

A. BARTHOLF.

APPARATUS FOR CARBURETING AIR AND GASES.

No. 108,432.

Patented Oct. 18, 1870.

Fig. 5.

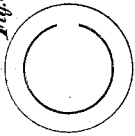
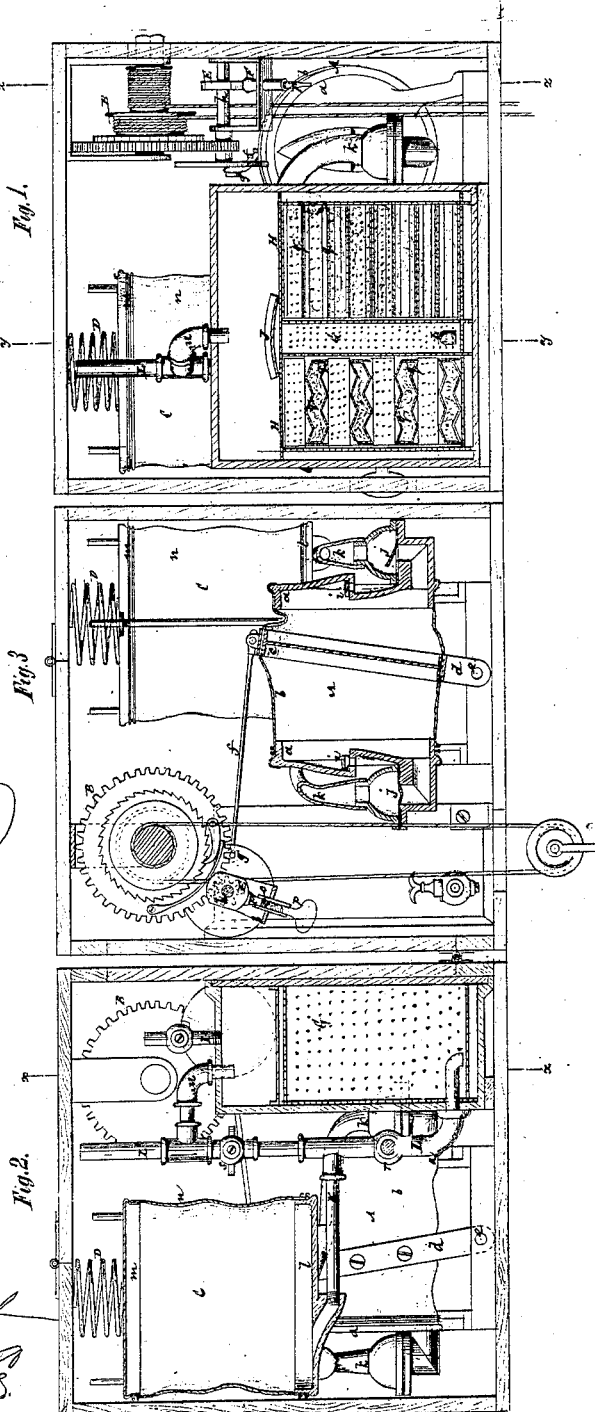
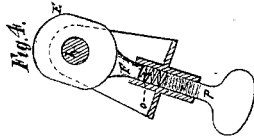


Fig. 6.



Fig. 4.



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Letters Patent No. 108,432, dated October 18, 1870.

## IMPROVEMENT IN APPARATUS FOR CARBURETING AIR AND GASES.

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

### To all whom it may concern :

Be it known that I, ABRAHAM BARTHOLF, of the city, county and State of New York, have invented certain new and useful Improvements in Apparatus for Carbureting Air and Gases, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a vertical section of a carbureting apparatus having my improvements applied to it, said section being taken as indicated by the line  $z z$  in Figure 2, which is a vertical section at right angles to fig. 1 through the line  $y y$ , and

Figure 3 a similar view through the line  $z z$  in fig. 1.

Figure 4 is a side view, on a larger scale, of an irregular shaped cam and variable spring-pressure attachment for operation in connection with the means by which the bellows of the apparatus are driven, to prevent jump of the bellows at the period of the driving-crank turning its centers.

Figures 5 and 6 are a face and sectional edge view of certain flexible or rubber valves used in the apparatus; fig. 6 also showing the seat upon which the same are made to shut.

Similar letters of reference indicate corresponding parts.

My invention is mainly applicable to apparatus in which the air or gas to be carbureted is forced by a bellows into a reservoir capable of distension and contraction, from whence it passes to and through the carbureter, the bellows deriving their action from clock-work, or other suitable power. But certain features of the invention are applicable to other descriptions of carbureting apparatus.

The invention consists in certain means, including an irregular-shaped cam and friction attachment under the control of a spring, for gradually checking and releasing hold on the driving mechanism at the period of the driving-crank turning its centers in the operation of the bellows, whereby jump of the bellows at such periods is avoided, which steadies the flow of the air or gas, and, in the application of the apparatus to illuminating purposes, prevents unsteadiness of the lights.

The invention also includes a yielding spring-pressure applied to the movable portion of the air-reservoir when distended or at work, but distinct from any weight or force operating by the general action of the bellows, to expel the air or gas, and exerting no control on the bellows till distended, said yielding spring-pressure serving to prevent irregular flow of the gas.

The invention likewise includes a certain construction or combination of bellows having a center or dividing head and vibrating arm for operating the same.

The invention furthermore embraces a novel con-

struction of the carbureter proper, including an air-chamber having a top or cover, and variously-disposed corrugated and perforated plates arranged in stacks outside of the air-chamber, with cotton, wool, or other absorbent material in between the plates, said top serving to insure the air being forced through the corrugated plates; also to spread the hydrocarbon liquid in its way to the carbureter, and the corrugations in the perforated plates operating to break or divert through current, whereby the air is more perfectly carbureted.

Referring to the accompanying drawing—

A represents the bellows, which, though of a double action, is of single construction, being made up of fixed heads  $a a$ , united by a flexible body,  $b$ , which is divided by a center head,  $c$ , carried by or connected with a vibrating arm,  $d$ , that has its fulcrum at  $e$ .

Said arm is vibrated, through a connecting-rod,  $f$ , by a revolving eccentric pin or crank,  $g$ , the shaft  $h$  of which derives its motion by gear that forms part of suitable clock-work B, which may be actuated by a weight.

$i i$  are the inlet valves to the pump, and

$j j$  the outlet-valves therefrom.

$k k$  are the pipes which serve to convey the air from the bellows to the air-reservoir O.

These valves  $i i$  and  $j j$ , or certain of them, it is preferred to construct of rubber or other suitable flexible material, by making, in a disk of said material, an incision which stops short of a complete circle, as shown in fig. 5.

This is a simple way of constructing a flap-valve, and furnishes a flange for securing the valve to its place. The valve-seat it is preferred to groove and ridge, as represented in fig. 6, whereby a tight fit of the valve when closed is secured.

The air-reservoir O is composed of a stationary lower head,  $l$ , and upper movable head,  $m$ , united by a flexible body,  $n$ .

The movable head  $m$  should be of sufficient weight to insure the requisite pressure within the reservoir to force the air through the carbureter proper, and the carbureted air or gas from the latter through the delivery-pipes to the burners; but, in addition to this provision, said reservoir is controlled, when distended, by a yielding spring-pressure applied to the movable head  $m$  of the reservoir, as by a detached spring, D, that is, a spring secured only at one of its ends, or of such a length that it is only brought into play after the reservoir has been fairly distended, whereby it is made to act with a gentle pressure and in a variable manner, as contradistinguished from a weight which has a uniform force, for the purpose of providing for any irregularity in the action of the apparatus, as, for instance, any irregularity in the motion of the bel-

lows when turning their center, and whereby regularity of flow is insured.

To provide against jump of the bellows when turning their center, and which produces unsteadiness of the flame or flames at the burners, I apply to the driving-mechanism of the bellows a frictional device that acts in a gradual manner as a temporary check, when the bellows are turning their center.

Said device consists of an irregularly-shaped cam, E, fast on the crank-shaft *h*, or other shaft connected with the driving-mechanism, and so arranged in relation to the crank or eccentric pin, from which the bellows take their motion, that the rounded or protruded surfaces of the cam come into contact with a leather or rubber friction-pad, F, as the bellows crank or pin crosses its center; but said cam, at other periods, being relieved from such frictional resistance, or only exposed to a very diminished one.

For this purpose the cam E is made with two rounded ends and two flattened or reduced sides, the rounded ends lying at right angles to the crank-pin, and to insure an elastic action of the friction-pad F, it is backed by a spring, *o*, and the latter preferably made adjustable, as regards its tension, by a set-screw, *p*.

The cam E is thus made to exert a soft or easy and temporary check upon the driving-mechanism of the bellows when turning the center, gradually letting up and go the same, and doing away with all jump at such period or periods.

The carbureter proper, or generator, consists of a perforated air-chamber, G, covered on its top, and having arranged outside of or around it, any number of stacks, H H, of corrugated and perforated cases or plates, *q q*, that may be variously disposed as regards the mounting of them, the one upon the other, but preferably being arranged to alternately cross each other as regards their corrugations.

These corrugated and perforated plates contain between them cotton, wool, or other absorbent material. Said plates may be arranged within perforated chambers, and have the fibrous material held between them, saturated with hydrocarbon liquid by its admission through a supply-pipe, I, onto a properly constructed top, J, over the air-chamber G, which top not only serves to prevent the air from escaping upward out of said air-chamber, and compels it to pass through between the perforated plates *q q*, but also answers to conduct the entering liquid to or over each stack of perforated plates, with their interposed absorbent material.

The air from the reservoir C is admitted to the air-chamber G by pipes K and L, the latter being provided with a cock, *r*, to regulate the admission of the air.

Introduced into the air-chamber G, which serves as

a distributor, the air is compelled by the top J to pass through the stacks H H of corrugated plates, in order to find a vent or outlet, and in so doing has its through course checked, or an undulating travel communicated to it, which materially aids its saturation with the hydrocarbon vapor, the increased area obtained by the corrugated construction of the plates *q q* also contributing to the same effect.

M is the branch by which the carbureted air or gas is taken from the chamber within which the stacks H H are arranged.

This branch connects with an upward extension, L', of the pipe L, above the junction of the pipe K, which extension forms the delivery-pipe for the carbureted air or gas to the burners.

Between this branch M and the pipe K is a cock, *s*, which, on being opened, serves to admit air direct from the reservoir C into the outlet or outlets which convey the carbureted air or gas to the burners to mix with said air or gas, whereby smoking at the burners is prevented, and the lights may be regulated as desired, the cock *r* being simultaneously regulated, if necessary, to adjust the supply of air to the carbureter.

Of course the connections and arrangement of the cocks may be variously modified to produce the same effect without changing this feature of the invention, and which provides for a flow of air from the reservoir C to mix with the carbureted air as it passes from the carbureter.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the irregularly-shaped cam E and spring-pressure pad F with the crank through which motion is communicated to the bellows of the apparatus, substantially as specified.

2. The combination and arrangement, essentially as described, of the detached spring D with the expanding and contracting air-reservoir C

3. The bellows A, constructed with a movable center head, *c*, in combination with the vibrating arm *d*, the pitman *f*, and crank *g*, substantially as specified.

4. The carbureter, constructed essentially as described, of a perforated air-chamber, G, with its top J, and carbureting chambers, composed of stacks H of perforated and corrugated cases or plates *q q*, arranged outside of the air-chamber and relatively to each other, with absorbent material or materials in between them, essentially as specified.

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Witnesses:

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