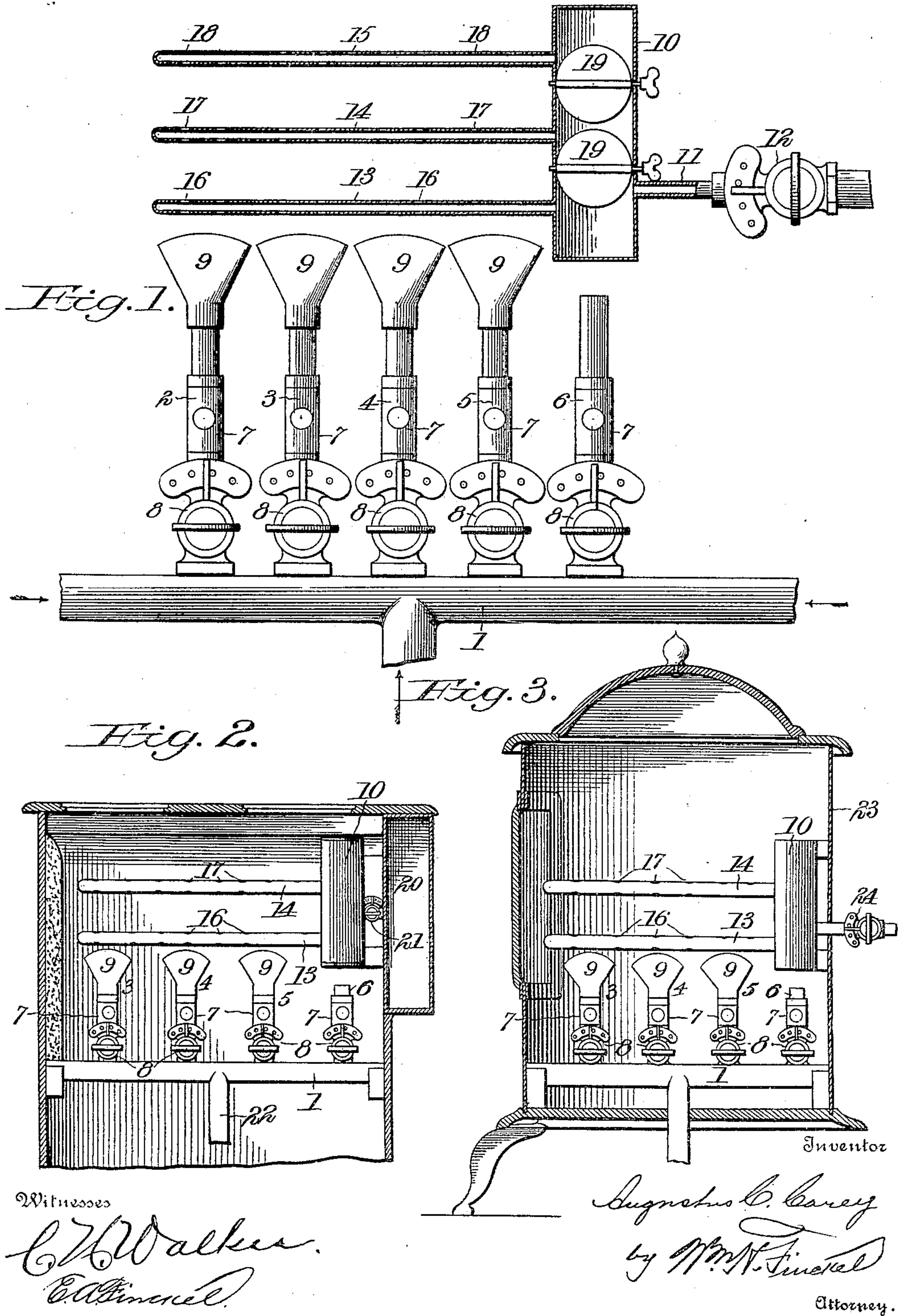


No. 824,338.

PATENTED JUNE 26, 1906.

A. C. CAREY.
GAS HEATING APPARATUS.
APPLICATION FILED MAY 22, 1903.



UNITED STATES PATENT OFFICE.

AUGUSTUS C. CAREY, OF BOSTON, MASSACHUSETTS.

GAS HEATING APPARATUS.

No. 824,338.

Specification of Letters Patent.

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Application filed May 22, 1903. Serial No. 158,368.

To all whom it may concern:

Be it known that I, AUGUSTUS C. CAREY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Gas Heating Apparatus, of which the following is a full, clear, and exact description.

The object of this invention is to improve the heat of an ordinary gas or other burner by combining therewith the highly-heated gases of decomposed steam without exposure to the objectionable or injurious odors produced by the products of combustion of the elements used.

The invention consists in introducing into or admixing with the heat of the flame of an ordinary burner the highly-heated gases of decomposed superheated steam in the manner and by the means I will proceed now more particularly to set forth and finally claim.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation. Fig. 2 is a sectional view illustrating a portion of an ordinary cooking-range with my invention applied thereto, and Fig. 3 is a sectional view of an ordinary heating-stove with my invention applied thereto.

In the drawings I have shown the preferred form of apparatus for carrying out my invention, and in this form of apparatus 1 is a gas-pipe, to which gas may be admitted from either end or at a central connection, as indicated by the arrows. Secured to and extending vertically from the gas-pipe 1 is a series of burners (preferably Bunsen burners) 2, 3, 4, 5, and 6. Each of said burners is provided with the usual air-regulating sleeve or collar 7 and with any suitable or approved construction of indexed stop-cock 8 to regulate the supply of gas to the burner. The burners 2, 3, 4, and 5 are provided with the usual fish-tail tips 9.

Arranged above the burner 6 is a tank or vessel 10, having a suitable connection 11 with a water-supply and provided with an indexed stop-cock 12 of any suitable or approved construction. Extending from and communicating with the tank or vessel 10 is a series of pipes or tubes 13, 14, and 15, and said tubes are arranged or connected with the tank or vessel at suitable distances apart

and in a vertical plane directly over the tips of the burners 2, 3, 4, and 5. The lower tube 13 is arranged in such proximity to the tips of the burners that it will lie in the flame of the burners when the apparatus is in operation. The tubes 13, 14, and 15 are provided with a series of holes or perforations 16, 17, and 18. The tubes are closed at their outer ends to better confine the steam therein as it progresses within the tubes in its course of decomposition and expansion and final escape through the openings. These tubes 13, 14, and 15 preferably are constructed of platinum or other refractory and non-corrodible metal capable of withstanding the high heat or incandescence to which they are subjected during the operation of the apparatus. Three tubes 13, 14, and 15 are shown; but it will be understood that any number of tubes may be used, the height of the tank or vessel being in proportion. In order to utilize only one or any number of the tubes in succession in the operation of the apparatus, any suitable means for separately closing communication between the tubes and the tank may be provided, and, as herein shown, the tank or vessel 10 is provided with a series of damper-like diaphragms 19, arranged at points between the inlets to the tubes and adapted to be operated from outside the tank or vessel.

The apparatus may be suitably mounted upon a stand or base and suitable connections made with the water and gas supplies and the apparatus placed in a room and the room heated in a much shorter time than can be done by an ordinary gas or other stove and without producing any unpleasant or injurious odors, or the apparatus may be arranged in the fire-box of an ordinary cooking-range, as shown in Fig. 2, the tank or vessel 10 being connected with the usual water-back 20 by a suitable connection and indexed stop-cock 21 and the gas-supply connected at 22, or the apparatus may be arranged in the fire-box of an ordinary heating-stove, as shown in Fig. 3, the tank or vessel 10 being arranged at the back 23 of the stove and a connection 24 for the water-supply extending through the back and provided with the usual indexed stop-cock, or in this instance the stove may be supplied with an ornamental water-tank arranged at the rear or back thereof and suitably connected with the tank or vessel 10. Where the apparatus is

to be used in a cooking-range or heating or other stove, of course it will be understood that the valves or stop-cocks for controlling or regulating the supply of gas and water will be arranged upon the outside of the stove.

The operation of the apparatus is as follows: The tank 10 is supplied with a suitable quantity of water to generate steam, the tank being heated by the burner 6 for this purpose, and the burners 2, 3, 4, and 5 are lighted and the flames thereof heat the tubes 13, 14, and 15. The tube 13, being directly in the flames of the burners 2, 3, 4, and 5, will become red-hot or brought to a state of incandescence, and as soon as steam is produced in the tank or vessel 10 it will enter the tube 13 and in its progress toward the closed end of the tube will be decomposed into its constituent gases, and the gases while still in the tube will become highly heated and greatly expanded and dissociated and the thus highly-heated, expanded, and dissociated gases of the decomposed superheated steam will be expelled from the tube through the openings therein directly into the flames of the burners, and thus the radiation of heat greatly enhanced and the objectionable and injurious odors produced by the products of combustion destroyed. Thus it will be seen that only one tube could be used in connection with the tank and a great heat obtained; but I have herein shown a series of tubes, and the tubes being arranged one above the other the initial heat from the flame of the burners subjected to the heat of the highly-heated, expanded, and dissociated gases of the decomposed superheated steam expelled from the openings in the lowermost tube will heat the tube next above and will be further subjected to the heat of the highly-heated, expanded, and dissociated gases of decomposed superheated steam expelled from said second tube, and so on through the series of tubes.

In order to effect the decomposition of the steam and the necessary expansion and dissociation of the gases thereof while confined within and passing through the tube or tubes, the tubes are brought to a gradually-increasing heat or temperature from the tank toward their outer ends. To this end the supply of gas to the several burners 2, 3, 4, and 5 is so regulated that the heat produced by the several burners will be the greatest at the burner 2 and gradually decreasing through the series of burners toward the tank or vessel 10.

The openings 16, 17, and 18 in the tubes 13, 14, and 15 may be arranged in any suitable manner; but it is preferred that those openings which occur in the tubes above the burner 5 be arranged upon the upper sides of the tubes only to thus better attain the decomposition of the steam as it enters the

tubes from the tank or vessel, while those openings occurring above the burners 2, 3, and 4 may be arranged in any suitable manner, preferably upon the upper and lower sides of the tubes, and thus provide for a more thorough distribution of the expelled heat of the highly-heated, expanded, and dissociated gases of decomposed superheated steam into the heat of the flame. Furthermore, the openings in the tubes, being made of a diameter equal to the bore of the tubes, will prevent the explosion of the gases of the decomposed steam by coming in contact with the hot walls of the tubes, and hence the gases will simply become highly heated, expanded, and dissociated within the tube and be expelled at the openings as heat.

If it be desired to use only a single tube of the apparatus, the lower diaphragm 19 may be turned to confine the steam within the space between said diaphragm and the level of the water, and thus direct what steam is produced in the tank into the lower tube 13. By this arrangement any number of tubes may be put into operation. Of course it will be understood that the indexed stop-cocks of the gas-burners and water-supply will be set to regulate the amount of flame and water required according to the amount of heat desired.

I wish to be understood as not limiting my invention to the particular construction of apparatus herein shown and described, as the details thereof may be changed in various particulars and still be within the scope and principle of my invention. Neither do I wish to be understood as limiting my invention to the use of a gas-burner, as the invention is equally applicable and operative with any other kind of burner, although a gas-burner is preferable for the reason that it causes no great amount of objectionable or injurious odors, and therefore permits the use of the apparatus in its numerous applications without the necessity of flues, &c., for conveying away the odors and fumes usually incident to oil and other burners when employed in apparatus of this character.

What I claim is—

1. In an apparatus for producing heat, the combination of a tank or vessel and a water-supply therefor, a burner for heating said tank, a tube projecting from and communicating with the steam-space of said tank and provided with a series of openings, and a series of burners of increasing heating power arranged in proximity to said tube to heat the same to a gradually-increasing temperature from the tank toward its end, whereby the steam as it enters and progresses through the tube is successively decomposed, highly heated and expanded and dissociated, and then expelled from said tube into the flames of the burners.

2. In an apparatus for producing heat, the

combination of a tank or vessel and a water-supply therefor, a burner for heating the same to produce steam therein, a series of perforated tubes projecting from and communicating with the steam-space of said tank and arranged one above the other in a substantially vertical plane, and a series of burners of successively-increasing heating power arranged in proximity to the lowermost of said tubes and adapted to heat the said tubes to a gradually-increasing temperature from the tank toward their ends, substantially as and for the purpose described.

3. In an apparatus for producing heat, the combination of a tank and a water-supply therefor, a burner for heating said tank to produce steam therein, a perforated tube projecting from and communicating with the steam-space of said tank, a series of burners of increasing heating power arranged in proximity to and in line with said tube to heat the same to a gradually-increasing temperature from the tank toward its end, a fuel-supply for said burners, means for controlling the supply of water to said tank, and means for regulating the heating power of said burners.

4. In an apparatus for producing heat, the combination of a tank and a water-supply therefor, a burner for heating said tank to produce steam therein, a perforated tube projecting from and communicating with the steam-space of said tank, a series of burners arranged in proximity to and in line with said tube to heat the same to a gradually-increasing temperature from the tank toward its end, a supply for said burners, and in-

dexed stop-cocks for controlling and regulating the supply to said tank and burners.

5. In an apparatus for producing heat, the combination of a tank or vessel, a water-supply therefor, a burner for heating said tank to produce steam therein, a series of perforated tubes projecting from and communicating with the steam-space of said tank and arranged one above the other in a substantially vertical plane, a series of burners arranged in proximity to and in line with the lowermost tube and adapted to heat the tubes, and means for cutting out one or more of said tubes from communication with the steam-space of said tank.

6. In an apparatus for producing heat, the combination of a tank or vessel, a water-supply therefor, a burner for heating said tank for producing steam therein, a series of perforated tubes projecting from and communicating with the steam-space of said tank and arranged one above the other in a substantially vertical plane, a series of burners arranged in proximity to and in line with the lowermost tube and adapted to heat the tubes, and a series of movable diaphragms arranged in said tank between the entrances to said tubes, whereby the steam may be cut off from one or more of said tubes.

In testimony whereof I have hereunto set my hand this 20th day of May, A. D. 1903.

AUGUSTUS C. CAREY.

Witnesses:

A. K. T. CAREY,
E. V. JACKSON.