H. R. SIEVERKROPP.

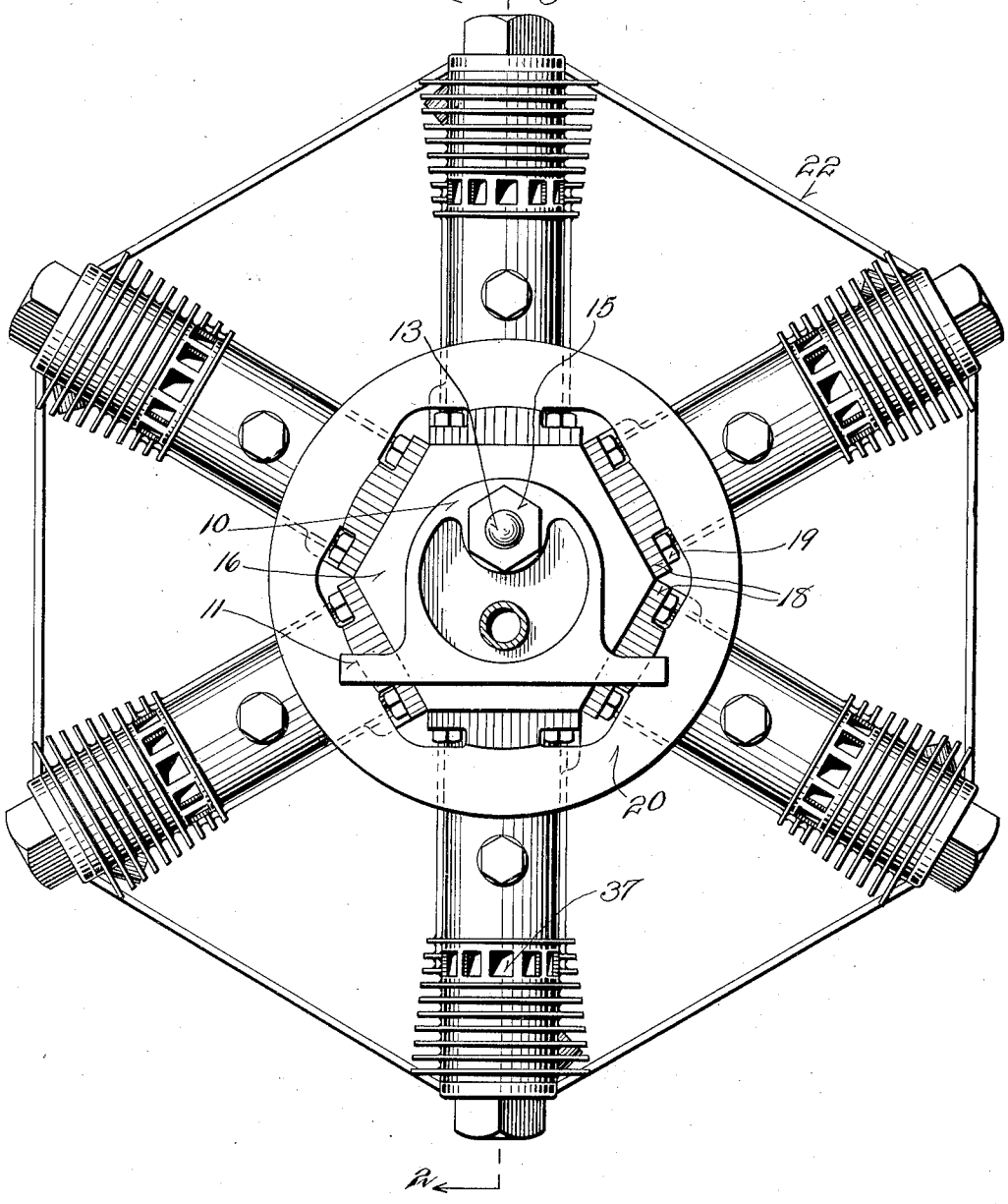
ROTARY INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JAN. 29, 1919.

1,338,256. **Patented Apr. 27, 1920.**

3 SHEETS—SHEET 1.

Fig. 1.



WITNESS:

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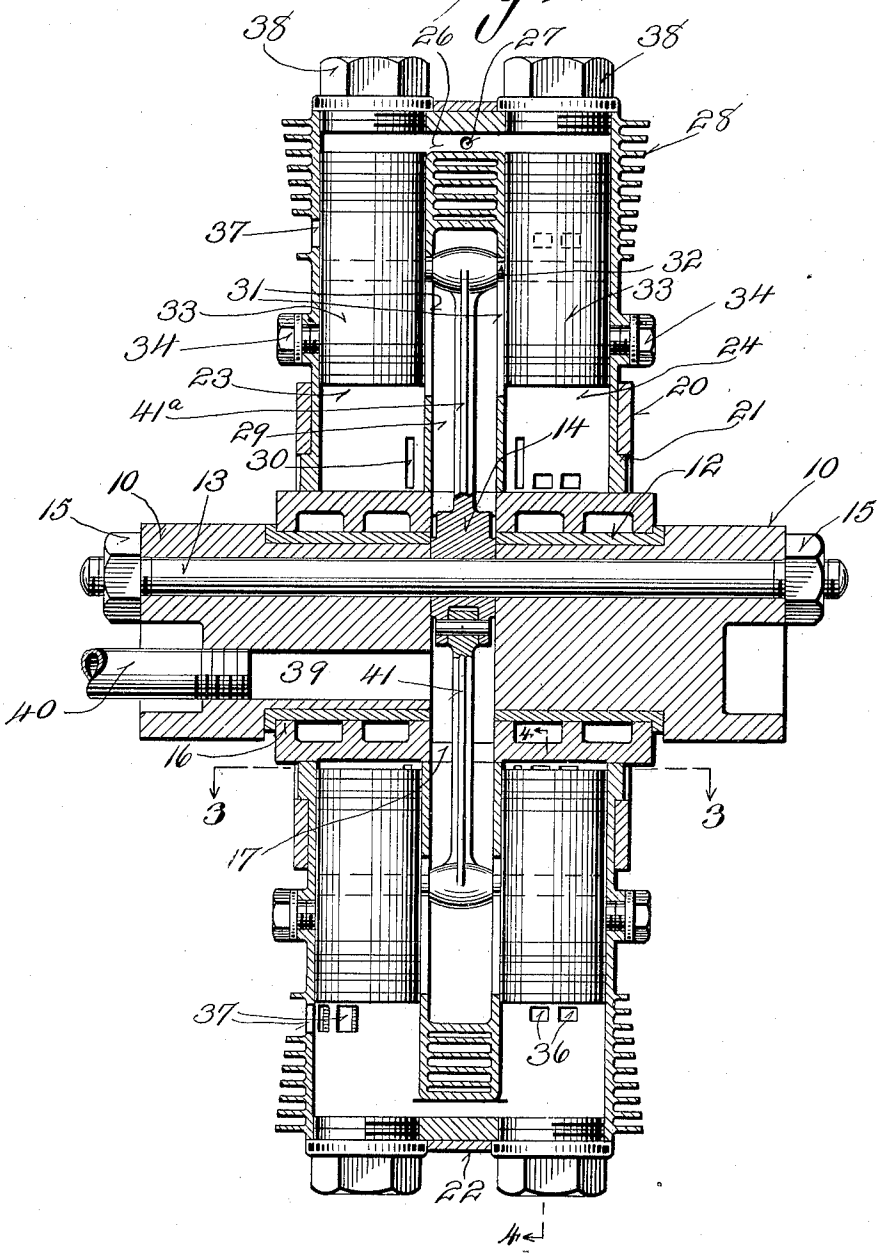
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

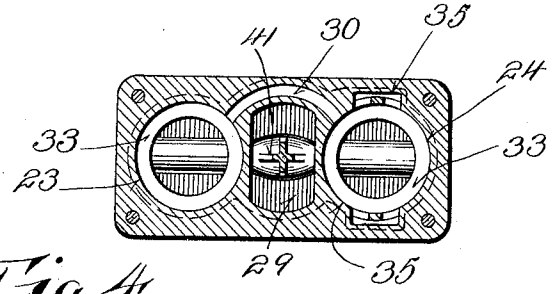
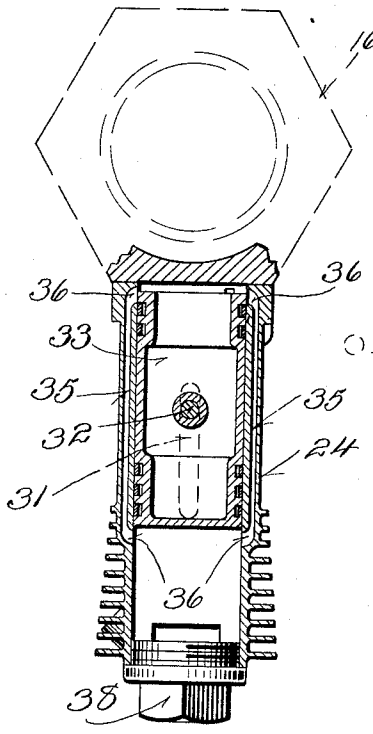
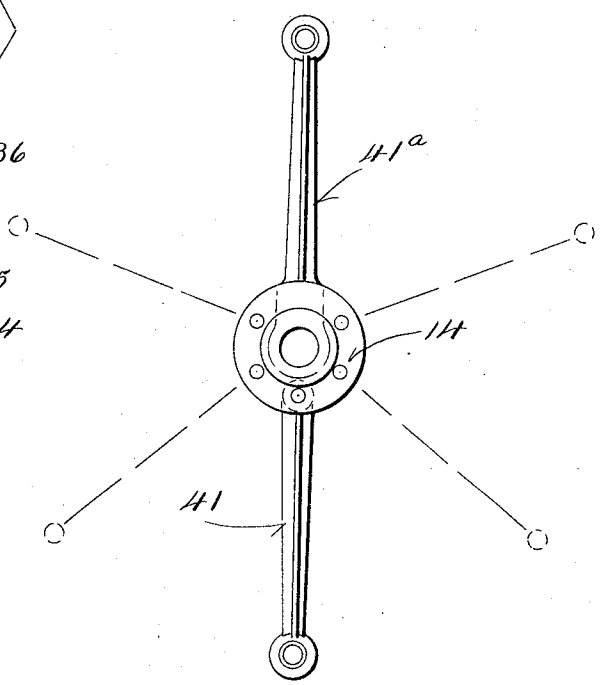


Fig. 4.

Fig. 5.





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UNITED STATES PATENT OFFICE.

HENRY R. SIEVERKROPP, OF RACINE, WISCONSIN.

ROTARY INTERNAL-COMBUSTION ENGINE.

1,338,256. Specification of Letters Patent. Patented Apr. 27, 1920.

Application filed January 29, 1919. Serial No. 273,798.

To all whom it may concern:

Be it known that I, HENRY R. SIEVERKROPP, a citizen of the United States, and resident of Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Rotary Internal-Combustion Engines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to new and useful improvements in internal combustion engines of that type wherein a plurality of cylinders are rotatably mounted on a stationary member and wherein the engine power is attained by exerting the force of the explosion against a member carried by the core eccentrically of the axis of rotation of the cylinders.

It is primarily my object to embody a two-stroke cycle of operation in an engine of the rotary type as above set forth.

More particularly, it is my object to embody in a rotary type of engine the two-stroke cycle operation shown in Patent No. 979,040 granted to me December 20, 1910, this operation involving the provision of a pair or pairs of cylinders having communicating end portions whereby fuel compressed in the inner end portions of the cylinders is supplied to the outer or explosion end portion of one of the cylinders and passes from thence into the explosion end portion of the other cylinder to thus insure a positive scavenging of burned gases from both cylinders through ports uncovered in the said other cylinder at the termination of the power strokes of the piston of said other cylinder, the pistons of the cylinders being connected together for movement in unison.

With the above and other objects and advantages in view, which will be apparent as the description proceeds, my invention resides in the novel features of construction, combination and arrangement of parts as hereinafter described and defined by the appended claims.

In the accompanying drawings:

Figure 1 is a side elevational view of a rotary engine embodying my invention.

Fig. 2 is a vertical sectional view therethrough on the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view through a pair of co-acting cylinders on the line 3—3 of Fig. 2.

Fig. 4 is a longitudinal sectional view through one of the cylinders on the line 4—4 of Fig. 2.

Fig. 5 is a detail elevational view of a pitman ring showing a pair of pitmen associated therewith.

Referring now more particularly to the accompanying drawings, there is provided a center journal structure comprising a pair of blocks 10 having lateral flanges 11 for securement to a common stationary base. The inner ends of these blocks are circular and are disposed in axial alinement, having bushing sleeves 12 mounted thereon. The blocks are connected by a shaft 13 which extends longitudinally therethrough eccentrically with respect to the common axis of the blocks, and the blocks are spaced apart for the reception therebetween of a pitman ring 14 loosely mounted on the shaft. The shaft is secured by end nuts 15 threaded thereon and bearing against the outer ends of the blocks, or may be secured in any other suitable manner. Journaled on the bushings 12 is a cylindrical ring 15 which has annular recesses cut in its inner periphery defining bearing portions 16 engaging on the bushing sleeves and which is provided with pitman openings 17 in its portion between the journal blocks 10.

The outer surface of the cylinder ring is in the form of regular flat faces against which are clamped the inner ends of pairs of cylinders. The cylinders of each pair coact to effect a cycle of the operation of the engine, as set out in my aforementioned previous patent. Each pair of cylinders is of air cooled type in the present instance, and is cast *en bloc* and is provided with base lugs 18 through which are passed bolts 19 securing them on the flat faces of the ring 15. The cylinders are further secured by side rings 20 fitting over shoulders 21 on the base portions of the cylinders, and by an endless strap 22 disposed about and engaging the outer ends of the cylinder castings.

Inasmuch as each pair of cylinders is similar in structure and operation, but a single pair will be described and the same numerals will apply to corresponding portions of the various pairs. Each cylinder casting comprises a pair of cylinders 23 and 24 of equal size, the outer end portions of the pistons being connected by a passage 26 extending therebetween and having a spark plug passage 27 opening thereinto.

Heat radiating fins 28 are formed about the outer portions of the cylinders, while the inner and intermediate portions of the cylinders are connected by walls forming a fuel inlet chamber 29. The inner end of the ends of the cylinders are closed by the corresponding face of the cylinder ring 12, and said inner end portions of the cylinders are connected by a passage 30 in one of the walls of the chamber 29 and bridged past said chamber whereby at all times to afford equalized pressure in the inner ends of the cylinders. The adjacent portions of the cylinder walls are provided with longitudinal slots 31 receiving a common wrist pin 32 for pistons 33 mounted in said cylinders, the outer wall portions of the cylinder walls being provided with openings normally closed by the plugs 34, permitting assembly of the wrist pin. The wall of the cylinder 25 is provided with longitudinal passages 35, the inner ends of said passages being open at the base of the cylinder, while the outer ends of the passages, designated at 36 are so located as to be opened by the piston as it moves to the limit of its working stroke. The cylinder 23 is provided with an exhaust port 37 opened by the piston of said cylinder as the piston moves to the limit of its working stroke. The outer ends of the cylinders are closed by head plugs 38.

Thus, the two-stroke cycle of operation desired in my aforementioned patent may be carried out with respect to each pair of cylinders 23 and 24. Fuel vapor is supplied to the chambers 29 from the space between the journal blocks 10, the fuel vapor being conducted to said space through a longitudinal passageway 39 in one of said blocks, from the outer end of which a pipe 40 extends to a suitable carbureter. It is noted that the inner ends of the wrist pin slots 31 are exposed in the outer limit of movement of the pistons, and that said pistons are hollow and open at their inner ends to provide compression spaces therein for gas in the inner ends of the cylinders. Thus in operation, as the pistons move inwardly on their power strokes, fuel fluid is compressed thereby in the inner ends of the cylinders. As the piston of the cylinder 23 moves past the exhaust port, the said port is opened and the ports 36 of the cylinder 24 are opened shortly thereafter, thus permitting fuel vapor under the compression of the pistons to rush into the cylinder 24 and through the passage 27 and into the cylinder 23, thus thoroughly scavenging both cylinders and supplying fresh charges of fuel vapor thereto. On the main compression strokes of the piston, this charge is compressed, and as the inner ends of the pistons move past the inner ends of the slots 31, a fresh charge of fuel vapor passes into the inner ends of the cylinder and the two-stroke cycle of operation is repeated.

The common wrist pin of one pair of cylinders is connected with the pitman ring 14 by a master pitman 41[a] integrally or otherwise rigidly connected with said ring, and the remaining peripheral portion of the ring is channeled for the pivotal reception of the inner ends of pitmen 41 connected with the wrist pins of the other pairs of cylinders, there being six pairs of cylinders shown in the present drawings, although it will be appreciated that any desired number of pairs may be employed. The pitmen extend through the openings 17 of the cylinder ring, which are in registry with the chambers 29. The master pitman 41[a] holds the ring 14 against twisting on the shaft 13 in such manner as might procure a binding action of the pistons.

By the foregoing construction, the exceedingly simple, positive and entirely valveless engine operation shown in my aforesaid previous patent is embodied in a rotary structure including a multiplicity of pairs of pistons whereby a maximum amount of power may be procured in a most compact power unit, and with an economy of material, as is particularly desirable in an engine adapted for aeroplane use. The entire structure may obviously be most readily assembled and disassembled.

What is claimed is:

1. A rotary engine including a stationary center journal structure, provided with a fuel supply chamber, a cylinder ring journaled on said stationary center journal structure and provided with openings communicating with the said fuel supply chamber, pairs of cylinders secured on the cylinder ring, a chamber between the cylinders of each pair communicating with a corresponding opening of the ring, means for conducting fuel vapor from the cylinder chamber to the cylinders, pistons in the cylinders, pitmen connected with said pistons and disposed in the cylinder chambers and extending through the openings of the cylinder ring, and a journal for the pitmen carried by said center journal structure.

2. A rotary engine including a pair of spaced journal blocks, a fuel supply passage extending through one of said blocks to the space therebetween, a cylinder ring rotatably mounted on the blocks and provided with openings communicating with the space therebetween, pairs of cylinders secured on the cylinder ring, a chamber between each pair of cylinders registering with the corresponding opening of the cylinder ring, a shaft extending between the journal blocks, a pitman ring loosely mounted on said shaft, pitmen on said ring

extending into the chambers between the pairs of cylinders, pistons in the cylinders, and connections between said pistons and the pitmen.

3. A rotary engine including a center journal structure provided with a fuel supply chamber, pairs of cylinders arranged radially and rotatably mounted on said journal structure, a chamber between each pair of cylinders communicating with the fuel supply chamber of the journal structure, pistons in the cylinders, said cylinders being provided with slots in their adjacent wall portions communicating with the chambers therebetween, a pitman in each cylinder chamber connected with the pistons of corresponding cylinders through said slots, a journal for the pitman carried by the center journal structure eccentrically of the axis of rotation of the cylinders, said slots being of such length as to be opened by the pistons in their outer limit of movement, and bypass ducts for conveying fuel vapor from the inner to the outer portions of the cylinders.

In testimony that I claim the foregoing I have hereunto set my hand at Racine, in the county of Racine and State of Wisconsin.

HENRY R. SIEVERKROPP.