Nov. 4, 1947. E. E. ELMORE ET AL 2,430,393

FORCED DRAFT HOT AIR HEATER

Filed May 2, 1941 2 Sheets-Sheet 1

Fig. 1

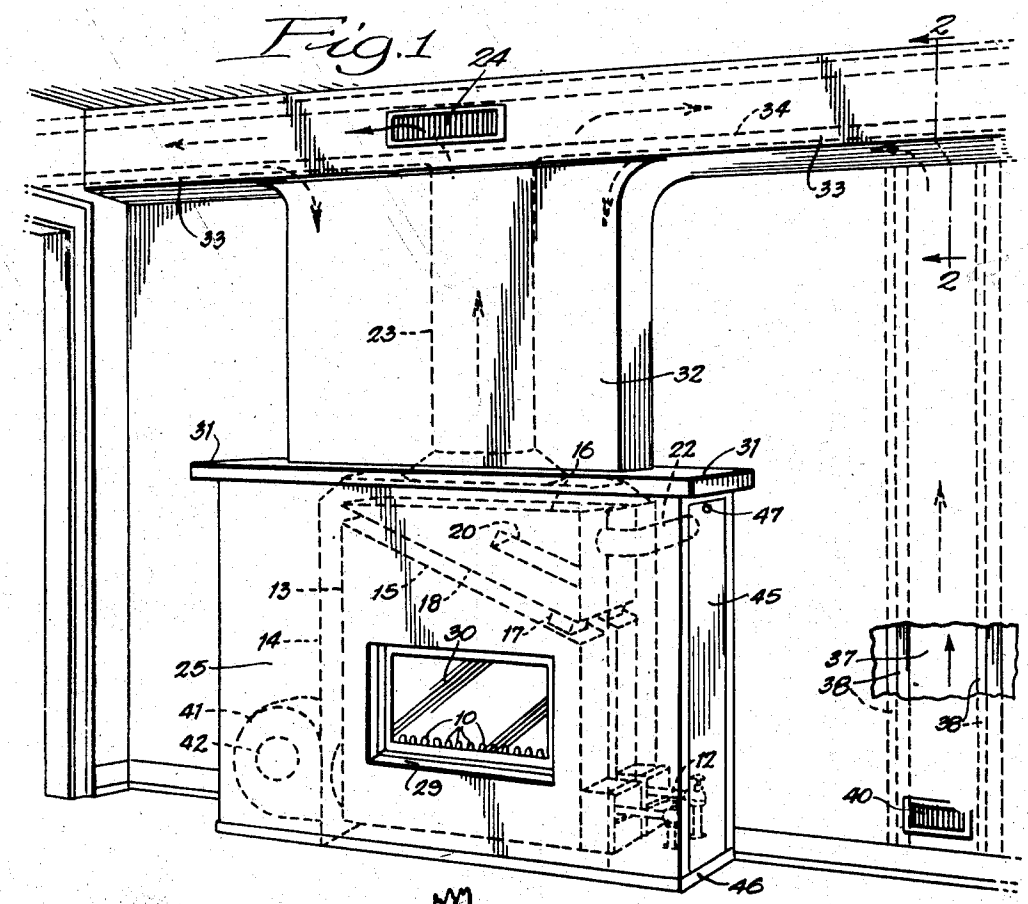
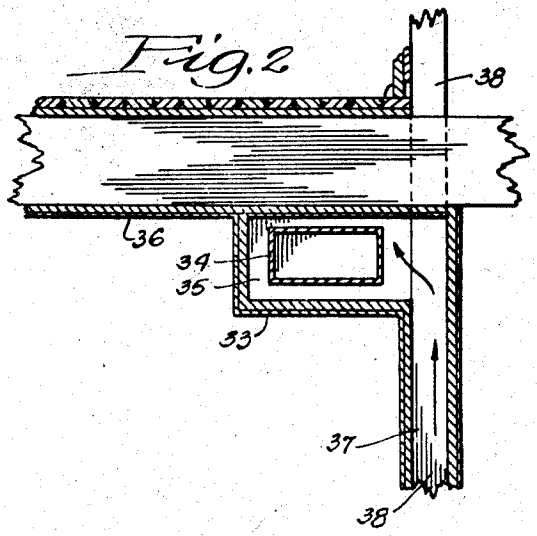


Fig. 2



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Fig. 3

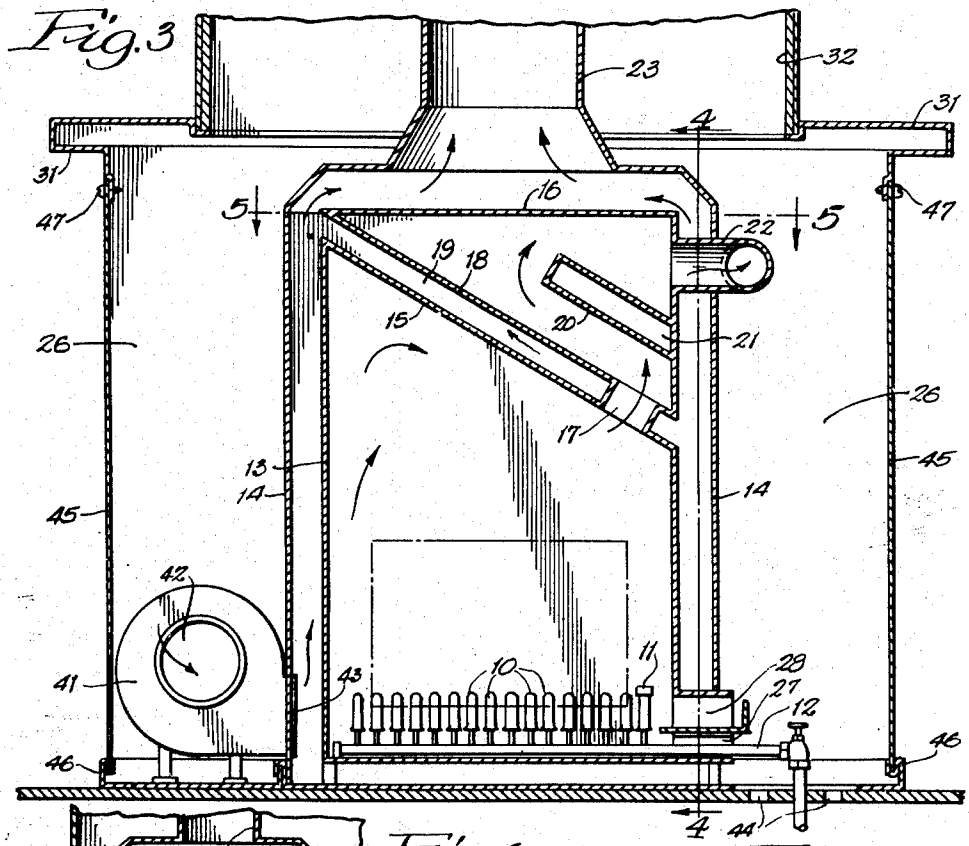


Fig. 4

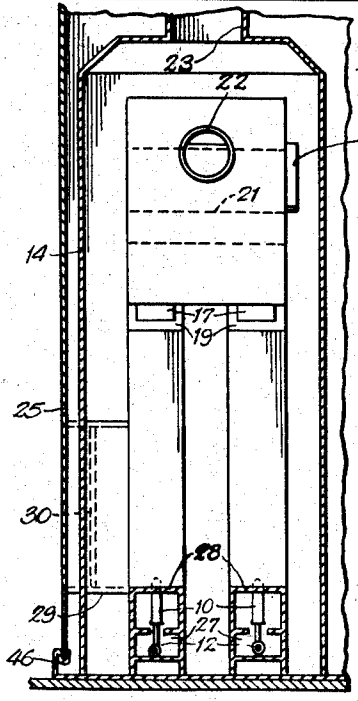
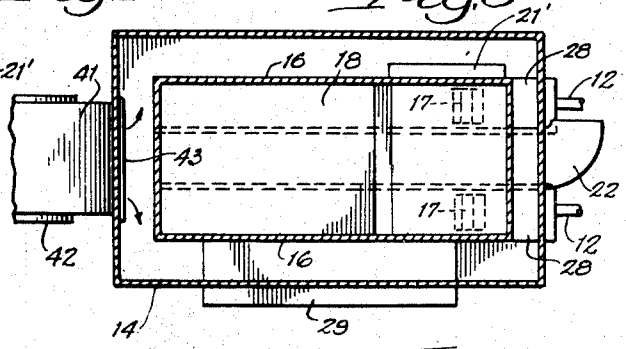


Fig. 5



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FORCED DRAFT HOT-AIR HEATER

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Application May 2, 1941, Serial No. 391,496

4 Claims. (Cl. 126—110)

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This invention relates in general to a heater of the central unit type, more particularly described as a fireplace heater for utilizing wall space in an ordinary living room usually occupied by built-in cases, cupboards, alcoves, and the like, and simulating a fireplace in which the actual combustion is visible.

An important object of the invention is in the provision of a central heating unit located in one room for heating other adjacent and individual rooms on the same floor or different floors by a system of ducts in the walls or covered by furring, plastering, or other materials located in the rooms, and also providing cold air return passages around the heating ducts leading back to the heater or unit.

Other objects of the invention are: to provide an enclosing frame structure to which may be applied an exterior surface made of or resembling brick, stone, plaster, or other material in any style or type, and resembling a fireplace with a mantel; in providing a heat distributing and return duct system leading from and returning to the heater with the return air surrounding the heating duct; in providing an insulating space between the sides and bottom of the heating unit and the enclosing casing in which a blower is also connected to insure circulation of the air; in sealing the gases and products of combustion within the heat generator, but in making visible the flames of combustion through a transparent fireplace plate; in providing a heat generator in which the crown sheet is inclined and has a surface greater than the transverse area of the unit; in connecting a fuel economizer section as a part of the generator unit in which the gases are directed in inclined planes and over an inclined baffle to the outlet flue; in providing a hollow, inclined, transverse air passage inside of a baffle with a projection at one side to cause a change in the static air pressure at opposite ends of the air baffle for insuring the circulation of air therethrough; and in general, to provide the construction herein shown and described.

Other and further objects of the invention will appear in the specification and will be apparent from the accompanying drawings, in which

Fig. 1 is a perspective of a fireplace heater in accordance with this invention located against the wall and resembling an ordinary fireplace with a mantel shelf and enclosed ducts within the room;

Fig. 2 is a sectional view taken on the lines 2—2 of Fig. 1;

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Fig. 3 is a sectional view of the heating unit and fireplace structure shown in Fig. 1;

Fig. 4 is a sectional view taken on the lines 4—4 of Fig. 3; and

Fig. 5 is a cross sectional view taken on the lines 5—5 of Fig. 3.

This invention is designed and intended to be fired or used with any fuel, particularly gas or oil, which lends itself to thermostatic, automatic, or semi-automatic control. It is intended that thermostatic and electrical controls are provided at the unit and in the various rooms served thereby for automatically increasing and decreasing the amount of heat, and for similarly controlling the operation of the blower in accordance therewith, all of which is a well known practice in connection with heating systems and forms no particular part of the present invention.

Referring now more particularly to the drawings, the heater unit is described for a gas burner having a plurality of burner nozzles 10 with a pilot 11 connected to a valved supply pipe 12. Each burner is located at the bottom of a metal heating shell 13, the bottom and side walls being spaced from an inner enclosing casing 14 of sheet metal, such, for example, as galvanized iron or the like, and providing an insulating air space between the shell and casing. The upper end or crown sheet 15 of each heater unit is inclined at an angle of 30° or more from the horizontal to provide an increased surface area greater than that of the transverse area of the heater or generator. One or more generator units or shells 13 are connected to a fuel economizer 16 by means of a tube 17 at the lower edge of the crown sheets 15, the bottom 18 of the economizer being substantially parallel to the crown sheet 15 but spaced therefrom and forming an air space 19 between them.

In the economizer is an inclined baffle 20 formed of sheet metal and inclined substantially parallel to the bottom 18 at a distance therefrom providing a transverse air space 21. At one side only of the economizer 16, the top 21' only of this air baffle projects beyond and into the air space between it and the inner casing 14 to cause a change in the static air pressure at the opposite side thereof to insure a flow of air transversely through the baffle.

Projecting from the side of the economizer adjacent the baffle 20 is a discharge flue or pipe 22 extending also through the inner casing 14 for discharging the products of combustion. This construction insures that the heated gases will engage the crown sheet and pass downwardly

along the inclined surface thereof through the tube 17 and thence upwardly between the baffle and the bottom 18 of the economizer, thence around the upper end of the economizer to the discharge flue 22.

One or more heat generators or shells 13 are connected to the fuel economizer 16 with an air passage or space between adjacent generator shells. The width of the economizer is increased to accommodate additional heater units or shells 13, and the inner casing 14 is made sufficiently large to accommodate the heating and economizing units, and to provide an air space at the outside all around them and at the top and bottom below the units. At the top, the casing 14 is connected to a warm air outlet duct 23 for distributing heat to the various outlets 24 in the same room or in adjacent rooms.

An outer casing 25 is spaced from the inner casing 14 to provide a surrounding return air space 26 which connects with the heating shell 13 at the bottom thereof through a lower combustion inlet 27 surrounding the fuel pipe 12, and also through an upper inlet 28 through which the burner nozzles are more accessible.

The outermost or front heater unit is provided with a metal shell or frame 29 extending through the outer wall of the casing 25 and has a transparent partition or window 30 therein of glass or similar material through which the flames of combustion arising from the burner are visible, the position and location of the frame and window being such that the heater unit may appear as, or resemble, an open fireplace.

The exterior surface of the casing 25 may have a finish resembling brick, stone, plaster, marble, plywood, iron, or any other material, and by providing an upper projecting ledge 31, a design of any period or style may be provided, closely resembling a mantel-piece or fireplace. Extending upwardly from and communicating with the interior of the casing 25 is a cold air return casing 32 which surrounds the warm air outlet duct 23.

Branching outwardly from the upper end of the casing 32 are return air ducts 33 which may be built into the walls or partitions of the room or rooms in which they are located, or they may be built outwardly into the room around a distributing warm air duct 34, leaving a return air space 35 surrounding and between the outer enclosing wall 36 and the warm air duct.

From this return air space 35, a cold air passage 37 may be formed between adjacent building studs 38 with a cold air inlet or register 40 at the bottom thereof.

In the air space 26, between the inner and outer casings 14 and 25, an air fan or blower 41 is preferably located having a central inlet 42 and discharging from an outlet 43 into the air space surrounding the heating and economizer units within the inner casing.

With this construction, the operation of the fan or blower will cause cold air to be drawn from the bottom of the air space 26 and forced within the casing 14 around and between the generating and economizing units through the inclined passageway 19 and through the air baffle 21 because of the pressure ledge 22. The air thus forced and circulated over and around the economizer and above the crown sheet will be heated thereby and will be forced outwardly through the warm air duct and into divisions thereof and through hot air registers 24 which communicate with the main or branch or warm air ducts 34 wherever they may be located. At

the same time, the inlet of the fan draws cold air from the inlets or cold air registers 40 through the cold air passages surrounding the warm air ducts, thereby tempering the warm air which is discharged from the outlet and gradually heating the air which is drawn into the blower or fan.

If desired, one or more combustion air inlets 44 may be provided through the floor adjacent the inlet of the fuel pipe 12 for admitting air to the burners through the combustion air passage 27 to insure that there will be enough fresh air to support combustion.

Air is also admitted to the burner through the passages 27 and 28 from the bottom of the cold air space 26 in the normal operation of the heating system, the products of combustion passing outwardly through the flue 22 from the economizer. Even though the blower 41 is not operated, a circulation of air from duct 23 will be afforded in substantially the same manner by the operation of the generator alone, but in most installations a fan or blower is desirable.

By having cold air ducts located between adjacent building studs, a practical and inexpensive return system is provided without the necessity of additional pipes or ducts built within a room, but these feeder ducts would not surround the warm air distributing pipes.

In order to make the enclosed parts freely accessible, the outer casing is preferably provided with removable end panels 45 each seated at the bottom in a return bend socket 46 and having a removable fastener 47 at the upper end by means of which the panel is held in the socket. With this construction, the burner and the blower are freely accessible from opposite ends of the mantel.

This heater system has the advantage that it is all accessible from one floor, no basement connections are necessary, and all of the air ducts may be located within the confines of one floor. The heater itself is easily accessible for repair, replacement, and adjustment, and the walls of the cold air return space are easily accessible for cleaning.

If desired, the air circulating system may be used without the heater for ventilating and for cooling purposes. Various changes may be made in the construction, combination, and arrangement of the parts without departing from the spirit and scope of the invention.

We claim:

1. A heater construction comprising a burner and a heating shell in which it is enclosed, a heat economizer above the heating shell, a warm air casing in which the shell and economizer are contained, the bottom of the economizer being inclined to the horizontal, a baffle in the economizer parallel to the bottom sheet adjacent the lower end thereof, and a tubular connection between the heating shell and the economizer at the lower end of the economizer and below the baffle therein, in which the baffle is hollow and forms a transverse air space through the economizer open within the warm air casing at both ends of the baffle.

2. A heater structure comprising a burner and a heating shell in which it is enclosed, a heat economizer above the heating shell, a warm air casing in which the shell and economizer are contained, the bottom of the economizer being inclined to the horizontal, a baffle in the economizer parallel to the bottom sheet adjacent the lower end thereof, and a tubular connection between the heating shell and the economizer at the

lower end of the economizer and below the baffle therein, in which the heating shell and the economizer are enclosed in a warm air casing which is spaced therefrom, the baffle being hollow and providing an air passage extending through the economizer and terminating at its ends in the air space, and the upper side of the baffle being extended into the air space at one end only to induce the air circulation through the hollow baffle.

3. A heater comprising a burner and a heating shell in which it is contained to form a generator, a heat economizer at the top of the generator, the top of the generator and the bottom of the economizer being similarly inclined to form a transverse inclined air space between them, a tubular connection between the generator and the economizer at the lower end of the economizer, a baffle in the economizer above the inlet thereto also inclined parallel to the bottom of the economizer, and a flue outlet from the economizer opening from the side above the baffle on the opposite side of the inlet.

4. A heater comprising a plurality of generator units, each comprising a burner enclosed in a heating shell, an economizer at the top of the heating shells, the top of the heating shells and the bottom of the economizer being inclined to provide an inclined air space between them, a tubular connection between each shell and the economizer at the bottom of the air space, a hollow baffle in the economizer above the bottom connection thereto and inclined to the bottom of the economizer, an enclosing casing spaced at the bottom, sides, and top from the generators and economizer, a discharge flue extending through

the casing from the economizer at the upper side of the baffle and one edge of the baffle extending into the space formed by the casing to induce the flow of air through the hollow baffle.

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