

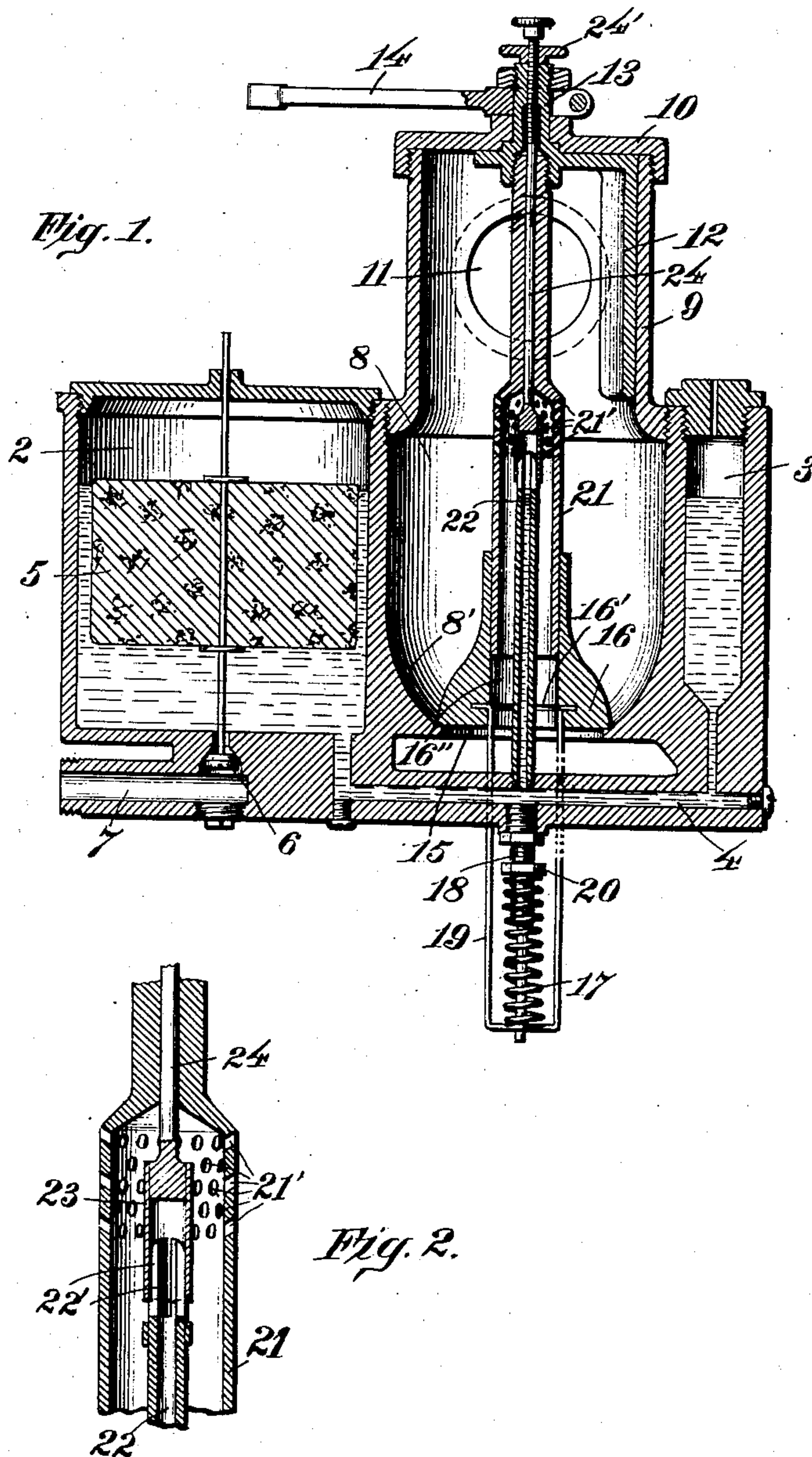
No. 898,361.

PATENTED SEPT. 8, 1908.

F. H. HEITGER.
CARBURETER.

APPLICATION FILED MAR. 31, 1906.

2 SHEETS—SHEET 1.



Witnesses:

H. S. Quast
M. Simon

Inventor
Frank H. Heitger

By
Charles D. H. H. H. H.
Attorney

No. 898,361.

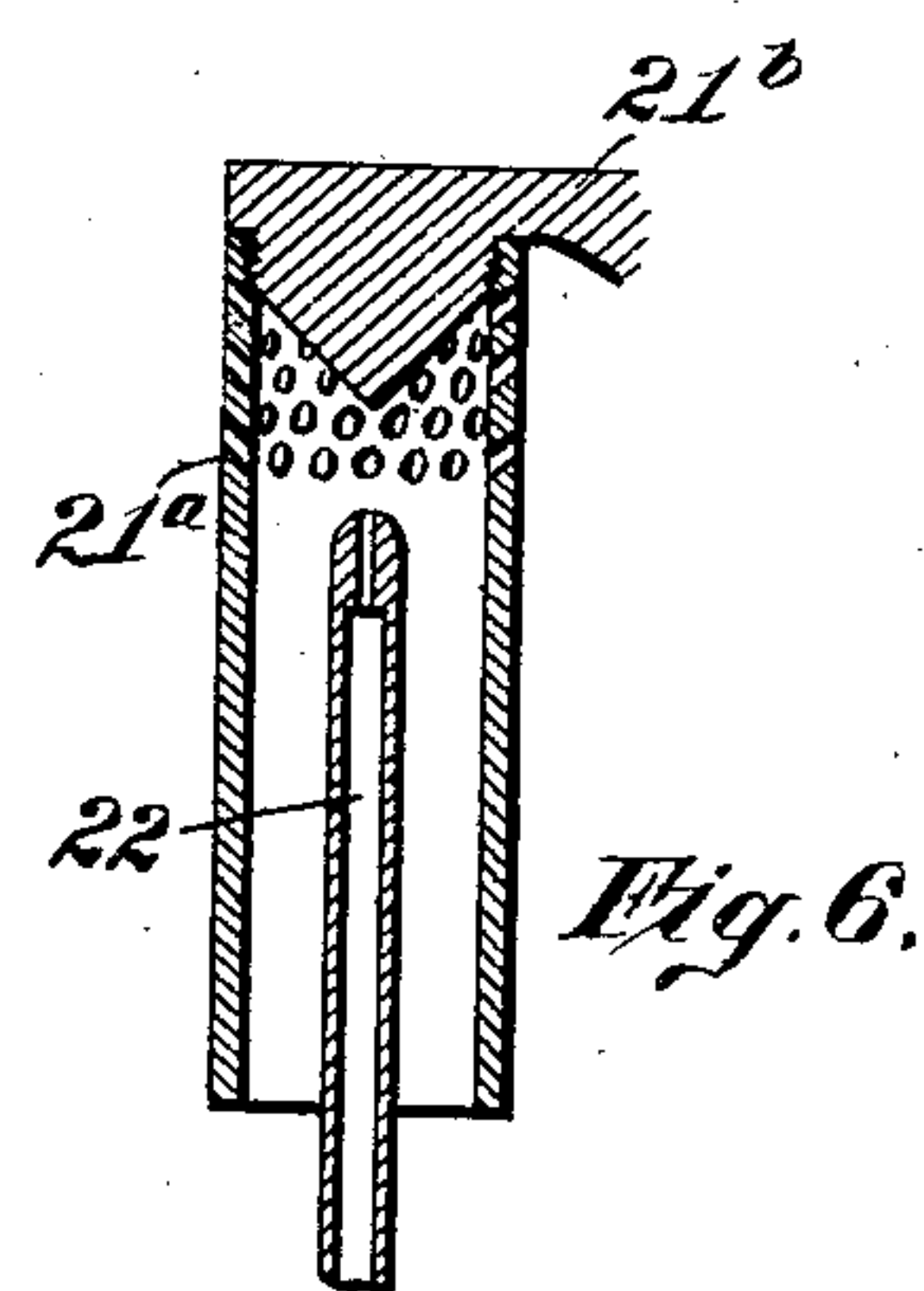
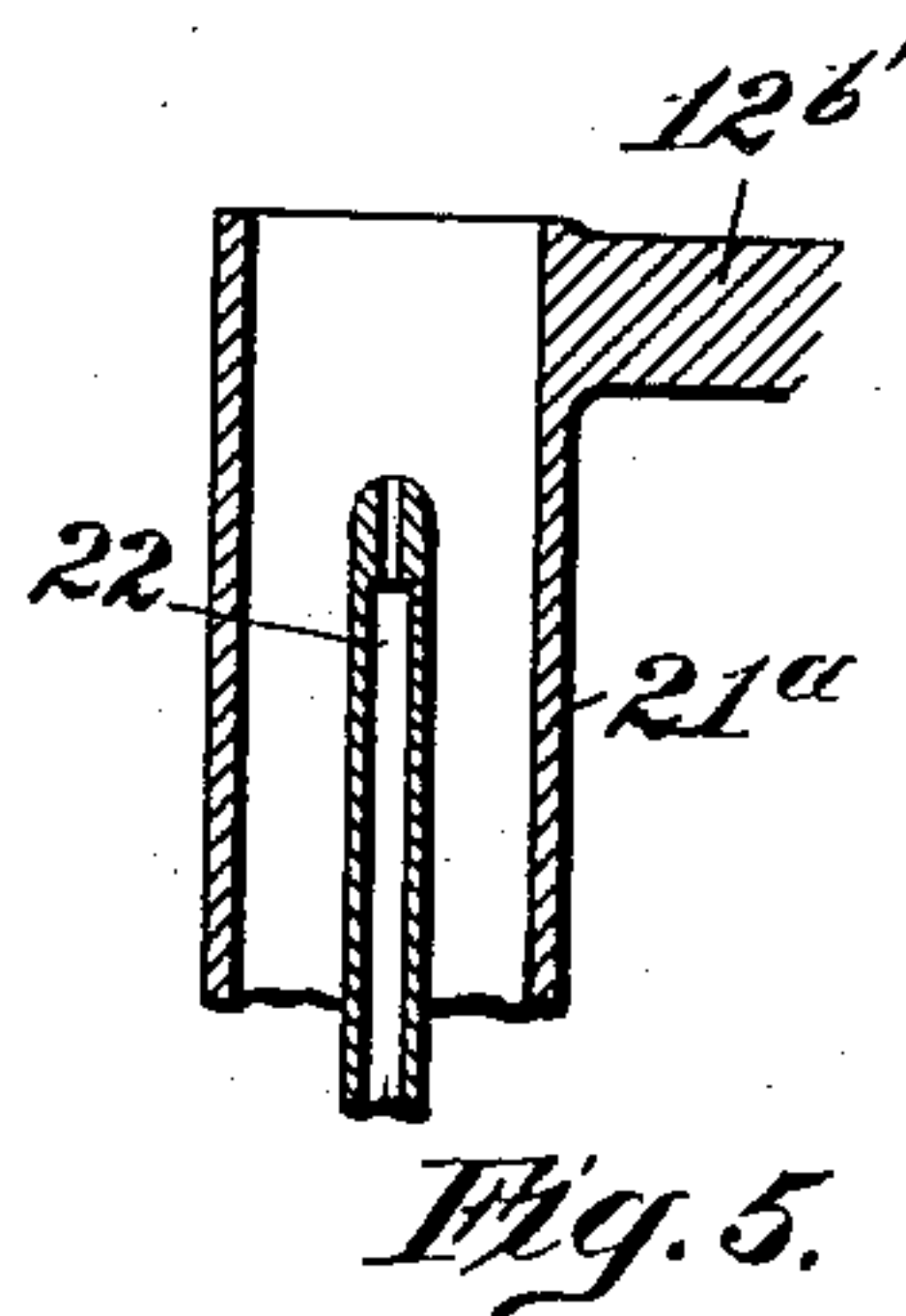
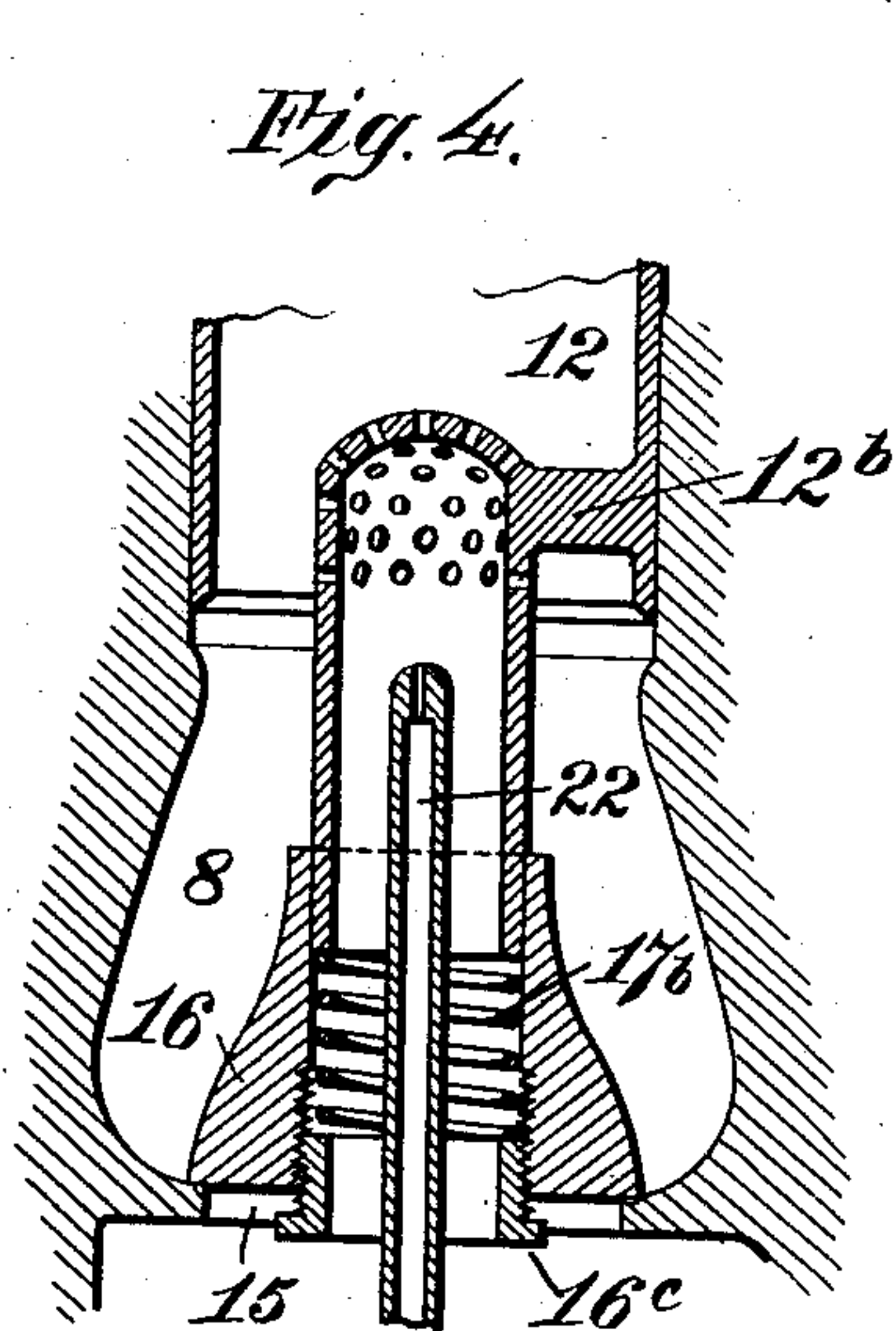
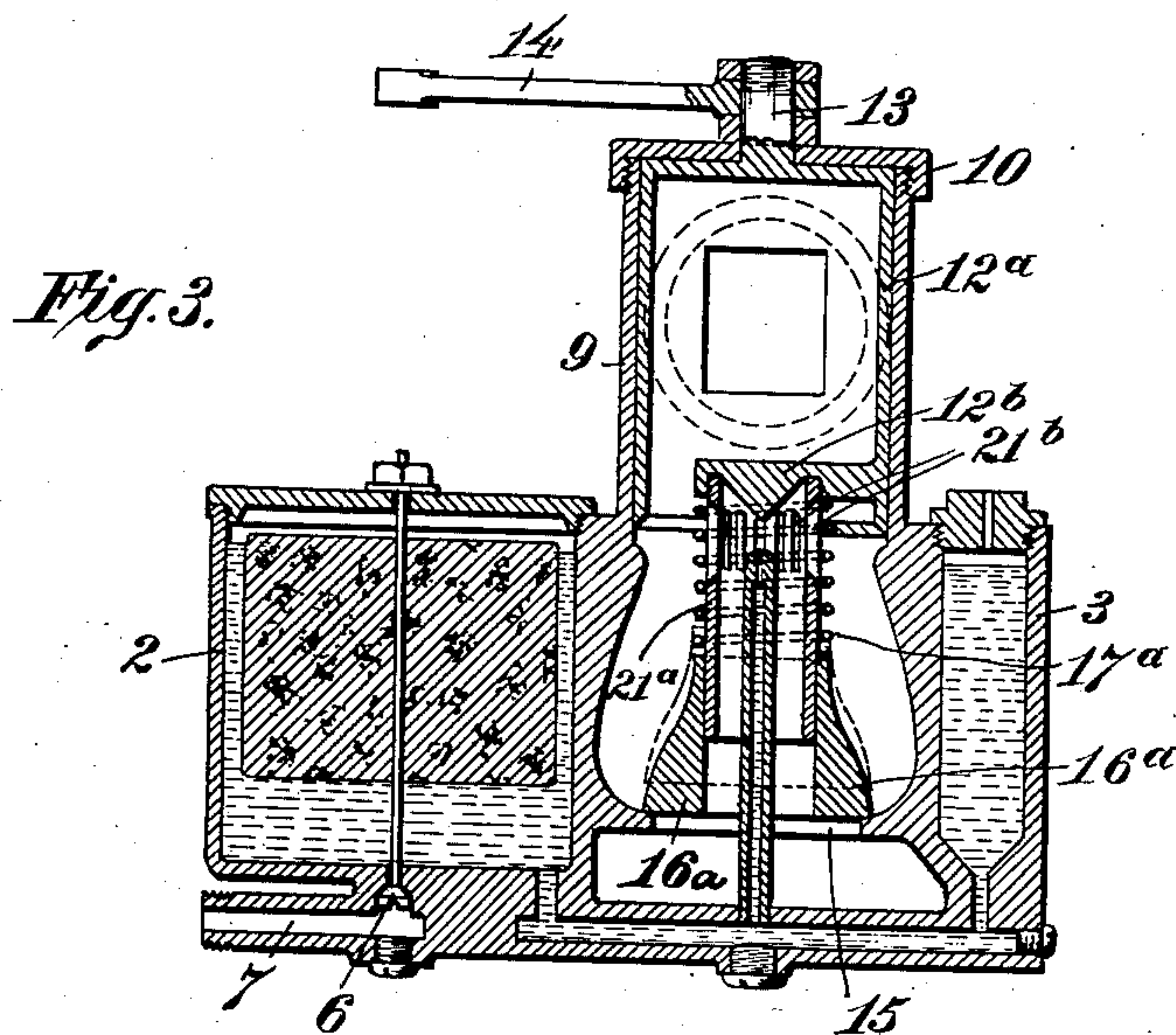
PATENTED SEPT. 8, 1908.

F. H. HEITGER.

CARBURETER.

APPLICATION FILED MAR. 31, 1906.

2 SHEETS—SHEET 2



Witnesses:

A. S. Austin
M. Simon

Inventor
Frank H. Heitger.

By
Charles H. Hawley
Attorney

UNITED STATES PATENT OFFICE.

FRANK H. HEITGER, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO SPEED CHANGING PULLEY COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

CARBURETER.

No. 898,361.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed March 31, 1906. Serial No. 309,195.

To all whom it may concern:

Be it known that I, FRANK H. HEITGER, a citizen of the United States, and a resident of Indianapolis, Marion county, Indiana, have invented a certain new, useful, and Improved Carbureter, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in apparatus for carbureting air for internal combustion engines, and has special reference to improvements in carbureters of that class in which the liquid hydro-carbon, to be vaporized, is held in bulk in a reservoir which forms part of the carbureter, the liquid being drawn into a mixing chamber, also forming part of the carbureter, through a nozzle leading from said reservoir.

The object of my invention is, to provide a carbureter which shall be so constructed as to produce an explosive mixture from gasoline, or the like, and air, of constant and invariable quality at all times following its adjustment, the special purpose of the invention being to provide a carbureter whose product, as to the quality of the mixture, shall be independent of and not altered by changes or variations in the demand of the engine or other consumer.

A further object of the invention is to provide a carbureter of simple and economical construction.

Still another object of the invention is the provision of a carbureter which shall be capable of all necessary adjustment, and which may be taken apart and then re-assembled without change in the relations of the adjustable parts.

My invention consists in a carbureter of the construction and combination of parts hereinafter described and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which

Figure 1 is a vertical section of a carbureter embodying my invention; Fig. 2 is an enlarged detail view of the vaporizer nozzle; Fig. 3 is a sectional view illustrating a modified form of my invention; Fig. 4 is a sectional detail showing the air valve in modified form; and Figs. 5 and 6 are sectional details of other forms of vaporizing tubes.

As shown in the drawings, the body of my carbureter contains two liquid reservoirs, 2 and 3, connected by a duct, 4. A float, 5, is arranged in the reservoir, 2, for operating the liquid supply valve, 6, in the supply duct, 7. Between the two reservoirs is the mixing chamber, 8, whereof 9 is a top extension, closed by a cap, 10. The part, 9, contains the outlet opening, 11, for which, 12, is the throttle valve. The stem, 13, of the throttle valve, is journaled in the cap, 10, and to it I attach the throttle lever, 14. It will be observed that the bottom of the chamber, 8, is elevated above the duct, 4, and is provided with a large air inlet opening, 15. The lower walls, 8', of the chamber, 8, are preferably curved, as shown, to co-act with the air valve, 16, the purpose of this construction being to gradually increase the actual valve opening in proportion to the elevation of the valve as it is raised from its seat. The weight of the valve resists the opening thereof by pressure of air from beneath, but in order that this resistance to the entrance of the air may be adjusted or regulated nicely, I preferably employ a spring, 17, which tends to hold the valve on its seat. This spring may be arranged on a stem, 18, depending from the duct, 4, and is connected with the valve by a light wire yoke, 19, having hooked ends, that are snapped into a groove, 16', in the valve, 16. The pressure of the spring may be adjusted by means of the nut, 20, on the stem, 18. The valve, 16, contains a central bore or tubular passage, 16'', which constitutes a part of the vapor tube that opens into the mixing chamber above the valve. This tube, 21, is preferably formed upon or attached to the swinging throttle valve, 12 and it serves as a guide for the valve, 16. At a point beneath the outlet opening, 11, the tube has a large number of small holes, 21'. The liquid nozzle, 22, projects upward from the duct, 4, wherefrom it is supplied with liquid, and the upper end of the tube terminates within the perforated portion of the vapor tube, 21. It is customary to provide such nozzles with a single jet opening, but I find that this is objectionable as it necessitates the breaking up of a comparatively strong stream of liquid in some manner and thereby delays the moment of the absorption of the liquid by the passing air currents. In lieu thereof I provide the upper end of the tube or nozzle, 22, with two or more longitudinal saw-cuts or fine slits,

22'. These deliver the liquid into the vapor tube in the form of very thin, flat streams or sprays. By this expedient I avoid the objections to the ordinary nozzles, being thus
 5 able to deliver the liquid in such a minutely subdivided state that it is practically a fine spray or vapor, which is quickly carried through the perforations into the mixing chamber by the small body of air moving
 10 through the vapor tube whenever there is a partial vacuum in the large chamber. The narrow slits in the nozzle lend themselves readily to adjustment, a slight reduction or increase in their length having a perceptible
 15 effect in the carburization of the air exhausted from the mixing chamber. The adjusting device which I employ comprises a small cylinder or cap, 23, on the upper end of the tube, the same being operated by a stem, 24,
 20 slidable in the reduced upper part of the member, 21, and threaded in the hub or stem of the throttle valve. A fine thread is used on the stem, 24, and the nicest possible adjustment may be made by turning the stem
 25 to raise or lower the cap, 23. A locking nut, 24', at the upper end of the stem, 24, serves to fasten it after it is adjusted.

The operation of my carbureter is as follows: The float valve operates to maintain
 30 the liquid in the reservoir at a level slightly below the slits in the nozzle. The carbureter is connected with the inlet valve or chest of the engine, and the partial vacuum created in the mixing chamber upon the suction stroke of the engine elevates the liquid
 35 in the nozzle so that the sprays described are formed in the vapor tube. The consequent heavy mixture of vapor and air leaves the tube through the perforations, 21'; meantime, the air-valve, 16, will have been lifted
 40 from its seat a distance proportional to the suction of the engine, and the strong currents of air which pass upward toward the outlet, 11, absorb the vapor as rapidly as it is supplied by the tube. The ultimate mixture is
 45 determined and regulated by adjusting the spring and the nozzle cap to such points as to accurately limit the liquid and the air to the exact quantities required.

50 It will be obvious that numerous modifications of my invention will readily suggest themselves to one skilled in the art and I therefore do not confine the invention to the specific constructions above described.
 55 Among the modifications of structure which may be made are those illustrated in Figs. 3 to 6. In Fig. 3 I have shown a throttle valve in the form of a plug, 12^a, in the upper part of the mixing chamber, and provided with an
 60 inwardly extending arm, 12^b, which supports the vapor tube, 21^a. In this instance the vapor tube is provided with a plurality of slots, 21^b, and the arm, 12^b has an inverted cone within the tube to break up the single jet of
 65 liquid provided by the nozzle here shown.

The valve, 16^a, has a spring, 17^a, but is non-adjustable. In other respects the carbureter of Fig. 3 is like that of Fig. 1. If desired, the tube, 21^a, may be supported by an arm, 12^{b'} and yet be open at the top, as shown in Fig. 70
 5. Fig. 6 differs from Fig. 3 in the substitution of round perforations for the slots, 21^b. Fig. 4 illustrates a structure like unto Fig. 3, but in which the perforated top of the vapor tube is domed. It is obvious that the ad- 75
 justable nozzle of Fig. 1 may be substituted for the nozzles illustrated in Figs. 3 to 6. The air valve of Fig. 4 is regulable and if desired, may be substituted for the valve shown in Fig. 1. In this case the spring, 17^b, is ar- 80
 ranged within the valve and is adjusted by means of a threaded sleeve, 16^c.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a device of the class described, a mixing chamber having an air inlet opening at the bottom and an outlet at the top, in combination with a liquid reservoir adjacent to said chamber and having a duct extending 85
 beneath the opening in the latter, a nozzle rising into said chamber from said duct, an air valve concentric with said nozzle for regulating the admission of air at the inlet opening, and a vapor tube within said chamber 90
 and forming a guide for said valve, substantially as described.
2. In a device of the class described, a mixing chamber having an air inlet opening at the bottom and an outlet at the top, in combination with a tubular air valve within said 100
 chamber to close said inlet opening, a vapor tube within said chamber whereby said valve is guided, means within said chamber supporting said tube, and a liquid nozzle rising 105
 through said valve and within said tube, substantially as described.
3. In a device of the class described, a mixing chamber having an air inlet at the bottom and an outlet at the top, in combination 110
 with a vapor tube hung within said chamber and having perforations below said outlet, and a spring-pressed air valve guided by said tube, substantially as described.
4. In a device of the class described, a mix- 115
 ing chamber having an inlet at the bottom and an outlet at the top, in combination with a throttle valve arranged in the upper part of said chamber and having a stem or hub concentric therewith, means for operating said 120
 valve, a vapor tube concentric with the inlet opening and supported by said throttle valve, a nozzle within said tube, and an air admission valve guided by said tube, substantially 125
 as described.
5. In a device of the class described, a mixing chamber having an inlet at the bottom and an outlet at the top, in combination with a suitable liquid reservoir, a float valve in the latter, an adjustable air valve at the inlet of 130

said chamber for automatically controlling the admission of air thereto, a nozzle connected with said reservoir and rising centrally within said valve, said nozzle having a plurality of narrow slits at its upper end, and a vertically adjustable cap on said upper end for varying the length of said slits, substantially as described.

6. A nozzle for carbureters comprising a nozzle proper having a plurality of slits in its upper end, in combination with a closely fitting cap on said upper end, and means for adjusting the same vertically thereon, substantially as described.

7. In a device of the class described a mixing chamber, having an inlet at the bottom and an outlet at the top, in combination with an intermediately perforated vapor tube depending from the top of said chamber, a vertically adjustable stem in said tube, a cap or cylinder upon the lower end of said stem adjacent to the perforations in said tube, a nozzle rising within said chamber and having a slitted upper end within said cap, and an automatic air valve guided on the lower end of said tube, for controlling the admission of air at said inlet, substantially as described.

8. In a device of the class described, a mixing chamber having curved lower walls and provided with an air inlet in its bottom and an outlet in its top, in combination with a liquid nozzle rising within said chamber, a vapor tube surrounding the same, and an air

valve seated at said inlet and vertically movable on said tube, substantially as described.

9. In a device of the class described, a mixing chamber, having an inlet at the bottom, an inwardly opening air valve for closing said inlet and provided with a central duct or passage, a liquid nozzle rising through said passage, a yoke depending from said valve, and a spring engaged therewith, substantially as described.

10. In a device of the class described, a mixing chamber having an air inlet opening at the bottom and an outlet at the top, in combination with a liquid reservoir adjacent to said chamber and having a duct extending beneath the opening in the latter, a nozzle rising into said chamber from said duct, an air valve concentric with said nozzle for regulating the admission of air to the inlet opening, and a tubular member within said chamber, said tubular member forming a guide for said air valve, and together with the bore of said valve forming a vapor tube; substantially as described.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses, this 17 day of March, 1906.

FRANK H. HEITGER.

Witnesses:

CHARLES GILBERT HAWLEY,
CHAS. T. MURRAY.