S. VINCENT.
ROTARY INTERNAL COMBUSTION ENGINE.
APPLICATION FILED OCT. 27, 1913.

1,112,734. Patented Oct. 6, 1914.
2 SHEETS—SHEET 1.

Fig. 1

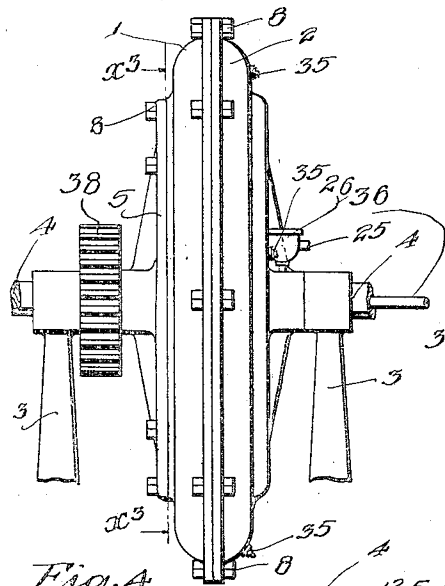

Fig. 2

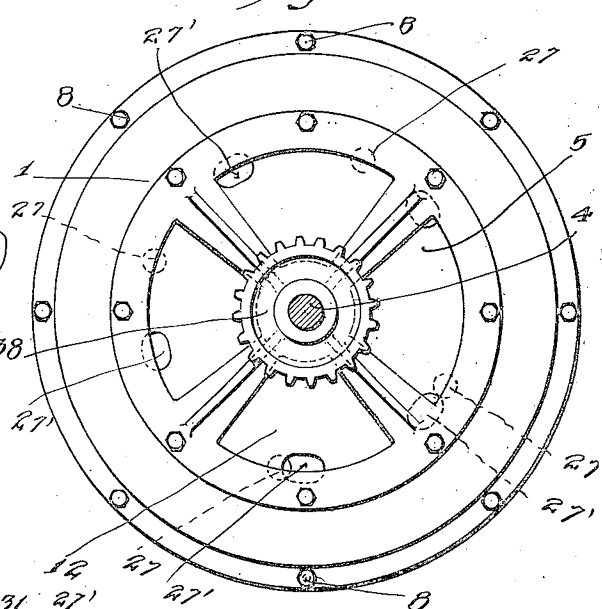

Fig. 4

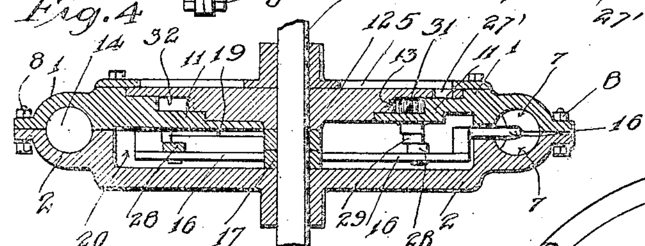

Fig. 3

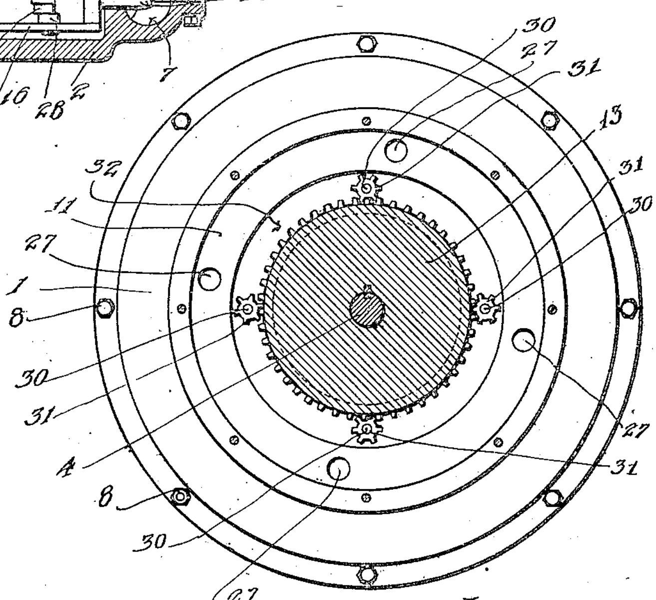

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Fig. 5

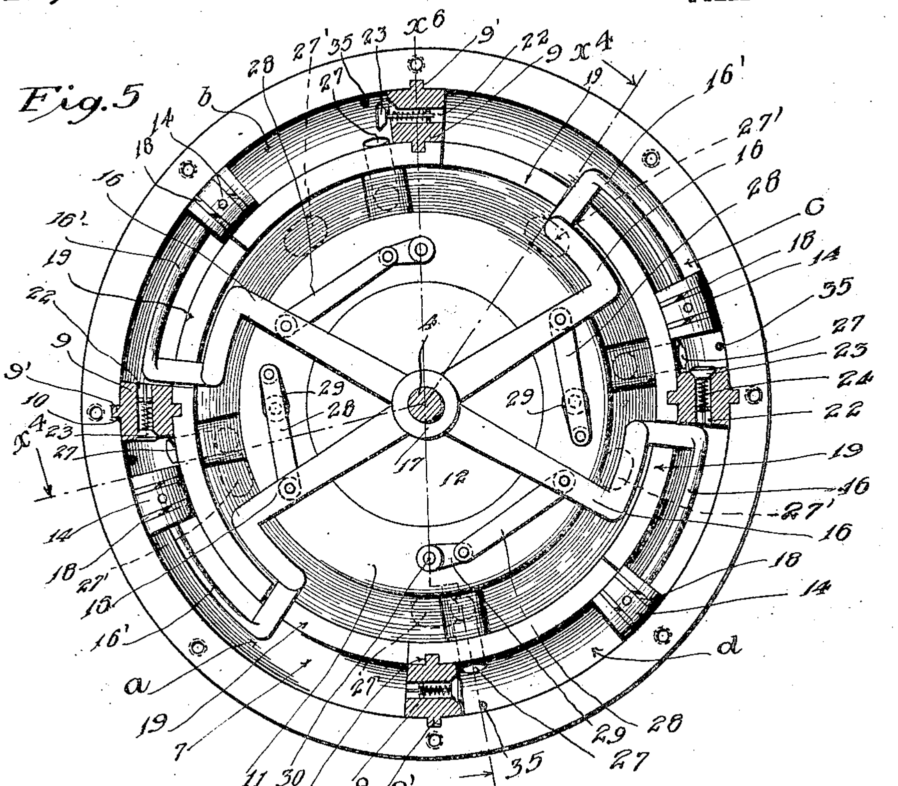
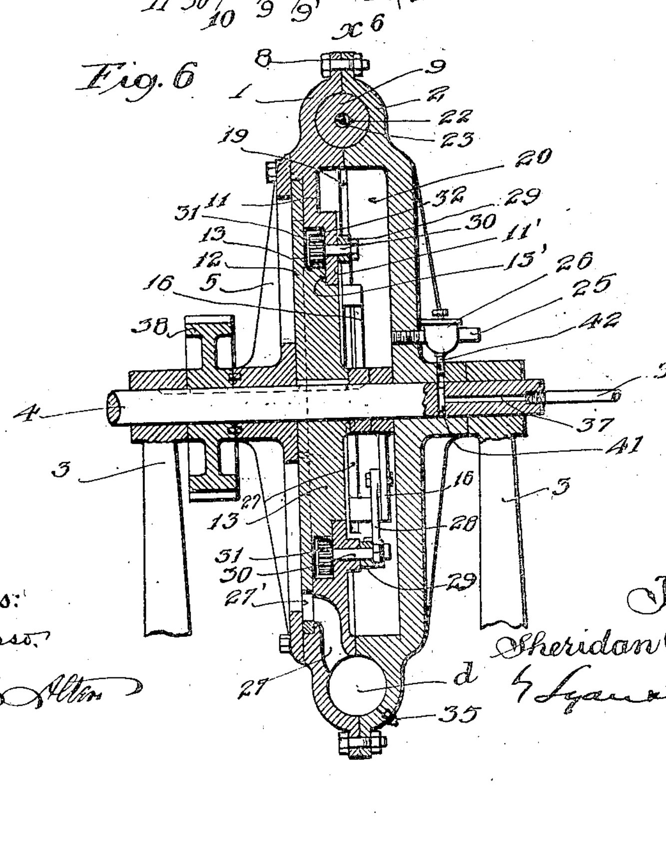


Fig. 6



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UNITED STATES PATENT OFFICE.

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ROTARY INTERNAL-COMBUSTION ENGINE.

1,112,734. Specification of Letters Patent. Patented Oct. 6, 1914.

Application filed October 27, 1913. Serial No. 797,490.

To all whom it may concern:

Be it known that I, SHERIDAN VINCENT, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Rotary Internal-Combustion Engine, of which the following is a specification.

The main object of the present invention is to provide a rotary internal combustion engine of simple construction and of great power for a given weight.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate an embodiment of my invention, and referring thereto:

Figure 1 is a plan view of the engine. Fig. 2 is an end elevation thereof. Fig. 3 is a section on line x^3—x^3 in Fig. 1. Fig. 4 is a section on line x^4—x^4 in Fig. 5. Fig. 5 is a vertical section of the engine. Fig. 6 is a section on line x^6—x^6, Fig. 5.

The engine comprises two casing members 1 and 2 mounted to rotate on shaft 4 which is supported on a frame 3. Each of said casing members 1 and 2 is provided with an annular groove 7 semi-circular in cross section, and said casing members are secured together by fastening bolts 8 so that the two grooves 7 form an annular space divided by fixed heads 9 into a plurality of cylinder chambers operating as the cylinder chamber of the engine. The fixed heads 9 may be fixed to one or both of the casing members in any suitable manner, for example, by a flange 9′ in the head engaging in grooves 10 in the casing members 1 and 2. Casing member 1 is provided with an inwardly extending annular flange 11 making sliding contact with a disk 12 fixed on shaft 4, and to facilitate assemblage, the casing 1 is mounted on shaft 4 by a spider 5 secured to said casing member and extending outside of disk 12. Disk 12 is formed with a gear 13 on one face, and the flange 11 has an extension 11′ engaging in a rabbet 13′ on this gear so that the flange 11 with its extension and the disk 12, together with the opposite casing member 2 inclose a space 20 serving as an intake chamber. The engine herein shown is adapted to operate upon a four-stroke cycle and is provided with four heads 9, dividing the annular chamber into four cylinder chambers a, b, c, d. Mounted in said cylinder chambers between the respective heads 9 are pistons 14 carried by extensions 16′ on respective arms 16, loosely mounted on the shaft 4, so that said pistons 14 may reciprocate to and from the respective heads 9. Opposite arms 16 may be connected to move in unison by mounting them on a hub 17. The pistons 14 are provided with packing rings 18. The extension 16′ of each arm 16 extends through a slot 19 in the inner wall of the corresponding cylinder chamber, and is U-shaped so as to embrace said wall when the piston 14 is at the inner end of its stroke.

Each head 9 is provided with an intake port 22 having a valve 23 normally held closed by spring 24 and opening under suction in the adjacent working chamber to admit mixture from the intake chamber 20 to said working chamber. An intake pipe 25 leading to the chamber 20 aforesaid is connected to a carbureter 26 for supplying mixture to said chamber. An exhaust port 27 is provided for each cylinder chamber a, b, c, d, and ports 27 are provided in flange 11 registering with the ports 27, at proper times in the rotation, and are so arranged that the four cylinder chambers a, b, c, d, are opened in sequence in each rotation.

Each of arms 16 is connected by a link 28 to a crank 29 on a shaft 30, there being four shafts 30 journaled on the rotating flange 11 aforesaid, and the respective shafts 30 carrying pinions 31 engaging with the gear 13 on shaft 4, so that in the rotation of the flange 11 the pinions 31 will roll around on the gear 13, and the cranks 29 will revolve so as to cause the arms 16 to swing in such manner as to move the pistons 14 to and from the heads 9, producing the working strokes of the engine. The gearing above described is flooded with oil contained in a chamber 32, formed between disk 12 and flange 11.

Suitable igniting devices, for example, spark plugs 35 are provided for the respective chambers a, b, c, d, connected to suitable energizing circuit timing means, not shown, for igniting the charges at the proper times.

The casing member 1 is provided with suitable means such as pinion 38 for transmitting power from the engine.

The engine is shown as adapted to give five working strokes for each cylinder chamber per each revolution of the casing, and to give these strokes in sequence in the respective cylinder chambers. For this purpose it is necessary to proportion the gears 13 and 31 so that as the casing turns one-quarter revolution, each piston 14 will move in and out twice from the corresponding head 9 and will move one stroke in addition, so as to provide for the sequential action of the cylinder chambers. With this arrangement five exhaust ports 27′ are necessary. It will be understood, however, that by properly proportioning the gearing and timing devices the working stroke may take place only once in each revolution for each cylinder chamber. In that case only one port 27′ is required.

To maintain fuel supply to the carbureter during rotation of the casing, the fuel inlet pipe 42 of the carbureter may communicate with an annular channel 41 in fixed shaft 4 which communicates through passage 37 with the fuel supply pipe 36.

The operation is as follows: The engine being set in rotation and the parts being in position as in Fig. 5 and turning to the right cylinder chamber *b* is starting on the compression stroke, cylinder chamber *c* is starting on the expansion stroke, and cylinder chamber *d* is starting on the scavenging stroke. As the piston 14 moves away from the head 9 the valve 23 opens under the suction in said chamber, causing a charge of air and fuel to be drawn in through carbureter 26, chamber 20 and port 22. When the casing has turned one-fifth of a quadrant, the piston 14 is fully withdrawn and begins to approach the head, whereupon the valve 23 closes and the charge is compressed, the operation being completed when the casing has turned two-fifths of a quadrant. At this moment the igniting device operates to explode the compressed charge and the piston 14 again moves away from the head 9, this being the working stroke and developing power both by forward pressure on the head 9 and by rearward pressure on the piston 14 which operates through the arm 16, link 28, crank 29 and pinion 31 to produce a rotative action on the casing. This operation is completed when the casing is turned three-fifths of a quadrant, and during the ensuing one-fifth quadrant of a revolution, the piston again approaches the head 9 and the products of combustion are ejected through the ports 27 and 27′, the ports 27′ being so positioned that at this time one of said ports is in register with the port 27 for the cylinder chamber *a* aforesaid. After one-fifth quadrant of further revolution, the cylinder chamber *a* has advanced to the initial position shown in Fig. 5 for cylinder chamber *b*, each cylinder chamber being one-quarter phase in advance of the preceding cylinder chamber, so that the successive positions operate successively.

What I claim is:

1. In an internal combustion engine, a fixed shaft, a casing rotatably mounted on said shaft and provided with a plurality of circumferentially extending cylinder chambers, and with fixed heads between said chambers, pistons working in the respective chambers, gearing connected to the respective pistons to move the casing forward in the movement of the pistons to and from said heads, intake ports for the respective cylinder chambers, spring-operated valves for said intake ports opening automatically under the suction in said chambers, exhaust ports for the respective cylinder chambers, and fixed means having a sliding engagement with said exhaust ports and provided with port means for opening the said exhaust ports in certain angular positions of the casing.

2. An internal combustion engine comprising a fixed shaft, a casing rotatably mounted on said shaft and provided with a plurality of circumferentially extending cylinder chambers and with heads between said chambers, pistons working in said cylinder chambers, arms connected to said pistons and rotatably mounted on said shaft, a gear wheel fixed on said shaft, a fixed member provided with an exhaust port, a flange extending inwardly from said casing and provided with exhaust ports registering with said ports in said fixed member at a certain point in the revolution of the casing, said flange engaging said fixed member and gear, pinions carried by said flange on the casing and engaging said gear wheel, cranks connected to the said pinions, and links connecting said cranks with the arms carrying the respective pistons aforesaid.

3. An internal combustion engine comprising a fixed shaft, a casing rotatably mounted on said shaft and provided with a plurality of circumferentially extending cylinder chambers and with heads between said chambers, pistons working in said cylinder chambers, arms connected to said pistons and rotatably mounted on said shaft, a gear wheel fixed on said shaft, a fixed member provided with an exhaust port, a flange extending inwardly from said casing and provided with exhaust ports registering with said ports in said fixed member at a certain point in the revolution of the casing, said flange engaging said fixed member and gear, pinions carried by said flange on the casing

and engaging said gear wheel, cranks connected to the said pinions, links connecting said cranks with the arms carrying the respective pistons aforesaid, and means for supplying combustible and air to said cylinder chambers between the said pistons and heads.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 20th day of October, 1913.

SHERIDAN VINCENT.

In presence of—
WALLACE D. MANLEY,
FORREST G. KOST.