

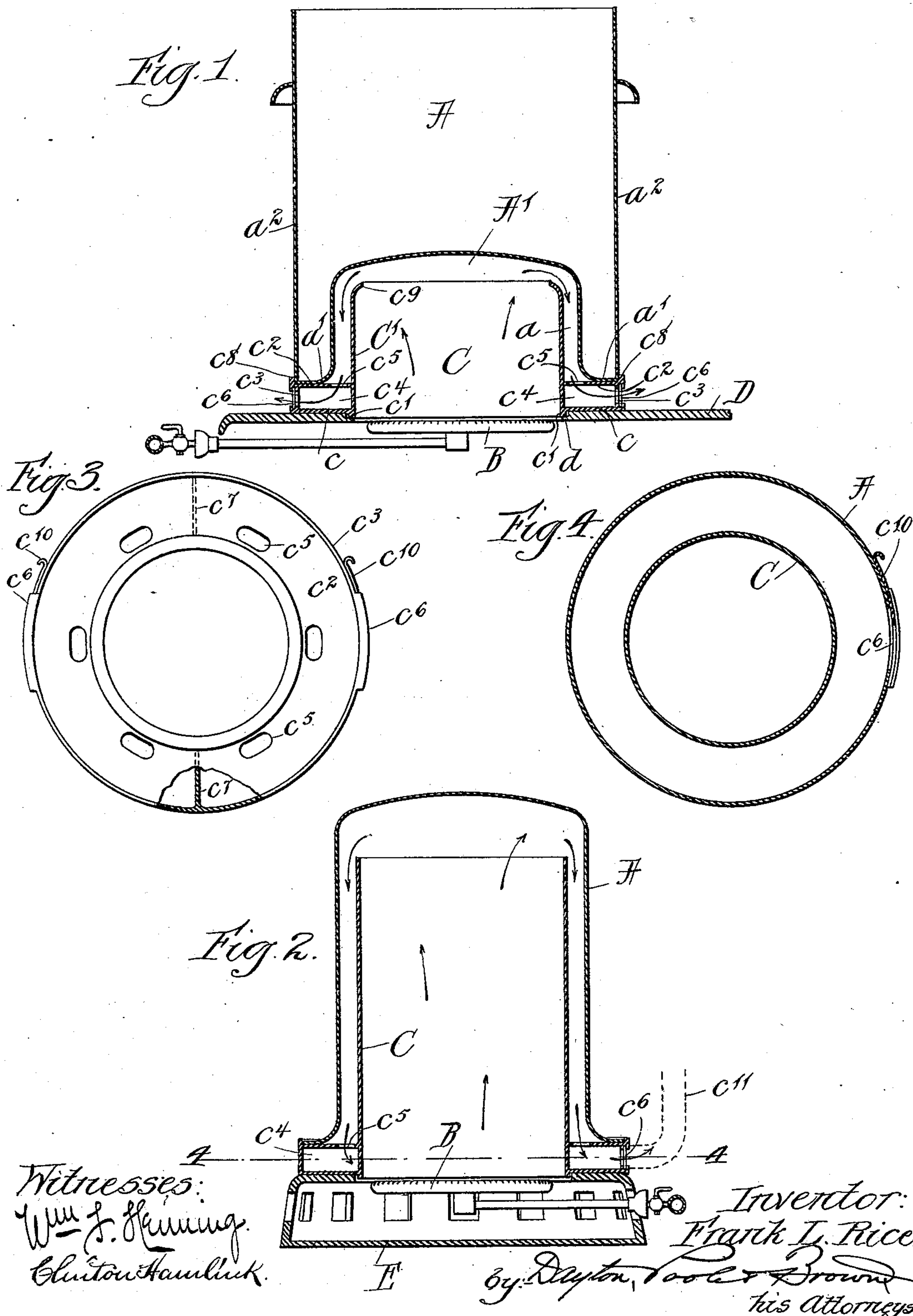
(No Model.)

F. L. RICE.

HEATING ATTACHMENT FOR GAS AND OTHER STOVES.

No. 555,466.

Patented Feb. 25, 1896.





# UNITED STATES PATENT OFFICE.

FRANK L. RICE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE KEYSTONE HEATER COMPANY, OF SAME PLACE.

## HEATING ATTACHMENT FOR GAS OR OTHER STOVES.

SPECIFICATION forming part of Letters Patent No. 555,466, dated February 25, 1896.

Application filed March 29, 1895. Serial No. 543,637. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK L. RICE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heating Attachments for Gas or other Stoves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved attachment for use in connection with gas or oil burners for improving the combustion and for more effectually distributing and utilizing the heat generated by the burner.

Described in general terms, the invention comprises a casing arranged to surround the burner at its sides, open at top and bottom and adapted to fit within a cavity at the bottom of a vessel containing liquid to be heated, somewhat larger than the exterior of the casing, the vessel being suitably supported free from the upper end of said casing, whereby the latter, in conjunction with the inner walls of the cavity, forms a tortuous exit-passage for the flame and products of combustion, thereby retaining said products of combustion in intimate relation with the wall of the cavity throughout the entire length of said passage.

The invention is capable of general use, but is more especially adapted for use with specially-constructed boilers, kettles, and similar vessels, such as are commonly employed for culinary purposes.

The object of the invention is to provide a simple, efficient, and durable device of the character described adapted for use upon any ordinary gas or oil stove.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and the same will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a central vertical sectional view of my improvement as applied to an ordinary urn. Fig. 2 is a similar view illustrating its application to an air-heater or heating-stove. Fig. 3 is a plan view of the device detached; and Fig. 4 is a plan sectional view of a slightly-

modified form of my attachment, illustrating a single outlet from the chamber thereof and having no partitions therein.

Referring to Fig. 1, wherein the attachment is shown as used in connection with an ordinary type of urn and an ordinary gas-burner, A designates the vessel as a whole; B, the burner; C, the attachment, and D the supporting-frame or stove-top.

Describing the attachment C more particularly, this comprises a cylindric casing C', preferably of cast metal, of suitable diameter to surround the burner B, but preferably of somewhat less diameter than that of the pot-opening d, within which the burner is placed. At its lower end the casing C' is provided with an outwardly-extending annular base-flange c, which serves to support the attachment upon the frame or stove-top D, and depending from the lower surface of said flange is an annular retaining-rib c', which fits within the usual rabbet a' of the pot-hole. At a short distance above the base-flange c the casing is provided with a second annular outwardly-extending flange c<sup>2</sup>. An inclosing web or wall c<sup>3</sup> extends between and joins the outer margins of these flanges c and c<sup>2</sup>, whereby an annular chamber c<sup>4</sup> is formed around the exterior of the cylindric casing C'. One or more openings c<sup>5</sup> are provided in the upper flange c<sup>2</sup>, and one or more openings or passages c<sup>6</sup> are provided in the inclosing web c<sup>3</sup>. Preferably, and as herein shown, the annular chamber c<sup>4</sup> is divided into a plurality of separate compartments by means of one or more radial partitions c<sup>7</sup>, but it is to be understood that the partitions c<sup>7</sup> may be entirely dispensed with, if desired.

c<sup>8</sup> designates an upwardly-extending retaining-rib formed around the outer rim of the upper flange, c<sup>2</sup>, which rib c<sup>8</sup> serves to hold the vessel A, supported upon the flange c<sup>2</sup>, concentric with the cylindric casing C', which casing is preferably, and as herein shown, contracted slightly at its upper end by curving the upper margin thereof inwardly, as designated at c<sup>9</sup>.

The vessel A designed for use in connection with the novel attachment hereinabove described will have any ordinary or desired exterior form, and will be provided in its bot-



tom with a cavity A', preferably conforming approximately to the exterior form of the casing and of such diameter as to provide an annular space *a* between said casing and said vessel, which space *a* communicates through the openings *c*<sup>5</sup> with the interior of the annular chamber *c*<sup>4</sup>. The vessel A is adapted to rest at the outer margin *a'* of the bottom directly upon and in close contact with the top surface of the flange *c*<sup>2</sup>, and the depth of the cavity is such that when thus supported there will be an opening or space between the upper end, *c*<sup>3</sup>, of the cylindric casing C and the wall of the cavity, thus forming communication between the interior of said casing and the surrounding annular space *a*.

Obviously when thus constructed and arranged the part *a*<sup>2</sup> of the vessel which surrounds the casing forms in effect an annular water-leg relatively thin or of small dimensions radially.

In operation the flame of the burner B rises through the casing C, impinges against the bottom of the vessel A, and is deflected outwardly and downwardly within the space *a* through the several openings *c*<sup>5</sup> into the space or chamber *c*<sup>4</sup>, from whence it finally passes through the openings *c*<sup>6</sup>. Throughout the principal part of the course of the products of combustion from the time they leave the burner until they emerge from the openings *c*<sup>6</sup> they are held in intimate relation with the bottom of the vessel, and consequently impart thereto a very large percentage of the entire heat produced. It will also be noted that after the attachment has been in position over the heating device only a very short while it becomes very hot and of itself gives off heat upwardly toward and against the vessel A or inwardly to the combustion-chamber that is formed by the cylindric casing C', and also that said casing will become intensely hot. The unconsumed products of combustion, which would ordinarily pass out of a combustion-chamber and be lost, are, by reason of the tortuous exit-passages provided, caused to impinge against and pass over said highly-heated surfaces, whereby a more perfect combustion is effected and a very much higher degree of heat is attained. Furthermore, this heat is largely transmitted to the relatively thin sheet of water contained within the water-leg of the vessel, and the result is that the water is rapidly heated. The heated water, of course, rises within the vessel and the colder and heavier water takes its place, thus creating a circulation within the vessel which rapidly brings the entire body of water to a boiling heat.

The purpose of the partitions *c*<sup>3</sup> is to equalize and more evenly distribute the circulation of the flame and other products of combustion in their exit from the burner by preventing any exterior currents or drafts driving such discharges all to one side of the device. The size of the openings *c*<sup>5</sup> and *c*<sup>6</sup> will be so

regulated as to retard the exit of the products of combustion to a desired extent, so as to insure the absorption as much as possible of the heat of the gases passing therethrough.

In order that the circulation or draft through the device may be under more perfect control and may be regulated to secure the most advantageous results with different sizes of burners or upon different stoves, the exit-openings *c*<sup>6</sup> are shown as provided with sliding doors *c*<sup>8</sup> which may be closed to any desired extent.

It will be obvious that the invention may be applied to any form of vessel which is provided with a suitable cavity for the reception of my improved attachment, and in Fig. 2 I have shown one such adaptation in which the vessel A is designed for an air heater or stove. The arrangement and operation are in all respects similar to that hereinbefore described, excepting that the cylindric casing is somewhat higher or longer, the cavity correspondingly deeper, and that the heater is in this instance provided with a hollow supporting-base E within which any suitable burner or heating device may be placed. In this instance, also, the partitions *c*<sup>7</sup> are omitted and the attachment is provided with but a single exit-opening *c*<sup>6</sup> and sliding door *c*<sup>8</sup>. Inasmuch as it may sometimes be found desirable to induce a greater draft or circulation through the attachment than that produced by the burner, especially when the attachment is of considerable height, as shown, I have also indicated in dotted lines at *c*<sup>9</sup> that a flue may be provided in lieu of the door *c*<sup>8</sup>.

While I have shown what I deem to be a preferred form of embodying my invention, yet the details thereof may be varied considerably without departing from the spirit of my invention or employing more than ordinary mechanical skill. I do not, therefore, wish to be limited to the precise details of construction herein shown.

While I have shown and described the casing C as being cylindrical in form, it is manifest that it may be constructed oblong or of some other form, and that the cavity A' should be arranged to correspond with the form given to the casing.

I claim as my invention—

1. The heating attachment for gas and other stoves described comprising a tubular casing having an annular chamber surrounding its lower end, a plurality of apertures in the upper wall of said chamber, and an exit-opening in the side of said chamber, in combination with an outer wall or casing surrounding said attachment-casing, resting at its lower end on the top of said chamber outside of the perforations therein, and closed at its upper end above the upper end of said attachment or inner casing, and with a suitable heating device, substantially as described.

2. The combination, with an inner tubular casing having an annular chamber surround-



ing its lower end, of an outer casing closed at its upper end, surrounding the inner casing to form an air-space between the two, apertures in the upper end of said chamber communicating with said air-space, an exit-opening in the side wall of said annular chamber, a damper for controlling the same, and means for supplying heat to the interior of the inner casing, substantially as described.

3. The combination, with an inner hollow casing, of an outer casing closed at its top and surrounding the former to form an air-space between the two, of an annular chamber surrounding the lower end of the inner casing, of vertical walls in said chamber whereby it is divided into two or more sections, an exit-opening in the side wall for each section, and one or more openings in the top wall whereby each section will be in communication with the space between the two casings, and means for supplying heat to the interior of the inner casing, substantially as described.

4. The combination, with an inner hollow casing, a second casing closed at its top and surrounding said inner casing to form an air-space between the two, of an annular chamber surrounding the lower end of the inner casing having openings in its top wall registering with said air-space and having an exit-opening in its side wall, means for supplying heat to the interior of said inner casing, and a third or outer casing surrounding the sec-

ond casing and joined to the latter at its lower end, substantially as described.

5. The combination, with a vessel provided in its bottom with a circular cup-shaped cavity, of an open-ended cylindric casing of less diameter than and arranged to extend at its upper end within said cavity, an outwardly-extending annular base-flange at the lower end of said casing, a second outwardly-extending flange located above the former and having openings therethrough, an inclosing web connecting the outer margins of said flanges and having an opening therein, a damper for said opening, and means for supplying heat to the interior of said cylindric casing, whereby the products of combustion will pass from the heating device upwardly through the said casing, then downwardly between the casing and walls of the cavity in the bottom of the vessel, thence through the openings in the upper flange, and finally out through said dampered opening, substantially as set forth.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 27th day of March, A. D. 1895.

FRANK L. RICE.

Witnesses:

TAYLOR E. BROWN,  
ALBERT H. GRAVES.