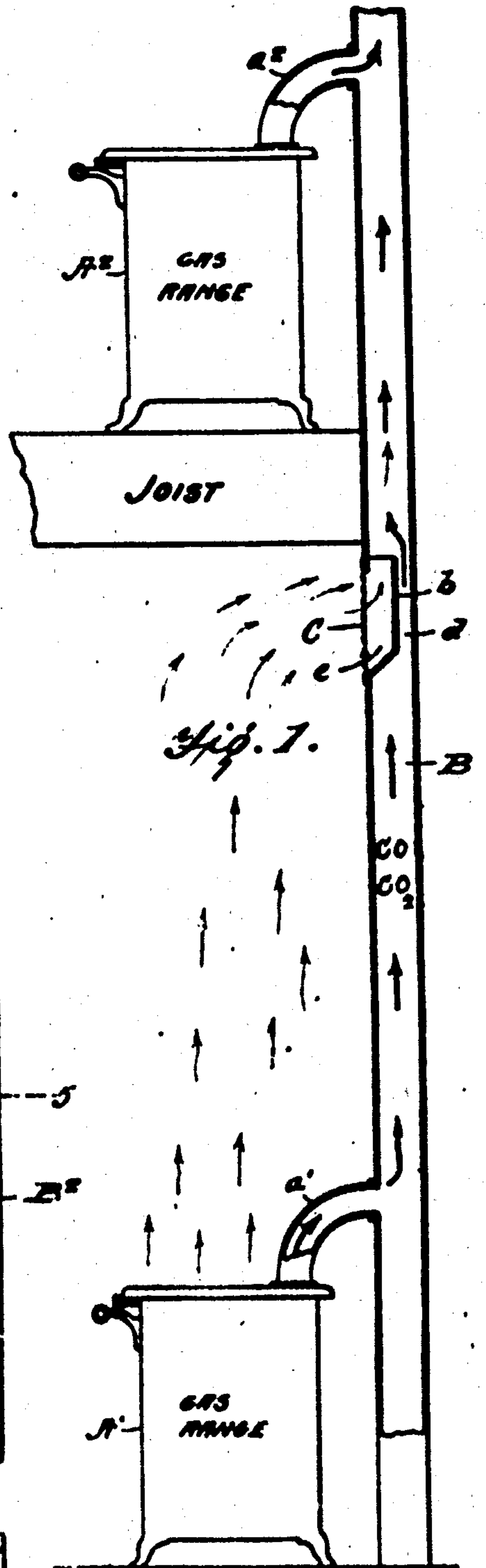
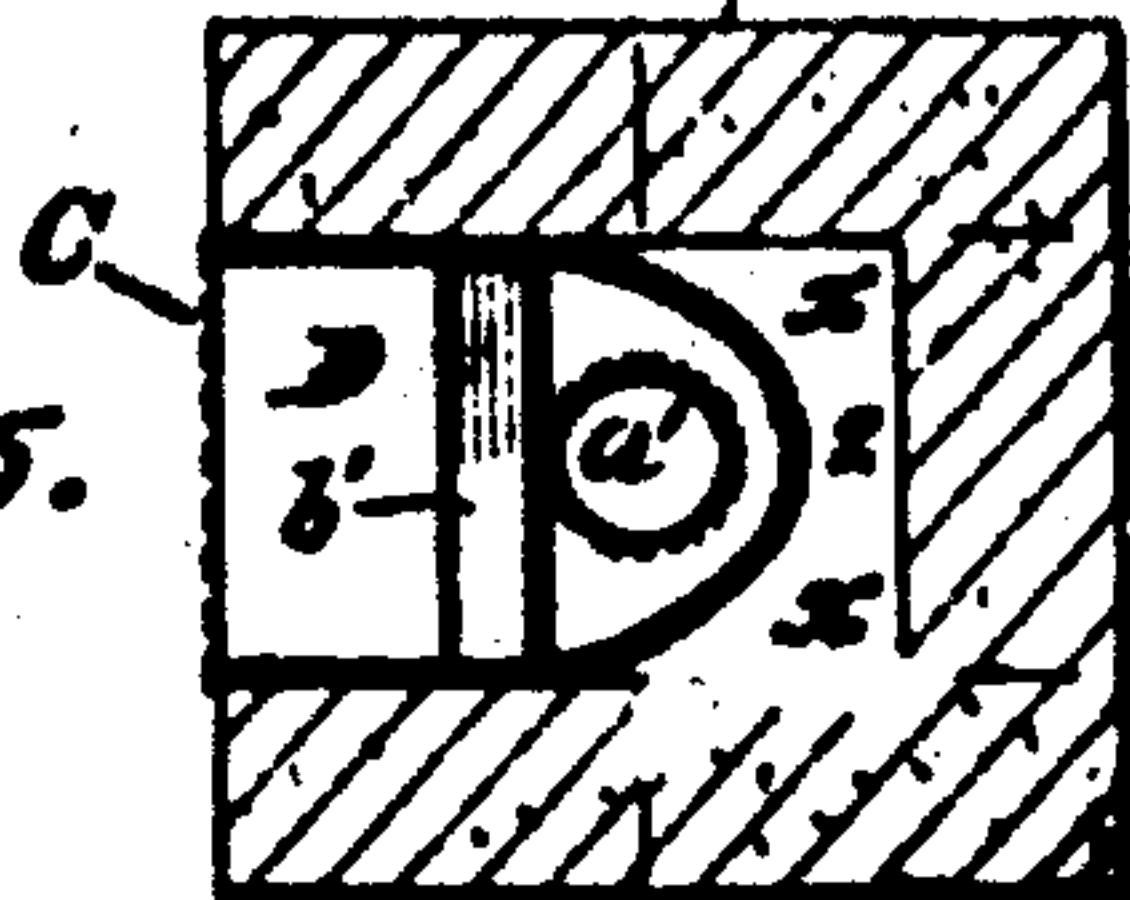
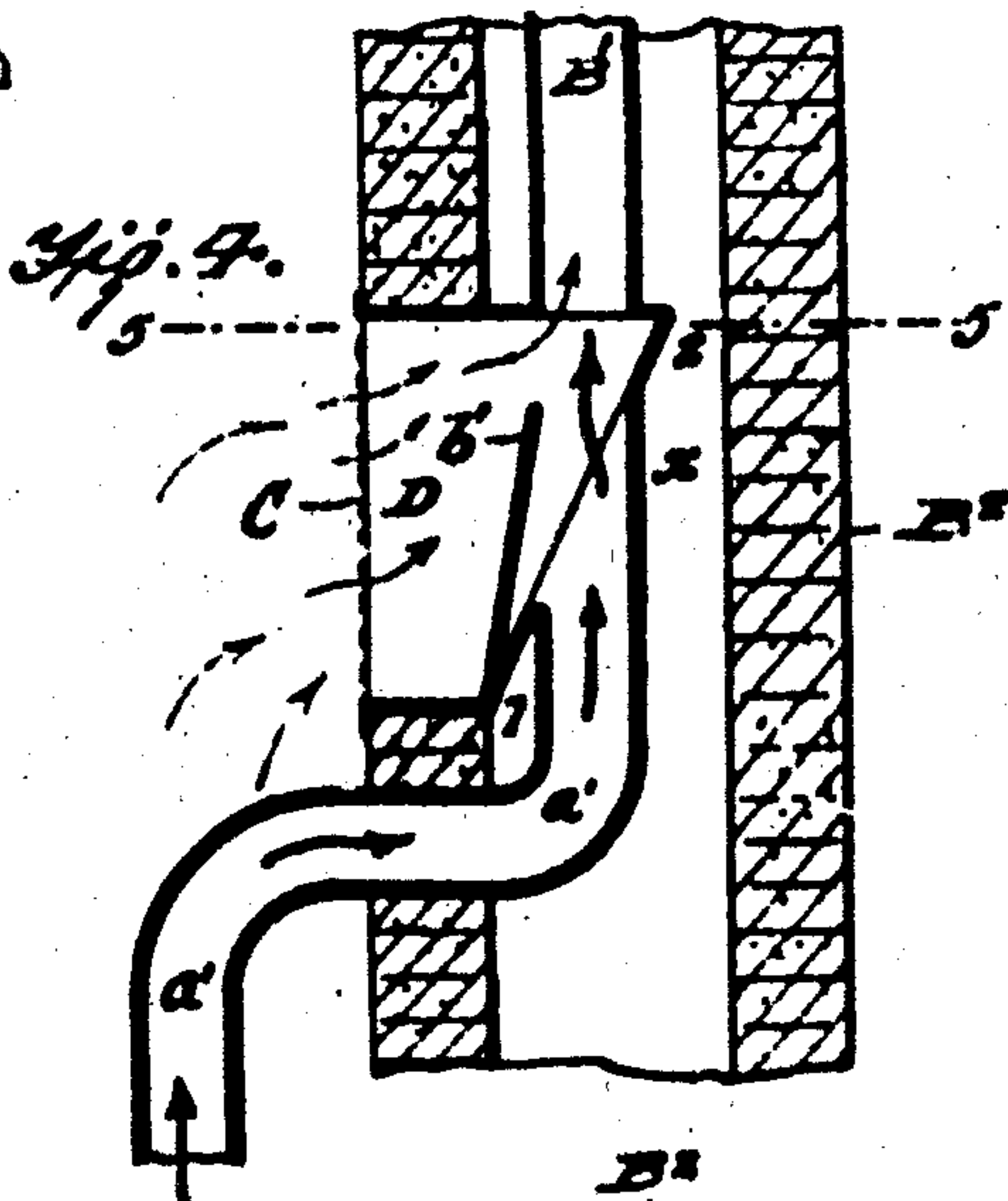
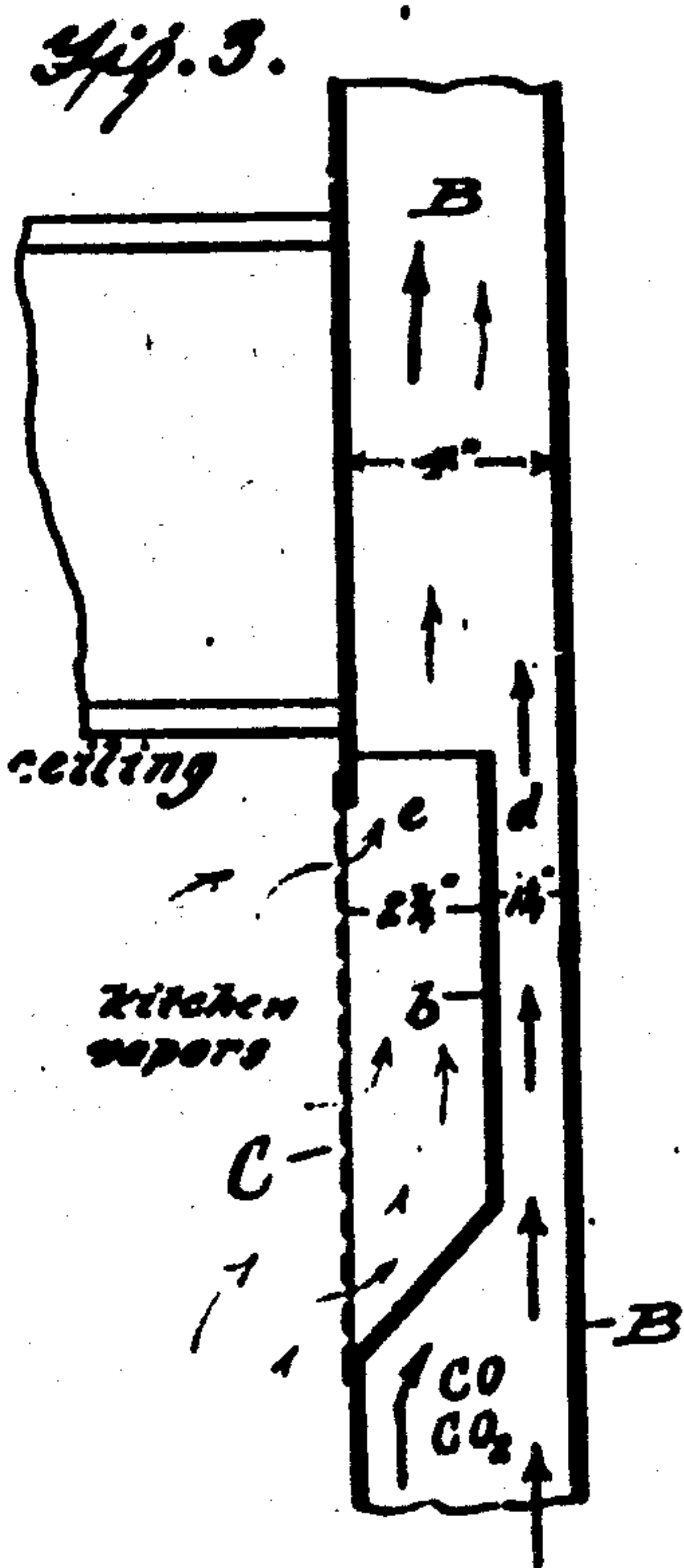
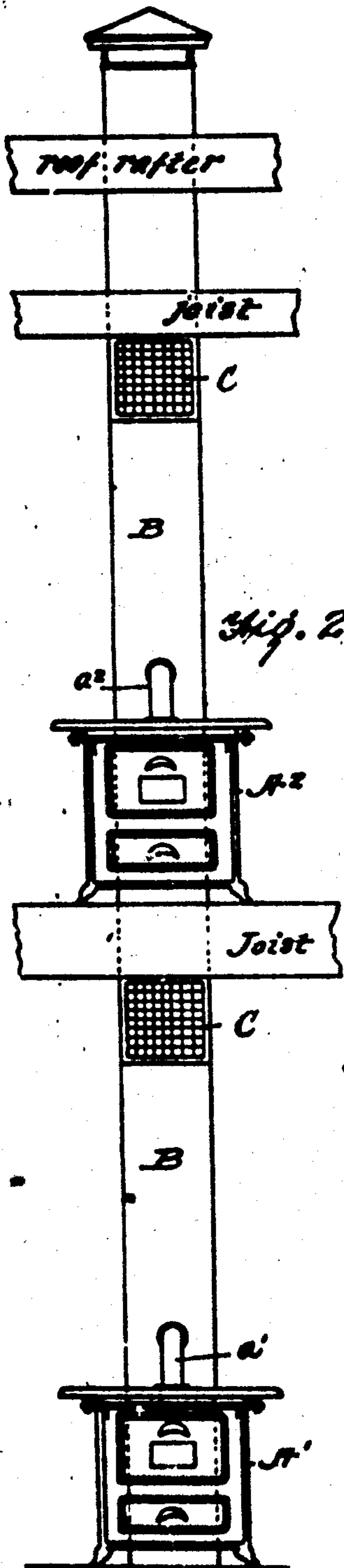


A. S. JOHNSON.  
VENTILATING SYSTEM.  
APPLICATION FILED NOV. 9, 1909.

948,629.

Patented Feb. 8, 1910



Witnesses  
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Fig. 5.

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# UNITED STATES PATENT OFFICE.

ALLEN S. JOHNSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

## VENTILATING SYSTEM.

948,629.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed November 9, 1909. Serial No. 227,024.

To all whom it may concern:

Be it known that I, ALLEN S. JOHNSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Ventilating Systems, of which the following is a specification.

In late years the extensive building of small houses and apartment houses with suites having each a small cabinet kitchen, together with the lower price of gas has made a greatly increased use of the gas range. The freedom from ashes and the avoidance of handling coal, together with its great convenience for quickly bringing it into, and putting it out of, service, have made it a very desirable adjunct to house-keeping. One very serious objection to its use, however, is to be found in the great danger of vitiating the atmosphere of the room with poisonous gases of combustion and the objectionable odors of cooking. This is especially true of the small kitchens of apartment houses where a limited amount of air space allows the air to become quickly vitiated. Whenever, from the fouling of the stove, a wrong adjustment, or other disorders, an imperfect combustion of the modern water gas occurs, a rapid generation of carbon monoxid follows, whose deadly nature and insidious character have in some instances poisoned and killed the entire family. Such frequent instances of such fatalities have occurred in late years as to have aroused great public apprehension and caused the formulation of rigid municipal rules as to the installation and regulation of the gas range.

The object of my invention is to cure this evil entirely and to make the air of a kitchen pure and sanitary and to that end it consists in a simple system, involving comparatively inexpensive elements of construction especially related to the gas stove, but having value also with other forms of heaters.

Figure 1 is a vertical sectional elevation showing two gas ranges in rooms one above the other coupled up with my ventilating devices, Fig. 2 is a front elevation of the same, on a smaller scale, Fig. 3 is an enlarged view in vertical section taken through the induction ventilating device, Fig. 4 is a vertical sectional view, showing a modification of the device as applied to masonry chimneys already built and Fig. 5 is a hori-

zontal cross section of the same on line 5-5 of Fig. 4.

In the drawing I have shown two gas ranges, A<sup>1</sup>, A<sup>2</sup>, in two kitchens arranged one above the other, as is common in apartment houses, but there may be more, or there may be only one. As they are all equipped substantially alike, it will only be necessary to describe one. These gas ranges are of any ordinary construction in which there is an oven or baking chamber having burners underneath it and also a table surface with top burners. The oven burners are especially liable to generate carbon monoxid if they become foul or the flames impinge against a relatively cooler surface, and if this gas is discharged into the air together with the carbon dioxid, disastrous and often fatal results follow. I therefore provide a special flue B which extends from the lowest gas range, out through the roof and terminates preferably in a covered ventilator. This flue performs a double function, in that it not only carries off the products of combustion, consisting chiefly of carbon monoxid and carbon dioxid, but it also carries off all the vapors, gases, and objectionable odors arising from the cooking. For this purpose each gas range has an outlet pipe a<sup>1</sup>, or a<sup>2</sup> in communication with its combustion chamber, which pipe is connected to the vertical flue B extending through the roof. Then at a point in this flue near the ceiling of each kitchen an opening is formed which is preferably covered by a grating or vent register C. The walls of the flue B are perfectly straight and parallel, and between them at a point immediately opposite the vent register a vertical partition plate d is arranged, whose lower end extends at an oblique angle to the wall bearing the register and connects with it at a point below the register. The upper end of this partition plate extends to a short distance above the register opening. The partition plate d is set between the two walls of the flue, closer to the back wall than it is to the register wall. In a four inch flue the preferred spacing would be about 1½ inches from the partition plate to the back wall, and 2½ inches from the partition plate to the register wall. The purpose of this will be more fully explained hereafter.

From the foregoing it will be seen that opposite each register opening in the flue



there is a relatively narrow space *d* behind the partition plate which opens into the flue both above and below, and also a relatively wide space *e*, between the partition plate and the register, which is closed below, but opens above into the flue so that an updraft in the space *d* will induce an updraft in the space *e* by suction, causing the air in the room near the ceiling to pass through the register opening into the space *e* and thence up the flue and out through the roof.

I will now explain more fully the physical principles involved in my invention, reference being had more especially to Fig. 3.

There are two classes of gaseous products to be taken care of from a gas stove. One is the direct products of the combustion of the fuel, which consists chiefly of carbon dioxide and carbon monoxide, which are very poisonous. The other is the vaporous exhalation proceeding from the cooking on the stove which, while not poisonous is, nevertheless, very objectionable, especially in apartment houses. In Fig. 3 the poisonous combustion gases are indicated by the heavy arrows and the cooking vapors by the light arrows.

I will now describe the special function of the partition plate *b* as regards its spacing, which forms the narrow throat *d* and the relatively wider space *e*.

It is well known that gases rise from convection with a velocity proportional to the temperature and, as the combustion gases CO, and CO<sub>2</sub>, are quite hot and rise rapidly, they do not need so large a passageway, and hence the small passageway *d*, while the moist and cooler cooking vapors, moving more slowly, require the increased space *e*. Not only this, however, but the inclined bottom of plate *b* makes a tapering throat for the hot combustion gases, which tapering throat crowds them into the narrow space *d*, and gives a greatly accelerated velocity to them and produces the effect of a steam ejector in creating a powerful suction in the space *e* that effectively draws out the sluggish cooking vapors.

It will be seen from the foregoing, that in my invention not only are the poisonous gases taken away, but they are made to effect, by their greater velocity and suction energy, the useful work of removing the unpleasant cooking vapors, thus ridding the apartment of all objectionable odors.

As so far described, the ventilating flue B is made of galvanized iron, which is four inches in depth to fit in between the studs of the wooden partitions of a house or in a vertical slot in a masonry wall. For a single gas range, a flue 4×4 inches is sufficient, but when a number of superposed ranges are employed, the flue is made of the same depth but proportionately wider.

In Figs. 4 and 5 I show a modification of

my invention for installing my ventilating system in a chimney B' already built. In such case, I make a galvanized iron box D, one portion of which is rectangular and fits in an opening in the brickwork, the rectangular portion being made of the same depth as the brick wall of the chimney. The other portion of the box is made tapering, extending from the inner face of the chimney flue at the lower end 1, to a point 2 at the top about two-thirds the way across the chimney flue, leaving the space *x* for the updraft of the smoke from other stoves. This box is formed with a partition plate *b'* (similar to *b* in Figs. 1 and 3). It connects at the bottom with the bottom of the box, but stops short of the top of the box so as to leave an adequate space for the odors to pass out. Into the inclined inner side of the box is tapped the outlet pipe *a'* from the gas range and a pipe B' communicates with the top of the box and extends to a point above the roof. The top of the plate *b'* is leaned inwardly a little, so as to give a slight convergence to the throat into which the pipe *a'* delivers its gases to produce the more forceful induction and suction effect. On the face of the box is placed the register C'. With this arrangement it will be seen that the updraft of hot, poisonous gases in pipe *a'* will create an energetic suction in the box D, drawing out all objectionable odors from the upper part of the room, which, together with the gases, pass out through the pipe B'. With this arrangement the ventilating pipe B' and the inner part of the box being bathed in the hot currents from the smoke pipes of other stoves, a greatly stimulated updraft is obtained and a more effective ventilation.

In carrying out my invention, I would have it understood that it may be applied to all heating appliances from which combustion gases are discharged and which in accordance with my system are made to remove the vapors of cooking by an inductive effect.

When I employ the term gas stove I would have it understood that I mean to include not only the so called gas range, but also all heaters operated by gaseous fuel, such as gas heating stoves for warming a room, or gas water heater for heating the water supply of the kitchen and bath.

I claim—

1. A ventilating system, comprising an apartment, a gas stove arranged in said apartment, having a discharge pipe communicating at one end with the combustion chamber of the gas stove, an upright ventilating flue communicating with said discharge pipe and extended into communication with the outer air, said ventilating flue having at a point in its side near the ceiling of the apartment a tapered box, one portion of which is rectangular and fits in an opening in the brickwork, the rectangular portion being made of the same depth as the brick wall of the chimney. The other portion of the box is made tapering, extending from the inner face of the chimney flue at the lower end 1, to a point 2 at the top about two-thirds the way across the chimney flue, leaving the space *x* for the updraft of the smoke from other stoves. This box is formed with a partition plate *b'* (similar to *b* in Figs. 1 and 3). It connects at the bottom with the bottom of the box, but stops short of the top of the box so as to leave an adequate space for the odors to pass out. Into the inclined inner side of the box is tapped the outlet pipe *a'* from the gas range and a pipe B' communicates with the top of the box and extends to a point above the roof. The top of the plate *b'* is leaned inwardly a little, so as to give a slight convergence to the throat into which the pipe *a'* delivers its gases to produce the more forceful induction and suction effect. On the face of the box is placed the register C'. With this arrangement it will be seen that the updraft of hot, poisonous gases in pipe *a'* will create an energetic suction in the box D, drawing out all objectionable odors from the upper part of the room, which, together with the gases, pass out through the pipe B'. With this arrangement the ventilating pipe B' and the inner part of the box being bathed in the hot currents from the smoke pipes of other stoves, a greatly stimulated updraft is obtained and a more effective ventilation.



cooking vapors and impure air and a partition plate arranged in said flue opposite said opening connected at the bottom to the wall of the flue below the opening and forming a chamber next to said opening in communication with the flue above said opening, to cause the hot and poisonous combustion gases of the stove to be removed from the apartment and to carry away by induction the impure air of the apartment and the vaporous exhalations from the stove.

2. A ventilating system, comprising an apartment, a gas stove arranged in said apartment, having a discharge pipe communicating at one end with the combustion chamber of the gas stove, an upright ventilating flue communicating with said discharge pipe and, extended into communication with the outer air, said ventilating flue having at a point in its side near the ceiling of the apartment an opening for receiving cooking vapors and impure air and a partition plate arranged in said flue opposite said opening connected at the bottom to the wall of the flue below the opening and forming a chamber next to said opening in communication with the flue above said opening, to cause the hot and poisonous combustion gases of the stove to be removed from the apartment and to carry away by induction the impure air of the apartment and the vaporous exhalations from the stove, said partition plate being spaced nearer to the back wall of the flue than it is to the wall containing the intake opening.

3. A ventilating system, comprising an apartment, a gas stove arranged in said apartment, having a discharge pipe communicating at one end with the combustion chamber of the gas stove, an upright ventilating flue communicating with said discharge pipe and extended into communication with the outer air, said ventilating flue having at a point in its side near the ceiling of the apartment an opening for receiving cooking vapors and impure air and a parti-

tion plate arranged in said flue opposite said opening connected at the bottom to the wall of the flue below the opening and forming a chamber next to said opening in communication with the flue above said opening, to cause the hot and poisonous combustion gases of the stove to be removed from the apartment and to carry away by induction the impure air of the apartment and the vaporous exhalations from the stove, said partition plate being spaced nearer to the back wall of the flue than it is to the wall containing the intake opening and having its lower end inclined to form a converging throat to stimulate the movement of the hot combustion gases at their point of contact with the cooking vapors.

4. A ventilating flue having an opening in the side provided with a grating and an induction partition plate opposite said grated opening connected at its lower end to the wall containing the opening and free and disconnected at its upper end, the lower end of said flue being formed as a box adapted to be seated in the wall of a chimney and having a combustion-gas pipe entering it behind the partition.

5. A ventilating flue having an opening in the side provided with a grating and an induction partition plate opposite said grated opening connected at its lower end to the wall containing the opening and free and disconnected at its upper end, the lower end of said flue being formed as a box adapted to be seated in the wall of a chimney and having a combustion-gas pipe entering it behind the partition and the inner wall of said box being inclined to give it a greater dimension at the top than it has at the bottom.

In testimony whereof I affix my signature in presence of two witnesses.

ALLEN S. JOHNSON.

Witnesses:

WM. D. LUSLER, Jr.,  
F. A. MILLIGAN.