No. 827,210. PATENTED JULY 31, 1906.

E. R. CAHOONE.

AIR HEATING ATTACHMENT FOR RANGES.

APPLICATION FILED NOV. 30, 1903.

3 SHEETS—SHEET 1.

FIG. 1.

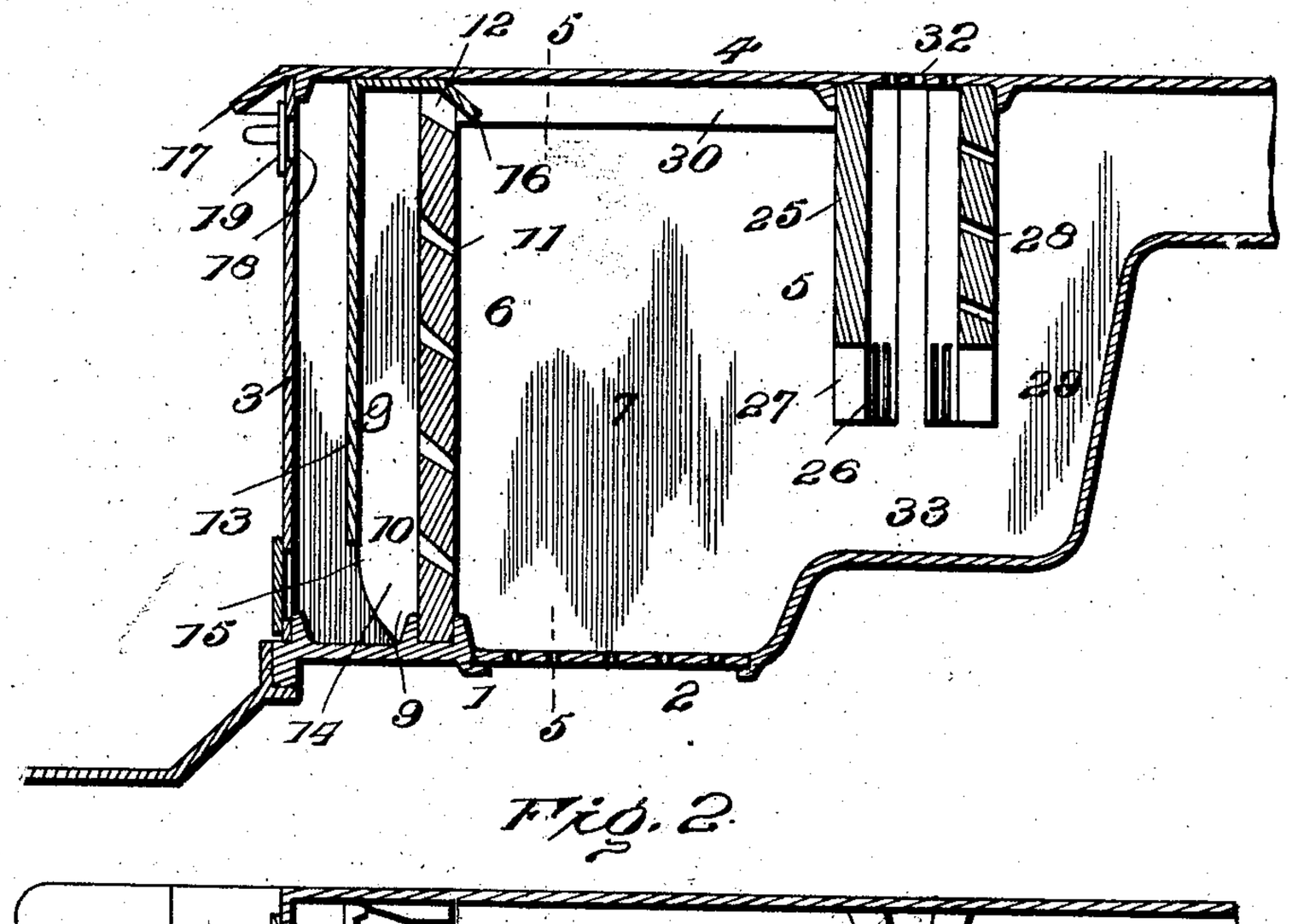
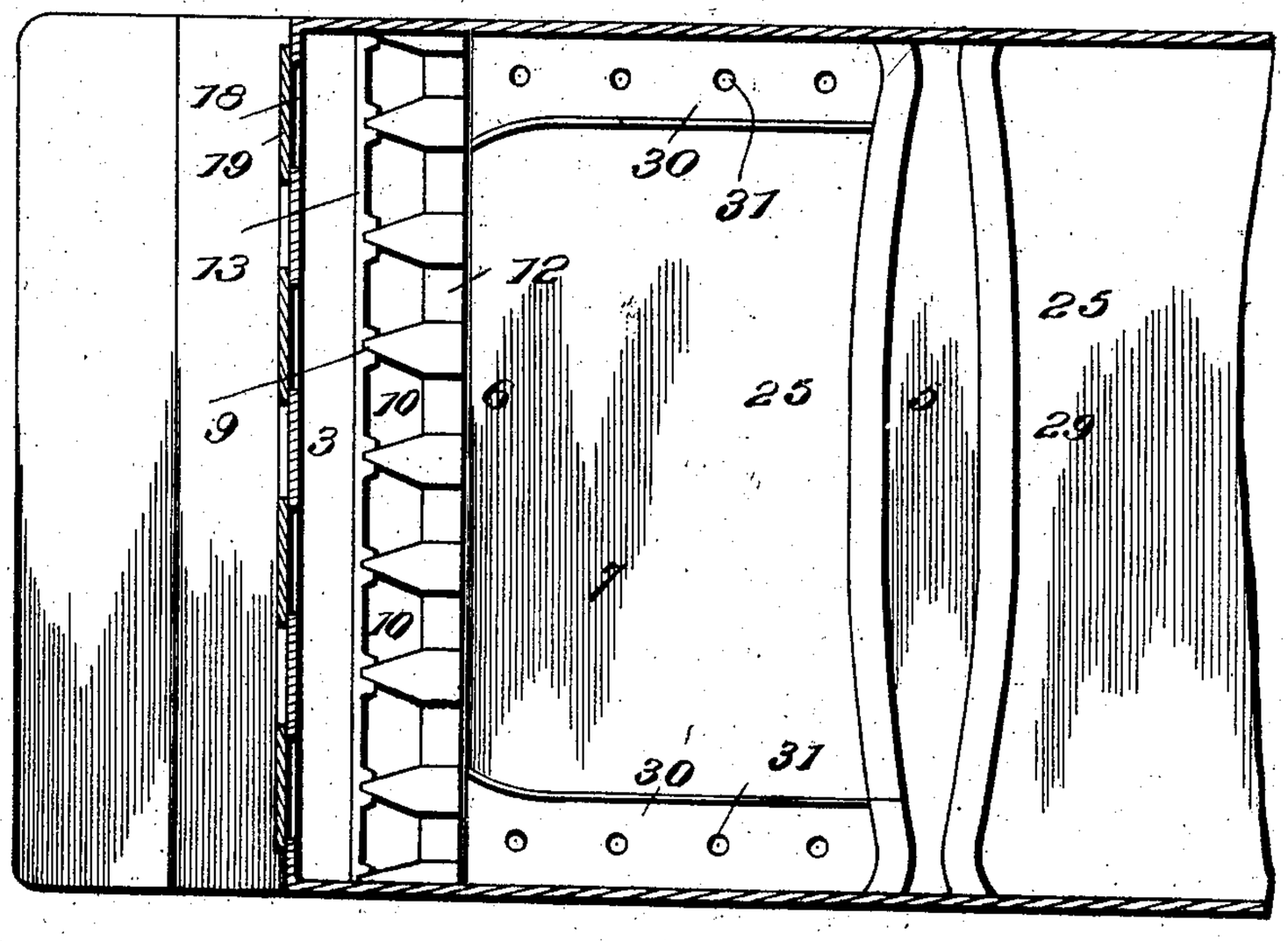


FIG. 2.



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3 SHEETS—SHEET 2.

Fig. 3

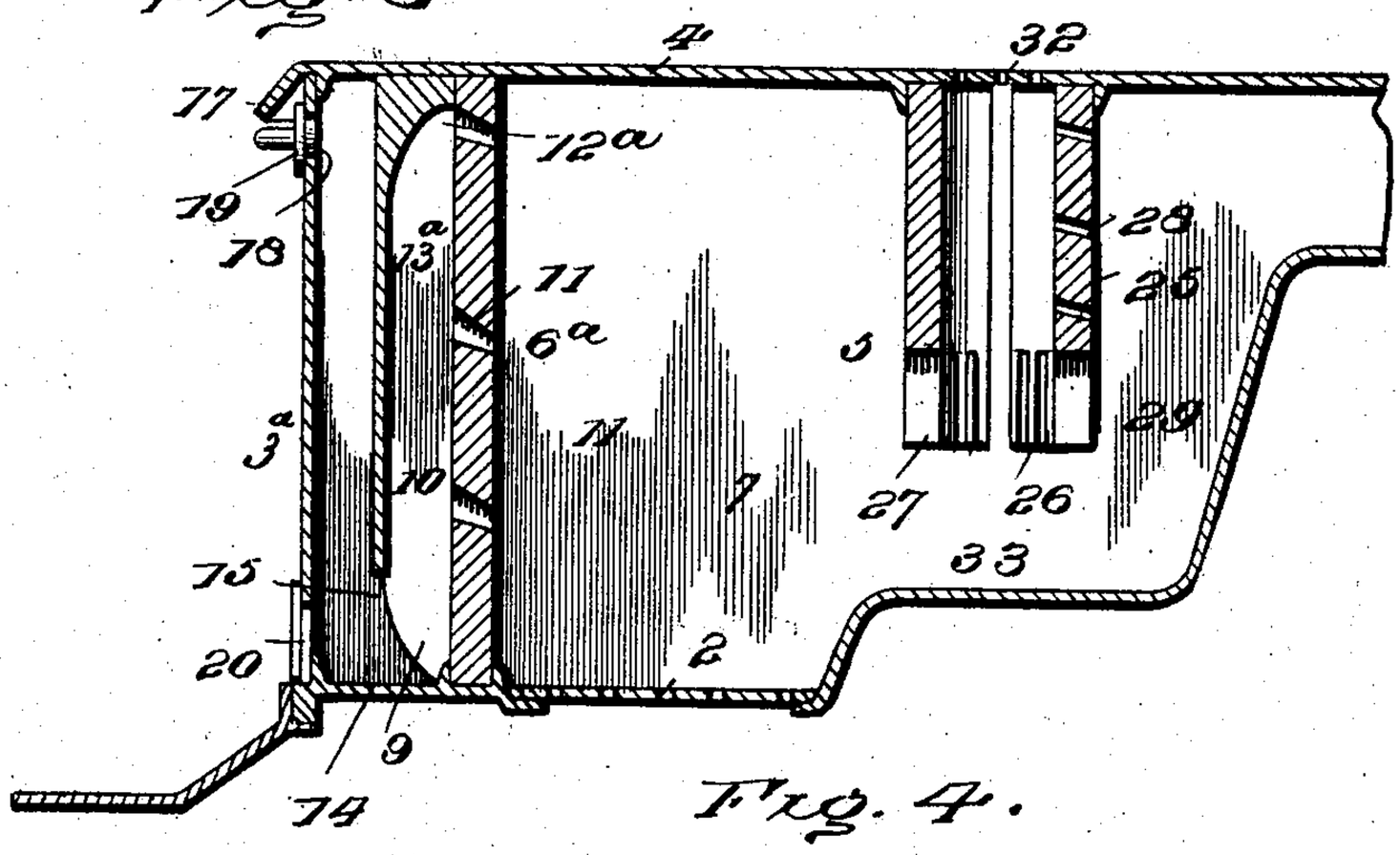


Fig. 4.

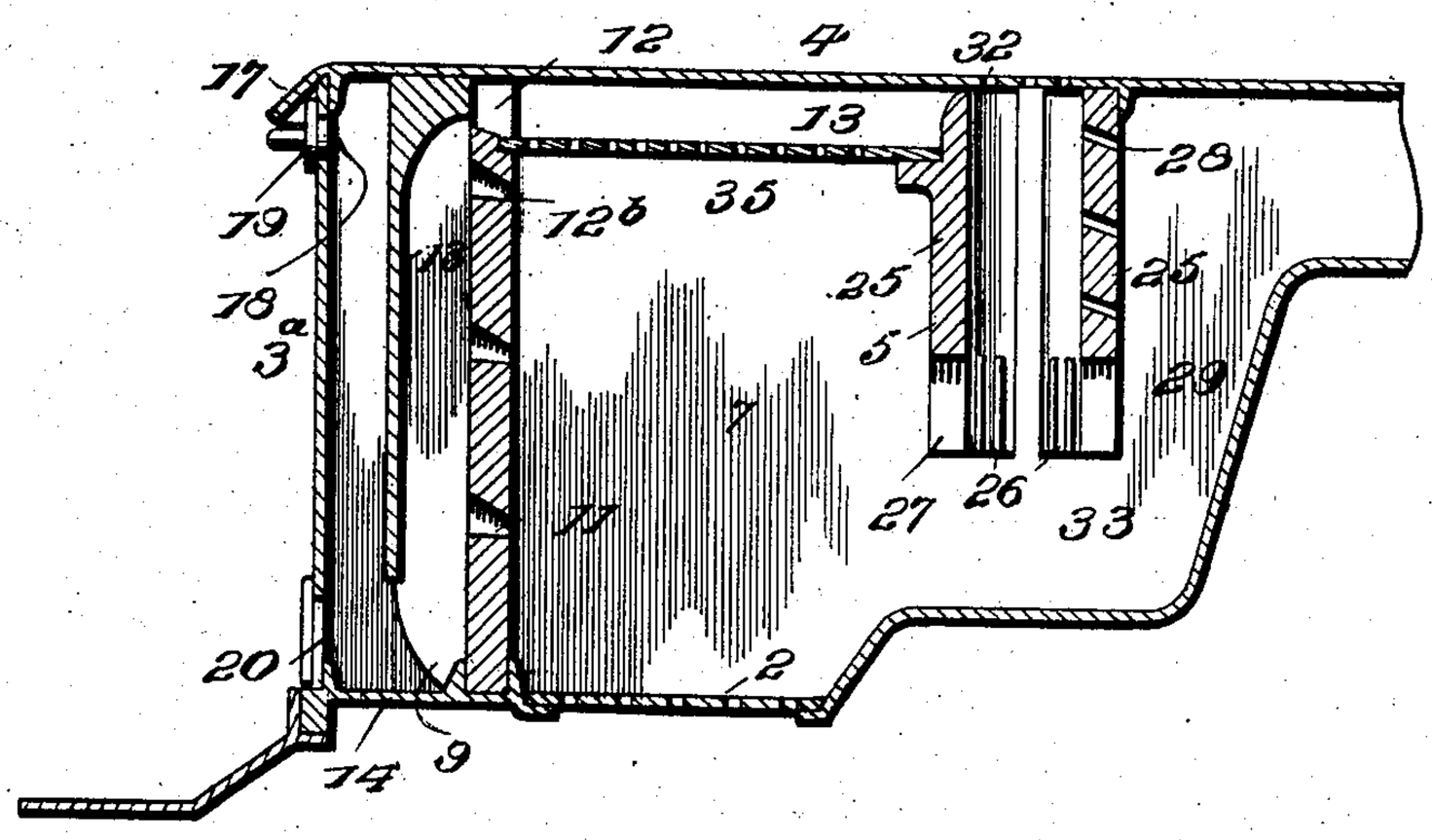
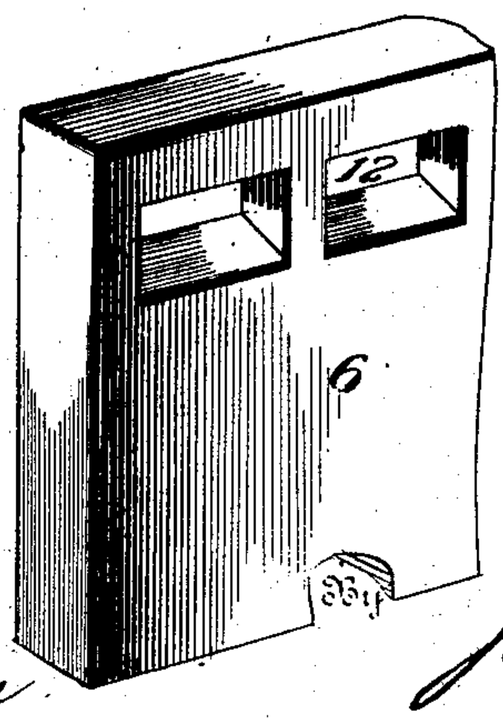


Fig. 7.



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3 SHEETS—SHEET 3.

FIG. 5

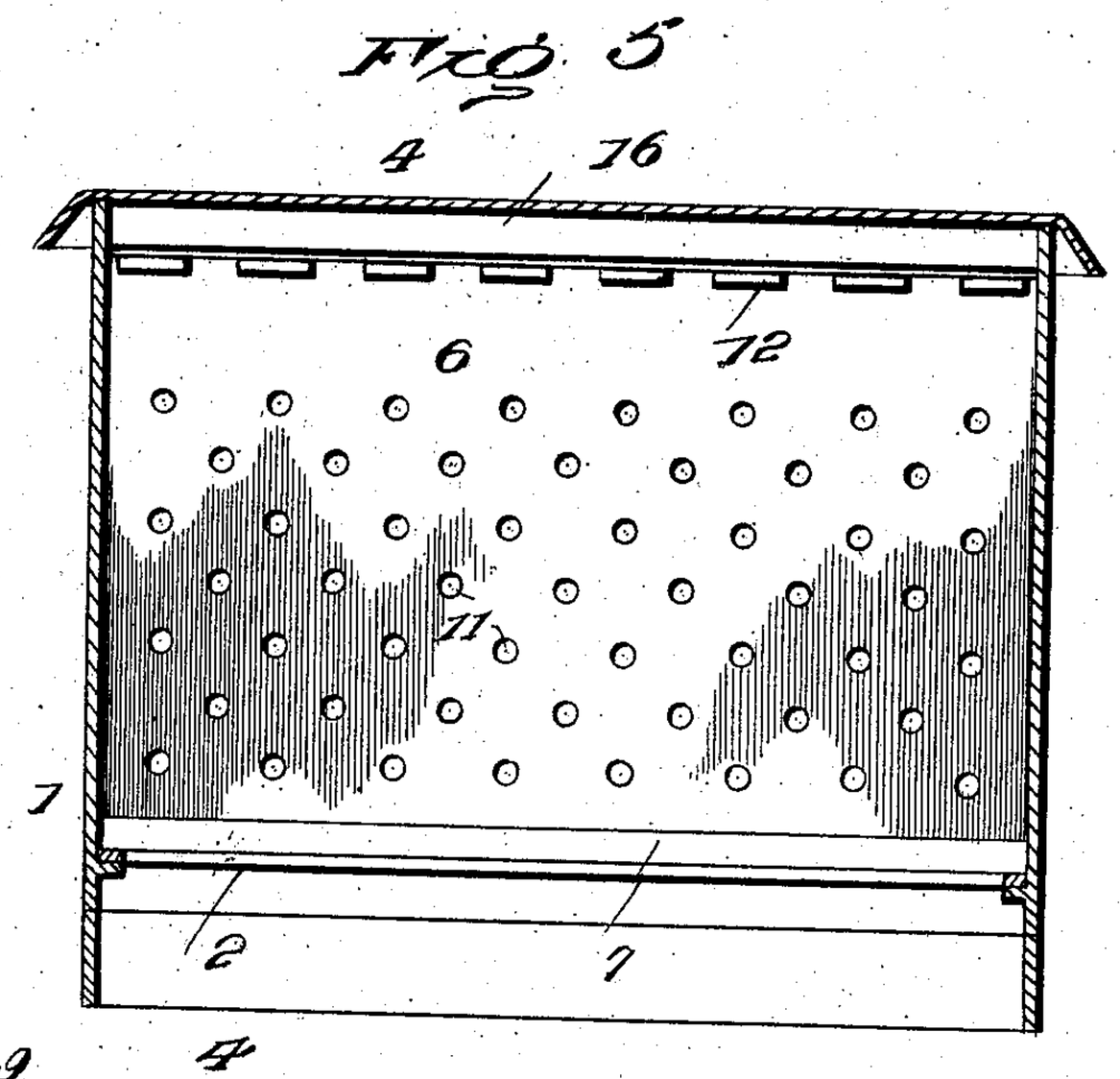


FIG. 9

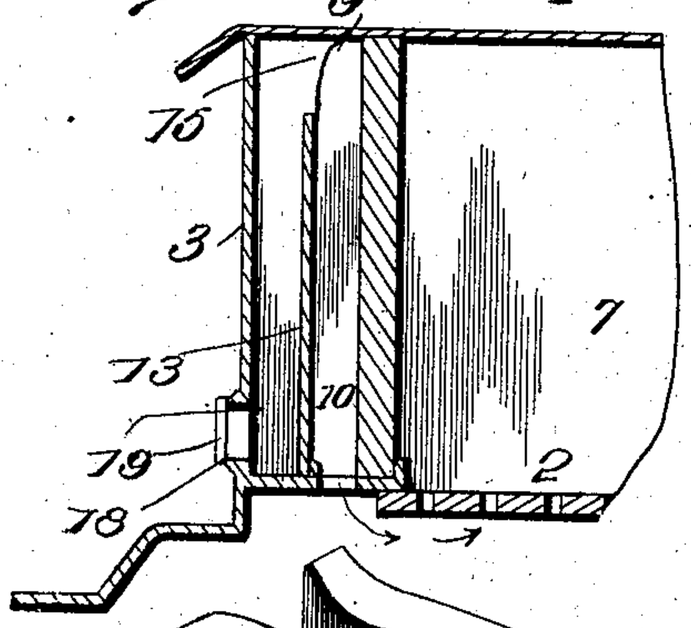


FIG. 6

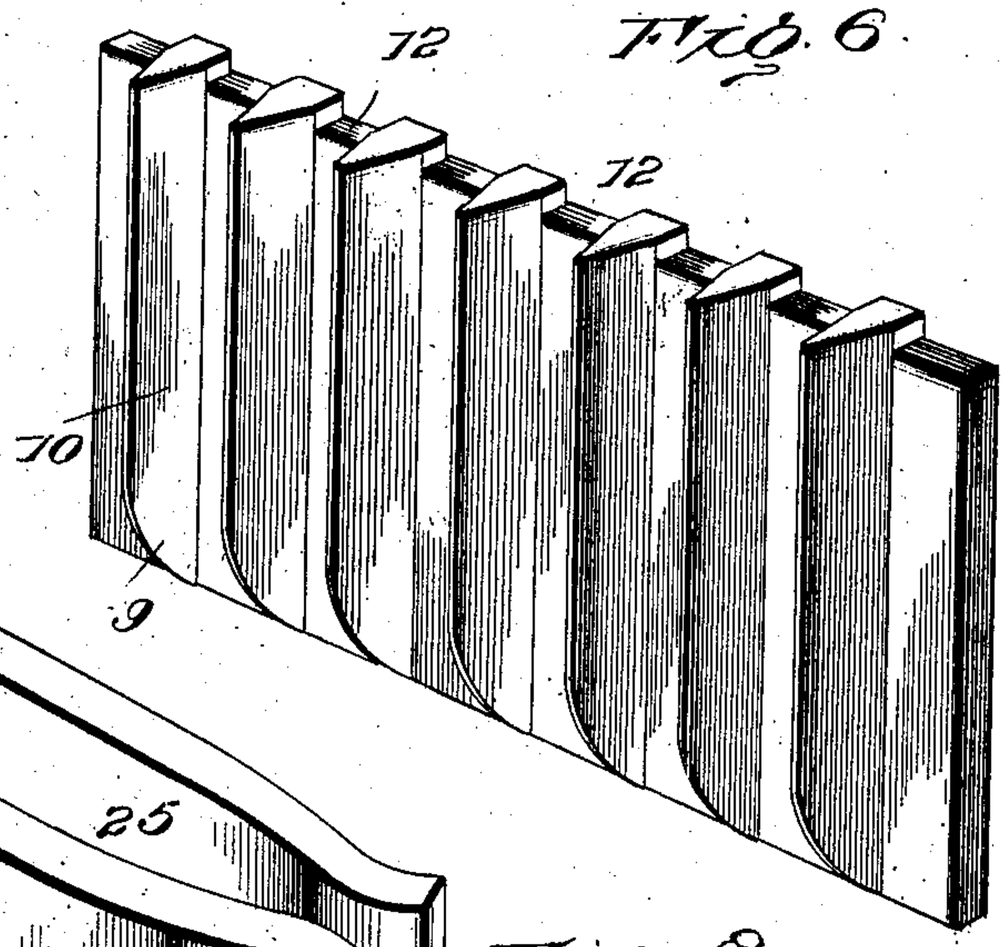
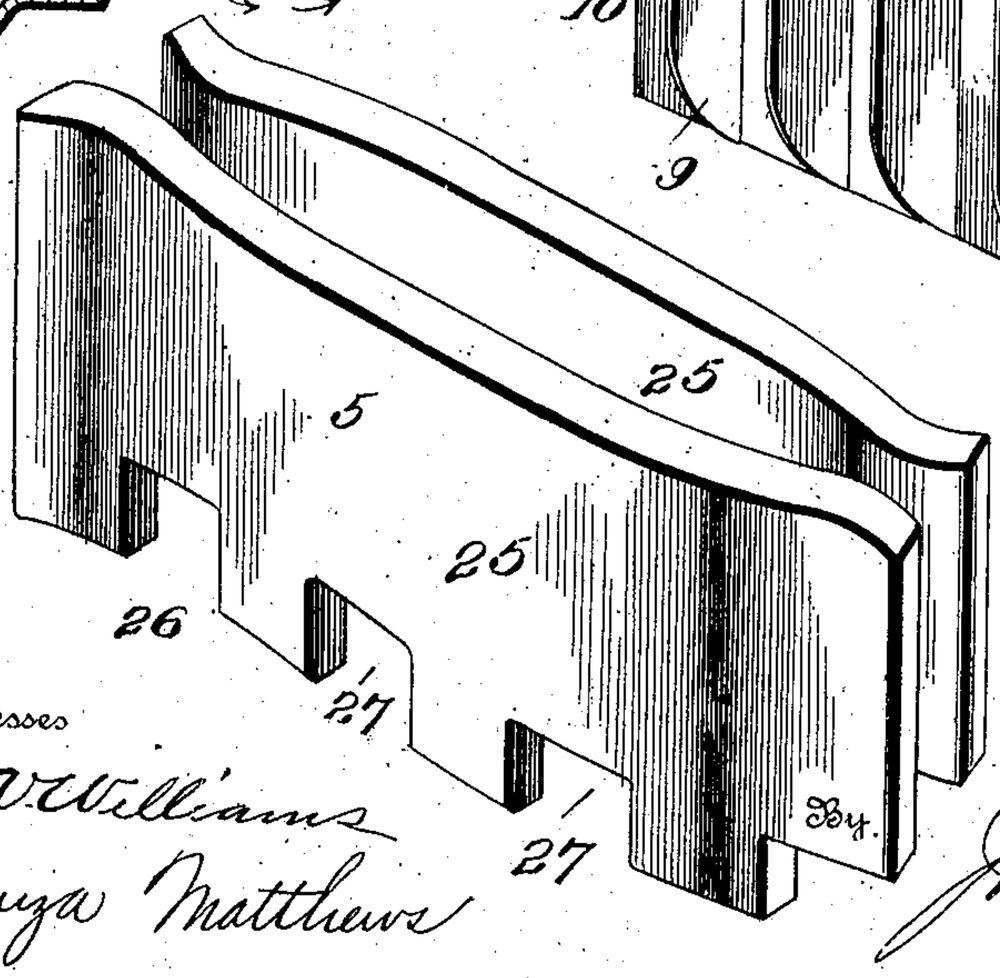


FIG. 8



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UNITED STATES PATENT OFFICE.

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AIR-HEATING ATTACHMENT FOR RANGES.

No. 827,210. Specification of Letters Patent. Patented July 31, 1906.

Application filed November 30, 1903. Serial No. 183,202.

To all whom it may concern:

Be it known that I, EDWIN R. CAHOONE, a citizen of the United States, residing at Troy, in the county of Rensselaer and State of New York, have invented new and useful Improvements in Air-Heating Attachments for Ranges, of which the following is a specification.

This invention relates to improvements in cooking-stoves, and is designed primarily to overcome certain disadvantages present in the structures now in use.

The prime object of the invention is to provide an air-heating chamber, preferably at the front of the stove, where the air is preliminarily heated and in this state is delivered to a plurality of ducts or minor chambers common to the preliminary heating-chamber and finally introduced to the body of the fuel in jets and deflected in streams to the top of the fuel by a deflector. The air is thus taken from the atmosphere and preliminarily heated and in subdivided streams of smaller volumes is secondarily and finally heated and is introduced to the fuel in this state. The air-exits are arranged to introduce the proper proportion of air to the body of the fuel at different levels, and the larger streams of air introduced at the top mixes and augments the gases to create a high grade of combustion.

A further object of the invention is to provide a specially-constructed air-duct to cooperate with the air-heating chambers referred to, that the gases liberated by the jets and streams of air may be freely mixed with a free supply of heated air at the time and point the products of combustion have a tendency to be formed into smoke-gas, and to meet this emergency I have found it expedient to construct an air-duct with an open bottom with depending lugs adjacent the same to prevent the fuel packing, as well as to provide a greater heating-space at the center than at the end for the ready mixing and proper distribution of the air with the gases below.

In the drawings, Figure 1 is a vertical section of a stove constructed in accordance with my invention. Fig. 2 is a plan view of the same, the stove-top being removed. Fig. 3 is a section showing a slight modification. Fig. 4 is a similar view of a further modification. Fig. 5 is a transverse section on the line 5 5, Fig. 1. Fig. 6 is a detail perspective view of the partition in which the secondary air-heating chambers are formed. Fig. 7 is a detail perspective view of the form of partition shown in Fig. 3. Fig. 8 is a detail perspective view of my improved air-duct. Fig. 9 is a section of a modification.

The numeral 1 represents a stove of the downdraft type; 2, the grate; 3, the front wall; 4, the top, and 5 the air-duct.

6 indicates a partition located in the front and forming a part of the fuel-chamber 7. The partition 6 is provided on its front or inside with a series of ribs 9, forming individual and secondary air-heating chambers 10. The partition is further provided within these chambers with a plurality of tapering air-exits 11, located at different levels, and is cut away at its upper edge to form a top exit 12.

An intermediate partition 13 depends from the stove-top 4 to within a short distance of the bottom 14, forming an opening 15, and it rests against the front faces of the ribs 9. A shield 16 is located at the upper end of the partition 6 to deflect and diffuse the heated air passing through the exits 12 toward the center of the fuel. This shield may be composed of one or a series of sections, as found most convenient.

The top 4 is turned down at its front edge to provide a deflector 17, and in the front wall 3, immediately below this deflector, are a series of inlet-openings 18, controlled by a damper 19, while near the bottom of the said wall is an opening 20 with a door for cleaning the air-heating chambers.

The operation of the invention as thus far described is substantially as follows: Air is deflected by the deflector 17 to the openings 18 and into the preliminary air-heating chamber, from whence it passes through the opening 15 to the secondary air-heating chambers 10. The preliminary air-heater is common to all the secondary chambers, which is of the utmost importance, as it subdivides the air into smaller volumes, whereby the temperature is quickly raised, and at the same time enables me to introduce to the fuel heated air-currents of varying temperatures. This is true in view of the fact that the fire, as a rule, is not of the same incandescence throughout. Hence the air in the chambers will be heated according to the condition of the fuel adjacent it. The air from the secondary air-heating chambers is delivered to the fuel through the exits 11 and 12. Hence the body of the

fuel is supplied with heated jets of air at different levels of varying temperatures, while a series of streams of heated air are deflected approximately toward the center of the top of the fuel. The jets of air delivered to the body of the fuel liberate and assist in igniting the gases, and as the latter naturally ascend the streams of heated air from the exits 12 meet, mix, and drive the gases back into the incandescent mass of fuel, where ignition takes place.

The air-duct I have designed to coact with the air-heaters above described consists of a pair of plates 25, preferably of fire-brick, each of which is horizontally and oppositely curved and provided on their lower sides with a series of depending projections 26, forming between each other a series of openings 27 for the passage of the products of combustion. This construction when the two plates are positioned forms, with the stove structure, an air-duct open at its bottom and wider at its center than at its ends. The rear plate is provided with a series of perforations 28 for the exit of air to the escape-flue 29.

The air-duct may be supplied with heated air from several of the secondary air-heating chambers 10 by ducts 30, which may be also perforated, as at 31, and also through openings 32 in the top 4 or at the ends from chambers in sides of the stove controlled by dampers.

The products of combustion passing through the passage 33 to the gas-chamber or flue 29 require a large supply of heated air of the proper proportion and temperature to prevent the formation of smoke-gas, and to so arrange the parts to properly coact I found it necessary to devise the peculiar form of air-duct. It will therefore be seen that if any unconsumed gas reaches the escape-flue 29 and can be ignited by a mixture of air such mixture and consequent ignition will be the result.

In the modification shown in Fig. 3 the partition 6^a and intermediate partition 13^a are so constructed that the exit 12^a is formed without the use of a shield, and, as shown in Fig. 4, I propose introducing streams of heated air to the top of the fuel through the exit 12^b and also introduce a plurality of jets toward the top of the fuel from a supplemental chamber 35, which extends from the partition 6^b to the air-duct 5.

The modification shown in Fig. 9 involves the same principles of operation of heating air as in the other forms described, except that the air is introduced at the bottom of the preliminary air-heating chamber instead of the top and the secondary chambers deliver air below the grate. This arrangement permits me to use my invention to supply heated air to the under side of and through the body of fuel.

What I claim as new is—

1. In a downdraft-range, the combination of a fire-pot, a pendent air-duct therein which is formed with openings, a space being formed between the bottom of the fire-pot and the pendent air-duct, a single preliminary air-heating chamber arranged to receive air from the atmosphere, a plurality of secondary air-heating chambers adjacent the preliminary air-heating chamber, all of said secondary air-heating chambers communicating with the preliminary air-heating chamber and formed with exit-openings which communicate with the fire-pot, the heated air being drawn through the exit-openings to the fire-pot downwardly and under the air-duct by the draft, said air being mixed with the air entering the openings in the air-duct.

2. In a downdraft-stove the combination with a preliminary air-heating chamber, of a series of secondary air-heating chambers, the preliminary chamber being common to all the secondary chambers, an air-duct composed of oppositely-curved plates having projections at their lower ends, the air-duct being disposed to form a flue at the bottom, and a duct or ducts connecting and communicating with the secondary chambers and the air-duct, substantially as described.

3. In a downdraft-stove, the combination with a preliminary air-heating chamber, of a series of secondary air-heating chambers, the preliminary chamber being common to all the secondary chambers, exit-openings formed in the secondary chambers at different levels to introduce jets of air to the body of the fuel, an exit-opening formed near the top of each secondary chamber for introducing streams of heated air above the bed of fuel, an air-duct supported in the stove to form a flue at the bottom thereof, and a flue or flues provided with air-exits, connecting the air-duct and the secondary chambers above the air-exits near the top, substantially as described.

4. An air-duct comprising a pair of oppositely-curved plates provided on their lower edges with projections and intermediate spaces, the two plates when assembled forming a duct which is of greater area at the center than at its ends, and means for supplying heated air to the air-duct, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN R. CAHOONE.

Witnesses:
FRANK SHRAUDER,
S. S. PRIMMER.