Sheet 1-2, Sheets.

W. G. Wing.

Hot-Air Furnace.

No. 4,532. Patented May 23, 1846.

Fig. 2. Section

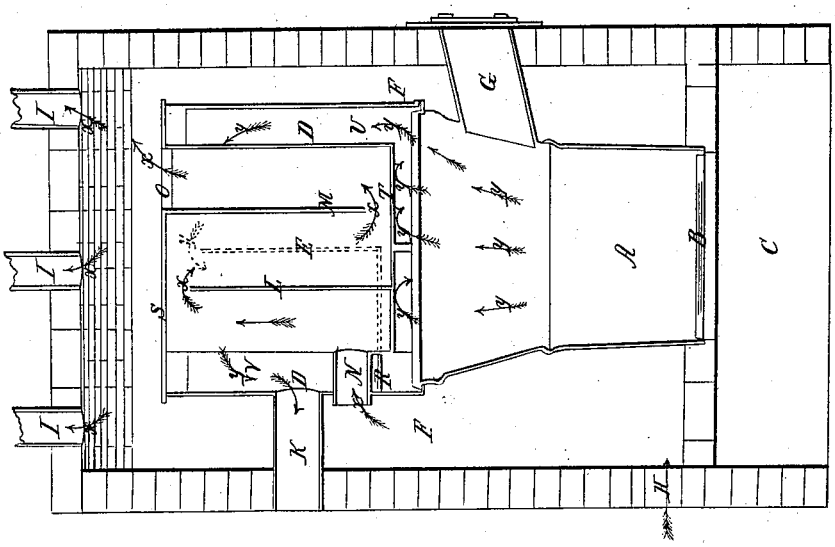
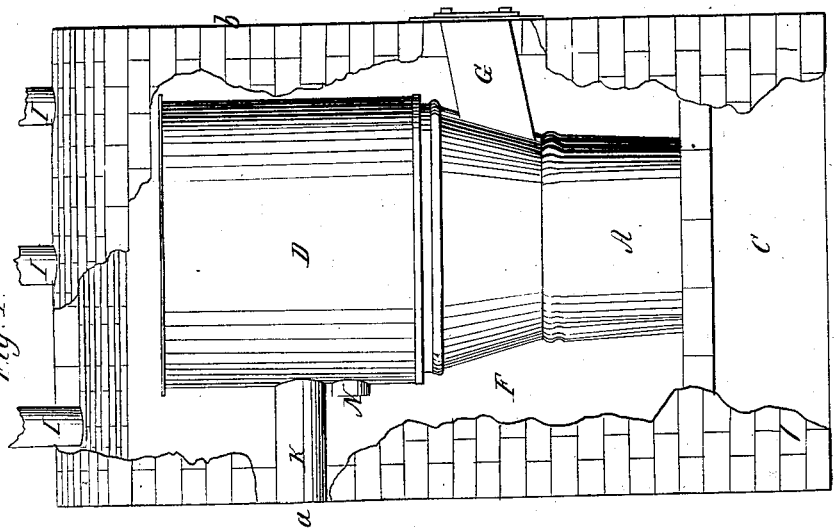


Fig. 1.



Sheet 2-2 Sheets.

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Fig. 4.

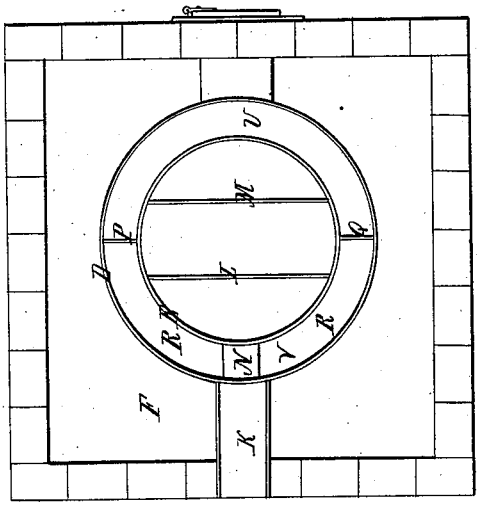
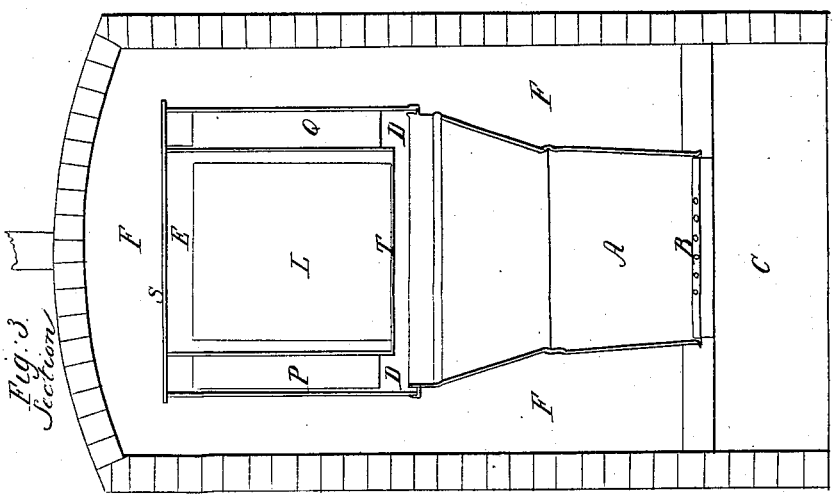


Fig. 3. Section



UNITED STATES PATENT OFFICE.

WM. G. WING, OF NEW BEDFORD, MASSACHUSETTS.

HOT-AIR FURNACE.

Specification of Letters Patent No. 4,532, dated May 23, 1846.

To all whom it may concern:

Be it known that I, WILLIAM G. WING, of New Bedford, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Hot-Air Furnaces for Warming the Apartments of Buildings; and I do hereby declare that the nature of the same is fully set forth and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

My said improvement is applicable only to such furnaces as are constructed with an internal air heating chamber which is placed directly over the chamber of combustion, and in such manner as to be exposed at its bottom to the direct action of the flame and heat, as they rise from the burning fuel.

The peculiar object of my improvement, is to produce a powerful current or rush of air downward and upon the top surface of that part of the bottom plate, of the inner air heating chamber, against which the flame and hot air from the fire pot immediately impinges, and by so doing heats said bottom plate in such manner as to soon seriously injure or destroy it. The current of air by striking upon the top of the plate abstracts so much of the heat as to prevent the fire from readily destroying the plate. I am thus enabled to use a very thin or sheet iron plate for the bottom of the air chamber, and by so doing to so rapidly impart heat to the air which passes through the inner air chamber as to effect a very great economy or saving of fuel.

My invention is represented in Figures 1, 2 3 and 4, of the aforementioned drawings. Fig. 1 is an external elevation of the fire pot, and the smoke chamber which surrounds the inner air heating chamber, the same being represented as placed within the outer air heating or brick chamber, whose side is denoted as being broken away, in order to exhibit the said parts within. Fig. 2 is a vertical central and longitudinal section and Fig. 3, a vertical central and transverse section of the aforesaid parts. Fig. 4 is a horizontal section of the smoke chamber and inner air chamber taken in a plane passing from *a* to *b* of Fig. 1.

A in the drawings denotes the fire pot or chamber of combustion, B the fire grate thereof C the ash pit D the smoke chamber placed over the fire pot, F the outer air heating chamber surrounding the whole, G the usual passage leading into the fire chamber for the purpose of supplying the fire pot with fuel. The positions of the several parts with respect to each other are as denoted in the drawings.

The cold air to be heated by contact with the external surfaces of the fire pot and smoke chambers enters the outer air chamber through one or more openings or passages H (see Fig. 2) and after circulating therein mixes with that proceeding from the inner air chamber, and escapes through one or more pipes I, I, I, leading from the top of the said chamber to the apartment or apartments to be warmed.

K denotes the pipe for the discharge of the smoke from the smoke chamber D.

The inner air chamber is divided by two vertical partitions L, M, which extend across it from side to side. The partition L extends upward from the bottom of the chamber E to within a short distance of its top as seen in Fig. 2. The other partition M extends downward from the top of the chamber E and terminates at a short distance from its bottom plate as seen in Fig. 2. A tube N passes through the smoke chamber and opens into the inner air chamber in the position and as seen in the drawings, the object of the said tube being to open a communication between the inner air chamber and the outer air chamber or the external atmosphere surrounding it. Whenever it may be desirable to introduce into the chamber E the air from the external atmosphere without first allowing it to pass into the chamber F the pipe N should be carried entirely through the brickwork of the chamber F. An opening O should be made through the top of the chamber E in the position as seen in Fig. 2.

Vertical partitions P, Q, are inserted in the smoke space D as seen in Figs. 3 and 4, each of the said partitions being joined at its lower end to one of the ends of a horizontal partition R placed as seen in Fig. 2, and extending across one half of the smoke space surrounding the inner air chamber. The partitions P and Q are not carried entirely up to the top plate S but terminate at a distance from it as seen in Fig. 3. The course of the smoke after it leaves the fuel in the fire pot is denoted in Fig. 2 by the arrows *y*, *y* &c. The arrows *x*, in Fig. 2 represent the course of the air into, through, and out of the inner air chamber.

The air enters the pipe N thence rushes upward and passes over the partition L thence it rushes downward through the space existing between the partitions L and M and impinges upon the top surface of the bottom plate T of the air chamber; thence it passes under the partition M, thence upward and escapes through the opening O. The flame and smoke from the fire place or pot as they rise meet the underside of the bottom plate and the partition R, thence they pass into the space U of the smoke chamber D thence over the partitions P and Q thence downward on the space V of the smoke chamber, and from thence through the discharge pipe K.

By inspection of Fig. 2 it will be observed that as the flame and smoke, after they leave the fuel, pass into the space U, they tend to heat that part of the lower plate T which is on the right of the partition L more than they do the remainder of it, or that on the left of said partition. Such part therefore, is that against which the current of air rushes when it passes down between the partitions L and M and underneath the partition M. By being brought or made to impinge perpendicularly or directly against the plate it absorbs the heat to a degree sufficient to counteract the burning power of the flame and prevent it from destroying the plate. Where an inner air chamber has been heretofore used the air has been introduced into it through its sides and somewhat above its bottom, and in such manner as to pass upward without impinging against the said bottom in such manner as to protect it from the heat or flame beneath.

I do not claim the combination of the inner hot air chamber with the smoke chamber (immediately surrounding it) and the outer hot air chamber immediately surrounding the said smoke chamber, but

That which I do claim is—

My aforesaid improvement or manner of causing the air to circulate through the inner air chamber for the purpose of protecting the bottom part or plate of the said air chamber from being too rapidly burnt out—and also for the purpose of causing the said air to absorb more heat than it would if allowed to circulate in an undivided chamber and escape at the top thereof; my said improvement consisting in the employment or arrangement of the partitions L, M and induction and eduction passages N, O, of the inner air chamber in such manner (as described) as to cause the air which is received into the inner air chamber to impinge in a current perpendicularly or directly upon the upper surface of that portion of the bottom plate, of the said air chamber, which is exposed to the direct action of the flame from the fire pot or furnace beneath it; the whole being substantially as set forth.

In testimony that the foregoing is a true description of my said invention or improvements I have hereto set my signature this fourth day of February in the year eighteen hundred and forty-six.

WILLIAM G. WING.

Witnesses:
SAMUEL WATSON,
THOMAS MANDELL.