

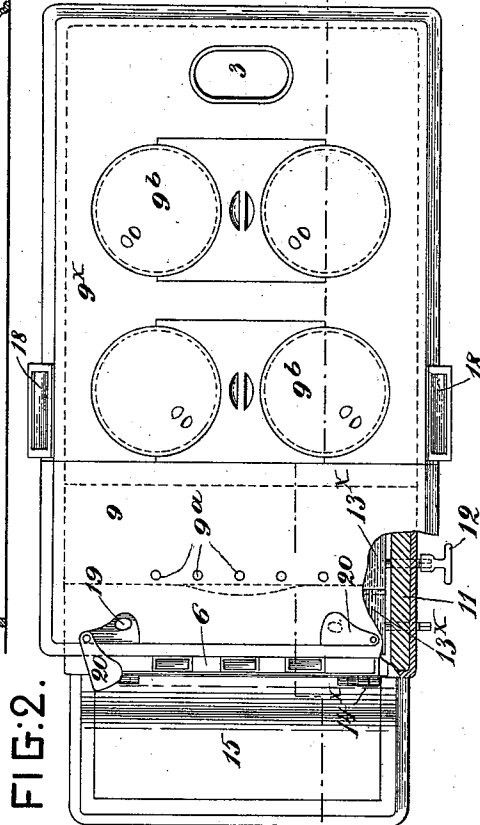
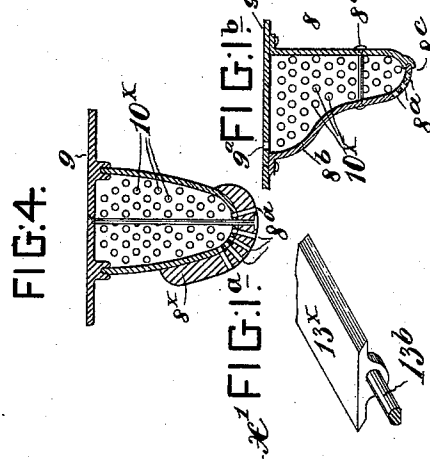
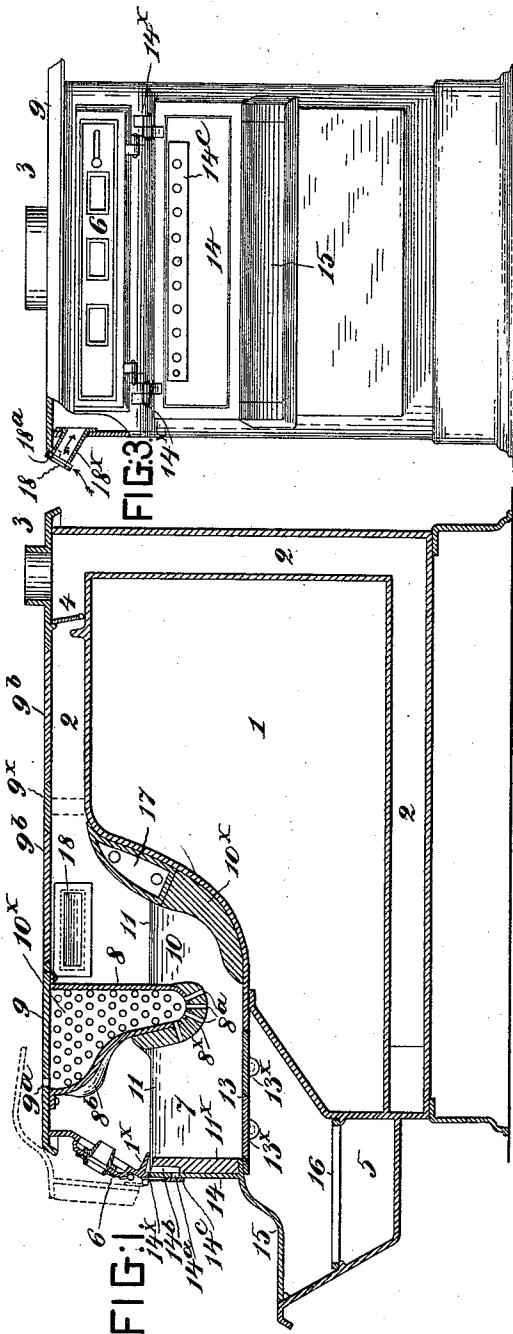
(No Model.)

2 Sheets—Sheet 1.

E. R. CAHOONE.
STOVE OR RANGE.

No. 540,716.

Patented June 11, 1895.



Witnesses:

J. W. Wiman
Peter A. Ross.

Inventor:

Edwin R. Cahoon
by Harry Connell
his attorney

(No Model.)

2 Sheets—Sheet 2.

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FIG:6.

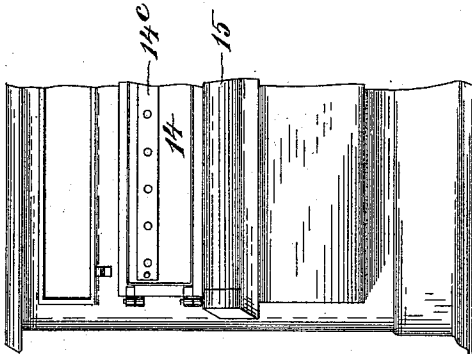
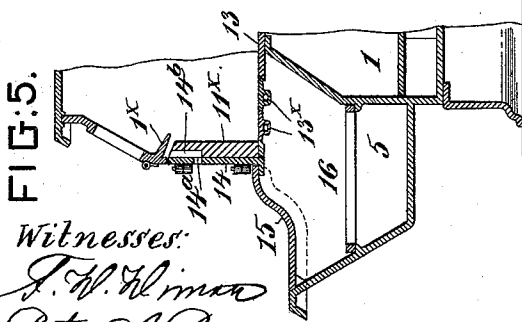


FIG:5.



Witnesses:
J. W. Wilmer
Peter A. Ross.

FIG:7.

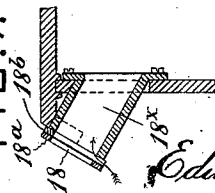


FIG:8.

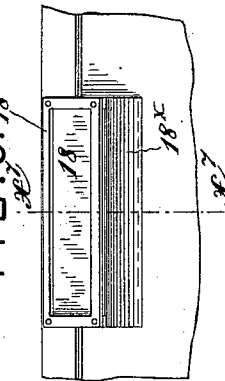


FIG:11.

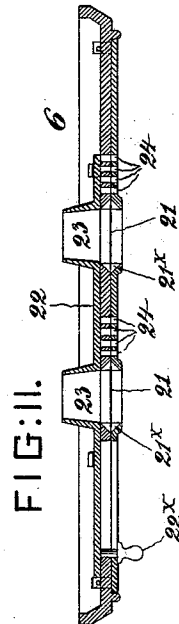


FIG:9.

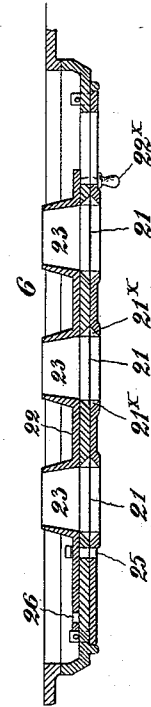


FIG:10.

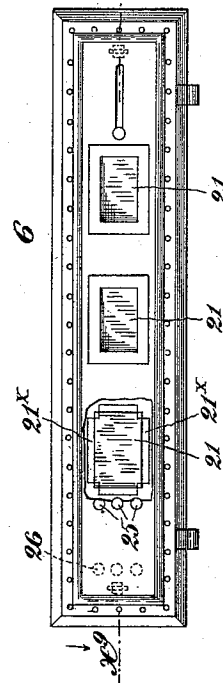
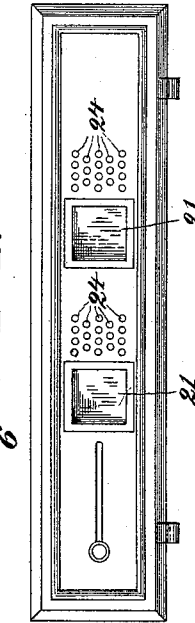


FIG:12.



Inventor:
Edwin R. Cahoon.
by Henry Connel
his Attorney

UNITED STATES PATENT OFFICE.

EDWIN R. CAHOONE, OF NEWARK, NEW-JERSEY.

STOVE OR RANGE.

SPECIFICATION forming part of Letters Patent No. 540,716, dated June 11, 1895.

Application filed August 10, 1894. Serial No. 519,927. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. CAHOONE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Stoves or Ranges, of which the following is a specification.

My invention relates in the main to the class of stoves and ranges for burning soft or bituminous coal, wherein the object of the construction is to effect such perfect combustion that free carbon is substantially eliminated and the generation of smoke thereby avoided. The main features of the invention are especially well adapted to a stove or range of this class which employs a transverse air-duct in the fuel-chamber and I have shown my invention as applied to a cooking stove of this kind.

The invention will be fully and clearly described hereinafter and its novel features carefully defined in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of a stove embodying the invention, the plane of the section being indicated by the line x' in Fig. 2; and Figs. 1^a and 1^b illustrate details of the stove which will be hereinafter described. Fig. 2 is a plan of the stove. Fig. 3 is a front elevation of the same. Fig. 4 illustrates a slightly-different form of the air-duct. Figs. 5 and 6 illustrate a slight modification of the construction of the front part of the stove, Fig. 5 being a vertical section and Fig. 6 a partial front elevation of the stove. Figs. 7 and 8 are detached views, on a larger scale, of the peep-window in the side of the stove, Fig. 7 being a vertical section on line x' in Fig. 8, and Fig. 8 a front view. Figs. 9 and 10 are detached views of the stove-door, Fig. 9 being a longitudinal section on line x'' in Fig. 10, and Fig. 10 a front view, partly broken away, to show the construction. Figs. 11 and 12 are similar views to Figs. 9 and 10, illustrating a slightly-different construction and the one preferred.

1 represents the oven of the stove; 2, the flues; 3, the outlet for the gases; 4, the damper in the flue; 5, the ash-box, and 6 the charging door, opening into the fuel-chamber, 7. Across the fuel-chamber is an air-duct, 8, secured to and pendent from a top-plate, 9, of

the stove and separating the fuel-chamber proper from a gas-duct, 10, between said air-duct and the front end of the oven. This air-duct 8 is made of metal, extends across the stove between the side plates thereof and its open ends are covered by perforated or apertured plates, 10^x, which admit air to the duct. The lower part of the air-duct is covered with a protecting tile, 8^x, of fire clay, or like refractory material, properly molded to shape and secured to the duct by bolts or screws, and both the air-duct and its refractory covering have air-jet apertures, 8^a, by which air is admitted to ignite the gases flowing from the fuel-chamber under the air-duct to the gas-duct or flue 10. Both the fuel-chamber and flue 10 will be lined at their ends with properly molded bricks or tiles, 11, of refractory material.

Fig. 4 shows an air-duct of a well known form provided with a protecting tile, 8^x, according to my invention, but I prefer the novel construction illustrated in Figs. 1 and 1^b. In this construction the air-duct has a pocket, 8^b, at its upper part, extending toward the front of the stove and air-inlets to this pocket at 9^a, in the plate 9. This construction allows the formation of a large air-space in the upper part of the duct where it will not interfere with the operation of the stove, and the constant influx of air to this space prevents the overheating of and injury to the duct. Preferably the metal portion of the duct will be cast in two parts, with a joint, as seen at 8^c in Fig. 1^a, the parts being secured together by a bolt, 8^d. This construction is for convenience in casting. I have not shown the tile 8^x fitted to the duct in Fig. 1^b, as this may be done when the stove is put together. The duct is secured to a removable top-plate of the stove by screws, or bolts, and when this plate and the attached duct are removed the entire fire-box or fuel-chamber will be open for inspection and repair. The plate 9 (Fig. 2) is independent of the top-plate, 9^x, of the other portion of the stove and may be removed without disturbing the latter. The important feature of this construction is to attach the air-duct 8 to a removable plate in the top of the stove so that it may be conveniently lifted out without dismantling the stove.

The bed, 13, on which the fuel rests is im-

perforate, the air for combustion entering the fuel-chamber above the fuel, partly from the air-duct 8, partly through apertures in the charging door, and partly through the hinged stove-front, as will be hereinafter explained.

I prefer to mount in the bed 13, two or more plates, 13^x, pivoted at their ends in the side-walls of the stove and adapted to close snugly together at their beveled edges. These are seen in plan where the figure is broken away in Fig. 2, and one is represented in perspective in Fig. 1^a. The purpose of these plates,—which are similar to butterfly valves,—is to enable the operator to discharge some of the lighter ashes from the bottom of the fire and not to admit air. Each plate or valve 13^x is independent and may be rocked by means of a detachable wrench or crank, 12, from the outside of the stove. In order to give stable equilibrium to the valve the stem 13^b of the same—see Fig. 1^a—is flattened on its under side where it rests in its bearing.

To get access to the fuel-chamber for cleaning out the ashes and cinders, I mount the stove-front, 14, on hinges, 14^x, so that it may be swung out. In Figs. 1, 2 and 3, the hinges 14^x are at the top or upper edge of the front 14, so that the latter may turn up; and the hearth-plate, 15, which covers the ash-box, is integrally connected to or cast with said front so that both turn up and back together, as indicated in dotted lines in Fig. 1.

When the stove-front is thus thrown open from the fire-bed 13 up nearly to the charging door, the ashes and cinders may be drawn over the edge of the bed 13 into the ash-box, where they fall onto a removable grid, 16, set on supporting lugs in the ash-box. This enables the ashes to be sifted and the combustible portions returned thereof to the fire-box.

The hinged stove-front 14 will be of metal plate (preferably cast-iron) lined on its inner face with a fire brick or tile, 11^x, which, when the front is closed, forms part of the refractory lining of the fuel-chamber.

Air is admitted at the top of the fuel in the fuel-chamber through the hinged front 14 at apertures, 14^a, in the metal plate, which open into upright flues or recesses, 14^b, formed in the outer faces of the tiles 11^x, and opening into the fuel-chamber at the upper edges of the tiles. To prevent fuel or cinders from getting into and choking these recesses 14^b, a projecting lip, 1^x, is formed on the front plate of the stove below the charging door and arranged to project out over the upper edge of the tile 11^x on the hinged stove-front. The function and operation of this lip or ledge will be obvious.

The back part of the gas-duct 10 is formed, as to its lower part by a curved tile, 10^x, and as to its upper part by a water-back, 17. Both of these features are clearly shown in Fig. 1. In stoves of this class, so far as I am aware, water-backs have not been employed owing to the difficulty of getting heat enough when

situated in the usual place at the front of the fire-box.

In burning soft coal it is not usual to employ mica windows as the mica is liable to become coated with soot so as to lose its transparency; and in the case of a stove having a transverse air-duct, it is very desirable to have some means of inspecting the gas-duct or flue 10 without having to raise one of the lids, or pot-hole covers, 9^b. To this end I provide the stove with a mica window, 18, at its side and in the end of the flue or gas-duct 10. In carrying out this construction (seen best in Figs. 7 and 8) I attach to the stove—or form integrally therewith—an inclined trunk, 18^x, which opens into the stove through the side wall thereof. In the outer end of this trunk and covering the opening in the same, is the mica window 18. The plate of mica is clamped between two frames, 18 and 18^b, the latter being cut away at its lower side to leave or form a restricted air-inlet under the edge of the mica. I find that the trunk 18^x prevents the smoke from getting to the mica and depositing soot thereon, and that the air entering (see arrow in Fig. 7) under the mica also assists in attaining the same end by creating a current inwardly through the trunk.

In order to facilitate slicing or stirring the fire in the chamber 7 without interfering with the draft, I provide in the top-plate of the stove (see Fig. 2) a poke-hole, 19, covered by a wicket, 20, hinged to the top-plate. I prefer to recess the wicket in the top-plate, and to arrange the recess at the front edge of the stove so that the wicket may be turned outward, laterally, as seen in Fig. 2.

For a cooking stove, which is adapted to be set with either side next to a wall, I prefer to provide two mica windows 18, and two wicket-covered poke-holes 19. This duplication is seen in Fig. 2, in which figure one of the wickets is shown displaced.

The preferred construction of the charging door is illustrated in Figs. 11 and 12, although the construction seen in Figs. 9 and 10 is substantially the same.

Referring first to Figs. 10, 11 and 12,—the door proper is formed of two plates, having apertures for the mica windows, 21, which are clamped and held between the plates at their corners only, as seen where the outer plate of the door is broken away in Fig. 10 about one of the windows. Except at the corners, the margins of the openings are beveled, as seen at 21^x, in Figs. 9, 10 and 11, so as to form restricted air-inlets about the mica at its four sides. On the inner face of the door is mounted a slide, 22, having in it apertures adapted to register with the windows 21, and trunks, 23, projecting inwardly from about each aperture. These trunks do not interfere with the inspection of the fire, and they, together with the air entering about the mica, prevent the access of smoke to the latter. As the volume of smoke is excessive at

times, for example when kindling a fresh fire or putting on fresh fuel, it is desirable at such times to screen the mica entirely, and to effect this it is only necessary to move the slide 22 endwise far enough to shift the trunks 23 out or register with the windows; and in order that this may not cut off entirely the entry of air through the door 6, the trunks are made to register with apertures, 24, in the door adjacent to the windows, as seen in Figs. 11 and 12. If it be desired, however, to cut off the entry of air entirely, the slide 22 may be moved still farther so that it will close both the mica windows and the apertures 24.

The construction of Figs. 9 and 10 is precisely the same as that just described except that, owing to the employment of an extra mica window—three instead of two—the slide 22 cannot be shifted so far and the air-inlet apertures 24 cannot be employed. Nevertheless, it is possible in this construction to use apertures, 25, which are brought to register with corresponding apertures, 26, in the slide 22, when the latter is so shifted as to screen the mica windows. The slide 22 will be operated in a manner similar to a register slide by a knob, 22^a, or equivalent means.

In lieu of hinging the stove-front 14 at its upper edge so that it may turn up, it may be hinged at one side, so as to swing like a door; and in lieu of connecting the hearth-plate 15 with said front, it may be made separate so as to be lifted off and set to one side when the front is to be opened. These constructions are clearly illustrated in Figs. 5 and 6. Either of the constructions illustrated in the several figures may be employed.

The apertures 14^a, in the stove-front 14, may be left open or furnished with a register slide, 14^b, at the option of the maker. In the drawings—Figs. 1, 3 and 6—I have represented such a slide somewhat diagrammatically.

The valves-plates 13^a in the bed or bottom 13 need not occupy the entire bed, nor need they be so wide, relatively, as represented in Fig. 1. In Fig. 5 they are represented as narrower and occupying a place at the front of the bed only.

I do not wish to limit myself to the specific construction shown herein, in all respects as this may be varied to some extent without departing materially from my invention. For example, as the air-duct 8 is supported in the linings 11, it is not absolutely essential that it shall be secured to the plate 9 at the top. The linings of the front 14, and indeed of the entire fuel-chamber, might be of metal, but fire-tiles are preferred.

The removable front 14 may be secured in any known manner to the stove-frame but I prefer to hinge it. The function of this front is to throw open the fuel magazine so that coke and unburned coal may be readily removed.

The frame about the mica in the door (Figs. 9 and 10) may be recessed in any convenient manner to allow air to enter.

The back wall of the gas-duct or flue 10 has an ogee form to properly direct the flames and gases, and if the water-back 17 be omitted, a tile or plate of the proper form should be substituted therefor.

Having thus described my invention, I claim—

1. A stove or range having a fuel-magazine, a flue 10, and a hollow partition of metal separating said fuel-magazine from said flue, said partition having a rounded, convex contour at its lower edge and perforations in said rounded edge, and furnished with an integral, curved tile which fits about and covers said rounded part, the tile having perforations which co-incide with those in the partition, as set forth.

2. A stove or range having a fuel-magazine and flue 10, and a transverse air-duct and partition which separates the fuel-magazine from the flue 10, said duct being suspended from a removable section of the top-plate of the stove or range in front of the front pot-holes, substantially as set forth.

3. A stove or range having a fuel-magazine and flue 10, and provided with a divided top-plate one section of which is arranged in front of the front pot-holes, and a removable, transverse air-duct and partition which is arranged under said front section and separates the fuel-magazine from the flue 10, substantially as set forth.

4. A stove or range having a fuel-chamber therein provided with a transverse air-duct 8, said duct having a pocket 8^b at its upper part, the top-plate of the stove having air-inlets 9^a, to admit air to said pocket.

5. The combination with a stove or range having in it a fuel-chamber, of the metal air-duct 8, extending transversely across said chamber, said duct being provided at its narrow, lower part with a protecting tile 8^c, and at its upper part with a pocket 8^b, extending toward the front of the stove and adapted to receive air through apertures in the stove top.

6. A stove or range for burning bituminous coal, having a fuel-magazine, a transverse air-duct and partition, and a gas-flue 10, back of said partition, the back wall of said flue being formed of a curved tile 10^c, at its lower part, and a water-back 17, above said tile and resting thereon, as set forth.

7. A stove or range for burning bituminous coal, having a fuel-magazine, a transverse air-duct and partition, a gas-flue 10, back of said duct, and an imperforate bed or bottom 13 provided with two or more rotatively mounted valve-plates 13^a, adapted for independent operation, substantially as and for the purposes set forth.

8. A stove or range for burning bituminous coal, having a fuel-magazine, a transverse air-duct and partition, a gas-flue back of said duct, a charging door and an imperforate fire-bed, and having a hinged front 14, extending from the fire-bed up nearly to the charging door and lined with a refractory tile,

said front forming the front wall of the fuel-chamber, substantially as set forth.

9. A stove or range for burning bituminous coal, having a fuel-magazine, a transverse air-duct and partition, a gas-flue back of said fire-bed, and having a front 14, which extends from the fire-bed up nearly to the charging door, said front being hinged at its upper edge, connected at its lower edge to the hearth-plate 15, and lined with refractory tiles or material, substantially as set forth.

10. A stove or range for burning bituminous coal, having a front 14, for the fuel-chamber, hinged to the stove-front and a projecting lip 1^x below the charging door, the said front 14 having air-inlets 14^a, and a tile on its inner face with recesses 14^b, which register with the inlets 14^a and open out of the upper edge of the tile under the lip 1^x, substantially as set forth.

11. A stove or range having a fuel-magazine 7, at its front part, the top-plate of said magazine having a wicket-recess at its front edge and a poke-hole 19 of small size in said recess, and having a covering wicket 20, set in said recess so as to close said poke-hole normally, said wicket being adapted to swing out of said recess toward the front for uncovering the poke-hole, as set forth.

12. A stove for burning bituminous coal having in its side at the top-plate an aperture provided with an inclined trunk 18^x, and a peep-window 18, of mica at the outer end of said trunk, substantially as set forth.

13. A stove or range for burning bituminous coal, having a transverse air-duct and a gas-flue 10, back of said duct, and having also a peep-window of mica in the side of the stove at the end of said flue, said window being situated at about the level of the top of the stove, substantially as set forth.

14. A stove or range for burning bituminous coal, having a charging door provided with a mica window and having an apertured sliding screen mounted on the inner face of the door and adapted to be moved into and out of register with said window, said screen having a trunk 23, at the aperture therein, substantially as set forth.

15. A stove or range for burning bituminous coal, having a charging door provided with a mica window having passages for air about the mica, and having an apertured slide, 22, mounted on the inner face of the door and provided with a trunk 23 about the aperture therein, said slide being adapted to put the aperture therein into or out of register with the mica window, substantially as set forth.

16. A stove or range having a fuel-magazine, a gas-flue 10, and a transverse, pendent, hollow partition between said magazine and gas-flue, the back wall of said gas-flue having the peculiar ogee form shown, that is, a concavity at its lower part and a substantially vertical middle portion, whereby the gases are deflected upward, and a backwardly flared upper part, all as set forth.

17. A stove or range for burning bituminous coal, having a fuel-magazine 7, and a transverse air-duct and partition at the rear of same, and having a removable front between the fire-bed and the charging door which front forms the front wall of the fuel-magazine and extends down to the fire-bed, whereby the fire-box may be opened for the removal of coke and unburned fuel.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDWIN R. CAHOONE.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.