

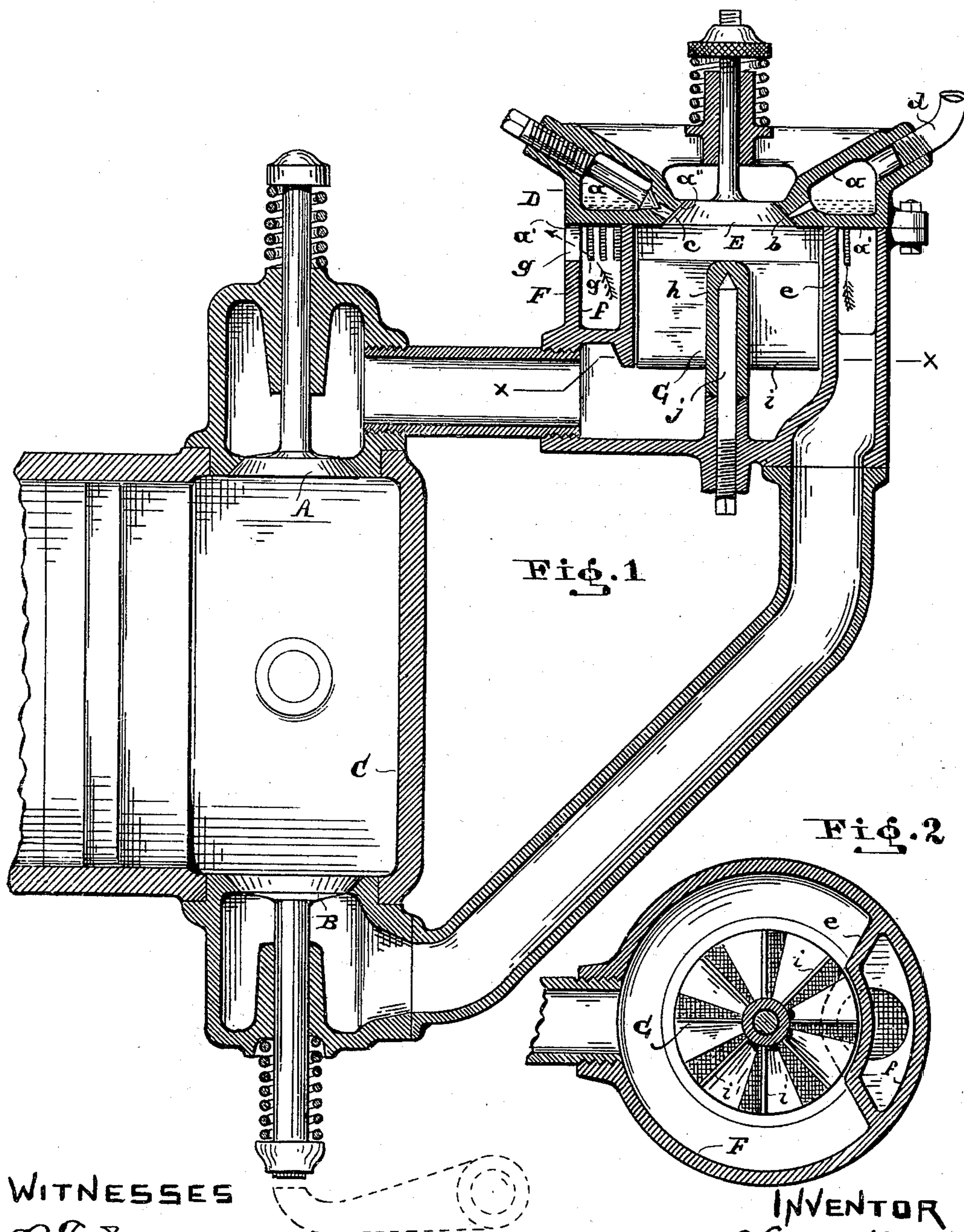
No. 635,166.

Patented Oct. 17, 1899.

W. HAY.
VAPORIZER FOR GAS ENGINES.

(Application filed May 21, 1898.)

(No Model.)



WITNESSES
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UNITED STATES PATENT OFFICE.

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VAPORIZER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 635,166, dated October 17, 1899.

Application filed May 21, 1898. Serial No. 681,339. (No model.)

To all whom it may concern:

Be it known that I, WALTER HAY, a citizen of the United States of America, and a resident of Seville, in the county of Medina and State of Ohio, have invented certain new and useful Improvements in Hydrocarbon Explosive-Engines, of which the following is a specification.

My invention relates to improvements in hydrocarbon explosive-engines; and the primary object of my improvement is to provide suitable means for vaporizing the fuel for said engines and to thoroughly mix same in controllable proportions with air preparatory to charging the cylinders of said engines; and another object is to provide in an expedient effectual manner for a noiseless escape of the exhaust-gases from said engines. I attain these objects in an apparatus constructed and arranged substantially as shown in the accompanying drawings, in which—

Figure 1 represents a vertical sectional view of said apparatus as attached in operative connection with an explosive motor-cylinder, and Fig. 2 is a horizontal sectional view of the same on line X X.

Like letters of reference denote like parts in the drawings and specification.

Substantially the apparatus combines a vaporizer, a mixing-valve, an agitator, and a so-called "exhaust-muffler," which parts respectively are arranged in open relation with the inlet-valve A and the exhaust-valve B of the motor-cylinder C in the manner shown and herein more fully described.

The vaporizer D consists of an annular receptacle *a*, concentric to which and in operative connection therewith is arranged the mixing-valve E.

The receptacle *a* proper is of hollow ring form, with a flat base *a'* and an angular inner face *a''*, which serves as a seat for the valve E. A series of outlets *b* from said receptacle terminate in said seat, and preferably one or more of them are under control of a needle-valve *c* or equivalent. An inlet is shown at *d*, which is adapted for connection with a source of supply of hydrocarbon fuel.

A guide for the valve E may be formed sub-

stantially as shown or in any other suitable manner.

Adjoining the base *a'* is a double-shell casing F, within the inner part (shell *e*) of which is placed the fan-wheel G, while the upper outer compartment F serves as a means for heating the inner compartment and the receptacle above referred to, the exhaust-gases being conveyed through said outer compartment. The inner and lower compartment connects with the inlet-valve chamber by means of a pipe or equivalent, and a like connection is established with the upper and outer compartment and the exhaust-valve casing. For escape of the exhaust provision is made by way of the openings *g*.

In emitting the exhaust-gases from the cylinder into the compartment *f* ebullition is effected of the liquid contained in the receptacle *a*. The vapors, however, rising from the liquid fuel remain confined within the receptacle when and while the valve closes the seat *a''*.

With this apparatus it is presupposed, and provisions are so made that the main inlet-valve A, as well as the valve E, will open only during an actual suction stroke of the piston.

In the instance of taking in air past the valve E the former becomes impregnated with combustible vapor, which issues from the receptacle *a*, and it is for the purpose of forming a thorough mixture of said vapor and air that the fan-wheel G, above referred to, is placed in the path of the current which is induced by the suction action of the piston. Said wheel G constitutes a hub *h* and a series of slanting blades *i*, the hub being preferably suspended from a pivot or pointed post *j*, as seen in Figs. 1 and 2. The suction action of the piston induces a rapid current, which tends to reach the cylinder in the straightest (shortest) possible course. An obstruction like the slanting blades of the wheel must thus be affected by such current and naturally cause a rotation of the wheel, which in turn agitates the inflowing vapors and air to such extent as to convert same into a fixed and highly-explosive gas. A thor-

ough uniform mixture of and in the charge for explosive-engines is essential to facilitate ignition, as well as to effect a complete combustion of such charges.

- 5 In an apparatus constructed substantially as above described there is combined, first, a vapor-generator; second, means for regulating the emission of said vapors and admission of air; third, a device operating auto-
 10 matically for converting the vapor and air into a gas; fourth, a source and means for preheating said gas, and, fifth, a simple and inexpensive provision to effect a noiseless exhaust of the burned gases from the cylinder.
 15 The generation of vapor, as well as the preheating of the fixed gas, is induced by induction of heat derived from the burned or exhaust gases. The supply of vapor is controlled by means of needle-valves. Proper proportions
 20 of vapor and air can thus be obtained. The fixed gas is formed by stirring the vapors and air and by bringing same in contact with the heated blades of the wheel G. Finally, a muffling or a noiseless escape of the exhaust is ef-
 25 fected simply by providing multiple exits for the exhaust in the outer shell of the heating-compartment designed for the purposes above referred to.

What I claim, and desire to secure by Letters Patent, is—

- 30 1. A mixing-chamber for gas-engines, an air-inlet in the top thereof, an exhaust-chamber surrounding the mixing-chamber, a fuel-chamber surrounding the air-inlet and forming the top of the exhaust-chamber, and a
 35 series of exit-ports leading from said fuel-chamber into the mixing-chamber, and a valve

controlling said ports and the air-inlet, whereby the mixing and fuel chambers are heated by the exhaust-gases. 40

2. A mixing-chamber for gas-engines, an air-inlet port in the top thereof, an exhaust-chamber surrounding the mixing-chamber, an annular fuel-chamber surrounding the air-inlet and forming the top of the exhaust-chamber, and a series of exit-ports leading from
 45 said fuel-chamber into the mixing-chamber, a valve controlling said ports, and said air-inlet port whereby the mixing and fuel chambers are heated by the exhaust-gases, combined with a mixing-wheel placed in the mix-
 50 ing-chamber, a pipe leading from the mixing-chamber to the cylinder, the cylinder, an exhaust-pipe extending therefrom to the exhaust-chamber, and suitable valves for controlling said pipes, substantially as set forth. 55

3. A mixing-chamber for gas-engines, an air-inlet therefor, an exhaust-chamber surrounding the mixing-chamber, a fuel-chamber forming the top of the exhaust-chamber, 60
 a series of ports leading from the fuel-chamber into the mixing-chamber, a valve controlling said ports, whereby the fuel is discharged into the mixing-chamber each time
 65 that the valve is moved from its seat, and the mixing-chamber and fuel-chamber are heated by the exhaust-chamber, substantially as shown.

Signed by me at Cleveland, Ohio, this 19th day of May, 1898.

WALTER HAY.

Witnesses:

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 W. E. COLLINS.