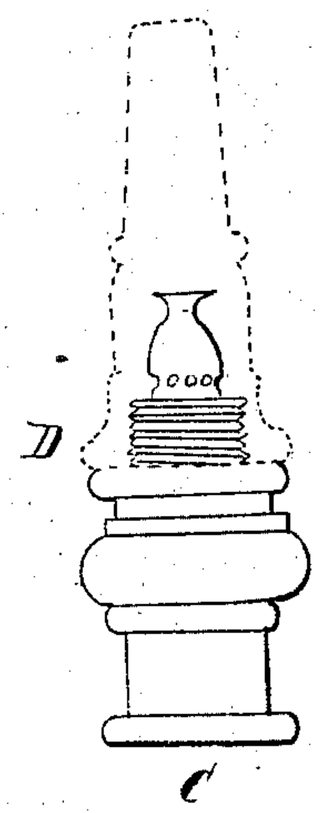
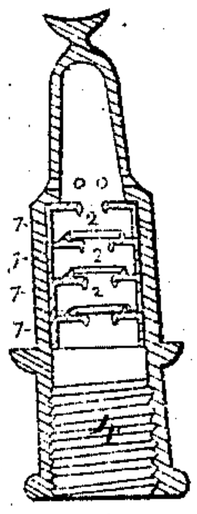
# W. Mallerd.

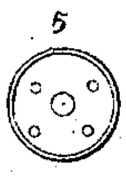
## Gas Regulator.

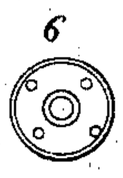
No. 11,167. Patented Jun. 27, 1854.

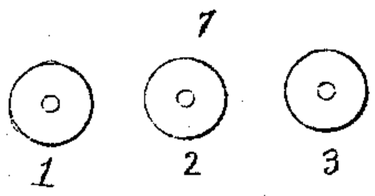






# UNITED STATES PATENT OFFICE.

WILLIAM MALLERD, OF BROOKLYN, NEW YORK.

## REGULATOR OF GAS-BURNERS.

Specification of Letters Patent No. 11,167, dated June 27, 1854.

*To all whom it may concern:*

Be it known that I, WILLIAM MALLERD, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Gas-Burners; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure A., is a longitudinal section; B., is a representation of the inner and lower portion of the gas-burner; and C., is a full view of the complete gas-burner.

The nature of my invention consists in constructing my gas-burner so as to make it self-regulating; that is—capable of adjusting itself to meet the changes of the pressure of gas under any and all circumstances, which would cause ordinary gas-burners to smoke, or blow; thus wasting gas, which in such case goes off to some extent unconsumed. I accomplish my design in this particular as follows. Into the inner portion of my gas-burner, or tube, shown in Fig. B., and in section Fig. A., No. 4., I place several cups made of brass, tin or other materials. I prefer tin or metal, coated with tin, each cup having on its upper surface three or more small pin pointed conical projections; and on its under surface a raised knife-edged ring, encircling the orifice through which the gas passes when admitted into the burner. The cups are shown as No. 1, 1, 1, 1, Fig. A. The upper surface with the conical points at No. 5, the under side with the raised ring at No. 6. The metallic cups form chambers in which I place circular valves of thin sheet metal, of a diameter slightly less than that of the cups No. 2, 2, 2, Fig. A., having holes through their centers No. 7, somewhat smaller than those which are pierced through the cups. I make the perforation through the cups of such size as to supply the burner at the lowest pressure which the burner is adapted to. The disk valves I make very thin and light; the largest opening through any of them, being less than those through the cups. The opening through the second valve being slightly less than that through the first; and that through the third being still less than that through the second. I have not contemplated more than three valves, as I find they will preserve a satisfactory uniformity of light and consumption of gas, from a pressure of $\frac{1}{2}$ an inch (water-gage) to a pressure of $3\frac{1}{2}$ inches—a pressure seldom reached. The disk valves vary also slightly in weight—the thickness being greater as the size of its perforation is less. When the gas enters the cup at the proper pressure for producing the required light, or flame, the weights of the valves are such that they remain unmoved and the gas passes to the tip a jet of the burner, both through and around the valves which offer but very slight obstruction. But when the pressure increases the current of gas lifts the lightest valve and carries it upward, obstructing the passage, and if the pressure be great enough will carry it up firm against the ring encircling the perforation in the cup, and allow no gas to pass to the jet, except what passes through the perforation in the disk. This being smaller than the perforation in the cup will diminish the stream of gas in size, in proportion to its increased velocity, and thus furnish to the jet about the same quantity of gas as if the pressure had not increased. The next valve being heavier than the first, is not disturbed by the pressure required to raise the first; but if the pressure becomes too great to allow the quantity of gas to be regulated by the first valve, or disk the current of gas will bring the second into action in the same manner as the first acted; and its perforation being smaller than that of the first disk, the size of the stream will again be diminished in proportion to its velocity; and the required quantity of gas thus furnished to the jet will not be materially changed. When the pressure of gas is again increased so as to bring the third valve into action, its operation will be fully understood from the foregoing description, and it will readily be perceived that the consumption of gas, and the quantity and, degree of light, are rendered substantially the same whether the pressure is $\frac{1}{2}$ an inch or $3\frac{1}{2}$ inches, or at any point between these limits. If the pressure diminishes the action of the valves will be reversed to such an extent as will preserve nearly a uniform action of the gas-burner.

The advantage of the ring for the valve to rest against, when raised, will be fully understood when it is recollected that the joints between the valve and ring are nearly gas tight; and therefore, if the valves rest against a surface of any considerable extent, will stick and not fall when the pressure

decreases, with sufficient readings to preserve the desired uniformity. Less pressure would keep the valve up than would carry it up.

By my arrangement the saving of the gas, as well as the improved uniformity of the light, and the exemption from smoking and blowing are obvious from the foregoing. It is also obvious that instead of the cups, mere partitions in the tube or in the gas-burner with perforations and the pin points above and the rings below would answer the purpose. It will also be readily perceived that more or less than three valves may be used; more would produce greater accuracy, but less would often produce satisfactory results, but the respective and relative weights of the valves would vary with their number according to the diameter of the tubes in which they are placed, and the size of the perforation of the jet; and therefore cannot be accurately set forth, and the perforations through them would vary from similar causes.

The following sized cups answer a good purpose. The cups at No. 1, 1, 1, 1, Fig. A, are made of tinned sheet copper and are about $\frac{5}{16}$ of an inch in diameter, and about $\frac{1}{8}$ of an inch deep. The valves or disks at No. 2, 2, 2, and No. 7, are made of thin sheet brass tinned over. No. 1, disk is made of No. 32 sheet brass, and is about $\frac{4}{16}$ of an inch in diameter with a perforation in the center, about $\frac{1}{16}$ of an inch in diameter. No. 2, disk or valve is made of No. 30 sheet brass, same diameter but perforation slightly less. No. 3 disk or valve is made of No. 28 sheet brass, preforation still less than No. 2 valve.

In order to distribute the gas to the best advantage, I elongate the upper part of the inner portion Fig. B. of my gas-burner into a sort of cone, around the base of which I pierce several small holes as shown in the Fig. B. This object may be obtained in various ways as by fixing a plate pierced with holes in the upper part of the burner; or a plate without holes, small enough to admit the gas to flow around it or by placing a fifth cup over the fourth one as shown in Fig. A., making holes in its sides or top. I however prefer the plan I now adopt as being a simplifying of the manufacture of the burners. The arrangement of the chambers, formed by the cups may also be changed without departing from the principle of my invention. I prefer the plan I adopt, for the same reason as the one I gave for employing the cone in the distribution of gas.

The regulating principle may be adapted to any gas burner, or it may be attached to the gas-meter, or placed in the main or in the distributing pipes. I prefer regulating at the jet because such a course is free from several objections which might be urged against regulating at the meter service, or distributing pipes.

It is an established rule to manufacture gas burners to stand or burn at certain pressures adapted to different localities. Seven tenth pressure is considered the lowest. Burners are also made to stand a pressure of 2 inches or more; by diminishing the orifice of the jet. They will not give a sufficient light at even a pressure of $\frac{1}{2}$ an inch lower and will blow at about $\frac{1}{2}$ an inch above any set pressure.

I make my burner to operate at less pressure than ordinary gas burners. The gas flies off often with such velocity that it simply produces a bluish flame, not giving so strong and brilliant a light as when passed through my new gas-burner, which is very readily perceived when tested by a photometer or otherwise.

Having described the nature of my invention and shown the manner in which I carry the same into effect, what I claim is.

1. The perforated cups or partitions, with their edged rings encircling the perforation, in combination with the perforated disk-valve and the pin points to support it.

2. The series of two or more valve chambers as described with their thin valves as described, each succeeding valve having a smaller perforation than the preceding one, and a slight increase of weight, the whole arranged and operating substantially in the manner and for the purpose set forth.

3. Making the holes in the jet so as to burn at low pressure in combination with a regulator.

WILLIAM MALLERD

Signed in presence of—
W. P. N. FITZGERALD,
SAML. GRUBB.