No. 632,509. Patented Sept. 5. 1899.

S. A. AYRES.

CARBURETING DEVICE FOR GAS OR EXPLOSIVE ENGINES.

(Application filed June 5, 1899.)

(No Model.) 2 Sheets—Sheet 1.

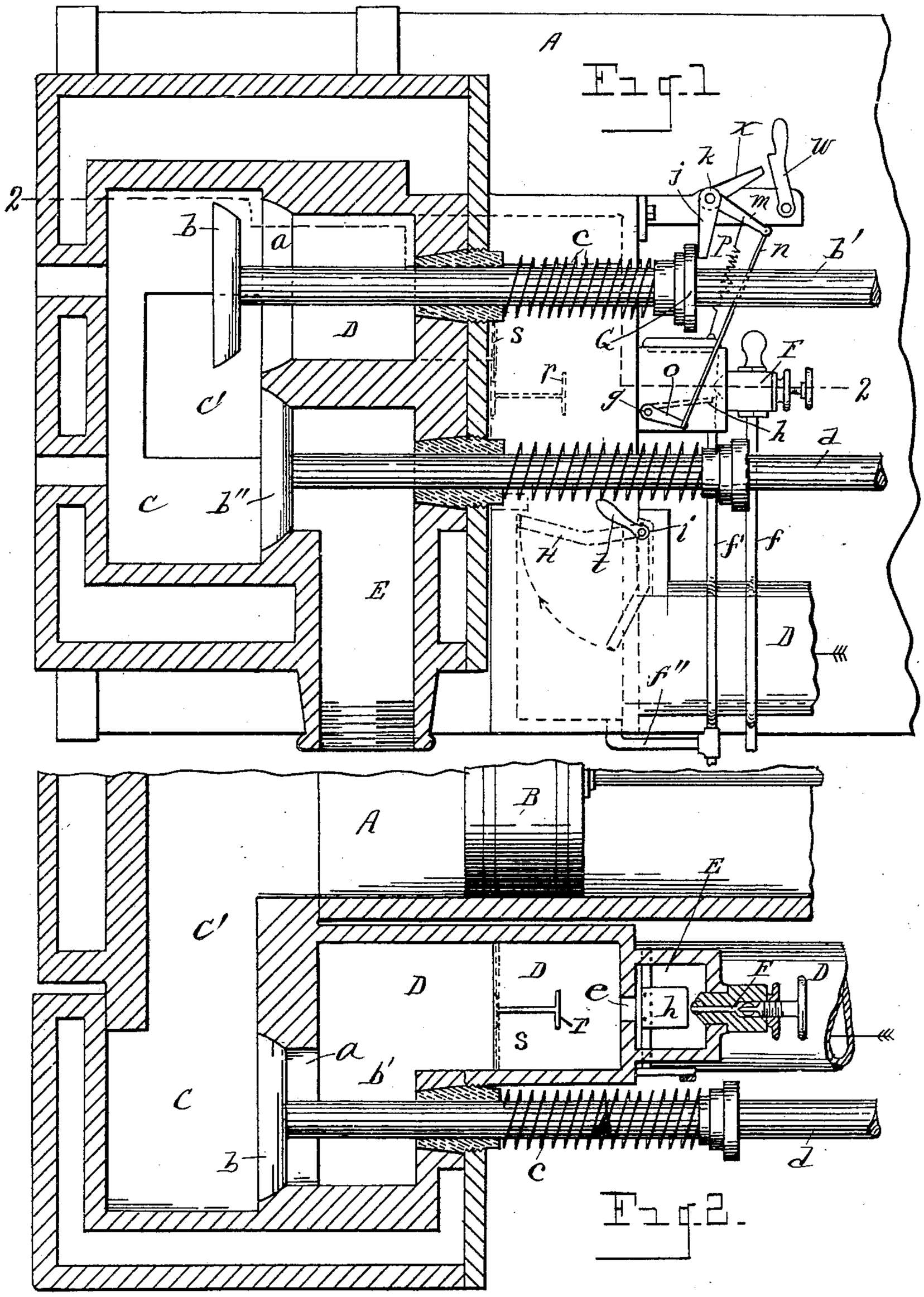

Fig. 2.

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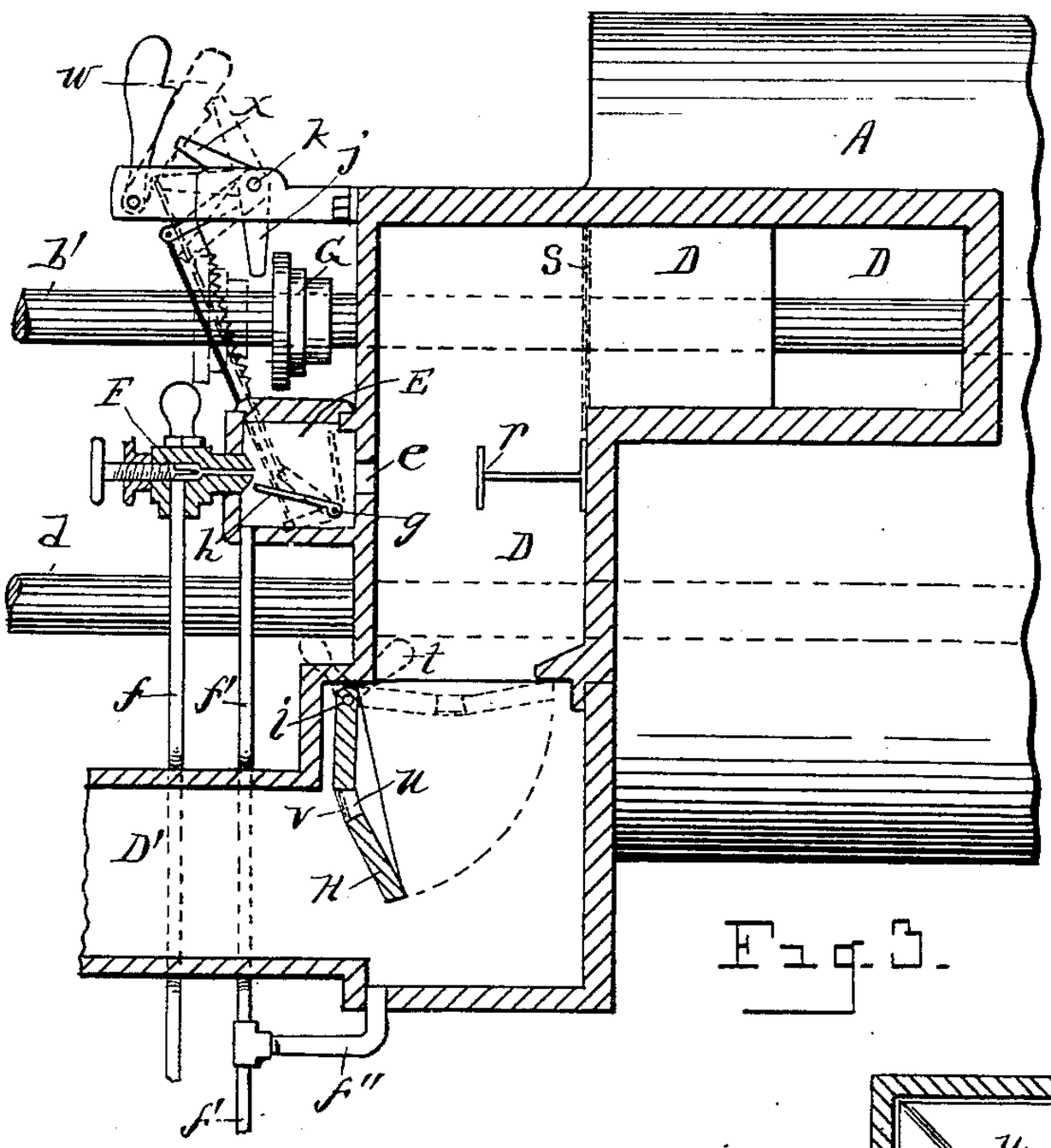

Fig. 3.

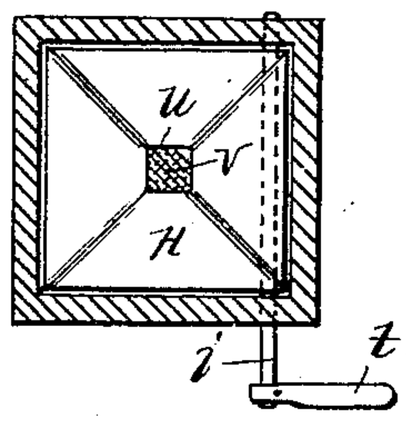

Fig. 4.

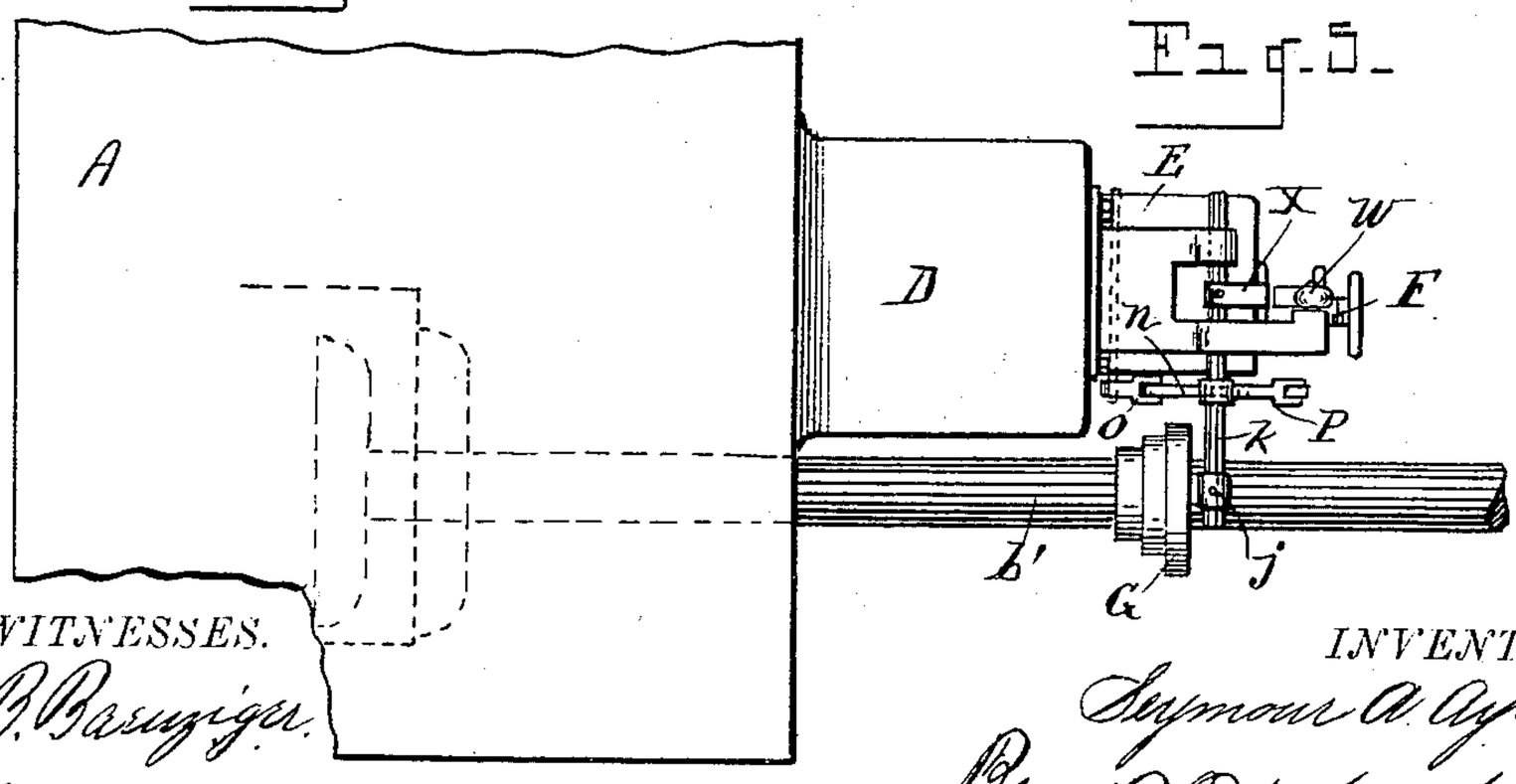

Fig. 5.

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UNITED STATES PATENT OFFICE.

SEYMOUR A. AYRES, OF BAY CITY, MICHIGAN.

CARBURETING DEVICE FOR GAS OR EXPLOSIVE ENGINES.

SPECIFICATION forming part of Letters Patent No. 632,509, dated September 5, 1899.

Application filed June 5, 1899. Serial No. 719,366. (No model.)

To all whom it may concern:

Be it known that I, SEYMOUR A. AYRES, a citizen of the United States, residing at Bay City, in the county of Bay, State of Michigan, have invented certain new and useful Improvements in Carbureting Devices for Gas or Explosive Engines; and I do declare the following to be a full, clear, and exact description of the invention, 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 letters of reference marked thereon, which form a part of this specification.

This invention relates to a carbureting device for gas or explosive engines; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The object of the invention is to produce a device in which the explosive fluid may be readily vaporized and mixed with air in the proper proportion to produce the desired explosion in the combustion-chamber of gas-engines or for analogous purposes. This object is attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section through the combustion-chamber communicating with the cylinder of the engine, showing in elevation the inlet and exhaust valves and the mechanism connected with the inlet-valve for controlling the entrance of the explosive fluid into the air passage-way communicating with said inlet-valve. Fig. 2 is a horizontal section as on line 2 2 of Fig. 1. Fig. 3 is a vertical section through the air passage-way leading to the combustion-chamber and through the fluid-emitting valve and fluid-receiving chamber into which the explosive fluid from the valve is discharged, other parts appearing in elevation. Fig. 4 is a plan view showing in full and dotted lines the parts shown in section in Fig. 3. Fig. 5 is a horizontal section through the air-passage, showing the damper or air-valve therein closed.

Referring to the letters of reference, A designates the cylinder, in which the piston B is adapted to reciprocate, as shown in Fig. 2.

C designates the combustion-chamber, which communicates with the cylinder through the passage-way C′.

D designates a passage-way through which the carbureted air passes into the combustion-chamber through the opening *a*, controlled by the valve *b*. E designates the exhaust-port, also communicating with the combustion-chamber through an opening controlled by the valve *b*′. Said exhaust-valve is normally held in its seat by a coiled spring *a*, which surrounds the stem *d* of said valve, said stem being actuated to unseat the valve to permit of the escape of the products of combustion by suitable means (not shown) after an explosion has taken place in the combustion-chamber. The valve *b* is provided with the valve-stem *b*′, carrying a coiled spring *c*, whose force is exerted to normally seat said valve. The valve *b* is carried from its seat through a longitudinal movement of the valve-stem, accomplished by means not shown, so as to permit a charge of carbureted air to pass into the combustion-chamber of the cylinder when it is desired to give an impulse to the engine.

The air passage-way D is provided with an opening at its lower end through the pipe D′, through which the air is drawn which passes through the passage D past the valve *b* when opened and into the combustion-chamber. Adjacent to the air-passage D is a small chamber E, which communicates with said air-passage through an opening *e*. Adapted to discharge into the chamber *e* is the fluid-emitting valve F, to which the fluid is conveyed under pressure through the supply-pipe *f*. A constant stream of the explosive fluid is ejected from the valve F into the chamber E, the quantity of fluid being regulated by said valve. Leading from the chamber E is a pipe *f*′, through which the explosive fluid not used in charging the air which passes to the combustion-chamber is returned to the supply-tank. (Not shown.) Hinged in the chamber E upon a transverse shaft *g* is a gate *h*, which by a rotation of said shaft is adapted to be swung before the opening *e*, leading to the passage D, to prevent the explosive fluid from passing through said opening into said passage D when the engine is not taking a charge.

The gate *h* is operated by means of the fixed collar G, mounted on the stem of the valve *b*, which when said valve returns to its seat engages an arm *j* on the shaft *k* and turns said shaft, so as to cause the crank *m*, mounted

thereon, to draw upon the connecting-rod *n*, which is attached at its lower end to a crank *o* upon the shaft *g* of said gate, whereby said gate is swung to a vertical position before the opening *e*, as clearly shown by dotted line in Fig. 3, so that the stream of explosive fluid emitted by the valve F will strike said gate and, being deflected thereby, will pass out of the chamber E through the pipe *f'*. Upon opening said valve *b* the collar G on the stem thereof will be carried away from the arm *j*, permitting the spring *p*, attached to the crank *m*, to draw said crank downward, thereby moving the connecting-rod *n* so as to swing the gate *h* to a horizontal position, as shown in Fig. 2 and by dotted lines in Fig. 1, permitting the jet of explosive fluid emitted by the valve F to pass through the opening *e* and strike the plate *r*, located in the passage *d*, thereby breaking up the jet of fluid and enabling the current of air rushing through the passage *d* to vaporize said fluid and carry it in the form of an explosive gas past the open valve *b* into the combustion-chamber, where it is ignited, so as to impart an impulse to the engine in a manner well understood in the art. It will be understood that upon the opening of the intake-valve *b* the piston B is traveling forward in the cylinder and exhaust-valve *b'* is closed, so that air is caused to rush through the passage *d* and into the combustion-chamber to supply the vacuum created in the end of the cylinder, carrying with it the vaporized fluid, with which the air becomes sufficiently carbureted to cause an explosion in the combustion-chamber when ignited.

Crossing the horizontal portion of the opening D is a screen *s*, which arrests any portion of the fluid that may reach that point and upon which said fluid is distributed and exposed to the action of the air passing through the screen, making the vaporization of the fluid complete.

When the engine is starting slowly, the rush of air through the passage D is not sufficiently strong to evaporate the combustible fluid discharged into said passage. Therefore the gate H, which is hung upon a transverse shaft *i* in said passage, is swung through the medium of the crank *l* upon said shaft to a horizontal position across the opening D, as shown in Fig. 5 and by dotted lines in Fig. 3, in which position the fluid passing through the opening *e* falls upon said gate and because of its concavo-convex form runs to the center thereof, through which is an opening *u*, covered by a screen *v*. The explosive fluid is broken up by said screen or arrested thereby and is more readily vaporized by the current of air which, because of the contracting of the passage D through the closing of said gate, rushes through the central opening thereof with great velocity. Should more of the fluid fall upon said gate than can be vaporized, it passes through the screened opening to the bottom of said passage and is conveyed to the return-pipe *f'* by the connecting-pipe *f''*.

Pivoted on the frame is a notched lever *w*, adapted to be moved into the path of the arm *x*, carried on the shaft *k*, as shown by dotted lines in Fig. 3, whereby the crank *m* on said shaft may be held against the action of the spring *p*, thereby locking said parts so as to maintain the gate H before the opening *e*, leading to the air passage-way, whereby the explosive fluid is prevented from entering said passage-way even when the inlet-valve *b* is open, enabling the engine to be stopped by this means when desired.

Having thus fully set forth this invention, what is claimed is—

1. In a carbureter for gas or vapor engines, the combination of the combustion-chamber, an air passage-way communicating with said chamber through the inlet-valve, a fluid-receiving chamber adjacent to said passage-way, a communicating opening connecting said passage-way with said fluid-receiving chamber, a fluid-emitting valve projecting into said fluid-receiving chamber in line with said communicating opening, and a movable gate located in said fluid-receiving chamber adapted to be moved before the opening communicating with said air passage-way.

2. In a carbureter for gas or vapor engines, the combination of the combustion-chamber, an air passage-way communicating therewith, a valve controlling the communicating opening between said air passage-way and the combustion-chamber, a fluid-receiving chamber adjacent to and communicating with the air passage-way, a valve projecting into said fluid-receiving chamber inline with the opening between said chamber and the air passage-way, a gate hinged before said communicating opening, and means operated by the movement of said valve and connected with said gate for moving said gate before the communicating opening between the fluid-chamber and air passage-way when said valve moves onto its seat.

3. In a carbureter for gas or vapor engines, the combination of the combustion-chamber, an air passage-way communicating with said chamber through a valve-controlled opening, a fluid-receiving chamber in communication with said air passage-way, a fluid-emitting valve projecting into said fluid-chamber in line with the opening between said chamber and the air passage-way, a hinged gate in said air passage-way below the opening between said passage-way and the fluid-receiving chamber, said gate being adapted to close said air passage-way and having a screen-covered opening in the center thereof.

In testimony whereof I sign this specification in the presence of two witnesses.

SEYMOUR A. AYRES.

Witnesses:

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