(No Model.) 2 Sheets—Sheet 1.

P. BILBAULT.

GAS OR PETROLEUM ENGINE.

No. 532,412. Patented Jan. 8, 1895.

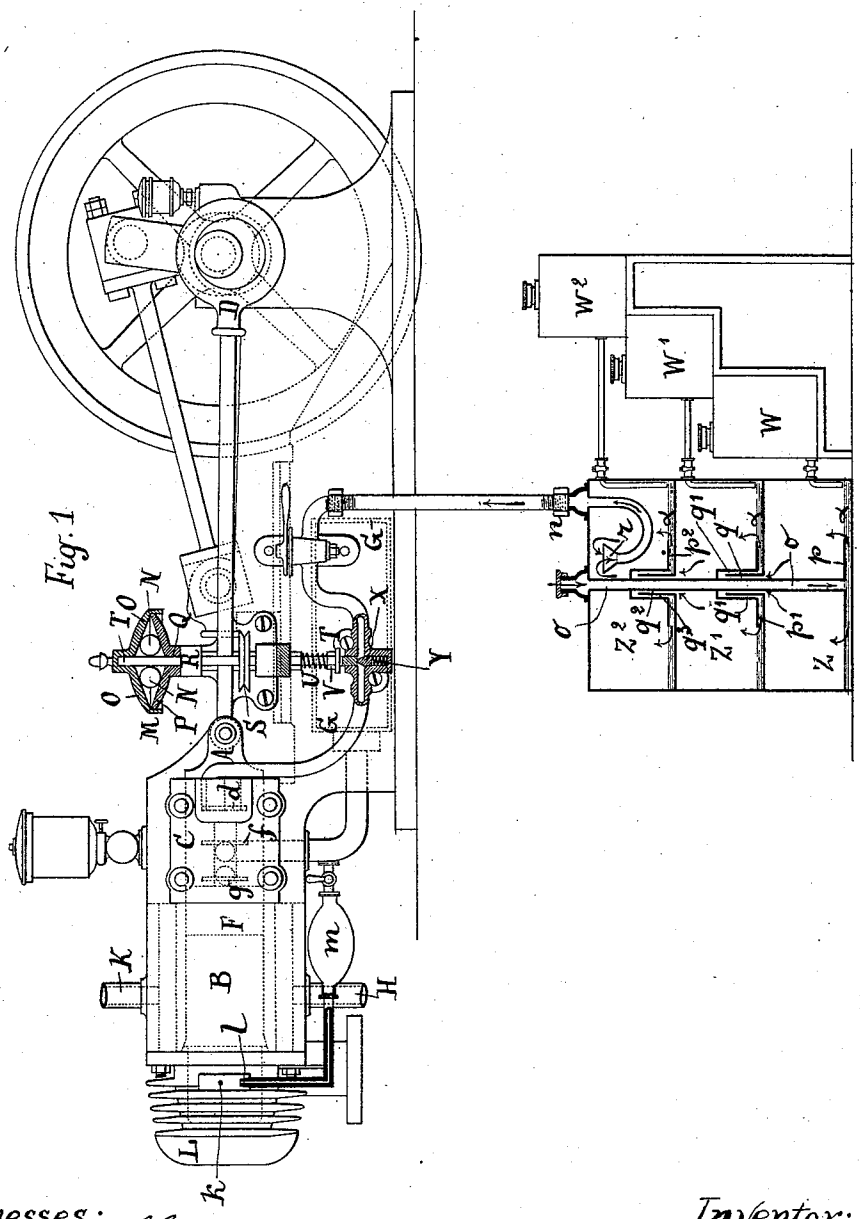

Fig. 1

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(No Model.) 2 Sheets—Sheet 2.

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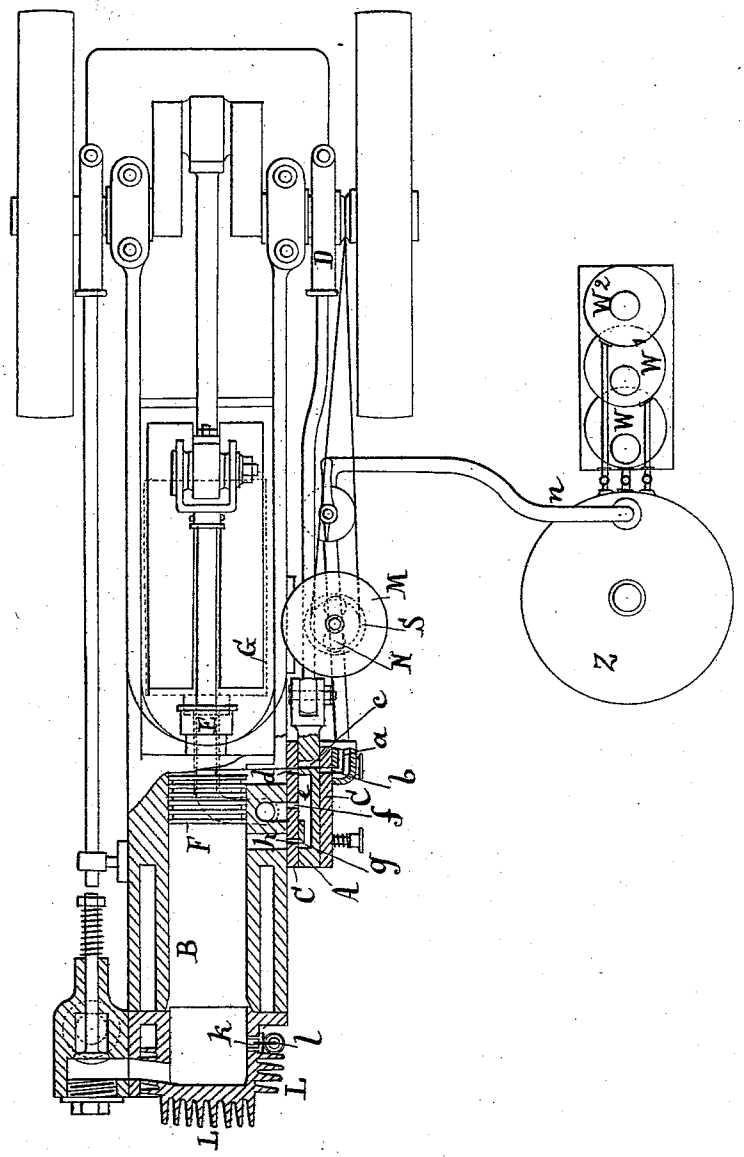
Fig. 2



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UNITED STATES PATENT OFFICE.

PIERRE BILBAULT, OF PARIS, FRANCE, ASSIONOR OF ONE-HALF TO WALTER J. FLATTERY, OF SAME PLACE.

GAS OR PETROLEUM ENGINE.

SPECIFICATION forming part of Letters Patent No. 532,412, dated January 8, 1895.

Application filed June 4, 1894. Serial No. 513,453. (No model.) Patented in France September 25, 1891, No. 216,352; in England March 23, 1892, No. 5,740, and in Belgium March 23, 1892, No. 98,924.

To all whom it may concern:

Be it known that I, PIERRE BILBAULT, a citizen of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Gas or Petroleum Engines, (for which I have obtained Letters Patent in France September 25, 1891, No. 216,352; in England March 23, 1892, No. 5,740, and in Belgium March 23, 1892, No. 98,924,) of which the following is a specification, reference being had therein to the accompanying drawings.

My improved engine which forms the subject of the present invention operates by means of air and gas or petroleum or any other mixture which explodes at a certain pressure, and it has two phases, that is to say, it gives an impulsion for every revolution of the crank. It is provided with two fly wheels, and the cylinder may if desired be cast in one piece with the frame, or made separately. On the cylinder are arranged a compression chamber with ribs, an escape box with its flap valve, an admission slide valve and an igniting device which acts by means of a heated platinum wire.

In the accompanying drawings I have shown how my said invention may be conveniently and advantageously carried into practice.

Figure 1 is a side elevation partly in section of my improved engine. Fig. 2 is a plan of the same.

A is a slide valve arranged at the front part of the engine cylinder B in a box C, the said valve being actuated by an eccentric D and serving to regulate the supply to the engine. By reason of the arrangement of its apertures the said slide valve permits the passage of air and gas to the front part of the cylinder, which has at this end a stuffing box E. The engine piston F performs the part of a pump when it moves to the rear. Four apertures *a b c d* in the aforesaid slide valve are open and allow the passage of the air and gas in order to be forced during the forward movement, through three apertures *d e f* into a supply reservoir G provided in the frame of the engine.

When the piston arrives at the end of its forward stroke two of the said apertures *c d* are closed and two others *g h* are opened for allowing the passage of the mixture which is at a certain pressure in the supply reservoir G into the cylinder at the rear of the piston. At this moment the escape being open the mixture passes easily into the engine cylinder B whereupon the escape is immediately closed by means of a small flap valve actuated by an eccentric. As the engine piston F continues its backward movement, it compresses the mixture, and the small platinum wire being heated to a white heat ignites it, which causes the motion of the engine.

B′ represents the exhaust valve operated by the eccentric D′ on the fly wheel shaft.

My improved igniting device comprises a small platinum wire *k* heated by a blow pipe *l* supplied by the explosive mixture coming from the above mentioned supply reservoir G and passing through a small india rubber pocket *m* for keeping it at a certain pressure, or by a gas obtained independently of the engine. This igniting device is arranged on the rear part in a cavity so that there shall always be a burned mixture. When the compression takes place the explosive mixture forces away the burned gas and allows the wire *k* to become heated which causes the ignition.

I may employ an igniting device of different construction, operating either by means of an electric spark or a flame.

The cooling of the cylinder is effected by a circulation of water in a jacket. This water is admitted through a pipe H placed below the cylinder and leaves through a second pipe K placed upon the said cylinder. The cylinder may be cooled also without the use of water by means of a series of ribs similar to those at L on the rear part of the cylinder which has no circulation of water.

This engine is provided with a governor M having balls N adapted to roll between two bevel surfaces O and P. As these balls move away from the center they displace the upper cone O which rises. The lower cup P has a round part Q which serves as a ring and which is fixed to a sleeve R at the extremity of which is fixed a ring for keeping this sleeve R upon the support of the governor. I also fix upon this sleeve a pulley S operated by a cord or belt. The aforesaid upper cone

O is connected with a small shaft T which traverses the sleeve of the former and to which is fitted a spiral spring U the tension of which is regulated by a nut V with the object of enabling the velocity of the engine to be varied. This mechanism operates a device which is designed to control the admission of the gas, and comprises a small cylindrical plug X having a conical part in the middle. At the lower part of this plug is placed a small spring Y which always bears against the above mentioned rod T set in motion by the balls.

This improved engine can be worked with ordinary gas or with air carburetor or by means of petroleum. In the latter case the gas admission pipe is branched off, as shown in Fig. 1, from the upper part of a carburetor composed of a cylindrical body divided into three compartments z z' z^2 situated one above the other. Each of these compartments is supplied with petroleum by special reservoirs W W' W^2 in such a manner that a layer d of the same lies at the bottom of each compartment. A tube o passes down the middle of the cylindrical body and opens into the petroleum in the lowest compartment Z. The air entering through this pipe is caused to circulate through the petroleum by the disk p and so to charge itself with vapor. The gas thus formed passes into the annular space q redescends by q', and spreads itself out under the disk p'. It ascends again into q^2, redescends through q^3 and spreads under the disk p^2 and finally the gas which has been in this manner successively enriched, passes into the cone r and flows through n in order to reach the engine.

What I claim as my invention is—

1. In a gas engine, the combination with a cylinder and its piston, of an explosion and compression chamber at the rear end of the cylinder forming a continuation thereof, a storage compartment having communication with the forward end of the cylinder, a suitable vapor supply having communication with the storage chamber at a point adjacent to the cylinder, a port entering the forward end of the cylinder, a port entering the cylinder at the rear of said other port, and a valve common to and controlling said ports, the communicating passage between the cylinder and storage chamber and the passage between the vapor and storage chambers, substantially as described.

2. In a gas engine, the combination with a cylinder and its piston, of an explosion and compression chamber at the rear end of the cylinder forming a continuation thereof, a storage compartment having communication with the forward end of the cylinder, a suitable vapor supply having communication with the storage chamber at a point adjacent to the cylinder, a port entering the forward end of the cylinder, a port entering the cylinder at the rear of said other port, a valve common to and controlling said ports, the communicating passage between the cylinder and storage chamber and the passage between the vapor and storage chambers, and a governor for controlling the supply of the vapor to the storage compartment, substantially as described.

3. The combination of the cylinder, its piston, the compression chamber, the igniting device therein, the exhaust port, from the rear thereof, of the valve casing at the forward end of the cylinder, the valve therein, the valve and casing having the ports a, b, in the casing the port c in the valve the port d leading into the cylinder in the front of the piston the port e in the valve, the port f leading from the port e to the compression chamber and the port h leading from the port e to the cylinder in the rear of the piston and the supply pipe and compression tank, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

PIERRE BILBAULT.

Witnesses:
CLYDE SHROPSHIRE,
AUGUSTE MATHIEU.