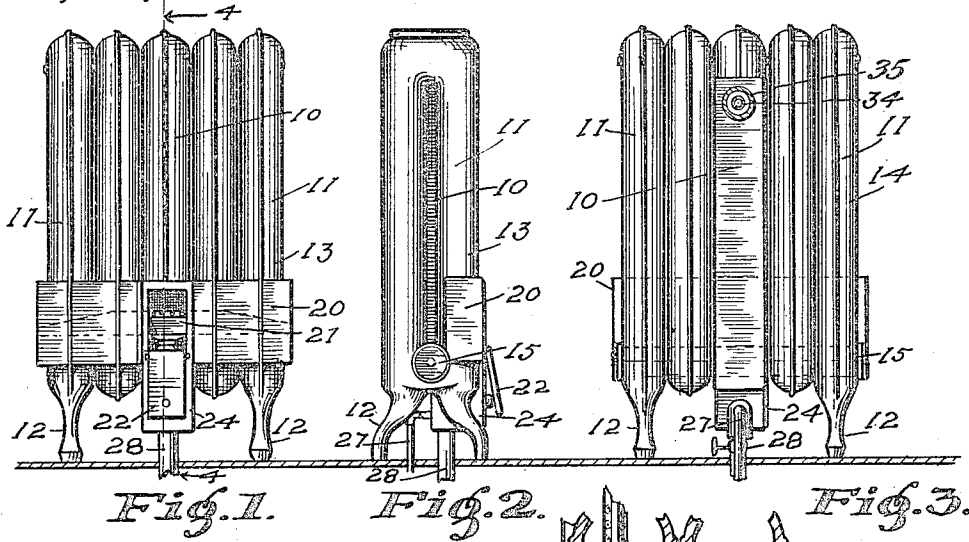
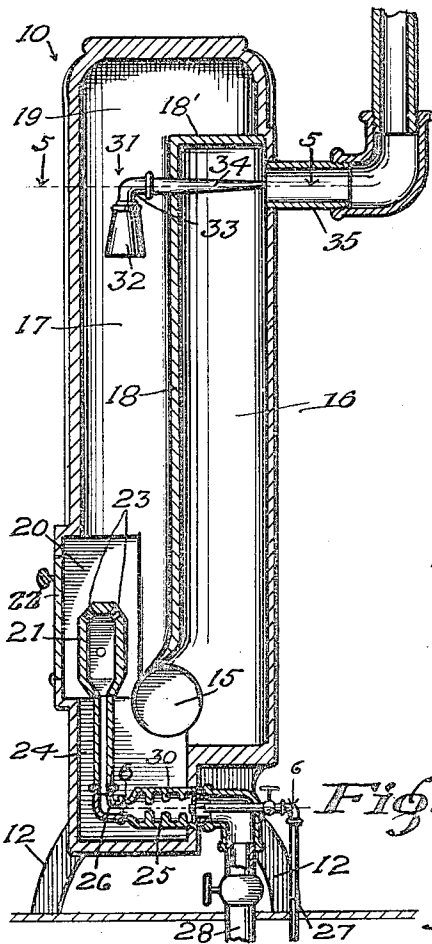
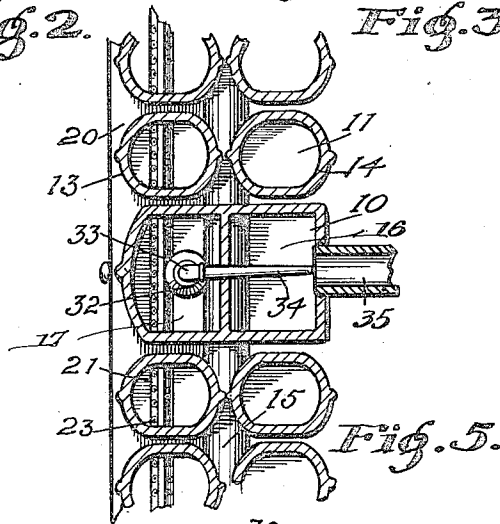
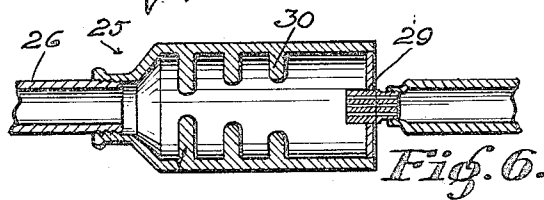
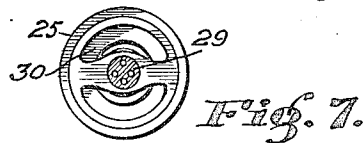


W. H. CAIN.  
GAS HEATER.  
APPLICATION FILED OCT. 23, 1916.

Patented May 8, 1917.

1,225,575.



INVENTOR  
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ATTYS.

# UNITED STATES PATENT OFFICE.

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## GAS-HEATER.

1,225,575.

Specification of Letters Patent.

Patented May 8, 1917.

Application filed October 23, 1916. Serial No. 127,149.

*To all whom it may concern:*

Be it known that I, WILLIAM H. CAIN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Gas-Heaters, of which the following is a specification.

My invention relates to a gas burning heater.

10 It is an object of this invention to construct a gas burning heater having the general appearance of the ordinary steam or hot water radiator, composed of a plurality of independent burner sections, each comprising a pair of flues. The hot gases ascend in one flue and descend in the other, and are collected in a collecting flue and passing on through the central section, are discharged through a vent into the chimney.

20 It is another object of this invention to construct an improved central burner section, having means whereby, on starting the fire, a positive draft is established in the vent pipe, causing the hot gases in each of the burner sections to circulate, traveling up and down the flues of the sections and thence through the connecting flue to the vent pipe.

It is another object of this invention to construct an improved burner to which a gaseous fuel mixture is supplied, means being provided to cause an intimate mixing of the gas and the air prior to their entrance to the burner.

35 With the above and other objects in view which will appear as the description proceeds, my invention consists in the construction, combination and arrangement of parts hereinafter described and claimed.

In the accompanying drawings which form a part of this specification, I have illustrated a convenient and practical embodiment of my invention, and in which:

Figure 1 is a front elevation of my heater.

45 Fig. 2 is a side elevation, looking from the left of Fig. 1.

Fig. 3 is a rear elevation.

Fig. 4 is an enlarged vertical cross section of a central burner section taken on line 4—4, Fig. 1.

50 Fig. 5 is a horizontal cross section taken on line 5—5, Fig. 4.

Fig. 6 is an enlarged horizontal section taken on line 6—6, Fig. 4, showing the construction of the mixing chamber.

Fig. 7 is an end view of the mixing chamber looking from the right of Fig. 6.

My improved heater comprises a central burner section 10 connected on either side with a plurality of burner sections 11. I have shown two burner sections on each side of the central section, although it will be understood that their number may be varied as desired.

The end burner sections 11 are provided with supports or legs 12, supporting the heater. Each burner section consists of an ascending flue 13 and a descending flue 14 connected at the top of the section. The descending flue 14 is connected to a horizontal waste gas collecting flue 15, located near the bottom of the sections, and terminating in an offtake flue 16 of the central burner section 10, hereinafter to be described. It should be noted that the tops of adjacent burner sections do not communicate with each other, and that except for their connection at the bottom, the sections are independent of each other.

The central section 10 comprises a vertical combustion chamber 17 separated from the offtake flue 16 by a vertical partition wall 18 which at the top terminates in a horizontal partition wall 18' connected to the rear wall of the section. The partition wall 18' is spaced from the top of the section, thereby providing a heat radiating chamber 19. The lower ends of the ascending flues 13 of the burner section 11 and the lower end of the combustion chamber 17 of the central section are united by a horizontal burner chamber 20 in which a horizontally disposed burner 21 is located. The central section 10 is provided with a downwardly swinging door 22 affording access to the burner chamber 20, whereby the gas may be ignited. The burner 21 comprises a tubular member having at the top thereof, two parallel rows of perforations 23. It should be noted that the tubular member is widest at the middle, tapering toward the ends of the burner chamber, as clearly shown in Fig. 1. The central section 10 is provided below the

burner chamber with a gas supply chamber 24 in which the gas and air mixer 25 and the pipe 26 which connects the mixer with the burner, are located. The gas pipe 27 furnishes gas to the mixing chamber 25 and air supply pipe 28, preferably taking the air from below the floor, furnishes air thereto. The mixing chamber 25 is cylindrical and the nozzle 29 of the gas pipe 27 projects centrally into it. A plurality of annular mixing flanges 30 transversely arranged to the axis of the mixing chamber 25 effect a thorough mixing of the air and gas. The flange 30 nearest the gas and air admission is the smallest, the flanges toward the exit end gradually increasing in size, thereby setting up whirling cross currents, effecting a homogeneous mixture of the gas and air.

The most important feature of my burner consists in the draft accelerator 31 located in the upper part of the combustion chamber 17 and the offtake flue 16 of the central section 10. The same comprises a tubular member 32 having the shape of an inverted cone and connected to an elbow 33, the latter being connected to a pipe 34 tapered toward its end. The pipe 34 passes through the partition wall 18 and is disposed horizontally in the flue 16, the orifice thereof terminating adjacent to the middle of the entrance of a vent pipe 35, leading to a chimney (not shown) from the upper part of the off-take flue 16.

In starting the heater, the gas in the gas pipe 26 is turned on. Gas and air are thoroughly mixed in the mixing chamber 25 and pass thence to the burner 21, whence the gaseous fuel mixture is evenly distributed in the various sections. On the ignition of the fuel mixture, the combustion in the combustion chamber 17 of the central section 10 will cause the hot gases to ascend and passing through the draft accelerator will leave the orifice of the pipe 34 in a strong current. It may be stated that the orifice has a diameter of  $\frac{1}{8}$  inch to  $\frac{1}{4}$  inch. The current of the hot gases issuing from the orifice of pipe 34 acts like an injector drawing the air or gas in the upper part of the offtake flue 16 with it and out through the vent pipe 35, thereby establishing a positive pull or draft in the lower part of the offtake flue 16, which in turn causes a draft in the collecting flue 15. The hot gases ascending in the burner sections 11, after reaching the top thereof, will be caused to flow in a downward direction through the connecting flue 15, offtake flue 16, and the vent pipe 35. It is thus seen that by the provision of the draft accelerator 31 immediately upon starting the fire, a positive circulation of the hot gases is effected, thereby preventing the formation of dead pockets of hot gases in the burner sections 11,

which would apt to be the case if means for producing a positive draft were not provided.

Various changes in the details of construction and arrangement of my heater may be made by those skilled in the art without departing from the spirit of my invention as claimed.

I claim:

1. A ventilating gas radiator comprising a central section, having a partition wall dividing the same into a vertical combustion chamber and a vertical waste gas offtake flue, a plurality of vertical burner sections arranged on either side of said central section, each of said burner sections comprising a pair of vertical flues connected at the top, a common burner chamber horizontally disposed and communicating with the bottom of a flue in each burner section, and with said combustion chamber, a burner located therein, a gas and air mixer supplying a gaseous fuel mixture to said burner, a waste gas collecting flue arranged near the lower ends of said burner sections for conducting the waste gases to said waste gas offtake flue, a vent pipe at the upper end of said waste gas offtake flue, and a draft accelerator comprising a tubular member having the shape of an inverted cone located in the upper part of said vertical combustion chamber, and a pipe tapering toward its orifice connected to said tubular member whose orifice is located adjacent to the center of the inlet of said vent pipe.

2. A ventilating gas radiator, comprising a vertical combustion chamber, a burner at the lower end thereof, a plurality of radiator sections, burners in said sections, means for supplying fuel and air to all of said burners, a waste gas collecting flue connecting said sections, a conduit conveying the waste gases from said collecting flue, a discharge pipe leading from said conduit, and a draft accelerator inducing a positive draft in said discharge pipe, said accelerator comprising a tube leading from the combustion chamber into said conduit to a point near said discharge pipe whereby, on ignition of the burner, a positive draft is established, causing immediate circulation of the gases through the various flues of the radiator.

3. A ventilating gas radiator, comprising a combustion chamber, a burner located therein, means for supplying fuel to said burner, one or more burner sections provided with burners, a conduit conveying the waste gases from said burner sections, a discharge pipe leading from said conduit, and a draft accelerator comprising a tube leading from said combustion chamber into said conduit whereby, on ignition of the burner in said combustion chamber, a posi-

tive draft is established causing immediate circulation of the hot gases through the various flues of the radiator.

4. A ventilating gas radiator, comprising  
5 a vertical combustion chamber, a burner located therein, means for supplying fuel to said burner, a waste gas discharge pipe located adjacent to said combustion chamber,  
10 and a draft accelerator comprising a tubular member extending from the upper part

of said combustion chamber and leading into said discharge pipe, the outlet orifice of said tubular member being of a comparatively small size whereby, on ignition of the burner in the combustion chamber, a positive draft is established in the discharge  
15 pipe.

In testimony whereof I have signed my name to this specification.

WILLIAM H. CAIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."