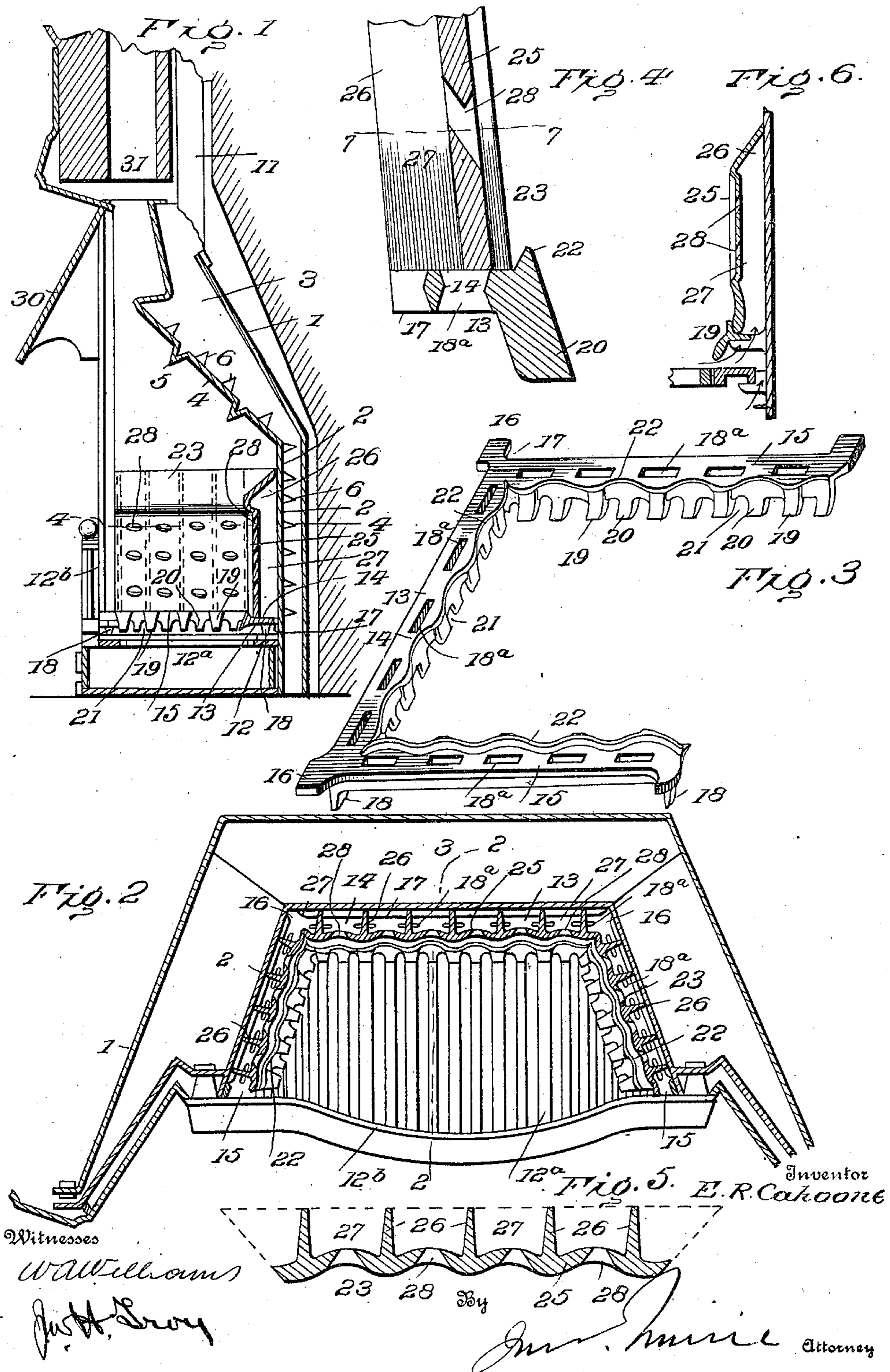


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HEATING GRATE.
APPLICATION FILED JAN. 25, 1908.

976,039.

Patented Nov. 15, 1910.



UNITED STATES PATENT OFFICE.

EDWIN R. CAHOONE, OF BEECHMONT, MASSACHUSETTS.

HEATING-GRATE.

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Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed January 25, 1908. Serial No. 412,653.

To all whom it may concern:

Be it known that I, EDWIN R. CAHOONE, a citizen of the United States, residing at Beechmont, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Heating-Grates, of which the following is a specification.

This invention relates to improvements in heating stoves, similar to an open fire grate.

The prime object of the invention is to provide a structure whereby air to assist the combustion is directed under the fire and into channels to become heated, and then directed into the body of the fuel before escaping up from it to the flue, the air in passing to the channels drawing with it a part of the gases from the fuel. The gases drawn from under the fuel ignite in the channels and thereby increase the temperature of the air which is subsequently introduced to the fuel.

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

In the drawings:—Figure 1 is a vertical section of my improved stove on the line 2—2, Fig. 2. Fig. 2 is a horizontal section on the line 4—4, Fig. 1. Fig. 3 is a detail perspective view of the lining supporting frame. Fig. 4 is an enlarged detail sectional view of a portion of the lining and its supporting frame. Fig. 5 is a detail horizontal view on the line 7—7, Fig. 4. Fig. 6 is a detail view of a slight modification.

The numeral 1, indicates an outer casing, and 2, an inner casing, spaced from the outer casing to form an air heating chamber 3. The inner casing is provided with an overhanging inclined portion 4, above the normal position of the fire pot, and on the surface of this inclined portion are two, or if desired more, ribs or deflectors 5, to gather the ascending products of combustion to cause a mixing or intermingling of the gases before escaping to the flue, and to further tend to throw the heat out into the room.

Within the casing 2, and somewhat above the bottom of the latter is a frame 12, carrying a bottom grate 12^a, and also supporting a lining supporting frame 13. Across the front of the inner casing and adjacent frame 12, is a front grate 12^b, which with the lining and bottom grate forms the fire pot. The lining supporting frame forms an

essential part of this invention, and I will now proceed to describe it in detail. The lining supporting frame comprises a rear bar 14, and two forward extending bars 15. Lugs 16 project outwardly from the bars 14 and 15, and abut against the inner casing 2, to form spaces 17, for the passage of the air. Depending from the bars at appropriate intervals are legs 18, supported by the frame 12, as clearly shown in Fig. 1. In each of the bars 14 and 15, are formed elongated vertical openings 18^a, and on the inner edges of said bars are two sets of downwardly extending fingers 19 and 20, between which are notches 21. The fingers 19, are more prominent than the fingers 20, and are formed on the projecting portions of the corrugated surfaces of the bars 14 and 15, and extend from the top of said bars. The other or less prominent fingers 20, are located intermediate the fingers 19, and are in the depressions of the corrugated surface of said bars. The inner edges of the bars 14, and 15, are extended upwardly to form a flange 22, to hold the lining sections against displacement, as shown clearly in Fig. 4.

Supported on the frame 13, is the lining 23, which in the instance shown in the drawings is formed of one rear section and two side sections. However, it will be obvious that a greater or less number of sections may be provided if found convenient or necessary.

Each lining section consists of a corrugated body portion 25, forming a series of projections and depressions, for the passage of the air up and around the body of the fuel, and extending outwardly from each section toward the inner casing 2, and bearing against the latter are vertical flanges 26, which when the lining is put in position form a series of channels 27. The upper ends of the sections incline away from the corrugated surface toward the walls of the inner casing as clearly shown in Fig. 1.

The depressions of the corrugated surface of the body portion are arranged between the vertical flanges 26, and in these depressions are openings 28. Each opening inclines downwardly as shown in Fig. 4, and also flares outwardly on the sides toward the front of the stove as shown in Fig. 5. This particular detail of construction prevents the fuel passing through the openings and falling into the channels 27, and at the same

time affords a means whereby the air is spread out against the walls of the fuel to liberate the gases.

At the front and top of the stove is a canopy 30, to deflect the products of combustion to the exit flue 31.

It will be noted that the lining supporting frame 13, is spaced from the grate supporting frame 12, whereby the products of combustion from the bottom of the fuel will be drawn by the air through the space and into the channels 27, and heat the walls of the latter. The air in the channels will therefore be highly heated previous to being introduced to the fuel through the openings 28.

In operation, a fire is started in the fire pot in the usual manner, and the products of combustion in rising contact with the inclined portion 4, of the inner casing 2, thence pass upwardly through the exit flue 31. The air enters the ash pit, and by reason of the compact nature of the fuel finds its way upwardly not only through the fuel but through the openings 18^a, into the channels 27, through the openings 28, to the walls of the fuel. By the formation of the openings 28, the air is delivered to the fuel in downwardly directed streams, which tend to drive the liberated gases into the fuel, and causes a mixture of the air and gases, which promotes combustion. Usually the fuel does not cover the upper row of openings 28, consequently, the gases rising from the top of the fuel are further mixed with air, which adds greatly to increase the combustion.

As the air is drawn through the various channels 27, the gases at the bottom of the fuel are drawn through the notches 21. The gas drawn into the channels is mixed with the air, and as the temperature surrounding the lining is very high, the gases will become ignited. The ignition of the gases in the channels, as previously stated, performs a dual function, to wit:—heats the air which is delivered to the fuel above the lining supporting frame, and also heats the inner casing adjacent the lining. The corrugated inner face of the frame, and the two sets of fingers serve as a means toward forming a series of small spaces between the particles of fuel, whereby the air can more readily attack the gases and mix with the same.

It will be noted by reference to Fig. 2 that the vertical flanges 26, are disposed approximately midway the length of the elongated slots 18^a, so that the air in passing through the slots contacts directly with both sides of the flanges, and as the latter are heated by the fire in the fire pot contacting with the lining, said air immediately it enters the

channels is subjected to increased temperature.

What I claim is:

1. In a stove, the combination with a casing, a grate, a perforated lining spaced from the casing and the grate and provided with flanges which abut against said casing to form a series of channels and a member forming the bottom of the channels, said member having a series of openings for the admission of air to the channels, the channel flanges straddling the openings in the member.

2. In a stove, the combination with a casing, a grate, a frame supported above the grate, said frame having a series of depending spaced fingers and a series of perforations, a perforated lining supported on the frame and spaced from the casing and formed with flanges to provide a series of channels, said flanges straddling the openings in the frame to divide the air passing there-through, means for supplying air to the bottom of the grate, a part of the air passing directly to the bottom of the fuel and part passing through the spaces between the fingers to the channels, and an exit flue located above the plane of the casing.

3. In a stove, the combination with a casing, a grate, a perforated frame supported above the grate and provided with outwardly projecting lugs which abut against the casing to form openings, said frame also having a perforated lining supported thereon, said lining having flanges which straddle the openings in the frame and abut against the casing to form a series of channels, and a flue to draw the air from below the grate and through the channels and the perforations in the lining to the fuel.

4. In a stove, the combination with a casing, a grate, a perforated corrugated lining supported above the grate and having flanges which abut against the casing to form a series of channels, the perforations in the lining being tapered toward the casing and inclining downwardly, a frame for supporting said lining provided with a series of fingers at the bottom of the lining, and a flange extending from the fingers and formed with cut away portions to provide openings for the admission of air to the channels, means for introducing air below the grate, and a flue for drawing the air through the perforated lining to the fuel.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN R. CAHOONE.

Witnesses:

W. N. WOODSON,
JNO. IMIRIE.