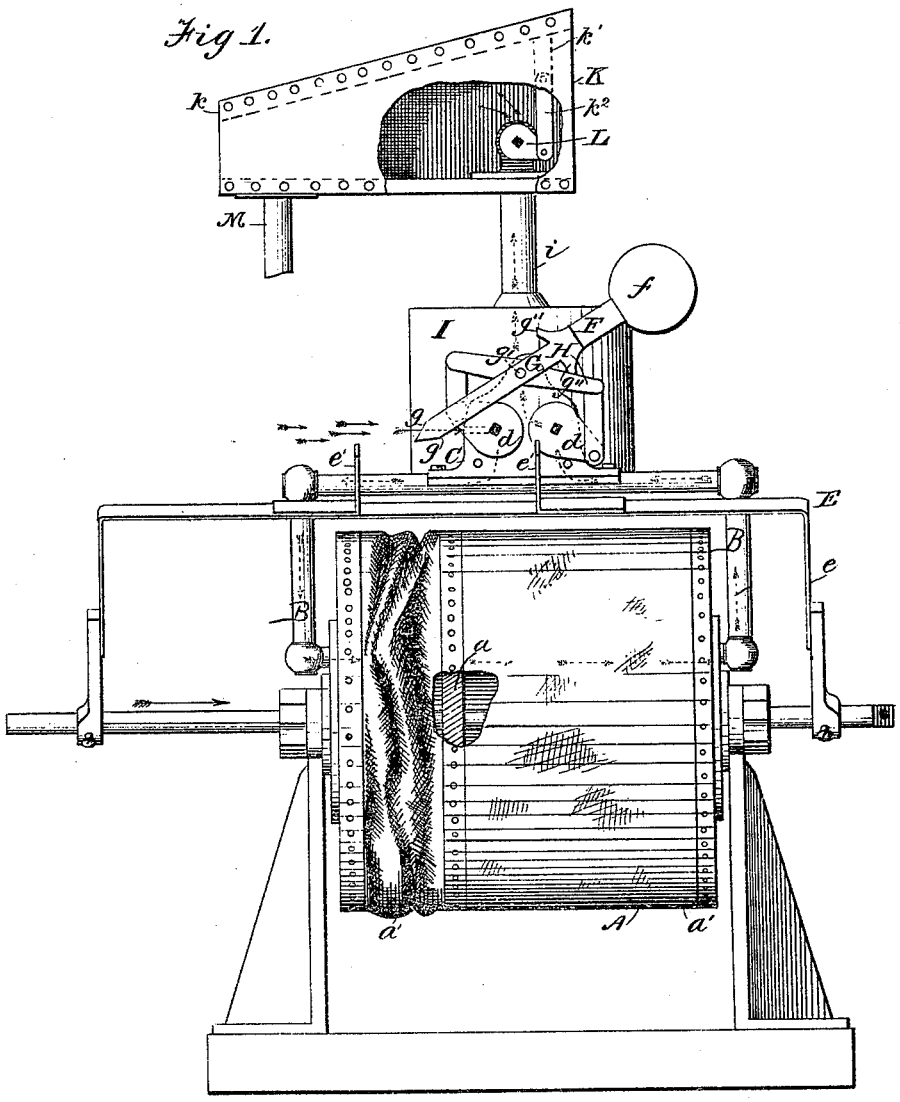
2 Sheets--Sheet 1.

J. H. BEAN.

Gas-Regulator.

No. 168,444. Patented Oct. 5, 1875.

Fig 1.



Witnesses;
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James J. Finley.

Inventor.
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by H. W. Beadle & Co.
his Attys

2 Sheets--Sheet 2.

J. H. BEAN.

Gas Regulator.

No. 168,444. Patented Oct. 5, 1875.

Fig 2.

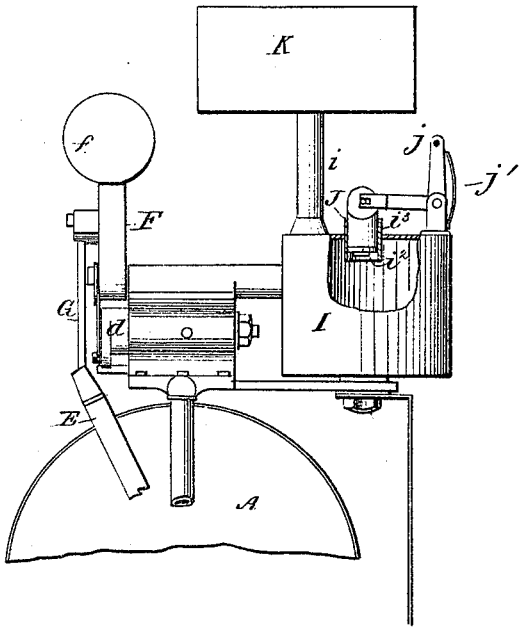


Fig 3

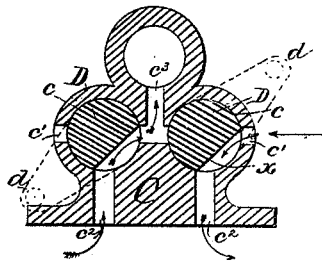


Fig 5.

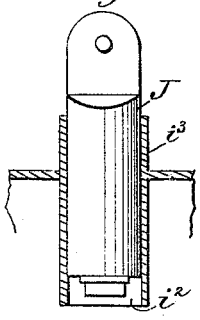
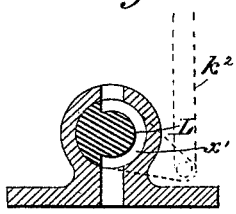


Fig 4.



Witnesses;
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UNITED STATES PATENT OFFICE

JOSEPH H. BEAN, OF CINCINNATI, OHIO.

IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **168,444**, dated October 5, 1875; application filed July 21, 1875.

To all whom it may concern:

Be it known that I, JOSEPH H. BEAN, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Gas-Machines; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This invention consists mainly in the combination of a pump or other air-forcer adapted to furnish an intermittent or irregular stream of air, with a governor adapted to deliver a continuous and uniform stream of any desired pressure. It consists, also, in the combination of a compression-chamber with a governor for controlling the movements of the motor for actuating the pump or air-forcer. It consists, further, in certain details of construction, which, in connection with the foregoing, will be fully described hereinafter.

In the drawings, Figure 1 represents a front elevation of my improved machine; Fig. 2, an end elevation, partially in section; Fig. 3, a sectional elevation of the valves connected with the pump; Fig. 4, a sectional elevation of the governor-valve; and Fig. 5, an enlarged view of the valve controlling the movements of the motor.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

A represents a pump of any suitable construction, the piston of which receives a reciprocating movement from any suitable motor. *a* represents the piston-head, suitably secured to the central portion of the flexible rubber or leather cylinder *a'*, as shown. B B represent air-tubes, which open into the chamber upon each side of the piston and extend to the valve-box, as shown. C represents the valve-box, consisting of a casting of proper size and form, which has longitudinal openings *c c*, Fig. 3, for receiving the valves, inlet-openings c^1 c^1 for taking in the air, and openings c^2 c^2 for discharging the air to the pump-chamber, and delivering the same to the discharge-pipe c^3. D D represent the rotating valves adapted to rest in the longitudinal openings of the valve-box, which are nearly cylindrical in shape, but are cut away at *x*, as shown, for the purpose of providing a proper passage-way for the air-stream. *d d* represent crank-arms, by means of which the valves are revolved. E represents a bar attached, by means of right-angled arms *e e*, to the piston-rod of the pump, which is provided with studs or pins *e' e'*, as shown. F represents a lever pivoted at its lower end to the valve-box, which is provided at its upper end with the weight *f*, as shown. G represents a bar, secured at its upper end to the lever F, and also at *g'* to the pivot of the same, which is provided at its lower end with beveled sides *g g*, and at its upper end with projecting bearing-blocks *g'' g''*, as shown. H represents a lever-beam, centrally secured to the common pivot *g'* of lever F and bar G, which is attached by connecting rods or bars to the crank-arms of the valves, as shown. I represents a compression-chamber of any suitable size and proper strength, which is provided with the discharge-pipe *i* and central openings i^2, Figs. 2 and 5, having the sleeve or hub i^3, as shown. J represents a valve or plug, suitably held in the opening i^2, but free to move in a vertical direction, which is united, by means of the bell-crank lever *j*, with a connecting-rod controlling, in any suitable manner, the movement of the motor. *j'* represents a spring of suitable strength, which is adapted to hold the valve against the pressure in the chamber I. If desired, the valve may be weighted to accomplish the same result. K represents the governor, consisting of a chamber having an elastic or yielding top or side, *k*, attached, by means of the stud or bar k^1 and connecting-rod k^2, with the valve controlling the inlet-opening into the chamber. L, Fig. 4, represents the valve, which is cylindrical in form and adapted to rotate in the corresponding opening of the valve-box. It is provided at *x'* with a groove or passage-way for the air stream, as shown. M represents the discharge-pipe, by means of which the stream of air passing from the governor is conveyed away to any desired point.

The operation is as follows: Motion having been given to the motor by any suitable means, a stream of air or other fluid is forced forward toward the governor-chamber in a series of in-

termittent or irregular impulses. This stream, entering the governor-chamber, exerts a pressure upon the elastic top of the chamber, and gives more or less movement to the same, according to the amount of pressure. The movements of the elastic top, by means of the connections described, actuate the regulating-valve, so that as the pressure is increased the supply is diminished by the closing of the inlet-opening, and as the pressure is diminished the supply is increased by opening the inlet-opening.

As the yielding top acts instantaneously upon the change of pressure, it follows that the valve will also act instantaneously, and that, consequently, the irregular movements of the pump cannot be communicated to the outflowing stream of air.

When the air in the chamber I reaches a certain given pressure the valve J will be raised, and, by means of the bell-crank-lever and connections described, the motor will be consequently checked or stopped in its movement until the pressure again falls below said given point, when the same is permitted again to operate.

The specific operation of the parts will be readily understood. By means of the piston air is drawn into one chamber of the pump and forced out of the other, the return movement of the piston forcing out that previously drawn in, and taking in a new supply for that previously expelled. The valves are properly shifted to permit the entrance of air and compel its proper discharge by the lugs upon the shifting-bar and the weighted lever, which latter serves to change the valves almost instantaneously when the proper time has come.

Some of the advantages of the described construction are as follows: By the employment of the governor a stream of air moving with great irregularity can be readily and certainly changed into a uniform and continuous stream of any desired pressure, the latter being determined by weighting the elastic top, according to the circumstances of the case. It is therefore possible to use a pump in connection with a carbureter without in the slightest degree affecting the steadiness of the flame, no matter how violently the stream may be agitated by the pump—a result of the highest importance in this class of machines. The movements of the motor, also, are readily controlled by the regulating-valve in the compression-chamber.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a pump, A, and governor, having the elastic top and rotary valve, controlling the inlet-opening, as described.

2. The combination of the pump, the valves, the compression-chamber, and the governor, as described.

3. The combination of the compression-chamber I and the valve J with its connections, adapted to control the movement of the motor, as described.

This specification signed and witnessed this 19th day of July, 1875.

JOSEPH H. BEAN.

Witnesses:
JAMES J. FINLEY,
C. A. BRAINERD.