

May 16, 1950

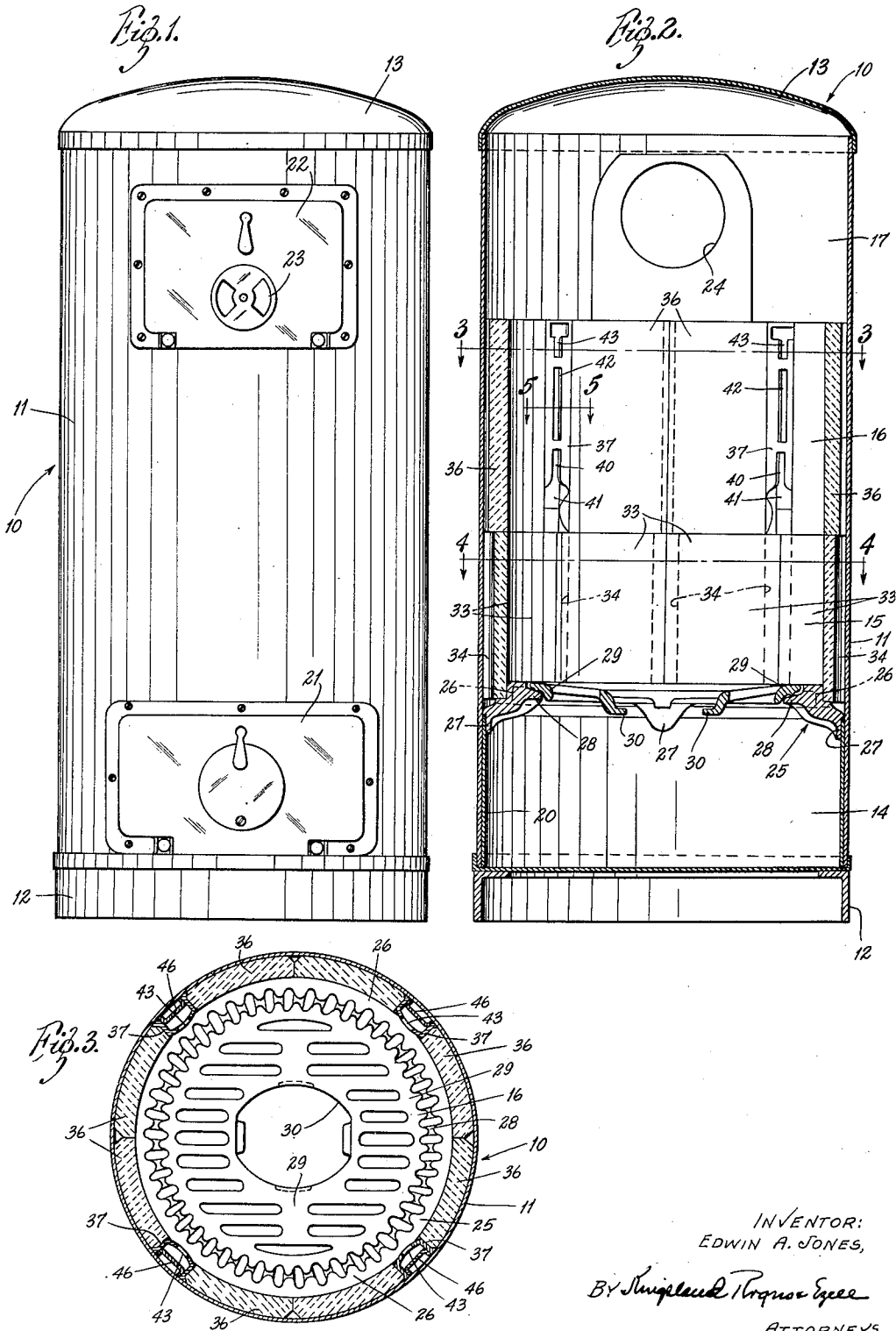
E. A. JONES

2,508,028

MAGAZINE HEATING STOVE

Filed Dec. 4, 1943

2 Sheets-Sheet 1



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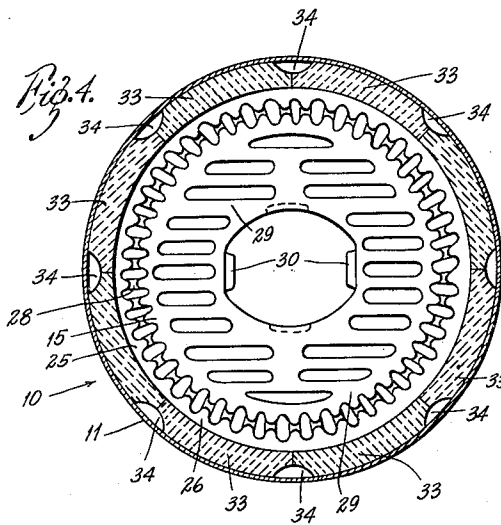
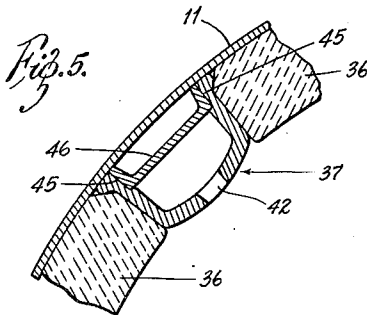
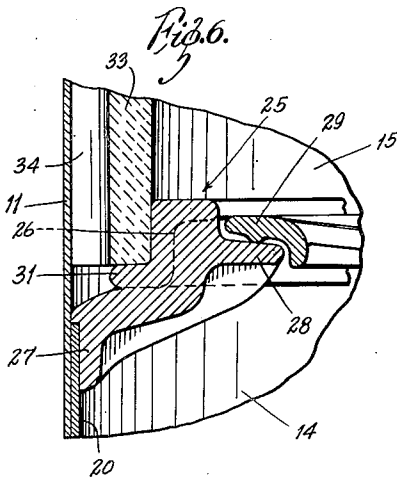
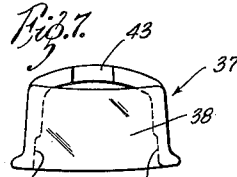
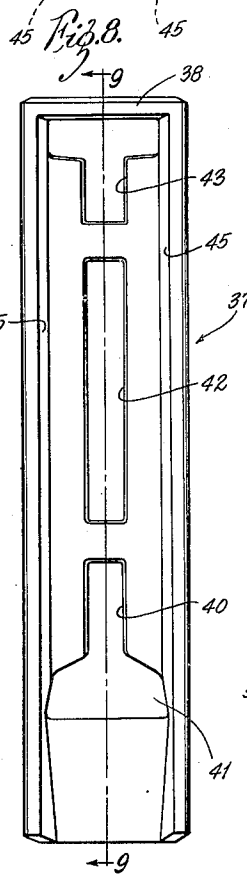
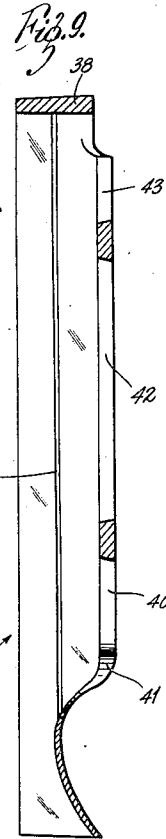
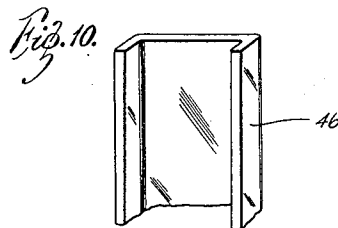
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2,508,028

MAGAZINE HEATING STOVE

Filed Dec. 4, 1943

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,508,028

MAGAZINE HEATING STOVE

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Application December 4, 1943, Serial No. 512,903

3 Claims. (Cl. 126-73)

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The present invention relates to a heater construction, for space heaters, ranges, furnaces, and the like.

More particularly, the invention involves a space heater of the deep fuel box type wherein raw fuel is introduced at the top and the burning of the fuel itself takes place principally at the bottom, but with combustion gases, the mixture of which is determined by controlled air flow upwardly, takes place from the bottom to the top of the heater.

It is an object of the invention to provide a heater of this kind which attains a higher efficiency than that obtained in similar heaters heretofore made.

A particular object is to provide a heater having a fuel box comprising an upper and a lower section, at the lower of which the fuel burns by direct up-draft of air therethrough from the bottom to the top of said lower section, and with lateral outlet passages from the upper section communicating with secondary air introduced only at said upper sections.

A further object is to provide particularly desirable construction elements to attain the foregoing objectives and to provide means to conduct fresh secondary air to the top of the fuel box.

In the drawings:

Fig. 1 is a front elevation of the heater;

Fig. 2 is a vertical diametrical section through the heater showing the back half thereof;

Fig. 3 is a horizontal section on the line 3-3 at the upper middle of Fig. 2;

Fig. 4 is a horizontal section on the line 4-4 at the lower middle of Fig. 2;

Fig. 5 is a transverse section through the air and gas conductors taken on the line 5-5 just above the middle of Fig. 2;

Fig. 6 is an enlarged view of the grate supporting means and tile supporting means;

Fig. 7 is a top view of one of the combustion gas channel members;

Fig. 8 is an outside elevation of one of the gas channels taken from the bottom of Fig. 7;

Fig. 9 is a vertical section through the gas channel taken on the line 9-9 of Fig. 8; and,

Fig. 10 is a fragmentary view of one of the air channels.

The heater is generally indicated at 10. It includes an outer shell 11, preferably of cylindrical shape, supported on a suitable base 12, and having a cover 13 enclosing the top thereof.

The inside of the casing 11 is generally divided into four sections. There is an ash compartment 14, a fuel combustion section 15, a fuel

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and gas discharge section 16, and an upper dome section 17. The sections 15 and 16 comprise the fuel box.

The ash section has a lining 20. It is also provided with a draft control and a clean-out door 21. The dome section 17 is provided with a fuel door 22 with a draft control 23. A chimney 24 also leads from the dome section 17.

A combination tile (or fire brick liner) and grate support 25 has a principal portion 26 of S-shaped cross section, and of annular shape to fit within the heater. At spaced points around the portion 26 are combination foot-like supports 27 and grate prongs 28. The foot supports 27 are ledged to engage over the lining 20. They thereby support the rings 26 and the grate prongs 28. The prongs 28 support a grate member 29 of familiar construction having a center portion 30 to receive a clean-out inner grate (not shown). Suitable means for agitating the grate 29 may be employed as desired.

The lower ledge 31 of the ring parts 26 is designed to support the tiles or fire brick liners of the fire box. Those for the lower section 15 comprise an annular series of tiles 33 interfitted, as shown in Fig. 4, and with complementary cut-out portions at the outer corners thereof, providing air passages 34 open at the bottom and at the top. The air passages 34 are not obstructed by the feet 27, because the latter are spaced from the bottom of the passages and are few in number spaced around the ring 26.

Mounted on the top of the tiles 33 are tiles 36 forming an upper course of tiles for the upper section 16 of the fuel box. These tiles, as shown in Fig. 3, are interfitted to provide an annular shape to the section 16, and to fit within the outer casing 11. At certain junctions of the tiles 36 there are cutaway portions in facing edges of adjacent tiles, that are shaped to receive gas channel members 37. These are shown in greater detail in Figs. 7-9. As Fig. 5 shows, these channels are generally of channel shape with an open bottom and a partially closed top 38. The bight portion of these channel sections is provided with three openings. The bottom opening 40 is widely cut away at 41 in its lower portion to permit ready cleaning out of ashes or fuel that might fall into the channels. These enlarged openings 41 also, as will appear, give large ports for the passage of gases from the fuel bed.

Above the passage 40, there is an elongated passage 42 extending almost to the top of the channel members. Above the passage 42 is a T-shaped

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opening 43 immediately beneath the top part 38. This is an egress opening for the gases.

The channel members are provided with indentations 45 adjacent the outer edges thereof. These indentations receive and seat air channels 46, introduced thereinto as appears in Fig. 5. The channels 46 are of a length to terminate at approximately the lower edge of the cross opening part of the T-shaped passage 43 within the gas channels 37. The air channels 46 otherwise extend downwardly to the bottom of the tiles 36 where they register with the passages 34 in the lower set of tiles 33. Their lateral extent is somewhat greater than that of the passages 34, so that they do not slip down into the latter.

Operation

With the removable portion of the grate in place, coal is filled in through the opening 22 up to the top of the fuel box. It will fill the lower section 15 of the fuel box and also the upper section 16.

The total depth of both sections 15 and 16 is preferably somewhat greater than the inside diameter of the fuel box, and the lower section 15 is not as high as the upper section 16. The upper section may be desirably about twenty-five per cent higher than the lower section, measured in terms of height of the tiles.

The fire is started in the bottom of the lower section 15. Air passes up through the grates to maintain the combustion. The heated gases in a state of incomplete combustion pass up through the coal bed and find a ready outlet through the several ports 40 and 41 in the gas channels 37. These channels, as distinguished from the air channels 46, receive normally no secondary air. Secondary air, however, does pass up through the channels 46 from the ports 34 within the lower tiles, to mix with the combustion gases at the point of the ports 43, and then is discharged over the top of the fuel bed where substantially complete combustion occurs. There may be burning within the channels 37, but the final mixture of secondary air, occurring at the top of the channels, provides the principal means for complete combustion of the gases.

In the foregoing operation, it will be seen that air is not mixed with the fuel in the lower section 15, beyond that coming up through the grate. Consequently, there is no point for escape of the combustion gases within the lower section other than by discharge into the upper section. This localizes the points of combustion and concentrates the heat therefrom in a way to attain greater efficiency. The combustion is quite extensive within the dome space 17. Of course, the ultimate discharge takes place into the chimney 24.

The draft control may be made at the door 21, which has shown on it a separate draft gate. Similarly, an over-fire draft control is provided by the gate 23. Ashes may be removed through the door 21, and a conventional shaker mechanism may be used.

Some of the heat from the lower section 15 will pass directly upward through the fuel in the upper section 16, causing this fuel to coke. The gases thus flowing will be oxidized in the dome 17, by the air supplied from the air channels. The drawing off of gases in the lower parts of the upper section 16 prevents smothering of the fire, by packing of the fuel, or fusing thereof as coking occurs. The restriction of this withdrawal to the upper section provides a definite

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section of the fuel bed in which the fuel is burning from the bottom up.

The disposition of the air passages is such as to give pre-heated air at the points of discharge. It also causes a draft pressure on this air.

The legs 27 are relatively few in number. They are necessarily in conductive relation with the fire bed, and the grate, but as they do not contact the casing all around it, the transmission of excessive heat at this elevation, to the casing, is eliminated. Where the legs are disposed across below the passages 34, the updraft of air thereinto will withdraw some heat from the legs, and will provide additional pre-heat to the air. The tile supporting ring is out of direct contact with the casing.

What is claimed is:

1. In a heating device, a fuel box including a casing, a tile lining around the inside surface thereof, channel members interposed into the said tile lining, said channel members including first channel devices, each having its bight portion inwardly of said lining, and openings through said bight portion opening into the fuel box, a second channel device fitted within the first to separate an inner passage from an outer passage, the inner passage registering with said openings, the outer channel devices opening into the said passages adjacent the top thereof but otherwise out of communication therewith, and means to introduce secondary air into the said outer passages.

2. In a heating device, a fuel box including a casing, a refractory lining around the inside surface of the casing and fitting thereagainst, vertical channel members each having a bight portion and legs interposed into the lining at spaced points, said channel members having the bight portions inwardly of the casing and spaced therefrom by the channel legs, means dividing each channel member into an outer passage and an inner passage, said inner passages being in communication with the space defined by said lining and adapted to receive gases therefrom, said outer passages being in communication with said respective inner passages only at the top points of said passages, and means to introduce secondary air into the said outer passages.

3. In a heating device, a casing, a refractory lining disposed against the casing, means supporting said lining, said lining including a lower course of refractory members and an upper course of refractory members, channel members interposed in the upper course of refractory members with the bight thereof inwardly disposed, a second channel member disposed in each of said first channel members, the bight of each second channel member inwardly of the casing, said second channel members separating said first channel members into inner and outer passages, openings in the bights of the first channel members communicating the inner passages with the space defined by the lining, said inner passages being closed at the bottom by the lower course of refractory members, said outer passages communicating through the passages provided in said lower course of refractory members with the space below the lining to receive secondary air, said inner and outer passages formed in each of said channel members communicating only at the top, whereby secondary air is supplied to gases of combustion only at the top of the lining.

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(References on following page)

5

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
183,955	McVean et al. -----	Oct. 31, 1876
786,062	Smith -----	Mar. 28, 1905
934,887	Cole -----	Sept. 21, 1909

5

Number
1,026,152
1,707,731
2,302,929
2,350,597
2,365,675
2,367,094
2,391,144

6

Name	Date
Dee -----	May 14, 1912
Kerch -----	Apr. 2, 1929
Allen -----	Nov. 24, 1942
Esson -----	June 6, 1944
Blumstengel -----	Dec. 26, 1944
Blumstengel -----	Jan. 9, 1945
Esson -----	Dec. 18, 1945