2 Sheets—Sheet 1.

W. J. TOWNE.

HOT-AIR FURNACE

No. 188,318. Patented March 13, 1877.

Fig: 1.

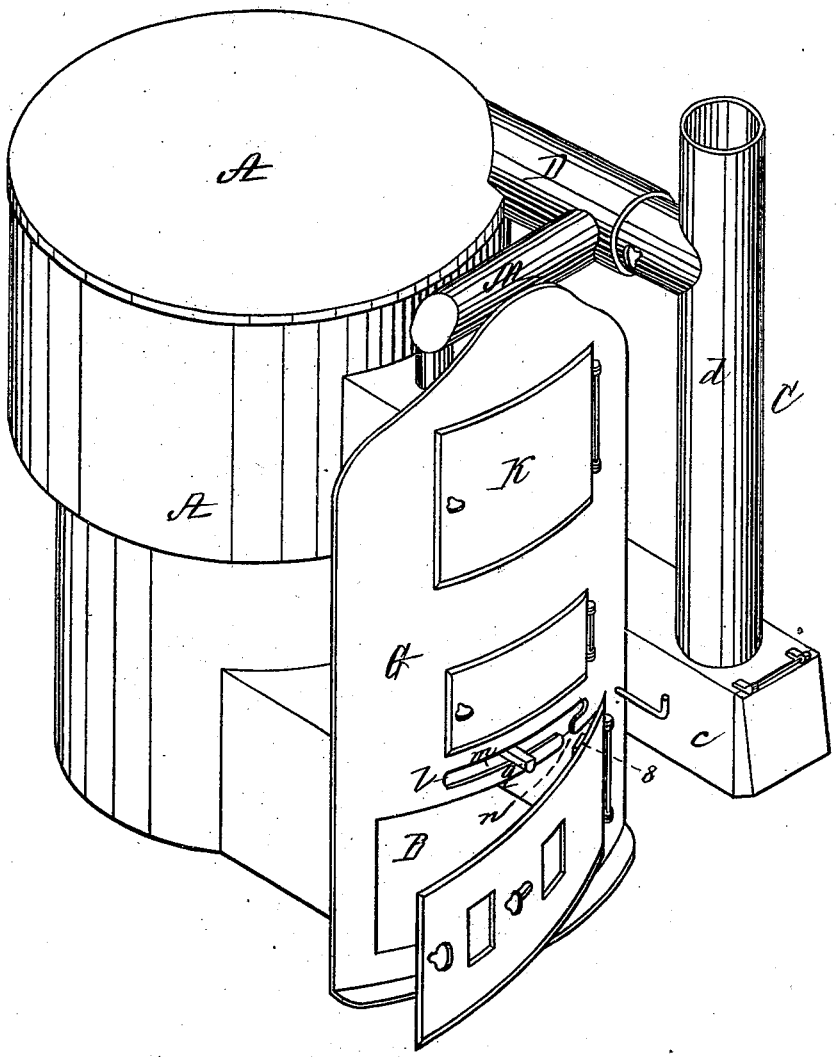
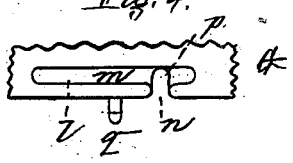


Fig: 4.



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2 Sheets—Sheet 2.

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HOT-AIR FURNACE

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Fig. 2.

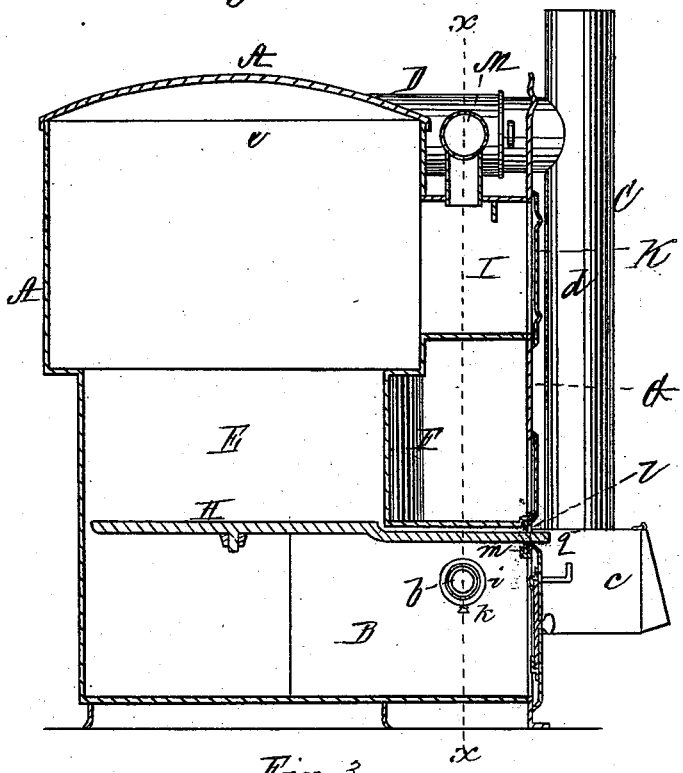
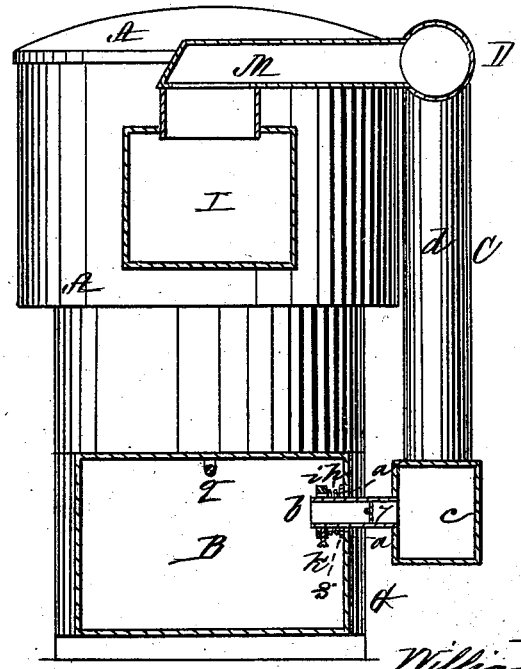


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM J. TOWNE, OF NEWTON, ASSIGNOR TO THE HIGHLAND FOUNDRY COMPANY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **188,318**, dated March 13, 1877; application filed January 10, 1877.

To all whom it may concern:

Be it known that I, WILLIAM J. TOWNE, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Hot-Air Furnaces, Stoves, and Ranges, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of a hot-air furnace having my improvements applied thereto. Fig. 2 is a central vertical section through the same. Fig. 3 is a vertical section on the line *x x* of Fig. 2. Fig. 4 is a detail in elevation.

The first portion of my invention consists in providing the said dust-flue with a washer and a collar, having a spring interposed between them for keeping the washer snugly against the side of the ash-pit, in order to constantly close the aperture in the frame around the dust-flue during the expansion and contraction of the parts incident to changes in their temperature, whereby the passage of any portion of the dust from the ash-pit to the hot-air chamber, and thence up through the registers into the apartments, is effectually prevented.

The second portion of my invention consists in forming within the front of the frame or shield an opening immediately below, and communicating with, the slot covered by the follower, and in which the handle of the grate slides, the opening in the follower through which the handle of the grate projects being brought in line with the said opening in the frame, so that when the ash-pit door is open the handle of the grate is allowed to drop, and the grate to be tipped sufficiently to remove the slate and clinkers in a convenient and expeditious manner.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the furnace, which is intended to be set in a suitable casing or brick-work, to form a hot-air chamber between them for the distribution of hot air through the ordinary pipes leading to the various apartments of the house. B is the ash-pit, in one side of which is formed a circular opening, *a*, into which projects the inner end of a short pipe, *b*, Figs. 2 and 3, which communicates with the "horseshoe" or horizontal lower portion *c* of the smoke-pipe C, the vertical portion *d* of which leads to the chimney-flue. D is a draft-pipe, extending between the chamber *e*, over the fire-pot E and the vertical portion *d* of the smoke-pipe C.

The short pipe *b*, leading from the ash-pit to the horseshoe of the smoke-pipe, is provided with a damper, 7, and serves as a flue for dust and fine ashes falling through the grate (when shaken or when the fire is poked) to escape into the smoke-pipe, thereby avoiding the passage of said dust, &c., out through the open door of the ash-pit into the furnace-room, and injuring articles therein, besides covering the attendant who has the care of the furnace.

This dust pipe or flue *b* is not rigidly secured to the side of the ash-pit, and the diameter of the opening *a* therein, through which the dust-flue passes, is greater than the diameter of the latter, by which construction the necessary allowance is made for the expansion and contraction of the parts when affected by different degrees of temperature; and in order to prevent dust from escaping through the opening outside the dust-flue into the hot-air chamber, and thence up through the registers into the apartments, I place around the dust-flue a tightly-fitting washer, *g*, which is kept against and closes the opening *a* in the side of the ash-pit by a spiral spring, *h*, which surrounds the dust-flue, and is interposed between the washer *g* and a collar, *i*, which also surrounds the dust-flue, and is held in place thereon by a set-screw, *k*, and by means of the latter the position of the collar may be adjusted to alter the tension of the spring, whereby the constant contact of the washer with the side of the ash-pit is insured during all movements of the parts due to their expansion or contraction.

To afford a ready means of removing clinkers from the grate, as also the grate itself when required, I resort to the following construction: In the front of the frame or shield G, immedi-

ately below and communicating with the slot *l* therein, covered by the sliding follower *m*, I form an opening, *n*, which, when the opening *p* in the follower for the passage of the handle *q* of the grate H is brought in line therewith, and the ash-pit door is open, allows the handle to drop sufficiently to tip the grate down into a convenient position, (see Fig. 4,) for readily removing clinkers without dumping the fire. When the ash-pit door is closed, a projection, 8, at its top fits over and closes the opening *n* in the frame and prevents the escape of ashes into the furnace-room, which might otherwise occur at this point, this projection on the door, when closed, fitting flush with the lower edge of the slot *l*, so as not to project up into the path of and obstruct the movement of the grate-handle. Leading from the top of the passage I, between the feed-door K and the fire-pot E, is a pipe, M, which connects with the draft-pipe D, extending between the chamber *e*, over the fire-pot and the vertical branch *d* of the smoke-pipe; this pipe M forming an auxiliary draft, especially designed for carrying off up the smoke-pipe the gases and smoke which are liable to escape into the furnace-room, out through the feed-aperture when its door is opened, the two pipes M and D forming a double direct draft, which, when employed in conjunction in the manner described, insure the proper and complete exit up the smoke-pipe of all gases and smoke, some portion of which, in furnaces as heretofore constructed, has found its way into the apartments of the house. The pipe M may lead directly to the smoke-pipe C instead of to the draft-pipe D, if desired, and some of my said improvements may be applied to stoves and ranges with the same advantages as those resulting from their application to furnaces without departing from my invention.

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

1. The washer *g*, spring *h*, and collar *i*, in combination with a dust-flue, *b*, leading from the ash-pit B to the smoke pipe or flue C, operating substantially in the manner and for the purpose set forth.

2. The frame G, with its opening *n* and slot *l*, in combination with the follower *m*, with its opening *p* and the grate-handle *q*, all constructed to operate substantially as and for the purpose described.

3. The ash-pit door with its projection 8, in combination with the frame G, with its opening *n*, substantially as described, for the purpose set forth.

4. In a heating-furnace, the two draft-passages direct from the inside of the casing of the dome, one draft, M, opening into the inclosed feed-passage within the door, the other, D, from the top of the main dome, in combination with the main draft-flue C, as described.

Witness my hand this 4th day of January, A. D. 1877.

WM. J. TOWNE.

In presence of—
N. W. STEARNS,
W. J. CAMBRIDGE.