May 16, 1944. L. E. SEELEY 2,348,933

STOVE

Filed March 7, 1940 3 Sheets-Sheet 1

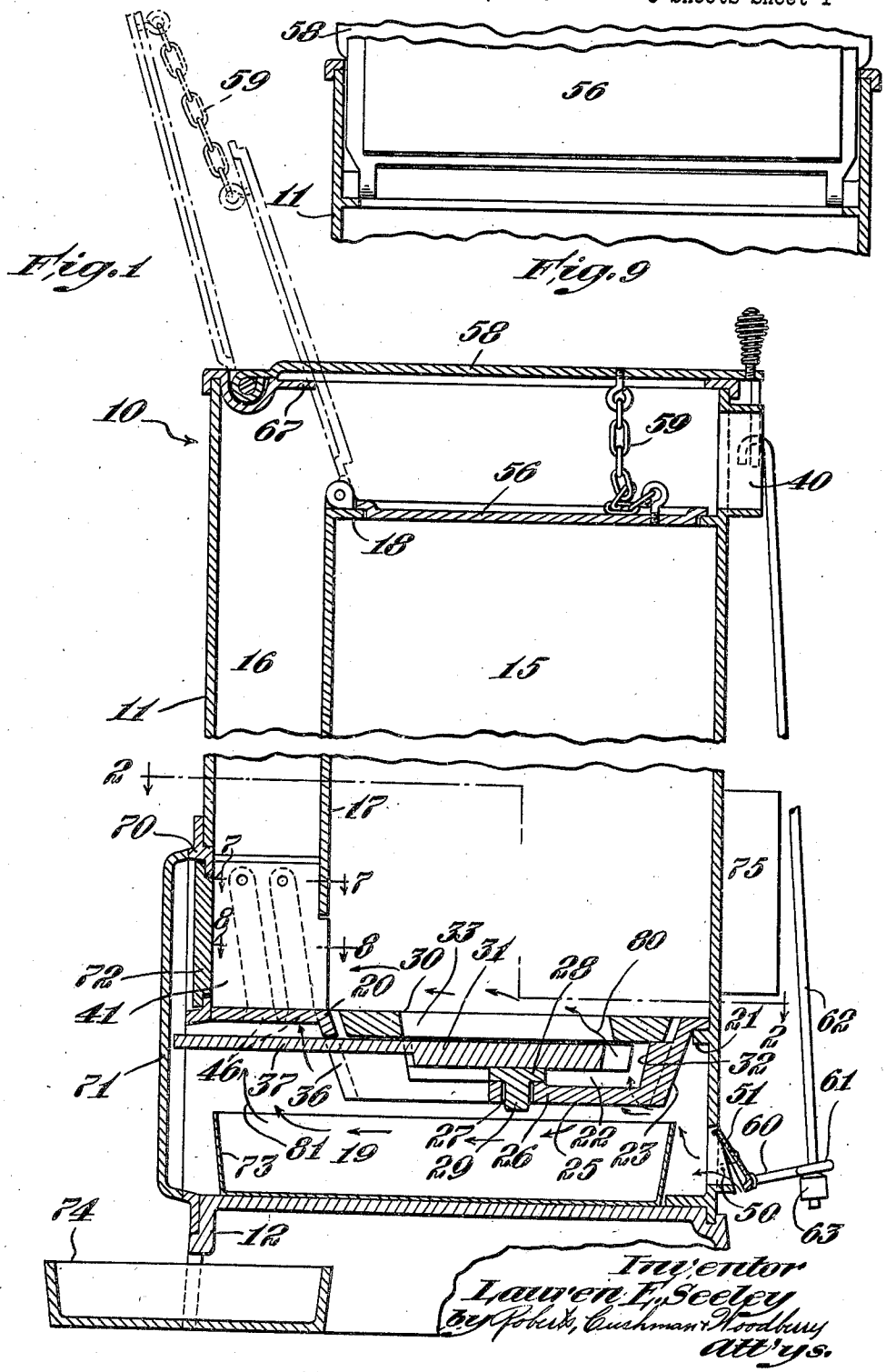


Fig. 1

Fig. 9

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STOVE

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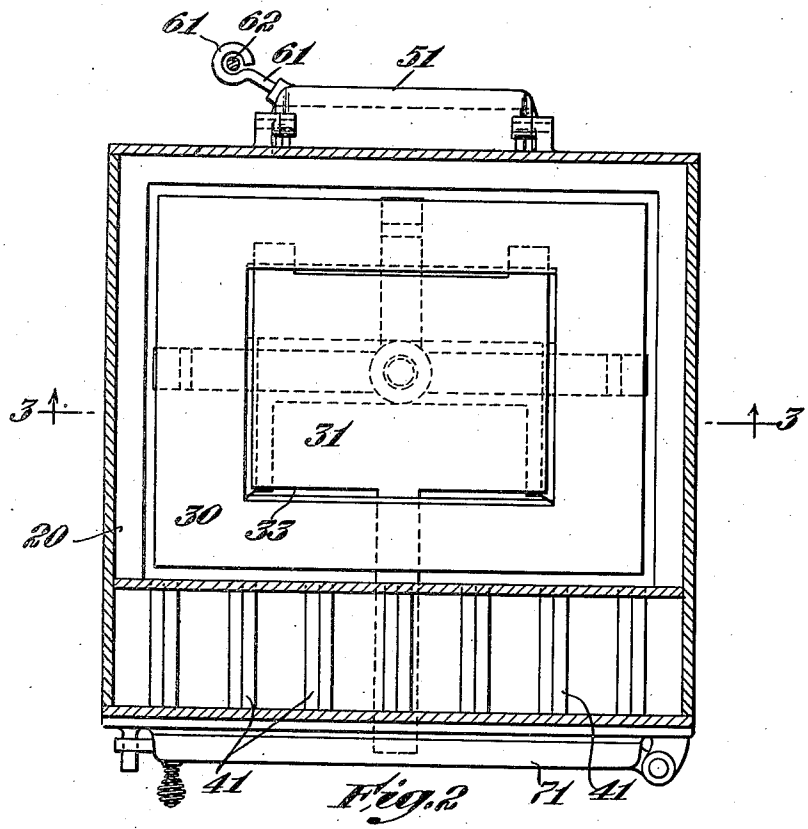


Fig. 2

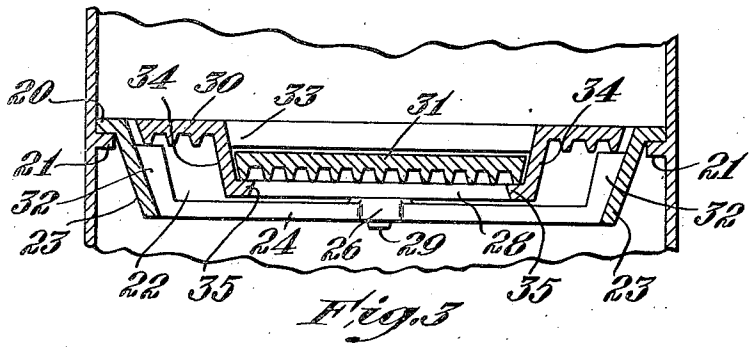


Fig. 3

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STOVE

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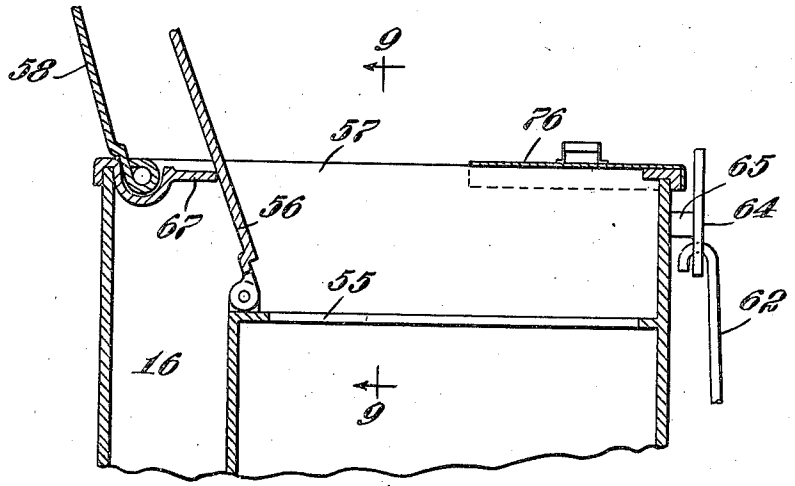


Fig. 4

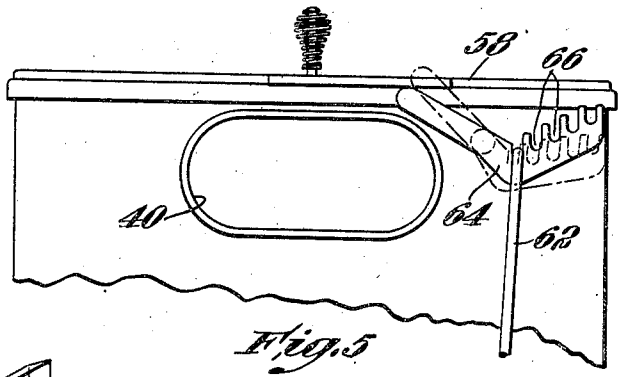


Fig. 5

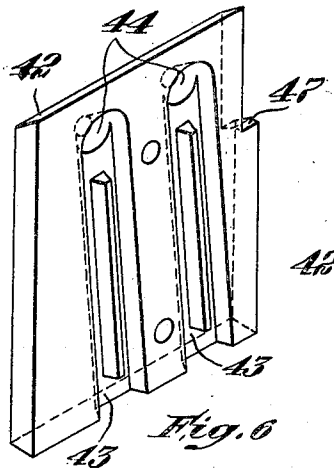


Fig. 6

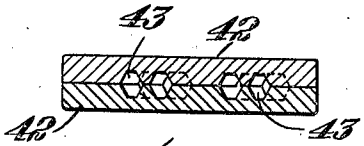


Fig. 8

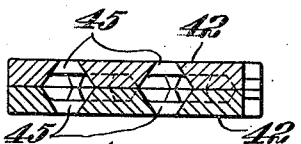


Fig. 7

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UNITED STATES PATENT OFFICE

2,348,933

STOVE

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Application March 7, 1940, Serial No. 322,655

2 Claims. (Cl. 126—73)

This invention relates to an improvement in stoves, more particularly stoves of the magazine type for the combustion of solid fuel, and has as its primary object the provision of a magazine type of stove wherein air is supplied in two streams, one stream facilitating combustion and distillation of the solid fuel and directing the flow of gases resulting therefrom to the outlet stack, and the other stream for completing the burning of said gases.

Further objects of this invention reside in the provision of means whereby the damper controlling the draft is automatically closed upon the opening of the lid to the fuel magazine, in the mounting of the lid to the fuel magazine so that when such lid is fully open the only path for smoke and gases is through the magazine, and in other features of construction and operation which will be hereinafter described.

An embodiment of this invention in a wood burning stove has been selected for the purpose of describing the invention, it being understood that the invention is not limited thereto but may be employed for the burning of other fuels.

In the accompanying drawings in which the selected embodiment of this invention is illustrated,

Fig. 1 is a longitudinal sectional view of a wood burning stove embodying this invention;

Fig. 2 is a plan view of the hearth and associated elements taken along the line 2—2 in Fig. 1;

Fig. 3 is a cross-sectional view of the hearth taken along the line 3—3 in Fig. 2;

Fig. 4 is a view similar to Fig. 1 illustrating the upper part of the stove with the lids of the housing and fuel magazine both open;

Fig. 5 is a rear view of the upper portion of the stove;

Fig. 6 is a perspective view of one of the elements forming the partitions of the mixing chamber.

Figs. 7 and 8 are enlarged cross-sectional views of a partition of the mixing chamber taken along the lines 7—7 and 8—8, respectviely, in Fig. 1; and

Fig. 9 is a sectional view taken along the line 9—9 in Fig. 4 with parts broken away.

The stove 10 comprises a housing 11 mounted upon a base 12. The housing 11 includes a compartment 15 comprising a fuel magazine and a combustion chamber, a compartment 16 which extends in front of and over the first compartment being separated therefrom by a vertical wall 17 and a horizontal wall 18, and an ash pit 19 below the compartments and separated therefrom by a plate 20. The wall 17 may be a solid wall as shown in the drawings, or a double wall providing a compartment having openings in the sides, at top and bottom through which water or air may be circulated to keep the partition cool and serve, if desired, as a supply for hot water. The plate 20 rests upon ears 21 carried by and here shown as integral with the walls of the housing 11.

The portion of the plate 20 below the fuel box 15 and which forms the hearth has a rectangular recess 22 therein in which recess the grate structure of the combustion chamber is contained. The walls 23 of the recess are inwardly inclined and connected at the bottom by a frame integral therewith and comprising a cross-strap 24 between the side walls and a strap 25 extending from the bottom of the rear wall to the center of the strap 24. A boss 26 at the joinder of the straps 24 and 25 has a central opening 27 therein. The frame and its elements are here shown as integral parts integral with plate 20 but may, if desired, be separate parts suitably joined. Supported by the frame above the strap 24 is a crossbar 28 held in position by a pin 29 depending therefrom and received in the opening 27.

The grate structure in the recess comprises a stationary grate 30 and a movable grate 31. The stationary grate 30 rests upon suitably formed lands 32 on the side and rear walls and has a rectangular opening 33 at the center. Inclined side walls 34 project downwardly into the recess 22 and terminate in horizontal flanges 35 between which the bar 28 extends.

The movable grate 31 substantially closes the opening 33 and rests upon the bar 28 and flanges 35. As shown in Fig. 1, the grate 31 is reciprocable in the recess 22 below the opening 33. In the front wall of the recess 22 is formed a slot 36 through which extends an arm 37 of the grate 31, said arm being accessible at the front of the stove for reciprocating the grate 31.

The compartment 16 which is right angular in form leads at the rear of the stove to a pipe connection 40 through which the gases and smoke pass to the stack (not shown). At the base of the compartment 16 are mounted on the plate 20 a plurality of partitions 41. Each partition comprises two plates 42. In the inner face of each plate 42 (see Fig. 6) are formed channels 43 leading from the bottom edge of the plate to a pocket 44 near the upper edge thereof. A converging opening 45 leads from the pocket

44 to the outer face of the plate. The channels 43 and pockets 44 are so positioned in the plates that, when the inner faces abut to form the partition, the channels and pockets register as shown in Figs. 7 and 8. Openings 46 through the plate 20 connect the channels 43 with the pit 19. The vertical wall 17 terminates short of the plate 20 and the partitions 41 are provided with extensions 47 which extend below the lower edge of the wall. Thus, the spaces between the partitions are directly open to the combustion chamber so that the vapors and gases of combustion enter freely and mix with the air supplied to such spaces by the openings 45, such air having been previously heated as set forth below. This portion of the compartment 16 will accordingly be hereinafter referred to as the mixing chamber.

The stove is substantially air-tight and air is supplied through an opening 50 in the wall of the housing into the ash pit 19, such opening 50 being covered or uncovered by a damper plate 51 pivotally mounted upon the housing. In the horizontal wall 18 is an opening 55 normally closed by the lid 56. The housing 11 has an opening 57 over the opening 55 and normally closed by the lid 58. The lids 56 and 58 are hingedly mounted at the forward ends and a chain 59 connects the lids near the rear ends thereof so that they are opened simultaneously.

It is desirable that the damper plate 51 be closed when these lids are opened and the following construction is one which has been found to be a satisfactory way of attaining this result. Projecting from the lower edge of the damper plate 51 is a post 60 (see Figs. 1 and 2) having a loop 61 at its outer end. A rod 62 extends through the loop 61 and carries a head 63 which normally bears against the lower face of the loop 61. A bar 64 is pivotally mounted intermediate its ends upon a stud 65 near the upper edge of the housing wall. The bar 64 is angular in form and one leg is provided with a series of notches 66 which receive the hooked upper end of the rod 62. The other leg of the bar is below the rearward edge of the lid 58 so that when the lid is closed the bar 64 takes the full line position shown in Fig. 5, and when the lid is open it takes the dotted line position there shown. These movements of the bar 64 lower and raise the rod 62 and cause the damper plate 51 to cover or uncover the opening 50.

The lid 56 when completely open, as shown in Fig. 4, rests against the flange 67 of the housing and is preferably of such width that it extends substantially from one side wall to the other of the housing and thus practically closes the compartment 16 (see Fig. 9).

A suitably formed door frame 70 supports a door 71 and closure plate 72. The plate 72 normally closes the mixing chamber. The door 71 affords access to the plate and also to the pit 19 so that the ash pan 73 may be removed therethrough, and to the arm 37 so that the grate 31 can be reciprocated. A water pan 74 below the ash pit serves not only to supply humidity to the room, but also to catch any ashes that might fall when the ash pan 73 is removed. At the rear wall of the housing 11 is mounted a water tank 75 which may be of any desired construction so that the water in the tank which is heated by the stove may be drawn off. A removable cover or shield 76 may also be provided to cover the rear portion of the opening 57 when the lids 56 and 58 are raised.

When using the stove 10, in kindling a new fire, the lids 56 and 58 are raised to the position indicated in dotted lines in Fig. 1. Paper and kindling are placed on the hearth in the combustion chamber of compartment 15. The magazine chamber of that compartment is filled with wood or other solid fuel. The lids 56 and 58 are closed, and the damper plate 51 is opened to the desired amount by engaging the hooked end of the rod 62 with the proper notch 66. The door 71 is opened and the grate 31 pulled out slightly. Paper is then placed in the ash pan 73 and lighted. When the lighted paper in the pan 73 has ignited the paper and kindling on the hearth, the grate 31 is pushed back into place and the door 71 is closed. When the fire is burning freely, the opening of the damper plate 51 is adjusted as necessary by shifting the hooked end of rod 62 along the bar 64.

The combustion gases pass into the mixing chamber where they mix with the air supplied directly thereto through the opening 45 and are completely consumed. The heat of the fire on the hearth distills gases from the wood which are carried with the combustion gases into the mixing chamber, mixed with the heated air supplied thereto and burned completely. The wood, as the gases are distilled therefrom, is converted into charcoal which is consumed on the hearth. As the wood nearest the fire is burned, the remaining wood descends in the magazine so that the fire is at all times well supplied with fuel.

The air passing to the mixing chamber through the channels 43 and pockets 44 of the partitions, which are in the path of the combustion gases, is, of course, heated so that it mixes with the gases and definitely facilitates their complete consumption. The consumed gases rise from the mixing chamber through the compartment 16 to the stack connection 40 and thence to the stack. Practically all the heat generated by the fire is delivered through the walls of the housing, most of it being delivered from the lower part of the stove as is of course most desirable.

The air admitted through the opening 50 separates to two streams. The stream indicated by the arrows 80 acts to promote the initial combustion on the hearth and also to direct the resulting gases to the mixing chamber. The stream indicated by the arrows 81 is heated as it passes through the channels 43, pockets 44 and openings 45 of the partitions 41, mixes with the combustion gases and the gases of distillation in the mixing chamber and insures the complete combustion thereof. The rate of fuel burning is controlled solely by this air supply.

When the magazine is to be refilled, the lids 56 and 58 are opened wide. As soon as the lid 58 is raised the damper plate 51 closes the opening 50 and cuts off the entry of air therethrough. The lid 56 when fully open so closes the compartment 16 (see Fig. 9) that any smoke and gases given off during refueling will rise through the magazine chamber. As soon as the lids 56 and 58 are opened, the cover or shield 76 is placed over the rear portion of the opening 57 and makes a hood that enables the chimney draft to pull any such smoke or gases from the open magazine. After the magazine has been filled, the cover or shield 76 is moved and the lids 56 and 58 are closed. The closing of the lid 58 raises the damper plate 51 so that the entry of air through the opening 50 is resumed and the stove is in normal operating condition.

While one embodiment of this invention has been shown and described, it is understood that other embodiments thereof may be made without departing from the spirit and scope of the invention as set forth in the following claims.

I claim:

1. In a stove of the fuel magazine type, in combination, means forming upwardly extending fuel and gas combustion chambers, an upwardly extending partition between said chambers and forming a common wall therefor, said partition terminating at a point spaced from the bottom of said chambers to provide a passage therebetween for gases flowing from the fuel chamber to the gas chamber, a flue, means forming a third chamber and connecting the top of said gas chamber with said flue, said third chamber extending over the top of the fuel chamber, said fuel and third chambers having openings in the top thereof, lids hinged to said fuel and third chambers for closing the openings therein, means connecting said lids whereby raising the lid on said third chamber raises the fuel chamber lid, said fuel chamber lid being pivoted adjacent the outlet of said gas chamber and the inlet of said third chamber and being of sufficient width so that when it is opened it pivots upwardly through said third chamber into engagement with the wall of said gas chamber to close the upper end of said gas chamber, means forming a grate in the bottom of said gas chamber adjacent said opening to retain the fuel in the fuel chamber but permit the flow of gases therefrom into the bottom of said gas chamber, means forming a passageway in said grate for air to flow therethrough into said gas chamber, an ashpit beneath said compartments, and draft means for supplying air to said fuel chamber and to said passageway.

2. Apparatus as described in claim 1 wherein the ashpit is provided wtih a pivoted damper which when open permits the flow of air into and through the ashpit, and means associated with said damper and with one of the lids for effecting the closing of said damper when said lids are opened.

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