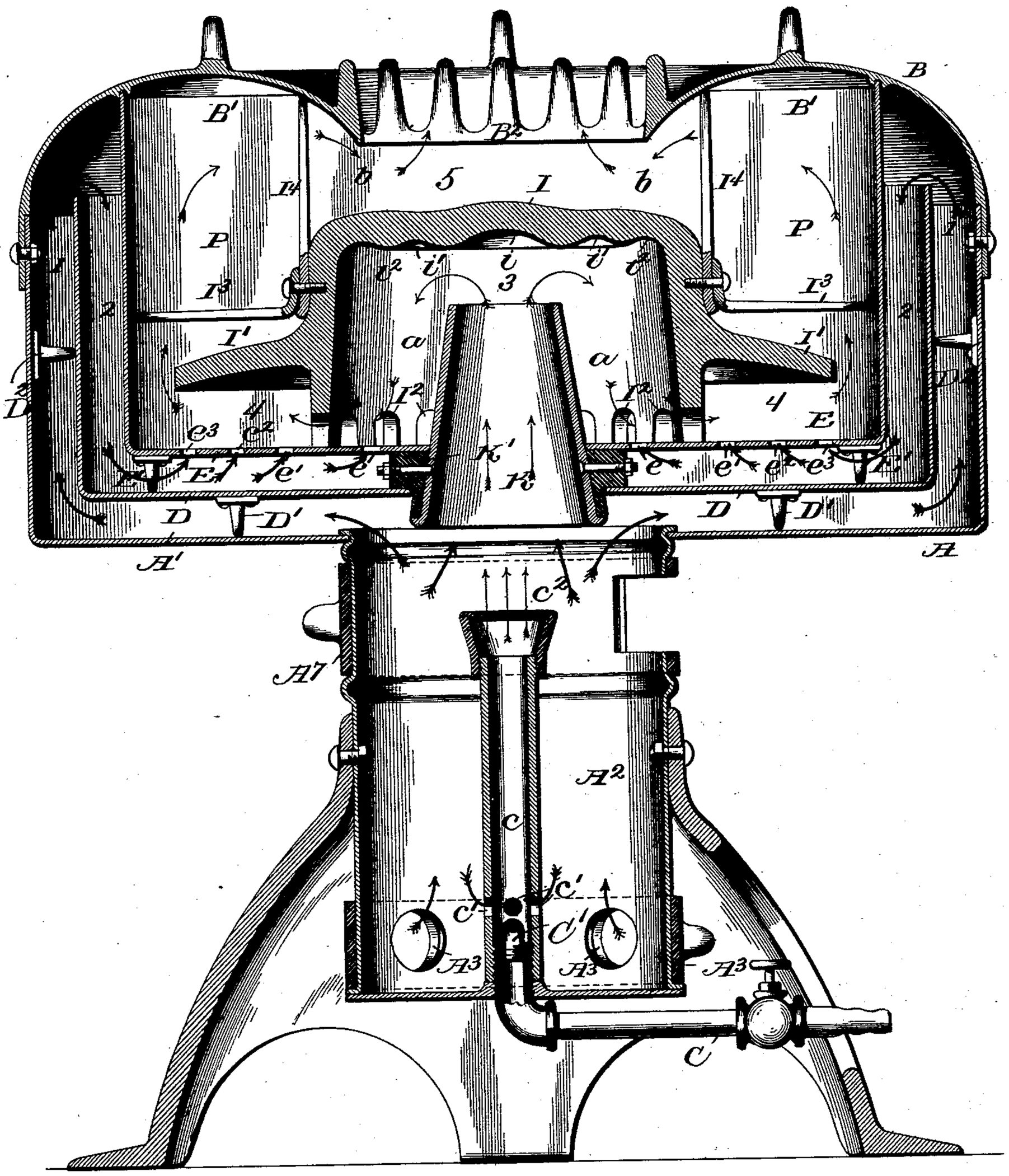
(No Model.)

V. W. BLANCHARD.

GAS STOVE.

No. 569,085. Patented Oct. 6, 1896.



WITNESSES

Jos. C. Stack.

James R. Mansfield.

INVENTOR

Virgil W. Blanchard.

By Alexander & Dowell

Attorneys.

UNITED STATES PATENT OFFICE.

VIRGIL W. BLANCHARD, OF NEW YORK, N. Y.

GAS-STOVE.

SPECIFICATION forming part of Letters Patent No. 569,085, dated October 6, 1896.

Application filed February 7, 1896. Serial No. 578,304. (No model.)

To all whom it may concern:

Be it known that I, VIRGIL W. BLANCHARD, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas-Stoves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which forms part of this specification.

The object of this invention is to provide novel devices for the more perfect combustion of liquid fuel, as gas.

To this end my invention consists in the novel construction and combination of parts set forth in the claims, and the best form of apparatus now known to me is illustrated in the accompanying drawing and described as follows.

The drawing represents a vertical longitudinal section through a stove or heater embodying my invention.

As shown, the apparatus is composed of a cylindrical casing A′, closed by a cover B and supported on a small upright cylinder A^2, having an annular damper A^3 on its lower end.

A gas-supply pipe C enters the cylinder and has a gas-tip C′ on its inner end, over which is screwed an upright tube *c*, provided with air-inlet apertures *c*′ and having a perforated burner c^2 on its upper end.

The gas may be ignited through an opening in the side of cylinder A^2, closed by a sliding door or damper A^7, as shown.

Within the casing A′ is a diaphragm D slightly smaller than the casing A′ and supported therein by legs D′ and centered therein by studs D^2, so as to leave an air-passage 1 between it and the casing A′, as shown.

Within the diaphragm is a combustion-chamber 5, formed by a pan-shaped vessel E, closed by the cover B, an air-space 2 being left between the wall of the combustion-chamber and the diaphragm and communicating with the air-space 1 over the top of the diaphragm, as shown.

Within the combustion-chamber and depending through diaphragm D, directly over tube *c*, is a conical tube K, which is supported on the diaphragm by a ring K′, as shown. Within the combustion-chamber, over tube K, is a removable dome I, having an outer peripheral flange I′ above ports I^2 in its lower edge. The dome is kept in position by lateral studs I^3 and upstanding studs I^4, as shown.

The closed upper portion of the dome forms a gas-combustion chamber 3, and in its ceiling are concavities *i i*′ i^2, which serve as shallow combustion-chambers for facilitating the combustion of the lighter elements in the combustible fluid, and thus prevents formation of "lampblack" in the dome. The space between the sides of tube K and dome I forms a descending flue-passage through which the burning gases pass to the ports I^2 in the direction of the light arrows, as shown.

The under surface of flange I′ is concaved to retard the gases and forms a small combustion-chamber 4.

A series of concentric apertures *e e*′ e^2 e^3 are formed in the bottom of combustion-chamber E, so as to admit jets of air from passage 2 into the burning gases in dome I and chamber 4.

The cover B is concaved, as at B′, to retard the escape of gases until consumed, and has a contracted outlet B^2 for the final escape of the gases from chamber 5.

Practical operation: The parts being arranged as shown in the drawing, the gas is lighted at burner c^2, and the upward flow of gas through the pipe *c* sucks air thereinto through the apertures therein and the mixed air and gas is ignited at burner c^2. The hot products of combustion rising from the burner c^2 into tube K create a suction in cylinder A^2 and draw a quota of air into the tube K, while part of the air is diverted into the passage 1 between the casing and deflector to be heated. From tube K the combustible fluids pass into the closed chamber 3, wherein the flow of their current is abruptly reversed from an upward to a downward direction, thereby causing an accumulation of unconsumed elements in the combustion-chamber 3, where much of it is oxidized, and dome I and its flange I′ become quickly heated. As the gases descend to ports I^2 they meet jets of heated air entering apertures *e*, and as they pass under flange I′ they are subjected to series of similar heated air-jets from apertures *e*′ e^2 e^3. The air jetted through said apertures is previously heated to a very high temperature in

passing through the passages 1 and 2, as indicated by the dark arrows. By thus adding air successively in a series of minute jets to intensely-heated burning gases passing above and through such jets the perfect combustion of all the oxidizable elements in said gas is progressively realized, a little air being added and heat developed before more air is added, as is evident, thereby preventing cooling of the burning gases below the igniting-point. The flange I′ directs the heated gases against the walls of the combustion-chamber 5, so as to heat the walls and thus raise the temperature of the air in passages 1 and 2 before it is admitted into the gases. After entering chamber 5 the flow of gases is slow, because of the greater capacity of said chamber, thereby greatly facilitating the mixing and mingling process between their constituent elements, which facilitates their complete oxidation.

Practical use of the apparatus has determined that enough air may be intimately mixed and mingled with the gas to afford a sufficiently large volume of oxygen to unite with the free carbon in the gas to form carbonic-oxid gas (CO) and also to reduce its hydrogenous element to water, thereby effectually preventing the formation of lampblack or soot.

The cover B, dome I, vessel E, tube K, pipe *c*, and diaphragm D all being removable, the interior of the heater is easily accessible for repairs or cleaning.

I do not confine myself to the precise construction herein described, as various modifications might be made within the scope of my invention.

Having thus described my invention, what I therefore claim as new, and desire to secure by Letters Patent thereon, is—

1. The combination of a chamber having an inlet-opening at the bottom and a suitable outlet-opening, a dome situated within said chamber above its inlet-opening, and means for admitting air through the bottom of the chamber at points contiguous to the base of the dome; with means for admitting fuel into the dome through the inlet-opening, substantially as and for the purpose described.

2. The combination of a chamber having an inlet-opening at the bottom and a suitable outlet-opening, a dome situated within said chamber above its inlet-opening, and provided with an external flange which extends laterally to near the side walls of the chamber, and means for admitting air through the bottom of the chamber at points contiguous to the base of the dome; with means for admitting fuel into the dome through the inlet-opening, substantially as and for the purpose described.

3. In a gas-heater the combination of a combustion-chamber and a dome therein having ports in its lower edge and provided with a flange or ring exterior to and above said ports adapted to spread out the burning gases or products of combustion escaping from the dome in a thin layer; with means for admitting air into gases as they pass under the flange, and means for discharging combustible fluids into the dome, substantially as described.

4. In a gas-heater the combination of a combustion-chamber and an air-chamber exterior thereto with a dome in said combustion-chamber having an external flange or ring and ports below the flange for the escape of burning gases from the dome, said flange being adapted to spread out the burning gases in a thin layer and direct them against the walls of the inclosing chamber; with means for admitting air from said air-chamber into the burning gases, and means for discharging combustible fluids into the dome, substantially as and for the purpose described.

5. The combination of the casing, the interior combustion-chamber and air-passages between the casing and combustion-chamber, with the tube extending into the combustion-chamber, the dome in the combustion-chamber over the tube, and a burner below the tube, substantially as described.

6. The combination of the casing having an enlarged upper part provided with air-passages around its walls and an interior combustion-chamber communicating with the air-passages; with the tube, the dome in the combustion-chamber over the tube, having ports and a flange extending toward the walls of the combustion-chamber; with a burner below the tube, and a gas and air mixing tube below the burner, all substantially as and for the purpose set forth.

7. The combination of the cylinder, the casing thereon having air-passages around its walls substantially as described and an internal combustion-chamber; with a gas and air mixing tube in the cylinder, a burner on said tube; a tube supported in the casing over the burner, and extending into the combustion-chamber; and a dome over said tube within the combustion-chamber, having ports in its lower edge; and apertures for admitting air from said air-passages into the burning gases in said dome and combustion-chamber, substantially as described.

8. In a gas-heater the combination of the casing, its cover, the combustion-chamber E and interposed diaphragm D, arranged to form air-passages between the diaphragm and casing and between the diaphragm and combustion-chamber, said air-passages communicating with the combustion-chamber; with the dome in chamber E and means for discharging combustible gases into the dome, substantially as described.

9. In a gas-heater, the combination of the casing; the vessel E therein having perforated bottom and interposed diaphragm D arranged to form air-passages between the casing and vessel; with the dome I within vessel E, the burner below the dome, and means for introducing products of combustion from the

burner into the dome; substantially as described.

10. The combination of the casing; the vessel E therein and the diaphragm D interposed between the vessel and casing so as to form air-passages therebetween; with the tube K passing through the casing and diaphragm, the air and gas mixer and burner below the tube, and the gas-trapping dome I in vessel E above the tube, all constructed and adapted to operate, substantially as and for the purpose described.

11. The combination of the casing, having an interior combustion-chamber, and the communicating outer and inner air chambers or passages 1 and 2 within the casing around the combustion-chamber and communicating therewith; with the dome I having flange I', within the combustion-chamber; and the burner below and discharging into the dome, all constructed and arranged substantially as described.

12. The combination of the casing, having an interior combustion-chamber, and an air chamber or passage surrounding the combustion-chamber within the casing; with the dome I within the combustion-chamber, having ports in its lower edge and an exterior flange above the apertures; the burner below the dome, the tube interposed between the burner and dome, and the gas and air mixer below the burner, all substantially as and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

VIRGIL W. BLANCHARD.

Witnesses:
G. B. UNDERWOOD,
A. D. B. WYLIE.