G. P. GANSTER.

Burner for Gas or Vapor.

No. 130,632. Patented Aug 20, 1872.

Fig: 1.

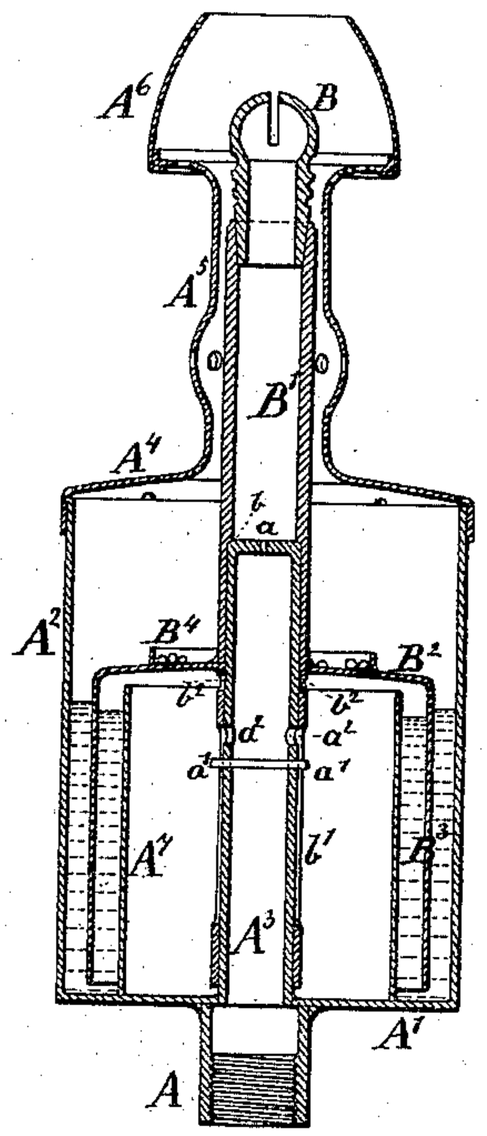
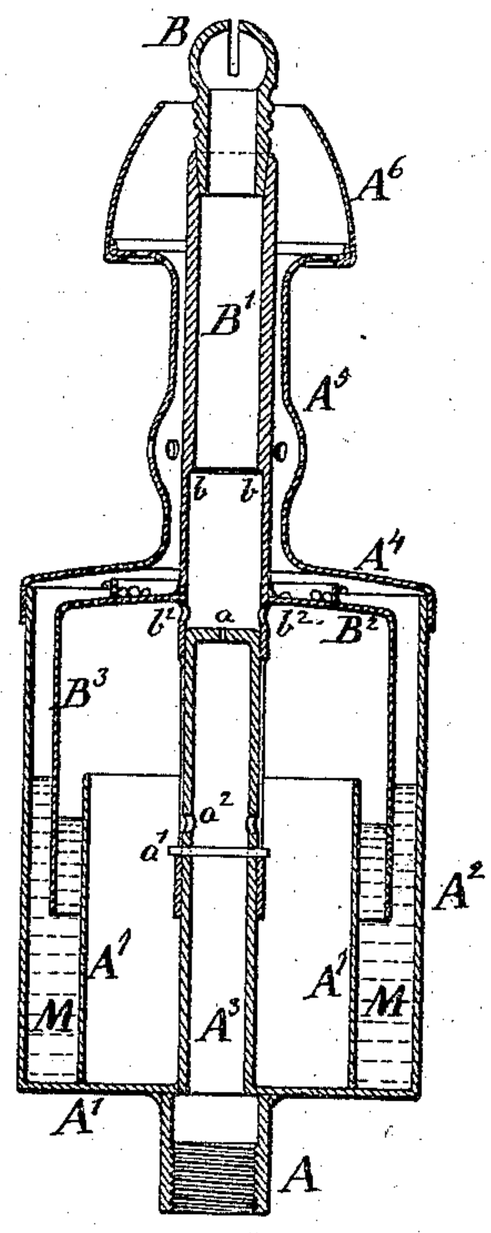


Fig: 2.



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UNITED STATES PATENT OFFICE.

GEORGE P. GANSTER, OF NEW YORK, N. Y.

IMPROVEMENT IN BURNERS FOR GAS OR VAPOR.

Specification forming part of Letters Patent No. **130,632**, dated August 20, 1872.

Specification describing certain Improvements in Burners for Gas and Vapor, invented by GEORGE P. GANSTER, of New York city, in the State of New York.

There is room for great economy in the use of gas by providing properly for great variations in the magnitude of the flame, so that a very small flame may serve during the day, and avoid a necessity for lighting at night. This has been often attempted. My invention consists in improvements in the means of providing therefor. I make a very small flame, and shield the small flame, and remove the shield automatically. It has long been known that a small flame may be effectually shielded from extinguishment by wind by means of a small shield or casing inclosing it, with proper provisions for ventilation. My invention makes it practicable to preserve a minute flame by an analogous shield, and to automatically remove the flame beyond the influence of the shield when it is required to exert its proper illuminating power.

The following is a description of what I consider the best means of carrying out the invention. The accompanying drawing forms a part of this specification.

Figure 1 is a vertical section in the condition for producing a very small flame; and Fig. 2 is a corresponding section, showing the condition which the parts automatically assume when the pressure of the gas increases from any cause. In this latter condition a large and strong illuminating flame is produced, and the burner operates without any incumbrance from the shield which before encompassed the feeble flame.

Similar letters of reference indicate like parts in all the figures.

A is a gas-pipe leading from a main, not represented. A^1 is the base, and A^2 the wall, of a cylindrical casing of thin brass or other material, up in the center of which an extension, A^3, of the gas-pipe A is led. The top of the extension A^3 is closed with the exception of a small perforation, indicated by *a*, which is only of sufficient area to supply the gas for the smallest flame. A^4 is a top fitted temporarily or permanently on the top of the casing A^2. A^5 is a neck extending up from the top A^4; and A^6 is an enlargement of the neck, forming a suitable inclosing-shield to protect the small flame. The neck A^5, as also the base of the casing A^6, and some portions of the top A^4, are perforated to allow the access of air to supply the minute flame. B is the nozzle or tip of the burner. It is here represented as of the style known as bat's wing; but this style is not absolutely necessary to the success of the invention. The tip B is formed of brass or other suitable material, and is mounted on a tight tube, B^1, which extends downward and loosely surrounds the tube A^3 before referred to. It is allowed to slide vertically thereon within certain limits, as will be presently described. A shoulder is formed in the interior of the tube B^1, which extends quite around, as indicated at *b*. This is nicely finished, and is adapted to close down and rest tightly upon a correspondingly-finished rim or top of the tube A^3. When the tube B^1, with its connections, stand in their lowest positions, the shoulder *b* rests on the top of the tube A^3 and forms a tight joint therewith. The tube B^1, extending loosely down below the level of the shoulder *b*, is slotted on each side with vertical slots adapted to slide freely up and down on the projections a^1, which extend out from the tube A^3, and may be conveniently formed, as represented, by a piece of wire extending across the tube and projecting at each side. Just above the projections a^1 are holes a^2. The vertical slots b^1, in the side of the tube B^1, must be so placed that when the tube B^1 is in its lowest position the apertures a^2 communicate with the slots b^1, so that the gas within the tube A^3 can always flow out freely through these apertures a^2. B^2 is the top, and B^3 the cylindrical sides of a tolerably capacious inverted bell, soldered or otherwise tightly fixed upon the tube B^1, and extending down so that its lower edge will be near the bottom A^1 of the apparatus when in its lowest position. This bell is intended to dip into a fluid and form a seal. Various fluids may be used for this purpose, including glycerine or any which will not freeze or evaporate, but I will describe it as mercury. The quantity of fluid required is small, by reason of its being confined in a narrow annular space between the inclosing sheet A^2 and an inner sheet, A^7, soldered or otherwise fixed on the bottom and extending upward a sufficient height, as represented. The mercury is indicated by M.

When the pressure of the gas is reduced, by properly operating a cock at a distant or near point, or by the ordinary change from night-pressure to day-pressure at the gas-works, the pipe B^1, with the connected bell B^2 B^3, firmly soldered together and worked as a single piece of metal, descends, and the burner B, being drawn down within the inclosing case A^6, the small quantity of gas issuing burns in a minute flame, amply protected from all disturbing influences. Under these conditions the gas, under the gentle pressure, circulates freely outward and inward through the holes a^2, but passes no further in that direction than to simply circulate in the chamber formed by the bell. There are orifices, not yet referred to, which provide under other conditions for a useful flow of gas through these apertures a^2, but under these conditions they are inoperative. The small quantity of gas which can flow under the gentle pressure up through the single orifice a is all which reaches the burner-tip B, and the consumption, in case the gas-burner stands under these conditions for a long period, is very trifling. Now when, by properly operating, the gas pressure is increased, the stronger pressure upward under the bell B^2 B^3 causes it to rise as far as allowed by the length of the slots b^1. This movement lifts the burner-tip B out of the inclosing case A^6, and presents it in a fair position to allow the flame to expand into a full illuminating jet. The same movement also provides for a liberal flow of the gas at the increased pressure to the burner. This is due to two causes—first, the shoulder b, which before formed a tight joint on the top of the tube A^3 is lifted far above it, and as the tube B^1 below that shoulder is loose around the tube A^3, there is room for gas to flow up between the two tubes to supply the burner; and, furthermore, or secondly, there are holes b^2, which open from the interior of the bell through the tube B^1 and allow the gas from the bell to flow inward into the tube B^1 above the top of the tube A^3, thus allowing a free and direct flow of the gas in the bell into the burner to be consumed. I may repeat that in the condition for illuminating the gas may not only flow up through the small orifice a, and also flow up through the loose joint or space between the tube A^3 and the tube B^1, but may also flow out through the holes a^2 into the interior of the bell B^2 B^3, and thence back again through the holes b^2 into the interior of the tube B^1 at such a high point that it has free communication with the burner.

Some of the benefits due to certain features of my invention may be realized without the presence of the entire combination, but the whole, as arranged, I believe to be the best form of its development. The bell B^2 B^3 may be contracted greatly in diameter, and if dispensed with altogether it may be practicable to lift the burner and its attachments by the changes of pressure, so as to secure a part of the effect, but with less delicacy and less certainty.

One point to which I attach some importance has not yet been explained. This is the provision for loading the bell and its attachment by very delicate additions. I propose to make the bell always of greater diameter than will be sufficient to allow it to be lifted by the ordinary night pressure and to load it with small shot, as required. B^4 is a rim soldered on the top of the part B^2, and forming a dish within it. When my device is mounted in a basement near the level of the rear and at a distance from the gas-works, so that the gas pressure is greatly reduced by the friction on its passage, it may need no load. When, under opposite conditions, my device is mounted in the attic of a high building near the gas-works, and especially if on very high ground, the pressure may be so great as to require a deep layer of shot within the cup B^4. But in both situations there will be the same difference between the day pressure and the night pressure, and the device will automatically sink to make a small flame on the assumption of the gentle day pressure at the works in the morning, and automatically rise to give the full flame on the assuming of the stronger night pressure at the works on the approach of night.

The device may be worked thus on the street-lamps of an entire city, operated by the difference between the day and the night pressure, which usually amounts to a half-inch of water; or it may be worked in a manufactory, a church, theater, or dwelling, operated by the same changes, or by special and more or less appreciable changes induced by other cocks or like devices.

The casing A^2 A^4 and its several inclosed parts may, if preferred, be at a somewhat greater distance from the burner B; but this distance is necessarily limited, or the bell will require to be of too great size in order to lift the great weight involved in the long connections. Under some conditions it may be expedient to partially balance the weight by a spring or analogous means.

I esteem it important to have the top A^4 of the casing removable, to allow easy access to add to or take from the weight on the moving parts.

I claim as my invention—

1. The automatic self-adjusting tip B and shield A^6, combined and arranged for joint operation, so as to shield or expose the flame by changes of pressure of the gas, substantially in the manner and for the purposes herein set forth.

2. The bell B^2 B^3 having a rim or casing B^4 for loading, as shown and arranged, to serve relatively to the gas-supply pipe A A^3, and movable tube B^1, with the holes or apertures for an increased flow in the elevated position, as herein set forth.

3. In connection with the above the shoulder b, matching on a suitable seat, A^3, and forming a tight joint when the flame is small, as shown and described.

4. In combination with the bell B^2 B^3 and

its attached tip B, rising and sinking with changes of pressure, as specified, the slots b^1 and projections or pins a^1, arranged for joint operation relatively to each other and the several parts, as set forth.

5. The construction and arrangement of the inclosing casing A^1 A^2, having the removable top A^4, supporting the shield A^6 with its several perforated connections, and the automatically-movable bell B^2 B^3 carrying the tip B and their several connections, as herein shown.

In testimony whereof I have hereunto set my hand this 30th day of January, 1872, in the presence of two subscribing witnesses.

GEO. P. GANSTER.

Witnesses:

WM. C. DEY,

ARNOLD HOERMANN.