J. WHITTINGHILL & E. W. RICHMOND.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED JULY 3, 1912.

1,054,729.

Patented Mar. 4, 1913.

2 SHEETS—SHEET 1.

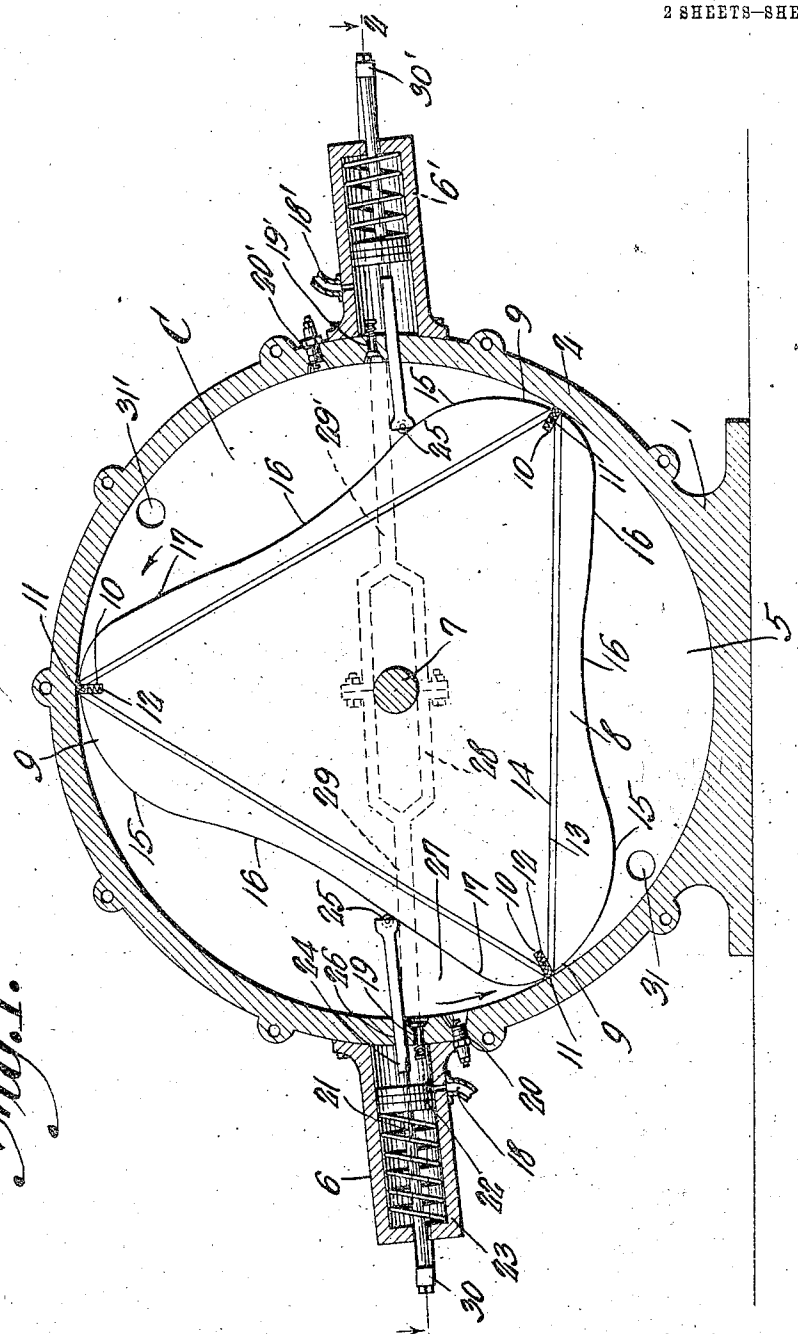

Fig. 1.

Witnesses

J. P. Tomlin

G. W. Wilson.

James Whittinghill and Elijah W. Richmond Inventors

by C. A. Snow & Co.

Attorneys

J. WHITTINGHILL & E. W. RICHMOND.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED JULY 3, 1912.

1,054,729.

Patented Mar. 4, 1913.

2 SHEETS—SHEET 2.

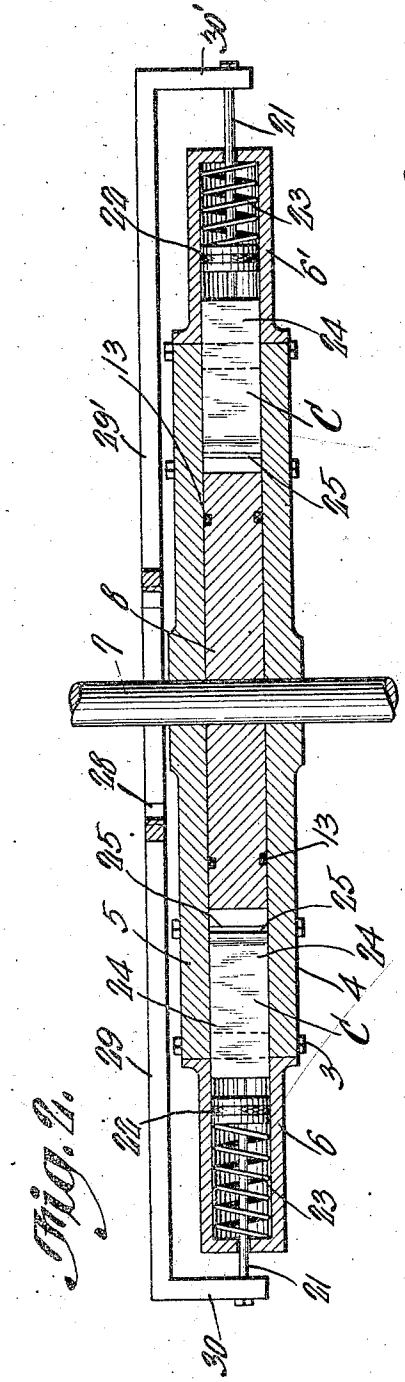

Fig. 2.

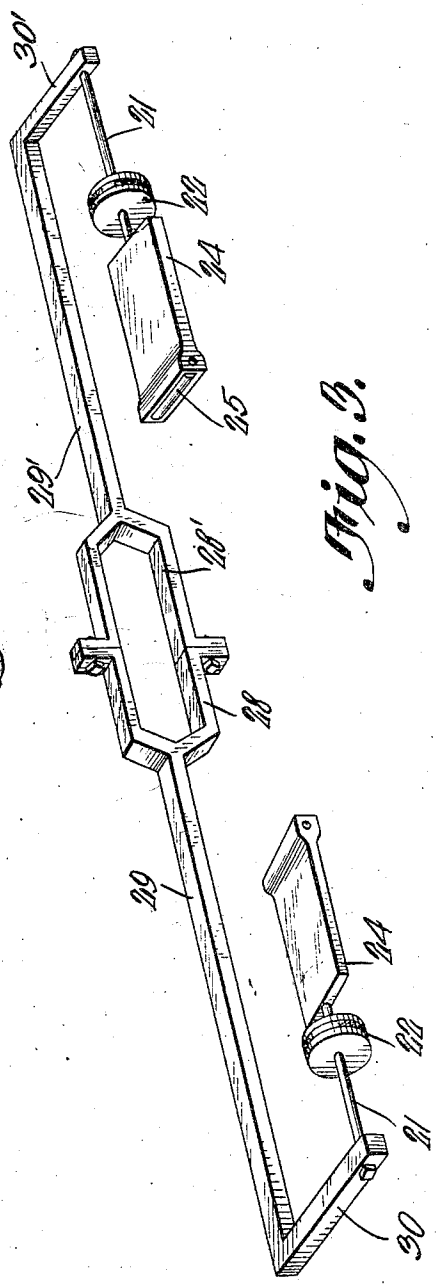

Fig. 3.

Witnesses

J. P. Comeau

E. W. Wilson

James Whittinghill and Elijah W. Richmond Inventors

by C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

JAMES WHITTINGHILL AND ELIJAH W. RICHMOND, OF ADVANCE, MISSOURI.

ROTARY EXPLOSIVE-ENGINE.

1,054,729. Specification of Letters Patent. Patented Mar. 4, 1913.

Application filed July 3, 1912. Serial No. 707,594.

To all whom it may concern:

Be it known that we, JAMES WHITTINGHILL and ELIJAH W. RICHMOND, citizens of the United States, residing at Advance, in the county of Stoddard, State of Missouri, have invented a new and useful Rotary Explosive-Engine, of which the following is a specification.

The present invention relates to improvements in rotary explosive engines, the primary object of the invention being the provision of a novel form of stator and rotor, in which the cam periphery of the rotor actuates the explosive charge admitting piston and also the explosive chamber forming blades or partitions, to at the proper time deliver the explosive charge into the rotor chamber, and compress the same, the explosion occurring at the desired point of compression and through any form of ignition system, which in the present instance is a jump spark system.

A further object of the present invention is the provision of a novel form of rotary engine in which there occur three explosions and exhausts during each revolution of the rotor, the admitting ports being disposed at diametrically opposite points, while the exhaust ports are also disposed at diametrically opposite points of the rotor chamber.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings Figure 1 is a central transverse sectional view through the stator, the rotor being shown in elevation and the parts in the position they assume when the compressed gas at one side of the rotor is about to be ignited. Fig. 2 is a section taken on line 2—2 of Fig. 1 through the complete engine. Fig. 3 is a perspective view of the frame and the piston and blades operated thereby.

Referring to the drawings, the numeral 1 designates the base of the engine which carries the annular ring or band 2, which has connected thereto by means of bolts 3, the respective heads 4 and 5 of the engine, said band 2 and the heads 4 and 5 constituting the stator of the engine and providing a narrow cylindrical rotor chamber C. Connected to the band 2 at diametrically opposite points are the cylindrical piston chambers 6 and 6′, respectively, and journaled concentrically of the heads 4 and 5 is the shaft 7, to which is keyed within the chamber C, the rotor 8. This rotor is of a peculiar shape and is provided with the enlarged ends 9, each one of which is provided with the transverse groove or pocket 10 for the reception of the packing strip 11, the spring 12 being provided to normally hold the packing strip 11 outward and into contact with the inner peripheral wall of the rotor chamber.

In order to pack the outer faces of the rotor 8, so as to produce a gas tight joint between the respective faces and the inner walls of the heads 4 and 5, are the strips 13 which are disposed as shown in Fig. 1, and form a triangle. Each peripheral portion of the rotor 8 between the respective strips 9 are provided with the compound curved portions 15, 16 and 17, the same providing a plurality of cam surfaces upon the periphery of the rotor for the proper actuation of the various means for forming compression chambers within the rotor and for permitting of the proper intake and exhaust of the explosive charges as will presently appear. Disposed to conduct the explosive charge to the respective cylinders 6 and 6′ are the conduits 18 and 18′ respectively, the same being disposed adjacent the inner ends of the respective cylinders, while formed in the ring 2 are the valve controlled intake ports 19 and 19′ respectively, to permit of the introduction of the explosive charge into the chamber C, and to prevent any back pressure of such charge or the burnt gases.

In order that the compressed explosive charge may be ignited at the proper time, the spark plugs 20 and 20′ are connected in the ring 2, as clearly shown in Fig. 1, while disposed for sliding movement within the outer end and concentrically of the chamber of the respective casings 6 and 6′, are the piston rods 21, each one of which has disposed upon its inner end the piston 22, which acts as a cut-off for the respective conduits 18 and 18′ and also as a means for forcing

the explosive charge through the valve ports 19 and 19′ into the chamber C. A spring 23 is mounted upon the piston rod 21 between the head 22 and the outer end of the respective casings 6 or 6′, and normally exerts a tension to move the piston 22 inwardly. A blade 24 is connected to the inner end of the rod 21 and projects through the transverse slot 26 formed in the ring 22, one to each casing 6 or 6′ and disposed upon the inner end of the partition or blade 24 is a packing strip 25 which is disposed to engage at all times the peripheral surface of the rotor 8. The explosive charge has been forced by the piston 22 through the valve port 19 and into the compression and explosive chamber 27 formed by the inner peripheral wall of the ring 2, the partition 24 and the adjacent surface of the periphery of the rotor 8, the spark plug 20 at this time being energized to ignite such charge and thus propel the rotor in the direction of the arrow Fig. 1.

In order to impart positive movement to the respective blades or partitions 24 and also the explosive charge supplying pistons 22, the guiding spider or frame 28 is mounted exteriorly of the stator and about the shaft 7, the said frame being provided with the oppositely disposed links or rods 29—29′, whose outer hooked ends 30 and 30′ respectively, are connected to the extreme ends of the piston rods 21 and exteriorly of the respective casings 6 and 6′.

It will thus be seen that as the rotor 8 is rotated, and due to the contact of the inner end 25 of the blades or partitions 24, that the cam surfaces of the rotor 8 will impart the desired inward and outward movements to the respective blades 24 and consequently the pistons 22, and as said pistons 22 are connected together for movement in unison, simultaneous movement will be imparted thereto to cause the explosive charge to be admitted to the chamber C at the desired time and in such a manner, that three successive explosions will occur each rotation of the rotor 8.

In order to properly exhaust the burnt gases from the chamber C, the two diametrically disposed exhaust ports 31 and 31′ are provided in either head 4 or 5.

It is evident that by cutting out the supply of carbureted air to one supply casing, that three instead of six explosions every revolution of the rotor will result, this being entirely at the will of the operator.

From the foregoing description, taken in connection with the drawings it is evident that the present form of engine may be advantageously used with any form of pressure fluid, such for instance as steam or compressed air, but is more especially designed for use in connection with the explosion of a hydrocarbon gas, and that with the present arrangement, three successive explosions and exhausts at each revolution of the rotor is produced. It is also evident that by reason of the cam surfaces of the rotor, that positive actions are imparted to the piston 22 and blades 24, the inner ends 25 of the blades 24 being at all times cushionedly held due to the springs 23 in proper contact with the periphery of the rotor, thus providing the desired pressure fluid tight joint therebetween, and that by the disposition of the casings 6 and 6′, the movable elements of the engine are readily accessible.

What is claimed is:

A rotary explosive engine, including a stator having a rotor chamber provided with two diametrically disposed intake ports and two exhaust ports, a valve controlling each intake port, two abutments mounted slidably at diametrically opposite points in the walls of the stator, an explosive charge supplying piston mounted in each casing and operably connected to its respective abutment, a piston rod connected to each piston and projected exteriorly of its respective casing, a rod connecting the two piston rods for movement in unison, a rotor mounted in the casing and provided with a plurality of cam surfaces upon its periphery, the inner ends of the two abutments being in engagement with said surfaces, whereby the rotation of the rotor will simultaneously actuate both sets of abutments and pistons, and a spring mounted in each casing upon its respective piston rod for normally moving its respective piston inwardly.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

JAMES WHITTINGHILL.
ELIJAH W. RICHMOND.

Witnesses:
WM. M. RHODES,
E. L. PETTER.