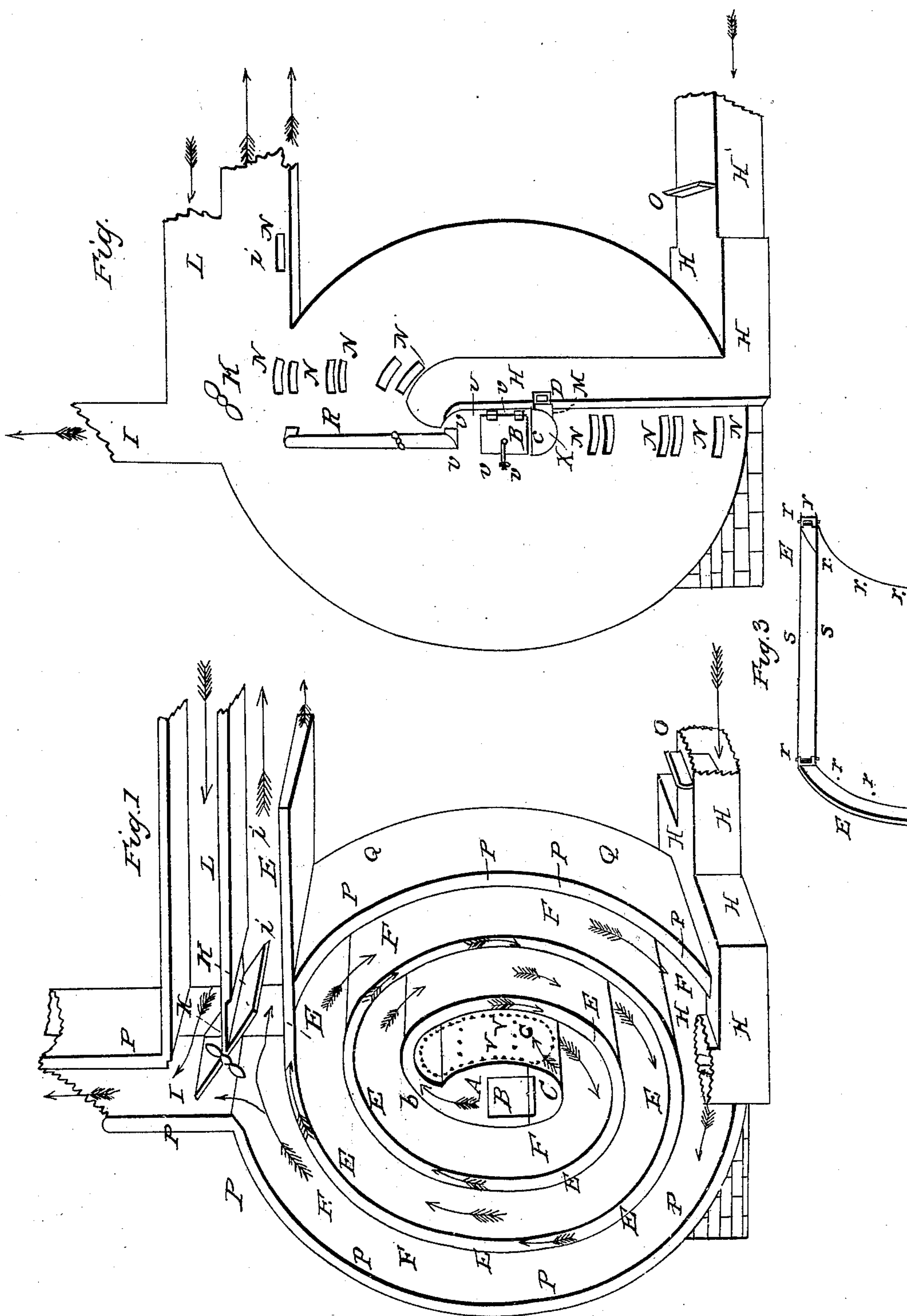


O. TIFFANY.  
Hot Air Furnace.

No. 6,205.

Patented March 20, 1849.





# UNITED STATES PATENT OFFICE.

OLIVER TIFFANY, OF NEW YORK, N. Y.

## AIR-HEATING FURNACE.

Specification of Letters Patent No. 6,205, dated March 20, 1849.

*To all whom it may concern:*

Be it known that I, OLIVER TIFFANY, of New York city, New York, have invented new and useful Improvements in Air-Heating Furnaces, of which the following is a specification.

Figure 1 is a perspective view of the apparatus, the front of it being removed so that the structure of the interior may be seen. Fig. 2 is a front view of the front face of the apparatus. Fig. 3 is a section of the stove's smoke pipe.

Fig. 1: A, the front end of the stove. It may as well be of other forms as the one here represented. B, the door. C, the ash pan: through this plate is the draught hole for the air for combustion. Through the whole length of the top of the stove extends the escape hole for the smoke &c. from the margin of which projects a collar of some inches high, lettered *b*, upon which the smoke pipe, E, is fitted, as at *e*. The width of the pipe therefore is the same as the length of the stove, and its short diameter the same as that of the collar *b* at *e*, which is only one to two inches. This broad thin flat pipe is bent so as to wrap around the stove, keeping at some distance from it; and it may be carried around more times, preserving the distance between it after gyrations that its first has from the stove, and then passes off to the chimney flue as its course is represented by the letters E, from the stove in the directions of the arrows. F, a gyral space formed by the revolutions of the pipe E, in which the atmospheric air is to be heated. This space becomes completed into a chamber by what forms the front and rear end walls of the apparatus and by the lateral wall, Q, the edge or thickness of which is seen at P. These walls may be made of brick, or of iron covered with a non conducting coat of wood-ashes clay or charcial which should be packed between the iron and an outside case of tin or brass with a burnished non radiating surface, rather than one of iron. (G, the place, as bounded by the dotted line, at which the atmospheric air enters the heating chamber, F,) between the stove and the first turn of its smoke pipe, from the supplying trunk, H, Figs. 2 and 1. The supplying trunk descending from the place G to a distance as far below the level of the bottom of

the air chamber as it can be conveniently sunk, passes out of doors and ends there at any elevation and in any shape most eligible. I, *i*, the tubes which receive the warmed air at its exit from the heating chamber. K, a valve which gives it direction into the tube I for the rooms, or *i* for discharge elsewhere, or partially into each. The valve when turned so far down as to shut off part of the warmed air from the tube I and direct it through *i*, opens the cool-air tube L which comes from without doors to a communication with the tube I so that cool air will flow in with and reduce the temperature of that going to the rooms, and by which a ventilation of the rooms above may be continued in warm weather whenever the valve may be turned quite down. The directions of the arrows show the directions of the currents. O, a sliding valve in the supplying trunk to diminish or stop altogether the flow of air into the apparatus. V, V, V, horizontal rows of holes through the sides of the stove through which to supply oxygenic air from the atmospheric chamber, for the combustion of the unburnt gases rising from the fuel. Each row of these spiracles has a damper with holes corresponding to them, which is moved to open and close the spiracles by its handle which passes through the front wall of the apparatus. The rows are thus arranged because the oxygenic air must be presented to the gases at or near the surface of the fuel; and therefore when the fuel settles down during burning, an upper row may be closed and a lower one opened. In a cylindrical vertical furnace the damper is a hoop, turned by an arm or lever of it so as to bring its holes in opposition to those through the stove, or the solid interspaces to close them.

Fig. 2: B, the door. It is of the same thickness as that of the front wall of the apparatus, to which it may be hung and into which it shuts. Its inner face is iron, its outer one iron tin or brass, between which it should be filled in with ashes or charcoal. It makes one unnecessary to the stove itself. C, the front plate of the ash pan; it is on the same plane with the surface of the wall of the apparatus. Between this plate and the inner one, C, Fig. 1, there is a distance equal to the thickness of the front wall into which lobby the air for the combustion



passes through the pipe M, from the supplying trunk. This plate has a door, X, shutting accurately, which is opened to supply the fire with air after it has been kindled and become active by the blast through M from H, at the times when it may be required to stop its influx that way by means of the slide D. L, i, I, mark the places of the air tubes lettered the same in Figure 1. N, plugs fitting into holes through which the ashes and dust are cleaned out from the smoke-pipe and air-chamber. K, the lever of the valve K, Fig. 1. To facilitate the kindling a fire, a direct route for the draught from the stove to the chimney flue may be made by the pipe R coming from the stove and ending in the smoke pipe E (Fig. 1) at where it goes off to the chimney. The pipe has a throttle valve to close it when the fire shall have become active and the hot furnace gases are to be directed through the main pipe, E.

The back end of the apparatus is like the front excepting that it does not require the door as at B, nor the lever of the valve K, nor the holes as at N, nor the damper handles as at V V V.

Fig. 3: Of several ways to construct the pipe the following are two: 1st. A set of thin iron plates, E, are cast, of such patterns that when placed end to end with each other in their proper order, their face describes the curves of the pipe, as seen for instance at the letters E, Fig. 1. Their width gives the short diameter, and their curves the curves of the pipe. The edges of the two sheets of iron, s, which sheets form the two sides of the pipe, lie upon the edges of the castings, projecting a little over, or beyond them, and they are fastened by nails or rivets that pass through them and through ears or short flanges of the castings as represented at r. An iron or aluminous lute is applied all around to the joinings to prevent leaking. 2nd. When the ends are built of brick: After the builder has placed the stove at its site, where it is supported upon the end of a shaft passed into it through its door,—then to affix the two sheets of the pipe to the collar of the stove and wind them around in the curves the pipe is to have, the sheets being kept apart temporarily by blocks that will give the short diameter of the pipe, and the revolutions of the pipe being kept at a distance from the stove and from each other by studs of the length of the desired diameter of the heating chamber; then to commence the brick work at the foundation and as it is carried up insert the masonry solidly a short distance in between the sheets of the pipe and into the air chamber between its revolutions—taking out the studs and blocks as the work proceeds upward.

The stove and its pipe E, and the air heat-

ing chamber, then, communicate with the outward atmosphere only at their lower and inner ends through the supplying trunk from below and out of doors (excepting when the stove does through the door of the ash pan)—and at their upper and outer ends, E through the chimney flue, and F through the tubes I with the rooms, kilns, &c., or i elsewhere. Therefore

Its operation is as follows. When heat is introduced into the stove, the air in it, and for some distance in its smoke pipe E, and in the heating chamber becomes immediately (through the quick heat-conducting property of the iron) somewhat rarefied. The heavier pressure of the air through the supplying trunk from below and out of doors overcoming the less resistance pressing down from above through the tubes I or i and from the chimney through E, it gravitates into the rarefied cavities and forces the warmed airs in them forward toward the less resisting points—through those upper outlets—with a force, the sum of which is a ratio of the height of the column from the lowest point of the supplying trunk to the top of the outlets, compounded with the degree of rarefaction of the heated airs relatively to the density of the outside atmospheric air—maintaining a current like a reversed action of the siphon, in a direction indicated by the direction of the arrows.

The laws of the pressure by gravitation, of fluids, liquid or gaseous, give the rationals of the motions.

Note 1. An oven and boilers may be used by deflecting the hot air from its course in its last revolution as that is marked in the drawing, around the oven and between the boilers on its way to the valve K, or by using it when discharged in a similar way to that by the tube i. The valve O being closed so far as to admit but little air, and by the slide D in the pipe M stopping any discharge of it that way, its slow progress through the heating chamber will cause it to acquire a high temperature. By opening the door of the ash-pan—the whole interior being hot—air enough for an active combustion will be furnished through it when the slide D is closed.

Note 2. Those who think there should be more humidity in a warmed room than the air outside contains, may place a pan of water in the air-heating chamber through one of the ports N, or in the supplying trunk.

What I claim is—

1. The manner in which I arrange the furnace, smoke pipe, and air heating spaces as herein set forth, that is to say,—I claim placing the furnace at, or near the center of the spiral flues and air spaces, the furnace being surrounded on all sides except the back and front as herein described.

2. I also claim the manner of arranging



the valve K in combination with the three flues I, J and L for the purposes of heating and ventilation as herein set forth.

In testimony of my claim to be the inventor of the pneumothermastic and ventilating apparatus as described in the foregoing specification and references in the an-

nexed drawings, I hereunto subscribe my name.

OLIVER TIFFANY.

In presence of—

W. R. BEEBE,

GEO. W. MORTON.