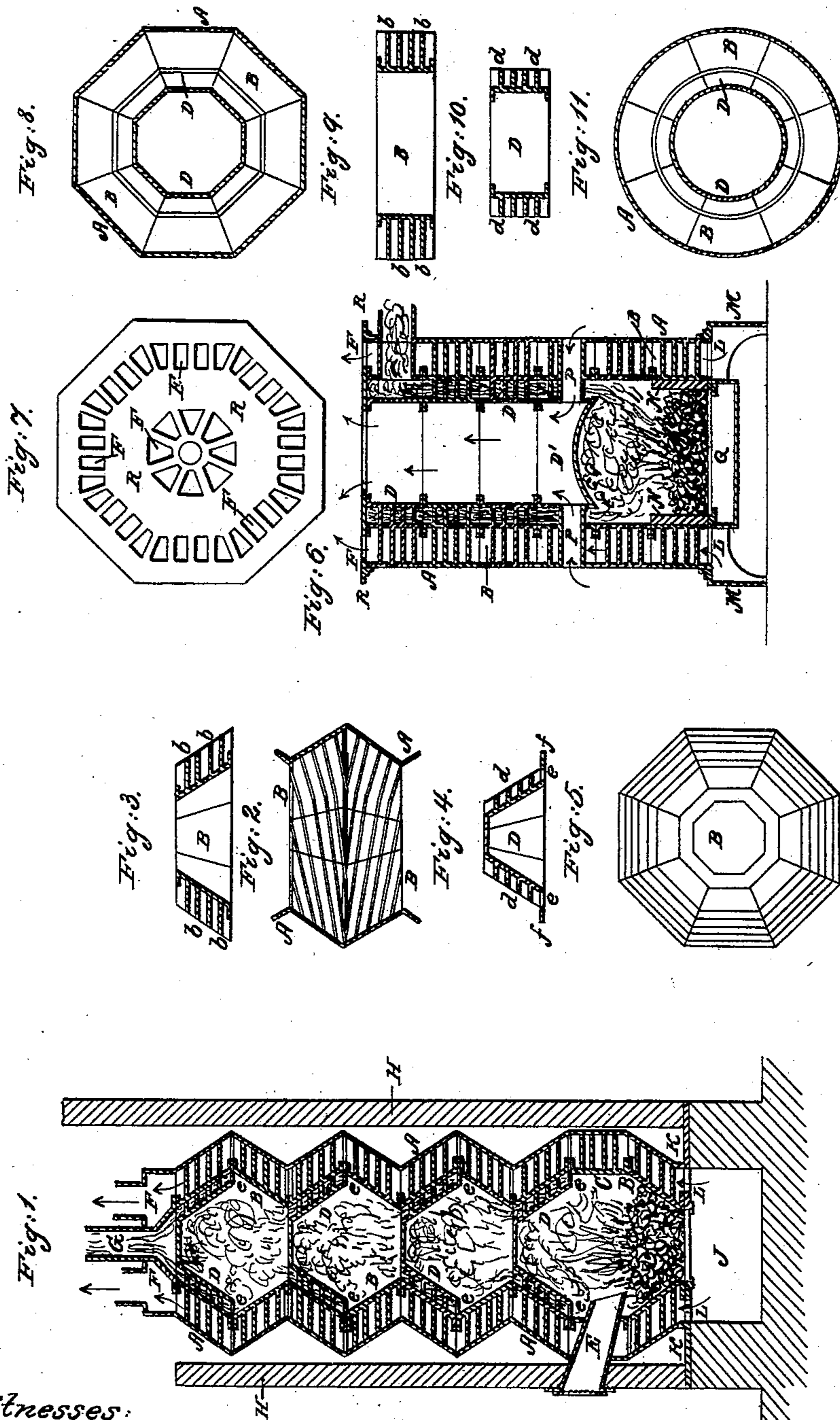


J. L. KITE.  
Hot Air Furnace.

No. 13,092.

Patented June 19, 1855.



Witnesses:  
Gerrit C. Hervey  
Harry Howson.

Inventor:  
John L. Kite.

# UNITED STATES PATENT OFFICE.

JOHN L. KITE, OF PHILADELPHIA, PENNSYLVANIA.

## HOT-AIR FURNACE.

Specification of Letters Patent No. 13,092, dated June 19, 1855.

*To all whom it may concern:*

Be it known that I, JOHN L. KITE, of the city of Philadelphia and State of Pennsylvania, have invented a new and Improved

5 Hot-Air Furnace; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

10 My invention consists in securing together, one above the other, a series of hollow metal cylinders or hollow frustums of cones or pyramids to the external surface of which, and projecting a convenient distance

15 therefrom, are cast a series of spiral or angular vanes the outside edges of the latter forming a figure similar to that of the hollow metal to which they are cast. Surrounding these vanes is a casing of plate

20 iron or other suitable material which is in shape similar to that presented by the outside edges of the vanes, which are in close contact with the said casing, so that the space between the metal cylinders or frustums of cones or pyramids and the outside

25 casing is intersected by the spiral vanes, which thereby form a circuitous passage for the air.

The fire acts on the inside of the hollow

30 castings, which together with the vanes become heated and the cold air below entering the spiral passages already referred to is discharged through the top at the high temperature imparted to it through contact

35 with the upper and lower surfaces of the vanes and the sides of the hollow castings. In the latter I arrange the vanes in such a manner that in each contiguous casting they may take a different direction, in other

40 words the vanes in one casting represent the threads of a right handed screw, and in the next those of a left handed screw, thus causing the air as it traverses the vanes to change its direction as frequently as possible and thereby have a tendency to receive

45 a greater amount of heat.

My invention further consists in placing at intervals within the above mentioned hollow castings, smaller castings of similar

50 shape but closed at the top. These have likewise spiral vanes on their exterior surface, the exterior edges of which are in contact with the first mentioned hollow castings so as to form another circuitous passage

55 for the products of combustion from the furnace, which impinging against the inside

and closed top of the interior castings are reverberated and pass into the spiral passages formed by the vanes and thence rise until they meet a second similar set of passages formed by another casting with vanes and so on until discharged into the chimney, the object of the whole being to impart as much heat to the vanes and to the air which passes between them as possible, with the consumption of a small amount of fuel.

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In order to enable others skilled in the art to make and use my invention I will now proceed to describe its construction and operation.

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On reference to the drawing Figure 1 is a sectional elevation of an improved hot air furnace constructed of a series of external and internal hollow octangular frustums of pyramids with vanes cast to their sides.

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Fig. 2 shows in elevation the direction which the said vanes assume in each contiguous casting. Fig. 3 is a detached sectional view of one of the external hollow castings. Fig. 4 the same of one of the internal castings. Fig. 5 a ground plan of the external hollow castings with the vanes cast thereto. Fig. 6 a sectional elevation of a hot air furnace or stove constructed of a series of octangular hollow prisms with

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Fig. 7 is a plan of the top grating for the same. Fig. 8 is a section through the middle of the furnace or stove. Fig. 9 a detached sectional view of one of the extended hollow prisms with its vanes. Fig. 10 the same of one of the internal prisms. Fig. 11 a sectional plan in which is shown the manner of using hollow cylindrical castings with vanes instead of octangular prisms.

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The same letters of reference allude to similar parts throughout the several views.

On reference to Fig. 1 A is the outside casing of plate iron or other suitable material, made so as to inclose and come in contact with the outside edges of the vanes

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on the castings B, one of which is shown detached and in section at Fig. 3. The vanes are cast onto and form a part of the castings B and are disposed on the surface of the latter as seen in Fig. 2, namely the vanes of each contiguous casting taking different directions as above mentioned, so that the space between the outside casing A and castings B is divided into a series of spiral passages which change their direction at the junction of each casting. The latter are se-

cured together one above the other by flanges or other suitable means. D, D, D, are likewise hollow pyramidal castings closed at the top and secured at the bottom by flanges to the castings B. These inner castings have likewise spiral vanes on their outside surface, which being in close contact with the inside of the former castings B form a circuitous passage for the products of combustion.

A detached sectional view of the inner castings D is seen in Fig. 4 where it will be observed that the flange *f*, which is secured between the flanges of the outer casting B has grated openings *e* for the free passage of the products of combustion from the fire below. The whole rests on the base plate K above the ash pit J and is inclosed in the brickwork H. The fire is placed in the lowest casting B' immediately above which is secured a second casting C, which for the greater facility of introducing the spout E for the coal, is made with its sides parallel representing a hollow octangular prism, all the other castings above being of the above mentioned pyramidal form. The products of combustion rising from the fire impinge against the inside of the casting D and being thence reverberated pass through the grated passages *e* in the flange *f* into the spiral passages formed by the vanes *d* on the said casting D, from whence they issue to meet with a second and similar casting and so on until discharged at the top into the chimney through the pipe G. By means of this circuitous passage of the products of combustion the full effect of the heat therefrom is communicated to the castings B and to their vanes *b* so that the cold air passing through the opening L in the base plate K into the spiral passages formed by the vanes of the castings B and the exterior casing A and continuing to ascend in a circuitous and zigzag direction has a corresponding amount of heat imparted to it and is discharged through the pipes F. Fig. 6 is a modified arrangement of my improved hot air furnace represented in section and intended as a substitute for ordinary stoves. In this instance the outside casing A as well as the external casting B and internal casting D have their sides parallel representing a series of octangular prisms instead of the pyramidal form shown in Fig. 1. The fire is contained in the pot N which rests on the base M and the products of combustion rise

therefrom and impinge against the concave bottom of the casting D' and are thence reverberated into the spiral passages formed by the vanes on the upper castings D, which vanes are in contact with the inside of the castings B, the said products of combustion continuing their circuitous passage until discharged through the pipe *b* into the chimney. The cold air entering the opening L in the base M ascends the spiral and zigzag passage formed by the vanes on the castings B (see Fig. 9) and the outside casing A, and is allowed to escape through the grated openings F in the cover R with the degree of heat imparted to it through its contact with the said vanes. An additional amount of heat is likewise obtained from this modified arrangement of my improved hot air furnace by allowing cold air to be admitted through the passages P into the space inside the castings D and discharged therefrom through the center openings in the cover R. (See Fig. 7.) If necessary this space inside the castings D may be likewise furnished with circuitous passages formed by additional vanes.

Although in the foregoing I have described the outside casing A as well as the castings B and D inclosed therein to be of an octangular form in their transverse sections, I wish it to be understood that I do not wish to confine myself exclusively to that shape, as the same may be made with any number of sides or of a perfectly circular form as shown in Fig. 11.

I am well aware that spiral flues and air passages have been commonly used in connection with hot air furnaces, which however have generally been made hitherto in the shape of pipes or by means of loose scraps introduced into the flues and passages. I therefore do not claim exclusively the use of spiral passages for hot air furnaces but

What I do claim and desire to secure by Letters Patent is—

The combination of castings B and D with their vanes and with the outside casing A constructed and operating in the manner herein shown for obtaining a great amount of heating surface at the expense of a small quantity of fuel.

JOHN L. KITE.

Witnesses:

GERARD C. KERSEY,  
HENRY HOWSON.