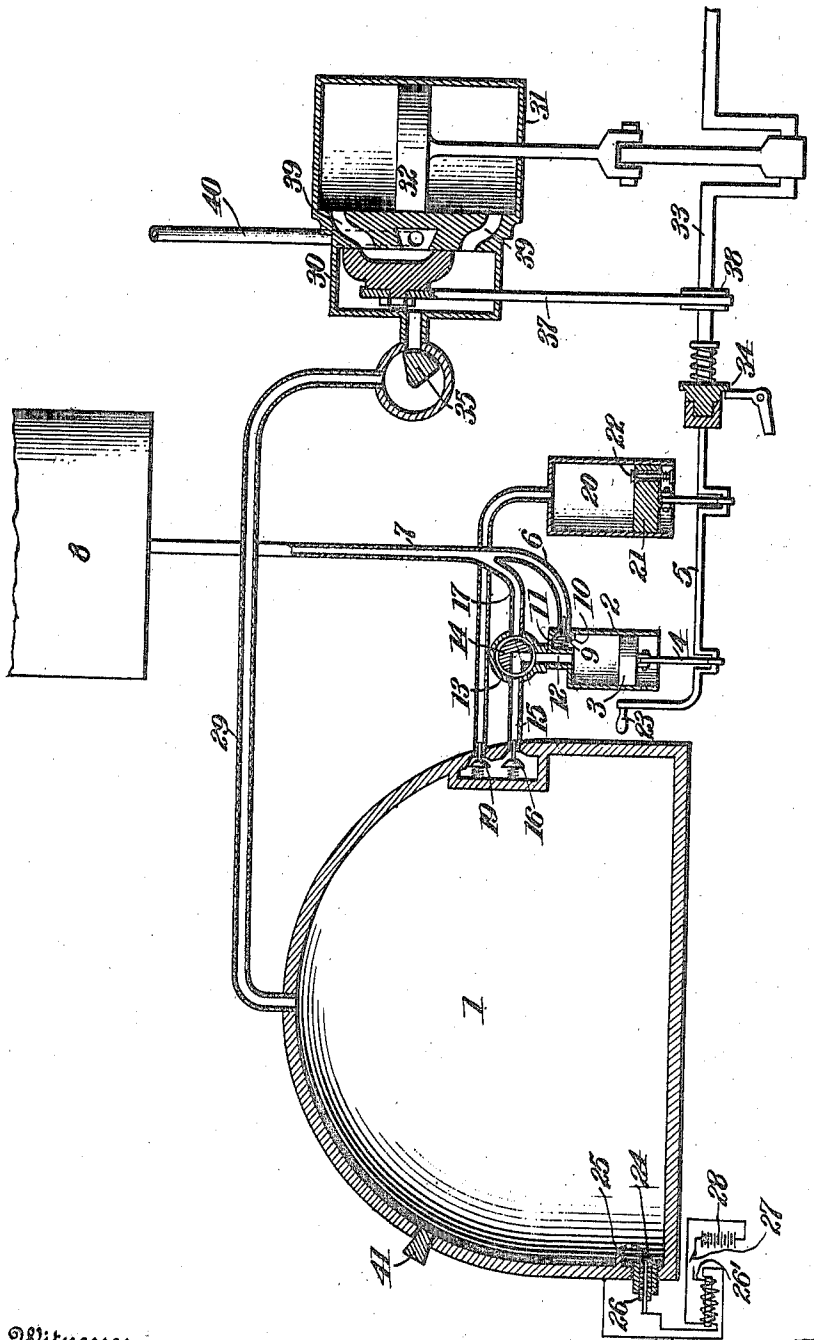
F. B. LATADY.

HEAT ENGINE.

APPLICATION FILED OCT. 14, 1910.

1,156,534. Patented Oct. 12, 1915




Witnesses

W. C. Dorsey

W. C. Blackwood

Inventor,

Francis B. Latady,

By H. P. Dorsey

Attorney.

# UNITED STATES PATENT OFFICE.

FRANCIS B. LATADY, OF BIRMINGHAM, ALABAMA.

## HEAT-ENGINE.

1,156,534. Specification of Letters Patent. Patented Oct. 12, 1915.

Application filed October 14, 1910. Serial No. 587,139.

*To all whom it may concern:*

Be it known that I, FRANCIS B. LATADY, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Heat-Engines, of which the following is a specification.

My invention relates to heat engines and its object is to provide a device of this class in which a common chamber for the combustion of suitable gases and for the storage of the gaseous products of combustion is provided, whereby a constant supply of expansive gas is obtained and the heat of combustion of each charge effectually utilized to ignite the succeeding combustive charge.

My invention is illustrated in the accompanying drawings, in which the view shown is a longitudinal vertical section of the apparatus.

Referring to the drawings, 1 is a combustion and storage chamber, preferably of bee-hive form in which is exploded or burned a suitable gas, the heat products of which are utilized expansively for driving an engine of the steam engine type. Communicating with this chamber are gas and air pumps adapted to force suitable quantities of gas and air into the chamber to form an explosive mixture. The gas pump 2 has a piston 3 operating only on the up-stroke. The piston-rod 4 of this pump is connected to and driven by the shaft 5. Leading into the pump chamber is a pipe 6 which connects with the supply pipe 7, leading from a suitable gas supply tank 8. A puppet valve 9 is seated in the opening 10 of the pipe 6 and is adapted to be opened by the downward, suction stroke of the piston, so as to admit gas to the pump and to be closed by the pressure from the upward operating stroke, such closing action being aided by the spring 11 which is secured to the head of the valve. A pipe 12 leads from the pump chamber to a valve chamber 13 in which is mounted a two-way valve 14 and from the valve chamber an inlet pipe 15 leads to the explosion and storage chamber. A valve 16 is mounted in the pipe 15 and is adapted to open inwardly toward the explosion chamber and to close the inlet against the escape of the gases. A branch pipe 17 connects the supply pipe 7 with the valve chamber 13 and said pipe is normally closed by the valve 14.

A pipe 18 controlled by an entrance port valve 19 leads into the chamber 1 from a pump 20, adapted to force air into the chamber to form with the gas admitted, a mixture which may be exploded or burned by ignition. The piston 21 of this pump is connected to and driven from the shaft 5. A spring-pressed upwardly-opening relief valve 22 is mounted in the piston 21.

One end of the shaft 5 is provided with a crank handle 23 by means of which the shaft 5 is adapted to be turned by hand to pump in a charge of combustible gas and air into the chamber 1 at the start of the operation. The gas used may be any easily burned hydrocarbon gas, as gasolene vapor, illuminating gas or producer gas.

Within the chamber 1 is a spark plug 24 coöperating with a contact 25 projecting from the end of the vessel and which sparker serves the purpose of igniting the initial charge. The plug 24 is mounted in the insulating sleeve 26, secured in the wall of the chamber 1. The sparker connects through the coil 26′ and switch-key 27 with a battery 28.

From the upper part of the chamber 1, leads an exit pipe 29 which contacts with the cut-off valve chest 30 of an expansively driven engine 31. The piston 32 of the engine is connected to and drives the main driving shaft 33. Adapted to connect the main shaft with the pump operating shaft 5 is a manually controlled clutch mechanism 34 which may be of any suitable construction and is employed for throwing the pump shaft into engagement with the main shaft after the starting of the engine for the purpose of maintaining an automatic operation of the pumps.

In a suitable chamber in the pipe 29 is mounted a throttle valve 35 adapted to control the expansive products of combustion passing to the engine. A sliding valve 36 is mounted in the valve chest 30 and is operated by rod 37 and an eccentric 38 on the main shaft and this valve coöperates with the ports 39 to admit the expansive products alternately to opposite sides of the engine piston. An exhaust pipe 40 opens from the valve chest. An opening in the combustion chamber normally closed by a plug 41 enables an initial charge of gas or other fuel to be introduced into the chamber.

The operation of the device is as follows:—The throttle valve being closed, the

plug 41 in the wall of chamber 1 is removed and a sufficient quantity of a combustible gas admitted to constitute an initial charge which, after the plug has been replaced, is then ignited by the spark plug. The clutch being first disengaged, the shaft 5 is turned by hand so as to pump in more hydrocarbon gas and air by the pumps 2 and 20 to increase the pressure within the chamber 1 to the desired point. The additional supply of gas and air thus admitted will be combined and ignited by the heat of the initial combusted charge. When the pressure inside the combustion and storage chamber is sufficient to work the engine, the clutch 34 is operated to throw the shaft 5 into engagement with the main driving shaft 33 so as to automatically supply hydrocarbon gas and air to the chamber and the throttle valve 35 is opened, permitting the hot products of combustion to pass to the engine for the purpose of expansively driving the same.

The capacity of the chamber 1 in proportion to the capacity of the engine is such that only a portion of the products of combustion are drawn therefrom at each stroke of the engine, the operation of the pumps serving to keep the pressure constant within the chamber and the latter thus serves not only as a combustion chamber but as a storage chamber having a constant supply of products of combustion under a constant expanding pressure. The air forced into the chamber 1 from the pump 20 not only serves to combine with the hydro-carbon gas to form a proper combustible mixture but also when admitted in sufficient quantities to cool the engine, thus dispensing with a water cooling system. If the temperature in the chamber becomes too high, the valve 16 is turned ninety degrees to the left to cut off the supply to the chamber and to turn the gas back to the supply tank 8 through the pipe 7 until the temperature again falls whereupon the valve is restored to normal position.

It is clear that various changes in the details of the apparatus may be made without departing from the principle of my invention.

Having thus described my invention, what I claim is:—

In combination with an expansive engine having a D-valve, a separate combined storage and combustion chamber having a capacity in excess of a single engine charge and operable to ignite the charges of gaseous fuel within said chamber, means for admitting an initial charge of combustible gas, a source of constant supply of combustible gas, a supply pipe leading from said source to the chamber, a pump communicating with said pipe between said source and the chamber, a two-way cut-off valve, a branch pipe between said valve and the supply pipe, check valves between the pump and supply pipe and between the chamber and supply pipe, an air-supplying pump, a main driving shaft connected to the engine, a pump-operating shaft in alinement with the main shaft, a clutch between said shafts, and a crank handle on said pump shaft, substantially as described.

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

FRANCIS B. LATADY.

Witnesses:
JOHN B. FAMEW,
A. G. BAIRD.