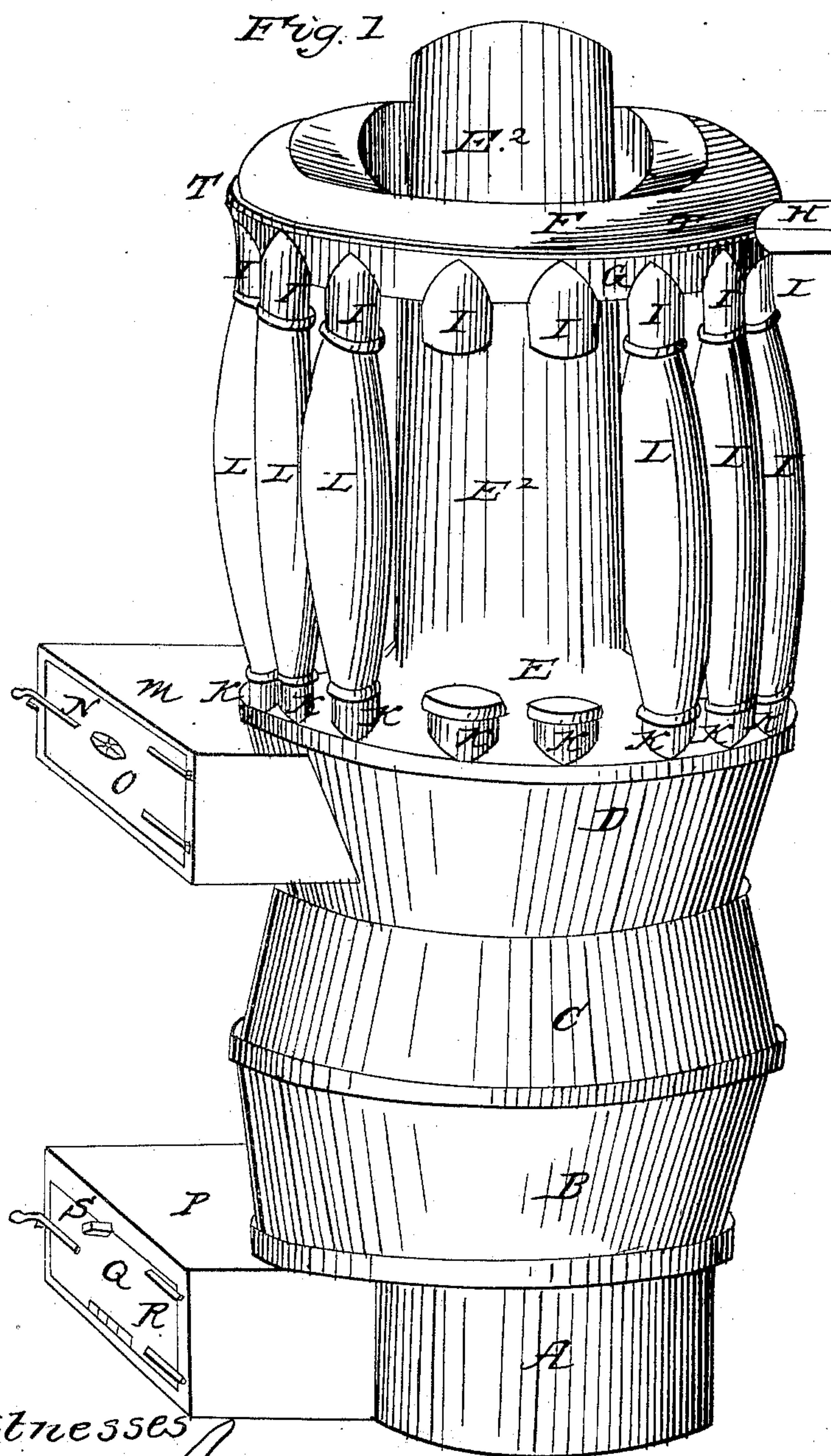


J. CARTON.
Hot Air Furnace.

2 Sheets—Sheet 1.

No. 35,216.

Patented May 13, 1862.



Witnesses
M. M. Lons
Benj. D. French

Inventor
John Carton

UNITED STATES PATENT OFFICE.

JOHN CARTON, OF UTICA, NEW YORK.

IMPROVEMENT IN HEATERS.

Specification forming part of Letters Patent No. 35,216, dated May 13, 1862.

To all whom it may concern:

Be it known that I, JOHN CARTON, of the city of Utica, in the county of Oneida and State of New York, have invented a new and Improved Hot-Air Furnace for Heating Dwellings, Public Buildings, and other Places; and I hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 of said drawings is a perspective view of the said hot-air furnace, some of the radiating-flues L L L being left out to show the dome-like cover E of the feed-section and its extension into the column E². Fig. 2 is a sectional view of the furnace, cutting through the center of the same in the line of the shaft of the grate. Fig. 3 is a perspective view of one of the radiating-flues. Fig. 4 is a sectional view of the lower and larger end of the radiating-flues. Fig. 5 is a sectional view of the smaller or upper end of the radiating-flues. Fig. 6 is a sectional view of the form of the center of the radiating-flues and of the diameters compared with the diameters of the ends of the same. Fig. 7 gives a sectional view of a part of the upper ring, F and G, Figs. 1 and 2, and the manner in which the openings from the radiating-flues into said ring are brought together at the top, so that there may be no place between any of the openings from the ring into the flues for soot, ashes, or dust to settle or rest upon in the said ring.

A is the ash-pit, and B the lower of the rings, which together form the fire-pot. C is the upper one of said rings. D is the feed-section; E, the dome-like cover of the feed-section and fire-pot, which terminates in a high column or cone, E². F and G form the hollow ring into which all the radiating-flues lead and through which the escape smoke and gases pass from the fire to the smoke-pipe, the collar of which smoke-pipe is H. I I I, &c., are the upper collars of the radiating-flues, connecting them with the upper ring, F and G, and K K K, &c., are the collars of said radiating-flues, connecting said flues with the outer edge or border of the dome E. L L L, &c., are the radiating-flues leading from the fire to the upper ring. M is the mouth of the feed-section, N the door thereof, and O a damper therein. P is the mouth of the ash-pit. Q is the door thereof. R is the damper

therein, and S the grate-shaft. I² I², Fig. 7, is the enlarged end and opening of the collars J J, &c., into the ring F G. T T are the flanges for fastening the two parts of the ring F and G together. U U U U, &c., represent the mode of uniting the several joints of the different parts of the furnace, as seen in Fig. 2.

The whole furnace, which is to be inclosed in brick-work in the usual way, or in a casing of metal when used as a portable furnace, may be of cast-iron, or the radiating-flues L L L, &c., may be of sheet metal.

The ash-pit presents no peculiarities.

The fire-pot is formed of two rings tapering in form, the widest ends of each being placed together facing one another, and the narrower ends being one above and one below, as seen in Figs. 1 and 2.

The feed-section is of the like form as either of the two parts of the fire-pot, and is placed upon the top of the fire-pot with the broadest end up. The mouth of the feed-section is in the usual form.

The feed-section is covered by the dome E and the hollow column E² and its cap, which cap may be round, as seen in Figs. 1 and 2, or it may gradually terminate in a point. E covers about one-third of the space all around on the outside, and E² and its cap the remaining central one-third part. E curves very gradually from the outer edge toward the center, as seen in Figs. 1 and 2, and E² rises almost perpendicularly and passes through and above the ring F and G.

On the upper side of the dome E and surrounding its entire outer edge are the collars K K K, &c., which open directly upon the fire below. The whole of the said dome E and column E² and the collars K K K, &c., are cast in one piece. The ring F and G is cast in two parts. The upper part of the ring, F, is a plain hollow half-ring, which, when united with the lower part, G, forms a hollow ring, as seen in Fig. 2. It has shoulders on its under side to form a joint with the under half, G, and flanges T T, to enable it to be attached to the lower half, G, and the one half of the smoke-pipe collar H. The lower half, G, of said ring is of the same form and has the other half of the smoke-pipe collars and corresponding shoulders and flanges for fitting and fastening the same to the upper half, F. On the lower side of this part of the ring are the col-

lars I I I, &c., corresponding in number and position with those below them on the dome E K K K, &c. The diameters of the collars J J J, &c., are about one-fourth less than the diameters of the corresponding collars, K K K, &c. Said collars I I I, &c., enlarge and open laterally as they ascend into the ring until the adjacent ones approach so close together that there is nothing but an edge between such adjacent openings, as seen in Fig. 7, where I² I² exhibit the form of the openings laterally with no space but a mere edge or line between the openings in the bottom of the ring, while such openings are also as broad as the inside width of the ring, by means of which arrangement and form no soot, dust, or ashes can lodge or rest in the said ring; but if anything should so lodge there it can be readily removed by passing a brush through the smoke-pipe collar H or by rapping upon the said ring.

The form of the ends of the radiating-flues L L is circular, as seen in Figs. 4 and 5, the upper ends being about one-fourth less in diameter than lower ends, and they enlarge gradually toward the center, where they become about twice the size of the lower and larger end, and the circular form of the ends gradually changes to an oval in the center, as seen in Figs. 3 and 6. The purpose of diminishing the upper end of the flues and of enlarging the center thereof is to retard in a measure the upward tendency of the smoke and gases and accompanying heat, and by changing the form from circular to oval I am enabled to present at the same time the largest possible heating-surface. In an ordinary-sized furnace the number of radiating-flues should be about fifteen. The greatest diameter of the center of the flues should be in the direction of the radii of the dome, and they should be of such size in all respect, compared with the size of the furnace as will leave room for a free passage of air between them, and also between them and the column E².

No part of the furnace is riveted together or bolted except the upper ring, F and G, where the heat cannot seriously affect the different parts; but all the other joints, as seen in Fig. 2, are sand-joints, with proper sockets and shoulders and flanges, as is also seen in said Fig. 2, to make tight air and gas joints, and at the same to allow sufficient play to the several parts, as they are variously affected by the changing temperature. All the joints are so formed as to present no uneven or irregular surface or projection on the inner side of the furnace where soot, ashes, or other matter might lodge.

The chief advantages of this form of hot-air furnace over others are:

First. By forming the fire-pot in two equal or nearly equal parts, substantially as described, it entirely obviates the liability of the pot to break by its expansion and contraction during the progress of heating and cooling, as it allows the pot to expand at the

very point where the greatest expansion is always required under a great heat—that is, at the center of the pot, or where the greatest heat usually is—and hence, also, it does away with the necessity of the ribs, flanges, rings, and other contrivances which have been devised to prevent the breaking of the pots when subject to the usual heat of a furnace. The form described will answer the best; but I do not confine myself to making the rings of this form.

Second. By extending a central column, E², to a considerably higher point than has ever been done before freer play is given to the fire, and the gases are in a great measure consumed, while it adds much to the heating-surface.

Third. The large number and the peculiar form of the radiating-flues is also a principal feature in the improvement. They at once tend to depress or retard the too rapid escape of the smoke and gases and the accompanying heat by reason of the enlarged center and the diminished upper opening, and their number and size add greatly to the amount of heating-surface, while their proximity allows the spaces between them where they enter the upper ring to be reduced to an edge on which no dust, soot, or the like can lodge. The arrangement of the flues around the column E² in the manner described has a tendency to create an upper current of air between said flues and between the flues and the column E².

Fourth. By the arrangement of the joints the furnace or any separate part may be made to turn to any position without lifting or deranging it in any way when required to suit the chimney or draft or for any other purpose.

Fifth. The combination of the dome E, the column E², the radiating-flues L L L, &c., in the form described, and the upper ring present a much greater heating-surface than any other known form of furnace.

Sixth. The form of the furnace is the best adapted for maintaining a free circulation of air around and about every part of it, and none of it can be become lodged, and consequently overheated and vitiated.

Seventh. The form of the inside and the construction of the joints is such that no dust or ashes can lodge upon its inner surface, and thus impair its heating-power, while if anything should adhere it can be removed by a brush or other proper implement passed through the smoke-pipe collar or by rapping or striking on the furnace.

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

The fire-pot composed of the sections B and C, constructed and operating substantially as described.

JOHN CARTON.

Witnesses:

BENJ. F. FRENCH,
M. M. JONES.