Feb. 26, 1929. 1,703,459

T. A. SALA

MULTIPLE FLUE HEATER

Filed April 5, 1928 2 Sheets-Sheet 1

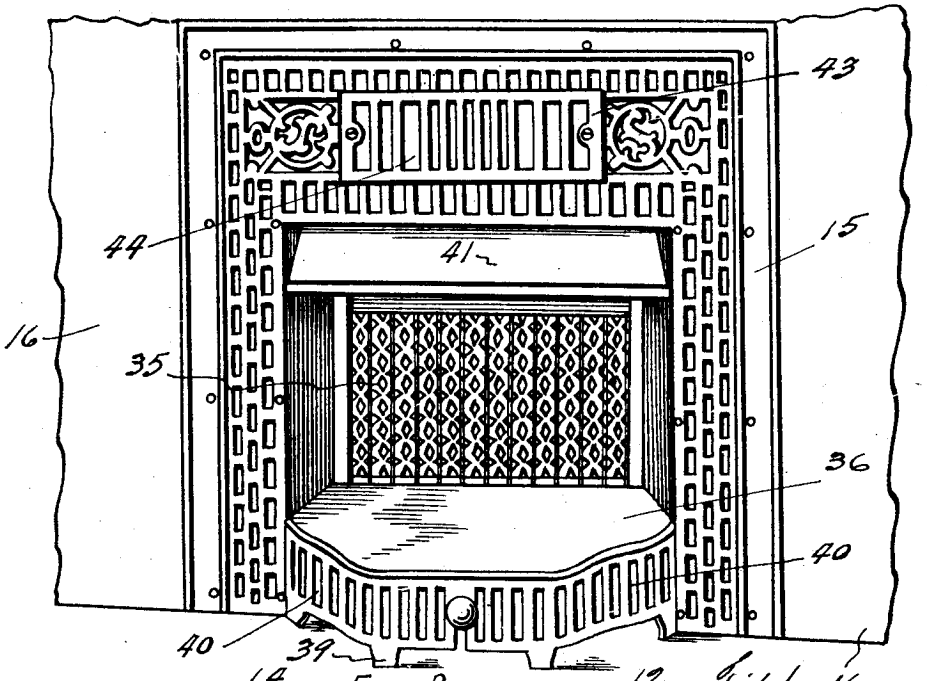

Fig. 1.

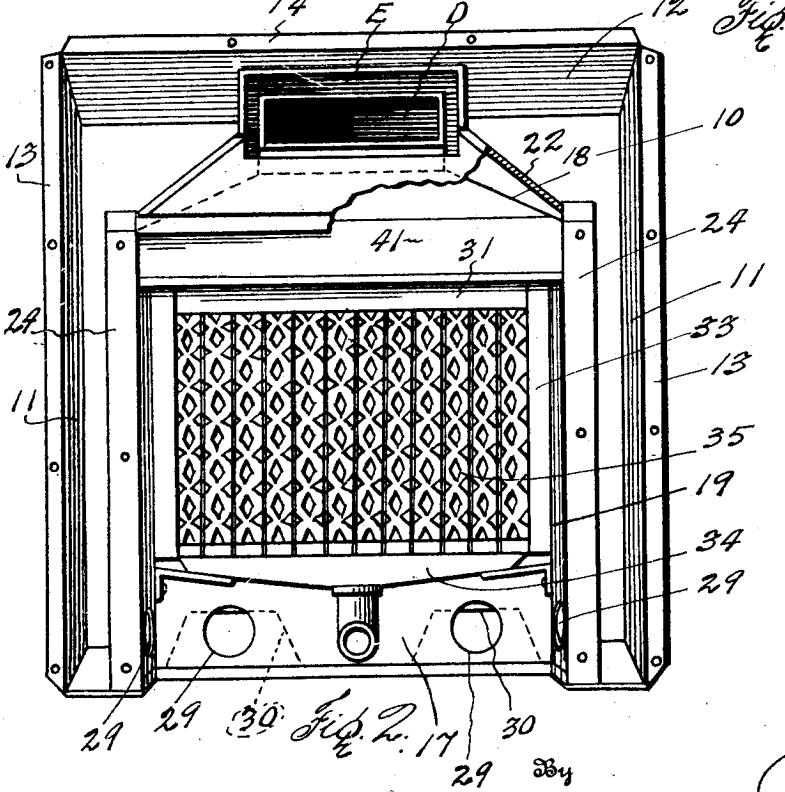

Fig. 2.

Inventor
T. A. Sala
By Jack & Ashley
Attorney

Feb. 26, 1929. 1,703,459

T. A. SALA

MULTIPLE FLUE HEATER

Filed April 5, 1928 2 Sheets-Sheet 2

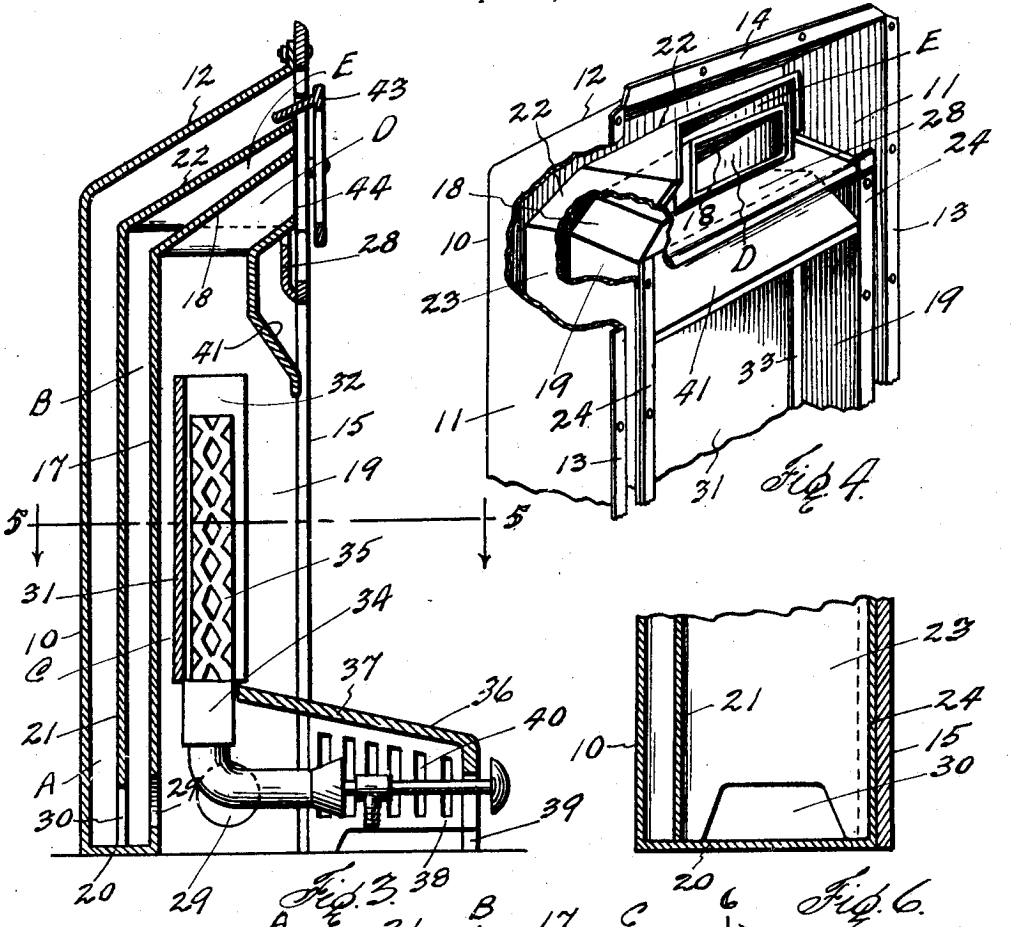

Fig. 3.

Fig. 4.

Fig. 6.

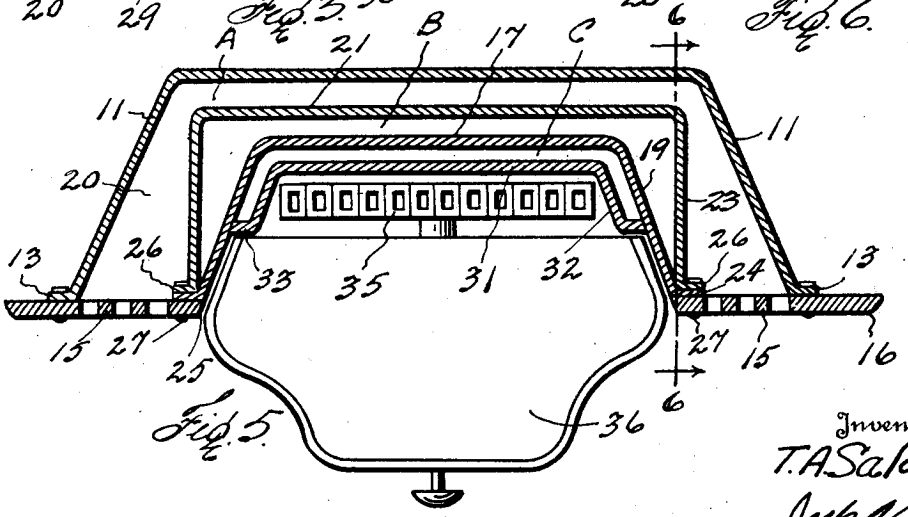

Fig. 5.

Inventor
T. A. Sala
Jack A. Gibb
By
Attorney

Patented Feb. 26, 1929. 1,703,459

UNITED STATES PATENT OFFICE.

THEODORE A. SALA, OF DALLAS, TEXAS.

MULTIPLE-FLUE HEATER.

Application filed April 5, 1928. Serial No. 267,578.

This invention relates to new and useful improvements in multiple flue heaters.

One object of the invention is to provide certain improvements upon the structure shown in my Letters Patent No. 1,621,135, issued March 15, 1927.

A particular object of the invention is to arrange a plurality of flues in relation to a grille, whereby heated air currents are discharged through the grille at the most desirable locations for producing the best heating results.

Another object of the invention is to concentrate the discharge of the hottest air currents at the upper central portion of the grille, whereby the most efficient circulation will be set up and also whereby the side and top margins of the grille will only be subjected to the relatively cooler heated air currents.

An important object of the invention is to utilize to the fullest extent the heat generated in the fire box, whereby the greatest volume of air may be heated by a given fire and full advantage of a maximum radiation had.

A still further object of the invention is to provide an arrangement of flues and component parts lending themselves to a more compact, efficient and economical organization.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown and wherein:

Fig. 1 is a front view of a heater constructed in accordance with the invention,

Fig. 2 is a similar view, the grille being omitted and a portion being in section,

Fig. 3 is a vertical sectional view,

Fig. 4 is a detail partly in section and partly in elevation,

Fig. 5 is a horizontal cross-sectional view taken on the line 5—5 of Fig. 3, and

Fig. 6 is an enlarged sectional detail taken on the line 6—6 of Fig. 5.

In the drawings the numeral 10 designates a jacket or outer casing including outwardly flared vertical wings or sides 11 and an upwardly inclined top 12. At the open front of the jacket outwardly directed vertical flanges 13 are formed on the front edges of the wings, while an upwardly directed horizontal flange 14 is provided on the front edge of the top 12. These flanges form a ready means of securing a front grille 15 to the jacket, which overlaps the flanges and conceals the same. The grille is made slightly larger than the opening receiving the jacket, so as to overlie the surrounding panel 16 (Fig. 1), thus adding to the ornamental appearance.

The grille and jacket when united constitute a unit which may be readily slipped into place. Of course the grille and jacket could be secured in some other way. The grille may be given any desired design and finish.

Within the jacket I dispose an inner vertical shell 17 having an inclined top 18 and provided with flared wings 19. This shell has substantially the same shape as the jacket and is placed concentrically therein. However, this particular shape and exact arrangement is not essential to the invention. A bottom 20 connects the lower edge of the shell 17 with the lower edge of the jacket 10.

Between the jacket and the inner shell 17 I dispose an intermediate shell or divider 21 which has an inclined top 22 and vertical side wings 23. This divider exhibits a rectangular shape in plan, the wings extending at substantially right angles to the back wall. The inner shell has vertical outwardly directed flanges 24 on the front edges of the wings 19 by which it is secured to the grille 15 contiguous to the fire opening 25 of said grille.

While the shape of the divider 21 is subject to change, convenience in assembling is obtained by turning vertical flanges 26 on the front edges of the wings 23 and securing said flanges to the rear sides of the flanges 24, by means of bolts 27, whereby the parts are fastened to the grille.

The jacket and the divider form a vertical flue A therebetween. This flue is U-shaped in plan, as is shown in Fig. 5, and has its front covered by the grille 15. The divider 21 and the inner shell 17 form a vertical flue B, the front of which is closed by the flanges 24 and 26 and a front plate 28 (Figs. 3 and 4). The entire front of the flue A being exposed through the grille, air may enter and escape through said grille.

It is pointed out that the flue B is open only at its top and bottom. Air admitting ports 29 near the bottom of the shell 17 provide entrances for air to the flue B and adjacent openings 30 in the bottom of the divider 21 admit air to the lower end of the flue A.

Within the shell 17 I dispose a vertical fire back 31 spaced from the shell and including outwardly flaring wings 32 provided with laterally directed vertical flanges 33 secured to the wings 19 of the shell. The fire back has its top and bottom terminating short of the top and bottom of the shell and co-acts therewith to form a short vertical flue C.

The fire back, together with the wings 19, forms the fire box of the heater. A suitable horizontal burner 34, gas or other fuel, is placed within the fire back at the bottom thereof and radiants 35 may be mounted on the burner in the usual manner. A shield 36 provided with an inclined top 37 and a depending apron 38 mounted on legs 39 is fitted in the lower portion of the grille opening 25. The apron has draft slots 40 and abuts the grille, while the top 37 inclines up to the burner 34. As is shown in Fig. 1, the shield conceals the ports 29 and the burner parts, as well as the lower portion of the shell 17, thus enhancing the ornamental appearance of the heater.

It is evident that the heated air currents rising from the radiants 35 will be most intense. Air currents passing up the flue C will be heated to a high degree, but will carry off or cause the radiation of a large amount of heat. Air currents passing up the flue B will also be heated and will carry off heat, but these currents will not be so hot. The heat of the air currents passing through the flue A will be moderate.

From the foregoing, two things will be apparent. First, that the generated heat is dissipated to a maximum and rapidly carried off, whereby a large volume of air is heated. Second, that the air currents passing through the various flues will be heated to different degrees Farenheit and thus will flow at different rates of speed.

In order to segregate the discharges of the flue currents and to confine the most intensely heated to the upper center of the grille, the top 18 of the shell is merged into a central duct D and a front baffle 41 inclines from the top of the fire box to the duct D. The hot air currents from the radiants 35 and the flue C are merged at the top of the fire box and discharged from the duct D at the center of the grille.

The top 22 of the divider 21 is also merged into a central duct E which surrounds the duct D and is spaced therefrom. The air currents from the flue B are discharged through the duct E.

In order to keep the main body of the grille 15 relatively cool, an outwardly displaced panel 43 is attached to the grille at each end and covers an opening 44 through which the ducts D and E are exposed. The intense heat from the ducts contacts with the panel which obviates its transmission to the body of the grille. This panel forms the subject matter of a separate application.

When the burner 34 is operating, heated air currents of the highest temperature will be discharged through the duct D from the fire box and the flue C. The air passing up the flue C will carry off the heat from the fire back 31, thus keeping the same relatively cool and dissipating the heat.

Air will be drawn into the flue B through the ports 29 and as this air passes upward in said flue, it will be heated by contact with the shell 17 and the divider 21. This air will be discharged from the duct E. The hotter air currents emerging from the duct D will have a tendency to draw the air currents from the duct E owing to the lower temperature of said air currents flowing from the duct E.

This action will promote circulation and enhance the heating efficiency, as well as prevent the excessive heating of the metal walls. Air may enter the flue A through the openings 30 and through the lower front portions of the grille and it may escape from any portion of the flue through said grille. The air discharged from the flue A will have the lowest temperature and will carry off the heat from the other flues, with the result that the jacket 10 will not be heated to any marked extent, so that said jacket may be safely mounted in a wooden cabinet or mantle.

The air currents discharged from the flues, each having different temperatures, will set up a rapid circulation. The flue B and its duct E, substantially surrounding the flue C, fire box and duct D, will aid materially in carrying off the high heat. The flue A being around and over the other flues and ducts will cause a further heat dissipation or radiation and will protect surrounding woodwork.

Various changes in the size and shape of the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

What I claim, is:

1. In a heater, the combination of an open fire box, a duct connected with the top of the fire box, a vertical flue contiguous to the fire box, a second duct connected with the top of the flue and contiguous to the first duct, a jacket within which the fire box, flue and ducts are contained and from which the parts are spaced, and a grille covering the front of the jacket and having a segregated area through which the ducts discharge.

2. In a heater, the combination of a jacket, a divider within the jacket and spaced therefrom to form a flue, a shell within the divider and spaced therefrom to form a second flue, a fire box within the shell, a duct directly forwardly from the top of the fire box, a second duct directed forwardly from the top of the second flue and substantially surrounding the first duct, and a grille covering the front of the jacket and having a section spaced inwardly from its margin through which the ducts discharge.

3. In a heater, the combination of a jacket, a divider within the jacket and spaced therefrom to form a flue, a shell within the divider and spaced therefrom to form a second flue, a fire box within the shell, a duct directed forwardly from the top of the fire box, a second duct directed forwardly from the top of the second flue and substantially surrounding the first duct, and a grille covering the front of the jacket and having a section spaced inwardly from its margin through which the ducts discharge, the first flue receiving air through the grille and the second flue having air admitting openings at its lower portion.

4. In a heater, the combination of a jacket, a divider within the jacket and spaced therefrom to form a flue, a shell within the divider and spaced therefrom to form a second flue, a fire box within the shell, a fire back within the fire box and spaced from the shell to form a third flue, a duct directed forwardly and receiving heated air currents from the top of the fire box and the third flue, said first duct being reduced to a comparatively small area, a second duct within which the first duct is located and receiving air currents from the second flue, and a grille covering the front of the jacket and through which air currents from the first flue are discharged above and on each side of said ducts and through which said ducts also discharge.

5. In a heater, the combination of a jacket, a divider within the jacket and spaced therefrom to form a flue, a shell within the divider and spaced therefrom to form a second flue, a fire box within the shell, a fire back within the fire box and spaced from the shell to form a third flue, a duct directed forwardly and receiving heated air currents from the top of the fire box and the third flue, said first duct being reduced to a comparatively small area, a second duct within which the first duct is located and receiving air currents from the second flue, and a grille covering the front of the jacket and through which air currents from the first flue are discharged above and on each side of said ducts and through which said ducts also discharge, the shell having ports at its lower end for admitting air to the second flue, the bottom of the third flue being open for receiving air from below the fire box.

6. In a heater, the combination of a jacket having outwardly flared wings and an inclined top, flanges on the front edges of the wings and top, a grille attached to said flanges and having a fire opening, a divider within the jacket having wings, and a shell within the divider having wings, the wings of the divider and the shell being attached to the grille contiguous to its fire opening.

7. In a heater, the combination of a jacket having outwardly flared wings and an inclined top, flanges on the front edges of the wings and top, a grille attached to said flanges and having a fire opening, a divider within the jacket having wings, a shell within the divider having wings, the wings of the divider and the shell being attached to the grille contiguous to its fire opening, a fire back within the shell, a burner at the bottom of the fire back, a duct attached to the divider, and a second duct within the front duct and attached to the top of the shell, both ducts having their discharge ends contiguous to the grille above the fire opening.

8. In a heater, the combination of a jacket having outwardly flared wings and an inclined top, a grille attached to the wings and top of the jacket and having a central fire opening, a shell within the jacket having outwardly flared wings and an inclined top, and a divider disposed between the jacket and the shell and forwardly directed wings and an inclined top, the front edge portions of the wings of the shell and also the divider being secured in common to the grille contiguous to the fire opening thereof.

9. In a heater, the combination of a jacket having outwardly flared wings and an inclined top, a grille attached to the wings and top of the jacket and having a central fire opening, a shell within the jacket having outwardly flared wings and an inclined top, a divider disposed between the jacket and the shell and forwardly directed wings and an inclined top, the front edge portions of the wings of the shell and also the divider being secured in common to the grille contiguous to the fire opening thereof, a burner within the shell between the wings thereof, and a shield fitting against the grille and having a top inclined up to the burner within the shell, the shield having draft openings for supplying air below the burner.

10. In a heater, the combination of a jacket having outwardly flared wings and an inclined top, a grille attached to the wings and top of the jacket and having a central fire opening, a shell within the jacket having outwardly flared wings and an inclined top, a divider disposed between the jacket and the shell and forwardly directed wings and an

inclined top, the front edge portions of the wings of the shell and also the divider being secured in common to the grille contiguous to the fire opening thereof, a fire back within the shell having flared wings, a horizontal burner at the bottom of the fire back extending between the wings thereof, and a shield fitting against the grille and having a top inclined up to the burner within the shell, the shield having draft openings for supplying air below the burner.

In testimony whereof I affix my signature.

THEODORE A. SALA.