J. S. BROWN.

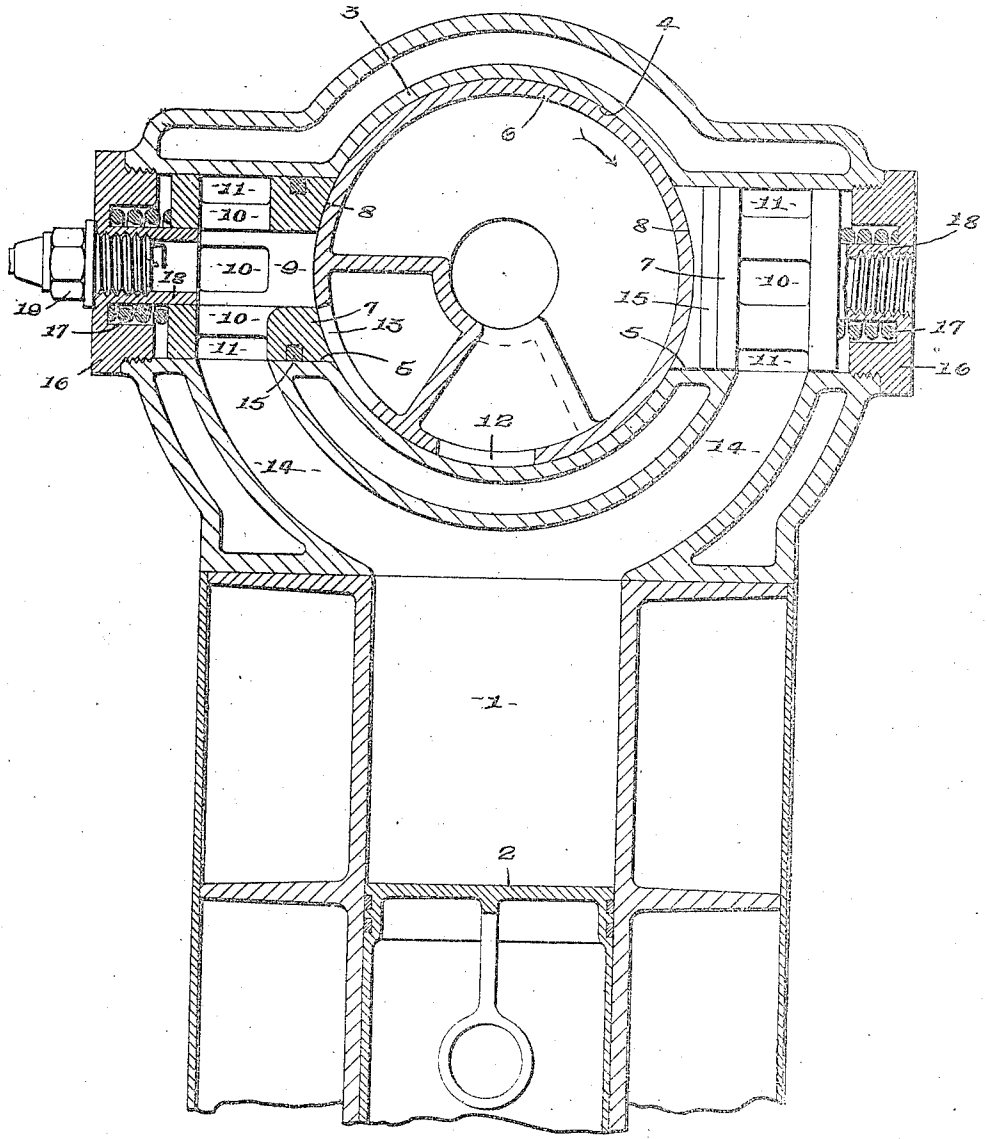
ROTARY VALVE MECHANISM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JAN. 8, 1914.

1,209,390.

Patented Dec. 19, 1916.

Fig. 1.

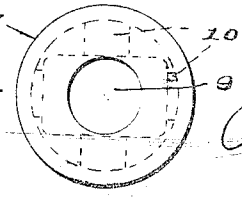


WITNESSES:

Chas. A. Young.

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Fig. 2.



INVENTOR.

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UNITED STATES PATENT OFFICE.

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ROTARY-VALVE MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

1,209,390. Specification of Letters Patent. Patented Dec. 19, 1916.

Application filed January 5, 1916. Serial No. 70,995.

To all whom it may concern:

Be it known that I, JULIAN S. BROWN, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Rotary-Valve Mechanism for Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines and particularly to rotary valve mechanism therefor, and it consists in the novel combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is a longitudinal sectional view, partly in elevation, of one form of rotary valve of my mechanism, the contiguous part of the engine being also shown. Fig. 2 is an end elevation of the plug coacting with the rotary valve.

This valve mechanism comprises, generally, a valve casing mounted on the cylinder of the engine and having a cylindrical valve chamber and a passage extending laterally from the valve chamber, a rotary valve journaled in the chamber, a spring pressed plug located in the laterally extending passage and engaging the periphery of the valve, the plug having a gas passage therethrough, the gas passage opening through the inner end of the plug, the valve having a port movable into and out of registration with the inner end of the passage of the plug, and the casing having a passage communicating with the cylinder of the engine and the passage of the plug, and means for rendering the plug gas tight.

1 designates the cylinder of the engine, 2 the piston movable therein, and 3 the valve casing which is here shown as mounted on the head of the cylinder, the casing having a cylindrical valve chamber 4 and a passage 5 extending laterally from the chamber 4 and opening through the outer face of the casing 3. As here shown, the casing is formed with two passages 5 located diametrically opposite each other for a purpose hereinafter explained.

6 is a hollow rotary valve located in the chamber 4.

7 is a plug slidable in each passage 5 and having a concave face 8 at its inner end fitting the periphery of the valve 6, and a gas passage 9 opening through the concave face 8 and preferably through the outer end face of the plug 7, the passage 9 opening through the periphery of the plug through a plurality of ports 10 which usually open into a peripheral annular channel 11 formed in the plug 7. The portion of the passage 9 opening through the concave face 8 is wider than it is high, that is, it is wider in the direction of the axis of the valve 6 in order to register with the wide inlet and exhaust ports 12, 13 of the valve 6. The ports 12, 13, of the valve 6, are movable successively and into and out of registration with the inner end of the passage 9 of each plug 7, and the casing 3 is formed with a passage 14 communicating with the cylinder 1 and opening through the side wall of the lateral passage 5 of the casing in position to communicate with the passage 9 of the plug through the channel 11 and ports 10. As there are two plugs, the ports 12, 13 of the valve register alternately with the passages 9 of the plugs, and the casing is formed with two passages 14. Each plug 7 is also provided with a piston ring 15 located in a peripheral annular groove near the inner end of the plug 7 between the channel 11 and the inner concave face of the plug, the piston ring rendering the plug gas tight.

Each plug 7 is placeable in, and removable from, the passage 5 through the outer end of the passage 5, and the plug is retained in position by a suitable retaining member 16, which threads in the outer passage 5. A spring 17 is interposed between the member 16 and the outer end of the plug 7. As here shown, this plug is formed with a stem 18 which enters the outer end of the lengthwise passage 9 of the plug and this stem is formed hollow for receiving a spark plug 19. The spring 17 encircles the stem 18. The spring may, however, be dispensed with and the gas pressure against the rear face of the plug relied on to hold in against the rotary valve.

So far as this invention is concerned, the valve casing may be provided with but one plug 7, but diametrically opposite plugs are provided in order that when the explosion takes place within the cylinder, the force thereof will be transmitted simultaneously to diametrically opposite points on the valve 6 so that the valve is balanced.

The construction and operation of the valve form no part of this invention, and this invention resides wholly in the plug 7 and contiguous parts.

In operation, the valve 6 rotates in the direction of the arrow, and the exhaust port 13 registers with the passage 9 of the left hand plug taking off the exhaust gases and immediately afterward, the inlet port 12 registers with the passage 9 of the left hand plug 7 permitting a fresh charge to enter the cylinder through the passages 9, 10, channel 11 and passage 14. Subsequently, the exhaust port 13 registers with the passage 9 of the right hand plug taking off the exhaust gases and then the inlet 12 registers with the passage 9 of the right hand plug.

This valve mechanism is particularly advantageous in that owing to the passage 5, the plug 7 is readily removed and replaced, and owing to the use of the plug, a piston ring which renders the plug gas tight can be employed. Furthermore, the plug and its retaining means, and constructions whereby the spark plug is supported by the retaining means provide a particularly simple and compact mechanism.

What I claim is:—

1. In an internal combustion engine, a cylinder, a valve casing mounted on the cylinder and having a cylindrical valve chamber and a passage extending laterally from the valve chamber, a rotary valve journaled in the chamber, a plug slidable in said passage and having its inner end concave and engaging the periphery of the valve, the plug also having a gas passage therethrough, the passage opening through the concave face, and a piston ring encircling the plug near the concave face, the valve having a port movable into and out of registration with the inner end of the passage of the plug, substantially as and for the purpose described.

2. In an internal combustion engine, a cylinder, a valve casing mounted on the cylinder and having a cylindrical valve chamber, and a passage extending laterally from the valve chamber and opening through the outer face of the casing, a rotary valve in the valve chamber, a plug slidable in said passage and engaging at its inner end with the valve, the plug having a gas passage therethrough opening through the inner end face of the plug, the gas passage also communicating with the cylinder and opening through the outer end of the plug, the valve having a port movable into and out of register with the inner end of the gas passage, a retaining member in the outer end of the lateral passage of the casing and having a hollow stem extending into said passage of the plug, a spring encircling the stem and interposed between the retaining member and the plug, and a spark plug extending into the hollow stem of the retaining member, substantially as and for the purpose described.

3. In an internal combustion engine, a cylinder, a valve casing mounted on the cylinder and having a cylindrical valve chamber, and a passage extending laterally from the valve chamber and opening through the outer face of the casing, a rotary valve journaled in the valve chamber, a plug slidable in the passage and having a concave face at its inner end engaging the periphery of the valve, the plug being formed with a gas passage opening through the concave face and through the periphery of the plug and communicating with the cylinder at the point said passage opens through the periphery of the plug, said passage also opening through the outer end of the plug, the valve having a port movable into and out of register with the inner end of the gas passage, a piston ring encircling the plug near the inner concave end thereof, a retaining member in the outer end of the lateral passage of the casing, the retaining member having a hollow stem extending into the passage of the plug, a spring inserted between the retaining member and the plug and encircling the stem, and a spark plug extending in the hollow stem of the retaining member, substantially as and for the purpose set forth.

4. In an internal combustion engine, a cylinder, a valve casing mounted on the cylinder and having a cylindrical valve chamber, and a passage extending outwardly from the valve chamber and opening through the outer face of the casing, a rotary valve in the valve chamber, a plug slidable in the passage and engaging at its inner end with the periphery of the valve, the plug having a gas passage therethrough opening through the inner end face of the plug and also through the outer end of the plug, the gas passage of the plug also communicating with the engine cylinder, the valve having a port movable into and out of register with the inner end of the gas passage, a retaining member in the outer end of the outwardly extending passage of the casing and having a passage opening into the plug, and a spark plug carried by the retaining member and having its electrodes exposed in the passage of the retaining member, substantially as and for the purpose described.

5. In an internal combustion engine, a cylinder, a valve casing mounted on the cylinder and having a cylindrical valve chamber and a passage extending laterally from the valve chamber, a rotary valve journaled in the chamber, a plug slidable in said passage and engaging at its inner end with the periphery of the valve, the plug having a peripheral annular channel, and an internal lengthwise passage opening through

its inner end and also into the channel, the valve having a port movable into and out of registration with the inner end of the passage of the plug and the casing having a passage communicating with the cylinder and opening through the side of the lateral passage of the casing in registration with said annular channel of the plug, and a spring arranged to force the plug inwardly against the valve, substantially as and for the purpose described.

6. In an internal combustion engine, a cylinder, a valve casing mounted on the cylinder and having a cylindrical valve chamber, and a passage extending laterally from the valve chamber, a rotary valve in the valve chamber, a plug slidable in said passage and having a concave face at its inner end engaging with the periphery of the valve, the plug having a peripheral annular channel, and an internal lengthwise channel opening through its concave face and into the channel, the plug also having a piston ring between said channel and the inner end of the plug, the valve having a port movable into and out of registration with the inner end of the passage of the plug, and the casing having a passage communicating with the cylinder and opening through the side of the lateral passage of the casing in position to register with said annular channel of the plug, and a spring arranged to force the plug inwardly against the valve, substantially as and for the purpose specified.

7. In an internal combustion engine, a valve casing formed with a cylindrical valve chamber, and a passage extending laterally from the valve chamber and opening through the outer face of the casing, a rotary valve journaled in the chamber, a plug located in the passage and having a concave face at its inner end engaging the periphery of the valve, the plug being formed with a passage opening through its opposite ends and through the periphery of the plug, the plug being also formed with a piston ring located near the inner end thereof, the valve being formed with a port movable into and out of registration with the inner end of the passage of the plug, and the casing being formed with a passage communicating with the cylinder and opening through a side wall of the lateral passage of the casing, in position to communicate with the passage of the plug where it opens through the periphery of the plug, a retaining member in the outer end of the lateral passage of the casing, said member having a hollow stem fitting the lengthwise passage of the plug, a spring interposed between the retaining member and the outer end of the plug, the spring encircling said stem, and a spark plug extending into the stem of the retaining member, substantially as and for the purpose set forth.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 15th day of December, 1913.

JULIAN S. BROWN.

Witnesses:
S. DAVIS,
T. B. PICKARD.