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C. B. REDRUP.

GAS, OIL, AND LIKE ENGINE.

APPLICATION FILED MAR. 31, 1905.

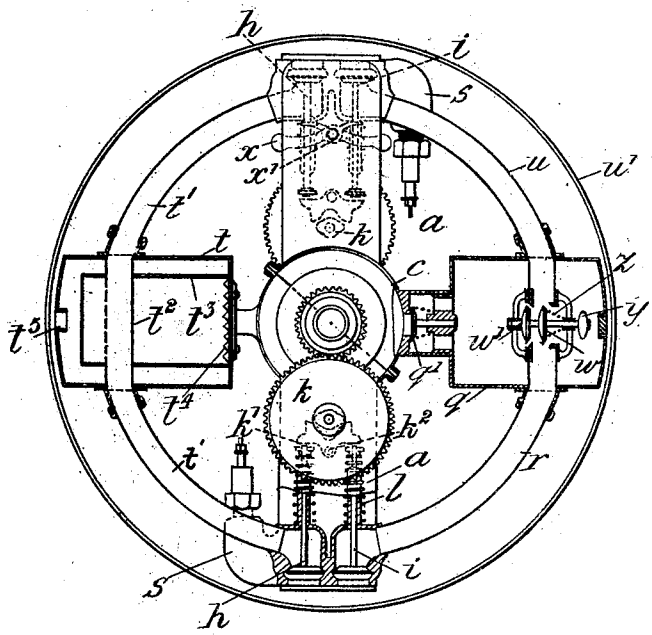

Fig. 1.

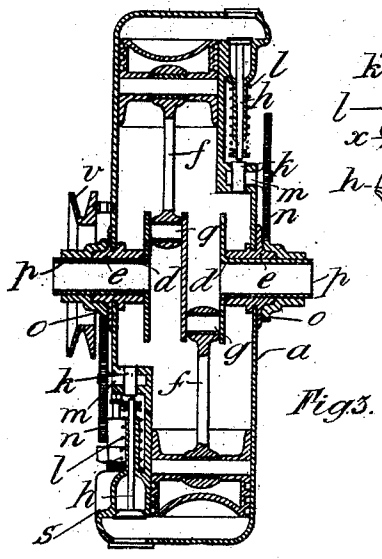

Fig. 3.

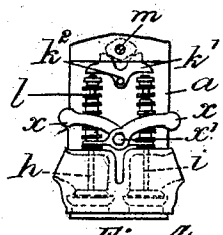

Fig. 4.

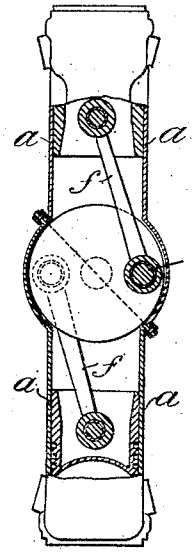

Fig. 2.

Witnesses

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GAS, OIL, AND LIKE ENGINE.

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Application filed March 31, 1905. Serial No. 253,070.

To all whom it may concern:

Be it known that I, CHARLES BENJAMIN REDRUP, a subject of the King of Great Britain and Ireland, residing at 22 Guthrie street, Barry Dock, county of Glamorgan, England, have invented certain new and useful Improvements Relating to Gas, Oil, and Like Engines, of which the following is a specification.

This invention relates to internal combustion engines of the fixed crank shaft and rotating cylinder type, and has for its object to provide a motor simple in construction and operation of light weight and capable of effective, efficient and economical working.

The invention has particularly for its object to provide a motor for mounting in a frame or within a wheel by which considerable space and weight is economized.

According to the invention a storage chamber is provided into which the mixture of vapor and air is forced before admission to the respective motor cylinders, while a silencer is also provided in such a manner that both the storage chamber and silencer rotate with the motor cylinders, while according to the invention other constructional features are involved, which are hereinafter more particularly described.

Figure 1 is a front elevation partly in section in which the disposition of the storage chamber and exhaust silencer are illustrated. Fig. 2 is a detail front sectional elevation showing the cylinders. Fig. 3 is a sectional side elevation. Fig. 4 is a detail view showing the arrangement of counterbalancing levers for the valves.

In carrying out the invention the fixed crank or crank disk is preferably provided with hollow trunnions and the respective cylinders, which when two only are employed are arranged diametrically opposite one to the other, are arranged as part of a circular casing or frame forming a common central chamber in which the combustible charge is drawn on the outward movement of the pistons and from which the charge is forced to an intermediate reservoir or storage chamber whence it is admitted by suitable valve gear to the combustion chambers of the respective motor cylinders. Gear is provided by means of which the rotation of the cylinders is transmitted to the driven member.

In carrying the invention into effect according to one construction I provide two cylinders forming part of a rotating frame *u* and being provided with a crank chamber *c* advantageously divided in a plane transverse or between the respective cylinders as illustrated in Figs. 1 and 2.

The hollow crank shaft or trunnions *d* are mounted in bearings *e* fitted centrally in the walls of the crank chamber casing *c* so that the frame constituted of the cylinders and their connections may rotate upon the trunnions or crank shaft *d*, and so that the trunnions or crank shaft may be fixedly held on the frame of the cycle or vehicle in any suitable and convenient manner.

The piston rods *f* are directly connected to the crank pins *g*. Exhaust valves *h* are provided on opposite sides of the respective cylinders *a* which by the arrangement before described it will be understood are out of line although oppositely disposed in parallel planes, the valves being accommodated in the spaces which result by reason of the disposition of the cylinders *a* as illustrated in Fig. 1, a very convenient arrangement being thus secured.

The exhaust valves *h* and the inlet valves *i* are operated by cams *k* and they are preferably held closed normally under the action of spiral springs *l* and are positively operated by the cams aforesaid, which are mounted upon spindles *m* upon which also toothed wheels *n* are mounted gearing with a toothed pinion *o* fixedly secured upon the trunnion *d* or upon the fixed frame, the gears being of the two to one order such as will cause the operation of the exhaust valve and the air valve as required according to the four stroke cycle of operation in the respective cylinders.

It will be understood that the motor may be modified for the use of a two stroke cycle of operation, without departing from the present invention.

It will be understood that the outward movement of the piston causes the suction of a combustion charge through the hollow crank shaft or trunnion *d* and that the inward movement of the piston compresses this charge and causes it to pass into the reservoir or storage chamber *q*, a non-return valve *q'* being provided thereon as illustrated.

The reservoir or storage chamber *q* it will

be understood is formed as a part of the rotating frame u, being connected to the respective cylinders by the inlet pipes r which may be of sufficient strength to contribute to the stability of fixture of the storage chamber or reservoir aforesaid.

The charge may advantageously pass through a non-return valve from the storage chamber or reservoir on the suction stroke, or instead no such valve may be employed. Or again, automatically operating means may be employed operable by means of a governor, or by centrifugal force.

In the illustrated construction the inlet pipes r are extended into the storage chamber and carry a double beat valve w which is carried upon a valve rod u' which latter has provided at its outer extremity a weight y. The valve w is normally maintained open by means of the spring z and it is closed upon the attainment of a predetermined excessive speed of rotation of the cylinders whereby the rotation is thus regulated and racing prevented.

Ignition plugs s may be provided at the end of each cylinder for making contact with high tension metallic contacts and a silencer t consisting of a perforated pipe t^2 and a perforated cylinder t^3 in communication therewith may be provided in a position diametrically opposite to the storage chamber or reservoir q aforesaid, which latter may be connected by means of pipes t' to the exhaust valve casings or the exhaust valve outlet of the respective cylinders a as illustrated. The outlet from the silencer t is provided in the outer end thereof as indicated.

A belt pulley v is mounted upon the cylinders for communicating movement to the driven parts; or a gear wheel chain wheel or other device may be employed for the same purpose.

In Fig. 4 means are illustrated for counteracting the tendency of the inlet and exhaust valves to open on an excessive speed being attained by the motor. These means consist of two levers x pivoted at x' upon a pin or spindle secured upon the wall of the cylinder. The outer extremities of these respective levers are weighted, while their inner extremities engage respectively with the springs of the valve spindles, so that on the rotation of the motor the weighted ends of the levers will tend to move upwardly and thus compress the springs with which they engage and thus draw the valves down upon their seats with a greater pressure than the normal pressure with the springs aforesaid.

In the design of an engine as hereinbefore described it will be understood that the necessity of an independent fly-wheel is obviated, and that the disposition of metal in the circular casing may be such as to insure uniformity in the rotation of the casing and of the accumulation of such momentum as will suffice for uniformity in the running of the cycle or vehicle with which the motor is used.

It will be understood that in a motor as hereinbefore described the cylinders are effectively air cooled, but with a view to render the cooling even more complete and effective the cylinders may be provided with a casing having an inlet and an outlet for air, the former advantageously being disposed in front of the casing while the latter is disposed in the rear.

One advantage of the arrangement of the storage chamber and silencer in the manner hereinbefore described is that the metal is more or less uniformly distributed.

Furthermore it is obvious that more than two cylinders may be employed.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In combination, an internal combustion motor of the rotating cylinder type having two cylinders disposed in line, a closed crank chamber between said cylinder in which the explosive mixture is drawn, a chamber communicating with said crank chamber in which the explosive mixture is accumulated, said chamber being radially disposed with reference to said cylinders with pipes connecting said chamber to the respective inlet valve casings of said cylinders and a silencing exhaust chamber also radially disposed with reference to said cylinders, and pipes leading therefrom to the respective exhaust valve casings of said cylinders substantially as described.

2. In combination, an internal combustion motor of the rotating cylinder type having two cylinders disposed in line, a closed crank chamber between said cylinder in which the explosive mixture is drawn, a chamber communicating with said crank chamber in which the explosive mixture is accumulated, said chamber being radially disposed with reference to said cylinders with pipes connecting said chamber to the respective inlet valve casings of said cylinders, a silencing exhaust chamber also radially disposed with reference to said cylinders, and pipes leading therefrom to the respective exhaust valve casings of said cylinders, said exhaust chamber being constructed of an outer cylindrical casing and an inner cylindrical casing into which the said pipes discharge, and an outlet from said inner casing at the inner end thereof and an outlet from the outer casing at the outer end thereof substantially as described.

3. In combination, an internal combustion motor of the rotating cylinder type, a chamber for the accumulation of the explosive mixture under pressure and means actuated by centrifugal force to close the outlet from said accumulator chamber, said means consisting of a tube traversing said accumulator chamber and two openings in line in said

tube and provided with valve seatings and a double valve, said valve being weighted and being maintained open by means of a spring and being adapted to close said openings substantially as described.

4. In combination an internal combustion motor of the rotating cylinder type consisting of two cylinders arranged in line and having a common closed crank chamber a chamber for the accumulation of the explosive mixture said chamber being connected to said crank chamber in position at right angles to the position of the said cylinders, and an exhaust chamber in a position in line with said accumulator chamber substantially as described.

5. In combination, an internal combustion rotary motor, a chamber for the accumulation of the explosive mixture, a tube traversing said chamber and two openings in line in said tube and provided with valve seatings and a double valve, said valve being weighted and being maintained open by means of a spring and being adapted to close said openings substantially as described.

6. In combination in an internal combustion motor of the rotating cylinder type, a chamber for the accumulation of the explosive mixture, inlet and exhaust valves for said motor, springs for said valves and means operated by centrifugal force for maintaining a greater pressure upon said springs upon the motor attaining an excessive speed substantially as described.

7. In combination in an internal combustion motor of the rotating cylinder type, a chamber for the accumulation of the explosive mixture, juxtaposed inlet and exhaust valves for said motor, springs for said valves and means operated by centrifugal force for maintaining a greater pressure upon said springs upon the motor attaining an excessive speed, said means consisting of levers pivoted upon a common center said levers having one of each of their extremities weighted, and their other extremities engaging the springs of said valves substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

C. B. REDRUP.

Witnesses:
WILLIAM EDWARD EVANS,
R. G. WILLIAMS.