

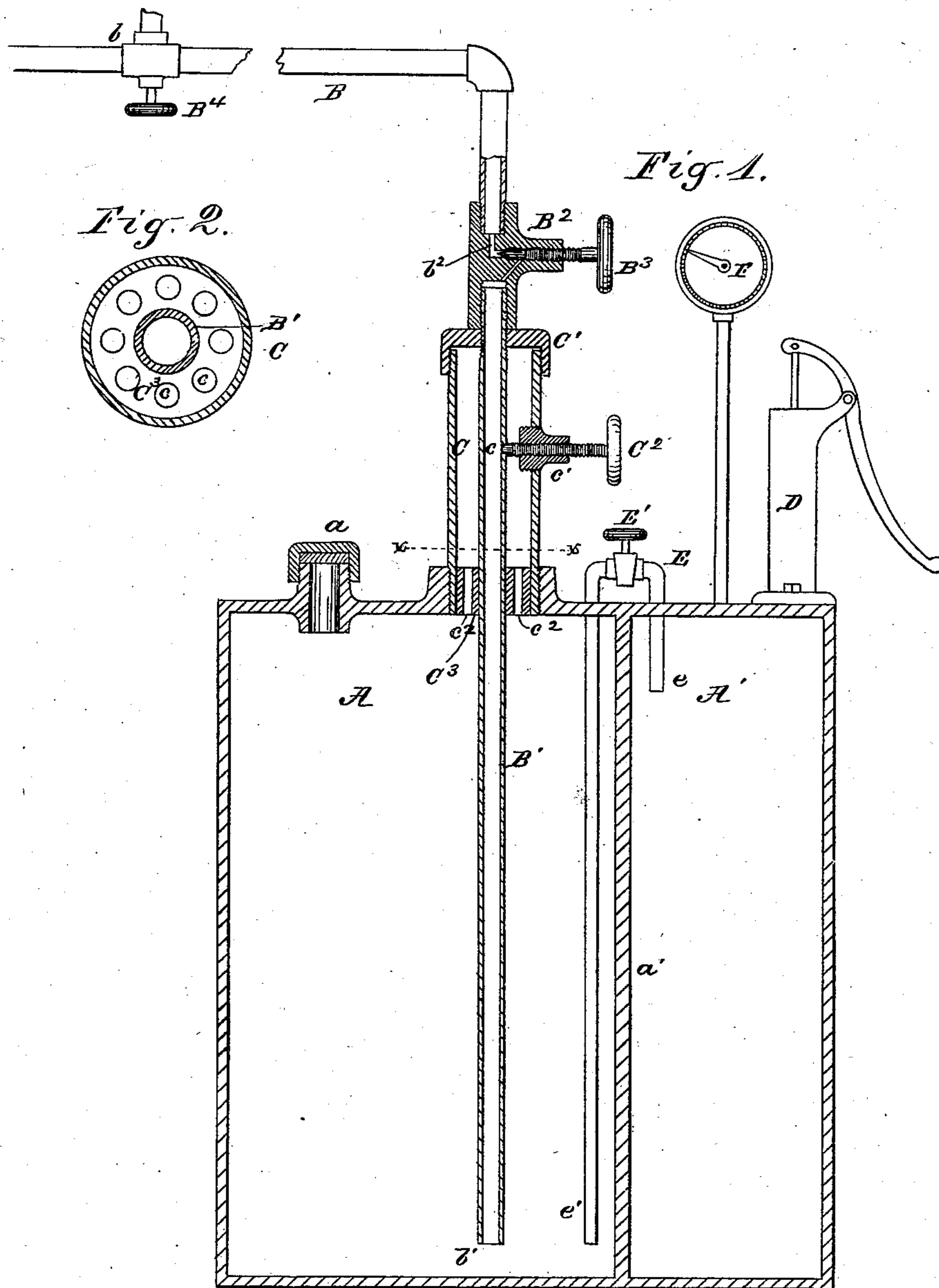
(No Model.)

A. M. BRAINARD.

APPARATUS FOR SUPPLYING HYDROCARBON TO BURNERS.

No. 255,244.

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WITNESSES—
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SUPPLYING HYDROCARBON TO BURNERS.

SPECIFICATION forming part of Letters Patent No. 255,244, dated March 21, 1882.

Application filed November 12, 1881. (No model.)

To all whom it may concern:

Be it known that I, ADELBERT M. BRAINARD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Supplying Hydrocarbon to Burners; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to hydrocarbon-vapor stoves or illuminating apparatus wherein the liquid is forced to the generator by pneumatic pressure. Its object is to supply carbureted air and liquid hydrocarbon successively through a single pipe proceeding from the reservoir to the burner, the generator-heater, or other point or points of consumption; and it consists in the several features of construction and combinations of parts hereinafter explained, and pointed out in the claims.

In the drawings, Figure 1 is a central vertical section of the parts immediately concerned in this invention; and Fig. 2 is a horizontal section through xx of Fig. 1, looking downward.

A represents a reservoir for liquid hydrocarbon.

A' is a reservoir for compressed air.

B B' is a pipe leading from near the bottom of the reservoir A to the burner or burners to be supplied.

C is a chamber in open interior communication with the reservoir A and situated above the liquid-level therein.

D is a pump or equivalent device for forcing air into the reservoir A'.

E is a pipe leading from the reservoir A' to near the bottom of the reservoir A.

E' is a valve in the pipe E, exterior to the reservoirs.

F is a gage connected with the air-chamber A', to indicate the pressure therein. The reservoirs A and A' are here shown as being closed separate chambers of a single cast-iron vessel, divided by a partition, a' , and they may be supposed to stand on the shelf of a hydrocarbon-vapor stove, preferably at one end, and between the legs thereof, and below the level of the stove-burners, (not here shown,) or in

any suitable position with reference to the burners of an illuminating apparatus.

The liquid hydrocarbon is supplied to the reservoir A through any suitable opening, a , adapted to be tightly closed, as shown.

The chamber C, as here indicated, is a short section of pipe firmly screwed into the top of the reservoir A, and provided with the tight cap C', through which the pipe B', considerably smaller than C, passes, being threaded at its upper end for this purpose. Within the chamber C the pipe B' is apertured at c , and said aperture is opened and closed by means of a screw-threaded pressure-valve, C², the shank of which passes through the nipple c' , secured in the pipe C, and is externally provided with a small hand-wheel, as shown.

To secure the pipe B' permanently in place and to steady it against lateral pressure of the valve C², the lower end of the pipe C is provided with a plug, C³, which surrounds and supports the pipe B', and which is apertured at c^2 to give open communication with the interior of the reservoir A. Above the cap C' a fitting, B², connects the pipes B' and B, said fitting being apertured and provided with the lateral needle-valve B³.

For the general purposes of this invention the valved coupling B² need not be present, and the pipes B B' and the coupling B², taken together, may be regarded as a single continuous pipe. They will be referred to hereinafter, when spoken of as a whole and with reference to the continuous passage which they afford, as the pipe B B'.

The burners (not here shown) are connected with the pipe B or branches thereof, as, say, at b . Said burners may be of any suitable description; but I have devised some improvements in burners for stoves for successively burning carbureted air and hydrocarbon vapor or gas, which give a blue or smokeless flame from the former as well as the latter material, and are therefore preferred. These improvements will form the subject of a separate patent.

In patents already granted to me I have shown initial generator-heaters in connection with generating stove-burners. Such and similar burners may be employed with the devices herein shown; and, if preferred, the carbureted air may be used only for initially heating the

generator or for keeping it hot when the stove is not in use.

In the operation of the apparatus provided with the improvements herein shown and described, the chamber A, having been first supplied with liquid hydrocarbon, is tightly closed. The chamber A' is supplied with compressed air by means of the pump D or any equivalent means for the purpose, said pump or other device being provided with a check-valve or stop-cock for the retention of the air so compressed into the said chamber A'.

In the use of a special receptacle for the compressed air separate from that for the liquid hydrocarbon, I prefer to use suitably powerful mechanical means, like an air-pump, for compressing the air, since by such means any desired quantity may be accumulated or pressure obtained in the air-chamber by only infrequent operations of the pump. Then by means of a valved connecting-pipe, E, any required part of such accumulated air may be transferred to and any desired pressure may be produced in the chamber A quickly by simply turning the cock E'. As the end *e'* of the pipe E opens near the bottom of the chamber A, air admitted through said pipe rises through the body of liquid hydrocarbon present in said chamber above the opening of the pipe at *e'*, and, being thereby carbureted, fills the chamber C and all space above the liquid surface with a compressed carbureted inflammable body. First opening the valve C² and then opening the valve B³, (if present,) or other valve or valves giving passage to the burner to be lighted, the carbureted air passes under pressure through the aperture *c*, and may be ignited at said burner. When by the flame of the carbureted air so supplied the generator of the burner is heated the valve C² may be closed, whereupon the liquid hydrocarbon, under pressure of the air above it, instantly passes up from the bottom of the chamber A to the generator, and, being vaporized therein, takes the place of the air at the point of ignition, continuing the flame without interruption.

If it is desired to resume the combustion of carbureted air, the valve C² is again opened, when the air takes the place of the liquid in the pipe leading to the burner and continues to supply the flame. After first admitting compressed air into the chamber A the stove or other apparatus may therefore be at once started by opening the cock C², and thereafter opening any other cock or cocks giving passage to the burner or burners.

So far as the operation of the single pipe B B' as a means of alternately or successively conveying air and liquid from the reservoir A is concerned, it is not material that a separate chamber, A', be provided for compressed air; but the pump or other air-injecting device may be directly connected with the reservoir A, being extended as shown of the pipe E at *e'*, to conduct the air first to the bottom of said chamber. The separate reservoir for air is, however, of great advantage in many cases, since thereby

enough air may be stored by a single operation of the pump to last several days, and no further labor be required meantime beyond turning the necessary valves, as described.

When several burners are present in the stove or illuminating apparatus each burner will be provided with its own local stop-cock or needle-valve, as shown at B⁴; but I prefer in all cases to employ the small passage *b*² and a needle-valve, as shown at B³ in the main pipe B B' above the aperture *c*, so as to better regulate the flow of air and liquid through the main portion of said main pipe.

The chamber C obviously is a part of the reservoir A, and may be cast of the same piece therewith and in any desired form, the essential feature being that an air-space is assured above the liquid-level by reason of the location of the liquid-inlet *a* being fixed at a point below the valved aperture *c*. A valve might be placed in the pipe B' below the opening *c*, instead of the valve B³; but the relative disadvantages of such an arrangement are clearly seen. It is further obvious that, instead of passing the air through the liquid body for the purpose of carbureting it, any suitable carbureting devices may be employed. It is still further obvious that by a suitable branch and valve the carbureted air may be conducted to the initial generator-heater, while the liquid may be passed through the generator and not to the initial heater. The disposition of the air and vapor in this respect is not material to my invention.

I claim as my invention—

1. In a hydrocarbon-vapor generating and burning apparatus, the combination, with a chamber for liquid, with a chamber for compressed carbureted air in open communication with the chamber for liquid, and with a generator and burner, of a single pipe leading from the said chamber for liquid, and through said air-chamber to supply the generator and burner, and suitable valves whereby air or liquid may be successively supplied through the said pipe, substantially as described.

2. In a hydrocarbon-vapor generating and burning apparatus, the combination, with the close reservoir A and chamber C for liquid and compressed carbureted air, of a valved outlet-pipe, B B', leading from near the bottom of the reservoirs, and provided with an aperture, *c*, within the air-space above the liquid-level, and with a valve for opening and closing said aperture, arranged to be operated from the exterior of the chamber, substantially as described.

3. In the apparatus described, the combination, with the reservoir A, chamber C, and suspended pipe B', having the valved aperture *c*, of the support C³ for the pipe B', apertured to allow free passage to the air, substantially as and for the purposes stated.

4. In combination with the pipe B B', leading from near the bottom of the chamber A, and provided with a valved opening, *c*, above the liquid in said chamber, a valved passage,

b^2 , in the pipe B B', located above the opening c, and smaller than the general interior of said pipe, substantially as described, and for the purposes set forth.

5 5. In combination with the chamber A, contrived to hold both liquid and compressed air, and provided with means for permitting the discharge of either to the burner, the separate air-storing chamber A', provided with a pump,
10 and the valved pipe E, connecting the cham-

bers A and A', and leading to near the bottom of the latter, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence 15 of two witnesses.

ADELBERT M. BRAINARD.

Witnesses:

M. E. DAYTON,
F. W. ADAMS.