F. D. MOSS.

GAS ENGINE.

APPLICATION FILED JULY 24, 1913.

1,122,529.

Patented Dec. 29, 1914.

2 SHEETS—SHEET 1

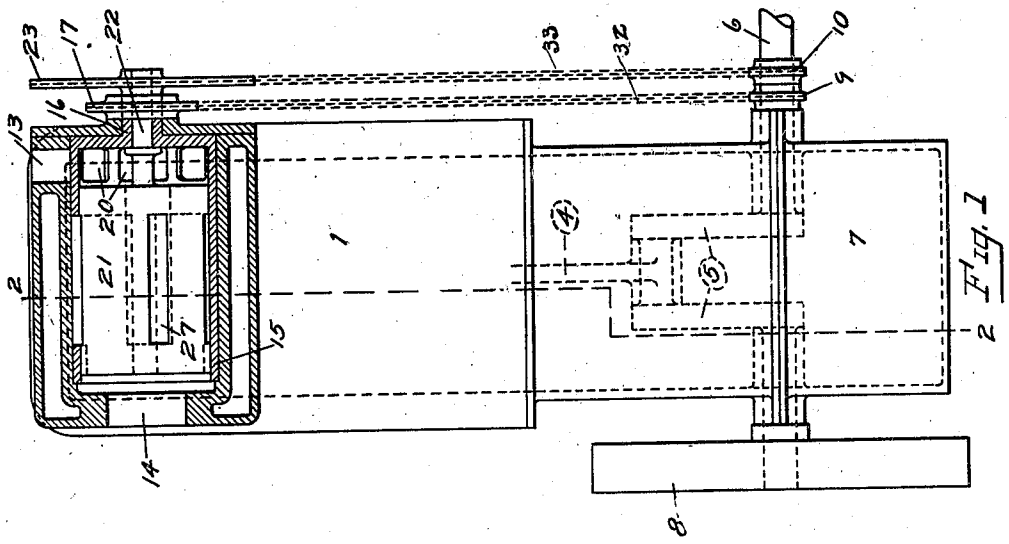


Fig. 1.

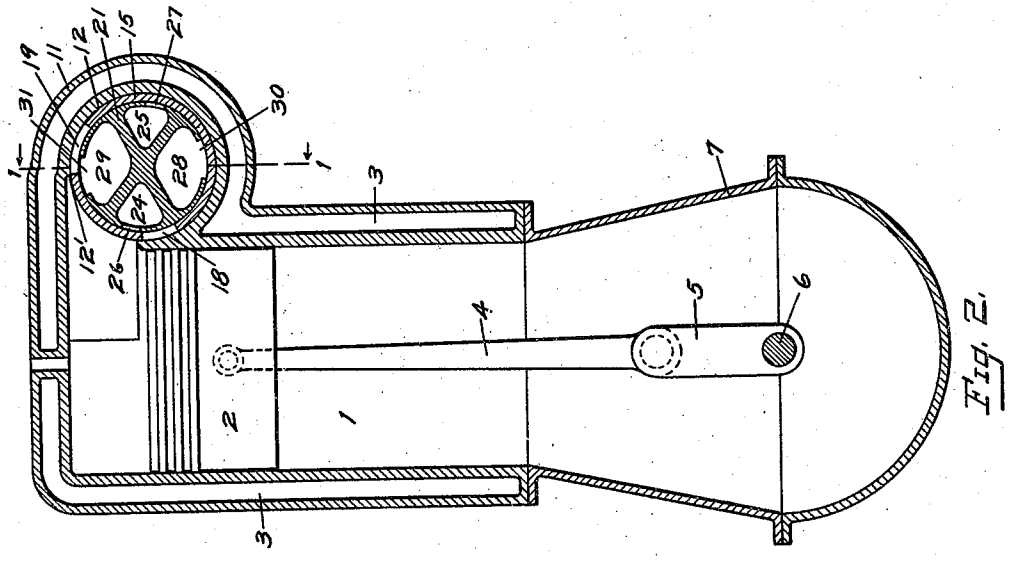


Fig. 2.

WITNESSES:

Manly M. Johnson

R. B. French

Fred D. Moss, INVENTOR.

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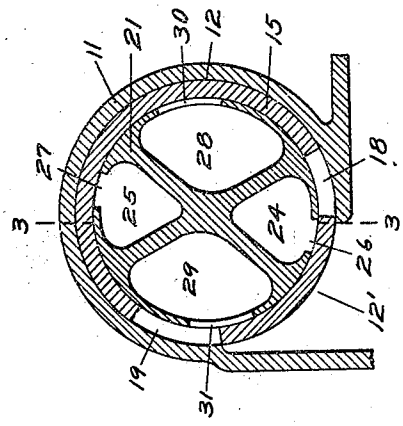


Fig. 4.

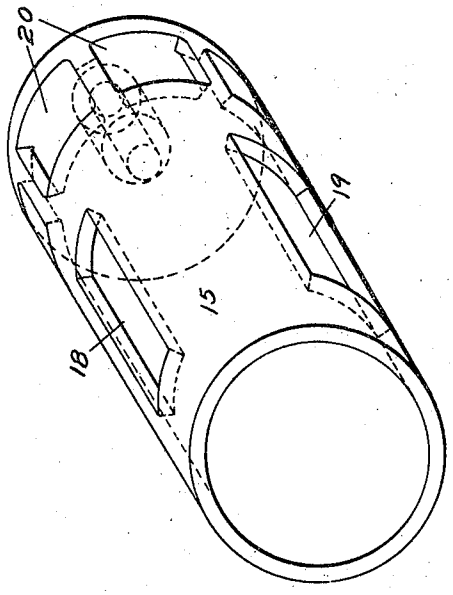


Fig. 6.

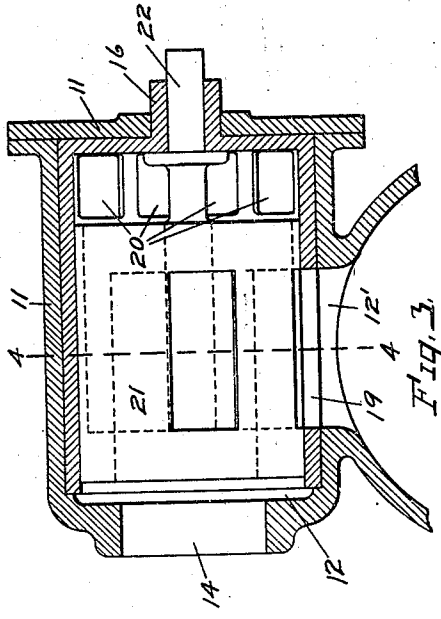


Fig. 3.

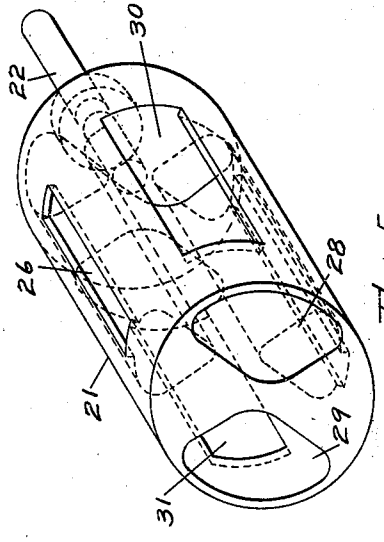


Fig. 5.

WITNESSES:

Manley M. Johnson

R. B. French

Fred D. Moss INVENTOR.

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UNITED STATES PATENT OFFICE.

FRED D. MOSS, OF SEASIDE, OREGON.

GAS-ENGINE.

1,122,529. Specification of Letters Patent. Patented Dec. 29, 1914.

Application filed July 24, 1913. Serial No. 780,946.

To all whom it may concern:

Be it known that I, FRED D. MOSS, a citizen of the United States, residing in the town of Seaside, county of Clatsop, and State of Oregon, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

This invention relates to gas explosive engines and has for its principal object to provide an improved valve mechanism for controlling the supply of an explosive mixture to the cylinder or cylinders and the exhaust of the burned gases therefrom.

There are many different kinds of explosive engines having valve or supply chambers to which the explosive mixture is first supplied, with valve members, both rotary and reciprocating, therein, for controlling the admission of the explosive mixture to the cylinders of said engines, and also the exhaust of the burned gases therefrom. These valve members are of various forms, some having pass pockets of different shapes and sizes therein, and some having ports therethrough, the object sought being to control in a most efficient and effective manner the supply of an explosive mixture to the cylinder, the compression and explosion thereof, and the complete exhaustion of the burned gases from said cylinder, whereby to secure the greatest efficiency with as little noise and friction as possible.

Broadly stated, my invention comprises the use between the cylinder chamber and the supply chamber of an explosive engine, of two coöperating valve elements, movable independently of each other, and having ports therein adapted to be moved into and out of register with each other and with the communicating port or opening between said chambers, whereby to intermittently open communication between the supply chamber and the cylinder chamber for supplying the explosive mixture to the cylinder, and likewise to open for exhaust purposes an outlet from said cylinder chamber. Heretofore this control has been accomplished by means of a movable valve member having ports therein adapted to be moved into register with fixed ports in the wall of the valve or supply chamber.

In my invention, by supplying an independently movable port member between the movable valve member and the wall of the valve or supply chamber, I am able to change the location of the ports to secure the desired results and to move the ports of the valve member and of the port member into register with each other at such times and positions as may be desired to get the best results. In other words, I am able to intermittently bring into open communication with the cylinder chamber inlet or port a supply chamber with a supply of explosive mixture, or an exhaust chamber to permit the escape of the burned gases therefrom.

One practical form of the invention comprises a rotary valve member, occupying a supply or valve chamber, and having within itself one or more supply or receiving chambers in communication with a source of supply of explosive mixture, with feed ports opening therefrom, and also having within itself exhaust chambers, each open at one end and having an outlet port in its side, and a rotary sleeve or port member, with ports therein, interposed between said valve member and the wall of said supply chamber, said sleeve member and said rotary valve member being revoluble at different speeds, if turned in the same direction, to intermittently and alternately bring the ports of said receiving or supply chambers in said valve member, and of said exhaust chambers, into register with the ports in said rotary sleeve member and said cylinder port or opening, for supply and exhaust purposes.

In order that others may understand my invention, I have shown in the accompanying sheets of drawings, one practical embodiment thereof, which I will now describe.

In the drawings,—Figure 1 is a side elevation of a gas engine embodying my invention, with a part shown in section, as if taken on line 1—1 of Fig. 2; Fig. 2 is a vertical sectional view thereof, as if taken on a line 2—2 indicated on Fig. 1; Fig. 3 is a longitudinal sectional view through the supply or valve chamber, showing the valve member in elevation, and the intermediate port or sleeve member in section; Fig. 4 is a cross sectional view through said supply or valve chamber; Fig. 5 is a perspective view of the valve member detached, and showing the receiving and exhaust chambers therein, with ports opening therefrom through the wall of said valve member; and Fig. 6 is a perspective view of the sleeve or port member within which the valve member fits.

Referring now to the drawings, 1 designates a cylinder with piston 2 working therein, which said cylinder has a double wall construction to provide a water jacket 3 therefor, and which said piston 2 is connected by means of a piston rod 4 to a crank arm 5, upon a crank shaft 6, mounted in the lower part of a suitable supporting casing or shell 7 for said cylinder. Mounted upon one end of said shaft 6 is the usual fly wheel 8, and mounted upon said shaft at the opposite side of said casing 7 are two small sprocket wheels 9 and 10, for a purpose hereinafter referred to. At the upper end of said cylinder is provided an extension 11, forming a valve or supply chamber 12, with one side in open communication with said cylinder chamber, as at 12', said valve or supply chamber 12' having a supply or inlet port, as 13, and being open at its opposite end, as at 14, for exhaust purposes, hereinafter again referred to. Rotatably mounted within said valve or supply chamber 12 is a port member or sleeve 15, shown in perspective view in Fig. 6, and provided with a spindle, as 16, Figs. 1 and 3, projecting through the end wall of said supply chamber, to receive a driving sprocket, as 17, Fig. 1, said port member or sleeve being open at its opposite end and provided in its sides, extending longitudinally thereof, with two ports, as 18 and 19, and near its opposite or closed end with a series of inlet ports 20—20, which provide communication to the interior thereof from the supply port 13 into said supply chamber.

Rotatably mounted within said sleeve or port member 15, is a valve member 21, shown in perspective in Fig. 5, said valve member having an operating shaft 22 extending through the spindle 16 of the sleeve 15, and the end wall of the extension 11, to receive a driving sprocket 23, Fig. 1, again referred to. Said valve member 21, is provided interiorly, extending longitudinally thereof, with two oppositely disposed receiving chambers 24—25, open at their inner ends, whereby to receive supplies of the explosive mixture through the openings 20—20, in the sleeve or port member 15, and having outlet ports 26—27 in their sides, as indicated, adapted to be alternately moved into and out of register with the port 18 in the sleeve member 15. It will be noted that said valve member 21 is shorter than the sleeve member 15, so that there is a space between the closed end of said sleeve and the inner end of said valve member, which is also closed, except the ends of the receiving chambers 24 and 25 formed therein, which are open to receive the explosive mixture entering through the supply port 13 and the openings 20—20 in said sleeve member. Said valve member 21 has also formed therein two oppositely disposed exhaust chambers 28 and 29, open through the opposite end of said valve member, as indicated, whereby to discharge through the open end 14 of said extension 11. Said exhaust chambers also have ports 30 and 31 through their sides, positioned so as to be moved into and out of register with the ports of the sleeve member 15, as hereinafter again referred to. It will be noted that the receiving or supply chambers 24 and 25 are smaller than the exhaust chambers 28 and 29 and that the chambers are disposed alternately around the valve member body, the supply chambers 24 and 25 being open at their inner ends and closed at their outer ends, while the exhaust chambers are closed at their inner ends and open at their outer ends, as shown.

The sprocket wheels 17 and 23 on the sleeve spindle 16 and the valve member shaft 22, respectively, are connected by means of sprocket chains 32 and 33 with the sprockets 9 and 10, respectively, on the crank shaft 6. The sprocket 23 is twice the diameter of the sprocket 17, and four times the diameter of the sprockets 9 and 10, whereby the sleeve 15 and the valve member 21 are revolved one-half and one-fourth as many times, respectively, as is the crank shaft 6. The sleeve or port member 15 will be revolved twice as fast as the valve member 21, so that port 18 in said sleeve member will overtake the port 26 from the supply or receiving chamber 24 in the valve member, and register therewith during their movement across the opening into the cylinder chamber, whereby the downward movement of the piston 2 will operate to cause a supply of explosive mixture from the supply chamber 24 to rush into the cylinder chamber through the ports 18 and 26, said chamber 24 being in open communication with the supply or inlet port 13. The port 18 in the sleeve 15 passes the port 26 in the valve member 21, and thereby closes the cylinder chamber inlet. The next up stroke of said piston operates to compress the charge of gas confined therein, at the finish of which the explosion takes place in the usual manner and the piston is forced downwardly on a power stroke.

The action of the piston and crank shaft, which have traveled through one and a half revolutions, has caused the sleeve member 15 to travel through three-fourths of a revolution, inasmuch as said sleeve 15 is geared to the crank shaft in the ratio of two to 1, and the valve member 21, being geared in the ratio of 4 to 1, revolve three-eighths of a revolution. This brings the port 19 in the sleeve 15, and the lower port 30 from the exhaust chamber 28, in the valve member 21, into register with the cylinder opening, whereupon the next up stroke of said piston forces all the burned gases from the cylinder.

The continued revolutions of the various

parts again bring the port 18 in the sleeve 15, and the other supply port 27, from the supply chamber 25, in the valve member, into register with each other at the cylinder opening, so that as the piston starts downwardly, another supply of the explosive from chamber 25 is caused to move into the cylinder, as before, and thus the operation of supplying, compressing, exploding and expelling is repeated in the operation of the engine.

I have shown and described but one embodiment of the invention for purposes of illustration, and am aware that many changes and modifications can be made therein without departing from the spirit of the invention, and I do not, therefore, limit the invention to the particular form or embodiment thereof here illustrated, except as I may be limited by the hereto appended claims, forming a part thereof.

I claim:

1. In an explosive engine, in combination, a cylinder with piston therein, and with supply or valve chamber opening thereinto, a rotary sleeve or port member with ports therein for inlet and exhaust purposes, a rotary valve member within said sleeve member with inlet and exhaust ports therein adapted to be moved into and out of register with the ports of said sleeve member, and means for driving said sleeve member and said valve member at different speeds in the same direction, substantially as described.

2. In an explosive engine, in combination, a cylinder with supply or valve chamber opening thereinto, a piston in said cylinder, a crank shaft driven by said piston, a rotary valve member with ports therein in said valve chamber, a rotary sleeve or port member interposed between said rotary valve member and the wall of said valve chamber and having ports therein adapted to be moved into register with the ports of said rotary valve member, and different driving connections from said crank shaft to said rotary valve member and said rotary sleeve member for driving them at different speeds in the same direction, for the purpose referred to.

3. In combination with a cylinder, piston and crank shaft, of a rotary valve member having supply and exhaust chambers formed therein and with ports in their sides, a sleeve or port member inclosing said valve member and having ports therein adapted to be moved into and out of register with the ports in said valve member, and driving connections from said crank shaft for driving said rotary valve member and said sleeve or port member at different speeds in the same direction, for the purpose indicated.

4. In an explosive engine, a rotary valve member having formed therein supply and exhaust chambers with ports thereinto, a rotary sleeve inclosing said valve member and having ports therein adapted to be moved into and out of register with the ports of said valve member, and means for driving said rotary valve member and said sleeve at different speeds in the same direction, for the purpose described.

5. In an explosive engine, in combination with the cylinder, piston and crank shaft thereof, a rotary valve member with supply and exhaust chambers formed therein and having ports therefor, a rotary sleeve or port member, with ports therein, over said valve member, and driving connections from said crank shaft for driving said rotary valve member and said rotary sleeve member at different speeds in the same direction, substantially as described.

6. In an explosive engine, in combination with the cylinder, piston and crank shaft thereof, a supply chamber opening into said cylinder with supply inlet port and outlet opening, a sleeve or port member revolubly mounted in said supply chamber and having ports in its sides, a rotary valve member with supply chambers formed therein in communication with said sleeve member and ports therefrom adapted to be moved into register with ports in said sleeve member, and with exhaust chambers formed therein with ports adapted to be moved into and out of register with the ports in said sleeve member, and driving connections from said crank shaft for driving said sleeve and said valve member at different speeds in the same direction, for the purpose referred to.

7. In an explosive engine of the character referred to, in combination with a cylinder, piston and crank shaft, a supply or valve chamber opening into said cylinder, a rotary sleeve or port member mounted in said chamber and open at one end and having ports through its side, a rotary valve member mounted within said sleeve or port member and having formed therein supply chambers in open communication with said sleeve, and exhaust chambers opening through the open end of said sleeve, said supply and exhaust chambers having ports in their sides adapted to be moved into and out of register with the ports in the side of said sleeve or port member, and driving connections from said crank shaft to said sleeve or port member and to said rotary valve member for driving them at different speeds in the same direction, for the purpose described.

8. In an explosive engine of the character referred to, in combination, a cylinder with opening thereinto, a piston in said cylinder, supply connections to said cylinder opening, exhaust connections to said cylinder opening, a rotary sleeve or port member interposed between said cylinder opening and

said supply and exhaust connections, a rotary valve member with ports therein within said sleeve, and driving connections from said piston for revolving said sleeve and said valve member at different speeds in the same direction to bring their ports into register with each other, alternately between the cylinder opening and the supply connections and the cylinder opening and the exhaust connections, for the purpose described.

Signed at Portland, Multnomah county, Oregon, this 16th day of July, 1913.

FRED D. MOSS.

In presence of—
M. M. JOHNSON,
R. B. FRENCH.