T. E. COLES.

Hot-Air Furnace.

No. 85,564. Patented Jan. 5, 1869.

Fig. 1.

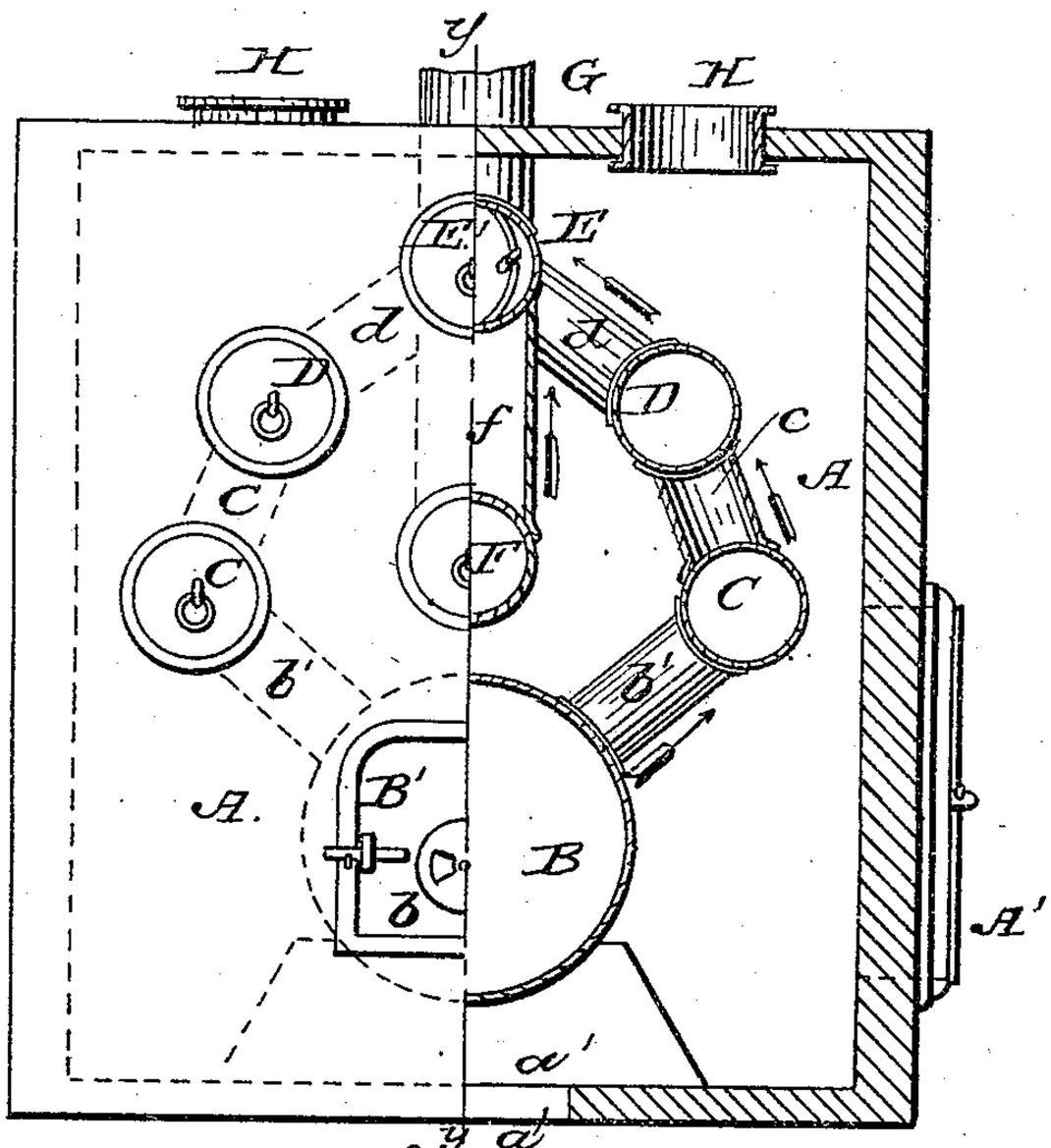

Fig. 2.

Witnesses

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THEODORE E. COLES, OF TROY, OHIO.

Letters Patent No. 85,564, *dated January* 5, 1869.

IMPROVEMENT IN HOT-AIR FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, THEODORE E. COLES, of Troy, in the county of Miami, and in the State of Ohio, have invented new and useful Improvements in Heating-Furnaces; and I do hereby that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view of my improved warm-air furnace, half in front elevation, and half in section, at the line *x x* of fig. 2, and

Figure 2, a vertical longitudinal section of the same, at the line *y² y* of fig. 1.

The object of my invention is to provide a convenient furnace for heating buildings, apartments, &c., by means of warm air, which shall be simple and economical in its construction, and present a large amount of heating-surface within a comparatively small space, as well as utilize, in an increased degree, the calorific power of the fuel; to which ends,

My improvements consist in a series of horizontal heating-pipes, arranged within a suitable chamber, and connected with a fire-chamber at the lower part thereof, in such manner that after an ascending draught has been maintained, and the products of combustion reached the upper pipe of the series, their direction may be changed, and they caused to pass downwards and through other pipes, for the purpose of fully utilizing their calorific power before they are allowed to escape into the chimney.

In the accompanying drawings, which show a convenient arrangement of parts for carrying out the objects of my invention, my furnace is represented as adapted to the use of wood fuel, but by substituting a vertical fire-chamber, provided with a suitable grate, for the horizontal one shown, mineral fuel can be burned with equal facility.

A represents a chamber, of brick, in which the furnace is set, the air to be heated being admitted through an opening, *a*, in its bottom, and access to its interior afforded by a door, A′, at one side.

B represents the fire-chamber, which is a cylinder of sheet-metal, of suitable thickness, elevated a short distance above the bottom of the chamber A, upon a bridge or support, *a′*, so as to radiate the heat in all directions, and provided with a door, B′, for the introduction of the fuel, to which is attached a register, *b*, for regulating the supply of air thereto.

The fire-chamber B communicates, through the connections *b′* near its rear end, with the horizontal heating-pipes C C, which extend longitudinally through the chamber A, passing through its front wall.

These pipes communicate, through the connections C, with similar pipes D D arranged above them, and these, in turn, by means of the connections *d*, with a pipe, E, which is the most elevated of the series, and to which the chimney G is attached.

Below the pipe E is placed a similar pipe, F, which communicates with E, through the connections *e* and *f*.

A throttle-valve, E^1, is placed in the pipe E, between the connection *d* and chimney G, and is operated by a rod, E^2, extending to the outside of the chamber A, in such manner as to close at pleasure the direct communication between the two.

Any number of conducting-pipes, H, may be attached to the chamber A, for the purpose of conveying the heated air to the rooms to be warmed.

The operation of my furnace is as follows:

Fire being made in the chamber B, the escaping smoke and gases pass through the connections *b′* into the pipes C C, thence through the connections *c*, into the pipes D D, and thence through the connections *d*, into the pipe E, from which, when the damper E^1 is open, they pass directly into the chimney G. After the fuel is thoroughly ignited, it becomes desirable to obtain from it the best possible calorific effect, and to this end the damper E^1 is turned, by means of its rod, E^2, into the position shown in fig. 2, when the products of combustion, having no other outlet, pass downwards through the connection *e*, into the pipe F, thence upward, through the connection *f*, into the pipe E, on the opposite side of the damper, and escape into the chimney G.

The arrows in the figures show the direction of the currents.

The heating-pipes are furnished with caps or covers *c′ d′ e′ f′*, by removing which they can be readily cleaned, and as the connections stand at a comparatively slight angle, there is no tendency of dust or soot to accumulate within them.

An additional pipe may be connected to F if thought proper, for the purpose of increasing heating-surface.

From the construction of my furnace it will be seen that it presents within a small compass a large amount of surface for the radiation of heat, and the ability to establish a downward draught at pleasure increases its calorific effect and economizes fuel.

Having thus fully described my invention,

What I claim therein as new, and desire to secure by Letters Patent, is—

1. The horizontal heating-pipes C C, D D, and E, in combination with the connections *b′ c d*, and fire-chamber B, the whole arranged and operating substantially as and for the purpose described.

2. The heating-pipe F and connections *e f*, in combination with the pipe E, damper E^1, connection *d*, and chimney G, as set forth.

3. A warm-air furnace, in which a downward draught is imparted to the products of combustion after they have reached the uppermost heating pipe, by means of the pipe F, connections *e* and *f*, pipe E, and damper E^1, substantially as described.

The above specification signed by me, this 27th day of October, 1868.

THEODORE E. COLES.

Witnesses:

DAVIS BAIRD,

R. H. PARSONS.