A. G. CARLSON.

ROTARY GAS ENGINE.

APPLICATION FILED JULY 28, 1913.

1,197,340.

Patented Sept. 5, 1916.

6 SHEETS—SHEET 1.

Fig. 2.

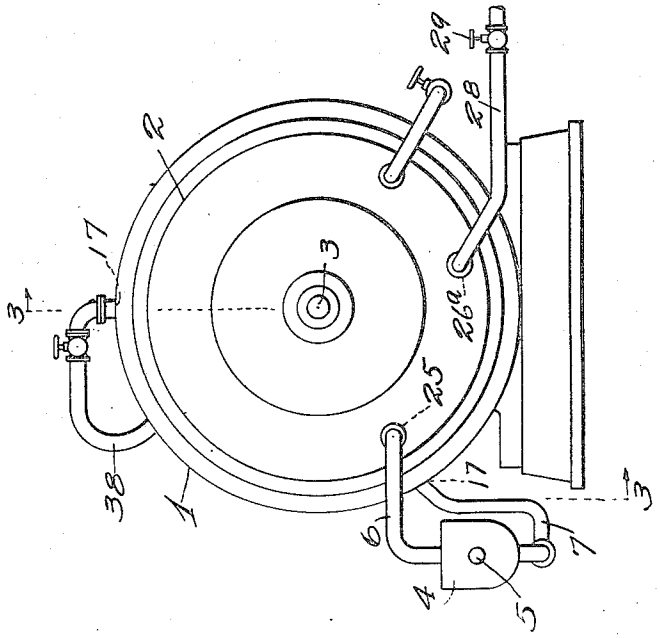
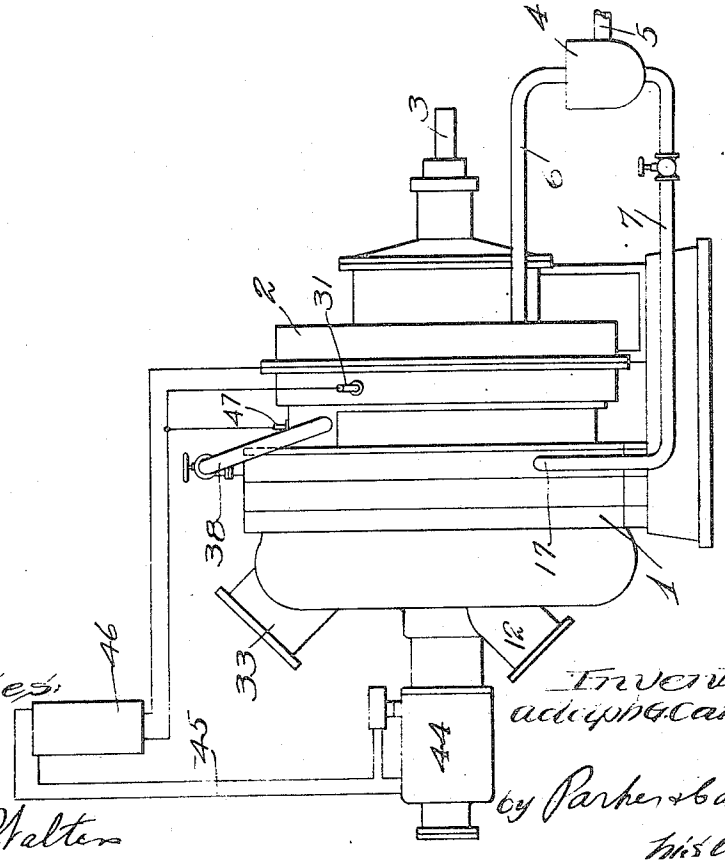


Fig. 1.



Witnesses:

Denis A. Walter

Inventor

Adolph G. Carlson

by Parker & Burton

his Attys

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6 SHEETS—SHEET 2.

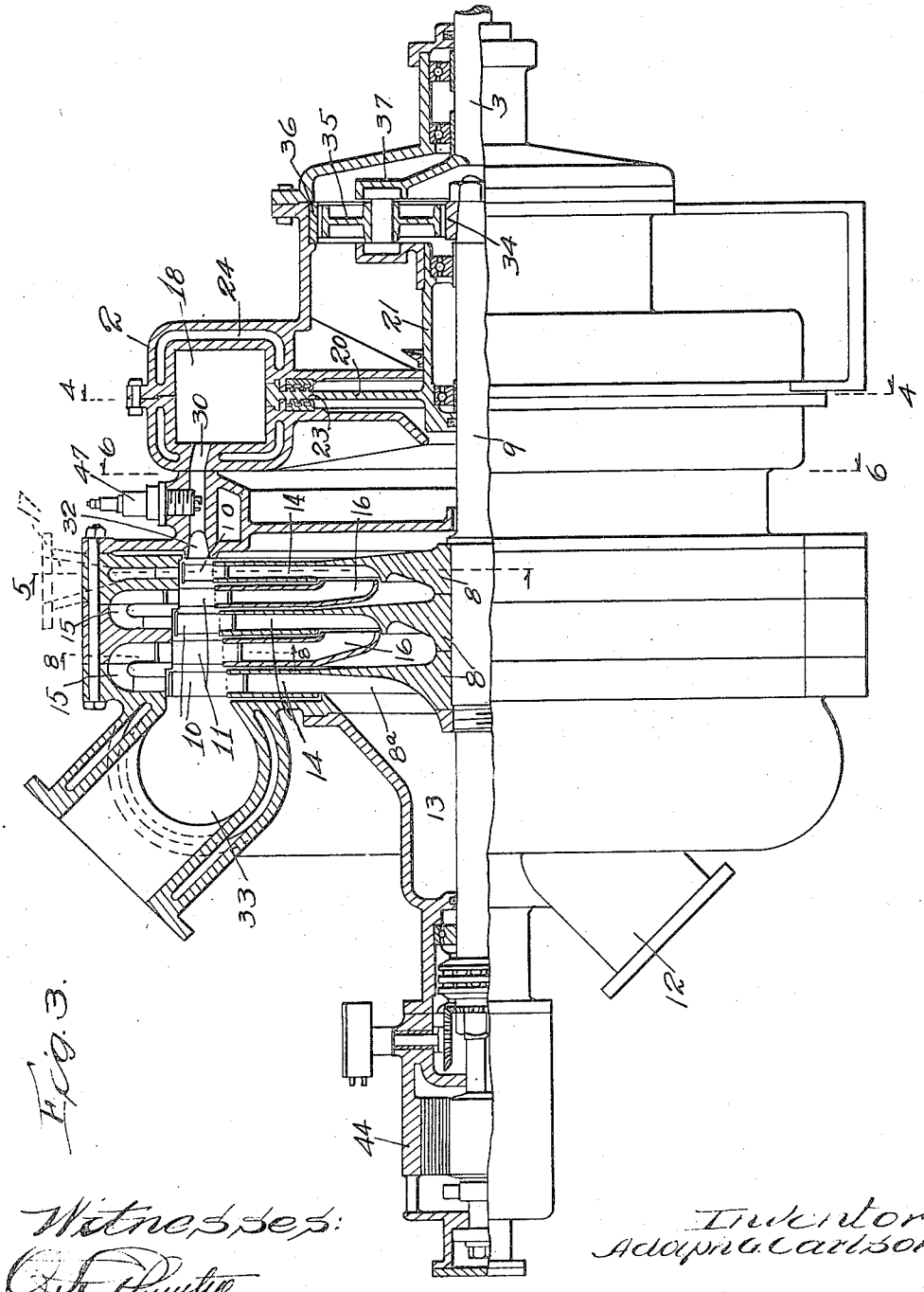


Fig. 3.

Witnesses:

C. H. Hamilton

Denie A. Walters

Inventor

Adolph G. Carlson.

by Parker & Carter

his Attys.

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6 SHEETS—SHEET 3.

Fig. 4

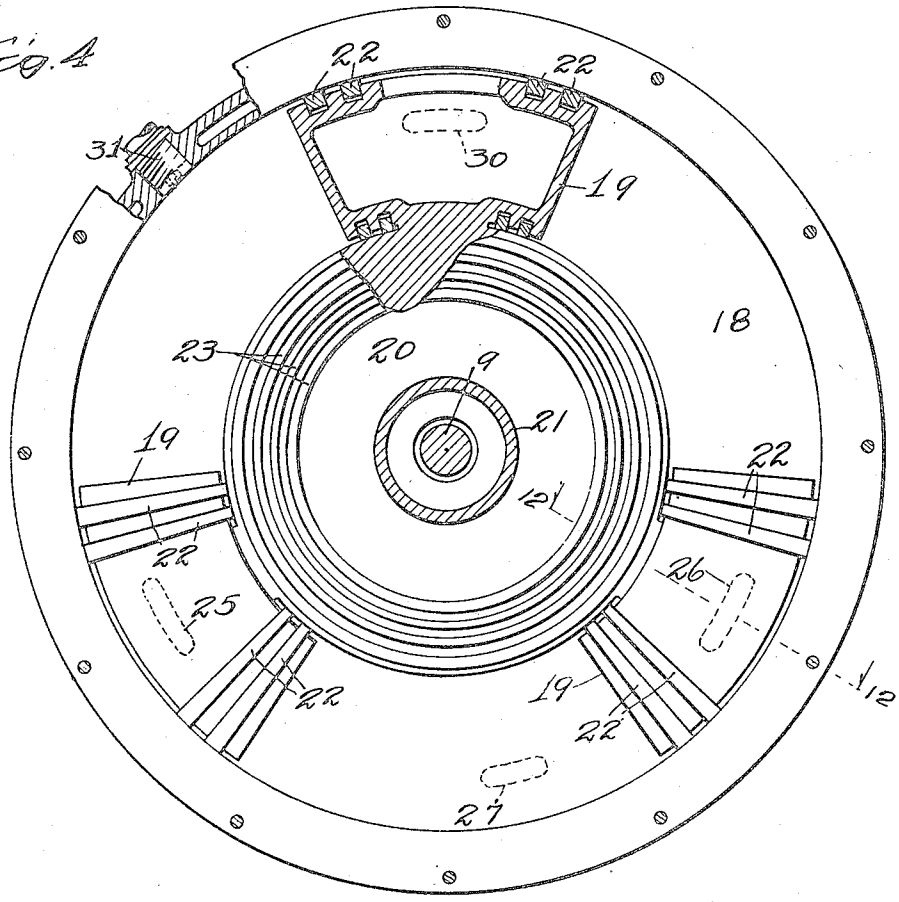
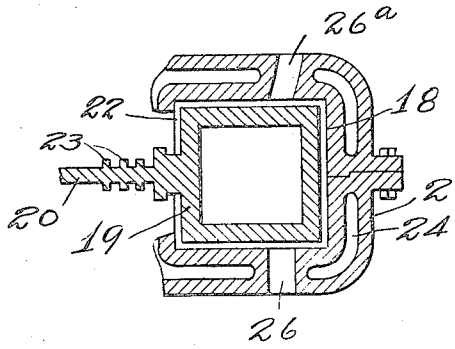


Fig. 12.



Witnesses:
C. F. Hunter
Denis A. Walter

Inventor
Adolph G. Carlson.
by Parker & Carter
his Attys.

A. G. CARLSON.

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6 SHEETS—SHEET 4.

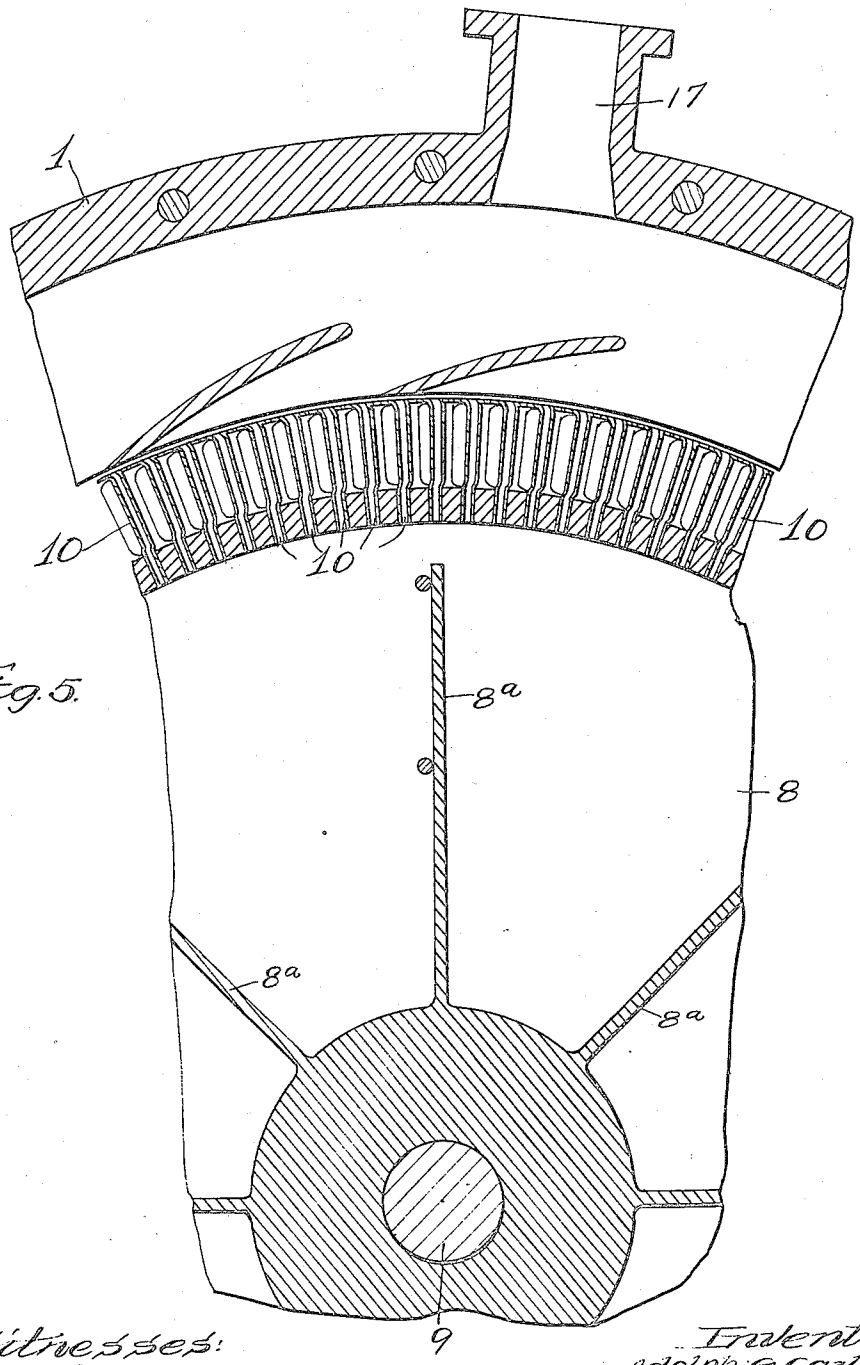


Fig. 5.

Witnesses:

Denis A. Walter

Inventor:
Adolph G. Carlson.

by Parker & Burton
his Attys.

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6 SHEETS—SHEET 5.

Fig. 6.

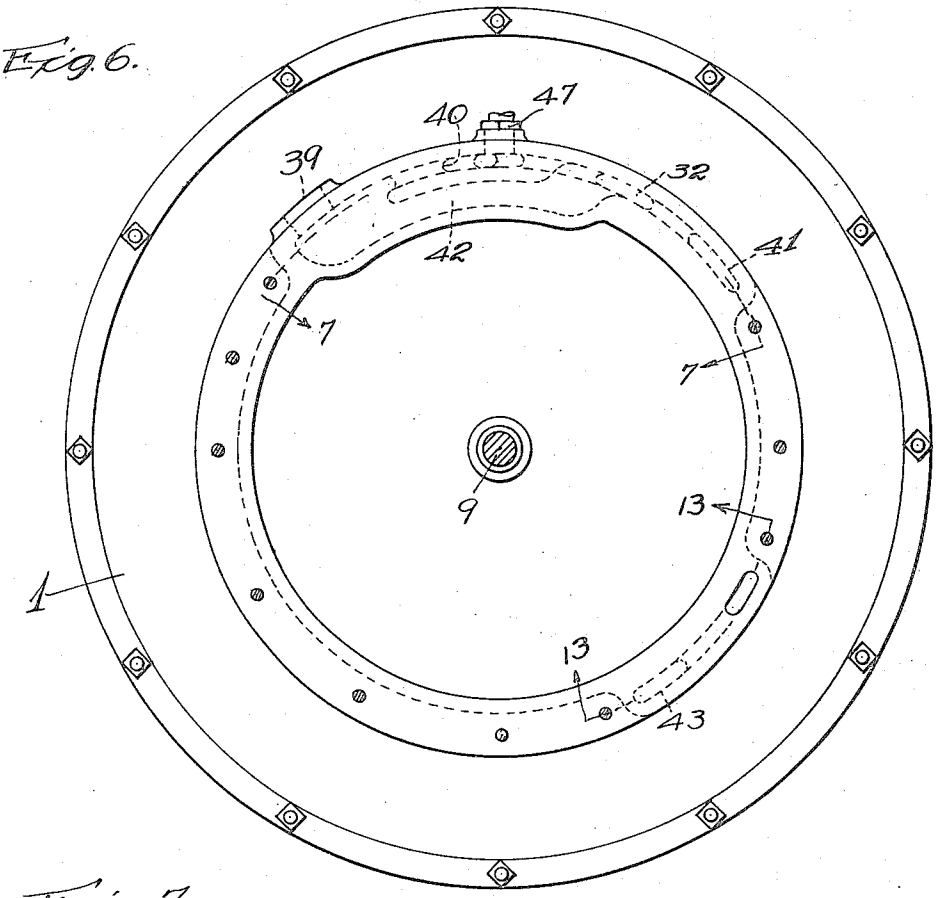


Fig. 7.

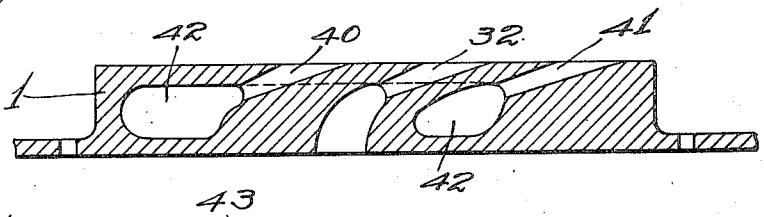
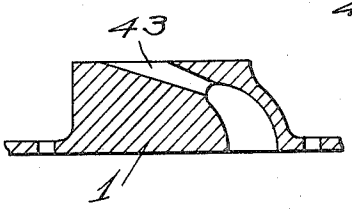


Fig. 13.



Witnesses:

C. F. Hunter

Denie A. Walters

Inventor

Adolph G. Carlson.

by Parker & Carter

his Attys.

A. G. CARLSON.

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6 SHEETS—SHEET 6.

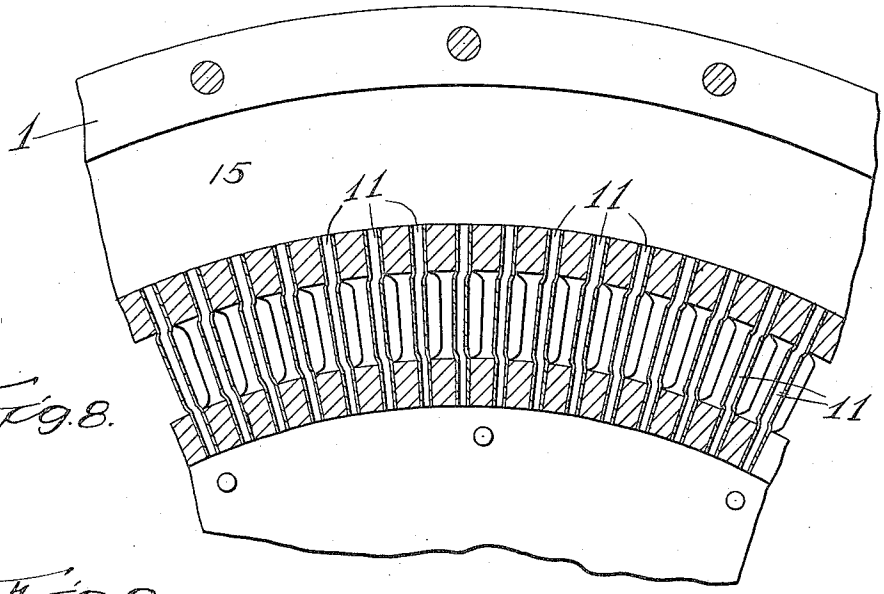


Fig. 8.

Fig. 9

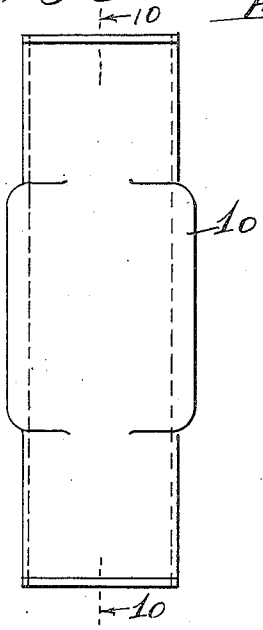


Fig. 10

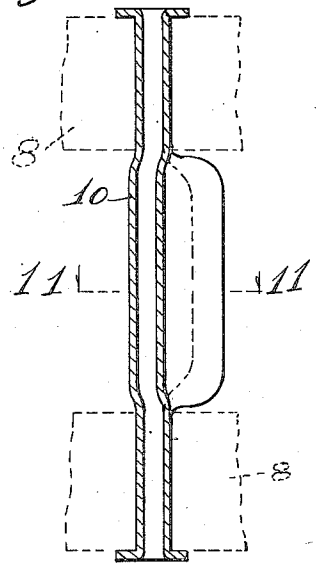
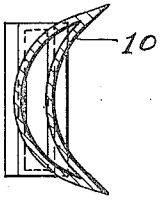


Fig. 11.



Witnesses:

Denis A. Walters

Inventor

Adolph G. Carlson

by Parker & Carter

his Att'ys.

UNITED STATES PATENT OFFICE.

ADOLPH G. CARLSON, OF CHICAGO, ILLINOIS.

ROTARY GAS-ENGINE.

1,197,340. Specification of Letters Patent. Patented Sept. 5, 1916.

Application filed July 28, 1913. Serial No. 781,504.

To all whom it may concern:

Be it known that I, ADOLPH G. CARLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rotary Gas-Engines, of which the following is a specification.

This invention relates to rotary gas engines and has for its object to provide a new and improved engine of this description.

The invention is illustrated in the accompanying drawings wherein—

Figure 1 is a side elevation of one form of engine embodying the invention; Fig. 2 is an end elevation of the device shown in Fig. 1; Fig. 3 is a sectional view taken on line 3—3 of Fig. 2; Fig. 4 is a sectional view taken on line 4—4 of Fig. 3; Fig. 5 is a sectional view taken on line 5—5 of Fig. 3 with parts omitted; Fig. 6 is a sectional view taken on line 6—6 of Fig. 3; Fig. 7 is a sectional view taken on line 7—7 of Fig. 6; Fig. 8 is a sectional view taken on line 8—8 of Fig. 3; Fig. 9 is a view of one of the stationary blades; Fig. 10 is a sectional view taken on line 10—10 of Fig. 9; Fig. 11 is a sectional view taken on line 11—11 of Fig. 10; Fig. 12 is a sectional view taken on line 12—12 of Fig. 4; Fig. 13 is a sectional view taken on line 13—13 of Fig. 6.

Like numerals refer to like parts throughout the several figures.

Referring now to Figs. 1 and 2 wherein I have shown one form of engine embodying the invention, said engine is provided with a suitable casing made up of a section 1 containing a turbine wheel, and a section 2 containing the explosion chambers. The engine is provided with a driving shaft 3 by means of which the power is applied to the driven device. The carbureter 4 is connected to the fuel supply by a pipe 5. The fuel supply enters the carbureter and is mixed with air and passes to the explosion chamber by way of pipe 6. Air for the carbureter is supplied from the turbine wheel by means of pipe 7.

Referring now to Fig. 3, the turbine wheels 8 are connected with the shaft 9 so as to drive the same. Connected at the periphery of the turbine wheels 8 are the turbine blades 10. The wheels 8 are also built as fan impellers, any desired arrangement being used. In the construction shown, these turbine wheels are provided with the air moving parts 8^a extending from the hub toward the periphery. I prefer to have a space between the ends of the parts 8^a and the open ends of the turbine blades so as to secure a more uniform distribution of the air. When the propeller wheels are in motion they create air suction and blast thereby forcing air through the hollow turbine blades 10 and through the stationary blades 11. These hollow stationary blades are thereby kept cool at all times. The air enters the casing 1 through the openings 12. The air passes up through passage 13 into the hollow part 14 of the first turbine wheel. It then passes through the hollow turbine blade 10 into an air passage way 15 in the casing. It travels from this passage way 15 through the stationary blade 11 and then through the passage way 16. From the passage way 16, it enters the hollow part 14 of the next turbine wheel and is passed up through this blade and through the next air passage 15 and through the next stationary blade 11 and into the hollow stationary part 16 and thence through the next turbine wheel. The air passes out through openings 17, of which in the particular construction shown there are three in number. One is connected with the carbureter 4 as shown in Figs. 1 and 2, and another is connected with the port 26 leading to the explosion chamber, and the other leads to nozzles on each side of the nozzle through which the exploded gases pass to the turbine wheels so that air may be mixed therewith to prevent the turbine wheels from getting too hot.

Associated with the turbine wheels is the explosion chamber 18. In this explosion chamber are a series of valves 19 which are connected by means of a disk 20 with a hollow hub or shaft 21 rotatably mounted on the shaft 9. The valves 19 divide the explosion chamber into three sections (see Fig. 4) and are provided with packing rings 22 so that when the gas explodes it cannot pass from one section to another. In order to prevent the gas from escaping from the explosion chamber through the opening for the disk 20, I provide a labyrinth packing 23 extending therearound and which prevents its escape. The valves and explosion chamber are made in halves to facilitate

the machine work and are assembled into the complete structure. The explosion chamber may be water or air cooled by means of the chambers 24. The gas from the carbureter passes through pipe 6 into the explosion chamber 18 through the port 25. In order to discharge the burnt gases from the section of the chamber in which the explosion has occurred and after the valves have moved so as to disconnect this section from the chamber containing the turbine blades, air from one of the openings 17 is directed through port 26 into such section of the explosion chamber and drives the burnt gas out of the port 26a. The ports 25, 26 26a and 27 are controlled by the valves 19. When the explosive mixture enters the port 25, the port 27 will be open so that the air in the section of the explosion chamber into which the explosive mixture is entering will be driven out through said port 27. The outlet port 26a is connected with a pipe 28 (see Fig. 2) controlled by a valve 29. As the valves 19 move forward, the port 27 is closed and the section between the two valves is filled with explosive mixture through the port 25. As the valves move forward this section of explosive mixture is carried forward and just as the port 30 is opened, the gas is exploded by means of the spark plug 31, and passes through the port 30 and the nozzle 32 (see Fig. 3) into the chamber containing the turbine blades. The gas striking the turbine blades causes a rotation thereof, and then passes out into the exhaust chamber 33. After this mixture is exploded and most of it has passed through the port 30, there will be some foul gas left in the explosion chamber. As the valves move along, this foul gas is driven out by the air which enters through port 26 when this port is open as before described. A fresh charge of explosive gas is then received and the operation repeated.

It will be seen that in the construction shown that there are three explosive spaces between the three valves, each one being charged with the gas, the gas then exploded and discharged and then re-charged, making a continuous cycle of operation, the exploded gas under pressure being discharged against the air-cooled blades of the turbine wheel so as to drive the shaft 9. In larger turbines, I may use six, nine, twelve, or any other number of these valves that may be desired. The shaft 9 is mounted upon suitable bearings in the casing and is connected with the driving shaft 3 by reducing gearing. In the particular construction shown, the shaft 9 is provided with a pinion 34 which meshes with a plurality of gears 35. In the particular construction shown, there are two of these gears 35, but any other number desired may be used. The gears 35 engage the internal gear 36 on the frame and are mounted upon a rotating frame 37 which is connected to the shaft 3 so as to rotate it. Disk 20 which is connected to valve 19 in the explosion chamber is connected with the movable frame 37 so that the valves 19 are operated from this reducing gearing. The air through the third opening passes through pipe 38 (see Fig. 2) and enters the opening 39 in the turbine wheel casing and passage 42 and passes through the nozzles 40 and 41 located on opposite sides of the nozzle 32 through which the hot gases pass to the turbine blades (see Fig. 7). This air becomes mixed with the hot gas which propel the turbine blades and prevent the turbine blades from becoming too hot. The turbine wheel casing is also provided with another nozzle 43 (see Fig. 13) through which is discharged the air and foul gas driven out of the explosion chamber through the port 26a. This gas strikes the turbine blades and exerts its force thereon so as to create a certain amount of power. At the end of the shaft 9 I prefer to provide a generator 44 of the magneto type for ignition purposes. This generator may be of any suitable type and I therefore have not described it in detail. The conductors 45 from this generator lead to the spark coil 46 and from this spark coil to the spark plugs 31 and 47, the latter plug being inserted in the passage way leading from the explosion chamber to the turbine wheel chamber (see Fig. 3).

It will be noted that when the engine is in operation, the air set in motion by the turbine wheel passes through the movable turbine blades and stationary hollow blades so as to cool them and that it is this heated air which enters the explosion chamber to scavenge it and enters the carbureter to supply air thereto as hereinbefore described.

I claim:

1. A rotary gas engine comprising a turbine wheel, a casing therefor, means for discharging gas under pressure against said turbine wheel to rotate it, said turbine wheel provided with a fan impeller forming a part thereof, adapted to set the air in motion to create an air blast when the turbine wheel is in motion, said turbine wheel provided with a series of hollow blades, a series of stationary hollow blades, and means for directing air set in motion by said fan impeller through both sets of hollow blades.

2. A rotary gas engine comprising a turbine wheel, a casing therefor, means for discharging gas under pressure against said turbine wheel to rotate it, said turbine wheel provided with a fan impeller forming a part thereof adapted to set the air in motion to create an air blast when the turbine wheel is in motion, said turbine wheel provided with a series of hollow blades, a series of stationary hollow blades, air passages connecting the hollow blades of the turbine wheel with

the stationary hollow blades and means for directing air set in motion by the turbine wheel through the hollow turbine blades and said air passages and said hollow stationary blades.

3. A rotary gas engine comprising a rotating turbine wheel, a series of movable hollow blades associated therewith against which the hot gas which drives the turbine wheel is directed, a series of stationary hollow blades associated with the movable hollow blades and means for forcing air from a common source through said movable hollow blades and stationary hollow blades when the turbine wheel is in operation.

4. A rotary gas engine comprising a rotating turbine wheel, a casing therefor, an explosion chamber associated therewith, a plurality of valves in said explosion chamber dividing it into sections said valves moving entirely around the explosion chamber when the engine is in motion and a connection between said explosion chamber and the turbine wheel casing through which gas is directed to the turbine wheel.

5. A rotary gas engine comprising a rotating turbine wheel, a casing therefor, an explosion chamber associated therewith, a plurality of valves in said explosion chamber dividing it into sections said valves located about a common axis and means for moving said valves around said axis and a connection between said explosion chamber and the turbine wheel casing through which gas is directed to the turbine wheel, and means for successively directing a charge of gas into each of said sections of the explosion chamber and exploding it.

6. A rotary gas engine comprising a turbine wheel, a casing for said turbine wheel, a nozzle for directing gas under pressure against said turbine wheel to operate it and an air nozzle associated with said gas nozzle by means of which air is simultaneously inserted in said turbine casing against the turbine wheel to assist in cooling it and means within said casing for supplying air to said air nozzle.

7. A rotary gas engine comprising a turbine wheel, a casing therefor, means for discharging gas under pressure against said turbine wheel to rotate it, an explosion chamber extending around a central axis, moving valves in said explosion chamber which move around said central axis, an air moving device associated with said turbine wheel, means for directing air set in motion by said air moving device into said explosion chamber to scavenge it.

8. A rotary gas engine comprising a turbine wheel, a casing therefor, means for discharging gas under pressure against said turbine wheel to rotate it, an explosion chamber extending around a central axis, moving valves in said explosion chamber which move around said central axis, an air moving device associated with said turbine wheel, means for directing air set in motion by said air moving device into said explosion chamber to scavenge it and means for directing said air and exploded gases from said explosion chamber against said turbine wheel to assist in rotating it.

9. A rotary gas engine comprising a rotating turbine wheel, a series of movable hollow blades connected with said wheel so as to rotate therewith and against which the hot gas which drives the wheel, is directed, a series of stationary hollow blades associated with the hollow blades on the wheel, the hollow blades and the blades on the wheel alternating, and means for successively forcing air through the hollow blades and the movable blades on the wheel when the wheel is in operation.

In testimony whereof, I affix my signature in the presence of two witnesses this 12th day of July 1913.

ADOLPH G. CARLSON.

Witnesses:
DENIE A. WALTERS,
LAUREL M. DOREMUS.