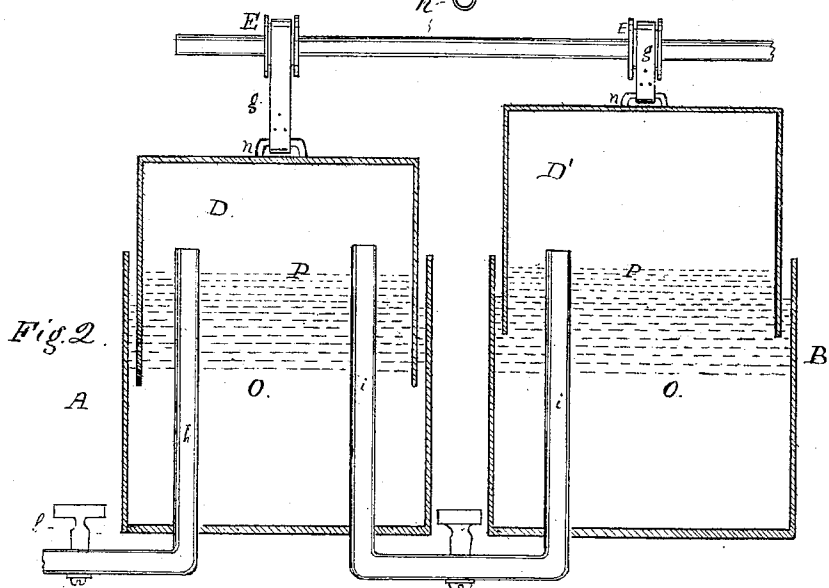
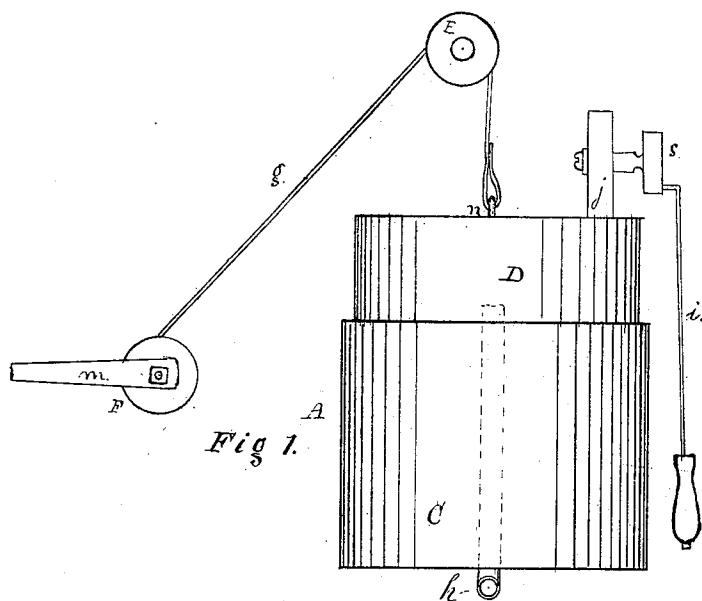


R. B. FITTS.
 APPARATUS FOR CARBURETING AIR.
 No. 114,787. Patented May 16, 1871.



Witnesses.

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R. BERKELEY FITTS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF,
GEORGE W. WAITT, AND WILLIAM ROGERS, OF SAME PLACE.

Letters Patent No. 114,787, dated May 16, 1871.

IMPROVEMENT IN APPARATUS FOR CARBURETING AIR.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern :

Be it known that I, R. BERKELEY FITTS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have, as I believe, invented new and useful Improvements in Carbureting Air for Illuminating Purposes; and I do hereby declare the following to be a full and exact description of the same, reference being had to the drawing that accompanies and forms a part of these specifications.

My invention relates to improvements in apparatus and manner of operating the same, for charging common air with the vapor of the lighter hydrocarbons for illuminating purposes.

One feature of my invention consists in first removing, partially, atmospheric pressure from the hydrocarbon, facilitating the vaporization thereof, and introducing the air afterward, as hereinafter described and set forth.

Again, in the manner of operating two or more separate carbureting-chambers, as herein described and set forth.

Figure 1 represents a side view or elevation of a single apparatus.

Figure 2, vertical bisection of two of the machines connected.

Letter A, fig. 1, a single apparatus by itself, ready for operation.

B, another similar to A, connected to it as in fig. 2.

C, a tank nearly filled with water.

D, air-reservoir, inverted, within the tank C.

E, a pulley hung over the air-chamber D.

F, a windlass arranged in rear of the tank.

g, a strap, rope, or chain attached to the reservoir D by staple n, and, passing over the pulley E, winds around the windlass F.

h is a service-pipe leading away to the burners.

i, a pipe connecting the reservoir D in apparatus A to reservoir D' in apparatus B.

j, a pipe provided with cock s, through which not only the hydrocarbon is introduced to tank C, but also the air into reservoir D, that it may be carbureted.

k is a stop-cock, the object of which is to provide for shutting off reservoir D' from reservoir D.

l is a stop-cock for shutting off the reservoir D from the service-pipes.

m, the crank to windlass F, which may be operated by any power most convenient and economical.

n, staples connecting chain g with the reservoir D.

O represents the water occupying the body of tank C, indicated by short horizontal lines.

P is the hydrocarbon lying upon the water in the upper central portion of tank C, and embraced within the lower part of reservoir D, and is represented by dotted lines.

s, a cock in pipe j, through which is regulated the flow of incoming air.

u, a rod, by means of which the cock s is moved—that is, opened or closed.

In operation my device is this:

The tank C, of any suitable material and of any desired capacity, being supplied with water, and the chamber D in position well down in the tank, I open cock s and pour in through pipe j the hydrocarbon, (preferably of about 85° specific gravity,) so that it shall lie three to five inches, more or less, deep, the cock l being surely first closed.

I then close cock s, and, applying force to rotate windlass F, wind up chain g and raise chamber D, so as to produce a partial vacuum therein, when the hydrocarbon P will rapidly vaporize to fill the said chamber D, when I open cocks letting in freely the atmosphere to take up the carbon vapor, continuing, meantime, the raising of reservoir D, partially closing cock s if the contents of D appear to be becoming deficient in carbon, or opening wider if too abundant in carbon, proceeding until the capacity of the holder D is reached, when cock s should be fully closed and the force upon windlass F thrown off, allowing the weight of vessel D, or so much of it as may be requisite, to rest upon its contents to supply pressure within the service-pipe h.

I raise reservoir D before I open cock s at all, and if the contents of said reservoir are in any manner deficient in carbon I continue to raise it somewhat after cock s is closed, and hold the force to the windlass F a short time before the said chamber D is allowed to rest, as above.

The reservoir D being now supplied with carbureted air suitable for illuminating purposes, the cock l may be opened and the burners lighted.

Hundreds of cubic feet of carbureted air may be prepared in a few minutes, even with a small apparatus of six to eight feet in diameter.

The nature of the structures will be apparent from the drawing and from the service to be rendered.

The reservoir D will provide a constant and uniform pressure, and if not sufficient, weight can be added.

To provide for a larger supply than could be conveniently made or kept in one apparatus I arrange and combine two or more, as A and B in fig. 2; not simply a number of containers or holders, but each a generating or carbureting device complete in itself.

Thus my device for that regulation as to the degree of exposure of the air to the carbon vapor, which seems to be necessary from the differences in specific gravity, and the sometimes more and sometimes less tendency to vaporization of the liquid carbon.

When the hydrocarbon gives off vapor freely the

chamber D only is used; but on indications that the air supplied to the burners is deficient in illuminating properties, D' is brought into action; the air being partially carbureted therein moves through tube *i* to chamber D, where it takes on more carbon before it passes to the service-pipes.

This provision for responding to the different conditions of the carbon vapor is of much importance, and may be carried still further than above described, viz., when the contents of chamber D exhibit a want of sufficient carbon vapor, chamber D' may be raised, with all the cocks connected therewith closed, so a vacuum will be formed therein, and vapor of carbon will be rapidly thrown off to fill it; and then, opening the connection with D, and allowing the weight of D' to rest upon its contents, carbon vapor will be freely passed over to and enrich the contents of D.

This method of enriching the contents of the chamber, from which lead the service-pipes, with pure carbon vapor without admixture of air I consider as an important feature of my invention.

Fig. 2 being a section the pipe *j* does not appear, but it will be borne in mind that each chamber D is supplied with one.

Apparatus B may have a pipe, *h*, leading to the service-pipes, for use in case apparatus A should be out of condition.

The state of things represented in fig. 2 is this:

Apparatus A is supplying the burners, which are supposed to be lighted; the stop-cock *k* closed, and reservoir D' is being raised and filled, but producing no disturbance or effect on apparatus A.

When D' is well supplied with the carbureted air it may be held in store, or cock *k* may be opened, uniting D and D', bringing them both into active service.

Should it be desirable to fill D' again without delay I apply force to the windlass attached to D, and raising it provide for the descent of D', which forces the carbureted air therein over into D; I then close cock *k* and go on, in the manner before described, and re-fill D'.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Vaporizing the hydrocarbon by raising chamber D or D', wholly shutting out the atmosphere, and following this by letting in air from cock *j*, as and for the purpose set forth.

2. One or more of the apparatus B, constructed and arranged to operate in connection with apparatus A in manner and for the purposes specified and set forth.

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

Witnesses: R. BERKELEY FITTS.
D. C. COLBY,
W. G. HENDERSON.