A. H. WOLFF.

GAS HEATER.

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1,410,280.

Patented Mar. 21, 1922.

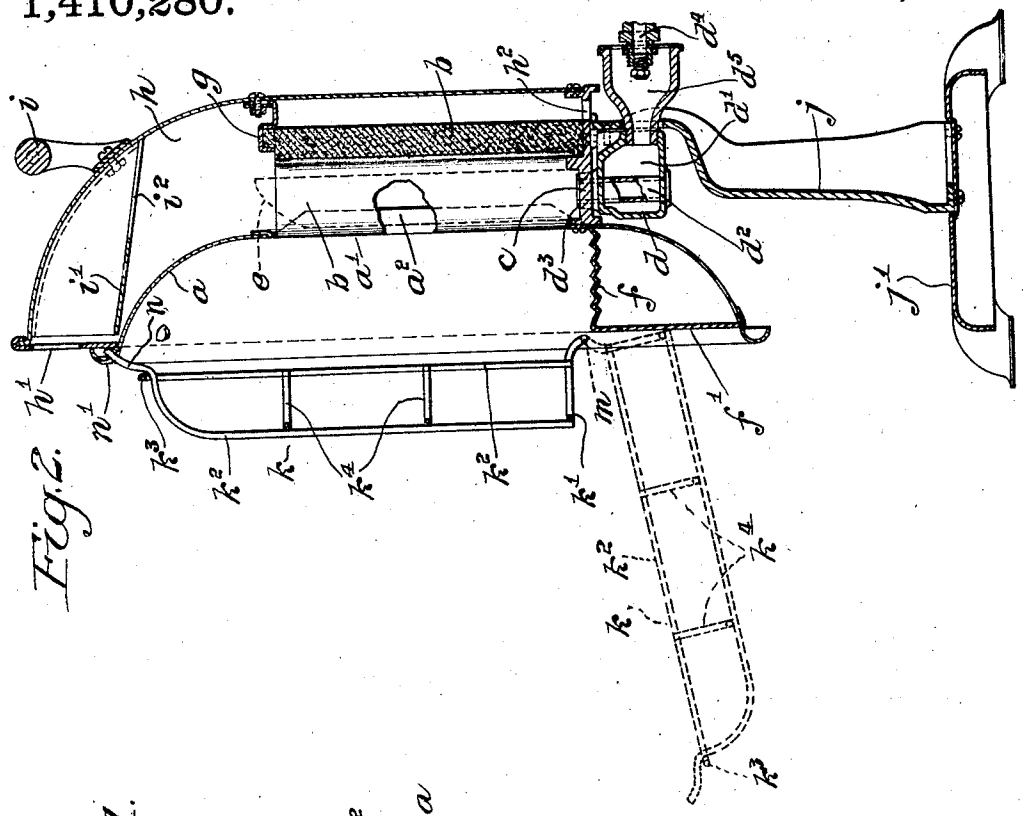


Fig. 2.

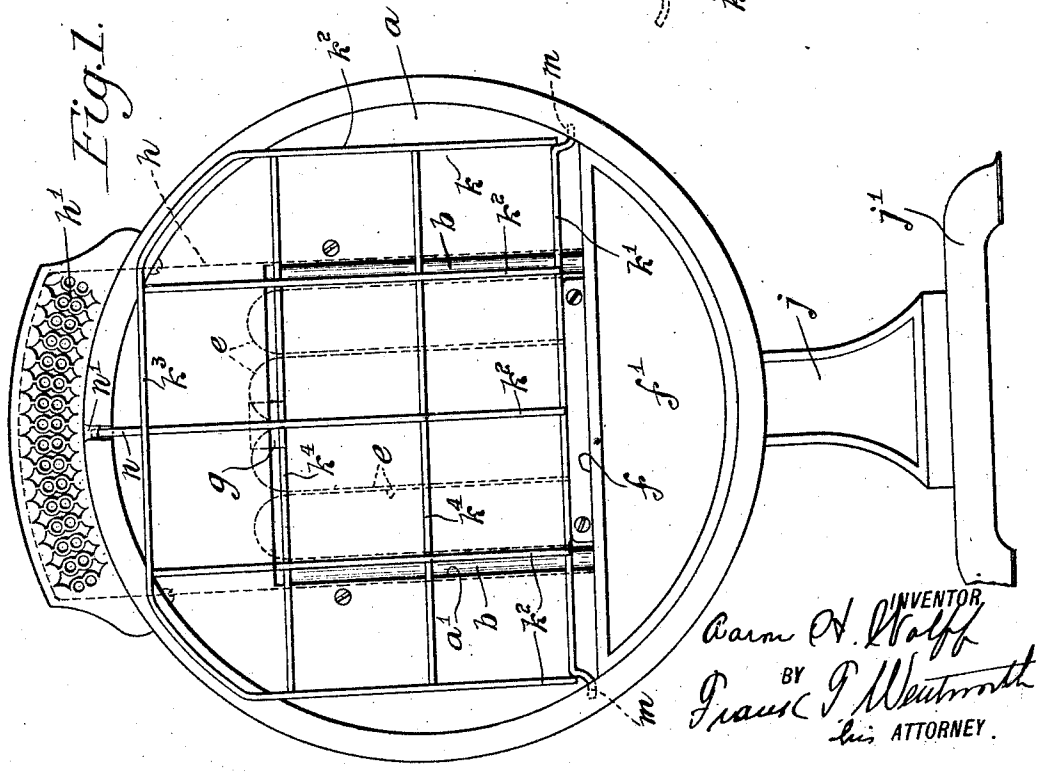


Fig. 1.

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GAS HEATER.

1,410,280. Specification of Letters Patent. **Patented Mar. 21, 1922.**

Application filed November 7, 1921. Serial No. 513,385.

To all whom it may concern:

Be it known that I, AARON H. WOLFF, a citizen of the United States, residing at the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Gas Heaters, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to gas heaters, and more particularly to improvements in the type of heater shown in my co-pending application Serial No. 450,622, which describes a portable domestic heating unit wherein refractory heating elements or radiants are positioned in a combustion chamber open at the top and communicating with means forming a flue positioned rearwardly of, and discharging horizontally above, said combustion chamber, so as to secure an effective utilization of the heat radiated from the walls of the combustion chamber and of the heated air rising therefrom, in addition to the heat projected into a room by a reflecting casing extending about and in front of the combustion chamber.

In a heater as described in my aforesaid application, the construction of the burners and the refractory elements above same, the combustion chamber and the said flue-forming means is such as to secure a substantially complete combustion of the gas and the utilization of the products of combustion for heating purposes under conditions which will secure a better distribution of same throughout the room to be heated.

In said heater the combustion chamber was positioned centrally and rearwardly of a dish reflector casing having a curved surface projecting forwardly of the combustion chamber at all points thereof.

By actual use, I have ascertained that the curved portion of the reflector below the combustion chamber did not contribute toward the brilliancy of the heater while in use, and that there was some loss in the effectiveness of the reflector owing to the fact that the portions thereof close to the opening of the combustion chamber did not have the light from the radiant elements directed thereupon.

The type of burner employed in connection with the radiant elements has a long blue flame, and under some conditions users experienced difficulty in lighting the gas at said burners by reason of the presence of the fixed shield.

With the above conditions in mind, I have in my present invention, improved certain of the minor characteristics of the invention of my aforesaid application, and in addition thereto have so constructed the reflecting casing that the light rays adjacent the bottom of the combustion chamber, will be caught and reflected against other portions of the reflecting casing about and above said opening, thus giving to the entire reflecting casing structure at the front thereof, a high degree of brilliancy irrespective of the angle from which the heater is being observed.

In addition to the above characteristics, I pivotally mount the shield in relation to the reflector, so that it may be readily displaced to permit convenient access to the burners for lighting purposes, while ensuring the desired rigidity of this shield in relation to this reflector while the heater is in use.

My invention consists primarily in a heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal, reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, means forming a combustion chamber at said opening adapted to receive refractory heating elements, a heating unit in said combustion chamber, and means forming a flue rearwardly of said combustion chamber, the opposite ends of which communicate respectively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is delivered to a room; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a front elevation of a heater embodying my invention; and

Fig. 2 is a vertical section therethrough. Like letters refer to like parts in both of said views.

In the embodiment of my invention shown in the drawings, *a* indicates a dish reflecting casing which is preferably of polished copper, aluminum, or other suitable material, for projecting light and heat waves forwardly of the heater. This reflecting casing, substantially centrally thereof, has an opening *a'* therethrough rearwardly of which is a housing *b* formed of refractory material seated upon the top plate *c* of a burner unit *d*, and forming a combustion chamber rearwardly of said reflecting casing.

The top plate *c* is adapted to receive a plurality of refractory elements known in the art as radiants, indicated in dotted lines at *e*, since such elements are considered merely as being articles used in the heater as distinguished from a part of the heater itself, and their showing in full lines would tend to obscure other essential characteristics of the invention.

While the reflecting casing *a* as a matter of convenience is drawn or spun to form a circular, dished reflector, I provide a substantially horizontally extending reflecting element *f* in a position forwardly of and adjacent the top plate *c* so that light rays projected thereonto from the elements *e* will not only afford a brilliant surface presented to those observing the heater from above, but will also reflect such rays against other portions of the reflecting casing, and receive and reflect rays from some portion of the reflecting casing, thus securing brilliancy throughout the entire reflecting casing *a*—*f*. Preferably this element is provided with transverse corrugations, as shown, as to the reflecting surface thereof, the portion *f'* of this element closing the lower portion of the reflecting casing *a* and serving merely to improve the finish of the heater.

The side edges of the reflector adjacent the opening *a'* are turned rearwardly as shown at a^2 in Fig. 2 to form side supports for the housing *b*, this housing being engaged at the top thereof by a flexible metallic member *g* so as to hold said housing *b* firmly in relation to the top plate *c*.

Rearwardly of the reflecting casing *a*, is a member *h* forming a flue rearwardly of, about and above the combustion chamber formed by the housing *b*, the top of said chamber opening into this flue. Said flue-forming means discharges horizontally above the casing *a*, the discharge opening thereof being provided with a decorated shield *h'*. Adjacent the bottom of said flue-forming means are openings h^2 which are also adjacent the bottom of the combustion chamber so that the opposite ends of said flue-forming member *h* communicates respectively with atmosphere adjacent the lower part of, and above said combustion chamber.

The member *h* has attached thereto a handle *i* by means of which the heater in its entirety may be readily transported from place to place, there being provided a brace *i'* within the flue and secured to the back wall of the flue-forming means *h* and to the reflecting casing *a* so as to brace the upper part of said structure adjacent said handle, said brace having an opening i^2 therethrough of sufficient capacity to ensure an uninterrupted convection movement of heated air and gases through the flue and their discharge into a room.

The burner *d* includes therein a casing forming a mixing chamber *d'*, supplemental air tubes d^2 passing through said chamber and opening above and below same, nipples d^3 extending about the upper end of said tubes and forming therewith a circular burner opening below each refractory element *e*, a combustible mixture being supplied to the chamber *d'* by the gas supply pipe d^4, and the mixing tube d^5.

To secure the desired rigidity in the heater structure, the top plate *c* of the burner is extended rearwardly and has the lower edge of the flue-forming means *h* secured thereto, the openings h^2 being formed in said top plate rearwardly of the refractory housing *b*.

While, as a matter of convenience in handling, the pedestal *j* and its base *j'* are made of hollow stock, this is considered immaterial to the invention.

Protecting the opening in the reflecting casing *a* above the reflecting element *f* is a wire shield *k* having a bottom bar *k'*, vertically extending bars k^2, a top bar k^3, and horizontal bars k^4, said shield being so formed as to normally prevent wearing apparel coming in contact with the radiant elements *e*.

The bottom bar *k'* has laterally extended ends *m*, which project through openings pierced in the wall of the reflecting casing *a* adjacent the member *f*, so as to permit said shield to swing downwardly as indicated in dotted lines in Fig. 2 and thus permit unobstructed access to the burner openings for the purpose of lighting the heater. One of the vertically extending bars k^2 extends substantially radially of the reflecting casing *a*, and while secured to each of the horizontal bars k^4 and to the bottom *k'*, is not connected in any way with the top bar k^3, the free end of said bar extending upwardly to form a latch member *n* adapted to enter a suitable pierced opening at the edge of the casing *a*, said edge being provided with a guide slot *n'* to facilitate a con-

venient engagement and disengagement of said latch member with the socket formed by the pierced opening in said casing.

The operation of the herein described heater is substantially as follows:—

The burner *d* operates in the usual manner in producing a long blue flame within the refractory elements or radiants *e*, bringing said elements to incandescence, the degree of incandescence of different portions thereof constantly varying with the circulation of air in relation thereto.

Some of the intense heat developed by and about said elements is absorbed by the housing *b* so that this housing reaches a high temperature, although it is no factor in the light effects secured with the heater.

The heated products of combustion pass upwardly through the open top of said housing, entering the flue formed by the member *h* and together with the heated air admitted through the openings h^2, flow by convection through the openings in the shield *h'* and are projected into a room horizontally so as to more or less diffuse the heated air by reason of its horizontal projection into a room.

The upflow of the products of combustion in addition to increasing the circulation of air through the flue *h*, will also induce a movement of air from the front of the housing *b* through the combustion chamber, thus increasing the effective supply of secondary air, ensuring perfect combustion of the gases within and about the refractory elements, and avoiding the presence of noxious fumes discharged from the flue into the room.

The air entering the flue through the openings h^2 is heated by contact with the housing *b*, this stream of air also serving to keep the back of the heater cool so that it may be readily placed against a wall, or in any other position, without increasing the fire hazard or causing likelihood of injury to articles in, or the wall of, a room.

The light and heat rays emanating from the elements *e* will in part be directed against the polished surface of the reflecting casing *a* and of the reflecting element *f*, some of these rays being projected directly into a room while others thereof will be reflected against different portions of the casing and said element, thus causing a distribution of the lighting effect throughout the entire reflecting casing including said element.

The element *f* has the particular advantage that practically the entire surface thereof is within the range of the refractory elements or radiants *e*, but is upon a plane which will reflect the rays of light upwardly and slightly inwardly of the reflecting casing *a*, thus securing an effective distribution of such light rays throughout the entire surface of said casing.

The brace *i'* and clip *g* are of dimensions to present no substantial obstruction in the flue formed by the member *h*, and are merely structural characteristics to impart greater rigidity to the heater structure.

The shield *k* being positioned well in advance of the combustion chamber, will prevent inflammable matter coming in contact with the radiant elements *e*, but make it somewhat difficult to light the burner. By hinging said shield in the manner described, however, and providing a latch member *n* formed integrally with one of the wire bars k^2 which is not connected with the top bar k^3 of this shield, this shield may be firmly secured to or disengaged from said casing *a* at all times by reason of the resiliency of the bar k^3 carrying said latch member and its engagement with the opening in said casing. This affords a very simple and convenient means permitting free access to the burner, the notch *n'* greatly facilitating the engagement and disengagement of said latch with its keeper opening in the casing *a*.

The use of the reflecting element *f* is of primary importance, since the top plate *c* of the burner will prevent the light rays from the more highly incandescent parts of the elements *e* being directed against the lower portion of the reflecting casing *a*, if the element *f* be omitted, and the arrangement of this element as shown will bring its polished surface in direct range of the light and heat waves from the lower portion of the elements *e*, which is their most highly incandescent portion.

It is not my intention to limit the invention to the precise details of construction shown in the accompanying drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, means forming a combustion chamber at said opening adapted to receive refractory heating elements, a heating unit in said combustion chamber, and means forming a flue rearwardly of said combustion chamber, the opposite ends of which communicate respec-

tively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is delivered to a room.

2. A heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal, reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, an open topped housing forming a combustion chamber at said opening adapted to receive refractory heating elements, a heating unit in said combustion chamber, and means forming a flue rearwardly of said combustion chamber, extending across and communicating with said combustion chamber through the open top of said housing; the opposite ends of which communicate respectively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is delivered to a room.

3. A heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal, reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, means forming a combustion chamber at said opening, a burner having a top plate forming the bottom of said combustion chamber and adapted to receive refractory elements exposed through the opening in said reflecting casing, and on substantially the plane of said reflecting element, and means forming a flue rearwardly of said combustion chamber, the opposite ends of which communicate respectively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is delivered to a room.

4. A heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal, reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, an open topped housing forming a combustion chamber at said opening, a burner having a top plate forming the bottom of said combustion chamber and adapted to receive refractory elements exposed through the opening in said reflecting casing, and on substantially the plane of said reflecting element, and means forming a flue rearwardly of said combustion chamber, extending across and communicating with said combustion chamber through the open top of said housing, the opposite ends of which communicate respectively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is delivered to a room.

5. A heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal, reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, an open topped housing of refractory material forming a combustion chamber at said opening adapted to receive refractory heating elements, a heating unit in said combustion chamber, means forming a flue rearwardly of said combustion chamber, extending across and communicating with said combustion chamber through the open top of said housing, the opposite ends of which communicate respectively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is delivered to a room, and a clip carried by said last named means and adapted to engage the upper edge of said housing, said clip being of insufficient width to materially obstruct said flue.

6. A heater embodying therein a front reflecting casing having an opening therein, a substantially horizontal, reflecting element within said casing and extending across the opening therein adjacent the bottom thereof, whereby said reflecting element will receive light rays and project them against other portions of the reflecting surface of said casing, and also present a brilliant surface to the observer, means forming a combustion chamber at said opening adapted to receive refractory heating elements, a heating unit in said combustion chamber, means forming a flue rearwardly of said combustion chamber, the opposite ends of which communicate respectively with atmosphere adjacent the lower part of and above said combustion chamber, whereby convection movement of air is set up about said combustion chamber, and air so heated is deliv-

ered to a room, a shield having a bottom wire provided with lateral extensions adapted to enter openings in said reflecting casing adjacent said reflecting element, a top bar and cross bars including a vertically extending bar having the free end thereof extending upwardly to form a latch member adapted to enter an opening in said casing, said vertical bar being unconnected with said top bar, whereby it may be flexed to permit its engagement with and disengagement from said opening in said casing.

In witness whereof I have hereunto affixed my signature, in the presence of two subscribing witnesses, this 3d day of November, 1921.

AARON H. WOLFF.

Witnesses:
F. T. WENTWORTH,
FRIEDA KOEHLER.