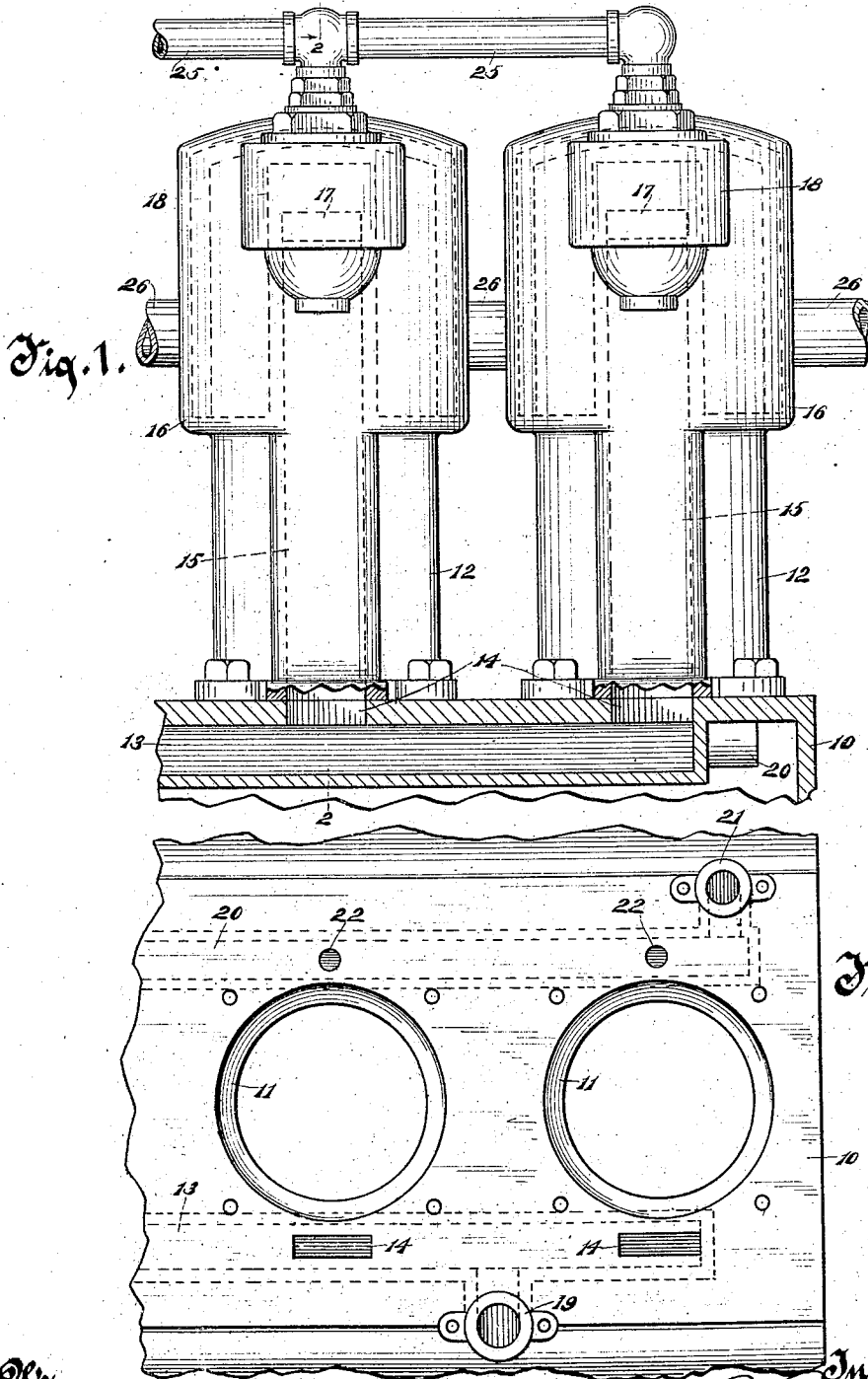


C. R. PIGGINS.
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 APPLICATION FILED FEB. 26, 1908.

898,678.

Patented Sept. 15, 1908.

2 SHEETS—SHEET 1.



Witnesses.

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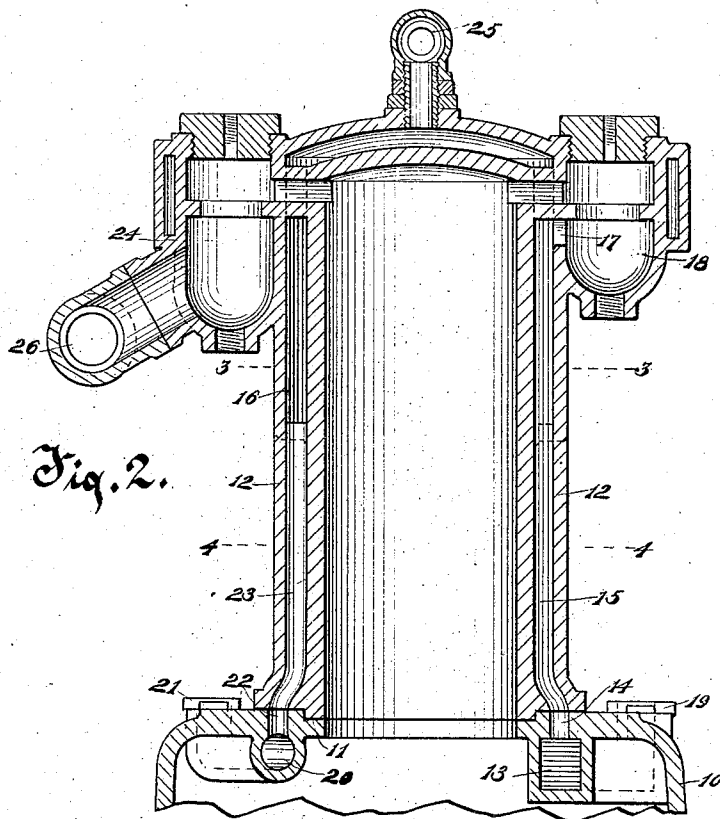


Fig. 2.

Fig. 3.

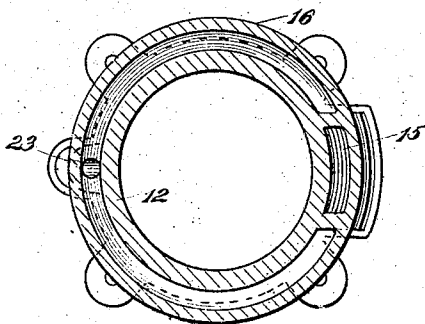
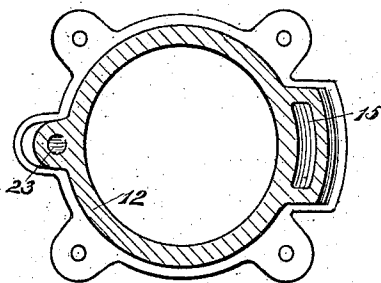


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES R. PIGGINS, OF RACINE, WISCONSIN, ASSIGNOR OF ONE-HALF TO FREDERICK PIGGINS, OF RACINE, WISCONSIN.

CASING AND CYLINDER CONSTRUCTION FOR GAS-ENGINES AND THE LIKE.

No. 898,678.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed February 26, 1908. Serial No. 417,837.

To all whom it may concern:

Be it known that I, CHARLES R. PIGGINS, residing in Racine, in the county of Racine and State of Wisconsin, have invented new and useful Improvements in Casing and Cylinder Constructions for Gas-Engines and the Like, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to casing constructions for gas engines and the like, and has for its object to provide the engine cylinder with internal passageways for the explosive mixture for its intake valve and for the water for its cooling jacket, the said passageways registering with internal supply conduits in the base or crank case and having connection with the carbureter and the water supply respectively.

Considerable difficulty is usually experienced in making the necessary tight fitting of pipe connections for multiple cylinder engines when tubing is relied upon for supplying the cooling water to the jackets and the explosive mixture to the cylinders as well as for discharging the exhaust gases and for removing the water from the jackets, the tubing then constituting a net-work which interferes with the accessibility of the other parts of the engine. With such constructions the removal of one cylinder for repairs has usually necessitated the dismemberment of the entire engine.

It is an object of the present invention to avoid pipe fitting to a material extent and to dispense with the obstructions to the accessibility of the working parts by conducting the cooling water and the gas through passages in the crank case and the cylinder walls.

With the above and other objects in view the invention consists in the casing construction for gas engines and the like herein claimed, its parts and combinations of parts and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in the several views; Figure 1 is a front elevation of one end of a multiple cylinder engine constructed in accordance with this invention, the crank case being broken away and sectioned; Fig. 2 is a vertical sectional view thereof on the plane of line 2—2 of Fig. 1; Fig. 3 is a sectional view

through one cylinder, taken on the plane of line 3—3 of Fig. 2; Fig. 4 is a similar view taken on the plane of line 4—4 of Fig. 2; and, Fig. 5 is a plan view of one end of the crank case with the cylinders removed.

In these drawings 10 represents a crank case with the countersunk openings 11 forming cylinder seats to receive the shouldered ends of the cylinders 12 as usual. The crank case is provided with a conduit 13 formed in its interior directly beneath its top part, which constitutes the base plate for the cylinders, the walls for said conduit being preferably cast integral with the shell of the crank case. The conduit 13 extends lengthwise of the crank case and close to the series of openings 11, being provided with an opening 14 near each of the openings 11 which is adapted to register with a gas passage 15 formed in the walls of the cylinder 12 which fits on said opening 11, the walls of said gas passage being preferably cast integral with the walls of the cylinder and extending through the water jacket 16 thereof to a port 17 opening into the usual intake valve chamber 18.

An integral boss 19 on the crank case has an opening communicating with the gas conduit 13 and affords a pipe connection for the carbureter which is not shown. The mixture passes from the carbureter through the connection 19 to the gas conduit and then through the openings 14 to the gas passages 15 of each of the cylinders and through the openings 17 to the intake valve chambers thereof, whence it is admitted to the explosion chambers in the usual manner.

At the back of the crank case is a water conduit 20 which is similar to the gas conduit 13, though being preferably of different sectional area. This conduit has a boss 21 forming a pipe coupling for connection with the water supply, and openings 22 leading therefrom through the top of the crank case near the cylinder openings 11 register with water passages 23 in the walls of the cylinders leading to the water jackets 16, the walls of the water passages 23 being preferably integral with the walls of the cylinders.

The water from the water jackets 16 and the exhaust gases from the exhaust valve chambers 24 may be cared for in any desirable manner, preferably as shown, by a common pipe connection 25 tapping the top of the water jacket centrally above each cylinder

der, and by a common exhaust pipe 26 at the back of the engine connecting with the exhaust valve chamber 24 of each cylinder.

As will be fully appreciated by those familiar with the art to which this invention belongs, the very act of fitting the cylinders in place on their crank case completes the gas and water supply connections, it being only necessary to connect the carbureter with the boss 19 to supply all cylinders with their charge and to connect boss 21 with the water supply to provide the water jackets of all cylinders with cooling water. This leaves only the pipe connections 25 and 26 to be connected up and they are so located as to permit of this being freely done, and are out of the way so as not to interfere with the access to the working parts.

By means of this invention the cylinders may be made separately removable for purposes of repair, the embedding of the gas and water conduits in the casing permitting this to be done with ease, it being then only necessary after the connecting rod of the desired cylinder has been disconnected to disconnect the water discharge pipe 25 and to detach the connecting flanges of the exhaust pipe 26 from the exhaust valve chamber 24 of the particular cylinder which it is desired to remove, and then the cylinder may be disconnected from the crank case and lifted from place without disturbing the other cylinders.

While the present invention is applicable to engines having only a single cylinder, it is particularly suited for multiple cylinder engines where the single gas conduit and the single water conduit in the crank case respectively serve to supply the gas and water passages of all of the cylinders. It is in the multiple cylinder gas engine also that the greatest saving in pipe connections results from the use of this invention.

Further advantages resulting from the casing construction of this invention are that the passages for the explosive mixture being within the cylinder walls are thereby kept heated during the operation of the engine and

give to the gas passing therethrough a preliminary heating which results in a more efficient operation than would otherwise be the case. Also because of the water passages being located within the cylinder walls and the water conduit being located within the crank case there is less liability of the water freezing than when it is conducted to the water jackets through exposed tubes.

What I claim as my invention is:

1. A gas engine casing, comprising a base having a cylinder seat, a water conduit and a gas conduit within the base each having an opening leading to the top of the base, an engine cylinder mounted on the cylinder seat of the base and provided with a water passage and a gas passage within its walls adapted to register with the openings of the water conduit and the gas conduit respectively, a water jacket communicating with the water passage, and an intake valve chamber communicating with the gas passage.

2. A multiple cylinder gas engine casing, comprising a base provided with seats for the engine cylinders, a water conduit and a gas conduit formed in the base near the edges of the cylinder seats on opposite sides thereof and each having its walls integral with the base and provided with openings leading through the base to each of the cylinder seats, cylinders mounted on the cylinder seats of the base and each provided with a water passage and a gas passage formed in the cylinder walls and registering with the openings of the water conduit and the gas conduit respectively, a water jacket communicating with the water passage of each cylinder, and an intake valve chamber communicating with the gas passage of each cylinder.

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

CHARLES R. PIGGINS.

Witnesses:

R. S. C. CALDWELL,
ANNA F. SCHMIDTBAUER.