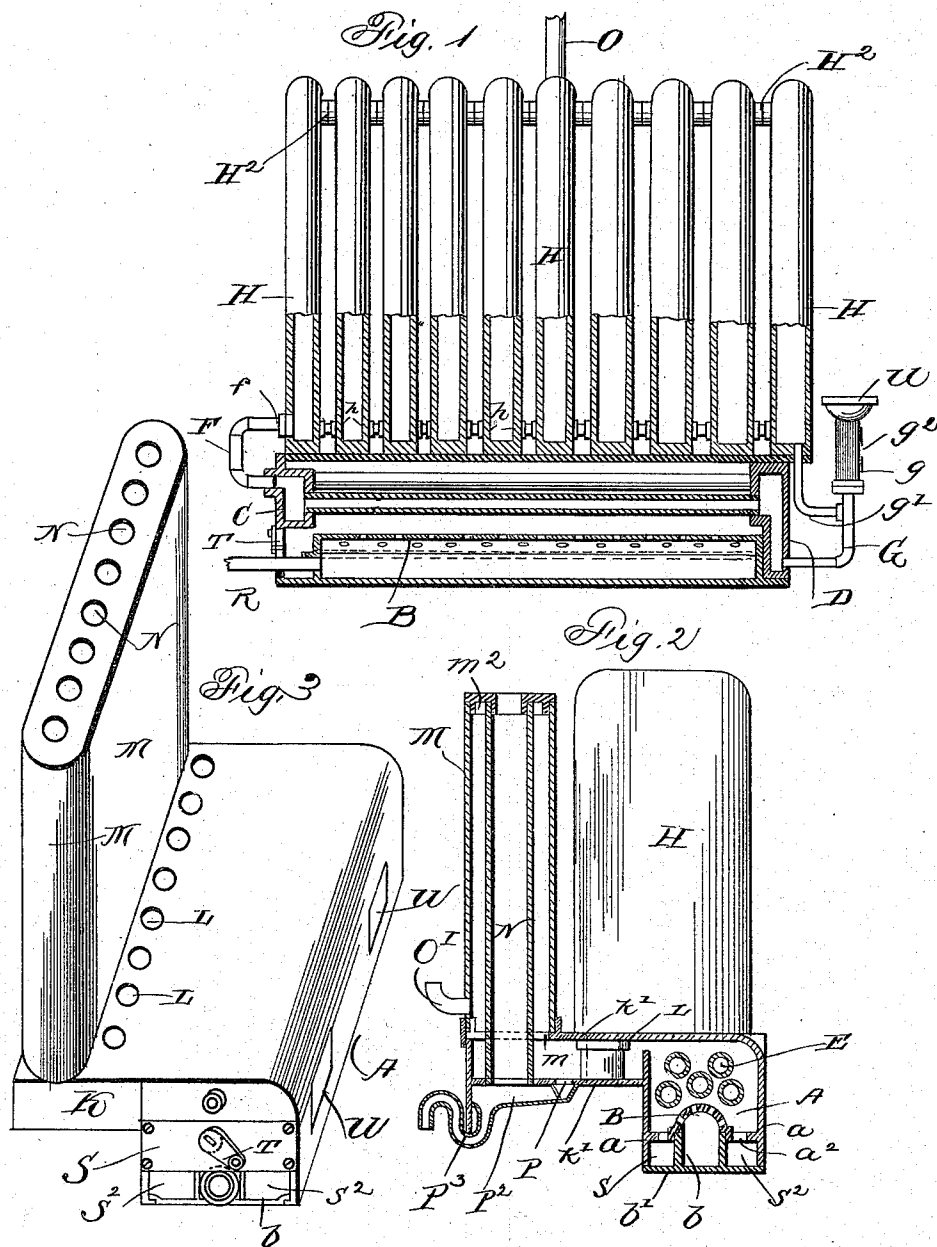


(No Model.)

J. E. DAME.
HEATER.

No. 573,451.

Patented Dec. 22, 1896.



WITNESSES:

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HEATER.

SPECIFICATION forming part of Letters Patent No. 573,451, dated December 22, 1896.

Application filed November 19, 1895. Serial No. 569,409. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. DAME, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Heaters, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar letters of reference indicate corresponding parts.

This invention relates to gas-stoves, and particularly to that class thereof which is designed for heating purposes; and the object of the invention is to provide an effective heater of this class in connection with which is employed a water-circulating apparatus or means for employing either water or steam as an aid or auxiliary in producing the required heat, a further object being to combine a gas-heater which employs radiators and a circulatory apparatus for water, a hot-air drum into and through which the products of combustion are passed, and through which also extend air-tubes, which serve as auxiliary means for heating the air in the compartment, dwelling, or building in which the heater is employed; and with these and other objects in view the invention consists in the construction, combination, and arrangement of parts hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a sectional front view of my improved heater, the lower portion thereof being in vertical section, so as to better show the construction of the burner and the air-circulating apparatus and the connection thereof with the radiator-tubes; Fig. 2, a sectional end elevation showing the burner, the fire-box, and the air-drum in section, and showing also the communicating passage or passages between the fire-box and the air-drum and the drainage pipe or trap connected with the air-drum; and Fig. 3 is a perspective view of the device or heater with the radiator proper removed.

In the practice of my invention I provide an oblong fire-box A, which is preferably rectangular in cross-section and square or approximately so, and near the bottom of this fire-box and at each side thereof are arranged

two longitudinal plates *a*, between which the burner B is passed, and said burner consists of a longitudinal box or housing composed of two vertical side plates *b*, a bottom plate *b'*, formed integrally with the vertical side plates *b*, and the top plate B, which is semicircular in form in cross-section and which is preferably formed integrally with the vertical side plates *b*, and said burner is removable from the fire-box, being capable of being slid out at the end thereof, and the object of this arrangement is to provide means for repairing the burner or cleaning the same whenever necessary.

At one end of the fire-box is a removable head C and at the other a removable head D, and said heads are provided with internal chambers with which the circulating-pipes E communicate, and, as will be observed, the head D is carried downwardly to the bottom plate of the burner, while the head C terminates above the burner proper, and communicating with the upper portion of head C is a pipe F, the other end of which communicates with the lower end of the adjacent side radiator-tube, as shown at *f*, and communicating with the bottom of the head at the opposite end is a tube G, the upper end of which is provided with a vertical extension *g*, the upper end of which communicates with the adjacent side radiator-tube by means of a pipe *g'*, and placed in the outer side of the extension *g* at *g*² is a glass or other transparent plate, the object of which is to provide means for determining the height of the water in the circulating apparatus, as will be hereinafter described.

It will be observed that the head C and the head D communicate with the radiator-tubes H on the same level, and each of said radiator-tubes is placed in communication by means of pipes or tubular coupling-heads *h*, as clearly shown in Fig. 1, said coupling heads or pipes being arranged in line with the pipes F and *g'*, as is also clearly shown in said figure.

The fire-box A is provided with a backwardly-directed extension K, formed by the top plate *k*, which also forms a top plate of the fire-box, and the bottom plate *k'*, which is secured to or formed on the back plate of the fire-box, and extended vertically through

said extension are a number of short pipes L, which open between the rear portion of the radiator-tubes II, said radiator-tubes II being preferably oblong in form in cross-section, and secured to the rear portion of the extension K is an air-drum M, which communicates with the extension throughout its length, as shown at *m*, and passing vertically through said air-drum are a number of air-tubes N, which extend through the bottom plate *k'* of the extension K and through the cap or top plate *m*² of the drum.

I also employ an escape flue or pipe O, which communicates with the air-drum by means of an elbow O' or any other desired connection, and this elbow or connection is preferably arranged near the bottom of said drum, and at the back thereof and in the bottom plate *k'* of the extension K is formed a passage or opening P, which communicates with a chamber or receptacle P², with which communicates a trap-pipe P³, and the object of this arrangement is to provide means for the escape of the water within the drum M.

In operation gas and air combined are employed, said gas and air being admitted into the burner through a pipe R by means of an ordinary Bunsen burner, (not shown,) or by means of any preferred device, and I also employ a removable plate S, which is secured to the end of the fire-box, through which the pipe R passes, the object of this removable plate being to provide means for the removal of the burner, and in connection with said plate I also prefer to employ a pilot or guide, which forms a part of the air and gas mixing apparatus, (which is not shown for the reason that it forms no part of this invention,) and below the plate S are openings S², into which air passes beneath the plates *a* of the fire-box, said plates *a* being provided with perforations *a*², whereby said air passes into said fire-box and around the perforated burner.

I also prefer to form the heads C and D so that they may be removed from the fire-box, and my invention is not limited to the form and construction of said heads or to the number of circulating-tubes E which are employed, or to other features of the construction herein shown and described, and I therefore reserve the right to make all such alterations therein and modifications thereof as fairly come within the scope of the invention.

In practice the upper portion of the extension *g* of the tube G is provided with a cap or cover U, which may be made removable, through which the water is passed into the circulatory apparatus or into the head D, and I also prefer to provide transparent plates W in the outer side of the fire-box, through which the condition of the burner may be determined.

In operation the heads C and D and the pipes E are filled with water through the extension *g* by removing the cap or cover U, and enough water is employed to fill said heads and said pipes and the coupling-pipes

F and *g'* and the radiator pipes or sections up to or slightly above said coupling-pipes, and when the gas and air has been ignited and the water heated said water will circulate, as will be readily understood, the circulation being through the pipes E, the head C, the coupling-pipe F, through the lower portions of the radiator sections or tubes, and downwardly into the lower portions of the head D, and this circulation, as will be understood, will be kept up as long as the heater is in operation.

It will also be understood that the products of combustion pass into the drum M, and at the same time said products of combustion pass around the tubes L, through which air passes into the spaces between the radiator tubes or sections H, and at the same time air passes into the tubes N from below upwardly, and by means of this arrangement almost the entire amount of heat is extracted from the products of combustion, and the coupling elbow or section O' is never at any time heated to any considerable extent, and by means of this arrangement I am also enabled to employ a flexible tube O, through which the products of combustion may be passed into the escape-flue or chimney or out through the window or any other desired passage that may be provided.

In this apparatus there will be a constant condensation within the air-drum M, and although this condensation is slight I provide means for the escape thereof consisting of the receptacle P² and the trap P³, and an ordinary goblet, cup, or other receptacle may be placed under said trap for the reception of said condensation. By means of this construction I am able to utilize the entire amount of heat produced by the combustion of the combined gas and air, and also to provide means for the escape of the noxious gases that are produced by the combustion of gas, and I thus provide a simple and effective heating apparatus which is comparatively inexpensive and which may be utilized in almost any compartment, room, office, or other structure.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A heater comprising a fire-box, a burner located therein, and removable therefrom, and detachable, hollow, heads approximately rectangular in cross-section connected with said fire-box, a plurality of tubes forming a communication between said heads, a radiator composed of separate radiator sections or tubes located above said fire-box, and said radiator sections or tubes being in communication at their lower ends, and said heads forming portions of the end walls of the apparatus and being also in communication with said radiator sections or tubes, substantially as shown and described.

2. A heater comprising a fire-box, a burner located therein, and removable therefrom,

and detachable, hollow heads approximately rectangular in cross-section connected with said fire-box, a plurality of tubes forming a communication between said heads, a radiator composed of separate radiator sections or tubes located above said fire-box, and said radiator sections or tubes being in communication at their lower ends, and said heads forming portions of end walls of the apparatus and being also in communication with said radiator sections or tubes, the communication between one of said heads, and the adjacent radiator section or tube being made by a pipe which communicates with the upper part of said head, and the communication between the other head, and the adjacent radiator section or tube being made by a pipe which communicates with the lower part of said head, substantially as shown and described.

3. A heater comprising a fire-box, a burner connected therewith, a number of tubes located in said fire-box and communicating with hollow heads at each end thereof said heads being also in communication with a radiator composed of separate sections or tubes located above said fire-box and the lower ends of which are in communication, said fire-box being also provided with a backwardly-directed extension, through which pass vertical tubes which communicate with the spaces between said radiator sections or tubes, and said extension being also provided with an air-drum which communicates therewith and through which extend air-tubes, substantially as shown and described.

4. A heater comprising a fire-box, a burner connected therewith, a number of tubes located in said fire-box and communicating with hollow heads at each end thereof, said heads being also in communication with a radiator composed of separate sections or tubes located above said fire-box and the lower ends of

which are in communication, said fire-box being also provided with a backwardly-directed extension, through which pass vertical tubes which communicate with the spaces between said radiator sections or tubes, and said extension being also provided with an air-drum which communicates therewith and through which extend air-tubes, said drum being also provided with a flue for the escape of the hot air or the products of combustion after the same have passed through said extension and through said drum, substantially as shown and described.

5. A heater comprising a fire-box, a burner connected therewith, a number of tubes located in said fire-box and communicating with hollow heads at each end thereof, said heads being also in communication with a radiator composed of separate sections or tubes located above said fire-box, and the lower ends of which are in communication, said fire-box being also provided with a backwardly-directed extension, through which pass vertical tubes which communicate with the spaces between said radiator sections or tubes, and said extension being also provided with an air-drum which communicates therewith and through which extend air-tubes, said drum being also provided with a flue for the escape of the hot air or the products of combustion after the same have passed through said extension and through said drum, and said drum being also provided with means for carrying off the products of condensation, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 15th day of November, 1895.

JOHN E. DAME.

Witnesses:

C. GERST,

F. V. KIRCHHOFF.