

J. B. SMITH & O. L. GIDDINGS.

Hot-Air Furnace.

No. 129,180.

Fig 1.

Patented July 16, 1872.

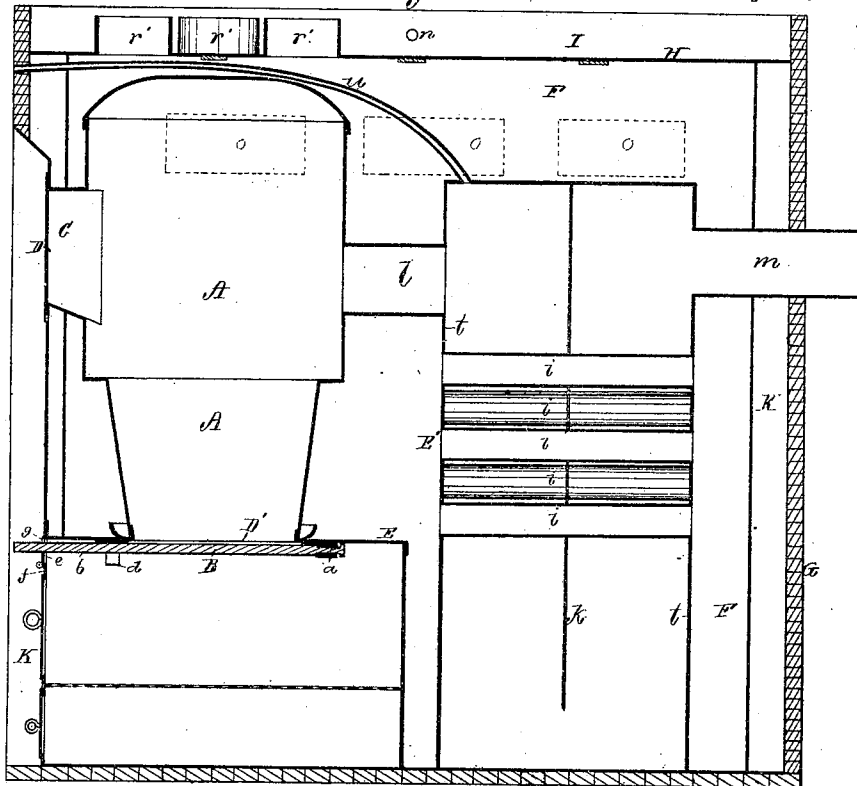


Fig 4.

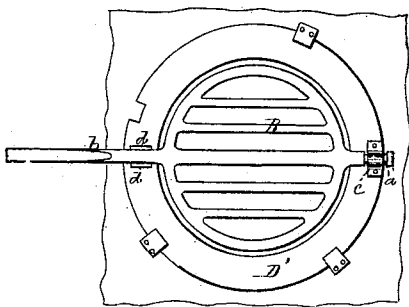
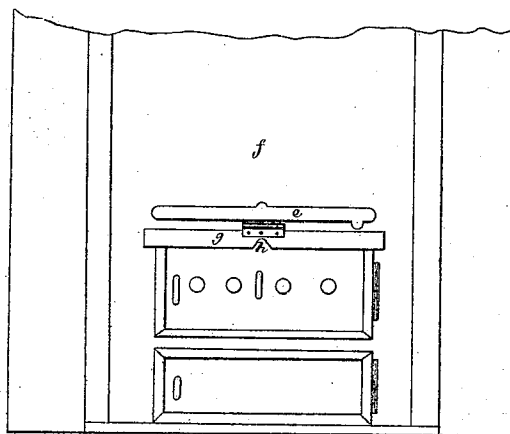


Fig 5.



Witnesses.

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Hot-Air Furnace.

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Fig. 2.

Patented July 16, 1872.

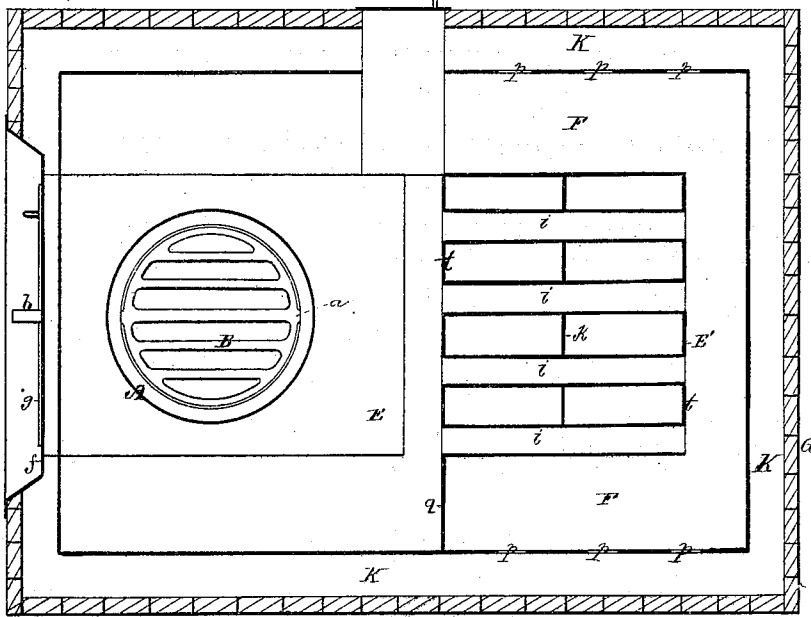
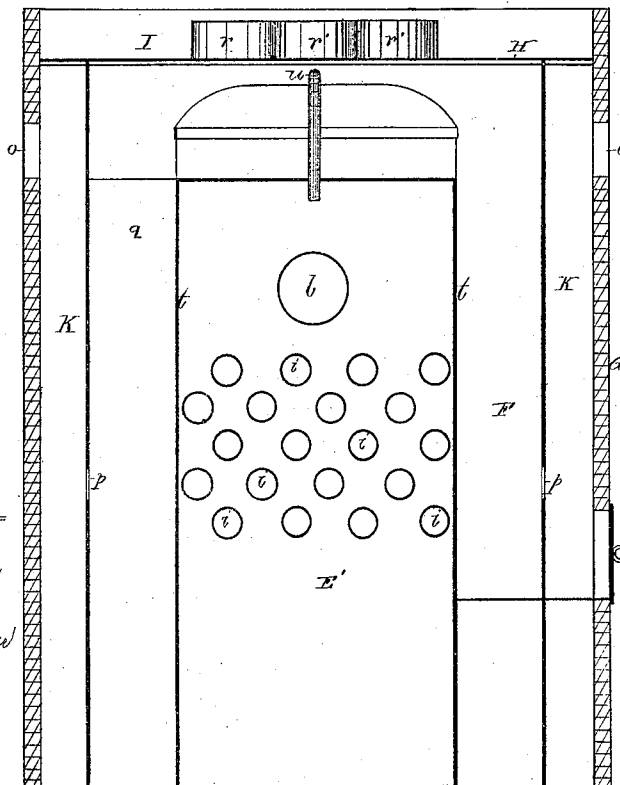


Fig. 3.



Witnesses,

S. N. Piper

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UNITED STATES PATENT OFFICE.

JOEL B. SMITH, OF MANCHESTER, AND OLIVER L. GIDDINGS, OF EXETER,
NEW HAMPSHIRE.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 129,180, dated July 16, 1872.

To all persons to whom these presents may come:

Be it known that we, JOEL B. SMITH, of Manchester, of the county of Hillsborough and State of New Hampshire, and OLIVER L. GIDDINGS, of Exeter, of the county of Rockingham, of the State aforesaid, have invented a new and useful or Improved Air-Heating Furnace for warming houses or other structures of like character; and we do hereby declare the same to be fully described in the following specification and represented in the accompanying drawing, of which—

Figure 1 denotes a longitudinal and vertical section; Fig. 2, a horizontal section; and Fig. 3 a transverse section of such furnace.

In such drawing, A denotes the stove, whose fire-pot or chamber of combustion is provided at bottom with a grate, B. The fuel-supply throat is shown at C as furnished with a door, D. The fire part of the stove rests on and is supported by an ash-chamber or box, E, of ordinary construction. The grate B is circular, and furnished with a pivot, *a*, and a shaft, *b*, arranged as shown in Fig. 4, which is an under-side view of the grate and its sustaining rotary ring, and the supports of the latter. The pivot *a* of the grate extends into a cylindrical hole or bearing made in a stud, *c*, extended down from a flat circular ring, *D'*, arranged concentrically with the grate and fire-pot, and supported against the top of the ash-box E, so as to be capable of being revolved horizontally. At its front the said ring is furnished with two studs, *d d*, extended down from it, and situated asunder a distance a little greater than the diameter of the shaft *b*, such shaft going between them, and being extended through a long horizontal slot, *e*, made in the front plate *f* of the furnace, as shown in Fig. 5. The slot is provided with a door, *g*, hung so as to turn downward. There is, at the middle of such door, a notch, *h*, which, when the door is turned up into a vertical position, serves as a bearing to the shaft *b*. The slot is to be of such a length as to enable the grate-shaft to be moved entirely out of it, while the grate may be in the act of being turned horizontally. This enables the grate to be readily applied to or removed from its supporting ring. The grate can be shaken horizontally, or it may be turned on its axis, as occasion

may require. In rear of the heater or stove A is the radiator E', which is a closed chamber, *t*, provided with a stack or series of pipes, *i*, going through it horizontally. Within the radiator is a vertical partition, *k*, which is projected downward from the top of the radiator nearly to its bottom. A pipe, *l*, opens from the smoke-chamber of the fire-pot into the upper portion of the radiator, as shown. Another or eduction-pipe, *m*, leads out of the upper part of the rear portion of the radiator, such pipe being intended to open into a discharge-flue or chimney when the former may be in use. The stove and radiator are placed within an air-heating chamber, F, which in turn is arranged within a case, G, there being a common metallic top, H, to the said two chambers, such top constituting the bottom of a shallow chamber, I, arranged over it, as shown, and having one or more holes or air-inlets, *n*, in its sides. The purpose of the said chamber I is to receive air, and heat it by the heat radiated from the top of the chamber F, such air so heated being conveyed away from the chamber by one or more pipes leading to one or more rooms to be warmed. The walls of the chambers F and G are to be supposed to be constructed of brick-work. Extending around the chamber F, and bounded by it and the case G, is an air-space, K, provided at or near its top with one or more inducts, *o*, and on the opposite side and leading into the air-chamber F, and opposite the radiator, one or more educts or passages, *p*, near which a vertical partition, *q*, extends from the front corner of the radiator to the next adjacent side of the chamber F, all being as shown in the drawing. Pipes *r' r'* for the conveyance of heated air to apartments lead out of the top of the chamber F directly over the fire-pot. While this furnace may be in operation the air to be heated will enter by the inducts *o*, and circulate freely in the space K, or about the outside of the walls of the chamber F; hence it will pass into the said chamber F by the holes *p*; and after circulating about and through the radiator and about the fire-pot, will escape by the pipes *r'*. A pipe, *u*, leads from the front plate of the furnace directly over the top of the stove A, and into the upper part of the radiator, as shown. By means

of this pipe air for support of combustion within the radiator is supplied thereto in a heated state. In consequence of the pipe being carried directly over and close to or against the top of the stove, the air passing through the pipe will be heated, and by being so will facilitate combustion of the gases in the radiator. The partition *g* causes the air received into the chamber *F* to first pass around and through the radiator before impinging against the stove or heater *A*, and thereby insures such air being heated to better advantage.

The heat, smoke, and volatile products of combustion after escaping from the stove or heater pass into the radiator, thence down underneath its partitions, thence upward in rear of it, and thence out of the escape-pipe, the heat being absorbed by the pipes and sides of the radiator, and radiated into the air-heating chamber, from whence the air heated may be drawn by the pipes leading therefrom.

Furnaces as usually constructed, with brick air-heating chambers, have no air-heating chamber over and upon the tops of their main air-heating chambers—that is, one arranged so that the top plate of the main air-heating chamber may constitute the bottom of the auxiliary-chamber, as in our improved furnace. By the construction of the latter we are enabled to utilize the heat usually radiated into the cellar from the top of a furnace, thereby preventing the cellar from being warmed by such heat.

In the said furnace we claim as our invention as follows:

1. The partition *g*, the air-chamber *F*, air-space *K*, the radiator *E'*, and the stove *A* or fire-pot and ash-box, arranged and combined substantially in manner and to operate as set forth.

2. Also, the auxiliary air-heating chamber *I*, combined and arranged with the main air-chamber *F*, or such and the case *G*, and the fire-pot or stove arranged in chamber *F*, as set forth.

3. Also, the radiator, as composed of the chamber *t*, the series of pipes *i*, and the partition *k*, arranged as described and shown.

4. Also, the front plate slot *e* and its notched door *g*, arranged and combined with the grate *B* and its supporting-ring *D*, applied to the fire-place, substantially in manner as described.

5. Also, the stove *A*, the air-chamber *F*, the partition *g*, the radiator *E'*, the air-space *K*, and the auxiliary air-heating chamber *I*, combined and arranged substantially in manner, and to operate as shown and described.

6. Also, the combination and arrangement of the pipe *u* with the stove *A*, the radiator *E'*, and the air-heating chamber *F*, in which they are placed.

J. B. SMITH.

OLIVER L. GIDDINGS.

Witnesses to signature of JOEL B. SMITH:

ISAAC W. SMITH,

JUSTIN SPEAR.

Witnesses to signature of OLIVER L. GIDDINGS:

WM. P. MOULTON,

WM. B. MORRILL.