2 Sheets--Sheet 1.

THOMAS B. FOGARTY.

Improvement in Gas-Machines.

No. 115,593. Patented June 6, 1871.

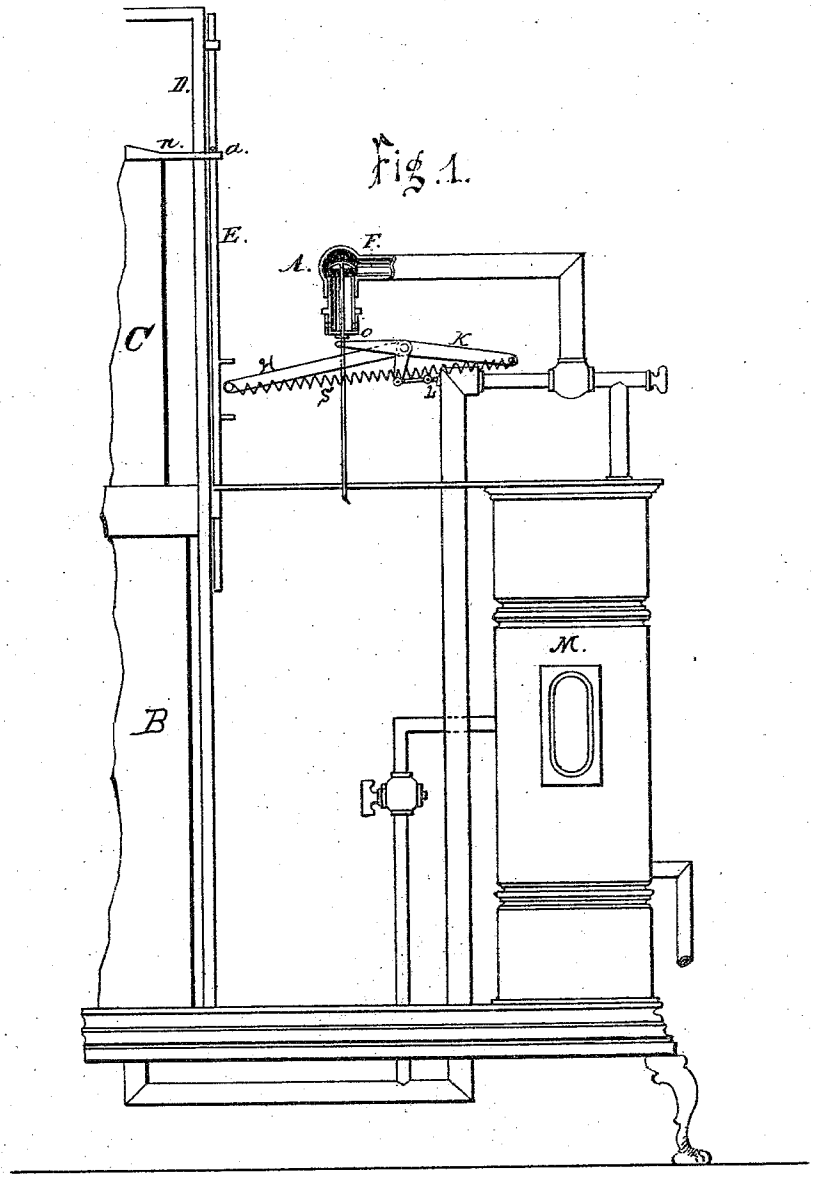

Fig. 1.

Witnesses
James S. Minnie
Chas. C. Wilson

Inventor
Thos. B. Fogarty

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

2 Sheets--Sheet 2.

THOMAS B. FOGARTY.

Improvement in Gas-Machines.

No. 115,593. Patented June 6, 1871.

Fig. 3.

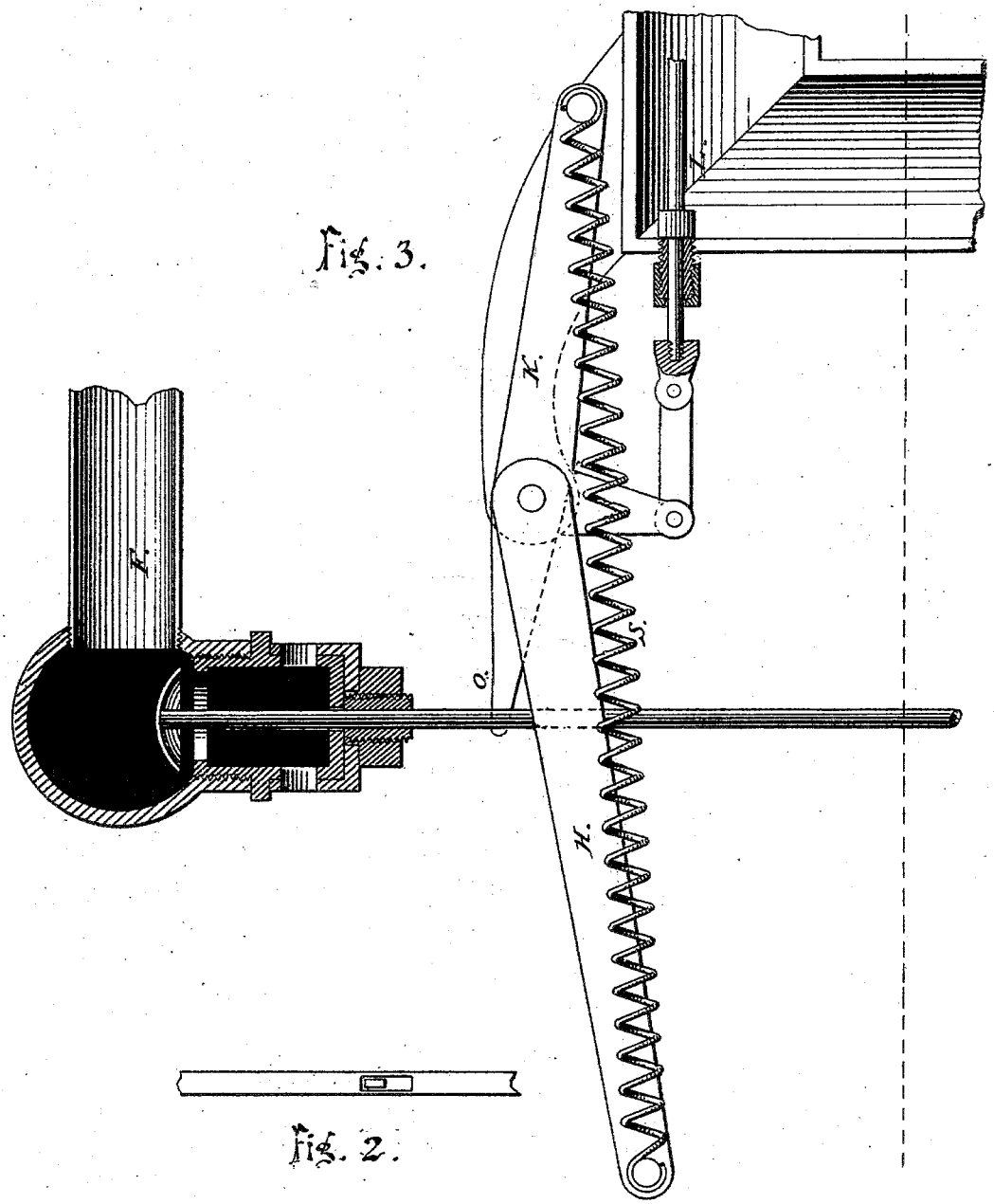

Fig. 2.

Witnesses;

Inventor;

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

THOMAS B. FOGARTY, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN GAS-MACHINES.

Specification forming part of Letters Patent No. 115,593, dated June 6, 1871.

I, THOMAS B. FOGARTY, of the city of Brooklyn, in the county of Kings and State of New York, have invented a certain Improvement in Gas-Machines, of which the following is a specification:

Nature and Objects of the Invention.

My invention relates principally to automatic gas-machines, in which the manufacture and supply of gas are automatically regulated by the rising and falling of a gas-holder sealed in a vessel of water or other suitable liquid, or its equivalent, a flexible diaphragm; but it refers more particularly to air-gas machines of the above class, in which a proper and equable admixture of air with the vapor or gas is effected by vaporizing hydrocarbon liquid under pressure, either hydrostatic or pneumatic, in a suitable retort, and causing the vapor so formed to be blown with a high velocity, through a small jet, across an intervening body of air and into the mouth of a larger pipe, so as to induce and carry along with it a large body of air.

In gas-machines of this description the usual practice has been, and is, to allow the volume of mixed air and gas to enter, and, by its pressure, raise or inflate a suitable holder, and to attach to said holder suitable valve-gear, so that when it would be inflated to a certain point it would close a valve and cut off the supply of gas until, through exhaustion of its contents, it would fall again to a point where it would react on the valve-gear in such a manner as to open the valve and turn on a fresh supply of vapor or gas. Now, while the valve is open and there is a flow of vapor through the jet, a corresponding and inward current of air will be created and induced through any suitable aperture; and if the pressure under which the vapor issues from the jet is sufficient, the mixed vapor and air will enter into the holder with force sufficient to overcome its weight or pressure and to inflate and raise it. As soon, however, as the holder has been inflated and raised so as to close the valve, there will be an instant cessation of the inward current and corresponding inward pressure, and the outward pressure of the holder will expel its contents through the opening through which the air had entered, and into the room or gas-house, if this opening is not provided with a check or back-pressure valve which will open to admit the inward current of air and will instantly close as soon as the current ceases.

The practice has hitherto been to raise this valve by the force of the inward current in the same manner as the foot-valve of a common pump is raised by the pressure of the water, and of course it instantly falls as soon as the actuating current ceases. This practice is liable to many objections, the principal of which are as follows: It necessitates vaporizing the hydrocarbon liquid under a high pressure, for the pressure required to lift the valve is usually far more than that required to overcome the pressure of the holder and raise or inflate it. Vaporizing at a high pressure requires a high heat, and, if pneumatic pressure is used, a far stronger and more expensive pressure-tank, and considerably enhances the difficulty of making tight joints. Another and more serious objection is that if, from any cause, the valve should get fouled or clogged so as to stick up or open, and remain open when the inward current ceased, the pressure of the holder would expel its contents through the opening and into the room containing the machine, and would continue to rise and fall and fill the room with gas so long as the valve remained stuck up. It need scarcely be said that this is attended with extreme danger—indeed, it has already caused several fires. Another trouble is that the valve may stick down or closed, so that if there is a light pressure in the retort, and, in some instances, whatever pressure there may be, the escaping vapor will not have power to create an inward current of air of sufficient force to lift it. The consequence of this would be that no air could enter to mix the vapor, and instead of being filled with vapor and air mixed in the proper proportions the holder would contain nothing but pure vapor, the result of which would be an enormous amount of condensation in the pipes and smoky lights, which has very frequently occurred to gas-machines of this class. In a word, a valve operated by the pressure of the inward current of air has been found to be extremely unsafe, uncertain, and unreliable.

My improvement is intended to remedy these defects, and consists in operating the

air-valve mechanically, so that the valve which opens to admit the vapor cannot open without opening the air-valve also, and cannot close without closing it, consequently the air-valve can never stick up or stick down; and at the same time, the air-valve being lifted mechanically by the same mechanism which opens the vapor-valve, the pressure required for working the machine will be reduced at least one half, as will be seen on reference to Fig. 3.

When the valve A is closed the back pressure from the holder—usually that of a column of one and a half inch of water—is on its upper surface, and with that force holds it to its seat, to which its own weight or pressure holds it with a force of at least as much more, so that the inward current of air will have to overcome a pressure of at least three inches of water before it can lift the valve. I propose to lift it mechanically, and by the same movement which opens the vapor-valve, so that instead of having to use a jet of vapor of sufficient pressure to create an inward current of air powerful enough to overcome a pressure of over three inches of water, it will only be necessary to use a pressure sufficient to overcome that of the holder—one and a half inch, or less, if desired. The drawing will explain itself.

Figure 1 shows a portion of a gas-machine, such as has been fully described by me in specifications Nos. 1 and 2, filed on or about April 6, 1871, and is intended merely to show the general connection of the parts. Fig. 3 shows, upon a large scale, the air-valve and the mechanism by which that and the vapor-valve are actuated. The dotted lines in both figures indicate corresponding sections. Fig. 2 merely shows the end of the actuating-lever passing through the air-valve stem.

In all the figures the same letters refer to the same parts.

B is a portion of the gas-holder tank, and C of the holder itself. D is the standard by which the center or guide post is supported; E, a rod sliding upon the standard D, and carrying the pins *a a* and *b b*, by which the levers that work the vapor-valve are actuated. L is the stem of the vapor or retort valve; M, the stove, containing a suitable retort and furnished with burner, inlet and outlet pipes, tank of compressed air, &c., as described in my specifications Nos. 1 and 2, before referred to. The stove, with its appurtenances and the holder, have been described in the above specifications; and as my invention does not relate to them, and there is nothing new claimed with regard to them except in combination with these parts which are claimed as new, it is unnecessary to enter into a detailed description of them here further than to introduce them as a part of my apparatus, so well known and so often described as not to need a fresh description.

It will be seen that, as the holder C rises, the arm N engages in the upper pin *a*, and by that means carries up with it the sliding rod D and causes *b*, one of the pins which it carries, to engage in the lever H, which, as soon as it is carried up sufficiently over the center line, is thrown upward by the contractile force of the springs, (but one spring is shown,) which at the same time act upon the lever K and throw it upward so as to close the vapor-valve.

I do not claim that there is anything new in this arrangement of springs and levers, for they are identically the same, as have been already described by H. S. Maxim and claimed by him in the specification of his patent No. 81,922. I therefore disclaim the arrangement of springs and levers, except in so far as it may be used in combination with my improvement, which consists in furnishing the lever K, by which the vapor-valve is actuated, with an additional arm, O, passing through a slot in or otherwise engaging with the stem of the air-valve A, as shown in Fig. 2, and by means of which the air-valve is closed by the lever K or its equivalent by the same movement which opens the vapor-valve, and at the same instant, and vice versa, is also closed at the same time and by the same movement which closes the vapor-valve. I do not, however, confine my claim to this particular method of actuating the valve A, for it is evident that the result would be the same if it was acted on by an arm attached to the lever H.

Claims.

I claim—

1. An air-injector or back-pressure valve for carburaters or gas-machines, moved mechanically, and actuated by the same mechanism which opens and closes the valve by which vapor is allowed to escape from the retort, operated substantially as described, and for the purposes set forth.

2. The air-valve, moved mechanically, as described, in combination with the lever K provided with the arm O or its equivalent, the lever H, and springs S, constructed and operated substantially as described, for the purposes set forth.

THOS. B. FOGARTY.

Witnesses:
JOS. T. K. PLANT,
W. A. BOSS.