

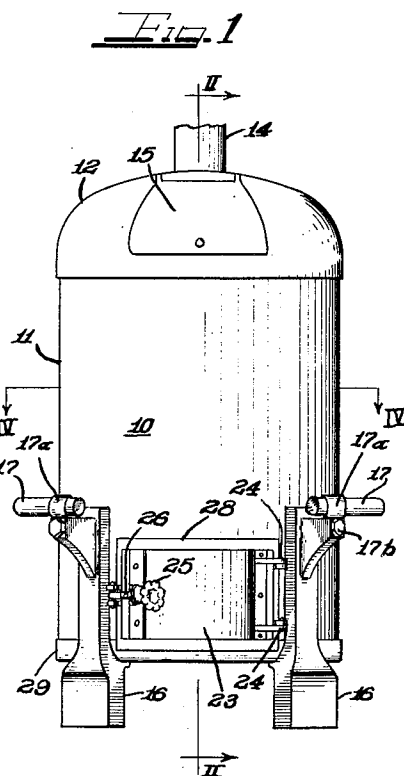
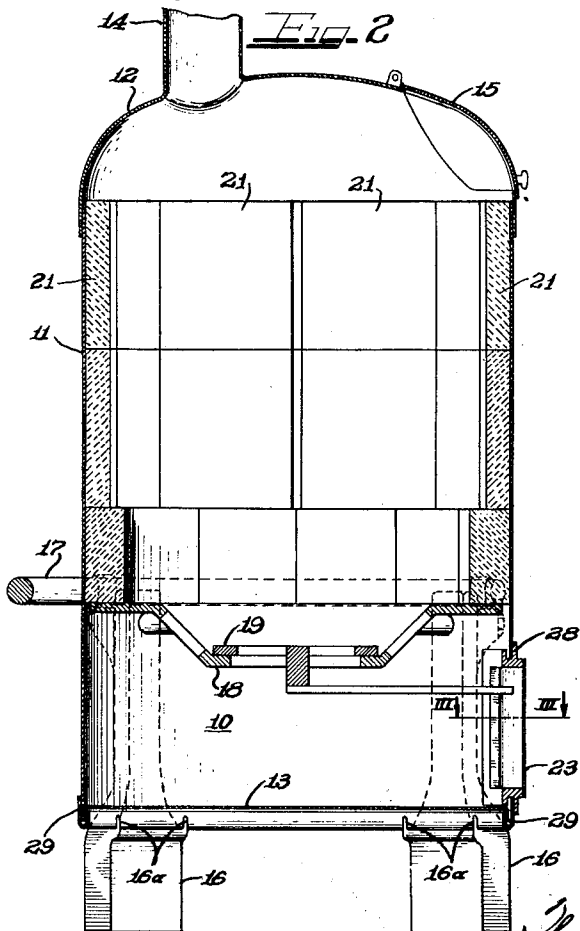
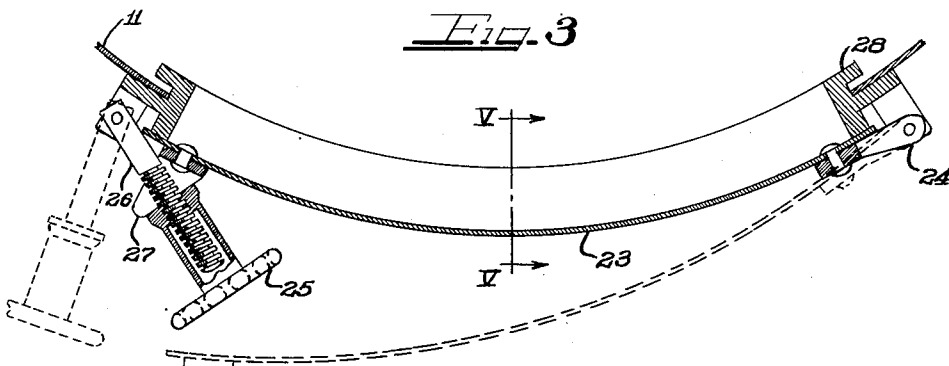
Dec. 12, 1950

S. P. LOCKE
HEATER CONSTRUCTION, INCLUDING
DOOR DRAFT AND CLOSURE MEANS

2,533,674

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4

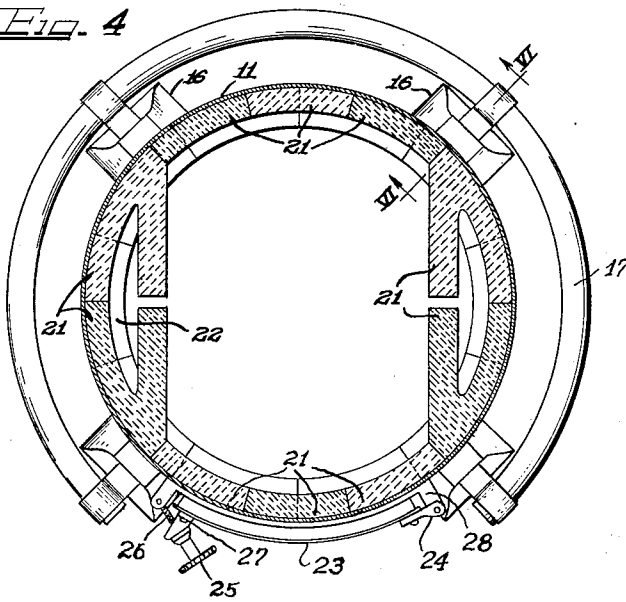


Fig. 5

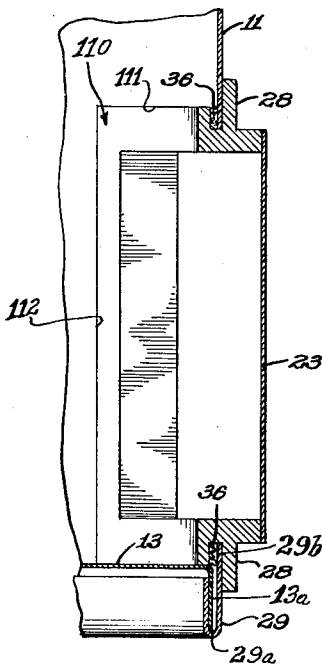


Fig. 6

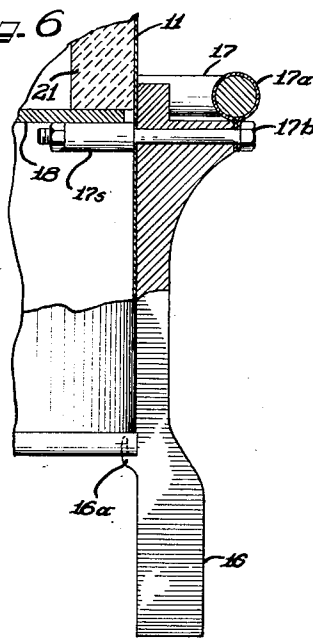
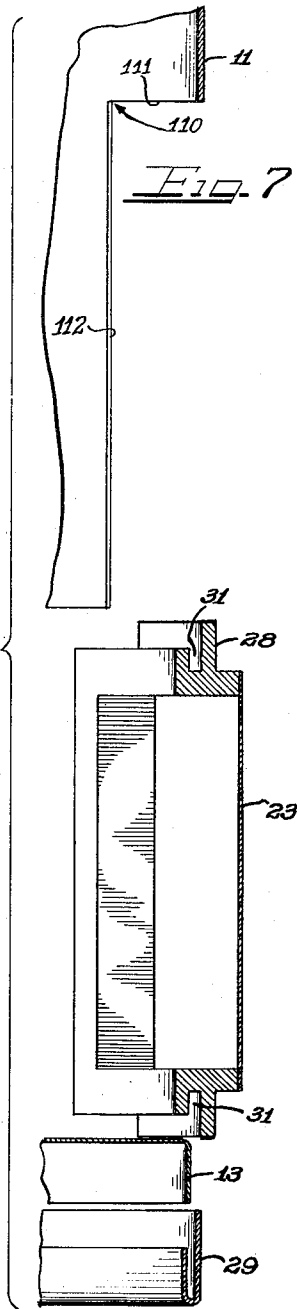


Fig. 7



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UNITED STATES PATENT OFFICE

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HEATER CONSTRUCTION, INCLUDING DOOR
DRAFT AND CLOSURE MEANS

Sam P. Locke, Mexico, Mo.

Application July 24, 1948, Serial No. 40,541

14 Claims. (Cl. 126—73)

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This invention relates to heating devices such as stoves, furnaces, boilers, and the like. More specifically, the invention relates to an inexpensive ash door for use in heating devices burning solid fuel.

According to this invention, the ash door on a stove or furnace is composed of sheet metal. Preferably, the radius of curvature of the sheet metal door is greater than the radius of curvature of the heating device or frame to which the door is attached so that the door is under stress when closed and so that it digresses from the shape of the door frame when open and in an unstressed condition. It is also preferable to have a means for adjusting the degree of closure of the ash door in order to control the draft of the heating device.

In the past, ash doors on heating devices have been composed of metal castings. It has been the practice to cast a door and a frame and to grind the two to the proper fit. This construction is both cumbersome and costly.

It is an object of this invention to provide an ash door for a heating device which is simple, effective and inexpensive.

Another object of the invention is to provide a heating device having a sheet metal ash door in which tight closure is effected by utilizing the natural spring of the sheet metal.

A further object of the invention is to provide a single draft stove or furnace in which the draft may be adjusted by controlling the degree of closure of the door.

A still further object is to provide a stove in which an ash door frame is sealed into the casing along with the stove bottom in a single operation.

Other and further objects of the invention will become apparent to those skilled in the art from the following detailed description of the annexed sheets of drawings which disclose preferred embodiments of the invention.

On the drawings:

Figure 1 is a front elevational view of a stove according to this invention;

Figure 2 is an enlarged vertical cross-sectional view taken along the line II—II of Figure 1;

Figure 3 is an enlarged fragmentary cross-sectional view through the ash pit looking down along the line III—III of Figure 2;

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Figure 4 is a horizontal cross-sectional view taken along the line IV—IV of Figure 1;

Figure 5 is a fragmentary vertical cross-sectional view taken along the line V—V of Figure 3;

Figure 6 is a fragmentary vertical cross-sectional view taken along the line VI—VI of Figure 4; and

Figure 7 is an exploded view of Figure 5 showing the make-up of the parts of Figure 5.

As shown on the drawings:

Numeral 10 designates a stove according to this invention. The stove 10 is composed of a cylindrical sheet metal body member 11 having a top or dome 12 on the top thereof with an ash opening recess 110 having an upper edge 111 and side edges 112 and a bottom plate 13 closing the bottom thereof.

The top 12 has a smoke outlet or collar 14. A fuel charging door 15 is mounted on the top 12.

Body member 11 is supported by legs 16. The legs 16 extend vertically for some distance along the body member 11 as shown particularly in Figure 1. Bolts 17B at the top of legs 16 pass through the body member 11 and through sleeves 17S (Figure 6), which support a grate ring 18. The bolts 17B also pass through straps 17A (Figures 1 and 6) which support a foot rest or rail member 17. Each of the legs 16 has two fingers 16A (Figures 2 and 6) extending upward in support of member 29 and bottom plate 13. In addition to supporting bottom plate 13, fingers 16A help to maintain bottom plate 13 in a gas-tight sealed condition. Grate ring 18 inside member 11 may be of any conventional design. Grate 19 rests on grate ring 18. Grate 19 may also be of conventional design. For the sake of simplicity and clarity, grate ring 18 and grate 19 have been omitted from Figure 4.

Member 11 may be lined with a refractory material 21. If it is desired to have a magazine-type stove, flues 22 may be provided in the refractory material. In this event the refractory lining immediately above grate ring 18 is made thicker and flue passages 22 begin several inches above grate ring 18.

Ash door 23 is provided below grate ring 18. Ash door 23 which is composed of flexible sheet metal opens on hinges 24. Ash door 23 is kept closed or is opened to the desired degree by means

of adjusting nut 25. Adjusting nut 25 turns on bolt 26 which is hinged or pivoted from body member 11 so as to pass through slot member 27 on ash door 23. Ash door 23 has a radius of curvature which is greater than the radius of curvature of member 11. Thus, when ash door 23 is closed by tightening nut 25 against slot member 27, the natural spring of the flexible sheet metal of which the ash door is constructed helps to maintain tight closure. As adjusting nut 25 is loosened, ash door 23 springs open, and thus the flexibility of sheet metal ash door 23 enables careful control of the draft to be maintained.

It is not necessary that the surface to which ash door 23 is attached be curved. If the surface is flat, it is only necessary that ash door 23 be given a slight outward curvature in order to utilize the natural springiness of the sheet metal to effect a tight closure.

Ash door 23 fits into door frame 28, which may be cast or forged. Door frame 28 may be fixed in place in the ash opening recess 110 along with bottom plate 13 in a single operation. Figures 5 and 7 illustrate specifically this method of fabrication. Bottom plate 13 is flanged as at 13a, and the flange portion 13a fits into an annular space 29a of a channel ring 29. An outer protruding portion 29b of channel ring 29 fits into furrow or groove 31 of door frame 28 (Figure 7). Groove or furrow 31 runs all the way around door frame 28 and is the means of securing it in place. When pressure is applied to the outside and inside of channel ring 29, ash door frame 28 is fixed in place and bottom plate 13 is sealed tight. Asbestos packing 36 (Figure 5) insures a tight fit. Door frame 28 helps to maintain the rigidity of the apparatus and fingers 15A on legs 16 provide additional support through their grip on channel ring 29.

In operating the apparatus illustrated in the drawings, a charge of fuel, such as coal, is shoveled through fuel door 15 onto grate 19. Ash door 23 is opened wide, and the fuel charge is ignited. As soon as the combustion is proceeding rapidly, ash door 23 is closed sufficiently for bolt 26 to be pivoted so that adjusting nut 25 impinges on slot member 27. The degree of draft is then adjusted by means of adjusting nut 25.

From the above description, it may be seen that this invention provides an inexpensive and effective ash door, and the saving in weight enables a much lighter stove to be designed.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A heater construction comprising a cylindrical casing having a recess extending upwardly from the bottom thereof, a substantially curved door frame defining a door opening and having a peripheral channel therearound receiving the marginal edge of the recess-defining portion of the casing in the top and sides thereof, a bottom for said casing having a peripheral flange, a the casing in the top and sides thereof, a bottom and having one leg thereof extending into the channel portion along the bottom of the door frame, legs at spaced intervals around said casing having recesses receiving said channel ring together with upstanding portions overlying the casing and extending to levels above the door

opening, bolts extending through the upper ends of said leg portions and into said casing, a rail supported by said legs and extending around the casing from the sides of the door frame in spaced relation outwardly from the casing, a grate ring in said casing supported by said bolts, a grate carried by said grate ring, refractory brick supported on top of said grate ring and extending to the upper portion of said casing for defining a combustion and fuel chamber above the grate, a top for said casing having a fuel-charging door and a smoke outlet, a flexible sheet metal door hinged on said door frame to control the door opening therein, said sheet metal door in its unstressed condition being substantially straightened to a shape out of conformity with the curvature of the door frame, and means for progressively and selectively stressing said sheet metal door to deform it into conformity with the curvature of the door frame for effecting control of the door opening and for regulating draft therethrough.

2. A heater construction comprising a cylindrical casing having a recess extending upwardly from the bottom thereof, a door frame in the configuration of a cylindrical segment and defining a door opening, said door frame having a peripheral channel therearound for receiving the marginal edge of the recess-defining portion of the casing in the top and sides thereof, means for fastening said door frame in said recess, a grate ring in said casing, a grate carried by said grate ring, said grate ring, grate and casing defining a combustion chamber, a top for said casing having a fuel charging door and a smoke outlet, a flexible sheet metal door hinged on said door frame to control said door opening, said flexible sheet metal door in its unstressed condition being curved on a radius of curvature substantially greater than that of the door frame, and means for progressively and selectively stressing said sheet metal door to flex it towards substantial curvate conformity with the door frame for controlling the door opening and for regulating draft therethrough.

3. A heater construction comprising a cylindrical casing having a recess extending upwardly from the bottom thereof, a curved door frame defining a door opening and having a peripheral channel therearound receiving the marginal edge of the recess defining portion of the casing in the top and sides thereof, a bottom for said casing having a peripheral flange, a channel ring receiving the flange of said bottom and having one leg thereof extending into the channel portion along the bottom of the door frame, legs at spaced intervals around said casing having recesses receiving said channel ring together with upstanding portions overlying the casing and extending above the door opening, bolts extending through the upper ends of said leg portions and into said casing, a grate ring in said casing supported by said bolts, a grate carried by said grate ring, a top for said casing having a fuel-charging door and smoke outlet, said grate ring, grate, casing, and top defining a combustion chamber, an ash pit below said grate ring, and a flexible sheet metal door hinged on said door frame, said sheet metal door in its unstressed condition being substantially straight, and means for progressively and selectively stressing said sheet metal door to flex it into curvate conformity with the door frame for controlling the door opening and for regulating draft therethrough.

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4. A heater construction comprising a cylindrical casing having a recess extending upwardly from the bottom thereof, a door frame defining a door opening and having a peripheral channel therearound receiving the marginal edge of the recess defining portion of the casing in the top and sides thereof, a bottom for said casing having a peripheral flange, a channel ring receiving the flange of said bottom and having one leg thereof extending into the channel portion along the bottom of the door frame, a grate ring supported inside said casing, a grate carried by said grate ring, a top for said casing having a fuel-charging door and smoke outlet, said grate ring, grate, casing, and top defining a combustion chamber, an ash pit below said grate ring, and a flexible sheet metal door hinged on said door frame, said door in an unstressed condition being straightened to at least greater curvature than the door frame, and means for progressively and selectively stressing said sheet metal door to flex it into registering conformity with the door opening edges of the door frame for controlling the draft through the door opening.

5. A heater construction comprising a cylindrical casing, a grate ring supported inside said casing, a grate carried by said grate ring, a top for said casing, said grate ring, grate, casing and top defining a combustion chamber, smoke outlet means and fuel-charging means for said combustion chamber, an ash pit below said combustion chamber, an ash pit opening leading through said casing to said ash pit, a curved door frame in said ash pit opening, and a flexible sheet metal ash door hinged on said door frame, said sheet metal door in its unstressed condition being substantially straight, and means for progressively and selectively stressing said sheet metal door to flex it into curvate conformity with the door frame for closing the door opening and for regulating draft through the door opening.

6. A heater construction comprising a cylindrical casing, a grate ring supported inside said casing, a grate carried by said grate ring, a top for said casing, said grate ring, grate, casing, and top defining a combustion chamber, smoke outlet means and fuel-charging means for said combustion chamber, an ash pit below said combustion chamber, an ash pit opening leading through said casing to said ash pit, and a flexible sheet metal ash door hinged near the edge of said opening, said door being straightened to at least substantially greater curvature than said casing when in unstressed condition, and means for progressively and selectively stressing said sheet metal door to flexibly deform it into curvate conformity with the cylindrical casing for closing the door opening and for regulating draft through the door opening.

7. A heater construction comprising a cylindrical casing having a recess extending upwardly from the bottom thereof, a door frame defining a door opening and having a peripheral channel therearound receiving the marginal edge of the recess-defining portion of the casing in the top and sides thereof, a bottom for said casing having a peripheral flange, a channel ring receiving the flange of said bottom and having one leg thereof extending into the channel portion along the bottom of the door frame, legs at spaced intervals around said casing having recesses receiving said channel ring, a grate ring supported inside said casing, a grate carried by said grate ring, a top for said casing, said grate ring, grate, casing and

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top defining a combustion chamber, smoke outlet means and fuel-charging means for said combustion chamber, and a door hinged on said door frame.

8. In a heating device including a cylindrical body member having an ash opening therein, a grate ring in said body member, and a grate cooperating with the grate ring, the improvement which comprises a hinged ash door on said casing and below said grate which said door is composed of sheet metal, said door having a radius of curvature substantially greater than the radius of curvature of said cylindrical body and being flexible under stress to conform to curved configurations determined by reduced radii of curvature to thereby close said opening.

9. A heating device comprising a curved body member having a grate construction therein, a fuel inlet for said body member, an ash outlet for said body member, a flexible sheet metal door for said ash outlet, said door being normally straightened to at least greater curvature than said curved body member, hinging means for said door, and latching means attached to said body member for flexing said door towards curvate conformity with said body member to control the degree of opening of said ash outlet.

10. A heating device comprising a shell defining a combustion chamber, a grate forming the bottom of the combustion chamber, an ash outlet below said combustion chamber, said ash outlet having a curved door frame, a substantially flattened door composed of flexible metal, hinging means for said door, and variable latch means between said shell and said door for progressively flexing said door towards the shape of the door frame and towards a closing relationship with the ash outlet.

11. A heating device comprising a shell defining a combustion chamber, a grate forming the bottom of the combustion chamber, an ash outlet below said shell, said ash outlet having a curved door frame, a door composed of flexible sheet metal normally extended towards a flattened configuration and having slot means, hinging means for said door at a side opposite said slot means, a hinged bolt extending from said shell and capable of being pivoted into said slot means on said door, and a nut for adjusting the tension on said hinge bolt whereupon said door may be flexed into a curvate shape to close said ash outlet.

12. A heating device comprising a shell defining a combustion chamber, a grate forming the bottom of the combustion chamber, a curved member forming an ash outlet below said shell, said curved member having a door composed of sheet metal having slot means and normally extended towards a straightened shape, hinging means for said door, a bolt pivotally mounted on said curved member and disposed to be pivoted into said slot means on said door, and an adjusting nut member for tightening said bolt against said slot means to adjust the degree of closure of said door by progressively flexing said door into variable curvate shapes determined by reduced radii of curvature.

13. In a heating device including a heat-radiating body member, a grate ring secured to said body member in spaced relation to the bottom thereof, a grate cooperating with the grate ring, and a curved member forming an ash outlet below said grate, the improvement which comprises an ash outlet door hinged on said curved member and composed of flexible sheet metal and means to stress said door towards and into

closing registry with said ash outlet, said door in its unstressed condition being in substantial flat sheet-like form.

14. In a draft controlled heating device having an ash outlet situated in a curved wall portion of the device, the improvement of a hinged ash door made of flexible material and being substantially flat in an unstressed condition and adjustable latching means connected between said portion of said heating device and said hinged ash door adjacent said outlet to successively flex said door toward curvate conformity with said device, whereby the ash outlet degree of opening may be closely controlled.

SAM P. LOCKE. 15

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