

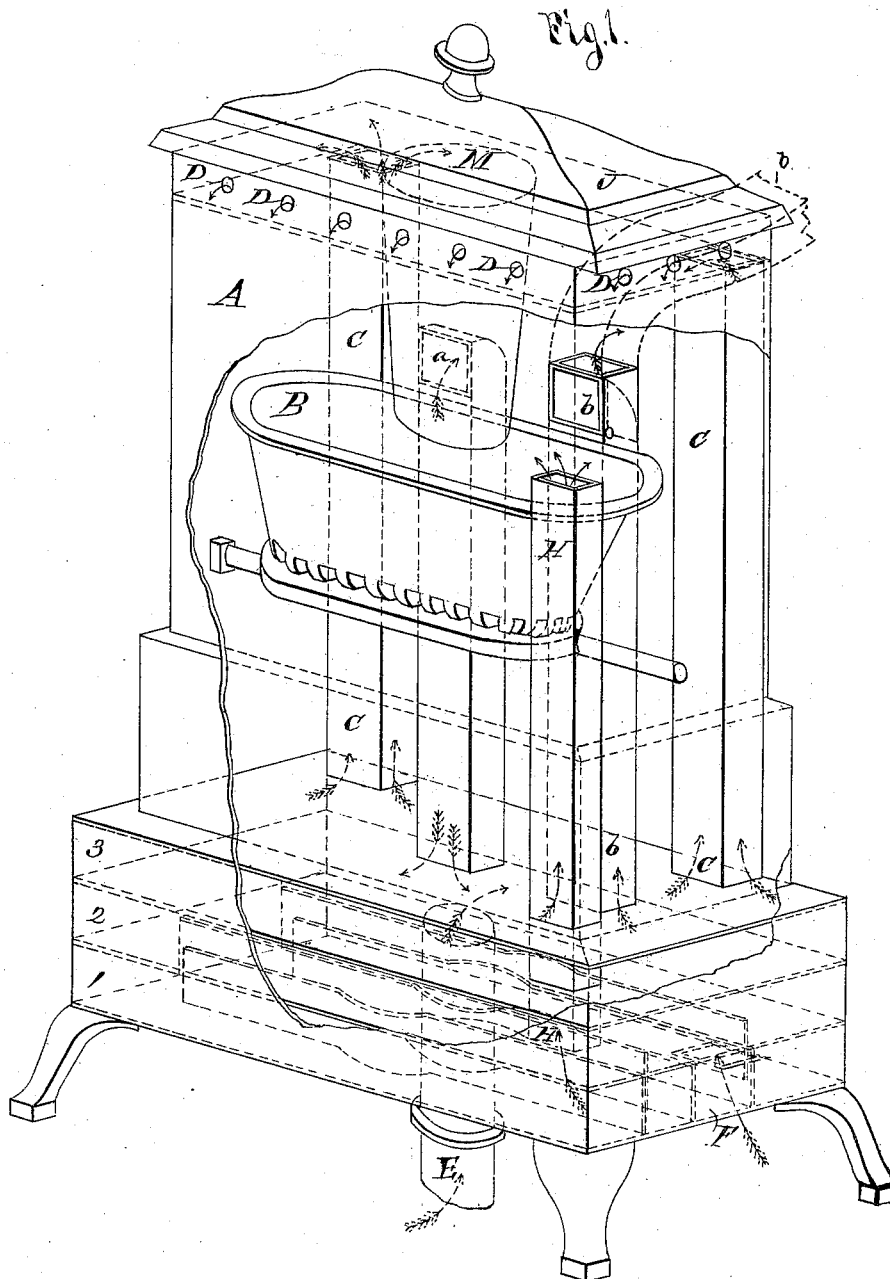
(No Model.)

6 Sheets—Sheet 1.

C. GARLICK.
STOVE OR FURNACE.

No. 344,647.

Patented June 29, 1886.



Witnesses.

E. C. Cannon

G. B. Brundison

Inventor.

Charles Garlick
per Duell, Leases & Hey,
Attorneys

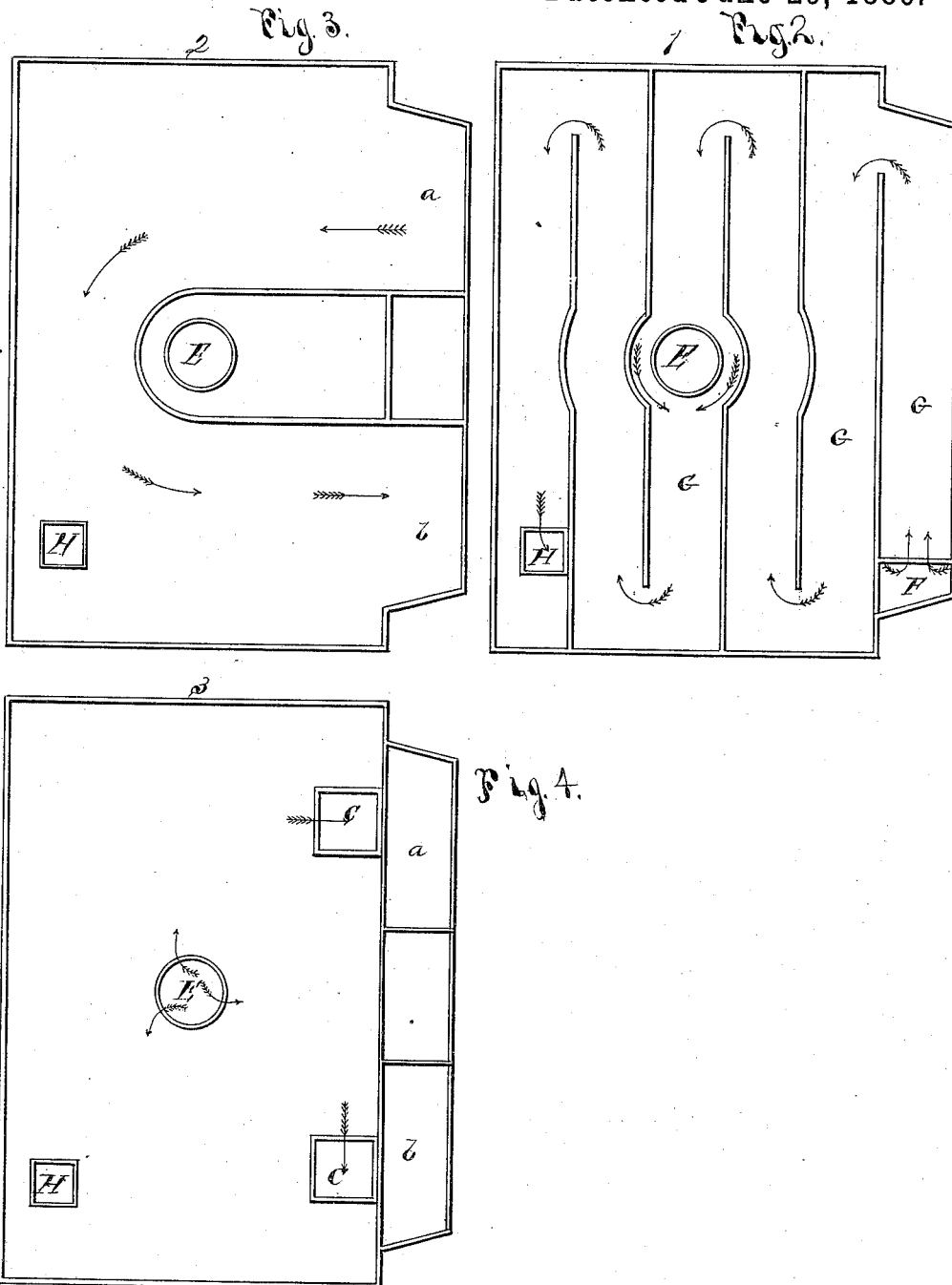
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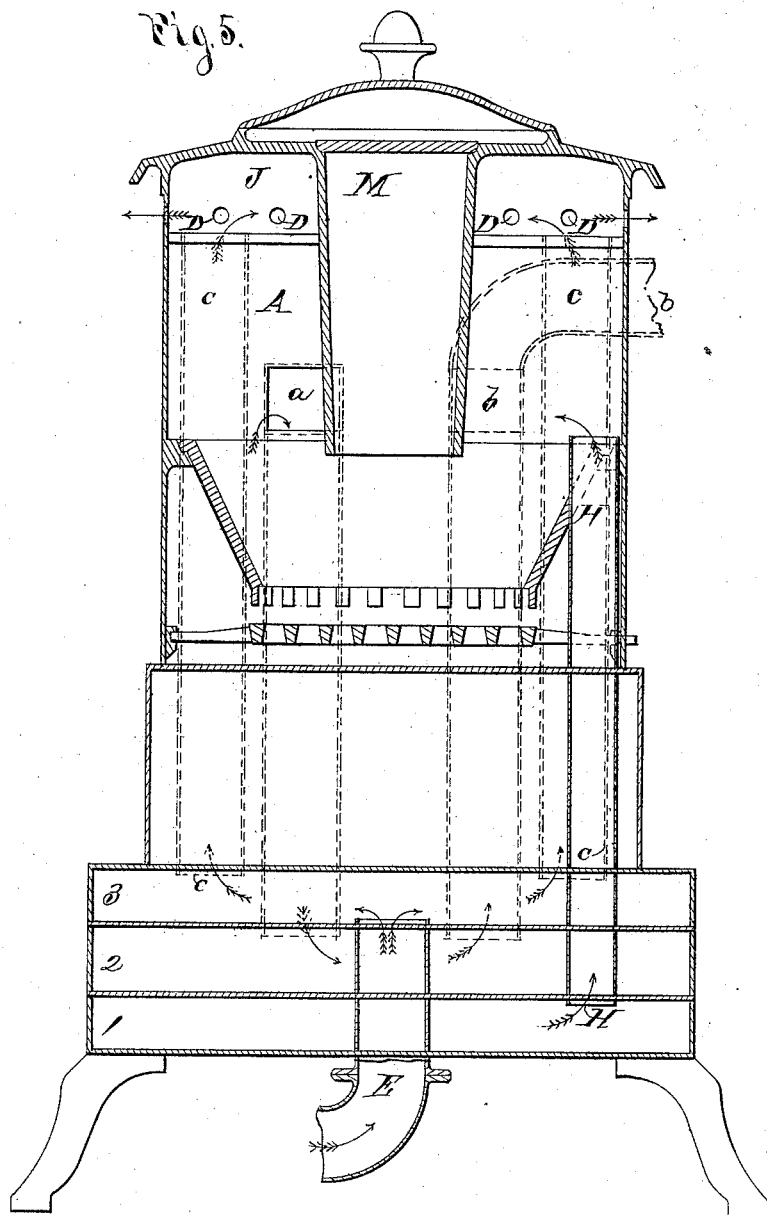
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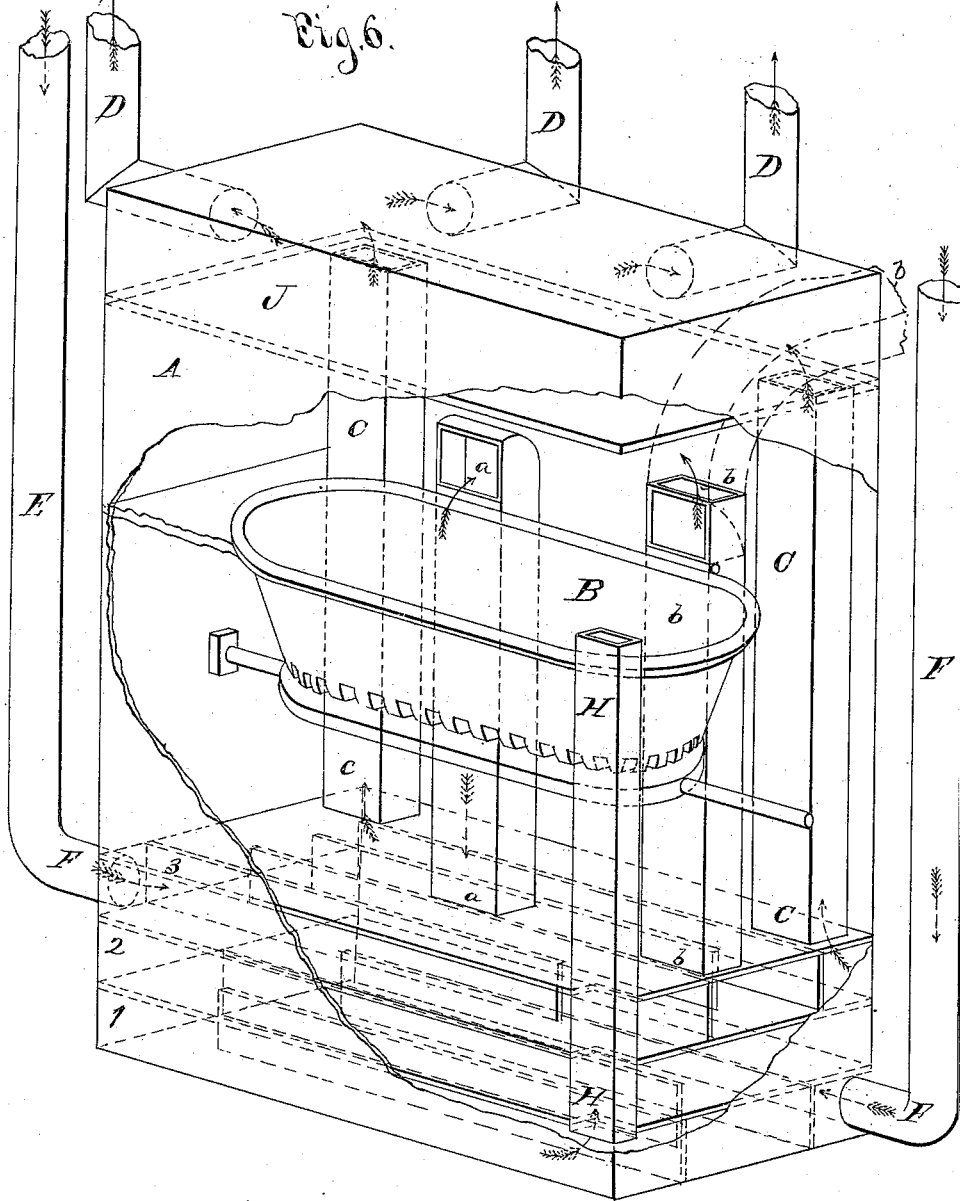
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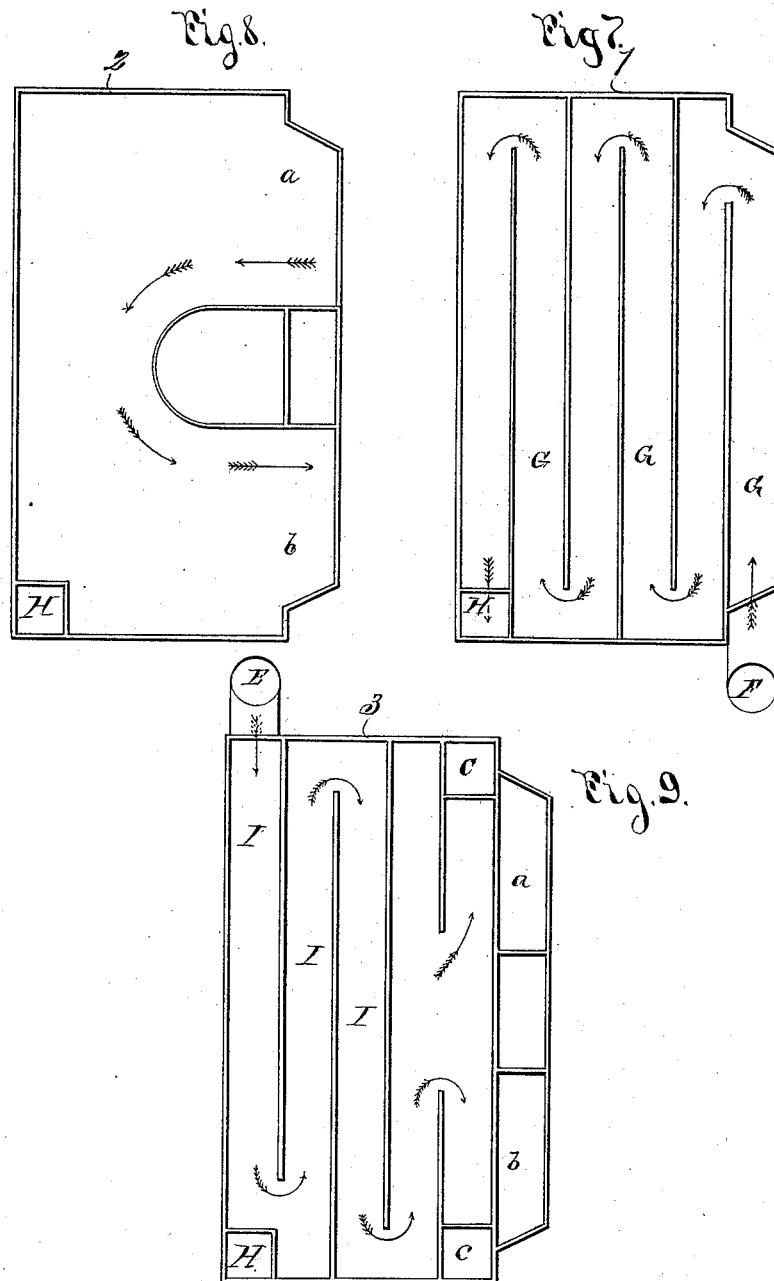
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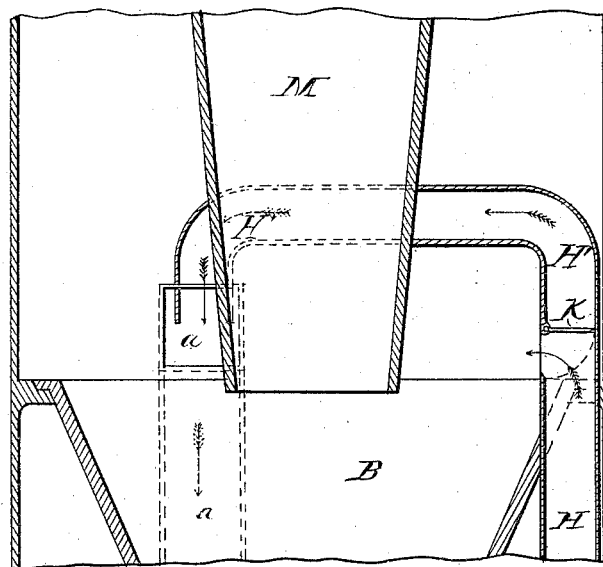
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Fig. 10



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES GARLICK, OF SYRACUSE, NEW YORK.

STOVE OR FURNACE.

SPECIFICATION forming part of Letters Patent No. 344,647, dated June 29, 1886.

Application filed December 9, 1885. Serial No. 185,109. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GARLICK, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Stoves and Furnaces, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in combining, with the base-heating flue-of base-burning stoves or hot-air furnaces and the fire-pot thereof, a supplemental heating-chamber located underneath the base-heating flue and connected to the fire-pot by a pipe extending from the supplemental heating-chamber to the top of the fire-pot, through which hot air is fed from the lower chamber, as more particularly hereinafter described, into the products of combustion.

It consists, also, in a system of heating-chambers located, respectively, above and below the base-heating flue-chamber and in contact therewith, said chambers being suitably connected to the combustion-chamber and provided with air-inlets for taking in fresh air for heating purposes and impure air from the house, all as hereinafter described, and set out in the claims; and it furthermore consists in the detail construction and arrangement of the parts, as illustrated in the drawings, more particularly described hereinafter, and pointed out in the claims.

My invention differs from prior stoves in respect to the application of the necessary air to supply the oxygen for producing combustion.

In such prior devices the air is supplied cold by direct draft upward and through the grate and through the combustible matter thereon. In this case the gases of combustion are disintegrated, set free, and carried through the flues into the chimney and escape without unifying. This loss involves the waste of fuel to raise the heat to a desired temperature, which would have been prevented could the unification of the gases have been secured in the fire-pot, and combustion thereby produced.

Experience shows that when oxygen is heated and fed over the upper surface of a combustible mass a perfect unification of the gases follows and complete combustion ensues.

The reason therefor lies in the fact that at the ordinary temperature of air the chemical affinities of oxygen are dormant; but when raised to the temperature of a red heat the dormant energies of its powers are aroused, and it combines immediately with the hydrogen and carbon of the burning mass.

My invention depends on the practical application of this principle in the construction of stoves and hot-air furnaces, and such application overcomes the difficulty heretofore encountered in producing combustion in stoves, and a large gain in heat is thereby produced, coupled with great economy in the use of fuel.

In specifying my invention reference is had to the accompanying drawings, like letters indicating corresponding parts in all the figures, in which—

Figure 1 is a perspective view of a stove, showing my invention applied thereto, the outer shell being partly broken away. Fig. 2 shows a plan of the lower supplemental heating-chamber at the base of the stove under the base-heating flue-chamber. Fig. 3 shows a plan of the base-heating flue-chamber, which is located over the lower supplemental heating-chamber shown in Fig. 2. Fig. 4 shows a plan of the upper supplemental hot-air chamber located on top of the chamber shown in Fig. 3, and which receives the cold outside air. Fig. 5 is a longitudinal section illustrating more clearly the arrangement of the chambers and their passages. Fig. 6 shows the application of my invention to a hot-air furnace. Figs. 7, 8, and 9 are the plans of the chambers attached to the furnace, corresponding to those shown in Figs. 2, 3, and 4; and Fig. 10 is a detached detail in section showing the hot-air feeding-pipe and its cut-off connection.

I will first explain my invention as applied to an ordinary base-burning stove as illustrated in Figs. 1 to 5 of the drawings.

A indicates a stove of the class named provided with the usual fire-pot, B, feeding-magazine M, and other necessary appurtenances. The base of the stove below the ash-pit is composed of three chambers denoted, respectively, in the drawings as 1, 2, and 3. These chambers are preferably constructed as best shown in the sectional view, Fig. 5, the bottom of 3

forming the top of 2, and the bottom of 2 forming the top of 1.

2 is the base-heating flue-chamber, heated in the well-known manner of all base-burning stoves, the products of combustion passing from the fire-pot B into the downward flue *a* to the flue-chamber 2, from which they ascend the flue *b* to the chimney. On the top and bottom of 2 are placed the upper supplemental hot-air chamber, 3, heated by radiation, and the lower supplemental heating air-chamber, 1.

Connected to the upper supplemental hot-air chamber, 3, is the cold-air-supply pipe E, which introduces fresh cold air from without the house in which the stove may be placed. This chamber 3, as will be observed upon referring to the drawings, owing to its location between the base-heating flue-chamber 2 and the ash-pit of the stove, is heated intensely hot by radiation from above and below, and the fresh cold air introduced therein from the outside of the building is taken directly through the hot-air flues *c c* into the hot-air storage-chamber J at the top of the stove and diffused into the room through the escape orifices or openings D D.

It is well understood that when hot air or radiated heat is taken into a room that the cold heavy air of a room is displaced as the hot air rises and it settles toward the bottom of the room. This displaced air I utilize as follows, viz: I provide the lower supplemental heating air-chamber, 1, located underneath the base-heating chamber 2, as described, and provide it with the inlet F, Figs. 1 and 2, opening into the room where the stove is placed.

On the interior of 1 I provide the divisions or passages G G G, as best shown in Fig. 2, and connect the hot-air pipe H, as shown in said figure. The displaced air of the room, which is often impure, rushes into the inlet F and passes through the divisions G G, becoming heated from the radiations of the base-heating flue-chamber 2, the divisions G G G serving to retard the current of air, thereby increasing the heat as it passes upward into the hot-air feed-pipe H.

The hot-air pipe has its exit end located just above the fire-pot B, and the hot air passing through it is discharged into the gases of combustion, supplying the necessary oxygen to unite with said gases to produce combustion.

It will be observed that the chamber 1 and hot-air pipe H, perform a twofold office in the operation of the stove—*i. e.*, in removing the impure or vitiated air from the room, thus ventilating it, and in supplying hot air to the combustion-chamber.

The operation of my invention will be readily apparent from the foregoing, and it is only necessary to direct attention to the fact that by reason of the supply of heated air through the pipe H to the products of combustion, a circulation of hot air is obtained to

supply heated oxygen directly to the gases, with which it unifies, thus gaining a uniform surface of combustion equally over and through the burning mass in the fire-pot without the necessity of the powerful direct draft through the grate essential to the present construction of stoves, and, since the gases unify by the supply of heated oxygen in the process of combustion, compressions of gas in the stove causing the heretofore annoying and dangerous leakage of gas through crevices and imperfect joints into the rooms to poison the air is obviated and overcome. It is obvious also that great economy in the use of fuel accrues from the described construction, owing to the fact that the gases of combustion are consumed, and the heat produced therefrom fully utilized, both from direct radiation and the heated air given out from the storage-chamber J.

For the purpose of controlling the operation of the stove and checking its action, I provide the cut-off device illustrated in the detached sectional view, Fig. 10, with an extension, H', connected to the downward flue *a*, which is adjustably connected to the hot-air pipe by a damper, K, by means of which the supply of hot air to the fire-pot can be regulated or wholly cut off at will, as desired.

At Figs. 6 to 9 I have illustrated an application of my invention to a hot-air furnace, which I will now proceed to describe. In this case the construction differs from that of the stove simply in the construction and connection of the cold-air pipes, and the arrangement of the hot-air pipes for supplying hot air for heating purposes. Of course the dimensions of all the parts are enlarged.

A represents the hot-air furnace, provided with the fire-pot B, and with hot-air flues C C, leading up from the supplemental hot-air chamber 3 at the base of the furnace into the hot-air chamber J at the top thereof, the same as in the stove. The downward flue *a* connects with the base-heating flue-chamber 2, and the uptake-flue *b*, as in the stove, and the hot-air pipe H is connected to the lower supplemental heating air-chamber, 1, as in the stove, said air-chamber being divided into passages G G G, as in the stove. The upper end of the hot-air pipe H has its discharge above the fire-pot B, as illustrated in Fig. 6. In this case the inlet F is elongated to connect with the base of the rooms to be heated, since it is customary to set hot-air furnaces in the cellar or basement of the buildings where they are used, and the fresh cold-air pipe arranged in any desired manner according to the location of the furnace. In fact, the description of the stove describes the upper hot-air furnace, with the exception that the hot-air chamber 3 is preferably divided into passages I I I, like the lower supplemental heating air-chamber, 1, for the purpose of giving more circulation to the air over the radiating-surfaces, allowance being made for the difference in dimen-

sions and the location of the furnace. In both cases the most desirable results accrue from the use of my invention.

It is obvious that the invention can be applied to any form of stove by modifying the construction of the parts to the desired form. I do not, therefore, restrict myself in this respect to the forms illustrated herein, having selected them simply for the purpose of exemplification.

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

1. In a base-burning stove or hot-air furnace, the combination, with the base-heating flue-chamber, the fire-pot, and flue *a*, of a supplemental heating-chamber located against the base-heating flue-chamber, and the hot-air pipe *H*, connecting said chamber with the fire-pot, and having its discharge end located at the top of the fire-pot to feed hot air from the supplemental heating-chamber into the products of combustion, substantially as described.

2. In combination, the fire-pot *B*, the base-heating chamber 2, flue *a*, supplemental heating-chamber 1, and hot-air feed-pipe *H*, all constructed and arranged substantially as and for the purpose specified.

3. In a base-burning stove or hot-air furnace, in combination, the fire-pot and combustion-chamber *B*, the hot-air pipe *H*, extending above the fire-pot, the extension *H'*, connected with the downward flue *a*, the damper *K*, located between pipes *H* *H'*, for turning the hot air either into the fire-pot or flue *a*, the downward flue *a*, and the smoke-exit flue *b*, all substantially as and for the purpose specified.

4. The combination, in a base-heating stove

or furnace, of a hot-flue combustion-chamber, 2, and a supplemental heating air-chamber, 3, attached to said hot-flue chamber, and a supplemental heating air-chamber, 1, located below said hot-flue chamber and attached thereto, the hot-air pipe *H*, the fire-pot *B*, the downward flue *a*, and the exit-flue *b*, substantially as described.

5. The combination, in a base-heating stove or furnace, of a supplemental heating air-chamber located below the ash-pit and above the hot-flue chamber, the bottom thereof forming the top of the hot-flue chamber, the hot-flue chamber, the bottom thereof forming the top of a supplemental heating air-chamber located below said hot-flue chamber and the supplemental heating air-chamber, the hot-air feed-pipe *H*, passing through the hot-flue chamber 2 and supplemental heating air-chamber 3, the fire-pot *B*, the flue *a*, the hot-air conduits *c c*, and smoke-exit *b*, substantially as and for the purposes specified.

6. The combination of the supplemental heating air-chamber 1, provided with the divisions *G G G*, the inlet *F*, pipe *H*, the fire-pot and combustion-chamber *B*, the downward flue *a*, the hot-flue chamber 2, and the exit-flue *b*, all substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 7th day of December, 1885.

CHARLES GARLICK. [L. S.]

Witnesses:

FREDERICK H. GIBBS,
E. C. CANNON.