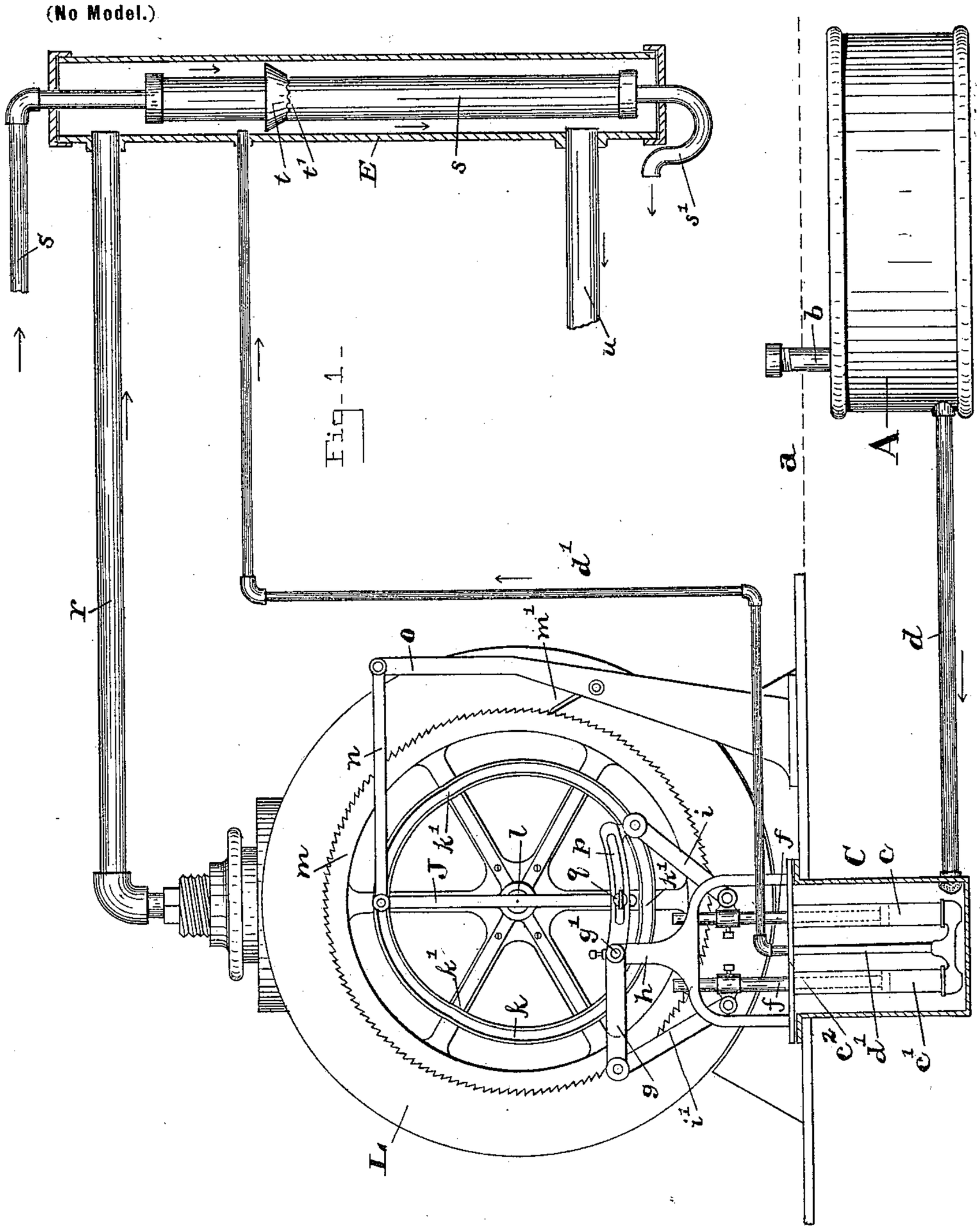
No. 622,008. Patented Mar. 28, 1899.

# C. M. KEMP.

## CARBURETER.

(Application filed Sept. 24, 1897.)

(No Model.)



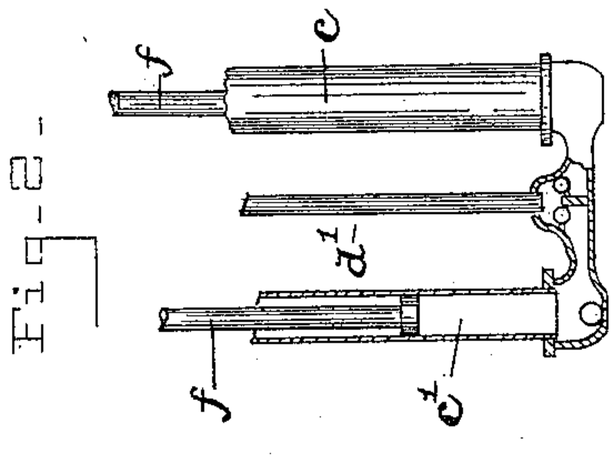




Fig. 2.

WITNESSES -

Charles B. Mann Jr.

Chapin A. Ferguson.

INVENTOR -

Clarence M. Kemp.

By Chas B. Mann

ATTORNEY -

# UNITED STATES PATENT OFFICE.

CLARENCE M. KEMP, OF BALTIMORE, MARYLAND.

## CARBURETER.

SPECIFICATION forming part of Letters Patent No. 622,008, dated March 28, 1899.

Application filed September 24, 1897. Serial No. 652,926. (No model.)

*To all whom it may concern:*

Be it known that I, CLARENCE M. KEMP, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Air-Gas Machines, of which the following is a specification.

This invention relates to an improved apparatus for combining atmospheric air and the vapor of a hydrocarbon liquid in definite or predetermined proportions in order to produce a gas of uniform quality.

The object of the invention is to provide an apparatus for making gas from hydrocarbon liquids that will satisfy the requirements of fire-insurance companies and which therefore may be used on insured premises.

It is essential in such apparatus that the storage or supply of gasolene shall be kept in a closed tank underground, where the temperature is uniformly cool, that in feeding measured quantities of gasolene from the said supply-tank to the air-mixer there shall be no exposure of the gasolene to the atmosphere and no opportunity for the volatilization of the gasolene, and that measured gasolene in liquid form and measured air in definite proportions shall be delivered to the mixer under conditions insuring absolute safety from fire or explosion. To accomplish these ends, I have provided the apparatus which is the subject of the present invention.

This invention is illustrated in the accompanying drawings, in which—

Figure 1 shows an elevation, partly in side view and partly in section, of the improved air-gas apparatus. Fig. 2 is a detail view showing the pump.

The letter A designates a gasolene-storage tank underground, the line *a* denoting the ground-surface. It is not convenient in the drawings to illustrate on one sheet the entire apparatus and have each part on a sufficiently large scale and at the same time show the gasolene-storage tank located as remotely from the other parts as it would be in practice.

The gasolene-tank A is to be underground, where the temperature will be uniformly cool. A pipe *b*, attached to the tank, will extend upward to a point above the ground and will serve for replenishing the tank with liquid gasolene. A small box or pipe C to hold but a small amount of gasolene and which acts as an intermediate supply-tank is sunk in the ground on a level with the main tank and is connected through a pipe D with the gasolene-storage tank A, at or near the bottom of same, and by gravity or natural flow maintains the gasolene in the box C at same level it has in the storage-tank A. A double-cylindered gasolene-pump *c c'* is placed in the box C. This pump is secured to the cap-plate $c^2$, which is attached to and covers the top of the box or tank C. By this construction the underground tank C need not be removed whenever it is necessary to remove the pump. All that is required is to detach the cap-plate, the removal of which carries with it the pump-cylinder. A small pipe *d'* leads from the gasolene-pump to the mixer or carbureter E. The construction is such that the pump *c c'* will force the liquid gasolene to the carbureter without any exposure of the gasolene to the atmosphere in its flow from the tank A to the carbureter and without possibility of the gasolene being volatilized in transition, and the strokes of the pump-pistons will also effect the measurement of the gasolene. The fluid-pump is, as will be apparent, submerged within the tank and forces the oil or gasolene to the carbureter without any chance for the escape of air laden with gasolene, as is the case where the oil is forced from the supply-tank by forcing into said tank air under sufficient pressure to displace the liquid. The strokes of the pump-pistons are governed by a suitable air-meter L, so that cooled liquid gasolene in small quantities and in definite proportions to the amount of measured air is lifted from the underground gasolene-tank C and without exposure is delivered to the mixing-chamber or carbureter.

Each of the two cylinders *c c'* of the pump has a piston and rod *f*. A rocking arm *g* is pivoted at *g'* on a standard *h*, which rests on the cap-plate $c^2$, and two link-bars *i i'* are joined one at each end of said rocking arm and connect the latter with each of said pump piston-rods. The rocking arm *g* is operated by a rod J, which connects with a cam-track *k*, revolved by the shaft *l* of the air-meter L.

The air-meter L is of well-known construc-

tion and the movable parts revolve in a case. The revoluble shaft *l* at one end of the case projects to the exterior, and mounted thereon is a ratchet-wheel *m*. A pawl *m'* engages said ratchet-wheel. An endless grooved cam-track *k* is on said shaft or secured to the ratchet-wheel. This cam-track has several inward depressions, (designated *k'*.) The pump-operating rod J, which is attached by its lower end to the rocking arm *g*, has at its upper end a small roller which takes in the endless groove of the cam *k*. This rod J is maintained in an upright position by a bar *n*, jointed to the upper end of the rod and connecting it with a fixed standard *o*. It will now be seen that the revolutions of the air-meter shaft *l* and endless cam-track will cause the inward depressions *k'* on said cam-track to act on the roller of the pump-rod J and give it a slight up-and-down movement, thereby causing the arm *g* to rock and the pump-pistons *f* to reciprocate. The stroke of the pistons is slight and the movement slow.

Provision is made for regulating the stroke of the pistons by adjusting the extent of the movement of the rocking arm *g*, and consists of a longitudinal slot *p* in one end of the arm, and a set-screw *q*, connecting the lower end of the rod J in said slot at any desired part. It will be seen the set-screw *q* permits the lower end of the rod J to be shifted along the slot, and thereby alter the extent of the rocking movement of said arm *g*, and consequently the length of the stroke of the pump-pistons.

The carbureter E comprises a vertical cylinder having closed ends and through the wall of which enters the end of the small gasolene-pipe *d'*. A larger pipe *r* leads from the air-meter L and also opens into said cylinder. A steam heating-pipe *s* enters the upper end of the vertical cylinder and extends downward through it and comes out at the lower end and then curves up at *s'* to form a water-trap. I provide said steam-pipe *s* within the mixing-chamber or vertical cylinder E with an enlarged portion *s*, so that the heating and gasifying area of the steam-pipe is materially increased. Within the cylinder and surrounding the steam-pipe *s* is a saucer or ring-shaped cup *t*, large enough to fill the cross-section of the cylinder, and thereby act as a diaphragm or division. This cup is located just below the open end of the gasolene-pipe *d'*, so that the liquid gasolene discharging from said pipe will drip into said ring-shaped cup. The cup has holes or is notched at *t'*, where it surrounds the steam-pipe, and the liquid gasolene passes in small streams downward through the holes. The measured air which enters from pipe *r* must also pass downward through the small holes *t'*, and thus while the heat volatilizes the gasolene the measured air mixes readily with the vapor and the blending is effected in the lower chamber part of the vertical cylinder E.

The pipe *u*, leading from the mixer or carbureter, conducts the gas to a suitable holder (not shown) or directly to the burners.

Having thus described my invention, what I claim is—

1. The combination of a gasolene main supply-tank placed underground where its contents will be kept uniformly cool; a small tank, C, also underground and on a level with the main tank; a pipe connecting the main tank and small tank and supplying the latter with gasolene by gravity or natural flow; an air-meter; a gasolene-pump attached to said small tank and having the stroke of its piston governed by the said air-meter; a mixer or carbureter; a pipe leading from the air-meter to said mixer; and a pipe leading from the gasolene-pump to the said mixer.

2. The combination of a gasolene-supply tank placed underground where its contents will be kept uniformly cool; a carbureter; an air-meter having a revoluble shaft; an endless grooved cam-track carried by said shaft; a small tank, C, also underground and placed intermediate between the main tank and carbureter; a gasolene-pump submerged in said small tank; a pivoted arm connected with the piston of said pump; and a rod connecting from said endless cam-track on the meter-shaft to the said pivoted arm.

3. The combination of a gasolene-supply tank placed underground where its contents will be kept uniformly cool; an air-meter having a revoluble shaft; a double-cylindered gasolene-pump also underground and connected with said underground supply-tank; a rocking arm having a longitudinal slot and two links, one at each end connected with a different one of the pump-pistons; and a connection from the said slot in the rocking arm to the revoluble shaft of the air-meter.

4. The combination of a gasolene main supply-tank placed underground where its contents will be kept uniformly cool; a carbureter; an air-meter; a small tank, C, also underground and placed intermediate between the main tank and carbureter; a detachable cap-plate covering the top of the small tank; a pump-cylinder secured to the said cap-plate and projecting down into the small tank; and a piston in the pump-cylinder operated by the said air-meter.

5. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and carbureting-chamber and in communication therewith, a pump in said intermediate chamber, an air-meter in communication with said carbureting-chamber, and connections between said air-meter and said pump to operate the latter.

6. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and carbureting-chamber and in communication therewith, a double-cylindered pump in said intermediate tank adapted

to deliver a determined amount of gasolene to the carbureting-chamber, an air-meter in communication with said carbureting-chamber, and adjustable connections between said meter and pump whereby the latter may be operated and its throw varied as desired.

7. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and said carbureting-chamber and communicating therewith, a pump in said second tank, a rotary air-meter in communication with said carbureting-chamber, connections between said air-meter shaft and said pump to operate the latter, and means for locking said air-meter and pump-operating mechanism against backward movement.

8. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and said carbureting-chamber, a double-cylindered pump in said intermediate tank, a rocking arm to drive the pump-pistons, a rotary air-meter in communication with said carbureting-chamber, a cam carried by the shaft of said meter, an adjustable connection between said cam and rocking arm, by means of which the latter is actuated and the pump is driven, and means to lock said meter-shaft and pump-operating mechanism against backward movement.

9. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and said carbureting-chamber, a double-cylindered pump in said intermediate tank, a rocking arm to drive the pump-pistons, a rotary air-meter in communication with said carbureting-chamber, a cam carried by the shaft of said meter, an adjustable connection between said cam and rocking arm by means of which the latter is actuated and the pump is driven, a ratchet-wheel on said meter-shaft, and a locking-pawl engaging said ratchet-wheel so as to lock said meter-shaft and pump-operating mechanism against backward movement.

10. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and carbureting-chamber and in communication therewith, a pump in said intermediate tank adapted to deliver a determined quantity of gasolene to the mixing-chamber, means for operating said pump, and means for supplying air to said mixing-chamber.

11. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and carbureting-chamber and in communication therewith, a pump in said intermediate tank, an air-meter in communication with said carbureting-chamber, means for operating said air-meter, and connections between said air-meter and pump to actuate the latter whereby determinate and proportionate quantities of air and gasolene will be delivered to the carbureting-chamber.

12. In a carbureter, the combination with a main supply-tank, of a mixing or carbureting chamber, a second tank intermediate said main tank and carbureting-chamber and in communication therewith, a pump in said intermediate tank, a rotary air-meter in communication with said carbureting-chamber, means for operating said air-meter, and adjustable connections between said air-meter and pump to actuate the latter, whereby determinate and proportionate quantities of air and gasolene will be delivered to the carbureting-chamber.

13. In a carbureter, the combination with a closed supply-tank, of a pump submerged within said tank, a piston-rod for said pump extending outside of said closed supply-tank, a carbureting-chamber in communication with said supply-tank, an air-meter to supply air to said carbureting-chamber, means for driving said air-meter, and connections between the air-meter and the said piston-rod to operate the pump.

14. In a carbureter, the combination with a carbureting or mixing chamber, of means for supplying oil and air to said chamber, a steam-pipe passing through said chamber, and a drip-cup or spraying-saucer carried by said steam-pipe and located below the entrance-ports of the oil and air supply pipe.

15. In a carbureter, the combination with a carbureting or mixing chamber, of means for supplying oil and air to said chamber, a steam-pipe passing through said carbureting or mixing chamber, and a drip-cup or spraying-saucer carried by said steam-pipe, said drip-cup being of such diameter as to fill the carbureting-chamber and being located below the entrance-ports of the oil and air inlets.

16. In a carbureter, the combination with a carbureting or mixing chamber, of means for supplying oil and air to said mixing-chamber, a steam-pipe passing through said mixing-chamber, said steam-pipe having an enlarged portion within said chamber to increase the heating area of the pipe and a spraying-saucer or drip-cup carried by said enlarged portion.

17. In a carbureter, the combination with a carbureting or mixing chamber, of means for supplying oil and air to said mixing-chamber, and a steam-pipe passing through said mixing-chamber, said steam-pipe having an enlarged portion within said chamber to increase the heating area.

In testimony whereof I affix my signature in the presence of two witnesses.

CLARENCE M. KEMP.

Witnesses:

CHAPIN A. FERGUSON,

CHARLES B. MANN, Jr.