United States Patent [19]

Jones

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[54] **HEATING ACCESSORY FOR USE WITH FIREPLACES**

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[51] **Int. Cl.** **F24b 7/00**

[58] **Field of Search** 126/121, 128, 129, 130, 126/131

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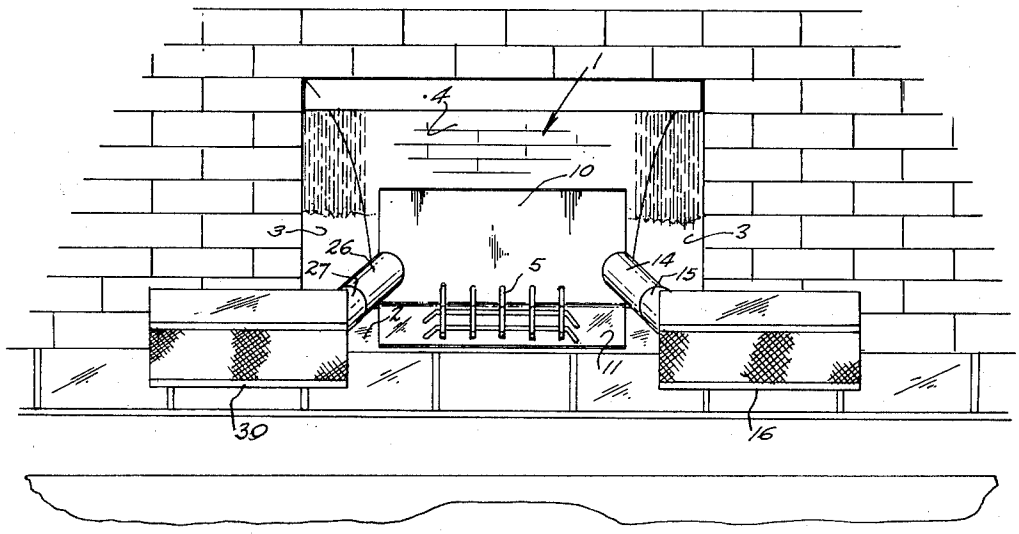
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[57] **ABSTRACT**

A forced air heating system including a heat exchanger for placement along the back wall of a fireplace. Ait intake and air exhaust structures are in opposed placement adjacent the fireplace opening with ducting routing air to and from the heat exchanger. A fan and motor assembly are housed within said air intake structure while baffle means in the exhaust structure serve to channel air therethrough. Said intake and exhaust structures are interchangeable to reverse the direction of airflow through the system to best accomplish room heating.

2 Claims, 5 Drawing Figures



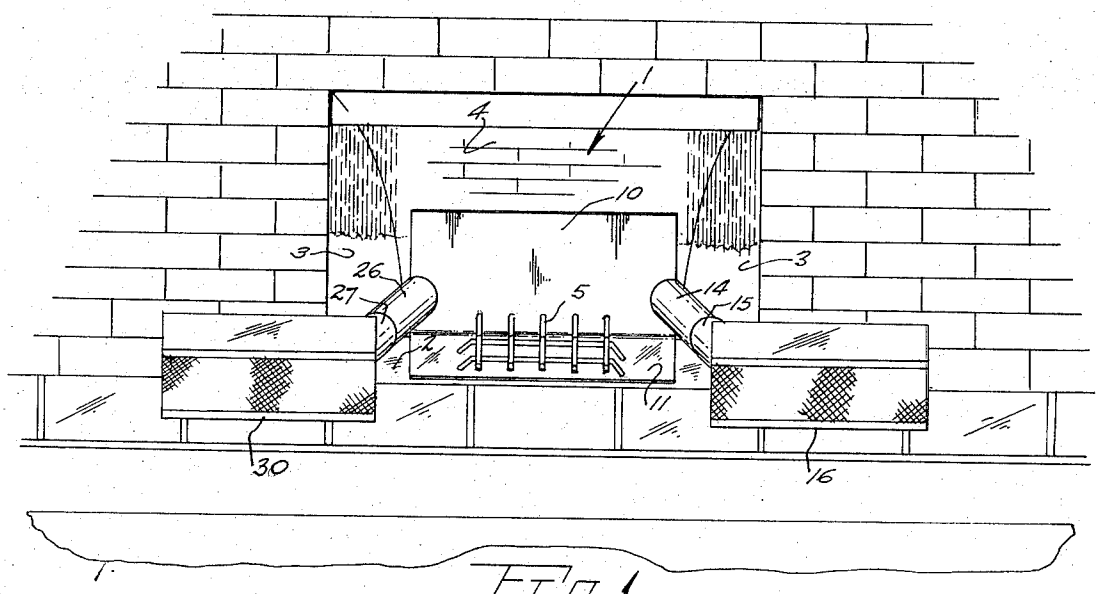


Fig. 1

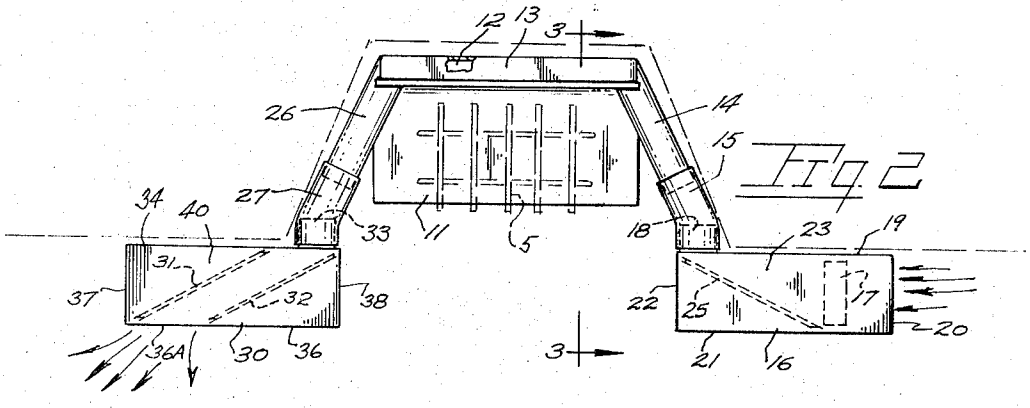


Fig. 2

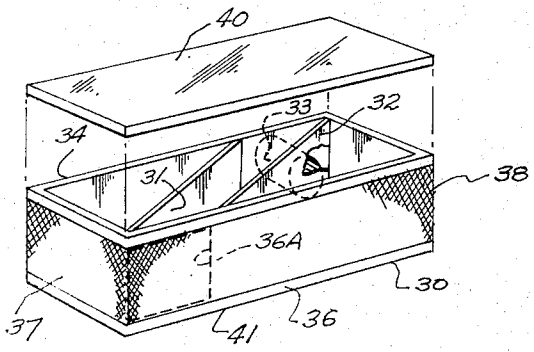


Fig. 5

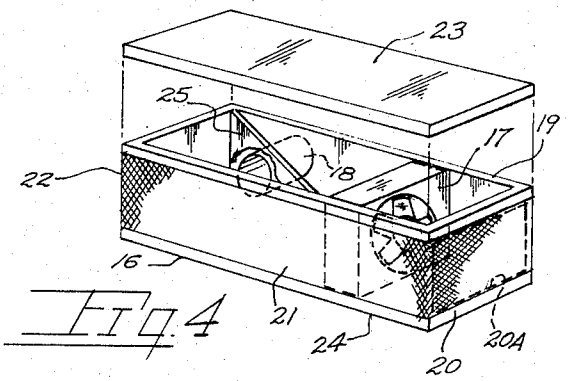


Fig. 4

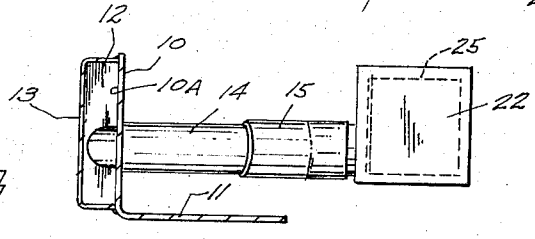


Fig. 3

HEATING ACCESSORY FOR USE WITH FIREPLACES

BACKGROUND OF THE INVENTION

The instant invention relates generally to fireplaces and more specifically to structure for placement therein for supplementing the heating capability of a conventional fireplace.

It is well accepted that conventional fireplace structures are thermally inefficient. While heat from the fire is radiated into the room area a substantial portion of heated room air is drawn into the fireplace and exhausted via the fireplace flue. Fireplaces in modern homes may be said, for the most part, to be primarily aesthetic in purpose rather than functional.

Within the known prior art are disclosures of many efforts directed toward remedying the heating inefficiency of fireplaces which efforts typically call for the installation of ducting, plenums, fans, etc., during assembly of the fireplace while the home is under construction. while no doubt these arrangements serve to increase the thermal output of a fireplace they do so only at considerable additional cost. Further, such arrangements are often objectionable as they detract from room and fireplace appearance. In general, the use of supplemental heating structures for fireplaces has not found wide favor with the public with the result that present day fireplaces in modern homes are of the simplest, least efficient construction. The advent of fuel shortages and increased fuel costs emphasize the importance of increasing fireplace efficiency.

SUMMARY OF THE INVENTION

The present invention is embodied within an independent, metal structure having components for placement into and adjacent an existing fireplace of conventional masonry construction. Accordingly, the present system is adapted for use with existing fireplace structures without modification thereof and importantly does not detract from the aesthetic values of the fireplace area. Attractive air inlet and outlet structures placed adjacent the fireplace opening efficiently provide a continuous flow of forced air lengthwise through the plenum of a heat exchanger and thence back into the room for exhaust away from the fireplace opening. Such inlet and outlet structures are interchangeable to best suit the heating requirements of the room or living area.

Among the important objectives of the invention are: the provision of a forced air heating system for detachable placement within an existing fireplace to efficiently utilize fireplace heat which otherwise to a large extent is wasted; the provision of a forced air heating system wherein components are interchangeable to permit reversing the direction of airflow for optimum heating; the provision of a heating system for use in conjunction with a conventional fireplace wherein air intake and exhaust components are of an attractive nature for placement on the fireplace hearth, said components contributing to the attractiveness of the fireplace area; the provision of a heating system of low cost, durable construction for installation without fireplace modification and removable therefrom without alteration to the fireplace structure; the provision of a heating system wherein exposed components may simulate other items found in a living area such as stereo speaker components.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawing:

FIG. **1** is a frontal perspective view of the present heating system shown operatively in association with a conventional fireplace and hearth,

FIG. **2** is a plan view of the heating system of FIG. **1** with fireplace and hearth outlines shown in dashed lines,

FIG. **3** is a vertical section of the heat exchanger taken along line **3—3** of FIG. **2**,

FIG. **4** is a perspective view of the air intake structure with the top wall removed therefrom for purposes of illustration only, and

FIG. **5** is a perspective view of the air exhaust structure with the top wall removed therefrom for purposes of illustration only.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With continuing attention to the accompanying drawing wherein applied reference numerals indicate parts similarly identified in the following description, the reference numeral **1** indicates generally a fireplace opening, said fireplace typically including a floor **2**, side walls **3** and a forwardly inclined back wall **4**, all being well known and of the type commonly found in the home. Normally used within such fireplaces is a grate **5** or other support for a fuel burned. The fireplace and grate structure may obviously vary from that illustrated without impairing use of the following described heating system embodying the present invention.

Indicated at **10** is an upright wall of a metal heat exchanger of the present invention which is integral with a base plate **11** in place on the fireplace floor. With attention to FIGS. **2** and **3**, a plenum **12** is jointly defined by the rear surface **10A** of upright wall **10** and a pan shaped sheet metal structure **13** secured at its perimeter to said rear wall surface. Base **11** of the plenum structure may support grate **5** with the fuel in place thereon being located in close proximity to heat exchanger wall **10** for efficient radiant heating of the wall and particularly interior surface **10A** thereof. Plenum structure **13** is heated primarily by conduction to provide, along with wall surface **10A**, opposing heat radiating surfaces. Either or both of said surfaces may be of an irregular nature to promote heat transfer to the passing airflow.

Supplying a flow of air to one end of plenum **12** is a duct **14** which extends outwardly from the plenum along a fireplace side wall terminating in communication with a flexible duct segment **15.**

With attention to FIG. **4**, an air intake structure **16** is of rectangular box shape and houses a fan and motor assembly **17.** A collar **18** projects rearwardly from a back wall **19** of structure **16** for telescopic engagement with flexible duct **15.** An end wall **20** of the structure defines an air intake opening **20A** which may be covered with porous, attractive fabric which fabric may additionally be applied to a closed front wall **21** and a remaining end wall **22** for appearance purposes. Such an appearance as well as that of a companion structure may be closely akin to that of a stereo speaker commonly found in living and recreation rooms of the house. A top wall **23** and bottom wall **24** are closed and, as later elaborated upon, may serve alternately as a base. Internally within said structure is an angularly

disposed baffle **25** directing the output of fan and motor assembly **17** towards outlet collar **18.** Fan and motor assembly **17** are preferably of the type wherein the motor is in axial relationship to the fan with the fan blades disposed about the motor housing for compactness and with an air delivery capacity of approximately 115 cfm. One suitable type of fan and motor assembly is that marketed under the registered trademark BOXER.

With attention to FIGS. **2** and **5,** an exhaust structure at **30** is desirably of the same configuration and outer appearance as the earlier described air intake structure. A plenum exhaust duct **26** is in telescopic connection with a flexible duct segment **27** to serve an exhaust structure **30.** Cooperating baffle plates at **31–32** are disposed in a diagonal manner to channel a heated airflow therebetween. A collar at **33** on the back wall **34** of the structure is in telescopic communication with flexible duct segment **27** to receive heated air which is diverted by baffles **31–32** for exhaust into the room area via an opening **36A** in a front wall **36** of the exhaust structure. End walls **37–38** as is the case with rear wall **34** are of closed construction. In a manner similar to the intake structure, top and bottom walls are indicated at **40–41.** Heat resistant porous fabric is applied to the front and end walls to match the appearance of the air intake unit. Further, insulative panels (not shown) are applied to the internal walls of the air exhaust unit for safety reasons. From the foregoing it will be seen that the air intake and exhaust structures are externally identical to the extent they may be interchanged by simply transposing and inverting same. The airflow, accordingly will be reversed through the system opposite to the direction indicated by the applied arrows in FIG. **2.** The homeowner may accordingly set up the system to most efficiently heat the room or to avoid exhausting heated air towards a room thermostat. To regulate airflow fan and motor assembly **17** may be of the variable speed type or alternatively the wall openings **20A, 36A** of the intake and exhaust structures may be provided with adjustable plates to curtail air passage.

While I have shown but one embodiment of the invention, it will be apparent to those skilled in the art that the invention may be embodied still otherwise without departing from the spirit and scope of the invention.

Having thus described the invention, what is desired to be secured under a Letters Patent is:

1. A forced air heating system for placement within and forwardly adjacent a conventional fireplace opening, said fireplace having a pair of side walls, a bottom wall and a back wall, said system comprising,

an elongate heat exchanger for placement lengthwise along the back wall of a fireplace rearward of a heat source, said heat exchanger defining a plenum therewithin for the reception of a pressurized flow of air, a heat exchanger base plate for the reception of a superimposed fireplace grate, an upright heat exchanger wall integral with said base plate and partially defining said plenum,

an air intake structure disposed exteriorly adjacent the fireplace opening and including a fan and motor assembly, a collar located adjacent one end of the air intake structure,

an air exhaust structure also disposed exteriorly adjacent the fireplace opening oppositely from the air intake structure, a collar located adjacent one end of the air exhaust structure,

said air intake and exhaust structures having corresponding external wall members of identical configuration and appearance rendering the structures identical in appearance, and

air duct means extending intermediate said intake structure and heat exchanger and intermediate the latter and the air exhaust structure in detachable connection to the collars of each said structures whereby the air duct means may be detached from the air intake and air exhaust structures permitting the latter to be interchanged for one another to reverse the flow of heated air therethrough for optimum room heating without altering the appearance of the heating system.

2. The heating system as claimed in claim **1** wherein said air intake and exhaust structures include top and bottom walls, said structures being invertible coincident with the interchanging of same for rested support on either of said walls during system operation.

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