W. P. BARCLAY.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED SEPT. 9, 1909.

1,012,051.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.

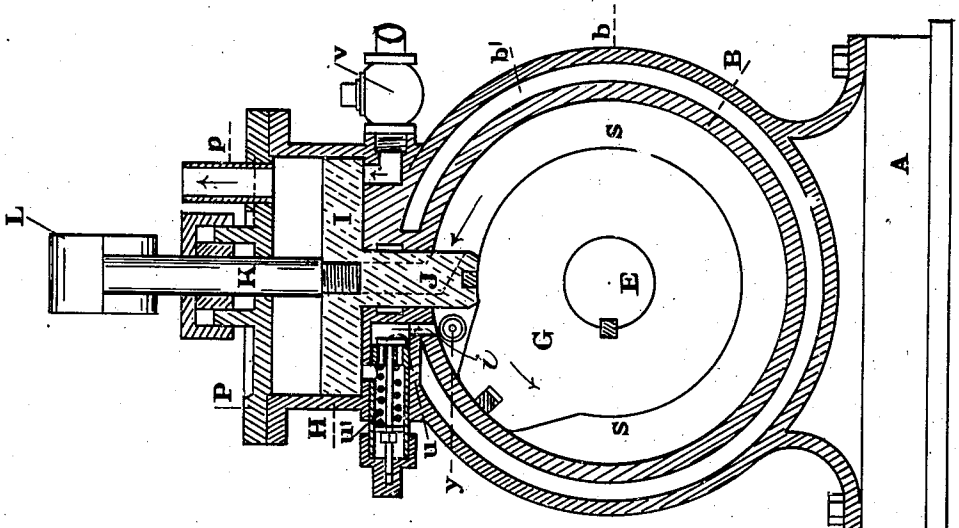

Fig. 2

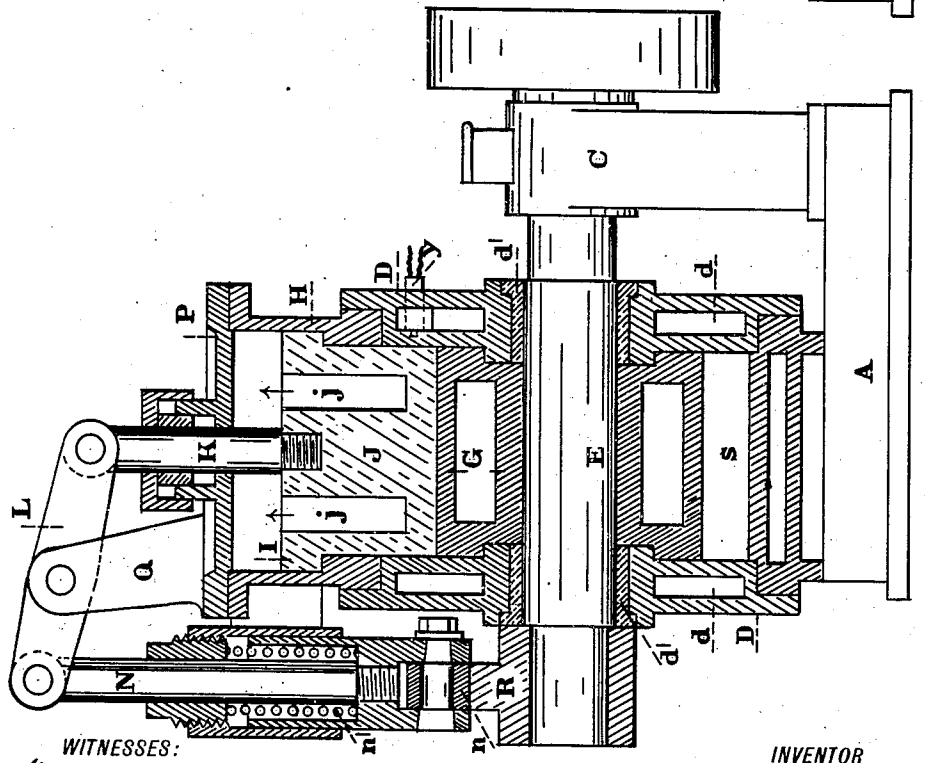

Fig. 1

WITNESSES:

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W. E. Glader

INVENTOR

William P. Barclay

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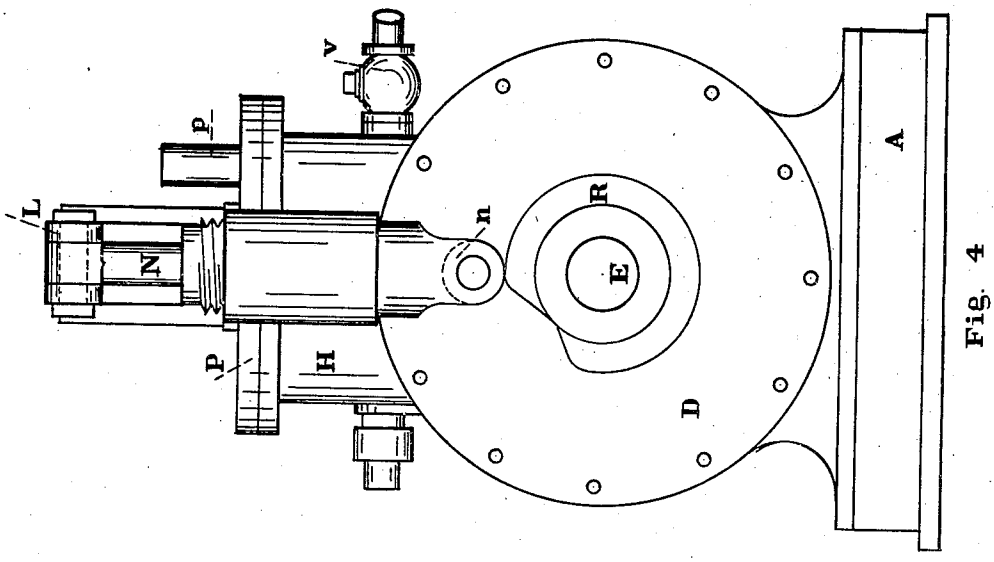

Fig. 4

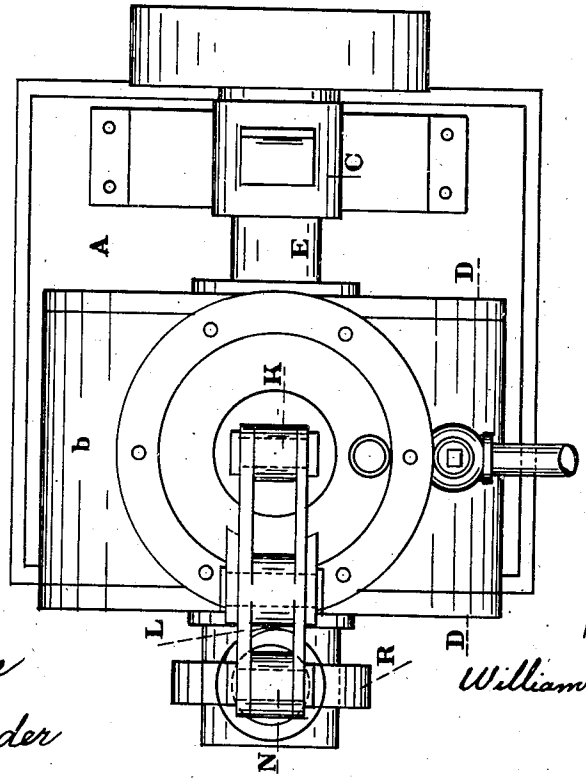

Fig. 3

WITNESSES:

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WILLIAM PARIS BARCLAY, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM D. KANE, OF CHICAGO, ILLINOIS.

ROTARY EXPLOSIVE-ENGINE.

1,012,051. Specification of Letters Patent. Patented Dec. 19, 1911.

Application filed September 9, 1909. Serial No. 516,869.

To all whom it may concern:

Be it known that I, WILLIAM PARIS BARCLAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Explosive-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide a simple, durable, and compact rotary engine which shall be of few parts and readily operated.

A further object of my invention is to provide a rotary explosive engine so as to use the motive agent expansively to the greatest amount compatible with the highest working efficiency.

A practical embodiment of my invention is represented in the accompanying drawings, forming part of this specification, in which similar letters refer to similar parts throughout the several figures.

Figure 1, shows a sectional elevation of my improved rotary explosive engine. Fig. 2, shows a transverse sectional elevation of the same. Fig. 3, shows an exterior plan view, and Fig. 4 shows an exterior transverse elevation of the rotary engine.

Referring to the drawings, A is the bed-plate of the engine, to which is attached the working cylinder B, and the outboard bearing C. The working cylinder B is surrounded with a jacket *b* so as to form an annular chamber *b'* around the working cylinder B for water circulation for cooling purposes.

The removable heads D of the working cylinder are of a box or double pattern, so as to have an annular chamber *d* in each head, for circulation of water for cooling purposes, and the hubs of the heads D have each a central bush *d'* for supporting the piston shaft E, and the said shaft extends through and is also supported by the outboard bearing C, that is attached to the bed-plate A.

The rotary piston G is of a cam shape, and is confined between the heads D of the working cylinder B and the said piston is rigidly attached to the piston shaft E, and revolves with it, and the piston G occupies within the working cylinder B a space conforming to its cam-shaped exterior dimensions; and the annular space S between the piston G and the inner wall of the working cylinder B, constitutes the length or stroke through which the gas entering the working cylinder B, is permitted to expand.

The compression cylinder H, and the working cylinder B are formed together as one casting, and the piston I of the compression cylinder H is given an alternate or reciprocating motion within the cylinder H. The piston I has projecting from its under side a division plate J, that takes into and divides the annular chamber S formed between the piston G and the wall of the working cylinder B, into two compartments or chambers, one of said chambers serving as an explosive chamber for the explosive agent or gas, to expand through, and force the piston G around, and the adjacent chamber serves as an exhaust port for the spent and exhaust gas to flow into the ports *j*, of the division plate J, and the spent and exhaust gas escapes to the atmosphere by way of the ports *j*, of the division plate J, into the exhaust pipe *p*, branching from the cover P of the compression cylinder H.

The piston I is provided with a piston rod K, pivoted from a lever L, operated through a rod N, provided with a small roller *n*, at its lower end, that bears upon a lift cam R that is rigidly secured to the shaft E, of the piston G; and the elasticity of the rods N, and K, permit a sufficient adjustment of the said rods to the arc of the circle described by the ends of the lever L. The lever L, is pivoted from a bracket Q, formed upon the cover P of the compression cylinder H.

The lift cam R, holds the rod N at its highest position, and through connecting parts the piston I, of the compression cylinder H at its lowest position at the time of explosion, and the expansion of the motive agent or gas within the working cylinder; and approximately three-fourths of a revolution for the admittance and the expansion of the gas within the working cylinder is allowed; and approximately one-quarter of the circumference of the cam R is so recessed as to permit the volute spring *n'* to force down the rod N and raise the compression piston I and the division plate J to their highest positions; and the lift cam

R, with its connecting parts, is a means of causing a reciprocating movement being given to the division plate J and the piston I of the compression cylinder, so that the piston G, of the working cylinder B is free to revolve and perform continuous revolutions, and the working cylinder B, capable of receiving and permitting a motive agent or gas to expand within the working cylinder, so that an expansive force is developed that acts upon the piston G, and it is caused to revolve rapidly, so as to be a useful means of communicating power.

The small valve *u* controls the admission of gas from the compression cylinder H, through the port *i* to the working cylinder B automatically, as said valve is provided with a spring *u'*, that holds the valve *u* closed a limited time during the down stroke of the piston I with the division plate J, and during said time, there is developed a space within the working cylinder between the division plate J and the piston G, for the gas within the compression cylinder to take into, by way of the valve controlled port *i*, between the said cylinders.

The valve chest *v* contains the inlet valve admitting the gas to the compression cylinder when the piston I is caused to make its up stroke, and on the down stroke of the piston I the gas within the compression cylinder is compressed fully one half before the small inlet valve *u* opens that admits the gas to the working cylinder to be used as a motive force, by igniting the said gas through an electric sparker *y*, in connection with a battery.

Having described the different parts of my improved rotary explosive engine, the operation of same is as follows:—The inlet side to the valve *v* is connected to a suitable gas receiver, and the piston shaft of the engine is caused to perform part of a revolution by hand so as to take in a supply of gas to the compression cylinder H during the up stroke of the piston I, and on the down stroke of said piston the motive agent or gas is forced from the compression cylinder H into the part of the annular chamber formed between the piston G, the division plate J, and the wall B of the working cylinder, and the said gas is subsequently exploded through an electric or other sparker in contact therewith, and a sufficient force being developed by the explosion and expansion of the gas within the working cylinder causes a sufficient pressure upon the face of the piston G, that it is forced to revolve and complete a revolution; and the operation of the cam R and connecting parts being adjusted to operate the piston I of the compression cylinder H and the division plate J, there is a regular automatic action of said parts, so as to enable the piston G to perform successive revolutions, and the compression cylinder to receive and discharge into the working cylinder a motive agent or gas, and through the ignition and expansive action of said gas motion is given to the piston G, so as to be of service as a motive power.

What I claim as new and desire to secure by Letters-Patent is:

In a rotary explosion engine, a working cylinder, a cam-shaped piston mounted therein carried from a shaft driven by the rotary movement of the piston, in combination with a compression cylinder, a piston reciprocating therein, a division plate projecting from said piston bearing upon the circumferential surface of the rotary piston, a valve controlled port between said cylinders and means for operating the reciprocating piston, consisting of a lift cam, a pivoted lever, a piston rod joining the said lever with the reciprocating piston, a connecting rod suspended from the lever with a pivoted roller in contact with the lift cam, and a guide bracket provided with a volute spring arranged to force down the connecting rod.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM PARIS BARCLAY.

Witnesses:

W. E. GLADER,

WILLIAM D. KANE.