

Dec. 8, 1925.

1,565,048

F. S. BITGOOD

FURNACE

Filed April 13, 1925

2 Sheets-Sheet 2

Fig. 3

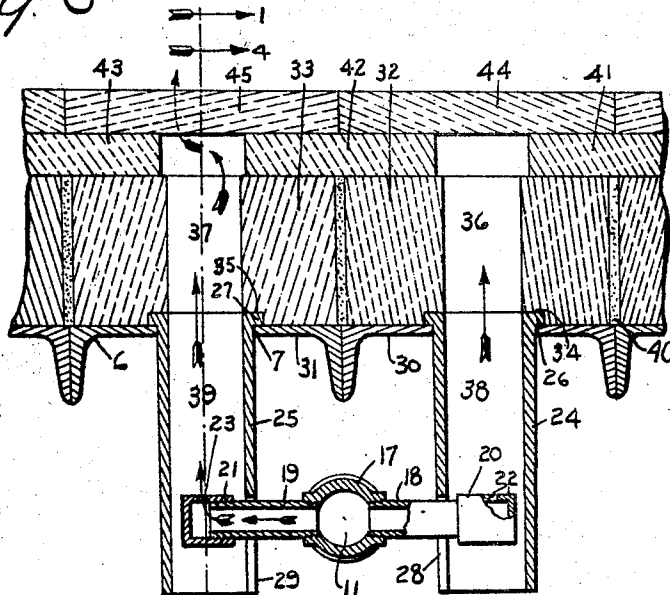
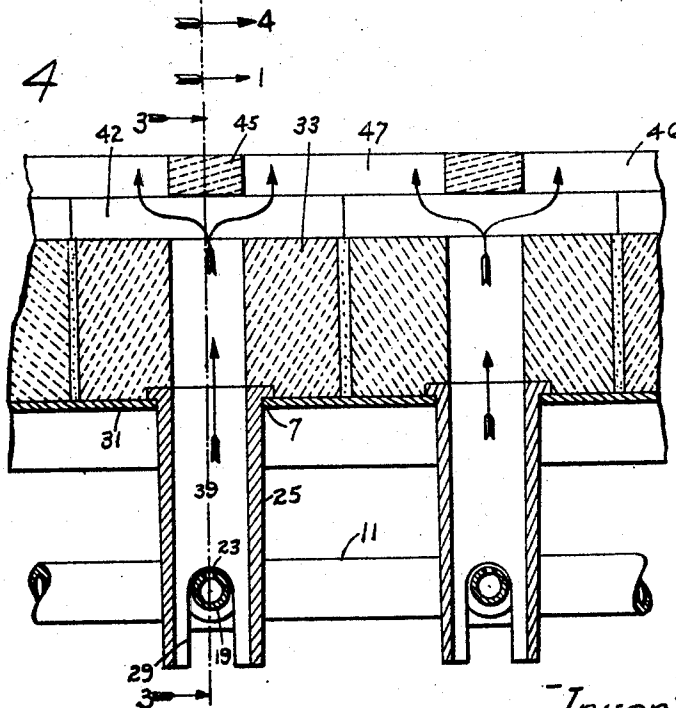


Fig. 4



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UNITED STATES PATENT OFFICE.

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FURNACE.

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To all whom it may concern:

Be it known that I, FREDERICK S. BITGOOD, 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 Furnaces, of which the following is a specification.

This invention relates to gas and oil burner furnaces and consists of the novel features herein shown, described and claimed. Specifically the invention relates principally to the gas burner construction.

An object is to make a gas burner construction for a boiler setting or the like and in which a very high degree of heat may be maintained without injury to the burners.

Specifically an object is to make a gas burner in which the lower part of the mixing chamber is a cast iron tube and the upper part a refractory sleeve having an opening in line with the cast iron tube, the refractory sleeve being a square block cast of fireproof material, such as fire clay burned in a kiln.

Other objects and advantages will appear from the drawings and specification. The drawings illustrate the invention.

Figure 1 is a fragmentary, vertical, longitudinal sectional detail of a furnace embodying the principles of my invention, the view being taken on the line 1—1 of Figs. 2 and 3, and looking in the direction indicated by the arrows.

Fig. 2 is a fragmentary horizontal section on the line 2—2 of Fig. 1 and looking downwardly as indicated by the arrow.

Fig. 3 is an enlarged fragmentary sectional detail on the line 3—3 of Figs. 1 and 2.

Fig. 4 is an enlarged fragmentary sectional detail on the line 4—4 of Fig. 3.

The details of construction and operation are as follows:

The furnace has brick or concrete side walls 1 and 2, an I beam 3 connects the side walls 1 and 2 near the front and a similar I beam 4 connects the side walls at the rear of the gas burner. An angle iron 5 is mounted below the I beam 3. Channel bars 6 have their side flanges cut away and the channel bars are turned with the side flanges downwardly and mounted upon the I beam 4 and angle iron 5 longitudinal of the furnace, parallel with the inner faces of the walls 1 and 2.

There is a series of channel irons 6 fitting together side by side as shown in Fig. 3, the

series forming an iron floor from the inner face of the wall 1 to the inner face of the wall 2.

Openings 7 are formed through the channel bars 6 at the transverse centers and evenly spaced apart and forming longitudinal and transverse rows as shown in Fig. 2. The gas pipe 8 feeds the longitudinal rows 9 and 10. The gas pipe 11 feeds the longitudinal rows 12 and 13 and the gas pipe 14 feeds the longitudinal rows 15 and 16.

Referring to Figs. 3 and 4, crosses 17 are incorporated into the gas pipes 11, and branches 18 and 19 extend in opposite directions from the crosses 17. Caps 20 and 21 are fixed upon the ends of the branches 18 and 19 and have orifices 22 and 23 in vertical alinement with the centers of the opening 7.

The cast iron tubes 24 and 25 have flanges 26 and 27 upon their upper ends and notches 28 and 29 in their lower ends. The cast iron tubes 24 and 25 are inserted downwardly through the opening 7 until the flanges 26 and 27 engage the webs 30 and 31 of the channel bars 6, and the branches 18 and 19 pass into the notches 28 and 29 as shown. The orifices 22 and 23 are at the centers of the tubes 24 and 25 and the tubes 24 and 25 form the lower parts of the mixing chamber of the burners.

Square blocks 32 and 33 are formed of refractory material, that is they are cast of suitable fire clay or the like and have recesses 34 and 35 in their lower faces and vertical openings 36 and 37 in their centers. The recesses 34 and 35 fit the flanges 26 and 27 to hold the blocks in place, and the openings 36 and 37 register with the openings 38 and 39 through the tubes 24 and 25 and form the upper parts of the mixing chambers of the burners.

After the blocks 32 and 33 have been properly placed upon the platform formed by the channels 6, suitable plaster 40 is inserted in the crevices between the blocks to make a solid mass. Spacing blocks 41, 42 and 43 are placed upon the blocks 32 and 33 and spaced away from the openings 36 and 37 and baffle blocks 44 and 45 are placed upon the blocks 41, 42 and 43 directly across the openings 36 and 37 so that the gas and flame passing upwardly through the openings 36 and 37 will strike the baffles 44 and 45 and spread and pass upwardly through the spaces 46 and 47 between the baffles.

The construction above set up is repeated over and over throughout the length of the gas pipe 8 and throughout the lengths of the gas pipe 11 and 14, thus producing a comparatively large bank of burners as required in a boiler setting or the like, the burners being on a horizontal plane and the fire from the burners discharging upwardly into the combustion chamber 48 from a horizontal plane 49. The bank of burners is held elevated above the bottom 50 of the furnace and air is supplied to the burners through the adjustable door 51.

In Fig. 1 I have shown a combination oil burning furnace and gas burning furnace, although it should be understood that the oil burning feature may be omitted. When the oil burning feature is used the oil pipe 52 may pass through the front wall of the furnace under the bank of gas burners to near the back wall 53 and upwardly, and the oil burner 54 mounted upon the upper end of the pipe to discharge forwardly into the combustion chamber 48. The passage of fresh air to the oil burner 54 may be regulated by the adjustable door 55 and the further supply of fresh air to the combustion chamber 48, thru checkered or perforated floor formed by the bank of gas burners, may be regulated by an adjustable door construction 51.

Heretofore in combination oil and gas burners it has been usual to make the bank of gas burners incline downwardly and backwardly from the front, and a special feature of my construction consists in making the bank of gas burners on a horizontal plane as shown and described.

Special attention is called to the following features:

The gas combustion or mixing tubes have metal sleeves forming their lower parts and refractory sleeves forming their upper parts. Heretofore gas burners have been made with all metal mixing tubes or all refractory mixing tubes.

The refractory portion of the burner combustion or mixing tube is made of a square block in which is cast a round hole. Heretofore refractory mixing tubes have been made round in plan or crosswise. The object in using square blocks is so that they will fit together and form a continuous platform or bank.

The square blocks are prevented from moving over the metal furnace floor by means of recesses in their lower faces to fit the tops of the iron sleeves.

The baffles over the combustion or mixing tubes are made interlocking to prevent movement of the baffles by expansion and contraction under heat and cold. This interlocking feature of the baffles is shown in the left

hand part of Fig. 2. The corners of the baffles are notched and spacing blocks 56 have corners fitting in these notches. The spacing blocks 56 rest upon the blocks 41, 42 and 43 while the baffles extend across the openings from one block to another and the spacing blocks serve to hold the baffles from moving laterally relative to the openings.

I consider the horizontal feature of the bank of gas burners important. Heretofore it has been usual to distort the bank of gas burners to accommodate the use of the oil burner, that is the bank of gas burners was made upon an incline plane, highest at the front and lowest at the rear.

The furnace is provided with an adjustable air regulating door for the gas burner system and an entirely independent air regulating door for the oil burner system.

In my construction I have a separate air inlet for the gas and the oil burners. The pan extending from the I-beam 4 to the front of the furnace forms a passage for the air through the door 51 to the gas burners, whereas the air to the oil burning furnace passes through the lowermost damper in the furnace wall.

Various changes may be made without departing from the spirit of my invention as claimed.

I claim:

1. In a furnace, a bank of gas burners comprising a metal platform having a series of vertical openings, metal mixing tube sleeves inserted downwardly through the platform and having stops to engage the platform, refractory sleeves having recesses in their lower faces to receive the upper ends of the metal sleeves, the refractory sleeves resting upon the metal platform and formed of square blocks approximately fitting to form a continuous bed, and plaster inserted in the crevices between the blocks.

2. In a furnace, a bank of gas burners comprising a metal platform having a series of vertical openings, metal mixing tube sleeves inserted downwardly through the platform and having stops to engage the platform, refractory sleeves having recesses in their lower faces to receive the upper ends of the metal sleeves, the refractory sleeves resting upon the metal platform and formed of square blocks approximately fitting to form a continuous bed, and plaster inserted in the crevices between the blocks, spacing blocks resting upon the sleeve blocks, baffle blocks resting upon the spacing blocks crosswise of the sleeve openings, and spacing blocks between the baffle blocks to hold the baffle blocks in place.

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

FREDERICK S. BITGOOD.