

G. R. MORRIS.
GAS ENGINE.
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971,919.

Patented Oct. 4, 1910.

2 SHEETS-SHEET 1.

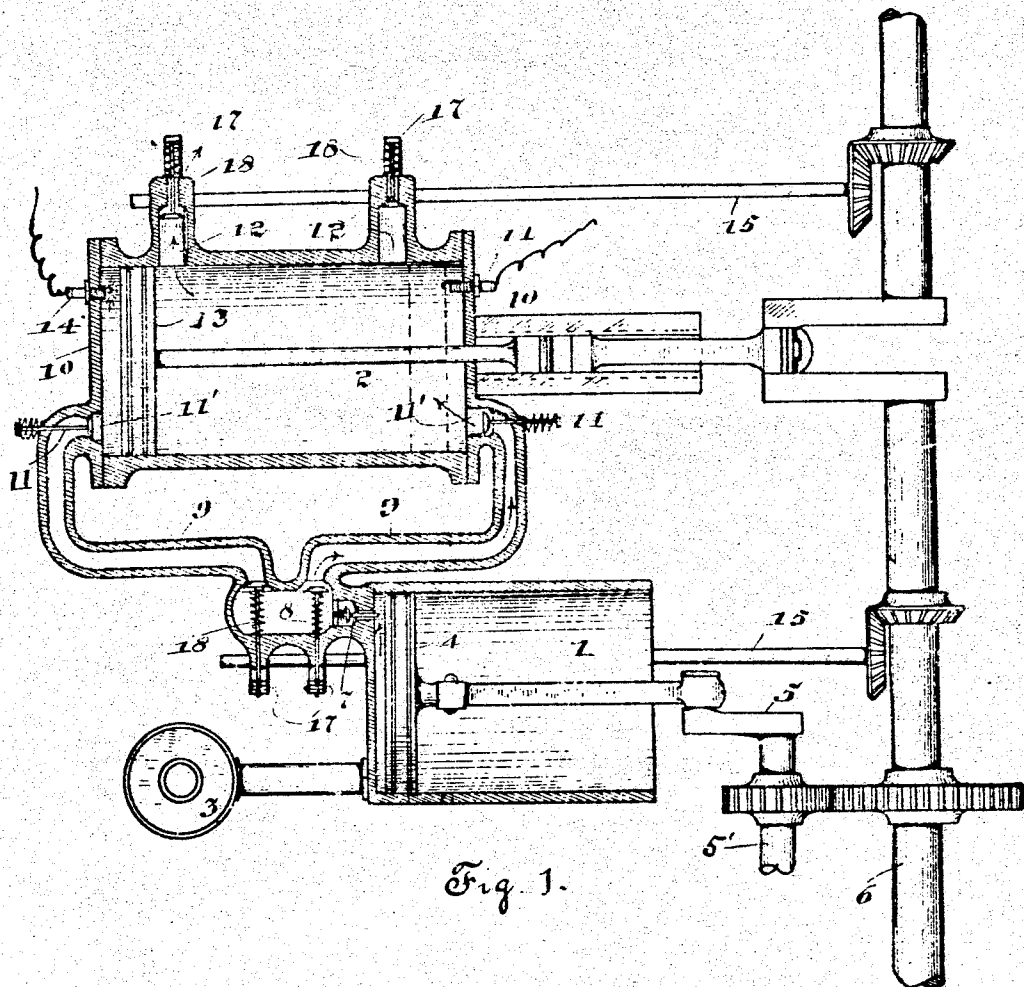


Fig. 1.

Witnesses

W. B. Smith
B. G. Richards

Inventor

George R. Morris
By Joshua R. Pores
his Attorney.

UNITED STATES PATENT OFFICE.

GEORGE R. MORRIS, OF CHICAGO, ILLINOIS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE R. MORRIS, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention relates to improvements in gas engines, under which designation are included engines in which hydrocarbon vapor, as well as those in which gas proper, is used as the inflammable ingredient of the explosive mixture.

The invention has for one of its objects to provide a construction free from objectionable complications by which the power cylinder may be exhausted on the same stroke that is produced by an explosion and recharged before the return stroke, so that an explosion may be made for every stroke of the power piston.

Another object of the invention is to provide a construction by which the engine may be made double-acting and an explosion produced for each stroke of the piston in each direction of its reciprocatory movement.

With these objects in view my invention consists in the novel construction and arrangement of parts which will be hereinafter fully described and more particularly pointed out in the appended claims.

My invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a horizontal section of my improved engine in its preferred form, and Fig. 2 is an end elevation thereof.

Referring now to the drawings, 1 designates a charge pumping cylinder and 2 a power cylinder, the former being piped to a carbureter 3 which is provided with the usual check valve (not shown), so that during the outstroke of the piston 4 a charge will be drawn into the cylinder 1. The piston 4 is connected to and actuated by the crank 5 carried by shaft 5' which is geared to the power shaft 6 and adapted to rotate at twice the speed thereof.

Mounted in the head of the pumping cylinder 1 is a check valve 7 which leads into a charge distributing chamber 8 and adapted to prevent the return flow of the charge when forced therethrough by means of the piston 4. The charge distributing chamber 8 is connected to the power cylinder 2 by

means of the pipes 9 which lead to the ports 11' provided in the cylinder heads 10. Check valves 11 are provided in the pipes 9 to prevent return flow of the charge and the same are adapted to open when the pressure in the power cylinder 2 becomes less than the pressure in the pipes 9. Formed in the cylindrical walls of the power cylinder 2 intermediate the heads thereof are valve controlled exhaust ports 12, one of which is positioned adjacent the piston 13 when at the end of one stroke and the other adjacent said piston when at the end of its other stroke. Spark plugs 14 are provided to ignite the charge when compressed at each end of the power cylinder 2. The cam shafts 15 are disposed perpendicular to the power shaft 6 and are geared to the same to run at the same speed thereof, and the cams 16 are secured to said cam shafts and properly timed to actuate the valve levers 17 which open the valves 18, the latter controlling the ports in the charge distributing chamber 8 and the exhaust ports 12.

The operation of the engine is as follows: When a charge is drawn into the cylinder 1 during the outstroke of the piston 4 thereof the check valve 7 is closed, but during the return stroke of said piston said valve opens automatically and allows the charge to be forced into the distributing chamber 8. Simultaneously with this gaseous movement one of the valves 18 is opened by means of the mechanism hereinbefore described so that the gas may flow onward through one of the pipes 9 passing a check valve 11 into the power cylinder 2 as indicated in Fig. 1. The exhaust valve 12 in the cylinder 2 which is disposed diagonally opposite said last named check valve is now opened and the products of combustion from the previous explosion are now passing therethrough into atmosphere. This reduces the pressure in the cylinder 2 and allows the free admission of the charge which fills the cylinder simultaneously with the exhausting of the products of combustion. On the return stroke of the piston 13 the conditions will be reversed and the other cam operated valves will open. It will be noted that since the piston 4 reciprocates at double the speed of the piston 13 a new charge is provided at each stroke of the latter piston.

While I have shown what I deem to be the preferable form of my improved engine I do not wish to be limited thereto as there

might be various changes made in the details of construction and arrangement of parts described without departing from my invention, and hence I desire to avail myself of
 5 such changes and alterations as fairly fall within the spirit and scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters
 10 Patent is:

1. A gas engine comprising a double headed power cylinder; a power crank shaft; a single-acting charge pumping cylinder with a piston therein; a supplemental crank
 15 shaft geared to run at twice the speed of said power shaft; an operative connection between said supplemental crank shaft and the piston of said pump cylinder; means for supplying a gaseous charge to said
 20 pumping cylinder; during the outstroke of the piston thereof; a check valve in the head of said pumping cylinder adapted to permit the outward flow of gas therefrom and to check the return flow thereto; a charge distrib-
 25 uting chamber to receive the charge flowing by said check valve; an inlet port in each head of said power cylinder; inlet pipes leading from said charge distributing cham-
 30 ber to said inlet ports; check valves in said inlet pipes; mechanically operated valves in said power cylinder and connected with said power crank shaft; exhaust ports in said
 35 power cylinder adapted to be covered and uncovered by the piston operating therein; mechanically operated valves in said exhaust
 40 ports; and means for controlling the mechanically operated valves of said inlet pipes and exhaust ports comprising cams and cam
 shafts geared to said power shaft and adapted to run at the same speed as said power
 shaft, substantially as described.

2. A gas engine comprising a double headed power cylinder; a power crank shaft; a single-acting charge pumping cylinder
 45 with a piston therein; a supplemental crank shaft geared to run at twice the speed of said power shaft; an operative connection between said supplemental crank shaft and the piston of said pump cylinder; means for
 50 supplying a gaseous charge to said pumping cylinder during the outstroke of the piston thereof; a check valve in the head of said pumping cylinder to permit the outward
 55 flow of gas therefrom but to check the return flow thereto; a charge distributing chamber to receive the charge flowing by said check valve; an inlet port in each head of said power cylinder; inlet pipes leading
 60 from said charge distributing chamber to said inlet ports; check valves in said inlet pipes; mechanically operated valves in said power cylinder and connected with said power
 65 crank shaft; exhaust ports in said power cylinder adapted to be covered and uncovered by the piston operating therein; mechanically operated valves in said exhaust
 70 ports; and means for controlling the mechanically operated valves of said inlet pipes and exhaust ports comprising cams and cam shafts geared to said power crank shaft and adapted to run at the same speed, the dispo-
 75 sition of said exhaust ports being diagonally opposite the cooperating inlet ports of said power cylinder, substantially as described.

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

GEORGE R. MORRIS.

Witnesses:

HELEN F. LILLIS,
 JOSHUA R. H. POTTS.