(No Model.)

W. M. JACKSON.

GAS BURNER.

No. 381,378. Patented Apr. 17, 1888.

Fig. 1.

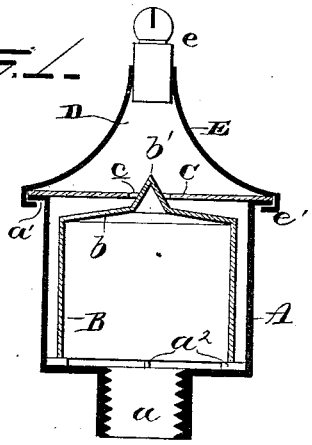


Fig. 2.

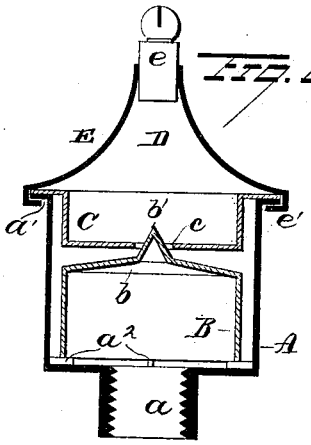
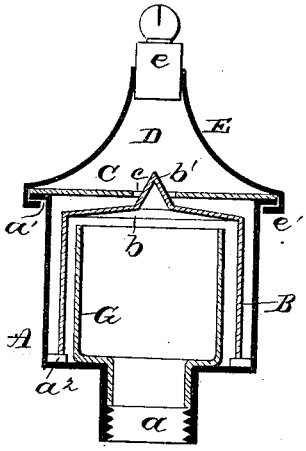


Fig. 3.



WITNESSES.

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GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 381,378, dated April 17, 1888.

Application filed February 26, 1886. Serial No. 193,352. (No model.)

To all whom it may concern:

Be it known that I, WALTER MARSH JACKSON, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in gas-burners.

The object is to provide a burner which will automatically regulate the pressure of the gas at the igniting-point.

A further object is to provide a regulating-burner which may be readily adapted to consume a greater or less number of feet of gas within a specified time, and which will be durable and present an attractive appearance.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view of the burner in vertical section. Fig. 2 is a similar view of a modified form of burner of less capacity, and Fig. 3 illustrates a further modification.

A represents an outer shell provided with a threaded tap, *a*, at the base for its attachment to the pipe. The shell A is preferably cylindrical in form, and is provided with an outwardly-extending flange, *a'*, at its upper edge. Within the shell A is located an open-bottomed hollow plunger, B, adapted to loosely fit within the casing A, leaving a narrow space between the outside of the plunger and the inside of the shell A. The top *b* of the plunger is made slightly conical, as shown, and at its center sharpens into a pronounced cone, *b'*, which acts as a valve.

The material of which the plunger B is composed is preferably non-corrosive, or it might be coated outside and in with a non-corrosive material, and the inside surface of the shell A should be coated with non-corrosive material or the shell itself made of such material.

The plunger B rests, when in depressed adjustment, on a set of projections, a^2, located at the base of the shell A; or the plunger might be provided with legs or projections, the object being to prevent the plunger from setting down snugly on the base of the shell and causing what is commonly termed "suction," when pressure is applied to raise it.

The cone *b'* extends upwardly into a hole, *c*, formed at the center of a partition-plate, C, the latter resting with its outer edge on the flange *a'* of the shell A. The hole *c* in the plate C is about the same diameter as the base of the cone *b'*, and therefore when the plunger is not in extreme elevated adjustment there will be more or less open space around the cone.

A chamber, D, is formed above the plate C by a conical concave-faced cap, E, the lower edges of which are turned under the edges of the plate C and flange *a'*, and in the top of which the nipple *e* is adjusted.

The lip *e'* on the lower end of the cap E is adapted to be bent under the edge of the flange *a'* and thereby lock the cap to the shell, and the plate C in its position between the two.

The operation of the burner is as follows: The plunger B having been constructed of such size and weight as to admit the required amount of gas past the cone-valve *b'*, any increase in the pressure of the gas coming from the feed-pipe will be exerted on the lower surface of the plunger, tending to lift the same and partially close the hole *c* by elevating the valve *b'* therein; but at the same time the gas passing beneath the edge of the plunger and up between the plunger and the shell would, if allowed the same freedom of flow, exert a downward pressure on the upper surface of the plunger which would counteract the increased upper pressure thereon, and it is just here that the gist of my invention appears.

The great extent of surface on the outside of the plunger and inside of the shell as compared with the small volume of gas passing between them, produces a frictional resistance to the free flow of the gas, the resistance being greater as the amount of surface is increased or volume of gas decreased, and less as the surface is decreased or volume of gas increased, and hence a variable pressure is established between the upward and downward pressures of the gas on the plunger, and the valve which admits the gas to the nipple will be automati-

cally closed or opened as the pressure of the gas from the feed-pipe is increased beyond or decreased below the desired degree of pressure.

The frictional resistance imposed upon the gas, as above set forth, may also serve to determine the amount of gas which shall be fed to the jet within a given time—viz., to determine the size of the burner in cubic feet of gas consumed per minute or hour. This may be accomplished by either increasing or diminishing the difference between the outer diameter of the plunger and inner diameter of the shell, or by increasing or diminishing the length of the outside surface of the plunger. I find the latter to be the most practical, since the burners of the same size in outward appearance and having the outer shells, A, of the same size and shape may be made to consume different amounts of gas per hour. This is conveniently accomplished by supplying the burners with plungers having shorter sides, as shown at B, Fig. 2, the plate C being depressed, as shown at C', Fig. 2, in order to keep the opening *c* and valve *b'* in the same relative position with respect to each other.

In the modification shown in Fig. 3 an inner tube, G, is secured to the base of the shell A within the plunger B. The tube is open at its top and is adapted to lead the gas from the feed-pipe to a point near the top of the plunger, from whence it passes down the outside of the tube G, between it and the plunger, under the edge of the plunger, and thence up between the plunger and shell, as before. An increased frictional resistance is obtained by this construction, which might be of importance in instances where the normal pressure of the gas from the main was unusually great. Different sizes of burners may also be made by constructing this inner tube of different lengths, or it may be made adjustable or concentric, capable of being elongated or shortened. Its upper surface may be perforated at its sides or serrated, and the plunger may rest upon it, thus doing away with the necessity of legs on the plunger or projections in the base of the outside shell.

It is evident that the several parts might be united by other means than by the bending under of the edge of the cap, and that other changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the construction herein set forth.

I am aware that it is not new to provide a gas-burner with a bell carrying a valve, the latter passing through a close-fitting valve-seat and adapted to control the admission of gas to the burner, and hence I make no claim, broadly, to such a construction. In my device the plunger, which has no attachment to the shell which would tend to bind or retard the movement of the plunger, is actuated by the frictional resistance to which the gas is subjected, and retards the progress of the gas after the latter enters the burner.

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

1. In a gas-burner, the combination, with a shell having a valve-seat, of a plunger slightly smaller in diameter than the internal diameter of the shell for forming a restricted gas-passage between its side walls and the inner face of the shell, the said plunger being closed at the top and open at the bottom, and provided on the upper surface of the top with a conical valve adapted to be moved into contact with its seat by the combined pressure of gas below the plunger and the frictional contact of the gas in its upward passage between the walls of the plunger and shell, substantially as set forth.

2. In a gas-burner, the combination, with a shell and a perforated diaphragm dividing the interior of the latter into two chambers and forming a valve-seat, and a stationary tube located within the lower chamber around the gas-inlet, of a plunger slightly smaller in diameter than the internal diameter of the shell for forming a restricted gas-passage between its side walls and the inner face of the shell, the said plunger being closed at the top and open at the bottom, and provided on the upper surface of its top with a conical valve adapted to be moved into contact with its seat by the combined pressure of gas below the plunger and the frictional contact of the gas in its upward passage between the walls of the plunger and shell, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WALTER MARSH JACKSON.

Witnesses:
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GEO. T. GADEN.