No. 710,312. Patented Sept. 30, 1902.

H. E. BARLOW.

IGNITER FOR EXPLOSIVE ENGINES.

(Application filed July 25, 1901.)

(No Model.)

Fig. 1.

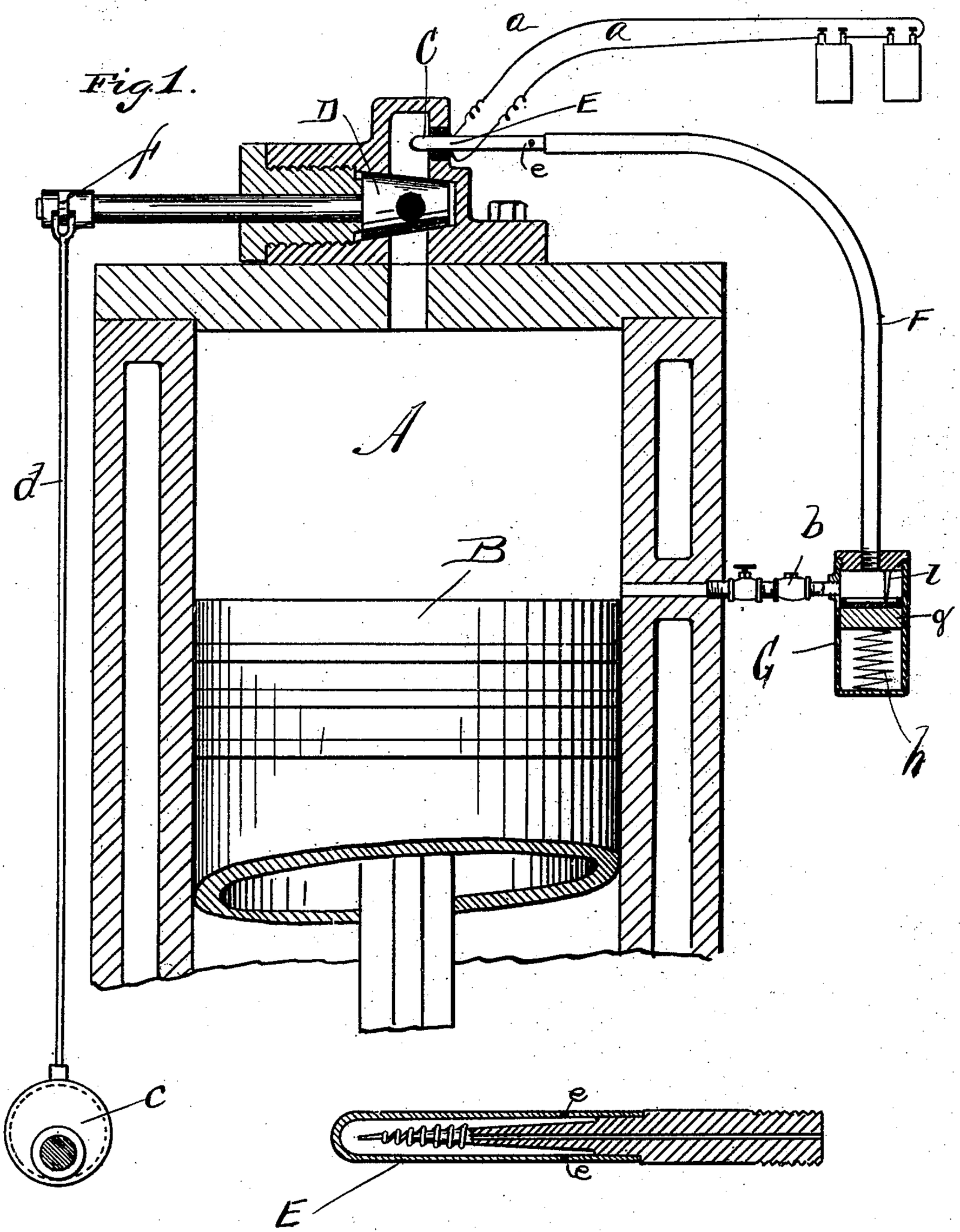

Fig. 2.

Witnesses.

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IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 710,312, dated September 30, 1902.

Application filed July 25, 1901. Serial No. 69,650. (No model.)

To all whom it may concern:

Be it known that I, HOWARD E. BARLOW, of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Igniters for Explosive-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to igniters for explosive-gas engines, and has for its purpose to provide an igniting device for exploding the charge of gas by an incandescent point kept at a white heat by pressure of vaporized naphtha or gasolene.

It is fully explained and illustrated in this specification and the accompanying drawings.

Figure 1 represents an engine cylinder and piston in partial sectional elevation with my igniting device attached thereto. Fig. 2 represents the firing-point in section enlarged.

A is the ordinary gas-engine cylinder, to which my igniting device may be attached. B is a piston in said cylinder.

C is a chamber connecting directly with the outer end of a cylinder A.

D is an oscillating valve, which may receive its motion from the crank-shaft through the eccentric C and connection-rod *d*. It opens and closes the passage-way to the chamber at predetermined intervals and is controlled by the action of the engine.

E is a hollow platinum needle having one end closed and inserted into the chamber C and its other end connected by pipe F through the equalizing-chambers G into the main cylinder A. The needle has vent-holes *e e*.

The operation is as follows: When the engine is to be started, the platinum point is first heated to a red heat by the flame of a lighted match or lamp, or another and more convenient method employed in heating the point is by passing a strong current of electricity through it from a battery or other source of supply by conducting-wires *a a*. The platinum being a metal of high resistance is easily brought to a high temperature by this method, which is preferably employed in automobiles, motor-bicycles, and the like, where frequent stopping and starting occurs. When the point is once heated, which takes but a few seconds, the electricity is shut off. The engine is then turned over and a charge of vaporized and aerated liquid is drawn into the cylinder A through the supply-pipe (not shown) by the downward movement of the piston B, and on the upstroke of the piston the vapor is forced through the pipe F into the heated point E, where it is ignited by coming in contact with the already-heated surface therein. The temperature of the point is thus intensified and raised to a white heat, which heat is maintained so long as it receives the inflammable vapor, which is supplied to it by the reciprocating action of the piston. As the electricity is only used for a few seconds in heating the point each time when the engine is started, the batteries will last for an indefinite period and two cells are all that are required. The equalizing-chamber G is for the purpose of keeping the pressure of gas constant in the needle E and is composed of a small cylinder having a piston *g*, packed at its upper end, held to slide freely in the cylinder, with a light spring *h* placed under it to keep up a constant flow of gas into the needle. A stop-pin *i* is placed above the piston at the proper point to keep it from going too high and covering the inlet-pipe.

This device is connected to the cylinder a short distance from its end, so the aperture is sure to be covered by the piston B on its upstroke before the explosion takes place in the cylinder, thereby preventing the excessive pressure from getting into the point. A check-valve *b* is inserted between the equalizing-chamber and the cylinder, so that the piston on its downstroke will not draw out the gas previously forced into the chamber. In order to control the igniting and have the firing take place at the proper time, an oscillating valve is placed in the passage-way to the upper chamber, with its stem projecting over the edge of the cylinder-head, and is connected by means of a lever *f* and connecting-rod *d* to the eccentric *c*. In the case of a two-cycle engine, when the charge explodes at every stroke, the eccentric is run at the same speed as the crank-shaft, and when the device is used on the four-cycle engine

and the explosion takes place at every other stroke the cam is placed on an auxiliary shaft, which may be driven by reducing-gears from the crank-shaft at one-half its speed. In some cases on the two-cycle engines this valve is entirely done away with, allowing the charge to be fired by the incandescent point without controlling the time by the use of a valve.

The igniting-point is composed of a platinum tube closed at one end and open at the other, into the open end of which is forced a brass holder having a bearing or shoulder to receive the tube and also a long tapering point, a platinum wire being wound around the point and projecting beyond it. The gas enters through an axial bore of the holder and strikes the previously-heated platinum wire, thereby causing it to glow and intensify the heat of the wire and also of the shell. The gas then passes out through the holes *e e* of the holder.

Some of the advantages of this invention are: It provides an igniter that is very light in weight, sure of action, extremely simple in construction, inexpensive to make and keep in repair, and of minimum cost to operate. This method of igniting while more simple than the electric spark also has the advantage over it by saving the weight and room taken up by the large number of electric batteries usually carried or the expense and unreliability of the auxiliary dynamo. On account of its exceeding lightness of weight it is particularly valuable on automobiles and all motor-vehicles, where lightness is so much to be desired. The great advantage over the ordinary hot-tube igniter is that it is impossible for the wind to extinguish the flame or reduce its efficiency.

A very desirable feature in the igniter is that it uses the same fuel as that supplied to the engine, which fuel may be taken from the cylinder, supply-pipe, tanks, or any other convenient place.

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

1. In an explosive-engine, the combination with the piston and cylinder, of a chamber communicating with the compression end of the cylinder, an ignition device located in the chamber, a pressure device, a passage connecting the pressure device with the cylinder and so disposed as to be covered by the piston at the latter part of its compression-stroke, and a pipe connecting the pressure device with the ignition-chamber.

2. In an explosive-engine, the combination with the piston and cylinder, of a chamber communicating with the compression end of the cylinder, an ignition device located in the chamber, a pressure device, a passage connecting the pressure device with the cylinder and so disposed as to be covered by the piston at the latter part of its compression-stroke, a check-valve located in said passage, and a pipe connecting the pressure device with the ignition-chamber.

3. In an explosive-engine, the combination with the piston and cylinder, of a chamber communicating with the compression end of the cylinder, an ignition device located in the chamber, a pressure device; a passage connecting the pressure device with the cylinder and so disposed as to be covered by the piston at the latter part of its compression-stroke, a pipe connecting the pressure device with the ignition-chamber, a valve in the passage between the cylinder and the ignition-chamber, and means coöperative with the piston for controlling said valve.

4. In an explosive-engine, the combination with the piston and cylinder, of a chamber communicating with the compression end of the cylinder, an ignition device located in the chamber, an equalizing-chamber, a piston reciprocating in the latter cylinder, a compression-spring between the latter piston and one end of its cylinder, a pipe connecting the other end of this latter cylinder with the ignition-chamber, and a pipe connected to the equalizing-chamber in proximity to this last-mentioned end and connected to the engine-cylinder at a place so disposed as to be covered by the piston at the latter part of the compression-stroke.

In testimony whereof I have hereunto set my hand this 24th day of July, A. D. 1901.

HOWARD E. BARLOW.

In presence of—
BENJ. ARNOLD,
EDGAR S. MARSH.