No. 619,121. Patented Feb. 7, 1899.

F. G. BARTLETT.

BURNER AND PILOT LIGHT FOR INCANDESCENT GAS LIGHTING.

(Application filed Nov. 23, 1897.)

(No Model.)

Fig. 1.

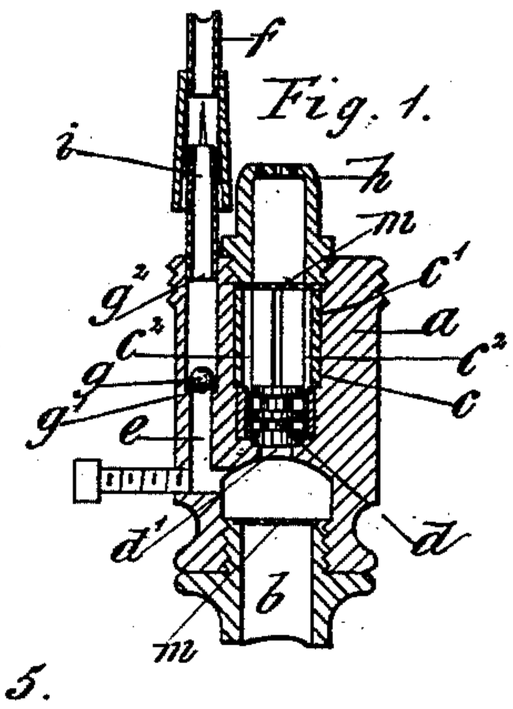


Fig. 2.

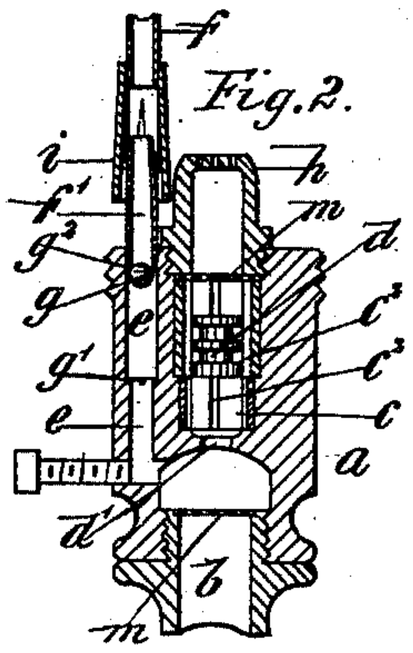


Fig. 3.

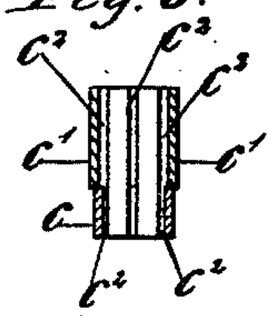


Fig. 4.

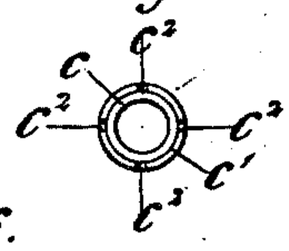


Fig. 7.

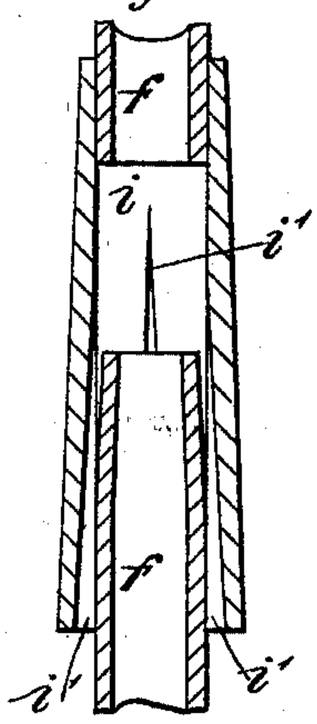


Fig. 5.

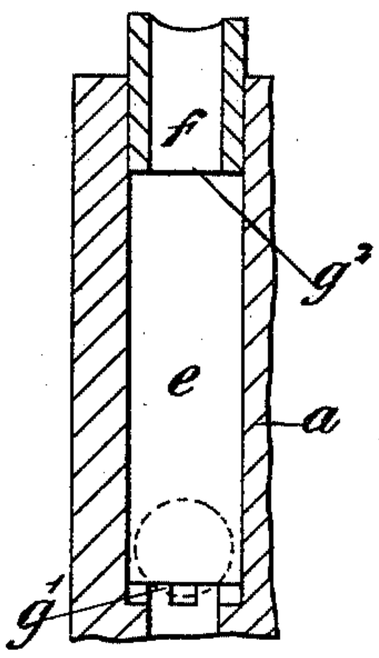


Fig. 6.

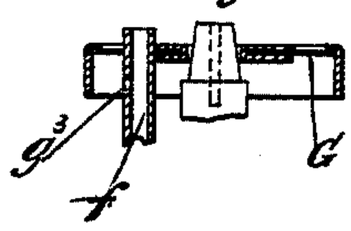


Fig. 16.

Fig. 9.

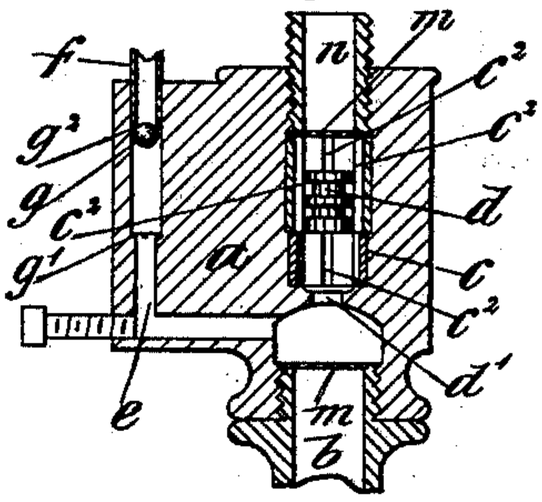


Fig. 8.

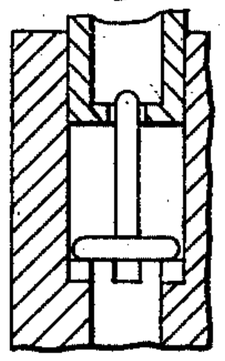


Fig. 11.

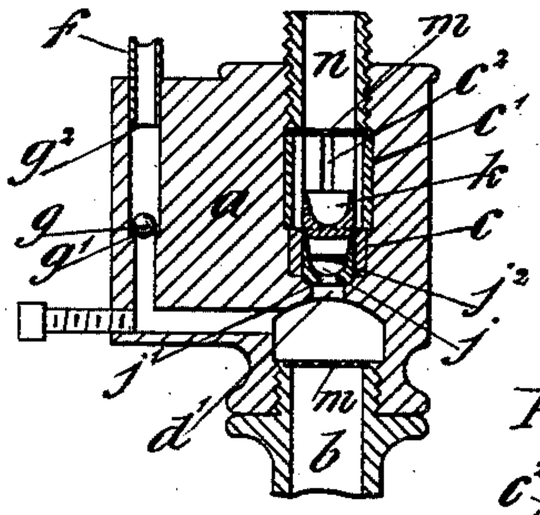


Fig. 10.

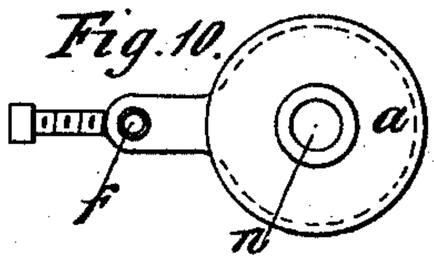


Fig. 12.

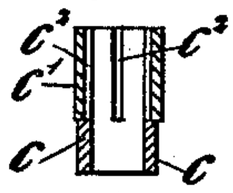


Fig. 13.

Fig. 14.

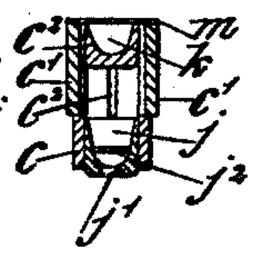
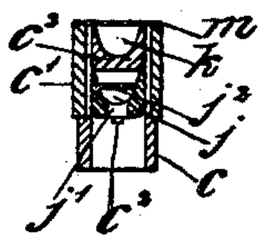


Fig. 15.



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UNITED STATES PATENT OFFICE.

FREDERICK GEORGE BARTLETT, OF BRISTOL, ENGLAND.

BURNER AND PILOT-LIGHT FOR INCANDESCENT GAS-LIGHTING.

SPECIFICATION forming part of Letters Patent No. 619,121, dated February 7, 1899.

Application filed November 23, 1897. Serial No. 659,630. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK GEORGE BARTLETT, a subject of the Queen of Great Britain and Ireland, and a resident of Bristol, England, have invented certain new and useful Improvements Relating to Burners and Pilot-Lights Used in Incandescent Gas-Lighting, of which the following is a specification.

This invention relates to burners and pilot-lights used in incandescent gas-lighting. It is applicable to single burners and also to a series of two or more burners. In the case of a single burner the by-pass cock controlling the same is not necessarily in close proximity to the burner, but may be situated remote therefrom at any convenient distance away—say, for instance, at or near the meter. In the case of a series of two or more burners controlled by one ordinary by-pass main cock common to the series the said cock may likewise be situated at any convenient point more or less distant from the series.

According to one arrangement comprised in this invention, and which arrangement is applicable to burners in which the pilot-light tube extends up to the inside of the mantle or burner, the pilot-light is extinguished while gas is being supplied to the burner. When the supply of gas to the burner is cut off, the pilot-light is restored. As an auxiliary to insure ignition of the gas at the burner an aperture is provided in the side of the pilot-light tube at a suitable distance below the gauze of the burner-head.

According to another arrangement comprised in this invention, and which arrangement is more particularly applicable to burners in which the pilot-light tube extends up outside the mantle or burner, the pilot-light remains permanently alight; but the flame thereof is reduced when the burner is being supplied with gas. When the supply of gas to the burner is cut off, the pilot-light flame is restored to the same dimensions as before reduction. This modification is adapted for connection to an ordinary Bunsen or incandescent gas-light burner or other burner, and such burner can be attached without alteration.

A further improvement constituting part of this invention consists in means for approximately controlling the consumption of gas under varying pressures.

Referring to the drawings accompanying this specification, Figures 1 and 2 illustrate in vertical section the arrangement first above referred to. Fig. 3 represents a longitudinal section of a sleeve detached from the burner, and Fig. 4 represents a plan view of the same. Fig. 5 represents an enlarged detail sectional view of the seatings for the ball-valve; Fig. 6, a detail sectional view showing an auxiliary means of insuring the ignition of gas at the burner; Fig. 7, an enlarged sectional view of the grooved ferrule; Fig. 8, an exaggerated sectional view of a form of valve for the pilot-light tube; Fig. 9, a vertical sectional view of a modified form of this invention by which the pilot-flame is kept continually burning, and Fig. 10 a plan view of the arrangement shown in Fig. 9. Fig. 11 is a sectional view showing a form of my invention in which two cup-shaped valves are employed; Fig. 12, a detached sectional view of the sleeve used with the device shown in Fig. 11, and Fig. 13 represents in elevation the valves shown in Fig. 11. Fig. 14 is a sectional view of the cup-shaped valves and sleeve, showing the upper valve lifted from the lower; Fig. 15, a similar view showing the lower valve lifted against the upper, and Fig. 16 represents a detail view of the lower end of one form of the pilot-light tube.

Similar letters refer to similar parts throughout the several views.

a is a barrel screw-threaded externally at the upper end for attachment of the usual Bunsen or mixing tube and burner-head. At the lower end the barrel *a* is screw-threaded internally for the attachment of the gas-supply pipe *b*. Closely fitting in the barrel *a* is a sleeve, of which a section is shown apart at Fig. 3 and a plan at Fig. 4. The sleeve consists of two tubes *c c'*, of which *c'* encircles the upper part of *c*. The tube *c* has slots c^2, which extend as open slits from the top of the tube *c* to the level of the lower end of the tube *c'*. Thereafter they are continued to the lower end of the tube *c* as grooves therein. The sleeve is made in this way for convenience and ease in manufacture; but, as is obvious, it may consist of one tube only. Within the

sleeve is a valve *d*. When this valve is in the position shown at Fig. 1—that is to say, down in its seat—the supply of gas to the burner is cut off.

In the channel *e*, by which gas is supplied to the pilot-light tube *f f'*, is a valve *g*, being a ball of aluminium or other suitable metal or material. This ball is free to ascend and descend in the space between its lower seat *g'*, provided by contracting the channel, and its upper seat g^2, provided by the lower end of the lower part *f'* of the pilot-light tube. A sectional view of the seatings and chamber for the valve *g* is shown at Fig. 5. It is drawn to an exaggerated scale. The ball is represented by a dotted circle. The lower seat *g'* is not gas-tight. It is grooved, slotted, dentated, serrated, or otherwise treated, so that gas can still pass up although the ball be in the position shown at Fig. 1—that is to say, in the seat *g'*—and which is the position it assumes when the gas-supply to the burner is cut off. In this way the pilot-light flame is kept supplied with gas, which is admitted through the by-pass of the said main cock even though the cock itself is turned off.

When it is desired that gas should flow to the burner, the by-pass cock is turned in the direction proper therefor, and by the gas thus admitted through the supply-pipe the valve *d* is raised from its seat, the gas acting on the under face of the valve through the aperture *d'* in the seat. At Fig. 2 the valve *d* is shown thus raised. The gas ascending in the sleeve *c c'* passes thence through the slots c^2 to the usual perforated nipple *h* and thence to the burner. The valve *g* is also lifted from its lower seat *g'* into its upper seat g^2, thus cutting off the supply of gas to the pilot-light, which is accordingly extinguished, but not before the gas issuing at the burner has been ignited by the pilot-light.

As an auxiliary, which is, however, not absolutely necessary to insure ignition of gas at the burner, the pilot-light tube has an aperture g^3. (Shown at Fig. 6.) When gas is turned on to the burner, an increased quantity of gas ascends in the pilot-light tube during the interval of the passage of the valve *g* from its seat *g'* to its seat g^2. This causes a temporary leakage of gas through the aperture g^3. The gas which thus finds exit through the aperture g^3 ascends and is ignited above the gauze G by the pilot-light, and thus an additional means is afforded for igniting the gas upon its arrival at the burner-head.

When the gas-supply to the burner is cut off, the feed in the pilot-light tube is restored as the valve *g* descends to its lower seat *g'*. Ignition of the gas issuing at the top of the pilot-light tube is effected by the expiring flame at the burner. Disks *m*, of wire-gauze, are placed both above and below the valve *d* with the object of excluding dirt.

In order to remove from the valve *d* any back pressure of gas when the valves are down, a grooved ferrule *i* is preferably fitted to the pilot-light tube. This ferrule, which is shown drawn to an exaggerated scale in the sectional view, Fig. 7, fits on the upper part *f'* of the pilot-light tube, which part is coned to form a nozzle. The ferrule *i* has internal grooves *i'*, which are open at bottom to the atmosphere. They do not extend to the lower end of the upper part *f'* of the pilot-light tube. By the provision of the grooved ferrule *i* an upward draft is induced in the pilot-light tube and back pressure of the gas is thereby prevented.

The valve in the sleeve *c c'* is not necessarily restricted to the form shown. It may be cup-shaped, bullet-shaped, or of other suitable configuration. This is also the case with respect to the valve in the pilot-light tube. It may vary in shape. As a further example it may be in the form of an inverted pin, as shown at an exaggerated scale in the sectional view Fig. 8.

At Fig. 9 is shown in vertical section the arrangement (constituting part of this invention) according to which the pilot-light tube extends up outside the mantle or burner, and the pilot-light frame is always burning. Fig. 10 is a plan of the arrangement shown at Fig. 9. In this arrangement neither seat of the valve *g* is gas-tight. The lower seat *g'* is the same as in the arrangement shown at Figs. 1 and 2. The upper seat g^2 is very slightly roughened at the edge, (see Fig. 16,) so that when the valve *g* is forced up into the seat g^2 by the gas there is sufficient leakage to maintain a very small, almost imperceptible, flame at the top of the pilot-light tube. For this purpose one side of the barrel *a* is extended out to carry the pilot-light tube outside the mantle or burner. In this modification the burner-flame is put in and out, as in the arrangement above described; but, as aforesaid, the pilot-light flame remains permanently alight. When the valve *g* is in its lower seat *g'*, the full supply of gas allowed by the by-pass flows to the pilot-light; but when the valve *g* is in its upper seat the supply to the pilot-light flame is reduced to the diminished quantity which the seat g^2 permits to pass. The barrel *a* carries at top a screw-threaded nozzle *n*, to which the burner is attached. The burner employed may be an ordinary Bunsen or incandescent gas-light burner. It can be attached without alteration. Or an Argand or flat-flame burner or other form of burner may be used, as the appliance here referred to is distinct. By sufficiently enlarging the said appliance it can be adapted for use with a cluster or group of burners, in which case pilot-light tubes are provided corresponding in number to the burners.

Instead of extending the barrel the pilot-light valve-tube may be carried out and up outside the barrel.

The further improvement, which is included as a part of this invention and which has for its object to control approximately the con-

sumption of gas under varying pressures, is illustrated in vertical section at Fig. 11 of the accompanying drawings. This method of approximate control is shown at Fig. 11 as applied to the second of the hereinbefore-described arrangements—namely, that in which the pilot-light tube is extended up outside the mantle or burner; but it is equally applicable to the arrangement in which the tube is extended up inside the mantle or burner. Instead of a single valve two cup-shaped valves *j k* are contained within the sleeve *c c'*. The tube *c* of the sleeve is slotted from the top only down to the level of the bottom of the tube *c'*. A detached sectional view of the sleeve is shown at Fig. 12. The valves *j k* are made of brass, gun-metal, or of other suitable metal or material. The lower valve *j* has an aperture *j'* extending through the bottom. This valve *j* is heavier than the valve *k*. The weight of the valve *j* is determined by the pressure of gas at which it is intended the valve shall act. A piece of wire-gauze j^2 laid in the valve *j* tends to prevent the gas from making a hissing or other sound when passing through the aperture *j'* in the valve. When the supply of gas to the burner is cut off, the valve *j* is down on its seat, and the valve *k* rests upon the valve, *j* as shown at Fig. 11. At Fig. 13 the valves are represented in elevation. When gas is turned on to supply the burner, the pilot-light valve *g* rises to its upper seat g^2, which, as above set forth, is not quite gas-tight. The valve *k* is lifted from the valve *j* by the gas entering through the aperture *j'* of the lower valve *j* and admits gas through the slots c^2 to the nozzle *n*, whence it passes to the burner. This position is shown at Fig. 14. If a sufficient further pressure of gas be admitted from the supply-pipe, the lower valve *j* is raised from its seat into contact with the previously-raised valve *k*. This position is shown at Fig. 15. Communication by the aperture *j'* in the valve *j* is accordingly again closed, and the passage of gas through the slots c^2 and thence to the burner is permitted to the maximum extent for which the valves are designed.

As before stated, the weight of the lower valve is adjusted to the pressure at which it is intended to rise, and the consumption of gas is maintained at an approximately uniform rate, owing to the degree in which the slots c^2 of the sleeve *c c'* are blocked by the range of travel permitted by the upper valve *k* to the lower valve *j*. The valves vary in dimension according to the maximum pressure of gas to be admitted to the burners they control.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a gas-burner, the combination of the main gas-burner and the pilot gas-burner, the tube of which is provided with two gas-seats, one of which is non gas-tight, and a valve and is further provided with an aperture near its top to insure the lighting of the gas from the main gas-burner, substantially as described.

2. In a gas-burner, means for preventing back pressure by inducing an upward draft in the pilot-burner tube, consisting of the ferrule *i* fitting on the nozzle *f* and on the upper part *f'* of the pilot-burner tube, said ferrule having internal grooves *i'* opening into the atmosphere, substantially as described.

3. Means for regulating the supply of gas to a burner consisting of a gas-supply tube having longitudinal channels cut in its inner surface, an upper imperforate valve and a lower perforated valve both located in said tube, the lower valve being the heavier of the two, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FREDERICK GEORGE BARTLETT.

Witnesses:

NICHOLAS WATTS,

WILLIAM HENRY DAVIES.