N. E. HOUSER.

ROTARY GAS ENGINE.

APPLICATION FILED DEC. 10, 1912.

1,119,699.

Patented Dec. 1, 1914.

3 SHEETS—SHEET 1.

Fig. 2.

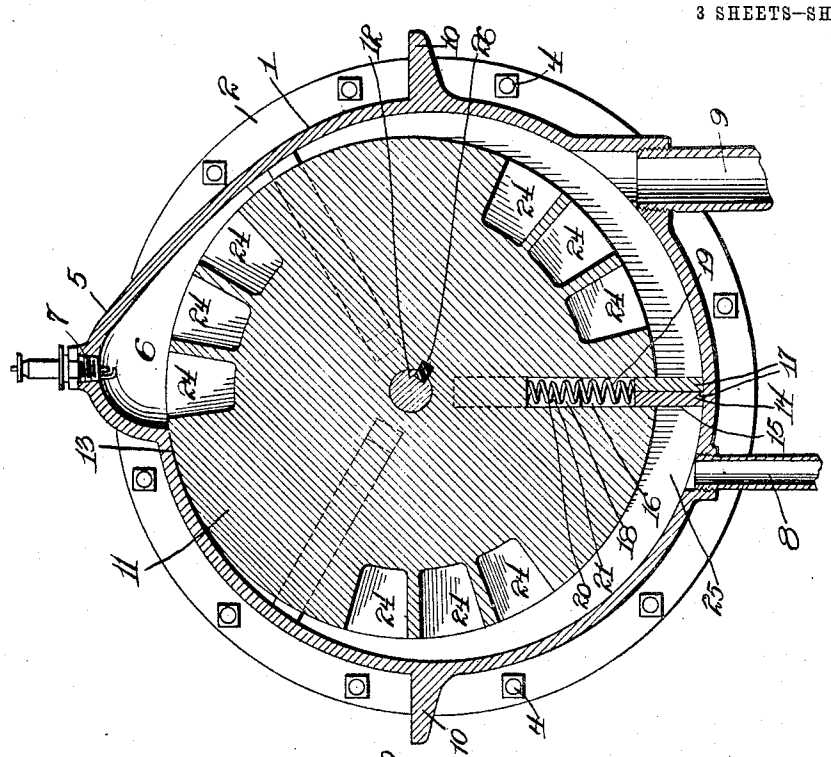
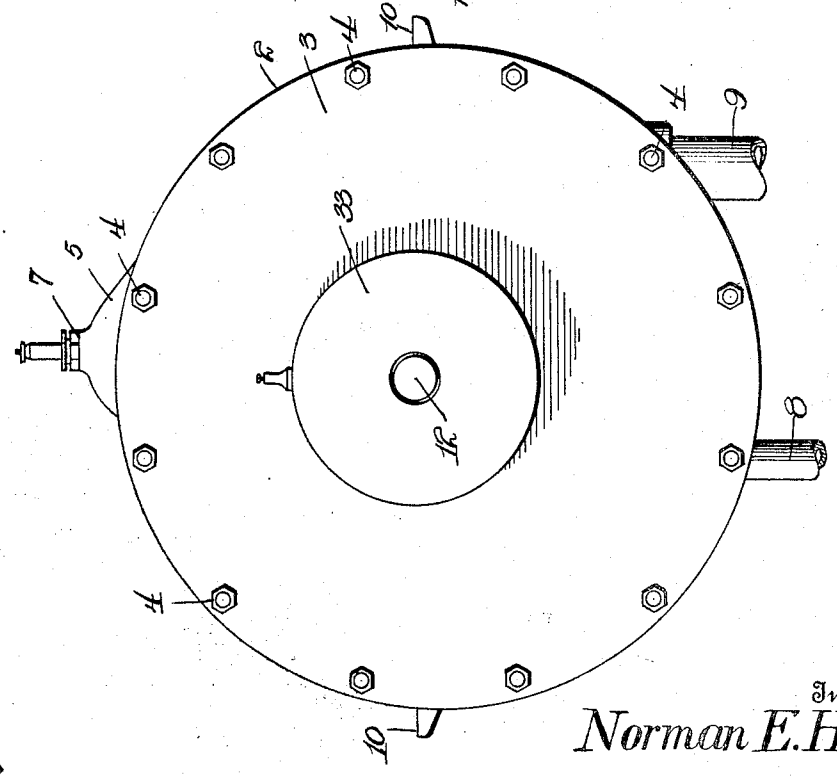


Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 4.

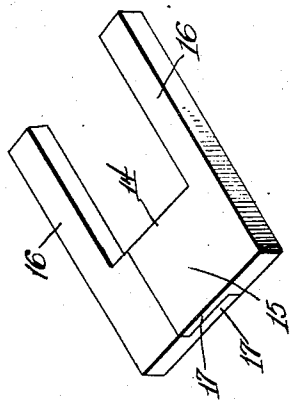
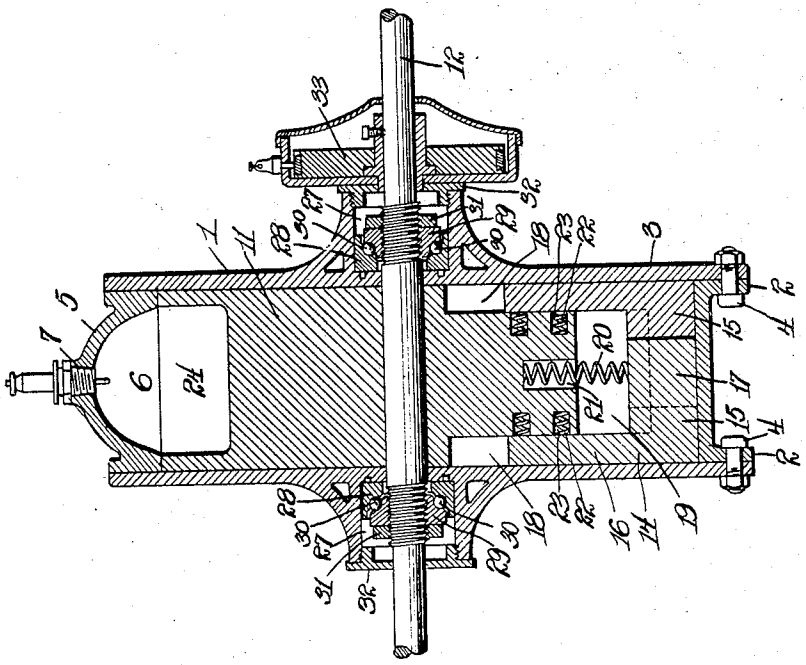


Fig. 3.



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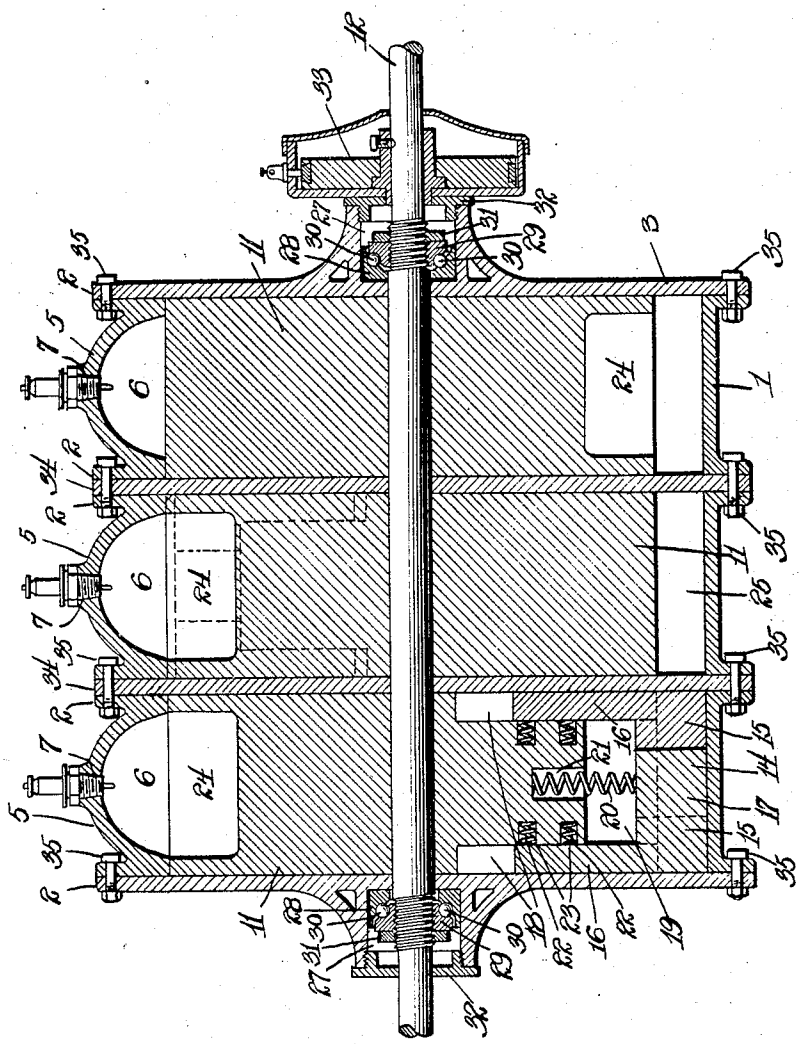
3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

NORMAN E. HOUSER, OF ST. LOUIS, MISSOURI.

ROTARY GAS-ENGINE.

1,119,699. Specification of Letters Patent. Patented Dec. 1, 1914.

Application filed December 10, 1912. Serial No. 735,998.

To all whom it may concern:

Be it known that I, NORMAN E. HOUSER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Rotary Gas-Engines, of which the following is a specification.

This invention relates to rotary gas engines, the object in view being to provide an engine of the class described, in which provision is made for effectively compressing the gas or other explosive mixture, after it is introduced into the casing, and during each cycle of operation of the rotor working within the cylindrical casing of the engine.

A further object of the invention is to provide a casing and rotor having such a relative arrangement to each other, in connection with radially movable wings carried by the rotor and compression cups, as to cause a compression of the gas between the points of location of the wings, during each cycle of the rotor, and the release of such compressed gas directly into the expansion chamber, where all of such gas is received, preparatory to ignition, the gas being then permitted to expand in a tangential direction with respect to the periphery of the rotor, so as to act directly against the wing located next in front of the compression cups and expansion chamber.

By means of the construction hereinafter described, a material saving in fuel is effected, accompanied by a considerable reduction in weight, and a simplification of the engine as a whole by a material reduction in the number of parts required in the manufacture thereof. Also, by reason of the construction herein described, the rotor is given a true balance, thereby producing a much smoother action in the operation of the engine as a whole.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claim hereunto appended.

In the drawings: Figure 1 is a side elevation of a rotary gas engine, embodying the present invention. Fig. 2 is a vertical longitudinal section through the same. Fig. 3 is a diametrical section through an engine embodying a single unit, including a casing and rotor. Fig. 4 is a perspective view of one of the wings detached. Fig. 5 is a diametrical section, showing the manner in which several units are combined with a common shaft.

Referring to the drawings, 1 designates a cylindrical casing which, as shown in Fig. 3, is provided at its opposite edges with circumferential outwardly extending flanges 2, to which the disk-shaped heads 3 are secured by means of bolts 4, enabling the cylindrical casing as a whole to be made gas-tight. At a suitable point, and preferably at the top of the casing, the cylindrical wall 1 thereof is offset outwardly, as shown at 5, to form an expansion chamber 6 which is made gradually contracting in size in the direction in which the rotor, hereinafter described, revolves, as shown in Fig. 2. This expansion chamber is provided with a threaded opening, at 7, to receive a spark plug or other suitable gas igniting device, such as is commonly employed in internal combustion motors. The casing 1 is further provided with an intake port 8, and an exhaust 9, said ports being located at a suitable distance from each other, and located, in the preferred embodiment of this invention, adjacent to the bottom of said casing and opposite the expansion chamber 6. The casing is also shown as provided at diametrically opposite points with supporting lugs 10, by means of which the casing may be mounted on any suitable supporting base for the engine as a whole.

Mounted within the cylindrical casing 1 is a rotor or rotary piston 11, the same being mounted upon a shaft 12 which is located centrally of the rotor, and eccentrically with respect to the casing 1, as clearly shown in Fig. 2, the location of the shaft 12 with respect to the casing being such that the rotor works in contact with the casing 1 at the top thereof, as indicated at the point 13, thereby forming a cut off between the expansion chamber and that portion of the cylindrical casing which lies in rear of the expansion chamber.

In connection with the rotor or piston 11, I employ a series of radially movable wings 14, each of which is constructed, as shown in Fig. 4, to comprise two L-shaped sections, each of which embodies an outer projecting blade portion 15, and an inwardly extending guide portion 16, the end portions 15 being rabbeted to form overlapping ends 17

adapted to slide upon each other as the guide portions 16 move toward and away from each other. The rotor or piston is provided in its opposite sides with guide-ways 18, in which the parts 16 work, both in a radial and lateral direction, and is provided in its outer periphery with a recess 19, in which the overlapping portions 15 of the wing are received and permitted to slide.

An expansion spring 20 is arranged in a recess 21 in the rotor, and presses outwardly against the end portions 15 of the wing, while other expansion springs 22 are arranged in recesses 23 in the side faces of the rotor, the last-named springs pressing the guide portions 16 of the wing laterally outward. In this way, constant contact is maintained between the outer edge of each wing and the inner wall of the cylindrical casing 1, and between the side edges of the wing and the side walls or heads of the cylindrical chamber. The springs 20 cause the outer edges of the wings to follow closely the inner surface of the cylindrical wall 1, and thereby prevent the gas from passing by the wings, as the rotor revolves, the gas in expanding operating against the projecting portion of the wing in advance of the expansion chamber, until said wing passes the exhaust port 9, whereupon the expanding gas is released and allowed to pass outwardly through the exhaust port. The rotor or piston 11 is further provided in the periphery thereof with series of compression cups 24, as best illustrated in Fig. 2. These cups may be of any desired size and number, a series of such cups being located between each pair of radially movable wings. The gas is forced by a suitable injector through the port 8 to the space 25, between the periphery of the rotor and the inner wall of the casing, it is carried on by the next following wing 14, and is compressed into the cups 24, it being noted that the space 25 contracts gradually from the inlet port 8 to the point of contact 13 between the rotor and the casing. As soon as the cups 24 of one series pass the contact point 13, the gas which has been compressed in the cups 24 is released into the expansion chamber 6, where it is ignited by the plug in the opening 7 which is timed to emit a spark at the proper period, thereupon the gas, in expanding, acts upon the piston wing in advance of the expansion chamber and carries the same past the exhaust port 9. While three of such wings have been shown, it will be understood that the number of wings may be increased or diminished, according to the will of the manufacturer.

The rotor 11 is preferably keyed to the shaft 12, as shown at 26, and is journaled in bearings on the opposite heads 3 of the cylindrical casing, as shown in Fig. 3. In the preferred embodiment of this feature of the invention, grease cups 27 are provided at opposite sides of the casing, said cups bearing a fixed relation to said heads and having fixedly mounted therein ball cones 28, in conjunction with which bearing cones 29 are threaded upon the shaft 12 to render them adjustable, a circular series of anti-friction balls 30 working between said cones, while the cone 29 after being properly adjusted is locked by means of a jam nut 31, or its equivalent. The cups 27 are adapted to contain grease or other lubricant, and are closed at their outer ends by threaded and removable caps 32 which exclude dust, dirt and other foreign matter.

33 designates a timer of any suitable type, having one portion thereof fixed, and another portion thereof mounted fast on the shaft 12, so as to turn therewith, said timer being wired to a source of electrical energy, and also to the spark plug or plugs, so as to deliver the current to said plug or plugs and ignite the gas in the expansion chamber at the proper times.

I have hereinabove described only a single unit of the engine, but by reference to Fig. 5, it will be observed that several of such units may be mounted on the same shaft 12, thereby increasing the horse-power of the engine proportionately. In such event, the inner end walls of the adjoining units may constitute partition walls 34, each partition wall serving as a head for two units or casings, in which the rotors work. In such case, the flanges 2 of the casings will both be connected to a common partition by means of bolts 35. Furthermore, as indicated in said Fig. 5, the rotors may be set on the shaft 12 so that the wings 14 will be out of line with each other, thereby obtaining successive explosions in the different casings, which will give a more constant torque to the engine shaft.

From the foregoing description, it will be observed that the make up of the engine is very simple, only about one-fourth as many parts being used as are now found in the ordinary four-cycle engine, and on account of the expansive force of the gas being directed against the wings at the outer periphery of the rotor, the engine is capable of delivering high power at a minimum fuel expense, and also without the vibration which is found in all engines of the reciprocatory type.

Any hydro-carbon oil may be used as a fuel for the engine hereinabove described.

What is claimed is:

In a rotary gas engine, the combination with a stationary casing having a cylindrical rotor chamber formed with an offset expansion chamber at the outer side thereof contracting in the direction of movement of the adjacent face of the rotor and communicating directly with a space of gradually

increasing area which leads to the exhaust outlet, a cylindrical rotor eccentric to the axis of said casing and working at one point only in contact with the inner periphery of said casing, a rotor shaft, and radially movable wings carried by the rotor, said rotor being provided in the periphery thereof with a compression cup in each interval between the points of location of two adjacent wings so as to be covered and closed by the casing before registering with said combustion chamber.

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

NORMAN E. HOUSER.

Witnesses:

RUTH E. DROSTE,

LOUIS BOEGER.