J. WHALEY.

INTERNAL COMBUSTION ENGINE.

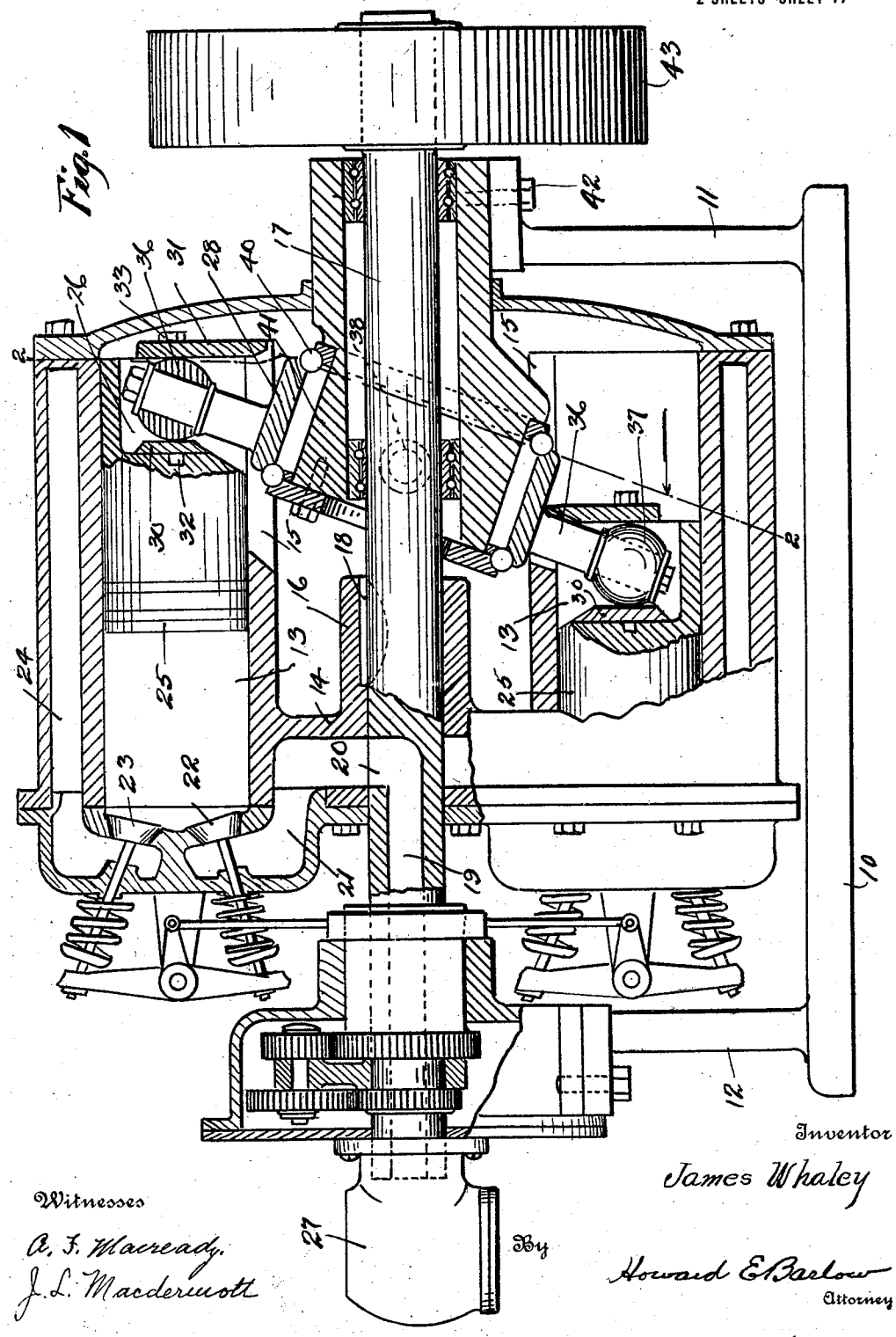
APPLICATION FILED MAR. 19, 1917.

1,244,668.

Patented Oct. 30, 1917.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2

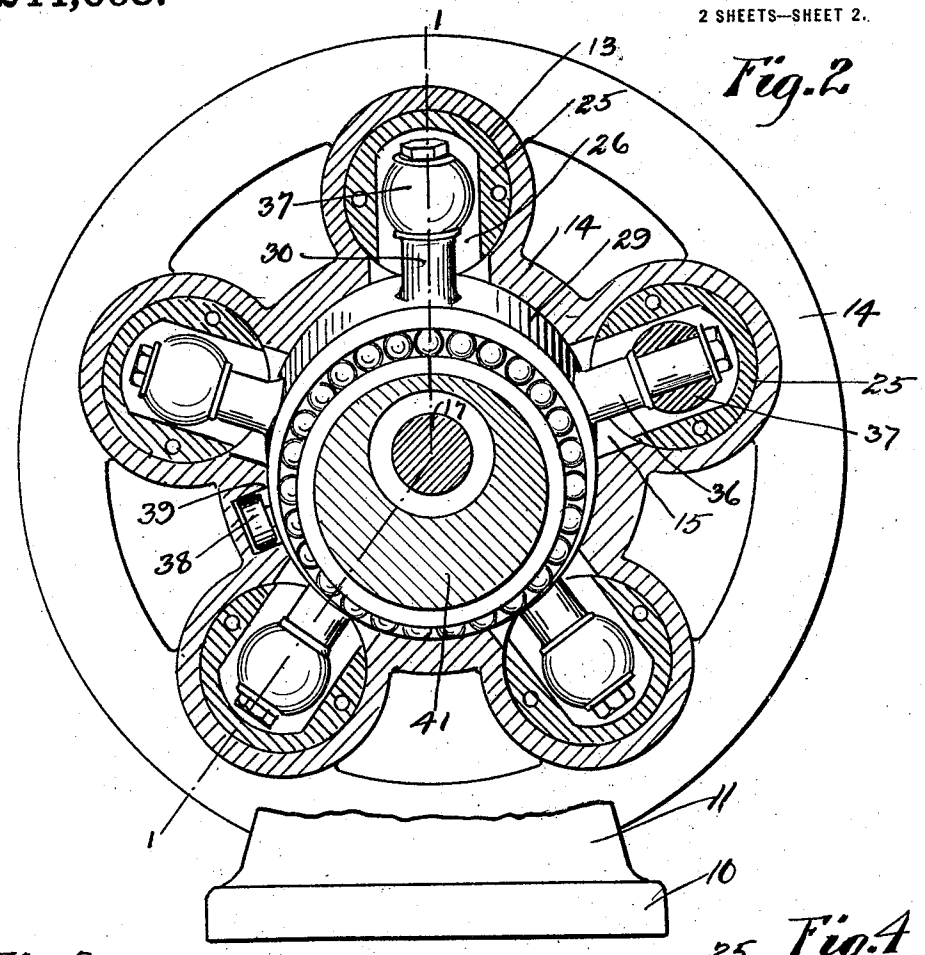


Fig. 3

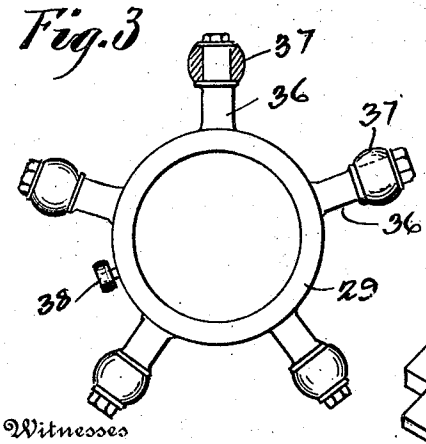


Fig. 6

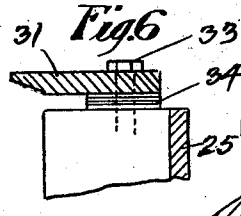


Fig. 4

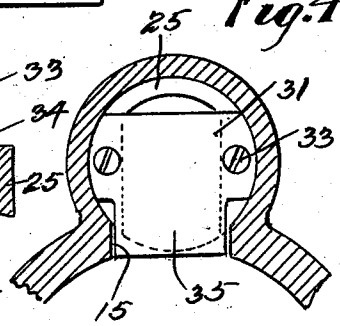
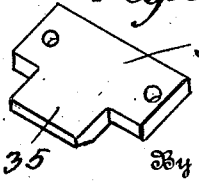


Fig. 5



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UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION ENGINE.

1,244,668. Specification of Letters Patent. Patented Oct. 30, 1917.

Application filed March 19, 1917. Serial No. 155,670.

To all whom it may concern:

Be it known that I, JAMES WHALEY, a citizen of the United States, and resident of the city of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines of the rotary type, and the object of the invention is to provide in such an engine, a rotor which includes cylinders provided with a plurality of reciprocating pistons, said pistons being all connected to act upon the individual arms of a common member or spider, the axis of rotation of said member being set on an angle to that of said rotor, whereby the action of the different pistons upon the arms of this member produces a revolving motion or torque to the rotor.

A further object of the invention is to provide a roll on the end of each arm which engages the piston, thereby reducing to the minimum the frictional movement of the arm upon the piston head.

A further object of the invention is the provision of a laterally extending roll member connected to the body portion of the spider, to prevent a relative rotation of the spider and rotor.

The invention further consists in the provision of a guide plate attached to the piston, said plate being provided with a tongue extending into a slot in the rotor to prevent rotation of the piston in its cylinder.

A still further object of the invention is the provision of means in the guide block on the piston whereby it may be adjusted to take up the wear and lost motion of the roll on the spider arm.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1— is a side elevation of the engine partly sectioned on line 1—1 of Fig. 2.

Fig. 2— is a section on line 2—2 of Fig. 1 looking in the direction of the arrow.

Fig. 3— is a detail view of the spider member.

Fig. 4— is a view showing a portion of one of the cylinders with the piston mounted therein having a guide plate connected thereto.

Fig. 5— is a perspective view of the guide plate.

Fig. 6— is an elevation partly in section on one of the pistons showing the shims under the guide plate whereby said plate may be adjusted to take up the wear or lost motion of the spider roll.

Referring to the drawings, 10 designates the bed plate of the machine which is provided with standards 11 and 12 on which the motor is supported.

The member termed the "rotor" is preferably a circular or drum-shaped casting bored to provide a plurality of cylinders 13 all connected together by a series of webs 14 extending between them, see Fig. 2, and through the inner web is formed openings 15 through which the arms of the spider member, presently described, extend. These cylinders are connected by a central sleeve 16 to the main shaft 17 by a key 18 or other attaching means, and the cylinders are supplied with gas from the carbureter 27 through the hollow portion 19 of the shaft 17, which shaft is provided with ports 20 communicating with the passageways 21 to admit the gas to the cylinders through the valve 22, the valve 23 controlling the exhaust gases which pass out through the passageway 24 and so to the open, through discharge pipes (not shown).

Each of these cylinders is borded to receive a piston 25 which is provided with a recess or pocket 26 on its outer end to receive an arm of the spider 28.

This spider has a body portion 29 preferably made in the form of a ring, see Fig. 3, and has radiating arms 36 adapted to project into the different cylinders and into the pocket of each of the pistons, the end of each arm being provided with an anti-friction roll 37 which works between the two hardened steel plates 30 and 31 on the piston. The inner plate 30 has a boss 32 extending into the piston to hold the plate in position and the outer plate 31 is secured in position by means of bolts 33. A plurality of shims or washers 34 are located beneath this plate 31 whereby it may be adjusted so as to take up any wear or lost motion of the roll 37 and so insure a quiet running engine. This plate is also provided with a forwardly projecting lip 35 which extends into

the opening 15 in the cylinder so as to prevent rotation of the piston therein. This spider is also provided with a roller 38 extending laterally from its body portion 29 into a groove 39 in the cylinders, to hold the arms in alinement with the cylinders.

The ring shaped body portion of this spider is preferably mounted on ball bearings 40 on the hub member 41, the axis of which hub member is set on an angle to the axis of the shaft. This hub member is held against rotation by bolts 42 through the bearing 11, by which construction the pressure on the pistons against the arms of the spider causes the rotor to revolve and provide the necessary torque on the shaft, the power from which may be transmitted through the pulley 43 or through suitable means.

By arranging the axis of rotation of this spider member on an angle to that of the rotor, it will be seen that this spider acts as a cam by which the pressure on the pistons causes the rotor to revolve, and the greater the incline of its axis relative to that of the shaft, the greater is the stroke of the pistons and consequently the easier the cam action.

I have illustrated one means whereby my invention may be carried out, but I do not wish to limit myself to this specific construction as various changes of the several features may be necessary. I, therefore, desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined by the appended claims.

I claim:

1. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, a member rotatable with said rotor having arms connected to all of said pistons, the axis of rotation of said member being set on an angle to that of said rotor.

2. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, a rotatable member having arms, each being provided with an end contacting with one of said pistons, and means whereby said member is caused to rotate on an axis set at an angle to the axial rotation of said rotor.

3. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, a rotatable spider having arms each provided with an anti friction roll engaging each of said pistons, a fixed hub on which said spider is rotatably mounted, the axis of said hub about which said spider revolves being set on an angle to the axial rotation of said rotor.

4. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, each piston being provided with a pocket near its outer end, a rotatable member having arms, the outer end of each extending into said pocket in each piston to work between the inner and outer walls thereof, and means whereby said member is caused to rotate on an axis set at an angle to the axial rotation of said rotor.

5. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, a rotatable spider having arms each provided with an anti friction roll engaging the center portion of each of said pistons, a fixed hub on which said spider is rotatably mounted, the axis of said hub being set on an angle to the axial rotation of said rotor, and a guide roll projecting from the body of said spider into a recess in the rotor to prevent relative rotation of the spider and rotor.

6. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, each piston being provided with a pocket open through its side wall, a member rotatable with said rotor having arms each extending into the said pocket in each of said pistons to work between the inner and outer walls thereof, one of said walls being adjustable to take up lost motion of the arm end therein, and means whereby said member is caused to rotate on an axis set at an angle to the axial rotation of said rotor.

7. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, a rotatable member having arms connected into each of said pistons the axis of rotation of said member being set on an angle to that of said rotor, and means for guiding said piston to prevent rotation in its cylinder.

8. In an internal combustion engine, a rotor, a plurality of reciprocating pistons in said rotor, each piston being provided with a pocket, a rotatable member having arms each extending into the said pocket in each of said pistons to work between the inner and outer walls thereof, one of said walls being adjustable to take up lost motion of the engaging end, means whereby said member is caused to rotate on an axis set at an angle to the axial rotation of said rotor, and means for guiding said piston to prevent rotation in its cylinder.

In testimony whereof I affix my signature in presence of a witness.

JAMES WHALEY.

Witness:
HOWARD E. BARLOW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."