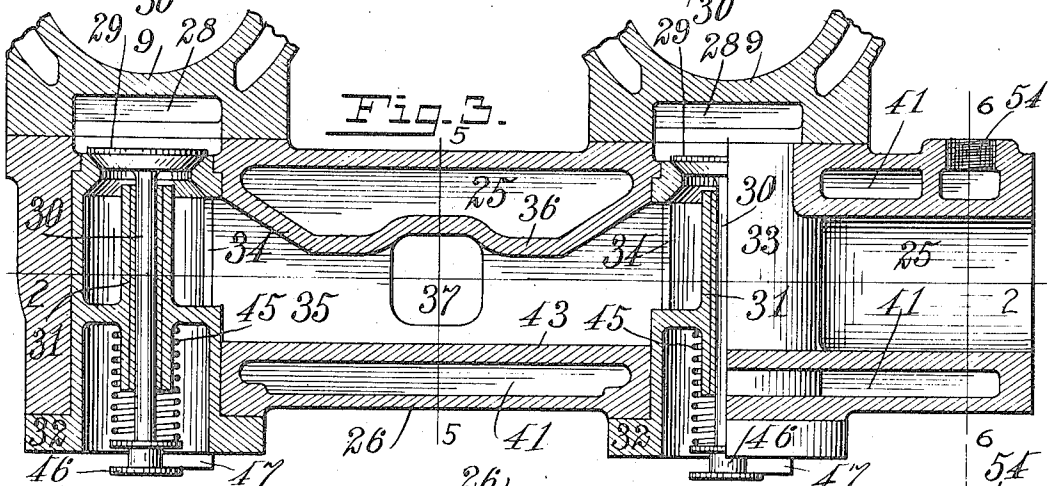


Fig. 3.



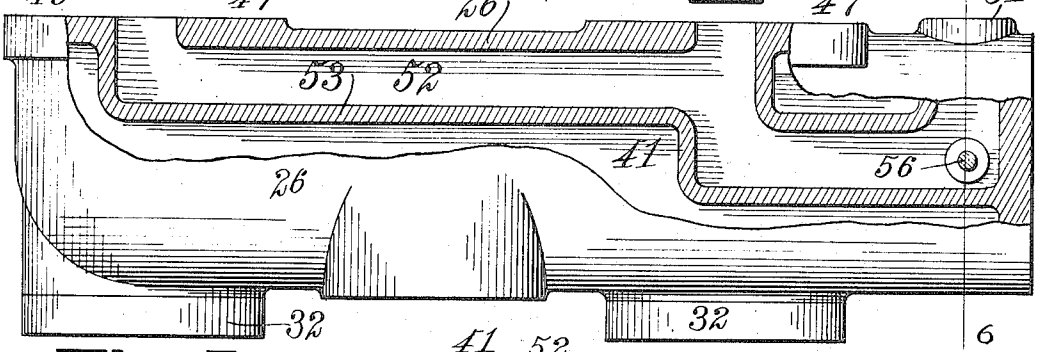


Fig. 4.

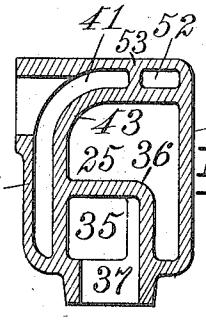


Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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GAS-ENGINE.

1,190,591. Specification of Letters Patent. Patented July 11, 1916.

Application filed January 2, 1915. Serial No. 126.

To all whom it may concern:

Be it known that I, CLAUDE RORABECK, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Gas-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in gas engines of the two-cycle type.

The objects of the invention are several; principally, to provide improved means for cooling the cylinder head and piston of the engine and thus prevent the deposits of carbon thereon.

Referring to the accompanying drawings, Figure 1 is a lateral vertical section through one cylinder of a two-cycle gas engine with my improvements applied thereto; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is a top plan view of the manifold with parts broken away to show the passageway for the cooling medium; Fig. 5 is a section on the line 5—5 of Fig. 3; Fig. 6 is a section on the lines 6—6 of Figs. 2, 3 and 4; and Fig. 7 is a section on the line 7—7 of Fig. 1.

Throughout the specification and drawings, similar reference characters represent corresponding parts both in the description and drawings.

Referring more particularly to the drawings, 8 represents the crank case of an engine upon which is mounted cylinders 9 only one of which is shown in the drawings. Reciprocatingly mounted within each cylinder 9 is a piston 10 connected to a crank 11 by a rod 12 in a well known manner. Each cylinder 9 has a head 13 provided with a priming cock 14, and with any well known form of ignition device 15, and a water-cooling jacket 16. The engine illustrated in the accompanying drawing is of the crank-casing-compression type. The mixture or air for supporting the portion of the fuel in the cylinder is previously compressed within the crank case and conducted into the cylinder 9 above the piston through lower and upper ports 17 and 17′ in the cylinder wall and a port 18 in the side of the piston. In order to prevent the top face of the piston 10 becoming overheated, the said piston is provided with a lateral horizontal wall 19 which forms a passageway 20 on the under side of the top face of said piston. The air or mixture when passing from the crank case to the cylinder passes through the passageway 20 and along the under side of the top of the piston 10 and serves to maintain the face of the piston at a reduced temperature which is instrumental to a desirable extent in preventing the lubricating oil from carbonizing. The cylinder-head 13 is provided with a cooling jacket 21 which connects with the cooling jacket 16 around the sides of the cylinder through ports 22. The said head 13 is also provided with an air space 23 which lies between the cylinder and the cooling jacket 21. The said air space 23 may or may not be open to the atmosphere and the same together with the water jacket 21 is instrumental in maintaining a temperature that prevents condensation of the mixture.

Each cylinder 9 is provided with exhaust ports 24 which communicate with a passageway 25 of a combined exhaust and inlet manifold 26. The passageway 25 is closed at one end and may be connected with an exhaust pipe (not shown) at the other end 27. The air for supporting combustion is drawn into the crank case 8 through passages 28 in said cylinders 9. The entrance of air into the passages 28 is controlled by valves 29 on stems 30 slidingly mounted in bearings 31 of valve casings 32, said valves being of the automatic type with springs 45. The said valve casings 32 are mounted in pockets formed by the walls 33 of the manifold and are provided with side ports 34 which communicate with a passageway 35 which lies below and to one side of the exhaust passageway 25, said passageways 25 and 35 being separated by a wall 36.

The passageway 35 is provided with a centrally disposed opening 37 which connects with a gasolene carbureter 38 by means of a curved tube 39. The said gasolene carbureter, which may be of any well known type, receives the air for forming the explosive mixture through a tube 40. To preheat the air from the exhaust of the engine before it is introduced into the carbureter, the manifold 26 is provided with a passage-

way 41 which communicates with the tube 40 through a centrally disposed opening 42. The said passageway 41 surrounds the exhaust passageway 25 and is separated from said exhaust passageway by a wall 43. See Fig. 6. The said passageway 41 communicates with the atmosphere through ports 44 at each end of the manifold 26. Fig. 2. By thus constructing the manifold, the air and mixture are previously heated by the exhaust gases and reheated before being introduced into the cylinder. When it is desired to run the engine on one cylinder and at reduced power, one of the valves 29 may be maintained closed by the following means. The said valves 29 are provided, as before stated, with springs 45 which move them to and maintain them in a closed position. The said springs 45 abut at one end against spool-shaped heads 46 on the stems 36 of said valves. The said spools 46 are adapted to be engaged by swinging pawls 47 controlled by thumb-screws 48. When a pawl 47 is placed in engagement with its spool 46, its respective valve 29 will be prevented from opening thereby placing its respective cylinder 29 out of operation.

The cooling water from the cylinders may be introduced into the jacket 16 through a conveniently located port 49. Fig. 7. The water passes thence upwardly through the ports 22 into the jackets 21 of the heads 13 and thence downwardly through ports 50 into a passageway 51 along one side of the cylinders. The said passageway 51 communicates with a further passageway 52 which lies along the top of the manifold 26. The passageway 52 is formed by the division wall 43, the outer casing of the manifold, and a partition wall 53. Fig. 4. At one end of the manifold 26, the passageway 52 turns downwardly and is provided with an outlet 54 to which an exhaust pipe (not shown) may be connected. In order to cool the exhaust gases in the passageway 25 after they have passed out of the manifold, said manifold is provided with an opening 55 which communicates with the water passageway 52 and the exhaust passageway 25. The opening 55 is controlled by a valve 56 mounted in a casing 57 in the top of the manifold. The valve 57 is instrumental in permitting water to be introduced into the exhaust pipe to cool the exhaust gases and to diminish the noise incidental to the exhaust. In the above description, the engine is described as running on gasolene; means, however, are provided for operating the same on kerosene as follows.

The engine cylinder 9 is provided with lower and upper ports 17 and 17′ in the side thereof. These ports communicate with a carbureter chamber 58, 17 being an air outlet port to said chamber 58 from the piston, and port 17′ being an inlet port from the carbureter chamber 58 to the engine cylinder above the piston. Mounted along the side of said cylinder adjacent to the chamber or passageway 58 is a kerosene carbureter 59 provided with a jet 60 which lies within the passageway 58. The carbureter 59 may be of any well known type. The kerosene at the jet 60 is vaporized by the heated air that passes through the manifold and the passage 20. The air is heated in the passages 41 and 35. For example, the air is pre-heated in passage 41 and reheated in passage 35, and receives a final heat in the passage 20. When it is desired to run the engine on gasolene, for example, as when starting and heating the engine, the supply of kerosene to the carbureter 59 is shut off, but, after the engine has become sufficiently heated to run on kerosene, the supply of gasolene to the carbureter 38 is shut off and the carbureter 59 is supplied with kerosene.

Having described my invention, I claim.

In an explosive engine, a cylinder having a water jacket inclosing the circumference and the head thereof, and an air chamber lying between the head and the water jacket thereof, said head water jacket and air chamber combining to maintain a temperature adapted to prevent condensation of the mixture upon the interior of the cylinder head, substantially as described.

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

CLAUDE RORABECK.

Witnesses:

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MATTHEW SIEBLER.