L. L. FEMONS.

TURBINE EXPLOSIVE ENGINE.

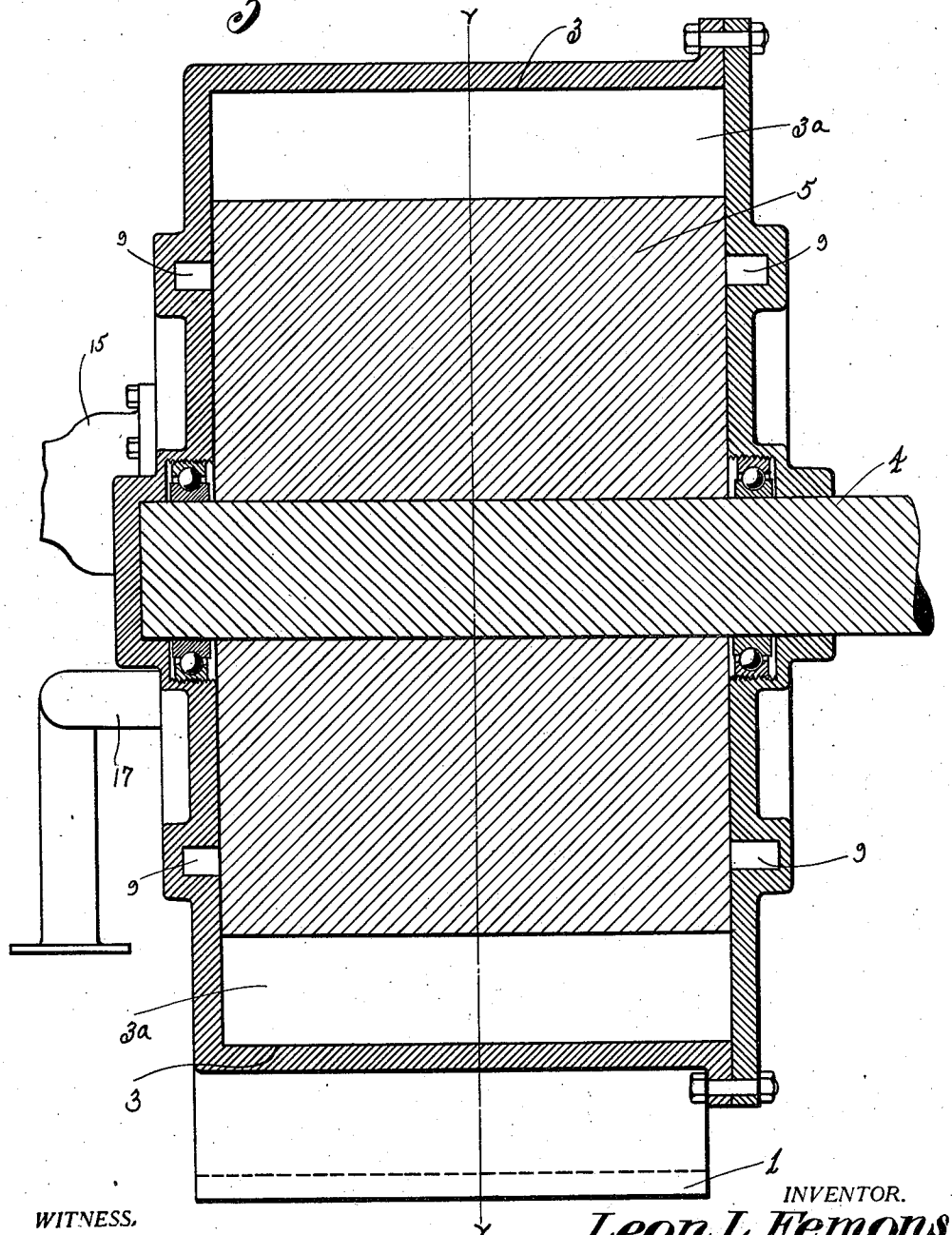
APPLICATION FILED APR. 3, 1916.

1,217,733.

Patented Feb. 27, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESS.

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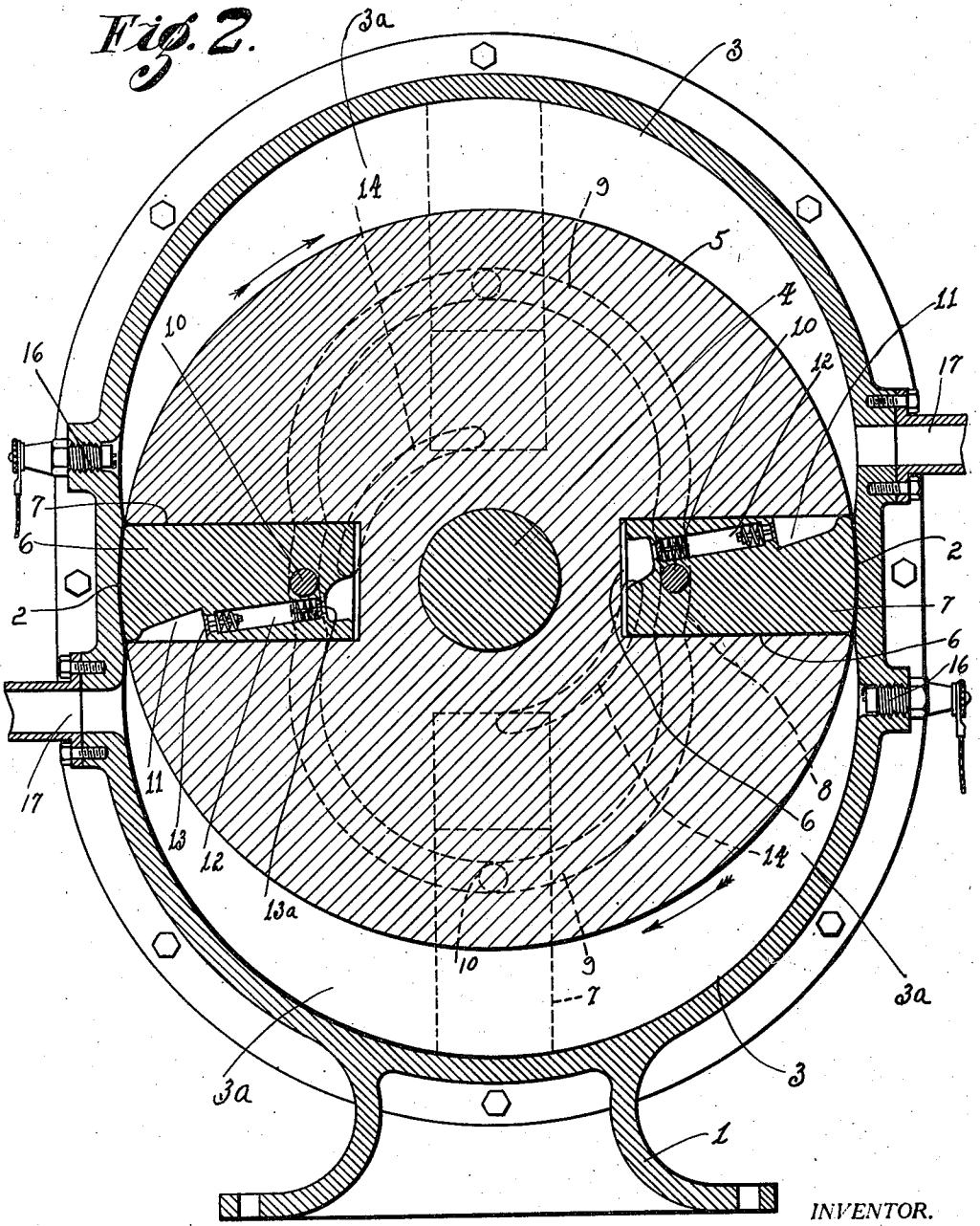
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2 SHEETS—SHEET 2.

Fig. 2.



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LEON L. FEMONS, OF FRESNO, CALIFORNIA.

TURBINE EXPLOSIVE-ENGINE.

1,217,733. Specification of Letters Patent. Patented Feb. 27, 1917.

Application filed April 3, 1916. Serial No. 88,455.

To all whom it may concern:

Be it known that I, LEON L. FEMONS, a citizen of the United States, residing at Fresno, in the county of Fresno, State of California, have invented certain new and useful Improvements in Turbine Explosive-Engines; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in gas, gasolene and oil engines or any other types of engines using explosive fuel, the object of the invention being to produce a turbine engine of the type described which will have a reciprocatory compression mechanism and a rotary impulse mechanism so combined that the action of the rotary impulse mechanism will operate the reciprocatory compression mechanism whereby there will be an alternate compression and explosive expansion of the fuel, all of which will be automatically controlled by the movement and relative arrangement of parts of the engine.

A further object of the invention is to do away with the necessity of the use of a large number of cam controlled valves as is the common practice in the present reciprocating types of engines.

A still further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly useful for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of the parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a vertical section taken through the axis of the turbine.

Fig. 2 is a sectional view taken relatively on a line Y—Y of Fig. 1.

Referring now more particularly to the characters of reference on the drawings the invention embodies first a support 1 which may be in the form of a pedestal or such other suitable brackets or supports as may be found necessary according to the place in which the turbine may be located.

Supported by the support 1 is the main casing of the turbine which comprises primarily two curved sides 2 disposed opposite each other and being arranged concentric with relation to each other, each side 2 having a projecting end member 3 of relatively greater diameter. These end members are disposed relatively opposite to each other and are eccentric with respect to the axis of the sides 2.

While I have here described especially the two sides 2 and the corresponding two sides 3, the casing may be broken into any desired number of said concentric and eccentric sides as it may be desired to have power impulses as will be readily noted from the illustration herein set forth.

Journaled within the casing is the driven shaft 4 fixed to which is a solid cylinder 5 which is concentric with the sides 2 and normally bears against said sides 2. By reason of the fact that the cylinder 5 is concentric with the sides 2 and the sides 3 are eccentric with respect to the sides 2 and of a greater diameter, this forms between the cylinder 5 and the sides 3 eccentric chambers 3^a which will be in practice the explosion chambers of the turbine as will hereinafter appear. Said cylinder 5 is also provided with a pair of radial recesses or chambers 6 movable in which are the impulse vanes 7.

The ends of the casing 2—3 are provided with slots 8 and 9 which follow the contour of the said casing 2—3 while on each of the vanes 7 are projecting pins 10 which are guided in the said slots 8 and 9.

When in their normal innermost position the outer ends of the impulse vanes 7 will lie flush with the outer circumference of the cylinder 5. With the rotation of the cylinder 5 the vanes 7 will be in their innermost position when the pins 10 pass through the slots 8 and when in this position the outer ends of the said vanes 7, as indicated, lie flush with the outer circumference of the cylinder 5 and hence will fit closely against the sides 2 as they pass the same. As soon however as the vanes 7 pass the sides 2 the pins 8 will move into the slots 9 and force said vanes 7 to follow the contour of the sides 3 all for a purpose as will presently appear.

Within each of the vanes 7 is what I will term a compression chamber 11, each compression chamber 11 being connected with its corresponding recess or chamber 6 by

means of a port 12, the communication between the ports 12 and chambers 11 being controlled by spring pressed valves 13.

The numeral 14 designates intake ports opening through the ends of the casing 2—3 and connected by a manifold intake pipe 15 with the carbureter in any suitable manner. These ports 14 commence at points in the casing 2—3 where the impulse vanes 7 are in their innermost position and continue to points where the said impulse vanes are in their outermost position so that with the rotation of the cylinder 5, as long as the vanes 7 are moved outwardly, they will draw into the chambers 6 a supply of the fuel for the engine and with the return movement of the impulse vanes 7 this fuel will be compressed in the said chambers 6 and through the ports 12 past the valves 13 into the compression chambers 11.

Assuming now that the turbine is in the position shown in Fig. 2, there would be a compressed charge of the fuel in each of the chambers 11. Then as the cylinder 5 revolves in the direction shown by the arrows in said Fig. 3, the vanes 7 would leave their contact with the sides 2 and move into contact with the sides 3. The sides 3 being eccentric with respect to the sides 2, and the slots 9 following this eccentric condition would move the vanes 7 so as to follow the contour of the said sides 3. This would bring the compression chambers 11 into such position that they would open communication with the explosion chambers 3^a. As soon as an explosion chamber has received all the compressed fuel from the chamber 11, a spark would be made in the usual manner by spark plug 16 which would explode the compressed fuel and the same would act against the impulse vane 7 to continue the rotation of the cylinder 5 in the direction indicated.

With this continued motion of the cylinder 5 the vane 7 would be forced to follow the eccentric side 3 until it reaches the limit of its outward movement as indicated by dotted lines in Fig. 2. During this entire outward movement it will be intaking a charge of fuel into the chamber 6 through the port 14. After reaching its outermost position the chamber 6 would be moved out of communication with the port 14 and as the vane 7 continues to follow the eccentric side 3 it would again move inwardly which action would compress the fuel out of the chamber 6 into the chamber 11 as described.

After the explosions have taken place against the vanes 7 and driven such vanes completely over the sides 3 and such vanes have moved out of and back into the chambers 6 the exploded gases then pass out through the exhaust ports 17 which are disposed directly opposite to the spark plugs which cause the explosions so that with the complete movement of the reciprocating vanes 7 there is a complete explosion and exhaust. Also the vanes 7 travel through the sides 3 under the impulse of an explosion on one side, the other side thereof forcing all the exploded gases which might remain out of and through the ports 17 so that there is a complete cleansing of the explosion chambers each time the vanes 7 pass therethrough.

The valves 13 prevent any back pressure from the compression chambers 11 into the chambers 6 during the period in which a charge is being taken into such chambers 6.

The springs of these valves 13 are made very heavy so that none of the compressed fuel will be allowed to pass through such valves into the chamber 11 until the blades 7 have been sufficiently redrawn into the chambers 6 to close communication from the chambers 11 into the firing chambers 3^a.

The ports 12 are also provided at opposite ends with spring controlled valves 13^a, the springs of which are just of a sufficient tension to hold the valves 13^a closed when the compressed charge leaves the ports 12 and passes into the chambers 11 so that there will be no back pressure into the chambers 6 while such chambers 6 are intaking the fuel from the carbureter.

I have not shown or illustrated in this particular application the oiling means for the various parts of my improved turbine as this might be done in various ways and when I perfect the same it would properly be the subject matter of a separate application for patent.

While I have described the invention here as particularly relating to turbine engines using explosive fuels, still in practice it might be well used with steam and by slight modifications the same principle could be applied to air or other fluid compressors.

From the foregoing description it can readily be seen that I have produced a turbine engine having a reciprocatory compression means and rotary impulse means so arranged that each unit (in one revolution of the turbine) performs the functions of taking in and compressing the fuel and exploding the same and clearing out the exploded gases. These functions are the essential ones to form a successful engine of the type described and the efficiency with which these functions are carried out by my improved structure is readily apparent.

Also from the foregoing description it will be readily seen that I have produced such a device as substantially fulfils the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit

of the invention as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A turbine engine of the type described comprising a casing having concentric sides enlarging into eccentric sides, a cylinder turnable within the casing and being concentric with the first named sides and bearing thereagainst to form explosion chambers between said cylinder and said eccentric sides, said cylinder being provided with radial recesses, reciprocating impulse vanes movable in the recesses, valve controlled means communicating from the recesses through said vanes to the outside of the cylinder, said casing being provided with intake ports arranged to be in open communication with said radial chambers during the entire travel of the vanes in one direction and out of communication therewith during the entire travel of the vanes in the opposite direction, and exhaust and ignition means.

2. A turbine engine of the type described comprising a casing having concentric sides enlarging into eccentric sides, a cylinder turnable within the casing and being concentric with the first named sides and bearing thereagainst to form explosion chambers between said cylinder and said eccentric sides, said cylinder being provided with radial recesses, reciprocating impulse vanes movable in the recesses, such vanes being provided with compression chambers arranged to openly communicate with the explosion chambers when the vanes are in one position and to be closed by the side walls of said recesses when the vanes are in the opposite position, valve controlled passages communicating from the inner ends of the vanes to said compression chambers, and exhaust and ignition means.

In testimony whereof I affix my signature.

LEON L. FEMONS.