Mar. 6, 1923.

1,447,337

F. S. BITGOOD

FURNACE

Filed Dec. 6, 1921

Fig. 1.

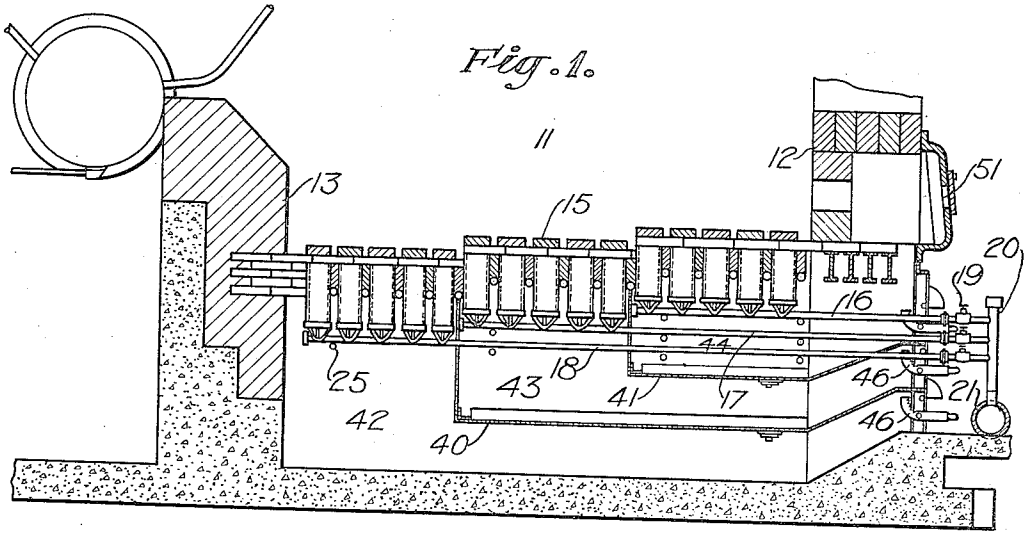


Fig. 3.

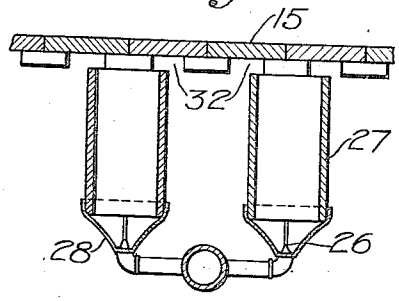


Fig. 2.

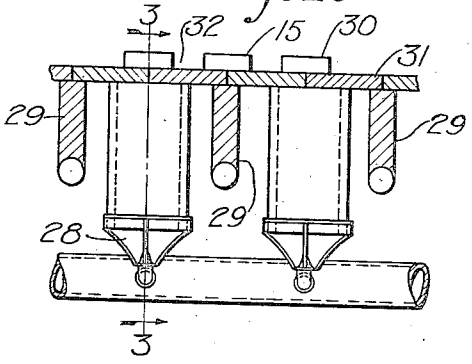


Fig. 5.

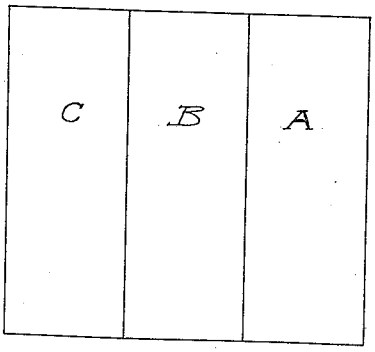
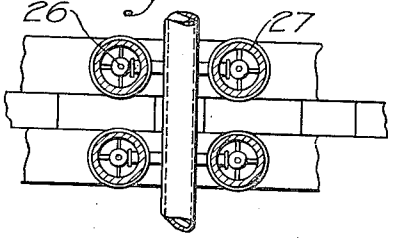


Fig. 4.



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Patented Mar. 6, 1923. 1,447,337

UNITED STATES PATENT OFFICE.

FREDERICK S. BITGOOD, OF BUTTONWILLOW, CALIFORNIA.

FURNACE.

Application filed December 6, 1921. Serial No. 520,260.

To all whom it may concern:

Be it known that I, FREDERICK S. BITGOOD, a citizen of the United States, residing at Buttonwillow, in the county of Kern and State of California, have invented a new and useful Improvement in Furnaces, of which the following is a specification.

My invention relates to furnaces and gas burners and more particularly to furnaces which are fired by gas or other fluid fuel.

The principal object of the invention is to provide in a furnace of this type means for insuring an efficient combustion.

Further objects and advantages will be made evident hereinafter.

Referring to the drawings which are for illustrative purposes only,

Fig. 1 is a cross section through a furnace equipped with my invention.

Fig. 2 is a view on an enlarged scale showing a portion of the mixing tubes and fire surfaces.

Fig. 3 is a section on a plane represented by the line 3—3 of Fig. 2.

Fig. 4 is a plan view of the structure shown in Figs. 2 and 3.

Fig. 5 is a diagrammatic plan view showing the arrangement of fire areas in the structure shown in Fig. 1.

In the form of the invention shown a furnace is provided having a fire box 11. This fire box has a front wall 12 and a rear wall 13. The fire box 11 is also provided with a floor or grate 15, the construction of which will now be described.

Extending into the space below the floor 15 are gas pipes 16, 17 and 18, the flow of gas through each of these pipes being controlled by a valve 19 and all of the pipes being fed through risers 20 from a gas main 21. The pipes 16, 17 and 18 are supported on cross members 25 and are provided with burners 26 on which fire clay tubes 27 are supported by means of brackets 28. Supported on members 29 over the fire tubes 27 are two courses 30 and 31 of fire bricks having openings 32 therebetween through which the combustible mixture is free to rise.

In the form of the invention shown, the space below the floor 15 which is formed of the members 26 to 32, just described, is divided by means of walls 40 and 41 into three chambers 42, 43 and 44. The walls 40 and 41 are air tight and form conduits which extend to the front of the furnace, each being provided with a damper 46. Each of the dampers regulates the amount of air admitted to one of the chambers 42, 43 and 44. The walls 41 and 42 form a tight closure with the lower portion of the floor 15; that portion of the floor 15 lying above the chambers 42, 43 and 44 may be considered as divided into three fire areas designated as A, B and C, each of these fire areas being fed by one of the gas supply pipes 16, 17 and 18 and the supply of air thereto being controlled by one of the dampers 46 controlling the flow of air to one of the chambers 43, 44 and 45.

The method of operation is as follows:

The gas or other fluid fuel is delivered, for example, through the pipe 16 and is forced through one of the burners 26. The fuel in a finely divided or gaseous form then rises through the tube 27, being mixed therein with air to a suitable degree to provide a combustible mixture. This combustible mixture passes through the spaces between the members 31 and 32, the products of combustion being finally delivered to the space over the floor 15.

In this manner a very uniform and perfect combustion can be obtained over the entire surface of the floor. Owing, however, to heating conditions within the furnace and particularly to the distribution of this heat in the furnace, it is often necessary to vary the proportions of the mixtures delivered to each of the fire areas A, B and C, and to regulate the amount of fuel delivered thereto, the degree of such regulation being governed by the operator who observes the fire through a peep hole 51. The supply of air and fuel to each of the areas A, B and C is under perfect control, the fuel being regulated by the valves 19 and the air being regulated by the dampers 46. It is thus possible for the operator to control the proportions of air and fuel in each of the areas A, B and C and the quantity of air or fuel delivered to each area. It is possible under some conditions to entirely shut off the flow of fuel in one or more areas or to so regulate the combustion in any area that the efficiency of the furnace as a whole may be maintained under widely varying load conditions. It is, of course, possible to divide the interior of the furnace up into more than three fire zones.

I claim as my invention:

1. In a furnace, the combination of walls forming a fire box; material forming a floor for said fire box, said floor having openings therein; walls forming a plurality of independent chambers below said floor thereby dividing said floor into a plurality of fire areas; means for producing a combustible mixture of gases for each of said fire areas; and means for controlling the proportions of said mixture in each of said areas quite independent of the other areas.

2. In a furnace, the combination of walls forming a fire box; material forming a floor for said fire box, said floor having openings therein; walls forming a plurality of independent chambers below said floor thereby dividing said floor into a plurality of fire areas; means for producing a combustible mixture of gases for each of said fire areas; and means for controlling the rate of flow of said mixture in each of said areas quite independent of the other areas.

3. In a furnace, the combination of walls forming a fire box; material forming a floor for said fire box, said floor having openings therein; walls forming a plurality of independent chambers below said floor thereby dividing said floor into a plurality of fire areas; a plurality of gas pipes each delivering a combustible gas to one of said fire areas; means for mixing said gas with air before delivery to said fire areas; and means of controlling the flow of gas to each fire area independently of the flow of gas to the other fire areas.

4. In a furnace, the combination of walls forming a fire box; material forming a floor for said fire box, said floor having openings therein; walls forming a plurality of independent chambers below said floor thereby dividing said floor into a plurality of fire areas; a plurality of gas pipes each delivering a combustible gas to one of said fire areas; means for mixing said gas with air before delivery to said fire areas; and means for regulating the amount of air delivered to each fire area.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 17th day of November, 1921.

FREDERICK S. BITGOOD.