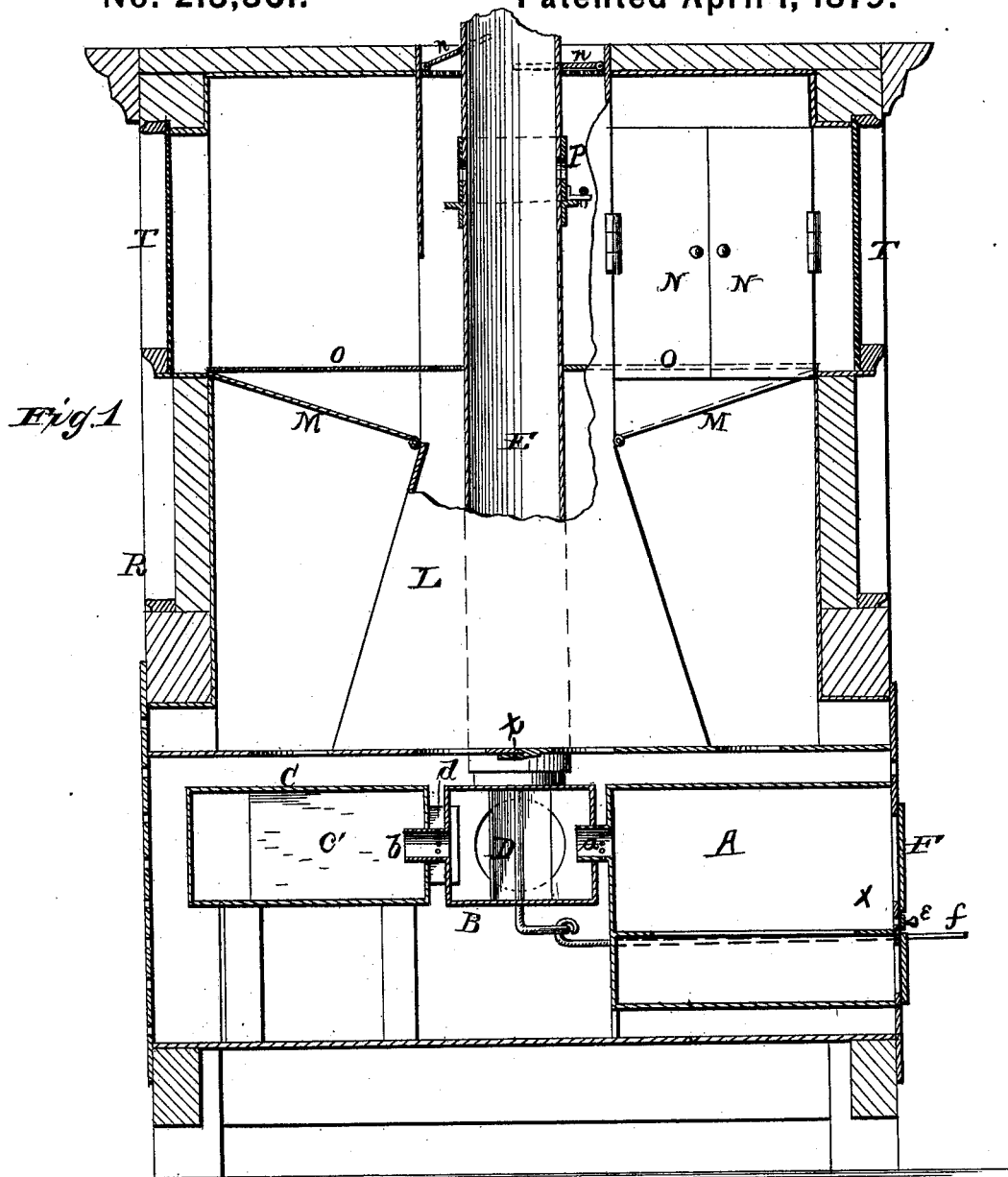


E. W. & C. W. BLAIR.

Furnace.

No. 213,861.

Patented April 1, 1879.



WITNESSES

F. L. Curand
H. A. Toulmin

By their Attorneys

INVENTOR

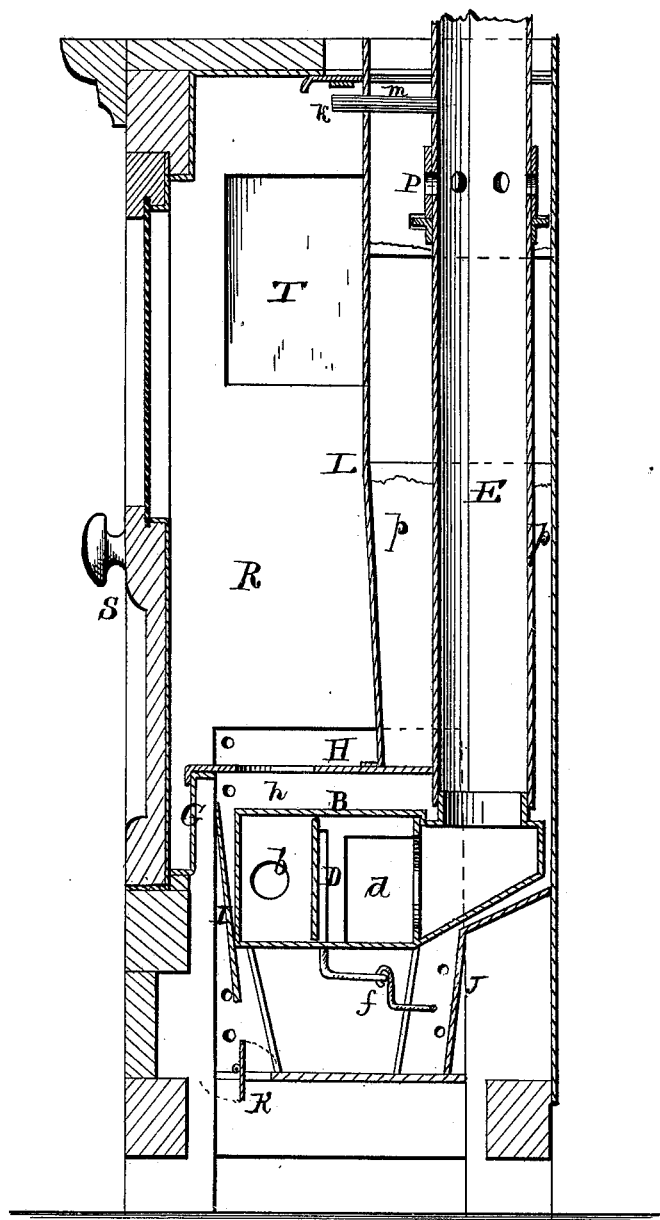
E. W. Blair and
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Fig. 2.



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INVENTOR

E. W. Blair and
By their Attorneys *C. W. Blair*

UNITED STATES PATENT OFFICE.

ERASTUS W. BLAIR AND CHARLES W. BLAIR, OF COLUMBUS, OHIO.

IMPROVEMENT IN FURNACES.

Specification forming part of Letters Patent No. **213,861**, dated April 1, 1879; application filed September 6, 1878.

To all whom it may concern:

Be it known that we, ERASTUS W. BLAIR and CHARLES W. BLAIR, of Columbus, in the State of Ohio, have invented certain new and useful Improvements in Furnaces; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of our invention consists in the construction and arrangement of a furnace for heating, cooking, and drying, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a longitudinal vertical section of our furnace. Fig. 2 is a transverse vertical section of the same.

A represents the furnace proper. B is a connecting-flue, and C is a return-flue, both being made of cast-iron. The furnace A is connected with the flue B by a perforated pipe, *a*, set to one side and near the top of the furnace. The flue B is connected with the return-flue C by a perforated pipe, *b*, which is of a little larger diameter than the pipe *a*. This pipe *b* is on the front side of the return-flue C, and on the rear side said return-flue is, by a square pipe, *d*, again connected with the connecting-flue B. The bottoms of these pipes should be as near as possible on a level with each other.

In the connecting-flue B is a damper, D, operated by a rod, *f*, and so arranged that by drawing out the rod the damper will allow the smoke from the furnace to pass through the connecting-flue, into the return-flue, around the wing C' therein, and thence, through the square pipe *d*, back into the connecting-flue, and into the main flue-pipe E. By pushing in the rod *f* the valve D closes the perforated pipe *b*, and allows the smoke to pass directly into the flue-pipe E.

The furnace front F is separate from the body of the furnace, and fastened to it by means of small screw-bolts. A register, *e*, is placed be-

tween the furnace-doors, to be used in burning wood.

G is a front shield of sheet-iron to form the front of the case, and supports the cooking-plate H at the front. I is an inner shield to protect the front shield, G, from the intense heat. J is a back shield extending from the bottom upward toward the cooking-plate H, thence to the back of the case. This shield protects the frame-work of the case at the bottom. The cooking-plate H extends from the front shield, G, to the back of the case, and is perforated with six holes, and forms a complete inclosed space, *h*, for heating air, the air being admitted to this space by means of a cold-air damper, K, at the bottom.

L is a hot-air conductor resting on the cooking-plate H, a sufficient opening being made in the cooking-plate to allow the hot air to pass into said conductor. To the sides of the hot-air conductor are hinged folding oven-bottoms M M, which, when closed, form the sides of the conductor.

N N are oven-doors, and O O are oven-trays. The doors N and shelves O are to be removed when the hinged plates M are to be folded up to form the sides of the conductor.

The flue-pipe E is provided with a collar-damper, P, operated by a rod, *i*. (Not shown.) When this damper is open it allows the hot air to pass directly into the flue-pipe E. Above this damper is a pipe, *k*, to convey heat and steam from the cooking-plate H, and directly over this pipe is a damper, *m*, working horizontally. This is used in cold weather to allow the radiated heat to escape at the top of the case. At the top of the hot-air conductor are two dampers, *n n*, which, when closed, retain the heated air in the oven, and when opened allow the heat to escape in the room.

p is a partition in the hot-air conductor from front to back of case, thereby separating the hot air into two separate columns. R is the outer case, made of wood and sheet-iron. Common glass is used in the doors S and windows T. The shields and heads are sheet-iron, and all that portion of the wood exposed on the inside is lined with tin.

The furnace A being provided with a draft-register, *e*, on the front, level with the bottom

plate used for wood, admits air at the proper point for perfect combustion. In the damper *e* is a center hole, *x*, for the insertion of a poker to stir the fire.

The pipe *a* being perforated admits a draft of heated air, insuring the combustion of gases in the flue B; and the pipe *b* being also perforated answers the same purpose to promote combustion in the return-flue C. The damper D in the flue B is hung in the center, thereby giving a free and easy movement to the same. The wing *v* in the return-flue C is placed in the center, between the pipes *b* & *d*, thereby protecting said wing from the direct action of the fire. The connecting-flue B is provided with a movable top, fastened with screws, so that by removing said top this flue, as well as the return-flue C, can easily be cleaned out. The flue B also receives the soot and ashes from the main flue E. The cooking-plate H is cast in two pieces, connected by a lap-joint at *t*, and intended to be fastened together by screws through elongated holes, thereby allowing for expansion and contraction, and obviating the liability to warp or crack.

The hot-air conductor L is made wide at the bottom, and allows the hot air to pass more readily up into the ovens from below. The folding oven-bottoms M being hinged to the sides of the conductor admits of the apparatus being quickly changed from a baker to a drier by closing the bottoms M and removing the doors N. The entire inside space except that occupied by the hot-air conductor is thus converted into a fruit or clothes drier.

The bottoms M may be used one at a time, one for baking and the other closed. One or more trays, O, may be used in each oven.

The fresh or cold air is admitted at the bottom and regulated by the damper K. This air passes around the furnace, connecting-flue, and return-flue to the cooking-plate H, and thence up through the hot-air conductor L.

By the flue-pipe E passing up through the hot-air conductor all the heat thrown off by said pipe is utilized, and, by means of the various dampers, the heat can be regulated just as required.

This furnace may be placed anywhere in a room, and, unless desired, hardly any heat whatever will escape into the room.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of the furnace A, connecting-flue B, with damper D, the return-flue C, with central wing *C'*, the pipe *d*, and perforated pipes *a* & *b*, substantially as and for the purposes herein set forth.

2. The hot-air conductor L, provided with the hinged plates M, for the purposes specified.

3. The combination of the hot-air conductor with the flue E, passing through the same, the damper P on the flue E, the pipe *k*, and dampers *m* & *n*, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 30th day of July, 1878.

ERASTUS W. BLAIR.
CHARLES W. BLAIR.

Witnesses:

CHARLES A. OZIAS,
G. C. DASHER.