

H. Q. HAWLEY.  
Gas Heating and Cooking Furnace.

No. 221,169.

Patented Nov. 4, 1879.

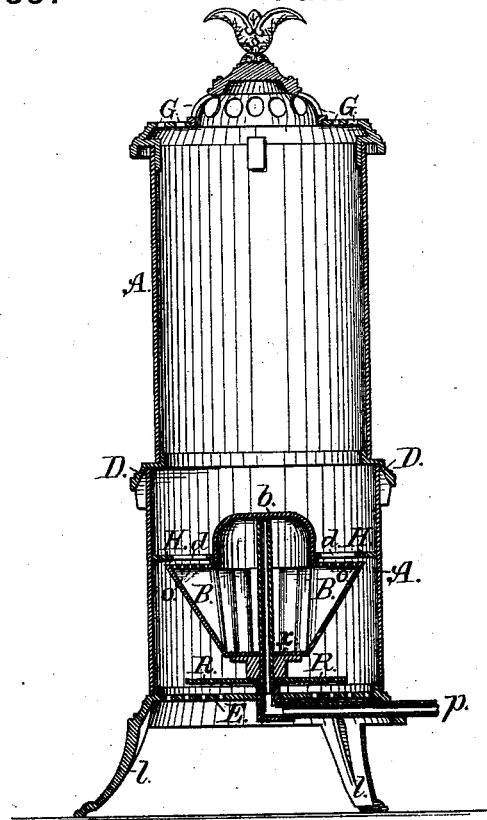


FIG. 1.

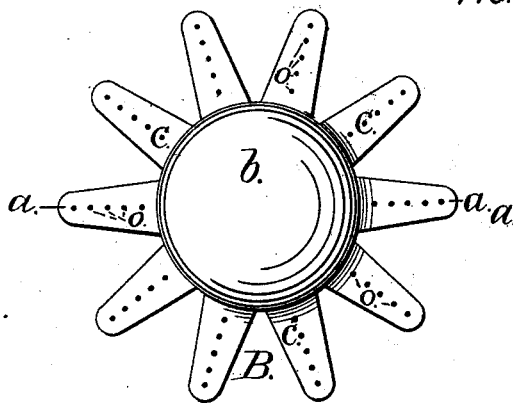


FIG. 2.

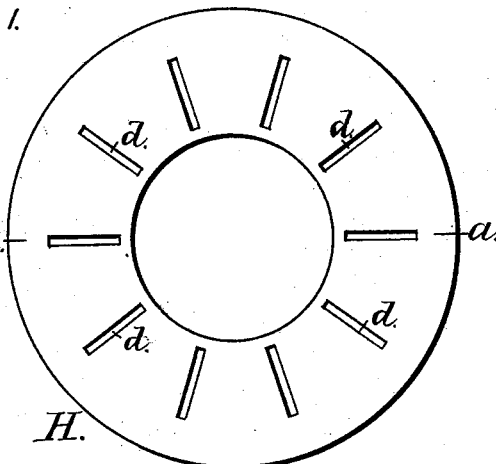


FIG. 3.

Witnesses,

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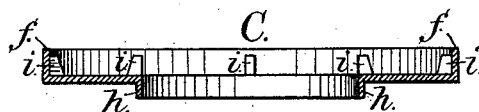


FIG. 4.

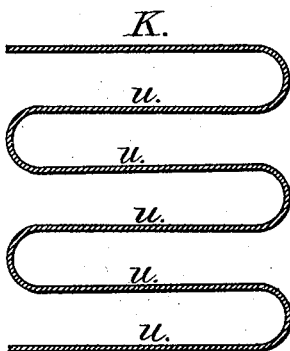


FIG. 5.

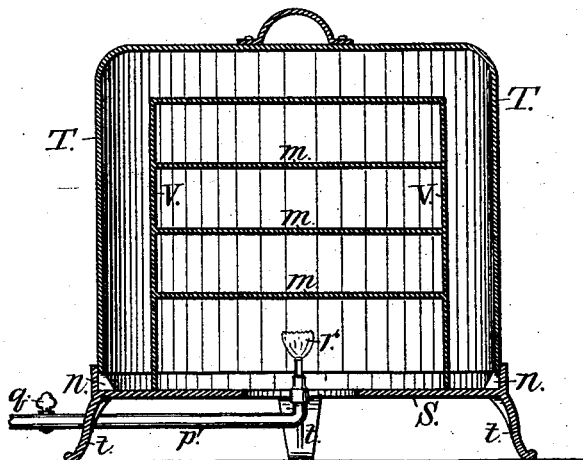


FIG. 6.

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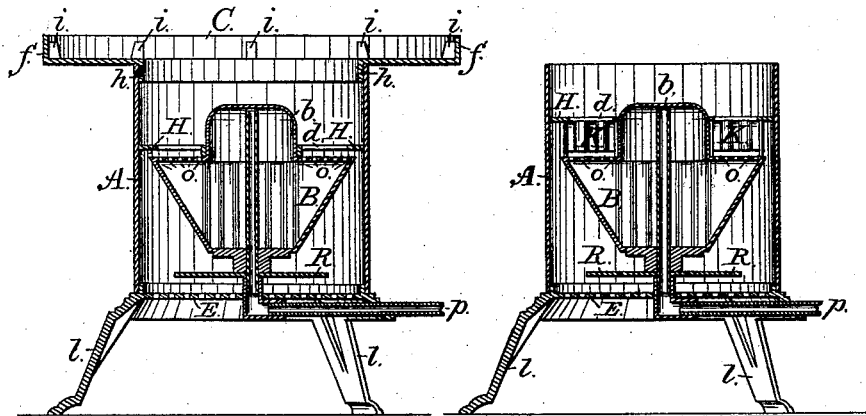


FIG. 8.

FIG. 7.

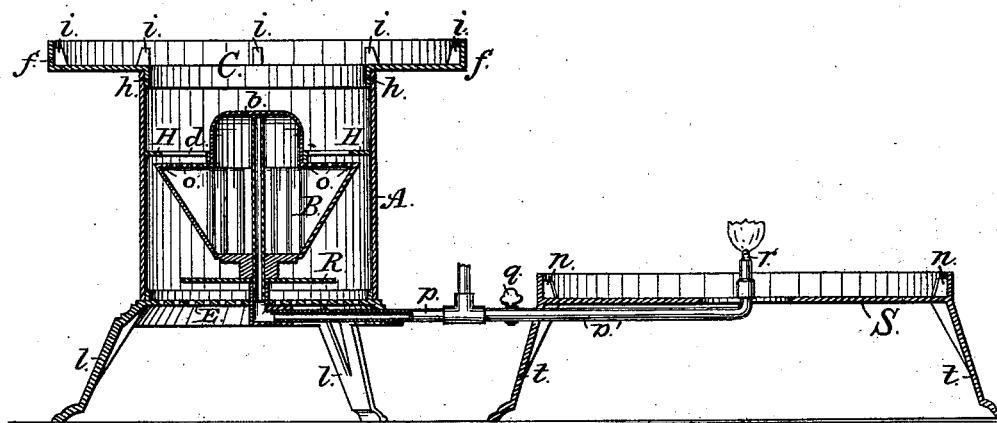


FIG. 9.

Witnesses,

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# UNITED STATES PATENT OFFICE.

HENRY Q. HAWLEY, OF ALBANY, NEW YORK.

## IMPROVEMENT IN GAS HEATING AND COOKING FURNACES.

Specification forming part of Letters Patent No. **221,169**, dated November 4, 1879; application filed June 27, 1879.

*To all whom it may concern:*

Be it known that I, HENRY Q. HAWLEY, of Albany, New York, have invented certain Improvements in Gas Heating and Cooking Furnaces, of which the following is a description.

To make gas a practical fuel for heating and cooking it must be burned economically.

Previous to my invention the method generally adopted for that purpose has been the Bunsen or atmospheric system—to wit, mixing air with the gas previous to its issue from the burner.

That system gives the desired economy, but at the expense of health, as gas when thus burned liberates freely carbonic oxide, a very poisonous and (being odorless) dangerous gas.

To avoid using it, therefore, and yet burn gas economically for heating and cooking (frequently required to be done in close rooms) is an important improvement, and the object in view in the following apparatus.

In the accompanying drawings, Figure 1 is a vertical section of the furnace when arranged for heating alone through the lines *aa* in Figs. 2 and 3. Fig. 2 is a top view of the burner B. Fig. 3 is a top view of the flat slotted ring H. Fig. 4 is a vertical section of the cooking-plate C. Fig. 5 is a top view of the bent piece K. Fig. 6 is a vertical section of the plate S with the movable oven T and frame V upon it. Fig. 7 is a vertical section of the furnace through the lines *aa*, Figs. 2 and 3, when containing the bent metallic strip K. Fig. 8 is a vertical section of the furnace through the lines *aa*, Figs. 2 and 3, when arranged with cooking-plate C. Fig. 9 is a vertical section of the apparatus when arranged for both cooking and keeping dishes warm.

A is the case of the furnace when used for heating rooms. It consists of a lower and upper section joined together by a movable ring, D, a short distance above the top of the burner B, and is a close cylinder, except it has its bottom E perforated for the admission of air in jets, and openings in its top, G, for its escape after being heated. It also has legs *e*.

B is a hollow metallic burner with narrow elongated side chambers, *c*, and is a close vessel, except it has perforations *oo* in the top of its side chambers for the issue of the gas when burning.

*x* is the bottom of this burner, and *b* a central extension of it to aid in more fully super-

heating the gas. *p* is the gas-supply pipe entering the burner B through its bottom *x* and extending up through it nearly to the top of its extension *b*.

H is a flat ring or hood, intended to fit the interior of the case A closely, and it must be placed in it around the upper part of the burner B, a short distance above its side chambers, *c*, and so that its slots *d* are over the gas-jets *oo*. These slots in an ordinary gas-furnace are from two to three eighths of an inch wide, and a little longer than the row of gas-jets under them.

C is a loose circular plate, having a flange, *h*, around the opening in its center to fit the top of the lower section of the case A, a rim, *f*, around its outer edge, and standards *i* cast upon its upper side as rests for utensils used in cooking. It is only required when the furnace is to be used in cooking, in which case it takes the place of the upper section of the case A and the ring D. (See Fig. 8.)

R is a circular plate placed in the case A, about one-half inch above its bottom E, and from one-fourth to one-third less diameter. Its object is to direct the draft of air through the furnace.

It will be noticed that the above construction adapts the same furnace to either heating or cooking, as desired. When it is to be used for heating exclusively, and the products of combustion are conducted into the chimney, it can be rendered still more effective, as follows: In Figs. 5 and 7, K is a strip of thin metal, about one inch wide, and bent, as shown, into as many partitions *u* as there are gas-jets *o* in each side chamber of the burner B, over which said partitions are to be used, so that, when said partitions *u* are placed edgewise across and so as to extend beyond the face of the side chamber *c* of the burner B, the flame and heated air from it must pass upward between said partitions *u*. They should also be raised about one-fourth of an inch above the said chamber *c*, and the flat ring H placed upon them so that its slots *d* are over the gas-jets *oo*. Thus adjusted the apparatus will burn the gas without flame when the ring H is used, and nearly so when it is not.

When the furnace is to be used for cooking exclusively, its working capacity will be greatly increased by adding a warming-chamber, constructed and arranged as follows: (See

Figs. 6 and 9.) S is a circular plate, of not less diameter than the cooking-plate C of furnace A, and is supported on legs *t*, and provided at intervals, upon the outer edge of its upper surface, with shoulders *n*. It is in the form of a plate to protect the floor from food falling from the dishes placed over it. Otherwise than for that use it can be dispensed with, and the frame V can be so arranged as to support the oven T as well as the shelves *m*.

T is a separate oven, having a handle on its top, and is close except at the bottom. It must be of such diameter that, when in position, it will rest upon the shoulders *n*.

V is a separate frame, resting upon S, and having one or more shelves, *m*. *r* is a burner connected with the gas-pipe *p'*, and *q* a cock in said pipe. This burner must be placed in an opening in the plate S of greater diameter than its own, so that room will be left around it for the entrance of air, and the pipe *p'* must be connected with the inlet-pipe *p* of furnace A. Thus arranged, the dishes, as fast as cooked over the furnace A, can be placed upon the shelves *m*, where they will be kept warm until the entire meal is cooked, the oven T being arranged to lift off or on, as required, to cover or expose the frame V without disturbing it.

The apparatus being constructed as above described, and the gas turned on and lighted, its operation is so evident it is not necessary to describe it. Its advantages are the following:

First, from the extended surface of highly-heated metal over and through which the gas must pass before being burned, it must be increased in volume several times before combustion. Again, from the peculiar construction of the case A, burner B, and flat ring H, and their relation to each other, no air can enter the furnace except from below, or mix with the gas until it is heated, and all of it in escaping must strike into the flame on both sides at a right angle, or nearly so, and must mix with it where the heat is greatest—viz., near the burner. The result is that although the gas is burned with a white flame, and therefore, without injury to health, less of it is required for a given amount of heat than when the atmospheric or Bunsen burner is used; and, further, when the apparatus is arranged as shown in Fig. 7 the combustion is so perfect that there is no flame.

Second, economy of construction, as the same furnace can be used for either heating or cooking, and, when connected with a warming-chamber, as shown in Figs. 6 and 9, becomes a practical family cooking-stove, although having only one cooking-burner, at much less cost, both of apparatus and operation, than is possible when such a gas-stove has separate burners and fixed ovens, broilers, boilers, &c., thereby using more gas, not only, but greatly increasing liability for its waste, a very small burner being sufficient to

keep cooked dishes warm, and the oven-frame used for that answering also for baking, &c., upon the furnace A.

Third, less liability to waste in careless hands, fewer burners being required at the same time, when the dishes cooked can be kept warm until all is ready.

Fourth, perfect operation under light pressure, a material advantage in cooking, as it is chiefly done in the day-time when gas companies reduce the pressure on their mains to the lowest point practicable to avoid leakage.

In the above improvements I do not claim burning gas for heating and cooking in a case arranged to have an air-heating chamber below the burner, and a combustion-chamber above it, that construction being described in the Letters Patent for improvement in gas-stoves granted to me by the United States December 28, 1875.

On the other hand I do not limit myself to a burner and hood of the precise form above described. For instance, the burner, when desired, can be in the form of narrow communicating straight or circular chambers, provided the air for combustion can pass between them, and the hood is constructed to control and direct the draft, as above described. The central chamber or extension *b* and extension of gas-pipe *p* into it, are also great advantages, but not necessities.

What I do claim, and desire to secure by Letters Patent, is—

1. A gas heating and cooking furnace consisting of the case A, with or without its upper section, the burner B, the slotted ring or hood H, and the gas-pipe *p*, constructed and operating substantially as and for the purpose above described.

2. The combination, in a gas heating and cooking furnace, of the burner B, the bent metallic strip K, the slotted ring H, and the gas-pipe *p*, with the case A, constructed and operating substantially as and for the purpose above described.

3. In a gas heating and cooking furnace the burner B, in combination with the hood H, constructed and operating substantially as and for the purpose above described.

4. A gas cooking and heating furnace consisting of the case A, the burner B, the hood H, the plate C, and the gas-pipe *p*, constructed and operating substantially as and for the purpose above described.

5. A gas cooking and heating apparatus consisting of the case A, the burner B, the hood H, the plate C, and the gas-pipe *p*, in combination with the plate S, the burner *r*, the cock *q*, and the pipe *p'*, when the latter are arranged to be merely an addition to the former to keep cooked dishes warm, and not as a duplicate cooker.

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Witnesses:

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