

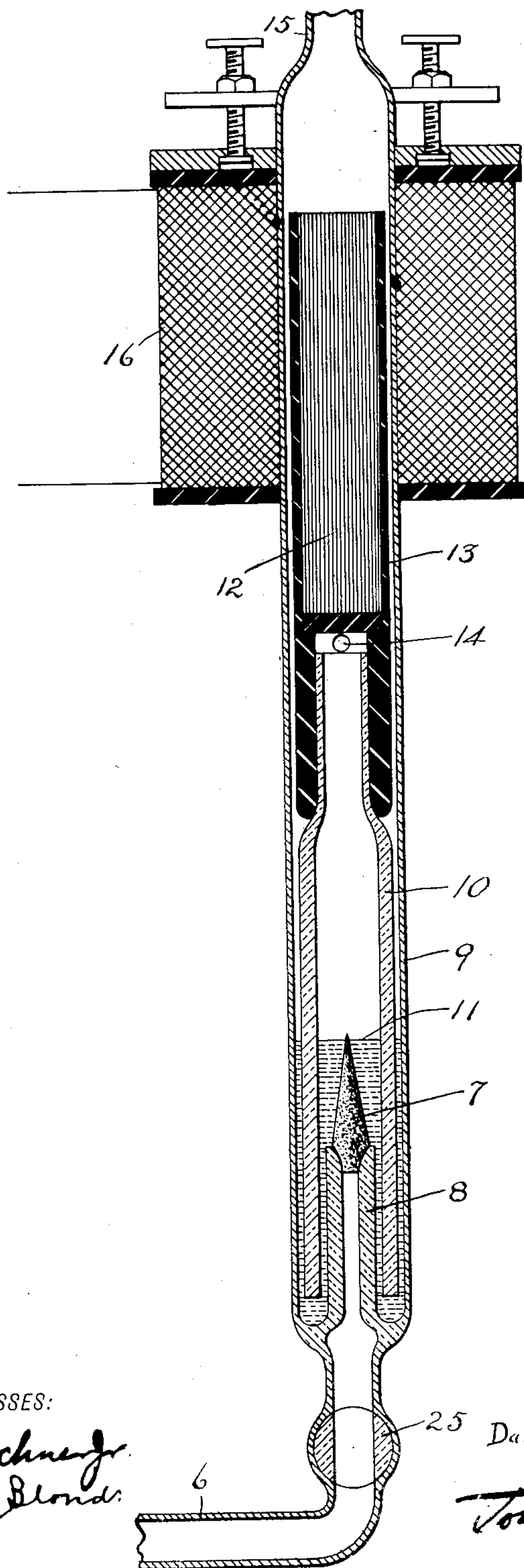
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PATENTED JUNE 4, 1907.

D. McF. MOORE.

GAS VALVE.

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WITNESSES:

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DANIEL McFARLAN MOORE, OF NEWARK, NEW JERSEY, ASSIGNOR TO
MOORE ELECTRICAL CO., OF NEW YORK, N. Y., A CORPORATION OF
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GAS-VALVE.

No. 855,801.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed April 16, 1906. Serial No. 311,816.

To all whom it may concern:

Be it known that I, DANIEL McFARLAN MOORE, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, (with post-office address 52 Lawrence street,) have invented certain new and useful Improvements in Gas-Valves, of which the following is a specification.

My invention relates to a novel construction of gas or other fluid check or valve especially designed for use in feeding gases in minute amounts.

The device may be employed in feeding gas to vacuum tubes such as vacuum tube lamps or to other devices of a similar character and for the purpose of maintaining a gaseous tension within the tube. My invention, however, is applicable generally to use wherever it is desired to control or regulate the flow of a gas or other fluid.

Briefly stated, the invention consists in combining a mass of porous material interposed in the passage way for the gas or other fluid and means for varying the exposure of the mass to regulate the flow. Preferably the exposure of the mass and the consequent resistance to the flow of gas is secured by the employment of a sealing liquid or other fluid, the height or level of which, with relation to the porous material may be varied to seal more or less of the porous material against the passage of the gas or other fluid from a chamber in which gas is maintained at a comparatively high density to the tube or passage leading to spaces wherein a lower tension or density exists.

In carrying out my invention, any porous material sufficiently homogeneous may be employed and any sealing liquid or other fluid of such character that it will not leak through the porous material. I prefer, however, to use mercury as the sealing liquid and in connection therewith may use as a porous material ordinary porous arc light carbon.

My invention consists also in special details of construction and devices for producing the changes of liquid level as hereinafter more particularly described and then specified in the claims.

In the drawings I show in vertical section a construction of apparatus embodying my invention.

9 is a valve chamber in which a pressure or density of gas is maintained higher than that in the tube 6 and communicating with spaces to which gas is to be fed in the desired regulated amount from the chamber 9.

Interposed in the passage from chamber 9 to tube 6 is a mass of any porous material shown as a plug or stopper fitted to and sealed in the end of tube 8 which is joined or leads to the pipe or tube 6. The exposed end of the stopper, plug or mass 7 is located within the chamber 9 and is exposed to the pressure of gas maintained therein.

In the chamber 9 is a body of liquid 11 or other fluid of greater density than the gas or other fluid whose flow is to be controlled and which lies in contact with the mass of porous material 7 leaving the upper terminal of the same exposed or adapted to be exposed by any change of level of the liquid 11 brought about in any desired way. As a means for bringing about such change of level, I show a displacer or plunger 10 which may be conical or cylindrical in form so as to be concentric with the cylindrical chamber 19 and the conical plug 7. In these matters of form, however, my invention admits obviously of indefinite variation. By moving the displacer 10, the tip of the mass 7 may be more or less exposed or by a suitable adjustment may be alternately disposed and concealed beneath the level of the liquid, thus varying the extent of the porous material through which the gas maintained under pressure in the spaces above the plug or mass 7 may leak into and through the same and then into the tube 6 in which the lower pressure or density exists. The mass might have its tip constantly exposed, the minute leakage being determined by the adjusted height of the sealing liquid with relation to the said mass of porous material. It is preferable to taper the point of the tip for the purpose of securing a marked change in the extent of exposure for a small change in the level of the liquid.

For porous material, I find that carbon is suitable and for a liquid I prefer to employ mercury.

The space within the displacer 10 is in communication with the source of gas through a hole 14 communicating with the spaces in the upper end of the tube 9 which are supplied

with the desired gas through the opening 15. I prefer to employ mercury because it forms an effective gas seal and does not clog the pores of the porous mass 7. Ordinary porous electric light carbon is suitable and desirable because it is generally of uniform porosity. For operating the displacer, the same can be suspended from core 12 of an electromagnet 16 and the position of the displacer determined by varying the current or strength of current in the electro-magnet 16 as desired. The plunger or displacer may be attached to the core by means of an indurated fiber tube 13 which carries the core of iron wires or may be otherwise connected to the movable portion of any electromagnet when electromagnetic means are employed for varying the position of the displacer. I do not limit myself, however, to the employment of any particular device for actuating the displacer. When a current flows continually in the coils of the electromagnet 16 and it is desired to determine the extent to which the tip of the mass 7 shall be normally exposed, an adjustment for that purpose may be provided by employing suitable devices for adjusting the electrical position of the electromagnet vertically on the tube 9. The liquid 11 by buoying the plunger 10 acts to counterbalance the weight of the parts operated by the magnet.

25 is a suitable stopcock in the connection from the valve to the tube 6.

In case arc light carbon is used for the plug a less length of plug will be required the denser the carbon.

By the use of my improved valve in which the gas at all times percolates through a mass of porous material, any sudden influx of gas to the tube 6 and any consequent sudden fluctuation of the gaseous tension within said tube can be avoided.

Inasmuch as the plunger works in the same body of liquid in which the tip of the porous plug is located and is exposed to the same gas pressure, it is obvious that any changes of such pressure will not affect the height of the liquid so as to disturb the adjustment of the valve.

I have described the application of my invention specially to the feeding of gases in minute amounts, but it is obvious that the same construction and principle of valve might be employed for regulating the flow of any fluid and that further, while I have described the specific fluid termed "liquid" as the sealing means for the porous material, it would be within my invention to use any fluid of greater density than the fluid which is to be passed through the valve and also of such character as not itself to leak through the porous material, thus permitting it to act like a liquid seal against the passage of the other or less dense fluid superimposed upon it. Accordingly, it will be understood

that my invention is not confined to any particular fluid for the sealing of the porous material, nor is the application of the invention confined to the control of the flow of any particular fluid, it only being necessary in the organization, as shown in the drawings, that the two fluids, namely, the sealing fluid and the fluid which is passed through the valve, should be of different densities and that the sealing fluid, which is of the greater density, should be of such character as not to pass through the porous material.

What I claim as my invention is:

1. The combination of a mass of porous material interposed in a gas passage, a sealing liquid and means for varying the exposure of the mass above said liquid to regulate the flow of gas.

2. The combination of a mass of porous material interposed in a gas passage to restrict the flow of gas, a body of liquid in which the mass is immersed and means for varying the height of the liquid relative to the mass to regulate the action.

3. The combination of a mass of porous material interposed in a gas passage and having a pointed terminal, a body of liquid in which the mass is immersed and means for varying the height of the liquid to vary the resistance of the mass to the flow of gas.

4. The combination with a mass of porous material projecting into a gas chamber containing a body of liquid, of a displacing body in said chamber and means for actuating the same to vary the exposure of the terminal of the mass of porous material.

5. The combination in a gas valve, of a mass of porous material adapted to permit the percolation of gas, and a liquid seal therefor consisting of mercury, as and for the purpose described.

6. The combination of a porous plug, a body of mercury in which the same is immersed, a displacer of the mercury and an actuating magnet adjustable for the purpose of adjusting the level of the liquid, and consequently the flow of gas.

7. The combination of a chamber containing mercury and communicating with a source of gas under pressure, a porous plug immersed in the mercury of said chamber and through which the air or gas under pressure may pass from said chamber to the tube, and a liquid displacer working in the mercury and adapted to allow the whole surface of the mercury to be exposed to the gas pressure, as and for the purpose described.

8. The combination in a gas valve, of a mass of carbon, adapted to permit the percolation of gas, and a liquid seal therefor consisting of mercury, as and for the purpose described.

9. In a gas valve, the combination of a mass of porous material interposed in the gas passage way and having a tapered ter-

minal, a body of liquid, and means for varying the exposure of the terminal above the liquid.

10. The combination of a mass of porous material interposing resistance to the flow of gas, a sealing liquid and magnetically actuated means for varying the height of the sealing liquid.

11. The combination in a gas check or valve, of a mass of porous material interposing resistance to the free flow of gas, a sealing liquid, a liquid displacer and an actuating electromagnet connected to said displacer.

12. The combination of a body of porous material interposed in a gas passage, a sealing body of mercury and a displacer for varying the height of the mercury.

13. In a valve, the combination of a mass

of porous material interposed in a fluid passage-way, a body of fluid of greater density acting as a seal, and means for changing the exposure of the mass above said fluid of greater density.

14. In a valve, the combination of a mass of porous material interposed in the fluid passage-way and having a tapered terminal, a body of sealing fluid, and means for varying the exposure of the mass above said sealing fluid.

Signed at New York in the county of New York and State of New York this 10th day of April A. D. 1906.

DANIEL McFARLAN MOORE.

Witnesses:

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