J. SMITH.

Heating Stove.

No. 112,188. Patented Feb. 28, 1871.

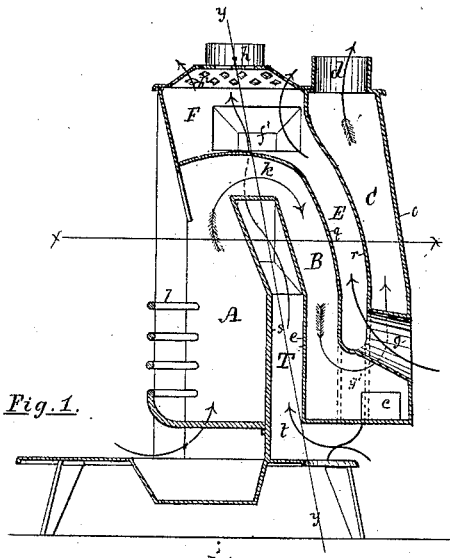

Fig. 1.

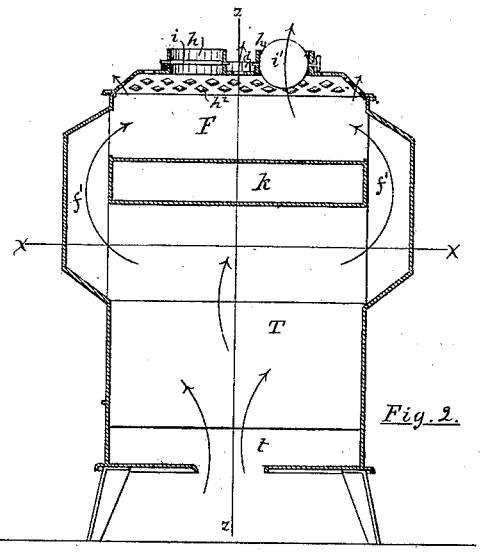

Fig. 2.

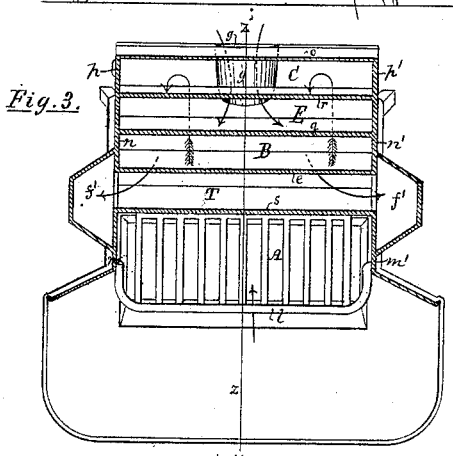

Fig. 3.

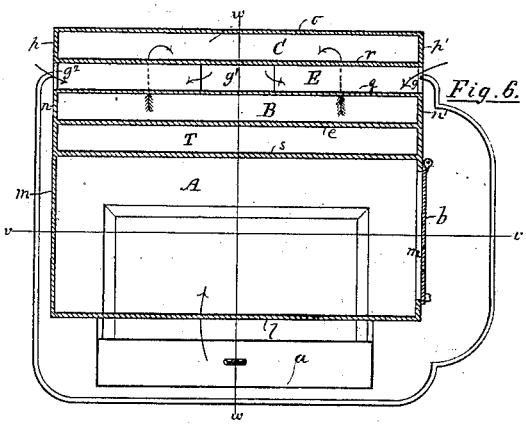

Fig. 6.

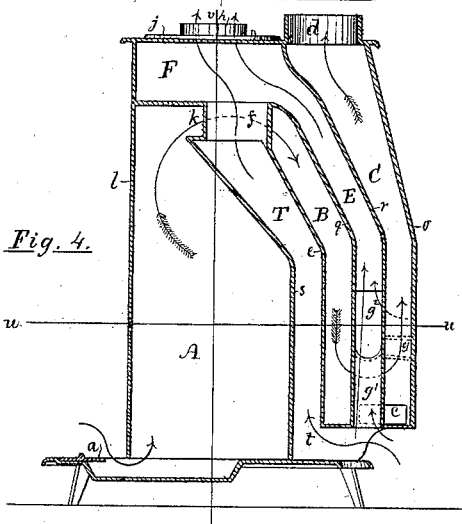

Fig. 4.

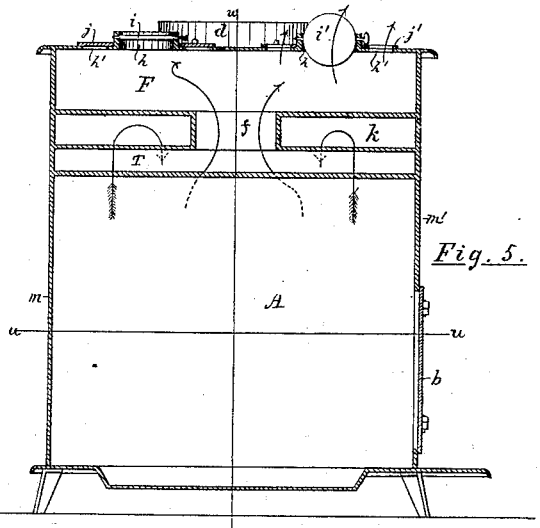

Fig. 5.

Witnesses:

Inventor:

United States Patent Office.

JOHN SMITH, OF BRANTFORD, CANADA.

Letters Patent No. 112,188, dated February 28, 1871.

IMPROVEMENT IN FIRE-PLACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN SMITH, of the town of Brantford, in the county of Brant, in the province of Ontario and Dominion of Canada, have invented certain Improvements in Stoves and Fire-Grates, of which the following is a specification, reference being had to the accompanying drawing, in which—

Figure 1 is a central vertical section from front to rear, at the line *z z* in figs. 2 and 3, of a fire-grate or open fire-place stove, which embodies the distinguishing features of my invention.

Figure 2 is a section of the same at, and elevation of the portion in rear of, the line *y y* in fig. 1.

Figure 3 is a section of the same at, and plan of the parts below, the line *x x* in figs. 1 and 2.

Figure 4 is a central vertical section at the line *w w*, in figs. 5 and 6, of a closed stove, which embodies my invention.

Figure 5 is a section of the same stove at, and elevation of the position in rear of, the line *v v*, in figs. 4 and 6.

Figure 6 is a section of the same at, and plan of parts below, the line *u u*, in figs. 4 and 5.

Like parts are marked by the same letters in the various figures.

The feathered arrows indicate the course of the gaseous products of combustion, and the other arrows point out the currents of air through the fire-grate and stove.

The general object of this invention is the production of a cheap and durable stove or fire-grate, which shall radiate a large amount of heat into the room in which the grate or stove shall be placed, and which shall at the same time be a good and economical heater for warming air to be discharged into the same room, or conducted into another apartment or apartments.

One part of my invention, which is illustrated by the aforesaid drawing, consists in the combination of the following-named elements, to wit:

An open or closed fire-chamber, A, for wood, coal, or similar fuel; a fire-flue, B, descending from the upper part of the fire-chamber, and in rear of the latter; a fire-flue, C, ascending from the lower part of the said descending fire-flue, and in rear thereof, and communicating at its top with an exit passage, *d;* an air-heating flue, E, between the said descending and ascending fire-flues; an air-heating chamber, F, over the said fire-chamber, and open to the upper part of the said air-heating flue; and an inlet aperture or apertures, *g* g^1 or g^2, in the lower part of the said air-heating flue, and an outlet opening or openings, *h* h^1 h^2, from the chamber F; the whole being arranged so that the hot gases of combustion shall pass from the upper part of the fire-chamber successively through the descending and ascending fire-flues B C, and so that heat shall be radiated into the room or place in which the stove or grate shall be located from the front side *l* and ends *m m'* of the fire-chamber, and from the ends *n n'* of the descending fire-flue, and from the rear side *o* and ends *p p'* of the ascending fire-flue; and so that air from outside the stove or grate shall enter through the aperture or apertures *g* g^1 or g^2 into the lower part of the flue E, and, in ascending through that flue, shall be heated by the rear and front sides *q* and *r* of the descending and ascending fire-flues; and so that such heated air shall pass from the flue E into the chamber F, and be therein further heated by the top of the fire-chamber, and may pass out of the chamber F through the opening *h* h^1 or h^2 into the apartment in which the stove or grate shall be placed, or may be conducted from the chamber F through a suitable pipe or pipes to some other room or rooms.

As regards this part of my invention, the descending flue B may be in immediate contact with the rear side *s* of the fire-chamber, or may be separated therefrom by an open, filled, or closed space.

Another part of my invention consists in the combination, with the subject-matter of the above-specified part of my invention, of an air-heating flue, space, or chamber, T, arranged between the fire-chamber A and descending fire-flue B, and having an inlet opening or openings, *t*, at its lower part or ends, and at its upper part a passage or passages, *f* or *f'*, into the chamber F, so that outside air shall enter into the lower part of the flue or space T, and be heated therein by the rear side *s* of the fire-chamber, and the front side *e* of the fire-flue B, and so that such heated air shall pass from the upper part of the flue or space T through the said passage or passages *f* or *f'* into the chamber F, and commingle with the warm air from the flue E, and increase the heat and quantity of the air to be discharged from that chamber.

In the drawing—

a, figs. 4 and 6, is a damper for regulating the admission of air into the fire-chamber; and

b, figs. 5 and 6, is the fuel-door thereto; and

c, figs. 1 and 4, is a small door, through which accumulations of soot and ashes may be removed from the fire-flues.

In figs. 2 and 5, *i i'* are dampers, by which the discharge of heated air from the chamber F through the passages *h* may be regulated; and in figs. 4 and 5 *j j'* are annular registers, by which the escape of hot air through the apertures h^1 may be controlled; but such dampers and registers are not essential to my invention.

In the closed stove, shown by figs. 4 and 5, the heated air passes from the heating-flue or space T into the chamber F through a central pipe, *f*, across the flame-passage *k;* but in the open grate, shown by figs. 1, 2, and 3, the hot air passes from the flue or

space T into the chamber F through passages f' f', at the ends of the flame-passage, so as to not obstruct the draught through the latter.

As regards my invention, the air may be admitted into the lower part of the flue E through any suitable ducts, as, for example, through a pipe, g, in the rear, as shown by full lines in figs. 1 and 3, and by dotted lines in fig. 4; or through a passage, g^1, in the bottom, as shown by full lines in figs. 4 and 6, and by dotted lines in fig. 1; or through openings g^2 in the ends, as in figs. 4 and 6; and the air may be let into the flue or space T through an opening or openings, t, in its bottom or ends, or in any other suitable manner.

The fire and air-flues B C and E T may be perpendicular, or inclined rearward or forward, as shown in the drawing.

The grate or stove may be set in the chimney-stack, or be placed in a recess therein, or be used or set out in a room, and the air may be admitted into the heating-flues or spaces E and T directly from the room or place in which the stove or grate shall be located; or the cold air may be conducted to these flues or spaces by a conduit leading thereto from the outside of the building.

I am aware that it is not new to arrange descending and ascending fire-flues in connection with and in rear of a fire-chamber with an open air space or an air-heating flue or chamber between and against the rear side of the fire-chamber and the front side of the descending fire-flue, and with or without an air-heating chamber over and in contact with the top plate of the fire-chamber, when there is no air-heating flue between the said descending and ascending fire-flues; but in my improved stove above described, the sheet air-heating flue E, which is between and has its sides formed by the side plates q and r of the descending and ascending fire-flues B and C, is an essential element of my invention, and adds greatly to the capability of the stove for heating air to be conducted to distant apartments, while it leaves the stove a good radiator of heat on both its upright sides and ends.

I am also aware that it is not new to arrange descending and ascending fire-flues in rear of and in connection with a fire-chamber, when the descending and ascending fire-flues are separated from each other and from the fire-chamber and entirely surrounded laterally by one large air-heating chamber, which is formed by a casing that incloses and covers the descending and ascending fire-flues and the rear side and upright ends of the fire-chamber, so that there cannot be any radiation of heat into the apartment in which the stove or apparatus may be placed from any part whatever of the descending and ascending fire-flues.

But in my improved stove, shown by the aforesaid drawing, the upright ends of the fire-chamber and descending and ascending fire-flues, and the broad rear side of the ascending fire-flue, are all outside plates, and render the stove a good radiator of heat on its upright ends and rear side, and at the same time the air-heating flue or flues and chamber E F or T E F, which have their upright end plates formed by the connection or extension of the end plates of the fire-chamber and fire-flues, render the stove a good and cheap heater of air to be conducted to other apartments.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the fire-chamber A and descending and ascending sheet fire-flues B and C in rear of the fire-chamber, of the sheet air-heating flue E, between and against the sides q and r of the fire-flues, air-heating chamber F, over and against the top plate of the fire-chamber, and inlet and outlet air-passages g g^1 or g^2 and h h^1 or h^2, all arranged as described, when the ends p p' and n n' of the fire-flues, and the rear side o of the ascending one, are outside radiating plates, as set forth.

2. The combination of the fire-chamber A, descending and ascending sheet fire-flues B and C, having outside radiating plates, as described, sheet air-heating flue E, air-heating chamber F, sheet air-heating flue T, between and against the sides s and e of the fire-chamber and descending fire-flue, air-passage or passages f or f', and apertures to admit cold air and discharge it when heated, all arranged as herein set forth.

JOHN SMITH.

Witnesses:
H. M. K. WILSON,
W. RUBIDGE.