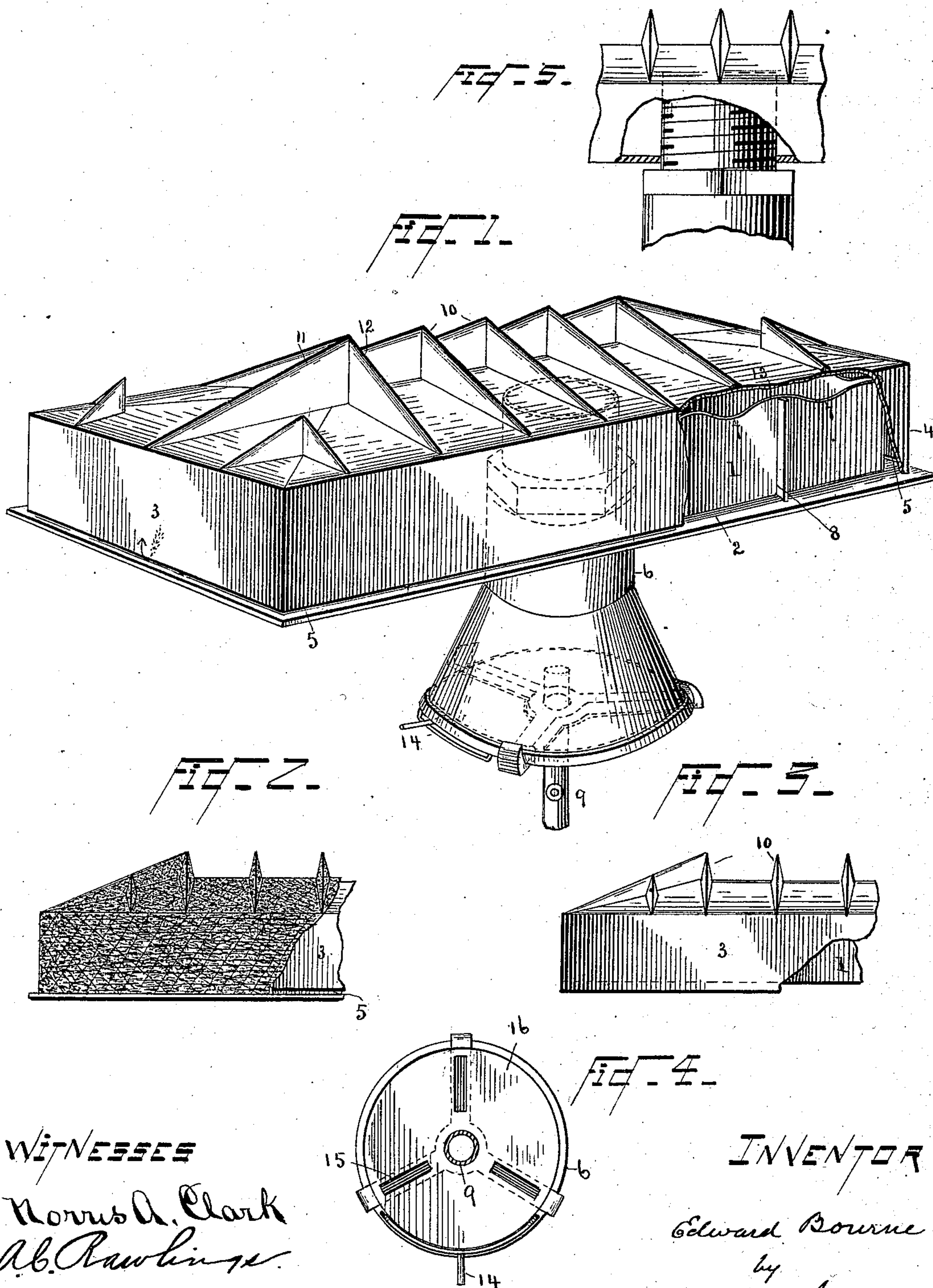


(No Model.)

E. BOURNE.
GAS BURNER.

No. 380,015.

Patented Mar. 27, 1888.



WITNESSES

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EDWARD BOURNE, OF ALLEGHENY CITY, PENNSYLVANIA.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 380,015, dated March 27, 1888.

Application filed June 3, 1887. Serial No. 240,150. (No model.)

To all whom it may concern:

Be it known that I, EDWARD BOURNE, a citizen of the United States, residing at Allegheny City, in the county of Allegheny and State of Pennsylvania, 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.

The invention relates to means of burning gas; and has for its object to expand, heat, and thoroughly intermix the same with air, and it is applicable to the burning of natural gas, which is ordinarily supplied under a considerable pressure and at a low temperature.

The invention consists in the burner hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form part of the specification, Figure 1 is an isometric view of the burner with a part broken away to exhibit the interior structure. Fig. 2 represents, on a smaller scale, a side view of the same provided with a covering of asbestos cloth or its equivalent. Fig. 3 represents a modification, and Fig. 4 is a bottom view, of the air-inlet closed by a damper, and Fig. 5 indicates the screw-threaded connection of the base and inlet-pipe.

The base of the burner is indicated by 1. This is a comparatively shallow box-like structure open at the top, and is preferably provided around its bottom with a flange, 2, extending outwardly at right angles to the body of the base. A cover, 3, which is made of a size to fit over the body of the base and over distance-pieces 8 on the same and leave a space, as indicated at 4, between the vertical walls of the two parts, rests upon and is supported by the highest parts 13 of the vertical wall of the base. This wall is made high enough to support the cover above the horizontal flange of the base, and leave a narrow space or exit, 5, between the bottom of the cover and the flange of the base, and its upper edge is scalloped or cut away at regular intervals, as indicated at 7 7, so that the gas entering the burner through inlet 6 can pass out over the vertical wall of the base down between

it and the cover, and escape at 5 just above the horizontal flange at the bottom of the burner-base, as indicated by the arrow. The vertical flanges or distance-pieces 8 are preferably cast or otherwise secured to the wall of the base, and also preferably reach from the highest to the lowest parts of the vertical wall of the base.

The inlet-pipe 6 has preferably a screw-thread connection with the bottom of the base, the latter being provided with a screw-threaded opening to receive the pipe, which can be screwed up more or less into the burner to vary the point of delivery of the gas into the same. The inlet-pipe is preferably provided with a flaring or trumpet-shaped bottom, to which may be secured a spider or frame having a central opening for the reception of the gas-pipe 9. Pipe 9 may be provided with a stop-cock and the air-inlet with a damper or valve of any known form adapted to close or open it more or less completely. In the present illustration 16 is the damper, 14 its handle, and 15 the openings represented as covered by the spider. I wished it to be understood that my invention is not limited to a damper or to any particular form thereof.

The cover or burner-top is on its upper side made in the form of a hip-roof, which form favors the even distribution of the gas escaping from the gas-pipe with the intermixed air, as the longitudinal channel immediately under the ridge first receives the gas and air and directs a part of it toward the ends of the burner until it meets the sloping walls of the same, when it is spread laterally down the corner channels, so filling the whole interior and flowing out evenly between the cover and base on all sides. This cover is provided with ribs 10, which serve to absorb heat from the burning gas, and also furnish a secure resting or holding place for a covering of fibrous or fine material of infusible character—such as asbestos, slag, wool, or fine wire—which covering may consist of strips of woven material, or of rope-like masses, or of simple layers or bunches. These ribs are made angular at the ends of the cover, as indicated at 11 and 12, to furnish a holding-place for asbestos or its equivalent, though many of the advantages of the improved burner could

be secured without these particular angular ribs. The asbestos or equivalent material is preferably arranged to extend over the top and down on each side and at the ends, and so as to cover or partially cover the exit 5 from the burner, in order that the mixed air and gas escaping from the burner may become, as it were, entangled between the fibers, threads, or wires, and conducted up among the same in a burning condition to the top of the cover and in some degree to the summit of the same. This secures a very thorough intermixture of air and gas and a complete combustion of the latter. The heat of combustion is largely absorbed by the ribs and cover, and is in part transmitted by conduction and radiation to the gas and air within the burner.

This burner could be used with advantage without the asbestos or other covering, the ribs serving to absorb and conduct heat; but the asbestos prevents the too ready escape into the air of light compounds of hydrogen which may issue at 5, and renders the burner very efficient for burning such gases delivered into it under considerable pressure. The covering also aids to retain heat in the burner and adapt it for the combustion of carbureted or vapor-laden gases.

The particular form and location of the ribs or of the distance pieces or of the so-called "scallop" are not essential. These latter forming numerous exits from the upper part of the base, tend to divide and equally distribute the escaping gas and air all around the burner, and the distance-pieces guide the escaping gases as well as suitably separate the cover and base.

The burner, including the cover and inlet-pipe, could be made of cast metal in two parts, the inlet and spider being cast in one with the base. I prefer, however, making the inlet-pipe separate and screwing it into the bottom of the base, as specified.

This burner is very suitable for use as a "gas-log," so called, though it is designed for use in heating furnaces and stoves. By properly regulating the amount of air supplied and mixed with the gas, if the latter has in it a sufficient amount of carbon, an illuminating-flame for a fire-place or other structure can be produced. A cock in the gas-supply pipe and valve at the air-inlet afford means of suitably regulating the proportions of air and gas. Either the cock or the valve, which may be of any approved construction, would, however, operate to control the relative amount of air and gas, though it is preferred to use both.

In operation the gas flowing in through the pipe draws in air through the mouth of the inlet-pipe. The mixed air and gas is spread within the burner, as above described, the gas being thereby expanded with a consequent reduction of pressure. The air and gas heated by the metal of the burner, which is kept hot by the burning gases, pass out at the bottom of the cover, where they are ignited. In some

cases the flame will run back into the burner, and the gas will be partially burned before escaping at 5; but the gas-exit is made narrow and the passage between the cover and base sufficiently narrow and deep to prevent it ordinarily. The gas is completely burned when brought in contact with the open air. In case the asbestos is used, the gas burns on its surface and in its interstices, and whether it is used or not the burner is more or less enveloped with flame, or with the hot products of combustion.

The shape and proportions indicated in the drawings are suitable for a common cook-stove, fire-place, or furnace, though the invention is not limited in this particular.

I make the width of the distance-pieces small and fit the cover so as to leave only a narrow space between it and the base. The bottom edge of the cover is made to extend as near the horizontal flange of the base as practicable, and yet leave a continuous opening all around the burner. One of the functions of the flange is to counteract the force of the issuing gas. Should the cover rest on the flange at intervals, it would not defeat its operation, and were the horizontal flange omitted the operation would not be defeated; but in such case it would be desirable to more carefully construct the parts to secure an exit for the gas between the vertical walls of uniform dimensions.

My invention contemplates a modification in which the horizontal flange is omitted and the issuing gas is directed downwardly from the burner. In some instances I propose to extend the cover below the base for a short distance to constitute a guide that will tend to prevent the outward flowing of the gas at the exit. In such a construction the gas being projected downwardly, its levity tends to quickly overcome the force of projection, which being overcome it will rise on the outside of the burner and among the overhanging asbestos, when that is used.

The burner above described is very simple and can readily be made by casting, and requires no bolt or screw fastenings, if the screw-threaded inlet be excepted. It provides abundant space for the expansion of gas and for its admixture with air, and also provides means for heating the mixed air and gas, and it is so made and arranged as to prevent the forcible escape of the gas directly away from the body of the burner. The pressure of the gas is ordinarily so reduced that it flows quietly out of the circumferential opening and rises immediately adjacent to the vertical wall of the cover, and when the asbestos is used and made to extend down over the opening 5 it tends to check any tendency of the gas to flow horizontally away from the burner, which may exist under some conditions.

I am aware that burners such as described in Patent No. 308,573, dated November 1884, have been provided with a narrow de-

scending passage leading to an orifice or orifices, and such construction is not of my invention, but only the matters hereinafter particularly pointed out.

5 Having thus described my invention, what I desire to claim and secure by Letters Patent is—

10 1. In a burner for gas, and in combination, the open-topped base having a vertical wall varying in height, a cover resting on the summit of the vertical wall, with distance-pieces separating the base and cover laterally, and a gas and air inlet, substantially as specified.

15 2. In a gas-burner, the base having an open top and side walls and provided with gas and air inlets, in combination with a cover supported on said walls, and made slightly larger horizontally than the base, and having walls terminating near the lower part of the base and separated from its vertical walls by a space substantially equal to the width of the burner-exit, whereby an expansion-chamber, a narrow circumferential space or passage, and burner-opening are formed, substantially as specified.

25 3. In a gas-burner, the base having an open top and side walls, and provided with valved gas and air inlets, in combination with a cover, closed except at its bottom, supported on said walls and made slightly larger horizontally than the base, and having walls terminating near the lower part of the base, and separated from its vertical walls by a space substantially equal to the width of the burner-exit, whereby an expansion-chamber, a narrow circumferential space or passage, and burner-opening are formed, substantially as specified.

35 4. In a gas-stove, the combination of an open-topped base provided with gas and air inlets, a cover, closed except at its bottom, supported on upward extensions from the base, the vertical walls of the cover terminating near those of the base and separated from its

vertical walls by a space substantially equal to the width of the burner-exit, whereby a narrow opening for escaping gas is provided between them, and asbestos extending over the top of the burner and below the edge of the cover and overhanging the gas-exit, substantially as specified, whereby gas delivered at the lower margin of the cover may ascend the fibers of asbestos and the burner be enveloped in flames.

50 5. In combination, the open-topped base provided with valved gas and air inlets, the cover closed, except at its bottom, and made slightly larger horizontally than the base and supported on its vertical walls, the walls of the cover extending down to near the bottom of the base, and separated from its vertical walls by a space substantially equal to the width of the burner-exit, whereby a narrow passage and burner-opening are formed, said cover having the form of a hip-roof for the better distribution of gas in the interior of the burner, substantially as specified,

65 6. In combination, the open-topped base, the cover closed, except at its bottom, and made larger than the base and supported on its vertical walls, the walls of the cover being separated from said vertical walls of the base by a distance approximately equal to the width of the burner-opening, and extending to near the bottom of the base and having the form of a hip-roof, and the gas-inlet pipe adjustable vertically in the base of the burner, substantially as specified, whereby the relative amount of air and gas can be regulated and then burned on the exterior at the bottom of the burner.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD BOURNE.

Witnesses:

HENDERSON E. DAVIS,
O. S. WOOD.