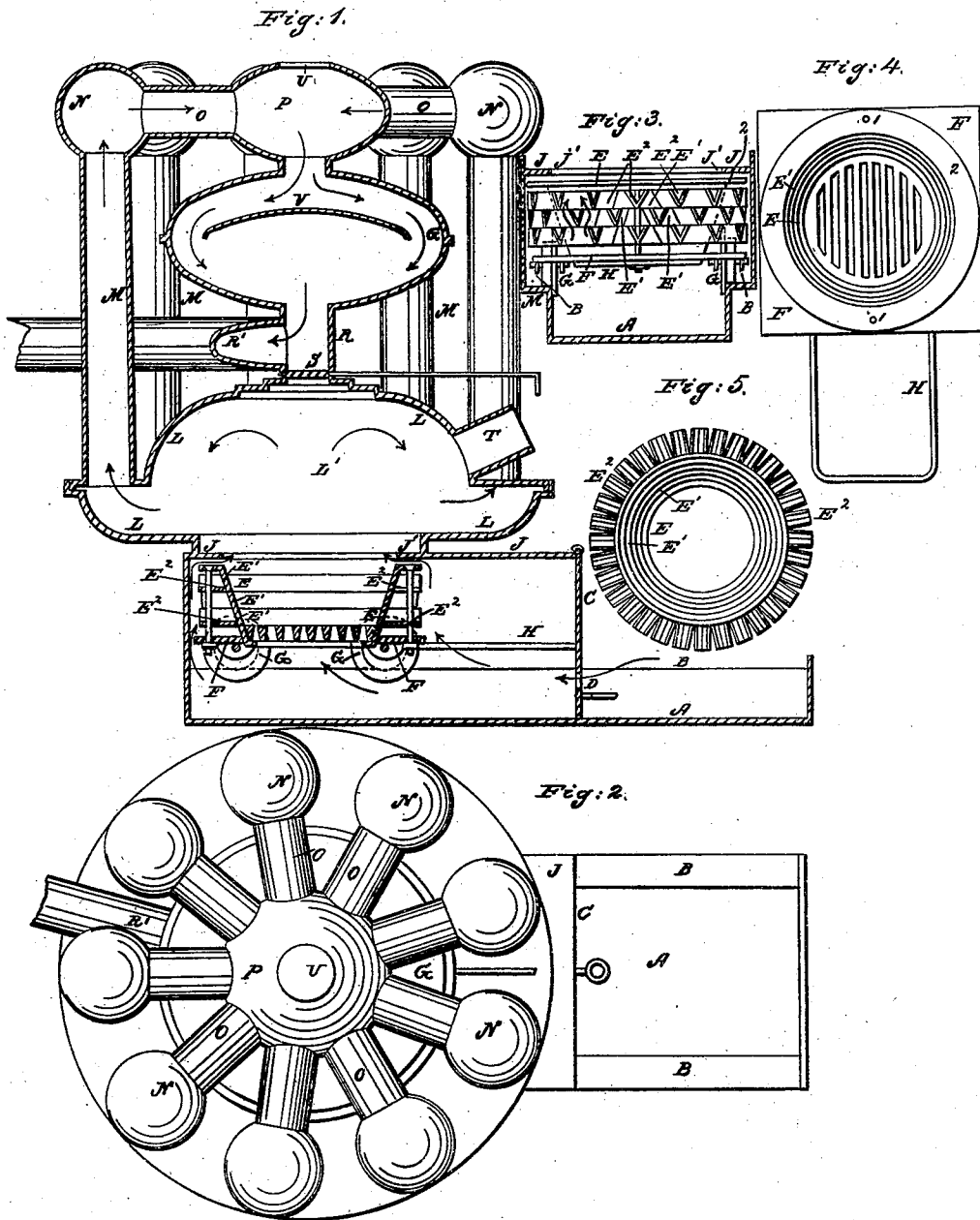


M. B. DYOTT.
Hot Air Furnace.

No. 12,901.

Patented May 22, 1855.



UNITED STATES PATENT OFFICE.

M. B. DYOTT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVED WARM-AIR FURNACE.

Specification forming part of Letters Patent No. 12,901, dated May 22, 1855.

To all whom it may concern:

Be it known that I, MICHAEL B. DYOTT, of the city and county of Philadelphia, and State of Pennsylvania, have invented new and useful Improvements in Warm-Air Furnaces, Heaters, or Stoves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 is a vertical longitudinal section of a warm-air furnace constructed after the improved plan. Fig. 2 is a top or bird's-eye view of the same. Fig. 3 is a vertical cross-section through the ash-pit and the lower part of the furnace surrounding the fire-chamber and a front elevation of the fire-chamber. Fig. 4 is a top or bird's-eye view of the fire-chamber detached from the furnace. Fig. 5 is a top or bird's-eye view of the same, with the upper plate and ring removed.

Where the same letters occur in the several figures they indicate corresponding parts.

The nature of this invention and improvement consists in combining, in the construction of the fuel-chamber, a series of metallic rings with radial arms cast on their outer peripheries in such a manner as to enable the heat of the rings to be drawn off by the radial arms, and the rings to be removed and replaced when burned out, or as occasion may require; and also in so otherwise forming the fire or fuel chambers of warm-air furnaces and arranging or combining them in relation to the furnaces as to form a space between and entirely around the two, to admit a sufficient draft of air (partially heated by the radial arms and other heated parts with which it has come in contact) to intermingle with the carbonaceous and other inflammable particles of the gases in the dome or space above the fire as they are in the act of passing up unconsumed in smoke, and enable them to be precipitated and consumed at the point of ignition of the fire, and by so combining the movable fire or fuel chamber with the space or chamber above as to prevent the said upper chamber being partially filled or obstructed with fuel or ashes, by which arrangements and combinations the important advantages hereinafter more fully described are obtained.

To enable others skilled in the art to make

and use my invention, I will proceed to describe its construction and operation.

The warm-air furnace as illustrated in the drawings may be made of cast-iron or other suitable material, and is incased or surrounded by a brick or a metallic chamber in the usual or most approved manner.

A is the bottom plate of the ash-pit, which extends out in front of the furnace about one-third of its entire length.

B are the rails or guides upon which the wheels of the fire or fuel chamber move in drawing it from beneath the furnace or forcing it back to its proper position under the dome, the said rails extending back the required distance under the furnace to admit of this, and being attached to the bottom plate, A.

C is the door of the ash-pit, and D are small vent-holes in the lower part of said door, through which the air necessary to support the combustion of the fuel is admitted.

E is the fuel or fire chamber, formed of a series of cast-iron rings, E', of the form of frustums of cones, placed one above the other, and having any desired number of radial arms, E'', cast with them on their outer peripheries, said arms being made in the form of angular V-shaped gutters, as represented in the drawings, or other form, if desired, and so arranged in relation to each other, when securing the rings together by the bolts and nuts at the front and back parts, as to bring each of their lower edges midway between the upper edges of two of those on the ring immediately below, and in this manner cause the air which is constantly passing up between them to be directed in a zigzag course against their heated surfaces, as indicated by arrows in Fig. 3. The upper ring of the fire or fuel chamber is provided with a flange at its upper edge, through the front and back portions of which pass vertical bolts 1, extending through and fastened by nuts to the front and back part of a square plate or carriage, F, upon which the fire or fuel chamber rests, having flanged wheels G, similar to railroad-wheels, near each corner, which rest and move on the guides B and serve to facilitate the movement of the fire or fuel chamber in and out.

H is a staple-formed handle, which is attached to the fuel chamber or carriage, for the purpose of moving the fuel-chamber when re-

required. It is made of sufficient length to project out flush with the inside of the door of the ash-pit when closed, so as to insure the fuel-chamber being forced back to its proper location under the furnace and make it impossible to close the door until this is done.

I is a dish-formed circular plate, arranged and secured a short distance above the top plate, J, of the space surrounding the fuel-chamber and forming the base of the drum or dome L. The top plate, J, has an opening formed in it in the center of the base-plate I, corresponding in every respect with the upper portion of the inner diameter of the fuel-chamber, which, when properly set, is situated immediately under said space with its upper surface a short distance below the plate J, so as to leave a space, J', between the fuel-chamber and the plate J of the furnace, to allow the admission of air to the upper portion of the fire, and at the same time in such close proximity to the plate J as to cause said plate to graduate the quantity of fuel in the fuel-chamber, and prevent it being pushed back to its position when filled too full of fuel.

The upper portion of the furnace is composed of an inverted bell-shaped dome, L, its outer edge fitting inside of or upon the outer edge of the base-plate I. Near its outer periphery or edge are arranged nine (more or less) vertical pipes, M, communicating with the space L', formed by the dome L and base-plate I, upon the top of which are cast hollow globes or balls N, from which extend horizontally to a common center pipes O, corresponding with the vertical pipes N, all of which horizontal pipes O terminate in or communicate with a larger globe or hollow hub or sphere, P, which communicates at its lower part by an opening in its center with a still larger hollow circular hub or sphere, Q, resembling in its vertical section an oval, and provided at its lower part with a vertical tube or pipe, R, extending from its lower center to the center of the inverted bell-shaped dome L, and forming a communication between the hub or sphere Q and the space or dome L immediately above the fire-chamber. This vertical pipe R communicates with a horizontal pipe, R', which extends to the chimney and forms the channel for the smoke, &c., to make its exit, and is provided with a damper, S, at its lower end, for either causing the draft to pass directly from the dome or space L' above the fire-chamber into the chimney or through the vertical and horizontal pipes M O and hollow spheres P Q before doing so, at the will of the person having the furnace in charge. A small pipe, T, is secured to the front of the bell-shaped dome L, closed at its outer end by any transparent substance—such as mica or glass—so as to enable the person to see the state of the fire in the furnace at any time without withdrawing the fuel-chamber. On the top of the globe or sphere P is an opening, U, which may be closed with a cap or cover, for enabling the person to have access

to the pipes or flues for cleaning the same or for other purposes.

The brick or metallic work surrounding the furnace incloses it in such a manner as to form an air-tight chamber, having the usual spaces for the ingress of cool air and the egress of the same in a heated state to supply the apartments above.

Operation: The fuel-chamber E is drawn out from under the upper portion of the furnace to be supplied with fuel by drawing upon the staple-formed handle H, and when replenished is forced to its original position under the same, the said handle projecting such distance from the carriage as to prevent the ash-pit door being closed without the furnace is entirely back to its proper position, thereby preventing the said furnace being stopped short of its full distance, and the slight distance between the top of the fuel-chamber and the plate J preventing the former being inserted in its place when filled with fuel much above its top. The smoke and heat from the fire ascends from the fuel-chamber into the chamber or space L' above and through the vertical pipes M, and thence passes through the globes N and horizontal pipes O, and the central hollow hubs or spheres, P Q, being spread over the inner surface of the lower hub or sphere to impart to it an increased degree of heat by the disk or plate V, arranged inside, and from thence it passes through the vertical pipe R and the horizontal pipe R' into the chimney.

The heat and smoke arising directly from the fire, and thus passing through the several compartments of the heater is increased in a great degree by the heated air admitted through the space J', not only from the fact that in passing through the hot space and between the radial arms E' surrounding the fuel-chamber, it is heated to such a state as to add greatly to the other heat and smoke with which it intermingles, and imparts a large portion of its heat to the surface of the furnace in its passage with the same, but also because the air thus introduced among the less ascensible particles of carbon and hydrogen at the base of the dome or space L', where they are subjected to an intense degree of heat, (but for the want of a draft of air are about passing off unconsumed with the smoke,) will be decomposed and burned above the fire in the dome or space L', and thus made available through the agency of this continuous draft of air passing through the space, which is at all times kept unobstructed by the constant removal of the fire-chamber in and out to receive its supply of fuel.

By combining the movable fire or fuel chamber E with the chamber or space L' immediately above the fire in the manner stated in the body of the specification, it is utterly impossible to obstruct or lessen the extent or capacity of said space or chamber L' above the fire by the introduction or accumulation of fuel, ashes, or other solid substance contained

in or arising from the fuel; and as the perfect combustion of the gases above the fire and the proper and uniform burning of the fire depend upon this space or chamber being preserved at all times from such filling or accumulations, this combination of the movable fire or fuel chamber E and space or chamber L' above is deemed essentially necessary to the proper operation of the furnace in these respects.

This improvement can be applied to every description of furnace, and in addition to the saving of fuel in its use, from the causes and effects above set forth, will, by making the furnace contain a uniform quantity of fuel, and producing a uniformity of draft, dispense with the usual dampers, and the necessity of constantly opening and shutting of them to regulate the draft, as experienced in the ordinary furnace, and the opening of the fire front doors to reduce the heat when it becomes too great, which thus admits a large quantity of cold air into the pipes; drums, &c., and chills the whole apparatus without materially lessening the

consumption of fuel. With the present improvement, when this becomes the case, it is only necessary to shut off the air which supports the combustion, and the fuel ceases to consume.

While this heating-furnace combines the advantages stated, and exposes to the action of the fire the largest amount of available radiating-surface, expanding the heat and impinging it against the sides of the furnace, it yet so distributes the heat as to avoid all excessively-heated surfaces of iron, by which the air would be rendered unhealthy for respiration.

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

The arrangement of devices herein described—to wit, the movable fire-pot E, the air-flue J, and chamber or fire-space L, constructed and operating in the manner and for the purpose substantially as above set forth.

MICHAEL B. DYOTT.

Witnesses:

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SAML. S. CAMPBELL.