

W. TWITCHELL.
Hot-Air Furnace.

No. 131,723.

Patented Sep. 24, 1872.

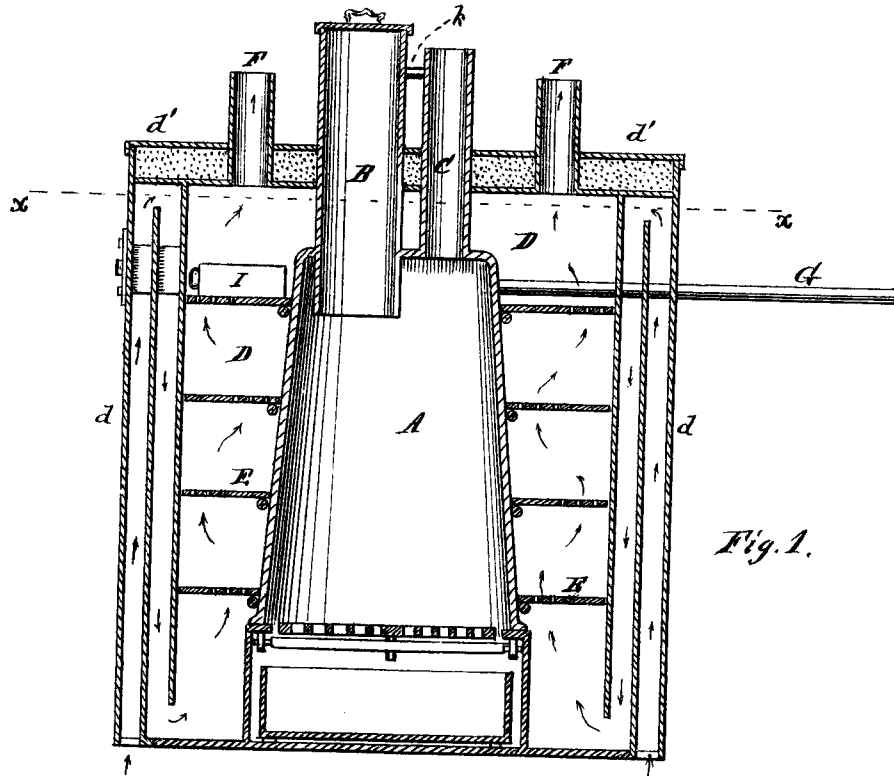


Fig. 1.

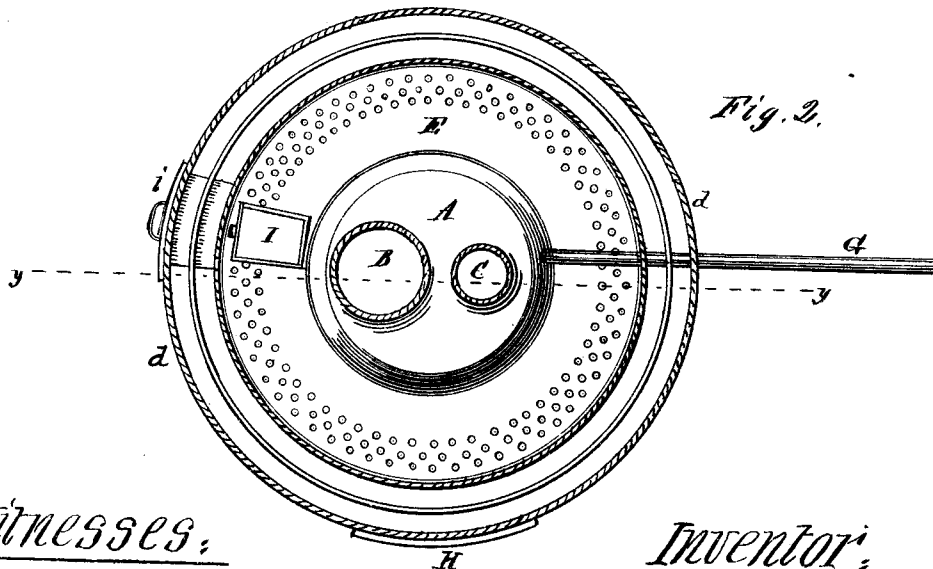


Fig. 2.

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WILLARD TWITCHELL, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 131,723, dated September 24, 1872.

To all whom it may concern:

Be it known that I, WILLARD TWITCHELL, of Syracuse, in the county of Onondaga and State of New York, have invented certain Improvements in Hot-Air Furnaces, of which the following is a specification:

My invention consists in the combination of hollow walls composed of metallic plates forming air-channels with perforated annular plates encircling the fire-pot, whereby the cold air, after passing through the passages in the walls, is made to enter at the bottom of the space surrounding the fire-pot and pass upward to the hot-air chamber in a zigzag course. The invention also consists in provision for guarding against leakages of gas from the fire-pot into the hot-air chamber, the fire-pot, with the magazine and smoke-pipe, being all cast in a single piece, and the upper ends of the magazine and pipe extending upward through the top wall of the hot-air chamber before making a joint, thus making a leaking of gas into the air-heating chamber impossible. Finally, the invention consists in a novel method of supplying air to the unconsumed combustible gases above the fire, without liability of gases being thrown out at times into the room in which the furnace is located, the cold-air termination of the supply-pipe being carried to the outside of the building into the open air, as hereinafter more fully described.

Figure 1 is a vertical section taken in the line *y y* in Fig. 2, and Fig. 2 is a horizontal section taken in the line *x x* in Fig. 1.

Similar letters of reference indicate like parts in the separate figures.

A is the fire-pot. B is the magazine. C is the smoke-pipe; and D is the hot-air chamber. The walls *d* of the heating-chamber are made of sheet metal, and hollow for the inflow of air to the heating-chamber, as indicated by the arrows, Fig. 1. By this means the heat that the walls absorb is again given out to the inflowing cold air, and waste of heat by radiation from the outer side of the walls is thus prevented, and a light, portable structure is obtained that is complete and set up without mason-work. The outer thickness of the wall *d* can be omitted and the air taken in at the top instead of at the bottom of the wall for increased simplicity and cheapness. The upper part *d'* of the air-chamber is made dou-

ble, and filled with some light non-conducting material like ashes. The fire-pot is provided with a series of perforated flanges or rings, E, that have a bearing on wrought-iron rings that fit upon the body of the fire-pot. The perforations of these plates or flanges alternate from the inner to the outer surfaces of the different flanges, as shown in Fig. 1, so that the current of air is broken up, and brought in contact with a large surface, and cold currents prevented. The heated air is conducted from the heating-chamber by the pipes F F. The fire-pot A, with the magazine B and smoke-pipe C, are cast in a single piece, as shown in Fig. 1, so that they have no joints within the heating-chamber, by means of which leakage of gas into the air-chamber is prevented. The fire-pot is made flaring, downward, so that ashes and clinker fall clear of its sides. The mouth of the ash-pit is carried through the walls *d* to the outside, as seen at H, Fig. 2, so that escape of gas from the bottom of the fire-pot cannot take place into the air-chamber. Fire is started in the furnace by introducing the kindling through the magazine B. Air is supplied to the combustion-chamber A above the fire by a pipe, G, which is extended to the outside of the building, so that in the event of a reverse flow through the pipe gas will be thrown out into the open air, and not into the room in which the furnace is located, and make the air therein impure; and the cold-air supply for the heating-chamber is also drawn from outside of the room or from the open air. By these means all escape of gas into the air that is heated by the furnace and supplied to the various parts of the house, is made impossible, and the greatest amount of the heat is utilized. A passage, *i*, is made through the walls *d* to allow a water-box, I, to be placed on one of the flanges E. A small pipe connection, *k*, Fig. 1, is made between the top of the magazine B and the pipe C for gas to escape from the magazine into the pipe and pass into the chimney. The hollow walls *d* of the heating-chamber can also be made in the form of a double wall the same as the top, and filled with some suitable non-conducting material. In this case the fire-pit is elevated a few inches, and the supply of cold air is taken in at the center of the bottom.

Having thus described my invention, what I

claim, and desire to secure by Letters Patent, is—

1. The combination of the hollow walls *d* forming air-passages, and the flanges or plates *E* incircling the fire-pot, whereby the air, after passing through the passages in the walls, is made to enter the space surrounding the fire-pot at the bottom and pass upward to the hot-air chamber, substantially as described.

2. In combination with the chamber *D*, the fire-pot *A*, magazine *B*, and pipe *C*, when cast

in one piece, and without a joint within said chamber, as and for the purpose herein specified.

3. In connection with the furnace *A B C D*, the oxygen-pipe *G*, when extended into the open air, as and for the purpose specified.

WILLARD TWITCHELL.

Witnesses:

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