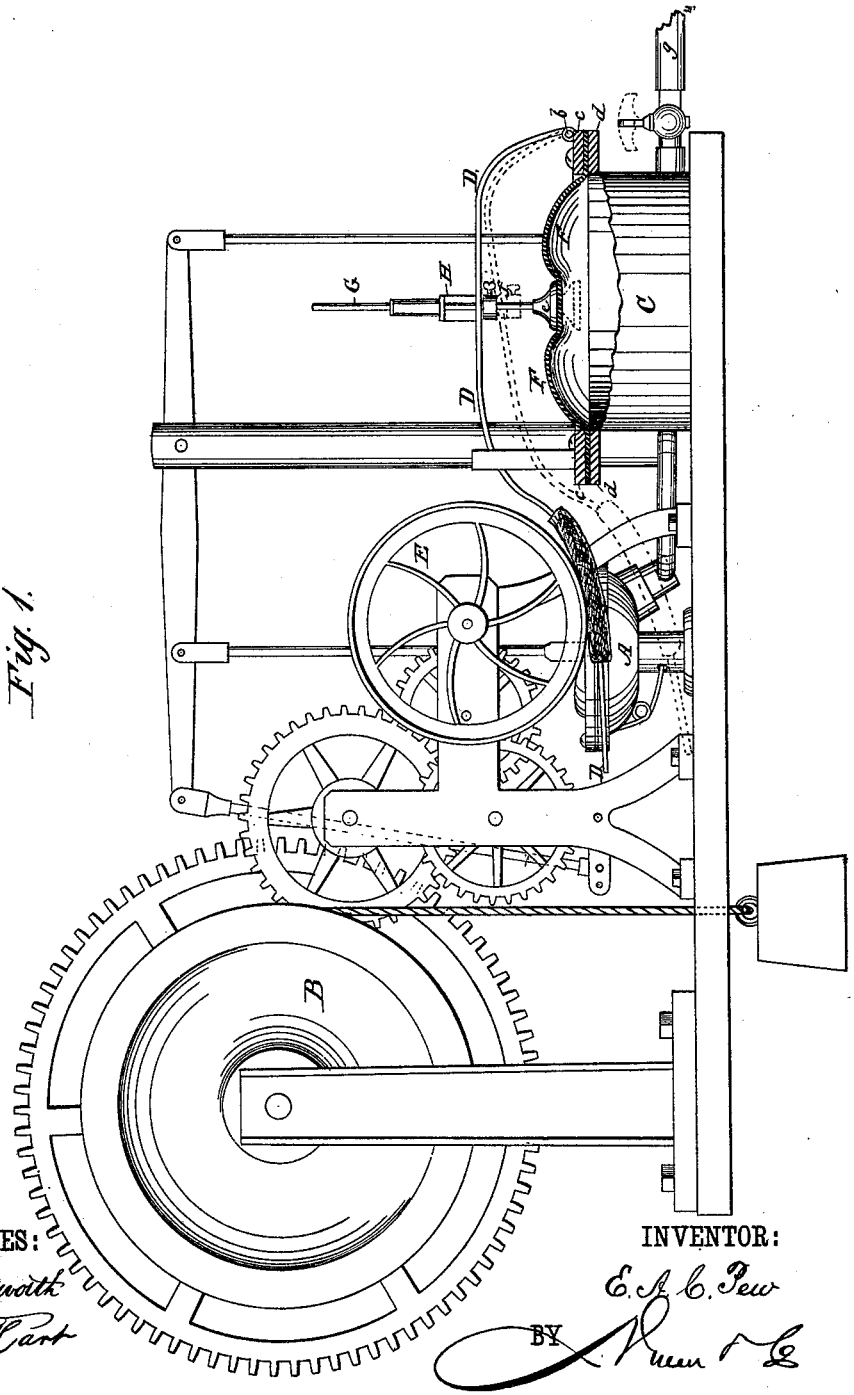
2 Sheets—Sheet 1.

E. A. C. PEW.

Air-Forcing Apparatus for Carbureters.

No. 214,442. **Patented April 15, 1879.**

Fig. 1.



WITNESSES:

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Amos W. Hart

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2 Sheets—Sheet 2.

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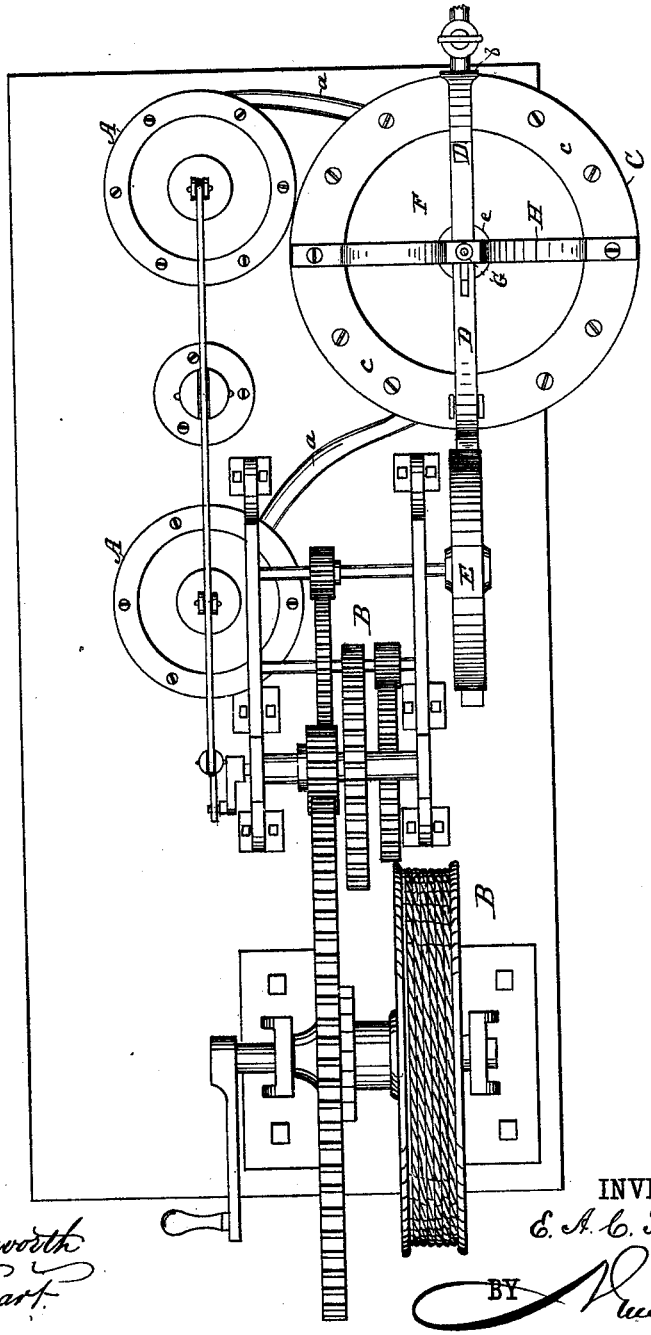

Fig. 2.

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UNITED STATES PATENT OFFICE.

EDWARD A. C. PEW, OF WELLAND, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE W. WEART, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN AIR-FORCING APPARATUS FOR CARBURETERS.

Specification forming part of Letters Patent No. **214,442**, dated April 15, 1879; application filed March 8, 1879.

To all whom it may concern:

Be it known that I, EDWARD A. C. PEW, of Welland, Province of Ontario, Dominion of Canada, have invented new and Improved Air-Forcing Apparatus for Carbureters; and I do hereby declare that the following is a full, clear, and exact description of the same.

Air-pumps have been employed for forcing air into carbureters, or vessels containing a carbureting-liquid, and an apparatus has been used in connection with the same for regulating the amount of air supplied in a given time, and thereby regulating the pressure of the carbureted air in the service-pipes. The apparatus usually employed is similar to a gasometer, with a valve and lever attachment, the parts being so connected that the rising and falling of the cylinder adjusts the valve and thus closes or opens the passage, more or less.

My invention is an improvement in this class of apparatus, (which has proved defective;) and it relates, first, to the construction of an air holder or receiver having an elastic top, which expands and contracts according to the amount of air forced into and contained in the receiver at any one time. It relates, secondly, to a brake mechanism, which is so constructed and applied that when the pressure of air in the receiver has expanded its elastic top to a certain extent the brake will be brought into action, and the motion of the pump or air-forcing apparatus arrested until the consumption of the carbureted air at the burners has diminished the pressure in the receiver, as hereinafter more fully explained.

In accompanying drawings, forming part of this specification, Figure 1 is a side elevation of my apparatus with part of the air-receiver broken away; and Fig. 2 is a plan view of the receiver, brake mechanism, and air-pump proper.

A A indicate the double-cylinder air-pump, and B the motor or apparatus for operating the same. In reference to these parts I claim nothing new. The air-receiver C is connected with the pump-cylinders by pipes *a a*. The brake-lever D is fulcrumed on a fixed point, *b*, extends across the top of the receiver C, and projects beneath the balance-wheel E of the motor.

The top F of the receiver is constructed of a plate of thin sheet-rubber, whose edge is clamped between the annulus *c* and the flange *d* of the receiver. A rod, G, is arranged to slide in a vertical guide, H, located over the center of the elastic receiver-top F, and has a flat disk, *e*, attached to its lower end and resting free on the top F. Said rod also passes through a slot in the lever D, and has a vertically-adjustable collar, *f*, upon which the lever rests or is supported, as shown in Fig. 1, being thus converted into a lever of the third class.

It will be perceived that, inasmuch as the elastic top F must expand more or less, according to the pressure of the air in the receiver, the rod G and lever D will rise and fall correspondingly.

The operation is more particularly as follows: Supposing connection to have been made by means of a pipe, *g*, with a vessel (not shown) containing any suitable carbureting-liquid, and the said vessel having also been similarly put in communication with service-pipes of the building to be illuminated, the motor B is put in operation, and the pump A A will begin to force air through pipes *a a* into the receiver C, and from thence into the carbureting-vessel, from which, in its converted state, (commingled with inflammable hydrocarbon vapors,) it will escape into the service-pipes and pass to the burners to be consumed. Practically, however, the burners are not thus supplied until the pump A A has filled the receiver C and the elastic top F has become expanded or crowning to a considerably extent. When expanded, as shown in full lines in Fig. 1, the pressure of said top F against the disk *e* will push up the rod G sufficiently to raise the lever H, so that its free end will be brought in contact with the periphery of the wheel E. As the pressure of air in the receiver C becomes greater the lever is of course caused to press with still greater force on the wheel E, so that the speed of the motor B is gradually diminished, and if the consumption of carbureted air at the burners is slight it will be arrested altogether

until the pressure of air in the receiver has been somewhat relieved by further combustion, when the elastic top F will collapse or contract more or less, and thus lessen the friction or force of contact between the lever H and wheel E, thus allowing the motor B to again put the air-pump A in operation to resume and continue forcing air into the receiver C until the expansion of the top F has arrested the motor B, as before.

The elasticity of the receiver-top F has a very important effect upon the regularity or evenness of the flow of air through the carbureter, and, consequently, upon the steadiness of the flame at the burners, for it has been practically demonstrated that a receiver with a rigid, but rising and falling, top or cylinder, either weighted or having a valve and lever attachment, is incapable of producing the same result, the flame being in such case unsteady and flickering, and blowing being also a common or usual attendant of the use of such apparatus. This difference of result is due to the delicate self-adjusting capacity of the elastic receiver-top; for, while a slight diminution or increase of pressure of air in the carbureting vessel or receiver (which may arise from unequal combustion or unequal action of the air-pump or other causes) will instantly lessen or increase the size of the flame at the burner, and while a rigid cylinder, such as before referred to, must rise or fall bodily to restore the equilibrium of pressure, and thus requires more or less time to overcome its own inertia, my receiver-top F, being light and thin and elastic in every part, will instantly adapt itself to the change in the pressure of air, and thereby as quickly restore the equilibrium, so that the diminution or increase in size of flame will be less rapid and less perceptible or annoying. In brief, the steadiness of the flame will be increased in proportion to the delicacy or sensitiveness of the elastic top as compared with the rigid top or rising-and-falling cylinder of an air-receiver.

The desired action of the elastic top is partly secured by the lever weighting it, as shown, and the brake attachment is incidental to the extension of the lever and its juxtaposition with the balance-wheel of the motor.

I am well aware that cylinders have been provided with an elastic top or diaphragm for various other purposes.

Having thus described my invention, what I claim as new is—

1. In an air-forcing apparatus for use in connection with a carbureting-vessel, the combination, with pump A, of the receiver having the elastic top, formed of a sheet of rubber, and a lever or weight pressing upon said top, substantially as shown and described.

2. In an air-forcing apparatus for use in connection with a carbureting-vessel, the combination of a lever with the motor, the air-pump proper, and an air-receiver having a rising and falling top, said lever coming in contact with a wheel of the motor, and acting as a brake when the pressure in the receiver becomes sufficient to raise its top, as specified.

3. In an air-forcing apparatus, the combination of the rod G, the adjustable collar *f*, the guide H, and brake-lever D, hinged on a fixed fulcrum, the elastic top F of the receiver, and the motor and air-pump proper, as shown and described.

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Witnesses:
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CHAS. A. PETTIT.