

No. 824,972.

PATENTED JULY 3, 1906.

J. F. BORNE.
GAS BURNER.

APPLICATION FILED APR. 5, 1905.

Fig. 1.

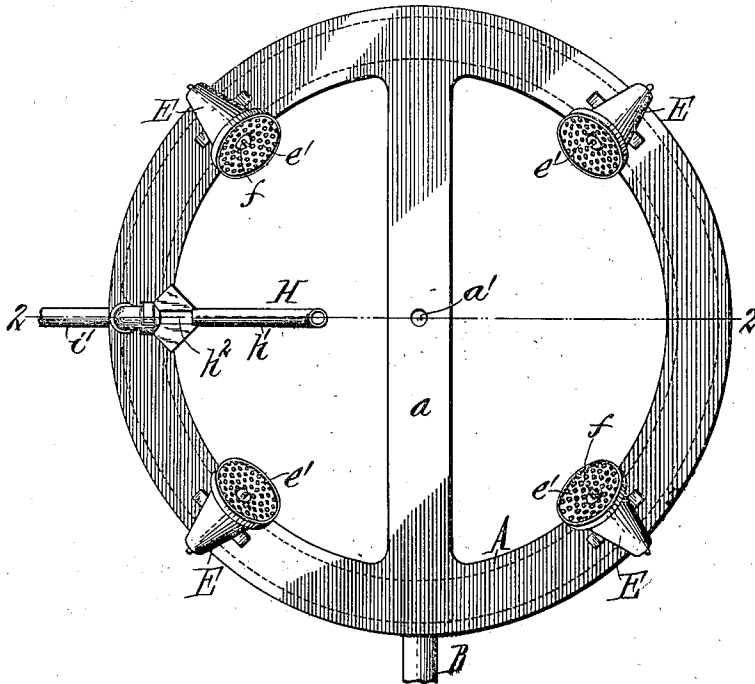


Fig. 2.

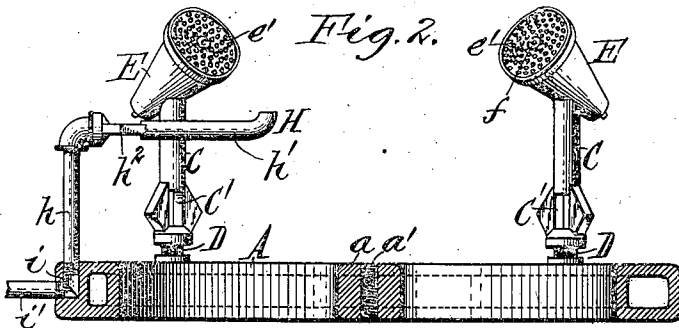
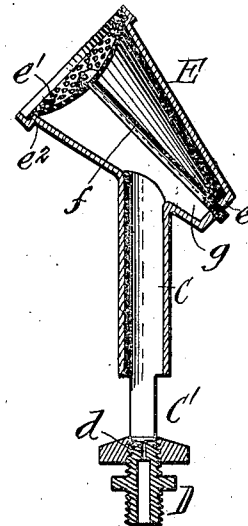


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN F. BORNE, OF SILVER CREEK, NEW YORK, ASSIGNOR TO
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GAS-BURNER.

No. 824,972.

Specification of Letters Patent.

Patented July 3, 1906.

Application filed April 5, 1905. Serial No. 253,968.

To all whom it may concern:

Be it known that I, JOHN F. BORNE, a citizen of the United States, residing at Silver Creek, in the county of Chautauqua and State of New York, have invented a new and useful Improvement in Gas-Burners, of which the following is a specification.

This invention relates generally to gas-burners, but more especially to the class of burners used in batteries under automatic water-heaters and combined with a pilot-light—such, for instance, as shown and described in Letters Patent of the United States No. 624,903, granted May 16, 1899, to Richard C. McClure and myself.

It is well-known that when the burner is turned low the flame is liable to flash back to the usual air-mixer and burn at that point. When this occurs, the resulting soot gradually clogs the burner, rendering the pilot-light useless and defeating the automatic operation of the water-heater.

The object of my invention is to provide a burner which will effectually prevent the flame from flashing back to the air-mixer.

In the accompanying drawings, Figure 1 is a top plan view of a battery of the burners. Fig. 2 is a transverse section thereof in line 2 2, Fig. 1. Fig. 3 is a vertical central section of one of the burners.

Similar letters of reference indicate corresponding parts in the several figures.

A indicates the body of the burner, which preferably consists of a tubular ring forming a gas-supply manifold or chamber. This ring is provided with a central cross-bar *a*, having a screw-threaded hole *a'*, adapted to receive a bolt (not shown) by which the burner is secured in place under a water-heater or other article or apparatus to be heated.

B is the gas-supply pipe, connected with the manifold.

The burners are mounted on the manifold, and each of the same preferably comprises an upright mixing-tube C, provided at its lower end with an air-mixer C' of any suitable construction, an externally-threaded gas-supply nipple or nozzle D connecting the lower end of the air-mixer with the manifold A and having an orifice *d* in its closed upper end, and a burner-tip or hollow head E arranged at the upper end of the tube C. The burner-tip E

is preferably arranged at an upwardly and forwardly inclined angle to the mixing-tube C, so that the several tips converge toward the center of the boiler-bottom when used under a water-heater. Satisfactory results have been obtained by placing the inclined tips at an angle of about forty-five degrees to the mixing-tubes, as shown.

Each burner-tip is closed at its lower or rear end by an imperforate head *e* and at its front or upper end by a foraminous plate or disk *e'*, which may be constructed of perforated sheet metal. This disk rests at its edge upon an internal shoulder *e''* of the tip and is clamped in place by a screw-bolt or rod *f*, passing centrally through the disk and the head *e*. The closed lower or rear portion of the tip is extended beyond the rear side of the mixing-tube C to form a pocket or cavity *g*. The tip is preferably contracted or tapered toward its rear end, giving the same the form of a conic frustum, as shown.

In the use of the burner when the flame tends to flash back it is checked by the pocket *g* and extinguished in the same instead of flashing down the mixing-tube and burning at the air-mixer. The rearwardly-tapering form of the tip causes the gas to be compressed in flashing back and aids in checking the descent of the flame in the mixing-tube. It has been found by numerous experiments that by arranging the clamping-bolt *f* lengthwise in the burner-tip, as shown in the drawings, the gas, which has a tendency to die out at the center of the disk, follows along the sides of the bolt back to the pocket *g*, the bolt thus acting as a guide which contributes to the desired result of checking or pocketing the flashed-back flame before the same reaches the air-mixer. In order to insure the dying out of the flame in the center of the perforated disk and cause it to follow along the bolt, the disk is dished or concave on its outer side, as shown. This concave construction also protects the flame when low from being blown out by a draft, the raised edge of the disk and the projecting rim of the burner-tip forming a guard or shield around the flame.

By inclining the burner-tips as shown the water of condensation from the boiler of the water-heater is not liable to drop into the same, preventing extinguishment of the gas and clogging of the perforated disks *e'* by the

lime in the water, which occurs when the tips stand upright. It has been found that by arranging the burner-tips at an angle of about forty-five degrees to their mixing-tubes the best heating results are obtained consistent with preventing flashing back of the flame.

In order to adapt the burner either to natural or artificial gas, its perforated disk e' and gas-inlet nozzle D are made removable, as shown, so that they may be interchanged with similar parts having different-sized orifices or perforations. When artificial or illuminating gas is used, the orifice of the inlet-nozzle should be larger and the perforations of the disk e' smaller than when natural gas is burned in order to obtain a flame of sufficient size to furnish the desired degree of heat.

H is the pilot-light or supplemental burner for automatically lighting the main burners when the latter are employed in connection with an automatic water-heater or similar apparatus. This light preferably consists of an upright pipe h , rising from the manifold A, and a substantially horizontal mixing and burner tube h' , connected with the upper end thereof and having its front end turned upwardly, as shown. This horizontal mixing-tube is preferably arranged midway between two of the burner-tips, as shown in Fig. 1, and provided at or near its rear end with an air-mixer h^2 of any suitable construction. The vertical pipe h is screwed into a supply-passage i formed in the manifold A independently of the main gas-chamber thereof.

i' is a supply-pipe connected with said passage.

By the above-described arrangement of the pilot-light if its flame should flash back to and burn at its air-mixer h^2 the flame is still in sufficiently close proximity to the adjacent main burner or burners to light the same, thus insuring a reliable operation of the auto-

matic water-heater provided with the improved burner.

I claim as my invention—

1. A burner comprising a gas-tube, and a burner-tip connected therewith and arranged at an angle thereto, the tip having its rear end extended beyond the tube and forming a closed pocket, substantially as set forth.

2. A burner comprising a gas-tube, and a burner-tip connected therewith and arranged at an upwardly and forwardly inclined angle to the tube, the rear portion of the tip being closed and extended beyond the tube to form a pocket, substantially as set forth.

3. A burner comprising a gas-tube, and a rearwardly extended and tapering tip connected therewith, the tip being arranged at an angle to the tube and the tapering extension forming a closed pocket at the rear end of the tip, substantially as set forth.

4. A burner comprising a gas-tube, a tip connected with the tube and having a foraminous plate at its front end, the tip having its rear end extended beyond the tube and forming a closed pocket, and a rod or bolt arranged in the tip and extending from said disk to the bottom of said pocket, substantially as set forth.

5. A burner comprising a gas-tube, a rearwardly extended and tapering tip connected with the tube and arranged at an upwardly and forwardly inclined angle thereto, the tip being provided on the rear side of said tube with a pocket and at its front end with a perforated concave plate, and a clamping-bolt passing centrally through said plate and the bottom of said pocket, substantially as set forth.

Witness my hand this 23d day of March, 1905.

JOHN F. BORNE.

Witnesses:

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N. S. BEBEE.