(No Model.)

# T. C. & W. E. HOPPER.

## GAS GOVERNOR.

No. 283,245. Patented Aug. 14, 1883.

FIG. 1.

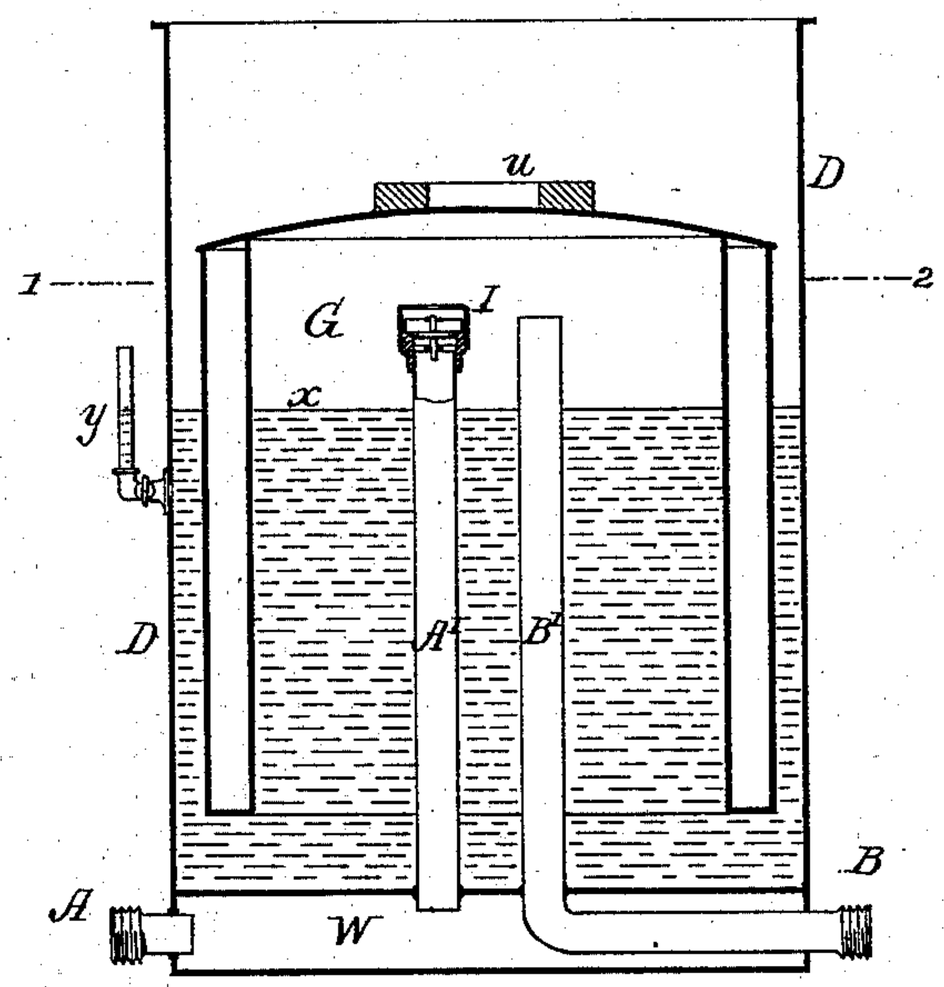



FIG. 2.

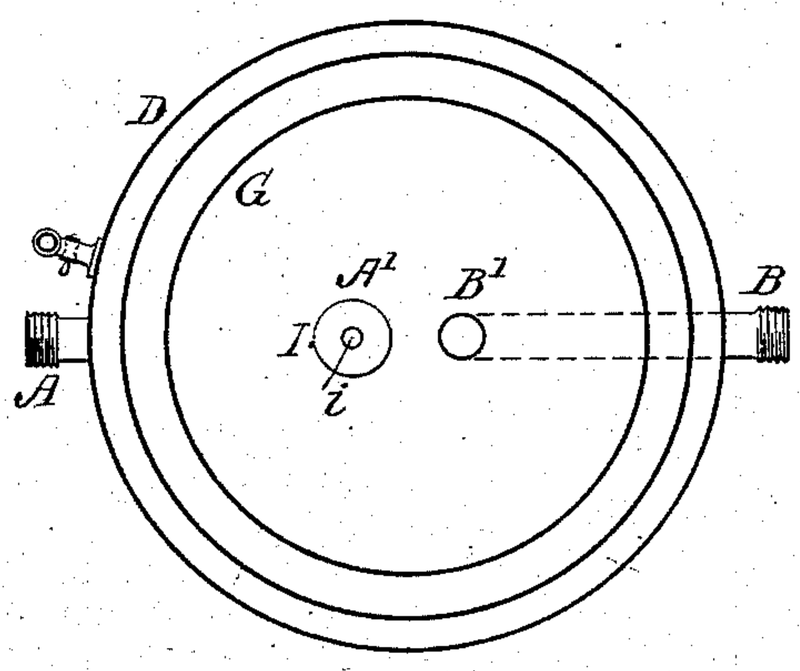



FIG. 3.

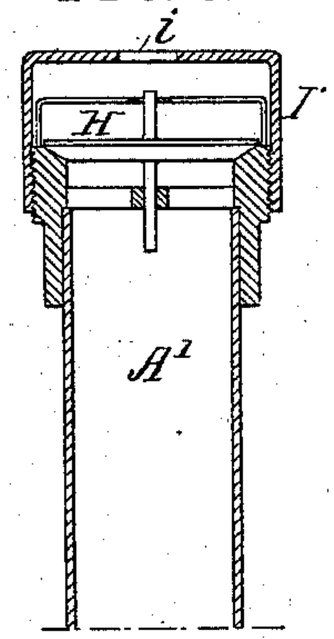



FIG. 4.

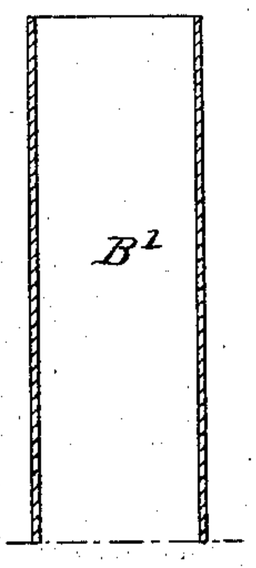
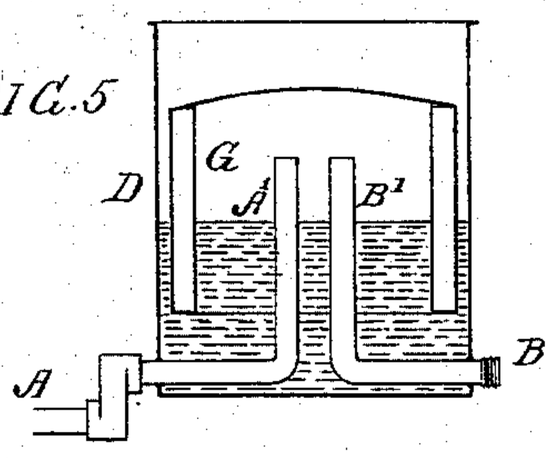



FIG. 5




WITNESSES.

Harry Drury

Harry Smith

INVENTORS.

Thomas C. Hopper

and

Walter E. Hopper

by their Attorneys

Howson & Sons

# UNITED STATES PATENT OFFICE.

THOMAS C. HOPPER AND WALTER E. HOPPER, OF PHILADELPHIA, PA.

## GAS-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 283,245, dated August 14, 1883.

Application filed May 31, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS C. HOPPER and WALTER E. HOPPER, both citizens of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Gas-Governors, of which the following is a specification.

The object of our invention is to prevent the disturbance of the flames of gas-burners which are supplied with gas from the same service-pipe which furnishes gas for gas-engines; and this object we attain in the manner which we will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of the regulator by which our invention is carried into effect; Fig. 2, a plan view; Figs. 3 and 4, sections drawn to an enlarged scale, and showing the upper ends of two pipes appertaining to the regulator; and Fig. 5, a view illustrating a modification of our invention.

Where a gas-engine is furnished from the same service-pipe which supplies gas-burners for illuminating purposes, the flames of the said burners are always disturbed, owing to the demand of the engine for sudden intermittent supplies of gas. In order to obviate this difficulty we interrupt the continuity of the service-pipe by a regulator, which we will now proceed to describe.

A represents the terminal portion of the service-pipe from which the burners derive their gas, and B the delivery-pipe, for conveying gas to the gas-engine only.

A tank, D, preferably of cylindrical form and closed at the bottom, contains a supply of water extending to about the line *x*, and in this water is immersed the lower portion of the holder G, which consists of an open-bottomed cylinder suitably guided in the tank, and which will be particularly alluded to hereinafter.

The terminus of the service-pipe A communicates, preferably through a chamber, W, formed in the bottom of the tank, with a vertical pipe, A′, which terminates within the holder above the water-line *x*.

On the top of the pipe A′ is a seat for the valve H, the spindles of which are guided by cross-bars, in the manner shown in Fig. 3; or any other available appliances for guiding the valve may be adopted. To the top of the pipe A′, and inclosing the valve, is secured a cap, I, having an opening, *i*, of much less area than that of the valve-seat. As long as the gas in the holder is at the same pressure as that in the main the valve remains closed by its own weight; but when the pressure of gas in the holder is reduced the valve will open and the equality of pressure of the gas in the holder and main will be restored. It should be here understood, however, that this opening of the valve is not simultaneous with the removal of gas from the holder, there being a slight hesitancy or sluggish action of the valve before it opens, owing partly to its weight and partly to the comparatively small opening *i* in the cap I.

A gas-engine demands intermittent and such briefly-continued supplies of gas that the latter may be said to pass to the engine with sudden pulsations. When a pulsation occurs, however, it does not disturb the valve, owing to its hesitancy in opening, and hence the pulsations have no effect on the gas in the service-pipe A or on the flames of the burners, the opening of the valve and the restoration of an equality of pressure of the gas in the main and in the holder occurring during the intervals between the pulsations.

The holder is so constructed that in the absence of the pressure of gas it will rest lightly on the bottom of the tank, but will rise under the pressure of gas to an extent dependent upon that pressure, the weight of the holder on the one hand and the limited buoyancy imparted to it on the other hand (in the present instance by making its walls hollow) rendering the said holder self-balancing at all times and under all degrees of pressure without resorting to any addition or removal of weights or any other adjustment.

It is not essential that the valve should be at the top of the vertical pipe A′, or within the limits of the holder or tank. For instance, there may be a valve-chest, K, at the point shown in Fig. 5, for containing a valve to perform the same duty as the valve H; but we prefer the plan of placing the valve at the upper end of the pipe A′.

A glass tube, *y*, communicates with the tank, for indicating the height of water therein.

We claim as our invention—

1. The mode herein described of preventing

the demands of a gas-engine for intermittent supplies or pulsations of gas from disturbing the flames of gas-burners, the said mode consisting in causing the termination of that portion of a service-pipe which supplies the burners to admit the gas to a holder during the intervals between the pulsating escapes of the gas therefrom to the engine, and excluding the gas from the said holder when the pulsations occur, all substantially as set forth.

2. The combination of a gas-holder, the terminal portion A A′ of a service-pipe, provided with a valve opened by the pressure of gas when the latter enters the holder, and a delivery-pipe, B, for directing gas to the gas-engine from the said holder, substantially as set forth.

3. The combination of the holder, the inlet-pipe with a valve, H, and a cap having an opening less in area than the valve, with the outlet-pipe B, substantially as specified.

4. The combination of the tank D and the holder G, automatically and constantly balanced in the said tank under different pressures of gas, with the valved inlet-pipe and the outlet-pipe, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS C. HOPPER.
WALTER E. HOPPER.

Witnesses:
HARRY L. ASHENFELTER,
HENRY HOWSON, Jr.