

F. C. JOHNSON.
 GASOLENE TURBINE ENGINE.
 APPLICATION FILED JULY 6, 1911.

1,069,552.

Patented Aug. 5, 1913.

2 SHEETS—SHEET 1.

Fig. 2.

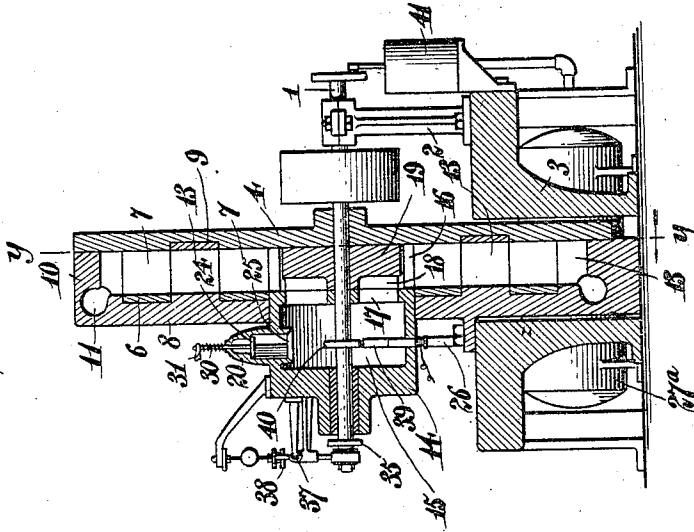
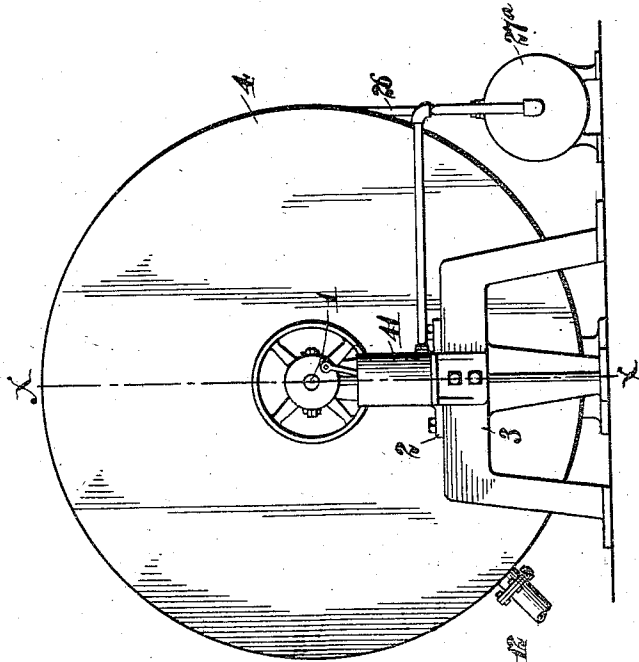


Fig. 1.



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2 SHEETS—SHEET 2.

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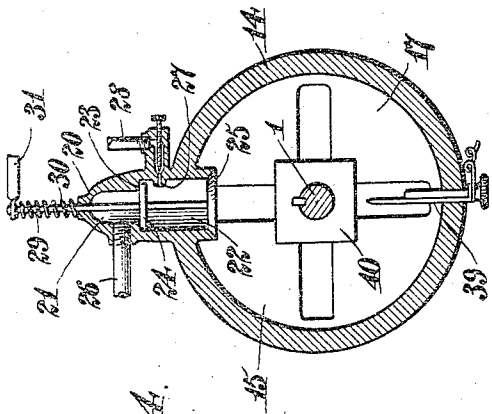


Fig. 4.

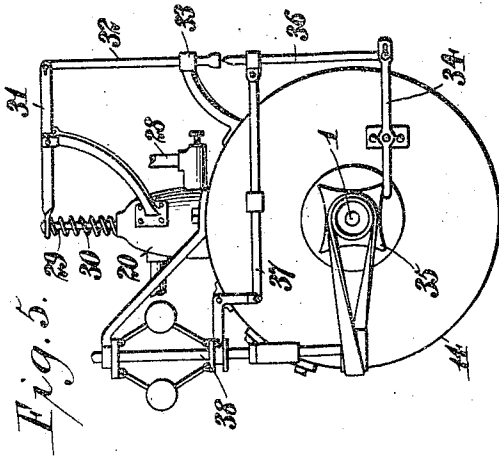


Fig. 5.

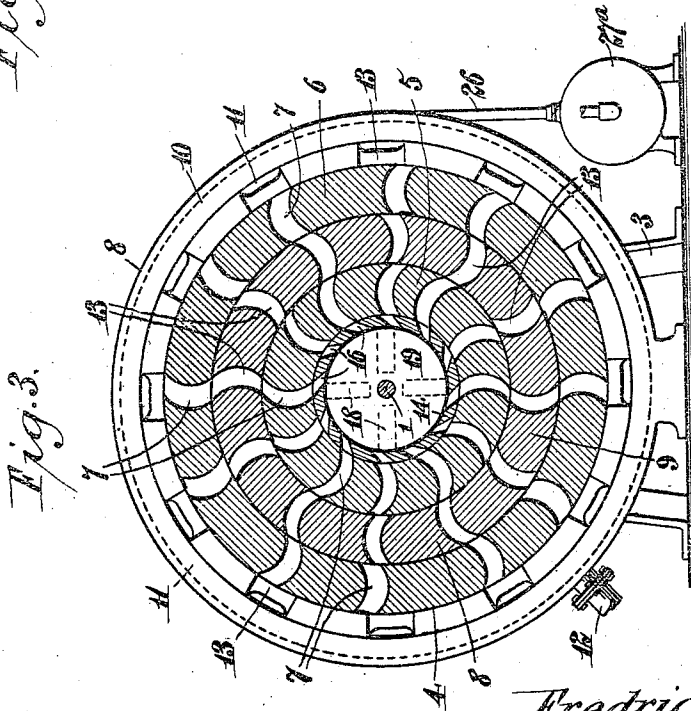


Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDRIC C. JOHNSON, OF BILLINGS, MISSOURI.

GASOLENE TURBINE-ENGINE.

1,069,552.

Specification of Letters Patent.

Patented Aug. 5, 1913.

Application filed July 5, 1911. Serial No. 636,873.

To all whom it may concern:

Be it known that I, FREDRIC C. JOHNSON, a citizen of the United States, residing at Billings, in the county of Christian and State of Missouri, have invented new and useful Improvements in Gasolene Turbine-Engines, of which the following is a specification.

This invention provides an engine of the rotary type utilizing a gaseous mixture as the motive medium, the engine embodying a chamber in which the gaseous mixture is exploded, the resultant products being directed through ports upon buckets, vanes, or like parts of a rotary element and after expending its force upon such rotary element being again utilized upon a second rotary element, said force being used in this manner until its energy is practically expended.

The invention further contemplates an engine of the type described having a valve mechanism of novel formation whereby compressed air and liquid fuel are combined and caused to commingle in a chamber in which the resultant mixture is ignited, the combustion taking place an instant prior to the opening of the ports through which the gas escapes and is directed to the rotary elements upon which the developed force is expended for driving the shaft with which the rotary elements are connected and from which the power is taken for operating the part to be driven.

The invention also contemplates a governor mechanism for regulating the admission of the combustible mixture into the explosion chamber, so that in the event of the speed of the engine exceeding the predetermined number of revolutions the supply of gas is cut off or prevented from entering the combustion chamber, with the result that the speed of the engine is diminished.

The invention consists of the novel features, details of construction and combination of parts, which hereinafter will be more particularly set forth, illustrated in the accompanying drawings, and pointed out in the appended claims.

Referring to the drawings, forming a part of the specification, Figure 1 is a side view of a turbine engine of the internal combustion type embodying the invention. Fig. 2 is a vertical section on the line $x-x$ of Fig. 1. Fig. 3 is a section on the line $y-y$ of Fig. 2. Fig. 4 is a detail view,

showing more clearly the igniter. Fig. 5 is a detail view of the valve mechanism.

Corresponding and like parts are referred to in the following description, and indicated in all the views of the drawings, by the same reference characters.

The engine comprises a shaft 1, which is mounted in suitable bearings 2 carried by a base or stand 3. A disk or like part 4 is secured to the shaft 1 to rotate therewith and is provided with laterally extending rings 5 and 6 having a concentric arrangement and spaced apart, each of the rings having curved openings or passages 7 forming buckets, vanes, or abutments for the motive medium to impact against to expend its force for driving the rings and the part 4. A stationary disk or plate 8 is mounted in line with the disk 4 and is provided with rings or flanges 9 and 10 in which openings are formed. The outer flange or ring 10 closes the space formed between the two disks or plates 4 and 8 so as to confine the exhaust motive medium which enters an annular passage 11 and passes off through a port 12 to a convenient point of discharge. The ring or flange 9 has openings 13 which give proper direction to the gases or motive medium without leaving the abutments of the ring 5 so as to direct said gases upon the abutting portions of the ring 6 to impart movement thereto. The rings of the two parts 4 and 8 alternate. The openings 13 in the stationary ring provide gates for directing the motive medium or gaseous products resulting from combustion upon the buckets or abutting portions of the rotary elements. A hub or casing 14 occupies a central position and is made hollow to form a combustion chamber 15. The inner end of the casing or hub 14 extends into the space formed between the disks or plates 4 and 8 and has a plurality of openings 16 through which the products of combustion pass to the abutting portions of the ring or flange 5. A partition 17 subdivides the space inclosed by the casing or hub 14 and has ports formed therein, which are adapted to register with passages 18 formed in a wheel 19 secured to the shaft 1 so as to rotate therewith. It is to be understood that the partition 17 may be arranged to rotate with the shaft 1 in which case the part 19 will be stationary.

A casing 20 has connection with the casing 14 and communicates with the combus-

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tion chamber 15. The casing 20 has two chambers 21 and 22 which are separated by means of a valve seat 23 against which a valve 24 closes. A valve 25 is adapted to close against the inner end of the casing 20, which is formed to provide a valve seat. The chamber 21 is smaller than the chamber 22 and a pipe 26 connects therewith for supplying air thereto under pressure, said pipe having connection with a reservoir 27^a. Liquid fuel is sprayed into the chamber 22 through a nozzle 27 to which a pipe 28 is connected, said pipe leading from a tank or other source for supplying liquid fuel, such as gasolene, under pressure. The two valves 24 and 25 are attached to a stem 29, which is arranged to operate in the casing 20, a spring 30 serving normally to hold the valves seated. The stem 29 is attached to one end of a lever 31, the opposite end of said lever having a rod 32 attached thereto and arranged to operate through a guide 33. A lever 34 has one end arranged in the path of a tappet wheel 35 mounted upon the shaft 1, the opposite end of said lever being attached to a rod 36, which is connected to one end of a rod 37. The two rods 36 and 37 are normally in alinement so that operation of the lever 34 by means of the tappet wheel 35 lifts the rod 32 and moves the lever 31 to effect an unseating of the valves 24 and 25, whereby a gaseous mixture passes into the combustion chamber 15. The rod 37 has connection with a governor mechanism 38, which is so arranged that in the event of the engine exceeding a given speed the rod 36 is moved to throw its upper end out of line with the rod 32, thereby preventing movement of the rod 32 when the rod 36 is lifted, with the result that the valves 24 and 25 remain closed and no mixture is supplied to the combustion chamber. This results in reducing the speed of the engine when the rod 36 is moved into operative position so that upon the next upward movement thereof the rod 32 is operated and the valves 24 and 25 unseated, thereby permitting a charge of gaseous mixture passing into the combustion chamber to be ignited for operating the engine.

The gaseous mixture may be exploded by any suitable igniter and it is preferred to have the parts so arranged as to produce a number of explosions during one revolution of the engine. The preferred form of igniter utilizes an electric current which is established the required number of times during each revolution of the engine and at the proper time so as to produce an explosion an instant before the ports in the parts 17 and 19 are caused to register. The igniter comprises an electrode 39, which is stationary and a rotary electrode 40, which is rotatable with the shaft 1. The contacting points of the electrodes 39 and 40 are so

positioned as to produce the spark at the proper instant, the number of explosions during each revolution of the engine depending upon the number of contact points embodied in the rotary electrode 40.

In the operation of the engine an air compressor 41 is arranged to be driven from the shaft 1 and supplies the reservoir 27^a with compressed air. When the engine is in motion compressed air is supplied from the reservoir 27^a to the chamber 21 by means of the pipe 26 and when the valves 24 and 25 are unseated the air confined in the chamber 21 rushes into and through the chamber 22 and becomes impregnated with the liquid fuel sprayed into said chamber through the nozzle 27. The mixture after entering the combustion chamber 15 is confined for a short interval of time, during which the valves 24 and 25 close, after which the mixture is exploded and an instant thereafter the products of combustion are released and pass through the openings 18 and 16 and exerts its force upon the wings, vanes, or abutting portions of the rotary element 5 and after expending its force upon such rotary element the mixture passes through the openings 13 and again exerts a force upon the abutting portions of the ring or flange 6, after which it passes through the openings of the flange or ring 10 into the passage 11 to a point of discharge. So long as the engine is running normal the rod 36 engages the rod 32 and unseats the valves 24 and 25 at each operation of the lever 34, but should the speed of the engine become excessive the governor mechanism 38 moves the rod 36 out of the path of the rod 32, thereby preventing the engine receiving a charge with the consequent result that the speed diminishes.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention what is claimed as new, is:—

1. An internal combustion turbine engine comprising a rotary member provided with abutment elements, a cylindrical casing concentric with the rotary member and having a portion in the plane of the abutment elements formed with a plurality of openings, a partition subdividing the casing and having a plurality of openings, a wheel mounted

in the part of the casing located in the plane of the abutments of the rotary member and having passages to register with the openings in the partition and in the said casing, means for supplying a gaseous mixture to the said casing, and means for igniting the gaseous mixture.

2. An internal combustion turbine engine comprising a rotary member having a series of abutments at one side arranged in circular form, a relatively stationary casing having an end portion entering the space circumscribed by the circular series of abutments and having a plurality of openings in its sides in the plane of said abutments, a partition subdividing the casing and having a plurality of openings, a wheel fitting snugly against a side of said partition to close the openings therein and the openings formed in the side of the casing, said wheel having passages to alternately register with the openings of the partition and casing, means for supplying a gaseous mixture to the casing, and means for igniting the gaseous mixture.

3. An internal combustion turbine engine comprising spaced plates, the one stationary and the other rotary, rings upon the opposing sides of the said plates, said rings having openings to form abutments, a casing having an end portion extending across the space formed between the two plates and

having openings in the sides of said end portion, a partition subdividing the casing and having openings formed therein, a wheel fitting snugly within the said end portion of the casing and against the said partition and adapted to close the openings in said partition and in the sides of the casing, said wheel having passages to establish communication between the openings of the partition and casing, means for supplying a gaseous mixture to the casing, and means for igniting the gaseous mixture.

4. A turbine engine of the rotary internal combustion type, the same comprising a rotary member, a casing concentric with the rotary member and embodying a combustion chamber and a valve chamber, a rotary valve operating in the said valve chamber, a second casing connected with the first mentioned casing and embodying inner and outer chambers, means for supplying fuel to the inner chamber, means for supplying air under pressure to the outer chamber, connected valves for controlling the outlets of the said inner and outer chambers, and means for operating the connected valves.

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

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