June 24, 1941. A. J. WHITCOMB ET AL 2,247,039

STOVE BURNER

Filed Dec. 16, 1938 2 Sheets-Sheet 1

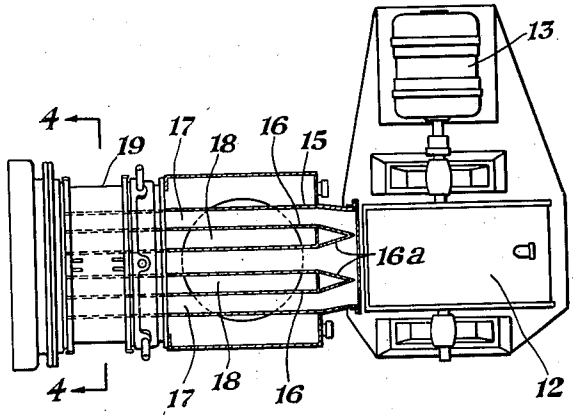


Fig. 2

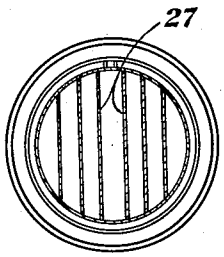


Fig. 4

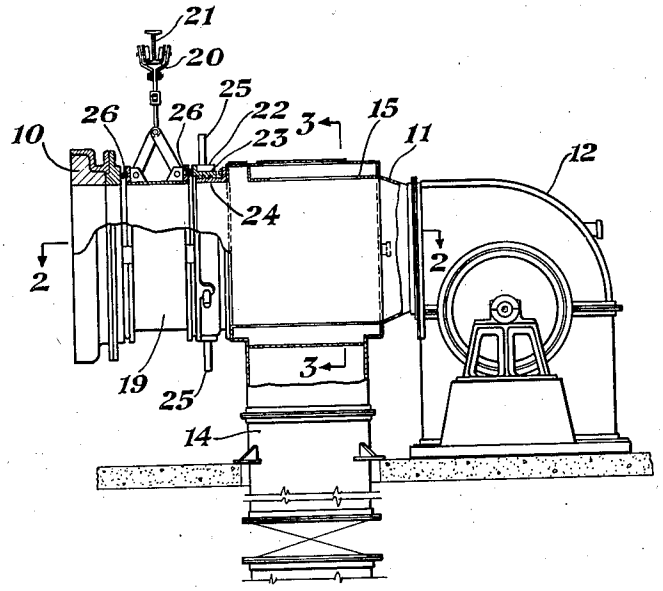


Fig. 1

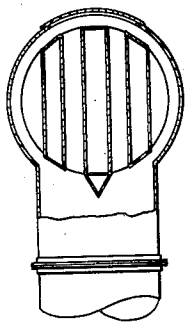


Fig. 3

INVENTORS

Arthur J. Whitcomb

Olaf C. Callow

Wilfred C. Schofield

ATTORNEYS.

By Williamson Hepley Byron & Knight.

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STOVE BURNER

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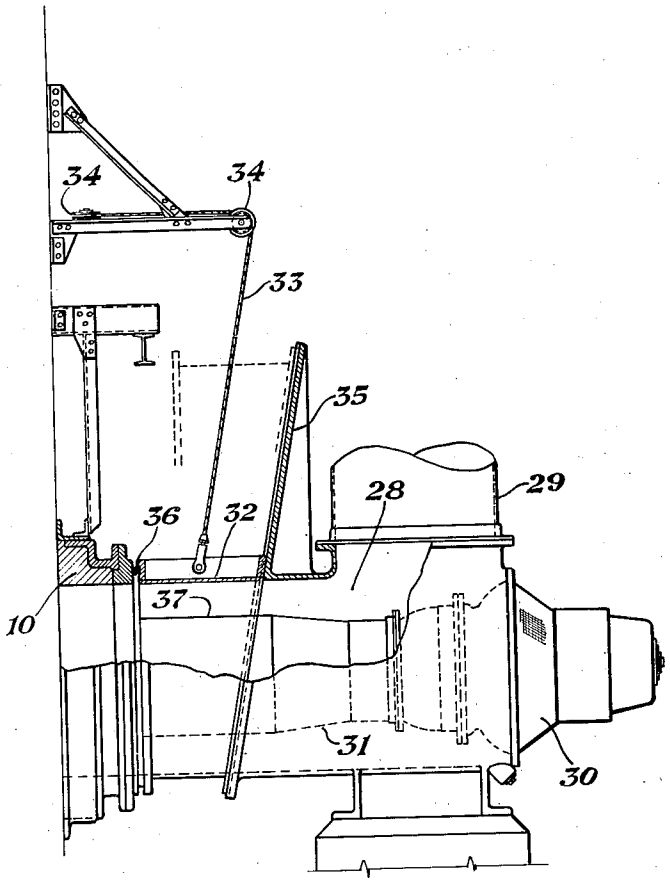


Fig. 5

INVENTORS
Arthur J. Whitcomb
Olaf C. Callow
Wilfred C. Schofield

ATTORNEYS.

By Wilkinson Huxley Byron & Knight

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STOVE BURNER

Arthur J. Whitcomb, Olaf C. Callow, and Wilfred C. Schofield, Chicago, Ill., assignors to Freyn Engineering Company, Chicago, Ill., a corporation of Maine

Application December 16, 1938, Serial No. 246,140

7 Claims. (Cl. 158—109)

The present invention relates to improvements in stove burners.

In blast furnace practice it is common to provide hot blast stoves filled with refractory material, which refractory material is heated by flame from a burner or products of combustion from a burner. The heat thus imparted to the refractory material is thereafter imparted to air which is directed through the stoves to the furnace. When the air to be heated is directed through the stove the burner is disconnected from the stove and a stove door closure is moved into position to close the opening formerly presented to the burner. Inasmuch as the burner is a relatively heavy piece of mechanism it is convenient to provide a spool or distance piece which may be inserted between the burner and the stove opening to complete the passage or connection between said burner and the stove opening during the period when gas is being burned in the stove. During the time when the stove is on blast, the stove door opening is sealed by a solid cover, at which time the spool or distance piece is removed.

An object of the present invention is to provide an improved burner construction having a spool or distance piece for connecting the burner with the stove which may be readily manipulated and will be safe in service.

A further object is to provide a burner construction which is positive in its action, which may be readily sealed and which will insure the separation of the gas and combustion air up to a point where the combination of the gas and air is desirable.

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

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a view in side elevation, parts being broken away, showing one embodiment of the present invention;

Figure 2 is a top plan view, partly in section, of the construction shown in Figure 1, the sectional part of Figure 2 being taken along the plane indicated by the arrows 2—2 of Figure 1;

Figure 3 is a view in elevation, parts being broken away, the broken away part being 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 2; and

Figure 5 illustrates a modification.

Referring first to the construction illustrated in Figures 1 to 4, inclusive, the numeral 10 indicates a portion of a stove and the numeral 11 indicates a burner cooperatively associated with the stove 10. Associated with the burner 11 is the fan box 12 provided with a fan adapted to be driven by the motor 13. The numeral 14 indicates a conduit for combustible gas. Said conduit 14 and the fan box 12 direct gas and air, respectively, to the chamber 15. As indicated in Figure 2, the chamber 15 is provided with longitudinally extending baffles 16 to keep the air from the fan box 12 and the gas from the conduit 14 separated, whereby there will be no combustion of said gas and air within said chamber 15. The baffles 16 are box-like in construction and preferably have tapering extremities 16a presented toward the fan box 12. Air from the fan box 12 passes outwardly of said baffles 16—16, that is, through the flues 17—17, whereas the gas in conduit 14 passes upwardly within the box-like baffles 16—16. In other words, the gas from the conduit 14 passes through the flues 18—18. The baffles 16—16 therefore perform the function of stratifying the income gas and air so that no combustion of said gas and air will occur within the chamber 15. Preferably said baffles 16 are vertically disposed. The vertical arrangement of the baffles 16 avoids collection of dirt on the sides thereof. This arrangement has the further advantage of reducing the pressure drop through the burner chamber 15, since the gas in practically all commercial installations enters either from the top or from the bottom of the burner.

While the arrangement of alternate gas and air flues 17 and 18 has decided practical advantages, these advantages would not be retained to their fullest extent in connection with a simple spool or distance piece between the burner and the stove 10 for the reason that, because of quick mixing, combustion would take place shortly after the gas and air leave the burner chamber 15. Such combustion would take place so close to the end of the burner that any metallic spool or distance piece would be overheated. It is desirable that combustion shall not take place until the gas and air have entered those portions of the stove which are protected by refractories.

The numeral 19 indicates a spool or distance piece between the burner 11 and the stove 10. Said distance piece takes the form of a cylindrical sleeve having a length substantially equal

to the distance between the end of the burner and the cooperating face of the door opening. This sleeve is adjustably suspended from an overhead trolley, indicated by the numeral 20, which is supported by and I-beam 21. The spool or distance piece 19 should have sufficient clearance with reference to the burner 11 and stove 10 to permit it to be moved laterally out of alignment with the burner 11 and the door opening of the stove 10, whereby the sleeve 19 may be rolled out of operative position or back into operative position. It is desirable that the joints at the extremities of the sleeve 19 be tight when gas is being burned. In order to accomplish this result and at the same time to permit the sleeve 19 to be moved freely into and out of operative position, an adjusting ring 22 is provided on the burner housing. Said ring 22 includes an internally threaded sleeve 23 adapted to cooperate with a threaded shoulder 24 carried by the burner 11. The ring 22 is provided with hand grips 25—25 whereby said ring may be turned into holding engagement with the sleeve 19. In order to provide a tight joint between the sleeve 19, the stove 10 and the burner 11, the two opposite faces of the cylinder 19 may be provided with annular packing members 26—26. The sleeve 19, as clearly indicated in Figure 4, is provided with a plurality of vertical partitions 27—27 dividing the sleeve 19 into a plurality of flues corresponding to the flues 17 and 18 within the chamber 15 of the burner 11. Said partitions 27—27 serve to keep the gas and air separated until they have passed through the sleeve 19 and have entered the stove 10. Of course, there will necessarily be a small clearance between the sleeve 19 and the adjacent portion of the burner 11 and a small amount of gas and air mixing will take place at this point. This amount, however, will be so small as not to affect the operation of the burner or the general result above described.

Referring now to the structure illustrated in Figure 5, a burner housing 28 is provided having a gas inlet conduit 29 and a fan 30. Said fan 30 directs air through the central conduit 31 and the gas passes through the annular space surrounding said conduit 31. The space between the burner housing 28 and the stove 10 is adapted to be bridged by the spool or distance piece 32, which may be lifted by means of the cable 33 trained over the pulleys 34 and operated from any convenient point. Said distance piece 32 is illustrated as being wedge-shaped in side elevation, though, of course, such wedge-shaped construction is not essential. According to the illustrated construction, however, the cooperating face of the burner housing 28 is inclined to the vertical, whereas the cooperating face of the stove door opening is substantially vertical. A guide plate 35 is provided for guiding the distance piece 32 in its upward movement.

It will be clear that when the burner is to be disconnected from the stove the distance piece 32 may be lifted out of its operative position and a closure for the stove opening may be moved into place. When it is desired to connect the burner to the stove said closure will be moved out of place and the distance piece 32 will be lowered into operative position. Packing material, indicated by the numeral 36, is provided for insuring a tight connection between the distance piece 32 and the stove 10. According to the embodiment of the present invention illustrated in Figure 5, the gas in the conduit 31 is kept separated from the air in the annular passageway surrounding said conduit 31 by means of a sleeve 37 rigid with the distance piece 32. Said sleeve 37, when the distance piece 32 is in its operative position, is aligned with the conduit 31 and constitutes a continuation of said conduit 31, whereby the gas and air delivered by the burner are kept separated until they enter the stove 10.

In the two embodiments of the invention above described the gas and air are stratified upon entering the stove and intimate mixture will take place shortly after the gas and air leave the burner and enter the stove. This accelerates combustion.

Though certain embodiments of the present invention have been described in detail, many 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 combination, a stove burner and a removable distance piece, means for supplying air under pressure to said burner and means for supplying gas to said burner, said distance piece having the function of connecting said burner to a stove, said burner and said distance piece having cooperating partitions for directing said air and said gas in proximity to each other to a stove while keeping said air and gas separated throughout the distance that said air and said gas must travel through said burner and substantially up to the point of entry to said stove.

2. In combination, a stove burner and a removable distance piece, means for supplying air under pressure to said burner and means for supplying gas to said burner, said distance piece having the function of connecting said burner to a stove, said burner and said distance piece having cooperating partitions for directing said air and said gas in proximity to each other to a stove while keeping said air and gas separated throughout the distance that said air and said gas must travel through said burner and substantially up to the point of entry to said stove, said partitions being vertically disposed.

3. In combination, a stove burner and a removable distance piece, means for supplying air under pressure to said burner and means for supplying gas to said burner, said distance piece having the function of connecting said burner to a stove, said burner having flues for delivering gas and air in adjacent paths while keeping said gas and air separated, said distance piece having dividing means for keeping said gas and air separated through said distance piece up to substantially the point of entry of said gas and air into said stove.

4. In combination, a stove burner and a removable distance piece, means for supplying air under pressure to said burner and means for supplying gas to said burner, said distance piece having the function of connecting said burner to a stove, said burner having flues for delivering gas and air in adjacent paths while keeping said gas and air separated, said distance piece having dividing means for keeping said gas and air separated through said distance piece up to substantially the point of entry of said gas and air into said stove, said flues and said dividing means being vertically disposed.

5. In combination, a stove burner and a removable distance piece, said distance piece hav-

ing the function of connecting said burner to a stove, said burner having flues for delivering gas and air in adjacent paths while keeping said gas and air separated, said distance piece having dividing means for keeping said gas and air separated through said distance piece, said flues being coaxial and said dividing means being of symmetrical configuration.

6. In combination, a stove burner, a removable distance piece, means for supplying air under pressure to said burner, means for supplying gas under pressure to said burner, said distance piece having the function of connecting said burner to a stove, said burner and said distance piece having cooperating partitions for directing said air and said gas in proximity to each other to a stove while keeping said air and gas separated, said burner being provided with an adjustment ring for positioning said distance piece axially of said burner.

7. In combination, a stove burner, a removable distance piece, means for supplying air under pressure to said burner, means for supplying gas under pressure to said burner, said distance piece having the function of connecting said burner to a stove, said burner and said distance piece having cooperating partitions for directing said air and said gas in proximity to each other to a stove while keeping said air and gas separated, said burner having an adjustment ring threaded thereto for positioning said distance piece axially of said burner.

ARTHUR J. WHITCOMB.
OLAF C. CALLOW.
WILFRED C. SCHOFIELD.