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Patented Jan. 22, 1901.

J. C. GEBHART.

HYDROCARBON VAPORIZER AND MIXER FOR EXPLOSION ENGINES.

(Application filed June 25, 1900.)

(No Model.)

Fig. 1.

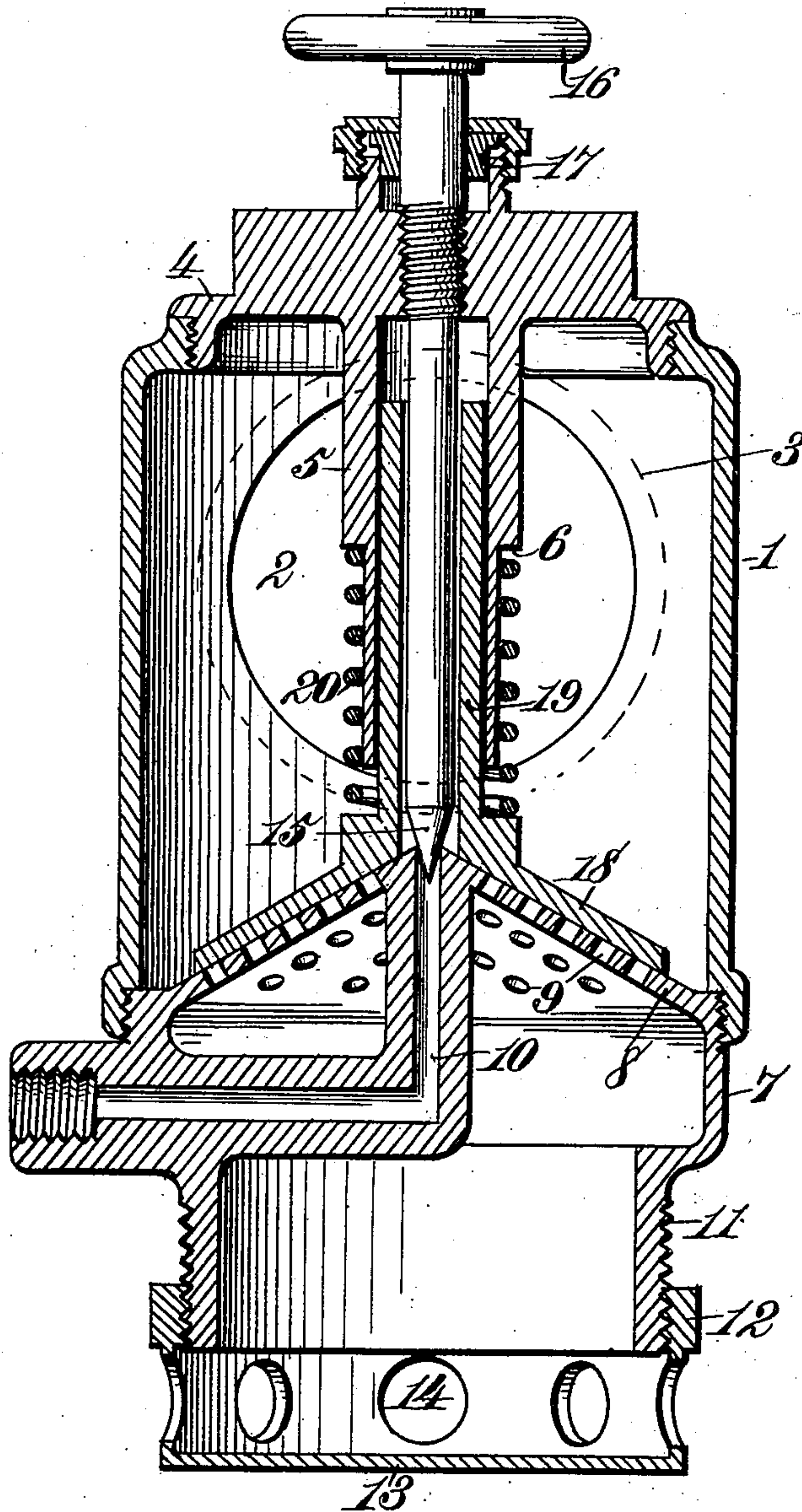
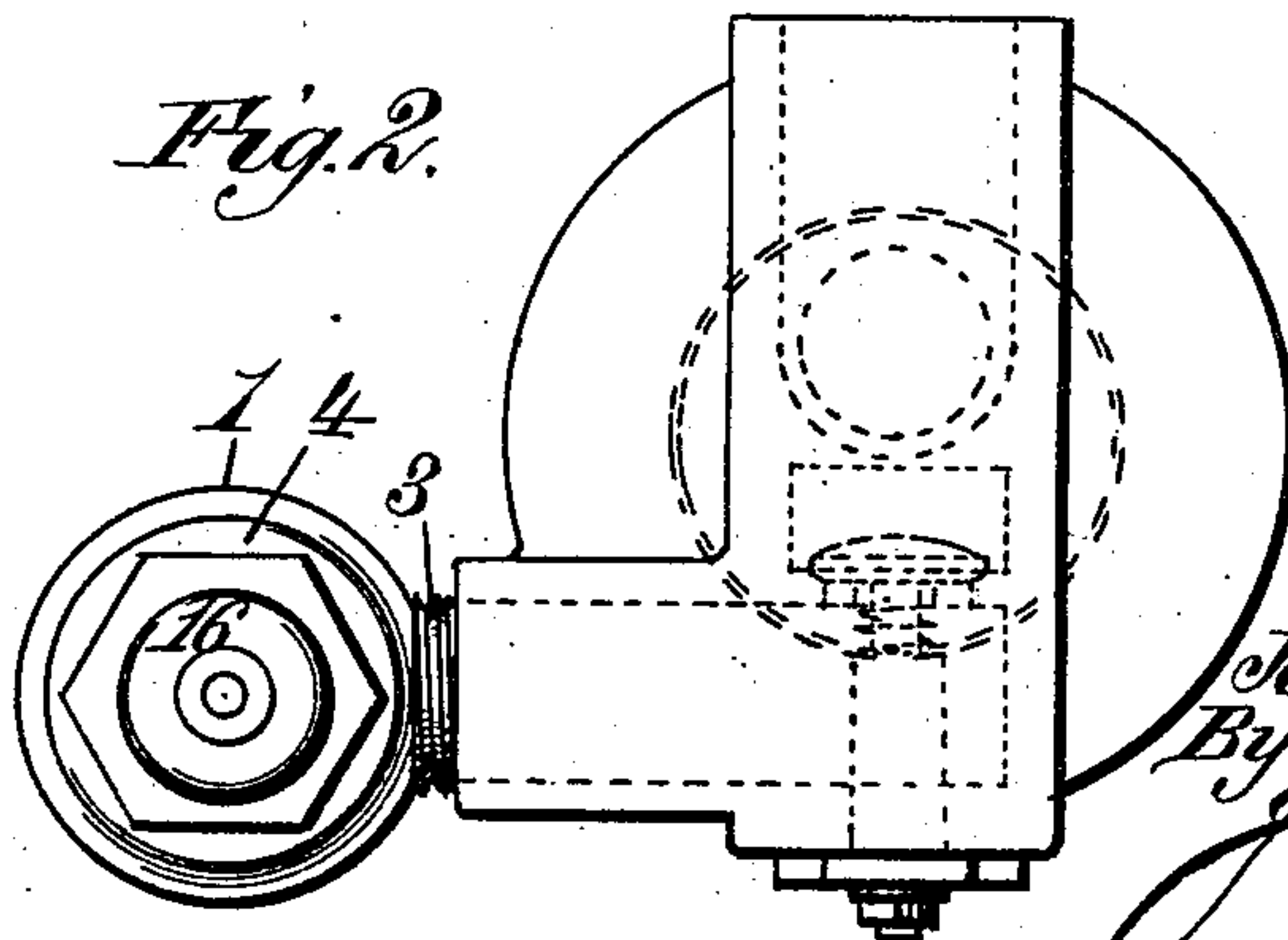


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN C. GEBHART, OF NEW ORLEANS, LOUISIANA, ASSIGNOR TO THE GULF MOTOR WORKS, OF SAME PLACE.

HYDROCARBON VAPORIZER AND MIXER FOR EXPLOSION-ENGINES.

SPECIFICATION forming part of Letters Patent No. 666,623, dated January 22, 1901.

Application filed June 25, 1900. Serial No. 21,514. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. GEBHART, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Hydrocarbon Vaporizers and Mixers for Explosion-Engines, of which the following is a specification.

My invention relates to hydrocarbon vaporizers and mixers for explosion-engines, one object of the same being to provide means whereby a hydrocarbon liquid may be discharged in thin sheets or streams and a current of air caused to pass through the same in its passage to the mixing-chamber, whereby a complete vaporization of said liquid may be effected and a thorough mixing of the same with air may be produced.

A further object of the invention is to provide novel means whereby the proportions of hydrocarbon and air for the mixture may be controlled.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be set forth in the claims.

In the drawings forming part of this specification, Figure 1 is a vertical sectional view of my improved vaporizer and mixer, and Fig. 2 is a plan view showing the application of the same to an explosion-engine.

My improved vaporizing and mixing device is made up of an outer cylindrical shell or casing 1, having an opening 2 on one side, which discharges into the explosion-chamber of a gas-engine of any suitable construction or into the admission-pipe therefor. Around the opening 2 the casing 1 may be formed with a threaded boss or extension 3 for the convenient attachment of the device to the engine. The upper end of the casing 1 is closed by a cap or cover 4, having a tubular extension 5, leading downwardly into the mixing-chamber and provided with a downwardly-facing shoulder 6.

To the bottom of the casing 1 is secured a hollow casting 7, having a cone-shaped web 8 at its upper end, the apex of which lies directly beneath the center of the tubular extension 5. The said web 8 is provided with

a plurality of perforations 9 and constitutes the bottom of the mixing-chamber. Leading to the center or apex of the web 8 is a passage 10, through which a supply of hydrocarbon liquid may pass from any suitable source of supply. The lower end of the casting 7 is formed with a boss 11, on which is adapted to screw a cap 12, having an imperforate bottom 13 and a series of openings 14 in the sides thereof. The openings 14 communicate with the interior of the castings 7 and constitute the passages for the admission of air thereto. The size of these passages may be varied by screwing the cap 12 upon the boss 11 to a greater or less degree. In this way the supply of air may be controlled.

The supply-passage 10 for hydrocarbon liquid is controlled by a needle-valve 15, whose stem extends up through the cap or cover 4, has a threaded connection therewith, and is provided with an operating-wheel 16. The stem of the valve 15 extends centrally of the tubular extension 5 on said cap and is provided with suitable packing 17 between it and said cap.

Normally closing the passages through the perforations 9 in the web 8 is a valve 18, having a cone-shaped cavity in its under side conforming to the shape of the upper surface of the web 8 and adapted to lie in close contact with said web. The said valve is provided with a tubular stem 19, which extends up into the tubular extension 5 of the cap 4 and is guided by said extension. Said stem also surrounds the stem of the valve 15. Said valve 18 is normally held in its lowermost position, covering and closing the passages through the perforations 9 by means of a coil-spring 20, which engages the shoulder 6 on the stem 5 at its upper end and a corresponding shoulder upon the stem 19 of the valve 18 at its lower end.

In operation the needle-valve 15 is opened by turning the handle 16 thereon so as to admit liquid gasoline or other hydrocarbon through the passage 10. At the same time the cap 12 is so adjusted on the boss 11 of the casting 7 as to admit through the openings 14 the proper quantity of air for mixture with

the hydrocarbon liquid. As the casing 1 is connected directly with the explosion-chamber or the admission-port of the gas-engine, one stroke of the piston of said engine will cause a suction in the mixing-chamber of the apparatus, which action will cause the elevation of the valve 18 against the force of the spring 20. When the valve 18 is raised, the liquid hydrocarbon will flow from the discharge end of the passage 10 at the apex of the web 8 down along the upper surface of said web in a thin sheet or stream. As it reaches the perforations 9 in said web, however, it is met by a current of air from the underside of said web, which passes through the thin sheet of liquid, breaking it up into fine particles, thereby vaporizing the same and thoroughly mixing or commingling it with the air. This vapor mixed with air passes into the mixing-chamber around the lower edges of the valve 18 and is drawn into the engine through the passage 2 in the casing 1. As soon as the piston of the engine starts on its return stroke the pressure on the under side of the valve 18 is relieved and the spring 20 returns said valve to its normal position, closing the passages 9 through the web 8.

It will thus be seen that by my apparatus the hydrocarbon in liquid form is first spread out into a thin sheet or stream and afterward a current of atmospheric air is caused to pass through the same, thoroughly breaking it up into fine particles, vaporizing it, and mixing therewith the air which produces the vaporization. It will also be seen that the supply of liquid hydrocarbon, as well as the supply of atmospheric air being mixed therewith, may be independently controlled, so that the proportions of these two ingredients of the final mixture may be accurately regulated.

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

1. A vaporizer and mixer for hydrocarbon-engines, comprising a mixing-chamber, an inclined perforated web or partition therein, means for supplying liquid hydrocarbon to the upper surface of said web, a valve normally closing the passages through the perforations in said web, and means for opening said valve and simultaneously creating a current of air through said perforations.

2. A vaporizer and mixer for hydrocarbon-engines, comprising a mixing-chamber, an inclined perforated web therein, means for supplying liquid hydrocarbon to the upper surface of said web, and an inwardly-opening valve normally closing the passages through the perforations in said web, whereby, upon the reduction of pressure in said mixing-chamber, said valve will be opened and a current of air will be simultaneously produced through said perforations.

3. A vaporizer and mixer for hydrocarbon-

engines, comprising a mixing-chamber communicating with the admission-port of the engine, an inclined perforated web or partition therein, means for supplying liquid hydrocarbon to the upper surface of said web, and a normally-closed valve controlling the passages through the perforations in said web, whereby upon one stroke of the piston in the engine-cylinder, a suction will be created in said mixing-chamber, said valve will be opened and a current of air will be created through said perforations.

4. A vaporizer and mixer for hydrocarbon-engines, comprising a mixing-chamber having an inclined perforated web therein communicating with the atmosphere, means for controlling the supply of air to the under side of said web, means for supplying liquid hydrocarbon to the upper surface of said web, means for controlling the supply of hydrocarbon, a spring-actuated valve normally closing the passages through the perforations in said web and connections between said mixing-chamber and the engine, whereby said valve will be opened and a current of air will be created through the perforations in said web.

5. A vaporizer and mixer for hydrocarbon-engines, consisting of a mixing-chamber communicating with the admission-port of the engine, a cone-shaped web or partition therein provided with a series of perforations, the apex of said web being uppermost, means for supplying air to the under side of said web, means for supplying liquid hydrocarbon to the apex thereof, and a spring-actuated valve having a cone-shaped cavity in its under side normally closing the passages through said perforations, whereby upon the reduction of the pressure in said mixing-chamber, said valve will be opened and a current of air will be simultaneously created through said perforations.

6. A vaporizer and mixer for hydrocarbon-engines, comprising a casing inclosing the mixing-chamber having an opening or port in the side thereof provided with means for connecting the same with the admission-port of the engine, a hollow extension upon the lower end of said casing having a perforated cone-shaped web at its upper end constituting the bottom of the mixing-chamber and having a screw-threaded boss upon its lower end, a cap having perforations in the side thereof screwed upon said boss, a supply-conduit for liquid hydrocarbon leading to the apex of said web, a cap closing the upper end of said casing having a tubular extension thereon leading down into the mixing-chamber and provided with a downwardly-facing shoulder, a needle-valve for controlling the passage through said supply-conduit extending through said cap, a valve for controlling the passages through the perforations in said web having a cavity in its lower end corre-

5 sponding in shape with said cone-shaped web and having a tubular stem which extends within and is guided by the tubular extension on said cap, and a coil-spring engaging the shoulder on said extension for normally maintaining the latter valve in its closing position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN C. GEBHART.

Witnesses:

WM. M. STOCKBRIDGE,
GEO. W. REA.