E. H. KENNEDY.

HEATING APPARATUS.

APPLICATION FILED FEB. 7, 1920.

1,420,264.

Patented June 20, 1922.

4 SHEETS—SHEET 1.

Fig. 1.

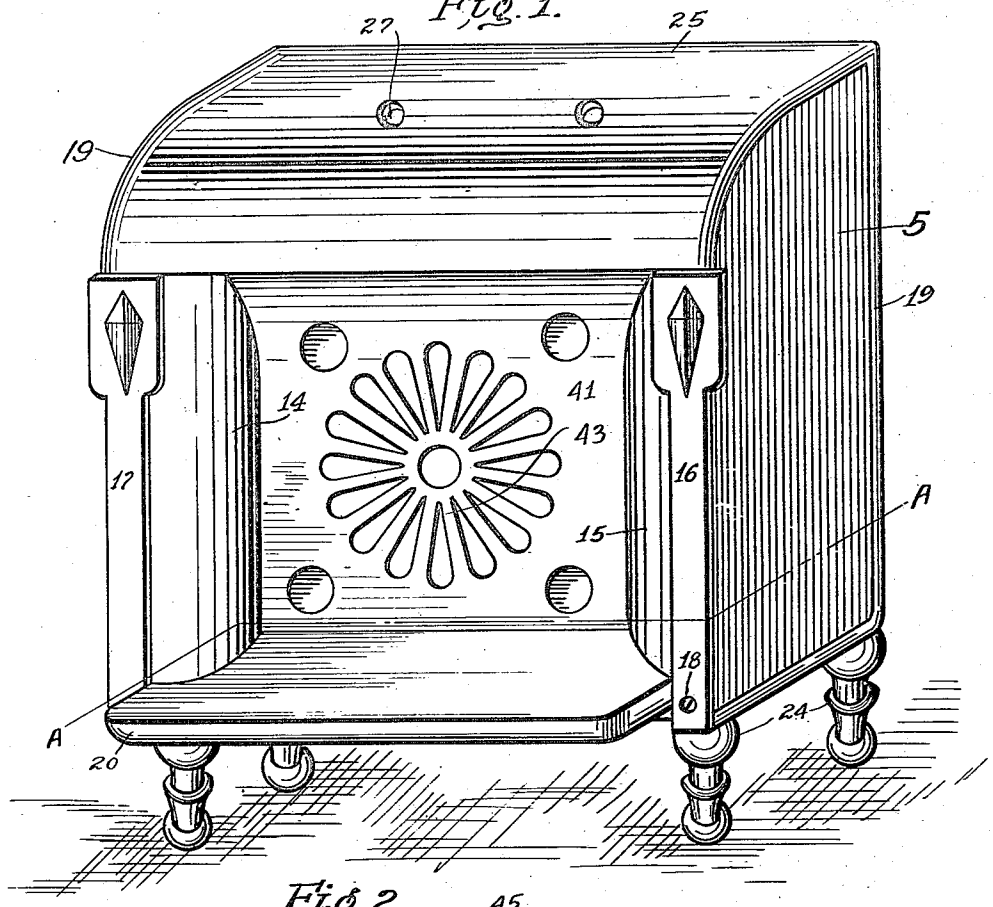
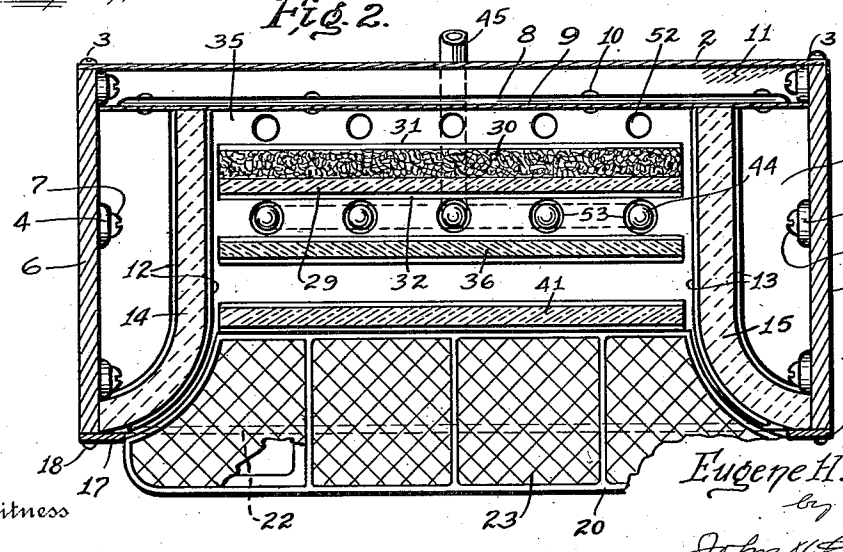



Fig. 2.




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4 SHEETS—SHEET 2.

Fig. 4.

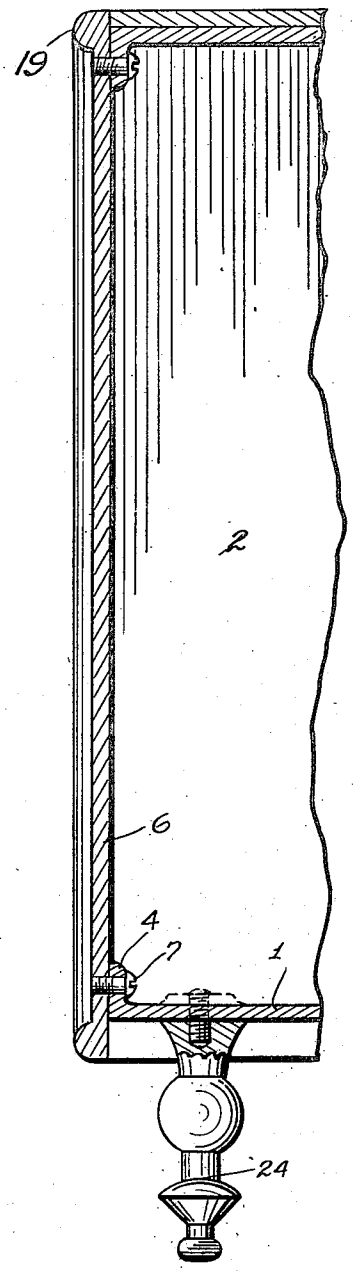
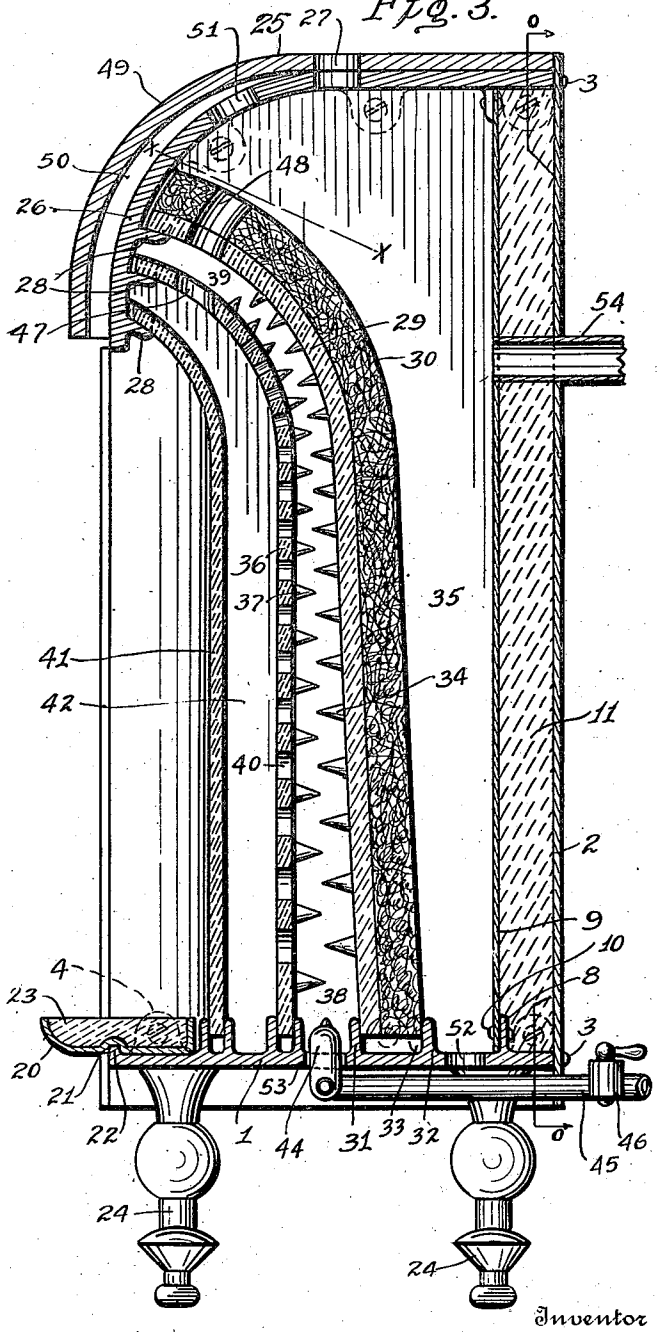



Fig. 3.




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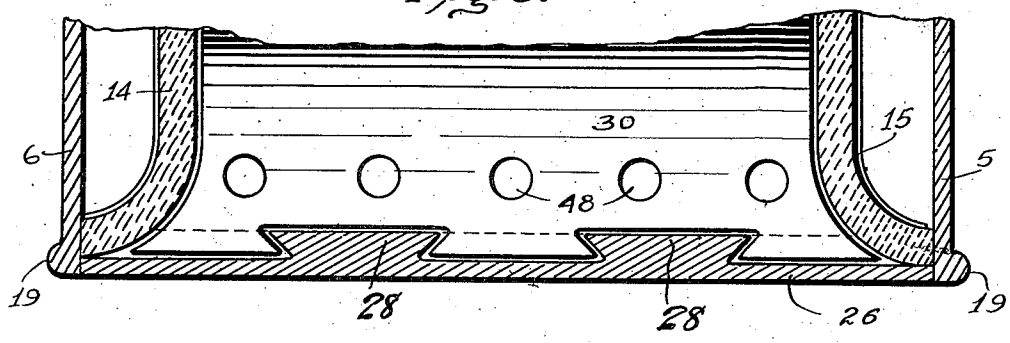
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4 SHEETS—SHEET 3.

Fig. 5.



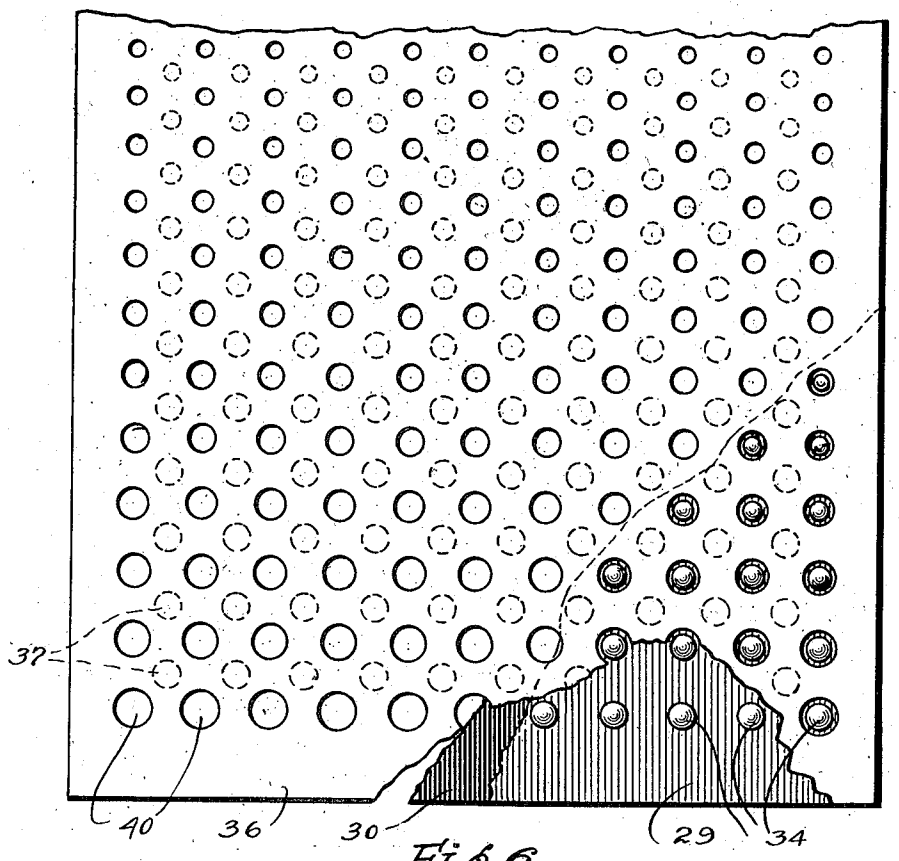




Fig. 6.

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4 SHEETS—SHEET 4.

Fig. 7

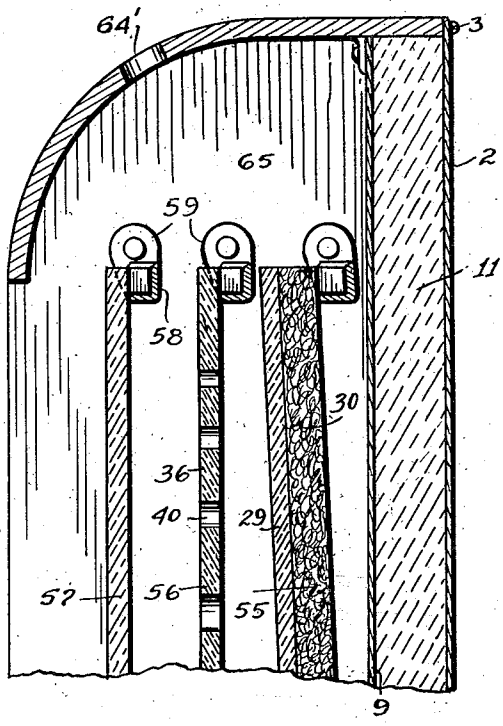



Fig. 8.

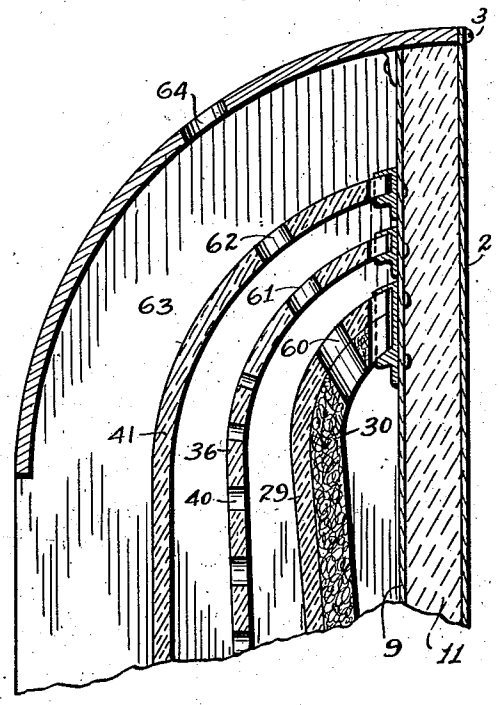



Fig. 9.

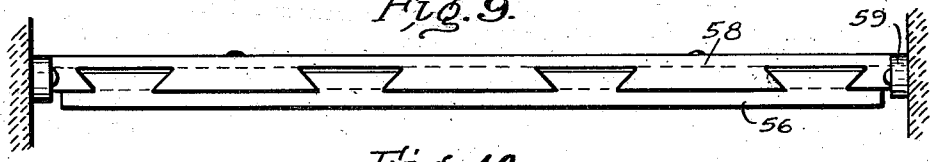
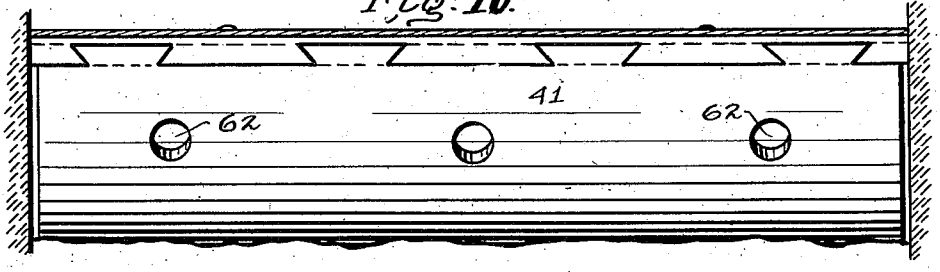



Fig. 10.




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# UNITED STATES PATENT OFFICE.

EUGENE H. KENNEDY, OF MANSFIELD, OHIO.

## HEATING APPARATUS.

1,420,264. Specification of Letters Patent. Patented June 20, 1922.

Application filed February 7, 1920. Serial No. 356,900.

*To all whom it may concern:*

Be it known that I, EUGENE H. KENNEDY, a citizen of the United States of America, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in a Heating Apparatus, of which the following is a specification.

This invention relates to a heating apparatus using gaseous fuel for the production of heat.

The primary object of the present invention is to provide a heating apparatus which is adapted to use gaseous fuel in such a manner as to store, retain and radiate the heat in a more efficient manner than has heretofore been obtained with the use of a conventional type of stove or the like.

Another object of the present invention is to provide a means for a gas burner heating apparatus which is adapted to retain and maintain heating elements in predetermined positions and to concentrate and confine the heat so as to force it to travel in certain well defined paths and permit it to escape into the room or enclosure containing the heating apparatus.

A further object is to provide means for supporting the heating elements in such a manner as to hang them in predetermined positions with respect to each other and provide for expansion and contraction of same.

A further object is to provide for the proper mixture for air and gas and the gaseous fuel without the use of an air mixer.

The present invention in conventional form comprises a gas burner heating apparatus built up of fire brick or clay in combination with metal and arranging a plurality of porous heating elements therein in such a manner as to concentrate, radiate and diffuse the heat produced by the burner efficiently.

A further object is to construct and arrange the heating elements in such a manner as to provide for automatic mixture of air and gas under all pressures of gas to provide for proper combustion and thereby intensely heat the heating elements.

These and other objects are attained by the conventional apparatus illustrated in the accompanying drawing in which:

Fig. 1 is a perspective view of a heating apparatus showing same in assembled form.

Fig. 2 is a cross sectional plan view on the line A—A of Fig. 1.

Fig. 3 is a vertical, central sectional view of Fig. 1 showing the preferred form of heating apparatus having heating elements positioned therein.

Fig. 4 is a section of the back and side of the heating apparatus on the line O—O of Fig. 3.

Fig. 5 is a section taken on the line X—X of Fig. 3.

Fig. 6 is a plan view showing in broken lines the heating elements and asbestos.

Fig. 7 shows a vertical broken section of a modified form of heating elements and apparatus.

Fig. 8 shows a modified form of the heating elements and heating apparatus.

Fig. 9 shows a plan view of the means of attaching the heating elements and asbestos in the form shown in Fig. 7.

Fig. 10 shows the detail of the fastening means used in connecting the heating elements in the apparatus shown in Fig. 8 which is the same construction for holding the heating elements that is shown in Fig. 3 except that the holding and supporting means is attached to the front of the heating apparatus in Fig. 3.

In the drawings the invention is shown applied to a gas burner heating apparatus the exterior of which is shown conventional in form.

In the manufacture and construction of my invention a bottom plate 1 is provided and a closed back wall 2 is attached thereto through the medium of screws 3 or other well known fastening means.

The bottom plate 1 is provided with upstanding lugs 4 to which the side walls 5 and 6 are attached by screws 7 or the like. An upstanding horizontal flange 8 is provided on the bottom plate 1 and a partition plate 9 attached thereto through the medium of rivets 10 or the like in spaced relation to the back wall 2 as shown in Fig. 2. The space between the back wall 2 and partition wall 9 is preferably filled with fire brick 11 or like material. Upstanding horizontal flanges 12 and 13 are formed on the bottom 1 and spaced apart to receive, retain and hold in position the side fire brick walls 14 and 15 as shown in Fig. 1.

Front plates 16 and 17 are attached to the side walls 5 and 6 by screws 18 or the like as shown in Figs. 1 and 2. The faces of the plates 16 and 17 can be provided with

any desired design. The meeting ends of the side, back, bottom and top walls are preferably provided with half round beads 19. A pan shaped hearth member 20 is provided with a depression 21 to fit a rib 22 formed on the bottom 1 of the heating apparatus when the same is supported upon the front portion of the bottom 1 as shown in Fig. 2 thereby preventing displacement of the pan. The pan is formed of such dimensions as to have a portion thereof extending beyond the front of the heating apparatus to provide a hearth, the larger portion of the pan extending inwardly over the bottom 1 and maintaining the pan in its proper position, because the greater weight thereof is resting or being supported upon the bottom 1 of the heating apparatus.

Fire brick 23 or similar material is laid in the pan as shown in Fig. 2 which can be of any design desired. The entire heating apparatus is supported by conventional legs 24 or the like. The top 25 of the heating apparatus can be made of any form but is preferably provided with a curved downwardly extending portion 26 as shown in Figs. 1 and 2. A series of openings 27 are provided in the top portion 25 as shown in Figs. 1 and 3.

In the preferred form as shown in Fig. 3 the members 28 are provided on the downwardly projecting portion 26. The members 28 are dove-tailed to receive counterpart dove-tailed portions formed on the top portion of the heating element 29 and asbestos 30. The lower ends of the asbestos 30 and heating element 29 engage the channel formed by the spaced apart flanges 31 and 32 thereby holding same in a predetermined position.

It will be observed that a space 33 is provided between the bottom 1 of the heating apparatus and the ends of the asbestos and heating elements to provide for expansion and contraction when the heating element is subjected to heat from the burner.

A series of cone shaped deflectors 34 are provided on the heating element 29 which serve to direct, diffuse, focus and radiate the heat from the burner. It will be observed that the heating element 29 is not provided with openings or apertures and that the asbestos 30 prevents the heat from radiating into the chamber 35 thereby tending to force the heat toward the front heating element 36. The heating element 36 is attached to the heating apparatus in the same manner as the heating element 29 hereinbefore described. The heating element 36 is provided with a series of heat deflectors 37 which are arranged in staggered relation with respect to the heat deflectors 34.

The heat deflectors 34 and 37 project toward each other or in opposite directions as shown in Fig. 3.

It will be observed that the heating elements are spaced apart in such a manner as to leave a larger space 38 at the bottom than at the top 39. This arrangement provides means of concentrating the heat within a smaller space just prior to its passage into the chamber 35 and out through the apertures 27 into the enclosure or room.

The heating element 36 is provided with a series of openings 40 which vary in size from the bottom to the upper portion thereof.

A front plate 41 is attached to the depending portion 26 of the top 25 in the same manner as the heating elements and asbestos. It is, however, as shown spaced apart from the heating element 36 leaving a chamber 42.

The front plate 41 can be provided with any design desired such as shown at 43.

A burner 44 is interposed between the heating elements 29 and 36 and is provided with a series of jet openings extending substantially from side to side of the heating apparatus, as shown in Fig. 2. The fuel is supplied through a pipe 45 which is regulated by a conventional type of valve 46.

An aperture 47 is provided in the heating element 36 to permit of the passage of heat through and into the aperture 48 formed in the heating element 29 and asbestos 30 whence it escapes through the apertures 27 formed in the top of the stove.

In order to provide protection for the part 26 of the downwardly projecting portion of the top 25 an apron member 49 is provided and attached to the top portion so as to leave a space 50 between the downwardly depending portion 26 and the apron to allow a cold draft of air to cool the depending portion 26 of the top and keep it from warping or distorting out of shape from the heat produced from the heating elements.

An aperture 51 is provided in the portion 26 to permit the cold air to pass into the chamber 35. A series of apertures 52 are provided in the bottom portion 1 of the heating apparatus to permit a current of air to pass up through the chamber 35 and mix with the hot air from the passage thereby forcing the heat to escape out through the apertures 27 into the enclosure or room surrounding the heating apparatus.

It will also be observed that circular spaces 53 are provided around the burner jets to permit of a free circulation around the burner and up through the space between and over the heating element.

If desired a conductor flue 54 can be attached to the heating apparatus and brought into communication with the chamber 35 to carry off the by products of combustion as shown in Fig. 1.

The modification shown in Fig. 7 is constructed and designed similar to the preferred construction hereinbefore described

except that the asbestos 55, heating element 56 and front apertured plate 57 are formed substantially straight and hang from a bar 58 which is attached through the medium of lugs 59 to the side walls of the heating apparatus.

The modification shown in Fig. 8 is similar to the preferred form of construction hereinbefore described except that the upper portions of the heating elements and asbestos are curved in reverse relation and attached to the partition wall 9 of the heating apparatus as shown in Fig. 10.

Alined apertures 60, 61 and 62 are formed in the heating elements and asbestos permitting the heat to pass into the chamber 63 of Fig. 8 and out into the enclosure or room through apertures 64 as shown in Fig. 7.

In the modification shown in Fig. 7 no apertures are provided in the asbestos or heating elements as they are all spaced apart permitting the heat to escape up into a chamber 65 and out into the room through apertures 64′ formed in the top of the heating apparatus.

It will be observed that the modified form shown in Figs. 7 and 8 do not have an apron such as shown at 49 to maintain the depending portion 26 cool through the medium of a cool draft of air, but it will be obvious that the same can be used if desired and found preferable.

The operation of the heating apparatus in the preferred form in brief is as follows: Gaseous fuel is conducted to the burner 44 and the flame from the burner contacts with the heat deflectors 34 and 37 of the heating elements and gradually passes up and out through the apertures 48 formed in the heating element 29 and asbestos 30 into the chamber 35, and thence into the room or other enclosure in which the heating apparatus is placed.

The apertures 40 formed in the heating element 36 being graduated or varied in size permitting more or less air to be admitted between the heating elements and as the gas pressure is reduced or increased the flow of air is increased or decreased in proportion through the medium of the graduated openings thereby automatically mixing the air and gas in proper proportions for proper combustion under different pressures.

The heating elements become intensely heated through the medium of the heat deflectors and as they are made of porous porcelain or similar material they are intensely heated diffusing, retaining and radiating intense heat into the room in which the heating apparatus is placed thereby economizing in the use of fuel as considerable more heat is produced because of the use of porous heating elements.

As the porcelain heating elements become intensely heated it is necessary that the same should be of a porous nature to provide for expansion and contraction thereof without cracking or breaking.

Attention is called to the fact that when the heating elements are heated by the burner that the same is transmitted to the fire clay walls and absorbed, thereby retaining the heat for longer periods of time because of the use of the fire clay material (or the like) in the construction of the heating apparatus in combination with metal.

In the modification shown in Figs. 7 and 8 attention is called to the fact that the heat deflectors 34 and 37 are not shown on the heating elements. It is preferable, however, to use said heat deflectors 34 and 37 as shown in Fig. 3 as more efficiency and radiation is obtained in producing heat from a given amount of fuel.

It is not intended to limit the application or use of my invention to a stove as the invention shown therein and described can be readily adapted for use without deviating from the principle of my invention and applied to other heating appliances such as furnaces or the like.

I claim:

1. In a gas fire heating structure, a metal body, means of securing fire brick to the back wall thereof, fire brick side walls secured to the metal body in spaced relation to the side walls of the metal body, two flat radiant heat retaining elements secured in spaced relation to the rear wall of the metal body and in spaced relation to each other providing a tapered passageway between them from the bottom to the top thereof, a burner secured to the lower portion of the metal body and arranged in the space between the radiant heating elements, means to direct the products of combustion from between said radiant heating elements into the chimney flue, and a canopy attached to the upper portion of the metal body having its free ends arranged in spaced relation to the front portion of the stove body to provide an air passage to communicate with the space between the radiant heating elements and the rear wall of the stove body.

2. In a heating apparatus, the combination of a metal body which is provided with means for receiving and maintaining fire brick back wall and fire brick side walls in association, radiant heating elements composed of refractory material hung from the upper portion of the stove body and spaced from the rear wall of the stove body and from each other in such a manner as to provide a tapered passage from the bottom to the top thereof, said radiant heating elements being provided with a series of heat retaining lugs arranged in opposed staggered relation to each other, one of said heat retaining elements also being provided

with a plurality of series of apertures of different sizes running from the bottom to the top, means for retaining the lower portion of said heating elements in spaced relation and position but allowing for expansion thereof and a shield secured to the upper portion of said structure in such a manner as to provide an air passage communicating with a space between the heating elements and the back wall of the heating apparatus.

3. In a heating apparatus, the combination of a metal body which is provided with means for receiving and maintaining a fire brick back wall and fire brick side walls in association, two flat radiant heating elements composed of refractory material hung from the upper portion of the stove body and spaced from the rear wall of the stove body and from each other in such a manner as to provide a tapered passage from the bottom to the top thereof, said radiant heating elements being provided with a series of heat retaining lugs arranged in opposed staggered relation to each other, one of said heat retaining elements also being provided with a plurality of series of apertures of different sizes running from the bottom to the top, means of retaining the lower portion of said heating elements in spaced relation and position but allowing for expansion thereof, a shield secured to the upper portion of said structure in such a manner as to provide an air passage communicating with a space between the heating elements and a hearth removably attached to the front of the metal body.

In testimony whereof I affix my signature.

EUGENE H. KENNEDY.