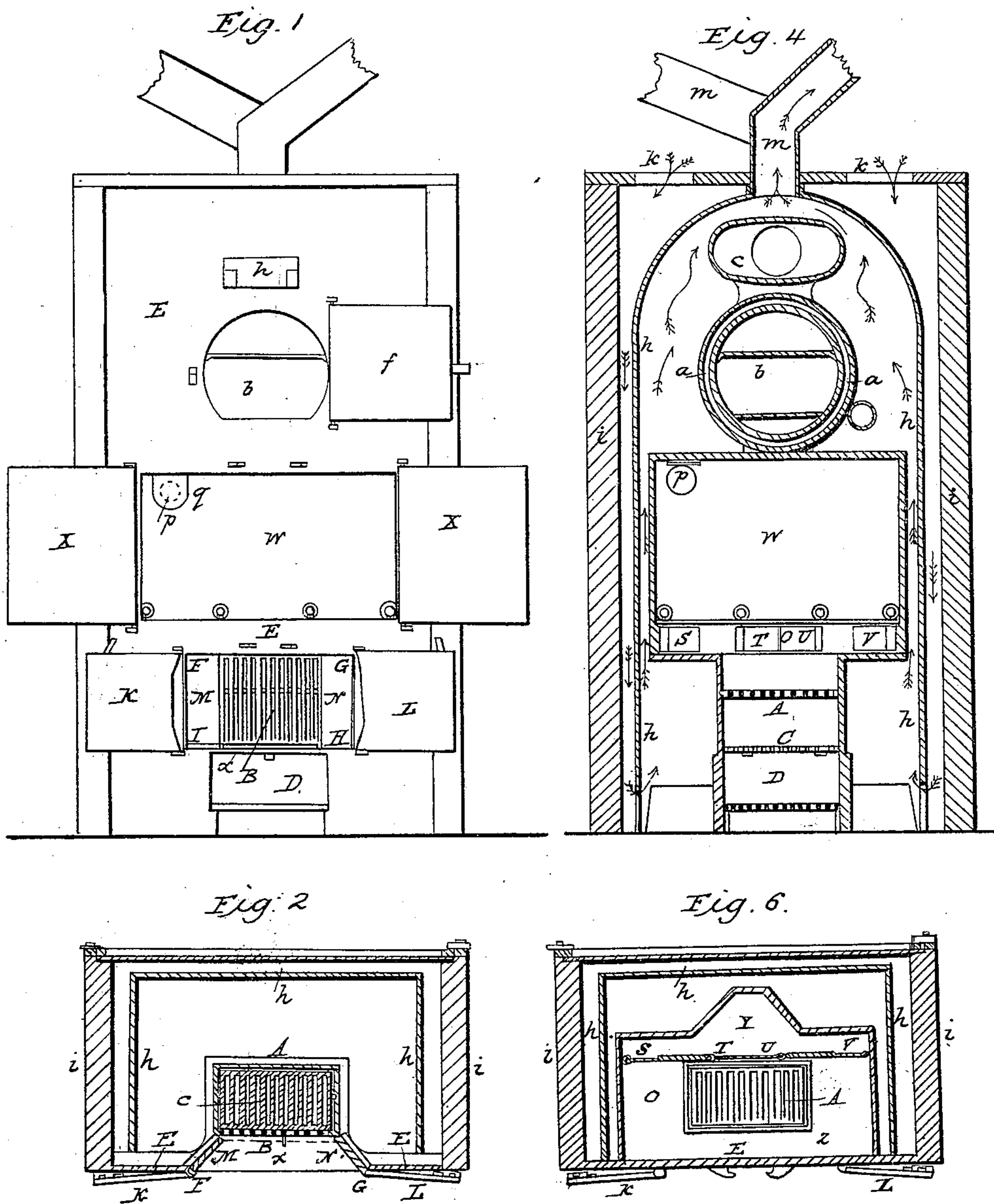


O. PACKARD.  
Hot Air Furnace.

No. 2,642.

Patented May 26, 1842.



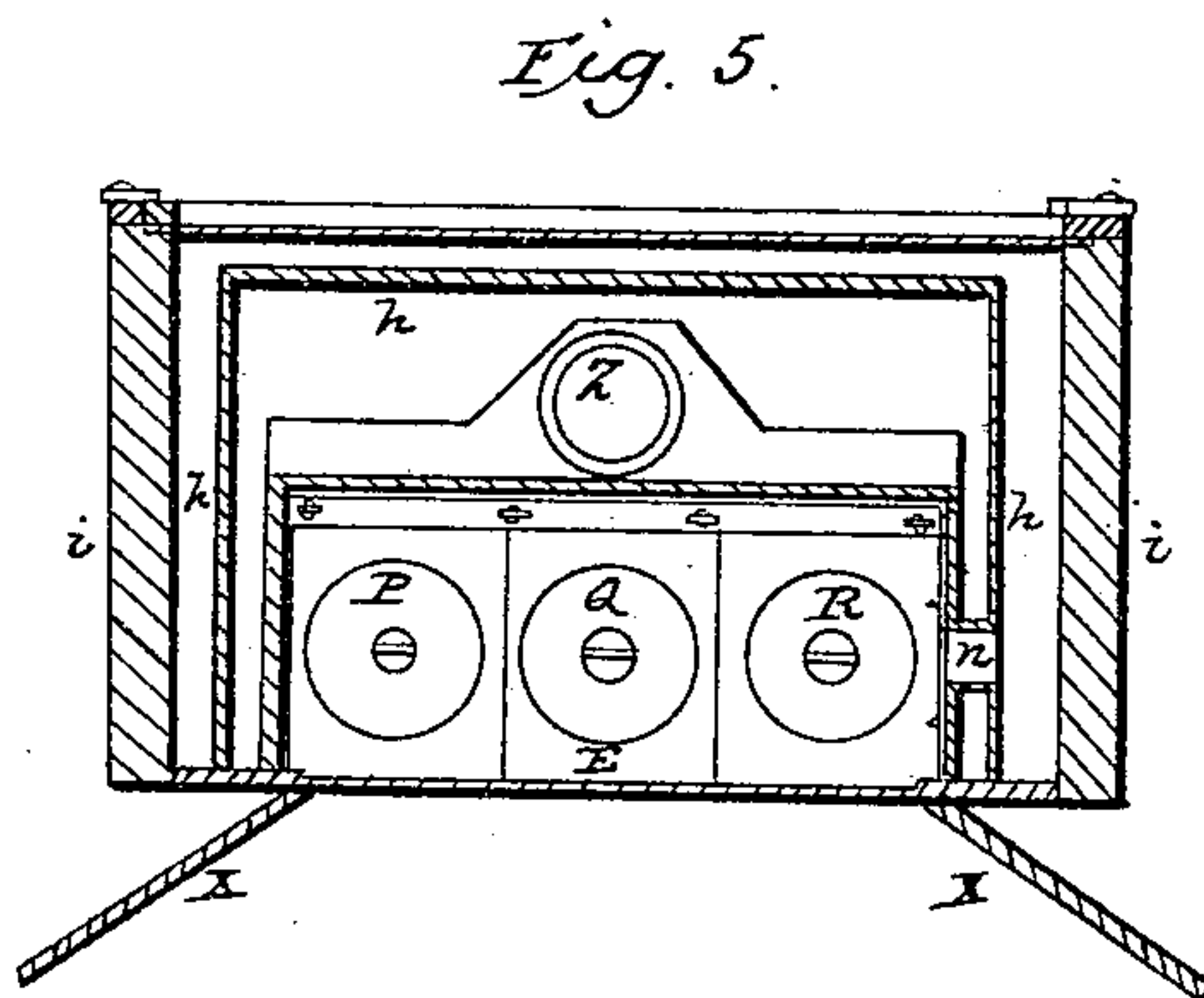
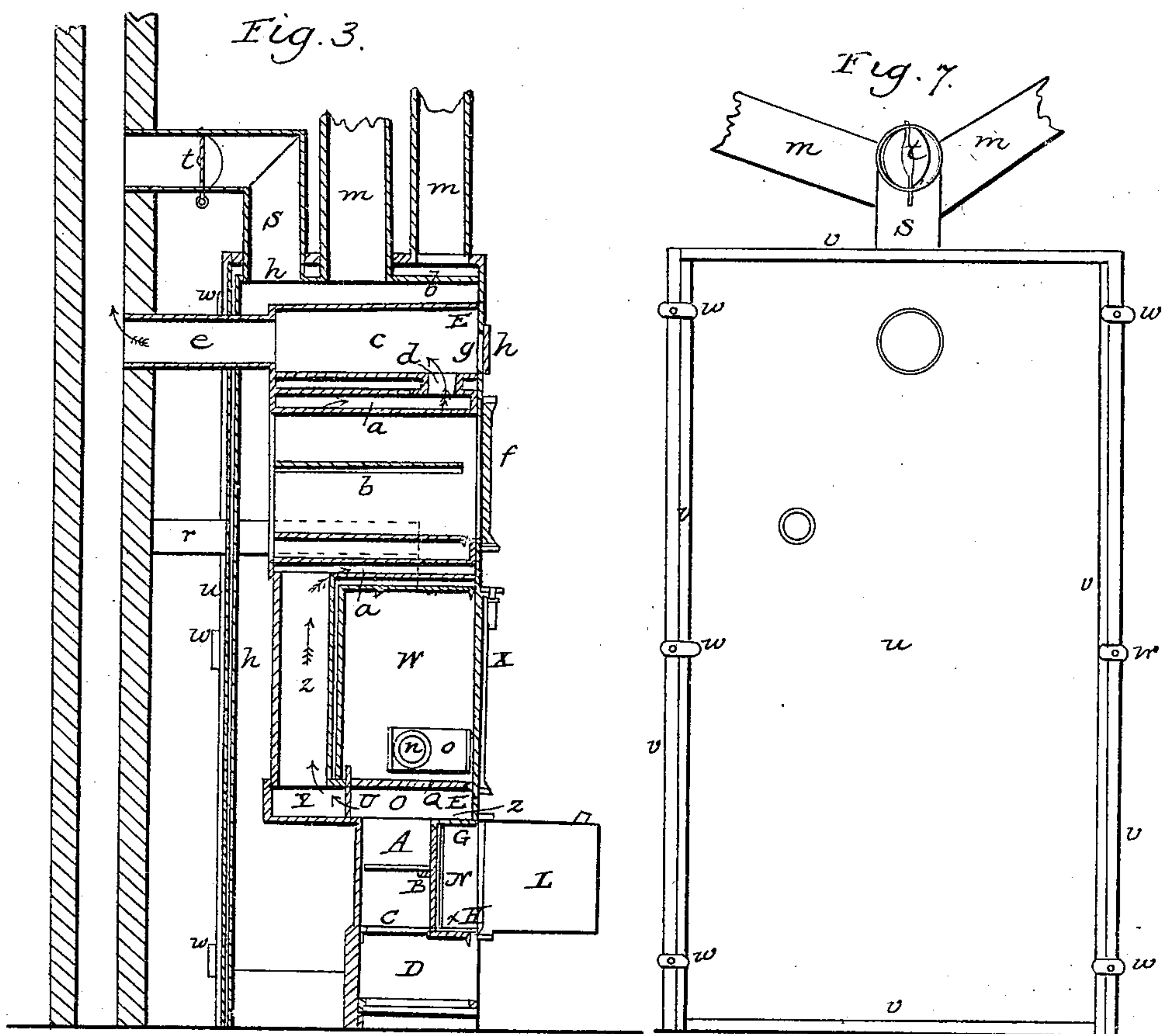
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# UNITED STATES PATENT OFFICE.

OTIS PACKARD, OF ROXBURY, MASSACHUSETTS.

## IMPROVEMENT IN COOKING AND AIR-HEATING FURNACES.

Specification forming part of Letters Patent No. 2,612, dated May 26, 1842.

*To all whom it may concern:*

Be it known that I, OTIS PACKARD, of Roxbury, in the county of Norfolk and State of Massachusetts, have invented a new, useful, and improved hot-air and cooking furnace, which is adapted to perform at one and the same time the several operations of boiling, baking, roasting meats, vegetables, &c., and of heating the different rooms or apartments in the building in which it may be arranged, the following being a full and exact description of the same, which, taken in connection with the accompanying drawings thereof, forms my specification, wherein I have set forth the nature and principles of my improvements, by which they may be distinguished from others of like character, together with such parts or combinations of the same as I claim, and for which I solicit Letters Patent.

Figure 1 of the drawings above mentioned represents a front elevation of my improved furnace. Fig. 2 is a horizontal section taken through the fire-grate. Fig. 3 is a central and vertical section taken perpendicular to the front of the furnace. Fig. 4 is a vertical and central section taken at right angles to that of Fig. 3, or parallel with the front. Fig. 5 is a horizontal section taken through the boiling-chamber. Fig. 6 is another section taken through the flue-chamber.

Such other drawings as may be necessary to a full explanation of the several parts will be hereinafter referred to and described.

The chamber of combustion A, Figs. 2, 3, 4, consists of a square or other proper-shaped box, of cast-iron or other suitable material, properly luted or lined with fire-brick on the interior of three of its sides, and having the fourth or front side an open grate, B, Figs. 1, 2, 3, the bottom being another and similar grate, C. This chamber rests over the ash-pit D, which is another rectangular or square chamber formed in the usual manner and erected on the brick hearth upon which the furnace is to be built. The front or vertical grate, B, of the chamber of combustion A is placed about twelve inches in rear of the front of the plate or face E of the apparatus, the said plate E having a rectangular opening, F G H I, Fig. 1, and F G, Fig. 2, directly in front of the fire-grate B, the said space being in width nearly double that of the fire-grate, and of the same height thereof. The said opening F G H I is to have

doors K L, by which it may be closed, for the purpose hereinafter to be described.

The sides or jambs M N, Figs. 1, 2, 3, of the space between the front plate, E, and the fire-grate B, which flare or open outward from the grate, as seen in Fig. 2, consist of two plates or doors suitably hinged or supported at or near the sides of the fuel-chamber, so as to be turned around into the position denoted by the dotted lines in Fig. 2, and thus to close up or shut over the front grate of the fire-place, and at the same time to open a communication between the space directly in front of the grate B and that around its sides and rear, to be more particularly described hereinafter. The fuel-chamber has a hearth or plate, x, extending from the lower part of it to the lower side, H I, of the opening F G H I, or over the space between the same. The chamber of combustion A has a rectangular box or flue-chamber, O, placed or situated directly over it, into the lower side of which it opens freely, so as to permit the flame and smoke to circulate throughout said flue-chamber. The bottom plate, z, of the flue-chamber extends back from the front plate, E, covering the space through which the doors M N swing. The upper plate of the flue-chamber has a series of circular or other proper shaped orifices, for the reception of boiling-kettles, and which, when the kettles are removed, may be closed by covers P Q R, Fig. 5, and Q, Fig. 3. The rear side of the flue-chamber has three suitable openings, by which it communicates with the smoke or discharge flue, and which are opened or closed at pleasure by dampers S T U V, Figs. 3, 4, 6. When the center dampers, T U, are closed and the outer dampers, S V, are open, the smoke will pass laterally under the side boilers, and when the dampers S V are closed and the dampers T U opened the smoke will pass directly from the fire-place into the discharge-flue.

The boiling-chamber W is another rectangular or other proper shaped box or chamber arranged over the flue-chamber, as seen in the drawings, and whose front is open and has doors X X, Figs. 1, 3, 5, by which it may be closed at pleasure. There is another small chamber, Y, arranged directly in rear of the flue-chamber O, the said chamber Y being the lower part of the discharge-flue, into which the smoke passes directly from the flue-chamber, and from whence it escapes into a pipe,



Z, inserted in the top of the chamber Y, and extending upward therefrom just in rear of the back plate of the boiling-chamber, and opening into or communicating at its top with a circular or other proper shaped chamber or space, *a a*, Figs. 3, 4, surrounding the oven *b*, the said oven being placed over the boiling-chamber, as seen in the drawings. The smoke-space *a* around the oven communicates, by a pipe or passage, *d*, Fig. 3, over or near the front end of the oven, with an elliptical or elongated chamber, *c*, placed directly over the oven, as seen in Figs. 3, 4, the said chamber *c* having a pipe, *e*, in its rear end, extending therefrom to the chimney, and through which pipe the smoke passes after circulating around the oven. The front of the oven *b* opens through the front plate of the apparatus, and is closed by a door, *f*. (See Figs. 1, 3.) An opening, *g*, is also made through the front plate of the apparatus in front of the smoke-chamber *c*, the said opening being closed by a hinged or sliding door, *h*, Figs. 1, 3, which, on being opened, will enable a person at any time to clean out the interior of the smoke-chamber *c* and its flues.

The whole of the exterior of the rear and two sides of the ash-box, the chamber of combustion, &c., the boiling-chamber, and flues leading to, about, and from the oven are inclosed within a tin reflecting-casing, *h*, Figs. 2, 3, 4, 5, 6, which is arched or formed semi-circular at top, as seen in Fig. 4, and the casing *h* is also inclosed in another external casing or brick-work, *i*, so as to leave a space between said casings *h* and *i*, into which atmospheric air is introduced by pipes, or in any other convenient manner, through openings *k k*, Fig. 4, of the top covering-plate, *l*, and passes downward between the casings *h i*, thence under or through the lower part of the casing *h*, and thence circulates freely in contact with the back and sides of the chamber of combustion, and those of the boiling-chamber, and the smoke flues and pipes leading to and about the oven, and, after being heated, is conveyed, by any suitable number of pipes, *m m*, inserted in the top of the casing *h*, to any apartments into which it may be desirable to introduce hot air. The space between the casings *h* and *i* is connected with the boiling-chamber by a pipe, *n*, Figs. 3, 5, inserted in the lower part of the side of the boiling-chamber, the mouth of said pipe, where it enters the boiling-chamber, being closed, whenever necessary, by a sliding valve, *o*, Fig. 3. A circular or other proper shaped hole, *p*, Fig. 4, and as represented by dotted lines in Fig. 1, is formed through the upper part of the back plate of the boiling-chamber, which may be closed at pleasure by a sliding valve or damper, *q*, Fig. 1, arranged in any convenient manner. By opening the valves *o* and *q* and closing the doors X X of the boiling-chamber, (the orifices for the boiling-kettles being supposed covered,) a portion of the cold air which passes down between the casings *h* and *i* will enter the

boiling-chamber through the pipe *n*, and will circulate in contact with the upper plate and covers of the flue-chamber O, and will be warmed and pass from said boiling-chamber through the opening *p*, and mingle with the hot air in rear of the boiling-chamber. By turning the doors M N round in front of the fire-grate B, or into the position represented by the dotted lines in Fig. 2, and by closing the doors K L, the air which is to be warmed circulates from the space which is around the rear and sides of the fire-grate between the doors K L and the doors M N, and is warmed by contact with the doors M N, which latter become heated by the fire in the grate.

Whenever the operation of roasting is to be carried on, it is only necessary to open the doors K L and to turn back the doors M N into the position represented in Fig. 2, when the whole front of the fire will act upon the roasting apparatus, which is to be set up in the usual manner before it.

In order that the steam and vapors arising from the kettles during the operations of boiling may escape into the chimney, a pipe should be inserted in the top of the boiling-chamber, and should lead from thence into the chimney, said pipe being partly shown at *r*, Fig. 3, the remainder of it being also therein exhibited by dotted lines. The mouth of the pipe or where it enters the boiling-chamber should have a register or valve, by which the pipe may be closed when the cold air is passed through the chamber, as above described. The hot-air chamber, or that space within the casing *h* before described, should also communicate with the chimney-flue by a pipe, *s*, Fig. 3, having a damper or throttle-valve, *t*, therein, by which the said communication may be interrupted at pleasure.

Whenever, as in summer, it may not be desirable to warm the apartments, the surplus heated air may be caused to pass into the chimney through the pipe *s*.

In order that easy access to the internal parts of the apparatus may be had at any time for repairs, the back of the same consists of a plate, *u*, Fig. 7, (which figure represents a rear elevation of the apparatus,) of iron or suitable metal, attached to a frame, *v v*, which surrounds its exterior edge, the said frame and plate being confined in position by several turn-buttons, *w w w w*, attached to strips of wood or metal *v' v'*, properly secured to the sides of the outer case. On removing the plate *u*, the casing *h*, and the several pipes which are inserted in the casing *h*, the said casing may be taken away from the parts which it surrounds, and thus access may be had to them. In order that this may be effected, it is supposed that the rear of the hot-air furnace is erected at a suitable distance from any wall of the room in which it is situated; but in case the furnace is to be built on a common hearth and immediately adjacent to or close against the chimney, one of the sides of the outer case may be simi-



larly arranged or confined with turn-buttons, so as to be easily removed; but this latter arrangement would require such a change in the form and construction of the inner casing, *h*, as would admit of its easy removal.

Having thus described my invention, I shall claim—

The chamber of combustion arranged with the extra doors or movable jams *M N*, and having its front grate placed at such a distance in rear of the opening *F G H I* of the front plate of the apparatus or hot-air chamber that when said doors are thrown open they shall shut against the vertical sides *F I G H* of the opening *F G H I*, and thus close the rectangular spaces between said vertical sides of said opening and the front edges of the vertical sides of the chamber of combustion, in combination with the opening *F G H I* of the front plate, *E*, having turning or other doors *K L*, by which said opening may be closed, so that

when the doors *M N* are shut over the front grate of the fuel-chamber and said opening *F G H I* is closed by its doors, the air of the hot-air chamber or space within the casing *h* will freely pass through the space between the doors *M N* and the doors *K L*, and be further warmed by contact with the doors *M N*, and that when the said doors *M N* and *K L* are thrown open to their utmost extent the fire in the fuel-chamber will be sufficiently exposed for the operation of roasting, the whole being substantially as above set forth.

In testimony that the foregoing is a true description of my said invention and improvements I have hereto set my signature this 4th day of April, 1842.

OTIS PACKARD.

Witnesses:

R. H. EDDY,  
EZRA LINCOLN, Jr.