No. 864,687. PATENTED AUG. 27, 1907.

C. R. RADCLIFFE.

VAPORIZER.

APPLICATION FILED JUNE 5, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

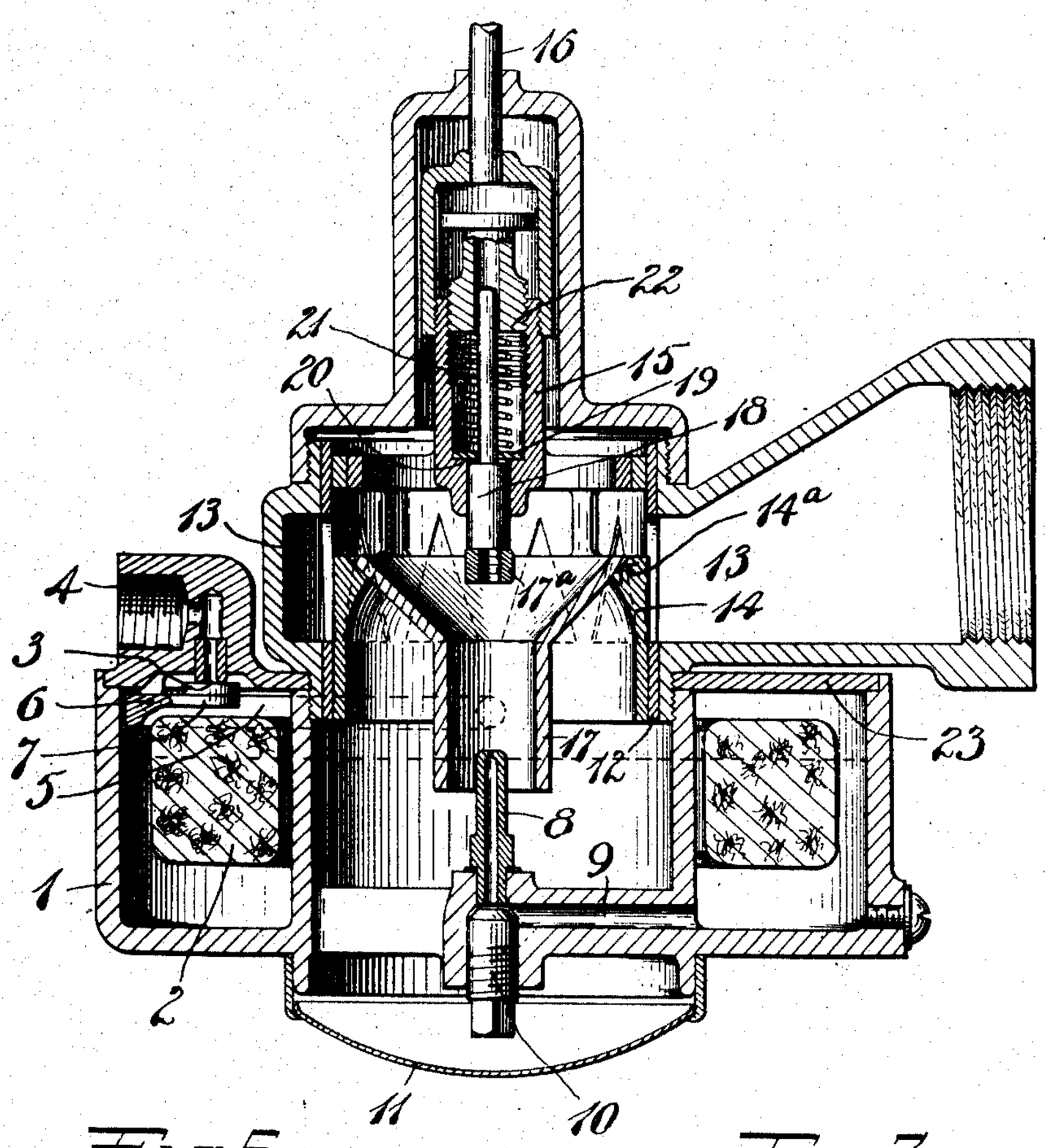


Fig. 6.

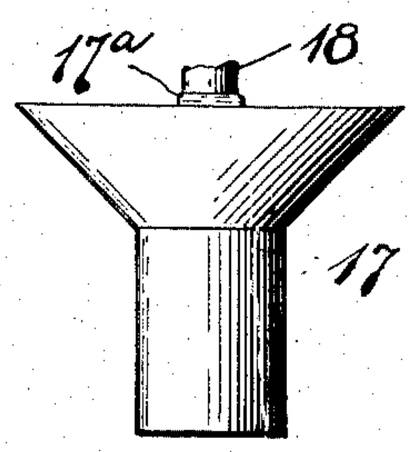
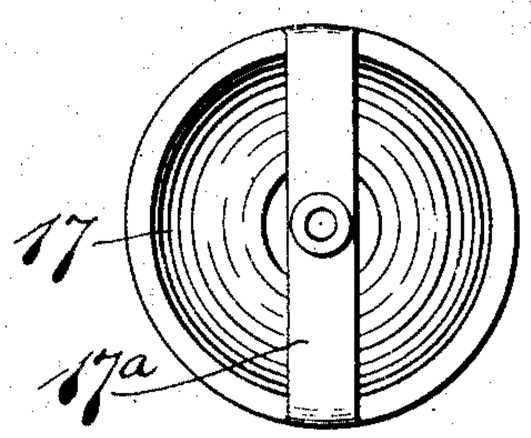


Fig. 7.



Witnesses

Inventor

C. R. RADCLIFFE

By his Attorneys

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2 SHEETS—SHEET 2.

Fig. 2.

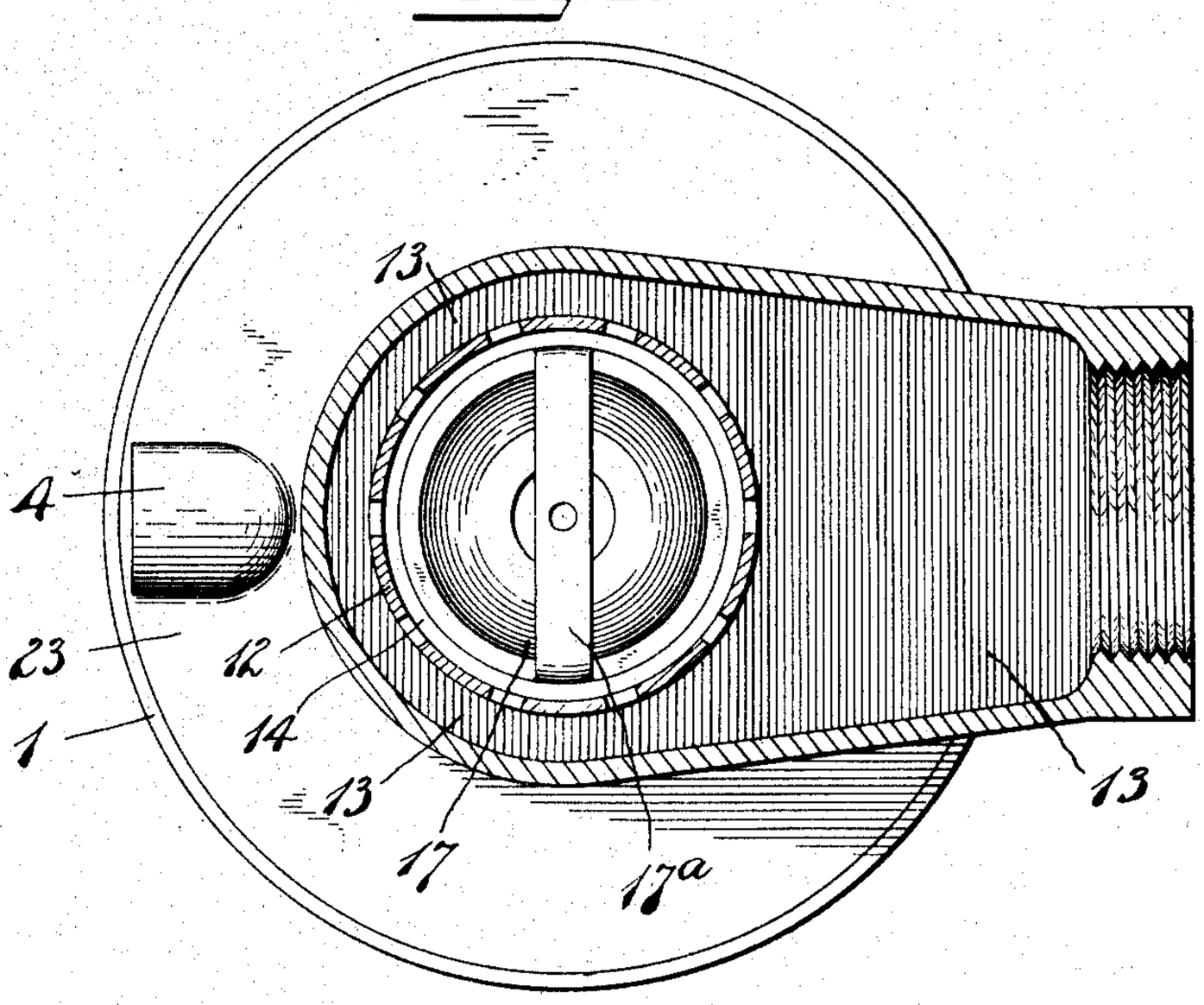


Fig. 3.

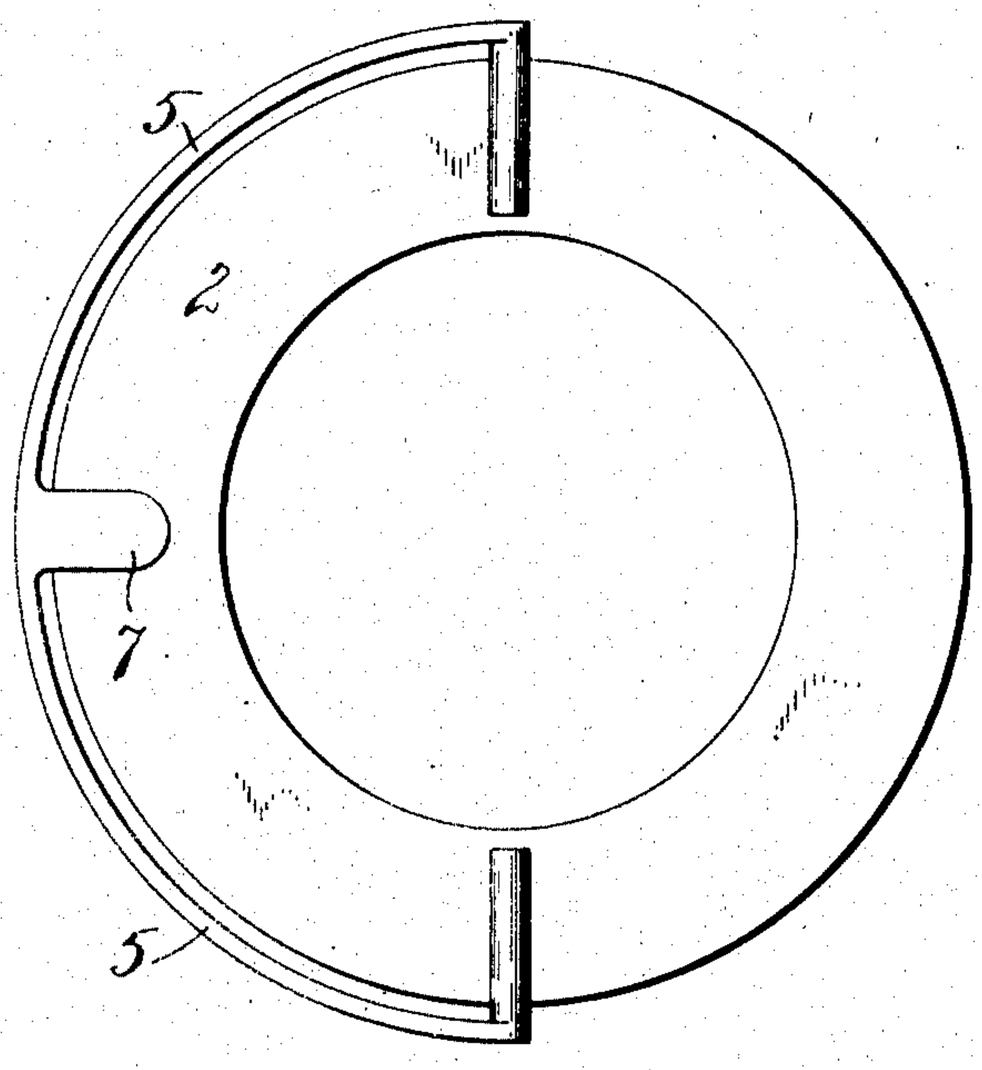


Fig. 4.

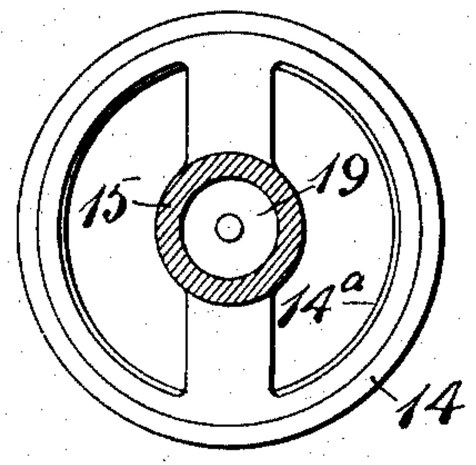
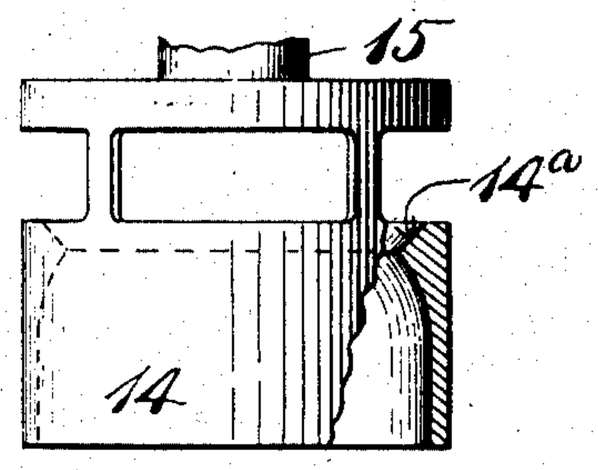


Fig. 5.



Witnesses

Inventor

C. R. RADCLIFFE

By his Attorneys

UNITED STATES PATENT OFFICE.

CARLTON R. RADCLIFFE, OF NEW YORK, N. Y., ASSIGNOR TO INTERNATIONAL PATENT CORPORATION, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF SOUTH DAKOTA.

VAPORIZER.

No. 864,687. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed June 5, 1906. Serial No. 320,288.

To all whom it may concern:

Be it known that I, CARLTON R. RADCLIFFE, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Vaporizers, of which the following is a full, clear, and exact description.

My invention relates to vaporizers for internal combustion engines and the like.

The object is to provide effective means for mixing in uniform proportions a liquid fuel with air, so as to produce an explosive mixture or gas.

In the drawings Figure 1 is a vertical section of the entire apparatus. Fig. 2 is a section taken on a horizontal plane directly above the part 17ª. Fig. 3 is a plan view of a float and valve operating lever. Fig. 4 is a plan view partly in section of certain other details of construction. Fig. 5 is a side elevation partly broken away of the same details. Fig. 6 is a side elevation of another detail. Fig. 7 is a plan view thereof.

1 is a reservoir of annular form for holding liquid fuel. The central upwardly extending passage through said reservoir is utilized as the admission passage for air. 2 is a float located within the reservoir and arranged to operate upon a valve or closer 3 in the fuel inlet pipe 4. 5 is a bifurcated lever or yoke pivoted at 6 and having a short arm 7 arranged to bear under the valve 3. The free ends of the long yoke arms rest upon the float 2 on diametrically opposite sides, so that said float (being of annular form) will not be tilted during operation, but will apply its full force in closing the valve 3. By means of this float the supply valve 3 is closed when the fuel has attained a certain height in the reservoir 1. As the fuel is consumed, the float descends and valve 3 opens, admitting more fuel, and so on.

8 is a fuel nozzle, the discharge end of which projects upwardly in the air admission passage. The upper end of this nozzle stands at approximately the normal level of the fuel in the reservoir 1. The liquid fuel within the reservoir flows to the nozzle through the communicating passage 9.

10 is a valve by which the size of the passage leading to the nozzle 8 may be varied at will.

11 is a screen which may be provided for the air admission passage and below the nozzle 8.

12 is an annular partitioning member having side openings therein, which register with an annular chambered outlet passage 13 leading to an engine, or other destination for the gas. These side openings, as shown in the drawings, are of less cross sectional area as they extend upwardly, the purpose therefor being hereinafter explained.

14 is a vertically movable member which I will term a damper. This damper is guided in the tubular member 12 and suitably connected with a sleeve-like member 15, which in turn is connected with a controlling rod 16. By manually moving the controlling rod 16, the gate 14 exposes more or less of the perforated portion of the partition 12, and by this means the freedom of the passage of gas to the outlet 13 may be varied at will.

17 is a funnel-shaped member, which I will term the controller, the lower or narrow part of which is concentric with the nozzle 8, while the upper or broader part rests upon a seat 14ª of damper 14 when the vaporizer is idle. This controller 17 is suitably connected, as by a cross bar or spider 17ª with a stem 18.

19 is a washer resting upon an internal shouldered portion 20 of sleeve 15.

21 is a spring within sleeve 15, one end of said spring bearing on the washer 20, the other end bearing against an adjustable abutment 22 also carried by the sleeve 15. By moving the abutment 22 up or down, the degree of compression of the spring 21 may be varied at will. The stem 18 is reduced in diameter, and the shoulder formed thereby is located directly under washer 19. When the vaporizer is idle, there is preferably a slight clearance space between said shoulder and washer, as shown in the drawings.

23 is a cover plate for the reservoir 1, and the fuel supply pipe 4 and valve 3 are connected therewith. So also is the lever yoke 5. This cover plate, being of annular form, may be adjusted around at any desired angle to facilitate the ready connection of the fuel supply pipe thereto. While this feature is not of the essence of the invention, it is nevertheless a feature of convenience and advantage.

Operation: When suction occurs in the outlet 13, air will be drawn in through the central screened opening and will rush up through the funnel-shaped controller past the nozzle 8, and a certain amount of fuel will be drawn out, depending upon the volume of air passing said nozzle. This forms a gas which then passes through the openings in partition 12 and into the outlet chamber 13. A small portion of air may be permitted to normally pass through the space between the flared upper portion of the funnel-shaped controller 17 and seat 14ª. This is possible by reason of the slight clearance between the shouldered part of the stem 18 and the washer 19, which permits the inrushing air to readily lift the controller 17. This is of advantage in the easy starting of the engine, although it is not a feature which is of vital importance to the fundamental idea. At a certain speed the parts will continue to assume this position, and the air rushing in will pass mainly through the member 17, drawing from the nozzle a suitable amount of fuel to form an explosive mixture. Should a larger demand for gas be made, and should a larger volume of air be required, this larger volume of air will lift the controller 17 away from seat 14ª, allowing more air to flow in around the controller rather than through it. I have found that under such conditions, were it not that

I permit unmixed air to flow into the mixing chamber above controller 17, that too great a proportion of fuel to air would be drawn into the mixing chamber, and too rich a mixture would result. This, however, is corrected by the additional air which is permitted to enter around controller 17 and past seat 14a. The relative amount of air that can enter by this course is determined automatically by the tension of the spring 21, which may be set by test and experiment in each particular case. When the proper adjustment of said spring has been effected, it will be found that the relative proportions of air and fuel in the gas will be substantially uniform, whether the demand for volume be great or small.

As before described, the stem 16 may be moved to elevate or depress the damper 14 to close or open respectively the outlet passages in the partition 12. By this arrangement, the air and fuel are effectively mixed before passing to the motor, and quick and effective combustion is assured. By this arrangement, the nozzle being centrally located with respect to the fuel chamber, there is no danger of flooding or overflowing the same in the event the apparatus is tilted. By having the mixing chamber central with respect to the chambered outlet 13, it gives a relatively large space in which to effectively mix the air and fuel before it is conveyed to its destination. By having the outlets in the wall of partition 12 extend entirely around the mixing chamber, the gas is delivered in all directions through a multitude of passages, which of itself tends to guarantee the effective admixture of fuel and air, should, for any reason, that admixture be imperfectly effected before that time. By having the cross sectional area of the outlet passages in the partition 12 increased as they descend, the slightest operation of the damper 14 secures a quick and effective response. These and other advantages will be found to result from the use of the apparatus described.

What I claim is:

1. In a vaporizer, an annular reservoir, a fuel discharge nozzle located within the passage through said annular reservoir, a chambered discharge pipe, a perforated partition at the side of the mixing chamber, a controller gate coöperating with said partition to open and close the passages therethrough, a movable funnel-shaped controller coöperating with said gate, having a passage through the same, said passage being located over said nozzle, a portion of said funnel coöperating with said gate to provide a variable air passage around said funnel and between it and said gate, and means to move said funnel toward said gate to reduce the size of the passage between said parts, movement in an opposite direction being produced by the inrush of air.

2. In a vaporizer, a reservoir having an air admission passage leading therethrough, a perforated partition having a mixing chamber between its walls, an annular controllable damper vertically movable in said partition, an automatic controller having a central air passage and coöperating with said damper and extending below said mixing chamber, a nozzle projecting into said passage, the adjacent walls of the damper and controller being spaced apart to form a supplemental air passage around said controller and between it and said damper, said controller operating automatically to vary the size of said supplemental air passage.

3. In a vaporizer, a reservoir having an air admission passage therethrough, a mixing chamber having a chambered discharge outlet, an annular perforated partition between said mixing chamber and discharge passage, an annular damper coöperating with said partition, a controller having a central passage therein movable relatively to said damper and independently thereof, and a fuel-supplied nozzle projecting into said passage.

4. In a vaporizer, a fuel reservoir having an air admission passage therethrough, a mixing chamber having a chambered discharge outlet, an annular perforated partition between said mixing chamber and said chambered outlet, the cross sectional area of the perforations in said partition increasing toward the lower ends of said perforated portion, an annular damper for said perforations, a funnel-shaped member below said mixing chamber and having a passage therein, and a fuel-supplied nozzle projecting into the passage through said funnel-shaped member.

5. In a vaporizer, a fuel reservoir having an air admission passage therethrough, a mixing chamber having a chambered discharge outlet, an annular perforated partition between said mixing chamber and said chambered outlet, the cross sectional area of the perforations in said partition increasing toward the lower ends of said perforated portion, and an annular damper for said perforations.

6. In a vaporizer, a fuel reservoir having an air admission passage therethrough, a mixing chamber having a chambered discharge outlet, an annular perforated partition between said mixing chamber and said chambered outlet, the cross sectional area of the perforations in said partition increasing toward one end of said perforated portion, an annular damper for said perforations, a funnel-shaped member below said mixing chamber and having a passage therein, and a fuel supplied nozzle projecting into the passage through said funnel-shaped member, said funnel-shaped member being movable independently of the damper to provide a supplemental variable air passage around said member.

7. In a vaporizer, a perforated annular member having a mixing chamber within the same and an exhaust chamber around the same, a movable damper adapted to said partition and arranged to open and close the perforations therein, an annular air controller having a central passage therethrough, a nozzle projecting into said passage, said controller being movable with and independently of said damper.

8. In a vaporizer, a perforated annular member having a mixing chamber within the same and an exhaust chamber around the same, a movable damper adapted to said partition and arranged to open and close the perforations therein, an annular air controller having a central passage therethrough, a nozzle projecting into said passage, said controller being movable with and independently of said damper and a spring for normally moving said controller toward said damper.

9. In a vaporizer, a partition or casing having a mixing chamber within the same and perforations or outlet passages therein, a damper arranged to throttle said openings, an air controller arranged to be supported by said damper and a spring coöperating with said controller, a clearance space between said controller and said spring to permit the controller to move freely a limited distance before encountering said spring.

CARLTON R. RADCLIFFE.

Witnesses:
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L. VREELAND.