

(No Model.)

A. F. OLDS.
GAS REGULATOR.

No. 331,000.

Patented Nov. 24, 1885.

Fig. 1.

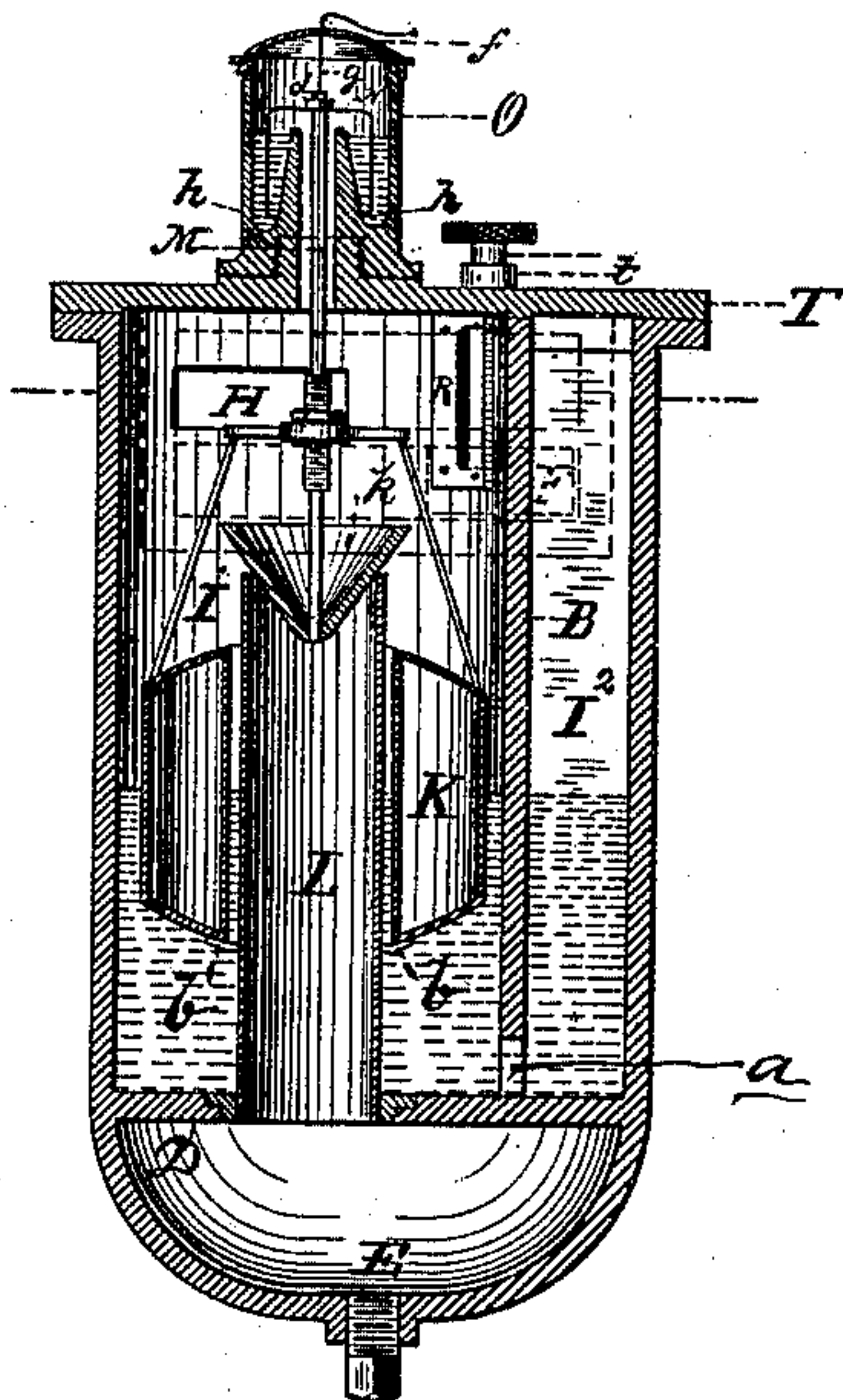


Fig. 2.

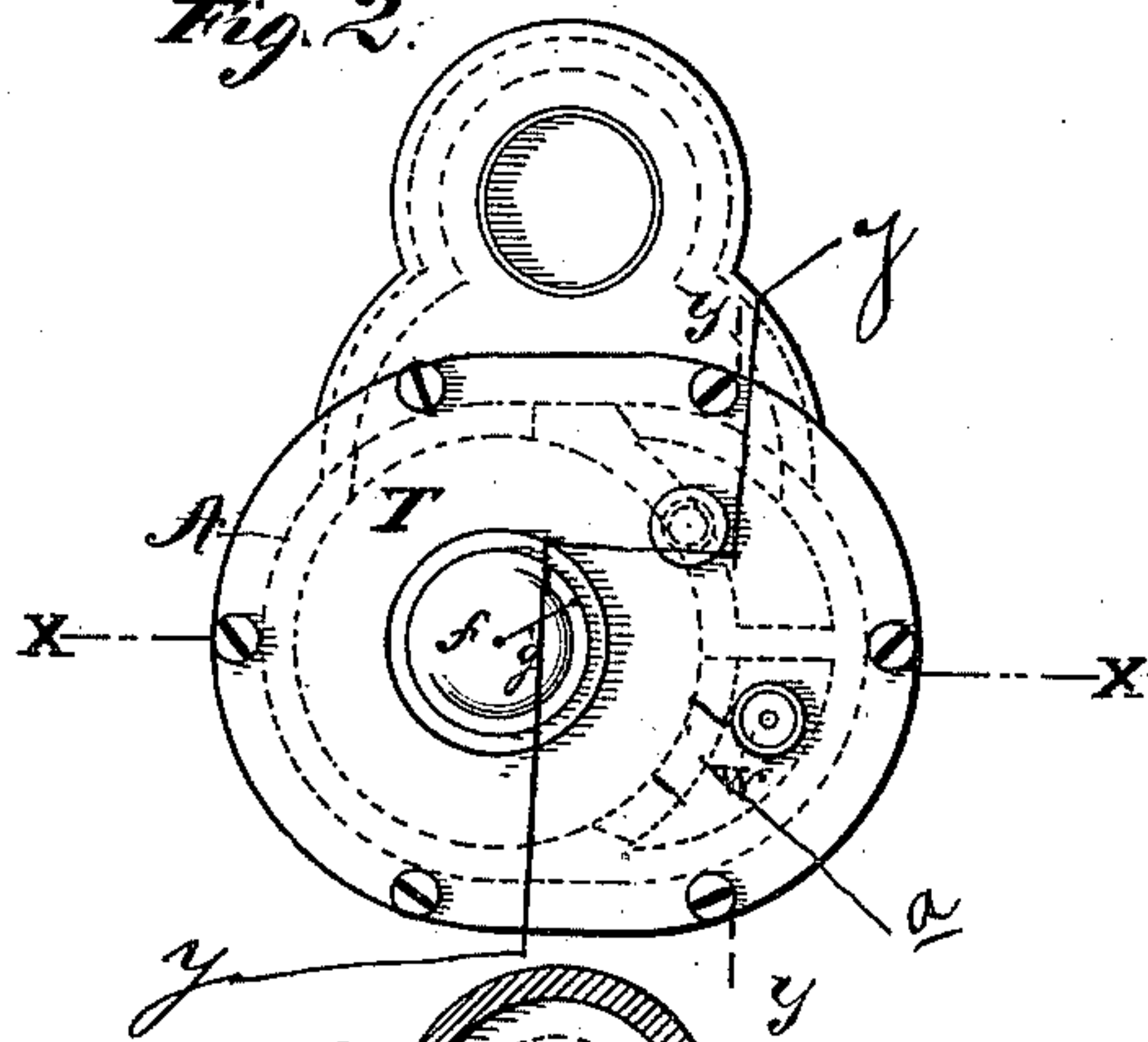


Fig. 3.

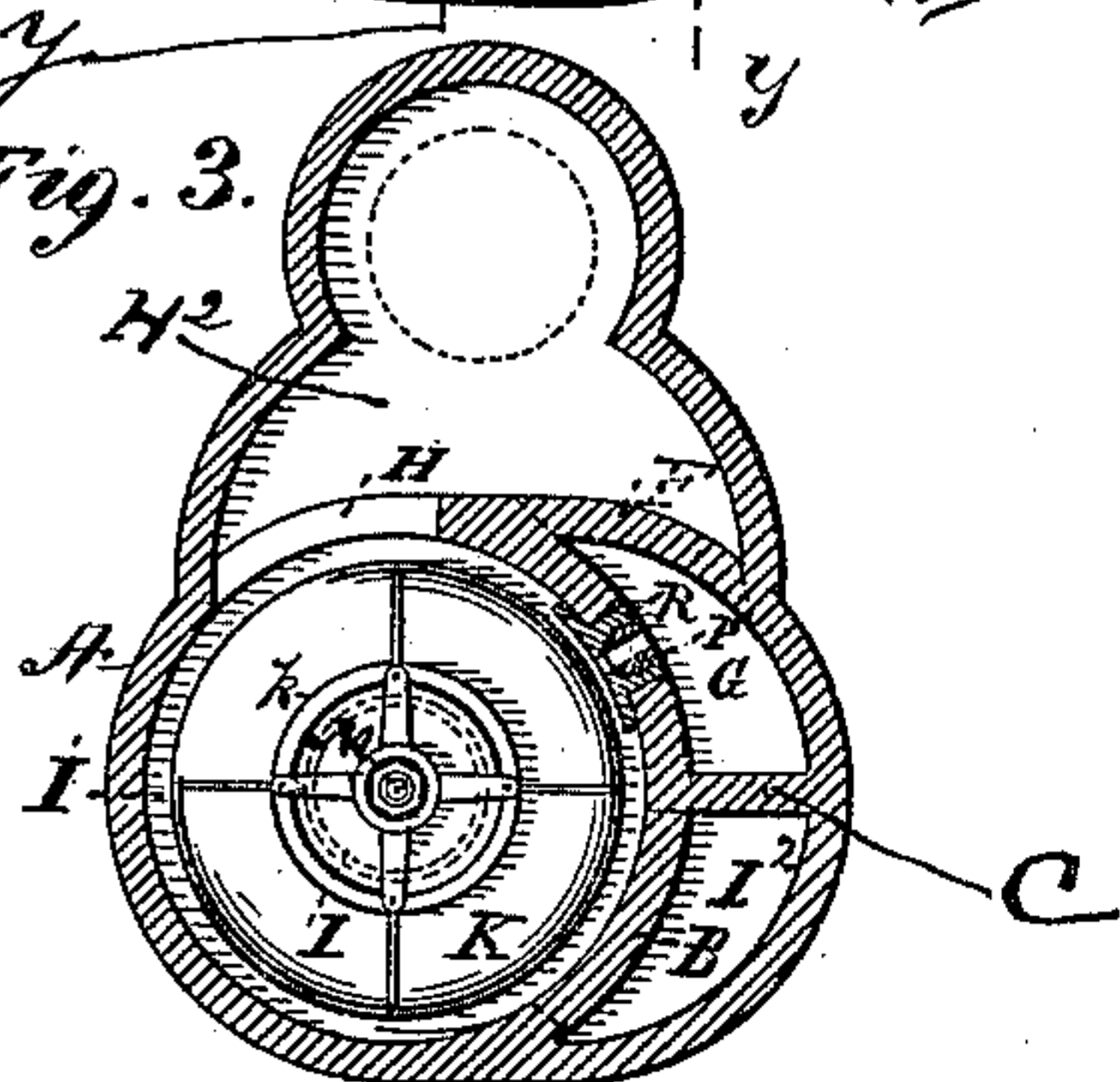


Fig. 4.

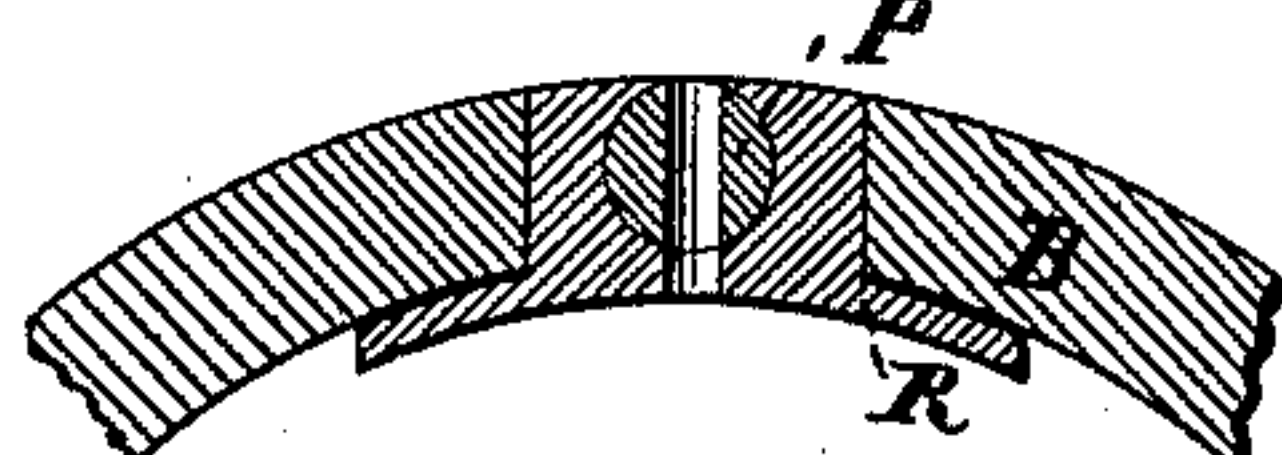


Fig. 5.

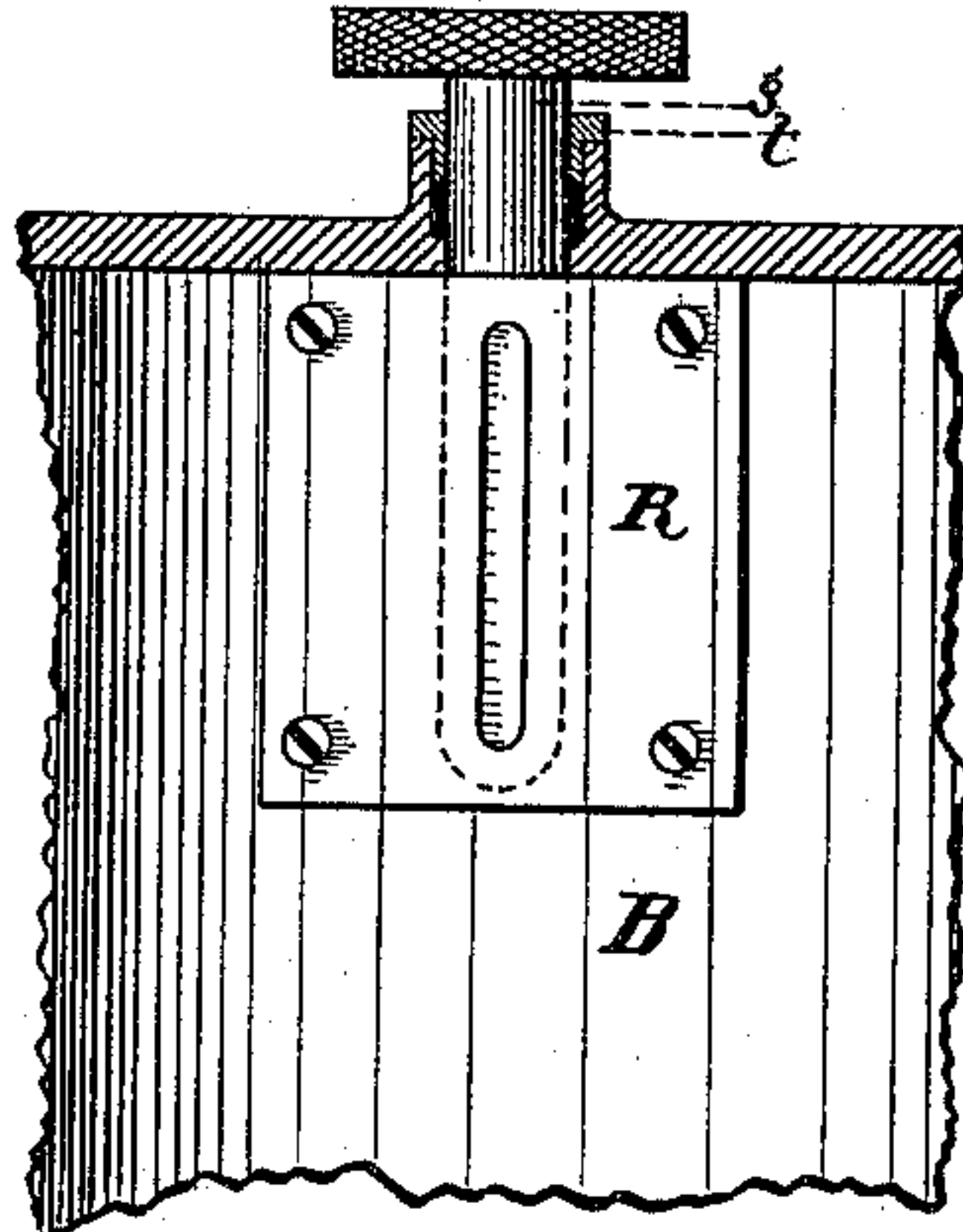
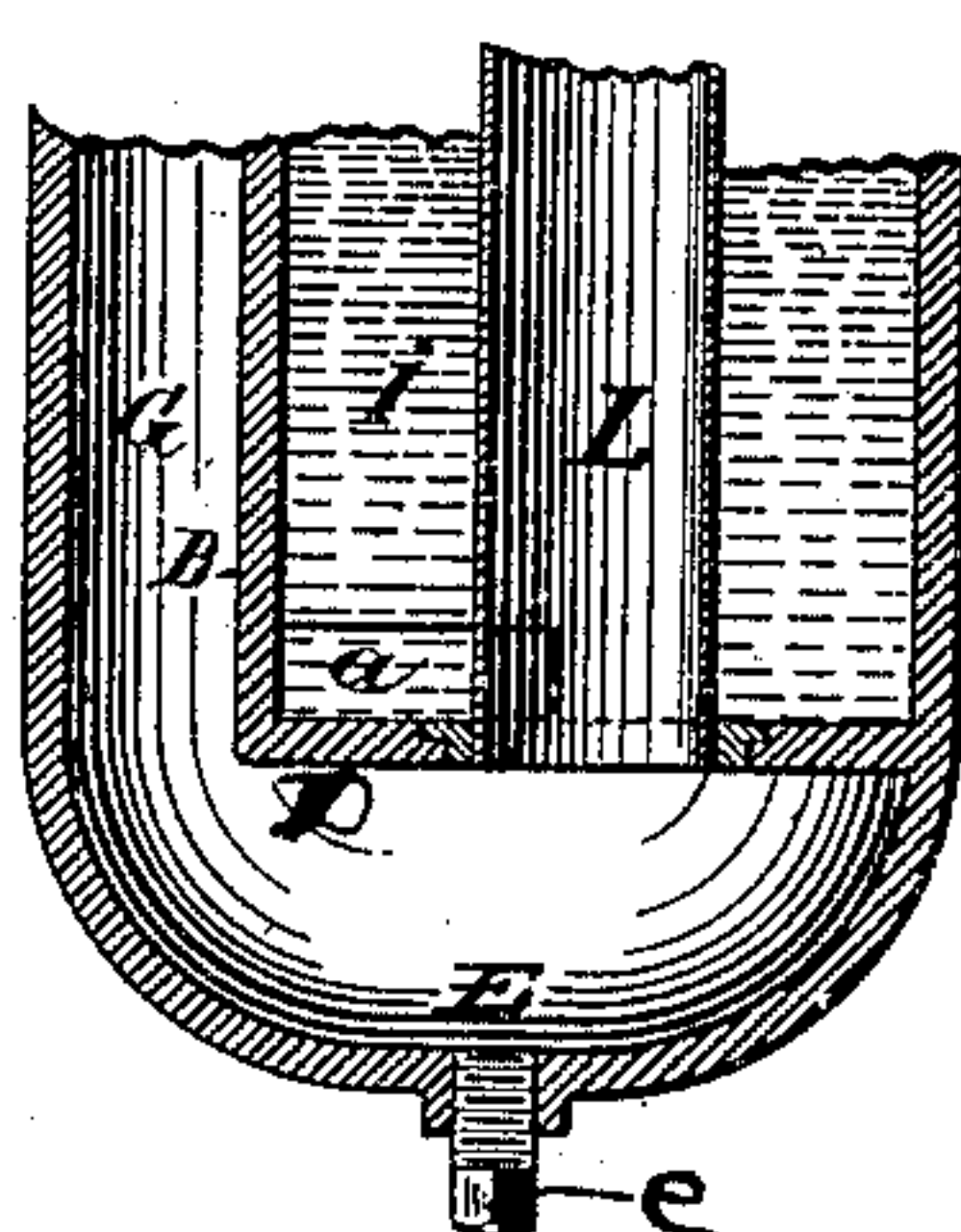


Fig. 6.



Fig. 7.



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GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 331,000, dated November 24, 1885.

Application filed August 28, 1885. Serial No. 175,542. (No model.)

To all whom it may concern:

Be it known that I, ALONZO F. OLDS, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification.

My invention is designed more especially as an improvement upon that class of regulators in which the regulating-valve is supported by a float floating in one of the compartments of a two-compartment liquid-chamber, one compartment (that in which the float is located) communicating with the outlet of the regulator and the other with the outside air.

My invention is further designed to improve regulators of the kind in which an elbow or trap to collect the condensations from the gas is employed, the gas entering the regulator being made to flow to said elbow, trap, or chamber, and thence upward into the regulator-case and to the pipe or passage opening at the regulator-valve. A regulator having these general characteristics forms the subject of patent to John D. Averell, No. 313,846, dated March 17, 1885; and it is to the simplification and improvement of the regulator of said patent that my present invention is more particularly directed, although some of the features of my improved regulator are applicable to other forms.

The object of my invention is to improve and simplify the construction of the regulator-case, to diminish the friction of the working parts, to steady them in action, and to improve in general the devices and attachments going to make up the complete regulator.

My invention consists (generally speaking) in the novel features that I shall first describe in connection with the accompanying drawings, and then specify more definitely in the claims.

In the accompanying drawings, Figure 1 is a vertical section of my improved regulator on the line X X, Fig. 2. Fig. 2 is a plan of the regulator with the cover-plate in place. Fig. 3 is a sectional plan of the regulator-casing with the regulating-valve and adjuncts removed. Fig. 4 is a horizontal cross-section through the part containing the by-pass cock.

Fig. 5 is an elevation of the by-pass cock secured in place in the partition, the cover and packing devices being shown in section. Fig. 6 is a vertical section of the excavated plug placed in the opening, through which air passes and liquid is introduced. Fig. 7 is a vertical section of the lower portion of the regulator-casing on the line Y Y, Fig. 2.

A indicates the casing of the instrument, in which are the four compartments, chambers, or passages, I I² G E, formed by partitions or walls B C D, cast in one piece with the case. The chamber I in the upper portion of the case is the valve-chamber, and forms in effect one leg or side of the two-compartment chamber in which the valve-supporting float K floats in liquid, the other compartment being formed by the chamber I², open to the air, as will be presently described, and communicating with I at or near its bottom by the opening *a* in the partition B. The upper portion of chamber I is the gas-chamber, communicating by opening H with space H², to which the outlet-pipe of the regulator connects in any suitable way, and the pressure of gas in said chamber determines the flow of gas by pressure on the connected columns of liquid contained in chambers I I². The chamber or pipe G communicates by opening F with the inlet-pipe to the regulator, and is cut off from chambers I I² by the walls C B. This chamber is open to the bottom of the casing, and is therefore in communication with the chamber E at the bottom of the case, which chamber I denominate a "condensing and collecting chamber," because it serves to condense and collect the impurities and surplus gas-products which might otherwise deposit upon or collect in other parts of the apparatus and clog the action. The bottom of the chamber is normally closed by a plug, *e*, fitting an opening in the bottom. By withdrawing the plug the accumulation in chamber E may be withdrawn. The chamber E, being a distinct chamber, may be of any desired size, and being, as described, of larger caliber than if it were formed only of a portion of the gas-pipe, will permit the accumulation of a large mass of material, which in the prior forms of the apparatus might clog and stop the flow of gas.

This chamber being of larger caliber than the gasway, constitutes, essentially, an expansion-chamber, in which the gas may expand before reaching the regulating-valve, and may there-
 5 by be made to throw down the impurities or excess of hydrocarbon which otherwise might pass to the regulating-valve, and by depositing on its surfaces eventually clog the same and stop the action of the regulator. This
 10 chamber might be simply an enlargement of a gas-pipe leading from the valve to the inlet; but I prefer to construct it as a chamber forming a portion of the regulator-case. As will be observed, this chamber serves the purpose of
 15 a condensing-chamber, and may, having regard to its functions in this respect, be located or arranged in any desired way, so that it shall be in effect an elbow or trap in the passage from the gas-inlet to the gas-regulator
 20 valve. The diaphragm D, cast in one piece with the casing, cuts off the chamber E from the upper portion of the case, excepting at the part coinciding with the gas passage or chamber G, and said diaphragm forms the bot-
 25 tom, closing the lower ends of the chambers I I². The chamber E communicates also with a gas pipe or passage leading to the regulator-valves K. Such pipe is here shown as a pipe, L, having a flange at its bottom that screws
 30 into an opening in the diaphragm D at the bottom of chamber I.

It is obvious that a portion only of the chambers or passages described may be formed by casting the proper partitions in one piece with the casing, the remaining passages consisting
 35 of separate pieces or pipes arranged and connected to form the proper communications.

The chambers I I² contain glycerine or other suitable liquid, and in chamber I is located
 40 the annular float K, surrounding the passage L, and carrying the cone-shaped valve *k*, that is located over the mouth of the passage L, and serves to increase or diminish the opening as the gas-pressure in the upper portion of
 45 chamber I varies, so as to cause variation in the height of liquid in which the float is buoyed. The float is guided by devices working in a lubricating-liquid, in order that there may be the greatest freedom from lateral vibrations of
 50 the valve, and at the same time the friction may be a minimum. In order to secure the result, I prefer to locate the guiding devices for the float in the liquid of the chamber I, which may be readily accomplished by forming
 55 guiding-projections on either the float or the tube L. I prefer to form them upon or attach them to the float, which is shown as provided at *b b* with two of the four or more projections that I should employ in practice.

60 M indicates a guide rod or stem rising from the valve into the gas-space in the upper portion of the chamber. This rod is also guided by devices that work in a lubricating-fluid, and is also provided with a liquid seal for preventing the escape of gas when the valve is
 65 raised, and suspended to permit the gas to flow freely through the regulator.

N indicates an inverted cup secured by a nut, *d*, to the guide-rod, and having its edge
 dipping into glycerine or other liquid con- 70
 tained in a chamber, O, that is secured to a nipple projecting from the cover T of the reg-
 ulator-casing. The rod M is, as stated, guid-
 ed by devices working in a lubricating-liquid, 75
 and for the sake of simplicity I utilize the sealing devices as guiding devices. This may
 be done by making the lower end of the cup
 work as a guide against the outside of the
 central passage for the stem, as indicated, at
 a point below the level of the liquid in the 80
 chamber O. The cup is for this purpose provided with projections or points *h*, although
 the rim might be continuous, so as to form a
 guiding-surface all the way round. I prefer to
 arrange these parts so that a slight lateral move- 85
 ment of the rod and cup shall be required to bring the guiding devices into engagement.
 Normally, therefore, the parts will move up
 and down with the greatest freedom, there be-
 ing under normal action no contact of the 90
 parts. The chamber O is provided with a movable cover, *f*, and a wire or cord, *g*, passing
 through said cover and connected with the
 rod M, serves as a means for raising and
 suspending the valve when it is desired that 95
 the gas should pass freely. In this operation there is no opportunity for escape of gas, since
 the gas-chamber is at all times securely sealed
 by the cup N, immersed in the liquid of cham-
 ber O. This arrangement also assists in ac- 100
 curately guiding the valve and prevents undue lateral vibrations of the same from any cause.
 At the same time all the guiding devices work
 in a lubricating-fluid, and a maximum free-
 dom from friction is thereby secured. 105

In the cover T of the casing, at W, is located
 the opening through which liquid may be in-
 troduced into the chambers, I I², and through
 which communication is also formed between 110
 chamber I² and the outside air. In prior devices the liquid has commonly been intro-
 duced through a pipe or opening into the cham-
 ber I directly, and a separate opening formed
 for an air-vent communicating with the air-
 space at top of the liquid column in what con- 115
 stitutes the outside leg of the pressure-gaging chamber. In my invention I utilize the same
 portion of the device for both purposes, and
 I at the same time do away with the liabilities
 to leakage, which exist from the pres- 120
 ence of the extra opening into the gas-space in or connecting with chamber I. In the
 present instance the opening, when not re-
 quired for introducing liquid, is closed by a
 perforated plug, W, the perforation serving 125
 as the air-vent. This plug I prefer to make,
 as shown in Fig. 6, a screw-plug, and I con-
 struct the same with an enlarged excavation
 extending inward, so as to leave a thin wall
 only at the point where the air vent or per- 130
 foration is made. The length of the passage
 through which air escapes and enters is thus
 reduced, so as to reduce friction, facilitate ac-
 tion, and increase the sensitiveness of the reg-

ulator. It may sometimes happen that the regulator will be put in a position where it is subjected to excessive vibrations, such that there might be a tendency to fluctuation in the flow of gas through it. In such case, if there be such tendency, cotton or other porous material may be placed (if desired) in the excavation in the plug, so as to check the free flow of air through the opening.

It is sometimes desirable to make use of a by-pass for the gas. In my improved regulator I embody the by-pass in and make it virtually a part of the regulator by locating it in a wall between gas chambers or passages in the regulator. In the present form of my invention I locate it in a wall, B, between the gas-passage connected with the inlet and the gas space or chamber at top of chamber I, communicating with the outlet. This part of my invention is shown more clearly in Figs. 4 and 5, where I have illustrated the employment of an ordinary stop-cock for the purpose. The body of the cock is provided with flanges, by which it is secured to the wall B by means of screws, suitable packing being employed to prevent leakage. The cock is set in an opening formed in the wall B, and its stem S extends upward through the cover-plate, and is packed to prevent escape of gas in any suitable way. A packing-nut is indicated at *t*. Any other form of cock or gate might be employed for controlling the flow of gas directly from one passage or chamber to the other without passing through the regulating-valve.

What I claim as my invention is—

1. In a gas-regulator, the combination, with a float-valve, of a guide stem or rod connected with guiding devices working in a lubricating chamber or cavity.

2. In a gas-regulator, the combination, with a float-valve, of a guide stem or rod, and a liquid-sealing device whose parts constitute guiding devices for the rod.

3. In a gas-regulator, the combination, with the float-valve, of an upwardly-extending guide-stem, and a liquid seal connected with the valve-stem and closing the gas-space above the valve, as and for the purpose described.

4. In a gas-regulator, a float-valve having a stem or rod connected with a liquid gas-seal for sealing the float-chamber, as and for the purpose described.

5. In a gas-regulator, the combination, with the float-valve and rod M, of the inverted cup working in liquid and sealing the gas-space of the float-chamber, as and for the purpose described.

6. The combination, with the float-valve, of the guide-rod, and the inverted cup connected with said rod, and provided with guiding points, as and for the purpose described.

7. In a gas-regulator, a collecting or drip chamber, E, cast in one piece with the regulator-case, and connected with a downwardly-leading gasway from the gas-inlet and an upwardly-leading gasway to the regulator-valve.

8. A gas-regulator case cast in one piece with three chambers or compartments, one of which is a gas and liquid compartment forming a float-valve chamber, a second of which is a liquid-compartment communicating at or near its bottom with the bottom of the first-named chamber, while the third forms a gas-passage connected at its top with the inlet-pipe of the regulator and at its bottom with a passage to the regulator-valve.

9. In a gas-regulator having a regulating float-valve, a gasway having a downwardly-leading portion, and an upwardly-leading portion leading to the gas-space of the float-chamber, and connected by a chamber, E, placed at the bottom of the gas-regulator and cut off from the main portion of the regulator-casing by a diaphragm or wall joining the vertical walls of the regulator-case.

10. In a gas-regulator, a gasway, G, whose walls are formed in part by the external wall of the regulator-case and in part by the walls cutting the same off from a float-chamber and from the outer leg of the two-compartment liquid-chamber, said walls and casing being cast in one piece.

11. In a gas-regulator, a casing cast in one piece with the diaphragms or walls, as described, to form a four-compartment case, one compartment being a drip-well, a second a gas-passage forming a communication between the inlet of the regulator and said well, while the two remaining chambers form a two-compartment liquid-chamber and are connected at their lower ends, as and for the purpose described.

12. The combination, with a gas-regulator having a float-chamber that contains the regulator-valve, and is connected at or near its bottom with a second chamber having an air-vent, of a plug in the latter chamber having a perforation at its end and an enlarged bore or cavity adapted to retain a porous material—such as cotton—for checking the free flow of air.

13. In a gas-regulator having a downwardly-leading gas-passage and an upwardly-leading passage leading to a gas-chamber formed at the upper portion of the float-chamber and communicating with the outlet, a by-pass applied in the wall between said downwardly-leading passage and said gas-chamber, as and for the purpose described.

14. In a gas-regulator, a by-pass cock secured to the wall B, dividing the gas-passage G from the gas-chamber I, as and for the purpose described.

15. The combination, with a gas-regulator having a dividing-wall, B, separating the gas-chamber from the passage leading from the gas-inlet, of a gas-cock whose body is provided with flanges, as described, and is secured to a wall, B, over an opening in the latter between the passage and chamber.

16. In a gas-regulator, a float for the regulating-valve, provided with guide-projections *b*, placed so as to be beneath the level of the

floating liquid, and working upon the outside of the gas pipe or tube L, opening into the float-chamber.

17. The combination, with the guide-rod for the valve, of guide-bearings lubricated in a glycerine-chamber, for the purpose described.

18. In combination with a gas-regulator, a gas-passage enlarged to constitute a drip or collecting chamber in which the gas may expand before reaching the regulator-valve, said chamber being provided at its bottom with a normally-closed outlet, through which the accumulated products of condensation may be withdrawn.

19. In a gas-regulator, a casing having a gas-expansion chamber at its bottom, connected on the one hand with the regulator-valve and on the other with a gas-inlet, said chamber being normally closed at its bottom

and forming a collecting-chamber for the products of condensation.

20. In a gas-regulator, an expansion-chamber located in the gasway to the regulator-valve and normally closed at its bottom, as and for the purpose described.

21. In a gas-regulator, a casing having a gas-expansion and drip-collecting chamber at its bottom, said chamber being connected with a gasway leading downwardly into it from the gas-inlet, and a gasway leading upwardly from it to the regulator-valve.

Signed at New York, in the county of New York and State of New York.

ALONZO F. OLDS.

Witnesses:

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WM. H. CAPEL.