US 20060185664A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2006/0185664 A1

Butler et al. (43) Pub. Date: Aug. 24, 2006

(54) BURNER SYSTEM INCORPORATING FLAME AND LIGHT

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(21) Appl. No.: **11/067,406**

(22) Filed: **Feb. 22, 2005**

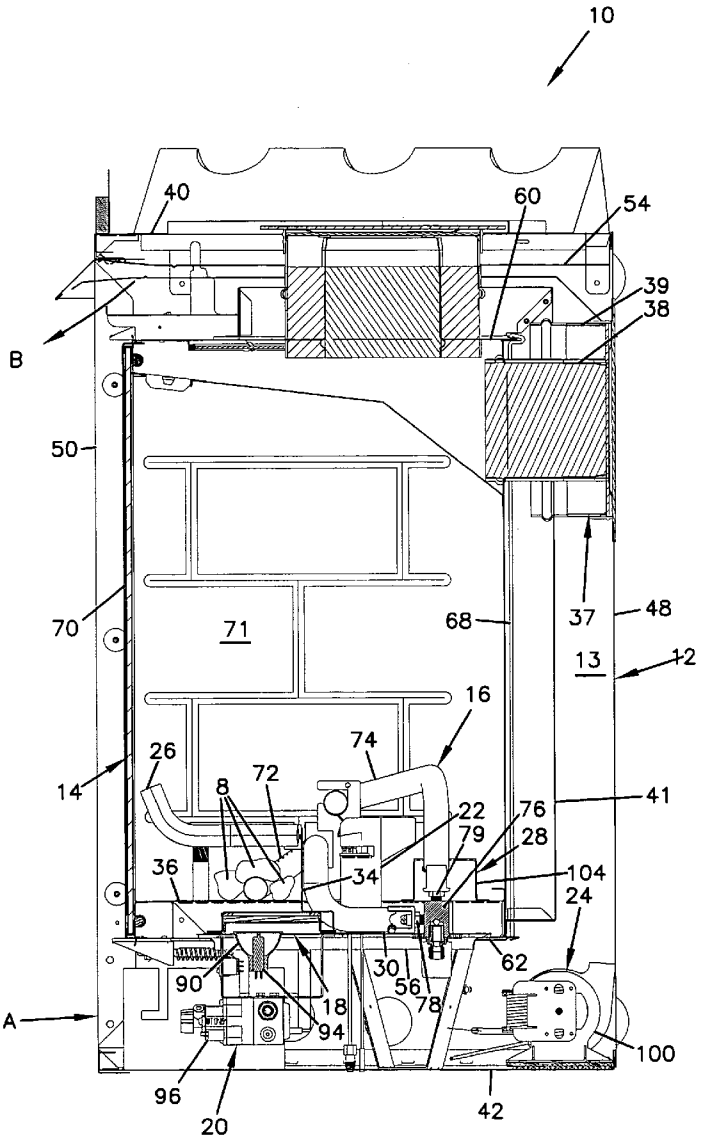
Publication Classification

(51) **Int. Cl.**
F24B 1/18 (2006.01)

(52) **U.S. Cl.** **126/512**

(57) **ABSTRACT**

A heating appliance that includes an enclosure defining a combustion chamber, an ember support member, a plurality of translucent artificial embers, a burner, and a light source. The embers are disposed upon the ember support member. The burner is coupled to a source of combustible fuel and is positioned vertically above the ember support member. The burner is also at least partially surrounded by and in contact with the embers to reduce viewability of the burner. The light source is positioned vertically below the ember support member and produces light that illuminates the embers.



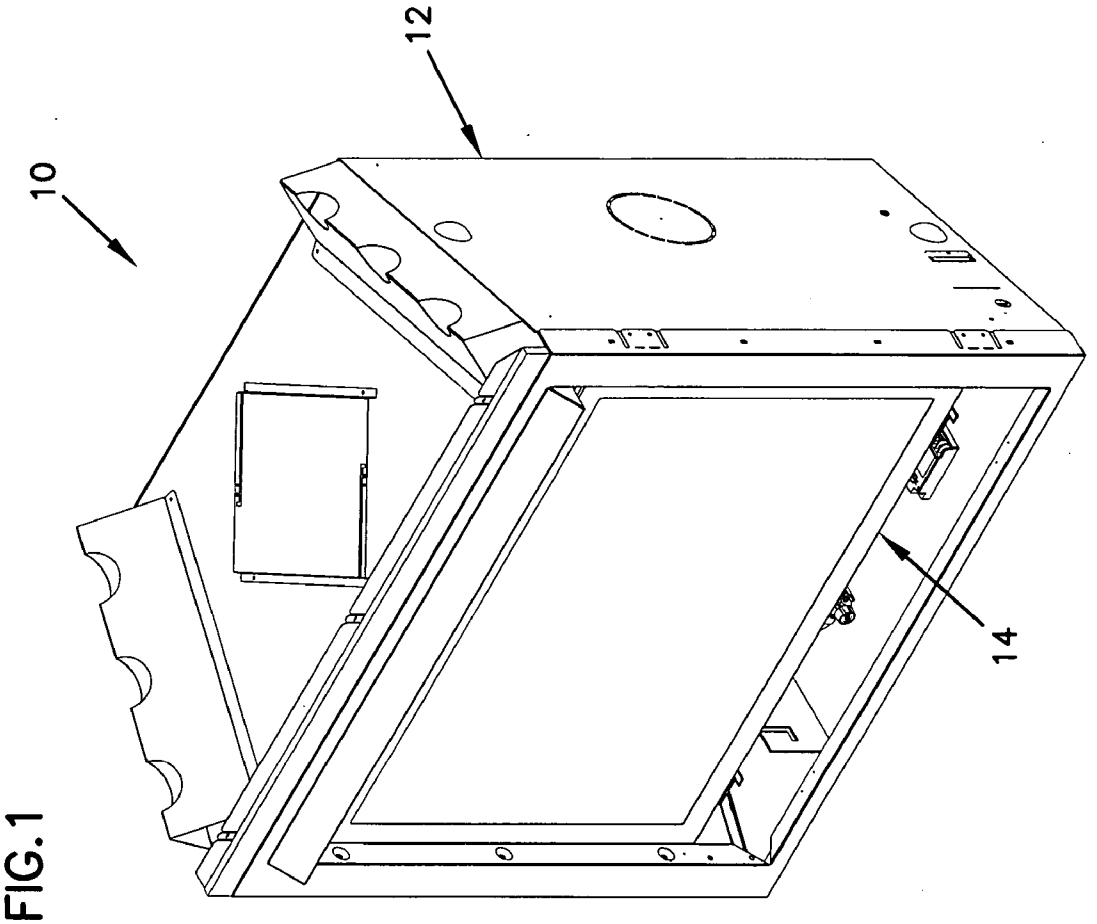


FIG. 1

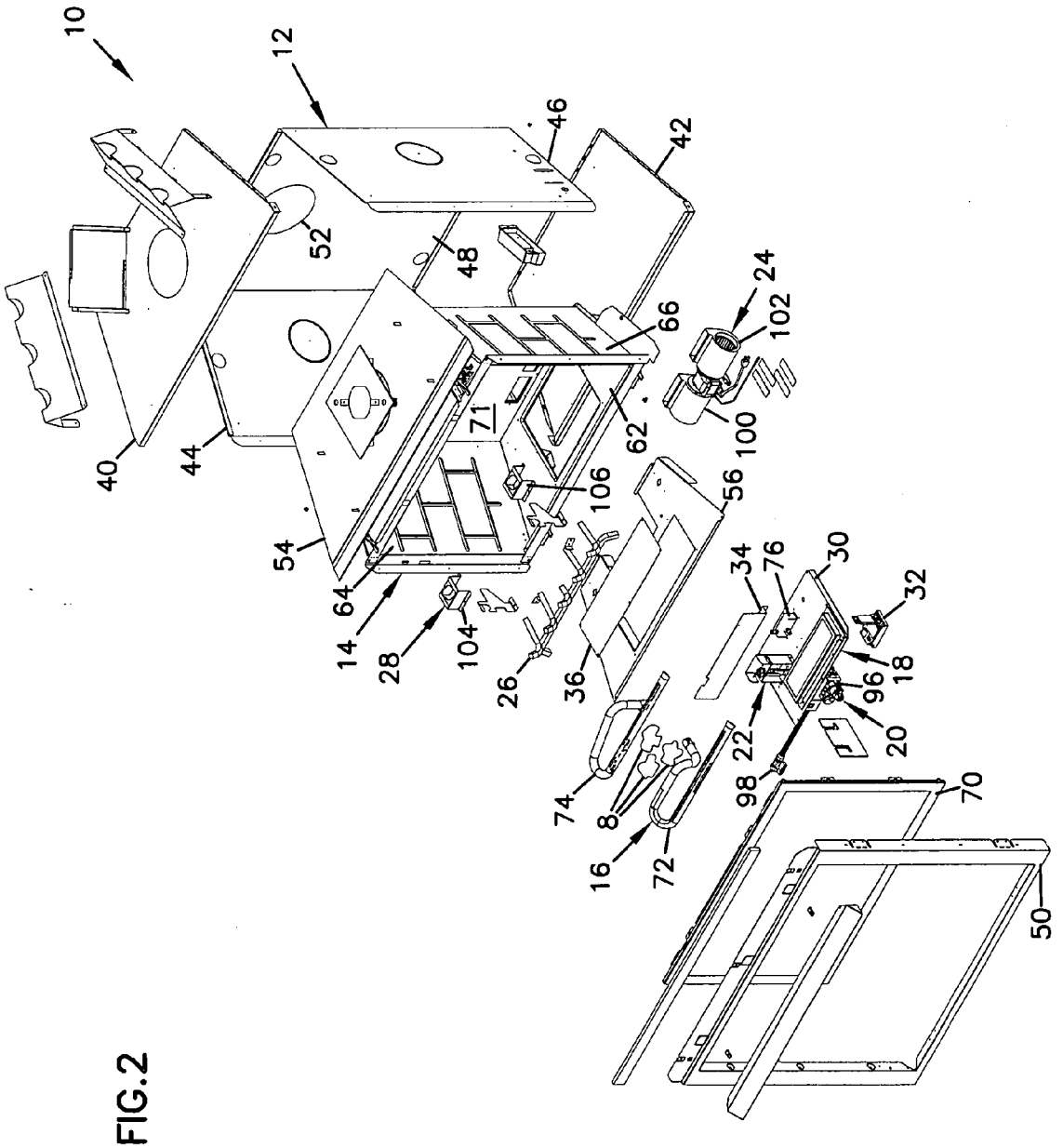

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FIG.2

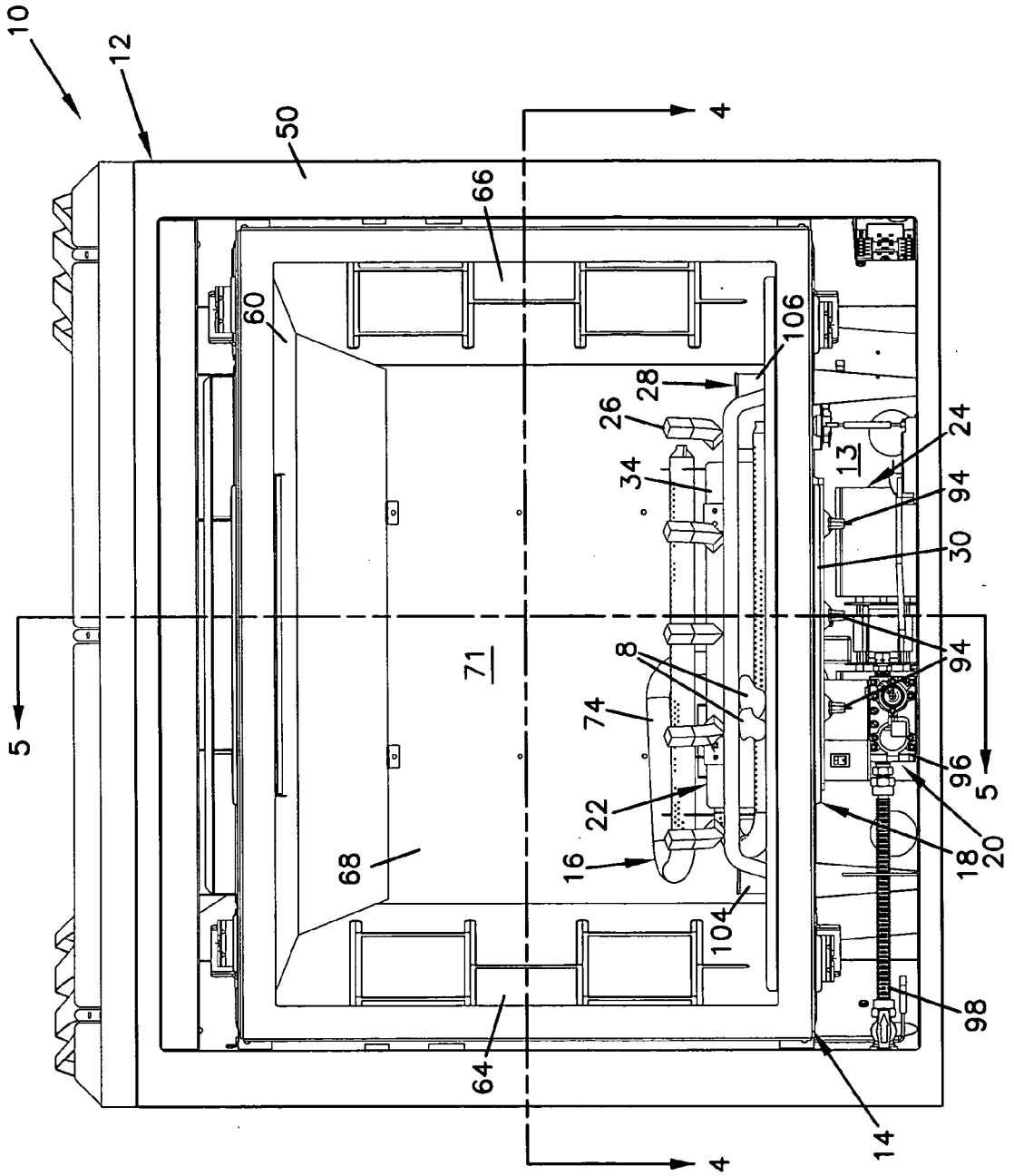
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FIG.3

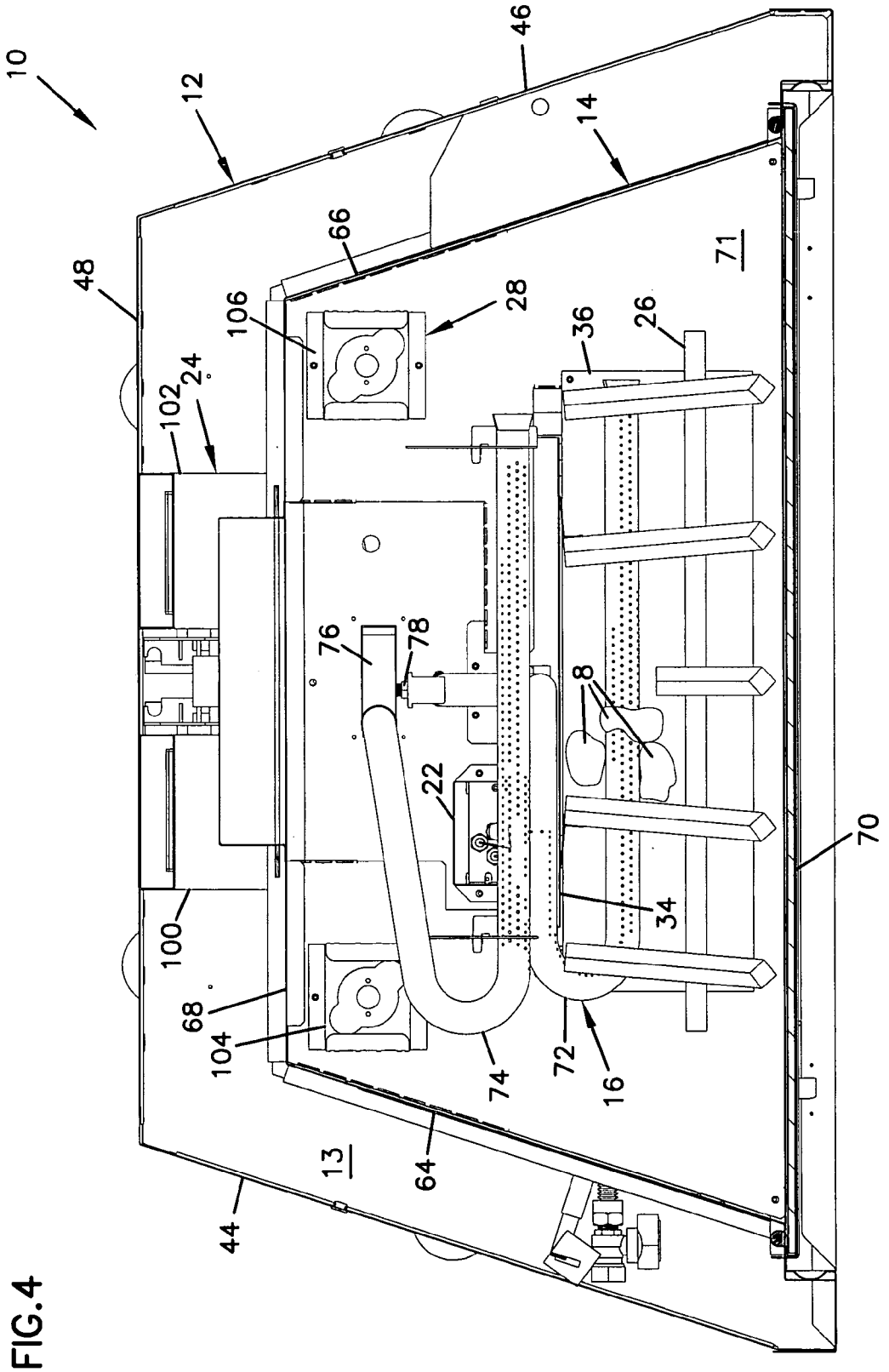
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FIG. 4

FIG.5

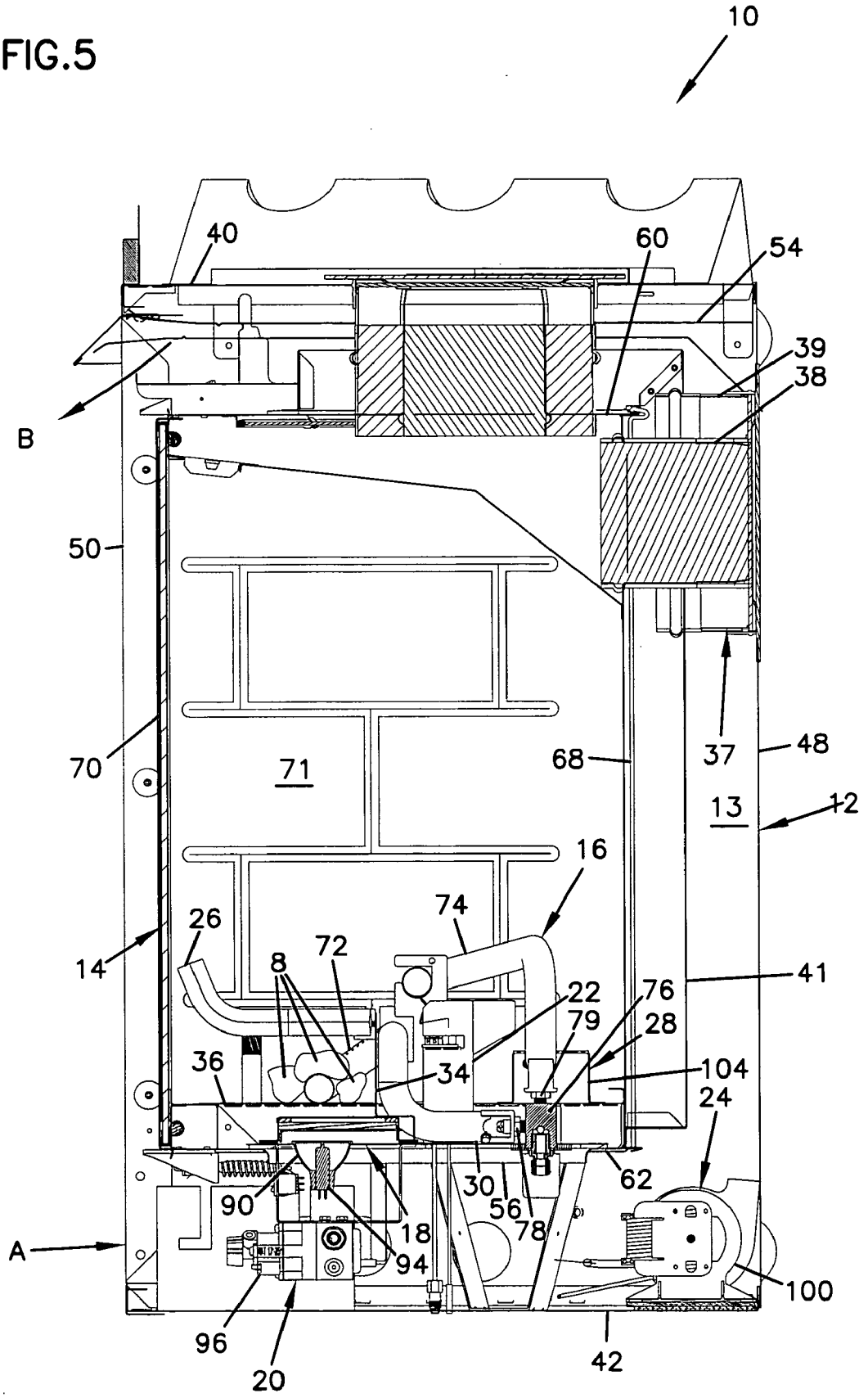
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FIG.6

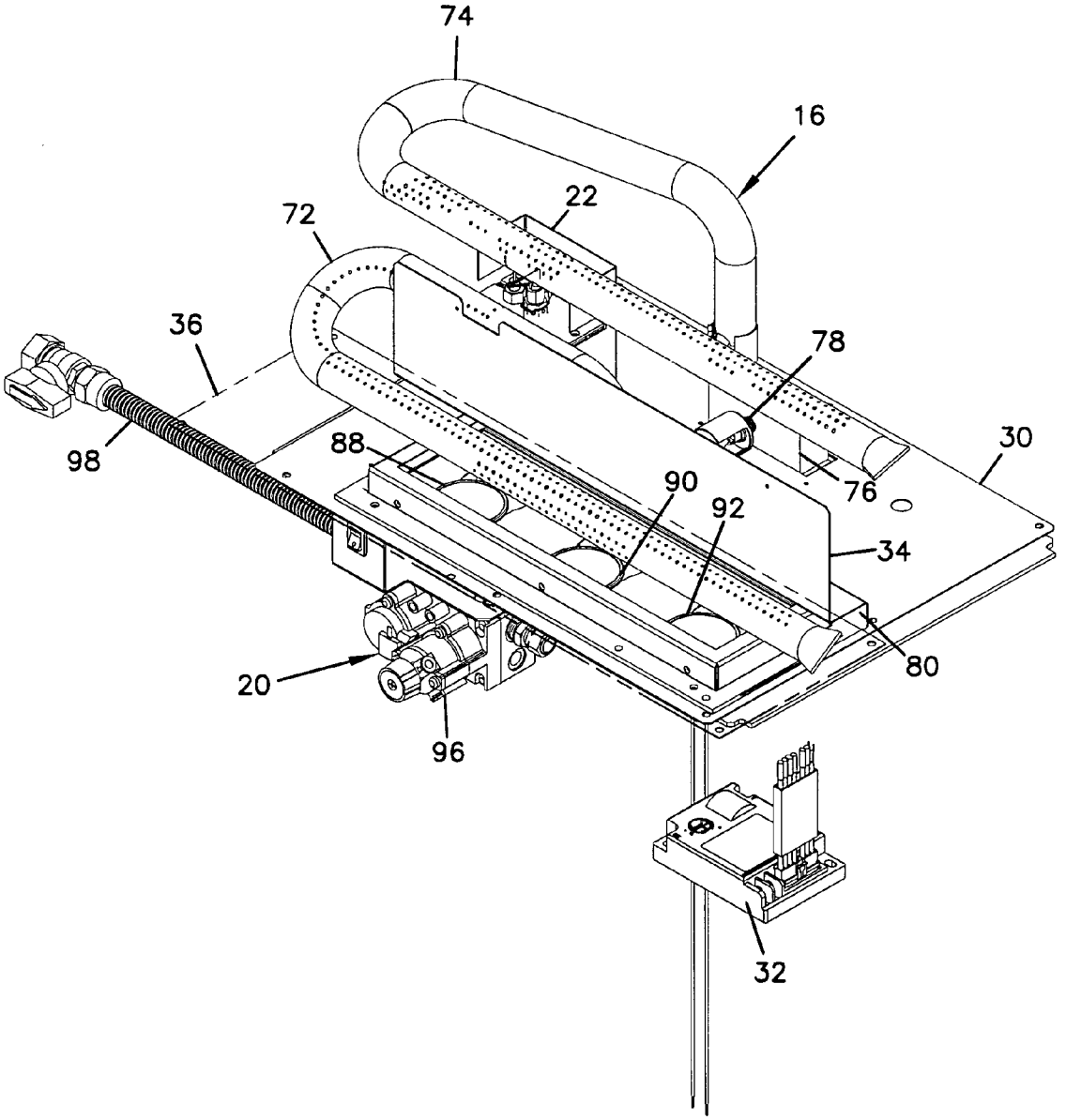
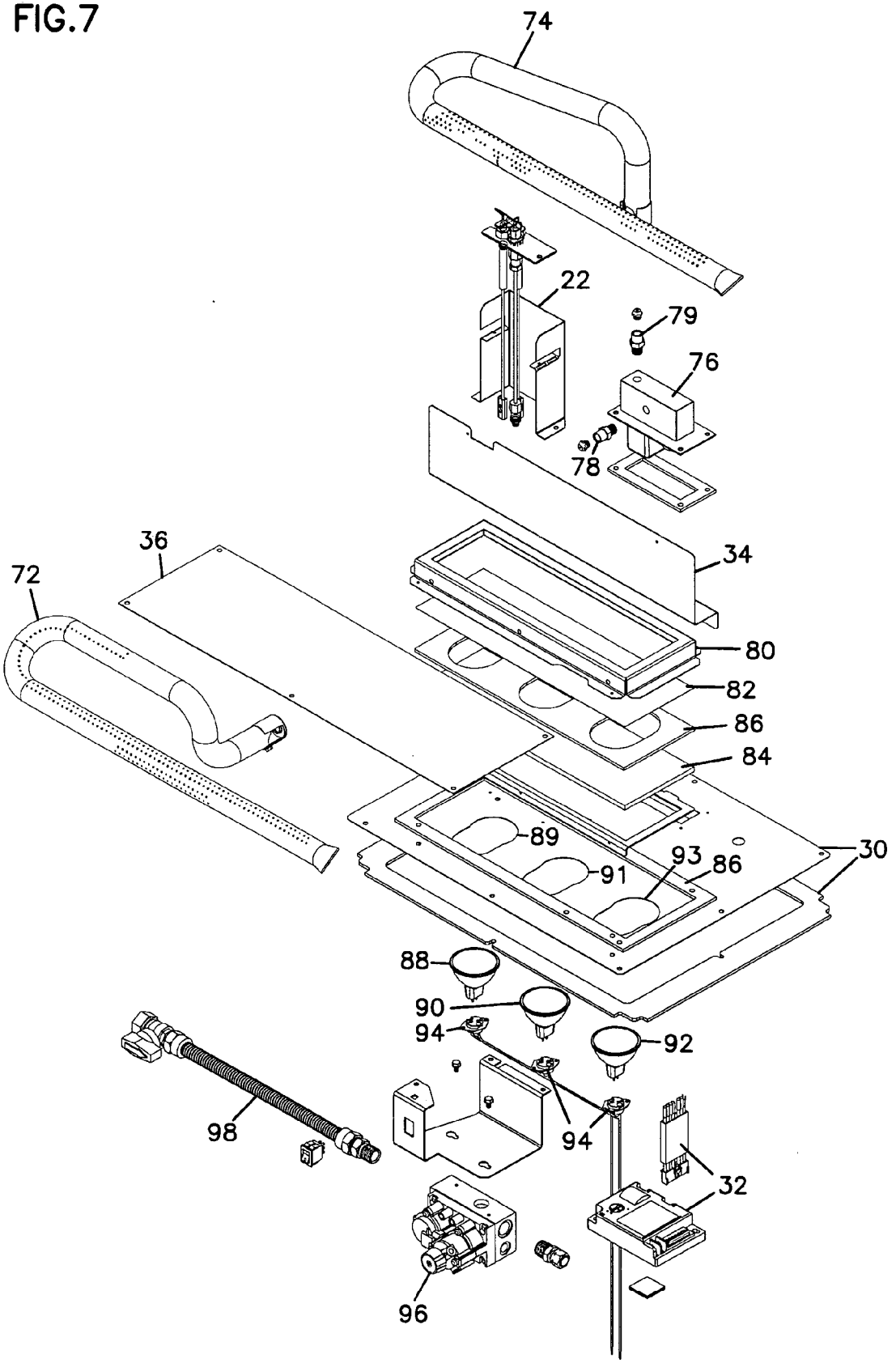


FIG.7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BURNER SYSTEM INCORPORATING FLAME AND LIGHT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to heating appliances, and more specifically relates to burner assemblies for use in heating appliances such as fireplaces, stoves, and fireplace inserts.

[0003] 2. Related Art

[0004] Gas, electric, and wood burning heating appliances such as fireplaces, stoves and fireplace inserts are an efficient method for providing warmth and creating the appeal of a fire within a room. Fireplaces have become commonplace in today's building trades for both residential and commercial applications. Most new home construction designs include at least one, and often several fireplaces. Further, a significant number of remodeling projects are focused on fireplaces.

[0005] The representation of glowing embers in such fireplaces is desirable to provide the realistic effect of a fire when a gas flame is present instead of a flame provided by combustion of wood or other fibrous products. Previous systems created to provide artificial glowing embers typically call for a glass panel with artificial embers fused to the panel and a light source positioned below the panel to illuminate the embers and thereby create the illusion of glowing embers. However, such systems have at least the following several drawbacks.

[0006] First, previous systems do not perform well at high temperatures. The materials used to create the artificial embers break down at the higher temperatures found in fireplaces. Such systems also require that the illumination device be remotely positioned from the combustion chamber enclosure because of the intense heat created in the combustion chamber. Second, the individual simulated glowing embers provided in the systems are not movable or adaptable to different burning environments because the simulated embers in the previous systems are fused together and to the glass panel. Third, the previous systems fail to provide the most aesthetically appealing embers because the artificial embers are fused and therefore create only a two-dimensional look. Fourth, the composition of the materials selected to create the artificial embers do not create a naturally looking ember bed.

[0007] The present invention addresses many of the above deficiencies of prior heating appliances and simulated glowing ember beds.

SUMMARY OF THE INVENTION

[0008] The present invention generally relates to gas, electric, or wood burning heating appliances. One aspect of the invention relates to a fireplace that includes an enclosure defining a combustion chamber, an ember support member, a plurality of translucent artificial embers, a first tube burner, and a light source. The embers are disposed upon the ember support member. The first tube burner is coupled to a source of combustible fuel and is positioned vertically above the ember support member. The first tuber burner is also at least partially surrounded by the embers to reduce viewability of the tube burner. The light source is positioned vertically below the ember support member and produces light that illuminates the embers.

[0009] Another aspect of the invention relates to a heating appliance that includes an enclosure defining a combustion chamber, an ember support surface, a plurality of translucent artificial embers, a first burner, a light source, and a reflective member. The embers are disposed upon the ember support surface. The first burner is coupled to a source of combustible fuel and configured to generate a flame. The burner is positioned adjacent to the ember support member and at least partially concealed from view by the embers. The light source is positioned vertically below the ember support surface and the tube burner. The light source produces light that passes through the ember support surface to illuminate the embers. The reflective member is positioned rearward of the embers in the combustion chamber to reflect light produced by the light source and the flame. The reflective member may be spaced frontward of a rear panel of the combustion chamber and has a height that extends within a lower vertical half of the combustion chamber.

[0010] A further aspect of the invention relates to a method of increasing viewable light in a heating appliance, the heating appliance includes an enclosure that defines a combustion chamber, and an ember support member, a plurality of transparent embers, a light source, and a burner member positioned in the enclosure. The method includes supporting the embers on a support surface defined by the ember support member with the embers being separable from the support surface and the support surface including a plurality of apertures sized smaller than the embers. The method further includes positioning the burner member adjacent to the support surface, wherein the burner is configured to generate a flame that produces light in the combustion chamber. The method may also include surrounding a portion of the burner member with the embers to at least partially conceal the burner member from view, and positioning the light source vertically beneath the support surface so that light that passes through the plurality of apertures to illuminate the embers and produce light in the combustion chamber.

[0011] Another method according to the invention relates to a method of generating viewable light. The method includes providing a support member, a plurality of transparent embers, a light source, a tube burner, and a reflective panel, supporting the embers on the support member, positioning the burner member adjacent to the support member, surrounding a portion of the burner member with the embers to at least partially conceal the burner member from view, positioning the light source vertically beneath the support surface, and positioning the reflective panel adjacent to at least some of the embers, the reflective panel being configured to reflect light produced by the flame and the light source, the reflective member being substantially vertically oriented and having a height that extends no more than about 6 inches vertically above the embers. The method also includes providing the embers separable from the support surface, configuring the burner to generate a flame that produces light, and passing light from the light source through the support member to illuminate the embers.

[0012] The above summary of the present invention is not intended to describe each disclosed embodiment or every

implementation of the present invention. The Figures and the detailed description that follow more particularly exemplify certain embodiments of the invention. While certain embodiments will be illustrated and describe embodiments of the invention, the invention is not limited to use in such embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The invention may be more completely understood in consideration of the following detailed description of various embodiments of the invention in connection with the accompanying drawings, in which:

[0014] **FIG. 1** is a front perspective view of an example fireplace according to principles of the present invention;

[0015] **FIG. 2** is an exploded front perspective view of the assembly shown in **FIG. 1**;

[0016] **FIG. 3** is a front view of the assembly shown in **FIG. 1**;

[0017] **FIG. 4** is a cross-sectional view of the assembly shown in **FIG. 3** taken along indicators **4-4**;

[0018] **FIG. 5** is a cross-sectional view of the assembly shown in **FIG. 3** taken along indicators **5-5**;

[0019] **FIG. 6** is a front perspective view of some of the components positioned in the combustion chamber enclosure shown in **FIG. 1**; and

[0020] **FIG. 7** is an exploded front perspective view of the components shown in **FIG. 6**.

[0021] While the invention is amenable to various modifications and alternate forms, specifics thereof have been shown by way of example and the drawings, and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0022] The present invention generally relates to heating appliances such as fireplaces, stoves, and fireplace inserts wherein heat is generated and light is produced. One aspect of the invention relates to a heating appliance having a set of artificial embers that are supported on an ember support surface, a burner positioned adjacent to the embers, and a light source positioned beneath the burner that illuminates the embers. A flame generated by the burner passes through the embers. The burner may be positioned vertically above the ember support surface and substantially surrounded by the embers to conceal the burner from view. The heating appliance may also include a reflection panel that is positioned rearward of the embers in the heating appliance. The reflection panel reflects light provided by the flame and the illuminated embers towards a front portion of the heating appliance. The heating appliance may also include another burner member positioned in the heating appliance rearward of the embers. The reflection panel may be positioned between the two burners to at least partially conceal portions of the burners positioned rearward of the embers.

[0023] Some examples of additional heating appliance structures with which the burner and ember system according to the present invention could be used includes universal vent, horizontal/vertical vent, B-vent, and dual direct vented fireplaces, as well as multisided units having two or three glass panels as side panels, or in any other unit used as a gas, electric, or wood burning fireplace, stove or insert. It will be understood that as used herein, the term "enclosure" is any structure that at least partially surrounds the simulated glowing ember system and is intended to be included in embodiments of all types of known fireplaces.

[0024] Referring now to **FIGS. 1-7**, an example fireplace **10** with various example components and assemblies according to principles of the present invention are shown. The fireplace **10** includes an outer enclosure **12**, a combustion chamber enclosure **14**, a burner assembly **16**, an ember light assembly **18**, a valve assembly **20**, an ignition system **22**, a blower assembly **24**, and a grate **26**. The fireplace **10** may also include a backlighting assembly **28**, a mounting plate **30**, a controller **32**, a reflection panel **34**, an ember support panel **36**, and a vent assembly **37** (see **FIG. 5** only for the vent assembly **37**).

[0025] The outer enclosure **12** is sized to contain the combustion chamber enclosure **14** therein. The outer enclosure **12** and combustion chamber enclosure **14** are sized and spaced relative to each other to provide a plenum space **13** there between (see **FIGS. 4 and 5**). At least portions of the ember light assembly **18**, valve assembly **20**, blower assembly **24**, mounting plate **30**, controller **32**, and vent assembly **37** are positioned within the plenum **13**. At least portions of the burner assembly **16**, ignition system **22**, grate **26**, backlighting assembly **28**, reflection panel **34**, and ember support panel **36** are positioned within a combustion chamber **71** defined by the combustion chamber enclosure **14**.

[0026] The outer enclosure **12** includes top and bottom panels **40**, **42**, first and second side panels **44**, **46**, a rear panel **48**, and a front panel **50**. A vent opening **52** is provided in the rear panel **48**. The outer enclosure **12** may also include a top vent panel **54** and a bottom vent panel **56** positioned between respective top and bottom panels **40**, **42** and the combustion chamber enclosure **14**. The combustion chamber enclosure **14** is spaced within the outer enclosure **12** such that a portion of the plenum **13** is defined both above and below the combustion chamber enclosure **14**. The front panel **50** is configured such that air flow A can enter into the plenum **13** below the combustion chamber enclosure **14** and an air flow B can flow out of the plenum **13** at a location vertically above the combustion chamber enclosure **14** (see **FIG. 5**). In this manner, room air (air residing in the room in which the fireplace **10** is exposed) can be drawn into the plenum **13**, heated by heat emanating from the combustion chamber **71**, and exhausted back into the living space as heated air flow B.

[0027] The combustion chamber enclosure **14** includes top and bottom panels **60**, **62**, first and second side panels **64**, **66**, a rear panel **68**, and a front panel **70**. These panels **60**, **62**, **64**, **66**, **68**, **70** define a combustion chamber **71** wherein heat is generated. While the front panel **70** preferably includes a pane of transparent material such as glass that is framed with a metal frame, the remaining panels may include any desired material. In one example, some of the panels of the combustion chamber enclosure may include a refractory material

such as a moldable ceramic material such as a composition of ceramic fiber and a binder. Such materials may be formed using, for example, the molding process disclosed in U.S. 2003-0049575-A1, which is incorporated herein by reference. An advantage of using a molding process to form portions of the combustion chamber enclosure is that multiple panels of the combustion chamber enclosure may be formed in a single step (for example using an injection, compression or vacuum molding process, or a casting process) and the shape and size of the panels can be formed with accuracy and precision. In other embodiments, panels of the combustion chamber enclosure **14** may be formed using a stamping process or other method for shaping a metal sheet. Using a metal product such as steel that is stamped or otherwise formed into a desired configuration may have the advantage of lower costs and lighter weight as compared to a molded ceramic or other molded material.

[**0028**] The burner assembly **16** includes first and second tube burners **72**, **74**, and a burner coupling base **76** having first and second couplers **78**, **79** that are coupled to the burners **72**, **74**. Each of the burners **72**, **74** includes a predetermined serpentine shape that extends from the burner coupling base **76** to a desired position within the combustion chamber. Each of the burners **72**, **74** includes a plurality of apertures wherein gaseous fuel can exit the burner members for ignition by the ignition system **22** into a flame.

[**0029**] Two burner members **72**, **74** are shown in this example, while in other embodiments a single burner member or more than three burner members may be used to provide the desired flame display within the combustion chamber **71**. Further, other embodiments may include different types of burners such as plate burners rather than the tube burners shown, or a combination of tube burners with plate or other types of burners. One advantage of using a tube burner is the ease of forming the tube burner such that it is positioned at desired locations within the combustion chamber **71**. Another advantage may be easier and less costly replaceability of the burner members **72**, **74** and easier interchangeability as compared to some other types of burners.

[**0030**] The tube burners **72**, **74** may comprise a metal material extruded and formed into the serpentine shape shown in the Figures. In other embodiments, the burner, whether in a tube or other shape or style of burner, may comprise other materials such as, for example, fused silica, ceramics, or glass material that are shaped or otherwise formed in to a desired configuration.

[**0031**] The second burner **74** is positioned such that the burner apertures formed in that burner **74** are positioned vertically higher in the combustion chamber **71** than the burner apertures of the first burner **72**. One advantage of this vertically offset arrangement of the burner members is that the flame provided by the second burner **74** better visibility because the first burner **72** does not obstruct viewing of the flame produced by the second burner **74**. When the burner assembly **16** is used with a log set (not shown) that covers portions of the first and second burners **72**, **74**, the second burner **74** can provide flames that appear to be extending from an upper portion of the log set, thus providing, in many configurations, a more realistic flame display.

[**0032**] The ember light assembly **18** (best shown in **FIGS. 6 and 7**) includes a frame **80**, a transparent panel **82**, a color panel **84**, gaskets **86**, first, second and third lamps **88**, **90**, **92**, and a plurality of lamp sockets **94** wherein a separate socket **94** is associated with each of the lamps **88**, **90**, **92**. The frame **80** holds the panels **82**, **84** and gaskets **86** against the mounting plate **30**. The lamps **88**, **90**, **92** are mounted within apertures **89**, **91**, **93** formed in the mounting plate **30**. The apertures **89**, **91**, **93** are configured for a quick release of the lamps **88**, **90**, **92** for easy replacement of the lamps. The lamps **88**, **90**, **92** are accessible from within the plenum space **13** defined beneath the combustion chamber enclosure. Replacement of the lamps **88**, **90**, **92** from within the plenum space **13** is advantageous for at least the reason that the front panel **70** of the combustion chamber enclosure **14**, the burner assembly **16**, the ember light assembly **18**, and the log set (not shown) do not need to be removed in order to gain access to the lamps for replacement, which would otherwise be necessary if the lamps **88**, **90**, **92** were accessible only from within the combustion chamber **71**.

[**0033**] The transparent panel **82** may be constructed of materials such as, for example, ceramic glass, tempered glass, or a ceramic/glass composite material. The transparent panel **82** is constructed of a clear or translucent material that allows light from the lamps **88**, **90**, **92** to pass through to a plurality of translucent artificial embers **8** (see **FIGS. 2-5**) that are positioned vertically above the ember light assembly **18** and on top of the ember support panel **36**. A typical ceramic glass panel can withstand temperatures in excess of 1400° F. A typical tempered glass panel can withstand temperatures in excess of 600° F. The glass can be colored using, for example, stove paint to enhance the coloring glow of the translucent artificial embers. Alternatively, the glass plate can be formed as a colored glass for generating a desired glowing ember effect. Other materials that can withstand high temperatures typically present within the combustion chamber **71** can also be used for the transparent panel **82** such as, for example, a metallic substance. The color panel **84** may have the same or similar characteristics as the transparent panel **82** and may have any coloring desired in order to provide the desired glowing ember effect in the plurality of embers **8**.

[**0034**] The ember light assembly **18** and the ember support panel **36** may be configured in other ways in different embodiments. For example, the surface of the ember support panel **36** or the ember light assembly **18** may be provided with multiple elevations to aid in placement of the embers **8** at different pitches, heights, and locations within the combustion chamber **71** and relative to the burners **72**, **74**. Further, portions of the ember light assembly **18** and the ember support panel **36** may be integrally formed with other components of the fireplace such as the bottom panel **62** or the bottom vent panel **56** described above.

[**0035**] The ember support panel **36** may be constructed with various materials, shapes and configurations. Some example materials for use in the ember support panel **36** include ceramic or glass or other suitable high temperature materials such a metal or refractory materials. The ember support panel **36** may be configured with a plurality of apertures, slots, or other shaped openings such as those defined by a wire mesh structure or a solid plate so long as the panel can support at least some of the embers **8** and provide for light transmission from the ember light assembly **18** to the embers **8**. The ember support member may have a contoured shape rather than the generally rectangular shape

shown in the Figures. The ember support member may also have a valley or recessed portion sized to fit, for example, some of the embers or a portion of the burner (e.g., burner **72**). The ember support member may also have raised portions to, for example, support some embers at an vertically elevated location or to support portions of the burner that are at different positions relative to the rest of the ember support member.

[**0036**] The translucent artificial embers **8** may be disposed on the ember support panel **36** in any desired arrangement. The embers **8** are constructed as individual pieces that allow for increased placement flexibility on the ember support panel **36**. The embers **8** are not integrally attached to each other, the ember support panel **36** or the burners **72**, **74**. Because the embers **8** are not fused to the ember support panel **36**, there is flexibility in the amount of artificial embers **8** that can be provided and the arrangement of those embers on the support structure. During or after installation of the fireplace **10**, embers **8** may be added, removed, or rearranged to provide a more esthetically pleasing fire display. The individual embers **8** provide an improved three dimensional, aesthetically pleasing ember display that resembles real embers from combustion of a fibrous product such as wood because each ember is separate rather than fused together or to other structures. Alternatively, the embers **8** can be formed into an array of embers through adhesion or other connecting techniques and then placed as a single unit upon the ember support panel **36**.

[**0037**] The embers **8** may be arranged so as to surround the first burner **72**, wherein a portion of the burner **72** extends along the ember support panel **36** either directly adjacent to, vertically above, or in direct contact with a top surface of the ember support panel **36**. Individual placement of each of the embers **8** surrounding the first burner **72** can provide a customized look for a given burner configuration. The embers **8** may also be arranged within the combustion chamber **71** so as to cover a portion of the second burner **74** or other portions of the first burner **72** that are not positioned directly adjacent to the ember support panel **36**. Alternative lighting may be provided within the combustion chamber **71** at other locations from the ember light assembly **18** to provide illumination of the embers **8** regardless of the position of the embers **8** within the combustion chamber **71**. In other embodiments, some or all of the embers **8** may be secured to the burner **72** or to other embers prior to or after installing the burner assembly **16** and embers **8** in the combustion chamber **71**.

[**0038**] The individual embers **8** may come in a variety of shapes and sizes. For example, embers **8** may be generally cubicle, spherical, jagged or irregular in shapes. Although different sizes may be used, embers **8** can preferably be sized with diameters between ⅛ inch and 2 inches. It should be understood that other shapes and dimensions for the embers **8** may be used without departing from the scope of the invention. Further, a combination of differently shaped embers may be used to better simulate a glowing ember bed.

[**0039**] The embers **8** may include different materials that perform in high temperatures without foaming or breaking up while providing semi-transparency so that light can at least partially pass through the ember to simulate glowing. The material utilized for the embers **8** in one embodiment is a fused silica material manufactured by C-E Minerals, located in King of Prussia, Pa., and sold under the Teco-Sil® mark. Teco-Sil® silica is a high purity fused silica with greater than 99% non-crystalline SiO_2. Less than 1% of Teco-Sil® silica includes cristobalite. Teco-Sil® silica has a melting point of greater than 3000° F.

[**0040**] Fused silica is a preferred material for the embers because it can withstand very high temperatures without foaming or breaking up and will not bind to the ember support panel **36**, to other embers, or to the burners **72**, **74**. Further, fused silica provides an aesthetically pleasing glow when illuminated because the fused silica diffuses light in a relatively natural way as compared with other materials. It should be understood that other translucent, high temperature materials can be used for the embers **8**. In some embodiments, paint to other darkening material can be applied to the surface of the embers **8** to provide a more natural ember look. An individual ember **8** can be provided with, for example, paint applied to at least a portion of the surface of the ember. Paint can be applied to the embers **8** to give the effect of a bed of coals having "cooled" embers on top and a hot glowing ember surface on the underside. The paint, normally a black or charcoal color, may be applied to a portion of the embers **8** or to all of them. Other colorization sources besides paint can be used such as, for example, pigmentation that can be added during manufacture of the embers.

[**0041**] A backlighting assembly **28** that includes first and second lamp assemblies **104**, **106** may be included within the combustion chamber **71** to provide additional lighting and illumination for an improved flame display. The lamp assemblies **104**, **106** may be reduced to a single lamp assembly or may include more than two lamp assemblies in some embodiments. Further, the lamp assemblies may be positioned at various locations within the combustion chamber **71** besides in the rear corners as shown in **FIGS. 1-5**.

[**0042**] The lamps used for the backlighting assembly **28** and the ember light assembly **18** may use halogen bulbs and ceramic sockets, or other components that can withstand the potentially high temperature environment of the combustion chamber **71** and the fireplace **10** generally. Halogen bulbs and ceramic sockets are examples of components that can withstand temperatures of at least 600° F., which temperatures are common in combustion environments. If the light source itself is constructed and configured to withstand high temperatures commonly found in a combustion chamber, it may not be necessary to create a temperature seal between the light source and the source of heat (e.g., the burner **72**, **74**) or to provide methods of cooling the light sources. For example, the lamps **88**, **90**, **92** associated with the ember light assembly **18** are sealed from the combustion chamber **71** and are exposed within the plenum **13** whereby the relatively cool intake air flow A can cool the lamps. However, the lamp assemblies **104**, **106** are positioned within the combustion chamber **71**, are exposed more directly to the heat generated by the burner assembly **16**, and are not exposed to the air flow within plenum **13**.

[**0043**] The lamps of the ember light assembly **18** and the backlighting assembly **28** may be controlled by the controller **32** to create a flickering effect or to further enhance simulation of the glowing embers or light generated by the flames produced by the burner assembly **16**. The controller can help generate a pattern of randomly flickering light that

is non-repetitive and simulates real glowing embers and real flame modulations whether or not the burner assembly **16** is generating flames. In some embodiments, it is possible to simultaneously operate the burner assembly **16** and at least one of the ember light assembly **18** and the backlighting assembly **28** to help provide a maximum amount of light with a minimum amount of heat generation (e.g., smaller flame size or intensity), thereby creating the illusion of a fire that is hotter and/or larger than it actually is.

[**0044**] The fireplace **10** may include a valve assembly **20** having a valve **96** and a gas input line **98** that control the flow of fuel to the burner assembly **16**. The controller **32** may be programmed to control the flow of fuel through the valve assembly **20** according to a program. The program may be similar to a preprogrammed thermostat control. In some embodiments, the program and controller may function similarly the flame control system described in U.S. patent application Ser. No. 10/802,538 entitled HEATING APPLIANCE CONTROL SYSTEM and filed on Mar. 17, 2004, which patent application is incorporated herein by reference in its entirety. The program and control system may also concurrently control lighting provided by the ember light assembly **18**, the back lighting assembly **28** according to principles similar to those disclosed in U.S. Ser. No. 10/802,538. The program and control system may also control sound and scent generation in the fireplace **10** according to principles of U.S. Ser. No. 10/802,538. In some embodiments, the program and control system may simultaneously modulate the flame and lighting in the fireplace **10** to create a more realistic and authentic fire display.

[**0045**] The fireplace **10** may also include a blower assembly **24** that includes first and second blowers **100**, **102**. The blowers **100**, **102** may be positioned within the plenum **13** and configured to provide air flow through the plenum **13**. An example direction of airflow is shown in **FIG. 5** by airflow A, B.

[**0046**] A vent assembly **37** of the fireplace **10** may include an exhaust vent **38**, a fresh air vent **39**, and a vent channel **41** that couples the fresh air vent **39** to a lower part of the combustion chamber enclosure **14** (see **FIG. 5**). In other embodiments, the vent assembly **37** may be coupled to the top panel **40** of the outer enclosure **12** and the top panel **60** of the combustion chamber enclosure **14** rather than along the back panels as shown in **FIG. 5**.

[**0047**] The reflection panel **34** is positioned in a lower portion of the combustion chamber **71** adjacent to the embers **8**, ember support panel **36**, and first and second burners **72**, **74**. The reflection panel is an elongate member having a rectangular shape with a flange at the lower end for easy coupling to the ember light assembly **18** or the bottom panel **62** of the combustion chamber enclosure **14**. The reflection panel **34** may include a reflective surface configured for reflecting light toward the front of the combustion chamber **71**. The reflective surface may be provided by a polished surface of a material such as a metallic material, or may be an inherently reflective material. The reflection panel **34** reflects light generated by the ember light assembly **18**, light passing through the embers **8**, and light generated by flames produced by the first burner **72**. The reflection panel **34** has a height that extends vertically higher than that portion of the first burner **72** that extends from the ember support panel **36** toward the burner coupling base **76** so as to cover that portion of the first burner **72** that does not include the plurality of apertures from which the flames extend. With this arrangement in the combustion chamber **71**, the reflection panel provides both reflecting of light and concealing from view a portion of the burner assembly.

[**0048**] The reflection panel **34** has a height that does not extend vertically above the grate **26** so that the reflection panel **34** is generally hidden from view behind the grate **26**. The reflection panel **34** also is sized and arranged so that it does not cover or otherwise conceal that portion of the second burner **74** that includes the plurality of apertures from which flames are generated. However, the reflection panel may also be configured to conceal portions of the ignition system **22**, and rearward sections of the second burner **74**, as well as the burner coupling base **76**. In other embodiments, the reflection panel may have a greater height or may be positioned at either more frontward, more rearward, vertically higher or vertically lower oriented positions within the combustion chamber **71** so as to conceal specific portions of the first and second burners **72**, **74** and other components of the fireplace **10** that are desired to be concealed from view. The reflection panel may also be contoured or shaped in some way different from the planar, rectangular shaped panel shown in the Figures. Likewise, additional reflection panels besides the single panel shown in the figures may be added within the combustion chamber **71** so as to provide the desired concealing and reflecting functions.

[**0049**] In one embodiment, the reflection panel **34** has a height no greater than about 6 inches and has any desired length and shape so long as the reflection panel provides reflection of at least the light generated by the ember light assembly **18**. The reflection panel **34** preferably also reflects light from flames generated in the combustion chamber **71** frontward of the reflection panel. The burner generating the flame may be positioned directly in front of the reflection panel and residing on top of the ember support panel, embedded within the ember support panel, or positioned below the ember support panel and the flame generated by the burner should still produce light that can be reflected frontward by the reflection panel.

[**0050**] The present invention should not be considered limited to the particular examples or materials described above, but rather should be understood to cover all aspects of the invention as fairly set out in the attached claims. Various modifications, equivalent processes, as well as numerous structures to which the present invention may be applicable will be readily apparent to those of skill in the art to which the present invention is directed upon review of the instant specification.

We claim:

1. A heating appliance, comprising:

an enclosure defining a combustion chamber;

an ember support member;

a plurality of translucent artificial embers disposed upon the ember support member;

a first tube burner coupled to a source of combustible fuel, the tube burner being positioned vertically above the

ember support member and at least partially surrounded by the embers to reduce viewability of the tube burner; and

a light source positioned vertically below the ember support member, the light source producing light that illuminates the embers.

2. The heating appliance of claim 1, further comprising a second tube burner positioned rearward in the combustion chamber from the first tube burner.

3. The heating appliance of claim 2, further comprising a reflective member positioned between the first and second tube burners, the reflective member being arranged in the combustion chamber to at least partially conceal the second tube burner from view.

4. The heating appliance of claim 3, wherein the reflective member reflects light from the light source and light from a flame generated by the first tube burner towards a front portion of the combustion chamber.

5. The heating appliance of claim 2, wherein the second tube burner is spaced vertically above the embers and the first tube burner.

6. The heating appliance of claim 1, wherein the light source includes a light bulb, the light bulb being accessible for replacement from underneath a bottom panel of the enclosure.

7. The heating appliance of claim 1, wherein the ember support member includes a wire mesh that defines a plurality of apertures that are sized smaller than the embers.

8. The heating appliance of claim 1, wherein the embers are separate from the ember support member.

9. A heating appliance, comprising:

an enclosure defining a combustion chamber;

an ember support member defining an ember support surface;

a plurality of translucent artificial embers disposed upon but separable from the ember support surface;

a first burner coupled to a source of combustible fuel and configured to generate a flame, the first burner being positioned adjacent to the ember support member and at least partially concealed from view by the embers, the first burner having a tube shape;

a light source positioned vertically below the ember support member and the tube burner, the light source producing light that passes through the ember support member to illuminate the embers; and

a reflective member positioned rearward of the embers in the combustion chamber to reflect light produced by the light source and the flame, the reflective member being spaced frontward of a rear panel of the combustion chamber and having a height that extends within a lower vertical halve of the combustion chamber.

10. The heating appliance of claim 9, further comprising a second burner positioned rearward in the combustion chamber from the reflective member.

11. The heating appliance of claim 9, wherein the reflective member at least partially conceals the second tube burner from viewing.

12. The heating appliance of claim 9, wherein the first burner is position vertically above the ember support surface and surrounded by the embers.

13. The heating appliance of claim 9, wherein the light source is positioned below a bottom panel of the enclosure.

14. A method of increasing viewable light in a heating appliance, the heating appliance including an enclosure that defines a combustion chamber, and an ember support member, a plurality of transparent embers, a light source, and a burner member positioned in the enclosure, the method comprising the steps of:

supporting the embers on a support surface defined by the ember support member, the embers being separable from the support surface, the support surface including a plurality of apertures sized smaller than the embers;

positioning the burner member adjacent to the support surface, the burner being configured to generate a flame that produces light in the combustion chamber;

surrounding a portion of the burner member with the embers to at least partially conceal the burner member from view; and

positioning the light source vertically beneath the support surface, the light source providing light that passes through the plurality of apertures to illuminate the embers and produce light in the combustion chamber.

15. The method of claim 14, wherein positioning the burner member includes positioning the burner member vertically above the support surface.

16. The method of claim 14, wherein the burner member is a tube burner.

17. The method of claim 14, wherein the heating appliance further comprises a reflective member and the method further includes positioning the reflective member in the combustion chamber rearward of the embers but frontward of a rear panel of the enclosure, the reflective member reflecting light from the flame and light from the light source towards a front portion of the combustion chamber.

18. The method of claim 17, wherein the heating appliance further comprises another tube burner and the method includes positioning the another burner in the combustion chamber rearward of the reflective member, the reflective member at least partially concealing the another burner member from view.

19. A method of generating viewable light, the method comprising the steps of:

providing a support member, a plurality of transparent embers, a light source, a tube burner, and a reflective panel;

supporting the embers on the support member, the embers being separable from the support surface;

positioning the burner member adjacent to the support member, the burner being configured to generate a flame that produces light;

surrounding a portion of the burner member with the embers to at least partially conceal the burner member from view;

positioning the light source vertically beneath the support surface, the light source providing light that passes through the support member to illuminate the embers; and

positioning the reflective panel adjacent to at least some of the embers, the reflective panel being configured to

reflect light produced by the flame and the light source, the reflective member being substantially vertically oriented and having a height that extends no more that about 6 inches vertically above the embers.

20. The method of claim 19, further comprising another burner member and the method further includes positioning the another burner member on an opposing side of the reflective member from the embers.

21. The method of claim 19, wherein positioning the burner member includes orienting the burner member vertically above the support member and surrounding the burner member with the embers includes contacting the embers against the burner member.

22. The method of claim 19, wherein the burner member includes a cylindrical tube shape having a plurality of gas apertures formed along a length of the burner member, and a flame associated with each of the gas apertures is viewable through the embers.

23. The method of claim 19, wherein the reflective panel is positioned directly adjacent to at least some of the embers.

24. The method of claim 19, wherein the support member includes a plurality of apertures sized smaller than the embers, and light from the light source passes through the plurality of apertures.

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