(No Model.)

E. RUUD.

GAS HEATING STOVE.

No. 483,086. Patented Sept. 20, 1892.

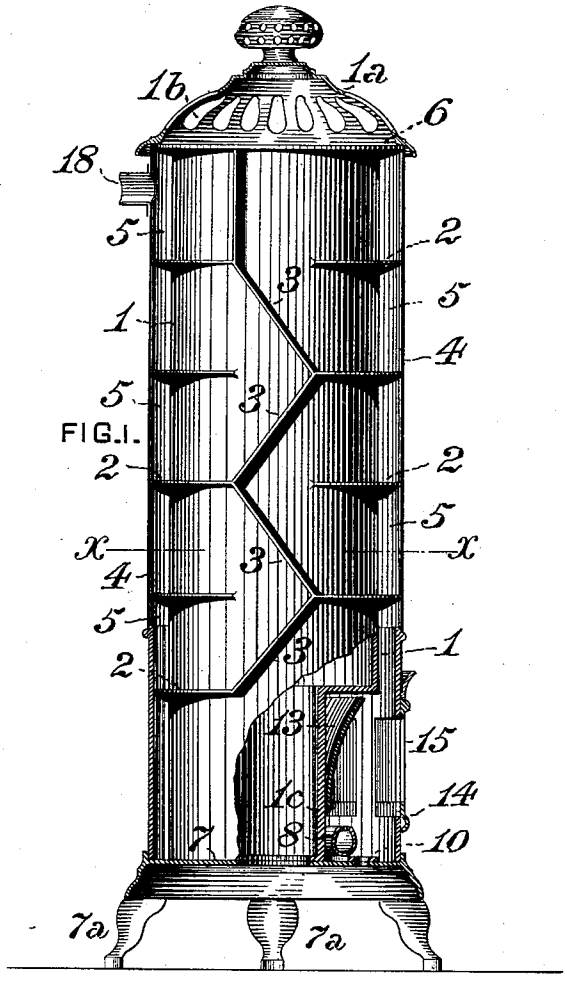

FIG. 1.

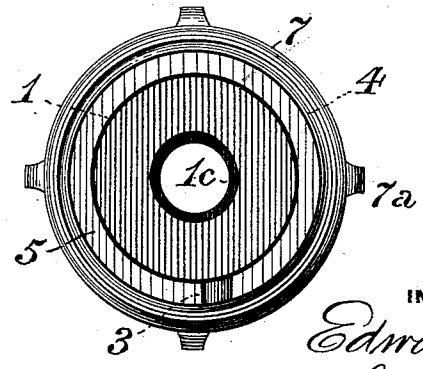

FIG. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

EDWIN RUUD, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE FUEL GAS AND MANUFACTURING COMPANY, OF SAME PLACE.

GAS HEATING-STOVE.

SPECIFICATION forming part of Letters Patent No. 483,086, dated September 20, 1892.

Application filed August 29, 1891. Serial No. 404,107. (No model.)

To all whom it may concern:

Be it known that I, EDWIN RUUD, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Gas Heating-Stoves, of which improvement the following is a specification,

The object of my invention is to provide a gas heating apparatus of simple and inexpensive construction in the operation of which a materially larger proportion of radiant heat may be evolved relatively to the entire amount generated than has been heretofore practicable under the ordinary constructions.

To this end my invention, generally stated, consists in the combination of an inner and an outer shell having an interposed series of annular chambers communicating at alternately-opposite ends for the passage of products of combustion and an internal air-passage, a lower burner, a radiating-plate, and a perforated cap.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a view, partly in elevation, with the outer case removed, and partly in vertical central section, of a gas heating-stove embodying my invention; and Fig. 2, a horizontal section at the line *x x* of Fig. 1.

In the practice of my invention I provide an inner shell 1, which is of cast metal, and preferably, as shown, of cylindrical form, said shell having a series of circumferential ribs or flanges 2 on its periphery, one of said flanges being located at its lower end and the others being set at intervals between its lower end and its top. The flanges 2 do not extend completely around the shell, each being less than a full circle, and thereby presenting a blank space or opening between its ends, said blank spaces being located in line vertically one above another. The flanges 2 are connected by a series of inclined flanges 3, which project from the periphery of the shell 1 to the same distance as the flanges 2, each flange 3 extending from one end of one of the flanges 2 to the end of the adjacent flange 2 on the opposite side of its blank space or opening. An external shell 4 of light wrought metal and of corresponding form to the inner shell 1 is fixed thereto and to the flanges 2 and 3, a series of annular chambers 5, located one above another and communicating at alternately-opposite ends, being thereby formed between the inner and outer shells 1 and 4. The uppermost of the chambers 5 is closed at top by an annular rib or flange 6 on the inner shell and is provided near its top with an outlet-pipe 18, leading to a connection with a suitable chimney pipe or flue. The lowest of the chambers 5 communicates through the blank space or opening of its flange 2 with the lower portion of the space between the inner and outer shells. The inner shell 1 terminates at its lower end in a central air-inlet 1^c, of reduced diameter, which is open at its lower and upper ends to the atmosphere and to the interior of the shell 1, respectively, and is secured at bottom to a base-plate 7, supported on legs or standards 7^a. The lower portion of the outer casing, or that which surrounds the air-inlet 1^c, is preferably formed of cast metal and is secured at bottom to the base-plate 7.

The flanges 2 and 3 are preferably formed integral with the inner shell 1; but it will be obvious that such construction is not essential, as they might, if preferred, be connected to the external shell 4 or be fitted closely between the shells without positive connection to either, their only function being to act as partitions bounding the several annular chambers 5.

A circular burner-pipe 8, to which gas is supplied by a pipe controlled by a proper valve, is supported in the lower portion of the space between the air-inlet 1^c and the inclosing outer shell, the admission of air to said space being regulated, as required, by a register or sliding plate 10. The burner-pipe 8 is provided with a series of burner openings or perforations on its upper side, and a radiating plate or tile 13 is secured to the outer surface of the air-inlet 1^c above the burner-pipe. The radiating-plate may, when gas which burns with a non-luminous flame is employed, be faced with asbestus or other porous non-combustible material which can be maintained in an incandescent condition. The portion of the outer shell around the ra-

diating-plate is provided with a series of removable frames 14, of ornamental design, which are fitted with mica lights 15.

The space within the inner shell 1 is closed at top by a cap 1^a, having a series of openings or perforations 1^b, and forms a heating-passage for air, which enters at the bottom of the inlet 1^c and is discharged through the perforations of the cap. In order to break up and retard the upward current of air in the inside of the inner shell 1 and to more fully transmit thereto the heat imparted to the inner shell by the escaping products of combustion, a series of projections or plates, which are not claimed as of my present invention, may be formed therein, said projections being staggered or alternated in position to correspondingly increase their effect in prolonging the exertion of heat upon the upwardly-moving column of air.

In operation gas is ignited at the openings of the burner-pipe 8, and the radiant heat of its flame is exerted upon the atmosphere of the room through the mica lights 15, that which is directed against the plate or tile 13 being likewise radiated therefrom through the mica lights. The heated products of combustion pass upward into and around the lowest of the annular chambers 5 between the inner and outer shells, thence into the next higher chamber and around the same in contrary direction, and so on through the remaining chambers, after which they are discharged through the outlet-pipe 18. The heat of the escaping products is in their retarded and alternately-reversed traverse applied to and radiated from the thin outer shell and is conducted through the inner shell and imparted to the upwardly-moving column therein. Both the inner and outer shells of the stove are thus made available as heating-surfaces, the most of which acts by direct radiation, and the construction is such that the parts may be made and fitted together with comparatively slight cost.

I claim as my invention and desire to secure by Letters Patent—

1. In a gas heating-stove, the combination of an inner shell, an outer shell, a burner located between said shells near their lower ends, a series of annular chambers being formed between said shells and communicating at alternately-opposite ends one with another, said chambers forming a continuous passage in alternately-reversed directions around the inner shell for the products of combustion from the burner, and an outlet leading from the upper chamber of the series, substantially as set forth.

2. In a gas heating-stove, the combination of an inner shell having air inlet and discharge openings at its lower and upper ends, respectively, an outer shell closed at top and connected to the inner shell, a burner located between said shells near their lower ends, a series of annular chambers being formed between said shells and communicating at alternately-opposite ends one with another, said chambers forming a continuous passage in alternately-reversed directions around the inner shell for the products of combustion from the burner, and an outlet leading from the upper chamber of the series, substantially as set forth.

3. In a gas heating-stove, the combination of an inner shell having air inlet and discharge openings at its lower and upper ends, respectively, an outer shell closed at top and connected to the inner shell, a burner located between said shells near their lower ends, a series of horizontal flanges interposed between and fitting on the inner and outer shells, each provided with an opening or blank space, a series of inclined flanges, each connecting one end of a horizontal flange with the end of the adjacent horizontal flange on the opposite side of its blank space, and an outlet leading from the outer shell above the uppermost horizontal flange, substantially as set forth.

In testimony whereof I have hereunto set my hand.

EDWIN RUUD.

Witnesses:
J. SNOWDEN BELL
R. H. WHITTLESEY.