Nov. 18, 1930. A. W. BECKER 1,782,229

SPACE HEATER

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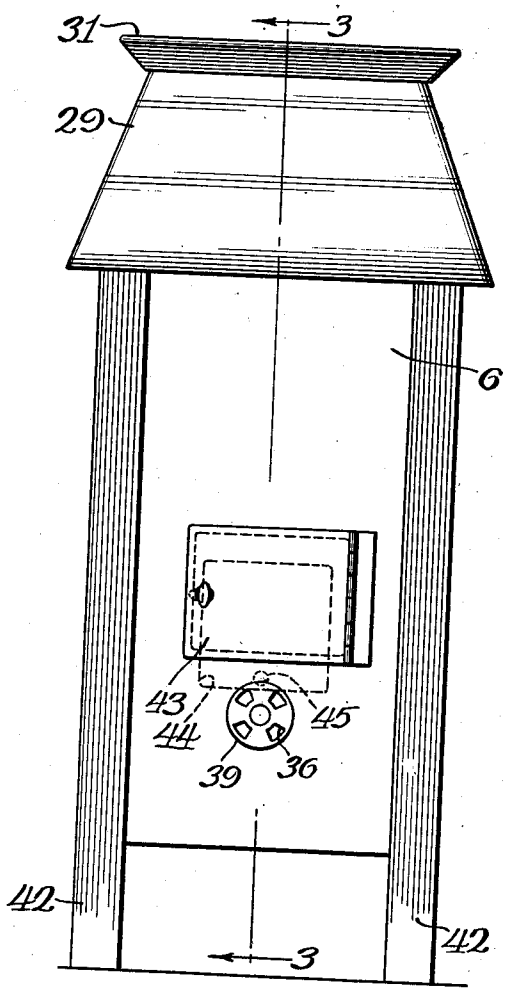


Fig. 1

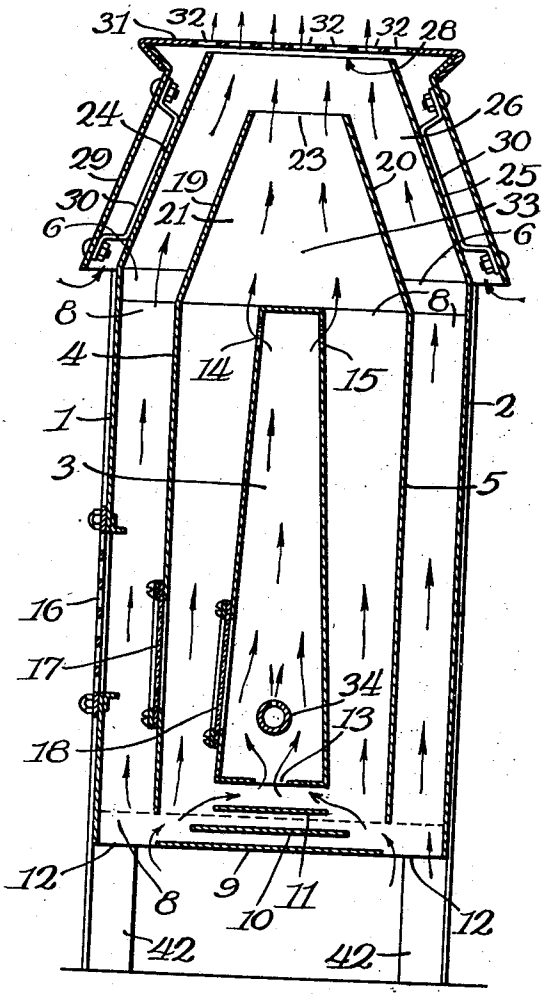


Fig. 2

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Fig. 3

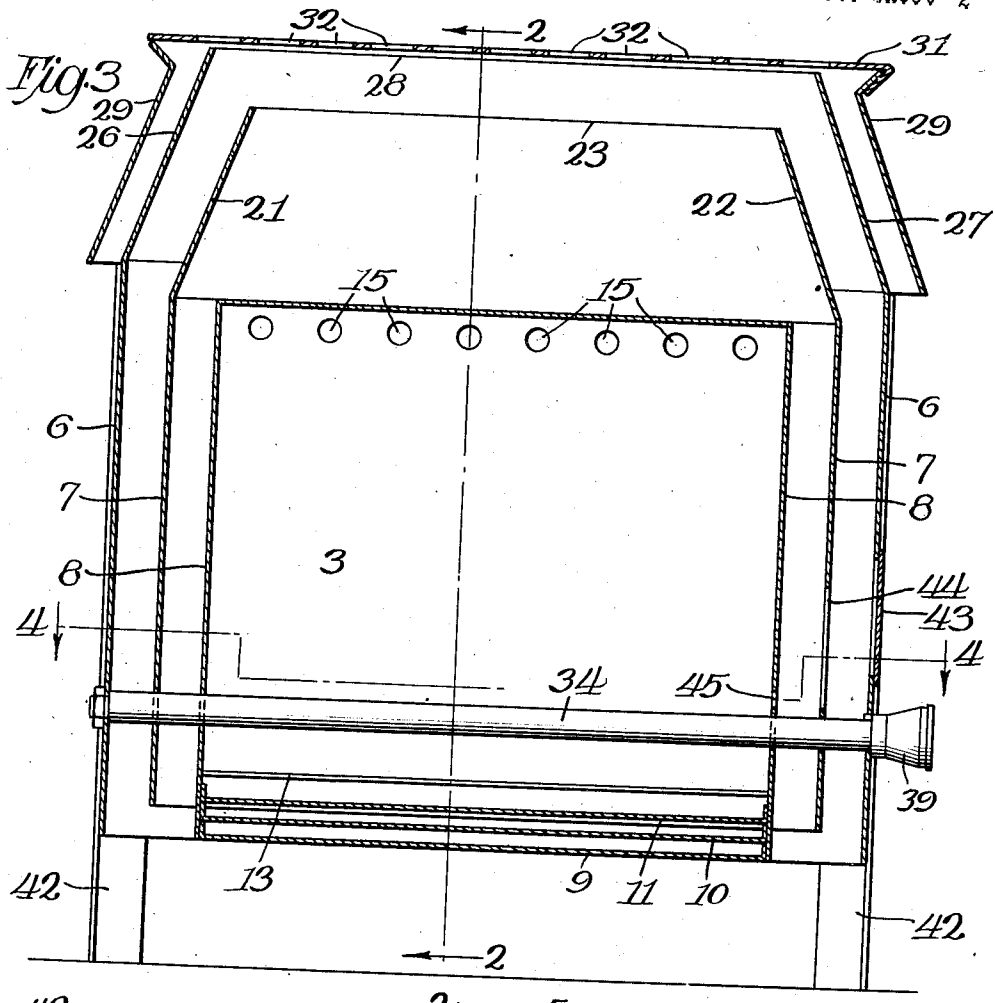
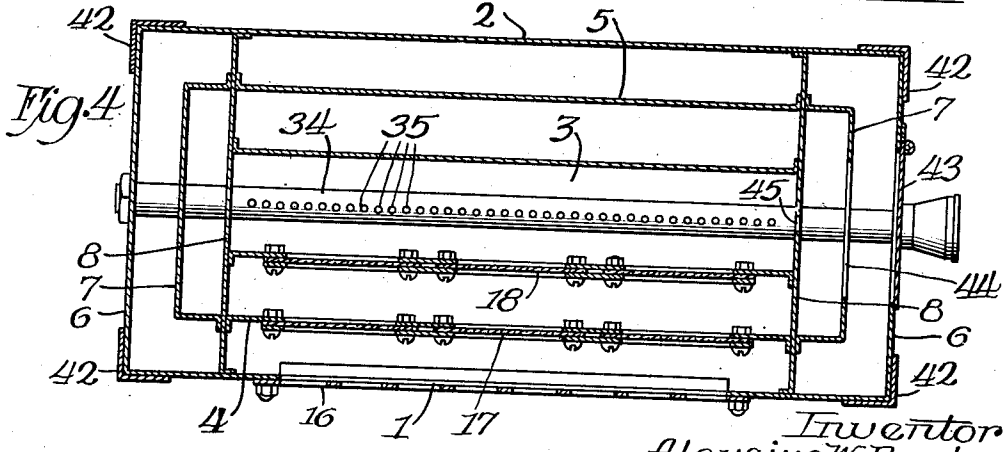


Fig. 4



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UNITED STATES PATENT OFFICE

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SPACE HEATER

Application filed December 17, 1928. Serial No. 326,604.

This invention relates to space heaters, and more particularly those which are adapted to be used in the rooms of a house or other building, and which are provided with gas or other burners or heating elements to heat the air which is taken into the heater at the bottom thereof, close to the floor, and which is then discharged from the top of the heater.

Generally stated, the object of the invention is to provide a novel construction and arrangement whereby to insure a faster and more efficient heating of the air, as it passes upwardly through the heater, and whereby to reduce to a minimum the radiation of heat from the sides of the heater, thereby to insure a practically complete liberation of all the heat from the top of the heater, as will hereinafter more fully appear.

Another object is to provide a novel and improved form of gas burner especially adapted for use in a heater of this kind, serving to more efficiently heat the upwardly moving column of air entering at the bottom of the heater and escaping at the top thereof, and serving to insure complete combustion and to prevent the discharge of any injurious or undesirable gases or products of combustion with the heated air from the top of the heater.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of a space heater of this particular character.

To the foregoing and other useful ends, the invention consists in the matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which,—

Fig. 1 is a side elevation of a space heater embodying the principles of the invention.

Fig. 2 is a vertical section of said heater on line 2—2 in Fig. 3.

Fig. 3 is a vertical section on line 3—3 in Fig. 1.

Fig. 4 is a horizontal section on line 4—4 in Fig. 3.

As thus illustrated, the invention comprises a rectangular upright structure having outside front and back walls 1 and 2, an inside and centrally arranged heating flue 3, which latter is tapered upwardly when viewed in vertical section, as shown in Fig. 2 of the drawings, and the intermediate front and back walls 4 and 5, these walls all being spaced apart, as shown, to provide air spaces between them for the upward passage of the air. Looking at Fig. 3 of the drawings, the structure has outside end walls 6, and inside end walls 7, the latter disposed substantially midway between the outside walls 6 and the end walls 8 of said flue. Baffle plates 9, 10 and 11 are provided, horizontally, in the bottom portion of the heater, being spaced apart as shown in Fig. 2 of the drawings, whereby air is adapted to enter through the openings 12 at the bottom of the heater. The flue 3 is provided at its bottom with an opening 13, as shown, and the top portion of the flue is provided with front and back openings 14 and 15, as shown, the opening 13 being an inlet opening, and the openings 15 being outlet openings. It will be understood that the windows 16, 17 and 18 in the walls 1 and 4, and the flue 3, may be of any suitable character, and it will be understood that the wall 1 is called the front wall because it has the window 16 therein, the wall 2 being intended to be against the wall, or adjacent thereto, when the heater is in use in the room of a house or other building.

The upper portion of the heater comprises the front and back upwardly converging walls 19 and 20, extending in continuation of the vertical walls 4 and 5, and the similarly inclined end walls 21 and 22 extending in upward continuation of the walls 7, 7, whereby the space enclosed by the walls 4, 5, 7, 7 has an upwardly tapered top portion provided with a discharge opening 23 for discharging the heated air. Similarly, the front and back inclined walls 24 and 25 are provided in continuation of the walls 1 and 2, and upwardly converging end walls 26 and 27 are provided in continuation of the walls 6, 6, whereby the air enclosed in the space formed by the walls 1, 2, 6, 6 is discharged through an upwardly tapered top portion having a discharge opening 28, which latter is somewhat larger than the discharge opening 23 previously mentioned. A housing 29

conforms to the upwardly tapered top portion of the heater, with a space between, as shown in Figs. 2 and 3, and is supported by brackets 30 on the top portion of the heater. An apertured grille 31 is suitably secured to the top of the housing 29, as shown, providing a plurality of openings 32 for the discharge of the heated air from the top of the heater. It will be seen that air will also be taken in at the bottom of the housing 29, and will be heated more or less by radiation from the walls 24, 25, 26, 27, and will be discharged from the top of the heater.

Thus, one volume of air enters at the bottom and passes up through the flue 3 and out into the upwardly tapered chamber 33, in which this air is mixed with the air passing up through the space enclosed by the walls 4 and 5, 7 and 7, and these two volumes of air are mixed with the volume of air escaping at the top from between the walls 19 and 24, and 20 and 25, and between the walls 21 and 26, and 22 and 27, there being a final intermingling of all the air which enters at the bottom of the heater, as well as with the air that enters at the bottom of the housing 29 previously described.

Of course, the radiation from the walls of the flue 3 is sufficient to heat the air immediately outside of this flue, and the radiation from the walls 4 and 5 and 7 and 7 is enough to more or less heat the air immediately outside of these walls; but, finally, the radiation from the walls 1 and 2, 6 and 6 is not very considerable, and is practically negligible, and is greatest through walls 24 and 25, and 26 and 27, in the top portion of the heater; but such radiation serves to heat the air entering at the bottom of the housing 29, whereby there is very little radiation from the sides of the heater anywhere, practically all of the heat being absorbed by and discharged with the air from the top of the heater.

The heating flue 3 can be heated in any suitable or desired maner, by any sort of interior heating element. As shown, it is heated by a gas burner 34 of tubular form, extending entirely through the structure of the heater, from one end wall 6 to the other end wall 6, thus forming a structural tie rod between the walls through which it passes, as shown in Figs. 3 and 4 of the drawings.

Looking at Fig. 4 of the drawings, it will be seen that the walls 8 of the heating flue extend through the walls 7, 7 to the outer walls 1 and 2, thus supporting the heating flue and the walls immediately outside of this flue upon the outside walls of the heater, thereby forming a rigid and stable structure. The baffles 9, 10 and 11 are supported, at their opposite ends, on the walls, 8, 8, as shown in Fig. 3 of the drawings, and the structure as a whole thus formed is preferably provided with legs 42 to support the heater on the floor.

The entire structure, it will be seen, with the exception of the burner and the corner legs 42, may be of sheet metal of any suitable or desired character. The windows 16, 17 and 18 can be of mica or any other suitable material.

At the right-hand end of heater, just above the intake portion of the burner, a door 43 is provided, and the adjacent wall 7 has an opening 44 therein, while the adjacent wall 8 has a smaller opening 45 therein, and through this door and these openings a match can be inserted to ignite the gas discharging from the top openings of the burner, after the gas is turned on.

With the foregoing construction, it will be seen that a strong suction is produced, by the passage of the heated air from the top of the heater, which serves to draw in the air at the bottom of the heater, thus heating the air faster. Moreover, the outer walls of the heater are kept comparatively cool, which has several advantages, among which is the possibility of using a cheaper paint or finish for the outside of the heater, than would be possible with a more highly heated exterior therefor; and, in addition, the heater can be placed near a wall, or near furniture, without danger of doing any harm, and in addition, people are not liable to be burned by the heater. Furthermore, it will be seen that the burner is midway between two inwardly inclined walls of the center heating flue, thereby affording the free passage of the air at both sides of the burner, thus insuring better combustion and less liability of smoking and less possibility of the production of objectional gases. This center flue which is upwardly tapered in vertical cross-section acts like a draft flue to pull the air up through the first and second air spaces, by the passage of the heated air from the top of the flue upwardly past the tops of said spaces. The tubular burner is spaced a distance from both walls, so that the flame will not impinge on either wall, and hence the smoking and formation of objectional gases, as stated, is prevented.

Also, it will be seen that the grill 31, as shown in Figure 3, is slidable endwise from the top of the heater, and it is desired to attain access to the top of the heater, for any purpose whatsoever.

What I claim as my invention is:

1. In a space heater, the combination, of an upright central heating flue having a bottom inlet opening and upper outlet openings, walls spaced from the walls of the flue to provide an air heating space all around said flue, and outer walls spaced from said first mentioned walls, forming a second air heating space all around said first mentioned walls, a heating element in said flue, and commingling means forming the top portion of the heater, said commingling means receiving and commingling the heated air

discharged upwardly from the flue and the upper ends of the first and second heating spaces, provided with discharge means to discharge the commingled and heated air from the top portion of the heater.

2. A structure as specified in claim 1, said flue having upwardly converging front and back walls, having outlet openings in the upper portions thereof, and said flue having vertically disposed end walls, the flue being closed at its top immediately above said outlet openings, and the bottom of the flue being open directly below said heating element.

3. A structure as specified in claim 1, said commingling means comprising upwardly converging walls for said first and second heating spaces, the upwardly converging walls for the second heating space being higher than those for the first heating space, providing an upwardly tapered top portion for the heater structure.

4. A structure as specified in claim 1, said commingling means comprising upwardly converging walls for said first and second heating spaces, the upwardly converging walls for the second heating space being higher than those for the first heating space, providing an upwardly tapered top portion for the heater structure, in combination with a housing conforming to and spaced from the outer upwardly tapered top portion of the heater, said housing being open at the top and bottom to permit air to enter at the bottom and be heated and escape from the top thereof.

5. A structure as specified in claim 1, said flue having upwardly converging front and back walls, having outlet openings in the upper portions thereof, and said flue having vertically disposed end walls, the flue being closed at its top immediately above said outlet openings, and the bottom of the flue being open directly below said heating element, together with a plurality of horizontal baffles spaced apart immediately below the open bottom of said flue.

6. A structure as specified in claim 1, said heating element comprising a tubular gas burner extending horizontally through the end walls of said heating flue, and also through the end walls of said first and second heating spaces, forming a tie rod through the entire structure.

7. A structure as specified in claim 1, said flue being formed by front and back walls spaced a distance apart, and by end walls spaced apart a much greater distance, forming an oblong space within the flue, when the flue is viewed in horizontal section, and said heating element comprising a gas burner extending lengthwise through said oblong space and through the entire structure of the heater, forming a tie rod for the structure.

8. A structure as specified in claim 1, said flue being formed by front and back walls spaced a distance apart, and by end walls spaced apart a much greater distance, forming an oblong space within the flue, when the flue is viewed in horizontal section, and said heating element comprising a gas burner extending lengthwise through said oblong space and through the entire structure of the heater, forming a tie rod for the structure, said burner having a series of jet openings along the upper side thereof, throughout practically the entire length of said oblong space, and having inlet and mixing provisions tending to mix the gas and air and distribute the mixture at uniform pressure to said outlet openings of the burner, thereby to cause uniform combustion and uniform heating throughout the length of said burner to uniformly heat the interior of said flue.

9. In a space heater, a structure having an upright heating flue having front and rear walls inclined inwardly, and a horizontal burner disposed substantially midway between said walls, in the lower portion of the flue, preventing the burner flame from impinging on either wall, and other walls providing air space around the exterior of said flue, and means at the top of the heater to mingle the air from the flue with the air from said space, and means to discharge the mixture from the top of the heater.

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