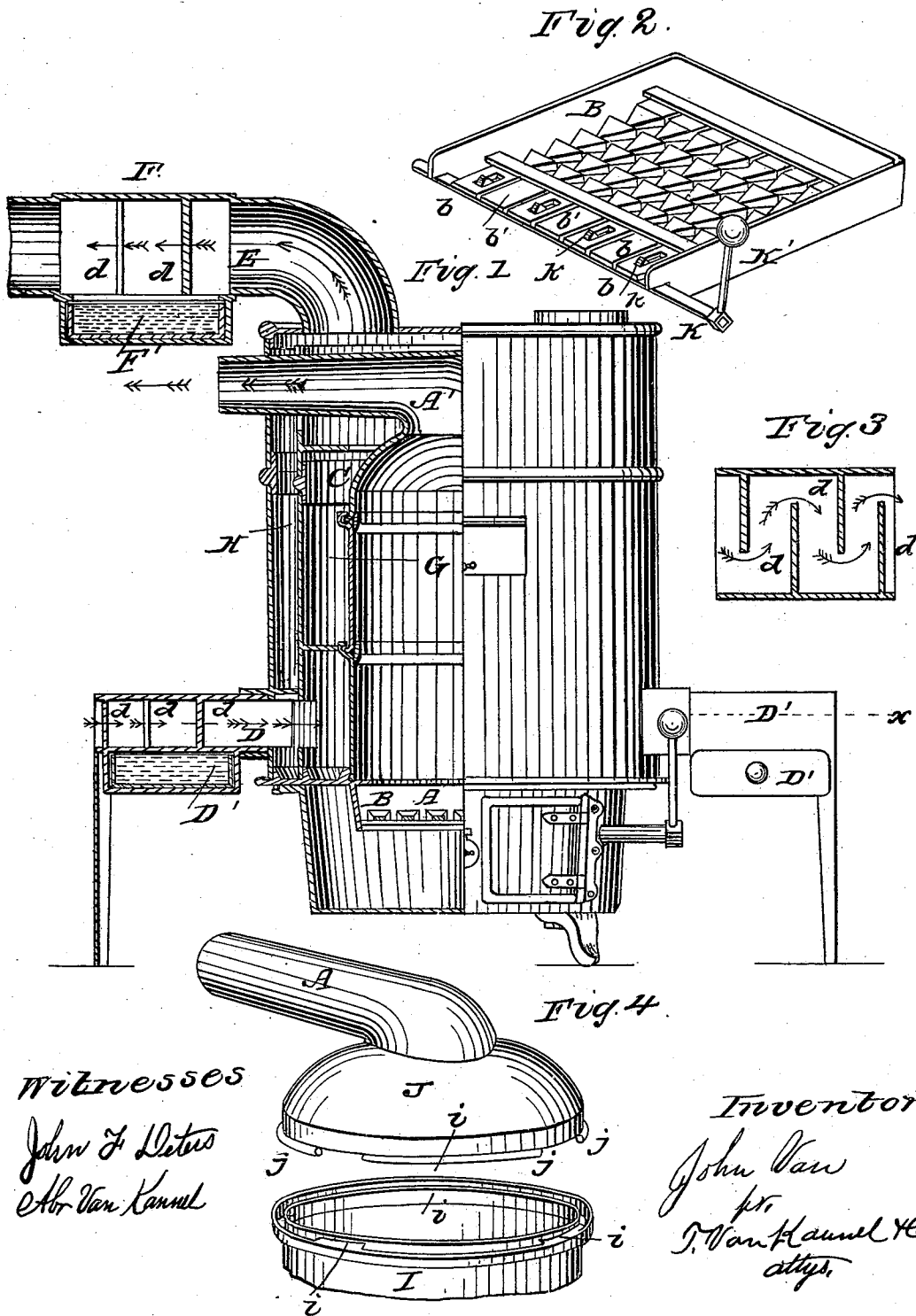


J. VAN.  
Hot-Air Furnace.

No. 106.746.

Patented Aug. 23, 1870.



Witnesses

John F. Lutes  
Abr Van Kannel

Inventor

John Van  
Kannel  
attys.

# UNITED STATES PATENT OFFICE.

JOHN VAN, OF CINCINNATI, OHIO.

## HOT-AIR FURNACE.

Specification forming part of Letters Patent No. 106,746, dated August 23, 1870.

*To all whom it may concern:*

Be it known that I, JOHN VAN, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, making a part of this specification.

Figure 1 gives a side elevation with one-half a cross-section. Fig. 2 shows the grate-bars detached from the furnace. Fig. 3 represents a cross-section of the dust-catcher, taken in the line *x* of Fig. 1; and Fig. 4 shows the construction of one of the joints.

Similar letters of reference indicate like parts.

The nature of my invention relates to a number of devices connected with a hot-air furnace: first, for freeing the warm air coming from the furnace from a large proportion of the dust which circulates in and about the room occupied by the furnace; second, for an improved joint holding one section or part of the furnace to the other without the use of bolts or screws, at the same time allowing the different parts to rotate on each other, so as to bring the outlets for the smoke and warm air to any position it may be required in respect to the flues; and, third, a vibrating lever or rock-shaft carrying projections or arms which act on alternate movable bars in the grate, by which the ashes are easily and quickly shaken from the fire-place of the furnace.

For the first, it consists of a series of dust-catchers, in the bottom of which are placed trays containing water, and above are broken walls, with which the air comes in contact before it enters the furnace, whereby the particles of dust are caused to fall into the water below, which may be emptied and the tray cleaned, as occasion may require.

It consists, further, of a lap and lock joint for the purpose of locking and binding together the different parts of a furnace, so arranged that projections on one part pass under projections on the other, and permitting the one to rotate on the other to any desired position, as will be more fully explained hereinafter.

Much difficulty has been experienced in constructing furnaces, stoves, and other structures for heating to prevent the breaking of the crown-plates, bed-plates, and other parts,

caused by the expansion and contraction of the several parts, and where furnaces have been held together by means of wrought-iron bolts the unequal expansion and contraction of these metals has almost invariably shortened the life of the structure. Another cause of breakage is in the unequal expansion of the same plate, and where the parts have been bolted tightly together it has caused breakages, owing to the want of a joint which would give sufficiently to accommodate this variation in the size of plates.

In my furnace, held together by the improved lock-joint, the expansion or contraction of the metal, whether equal or not, is so distributed between the several parts as not to strain them, and not being bolted tight or in any way confined, the metal is permitted to expand or contract without straining any of the parts used in the structure.

In construction my invention is as follows:

A is the fire-space, and B the grate. All the heat not communicated to the hot-air chamber C is carried off, together with smoke, through the pipe A', the smoke being represented by double-barbed arrows and the heat to be led into the rooms by single-barbed arrows. The air which is to be warmed for the rooms is taken in by a series of air-receivers or dust-catchers, D D, the construction of which consists of a suitable frame supported by legs, and communicating directly with the warm-air chamber C.

On the bottom of the frame rests a tray, D', containing water, and to the roof is attached a series of broken partitions, *d*, lapping past each other, and so arranged that the air is slightly resisted in its passage through the same and caused to change the direction of its course constantly. A similar arrangement is placed on the pipe E, leading the warm air to the apartments to be warmed, as seen at F, Fig. 1.

G is the wall of the hot-air chamber, and has a series of overlapping horizontal partitions, which retains the air sufficiently to become warm. H is the outside jacket, leaving an air-space between it and the wall G, to prevent the heat being communicated to the free air without.

The joints holding together the different parts of my furnace are constructed with one or more beads, *i i*, on the face of the part I,

and having projections *i' i'*, as seen in Fig. 4. On the other part, J, are sections of beads or concentric projections *j j*, which, when brought into proper position, reach under projections *i'* on part I, thus completely locking the two parts with each other. This locking, however, does not prevent the parts from being rotated, as above described.

The grate B consists in making each alternate bar *b* to move longitudinally in guides, while the remaining bars, *b'*, are permanent. A rock-shaft, K, vibrates on journals, and has attached to it arms *k*, working in slots cut in the bars *b*, as seen in Fig. 2. A lever, K', is attached to the end of rock-shaft K, by which motion is given to the movable bars *b*.

The operation of my invention is as follows: The air on entering passes through the dust-catcher or air-receiver D, and in its passage through the same comes in contact with the projecting plates or broken partitions *d d*, having its current continually changed and resisted, thereby causing a large proportion of the dust to fall into the trays below. The air thus partly freed from dust passes on around the fire-chamber, as shown by the arrows, becoming heated, and passes through another dust-catcher, F, which is situated at the top of the furnace, and forms a part of the hot-air pipe.

This dust-catcher is constructed similarly to the others described, but being kept somewhat warmer, the water contained in its tray evaporates more readily, and thus catches the fine dust which may have escaped the lower one; also, on account of the warm air being lighter than it is on entering the furnace where it is cold, the upper dust-catcher will act comparatively better, while not sufficient dampness is given to make the air injurious or unpleasant.

The operation of my improved lock-joint, and also the grate-bars, is obvious from the description already given above.

Having thus described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The dust-catcher arranged at the place of entrance of air into the heating-chamber, in combination with the dust-catcher arranged at the place of discharge thereof, substantially as and for the purpose described.

2. The part J, resting on the part I, and provided with the locking-joint, substantially as and for the purpose described.

JOHN VAN.

Attest:

THOMAS COSTELLO,  
W. W. MITCHELL.