(No Model.) 3 Sheets—Sheet 1.

P. H. IRGENS.

APPARATUS FOR CARBURETING AIR.

No. 493,165. Patented Mar. 7, 1893.

Fig. 1.

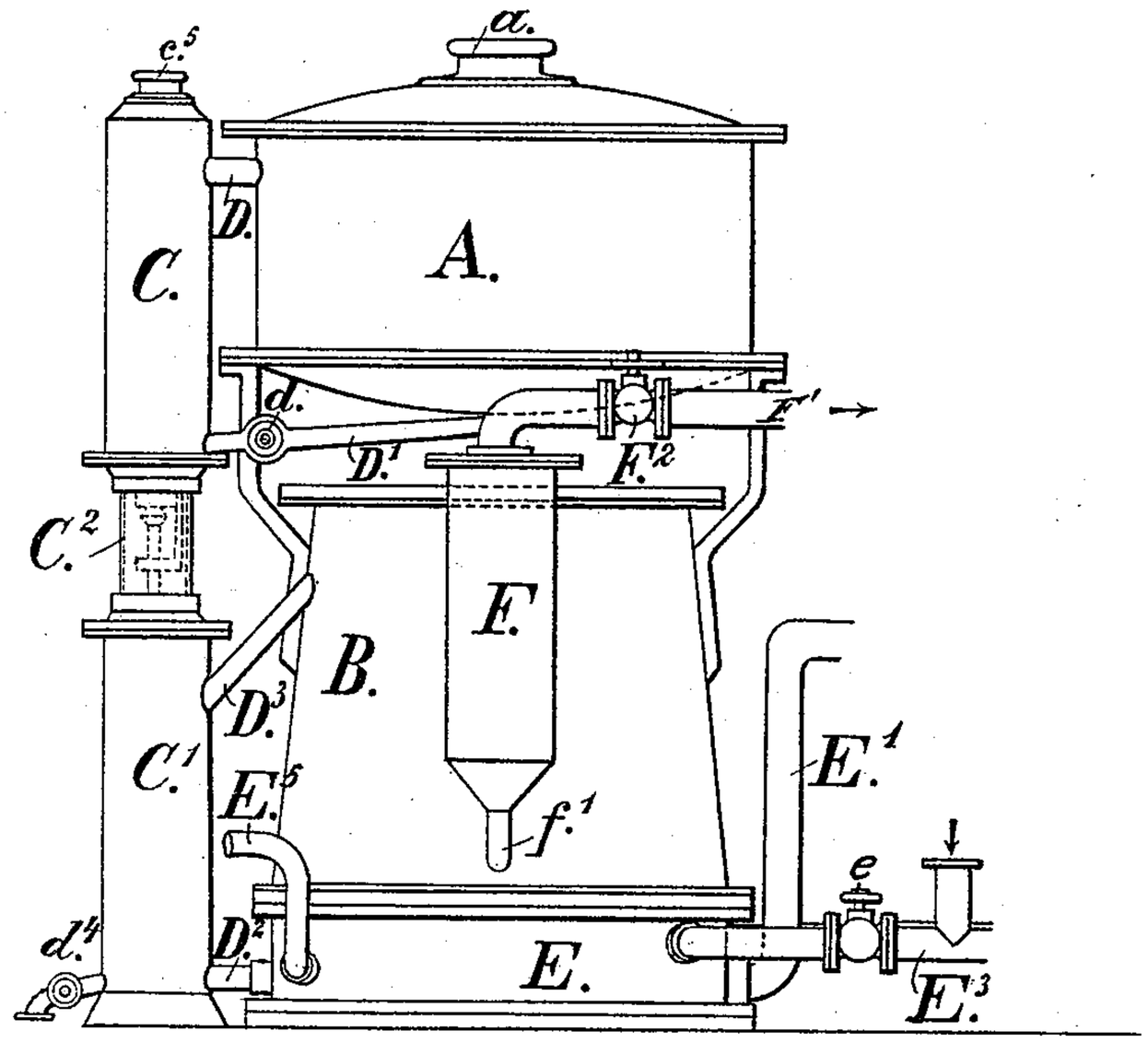
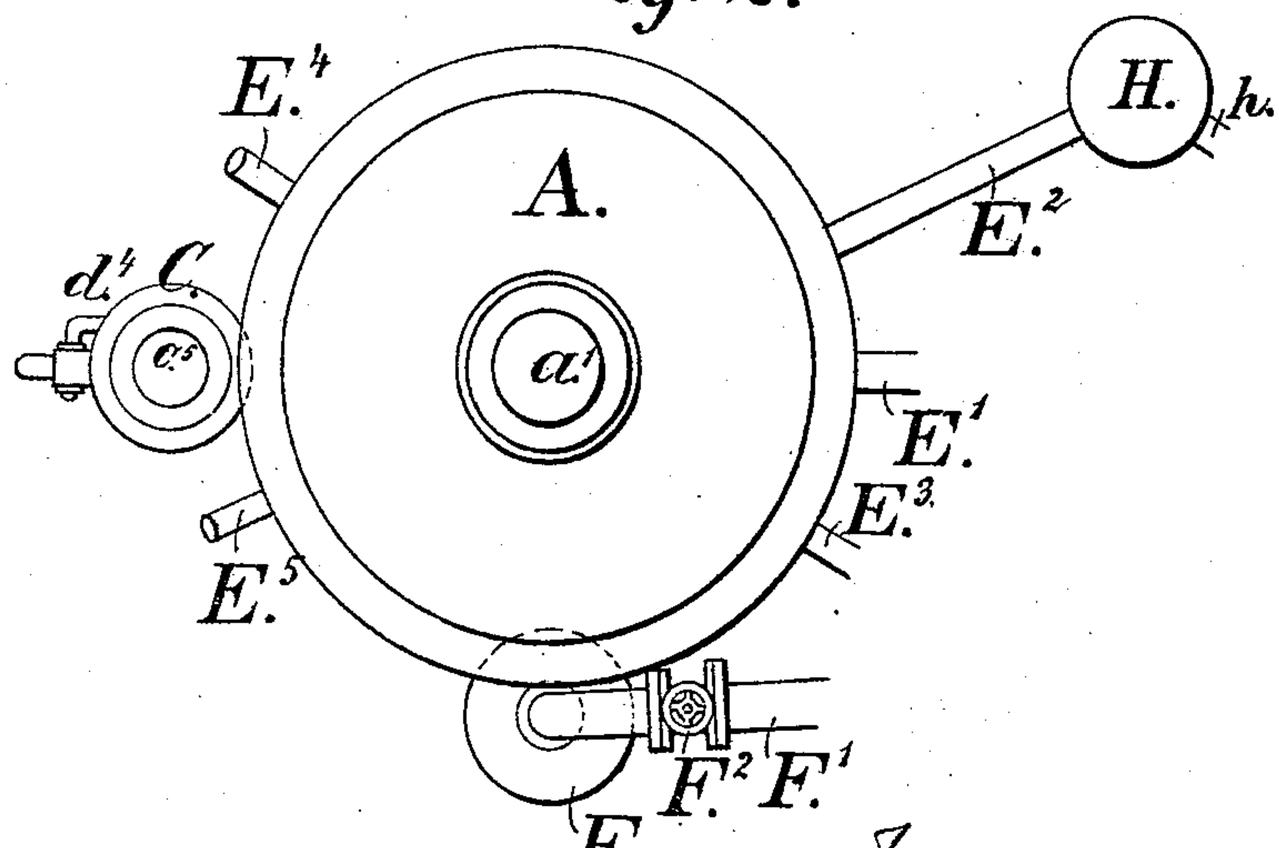


Fig. 2.



Witnesses:
J. A. Rutherford.
Geo. H. Rea.

Inventor:
Paul H. Irgens
By James L. Norris.
Attorney

(No Model.) 3 Sheets—Sheet 2.

P. H. IRGENS.

APPARATUS FOR CARBURETING AIR.

No. 493,165. Patented Mar. 7, 1893.

Fig. 3.

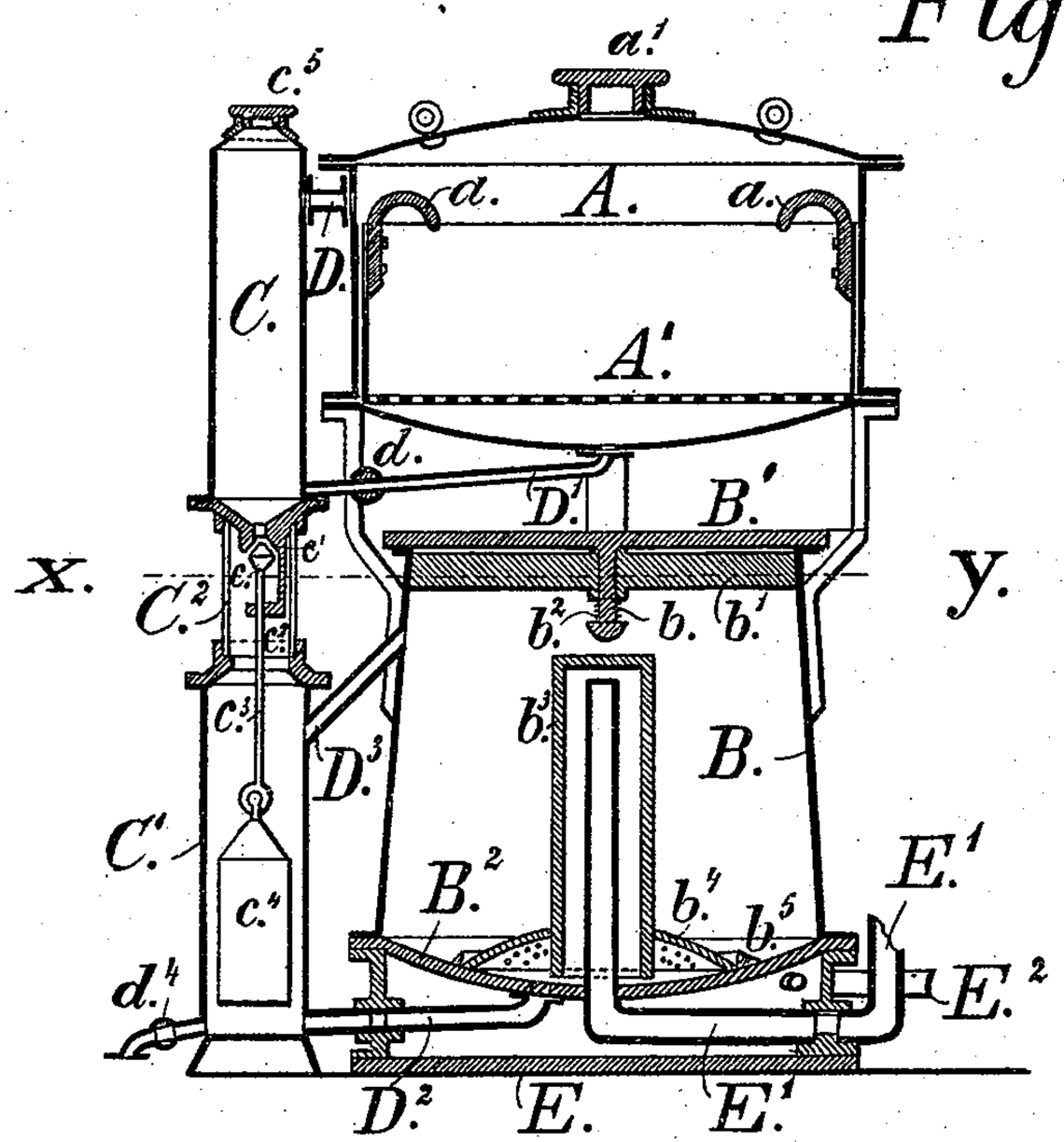
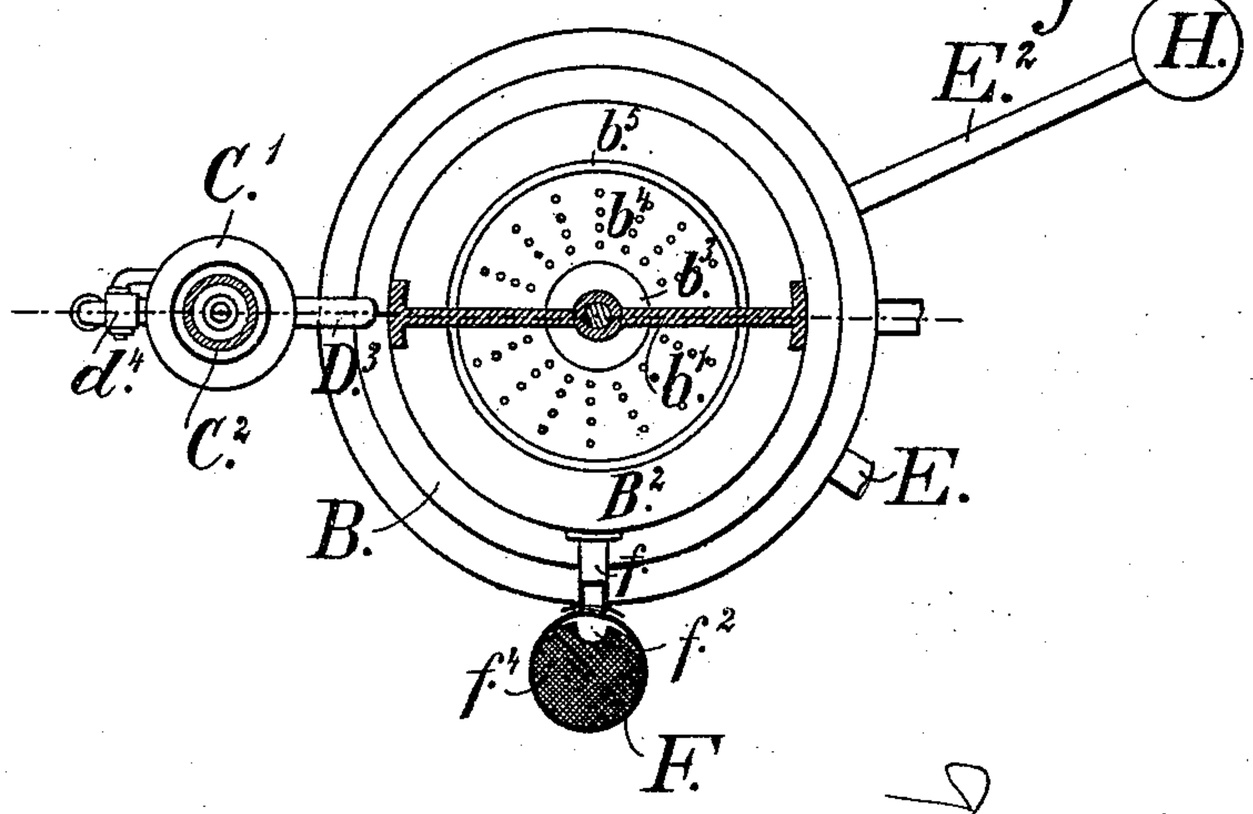


Fig. 4.



Witnesses:—
J. A. Rutherford.
Geo. H. Rea.

Inventor:
Paul H. Irgens.
By James L. Norris.
Attorney.

(No Model.) 3 Sheets—Sheet 3.

P. H. IRGENS.

APPARATUS FOR CARBURETING AIR.

No. 493,165. Patented Mar. 7, 1893.

Fig. 5.

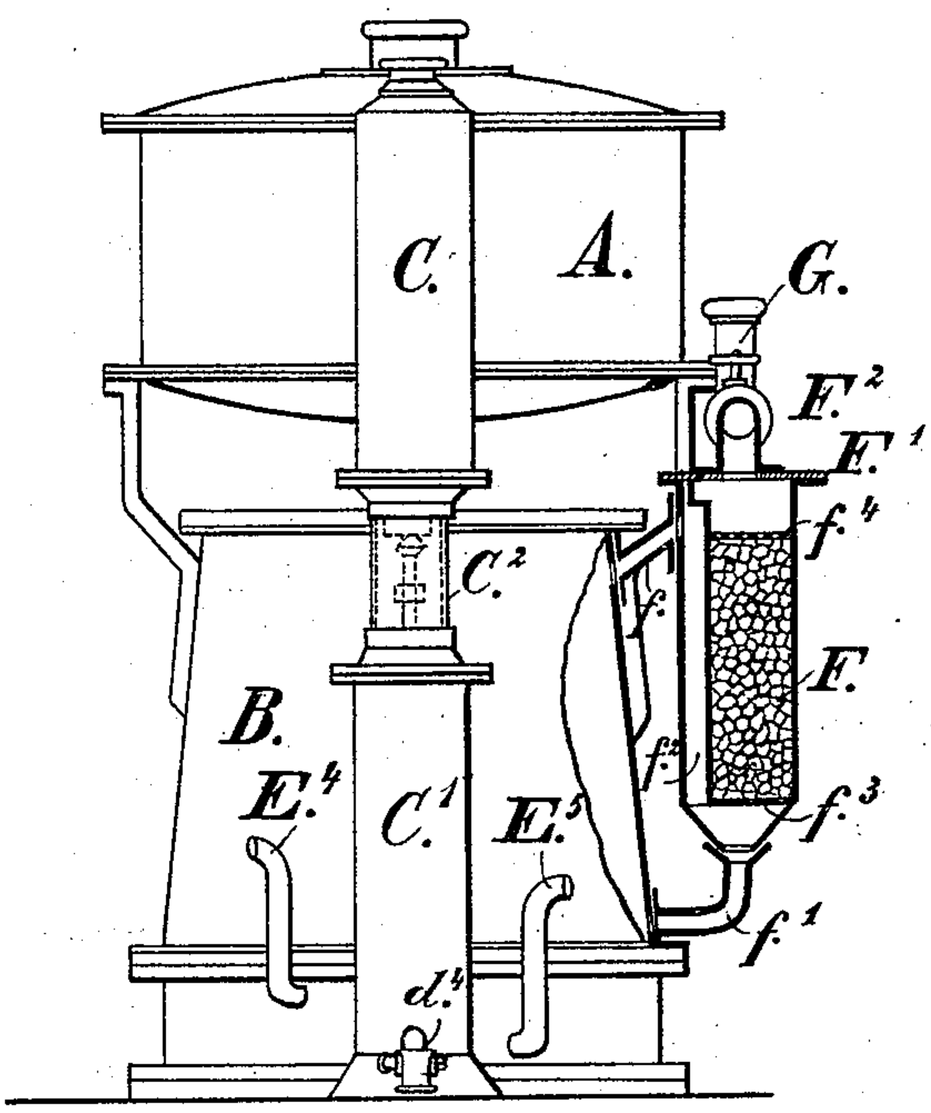
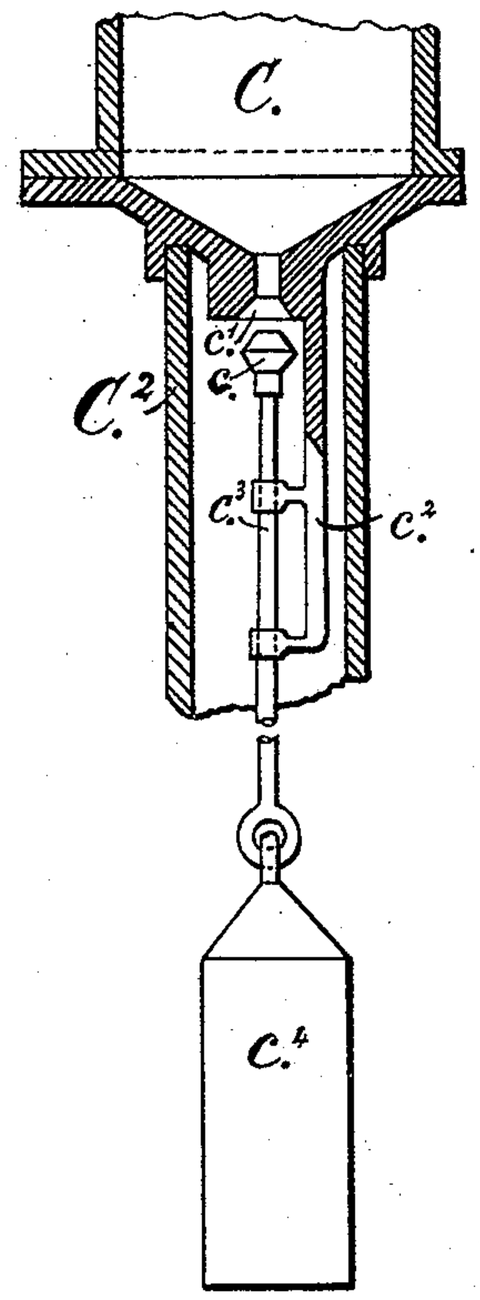


Fig. 6.



Witnesses:
J. A. Rutherford.
Robert Sewall.

Inventor:
Paul H. Irgens
By James L. Norris.
Attorney

UNITED STATES PATENT OFFICE.

PAUL HENNING IRGENS, OF CHRISTIANIA, NORWAY.

APPARATUS FOR CARBURETING AIR.

SPECIFICATION forming part of Letters Patent No. 493,165, dated March 7, 1893.

Application filed March 19, 1892. Serial No. 425,623. (No model.) Patented in Norway August 19, 1891, No. 2,211; in England October 3, 1891, No. 11,132; in France November 11, 1891, No. 214,952; in Germany March 14, 1892, No. 61,352, and in Sweden November 10, 1892, No. 4,061.

To all whom it may concern:

Be it known that I, PAUL HENNING IRGENS, machinist, a subject of the King of Sweden and Norway, and a resident of Christiania, in the Kingdom of Norway, have invented certain new and useful Improvements in Apparatus for Carbureting Air, (for which I have obtained Letters Patent in Norway, No. 2,211, dated August 19, 1891; in Sweden, No. 4,061, dated November 10, 1892; in Germany, No. 61,352, dated March 14, 1892; in Great Britain, No. 11,132, dated October 3, 1891, and in France, No. 214,952, dated November 11, 1891,) of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements for carbureting air and it consists in the novel construction, combination and arrangement of parts hereinafter described and claimed. The material used in the carbureting of the air may consist of any volatile oil or liquid such as naphthaline, petroleum or other hydrocarbon which is heated and through which a current of warm air is passed.

The invention is represented in the accompanying drawings in which—Figure 1 is a front elevation of an apparatus constructed according to this invention. Fig. 2 is a plan of the same. Fig. 3 is a longitudinal section thereof. Fig. 4 is a horizontal section on the line $x\ y$ of Fig. 3. Fig. 5 is an end elevation partly in section. Fig. 6 is a vertical section of a valve for automatically supplying the liquid to the apparatus.

Like letters of reference indicate corresponding parts throughout the several figures of the drawings.

The apparatus is composed of a liquid reservoir or reservoir for the crude material A arranged above the reservoir B for the production of the vapor. The liquid reservoir is provided inside with a perforated bottom or filter A′ furnished with handles a with which it may be taken out and cleaned when desired the object of this filter being to retain any foreign matter in the liquid. The reservoirs A and B are connected by means of the reservoirs C and C′ which are connected with each other by a cylindrical neck C^2 of glass or the like. The reservoir C serves for the reception of the raw material when starting the engine the said reservoir being filled with the volatile liquid which speedily passes over as vapor, when it returns into the apparatus without heating. When the machine has been put in operation the outlet or the reservoir for the raw material is opened.

The reservoir A is in connection with the reservoir C through the vapor-delivering pipes D and D′ of which the latter, serves as a discharge pipe for the liquid and is furnished with the cock d. D is a pipe for the admission of air in order to prevent the formation of a vacuum in the reservoir for the raw-material. The vapor reservoir B communicates with the reservoir C′ through the pipes D^2 and D^3 the latter being an air-pipe. In the neck C^2 between the reservoirs C and C′ is arranged a valve c with seat c' in the bottom of the upper reservoir C. From the said bottom projects an arm c^2, which forms a guide for the valve-rod c^3, which is connected below with a float c^4. The reservoir C′ is provided with a waste pipe having a cock d^4 through which the fluid in the apparatus may be drawn off.

The reservoir A as well as the reservoir C are furnished with feed holes provided with covers a' and c^5 respectively and apparatus B for the production of gas is provided with the cover B′, which forms a valve adapted to lift of itself if the explosion in the engine happens to rebound to the apparatus. The cover or valve is guided by the spindle b working in the cross-piece b' and is held down by the spiral spring b^2. The bottom B^2 of the reservoir B is made concave, partly to prevent the air getting into the apparatus without passing through the liquid in reeling, when it is used on board ship, and partly to get a larger surface for heating. In the center of the bottom B^2 is arranged the pipe E′ for the supply of air which opens into a cap b^3, which is provided below with a dish-shaped piece b^4, which rests upon the bottom and and is held in place by the annular projection b^5 formed on the said bottom. The said dish shaped piece is furnished with a number of small holes, through which the air passes, the ob-

ject of the said holes being to divide the air as it ascends through the liquid. The cap does not reach quite down, to the bottom, but a small space is left between it and the said bottom in order to allow the air to pass from under the said cap.

The reservoir B rests upon a base E and the said base is adapted to receive the heated cooling-water or cooling-air and the exhaust, which comes from the engine which together serve for heating the liquid in the said reservoir B.

H is a receiver for the heated cooling water, which comes from the engine. When the apparatus is set in motion after a stoppage boiling water is filled into this receiver; the water flows from the said receiver into the base E under the gas-apparatus and heats the liquid therein. If there is a very light volatile liquid on hand, as above mentioned which is filled into the reservoir C, no previous heating of the base E from the reservoir H is necessary. When more light volatile oils, for instance, raw petroleum or gas oils are used instead of usual refined petroleum, it is not necessary to heat the base E. E^2 is the inlet-pipe for the heated cooling-water, which comes from the engine through the receiver H. E^3 is an inlet-pipe with a stop-valve for the exhaust. E^4 is discharge pipe for exhaust air, and E^5 a discharge-pipe for the water.

F is a filter consisting of an outer reservoir which by means of the pipes f and f' communicate with the apparatus. From the opening of the pipe f on the inside of the filter, a pipe or channel f^2 leads down to the bottom f^3 of the said filter on which is laid pebbles, which form the filter bed. Over the said filter bed is laid a perforated plate f^4 in order to prevent the pebbles from being carried with the vapor into the pipe. The object of the above described filter is to purify the vapor, and to retain any oil that has been carried therewith and to prevent the return of the vapor to the vapor reservoir. The oil, filtered off from the vapor runs back into the gas-reservoir through the pipe f' in the bottom of the filter. A pipe F′ leads from the said filter to the motor, and in this pipe is arranged a cut-off valve F^2 of any suitable form.

The operation of the apparatus is as follows:—If petroleum or any other heavier volatile oil is employed it is necessary, in order to set the apparatus in operation, to have warm water at hand for heating the oil or fluid, and it is then poured in the receiver H from which it flows to the base or heating chamber E and heats the liquid, or a volatile liquid may be employed, which, in a suitable quantity is poured into the apparatus through the reservoir C, and a part of which immediately it comes into the apparatus, passes over as vapor by which the engine is set in operation. As soon as the apparatus is properly in operation and the base or heating chamber E is filled with the heated cooling-water and exhaust, which comes from the engine, so that the liquid in the apparatus is heated by it the cock d is opened, and the liquid from the filled reservoir A for theraw-material runs into the reservoir C and from the said reservoir down through the neck C^2 to the reservoir C′, and from thence through the pipe D^2 into the apparatus or reservoir B. In the two reservoirs C′ and B the liquid will assume the same level and will rise until the liquid inlet is shut off by the valve c' which thus automatically opens and shuts the valve by means of the float c^4. As soon as the level of the liquid falls, the valve is again opened by the float. The vapor is generated in the reservoir B and passes through the pipe f into the filter F down through the passage f^2 and is then filtered and passes up through the pipe F′ to the engine. During its passage through this pipe the vapor receives the necessary quantity of air for the explosion, through a valve.

What I claim is—

1. In apparatus for carbureting air the combination with a liquid reservoir A, and a vapor generating reservoir B, of auxiliary reservoirs C, and C′, communicating respectively with the liquid reservoir and the vapor generating reservoir, and communicating also with each other, valve mechanism located in one of said auxiliary reservoirs, a cap b^3 resting upon the bottom of the vapor generating reservoir and opening beneath the surface of the liquid in said reservoir, an air inlet pipe entering said reservoir and discharging into said cap, a carbureted air outlet pipe and a filter connected with said vapor-generating reservoir, substantially as described.

2. In an apparatus for carbureting air, the combination with a liquid reservoir, a vapor generating reservoir, and auxiliary reservoirs C and C′, communicating with said liquid reservoir, vapor generating reservoir and with each other, of a perforated bottom arranged in the liquid reservoir, a combined cover and safety valve fitting the top of the vapor generating reservoir, an air inlet pipe and a carbureted air outlet pipe, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

PAUL HENNING IRGENS.

Witnesses:

OSCAR WINGE,

JOHAN FREDRIK ECKERSBERG.