(No Model.) 2 Sheets—Sheet 1.

J. G. HAWKINS & J. BARTON.

REGULATING GAS BURNER.

No. 407,656. Patented July 23, 1889.

FIG. 1.

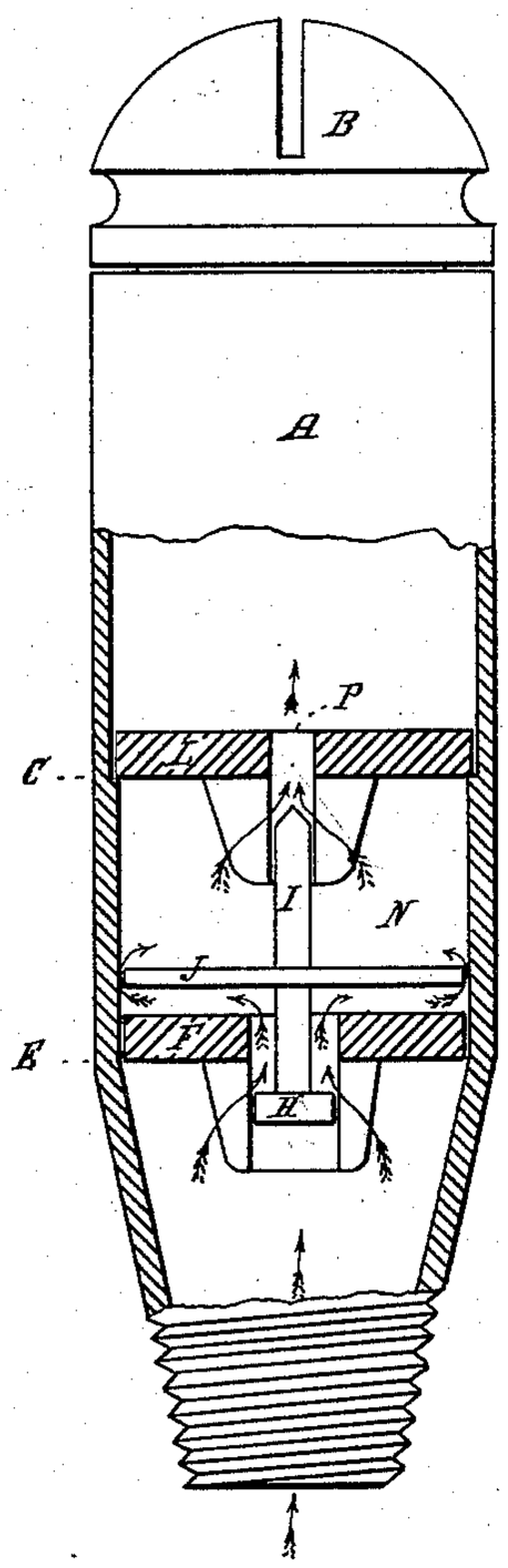
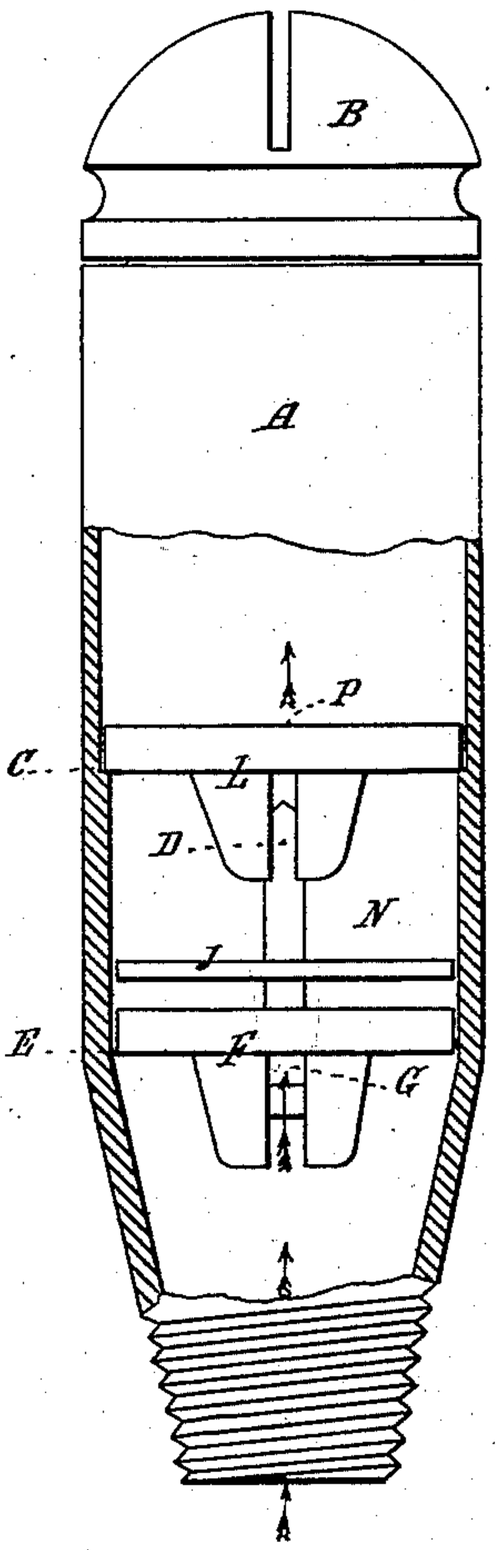


FIG. 2.



WITNESSES.

J. A. Rutherford.

Robert Garrett.

INVENTORS.

John G. Hawkins

John Barton

By James L. Norris

Atty.

(No Model.) 2 Sheets—Sheet 2.

J. G. HAWKINS & J. BARTON.

REGULATING GAS BURNER.

No. 407,656. Patented July 23, 1889.

FIG. 3.

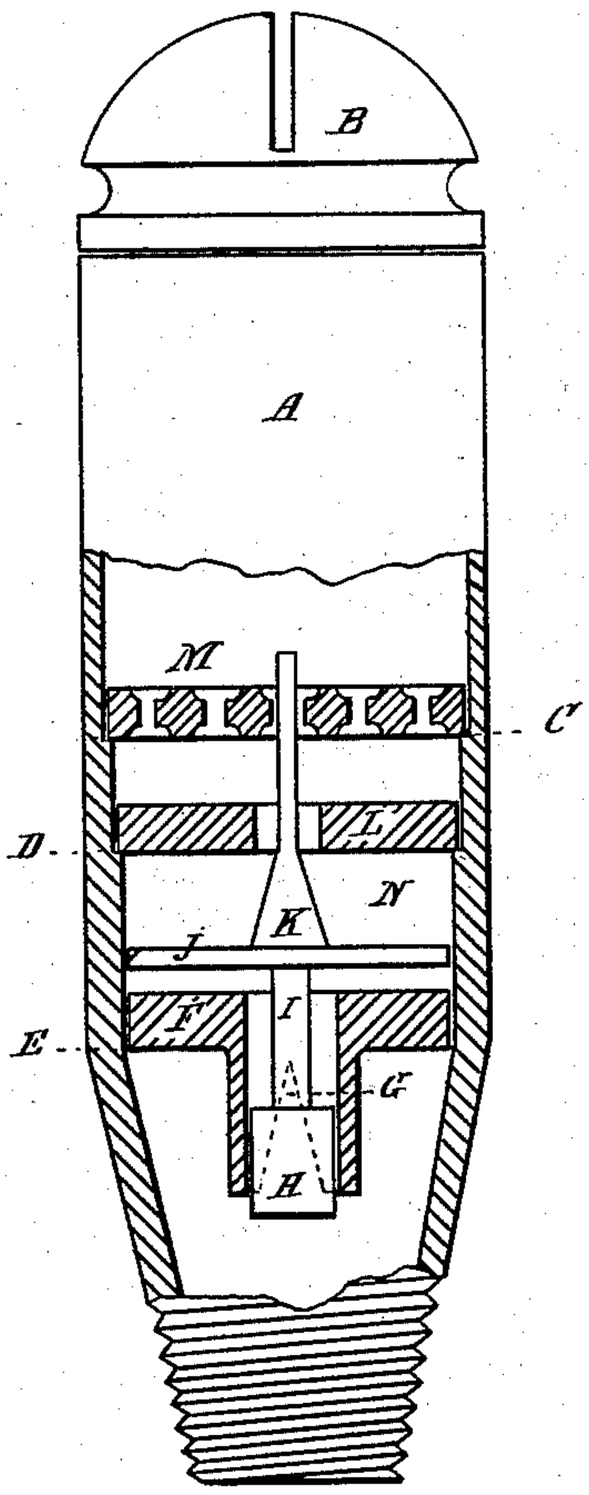


FIG. 5.

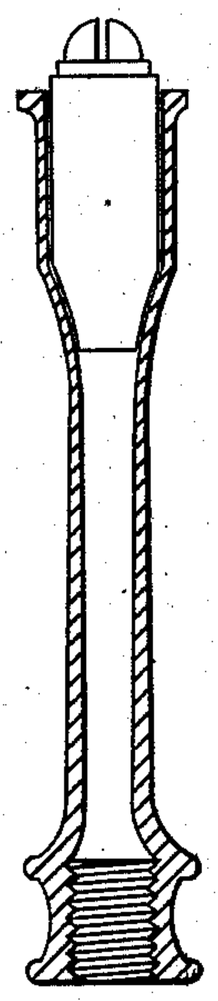
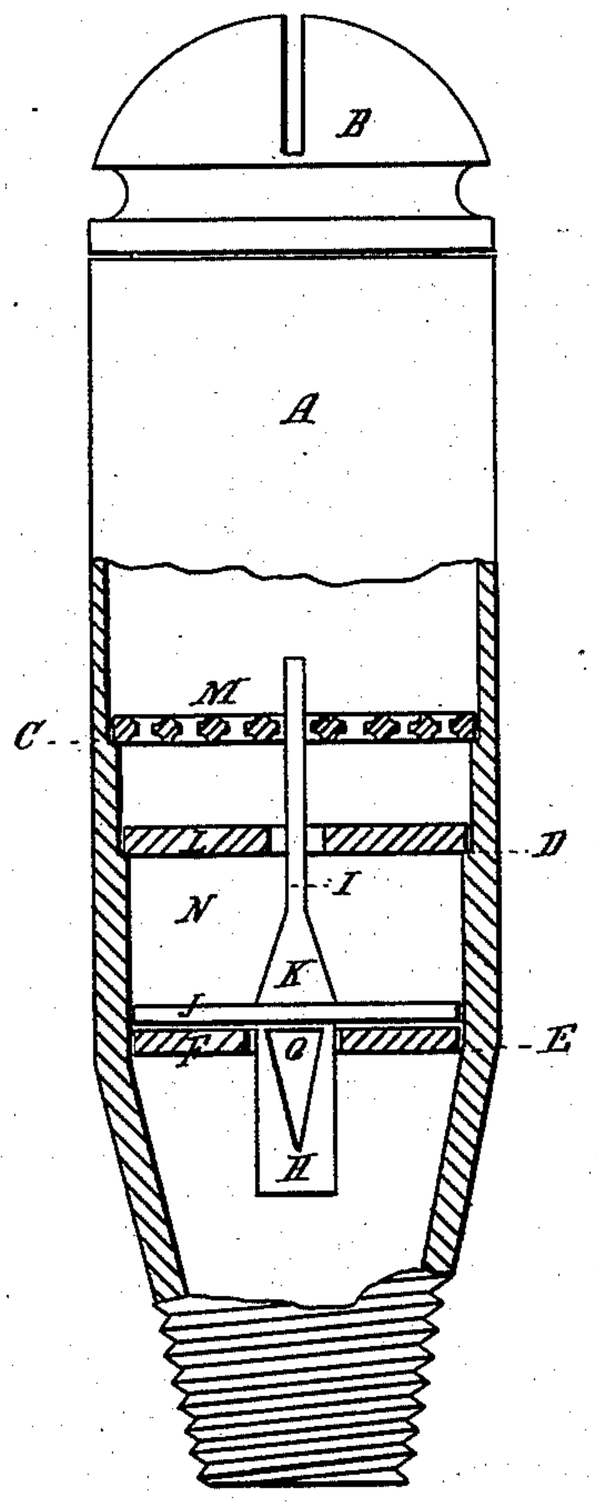


FIG. 4.



WITNESSES.

J. A. Rutherford.

Robert Everett.

INVENTORS.

John G. Hawkins.

John Barton.

By James L. Norris.

Atty.

UNITED STATES PATENT OFFICE.

JOHN GREAVES HAWKINS AND JOHN BARTON, OF PETERBOROUGH, COUNTY OF NORTHAMPTON, ENGLAND.

REGULATING GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 407,656, dated July 23, 1889.

Application filed February 27, 1889. Serial No. 301,382. (No model.) Patented in England November 1, 1887, No. 14,866, and February 13, 1888, No. 2,162.

To all whom it may concern:

Be it known that we, JOHN GREAVES HAWKINS and JOHN BARTON, engineers, subjects of the Queen of Great Britain, residing at Peterborough, in the county of Northampton, England, have invented new and useful Improvements in Regulating Gas-Burners, (for which we have obtained patents in Great Britain, No. 14,866, dated November 1, 1887, and No. 2,162, dated February 13, 1888,) of which the following is a description.

This invention has for its object the construction of gas-burners in such a manner that when in use the gas issuing from them may be uniform in quantity under varying pressures at the point of supply.

In order that the invention may be easily understood, drawings are attached hereto, Figure 1 being a part vertical section and part elevation, and Fig. 2 also a part vertical section and part elevation, the latter view being taken at right angles to that of Fig. 1. Fig. 3 is a part vertical section and part elevation of a modification of Fig. 1, and Fig. 4 is a similar view of a second modification. Each illustration is drawn about four times linear the natural size in order to exhibit each part distinctly. Fig. 5, which is drawn to the natural size, shows the manner in which the regulating-burner is adapted to a public "lighting-cone," the burner being in elevation and the cone in vertical section. The arrows show the direction in which the gas flows.

The following is a description of the first form of the regulating-burner.

A is a metal case, in which a steatite tip B is inserted in the usual manner. The inside of the case is made with a shoulder at C, and from E downward it is contracted.

F is a diaphragm of steatite, metal, or other suitable substance and of the form shown, fits closely, and is thrust down the case as far as it will go or until it rests at the commencement of the contracted part. In the center of the diaphragm there is a hole large enough to admit of the plug or valve H and spindle I rising and falling easily. Attached to the spindle I there is a metallic disk J, which rises and falls with it between the diaphragms F and L. Above the diaphragm F there is a similar diaphragm L, that fits the case tightly and rests upon the shoulder C. This diaphragm has also a hole in its center of such size only as to allow of the upper part of the spindle I sliding up and down in it with ease. In the tubular downwardly-projecting portion of the lower diaphragm there is a slit G, and in the top diaphragm there is also a slit D, in both instances the slit being cut through the lower part in the direction of their diameters.

On gas being admitted to the case it passes through the slit G above the plug or valve H and exerts an upward pressure upon the under side of the disk J, which rises and causes the plug or valve H to rise also and partially close that part of the slit G through which the gas flows. The quantity of gas passing is therefore restricted; but in order that the regulation shall be more nearly perfect it has to flow by the edge of the disk J into the chamber N, where, in consequence of the gas having to pass through the upper part of the slit D and above the point of the pin or spindle I, a downward pressure is exerted upon the disk J and partially counteracts the pressure on the under side of the said disk J, which consequently falls and causes the pin or spindle I to drop also till there is sufficient space between its space and the upper part of the slit D to allow of the required quantity of gas to pass through to the burner, thus constituting a double-action regulating-burner. The result is that the pressure to which the burner is adjusted is the difference between the pressure entering through G and the pressure as it issues from the opening in the upper diaphragm at P. In lieu of the slits G and D, circular or other shaped holes may be formed in the diaphragm with equal effect.

The second form or modification shown in Fig. 3 consists of a metal case A, in which a steatite tip B is inserted in the usual manner. The inside of the case is made with two shoulders, as at C and D, and from E downward it is contracted. F is a metallic diaphragm of the form shown, fits closely, and is thrust down the case as far as it will go, or until it rests at the commencement of the contracted part. The central portion of the diaphragm is made cylindrical with two or more

conical-shaped openings G. Within the cylinder a plug H, attached to a spindle I, is capable of rising and falling. Above the diaphragm F, and attached to the spindle, is a metallic disk J, the center of which is stamped or formed into a cone K, which acts as a valve and has for its seat a fixed diaphragm L, that fits the case tightly and rests upon the shoulder D. The spindle I is prolonged sufficiently to pass through a central aperture in the fixed diaphragm M, that serves as a guide and rests on the shoulder C of the case. The diaphragm M has also a number of perforations for the passage of the gas to the tip B.

The third form of the regulating-burner is shown in Fig. 4, where it will be seen that there is a modification of the plug H, the plug having in this instance two or more inverted conical grooves or channels O formed in its periphery.

The action in the case of the second and third forms is very much the same as in the first, and may be described in very similar language, as follows: On gas being admitted to the burner it passes through the conical openings G, Fig. 3, or through the grooves O, Fig. 4, and exerts an upward pressure upon the under side of the disk J, which rises and causes the plug H to rise also and practically close the conical openings G, Fig. 3, or O, Fig. 4. The quantity of gas passing is therefore restricted; but in order that the regulation shall be more perfect it has to flow by the sides of the disk J into the chamber N, where a downward pressure is exerted upon the conical valve K while passing through the valve-seat on its way to the point of consumption. The pressure, therefore, to which the burner is adjusted is the difference between the pressure entering through G and the pressure at its passage through the seat at L.

By the adoption of burners made as described the pressure at the point of combustion may be made uniform irrespective of the change of pressure at the point of supply or any increase in the size of the tip. The pressure at the point of combustion may be varied by increasing or diminishing the weight of the moving parts.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

In a gas-regulating burner, the combination of a casing having a lower contracted portion, a diaphragm located in said casing at the junction of its expanded and contracted portions and provided with a central opening and a tubular downwardly-projecting portion having lateral openings or slits, a valve located in the downwardly-projecting tubular portion of said lower diaphragm and provided with an upwardly-projecting valve-spindle, a disk on said spindle above the lower diaphragm, and an upper diaphragm having a central opening for passage of the valve-spindle, substantially as described.

JOHN GREAVES HAWKINS.
JOHN BARTON.

Witnesses:
W. H. BENNETT,
W. P. LAMPARD.