No. 879,029. PATENTED FEB. 11, 1908.

J. M. BLACKBURN.

REGULATOR.

APPLICATION FILED DEC. 2, 1907.

Fig. 1.

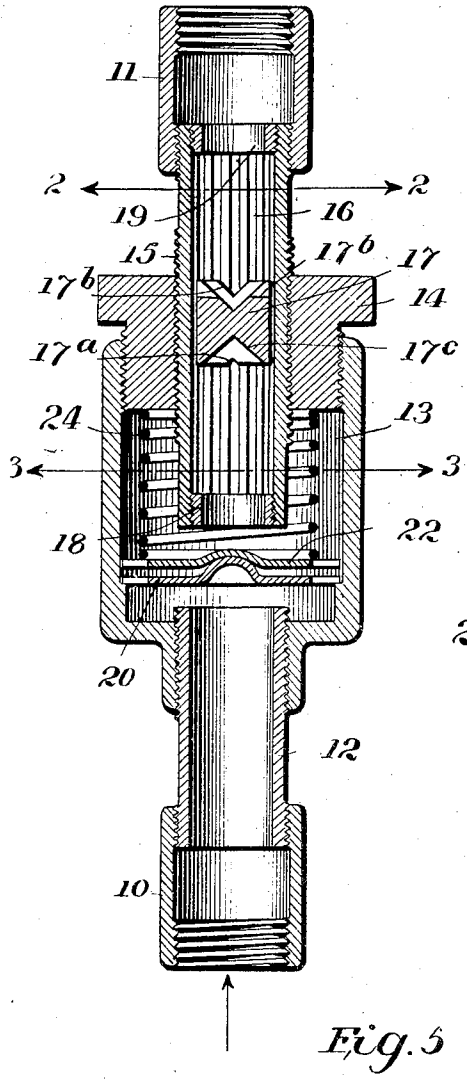


Fig. 2.

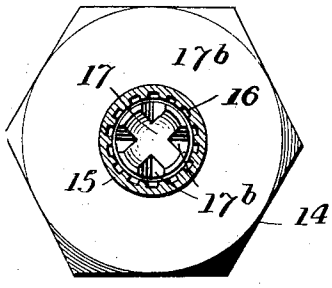


Fig. 3.

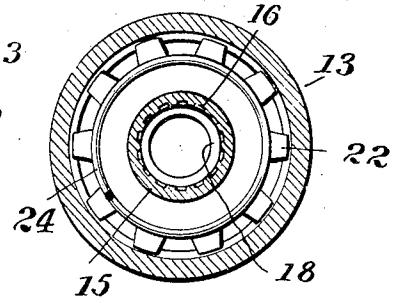


Fig. 4.

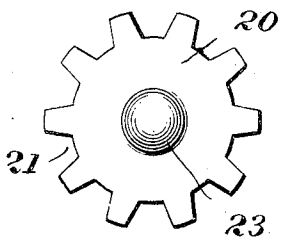
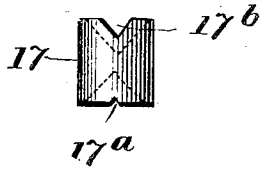


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES M. BLACKBURN, OF BALTIMORE, MARYLAND.

REGULATOR.

No. 879,029. Specification of Letters Patent. Patented Feb. 11, 1908.

Application filed December 2, 1907. Serial No. 404,720.

To all whom it may concern:

Be it known that I, JAMES M. BLACKBURN, a citizen of the United States, and resident of Baltimore, Maryland, have invented certain new and useful Improvements in Regulators, of which the following is a specification.

It is well known that gas, as ordinarily supplied for heating and illuminating purposes, varies greatly in pressure in different localities in the same city and sometimes in different parts of the same building, the result being that the burners cannot be depended upon to limit the flow of gas. For instance, a burner which is rated to consume eight feet per hour might in some locations consume eight feet or less, while in other locations it might consume considerably more gas with less effect. When the pressure is abnormally high the gas flows from the burners with a disagreeable whistling noise and considerable waste.

My invention is intended to render the pressure in any system of house pipes substantially uniform regardless of the pressure in the main. By connecting my device with the gas pipe at or near the meter, the entire supply for the building may be regulated, or the device may be connected to any part of the house system, as may be desired. In some instances two of the devices will be used in a single building, one upon the pipes leading to the heating and cooking apparatus and the other upon the pipes supplying gas for illumination.

The invention will be described in connection with the accompanying drawing, in which,

Figure 1 is a longitudinal central section of a device embodying the present invention; Figs. 2 and 3 are transverse sections on the lines 2 and 3 respectively; Fig. 4 is a plan view of the baffle plate; Fig. 5 is a side view of the valve.

Referring to the drawing, 10 and 11 are couplings of any suitable character for connecting the regulator to a gas service pipe. The gas enters the regulator at the coupler 10 and passes through a tube 12 into a regulator chamber 13. The casing of this regulator chamber may be of any suitable form, the cylindrical form illustrated being preferred. For convenience in assembling the parts the casing is provided with a removable cap 14 which is united with the casing by a threaded joint. The gas flows from the casing through an outflow pipe 15 which is adjustably fitted in a threaded opening in the cap 14. The outflow pipe 15 is provided with a series of internal longitudinal tapering grooves 16 which are of larger cross section at their upper ends than at their lower ends. The interior of the pipe 15 is otherwise cylindrical and within the pipe is a cylindrical valve 17 which is adapted to move freely up and down but which shuts off practically all of the gas except that which passes around the valve through the grooves 16. Means, such as the annular stops 18, 19, are provided for limiting the movement of the valve 17.

When the valve is in its lowest position, resting on the stop 18, a very limited amount of gas is permitted to pass through one or more notches 17^a in the lower end of the valve and through the grooves which at this point are very shallow. The valve would occupy this position when but one or two small burners are in operation. When more burners are turned on the difference in pressure above and below the valve causes the valve to rise until it registers with deeper portions of the grooves 16 and a greater amount of gas is thus permitted to pass. Notches or openings 17^b are formed in the upper end of the valve to permit the gas to pass when the valve is at its upper limit of travel, against the annular stop 19, that is when the regulator is working at its full capacity. The weight of the valve 17 is such that the pressure of the gas will move it and sustain it at the proper elevation to permit a sufficient supply of gas to pass and be delivered at an economical and efficient pressure. I have found an aluminium valve to work very satisfactorily but it will be evident that other materials may be used, it being only necessary that the weight of the valve should be in proper proportion to its area. The valve should be of sufficient length to prevent it from canting and sticking in the tube.

It is necessary to provide a baffle plate in line with the inlet tube 12 to prevent the direct flow of gas from the main striking the valve 17, and for this purpose I arrange a plate 20 transversely in the casing 13 above the inlet tube. The plate 20 has notches or openings 21 near its periphery which permit the gas to pass indirectly from the tube 12 to the tube 15.

It is found that the pressure in the mains varies in different localities and to adjust my regulator to different normal pressures, I

make the outflow pipe 15 longitudinally adjustable in the casing to limit more or less the amount of gas which may enter it and I provide a valve for closing the lower end of this pipe. As shown the valve consists of a disk 22 which is poised on a central projection 23 on the baffle plate. The valve disk 22 is provided with openings similar to those in the baffle plate to permit the gas to pass freely around it. The valve plate 22 is thus free to adjust itself to the lower end of the tube 15 and by turning the tube down the amount of gas entering it can be regulated or the gas may be shut off altogether. The valve plate 22 and the baffle plate are permanently held in positions shown in the drawing, preferably by a spring 24.

The operation of the regulator is as follows: The gas entering through the tube 12 impinges on the baffle plate 20 and then passes around the baffle plate and into the chamber or casing 13. The direct current of gas is thus prevented from striking the floating valve 17. The gas then enters the outflow tube 15 and more or less of it passes through the grooves around the valve in said tube, depending upon the number of burners which are in use. The tube is made long enough and the grooves vary sufficiently in area to supply any number of burners up to the maximum in the building for which the regulator is intended. It will be noted that the annular stop or ring 18 forms a somewhat contracted entrance passage to the outflow tube 15 which directs the gas against the central portion of the valve. The valve is preferably formed with a central recess 17^b against which the flow of gas impinges. It is found that the stream of gas striking the center of the valve will raise it when but a few feet per hour are being consumed. When but one or two burners are in operation however the pressure is not always sufficient to raise the valve and it is preferred to form the valve, or its seat, with one or more small notches to permit a small flow of gas to pass. The regulator is preferably arranged vertically although it may be inclined more or less.

In practical operation it has been found that the regulator described will preserve a substantially uniform pressure at the burners, regardless of the number in use, and this pressure may be varied either by adjusting the inlet tube 12 toward and from the baffle plate or by adjusting the outflow tube 15 toward and from the valve plate 22. It will be evident that the valve plate 22 may be dispensed with and a single plate used both for a valve and baffle.

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

1. In a gas regulating device, the combination with a casing, of an inflow tube, an outflow tube, and an intermediate baffle, the outflow tube having grooves of gradually increasing sectional area, and a floating valve in said outflow tube.

2. In a gas regulating device, the combination with a casing, of an inlet tube, an outflow tube, and an intermediate baffle, one of said tubes being adjustable in the casing toward and from the baffle, and one of said tubes being provided with internal grooves of varying cross-section, and with a floating cylindrical valve.

3. In a gas regulating device, the combination with a casing having an inlet opening, of a baffle in line with said opening and an outflow tube, said outflow tube having a cylindrical floating valve therein, stops to limit the movement of said valve, and tapering grooves in the inner wall of the tube to permit more or less gas to pass around said valve.

4. In a gas regulating device, the combination with a casing having an inlet opening, of a baffle within the casing in line with said opening, a valve plate pivotally supported on said baffle, a spring for holding the valve plate and baffle in normal position, and an outflow tube mounted in the casing and adjustable therein toward and from the valve plate, said outflow tube being provided with means for varying the opening therein to regulate the discharge of gas from the casing.

5. In a gas regulating device, the combination with the casing having an inlet opening, of a baffle in line with said opening, and an outflow tube having tapering grooves in its inner wall, said outflow tube having a contracted inlet, and a floating valve arranged above said inlet.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES M. BLACKBURN.

Witnesses:
ARMSTEAD M. WEBB,
ISRAEL B. BRODIE.