A. S. KENMONTH.

ENGINE.

APPLICATION FILED APR. 29, 1920.

1,405,224. Patented Jan. 31, 1922.

2 SHEETS—SHEET 1.

Fig. 4

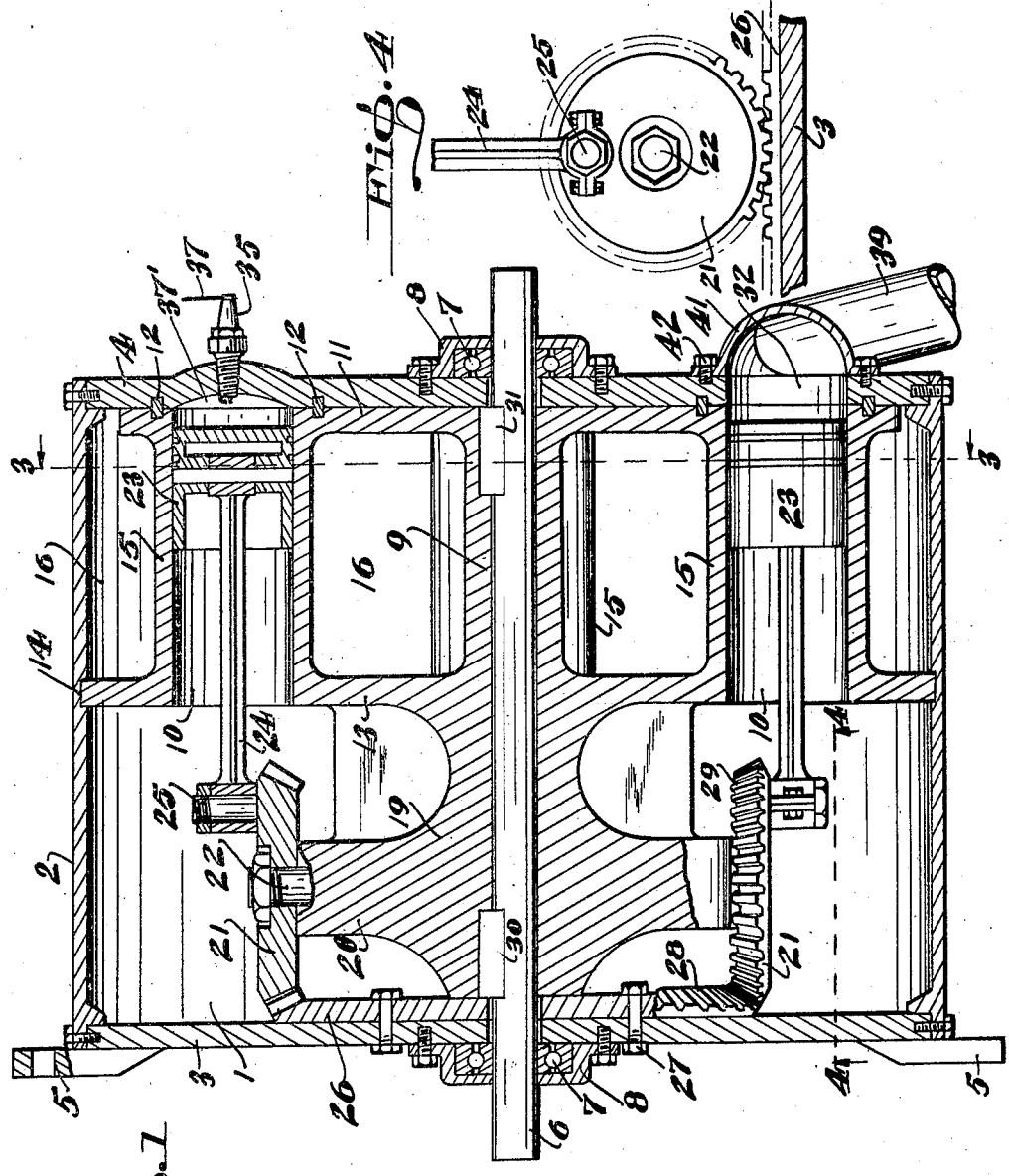


Fig. 1

Alton S. Kenmonth INVENTOR.

BY

Hazard & Miller ATTORNEYS

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2 SHEETS—SHEET 2.

Fig. 2

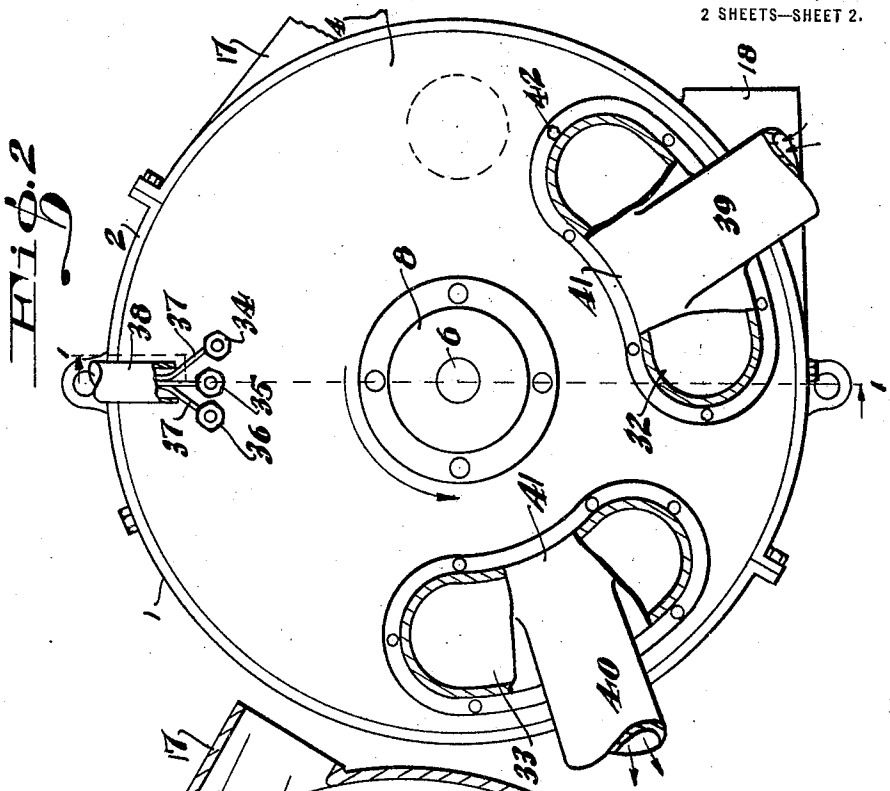
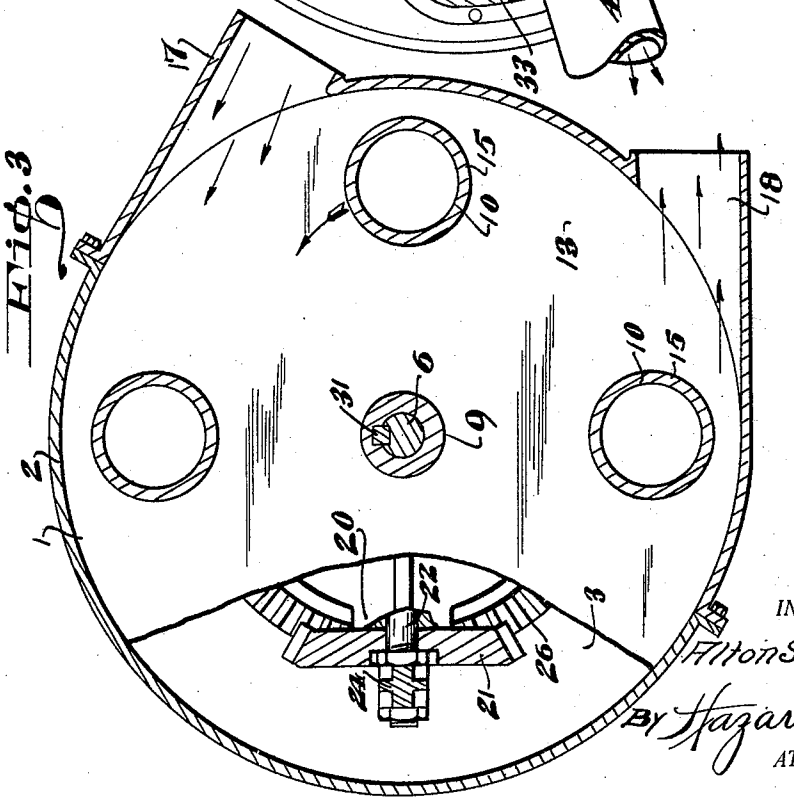


Fig. 3



INVENTOR.

Alton S. Kenmonth

By Hazard & Miller

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALTON S. KENMONTH, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO JOHN GARRIGUES, OF LOS ANGELES, CALIFORNIA.

ENGINE.

1,405,224. Specification of Letters Patent. Patented Jan. 31, 1922.

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To all whom it may concern:

Be it known that I, ALTON S. KENMONTH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Engines, of which the following is a specification.

This invention is an engine of the internal combustion type, and has for its object to provide an improved construction wherein the necessity for movable inlet and exhaust valves is eliminated, the cylinders of the engine rotating around the axis of the main shaft thereof and passing successively beneath suitably arranged inlet and exhaust ports.

It is a further object of the invention to provide improved connecting means between the piston rods and the main shaft of the engine for rotating the latter.

Further objects of the invention will be readily understood from the following description of the accompanying drawings in which:

Figure 1 is a longitudinal section through an engine constructed in accordance with my invention.

Fig. 2 is an end elevation of the same.

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1 and partly broken away.

Fig. 4 is a fragmentary longitudinal section taken on the line 4—4 of Fig. 1.

In the embodiment of the invention illustrated a four cylinder four cycle engine is shown. The engine is housed within a cylindrical casing 1 comprising a side wall 2 and end walls 3 and 4 suitably secured thereto. This casing is suitably mounted, preferably, so that the side wall 2 extends horizontally, the supporting means for the casing being shown as comprising brackets 5. The main shaft 6 of the engine extends lengthwise through the casing 1 medially thereof and may be journaled at the ends of the casing, preferably, in antifriction bearings shown as ball bearings 7 carried in suitable bearing housings 8, preferably secured to the outside of the end walls of the casing.

The cylinders of the engine, in the present instance four in number, are formed in a cylinder block 9 mounted upon the main shaft 6. The cylinders are shown at 10 arranged in diametrically opposed pairs and equi-distance from one another. The cylinders extend the entire length of the cylinder block and are open at their respective ends. The outer end 11 of the cylinder block abuts against one end of the engine casing, say, the end 4, a leak proof bearing surface 12 being provided between the contacting surfaces of the cylinder block and the end of the engine casing. The opposite end 13 of the cylinder block is, preferably, approximately midway of the length of the engine casing and, preferably, extends radially to the side wall of the engine casing, the peripheral edge of this end of the cylinder block having a bearing 14 in the side wall 2. The walls of the engine cyinders are shown at 15, a space 16 being, preferably, provided surrounding the cylinder walls between the latter and the outer casing of the engine and between the cylinder walls and the axial bearing of the cylinder block which is journaled upon the main shaft of the engine. The space 16 surrounding the engine cylinders forms an air jacket, this jacket being closed at its respective ends by the ends of the cylinder block, and a suitable inlet port 17 and an outlet port 18 being provided therein for the entrance and exit of air to the air jacket to provide a circulating current of air through the air jacket for the proper cooling of the engine cylinders.

A bearing hub 19, preferably, integral with the cylinder block 9 extends from the end 13 thereof to a point spaced from the end 3 of the engine casing. This bearing hub is provided with radially extending arms 20 equi-distantly spaced, in the present instance four in number, to provide one of the bearing arms for each of the engine cylinders. Rotatable members are journaled upon each of these bearing arms and are connected with the respective pistons of the engine cylinders so as to be rotated by the reciprocation of the pistons. For this purpose the rotatable members may comprise pinions 21 journaled on the ends of arms 20 as by bearing bolts 22 so as to be rotated upon axes extending radially from the main shaft 6 of the engine.

The pistons for the respective cylinders of the engine are shown at 23 arranged to reciprocate within the respective cylinders and are each provided with a piston rod 24, these piston rods being journaled at their outer ends to the respective pinions 21 as shown at

25, the parts as thus described being so arranged that reciprocation of the respective pistons will rotate the respective pinions 21.

A driving connection is provided between pinions 21 and a stationary member shown as a bevel gear wheel 26 fixed upon the inner surface of the end wall 3 of the engine casing as by bolts 27. This gear wheel is arranged between the end of the bearing hub 19 and the end wall of the engine casing, the teeth 28 of the gear wheel meshing with the teeth 29 of the pinions 21, so that when the pinions are rotated the bearing hub 19 and the cylinder block 9 integral therewith will be rotated upon their longitudinal axis. The rotatable member thus formed is fixed upon the main shaft 6 of the engine so that the latter will be rotated with said rotatable member, the means for fixing the rotatable member upon the shaft being shown as comprising keys 30 and 31 arranged respectively between the main shaft and the bearing hub 19 and the cylinder block 9 at opposite ends of the engine casing.

By the construction as thus described it will be seen that the bearing hub 19, the cylinder block 9 and the operating connections between the cylinders and the arms 20 of the bearing hub 19 form a unitary rotatable member fixed upon the main shaft of the engine, this rotatable member having a bearing in the side wall 2 of the engine casing approximately midway of the length of the casing at the leak proof bearing 14, thereby providing a substantial bearing for the rotatable member.

The inlet and discharge ports for the engine cylinders are arranged in the end wall 4 of the engine casing, and are shown at 32 and 33 respectively. These ports are so arranged in the end wall 4 that when the engine is rotated the cylinders will pass beneath said ports, the ports being, preferably, elongated circumferentially of the end 4 to a length several times the diameter of the cylinders, and, preferably, of a transverse width equal to the diameter of the cylinders. These two ports are arranged in successive quadrants of the end wall 4 and are each of such a length as to be disposed entirely within their respective quadrants. The inlet port 32 is arranged in a quadrant of the end wall in advance of the exhaust port 33 in the direction of rotation of the engine as indicated by the arrow in Fig. 2.

The means for firing the explosive charge within the cylinders is arranged on the end wall 4 in the quadrant thereof diametrically opposite the quadrant containing the inlet port 32, such firing means being, preferably, arranged at the beginning of said quadrant in the direction of rotation of the engine.

The firing means, preferably, comprises a usual spark plug, and in order to retard or advance the spark several spark plugs are, preferably, provided as shown at 34, 35 and 36, these plugs being received through suitable apertures in the end wall 4 with their inner ends positioned in suitable recesses 37′ provided in said end wall, the spark plugs being arranged circumferentially of the end wall slightly in advance of one another, so that by causing the spark to be produced in the cylinders from various ones of the spark plugs the timing of said spark may be adjusted relative to the position of the pistons within the cylinders.

The electrical connections to the respective spark plugs are shown at 37 extending into a conduit 38, these electrical connections leading to a suitable switch mechanism, not shown, arranged to cause sparking of the desired one of the plugs. The quadrant of the end wall 4 which is diametrically opposite the quadrant containing the exhaust port 33 is a closed wall, so that during the movement of a cylinder through said quadrant the end of the cylinder will be closed to provide for the compression of the charge within the cylinder. The inlet and discharge ports 32 and 33 are connected to the inlet and discharge pipes 39 and 40 respectively, these pipes being, preferably, provided with enlarged ends 41 fitting over the elongated ports 32 and 33. The inlet and discharge pipes may be secured in position by suitable bolts 42 extending through the rims of the enlarged ends of said pipes into the end wall 4.

In operation the pistons within the cylinders are each arranged for a suction stroke while passing the quadrant of the end wall having the inlet port formed therein; for a compression stroke while passing the next adjacent quadrant; for a driving stroke while passing through the next adjacent quadrant in which the spark plugs are located; and for an exhaust stroke during passage through the next adjacent quadrant in which the exhaust port is positioned. By this arrangement it will be seen that successive pinions 21 will be rotated by the piston rods connected thereto when their respective pistons successively pass through the driving quadrant of their cycle of operation, and through engagement of these successively rotating pinions with the stationary bevel gear 26 the rotatable parts of the engine will be rotated upon the axis of the main shaft 6.

The usual lubricating oil for the movable parts of the engine may be supplied to the space within the casing of the engine between the end wall 13 of the cylinder block and the end wall 3 of the engine casing, the leak proof bearing 14 between the wall 13 and casing 2 preventing leaking of the oil into the jacket 16.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is;

1. An engine comprising a rotatable member having a cylinder therein; a piston in said cylinder; an operating connection between said piston and said rotatable member for rotating the latter; a casing forming an end wall for said cylinder; and a plurality of firing means in said end wall arranged so that said cylinder will pass said firing means during rotation of the rotatable member, said firing means being arranged one in advance of the other, said firing means adapted to be selectively fired for retarding or advancing the firing of an explosive charge within the cylinder.

2. An engine comprising a rotatable member having a cylinder therein, a casing including an end plate received flush against the end of said cylinder, said end plate having an inlet and an exhaust port arranged to successively communicate with the entire bore of said cylinder, said end plate between said communications closing the end of said cylinder, and manifold upon the exterior of said end plate leading from said ports.

3. An engine comprising a main shaft, a cylinder revolving with the same and having a piston, a driving connection between the piston and said shaft, an end wall for said cylinder, and ignition means carried by said end wall arranged whereby said cylinder is brought into alinement therewith, said ignition means including a plurality of spark plugs arranged one in advance of another and adapted to be selectively fixed for advancing and retarding the firing of an explosive charge within the cylinder.

In testimony whereof I have signed my name to this specification.

ALTON S. KENMONTH.