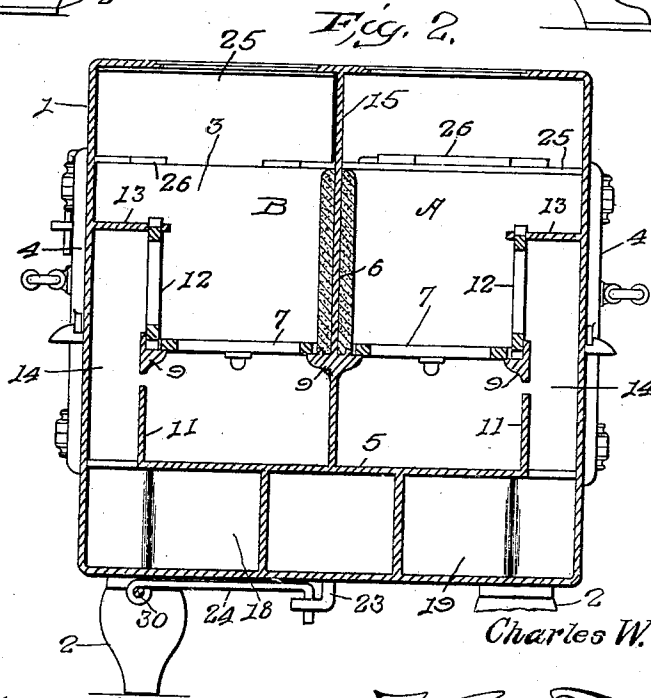
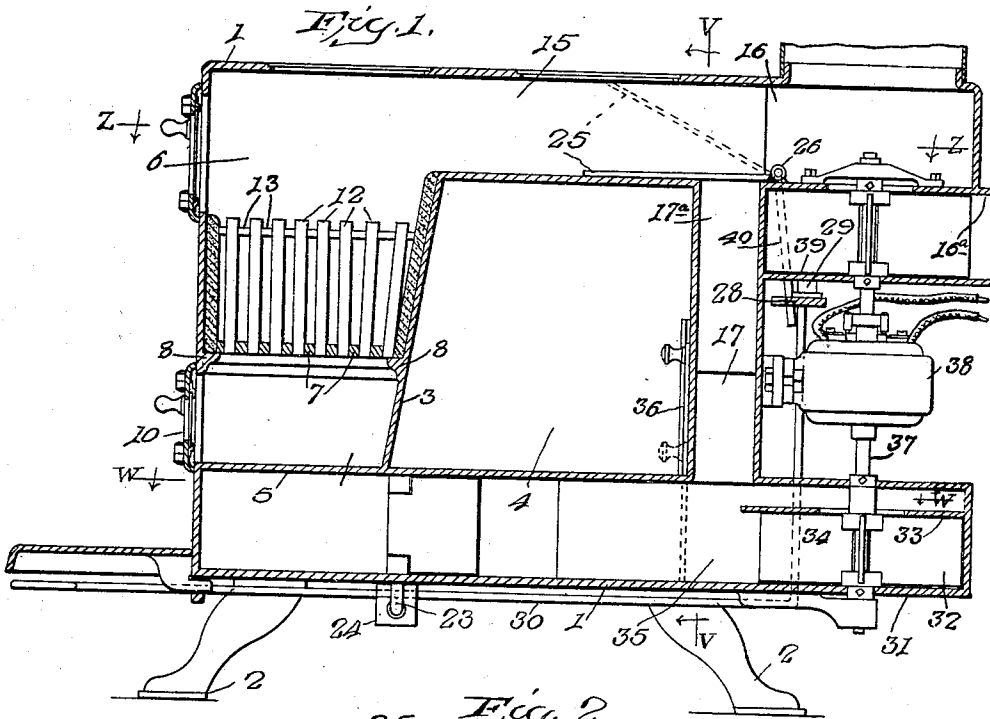


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STOVE AND THE LIKE.
APPLICATION FILED FEB. 10, 1908.

Patented Jan. 26, 1909.
3 SHEETS—SHEET 1.



Witnesses

G. Howard Walmsley,
Edward A. Reed

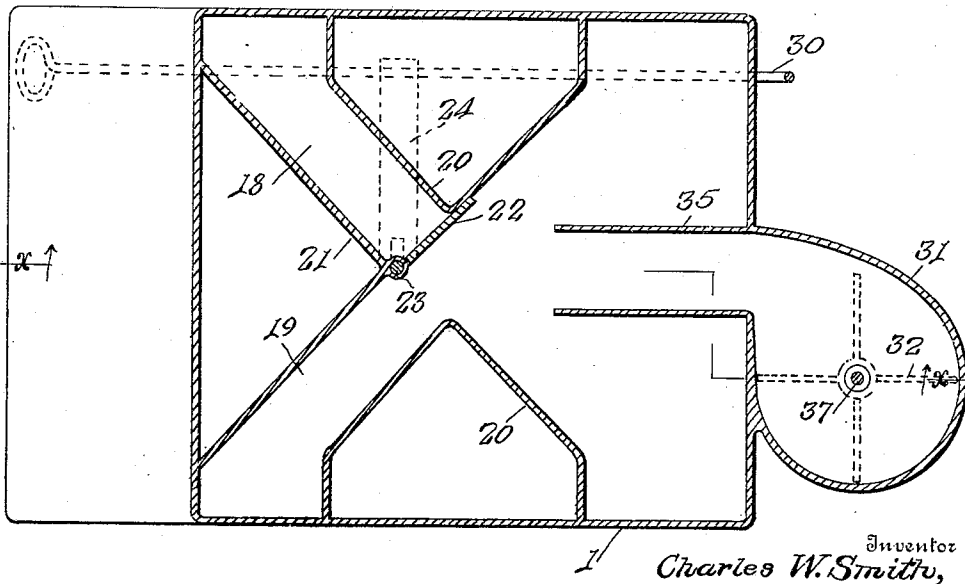
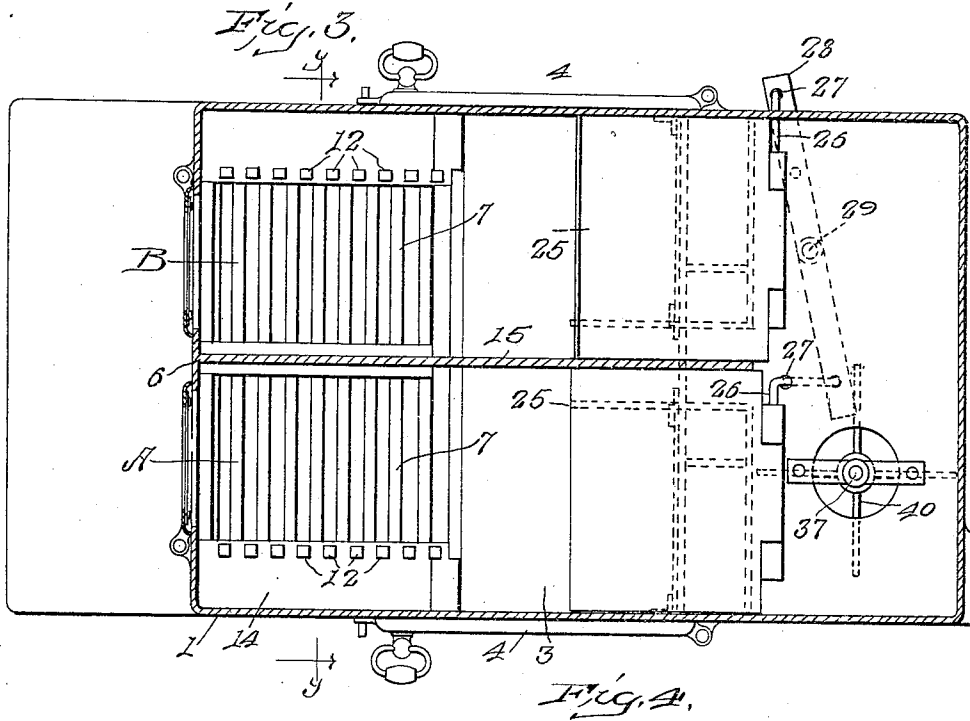
Inventor
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3 SHEETS—SHEET 2.



Witnesses

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Edward T. Reed.

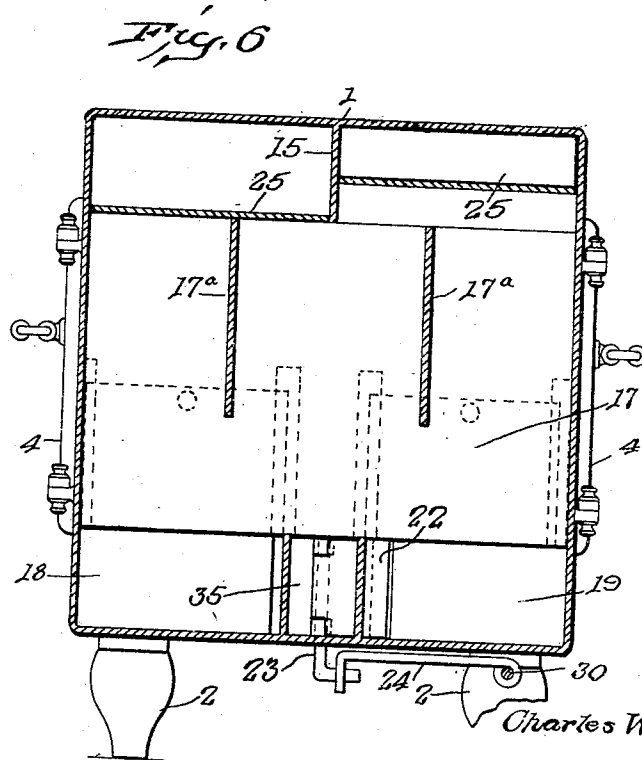
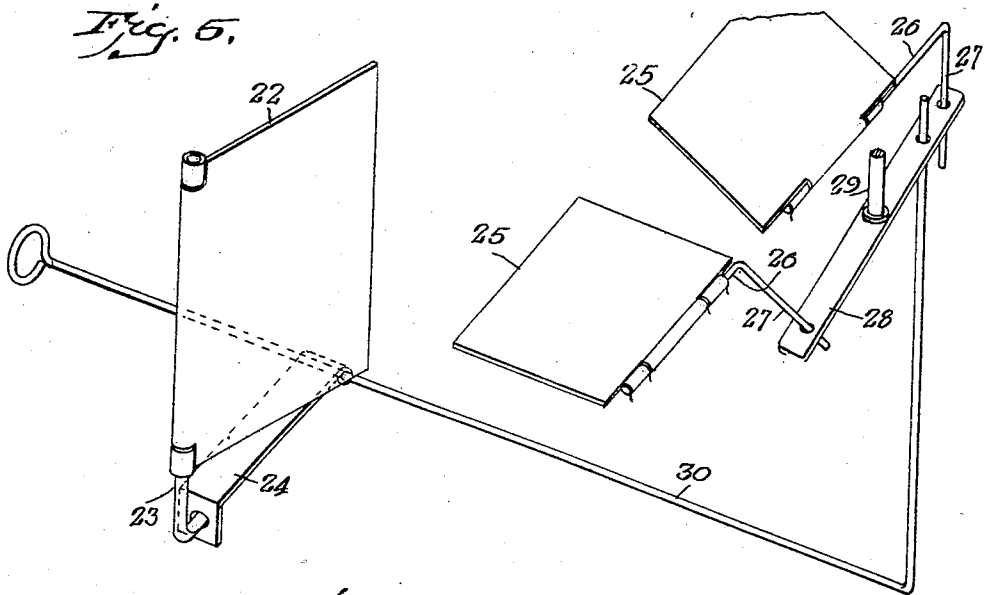
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3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES W. SMITH, OF SPRINGFIELD, OHIO.

STOVE AND THE LIKE.

No. 910,876.

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Application filed February 10, 1908. Serial No. 415,250.

To all whom it may concern:

Be it known that I, CHARLES W. SMITH, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Stoves and the Like, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to stoves and the like, and more particularly to that type of stove known as a cook stove.

The object of the invention is to provide a stove of this type in which the fuel will be completely consumed, thus not only securing the maximum amount of heat from the fuel, but so purifying the air which passes through the fire box and becomes heated therein that this air can be used for heating purposes.

With this object in view my invention consists in certain novel features of construction and in certain parts and combinations hereinafter to be described, and then more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of a stove embodying my invention, taken on the line $x x$ of Fig. 4 and looking in the direction of the arrows; Fig. 2 is a transverse sectional view taken on the line $y y$ of Fig. 3 and looking in the direction of the arrows; Fig. 3 is a horizontal sectional view, taken on the line $z z$ of Fig. 1 and looking in the direction of the arrows; Fig. 4 is a horizontal sectional view, taken on the line $w w$ of Fig. 1 and looking in the direction of the arrows; Fig. 5 is a detail view of the valves and their operating mechanism; and Fig. 6 is a transverse sectional view, taken on the line $v v$ of Fig. 1 and looking in the direction of the arrows.

In carrying out my invention I provide a body or outer casing 1 which is mounted upon suitable supports 2. Within this casing are provided a plurality of fire boxes, each of which is connected at a point above the fire therein with a passage for the products of combustion, which passage is adapted to be connected either with an outlet, leading to the open air or to a heating system, or with another of the fire boxes at a point near the fire therein, thus enabling the products of combustion to be discharged either directly into the atmosphere or to be discharged into a heated fire box and there consumed. The superheated air which is thus freed from the

products of combustion is then carried from the fire box and discharged either into the open air or into the heating system.

In the accompanying drawings, I have illustrated the preferred form of my invention, and, as there shown, I have provided the stove with an oven consisting of a casing 3 extending transversely of the main casing 1 and having its ends secured to the side members of that casing, where it is provided with suitable doors 4 for closing the oven. The top, bottom and side walls of the casing or oven 3 are supported some distance from the corresponding walls of the main casing 1. The front wall of the casing 3 is removed a considerable distance from the front wall of the main casing 1 and within the space between said casings are formed a plurality of fire boxes. In the present instance, the space between the front walls of the casings 1 and 3 is closed by a bottom wall 5 extending from the front wall of the casing 3 to the front wall of the main casing 1 and of a length less than the distance between the two side walls of the main casing, thus leaving a space between each end of the bottom plate 5 and the corresponding side wall of the main casing 1.

The space lying above the bottom plate 5 and between the casings 1 and 3 is centrally divided by a vertical partition 6 extending from the bottom plate 5 to the top wall of the casing 1, thus dividing the space between the said casings into two substantially equal compartments, within each of which is mounted a grate 7 which is supported on suitable lugs or projections 8 secured to the walls of the casing and upon transverse bars or supports 9 extending between the casings. This grate is supported some distance above the bottom plate 5, thereby forming between the same and the bottom 5 an ash pit having an outlet door 10. Each grate 7 is of a length less than the distance between the vertical partition 6 and the side wall of the main casing 1 and preferably has its outer end in substantially the same vertical plane with the outer end of the bottom plate 5, which bottom plate is preferably provided with a vertically extending partition 11 which extends upwardly therefrom to a point a short distance below the grate bars 7, thus closing the end of the ash pit, but permitting the entrance of air beneath the grate bars 7. The end of the fire box is pref-

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erably closed by a grate, which, in the present instance, is composed of bars 12 having their lower ends supported on one of the transverse supports 9 which carries one side of the grate 7 and having their upper ends supported by an inwardly extending partition or flange 13 carried by the side wall of the main casing 1 and serving not only as a support for the end grate 12 of the fire box, but also to close the upper end of the passage 14 which is formed between the ends of the fire box and ash pit and the side wall of the casing 1. The space between the upper wall of the oven casing 3 and the top wall of the main casing 1 is also centrally divided by a vertical partition 15 extending longitudinally thereof, this partition being preferably a rearward continuation of the partition 6 between the fire boxes and dividing the space above the oven into two passages leading from the fire boxes to an outlet passage 16 in the rear wall of the casing 1.

The space between the rear wall of the casing 1 and the rear wall of the oven casing 3, which walls are of equal length, is not necessarily divided into passages and is here shown as forming a single passage 17 and provided only with supporting projections or ribs 17^a extending between said walls and terminating some distance above the lower edge of the rear wall of the casing 3. The space between the lower wall of the main casing 1, and the bottom wall of the oven casing 3 and the bottom plate 5 of the ash pit is provided with suitable partitions to divide the same into passages 18 and 19, each extending diagonally of the bottom wall of the main casing from a rear corner thereof to a forward corner and connecting the vertical passage 17 at the rear of the main casing with the vertical passages 14 leading to the fire boxes. In the present instance, these passages are formed by substantially V-shaped partitions 20 and 21 which are provided at the point of intersection of the passages with a suitable valve adapted to close one passage when the other is in use. This valve, as here shown, consists of a pivoted valve 22 mounted on a pivot pin 23 extending through the bottom wall of the casing and provided with an actuating arm 24. The upper longitudinal passages formed on the opposite sides of the partition 15 are provided at their point of connection with the vertical passage 17 with valves adapted to open and close said vertical passage. In the present instance, these valves consist of pivoted valves 25 mounted on suitable horizontal pivot pins 26 in the rear of the passage 17 and so connected one to the other that when one valve is open the other will be closed, the construction of the valves being such that when a valve is in its open position, it will entirely close that end of the passage leading to the outlet passage 16 and will

cause all the products of combustion, carried by the longitudinal passage in which the valve is located, to pass into the vertical passage 17, and, when closed, will cause all the contents of said longitudinal passage to pass through the outlet passage 16 either to the open air or to a pipe 16^a leading to the heating system.

The pipe leading to the open air may be provided with a damper or other device to close the same and thus force the air to pass through the pipe 16^a. This damper is not shown as it forms no part of the present invention.

The operation of the device so far described is as follows:—When a fire is first started in one of the fire boxes, say A, the products of combustion from this first fire are necessarily unconsumed and are discharged through the outlet pipe 16 to the open air. As soon as the fire in the fire box A has heated that fire box to a sufficiently high temperature, a fire is started in the fire box B, the valve 25 in the passage leading from the fire box B being open to divert the products of combustion from the fire through the vertical passage 17 into the diagonal passage 19, whence they are carried upward through the vertical passage 14 and discharged through the end and bottom grates 12 and 7 into the fire in the fire box A. The heat in this fire box is such as to completely consume all particles of carbon and all gases which are discharged into the same, thus purifying the air in which the products of combustion were suspended. The air which then passes from the fire box A is carried through the longitudinal passage to the outlet passage 16 and then discharged either to the open air or into the heating system through the pipe 16^a. By the time the fire in the fire box A needs replenishing the fire in the fire box B will have heated that box to a high degree of temperature and the products of combustion from the new fire in the fire box A will be carried through the fire box B and therein consumed, the valves 25 and 22 being reversed for this purpose. These valves may be operated in any suitable manner, but I prefer to provide the pivot pin 26, upon which the valves 25 are mounted, with a downwardly extending stem or handle 27 adapted to extend through apertures located near the opposite ends of a bar 28, which is mounted upon a suitable pivot stud 29 in the rear of the main casing. The stems 27 project at such an angle relatively to the valves 25 that, when the bar 28 is turned in one direction, one of said valves will be open and the other closed, and, when the bar is turned in the opposite direction, the position of the valves will be reversed. An operating handle or rod 30 is connected at its rear end to the bar 28 and extends longitudinally of the casing 1. This rod

is connected to the actuating arm 24 of the valve 22 so that a single movement of the rod 30 will serve to reverse the positions of the three valves.

5 As above described, the stove is constructed for use with natural draft only, but it is sometimes desirable, in order to secure an increased efficiency to provide an artificial draft. To this end I have provided in
10 the rear of the main casing 1 a blower casing 31 within which is mounted a blower 32. This casing is preferably divided by a horizontal partition 33 into two compartments, in the lower of which is mounted the blower
15 32. The upper compartment is connected to the vertical passage 17 in the rear of the main casing and is connected by an opening 34 in the partition 33 with the lower compartment which is provided with a suitable discharge
20 nozzle 35 extending through the rear wall of the main casing into the space between the lower wall of the main casing and the lower wall of the oven casing 3 and adapted to discharge into the diagonal passages 18 and 19.
25 The rear wall of the oven casing 3 is provided with sliding gates 36, which, when in their lowermost position, as shown in dotted lines in Fig. 1, entirely cut off the vertical passage 17 from the diagonal passages 18 and 19,
30 thus causing all the products of combustion to be carried through the blower casing 31 and discharged through the nozzle 35. This blower may be operated in any suitable manner, but, as a matter of convenience, I have
35 extended the shaft 37 upwardly above the blower casing and have mounted thereon a small electric motor 38. In the present instance, I have shown the shaft 37 extended above the motor 38 and through a second
40 blower casing 39, in which is mounted a blower 40, the casing 39 being connected at its upper end with the outlet passage 16 in the rear wall of the main casing 1 and discharging into the pipe 16^a which is connected
45 with the heating system. Thus, it will be seen that, by the use of the blower fans, a positive circulation is created in the passages for the products of combustion and the efficiency of the device is greatly increased; and
50 further, that the upper blower 40 will carry away the superheated air which is discharged from the outlet passage 16 and force the same through the heating system, which may be of any suitable construction.

55 From the foregoing description, it will be seen that I have provided a stove having a plurality of fire boxes and so arranged that the products of combustion from one fire box will be passed through the other fire box and
60 thus completely consumed, and that by alternately firing the two fire boxes, the whole of the products of combustion will be consumed and the air conveying the same so purified as to enable it to be utilized for heating
65 ing purposes, thus not only securing the

maximum amount of heat from the fuel, but also enabling the superheated air from the fire boxes to be utilized. Further, the arrangement of the passages for the products of combustion enable the heat contained
70 therein to be brought into contact with the walls of the oven, thus causing the same to be heated to a maximum degree of temperature. The pressure of the air in which the products of combustion are suspended
75 against the bottom and ends of the beds of fuel in the fire boxes is such as to enable the grates supporting these beds of fuel to be made very fine, thus effectually preventing the passage of lumps of fuel and retaining
80 the same in the fire boxes until they are completely consumed, and in this manner minimizing the waste and further aiding the complete consumption of the fuel.

While I have shown and described the invention as applied to a cook stove, it will be obvious that the same is applicable to stoves and furnaces of various types and that such application would be entirely within the spirit of my invention. Therefore, I wish it
90 to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, 95 what I claim as new and desire to secure by Letters Patent, is:—

1. A stove of the character described comprising a plurality of fire boxes, and an oven, said stove having a passage for the products
100 of combustion extending from a point above the fire in one of said fire boxes along the walls of said oven to a point near the fire in another of said fire boxes.

2. A stove of the character described comprising a main casing, two fire boxes, an oven, and having a separate passage for the products of combustion, formed between the walls of said casing and said oven, extending
105 from each of said fire boxes at a point above the fire to the other fire box at a point near the fire.

3. A stove of the character described comprising a main casing, a plurality of fire boxes, an oven, an outlet pipe, and having a
115 separate passage extending from each of said fire boxes, formed between the walls of said casing and said oven, means for connecting the passage from any one of said fire boxes with said outlet, and means for connecting
120 the passage of another of said fire boxes with said first-mentioned fire box.

4. A stove of the character described comprising a main casing, two fire boxes, and an oven, and having a passage for the products
125 of combustion extending rearwardly from the upper portion of one of said fire boxes between the top wall of said casing and said oven, thence downwardly between the rear wall of said casing and said oven, and also
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having a diagonal passage formed between the bottom wall of said casing and said oven and connecting the lower end of the first-mentioned passage with the lower portion of the other of said fire boxes.

5 5. A stove of the character described comprising a main casing, two fire boxes, and an oven, and having a passage extending rearwardly from the upper portion of each of said
10 fire boxes between the top wall of said casing and said oven, and a vertical passage extending downwardly from said first-mentioned passages between the rear wall of said casing and said oven, and cut-off valves located in
15 the rear portion of said first-mentioned passages, said stove also having other passages formed between the bottom wall of said casing and said oven and connecting the lower end of said vertical passage with the lower
20 portion of said fire boxes.

6. A stove of the character described comprising two fire boxes, and a main casing having a horizontal passage connected to the upper portion of each of said fire boxes, having
25 a diagonal passage connected to the lower portion of each of said fire boxes, and having a vertical passage connecting said horizontal passage and said diagonal passage, and valves controlling said passages.

30 7. A stove of the character described comprising a plurality of fire boxes, a main casing having a passage extending rearwardly

from the upper portion of each of said fire boxes, and having other passages extending rearwardly from the lower portion of each of
35 said fire boxes, and a blower connected to said passages and adapted to take the products of combustion from the passage connected to the upper portion of one of said fire boxes and discharge the same into the
40 passage connected to the lower portion of another of said fire boxes.

8. A stove of the character described comprising two fire boxes, a main casing having passages extending from the upper portion
45 of each of said fire boxes, valves controlling said passages, said casing having other passages extending from the lower portion of said fire boxes, a valve controlling said passages, a blower adapted to draw the products
50 of combustion from the passage connected with the upper portion of one of said fire boxes and discharge the same into the passage connected with the lower portion of the other of said fire boxes, and means for simultaneously reversing the position of said levers.
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In testimony whereof, I affix my signature in presence of two witnesses.

CHARLES W. SMITH.

Witnesses:

A. C. LINK,
EDWARD S. REED.