J. T. BUSTIN.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED OCT. 2, 1909.

1,047,913.

Patented Dec. 24, 1912.

2 SHEETS—SHEET 1.

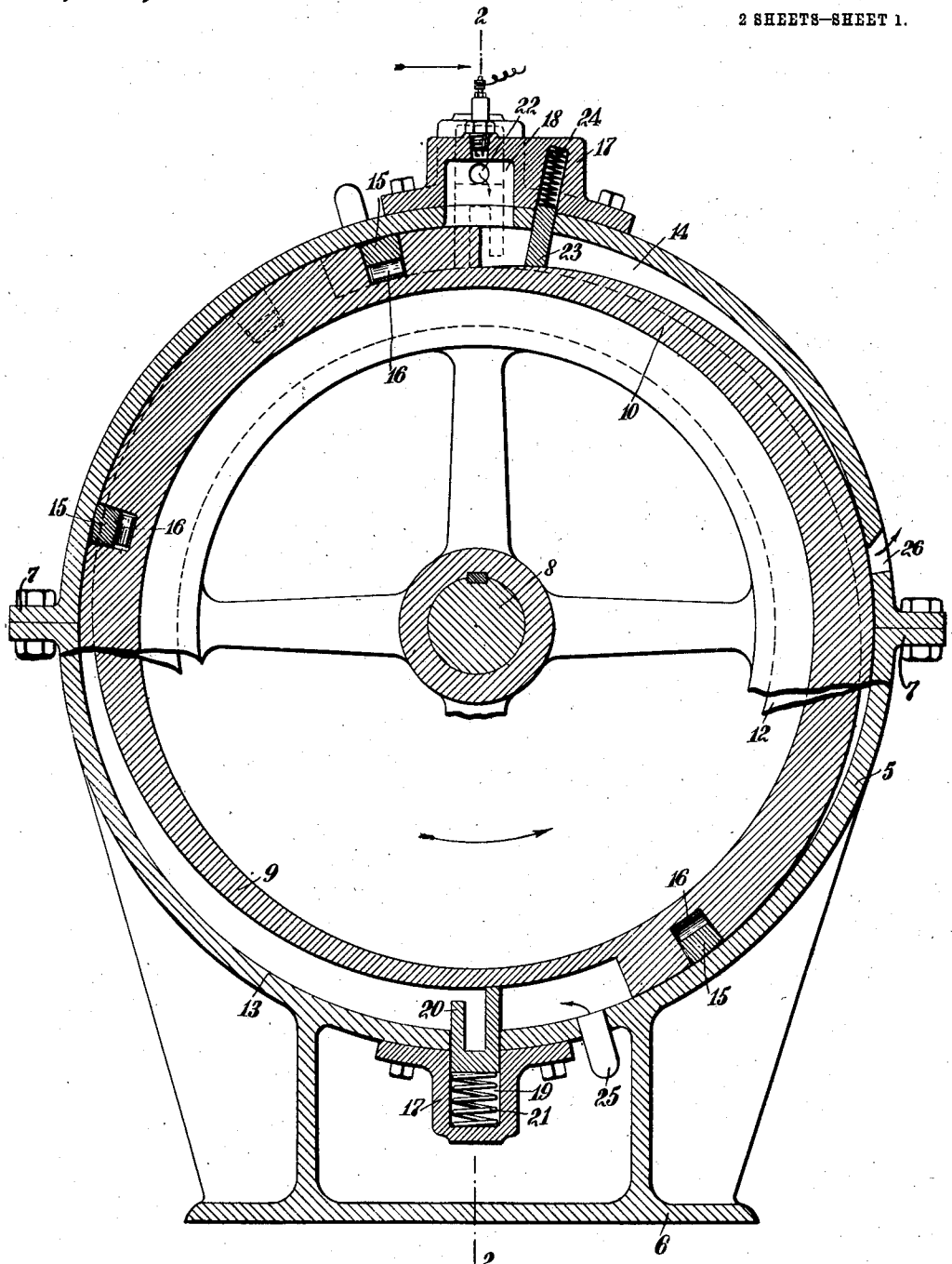

Fig. 1

WITNESSES

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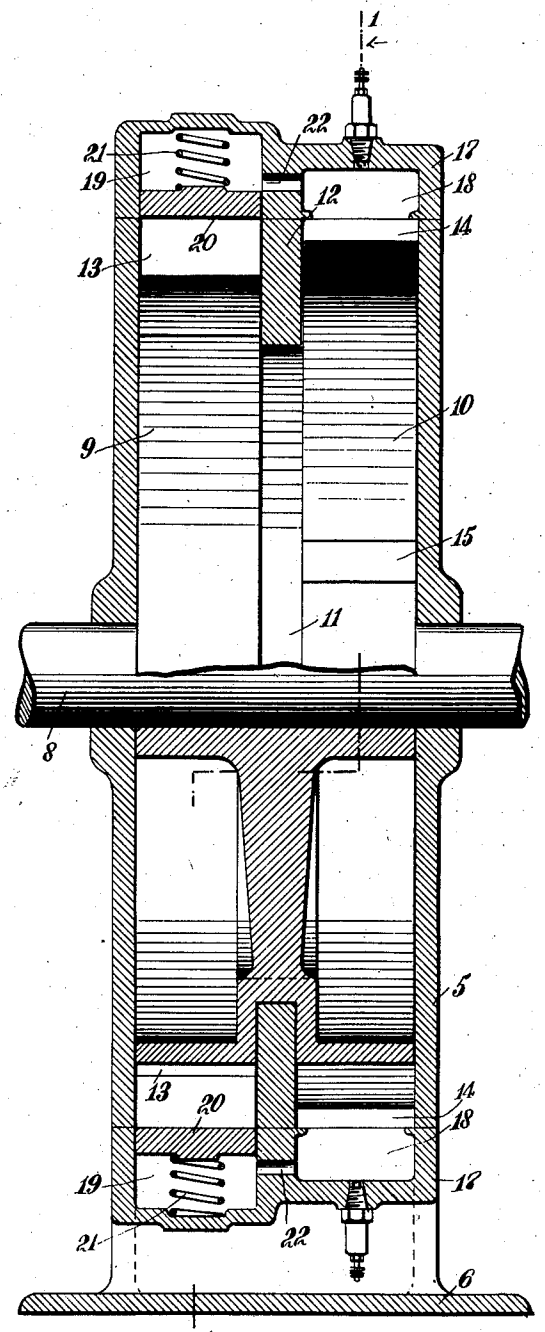

Fig. 2.

WITNESSES

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JAMES T. BUSTIN, OF WATERTOWN, MASSACHUSETTS.

ROTARY EXPLOSIVE-ENGINE.

1,047,913. Specification of Letters Patent. Patented Dec. 24, 1912.

Application filed October 2, 1909. Serial No. 520,634.

To all whom it may concern:

Be it known that I, JAMES T. BUSTIN, a citizen of the United States, and a resident of Watertown, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Rotary Explosive-Engine, of which the following is a full, clear, and exact description.

The invention is an improvement in rotary explosive engines, and has in view a compact engine of this character of a relatively high efficiency and operating with little vibration, the engine embodying cylinders, a compression and an actuating piston constructed to revolve as a unit in the respective cylinders, the compression piston having one or more peripheral compression pockets eccentrically arranged, and the actuating piston having similar expansion chambers equal in number to the pockets of the compression piston, the cylinders being provided with abutments coacting with the respective pistons, and firing chambers equal in number to the expansion pockets of the actuating piston and arranged to communicate therewith and receive the compressed charges from the compression piston as the two pistons revolve.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a vertical section of a rotary explosive engine embodying my invention, the section being taken on the line 1—1 of Fig. 2; and Fig. 2 is a central vertical section on the line 2—2 of Fig. 1.

In the construction of my improved engine I employ a casing 5, having a suitable supporting base 6, the casing being constructed of upper and lower sections detachably connected by flanges 7 and bolts or other suitable devices. Centrally journaled in the casing is a driving shaft 8, to which is secured a rotor comprising a compression piston 9 and an actuating piston 10, the two pistons being integrally cast or otherwise rigidly joined to revolve as a unit and having a dividing groove 11 centrally arranged between them, the groove receiving an annular partition 12 secured to the casing, the partition in connection with the rotor dividing the casing into two distinct cylinders. The compression piston is constructed with one or more peripheral compression pockets 13 eccentrically arranged, two being shown located at diametrically opposite points, and the actuating piston is provided with a like number of expansion pockets 14 of like construction and similar arrangement, the expansion pockets, however, as shown in the upper half portion of Fig. 1, being relatively shorter than the compression pockets 13, with the shouldered end of the compression pockets arranged a substantial distance in advance of the corresponding ends of the expansion pockets. Adjacent to each end of the expansion pockets the actuating piston is provided with packing strips 15 crosswise arranged and pressed out against the inner wall of the cylinder by centrifugal action or by springs 16, as shown, a like packing strip being arranged adjacent to the shouldered end of each compression pocket of the compression piston.

At diametrically opposite points of the casing, preferably at the top and bottom, are attached castings 17, each having a firing chamber 18 in communication with the cylinder of the actuating piston, and a guideway 19, in which is slidably retained an abutment 20 pressed to the periphery of the compression piston by a spring 21, the abutment being slotted longitudinally of the cylinder, with only that portion of the abutment at the advanced side of the cylinder bearing on the compression piston. The explosion chamber 18 and the guideway 19 communicate through a charge inlet opening 22, this opening being cut off from the compression pocket when the abutments and pistons are in the position shown in the drawing figure, and placed in communication therewith when the abutment is forced downwardly to the bottom of the way under the action of the compression piston. At the rear side of each firing chamber 18, an abutment 23 is slidable in a slot formed in the wall of the cylinder and casting, and is forced against the actuating piston by a spring 24. At the advanced side of each abutment 20, the cylinder of the compression piston is provided with a vapor inlet 25 leading from the carbureter. The cylinder of the actuating piston is provided with exhaust openings 26 arranged ninety degrees or more from the expansion pocket.

The engine is started by cranking or other suitable way, causing the compression piston to draw the charges into the compression pockets. After these pockets

have been charged and passed to the abutments 20, the latter are projected against the compression piston, as shown in the lower half of Fig. 1, and compress the charges until the abutments have been sufficiently retracted by reason of the cam surfaces of the piston, to uncover the inlet openings 22, allowing the charge to escape into the explosion or firing chambers. As the compression pockets pass in the abutments 20, a fresh charge is drawn in by reason of the vacuum created. The expansion pockets of the actuating piston pass into communication with the firing chambers preparatory to the introduction of the charge in the latter, and the charges thereafter fired by the spark plugs, as shown, or other suitable means, causing the burnt gases between the abutments 23 and the shouldered ends of the expansion pockets to act expansively until the exhaust ports 26 are reached, where the exhaust takes place. This operation is continued in the working of the engine, causing four charges to be exploded at each revolution of the pistons.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a rotary explosive engine, a casing, and a rotor revoluble in the casing, having an actuating piston and a compression piston arranged side by side and movable as a unit, the pistons respectively provided with expansion and compression pockets gradually diminishing in cross-sectional area from their active faces rearwardly.

2. In a rotary explosive engine, cylinders, an actuating piston revoluble in one of said cylinders, a firing chamber in communication with the cylinder of the actuating piston, a compression piston revoluble in the other of said cylinders, and sliding abutments carried by the cylinders coacting with the respective pistons, with the abutment coacting with the compression piston controlling the passage of the charge to the firing chamber.

3. In a rotary explosive engine, cylinders, an actuating piston revoluble in one of the cylinders, having peripheral expansion pockets eccentrically arranged, and a compression piston revoluble in the other cylinder, having compression pockets of like form and arrangement, with the compression pockets in advance of and relatively longer than the expansion pockets of the actuating piston.

4. In a rotary explosive engine, a casing, a rotor revoluble in the casing comprising an actuating piston and a compression piston, an annular partition dividing the casing into two cylinders and separating the peripheral portions of the pistons, a casting secured to the peripheral portion of the casing, having a guideway and a firing chamber connected together by a fuel passage, with the firing chamber in communication with the cylinder of the actuating piston, and the way leading into the cylinder of the compression piston, and an abutment bearing on the periphery of the compression piston and slidable in said guideway, controlling the flow of the gas to the firing chamber through the fuel passage.

5. In a rotary engine, cylinders, an actuating piston revoluble in one of the cylinders, a compression piston revoluble in the other of the cylinders, a firing chamber communicating with the cylinder of the actuating piston and with the other of the said cylinders, and a sliding abutment coacting with the compression piston and controlling the passage of the fuel from the compression chamber to the firing chamber.

6. In a rotary engine, a casing, a rotor revoluble in the casing, having a compression piston and an actuating piston separated at their peripheries by an annular groove, an annular wall carried by the casing and projecting into said groove and dividing the casing into two cylinders, a firing chamber in communication with the cylinder of the actuating piston, a way communicating with the firing chamber, and an abutment slidable in the way against the compression piston and controlling the passage of the fuel through the way into the firing chamber.

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

JAMES T. BUSTIN.

Witnesses:

FREDERIC E. CRITCHETT,

HIRAM H. MCGLAUFLIN.