No. 791,071. PATENTED MAY 30, 1905.

J. BARTOSIK.

ROTARY EXPLOSIVE ENGINE.

APPLICATION FILED JAN. 18, 1904.

2 SHEETS—SHEET 1.

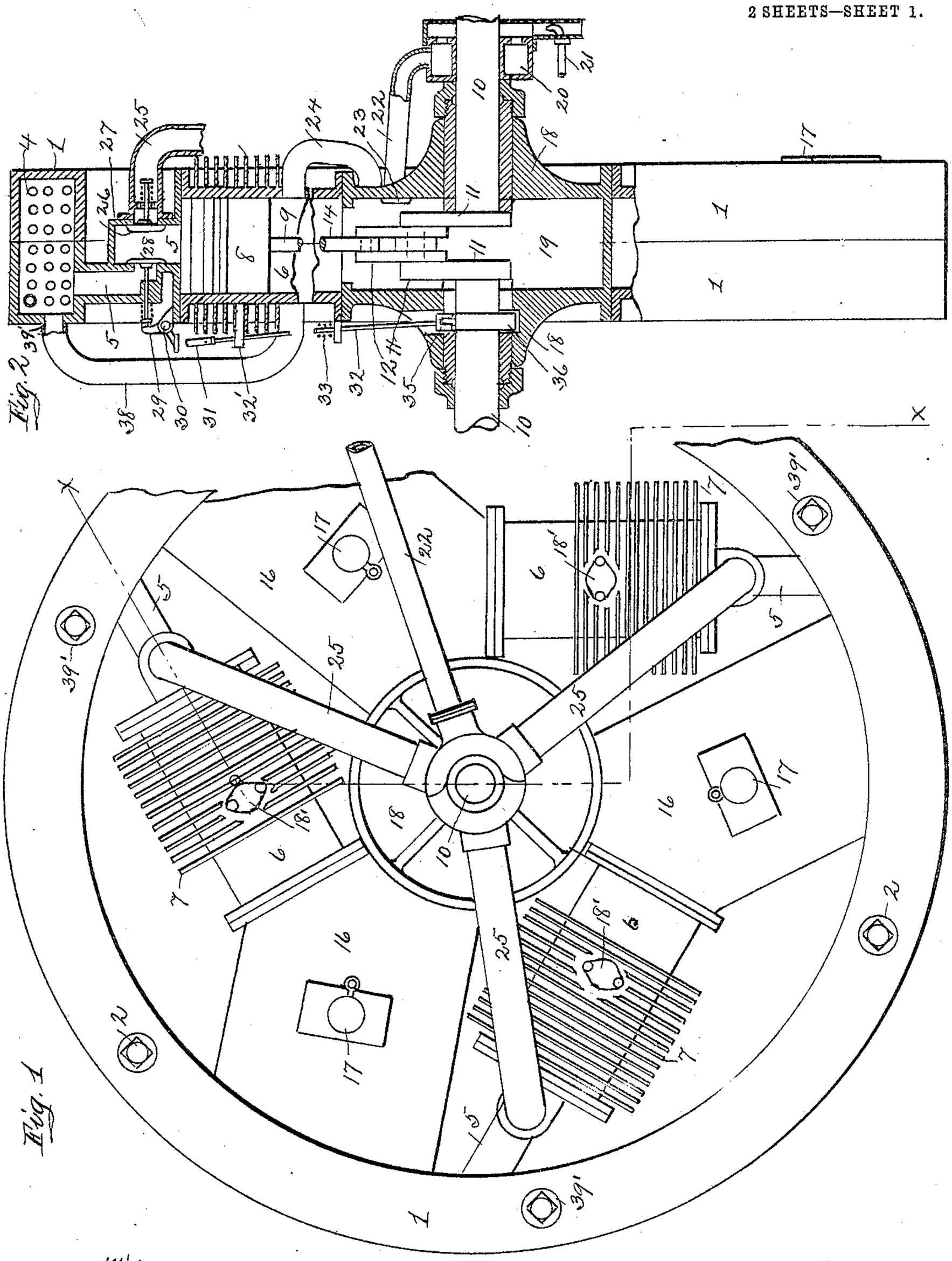

Fig. 2

Fig. 1

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Inventor:
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by his attorney
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Fig. 4

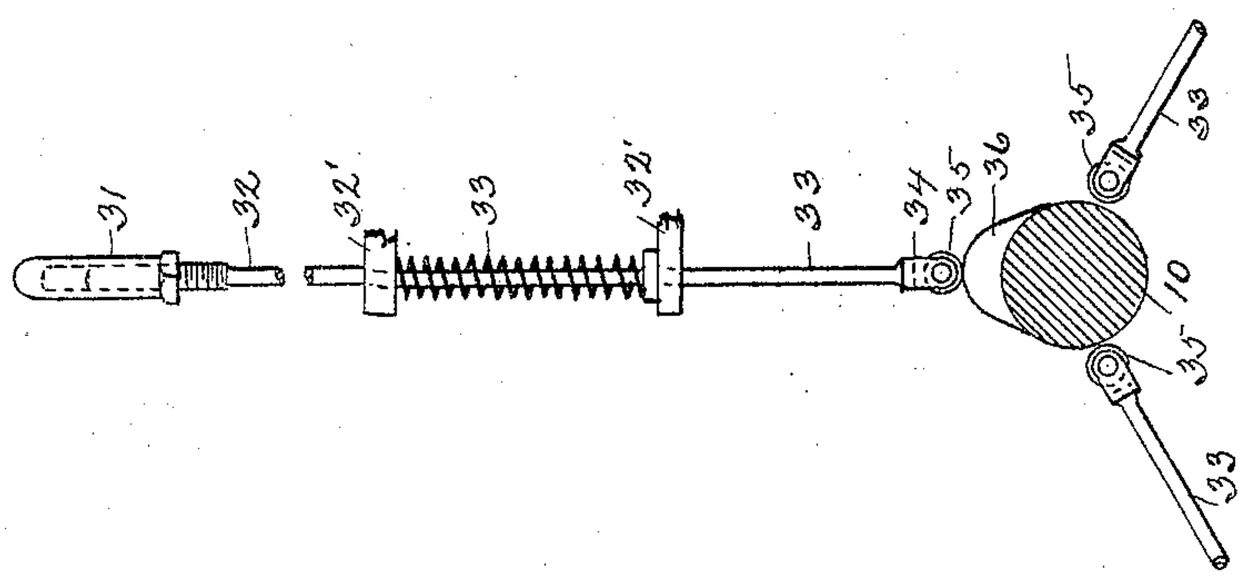
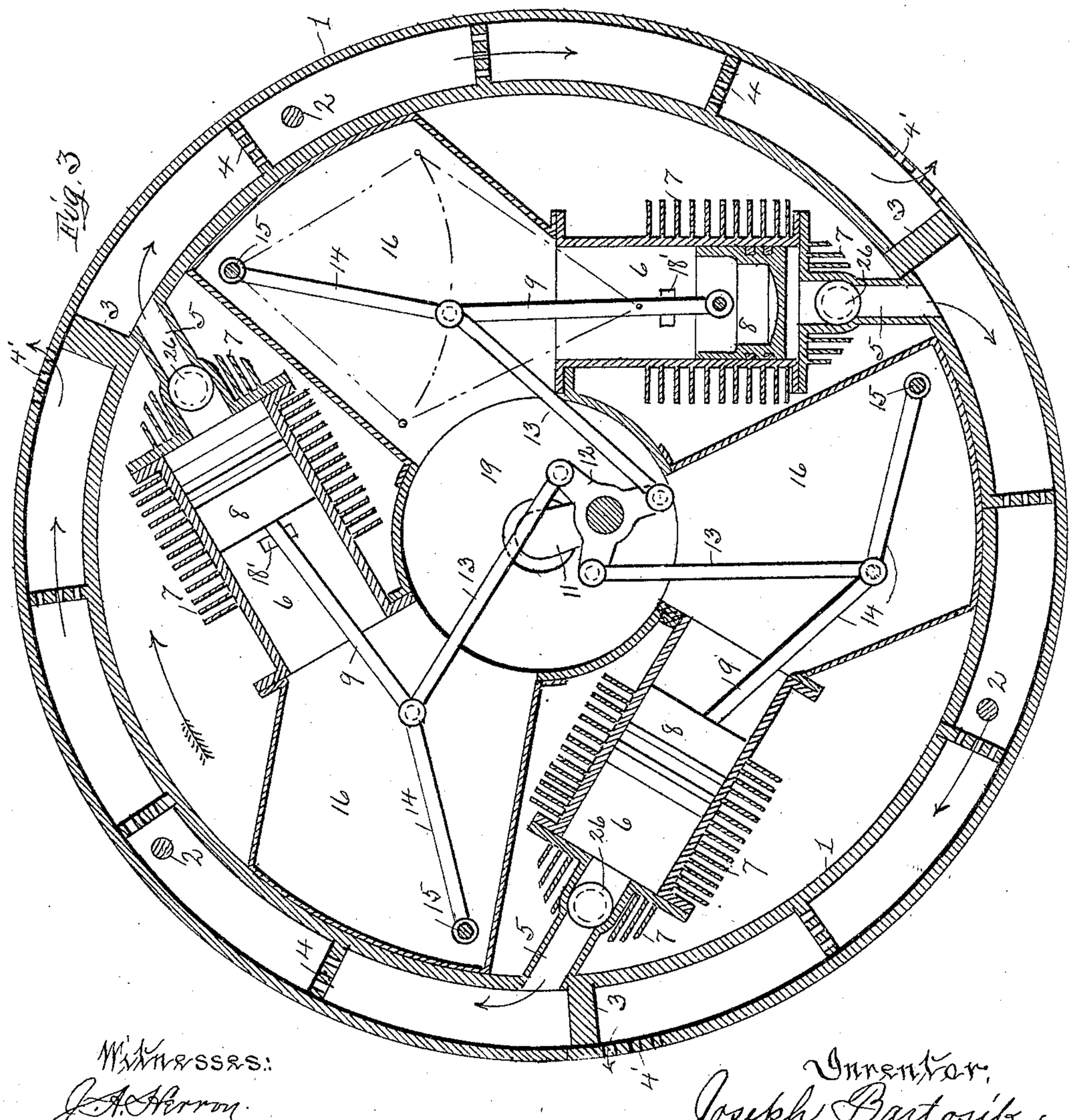


Fig. 3



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UNITED STATES PATENT OFFICE.

JOSEPH BARTOSIK, OF PITTSBURG, PENNSYLVANIA.

ROTARY EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 791,071, dated May 30, 1905.

Application filed January 18, 1904. Serial No. 189,443.

To all whom it may concern:

Be it known that I, JOSEPH BARTOSIK, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rotary Explosive-Engines, of which improvement the following is a specification.

This invention relates to an improved interchangeable gas or oil engine of the rotary explosive type, the object being to provide an improved form of such apparatus that may be readily converted from a one-revolution four-cycle to a half-revolution two-cycle engine, may be constructed either in the form of a rotary or stationary type; and the invention further consists in the certain details of construction and combination of parts, as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of my improved engine, a portion of which is broken away, the connections of which are arranged for a four-cycle engine, the said view showing the construction and arrangement of the invention. Fig. 2 is a sectional end elevation taken on the line X X of Fig. 1, but showing a slightly-modified form, the connections being arranged for a two-cycle engine. Fig. 3 is a central side sectional elevation of the engine, showing the arrangement of the cylinders and their pistons and connections. Fig. 4 is a detailed side elevation of one of the exhaust-rods and its operating-cam.

In the drawings I have shown my invention in the form of a rotary engine, and to construct this type I provide an annular shell 1, formed in two sections and securely attached together by transverse bolts 2, forming within said shell three compartments, the one being separated from the other by partition-walls 3, and in each compartment are arranged baffle-walls 4 and an inlet-pipe 5, through which the exhaust from the cylinders pass. These compartments act as mufflers, the waste products escaping from the engine through the openings 4′ and the shell acting as a fly-wheel. Supported within the inner periphery of the shell 1 are three cylinders 6, arranged at an angle of sixty degrees the one from the other at equal radial distances from the center of said shell and in the same vertical plane. Each cylinder 6 is attached to and in communication with its exhaust-port 5 at its upper end and is further supported and attached to the walls of the crank-casing 18 and connecting-rod casing 16, the latter being firmly bolted to the inner periphery of the shell 1 and the former supported by a stationary transverse shaft 10. Each cylinder 6 is constructed with integral cooling-ribs 7 and formed on one side with exhaust-ports 18′, which are provided with removable covers or valves and located at points below the center of the length of the cylinders, and similar inlet-ports 17, fitted with spring-actuated closing-valves 23 on the opposite side located farther down the said cylinder, the said inlet and outlet ports being used for changing the engine from a four-cycle to a two-cycle, as will be described hereinafter. These cylinders 6 are each fitted with a piston 8, properly packed and loosely connected to the ends of piston-rods 9, the other ends of which are journaled to two connecting-rods 13 14, the one set, 13, being journaled to a triple crank 12, loosely mounted upon a single crank 11, formed on the stationary shaft 10 supporting the engine, and the other set of rods, 14, journaled to stationary pins 15, located in the upper angles of the connecting-rod casings 16. The triple crank 12 is arranged in such position as to operate the pistons 8 in a manner that one cylinder will receive a charge of air mixed with gas or other explosive substance by the suction created by the movement of said piston. The other piston compresses its charge while the third is discharging the waste products through the exhaust-port 5. This arrangement of the pistons and cylinders and their connected parts is best seen by reference to Fig. 3 of the drawings. Arranged in connection with the ports 5 are spring-actuated exhaust-valves 28, adapted to close communication with the top of the cylinders 6 and the mufflers above, the said valves being operated by bell-cranks 29, mounted in suitable bearings 30. To impart movement at proper intervals to these bell-cranks 29, a cam 36 is formed on the main shaft 10, which by reason

of the rotary movement of the engine elevates the rods leading from said shaft to points immediately beneath one arm of said crank. Each of these rods (see Figs. 2 and 4) consists of a bar 32, threaded at one end to receive a removable or adjustable section 31, a friction-roller 35 at the other end to contact with the cam 36 and shaft 10, and an intermediate collar and spring 33 to maintain said contact, the whole being supported in suitable bearings 32′ in a manner that an upward movement of each rod will operate the crank 30 and open the exhaust-valve.

Arranged opposite the exhaust-valves 28 are spring-actuated inlet-valves 26, adapted to open and close the inlet-pipes 25 by the vacuum created by the downward movement of the pistons 8. These inlet-pipes all lead to the center of the engine and are connected to a box-shaped compartment 20, which is in communication (by means of a tube 22) with a source of supply of gas or other explosive substance located at a point distant from the engine.

The above-described construction and arrangement of parts is such that a one-revolution four-cycle engine is formed, the operation of which is as follows: Gas or other explosive substance mingled with air under slight pressure is introduced through the medium of the pipe 22 into the compartment 20 to the inlet-pipes 25. The downward stroke of the piston, caused by the rotary movement of the shell 1, and position of the crank 12 and connecting-rods forms a vacuum, causing the inlet-valve 26 to open, permitting a "charge" to enter the cylinder pertaining to said valve. This charge will be compressed upon the return movement of the piston, and by means of suitable igniters (not shown) located at proper points above the top of said piston the charge is exploded, driving the piston forward. This movement of the piston will be imparted to the piston-rod 9 and will tend to move the fixed points 15 away from the cylinder, as the crank 11 is stationary. The movement of the connecting-rods 13 14 is indicated by dotted lines at Fig. 3 of the drawings and will tend to force the shell away, causing the same to revolve upon its shaft 10. At this time the piston of the second cylinder is being thrust forward by its exploded charge, giving a further momentum to the shell, and in its turn the third cylinder is operated, making a continuous regular propulsion, thereby rotating the shell, thus forming a four-cycle one-revolution engine. This rotary movement may be transmitted by any suitable means, such as a sprocket or pulley attached to the crank-casing 18 and connected by a chain or belt.

To convert the engine into a half-revolution two-cycle engine, the outer ends of the exhaust-operating rods 33 are removed or adjusted out of reach of the bell-cranks. The inlet-pipes 25 are disconnected from the inlet-valves 26, and pipes 22 are provided, which are connected to the crank-casing 18, (as at 23, Fig. 2,) and other pipes, 24, are provided, leading from the compartment 19, formed by the crank-casing, to the inlet-ports in the side walls of the cylinders 6. Exhaust-pipes 38 are connected to the muffle-compartments by removing screw-caps 39′, the other ends of said pipes communicating with the exhaust-ports 18′ of the cylinders. The piston on its upward stroke compresses the charge at one end of the cylinder and at the same time draws a charge into the compartment 19. The explosion of the compressed charge above will drive the piston downward to operate the engine and also to compress the gas in the compartment 19. The piston traveling downward will open the exhaust-port leading to the pipe 38, permitting the waste gases to escape to the muffler, and its continued downward stroke will open the passage 24 and permit a second charge from the compressed gas of the compartment 19 to pass into the cylinder and be compressed upon the upward stroke of the piston, thus giving two explosions to one revolution. By this construction and operation each piston imparts two impulses to the shaft at each revolution. Therefore the engine may be built smaller in its parts and give more than double the power that is given by the ordinary type now in use.

The engine by slight modifications may be constructed for stationary types, or by the peculiar construction and arrangement of the connecting-rods the same may be adapted for use in one or more cylinder engines.

Other modifications and changes may be made in the details of construction without departing from the spirit of the invention. Therefore I do not wish to confine myself to that shown and described.

I claim—

1. In combination with the cylinder of a gas-engine, a piston operating therein, a piston-rod attached thereto, a connecting-rod attached to the moving shell of the engine and to said piston-rod, a similar rod connected to said piston and connecting rods and with a rotatable crank mounted upon a stationary crank, whereby movement is imparted to said moving shell by the reciprocating motion of the piston.

2. In a gas-engine, the combination consisting of the crank-shaft, a triple crank mounted upon the crank of said shaft, connecting-rods to each arm of the triple crank, cylinders fitted with pistons connected to said rods, said cylinders being arranged in a circle and at equal distances the one from the other, and other connecting-rods joining the piston-rods with the rotatable shell of the engine.

3. An interchangeable rotary gas-engine, comprising the rotatable shell 1, the station-

ary crank-shaft 10 supporting said shell, the cylinders 6 supported within the shell each of which is fitted with a piston and rod 9, a triple crank 12 mounted upon the crank of the shaft 10, rods 13 connecting said triple crank with the piston-rods, similar rods 14 uniting the piston-rods with the shell, inlet and outlet ports at one end of the cylinders valves controlling said ports and means for operating the same, inlet and outlet ports leading to and from the crank-chamber 19, said outlets connected to the cylinders at points about midway the length of the same, a muffler exhaust-ports about opposite said inlet-ports and a removable connecting-pipe 38, leading to the muffler, all arranged and combined, substantially as described.

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

JOSEPH BARTOSIK.

In presence of—

ALBERT A. SOMSAG,

R. F. SCHMITT.