

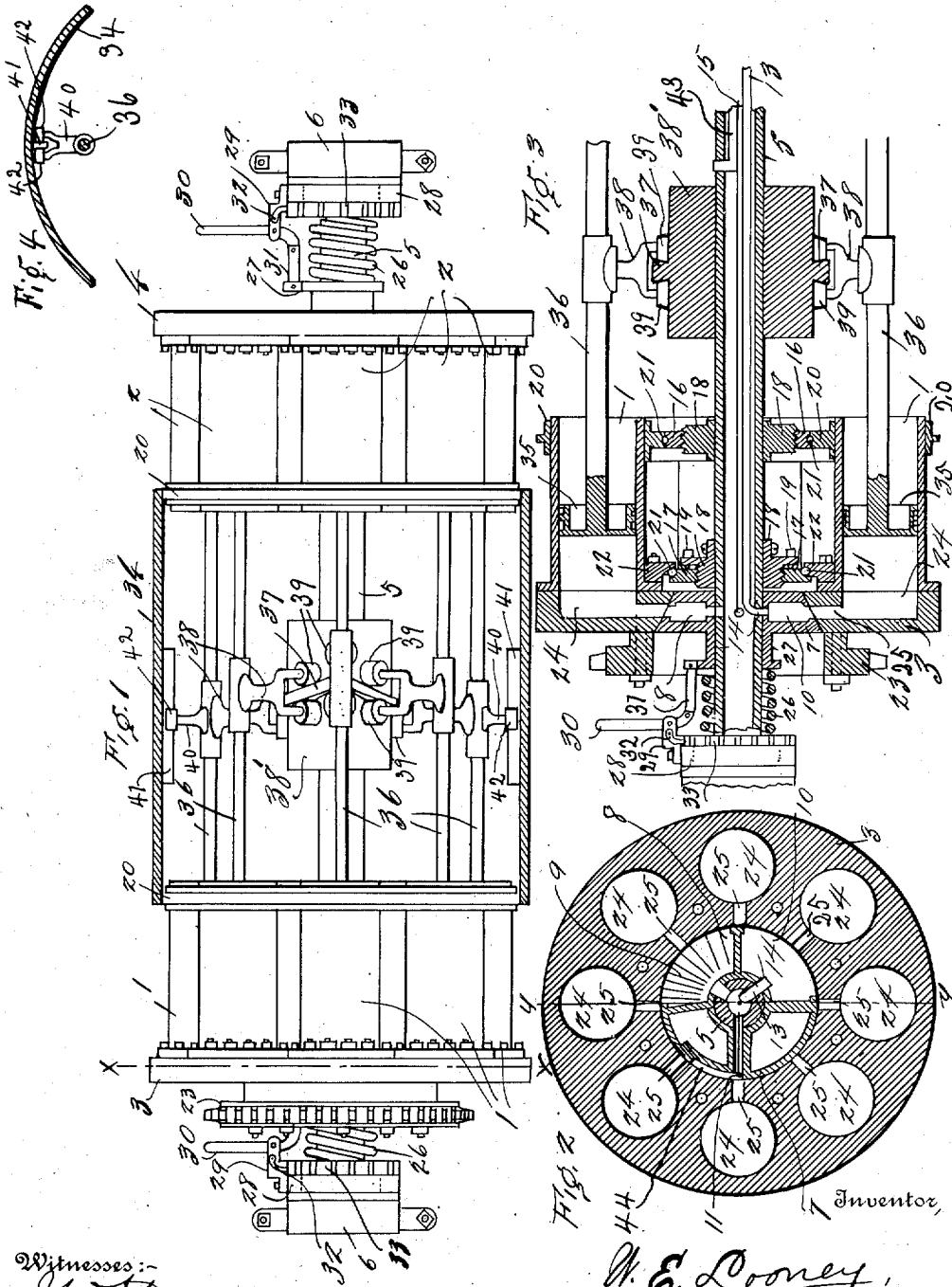
W. E. LOONEY.

ROTARY MULTIPLE CYLINDER FOUR CYCLE ENGINE.

APPLICATION FILED JUNE 2, 1911.

1,063,456.

Patented June 3, 1913.



Witnesses:-
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UNITED STATES PATENT OFFICE.

WILLIAM E. LOONEY, OF FORT WORTH, TEXAS.

ROTARY MULTIPLE-CYLINDER FOUR-CYCLE ENGINE.

1,063,456.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed June 2, 1911. Serial No. 630,959.

To all whom it may concern:

Be it known that I, WILLIAM E. LOONEY, a citizen of the United States, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented certain new and useful Improvements in Rotary Multiple-Cylinder Four-Cycle Engines, of which the following is a specification.

My invention relates to explosive or combustion engines and the objects are to provide an engine which will be extremely light in proportion to the work accomplished and which is simple in construction and operation and in which the number of delicate parts are reduced to a minimum, valves and crank-shafts and timing gear being dispensed with.

This invention relates more particularly to rotary multiple cylinder four cycle engines as the preferred form, but the cylinders may be made stationary and the cam shaft made to rotate, or in other words the engine can be operated so that the power can be taken either from the motion of the cylinders or from the cam shaft.

One of the advantages of the improved engine is that a plurality of independently operating piston rods are provided for operating with a common cam or a common double cam.

One advantage is in the improved sparking system whereby one sparking plug serves a plurality of cylinders and in which the sparking plug may be dispensed with after initial starting.

Another advantage is that the cam and cooperating parts are inclosed completely and may be oiled by a splash system.

Another advantage is that two systems of cylinders are provided and provision made for operating both or either one of the systems at will. The cylinders are each provided with only one port, intake, exhaust, and ignition all being accomplished through the one port.

Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Figure 1 is a plan view with the oil casing shown in horizontal section. Fig. 2 is a vertical section, taken along the line $x-x$

of Fig. 1. Fig. 3 is a broken longitudinal section, taken along the line $y-y$ of Fig. 2.

Similar characters of reference are used to indicate the same parts throughout the several views.

Two sets of cylinders 1 and 2, eight in each set, are shown in the drawings. The cylinders 1 are attached to a rotary head 3 and the cylinders 2 are attached rigidly to a rotary head 4. The heads 3 and 4 rotate about a stationary shaft 5 which is mounted in supports 6. A controller 7 is mounted on the shaft 5 and is provided with a chamber 8 for exhaust purposes and a chamber 10 for intake purposes. A spark plug 11 is also mounted in the controller 7. Baffle plates 9 are mounted in the exhaust chamber 8 for muffling purposes. The shaft 5 is a hollow shaft or tubular and an intake pipe 13 is mounted in the shaft 5 and has a projection 14 extending into the intake chamber 10. A wire 15 leads through the shaft 5 and through the controller 7 to the spark plug 11. The peripheral surface of the controller 7 is cone-shaped and the meeting face or surface of the head 3 is funnel-shaped so that a perfect joint between the head and the controller is assured. The cylinders 1 and 2 are held in operative relation by interior bearings 16 and 17 which are rings screwed on collars 18. Adjusting studs 19 bear against the bearings 17. Each set of cylinders 1 and 2 is carried at the outer or open ends by a bearing collar 20 which co-operates with the bearings 16. Ball bearings 21 are placed between the meeting faces of the bearings 20 and 16. Bearings 22 are bolted to the head rims of the cylinders 1 and 2 for cooperating the bearings 17. By means of the construction thus described the cylinders 1 and 2 are easily revolved about the shaft 5 and the controllers 7.

It is apparent that the shaft 5 could be made to revolve and the cylinders 1 and 2 made stationary.

With the construction above described the power is taken from the head 3 by means of a gear wheel 23 which is bolted to the head 3. The power could also be taken from the head 4. Should the cylinders 1 and 2 be made stationary and the shaft 5 a revolving shaft, the power could be taken from the shaft.

The heads 3 and 4 have chambers 24 which are continuations of the chambers of

the cylinders 1 and 2 for ignition, compression and expansion purposes and ports 25 leading from the chambers 24 to be brought in communication with the intake port 10 and exhaust port 8 and the sparking plug 11 as the cylinders 1 and 2 are revolved about the controllers 7. The controllers 7 are held in position by springs 26 which bear against the supports 6 and against flanged sleeves 27 which are integral with the controller casings. Means are provided for throwing either one of the controllers out of commission and also to vary the times of intake, compression, ignition, expansion, and exhaust. A collar 28 is mounted in a peripheral groove in the support 6. A fulcrum block 29 is attached to the collar 28 and a lever 30 is fulcrumed in the block 29 and pivotally connected to a link 31 which is pivotally connected to the sleeve 27. The lever 30 can thus be used to throw a controller out of commission by shifting the controller axially on shaft 5. A dog 32 is pivotally mounted on the fulcrum block 29 and is adapted to engage a rack 33 formed on the support 6. The lever 30 can be used to shift the controller 7 circumferentially to vary the times of intake, compression, ignition, expansion, and exhaust and the controller may be held at any desirable position by the dog 32 and rack 33. This is done by manual movement of the lever 30 about the support 6. This is possible because the fulcrum of the lever is carried by the collar 28 which is movable.

The two sets of cylinders 1 and 2 are rigidly connected together by the casing 34 which is attached to the rings 20. The cylinders 1 and 2 are thus left exposed to the atmosphere so that the cylinders are air-cooled. The cylinders are provided with pistons 35 and piston rods 36,—a cylinder 1 and the opposite cylinder 2 having a common piston rod so that when one cylinder has expansion, the co-acting cylinder has exhaust. The cylinders thus work in pairs. The reciprocation of the piston rods accomplishes the driving of the engine by means of a series of cams 37 or one continuous cam 37. The cams 37 are formed on a cylindrical block 38' which is mounted rigidly on the shaft 5. Cam clutches 38 are attached rigidly to the piston rods 36 and provided with antifriction rollers 39. The cams 37 are slightly undercut and the rollers 39 are somewhat cone-shaped to conform to the undercut sides of the cams 37. This will prevent the rollers from leaving the cams during operation. This construction of the cams and rollers will also prevent the pistons from turning in the cylinders. If the pistons should turn, the cam clutches 38 might leave the cams and the engine would not operate. In addition to the means already described for preventing the pistons

from turning in the cylinders, guides 41 may be formed on the interior of the casing 34 and clutches 40 provided with antifriction rollers 42 may be made rigid with the piston rods so that the clutches 40 will follow the guides 41 and be held in their proper alignment. The cams 37 and all the cooperating parts are oiled by the splash system together with centrifugal force. Oil is let into the casing 34 by and pipe 43. As this casing revolves, the oil will be distributed to all parts of the casing 34 and to all the elements inclosed by this casing.

The engine must be cranked like other explosive engines until a cylinder which has explosive mixture passes the sparking plug 11. When the first cylinder which has explosive mixture passes the sparking plug 11, there will be an explosion on the ignition of the mixture. This will start all the other cylinders to operating, the explosive mixture being supplied through the pipe 13. After the engine has been started the ignition may be accomplished without a sparking plug. When the cylinder is passing expansion, a part of the burning mixture can be let back into the next cylinder in the rear through a peripheral groove 44 in the controller 7.

The cylinders 1 and 2 have been described as single acting cylinders. It is apparent that the cylinders can be compounded by placing heads corresponding to heads 3 and 4 on the other ends of these cylinders and providing port connections from shaft 5 and controllers similar to controllers 7.

Having fully described my invention what I claim as new and desire to secure by Letters Patent, is,—

1. An engine having a stationary shaft, controllers normally stationary therewith, each controller having an intake chamber and an exhaust chamber and ports for said chambers, a plurality of cylinders, chambered rotary heads carrying said cylinders and revolving about said controllers and having ports adapted to be brought in communication with the ports of said controllers, pistons for said cylinders, said cylinders communicating with the chambers in said rotary heads, means for sparking said cylinders, actuating members operatively connected with said shaft and with said pistons whereby said cylinders are rotated about said shaft, means for supplying said controllers with explosive mixture, and means for shifting said controller.

2. An engine having a stationary shaft, controllers normally stationary with said shaft, a plurality of cylinders, chambered rotary heads mounted on said controllers and carrying said cylinders and having ports communicating with said controllers during operation, said controllers having means for supplying explosive mixture to said cylinder

ders through said heads, means for axial and circumstantial movement of said controller, pistons in said cylinders, cams mounted on said shaft, and actuating members carried by said pistons and engaging said cams.

3. An engine having a stationary shaft, controllers rigid with said shaft, a plurality of cylinders, chambered rotary heads carrying said cylinders and forming communications from said controllers to said cylinders, pistons in said cylinders, said controllers having provisions for supplying explosive mixture to said cylinders through said heads, means for axial and circumferential movement of said controller, and means actuated by said pistons for revolving said cylinders and heads about said controllers and said shaft.

4. An engine having a stationary shaft, two sets of cylinders, controllers on said shaft for supplying explosive mixture to said cylinders, a cylinder of one set co-acting with the opposite cylinder of the other set, means for shifting said controllers circumferentially on said shaft to vary the times of sparking, intake, compression, expansion, and exhaust, means carrying said cylinders

and coöperating with said controllers to feed said cylinders, pistons for said cylinders, and means actuated by said pistons for causing said cylinders to revolve about said shaft.

5. An engine having a stationary shaft, two sets of cylinders, ball bearing collars surrounding said shaft and carrying said cylinders, means for supplying explosive mixture to said cylinders, a cylinder of one set co-acting with the opposite cylinder of the other set, a common piston rod for a cylinder and its co-acting cylinder, piston heads operating said piston rods, cams on said shaft and cam clutches on said piston rods for causing reciprocating motion of said piston rods, a casing attached to said collars and inclosing said piston rods and cams and constituting an oiling means for said cams and piston rods, and means for supplying oil to said piston rods and cams.

In testimony whereof, I set my hand in the presence of two witnesses, this 30th day of May, 1911.

WILLIAM E. LOONEY.

Witnesses:

A. L. JACKSON,
J. W. STETT.

Correction in Letters Patent No. 1,063,456

It is hereby certified that in Letters Patent No. 1,063,456, granted June 3, 1913, upon the application of William E. Looney, of Fort Worth, Texas, for an improvement in "Rotary Multiple-Cylinder Four-Cycle Engines," an error appears in the printed specification requiring correction as follows: Page 3, line 2, for the word "circumstantial" read *circumferential*; and that the said Letters Patent should be read with this correction therein, that the same may conform to the records of the case in the Patent Office.

Signed and sealed this 1st day of July, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

ders through said heads, means for axial and circumstantial movement of said controller, pistons in said cylinders, cams mounted on said shaft, and actuating members carried by said pistons and engaging said cams.

3. An engine having a stationary shaft, controllers rigid with said shaft, a plurality of cylinders, chambered rotary heads carrying said cylinders and forming communications from said controllers to said cylinders, pistons in said cylinders, said controllers having provisions for supplying explosive mixture to said cylinders through said heads, means for axial and circumferential movement of said controller, and means actuated by said pistons for revolving said cylinders and heads about said controllers and said shaft.

4. An engine having a stationary shaft, two sets of cylinders, controllers on said shaft for supplying explosive mixture to said cylinders, a cylinder of one set co-acting with the opposite cylinder of the other set, means for shifting said controllers circumferentially on said shaft to vary the times of sparking, intake, compression, expansion, and exhaust, means carrying said cylinders

and coöperating with said controllers to feed said cylinders, pistons for said cylinders, and means actuated by said pistons for causing said cylinders to revolve about said shaft.

5. An engine having a stationary shaft, two sets of cylinders, ball bearing collars surrounding said shaft and carrying said cylinders, means for supplying explosive mixture to said cylinders, a cylinder of one set co-acting with the opposite cylinder of the other set, a common piston rod for a cylinder and its co-acting cylinder, piston heads operating said piston rods, cams on said shaft and cam clutches on said piston rods for causing reciprocating motion of said piston rods, a casing attached to said collars and inclosing said piston rods and cams and constituting an oiling means for said cams and piston rods, and means for supplying oil to said piston rods and cams.

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