

(No Model.)

J. S. CONNELLY.  
AUTOMATIC GAS GOVERNOR.

No. 316,945.

Patented May 5, 1885.

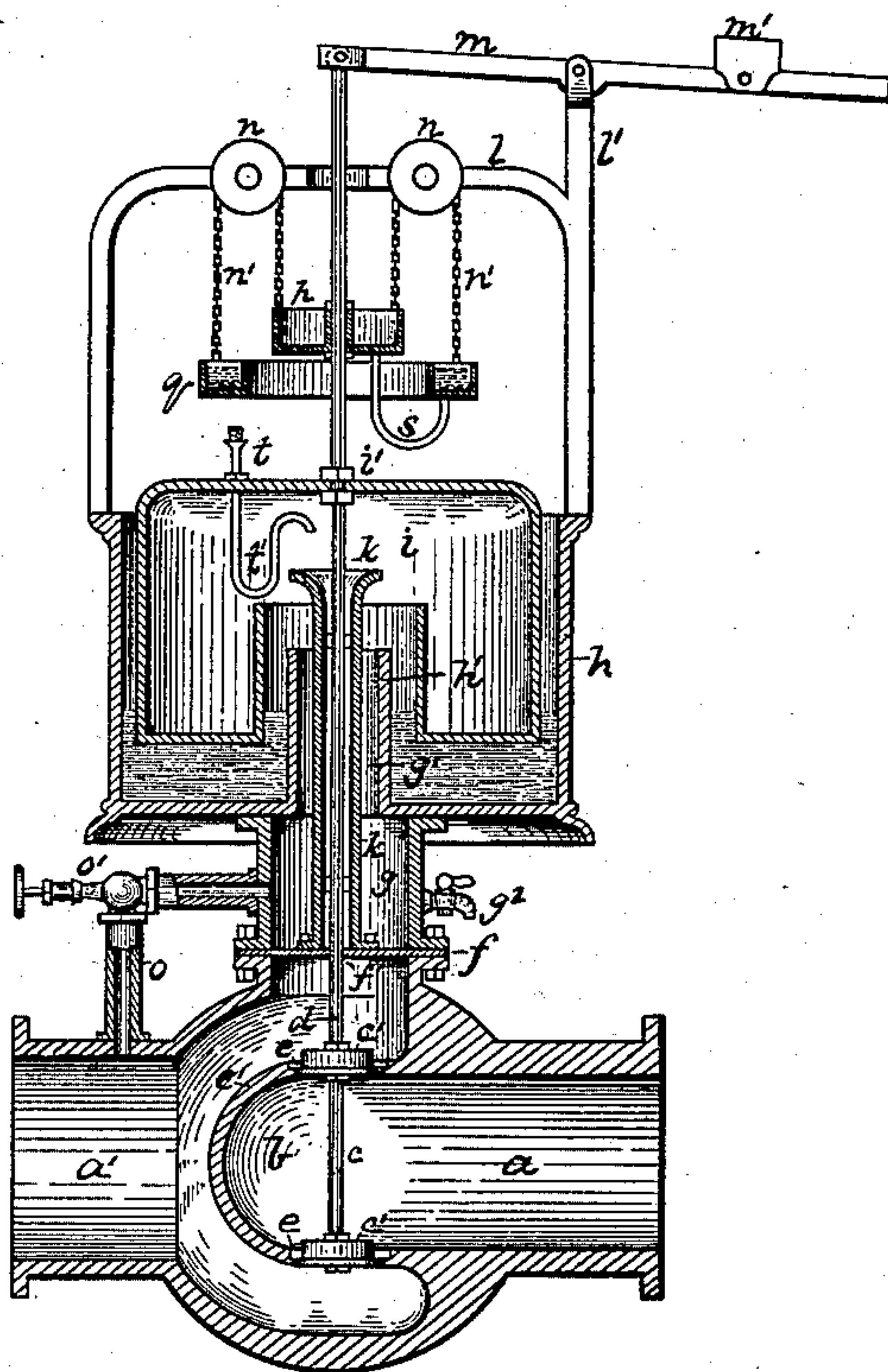


Fig. 1.

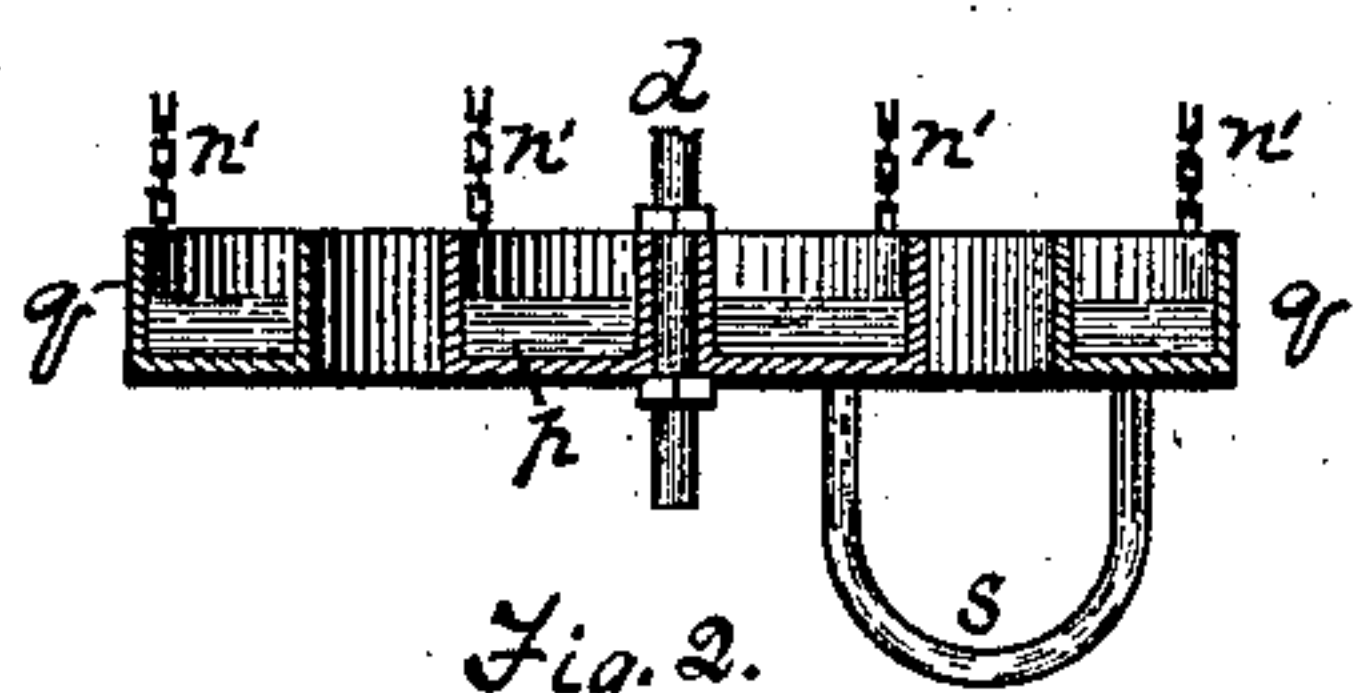


Fig. 2.

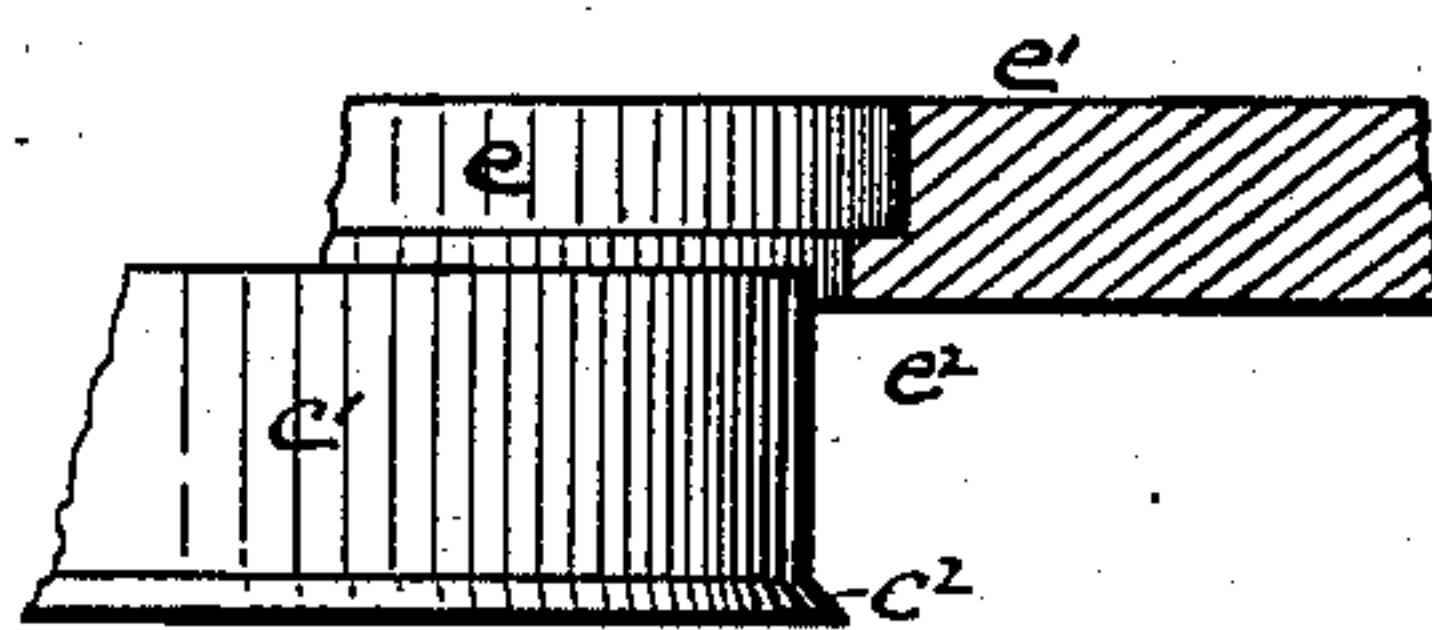


Fig. 3.

Witnesses.

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# UNITED STATES PATENT OFFICE.

JOHN S. CONNELLY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO THOMAS E. CONNELLY, OF SAME PLACE.

## AUTOMATIC GAS-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 316,945, dated May 5, 1885.

Application filed January 16, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN S. CONNELLY, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Governors; and I do hereby declare the following to be a full, clear, and exact description thereof.

My present invention relates to improvements in automatic gas-governors, whereby the valve is rendered more sensitive, and its tendency to vibrate under the gas-pressure when used in extensive lines of main pipes is obviated. In this respect it is an improvement on the device shown in my Patent No. 297,113, dated April 22, 1884, which, while of greater precision in lines of moderate length and capacity, develops a tendency to vibrate in more extended or larger lines.

To enable others skilled in the art to make and use my invention, I will now describe it by reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my improved governor. Fig. 2 is an enlarged view of the mercury-cups. Fig. 3 is an enlarged view of the valve and seat.

Like letters of reference indicate like parts in each.

In the drawings, *a* indicates the main leading from the gasometer, *a'* the service-main, and *b* the valve-chamber of the governor. In the valve-chamber *b* is a diaphragm, *e'*, in which is a balanced valve, *c*, composed of two disks, *c'* *c'*, mounted on a stem or rod, *d*, and controlling the valve-openings *e*. The disks *c'* *c'* each have a cylindrical body and a radially-projecting flange, *c''*, extending around the edge. The valve-openings *e* each have an inwardly-projecting flange, *e''*, extending around the lower edge, of such diameter as to fill the opening nicely, and at the same time capable of passing through it. When, in the movement of the valve, the flanges *c''* of the disks *c'* are opposite the flanges *e''*, the valve is closed, and when the flanges *c''* are below the flanges *e''* the valve is partially open, and no increase in the area of the openings will take place until the disks have passed entirely through the valve-openings *e*.

Secured to the upper side of the valve-chamber *b* is a tubular casing, *g*, which sustains a float-chamber, *h*, containing water or other liquid, and fitting loosely in the chamber *h*, so as to rise and fall therein, is a float, *i*. A central tube, *h'*, extends from the bottom of the chamber *h* up to a point above the level of the liquid therein.

Secured between the flanges of the valve-chamber *b* and the casing *g* is a plate or disk, *f*, from which a tube, *k*, rises and extends up through and above the tube *h'*. The plate *f* has a central hole, *f'*, of sufficient size for the passage of the valve-stem *d*, which stem extends up through it and through the tube *k*, float *i*, and bail or yoke *l* to the end of the lever *m*, to which it is pivotally fastened.

Surmounting the chamber *h* is a yoke or bail, *l*, at one side of which is a vertical arm or standard, *l'*, upon which the weighted valve-lever *m* is pivoted.

Journaled on the yoke *l* are pulleys *n* *n*, preferably two on each side, suspended on which, by means of two chains, *n'* *n'*, are two cups, *p* *q*, the inner ends of the chains being connected to the inner cup, *p*, and the outer ends to the cup *q*. These cups are designed to hold mercury, and each has sufficient capacity to contain the entire quantity of mercury used. They are connected by means of a flexible tube, *s*, by which the mercury can pass from one to the other. The inner cup, *p*, is fastened to the valve-stem *d*, as also is the float *i* at *i'*.

Passing through the top of the float *i* is an oiling-tube, *t*, which is bent so as to form a seal at *t'*, and has its inner end turned downward over the flaring mouth or upper end of the tube *k*, so as to discharge therein. The outer end of the tube *t* is preferably closed by a stopper or cap.

When it is desired to oil the valve-stem, the stopper or cap is removed and the oil is poured into the outer end of the tube, by which it is discharged into the tube *k*. The oil remaining in the bend *t'* acts as a seal, and prevents the escape of the gas from the float through the tube when the latter is opened for the purpose of oiling.

Connected to the valve-chamber *b* at a point beyond the valve *c* is a pipe, *o*, controlled by



a valve,  $o'$ , which pipe extends upward and enters the side of the casing  $g$ . An annular opening or passage,  $g'$ , extends from the chamber  $g$  up between the tubes  $h'$  and  $h$  and opens into the float  $i$ . Thus communication is established between the service-main  $a'$  and the float  $i$  by means of the pipe  $o$ , chamber  $g$ , and passage  $g'$ , so that the pressure in the service-main may act on the float and the variations of such pressure regulate the position of the valve  $c$ . The chamber  $g$  is provided with a drain-cock,  $g^2$ .

In the distribution of illuminating-gas the governor, when not automatic, requires to be adjusted to meet the exigencies of two different and widely-varying pressures—viz., the day-pressure, which, being designed to supply the small demand of the daylight-hours, is comparatively very low, and the night-pressure, which must be sufficient to supply every burner on the line. If the night-pressure is kept on the mains during the daylight period, the loss by leakage is great, and hence it has been customary to adjust the valve so that when the float is free to act it shall stand normally at the day-pressure, and then to obtain the night-pressure by placing weights on the valve-stem, so as to depress the valve. These weights are removed when the necessity for a high pressure passes, and the valve then returns to its normal position. In my Patent No. 297,113 I obtained an automatic operation of the valve by an improved application of a counterweighted pivoted lever, which was rendered more sensitive and effective by providing a valve having a long run in its seat before passing out of the same to give the night-pressure. As stated, my present invention is an improvement on the latter. The rationale of the operation of a governor is as follows: The valve being in position to supply the day-pressure, any diminution of pressure in the service-main  $a'$  produced by additional lights will permit the float to descend, because it is sustained by the pressure of the gas in the service-main acting through the pipe  $o$ , and thereby open the valve sufficiently to admit the requisite quantity and pressure of gas to the service-main to supply the increased demand thereon. Any reduction of demand on the service-main caused by the turning out of some of the lights supplied thereby causes the float to act in the opposite direction and close the valve sufficiently to reduce the supply to correspond with the reduced demand.

The operation of my improvement is as follows, viz: As shown in Fig. 1, the parts are in position for daylight-pressure. The cup

$q$ , being below the cup  $p$ , contains all the mercury, the weight of which contributes to the counter-weight  $m'$  in sustaining the valve  $c$  in position. A reduction of pressure in the service-main  $a'$  causes the valve to descend. It moves with little or no increase of pressure until the lower surfaces of the disks  $c'$  and the upper surfaces of the diaphragm  $e'$  are in the same horizontal plane, as shown in Fig. 3, when the cups  $p$  and  $q$  will be on the same level and the mercury evenly divided between them, as shown in Fig. 2. The further descent of the valve causes the disks  $c'$  to clear the openings  $e$  and gradually throw the night-pressure on the service-main. It also causes the entire quantity of mercury to be transferred to the cup  $p$ , so as to weight the valve against the increased pressure in the service-main and hold it open. When the pressure in the service-main diminishes by the turning off of the lights during the late hours of the evening, the valve  $c$  is gradually restored to its normal position, and the mercury gradually transferred to the cup  $q$ , as in Fig. 1, when its weight aids in sustaining instead of depressing the valve.

My improved governor is very sensitive and precise in its operation, and entirely automatic. It is applicable with the same good results to gas-distribution plants of all sizes, and is not subject to the vibration before mentioned.

I can use any other suitable transferable weight medium instead of the mercury; but I prefer it on account of its weight, fluidity, and non-evaporating property.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a gas-governor, the combination of a valve, valve-stem, and float with compensating fluid-weight vessels having a flexible connection, one of which is fastened to the valve-stem and connected to the other by chains passing over suitable sheaves, substantially as and for the purposes described.

2. In a gas-governor, the combination of a float, a tube projecting up through the float, and a valve-rod extending through said tube, with an oiling-pipe, provided with a trap or sealing-bend, extending through the shell of the float, and terminating over the end of the valve-stem tube, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 6th day of January, A. D. 1885.

JOHN S. CONNELLY.

Witnesses:

W. B. CORWIN,  
THOMAS W. BAKEWELL.