

May 8, 1928.

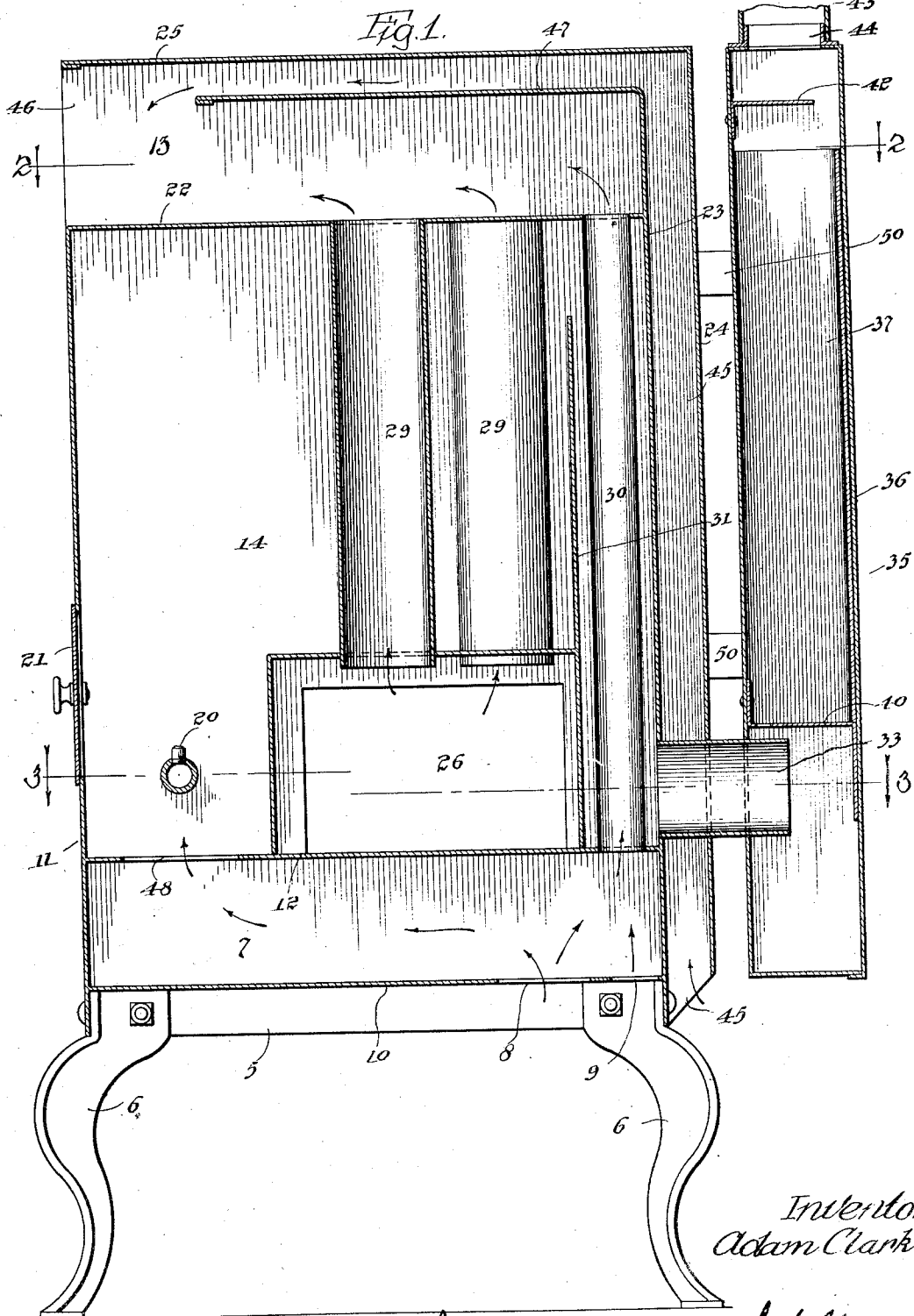
1,669,078

A. CLARKE

HEATING STOVE

Filed June 15, 1927

3 Sheets-Sheet 1



By Jones, Addington, Ames & Pioboll Attys

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Fig. 2.

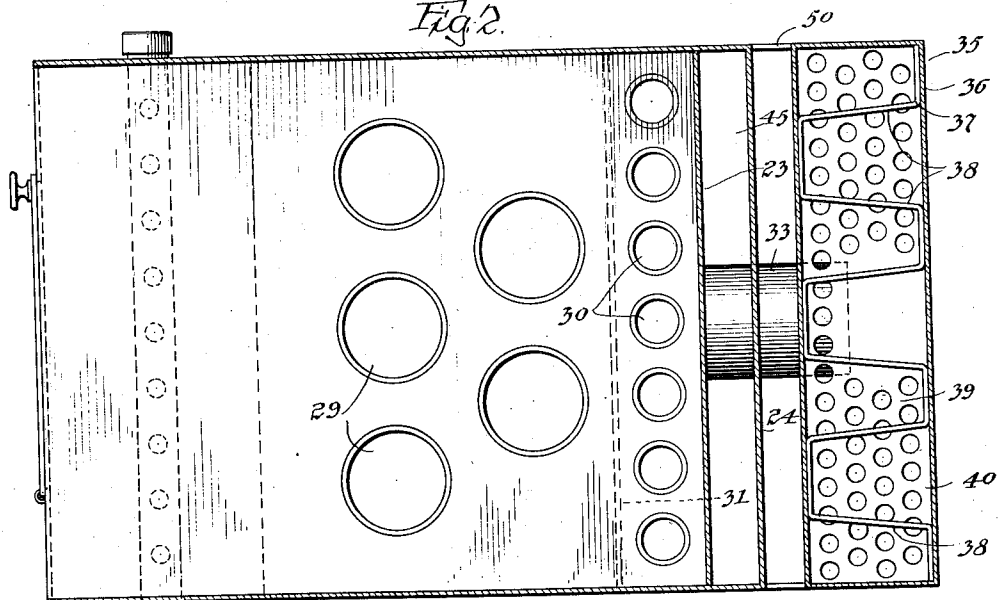
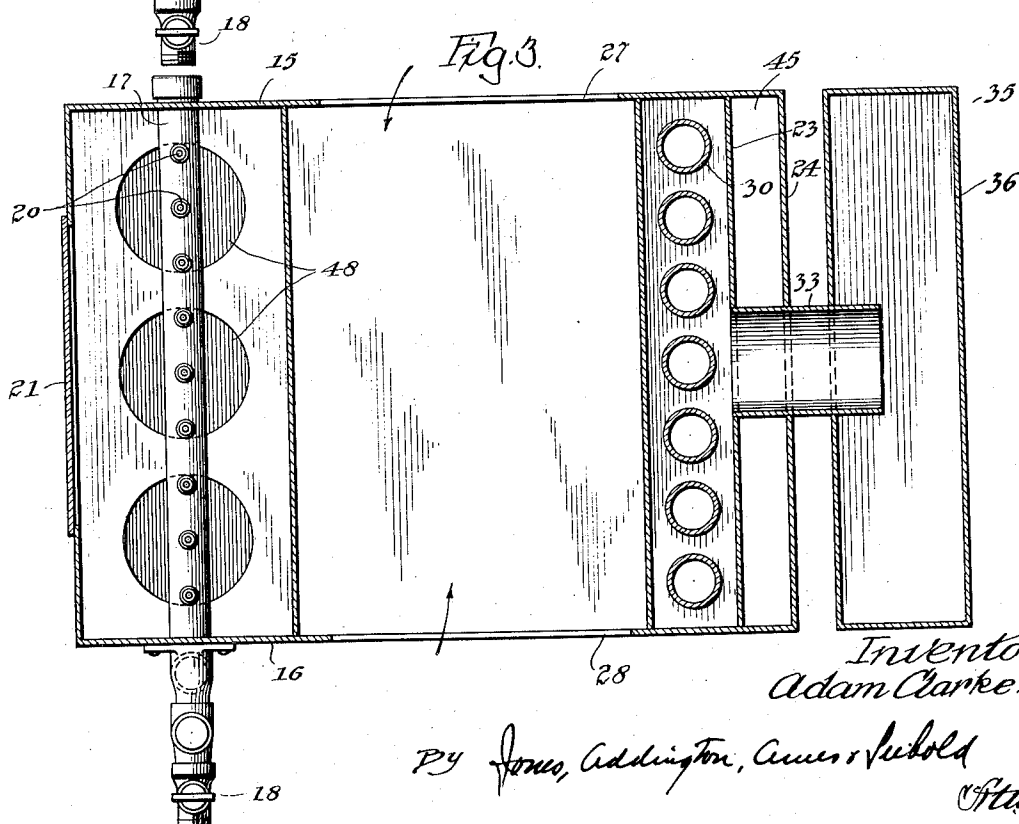


Fig. 3.



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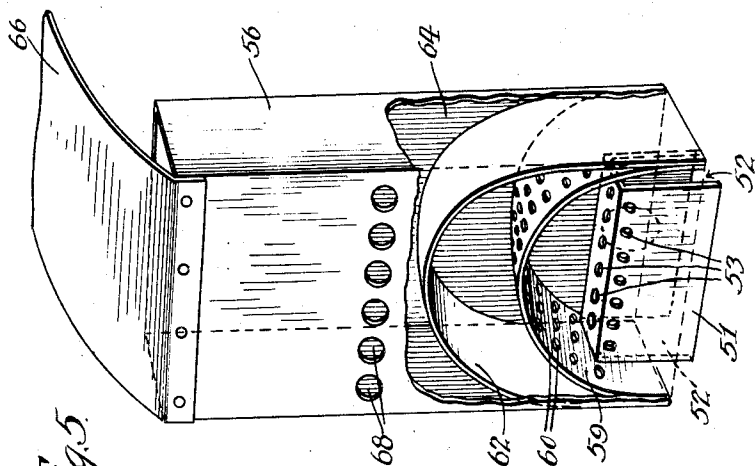


Fig. 5.

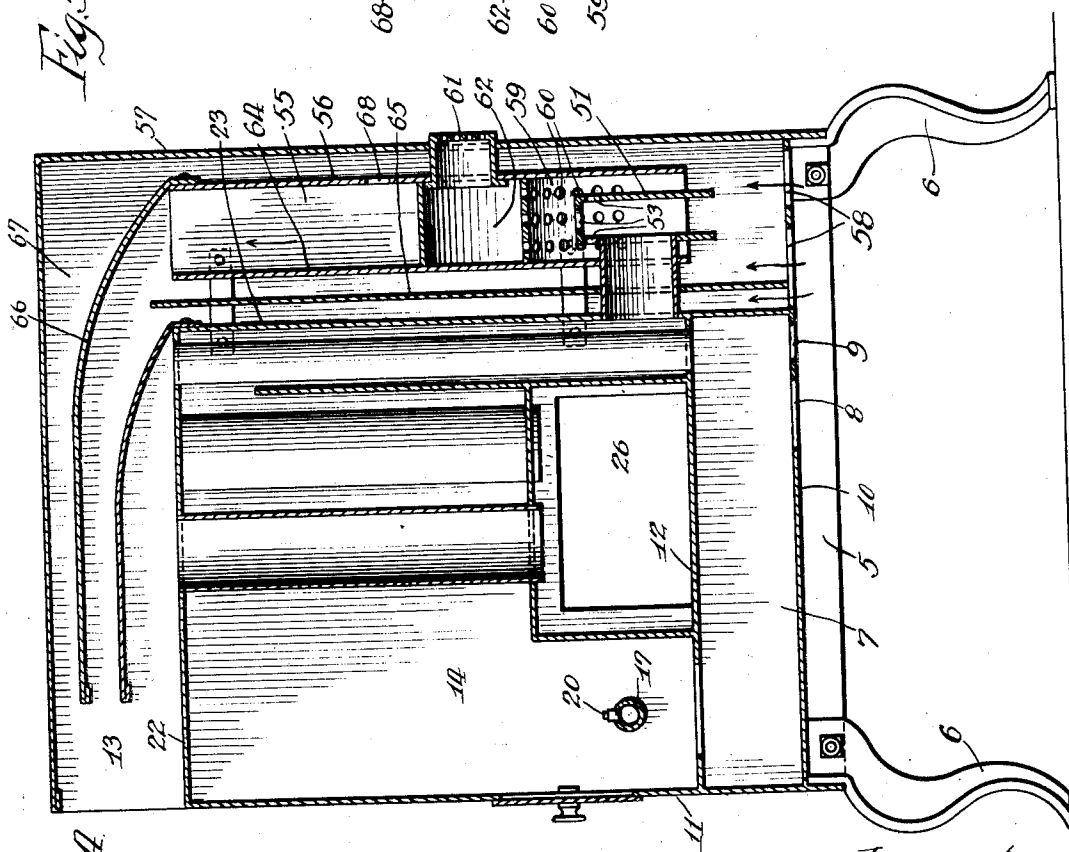


Fig. 4.

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UNITED STATES PATENT OFFICE.

ADAM CLARKE, OF CHICAGO, ILLINOIS.

HEATING STOVE.

Application filed June 15, 1927. Serial No. 198,906.

My invention relates to heating stoves.

More particularly my invention relates to an improved heating stove which is more efficient, more economically operated and cheaper to construct.

Due to the abundant supply of gas and its low cost, gas heated stoves are extensively used. There is a growing tendency to heat by gas because of the cost and difficulty of obtaining high grade coal and fuel oil. However, certain drawbacks have been encountered due to improperly constructed heaters and their inefficient methods of heating. Attempts to obtain maximum conduction of heat from the heating zones to the radiating zone have been unsuccessful. It seems that difficulty has been experienced in preventing the escape of the products of combustion, and consequently, efforts have been directed towards rapid withdrawal of the products of combustion, with little attention given to the resultant loss of heat.

An object of my invention is to provide an improved structure, which overcomes these difficulties of the prior art, and in which the gas is economically burned. Maximum conduction of heat is obtained to secure increased heat radiation and efficiency.

I preferably provide two air supply chambers, one located below the heating chamber and the other adjacent to the heating zone. The first chamber functions to furnish an adequate supply of air to the heater so as to maintain efficient combustion, and also to furnish air to heating pipes located in the heating zone. The second supply chamber functions to supply air to a second set of heating pipes, also in the heating zone. Locating this second supply chamber adjacent to the heating zone allows preheating the air before passing through the heating zone. Thus, the air is thoroughly heated before it goes to the radiating chamber, and I have found by actual experiments that the construction herein provided will radiate the air at a hotter temperature and at a greater distance than heretofore.

To obtain maximum conduction of the heat from the heating zone to the heating pipes, a flue attachment is provided which efficiently withdraws all gases of combustion to prevent the escape of offensive odors, but which retards the draft long enough to allow this maximum conduction of heat from the heating zone to the heating pipes.

Further objects and advantages of my invention will be apparent from the following description when taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a vertical sectional view of a heating stove embodying my invention;

Fig. 2 is a horizontal sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a similar view taken on line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view of an alternative embodiment; and

Fig. 5 is a perspective view of a portion of the device.

A heating stove embodying my invention comprises a base 5 provided with suitable supporting means, such as legs 6. An air supply chamber 7 is mounted directly above the base 5, this chamber having a plurality of openings 8 and 9 in the floor 10. Casing 11 of the heating stove may be formed in any manner and is preferably provided with a horizontal partition 12 serving as the upper wall of air supply chamber 7. A heating chamber 14 is disposed above the air supply chamber 7 and is adapted to receive a fuel supply pipe 17 arranged to be supported in the side walls 15 and 16 of casing 11. Pipe 17 may be suitably connected at 18 to a gas supply, if so desired, this pipe 17 being furnished with a plurality of burner jets 20. A door 21 is suitably connected at the front of casing 11 to provide access to the burners 20.

A second horizontal partition 22 is provided in casing 11, which connects with the front wall and a vertical inner partition 23 disposed adjacent to rear wall 24. Between the partition wall 22 and the top wall 25 of casing 11 is provided a radiating or heated chamber 13, to which the heated air is conducted for radiation from the stove.

A second air supply chamber is provided in the device herein disclosed, this supply chamber being designated 26 and mounted transversely in the heating chamber 14 adjacent to the heating zone. Chamber 26 may be furnished with side openings 27 and 28 in the side walls 15 and 16 to allow sufficient circulation of fresh air which is fed upwardly through a set of vertical stacks or heating pipes 29. These pipes are adapted to provide communication between chamber 26 and the radiating or heated chamber 13. A sec-

ond set of pipes 30, preferably smaller in diameter than pipes 29, is furnished to the rear of pipes 29 and is adapted to provide communication between the fresh air supply chamber 7 and the heating chamber 13. A vertical baffle plate 31 is furnished, however, to divide the heating zone within the heating chamber 14, so that the currents of hot air coming from the burners 20 will first circulate in and about the vertical pipes 29 and then pass over the upper end of this vertical baffle plate, from where this heated air will be drawn downwardly thoroughly to come into contact with the pipes 30 whereby to heat the air drawn from the lower air supply chamber 7 through these pipes. The gases of combustion, which are in effect the heated currents of air, then pass through the pipe 33, feeding into a flue attachment 35 comprising a housing 36, disposed substantially to the rear of the heating stove.

Housing 36 is preferably provided with a baffle 37 having a plurality of vertical walls 38 functioning to divide the housing into a plurality of vertical passages, so that the gases of combustion are compelled to move upwardly substantially in a vertical path.

A perforated plate 40 is located between the pipe 33 and the lower end of the baffle 37. A second horizontal baffle plate 42 is mounted directly above the upper end of the vertical baffle 37 and extends slightly thereover, both of these plates acting to check the draft, so that the gases of combustion will be slowed up considerably to allow them to remain a maximum time in the heating zone. This action permits maximum conduction of heat from the gases of combustion and heated air in the heating zone to the pipes 29 and 30 so that the air circulating through these pipes will be of maximum temperature before entering the heated chamber 13. The usual flue pipe 43 is attached to opening 44 at the upper end of flue attachment 35. Such pipe 43 may lead to the usual flue opening in the building provided to pass off the gases of combustion of a stove of this type.

Spacing the inner partition 23 from the rear wall 24 furnishes a passage 45 which tends to accelerate the circulation of hot air through the pipes 29 and 30 by causing a suction at their upper ends. It also serves to supply additional fresh air to the radiating chamber 13, which air may be heated by the hot air coming from pipes 29 and 30. Partition 23 is extended forwardly in a horizontal direction in the chamber 13, as indicated at 47, to allow this additional air to travel forwardly a considerable distance, preferably beyond the points of the openings of pipes 29 and 30 so that this air is not mingled with the air coming from pipes 29 and 30 until the latter has circulated into the radiating or heating chamber 13.

It will be observed that a portion of the air supply in lower chamber 7 is drawn through an aperture 48 in the horizontal partition 12 to provide proper combustion of the gas burned at the burners 20. This air also acts to carry the heat from the burners into the heating zone so that maximum conduction of heat to pipes 29 and 30 will take place. The remaining supply of air in chamber 7 is drawn through the vertical pipes 30, and, as before explained, is heated by the gases of combustion which travel downwardly between the vertical baffle 31 and the inner rear partition 23.

Pipes 29 are provided larger in diameter and circulate a greater quantity of air through the heating zone because these pipes are disposed in the hottest portion of this heating zone. Pipes 30 are provided to insure maximum conduction of the heat by being disposed in the path of the gases of combustion after they leave the portion of the heating zone in which pipes 29 are disposed.

Any suitable bracket means 50 may be furnished to attach the flue attachment 35 to the heating stove. I find that the flue attachment 35 adds to the efficiency of the device, because it prevents too rapid circulation of the gases of combustion through the stove, which otherwise would take place and reduce the time in which the heat could be conducted to the pipes 29 and 30, and consequently, the amount of heat that may be conducted. Furthermore, this flue attachment has been found to decrease the formation of carbon, due to the amount of air supplied by chamber 7 and the time in which it is permitted to remain in the heating chamber 14 adjacent to the burners 20. The air is thus given an opportunity to be heated before passing into the heating zone, and sufficient oxygen may be drawn therefrom to support proper combustion at these burners.

The transversely disposed air supply chamber 26 is mounted in the vicinity of the heating zone so that the incoming air will be preheated before it circulates through pipes 29. Allowing the air, which flows upwardly through the passage 45 at the rear of the device, to travel horizontally over the baffle 47 also permits preheating thereof. This air serves the two-fold function of increasing the draft through the pipes 29 and 30 and also to supply additional air to the heated chamber for increased radiation at the mouth 46.

In Fig. 4 I have shown an alternative embodiment of my invention illustrating a different form of flue attachment for the device; otherwise, the structure is substantially the same as shown in Fig. 1. The flue heat enters the flue attachment 55 by passing transversely through the pipe 33 into an in-

verted U-baffle 51 suitably secured in the lower portion of this flue attachment. This flue heat or gases are then divided so as to pass about the open ends of the U as illustrated at 52 in Fig. 5 and also through the apertures 53 in the vertical sides and horizontal connecting portion of this baffle.

Flue attachment 55 in this embodiment is preferably in the form of a rectangular casing 56 seated within the outer covering 57 of the stove. It is preferable to provide holes 58 in the base to permit circulation of cold air therethrough into the interior of the lower portion of the flue attachment 55. This fresh air acts gradually to reduce the temperature of the flue heat or gases. To prevent immediate withdrawal of these flue gases before they have had adequate time thoroughly to mingle with this fresh air so as to be reduced in temperature, I provide an arcuate horizontal baffle plate 59 disposed at a slight distance above U-shaped baffle 51, the baffle 59 being provided with a series of perforations 60 which allow slow circulation of the reduced flue gases therethrough and vertically upwardly where they pass through a horizontal sleeve 61. Sleeve 61 may connect to the usual flue pipe leading to the outside of the house, or if desired, this flue pipe may be omitted to allow the gases to pass directly into the room. I desire to provide a second arcuate horizontal baffle 62 slightly above the sleeve 61 so as to direct the cooled and expanded flue gases toward the same.

The advantage of this form of the invention is that the gases are so reduced in temperature before expelled that they have no harmful effect whatsoever upon the occupants of the room. On the other hand, by reducing the flue gases, I find that there is not the tendency for a stove of this type to cause condensation on the windows and walls of the rooms in which the stove is used. This is accomplished by having the flue attachment 55 act as a cooling device for the gases, so that they will leave the same practically at the same temperature as that of the room. To assure that the inner vertical wall 64 of the casing 55 is maintained cold, I provide a vertical wall 65 spaced to divide the portion between the wall 64 and wall 23 and allow air to circulate upwardly between wall 65 and wall 64 by first entering at the base and thereafter feeding into the heated air chamber 13. Cold air may circulate upwardly from the base between the wall 23 and the wall 65 to absorb the heat that is conducted through wall 23, which air will also feed into the heated air chamber 13. This tends to maintain the dividing wall 65 in a cold state, so that the housing 56 will remain cold and properly function to cool the exhaust gases before discharged. In effect, wall 65 and casing 57 provides a cold chamber in which flue at-

tachment 55 is disposed, thereby assuring that the attachment will remain cold to cool the exhaust gases as they enter.

Thus, the exhaust gases will be discharged from the stove at a very low temperature, 70 and, as I have found, practically at the same temperature as that of the room.

An arcuate plate 66 serves to deflect the air, which feeds into casing 56 through a series of openings 68, into the heated air 75 chamber 13. The arrangement affords an effective circulation of cool air in and about casing 56 so as to cool the exhaust gases as they finally pass therethrough.

Without further elaboration, the forego- 80 ing will so fully explain the gist of my invention, that others may, by applying current knowledge, readily adopt the same for use under varying conditions of service, without eliminating certain features, which 85 may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. A stove of the class described comprising a housing divided horizontally into a lower chamber, an intermediate chamber and an upper chamber, means for feeding air into said lower chamber to supply a part thereof to said intermediate chamber and a part to said upper chamber, a transverse chamber extending through said intermediate chamber and open at the ends, and means for conducting the air supplied by said transverse chamber to said upper chamber. 90

2. A stove of the class described comprising a housing divided horizontally into a lower air chamber, an intermediate heating chamber and an upper heated chamber, 105 means for supplying air from said lower chamber to said upper chamber, said means passing through said intermediate chamber, a transverse chamber extending across said intermediate chamber, and means providing communication between said transverse chamber and said upper chamber. 110

3. A stove of the class described comprising a casing having an air supply chamber, a heating chamber and a heated chamber, 115 means in said heating chamber for heating the air supplied thereto, a transverse chamber having open ends in said casing, means for conducting air from said air supply chamber through said heating chamber to be heated thereby and then to said heated chamber, and means for conducting air from said transverse chamber through said heating chamber to be heated thereby and then to said heated chamber. 125

4. In a stove of the class described comprising a casing having an air supply chamber, a heating chamber and a heated chamber, means in said heating chamber for heating the air supplied thereto, a transverse 130

chamber extending crosswise through said heating chamber to be heated thereby, means for conducting air from said air supply chamber through said heating chamber to said heated chamber, and means for conducting air from said transverse chamber through said heating chamber to said heated chamber.

5. A stove of the class described comprising in combination with a casing having three chambers, one constituting an air supply chamber, another a heating chamber for the air, and a third chamber to receive and radiate the heated air, of a fourth chamber subjected to the heat of said heating chamber for supplying heated air to said heated chamber.

6. A stove of the class described comprising in combination with a casing having three chambers, one chamber constituting an air supply chamber, a second chamber constituting a heating chamber, and a third chamber serving to receive and radiate the heated air, of a transversely disposed chamber in said heating chamber, and means for connecting said transversely disposed chamber with said heated chamber.

7. A stove of the class described comprising in combination with a casing having an air supply chamber at the base, a heating chamber above said air supply chamber, said heating chamber having ports communicating with said air supply chamber, of heating means disposed over said ports to heat the air passing therethrough from said air supply chamber, a heated chamber above said heating chamber, vertically disposed pipes in the path of the heat currents in said heating chamber, said pipes supplying air from said air supply chamber to said heated chamber, a transversely arranged chamber in said casing, and a second set of vertically disposed pipes also in the path of the heat currents in said heating chamber, said pipes supplying air from said transversely arranged chamber to said heating chamber.

8. A stove of the class described comprising in combination with a casing having an air supply chamber, a heating chamber disposed over said air supply chamber and communicating therewith, a second air supply chamber, a heated chamber disposed above said heating chamber, and means for connecting said air supply chambers with said heated chamber, said means passing through the heating zone of said heating chamber whereby to heat the air supplied to said heated chamber.

9. A stove of the class described comprising in combination, a casing having a heating chamber including a heater and a heating zone, air supply chambers in said casing, one of said air supply chambers being below said heating chamber and communicating therewith to supply air thereto for

the purpose of supporting combustion at said heater and to provide heated currents for said heating zone, the other air supply chamber being disposed in said heating chamber adjacent to said heating zone, a heated chamber above said heating chamber, and means for conducting the air of said air supply chambers through said heating zone to said heated chamber.

10. A stove of the class described comprising in combination, a casing having a heating chamber including a heater and a heating zone, air supply chambers in said casing, one of said air supply chambers being below said heating chamber and communicating therewith to supply air thereto for the purpose of supporting combustion at said heater and to provide heated currents for said heating zone, the other air supply chamber being disposed in said heating chamber adjacent to said heating zone, a heated chamber above said heating chamber, means for conducting the air of said air supply chambers through said heating zone to said heated chamber, and means for stimulating a circulation of the air conducted through said last means to said heated chamber.

11. A stove of the class described comprising in combination, a casing having provided therein a heating chamber including a heater and a heating zone, a heated chamber, chambers for supplying air to said heating chamber and also to said heated chamber, means for conducting through said heating zone the air supplied by said chambers, and means for receiving the gases of combustion from said heating zone, said means having provisions for retarding the draft to allow an increased heat conduction to said air conducting means passing through said heating zone.

12. A stove of the class described comprising in combination with a casing having a heating chamber therein, a heated chamber and means for conducting air to be heated through said heating chamber to said heated chamber, of a flue attachment comprising a housing, a connection between said heating chamber and the lower end of said housing, and vertically arranged baffle means in said housing, said baffle means affording separate vertical passages for imparting vertical movement to the gases of combustion received from said heating chamber.

13. A stove of the class described comprising in combination with a casing having a heating chamber therein, a heated chamber and means for conducting air to be heated through said heating chamber to said heated chamber, of a flue attachment comprising a housing, a connection between said heating chamber and the lower end of said housing, vertically arranged baffle means in said housing, and a perforated baffle mount-

ed in said housing between said connection and said vertical baffle means.

14. A stove of the class described comprising in combination with a casing having a heating chamber therein, a heated chamber and means for conducting air to be heated through said heating chamber to said heated chamber, of a flue attachment comprising a housing, a connection between said heating chamber and the lower end of said housing, vertically arranged baffle means in said housing, a perforated baffle mounted in said housing between said connection and said vertical baffle means, and a substantially horizontally disposed baffle mounted at the upper end of said vertical baffle means.

15. A stove of the class described comprising in combination with a heating zone, means for conducting air through said heating zone to be heated thereby, and heat ra-

diating means for receiving the heated air, of a temperature reducing device for receiving the gases of combustion of said heating zone, said device having provisions for lowering the temperature of said gases of combustion to substantially that of the air exterior of the stove.

16. A stove of the class described comprising in combination with a heating zone, of means for receiving the gases of combustion of said heating zone, said means having provisions for dividing the gases of combustion as received and intermingling there-with currents of cool air whereby to lower the temperature before the gases of combustion are discharged.

In witness whereof, I have hereunto subscribed my name.

ADAM CLARKE.