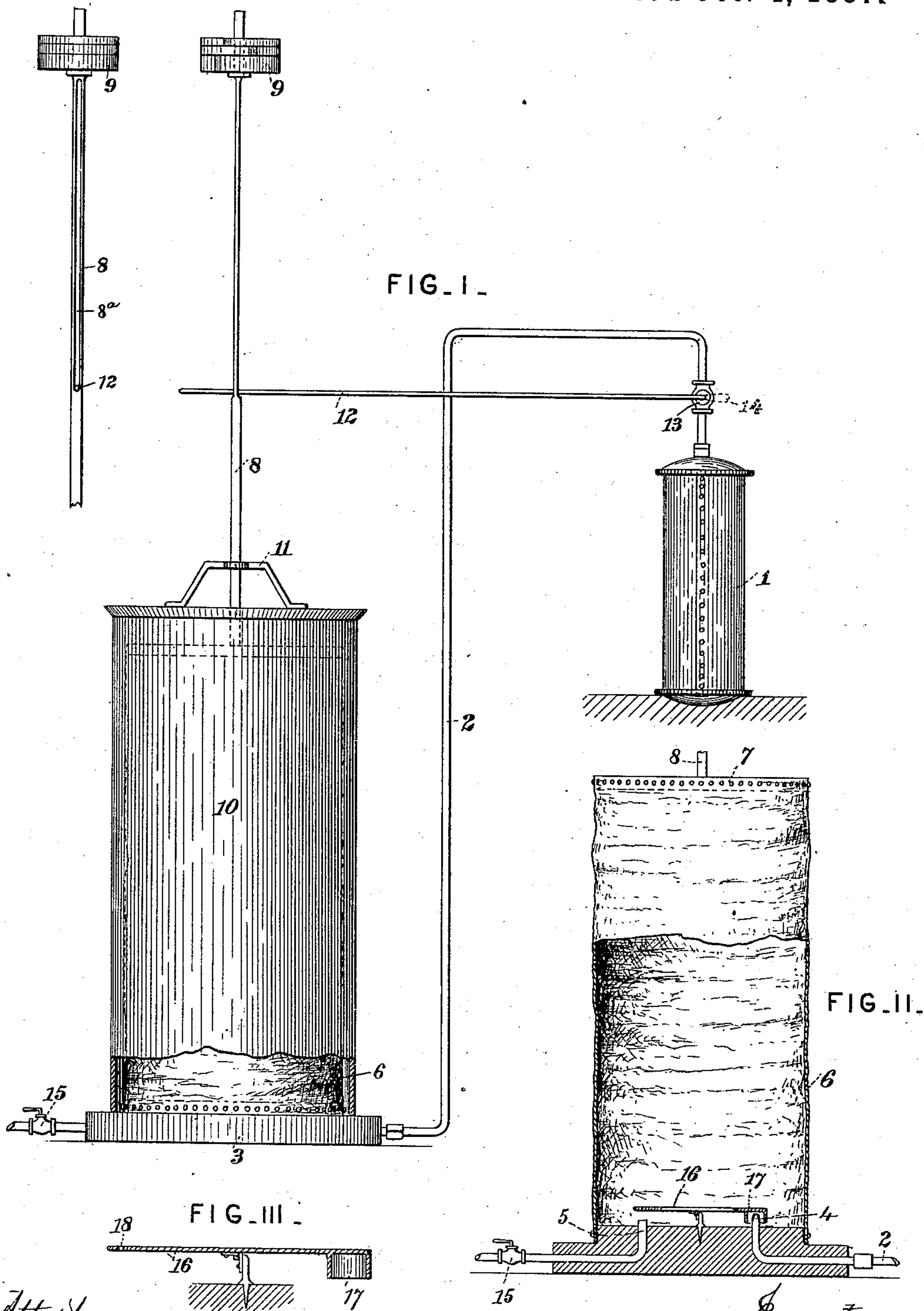


(No Model.)

H. C. JOHNSON.
FLUID PRESSURE REGULATOR.

No. 370,791.

Patented Oct. 4, 1887.



Attest:
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UNITED STATES PATENT OFFICE.

HENRY CLAY JOHNSON, OF MEADVILLE, PENNSYLVANIA.

FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 370,791, dated October 4, 1887.

Application filed January 25, 1887. Serial No. 225,472. (No model.)

To all whom it may concern:

Be it known that I, HENRY CLAY JOHNSON, a citizen of the United States, residing at Meadville, in the county of Crawford and State of Pennsylvania, have invented certain new and useful Improvements in Fluid-Pressure Regulators, of which the following is a specification.

This invention relates to gas-regulators.

The object of the invention is to be able to regulate the pressure of gas, so that it may be supplied at the point of use with any desired degree of force and at a uniform rate.

It is well known that difficulties present themselves in the use of natural burning-gas as it issues from the well, owing to the great pressure and tension under which it seems to be held and the great force with which it issues from the earth, while when gas, either natural or artificial, is stored under pressure in an unyielding receptacle the pressure varies directly with the discharge of the gas therefrom, and is at first too great, impairing the desired effect and causing waste of the gas.

The present invention, then, consists in an apparatus designed to overcome these defects and insure a uniform supply of gas at a moderate degree of force, all as hereinafter described with reference to the accompanying drawings, the particular features of novelty being pointed out in the claims.

In the accompanying drawings, in which like letters of reference indicate corresponding parts, I have illustrated an embodiment of my invention.

Figure I is a view, chiefly in side elevation, showing my improvement applied for use in connection with a portable holder for compressed artificial or natural burning-gas, but with a portion in section to show a rigid casing over the expansible reservoir. Fig. II is a view partly in elevation, but chiefly in vertical section, of the expansible reservoir, showing the induction and discharge pipes therefrom with means for regulating the discharge. Fig. III is a vertical longitudinal section, on an enlarged scale, of my automatic gage.

While my invention is applicable to the control and regulation of the supply of gas wherever it may be found under pressure, and is thus applicable to the regulation of the supply of gas as it issues directly from a well or the

earth, I have illustrated my invention with the employment of an unyielding holder or receptacle in which gas is stored for use.

When burning-gas, either natural or artificial, is stored in unyielding portable holders, it may be employed in various situations for use. Thus upon railway-trains or on ship-board it may be employed for illuminating purposes, though in these situations it may also be employed as the sole means or the fuel for the generation of steam to supply the requisite power of propulsion; but in any of these situations it is requisite that the supply should be capable of exact control.

In the present case I show only one embodiment of my invention, and illustrate its application in connection with a portable unyielding holder, 1, of convenient size for transportation, in which burning-gas may be stored under a pressure of many atmospheres. A supply-pipe, 2, may be coupled to the holder 1 at one end, its other end having communication with the apparatus for consumption of the gas. At an intermediate position of the pipe 2 it is led into the base 3 of my pressure-regulator. Preferably it passes directly into the material of the base and has both its inlet and outlet ends or nozzles 4 5 slightly above the level of said base. Fixed to the base, so as to surround both inlet and outlet, is a reservoir, 6, preferably of rubber, leather, or other flexible material, having wooden or similar head, 7, to which is fixed rod 8, bearing weights 9, which may be regulated as desired. A strong metal or wooden casing, 10, may surround flexible reservoir 6 to protect it and keep it in place. On the top this casing may support guides 11 for the rod 8. A vertical slot, 8^a, is made in the rod 8, to receive a lever, 12, fixed to a valve, 13, in the pipe 2. Instead of being directly fixed to this valve, as here shown, the lever 12 may have any other suitable operative connection therewith; or a handle, 14, (shown in dotted lines in Fig. 1,) may be fixed to the valve 13 to enable its manipulation. A hand-valve, 15, may also be employed in the exit 2 to enable the ready cutting off of the flow when it is suddenly necessary.

Pivoted to the base 3 centrally between the inlet and outlet 4 5 is an arm, 16, having at one end a cup, 17, surrounding the inlet 4, and

near the other end a small hole, 18, immediately over the outlet 5.

The operation of my improvement is as follows: The position of the arm 16 being that shown in Fig. 2, and the reservoir 6 being full, as there shown, the supply of gas from holder 1 will be cut off, and as the gas is needed it will be pressed out through the outlet 5 with a constant pressure regulated by the weight 9. When the head 7 has been pressed down by the weight, so as to have nearly emptied the reservoir, the lever 12, abutting against the upper end of the slot of the rod 8, will be carried down with the said rod. The valve 13 then will be opened and gas will be admitted from the holder 1. As the gas enters the reservoir 6 under heavy pressure, it will throw up the cup 17 and gradually fill the reservoir. The hole 18 being of sufficiently smaller area than the exit 5, prevents the increase of pressure in the reservoir while filling from increasing the rapidity of outflow. By a proper proportion of the areas of the openings and weight 9 the pressure in the exit-pipe can be maintained practically constant. When the reservoir has become filled to the necessary extent, the lever 12 is raised by impinging against the lower end of the slot 8, the supply of gas from the holder 1 cut off, and the arm 16, by reason of the weight of the cup 17, reassumes the position shown in Fig. 2, thus opening the outlet 5.

I am aware that a regulating-reservoir with which communicate an inlet and an outlet pipe has been provided with means for closing the inlet-pipe, and thereby cutting off the supply of gas to the reservoir when a predetermined pressure within the latter has been reached; but I am not aware that a regulator actuated by the admission of gas to the said reservoir has ever been applied to the outlet-pipe for the purpose of maintaining an even pressure therein, even though the pressure within the reservoir be at times materially varied.

Having thus described my invention, what I particularly desire to claim and secure by Letters Patent is—

1. The combination, with an expansible reservoir having inlet and outlet tubes, of a valve in the inlet-tube opened by the collapsing of the expansible reservoir to admit gas thereto, and a device actuated by the admission of gas to the expansible reservoir for partially closing the outlet-tube, substantially as set forth.

2. The combination, with an expansible reservoir having an inlet and an outlet tube, of a cup opposite the mouth of the inlet-tube for receiving the impact of the gas as it enters and a valve for regulating the passage of gas through the outlet-pipe, having connection with said cup, whereby it is actuated by the impact of the intruding gas, substantially as set forth.

3. The combination, with an expansible reservoir having an inlet and an outlet pipe, of a valve located in the inlet-pipe, actuated near the end of the expanding movement of the reservoir to close and near the end of the contracting movement of the reservoir to open said pipe, substantially as set forth.

4. The combination, with a gas-holder provided with a valve to control the discharge of gas, having an elongated handle, of an expansible reservoir having a weighted rod fixed to its head and provided with a slot through which the elongated handle of the valve of the gas-holder passes, whereby the valve is closed or opened by the expansion or contraction of the expansible holder, substantially as shown.

5. The combination, with an expansible reservoir having inlet and outlet tubes to and from it, of a lever having one end arranged over the inlet-pipe and adapted to be operated by the flow of gas therefrom, and the other over the discharge-pipe and adapted to decrease its capacity of discharge, substantially as set forth.

HENRY CLAY JOHNSON.

Witnesses:

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HARRY E. KNIGHT.