(No Model.)

P. M. PURSELL.

GRATE SETTING FOR FIRE PLACES.

No. 440,196. Patented Nov. 11, 1890.

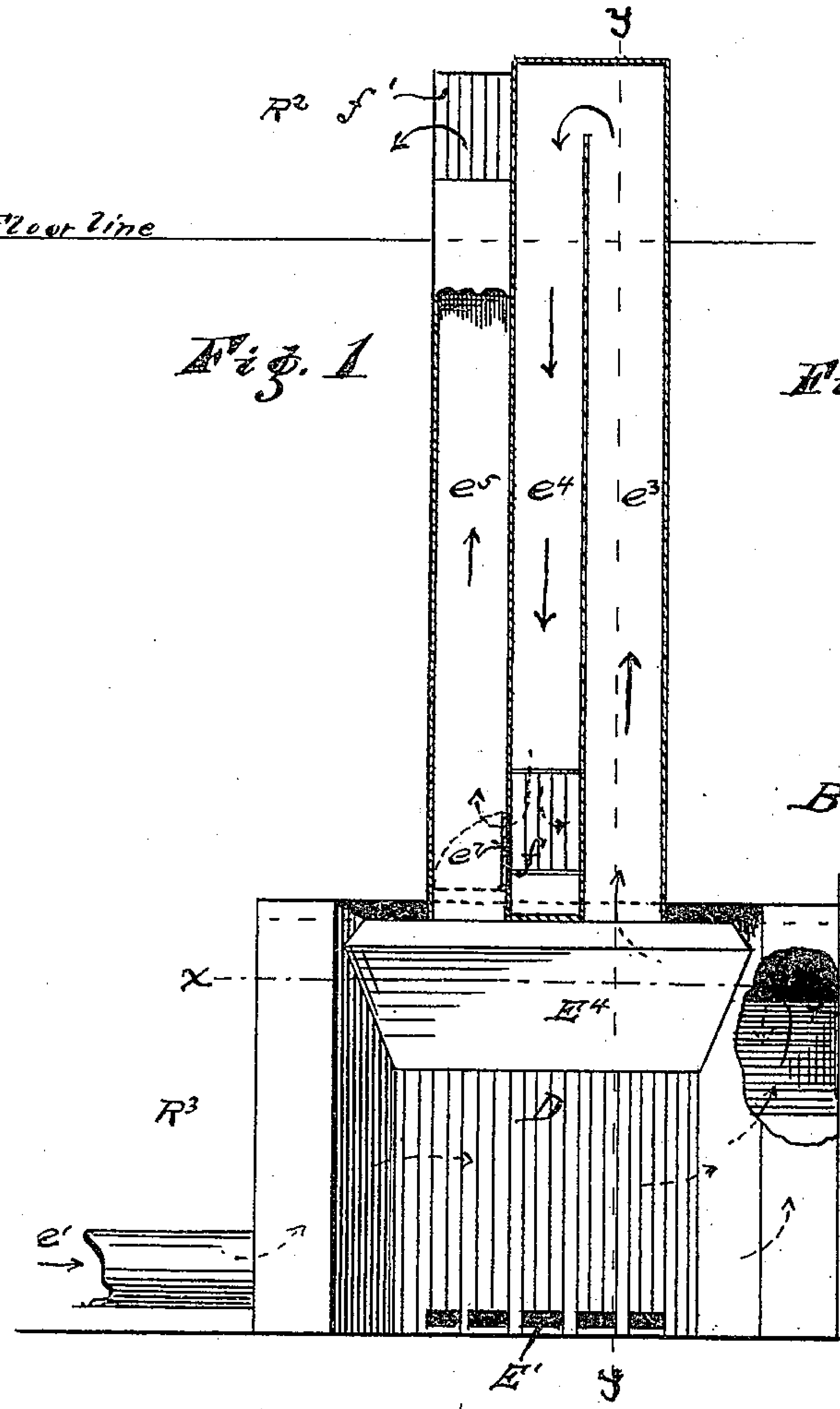

Fig. 1

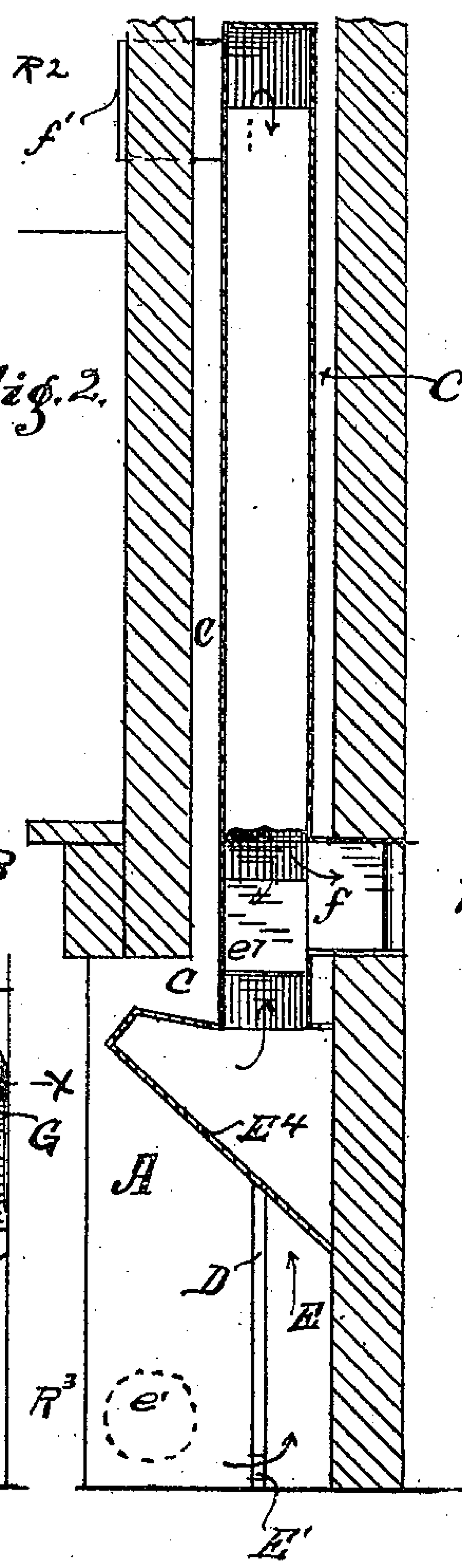

Fig. 2.

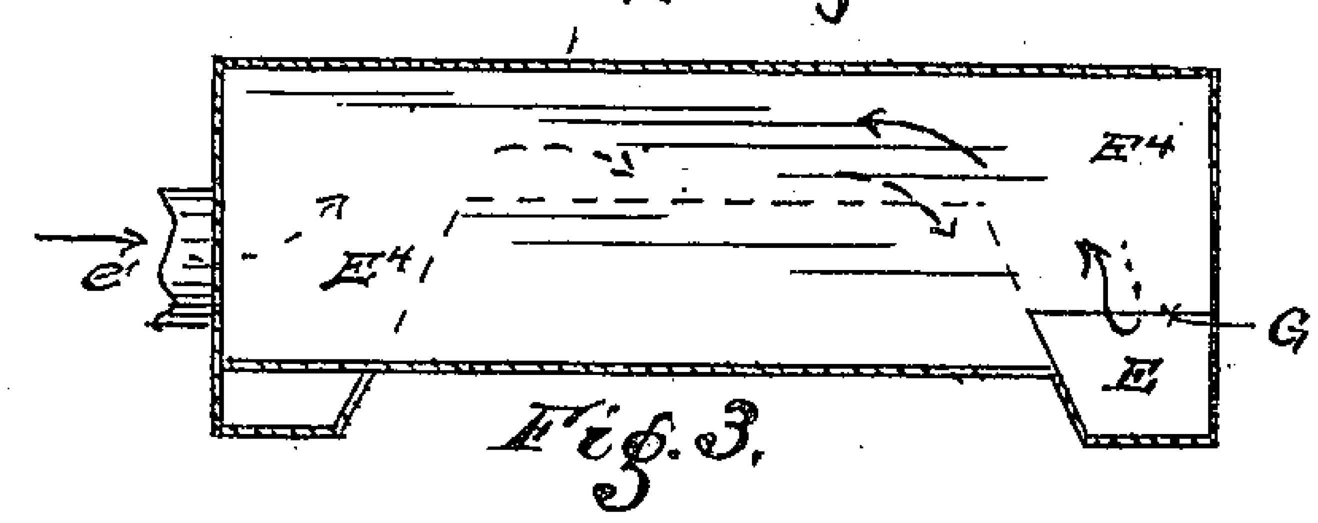

Fig. 3.

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UNITED STATES PATENT OFFICE.

PETER M. PURSELL, OF INDIANAPOLIS, INDIANA.

GRATE-SETTING FOR FIRE-PLACES.

SPECIFICATION forming part of Letters Patent No. 440,196, dated November 11, 1890.

Application filed March 29, 1890. Serial No. 345,864. (No model.)

To all whom it may concern:

Be it known that I, PETER M. PURSELL, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Grate-Settings for Fire-Places; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to fire-places for heating houses.

The object of the invention is to utilize the heat in a greater degree than is possible by the construction of fire-places as heretofore generally adopted and to afford a simple and economical means for heating more than one room with the same fire.

The accompanying drawings illustrate the mechanism by which these objects are accomplished.

Figure 1 is a front elevation, partially in section, of a fire-place constructed in accordance with the spirit of this invention. It also shows one side of the facing partially broken away to show the interior. Fig. 2 is a vertical cross-section of same through the line $y\ y$, Fig. 1. Fig. 3 is a horizontal section through the line $x\ x$, Fig. 1.

A is a recessed compartment of known construction for the reception of the grate, and in which the combustion of the fuel takes place.

B is the mantel, also of known construction, and C the opening in the chimney for the escape of smoke and gases.

D is the fire-back, in the construction of which, instead of using fire-brick and forming a wall of solid masonry, as heretofore, a lining, preferably of wrought-steel or cast-iron, and only of a thickness adapted to withstand the heat, is used, thereby leaving an open space between the lining and the chimney-back, which it has been the custom heretofore to fill in with masonry. This open space is transformed into a reservoir or chamber E by the addition of a top, back, and sides to inclose it. As the heat given off in the combustion of fuel is equal on all sides of the fire, it is evident such air as may be contained within the chamber E will be subjected to as great heat as if in front of the grate, and in fact the heat will be more intense on account of the closely-surrounding walls of the chimney, which tend to prevent radiation. If an opening be provided, preferably at a point near the top of the chamber, the heated and expanded air therein will be forced out, and if a second opening be provided into the chamber at a point near the bottom cold air will rush in to fill the partial vacuum caused by the escape of the hot air, thereby establishing a continuous current. The temperature of the air-current will depend largely on its contact with the heated metal partition separating it from the fire, and it is obvious that any means for increasing the area of contact will be an advantage. To this end, the chamber E, besides extending across the back, is continued forward on each side of the grate, as shown in Fig. 3. In this construction the sloping section E^4 is projected downwardly until it intersects the chimney-back, as shown in Fig. 2, thus dividing the chamber into an upper and lower compartment, with an open communication at G, through which the air admitted at e' will pass in reaching the discharge-pipes. By this construction the air-current will be forced to pass from one side and past the back of the fire-place to the side opposite, and thence back through the upper compartment into the discharge-pipes, greatly increasing the area of heated surface over which it passes.

In the drawings, e' is the inlet-pipe, which, in order to secure pure air, connects with the outside of the building. This may be done either directly, which is preferable, or by running to a vertical space between studding in the neighboring wall. The cold air is admitted through e' in the direction shown by the arrow.

In the fire-back D, at or below the lower line of the grate-bars of the fire-place, is an opening E' into the chamber E. This opening allows the cold air in the room R^3 (which will always be found nearest the floor) to pass into the chamber E, thereby establishing a circulation of air in the room R^3 and greatly facilitating the heating of the room. An outlet-pipe connects the chamber E with the rooms to be heated, and to still further utilize the heat that heretofore has been wasted I locate the outlet-pipes within the chimney. It is well known that all chimneys carry off a large percentage of heat as well as smoke, and by the construction here shown this heat, which would otherwise be wasted, may be utilized to increase the temperature of the air within the discharge-pipe.

In the construction shown in the drawings the discharge-pipe is divided into three compartments, two of which e^3 and e^4 have permanent communication at the top, and the third e^5 has a damper-regulated connection e^7 with the lower end of the middle pipe, whereby it may be connected or disconnected at will.

By means of a register f at the lower end of the pipe e^4 communication may be had with the room R, and by means of the register f' in the pipe e^5 like communication may be had through the pipe e^5 with the upper room R^2. By placing the damper as shown in the drawings both rooms R and R^2 may be simultaneously heated, or by dropping the damper and closing the lower register f all of the heat may be conveyed into the upper room R^2, and by the circuitous route would be thoroughly subjected to the influence of the heat escaping through the chimney. A corrugated fire-back D may be used to still further increase the area of heating-surface around the chamber E, adding thereby still more to the heating capacity of the chamber.

Inasmuch as it is new with me to divide the discharge-pipe into three sections and connect them as above described, I do not wish to limit this invention to the construction of heating-chamber E, as here shown, as it is obvious the divided chamber is not essential; and therefore

I claim and wish to secure by Letters Patent—

1. In a grate-setting for fire-places, the combination of a compartment E, located between the fire and the chimney-walls and having a corrugated partition D, separating the compartment E from the fire, an inlet e' for the admission of cold air, an auxiliary opening E', a discharge-pipe divided longitudinally into three compartments e^3, e^4, and e^5, the damper e^7, and registers f and f', all constructed and arranged substantially as described.

2. In a grate-setting for fire-places, a metal-incased compartment E, extending on two sides and across the back of said fire-place and divided into upper and lower communicating chambers by the section E^4, in combination with the inlet e', and a discharge-pipe divided into three compartments e^3, e^4, and e^5, the dampers e^7, and the registers f and f', all constructed and operating substantially as described.

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

PETER M. PURSELL.

Witnesses:
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