G. L. MEYER.

GAS ENGINE.

APPLICATION FILED APR. 11, 1918.

1,342,922.

Patented June 8, 1920.

2 SHEETS—SHEET 1.

FIG. 1.

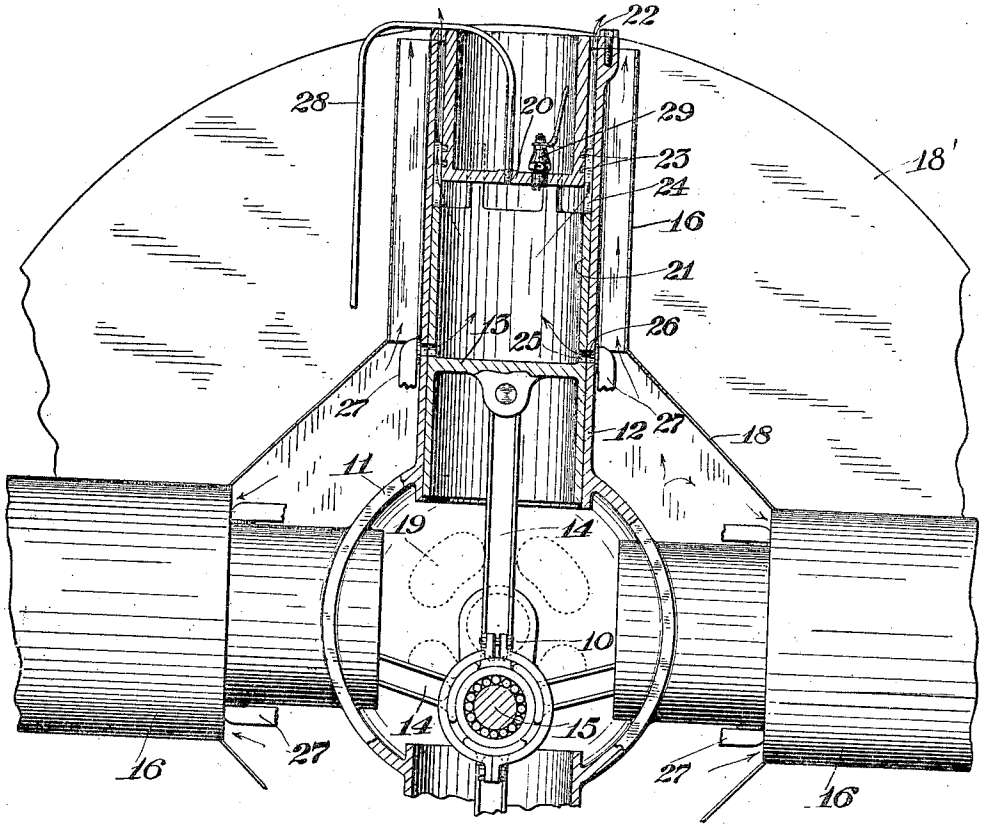
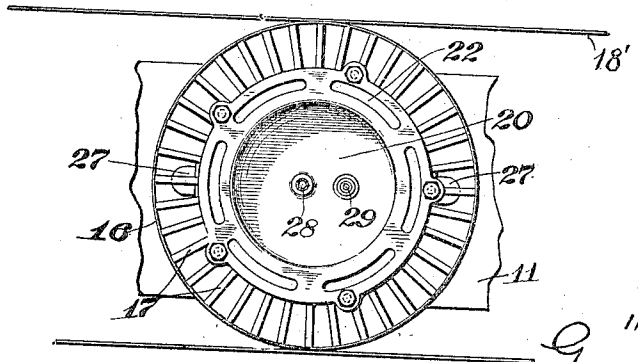


FIG. 3.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 4.

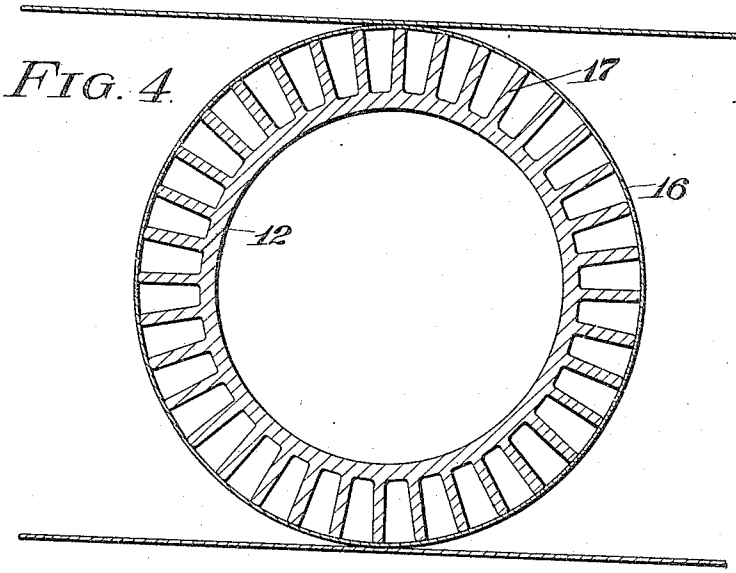
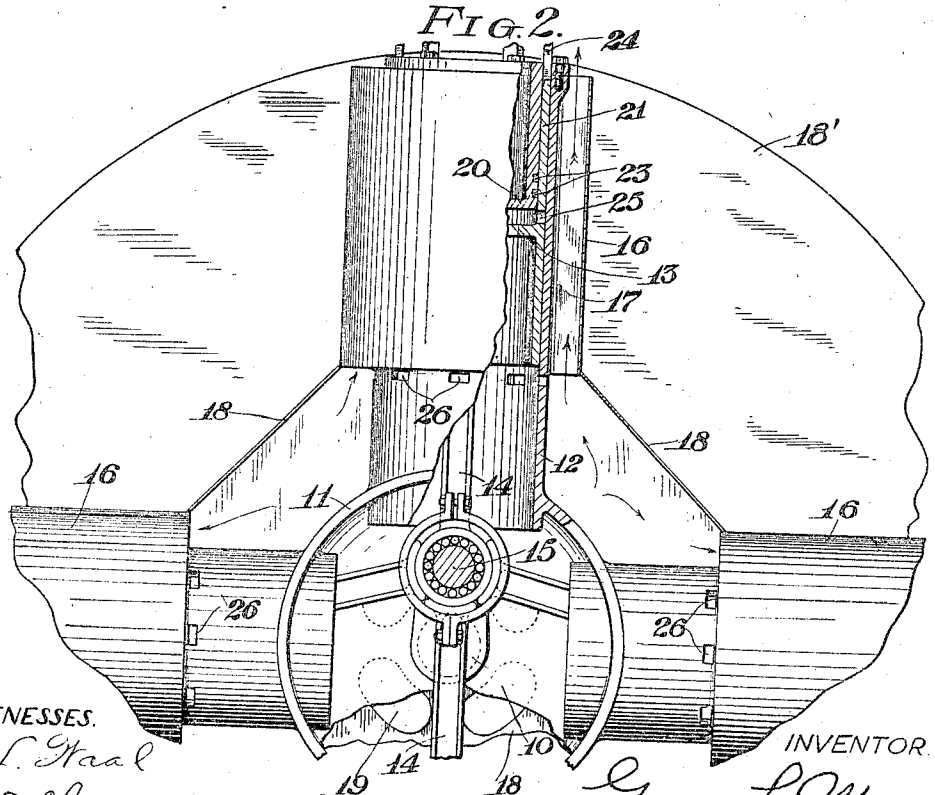


FIG. 2.



WITNESSES.

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GEORGE L. MEYER, OF MILWAUKEE, WISCONSIN.

GAS-ENGINE.

1,342,922. Specification of Letters Patent. Patented June 8, 1920.

Application filed April 11, 1918. Serial No. 227,928.

To all whom it may concern:

Be it known that I, GEORGE L. MEYER, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Gas-Engines, 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 gas engines of the rotary cylinder type such as used for airplanes and has for its object to provide for more efficiently and uniformly cooling the cylinders by currents of air induced by centrifugal force through longitudinal air passageways positioned around the cylinders.

Another object of the invention is to secure efficient scavenging of the burnt gases from the cylinder with an engine of the two cycle type.

With the above and other objects in view, the invention consists of the gas engine, its parts and combinations of parts as herein claimed and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in different views:

Figure 1 is a sectional view of a gas engine embodying the present invention with one cylinder sectioned showing the piston thereof at the end of its working stroke;

Fig. 2 is a similar view of a slightly modified form thereof with the piston at the end of its compression stroke;

Fig. 3 is an end view of one cylinder; and,

Fig. 4 is a transverse sectional view thereof showing the construction of the cooling jacket.

In these drawings 10 indicates a stationary crank shaft and 11 is the rotor mounted to rotate therearound as usual, and carrying the radially positioned cylinders 12. The pistons 13 in the cylinders are connected by their connecting rods 14 with the crank 15 of the crank shaft. In usual practice the cylinders are left without covering so that cooling may be effected by their rapid travel through the air. This, however, causes unequal cooling with a corresponding distortion of the cylinders, for the cooling effect is greater at that portion of the cylinder which is in advance. The distortion from the true cylindrical shape of the cylinder walls causes binding with the pistons and uneven wear of pistons and cylinders, requiring frequent refitting and repairs.

To remedy this defect the present invention provides a cylindrical jacket 16 surrounding each cylinder and spaced therefrom by fitting around numerous longitudinally extending radial fins or ribs 17 around the cylinder and preferably integral with the walls thereof, as shown in Fig. 4. A sheet metal casing 18 connects the inner ends of the jackets 16 to form an inclosure therewith through which air passes for cooling the cylinders. Openings 19 are formed in the ends of the casing 18 near the center and through them air enters the casing and passes out through the narrow passageways between the fins 17 around the cylinders, being forcibly propelled by the rapid rotation of the cylinders and the casing acting on the principle of the blower pump. This outward current of air evenly distributed around each cylinder serves to cool the cylinder walls uniformly and to prevent the distortion that occurs when they are not covered.

Parallel metal disks 18′ are placed at opposite sides of the cylinders in contact with the jackets 16 and extending from the casing 18 to the outer ends of the cylinders to prevent a disturbance of the air by the travel of the cylinders with a consequent resistance to the movements of the rotor.

In order to further utilize the centrifugal force of the rapidly rotating cylinders, provision is made for scavenging the cylinder by opening both ends thereof so as to admit air or explosive mixture at the inner end of the cylinder or the end nearer the crank shaft and to exhaust the burnt gases at the other end. With this object in view the cylinder head 20 is cylindrical and extends a considerable distance within the end of the cylinder 12 with its side walls concentric with the side walls of the cylinder to form an annular space between them. The piston 13 is provided with a sleevelike cylindrical extension 21 fitting within a cylinder 12 and into said annular space. The annular space is open at the outer end of the cylinder, there being slots 22 in the outwardly extending flange of the cylinder head by which it is secured to the end of the cylinder. Piston rings 23 contained in grooves around the inner end of the cylinder head bear against the inner wall of the piston ex-

tension sleeve 21 to form a tight connection therewith, but said extension sleeve is of such length that it passes said rings and the end of the cylinder head before the piston reaches the end of its inward movement and at such times the piston rings 23 are confined in place by means of fingers 24 around the edge of the piston extension sleeve. At the other end of the piston extension sleeve where it joins with the piston proper, there are openings 25 which at the end of the inward movement of the piston register with openings 26 in the cylinder 12 to admit compressed air or an explosive charge either from the casing 18 direct as in Fig. 2, or from pipes 27 from a blower or other supply means as in Fig. 1. The fuel may be introduced into the cylinder either with the air through registering openings 25 and 26, or in a liquid form through a valve-controlled pipe 28 passing through the cylinder head 20. A spark plug 29 is also provided in the cylinder head.

In operation the compression stroke of the piston carries the openings 25 out of register with the openings 26 and closes the exhaust passageway between the end of the piston extension sleeve 21 and the cylinder head 20 so that during the travel of the sleeve 21 in contact with the piston rings 23 the air or charge of explosive mixture is compressed above the piston. If only air has been introduced at the inner end of the cylinder, liquid fuel is injected through the pipe 28. The explosion of the compressed charge is effected by the spark plug as usual either just before or after the piston has reached the end of its outward stroke and the expanding burnt gases are exhausted before the piston reaches the end of its power stroke, or as soon as the extension sleeve 21 passes the end of the cylinder head. Residual pressure within the cylinder will thus be vented before the openings 25 and 26 come into register. When these openings register there is a quick scavenging action due to the rush of air through said openings and the outflow of exhaust gases through the annular space between the cylinder head and the cylinder with the assistance of the centrifugal force of the rotating cylinders tending to produce outwardly directed currents of air for cooling and scavenging the cylinder. Furthermore, the arrangement of the jacket 16 tightly fitting on the radial longitudinally extending ribs or fins of the cylinder serves to greatly strengthen the cylinder, enabling the use of a cast iron cylinder instead of a steel cylinder which is usually employed on account of its greater strength. The cast iron cylinder with a cast iron piston is found to be a better combination for the purpose as there is less likelihood of scoring and their bearing surfaces take a glaze, reducing friction and increasing efficiency.

I desire it to be understood that the invention is not limited to any specific form or arrangement of parts except in so far as such limitations are specified in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a gas engine of the rotary cylinder type, the combination with the rotary cylinder, of a hollow jacket surrounding the cylinder and open at both ends, a scavenge port in the cylinder, means for controlling the passage of scavenging air to the interior of the cylinder, and means for simultaneously conducting air both to the scavenge port and through the jacket under the influence of the centrifugal force of the rotating cylinder.

2. In a gas engine of the rotary cylinder type, the combination with the rotary cylinder of an inclosed crank case having an air inlet, a hollow jacket surrounding the cylinder and communicating at its inner end with the crank case and open at its outer end, scavenge ports in the cylinder in communication with the crank case, and means for controlling the passage of scavenging air through said ports, the rotation of the cylinder simultaneously inducing by centrifugal force the passage of air through the jacket and through the interior of the cylinder.

3. In a gas engine of the rotary cylinder type, the combination, with the rotary cylinder, of a hollow jacket surrounding the cylinder and open at both ends, a casing communicating with the cylinder and jacket, and means under the influence of centrifugal force of the rotating cylinder for supplying both the interior of the jacket and cylinder with air from said casing.

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

GEORGE L. MEYER.

Witnesses:
R. S. C. CALDWELL,
H. D. CHASE.