April 30, 1929. F. H. WILLCOX 1,711,256

BURNER

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Fig. 1.

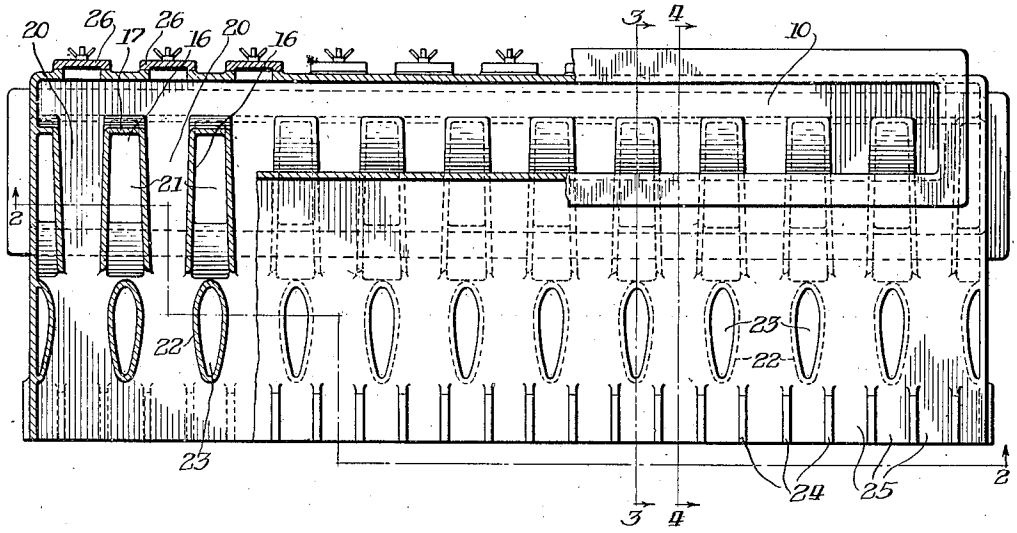
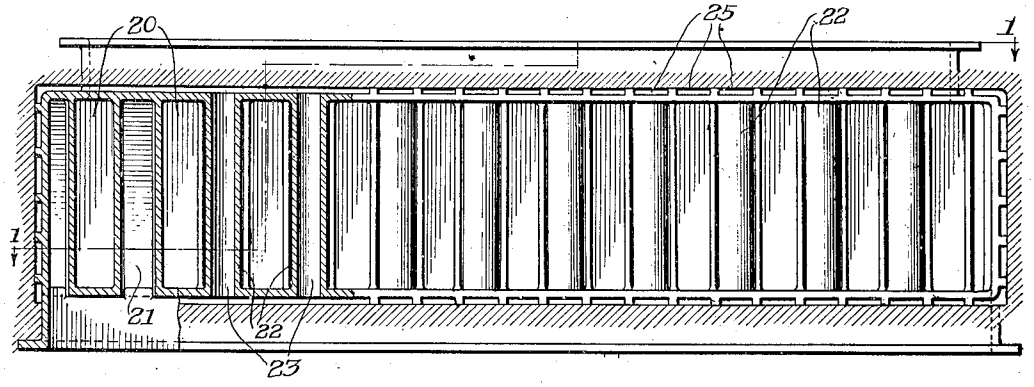


Fig. 2



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BURNER

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Fig. 3

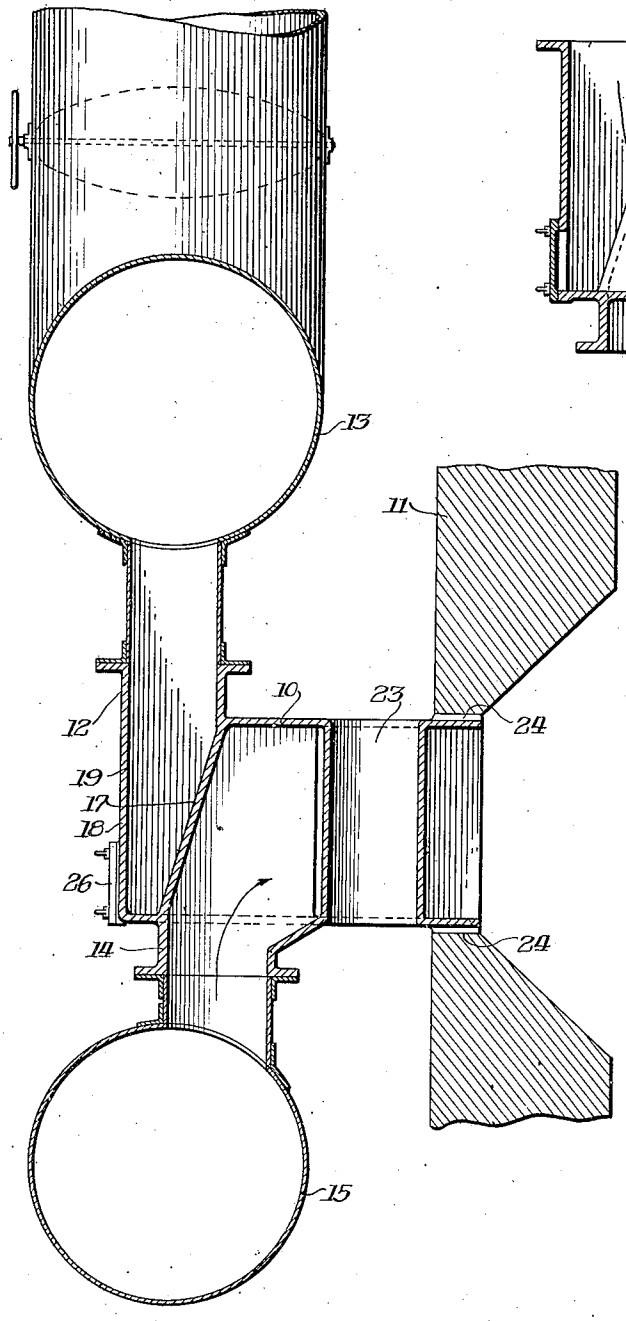
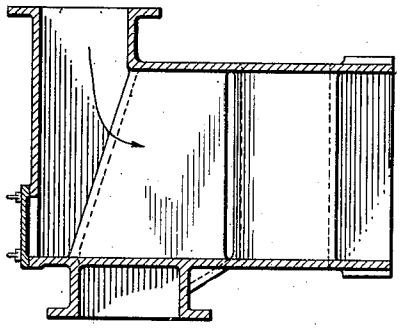


Fig. 4



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Fig. 5.

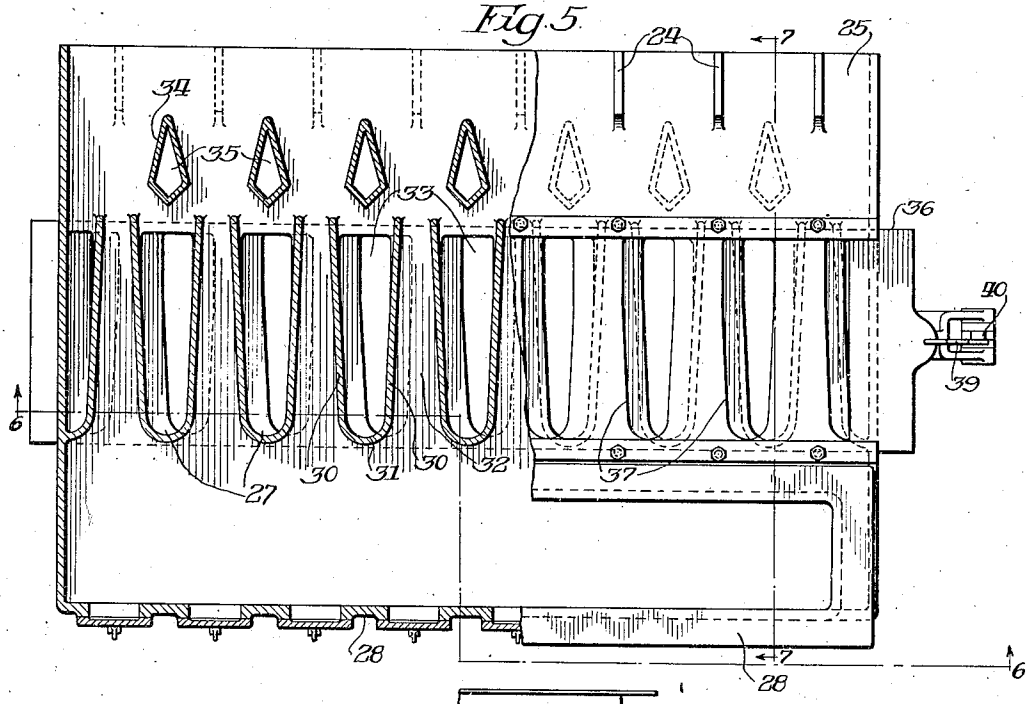
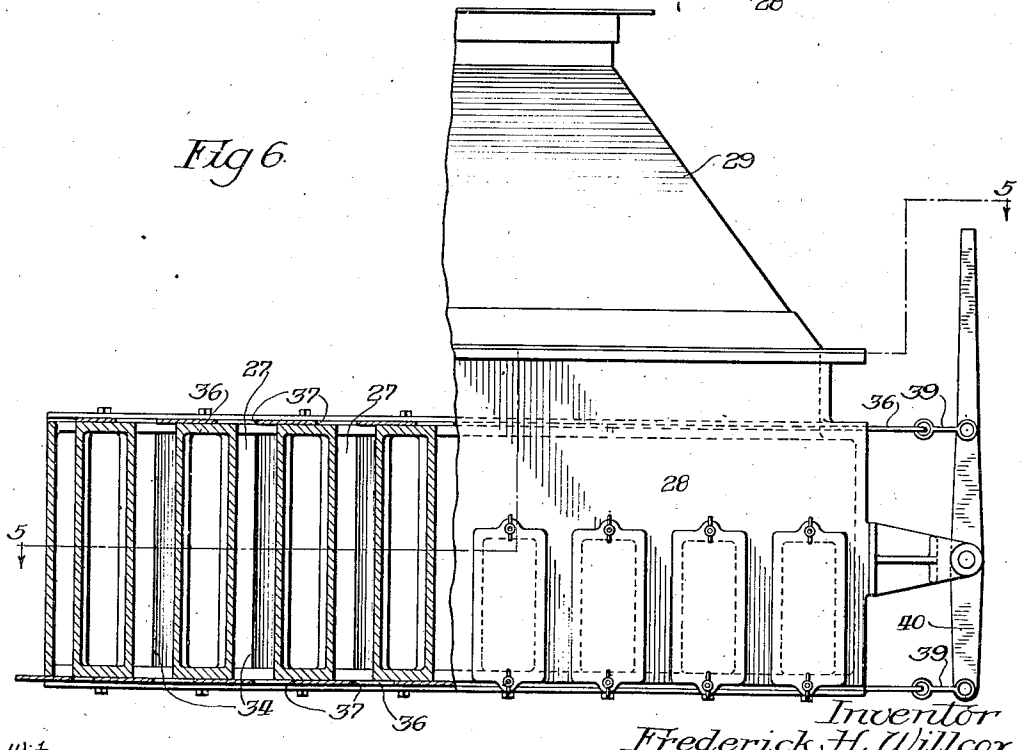


Fig 6.



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BURNER

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Fig. 7

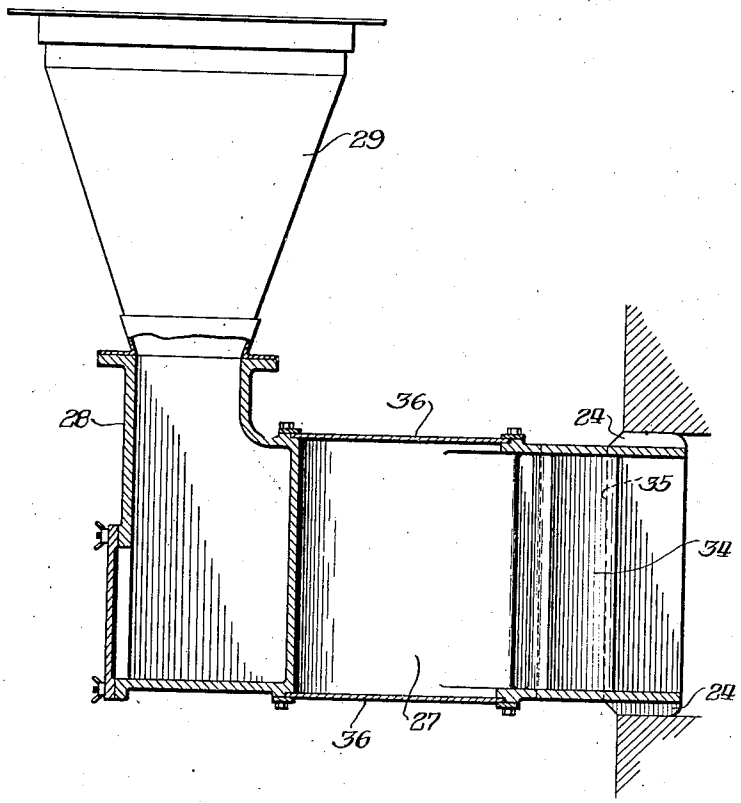
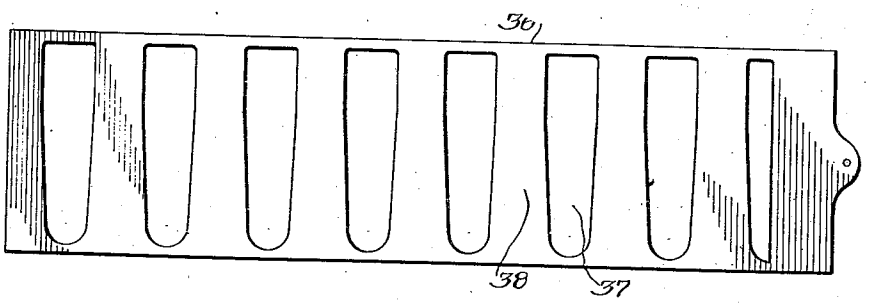


Fig. 8.



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Patented Apr. 30, 1929. 1,711,256

UNITED STATES PATENT OFFICE.

FREDERICK H. WILLCOX, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREYN ENGINEERING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

BURNER.

Application filed April 21, 1927. Serial No. 185,370.

The present invention relates to burners.

More particularly the present invention relates to improved burners of the type suitable for gas fired boilers, blast furnace stoves, or the like. The present invention is illustrated and will be described in connection with burners of the type in which air is supplied under pressure and also of the type in which the air is aspirated by the flow of gas.

An object of the present invention is to provide a burner which will cause the desired commingling of the gas and air and which will provide ventilation, whereby the temperature of the burner may be kept down.

A further object is to provide a burner which may be very closely associated with the boiler, stove, or the like, with which it cooperates, but which will not be overheated by said stove.

A further object is to provide a burner for cooperation with a boiler, stove, or the like, which will have the double advantage that the heat transfer from said boiler, stove, or the like, to said burner will be minimized and the burner will be maintained at a relatively low temperature by the passage of air which may be at or near atmospheric temperature.

A further object is to provide a construction of burner well adapted to meet the needs of commercial operation.

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a top plan view, partly in section, of a burner embodying the principles of the present invention, said view being taken along the planes indicated by the line marked 1—1 in Figure 2;

Figure 2 is a view in elevation, partly in section, said view being taken along the line indicated by the arrows 2—2 of Figure 1;

Figure 3 is a sectional view taken along the plane indicated by the arrows 3—3 of Figure 1;

Figure 4 is a sectional view taken along the plane indicated by the arrows 4—4 of Figure 1;

Figure 5 is a top plan view, partly in section, of a burner comprising a modification of the burner disclosed in Figures 1 to 4, inclusive, Figure 1 being a view taken along the planes indicated by the arrows 5—5 of Figure 6;

Figure 6 is a view, partly in section, taken along the planes indicated by the arrows 6—6 of Figure 5;

Figure 7 is a sectional view taken along the planes indicated by the arrows 7—7 of Figure 5; and

Figure 8 is a plan view illustrating a detail of construction.

Referring first to Figures 1 to 4, the numeral 10 indicates the burner and the numeral 11 indicates the wall of a boiler, hot blast stove or the like with which said burner cooperates. In the claims forming part of this specification said boiler, stove or the like will be referred to as a combustion housing. Said burner 10 is provided with the elongated inlet portion 12, which inlet portion is adapted to be connected to the supply pipe 13, which in a preferred installation supplies air to the burner 10. Said burner 10 is also provided with the elongated inlet portion 14, which is adapted for connection to the supply pipe 15, which in the installation above referred to is adapted to supply gas. Disposed in spaced relationship along the burner 10 are a plurality of sets of walls 16—16, each of which walls is disposed in a vertical plane, the walls 16—16 of each set flaring slightly from the rear toward the front of said burner. Said walls 16—16 of each set of walls are connected by the back wall 17, said walls 17—17 being spaced from the rear wall 18 of the burner, whereby to provide a passageway 19 for air. Said air passes around the back wall 17 and the converging walls 16—16 of each set of walls into the passageways 20. The gas inlet 14 communicates with the spaces 21—21 between the walls 16—16 of each set thereof. Inasmuch as said walls 16—16 provide an opening at their forward extremities, access is had at the forward extremities of said walls 16—16 between the gas and air, whereby commingling of said gas and air may occur. Disposed in the path of the gas entering through each of the pasasgeways 21 is the baffle 22. Said baffles in the structure shown in Figure 1 are elliptical in shape and are disposed symmetrically in the path of gas passing through the passageways 21. Said baffles 22 comprise hollow columns, pro-

viding vertical passageways 23, which permit the flow of air in a vertical direction therefrom, resulting in the cooling of the burner.

The forward edge portion of the burner is provided with a plurality of flanges 24—24 adapted to space the major portion of said burner from the wall 11 of the hot blast stove. Said flanges 24—24 therefore provide passageways 25—25 through which air may be drawn into the hot blast stove by an aspirating action, the air passing through said passageways 25—25 being used not only for combustion, but for cooling the forward edge portion of the burner.

Communication to the passageway 19 in rear of the walls 17—17 is controlled by the closure members 26—26, which may be held immovably in place by nuts or other preferred holding means. The structure shown in Figures 1 to 4, inclusive, does not show any control means for the supply of gas or air, said controls being independent of the burner shown in said figures. In the practice of the present invention it will be preferred to supply both gas and air under pressure.

Referring now to Figures 5 to 8, inclusive, a structure is illustrated which includes means for regulating the supply of air, the parts being so arranged that the air may be drawn into the hot blast stove by the aspirating action of the flow of gas.

The burner 27 shown in Figures 5 to 8 includes the gas inlet portion 28 which is an elongated member adapted to be connected to a source of gas supply 29. The gas entering through the inlet portion 28 engages the diverging walls 30—30, which are connected at the rear by the wall 31. Said walls 30—30 provide converging passageways 32 for the flow of gas.

The burner 20 is provided with openings in its top and bottom walls for the admission of air, which openings communicate with the spaces between the walls 30—30 of each set thereof. The passageways for air are indicated by the numerals 33—33. Baffles 34 are provided, symmetrically disposed relative to the passageways 33, which baffles are hollow columns providing passageways 35 for ventilating air, which passageways are open at the top and bottom of the burner. Said baffles 34 are illustrated as quadrangles arranged symmetrically about the axes of the passageways 33, said quadrangles being disposed in position to provide the proper commingling of air and gas and to provide passageways for the commingled air and gas through the forward portion of the burner into the hot blast stove. The burner illustrated in Figures 5 to 8 is provided with the spacing flanges 24—24 providing the passageways 25, as described in connection with Figures 1 to 4, inclusive.

The air inlet passageways to the passageways 33—33 are controlled by the valve plates 36 arranged at the two extremities of said passageways 33—33. A valve plate suitable for the purpose is illustrated in Figure 8, said valve plate being provided with the apertures 37—37 and the closed portions 38. It will be clear that the flow of air may be controlled by the proper positioning of said valve plates 36—36 relative to the passageways 33. According to the showing of Figure 6, the two valve plates 36—36 are connected by lines 39—39 to a lever 40 pivoted between said links. Movement of said lever will therefore control the position of the two valve plates 36—36.

In both modifications of the structure herein described the baffle members indicated by the numerals 2—2 in Figures 1 to 4 and by the numerals 34—34 in Figures 5 to 8 serve the double function of providing the proper commingling of gas and air and of permitting the passage of ventilating air whereby to cool the burner. Said baffles, being columns, also strengthen the burner, whereby the weight of material therein may be reduced to a minimum.

By reason of the flanges 24—24, which space the burner away from the wall of the hot blast stove, a further cooling action is had at that portion of the burner which is in proximity to the hot blast stove. This cooling action is due to the cooling air which is drawn through the passageways 25—25 by the aspirating action of the entering gas and air. Furthermore, by reason of the fact that the physical contact between the burner and the stove is reduced to a minimum, the heat conduction from said stove to said burner is minimized.

Though certain preferred embodiments of the present invention have been described in detail, may modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is—

1. In a burner, in combination, an air inlet member, a gas inlet member, spaced walls within said burner providing alternate passageways communicating with said air inlet member and said gas inlet member, and columns within said burner providing vertical passageways for the flow of ventilating air through said burner, said columns being disposed in baffling relationship with certain of said passageways to cause the commingling of gas and air from said gas and air inlet members.

2. In a burner, in combination, an air inlet member, a gas inlet member, walls providing passageways communicating with said gas and air inlet members and permitting communication between said passageways, and baffle members comprising

columns providing vertical passageways through said burner, said baffle means being disposed in baffling relationship with certain of said passageways to cause the commingling of air and gas flowing through said passageways.

3. In combination, a combustion housing and a burner, said burner being provided with an air inlet member and a gas inlet member, means within said burner providing passageways communicating with said gas and air inlet members, said passageways having a common exit region, and baffle means in cooperative relationship with certain of said passageways, said baffle means comprising ventilators for cooling air, said burner being disposed within the wall of said housing and having spacing flanges for spacing said burner from said wall of said housing and for providing passageways for cooling air drawn into said housing by the aspirating action of the air and gas delivered by said burner.

4. In a burner, in combination, an air inlet member, a gas inlet member, spaced walls within said burner providing alternate passageways communicating with said air inlet member and said gas inlet member, and columns within said burner providing passageways for the flow of ventilating air through said burner, said columns being disposed in baffling relationship with certain of said passageways to cause the commingling of gas and air from said gas and air inlet members.

5. In a burner, in combination, an air inlet member, a gas inlet member, walls providing passageways communicating with said gas and air inlet members and permitting communication between said passageways, and baffle members comprising columns providing passageways through said burner, said baffle means being disposed in baffling relationship with certain of said passageways to cause the commingling of air and gas flowing through said passageways.

6. A burner having a plurality of air inlets, a plurality of gas inlets and a plurality of columns internally of said burner, said columns having their axes vertically disposed and being open to the atmosphere at their extremities to permit the flow of ventilating air therethrough, said columns being disposed in baffling relationship with certain of said inlets to cause the commingling of gas and air from said gas and air inlets.

7. In combination, a combustion housing and a burner, said burner having a plurality of air inlets, a plurality of gas inlets and a plurality of columns internally of said burner, said columns having their axes vertically disposed and being open to the atmosphere at their extremities to permit the flow of ventilating air therethrough, said columns being disposed in baffling relationship with certain of said inlets to cause the commingling of gas and air from said gas and air inlets, said burner being disposed within a wall of said housing and having spaced flanges for spacing said burner from said wall of said housing and for providing passageways for cooling air drawn into said housing by the aspirating action of the air and gas delivered by said burner.

Signed at Chicago, Illinois, this 18 day of April, 1927.

FREDERICK H. WILLCOX.