No. 698,800. Patented Apr. 29, 1902.

E. R. CAHOONE.

STOVE.

(Application filed Dec. 24, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 7.

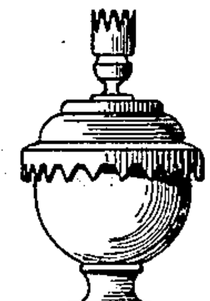
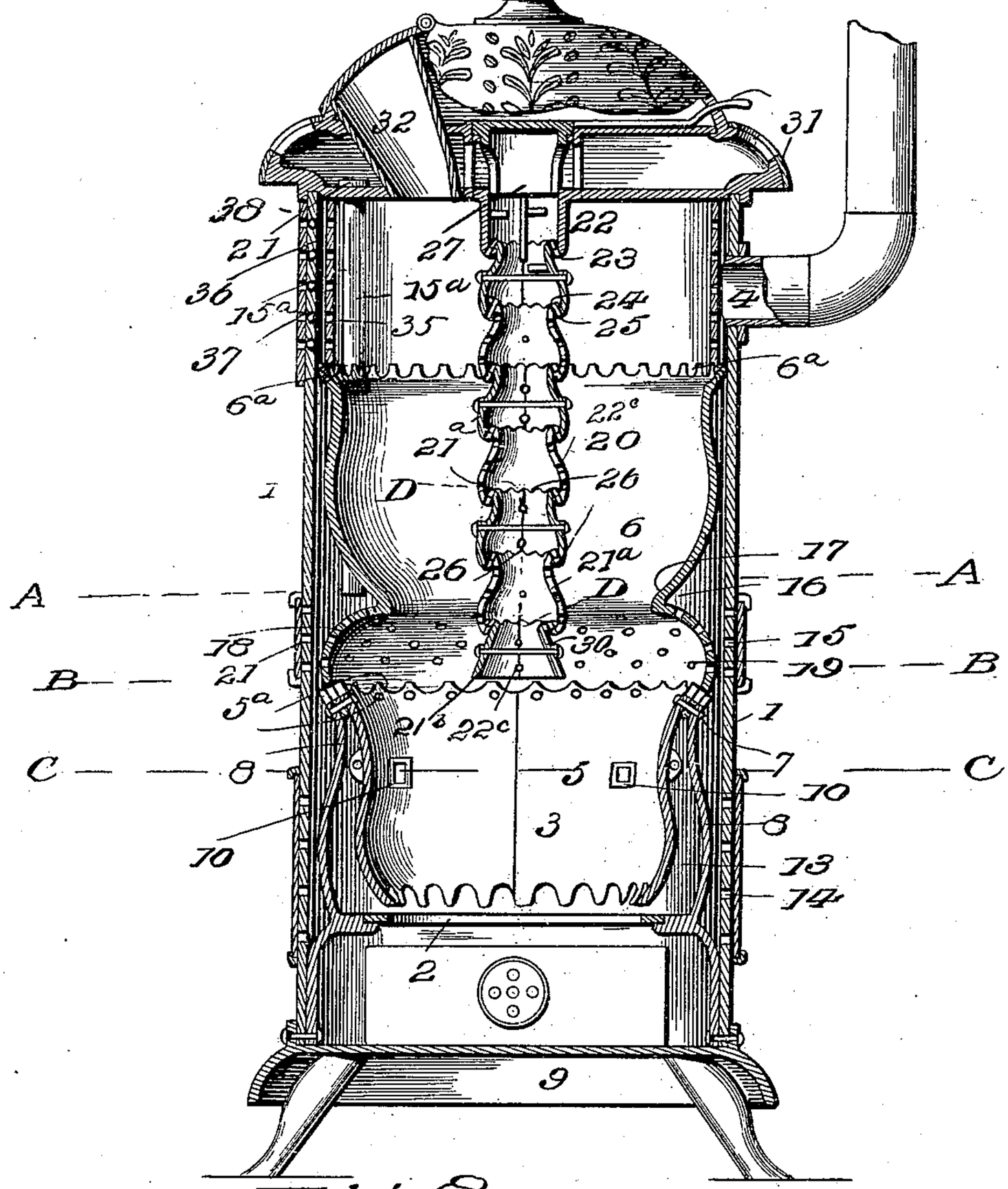
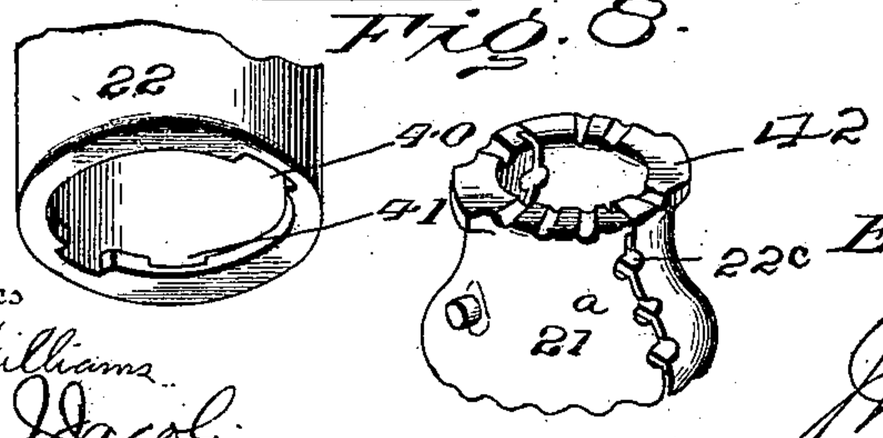


Fig. 8.





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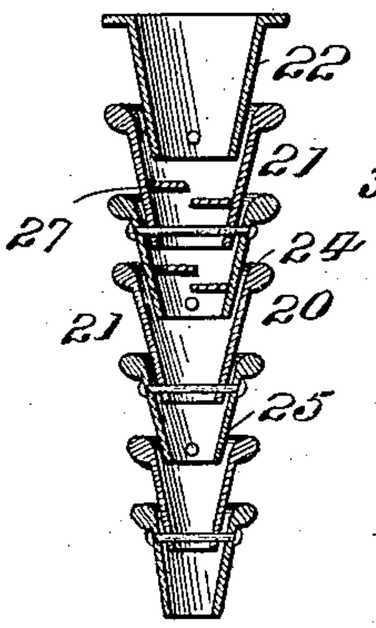
(No Model.) 2 Sheets—Sheet 2.

Fig. 7.

Fig. 6.



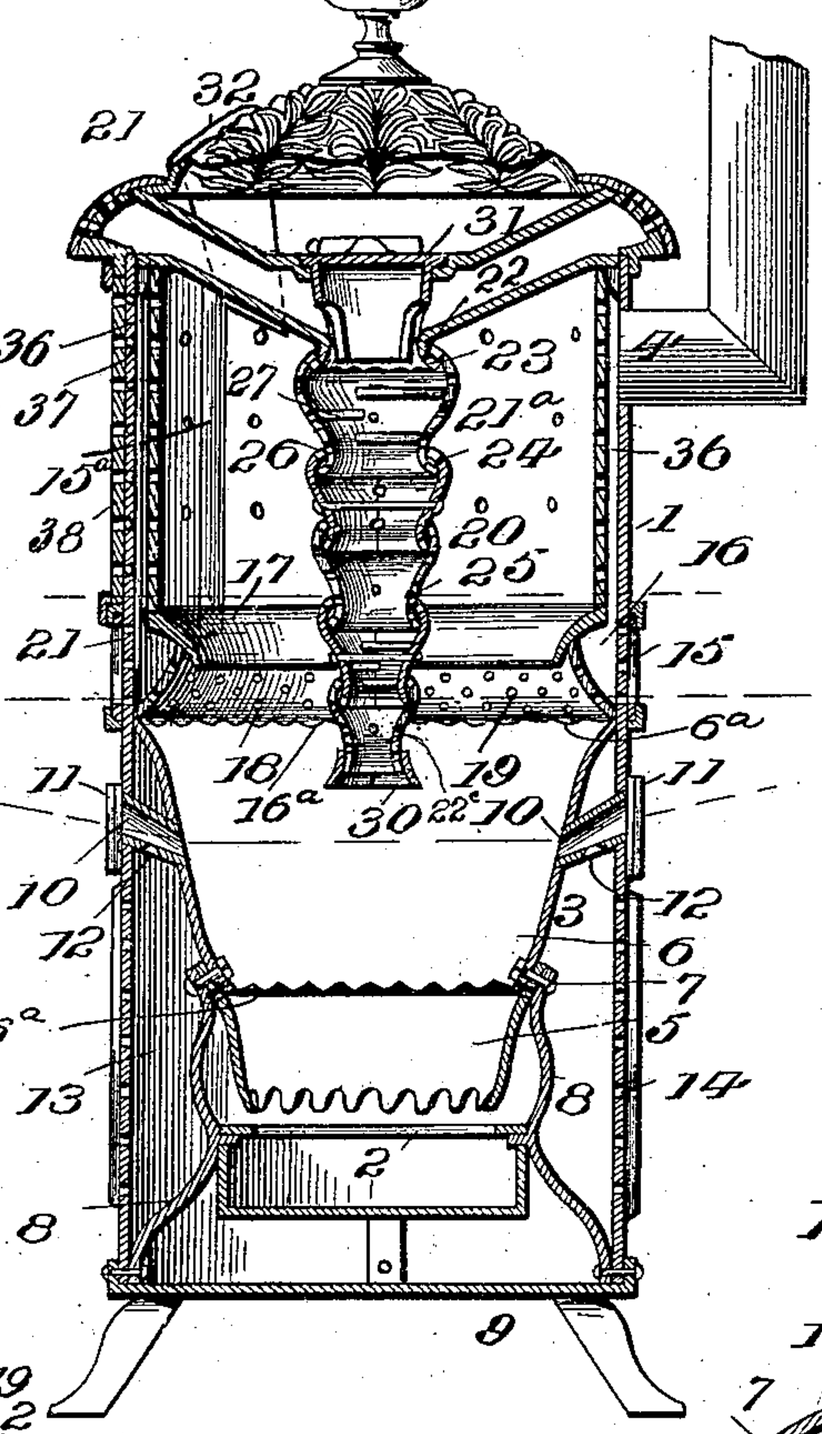


Fig. 5.

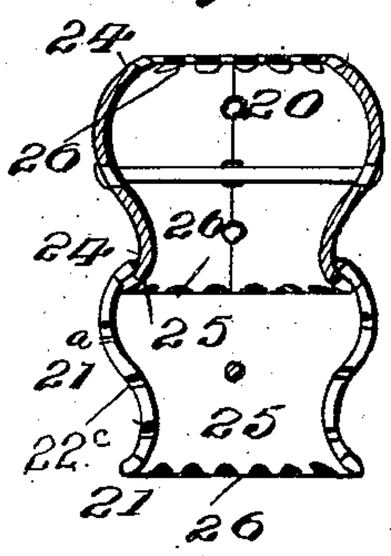


Fig. 2.

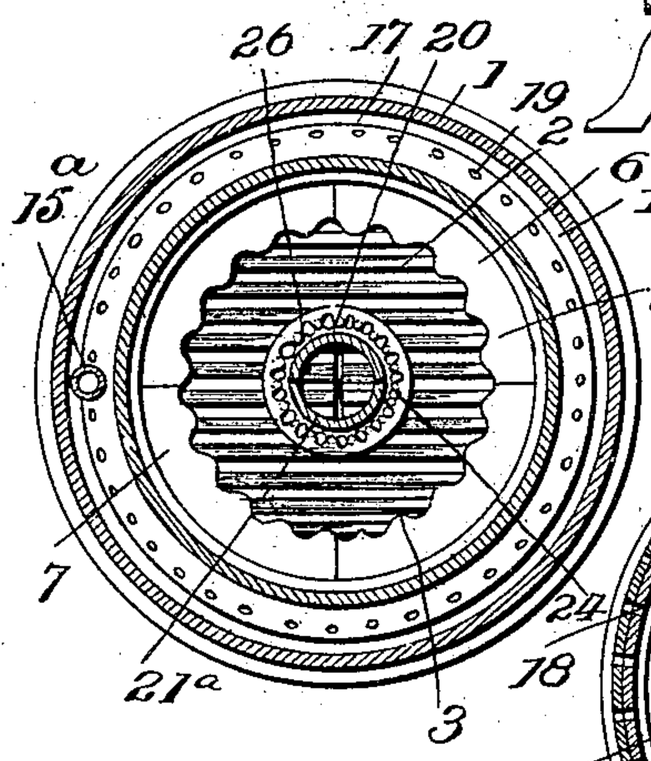


Fig. 3.

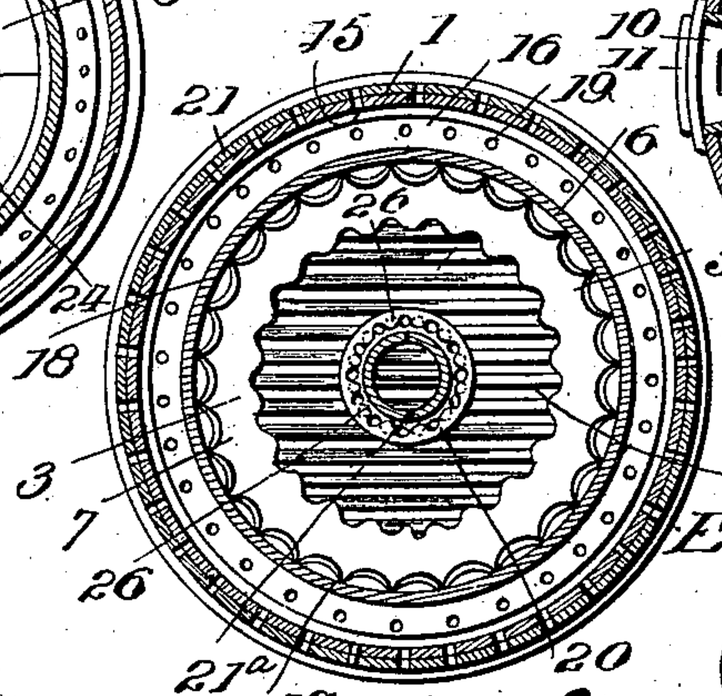
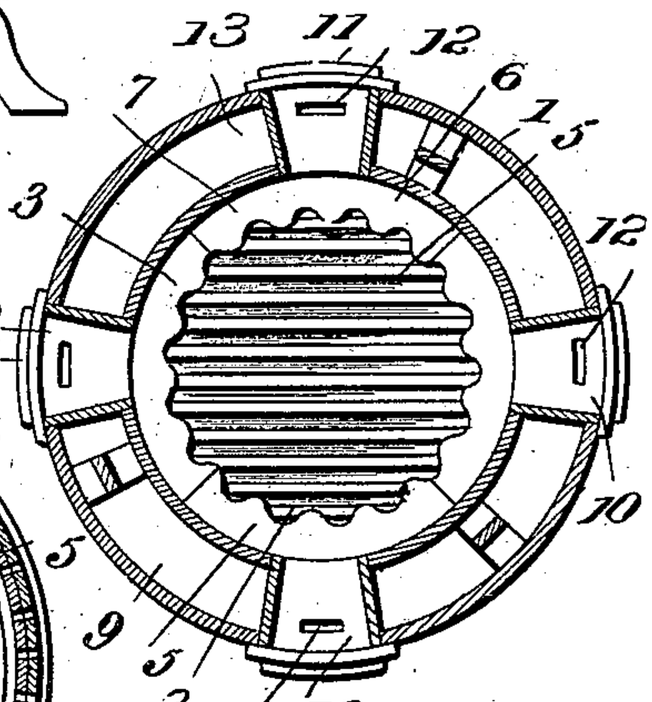


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWIN R. CAHOONE, OF NEWARK, NEW JERSEY.

STOVE.

SPECIFICATION forming part of Letters Patent No. 698,800, dated April 29, 1902.

Application filed December 24, 1900. Serial No. 40,923. (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 new and useful Improvements in Stoves, of which the following is a specification.

This invention relates to improvements in updraft heating-stoves.

The prime object of the invention is to provide a portable sectional tube having air-exits at the meeting edges for delivering currents of heated air at different angles and levels, which mixes with the escaping products of combustion to more readily ignite the molecules of escaping gases.

A further object of this invention is to provide means for equally distributing heated-air currents to the fuel, whereby the products of combustion are made more susceptible to ignition.

A further object of this invention is to provide an air-heating chamber for delivering currents of heated air above the bed of the fuel at a point approximately on a line with the air delivered through a tube, whereby the products of combustion as they rise become more thoroughly mixed and readily ignite.

A still further object of the invention is to provide a cheap and durable fire-pot made up of sections, the meeting edges of said sections being serrated or perforated to provide air-inlets.

Many other objects and advantages will be hereinafter referred to and be particularly pointed out in the claims.

In the drawings forming a part of this specification, Figure 1 is a vertical section of a stove, showing the application of my improvements. Fig. 2 is a cross-section on the line A A of Fig. 1. Fig. 3 is a similar view on the line B B of Fig. 1. Fig. 4 is a similar view on the line C C of Fig. 1. Fig. 5 is a detail section on the line D D of Fig. 1. Fig. 6 is a similar view of a modified form of air-delivery tube. Fig. 7 is a vertical section of a modified form of stove structure. Fig. 8 is a detail view of the means employed for locking the sectional tube in position.

Referring to the drawings, the numeral 1 indicates a casing; 2, a grate; 3, a fire-pot, and 4 an exit-flue.

The fire-pot is made up of sections 5 and 6, said sections being designed to enlarge the fire-pot when so desired—that is to say, by adding an additional section or sections the size of the fire-pot may be increased. The sections are secured together in any well-known manner, as at 7, and held in place by standards or supports 8, rising from the base 9 of the stove. The upper and lower edges of the sections are serrated or perforated, as shown at 5^a and 6^a, to provide air-exits.

Entering the fire-pot at a point where the fuel is incandescent will be one of a series of tubes 10, having doors 11 for the admission of air when the fire is first started and it is desired to make the fuel burn more rapidly. In the bottom of each tube is an air-inlet 12, communicating with a space 13, formed between the fire-pot and the casing 1. The casing 1 has a series of air-inlets 14, controlled by a suitable damper, whereby air can be introduced to the space 13, from whence it enters through the opening 12 into the tubes, thence into the fire-pot, the series of perforations being so proportioned as to admit a sufficient quantity of air to burn the fuel evenly, the air before it enters the tubes becoming highly heated. In addition to supplying air to the space 13 through the openings 14 I may supply said space with air from the ash-pit. Above the fire-pot the casing 1 is provided with a series of air-inlets 15, which enter the air-heating chamber 16, the latter being formed separately or with the upper section of the fire-pot, said chamber having an upper wall 17 and a depending inner wall 18, the upper wall 17 overhanging the wall 18, whereby the fuel as it is delivered to the fire-pot is prevented from clogging a series of air-exits 19. By reason of the inclination of the wall 18 and the overhanging of the ledge 17 the air as it is delivered through the openings 19 is deflected downwardly and meets the gases arising from the fuel, and in addition thereto meets the heated air introduced through the tube 20, causing a series of resistances which tend to mix and break up the molecules of gas, and consequently ignite them. The supply of air to the chamber 16 may be taken in through a tube 15^a, extending from the top of the stove. In either event the supply will be regulated by a damper 21.

A false structure 35 surrounds the inside of the stove above the fuel fire-pot and forms an additional air-heating space 36. Air is introduced to the space 36 through openings 37, which are controlled by a damper 38, or communication between the air-heating chamber 16 and the air-space may be made. Further than this, air may be introduced to said space 36 through the openings 37 and from the chamber 16 simultaneously.

Depending from the stove-top is a tube 20, composed of a series of loose sections 21^a, adapted to diffuse air to meet the escaping products of combustion at various heights. The tube consists of a stationary support 22, having a surrounding flange 23 at its lower end. Each section of the tube is preferably made in two parts, each part having notches to provide air-exits when put together. These sections are constructed substantially alike, except as hereinafter noted, and bolted or riveted together. The sections have an upper flanged end 24 and a lower flanged end 25. The end 24 turns out and the end 25 turns in, forming the means for holding the sections together. The flange ends 24 and 25 are also provided with notches 26 for the exit of the air, and in one or more sections will be, when desired, a series of baffle-plates 27 to assist in heating the air as it passes through the tube. I prefer to have the contracted end uppermost, so as to prevent the dust and dirt from choking the air-exits in the joints of the tube; but, if desired, I may arrange the sections as shown in Fig. 7. In Fig. 6 I have illustrated a modified form of this structure; and it consists in making the sections tapering and in one piece. The manner of securing the sections together in this instance consists of loosely pivoting the reduced end of one section in the enlarged end of the next succeeding section, the succeeding pivotal connection being at right angles, which will permit a certain amount of flexibility. In either of the structures a loose joint exists between the sections for the exit of the air-currents. At the lower end of the tube there may be a tip 30, made of some suitable material. A damper 31 controls the admission of air to the tubes and is used to regulate the fire, together with the other dampers before described.

In the lower end of the stationary support 22 and the lowermost section 21^b, which carries the tip, I provide slots 40 and seats 41, and the two sections 21^a, which fit within the support 22 and the lowermost section 21^b, have flanges 42, adapted to pass into the slots 40, where they are given a slight turn, whereupon said flanges 42 rest in the seats 41. This construction permits the quick and convenient attachment of the whole tube, or the replacing of the tip should it become burned out.

Fuel is introduced through the fuel-opening 32 in the top of the stove, and air enters the openings 12 into the tubes or the usual openings through the ash-pit door, thence into the fire-pot, to intermingle with the products of combustion, and now meets the currents of air coming from the heated-air chamber 16 and from the tube 20, creating a series of resistances, which intermingles the molecules of gas and air to such an extent as to cause the gases to be ignited before they reach the exit-flue 4. The chamber 16 may be supplied with air from the ash-pit or through the openings 15 or through the openings 14 independently or together. If it is desired, however, to force the fire, the doors 11 of the tubes are opened, whereupon a supply of air is admitted direct to the fuel-chamber, which will cause a greater draft from the bed of the fuel to the exit-flue, which necessarily assists in more rapidly making the mass of fuel incandescent. As the products of combustion rise, if any unburned gases pass the air-exits around the lower tube-section said gas will be met by the incoming air from the next joint and is further met by the air coming through the inlets 38, and so on until the exit-flue is reached. By introducing heated air in a series of angles a constant resistance is going on, resulting in breaking up the molecules of gas and igniting them before the exit is reached. Of course it will be understood that the supply of air introduced through the tube 20 and from the chamber 16 or through the edges or joints of the fire-pots will be regulated according to the conditions and circumstances not only of the grade of fuel, but according as the attendant may desire the condition of the fire.

From the foregoing description it will be seen that I have provided a stove which has approximately an equal distribution of heated-air currents for thoroughly mixing and igniting the gases before they reach the chimney, this being especially brought about by the molecules of gas being broken and the means for properly supplying and heating the air as it is being mixed while the combustion is taking place.

Having thus fully described my invention, what I claim is—

1. In a stove, the combination of a fire-pot having an overhanging perforated portion, an exit-flue, an air-heating chamber surrounding said fire-pot, means for regulating the admission of air to said air-heating chamber, a series of tubes entering the side walls of the fire-pot, each of said tubes having a window in its outer end and an opening in its under side, heated air entering said tubes to be delivered to the body of the fuel from the sides thereof, heated air also being delivered downwardly to the top of the fuel-bed through the perforated overhanging portion of the fire-pot from the air-heating chamber, and means for delivering currents of heated air through the fuel from below, said air-currents being drawn in under the influence of the main draft, substantially as described.

2. In a stove, the combination with a fire-pot, an exit-flue, an air-heating chamber surrounding said fire-pot, a series of tubes communicating with the air-heating chamber and the fire-pot for introducing heated air to the fuel-body from the sides thereof, an air-heating chamber above the fire-pot, and a portable sectional tube provided with air-exits at the meeting edges of said sections of the tube, said tube communicating with said latter air-heating chamber to deliver air downwardly toward the fuel-bed in currents at various heights and angles to mix with the gases escaping to the flue, substantially as described.

3. In a stove, the combination of a fire-pot, an exit-flue, an air-heating chamber surrounding said fire-pot, means for introducing air into said chamber, one or more tubes which enter the fire-pot, each tube having a perforation in its under side which communicates with the air-heating chamber, and means for introducing currents of heated air downwardly and at different levels toward the bed of the fuel which mixes with the gases escaping to the flue, substantially as described.

4. A stove comprising a casing, a fire-pot, means for introducing air to said fire-pot, an exit-flue, and a depending sectional tube provided with air-exits at the meeting ends of each section, said tube being located wholly above the top of the bed of the fuel and formed to deliver currents of air at different levels and angles to mix and ignite the gases escaping to the flue, substantially as described.

5. A stove comprising a casing, a fire-pot and a tube made in sections and loosely joined together, each section having a notched in-turned flange at its lower end and a notched turned-out flange at its upper end forming air-inlets, said flanges also forming the supports between the sections, substantially as described.

6. In a stove, the combination of a fire-pot made in two or more sections which overlap, said overlapping sections being provided with air-inlets, means for securing said sections together, and an air-heating chamber surrounding said fire-pot, for introducing air through said inlets, and means for introducing heated air downwardly toward the top of the fuel in the fire-pot, substantially as set forth.

7. In a stove, the combination of a fire-pot made in sections, means for securing said sections together, an air-heating chamber for delivering heated air above the bed of the fuel, means for introducing air to said chamber, an exit-flue, a second air-heating chamber and a sectional tube communicating with said latter chamber, the meeting edges of said sections having exits to introduce currents of heated air downwardly and at different levels toward the fuel-bed, to mix and ignite the gases escaping to the flue, substantially as described.

8. A stove comprising a casing, a fire-pot made in sections, said sections overlapping and being provided with air-inlets, a passage being formed between the casing and fire-pot, regulating means for supplying air to said passage, a series of tubes entering the fire-pot, and a depending sectional tube provided with air-exits for delivering air to the top of the fuel, substantially as described.

9. A stove comprising a casing, a fire-pot, a perforated air-heating chamber surrounding said fire-pot, an overhanging upper ledge surrounding the chamber to deflect the air-currents to the top of the bed of the fuel, a series of tubes entering the fire-pot which communicate with said air-heating chamber, a second air-heating chamber, and a depending sectional tube communicating with said latter chamber, said tube having air-exits at the meeting ends of the sections to introduce currents of heated air downwardly at different levels toward the fuel-bed, substantially as described.

10. A stove comprising a casing, a fire-pot, a space being formed between said fire-pot and the casing, a portable sectional tube to supply air at different levels above the bed of the fuel, an air-heating chamber above the fire-pot, an air-heating space being formed above said air-heating chamber, said space supplying air to the fire-pot and means for introducing air thereto, as set forth.

11. A stove comprising a casing, a fire-pot, an air-heating chamber in the stove structure, a depending sectional air-introducing tube located wholly above the fuel-bed and communicating with said air-heating chamber, said sections having air-exits at the joints thereof, and means for flexibly joining the sections together, all for the purpose of delivering heated-air currents above the fuel-bed at different angles and levels, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWIN R. CAHOONE.

Witnesses:
GEO. E. FRECH,
WALTER A. WILLIAMS.