

A. B. GRIFFEN.

APPARATUS FOR MIXING AERIFORM FLUIDS.

No. 320,060.

Patented June 16, 1885.

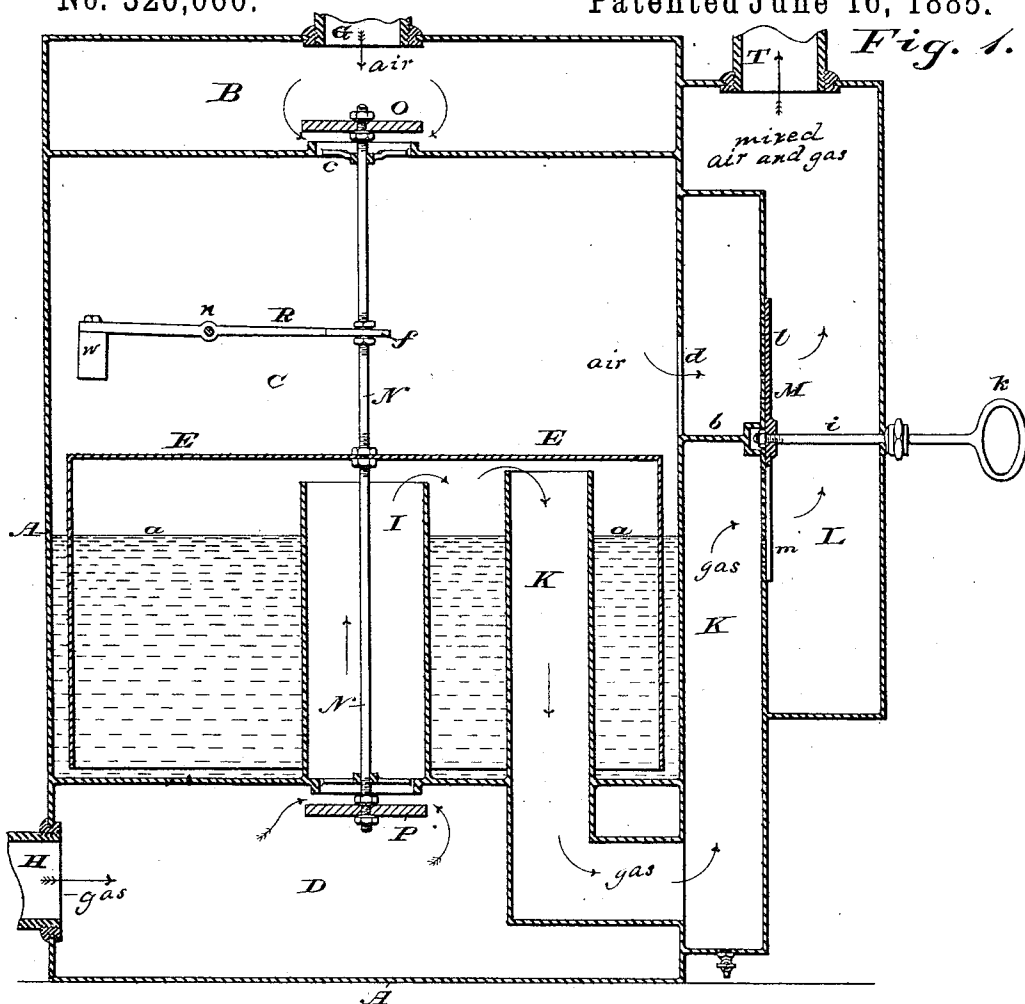
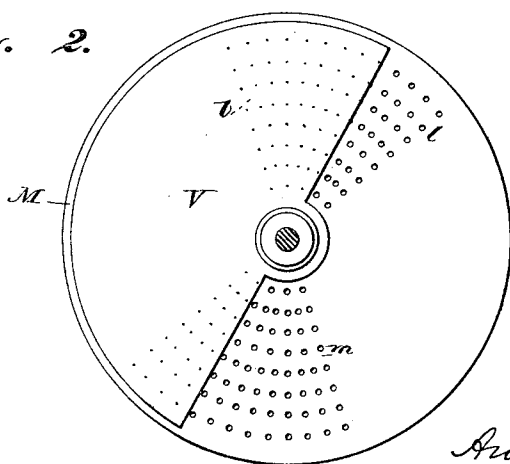


Fig. 2.



WITNESSES:

John H. Parsons
Charles F. Fisher

INVENTOR:

Arthur B. Griffen
By his Attorney,
Abner Malcomson

(No Model.)

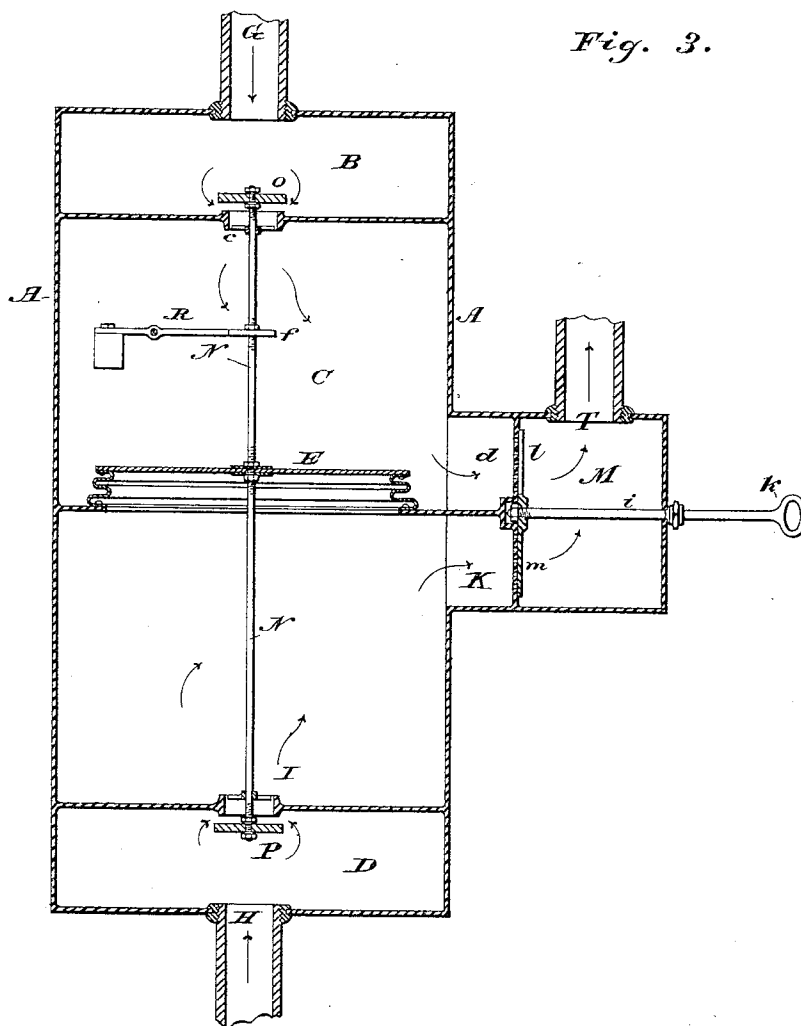
3 Sheets—Sheet 2.

A. B. GRIFFEN.

APPARATUS FOR MIXING AERIFORM FLUIDS.

No. 320,060.

Patented June 16, 1885.



WITNESSES:

John H. Parsons
Amos F. Fisher

INVENTOR:

Arthur B. Griffen
By his Attorney,
Wm. B. Malcom

(No Model.)

3 Sheets—Sheet 3.

A. B. GRIFFEN.

APPARATUS FOR MIXING AERIFORM FLUIDS.

No. 320,060.

Patented June 16, 1885.

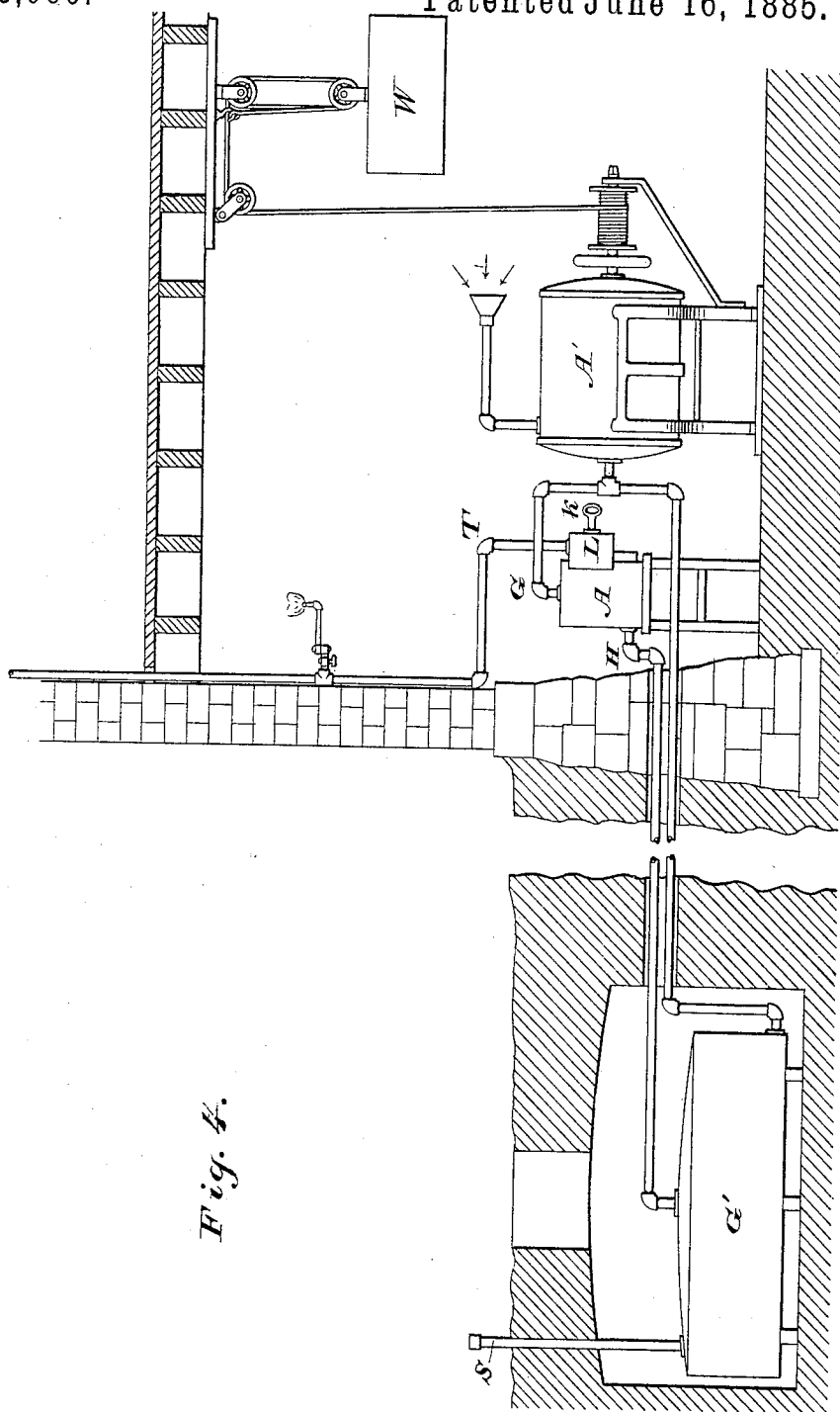


Fig. 4.

WITNESSES:

L. H. Brown
August Fischer

INVENTOR:

Arthur B. Griffen
By his Attorney,
A. Bell Marcoms

UNITED STATES PATENT OFFICE.

ARTHUR B. GRIFFEN, OF NEWARK, NEW JERSEY.

APPARATUS FOR MIXING AERIFORM FLUIDS.

SPECIFICATION forming part of Letters Patent No. 320,060, dated June 16, 1885.

Application filed February 26, 1884. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR B. GRIFFEN, of the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Mixing Aeriform Fluids not heretofore known or used; and I hereby declare the following to be a full, clear description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view of my improved mixer. Fig. 2 is a detached view of the regulator or gate leading into the mixing-chamber. Fig. 3 is a view of the apparatus adapted to be used without water. Fig. 4, Sheet 3, shows the relative positions of the gas and air mixer, the air-pump, and generator.

In Fig. 4, Sheet 3, A represents the gas qualifier or mixer, A' the air-pump, and G' the generator. S is a pipe through which the gasoline is poured into the generator.

This invention relates to that class of apparatus used for the purpose of mixing the requisite quantity of air with gas generated from gasoline in order that it may be of the proper quality for producing perfect combustion at the burners. Various devices have been used for this purpose, all of which are more or less complicated, and designed to regulate the quantity of air introduced into the mixing-chamber in accordance with the varying density or richness of the gas coming from the gasoline in the generator. When the generator is freshly charged with gasoline, the vapor or fluid generated is very dense or rich, and burns poorly, owing to a lack of oxygen; but as the supply in the generator decreases the vapor emitted becomes thinner, and the air passing through the generator being less saturated with gasoline vapors, it contains sufficient oxygen to produce better combustion at the burner, and consequently the supply of fresh air at what is termed the "mixing-chamber" in this general class of apparatus must vary with the condition of the gasoline in the generator.

In the apparatus to which my invention relates the vapors of the gasoline are absorbed by air forced by an air-pump through the generator to the burners, or to what is termed a "mixing chamber" or "compartment," where it may mingle with additional fresh air, if re-

quired, the air for such mixing-chamber being supplied by the same air-pump.

Owing to friction and other causes, the two fluids—viz., the gas from the generator and the fresh air from the air-pump direct—almost invariably vary in pressure; and my invention has for its object the perfect equalization of the pressure of these two fluids before they are brought together at the mixing-chamber, and the provision of a suitable device for gaging the quantity of each fluid admitted to the mixing-chamber when under equal pressure.

Various modifications of the same device may be used to utilize the principle of my invention, and I have shown in the drawings those which I have found will most effectually accomplish the required result.

In the drawings, Figure 1, Sheet 1, shows a compact arrangement of my device for equalizing the pressure of the two fluids and mixing them when under equal pressure.

In Fig. 1, A is a hollow metal case, preferably tubular in form, which is divided by partitions into three compartments, B, C, and D. B is the air-chamber, which is supplied with air directly from the air-pump through the pipe G. D is the gas-chamber which is supplied from the generator G', Sheet 3, through the pipe H. The compartment C contains water to the level A A, floating in which is a gasometer or diaphragm, E. Passing through the center of the gasometer E, and secured to it, is a rod, N, attached to which are the valves O and P, and the rod N is secured to a lever, R, at F in such a manner as to allow a slight movement. The lever R has its fulcrum at n, which is a rod passing across the compartment C and having bearings on the shell A. At one end of the lever R is attached the weight w, which serves to evenly balance the weight of the rod N, and the valves O and P, and gasometer E.

I is a pipe leading from the gas-chamber D up under the gasometer or diaphragm E, and K is a pipe leading from the space under the gasometer to the entrance to what I shall term the "mixing-chamber" L. At the entrance to the mixing-chamber L is a gate or regulator, M. (Shown also in Fig. 2, Sheet 1.) This gate is circular in form, and has two quarter-sections, l and m, perforated or provided with openings, as shown in Fig. 2, Sheet 1, over

which openings a semicircular disk, V, is arranged to slide by turning a handle, *k*. The perforated quarter-sections *l* and *m* cover, respectively, the entrances into the mixing-chamber L of the air and gas. When the disk V is turned so as to equally divide the quarter-sections *l* and *m*, the apertures for the inlet of air and gas will be equal, and any slight turn of the disk V from such position will decrease the air-openings and increase the gas-openings, or vice versa. By the construction of valve shown there will always be a space of one quarter-section open for passage of the fluids into the mixing-chamber. The proportions of gas and fresh air may be altered; but the combined quantity of both passing into the mixing-chamber is fixed by the size of the quarter-sections of the gate M. In practice, therefore, the capacity of the machine may be gaged by the size of the quarter-sections, each hole, when perforations are used, being of a size to supply fluid for one burner. The number of small openings in one of the quarter-sections will then indicate the number of burners the qualifier will supply.

In operation there is a full flow of gas through the pipe H into the chamber D, and a full flow of air through the pipe G into the chamber B. The normal position of the gasometer or diaphragm is that in which the valves O and P are open, admitting gas under the gasometer E and air above it. The gasometer is adjusted to move slightly up or down very easily. When the gasometer moves upward, it carries with it the rod N and valve-plates O and P, by which movement the entrance for gas under the gasometer is partially closed, and the entrance for air over the gasometer is increased. A reverse movement of the gasometer decreases the passage for air and increases the passage for gas. The gas passes through the pipe I under the gasometer and through the pipe K to the mixing-chamber L through one of the perforated quarter-sections of the gate M. The air passes from above the gasometer into the mixing-chamber L, through one of the perforated quarter-sections of the gate M. The mixture passes from the chamber L through the pipe T to the burners. The gate M is adjusted by the handle *k* so as to give the requisite proportions of gas and air. If, for instance, one part air to two parts gas is required, then in a seventy-five-light qualifier the disk V would be turned to give twenty-five openings for air and fifty openings for gas, being one-third of the air-openings and two-thirds of the gas-openings; but in whatever position the disk V was placed there would always be seventy-five openings for the combined fluids to pass through into the mixing-chamber. If the gate M is thus properly adjusted, and the flow of gas should tend to be in excess of the demands for the mixture, the pressure of the gas under the gasometer accumulates and is in excess of the pressure of air above the gasometer, which causes the gasometer to rise

and cut off the supply of gas just enough to reduce the pressure of gas to the pressure of air above the gasometer, thus causing a perfect equilibrium of pressures on the opposite sides of the gasometer or diaphragm. Whenever the discharge of air through the gate M tends to be in excess of the demands of the mixture, the pressure accumulates above the gasometer, which causes the gasometer to fall and cut off the supply of air just enough to reduce to an equilibrium the pressures on the opposite sides of the gasometer or diaphragm. It will be noticed that whenever the supply of either fluid entering the apparatus is reduced the passage for the other fluid is increased; also, that there is always a free passage through the whole apparatus for one or both of the fluids.

Any convenient attachment may be used for supplying water to the chamber C to act as a water-seal for the diaphragm E.

Fig. 3, Sheet 2, shows another form of my apparatus adapted to work without water. A is a metal casing divided into three compartments, B, C, and D. About the middle of the compartment C is a diaphragm, E, of leather or rubber or other suitable material. N is a rod secured to the diaphragm and having valves O and P. G is the air-pipe entering the air-chamber B, and H is the gas-pipe leading from the generator to the compartment D. The valve O covers the opening *c* from the chamber B to the space above the diaphragm E, and the valve P finds its seat on the opening I from the gas-chamber to the space below the diaphragm. The space above the diaphragm has an outlet at *d* to the upper half of the gate or regulator M, which may be of the same construction and arrangement as that described as being used in Fig. 1. The gas below the diaphragm finds its outlet to the gate M through the opening K.

The operation of the apparatus is similar to the operation of the device shown in Fig. 1, the diaphragm E being acted upon by the varying pressure of the two fluids, and by its movement operating the valves O and P.

I do not wish to limit myself to this special mechanism for connecting the cut-offs at the inlet-ports in such a manner as to reduce one port at the same time the other port is increased. Other mechanism can be used for this purpose, as I have shown in separate applications.

I claim—

1. An apparatus for mixing aeriform fluids having ports at the air and gas inlets provided with cut-offs connected by mechanism which under the action of the varying volume and pressure of the fluids reduces the flow of either fluid that is in excess of the demand for the mixture and by the same movement inversely increases the flow of the other fluid, substantially as shown and described.

2. In an apparatus for mixing aeriform fluids, cut-offs at the air and gas inlets con-

5 nected with a gasometer or diaphragm separating the fluids, which is actuated by the varying volume and pressure of the fluids and by its action reduces the flow of the fluid that is in excess of the demand for the mixture and increases the flow of the other fluid, substantially as shown and described.

10 3. In an apparatus for mixing aeriform fluids, cut-offs at the inlet-ports connected to a gasometer or diaphragm inclosed in a compartment containing the air and separating the fluids, which is operated by the varying volumes and pressure of the fluids, in combination with a gate, M, at the entrance to the

mixing-chamber invariable as to capacity for 15 the passage of the combined fluids, but variable as to capacity for the passage of each fluid, substantially as shown and described.

4. In an apparatus for mixing aeriform fluids, the gate M, having perforated quarter- 20 sections *l* and *m*, and semicircular disk V, operated by a handle, *k*, substantially as and for the purposes shown and described.

ARTHUR B. GRIFFEN.

Witnesses:

A. BELL MALCOMSON, Jr.,
ROLAND DE V. PARKER.