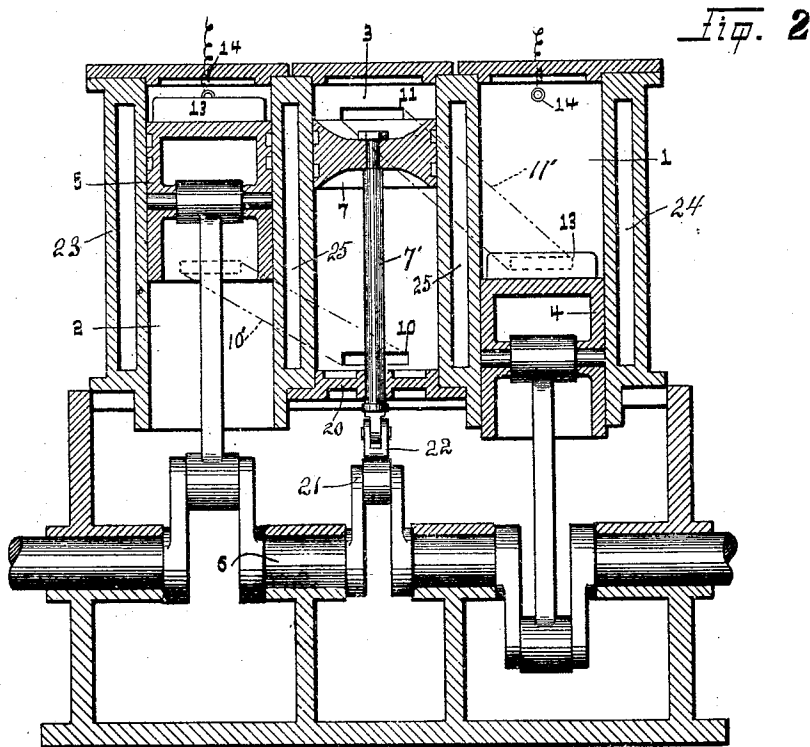
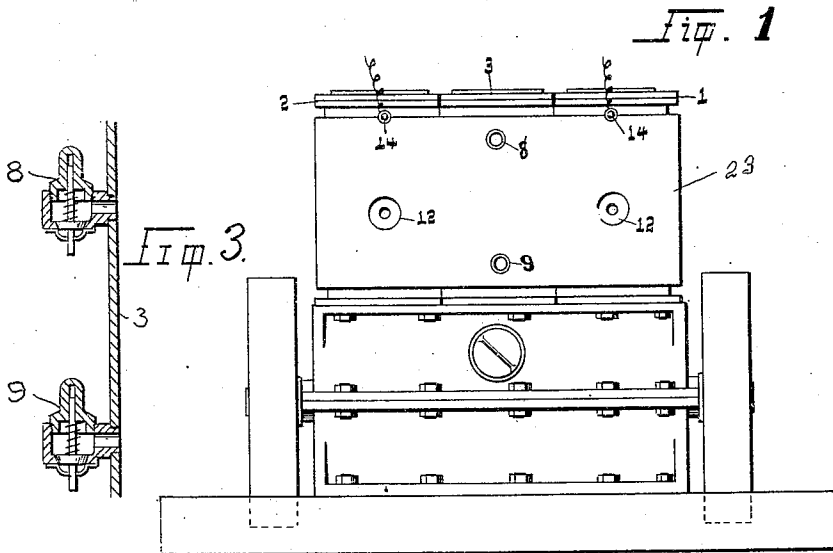


W. L. MORROW.
GAS ENGINE.
APPLICATION FILED NOV. 13, 1906.

954,577.

Patented Apr. 12, 1910.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM L. MORROW, OF STOCKTON, CALIFORNIA.

GAS-ENGINE.

954,577.

Specification of Letters Patent.

Patented Apr. 12, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM L. MORROW, a citizen of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Gas-Engines; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in gas engines, and particularly to that type known as double two cycle engines, my object being to produce a vertical double two cycle engine having a separate compression chamber connected with the cylinders of the engine by an all open port mechanism, with the pistons of the engine forming the only valve gates thereof; also to produce a simple and compact engine which may be inexpensively made and one which will be highly efficient for the purposes for which it is designed. This object I accomplish by two vertical cylinders having a separate compression chamber arranged therebetween and ports leading from said chamber to said cylinders in an alternate manner, all as will appear by a perusal of the following specification and claim.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a side elevation of the engine. Fig. 2 is a vertical section thereof on an enlarged scale. Fig. 3 is a sectional view showing the fluid inlet valves.

1 and 2 designate vertical cylinders upheld by a suitable base and having a separate compression chamber 3 arranged therebetween. A common outer casing or jacket 23 is provided as shown for all of said cylinders and provides an encircling chamber 24 with communicating passages 25 between the cylinders; and the passages 11 and 11', lying in substantially parallel relations to one another, are positioned exteriorly of the cylinders. In the cylinders 1 and 2 are arranged pistons 4 and 5 respectively, the same being so connected to a crank shaft 6 as to work in a manner alternate to each other for the purpose as will appear. Arranged in the chamber 3 is a

piston 7 suitably connected to the crank shaft 6, by a connecting rod 7'. At the upper end of the chamber 3 is an intake check valve 8 and at the lower end of said chamber is a similar check valve 9. Leading from the lower end of the chamber 3 is a circulating port 10, said port being adapted to open into the cylinder 2 when the piston 5 is in its lowest position by means of a passage indicated at 10'. Leading from the upper end of the chamber 3 is a port 11, said port being adapted to open into the cylinder 1 when the piston 4 is in its lowest position by means of a passage indicated at 11'.

12—12 are the exhaust ports which open just one half inch in advance of the ports 10 and 11 thus allowing the exhaust to occur before the new charge of gas enters.

13 are baffle plates on the pistons 4 and 5 adapted to throw the charge entering through the ports 10 or 11 upward, and prevent it from shooting out of the exhaust ports.

At the lower end of the cylinder 3 is provided a perforated head 20 for positioning the reciprocating rod 7' and closing said cylinder; the said rod 7' is connected to a small middle crank 21 by means of the link 22.

14 are the usual jump sparks.

In practice the upward drive of the piston 7 draws the charge into the lower end of the chamber 3, through the intake check valve 9. The downward drive of the said piston 7 draws the charge into the upper end of the chamber 3 and simultaneously the port 10 opens into the cylinder 2 and the mixture from the lower end of said chamber 3 is forced into said cylinder 2; with the upward drive of the said piston 7; the piston 4 drives downward and thus opens the port 11 into the cylinder 1, allowing the mixture from the upper end of the chamber 3 to be forced into said cylinder 1. The alternate upward drive of the pistons 4 and 5 compresses the mixture in their respective chambers near the top thereof, and the ignition of the same from the sparks drives the engine as described.

Thus it will be seen I have produced a vertical double two cycle engine having a separate compression chamber; cylinders having arranged therein alternating pistons, and means for conveying the explosive mixture from said compression chamber to said

cylinders in a manner in conformity to the movement of the pistons, as described.

This specification sets forth in detail the present and preferred embodiment of the invention, but deviations therefrom may, however, be resorted to within the scope of the appended claim without forming a departure from the spirit of the invention.

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

In a gas engine, two explosion cylinders spaced apart and each provided with a lateral inlet port intermediate its ends, said ports being arranged in horizontal alinement, a compression cylinder between said explosion cylinders and provided with both charge inlet and outlet ports at the ends thereof, a common jacket inclosing said cylinders providing a chamber around the cylinders and communicating passages therebetween, a diagonally-extending passage contiguous to one of the explosion cylinders and the compression cylinder and connecting the

port of one of said explosion cylinders with one of the charge outlet ports of said compression cylinder, a second diagonally-extending passage substantially parallel to said other passage and contiguous to the compression cylinder and the other explosion cylinder and connecting the port of the other of said explosion cylinders with the charge outlet port in the opposite end of said compression cylinder, a driven shaft and cranks provided thereon, pistons operating in said explosion cylinders and of sufficient length to cover the ports thereof except at the termination of the downward stroke, a piston in said compression cylinder and connecting means between said pistons and said cranks.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM L. MORROW.

Witnesses:

PERCY S. WEBSTER,
JOSHUA B. WEBSTER.