

L. P. HAWES.

Gas Carbureting Machines.

No. 153,952.

Patented Aug. 11, 1874.

Fig. 1.

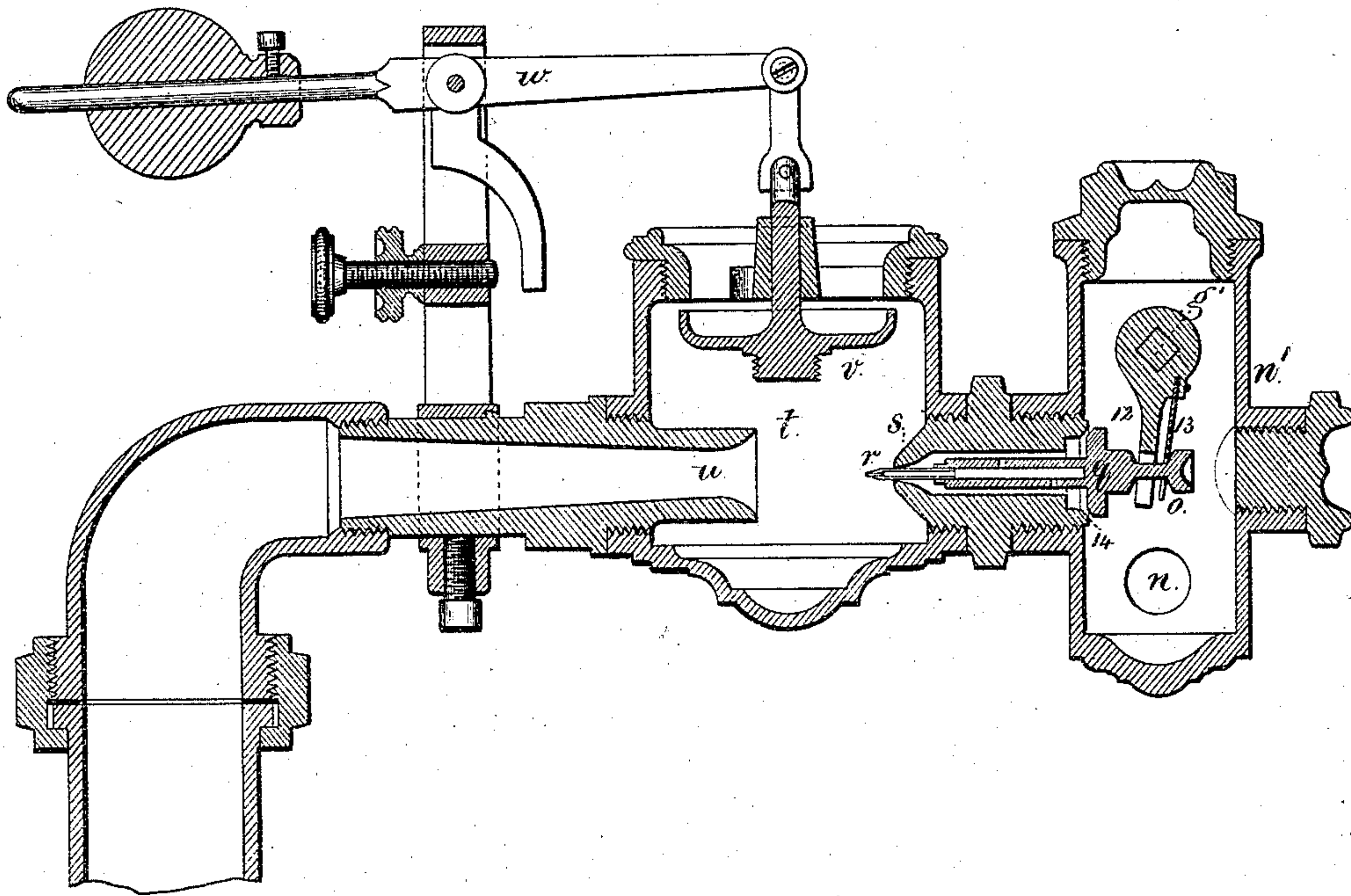
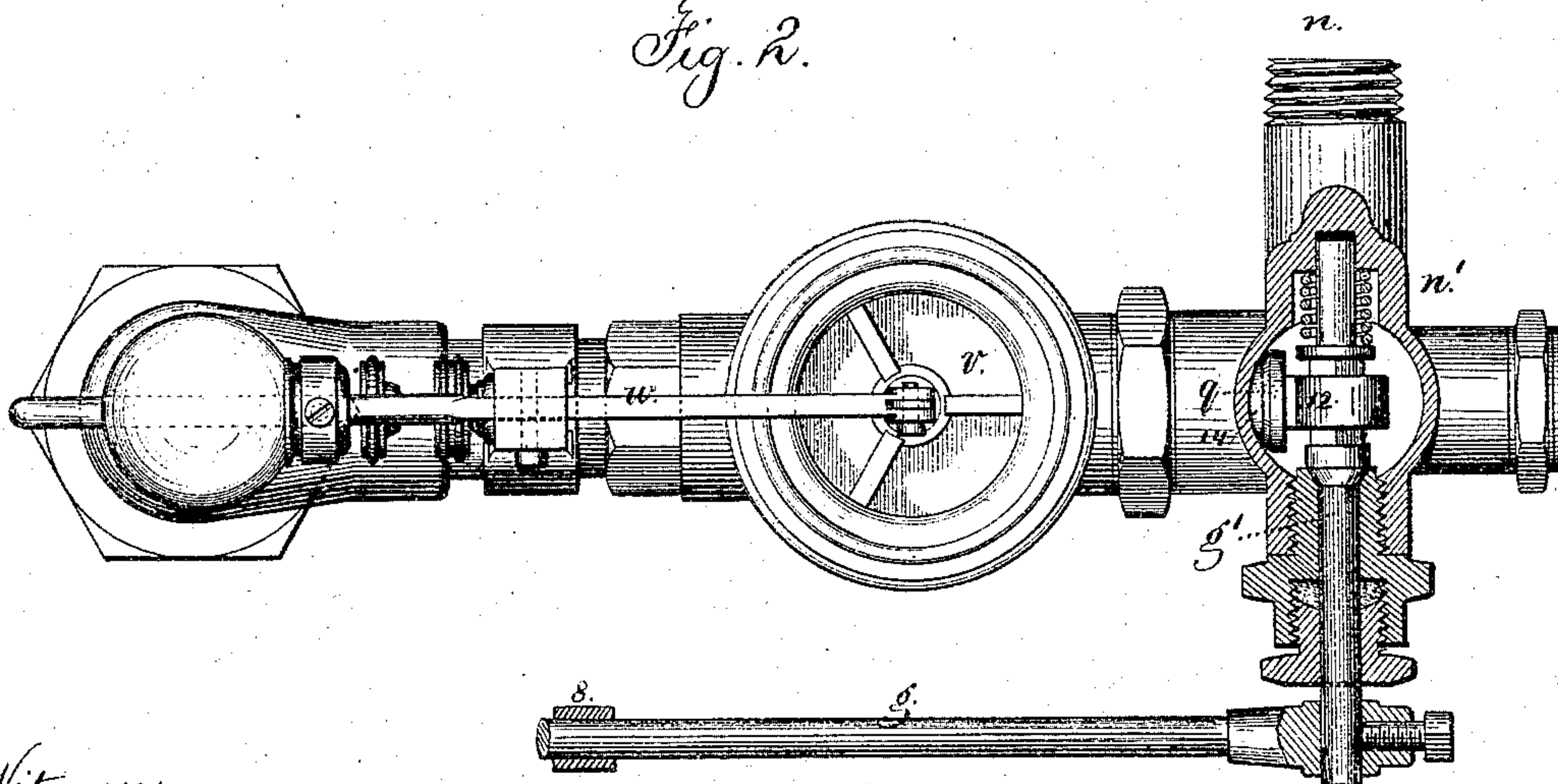


Fig. 2.



Witnesses,

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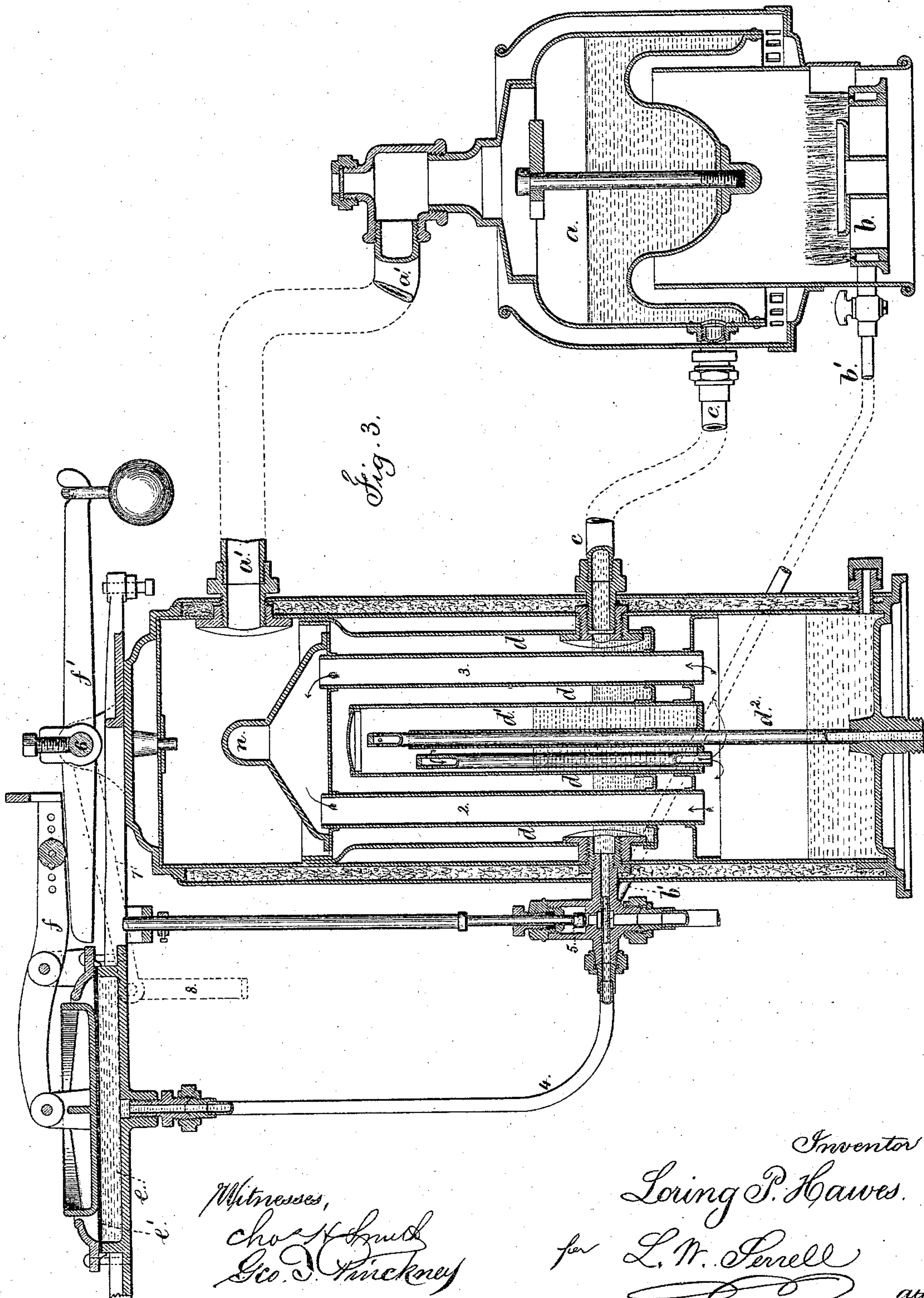
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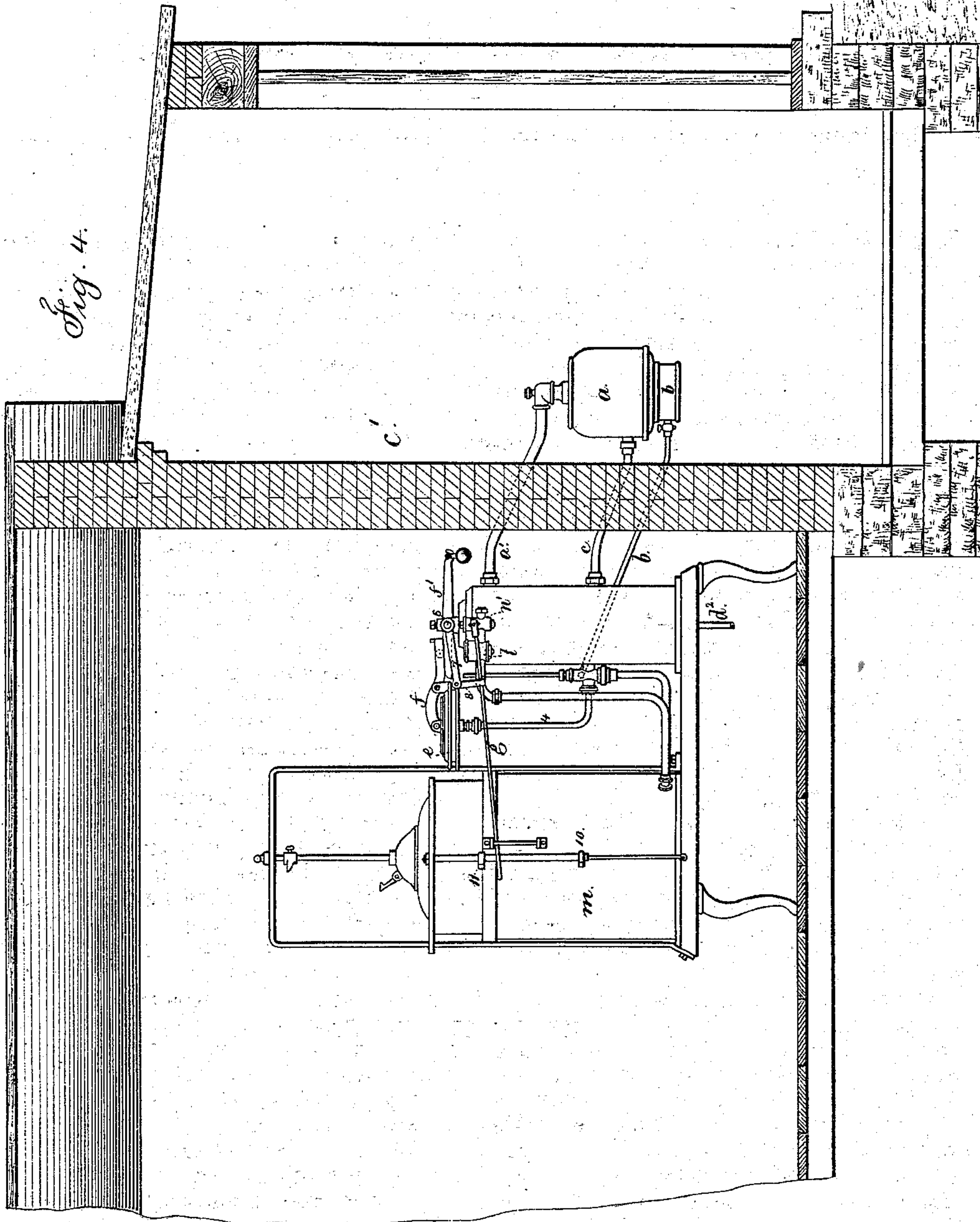
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UNITED STATES PATENT OFFICE.

LORING P. HAWES, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN GAS-CARBURETING MACHINES.

Specification forming part of Letters Patent No. **153,952**, dated August 11, 1874; application filed April 11, 1874.

To all whom it may concern:

Be it known that I, LORING P. HAWES, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Gas-Carbureting Apparatus, of which the following is a specification:

In this apparatus a burner is placed beneath a steam-generator, and supplied with liquid or gaseous hydrocarbon. This generator is in a separate compartment from the gas-holder, and the steam passes through a wall into a vapor-generator, the vapor from which is mixed with air and received into a gas-holder. These parts are only herein described sufficiently to understand my improvement, as the aforesaid parts are not my invention. My improvement relates to a peculiar character of valve and mixing apparatus that causes the gaseous hydrocarbon to commingle with the atmosphere, and regulates the inlet according to the amount required for the burners or the inflated or contracted condition of the gas-holder.

In the drawing, Figure 1 is a vertical section, and Fig. 2 is a plan, partially in section, of the improved valve and apparatus connected therewith. Fig. 3 is a vertical section of the steam-generator and vaporizing-vessel, and Fig. 4 is an elevation of said apparatus in position for use.

The steam-generator *a* is above the burner *b*, that is supplied with liquid or gaseous hydrocarbon through the pipe *b'*, and heats the water in the vessel *a*, and steam passes by the pipe *a'* into the jacket and steamways *d* of the vaporizing-vessel *d'*, and the water of condensation returns by the pipe *c* to the generator *a*. A wall of masonry, *c'*, (see Fig. 4,) intervenes between these parts, the pipes *a'*, *b'*, *c* passing through the same. This is a precaution against fire. In the vaporizing-vessel the liquid hydrocarbon is supplied by a pipe, *d²*, and is vaporized in the vessel *d'*, and the gaseous vapors passing by the pipes 2 and 3 are subjected to sufficient heat to be thoroughly volatilized and in a proper condition for mixing with atmospheric air. A pipe, 4, leads from the water-space of the vaporizer to the chamber *e* and diaphragm *e'*, and when the pressure in the generator *a* and steam-space of the vaporizer rises above a fixed

point the lever *f* acts on the weighted lever *f'*, and closes or partially closes the valve 5 to the burner *b*, and lessens or shuts off the combustible fluid going to the same and lessens the heat. The shaft 6 of this lever *f'* extends outwardly, and has upon it an arm, 7, and loop 8, that passes around the valve-lever *g*, so that that valve-lever *g* is balanced, or nearly so; but if the said lever *f'* is moved by the diaphragm to close or partially close the valve 5, that valve-lever *f'*, being unsupported, opens the valve to allow the escape of the gasoline vapors from the vaporizer, so that they may be mixed with air and pass into the gas-holder *m*. This gas-holder *m* is made in any usual manner, and when it is inflated and rises the tappet 10 acts on the valve-lever *n* to close the gasoline-vapor valve, and when it descends the tappet 11 acts the other way on the lever *g* to open the valve. My improved valve mechanism, as shown in large size in Figs. 1 and 2, is made with a pipe, *n*, leading from the vapor-chamber of the vaporizer, and in the coupling *n'* thereof the rock shaft *g'* of the valve-lever *g* is placed. There is an arm, 12, upon this shaft *g'*, that is forked to sit upon the neck of the valve-stem *o*, and a spring, 13, is applied at the same place. The valve *q* is upon this stem *o*, and resting upon the seat 14, closes the outlet for gasoline vapor entirely. The valve-stem is prolonged as a tubular secondary jet-valve, *r*, within the nozzle *s*.

It will now be evident that when the valve *q* is drawn back partially from its seat the vapors pass by the lateral holes into the jet-tube *r*, and issue in a small jet; but when that secondary jet-tube *r* is drawn back further, the tapering end of *r* opens an annular jet of greater or less capacity, according to the distance that the tube *r* is drawn back, until the vapors issue in full volume, both around the tube *r*, as well as through it. By this means the apparatus is adapted to a small or a large number of lights, and smoking will be prevented, because, when a small number of lights are burning, the vapors issuing from *r* will carry with them the proper proportion of atmospheric air, and when the demand is increased the vapor-jet will be proportionately increased, and take with it the proper volume of air, thus avoiding a difficulty heretofore ex-

perienced in adapting gas-carbureting apparatus to a large as well as a small number of lights. When the valve-lever *g* is fully depressed, or nearly so, the nozzle *s* is fully open, and when it is fully raised the valve *q* is closed, so that no vapors pass out. The spring 13 allows the gas-holder to descend partially before the force is sufficient to open the valve against the pressure of the gasoline vapors, and the volume of gasoline vapor and air being increased when a large number of lights are in use, the gas-holder will rise and fall but seldom, thus lessening the risk of unsteadiness in the flame.

The jet of gasoline vapors, whether small or large, commingles with its proper proportion of atmospheric air as it passes across the chamber *t*, and enters the mixing-tube *u*, leading to the gas-holder, the force of the jet being greater or less, according to the size of the opening formed by drawing back the tubular secondary jet-valve *r*. The inlet air-valve *v* is balanced by the lever *w* and weight, and closes the chamber *t*, when the gasoline-jet is stopped, and it opens to admit whatever quantity of air is required in proportion to the volume of the jet and its action in exhausting the chamber *t* and forcing the atmosphere to enter the commingling-tube with the jet of gasoline vapors.

I am aware that a tapering point has been used as a valve to regulate the quantity of vapors issuing from the jet-tube; but the jet thus produced is hollow, and when a small number of burners are lighted, this jet is not sufficient to draw in the proper volume of air. With my improvement the small jet issues from an unobstructed hole, and this is added to, if required, by a surrounding annular jet.

I do not claim the valve that regulates the discharge of gasoline vapor from a jet-nozzle as in the patent of Strong and Reid, March 2, 1871, No. 112,981. In this patent the valve is solid. My valve is tubular for the purposes before mentioned.

I claim as my invention—

The tubular stem *r* of the valve *q*, acting as a valve within the nozzle *s*, and also forming a jet-tube, in combination with the rock-shaft *g'*, spring and arm 12, and balanced air-inlet valve *v*, substantially as and for the purposes set forth.

Signed by me this 4th day of April, A. D. 1874.

LORING P. HAWES.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.