H. HOLCOMB.

Heating Furnace.

No. 202,439. Patented April 16, 1878.

Fig. 1

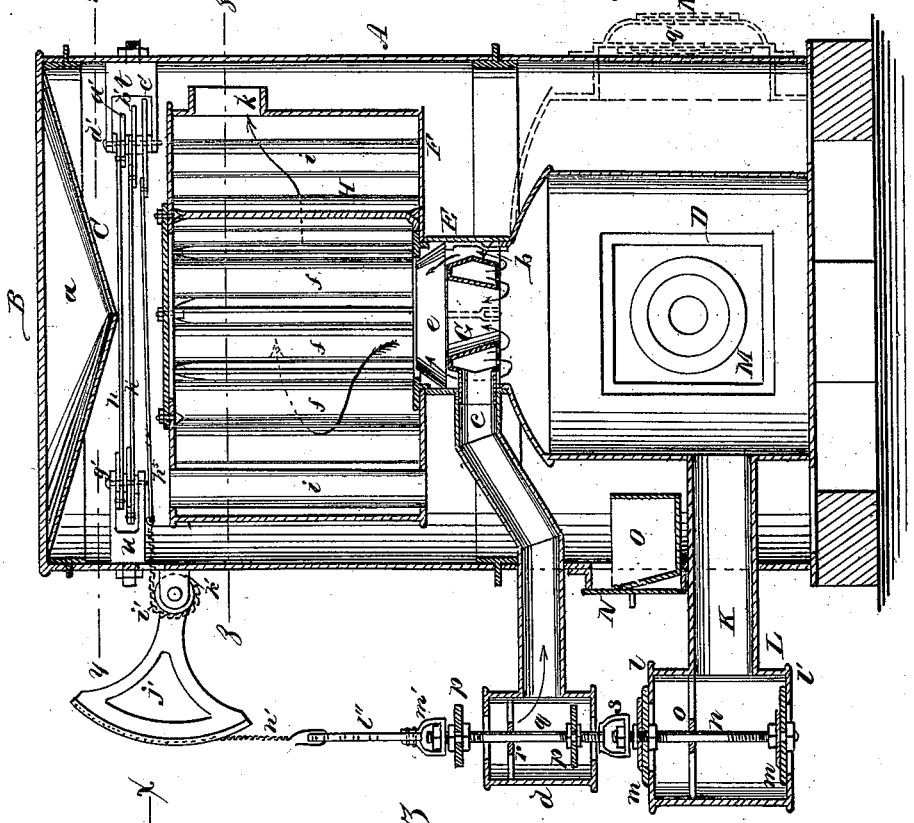


Fig. 2

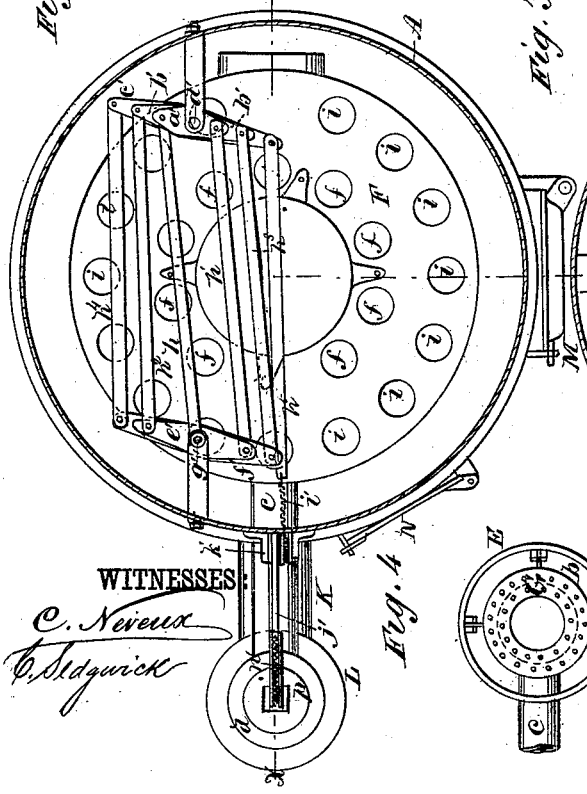


Fig. 3

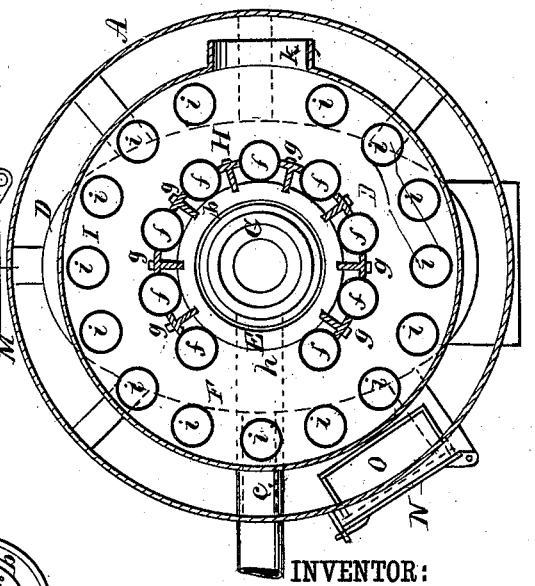
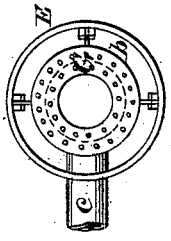


Fig. 4



WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

H. Holcomb

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY HOLCOMB, OF PAINESVILLE, OHIO.

IMPROVEMENT IN HEATING-FURNCAES.

Specification forming part of Letters Patent No. **202,439**, dated April 16, 1878; application filed January 11, 1878.

To all whom it may concern:

Be it known that I, HENRY HOLCOMB, of Painesville, county of Lake, and State of Ohio, have invented a new and Improved Heating-Furnace, of which the following is a specification:

Figure 1 is a vertical section taken on line *x x* in Fig. 2. Fig. 2 is a horizontal section taken on line *y y* in Fig. 1. Fig. 3 is a horizontal section taken on line *z z* in Fig. 1. Fig. 4 is an inverted plan view of the annular gas-burner.

Similar letters of reference indicate corresponding parts.

The present invention relates to that class of hot-air furnaces which are provided with automatic means for regulating the admission of cold air into the fire-chamber.

The invention consists in the construction and combination of parts, which will be hereinafter more fully described, and then specifically set forth in the claims.

Referring to the drawing, A is the casing of the furnace, which in the present case is cylindrical in form. It is provided with the cap B, to the under surface of which the conical lining C is attached, inclosing the air-space *a*.

In the lower portion of the casing A there is a combustion-chamber, D, which is elliptical in plan and has vertical sides. In the top of this chamber there is a short circular flue, E, which communicates with the drum F, which it also supports. In the flue E there is a hollow ring, G, whose aperture is conical, being largest at the top. This ring is supported centrally in the flue E, leaving around it the space *b*, and it is provided with the air-supply pipe *c*, which extends outward through the casing A, and is connected with the valve-casing *d*. The ring G is perforated in its under side, and above it in the flue E a cone, *e*, is placed, which concentrates the flame, and thoroughly mixes the air entering through the perforations of the ring with the gas evolved from the burning fuel.

The flues in the drum F are arranged in two series, one series, H, composed of flues *f*, surrounding the flue E, and connected together by the webs *g*. A space, *h*, is left in the series H for the escape of the products of combustion to the space between the series H and the series I. The series I is composed of flues *i*, which are placed near the wall of the drum F, and in this series there is a space, *j*, for the escape of the products of combustion to the flue *k*, which leads to the chimney.

The combustion-chamber D is provided with an air-supply pipe, K, that is connected with the valve-casing L, which is placed axially in line with the casing *d*. This air-supply pipe in coal-furnaces will enter the chamber underneath the grate. The upper and lower heads *l l'* of the casing L are apertured, and upon the upper surface of each head a valve, *m*, is placed. These valves are connected together by a rod, *n*, which passes through a guide-bar, *o*, in the casing L. The heads of the valve-casing *d* are also apertured, the apertures being covered by valves *p*, which are connected by the rod *q*, which passes through a guide-bar, *r*, in the casing *d*. These rods *n q* are connected together by a stirrup, *s*, which is movable, within certain limits, upon the lower rod *n*, to admit of moving the valves *p* a small distance, while the valves *m* remain unmoved.

Above the drum F there are two forked lever-supports, *t u*, which are secured to opposite sides of the casing A. In the support *t* three levers, *a' b' c'*, are fulcrumed on the pivot *d'*, and in the support *u* two levers, *e' f'*, are fulcrumed on the pivot *g'*. A strip, *h*, of brass or other expansible metal is apertured to receive the pivot *g'* in the support *u*, and is pivoted to one end of the lever *a'*. To the opposite end of the lever *a'* an expansion-strip, h^1, is pivoted, which is also pivoted to one end of the lever *e'*. To the opposite end of the lever *e'* an expansion-strip, h^2, is pivoted, which is also pivoted to the lever *b'*. In like manner the opposite end of the lever *b* is connected, by the expansion-strip h^3, with the lever *f'*, which lever is connected with the lever *c'* by the expansion-strip h^4. The end of the lever *c'* opposite that to which the strip h^4 is attached is connected, by the expansion-strip h^5 and chain *i'*, with a sector-lever, *j'*, which is pivoted in a support, *k'*, projecting from the casing A. The chain *i'* is wound partly around the bars of the sector-lever *j'*, so that when the expansion-strips which connect the several levers, as already described, expand or contract, the sector-lever will be moved.

A perforated strip, l'', is attached to the rod q by means of a stirrup, m', and a chain, n', which is attached to the upper end of the curved surface of the sector-lever, hooks into one or the other of the apertures in the strip l'', so that the adjustment of the valves may be altered to suit the temperature to be maintained.

It will be observed that the movement of the chain is equal to the total of the motion of all of the expansion-strips, so that the sector-lever is moved by a slight variation of the temperature in the casing A.

The contraction of the strips raises the sector-lever, and opens first the valves p, so as to admit air to the flue E, and thus insure the perfect combustion of the gas evolved from the burning fuel.

Should the temperature in the casing A continue to fall, the contraction of the brass strips raises the valves m and admits air to the combustion-chamber through the tube K. An increase in temperature expands the brass strips, and permits the valves to drop to their seats and exclude air from the furnace.

The combustion-chamber D is provided with a double door, M, which incloses an air-space, q', that prevents the radiation of heat through the door. Both walls of the door are apertured and provided with a mica covering, which admits of looking into the fire without opening the door.

In one side of the casing A there is a door, N, in which is placed a vessel, O, for containing water to render the air heated by the furnace humid.

I am aware that a hollow air-distributing ring has been located in the combustion-chamber of a furnace above the level of the fuel-bed for the purpose of supplying the necessary air for the combustion of gases.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a hot-air furnace, the double walled or jacketed air-distributing ring G, having a central opening for the passage of the gases of combustion, bottom air-discharge openings, and a surrounding space, in communication with the combustion and air-heating chambers, the flue E, surrounding the air-distributer, and the superposed ring e, in combination with the combustion-chamber D, heating-drum F, and air-inlet pipe, as and for the purpose set forth.

2. The air-inlet casing L, having apertured end heads l l', valves m, and valve-rod n, and the upper air-inlet casing d, having apertured ends, valves p, valve-rod q, and swivel or slide connection s with the lower valve-rod, in combination with the combustion-chamber D and air-supplying pipes K c, as and for the purpose set forth.

3. The combination of the levers a' b' c' e' f and the expansion-strips h^1 h^2 h^3 h^4 h^5 with the brackets or supports t u, the casing A, the chain i', and a valve mechanism for supplying air to the furnace, as and for the purpose set forth.

HENRY HOLCOMB.

Witnesses:
L. STERLING,
L. E. TUTTLE.