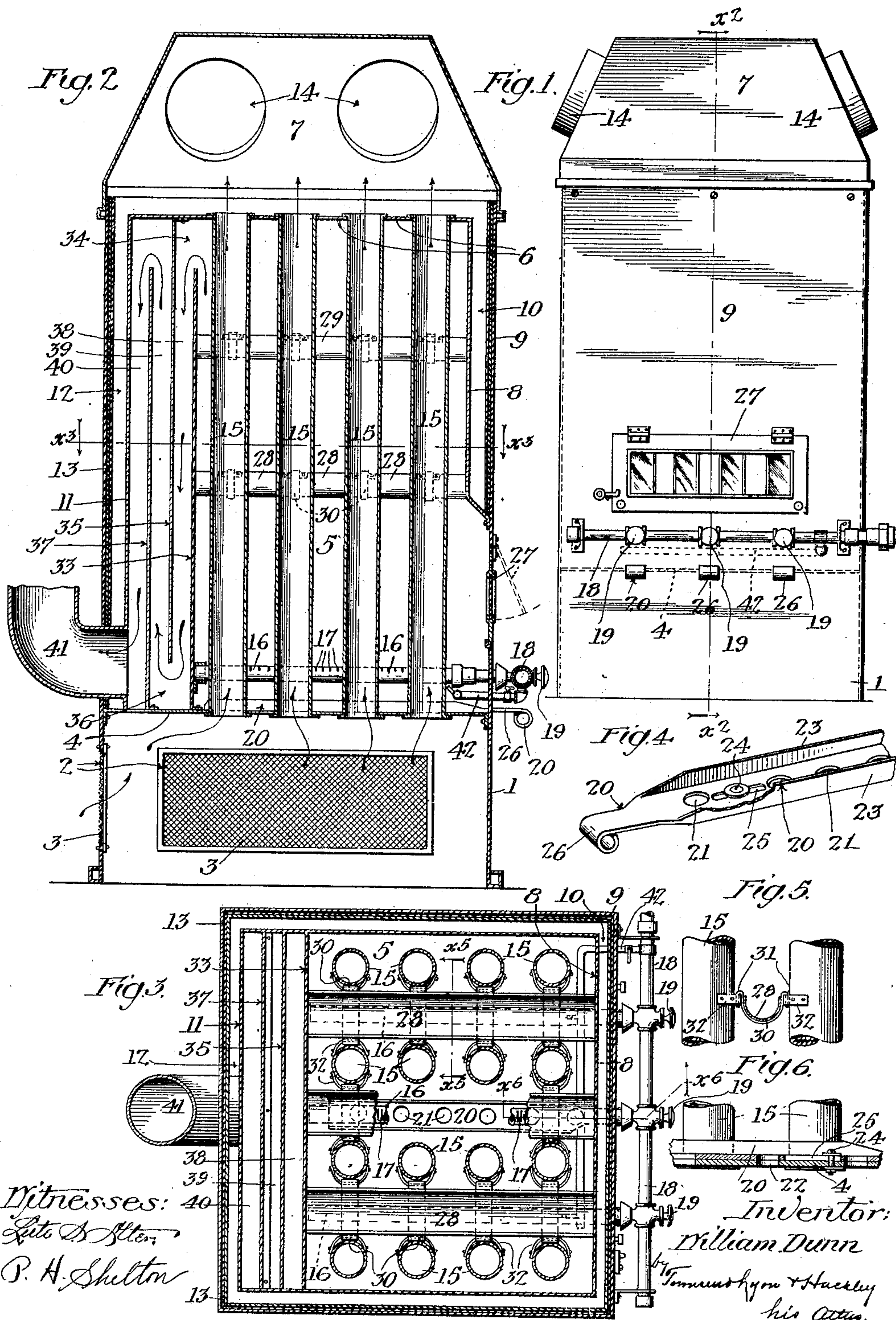


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GAS FURNACE.  
APPLICATION FILED AUG. 1, 1910.

990,808.

Patented Apr. 25, 1911.



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# UNITED STATES PATENT OFFICE.

WILLIAM DUNN, OF PASADENA, CALIFORNIA.

GAS-FURNACE.

990,808.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed August 1, 1910. Serial No. 574,988.

*To all whom it may concern:*

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

This invention relates to gas furnaces and has for its objects to provide a furnace of that character which is very efficient in operation, safe in use, which will prevent any odor of gas from escaping into the apartments to be heated, and which is of comparatively economical manufacture.

A further important object of the invention is to so construct the furnace that, although a plurality of burners may be used when the maximum heat is desired, it is possible to turn out one or more of the burners without interfering with the operation of the remaining burners which are permitted to burn.

Further objects of the invention relate to details of the construction and will be fully understood from the following description.

Referring to the drawings: Figure 1 is a front elevation of the invention. Fig. 2 is an enlarged section on line  $x^2-x^2$  Fig. 1. Fig. 3 is a cross section on line  $x^3-x^3$  Fig. 1. Fig. 4 is a perspective view of one of the cold air dampers. Fig. 5 is a section on line  $x^5-x^5$  Fig. 3. Fig. 6 is a section on line  $x^6-x^6$  Fig. 3, taken at a point through the cold air damper and its support.

The furnace comprises a lower portion 1 forming a cold air box, in three side walls of which are cold air inlets 2 covered by suitable screens 3. A partition 4 forms the upper wall of the cold air box 1 and above the partition 4 is the combustion chamber 5. A partition 6 forms the top of the combustion chamber and separates the same from a distributing chamber 7. A front plate 8 extends down from the partition 6 and joins the front wall 9 of the furnace, thereby forming an air chamber 10 which communicates with the distributing chamber 7 and forms a heat insulating space. The plate 11 extends down from the partition 6 at the back of the furnace and forms a heat insulating space 12. The outer wall of the furnace is preferably lined with heat insulating material, such, for example, as asbestos lining 13. The distributing chamber 7 is provided with as many hot air outlets 14 as are required.

Extending from the partition 4 to the partition 6 is a series of vertical air tubes 15, the lower ends of which communicate with the cold air chamber 1 and the upper ends of which communicate with the distributing chamber 7. The tubes 15 extend up through the combustion chamber and the cold air as it passes up through the tubes 15 becomes heated before it enters the distributing chamber 7. The burners comprise horizontal pipes 16 which have slots 17 cut in them, as indicated in Fig. 3. As many burners may be employed as desired. In the drawings I have shown three, each burner being located midway between the adjacent vertical tubes 15. The pipes 16 extend through the front wall of the combustion chamber and connect with a suitable header 18 furnished with valves 19 for controlling the flow of gas to the respective burners.

Below each burner is an air valve comprising a slide 20 provided with perforations 21 which are adapted to be moved into or out of register with similar perforations 22 in the partition 4. Fig. 4 shows one of the air valves in detail. Each air valve has side flanges 23 which stiffen it and is slidably supported on the partition 4 by means of screws 24 which extend through slots 25 in the slide, each slide having a handle 26 which projects through the front wall of the furnace, as shown in Fig. 2, and by means of which the position of the slide may be regulated to permit more or less air from the cold air box 1 to pass through the perforations 22 and 21 into the combustion chamber at a point immediately below the respective burners or to entirely shut off the entrance of air, if desired. Thus, if a burner is extinguished, the air slide immediately below it may be operated to close the ports 22 and prevent cold air from entering at that point. The entrance of cold air is confined to air slides associated with burners which are in operation.

Access to the burners and to the interior of the combustion chamber is afforded through a door 27 in the front wall of the furnace.

Above each burner are two spreaders 28 and 29, preferably spaced about equally apart in the combustion chamber, each spreader comprising a trough-shaped member, as clearly shown in Fig. 5, which lie in



semi-circular loops 30, each loop 30 having hook-shaped ends 31 which engage in clips 32 riveted to the vertical tubes 15. This construction enables the spreaders to be  
5 easily assembled or removed.

At the rear of the combustion chamber 5 is a vertical wall 33 which extends to a point somewhat below the upper partition 6, thereby leaving a passageway 34. Extending  
10 down from the partition 6 and located at a point back of the wall 33 is a vertical wall 35, the lower end of which terminates at a point above the partition 4, thus forming a passageway 36. Back of the wall 35 is a  
15 wall 37 similar to the wall 33. There is thus formed three vertical passages 38, 39 and 40, which give a circuitous passage to the products of combustion before they leave the combustion chamber and enter the flue  
20 41, which has the result of abstracting as much heat as possible from the products of combustion before they escape from the furnace.

It will be noted that the products of combustion can not escape into the apartments  
25 to be heated as the combustion chamber is entirely sealed from the distributing chamber 7, tubes 15 and cold air chamber 4, and the air which is heated in its passage through  
30 the furnace does not come in direct contact with the products of combustion, but is heated through the heat it receives from the walls of the vertical tubes 15 and also from conduction from other parts of the furnace.

35 A pipe 42 is provided to furnish a pilot light for enabling the easy ignition of each burner.

What I claim is:

40 1. A gas furnace comprising a combustion chamber, a cold air chamber below the combustion chamber, a distributing chamber above the combustion chamber, a series of

vertical tubes arranged in rows extending through the combustion chamber and communicating with the cold air chamber and  
45 distributing chamber, a plurality of tubular burners in the combustion chamber longitudinally arranged between the rows of tubes therein, deflectors in the combustion chamber above the burners, a series of vertical walls  
50 in the back of the combustion chamber, alternate walls projecting down from the upper wall of the combustion chamber and terminating short of the lower wall of the combustion chamber, intervening walls ex-  
55 tending up from the bottom wall of the combustion chamber and terminating short of the upper wall of the combustion chamber, thereby forming a tortuous passage, and a gas outlet flue communicating with the  
60 rear portion of said tortuous passage.

2. In a gas furnace, a combustion chamber, a cold air chamber below the combustion chamber, a distributing chamber above the combustion chamber, a series of vertical  
65 tubes extending through the combustion chamber and communicating with the distributing chamber and cold air chamber, burners within the combustion chamber, air valves below the respective burners, a plu-  
70 rality of spreaders above each burner, each spreader comprising a trough-shaped member, semi-circular loops with hook-shaped ends supporting each spreader, and clips on the adjacent tubes engaging the hook-shaped  
75 ends for supporting the loops.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 25th day of July, 1910.

WM. DUNN.

In presence of—

G. F. HACKLEY,  
P. H. SHELTON.