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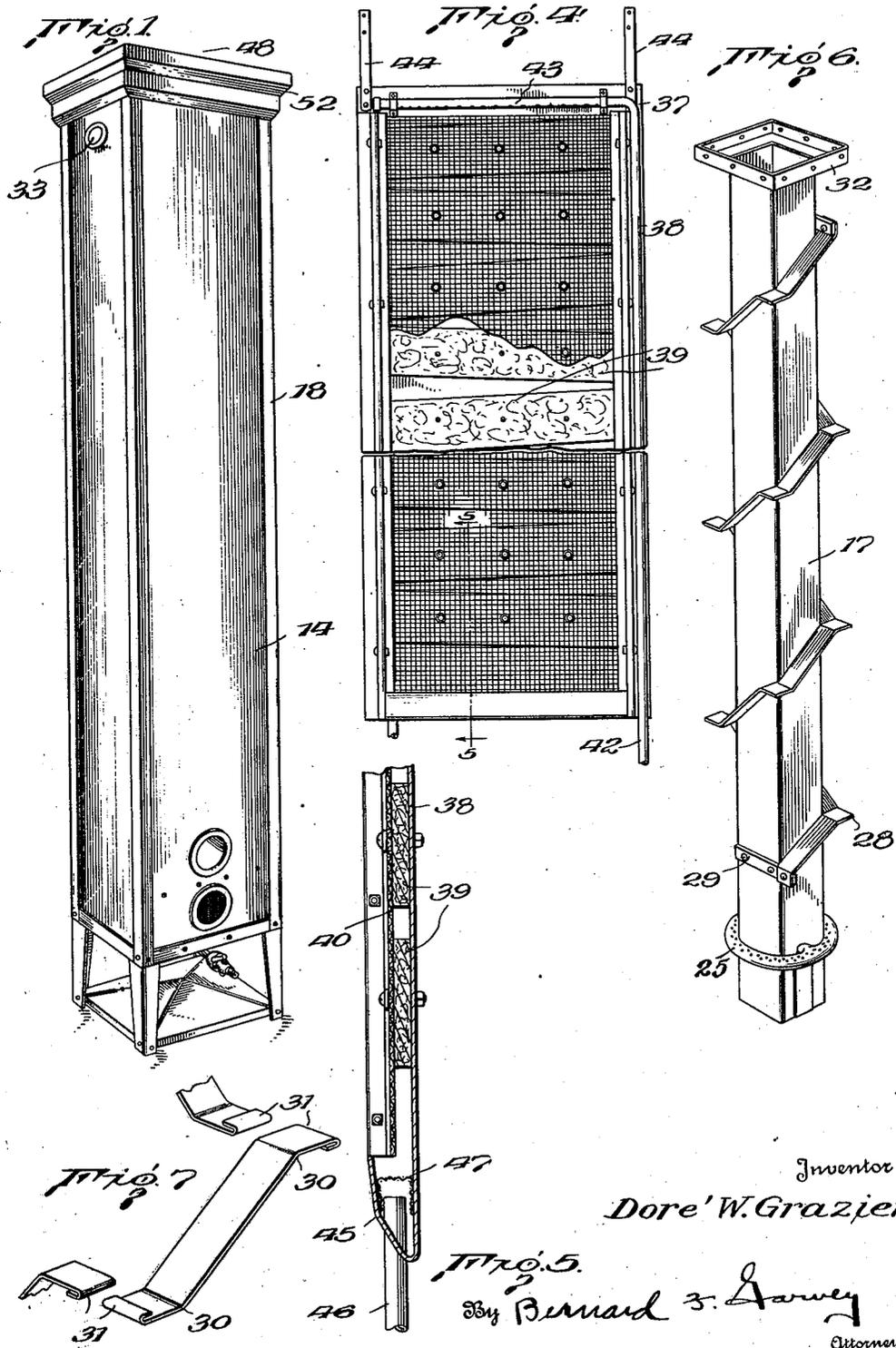
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2,017,621

HEATER

Filed Nov. 29, 1932

2 Sheets-Sheet 1



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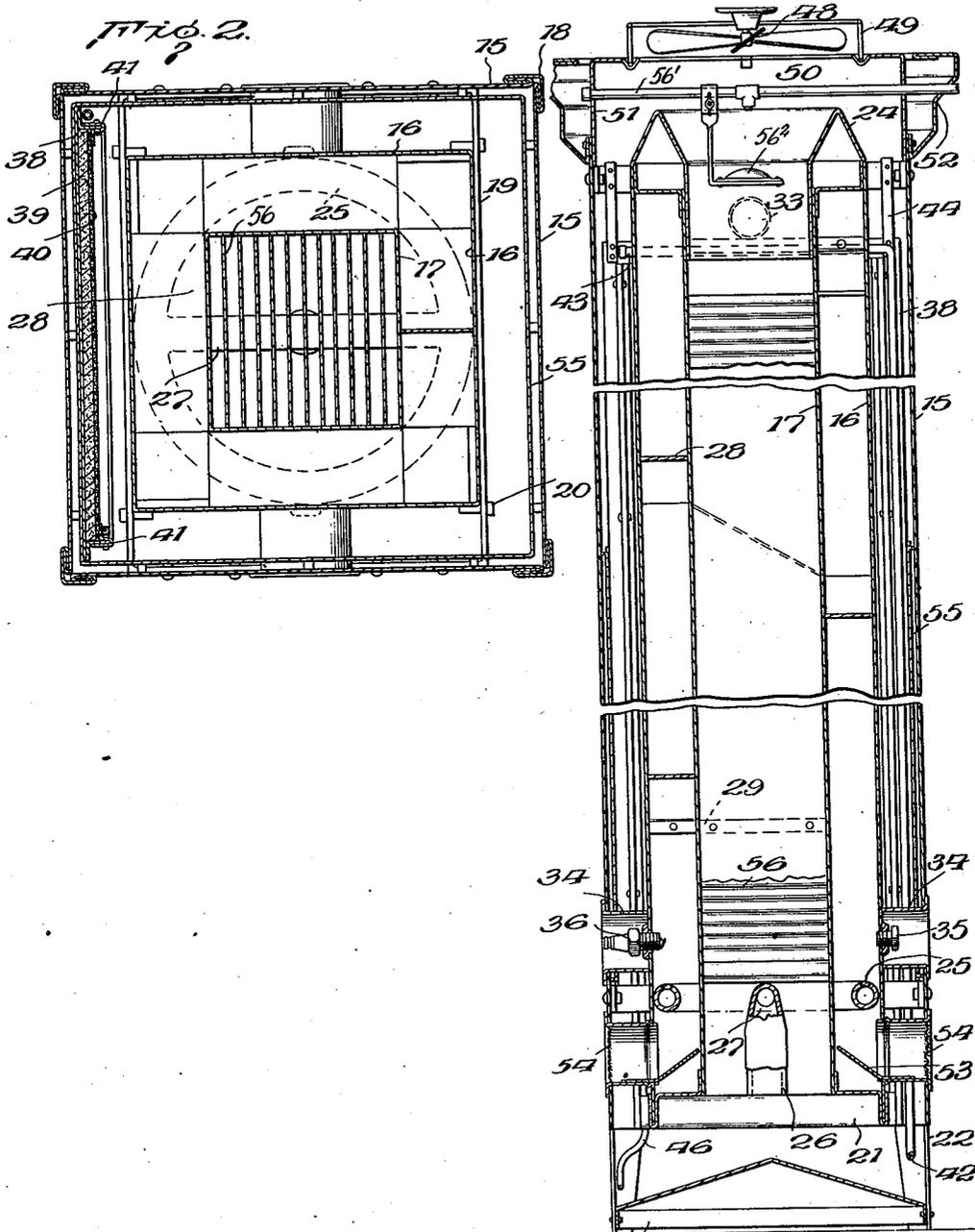
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HEATER

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2 Sheets-Sheet 2



23 Fig. 3. Inventor
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UNITED STATES PATENT OFFICE

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HEATER

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2 Claims. (Cl. 126—90)

The present invention consists of a heater which is designed primarily for use with a gaseous fuel burner automatically controlled by a room thermostat or the like, the heater being also susceptible of conversion into an air conditioner without changing the construction of the heater in any way.

To obtain maximum efficiency the following objects are included in the teaching of the present invention: to confine products of combustion, generated by a burner, to a tortuous path in an enclosed space which is completely jacketed by air passage-ways; to provide an air jacket for the combustion space which is equipped with a humidifier from which the moisture content is evaporated by the radiant heat of the combustion chamber; to provide a combustion chamber employing a spiral vane of multi-part construction to facilitate assemblage and reduce the cost to manufacture to a minimum; and to provide a humidifier which consists of an independent unit arranged in the heater out of the path of the products of combustion, yet positioned for direct impingement by the radiated heat from the combustion chamber, the humidifier including moisture absorbing elements constantly saturated by suitable liquid supply means.

A coordinate object of the invention consists in employing a heater which may be mounted on a floor or other base, or suspended from a suitable superstructure, such as a floor or ceiling, without changing the essential characteristics of the heater and without in any way changing its mode of operation.

A further object of the invention is to provide a heater which, although primarily designed to be of elongated form, arranged in vertical position when in use, may likewise be used in relatively short batteries through which the products of combustion are circulated in a manner to obtain maximum efficiency and including a humidifier of the same construction and used in the same manner as the humidifier in the elongated type of heater.

A still further object of the invention consists in the provision of a heater embodying a combustion chamber completely closed by air jackets through which air is constantly fed, either by natural or artificial circulation, depending upon the type of heater employed.

Other objects of the invention will be apparent from the following description of the present preferred forms thereof, taken in connection with the accompanying drawings, wherein

Fig. 1 is a perspective view of a heater con-

structed in accordance with the present invention;

Fig. 2 is a horizontal sectional view thereof;

Fig. 3 is a longitudinal sectional view of the heater, showing to advantage the combustion chamber and air spaces surrounding the same;

Fig. 4 is a fragmentary elevational view of a humidifier made in accordance with the present invention;

Fig. 5 is a fragmentary longitudinal sectional view of the humidifier taken on the line 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a perspective view of the innermost shell of the heater illustrating the manner of mounting the spiral deflector vane thereon;

Fig. 7 is a detail fragmentary perspective view of the spiral vane, showing the adjacent terminals of the vane strips disconnected.

The preferred form of the present invention is illustrated in Figs. 1 to 7 of the drawings and consists of a heater, generally designated 14, which in the present instance is shown to be of oblong configuration and is especially adapted for vertical positioning in the corner of a room where it will occupy a minimum amount of space. The heater is composed of a series of shells, the outermost of which, indicated at 15, constitutes the casing, while the intermediate shell 16 and innermost shell 17 are fitted within the casing in spaced relation to the latter and in spaced relation to one another. In the present instance these shells are shown to be of square cross section, although it is to be understood that the contour of the shells may be changed without departing from the spirit or scope of this invention. The casing 15 consists of metal sheets, the adjacent margins of which are reversely folded to interengage corner pieces 18, which are slidably engaged with said plates, as illustrated to advantage in Fig. 2. The casing 15 is engaged with the intermediate shell 16 by supporting irons 19, the ends of which latter are secured to the casing, while the intermediate parts thereof are equipped with pins 20, which embrace the intermediate shell 16, permitting sliding movement of the latter within said pins and also allowing for the expansion and contraction of the shell. The lower end of the shell 16 fits in a bottom cap 21, which latter also embraces the lower terminal of the innermost shell 17. The outer shell or casing 15 is supported on a bottom assembly, generally designated 22, embodying legs and a pyramidal heat deflector plate 23. The bottom cap closes the space between the innermost shell 17 and the intermediate shell 16 at the lower end

of the latter, the upper ends of said shells carrying a deflector cap 24, which spans the distance between the shells 16 and 17, said deflector cap including a depending collar which extends downwardly into the shell 17 for an appreciable distance and is contiguous to the inner periphery thereof.

The closed space between the shells 16 and 17 constitutes a combustion chamber in which suitable combustion means is mounted. For this purpose, in the present instance, I employ a gaseous burner 25 of circular construction, which lies wholly within said chamber near the bottom of the latter, gas being fed to the burner through an inlet pipe 26, which communicates with a yoke 27 that opens at diametrically opposite points into the burner. The inlet pipe 26 is connected with a source of fuel supply in a manner well known in the art and may be equipped with a suitable thermostatically controlled valve.

To intercept the products of combustion in the combustion chamber, I provide a spiral vane, generally designated 28, the opposite ends of which are anchored on strips 29 carried by the shell 17. Preferably the vane is composed of a series of metal straps, the opposite ends of which are offset, as indicated at 30, while the terminals thereof are reversely folded for engagement with complementary terminals on the adjacent straps to form lock joints 31. As shown to advantage in Figs. 3 and 6, the burner 25 circumscribes the lower end of the shell 17 and is in relatively close proximity thereto in order that the products of combustion will pass upwardly against the spiral vane 28 to radiate the heat from said products through the walls of the shells 16 and 17. The upper end of the combustion chamber is also sealed or bonded to the intermediate shell by a boxing 32 on the upper end of the shell 17, which is secured to the inner wall of said shell. As shown to advantage in Figs. 1 and 3, the upper end of the combustion chamber is provided with a flue opening 33.

In each side of the heater, immediately above the burner 25, a collar 34 is mounted, the outer end of which lies against the outer wall of the casing 15 while the inner end engages the outer periphery of the shell 16. The inner end of each collar is closed and provided with a threaded opening which may receive a closure plug 35, or electrical ignition means, such as a spark plug 36. The spark plug 36 may be engaged in circuit with a source of electric supply for use in igniting the burner, or the plug 35 may be removed to permit the introduction of a match or taper into the burner for lighting the same. The threaded openings in the collars are of standard size to permit the use of either or both of the closure plug 35 or spark plug 36. Preferably both are used, as shown in Fig. 3 of the drawings, so that in the event of the failure of the spark plug to operate, the burner may be lighted in a manner already described.

The heater of the present invention also includes a humidifier which is preferably mounted in one or more of the air spaces outside of the closed combustion chamber. The humidifier preferably employed in this organization is of the panel type, generally designated 37. The panel consists of a heat radiating wall 38, made of any suitable material of high heat conductivity, having detachably mounted on one face thereof, preferably in zig-zag relation, a plural-

ity of liquid absorbing pads 39 made of an asbestos composition or the like. The pads 39 are covered by a foraminous sheet 40 which may be made of wire mesh and is secured, as indicated at 41, to flanges formed by inturning and contracting the lateral margins of the wall 38. Liquid is supplied to the pads 39 through the medium of a pipe 42, the latter extending upwardly in parallel relation to one of said flanges of the wall 38 and terminating adjacent the upper end thereof in a right angle perforate head 43, through which the water gravitates into engagement with the pads 39, as advantageously illustrated in Fig. 4. The panel 37 is suspended from the top of the heater by hangers 44. Preferably, as shown in Fig. 3, the top of the humidifier is arranged to lie just below the flue opening 33 in order that the zone of highest saturation of the humidifier will be positioned at the point most remote from the zone of generation of the products of combustion. I have found from experiment that by making the combustion pad of the humidifier in multiple, instead of in a single piece, a maximum humidifying efficiency is attained. In making the pad in a number of parts, a space is provided between the parts for the radiation of heat from the wall 38 and by arranging the pads in zig-zag relation, the gravitation of water from one pad to another forms in effect a water curtain to positively provide an ample moisture content in the heated air under all operating conditions of the burner. The bottom of the wall 38 is bent upwardly to provide a catch basin or trough 45, with which a drain pipe 46 communicates. The drain pipe may be covered by a screen 47 detachably mounted in the trough to intercept extraneous materials gravitating downwardly from the humidifier suspended in the water.

For the purpose of creating a draft through the air passages of the heater around the combustion chamber, I provide a fan 48, the guard 49 of which may be mounted in an annular recess or depression 50, formed in a support 51 carried by the heater casing. The support is encased in a crown 52, also carried by the casing and of any suitable ornamental design.

In order to at all times determine whether or not the burner is in operation, I have mounted in the heater directly below the burner 25, mirrors 53 which may be made from a chromium plated metal and disposed at an inclination to be visible through peep or sight opening 54, formed in the heater casing. Said openings also serve as secondary air inlets for the combustion chamber.

It is desired to interpose between the outermost shell 15 and the intermediate shell 16, a liner 55 at the zone of the heater where the maximum radiation would be normally effected. Consequently, in Fig. 3 of the drawings, I show the liner mounted in the bottom of the heater between the shells indicated and extending upwardly to a point approximately midway the ends of the shells. The liner may be made of any suitable material and is of a size to be conveniently accommodated between the shells 15 and 16, outside of the humidifier 37.

In the form of invention just described, after the burner has been lighted, it is manifest that the products of combustion will travel through a tortuous path, regulated by the conformation of the vane 28, through the combustion cham-

ber, permitting the spent products to exhaust through the flue opening 33. In this manner heat is radiated from the products of combustion through the shells 16 and 17 and is forced downwardly by the fan 48 into engagement with the deflector 23 into the room in proximity to the floor upon which the heater is mounted. Evaporation from the humidifier is of course effected by the radiated heat to charge the air with a predetermined moisture content. It is of course to be understood that although I have shown a single humidifier mounted in the space between the shells 15 and 16 of the heater, nevertheless the number of panel humidifiers may be increased and may be mounted at any point outside of the combustion chamber, such, for instance, as in the air space within the innermost shell 17.

The heater shown in the form of invention just described may also be provided with an air conditioner 56, of any conventional design. In the present instance, I have, in Figs. 2 and 3 of the drawings, shown plates for this purpose. The plates may be moistened by water gravitating through a pipe 56' for impingement against a baffle 56², which latter is pendently carried by the pipe 56'. The air conditioner may be superimposed on the yoke 27 of the burner 25 in order that the air blast passing through the innermost shell 17 will directly impinge the air conditioner to drive the moistened air below the bottoms of

the shells. The deflector 23 is so formed that it may be inverted to provide a catch basin for the moisture gravitating from the air conditioner.

While I have herein described preferred forms of my invention, which I have found to be most practical in reducing the invention to practice, I am nevertheless aware that various changes may be made therein, especially in the details of construction, proportion and arrangement of parts, within the scope of the claims hereto appended.

What is claimed is:

1. In a heater, a combustion chamber equipped with a spiral baffle for conducting products of combustion in a tortuous path through the chamber, said baffle being of multi-part construction the ends of said parts being complementary to interlock.

2. A heater comprising a series of concentric shells, two of which are connected at their terminals to provide a closed combustion chamber, means providing an opening between the combustion chamber and through the outermost shell, a burner in said chamber, and reflector means mounted in the chamber in proximity to the burner and visible through said opening in the shells in such relation to the burner and opening to reflect the image of the burner through the opening.

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