

(No Model.)

D. S. RICHARDSON.

HOT AIR FURNACE.

No. 371,363.

Patented Oct. 11, 1887.

Fig. 2.

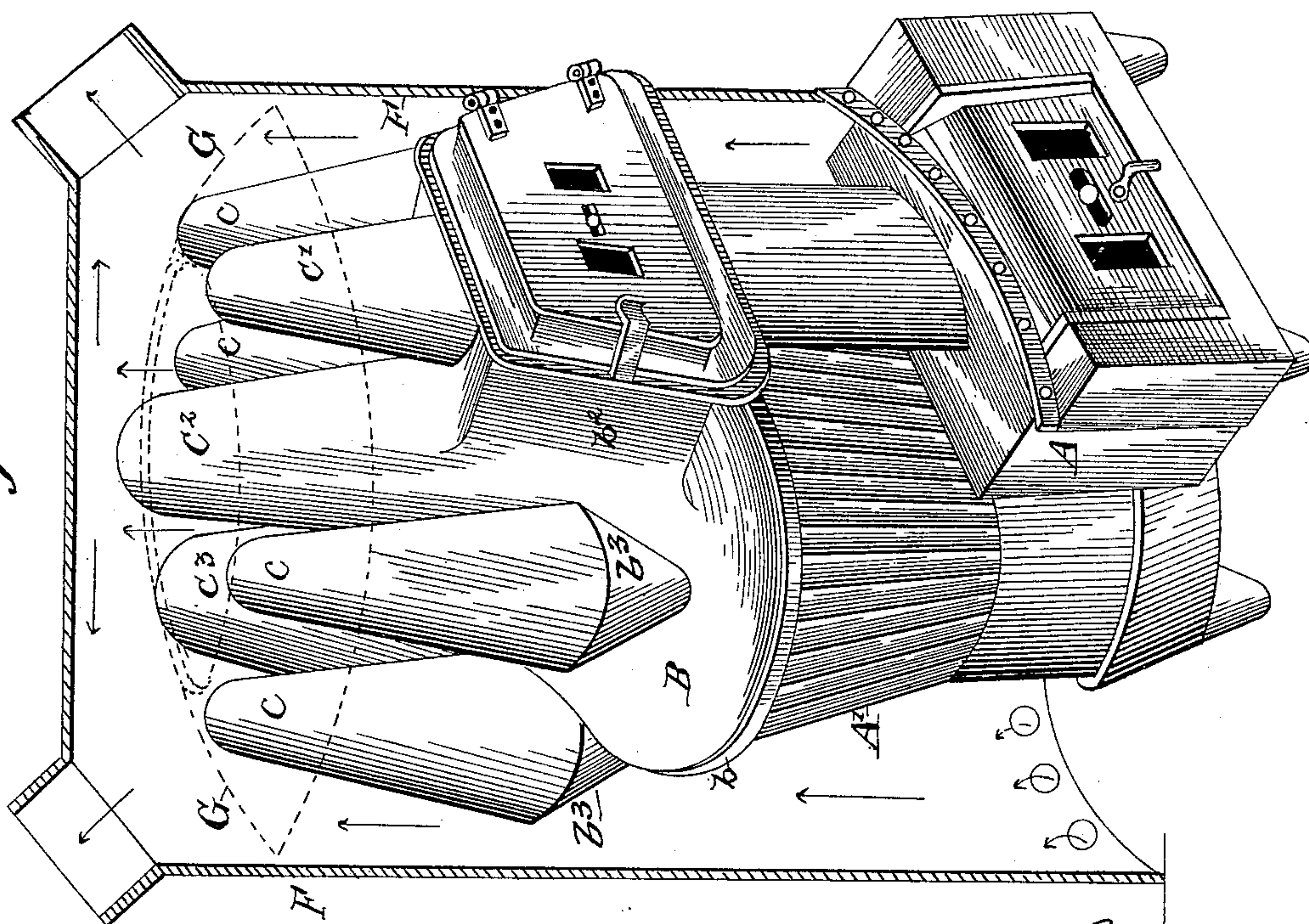
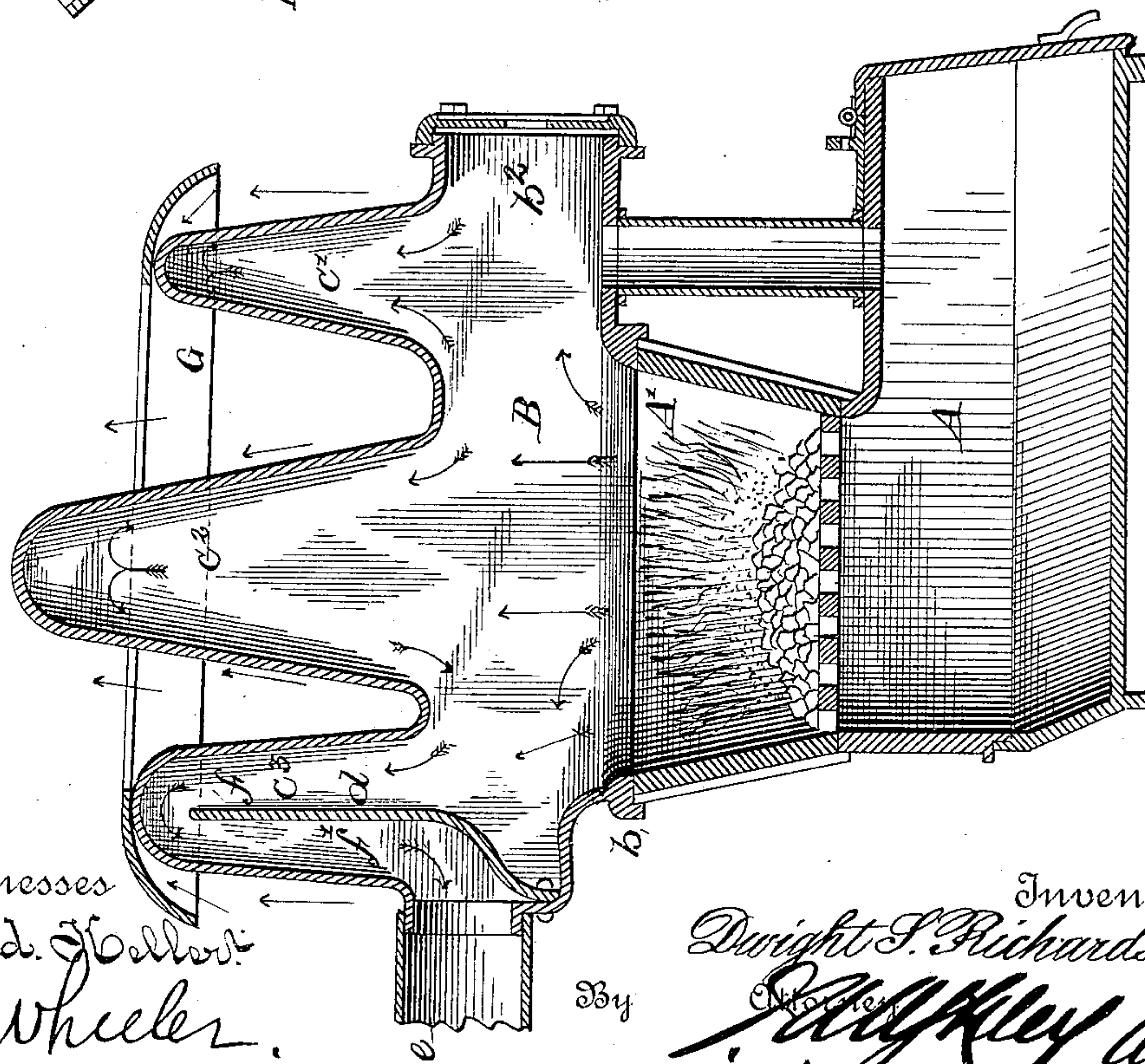


Fig. 1.



Witnesses
Edw. J. Hall
P. H. Wheeler.

By

Inventor
Dwight S. Richardson
Atty.
W. H. Key

UNITED STATES PATENT OFFICE.

DWIGHT S. RICHARDSON, OF BROOKLYN, NEW YORK.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 371,363, dated October 11, 1887.

Application filed December 24, 1886. Serial No. 222,451. (No model.)

To all whom it may concern:

Be it known that I, DWIGHT S. RICHARDSON, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Hot-Air Furnace, of which the following is a specification.

In "setting" hot-air furnaces in position for use it has been found that many basements and many cellars have not sufficient vertical extent to permit such an inclination of the hot-air pipes as is requisite to insure a rapid flow of the contents of the hot-air chamber to the apartments which are to be warmed, the upper portion of the furnace, variously termed the "body," the "radiator," the "drum," or the "combustion-chamber," as ordinarily constructed, extending so far above the fuel chamber or fire-pot and so near to the hot-air casing that the hot-air pipes are necessarily placed in a nearly horizontal position.

A leading object of this invention is to provide a furnace in which the difficulty thus described will by simple and inexpensive means be avoided.

Another object is to provide a rounded or arching body, radiator, or heating dome, which, while presenting an extensive area of heat receiving and radiating surface, shall thoroughly utilize the heat contained in the volatile products of combustion, and yet be proof against the escape of any portion of the injurious gases contained therein.

With these objects in view the invention consists in the provision, in a hot-air furnace, of a rounded or arching body, dome, or combustion-chamber which is provided upon its upper, rounded, or arching surface with a series of hollow cones or smoke pockets, which are closed at the top and open at the bottom, and are formed integrally with such dome.

The invention, consists, also in the provision, in a hot air furnace, of a rounded or arching body, dome, or combustion-chamber which embraces a supporting-ring portion or base and a series of cones or smoke-pockets, the ring or base and the pockets being formed together in a single part.

The invention consists, also, in the combination, in a hot-air furnace, of a rounded or arching body or combustion-chamber which

is provided with cones or pockets, an exterior air-casing, and an encircling air-deflecting plate, which rests by its inner edge upon the outer pockets, and which extends outwardly to a point near the air-casing.

The invention consists, also, in a hot-air furnace which is provided with a rounded or arching body portion or combustion-chamber, which embraces a series of imperforate cones or smoke-pockets, and an exit-cone or pocket which has a perforation or exit-opening, and a vertical diaphragm or deflecting-plate by which such pocket is divided into two flues.

In the drawings, Figure 1 represents a longitudinal vertical central section on a line extending from front to rear of the furnace proper, the air-casing and the air-deflecting plate being removed. Fig. 2 is a perspective elevation of the furnace and the air-deflecting plate, the air-casing being shown in vertical section.

The ash-pit section A and the fuel-chamber or fire-pot section A' and their attachments are or may be of any ordinary or desired construction. The body or combustion-chamber B consists of a base portion or ring, *b*, of a substantially annular form, but having formed therein a front horizontal passage or chute, *b*², for supplying fuel and for the removal of the residuum thereof, and having also curved and outwardly and upwardly flaring enlargements *b*³, which at their point of greatest horizontal extent are coincident and continuous with the lower extremities of the cones or pockets *c c*, preferably two in number, at each side of the center of the furnace. At the front, upon the top of the passage or chute *b*², is the cone or pocket *c'*. At the center, upon the highest part of the dome, rises the central cone or pocket, *c*², having greater capacity than the cones already described, while at the rear is a seventh cone, *c*³, which is of dimensions sufficient to permit its division into a rising-flue, *f*, and a diving-flue, *f'*, by means of a deflecting plate or diaphragm, *d*, behind which, in the outer wall of the cone and near the base thereof, is formed the collared exit-opening *e*.

The air-deflecting plate G, of annular form, as shown, and preferably inclining downwardly from its inner edge to its periphery, rests unattached upon the top of the outer

members of the series of cones or pockets, its outer extremity extending to a point within a short distance of the inclosing air-casing F.

Through the provision of the numerous hollow cones upon the dome a very extensive heat receiving and radiating surface is afforded, while at the same time the top of the furnace is not extended to such a height as to prevent the necessary inclination of the hot-air-supply pipes F'.

In the operation of the furnace a fire is no sooner lighted than the cones or pockets become filled with the volatile products of combustion, and the peculiar form of the pockets serves to retain within them a great proportion of these until the heat thereof has been imparted to the air which envelops them, the deflecting-plate G causing the incoming currents as they rise to pass inwardly among the cones and become thoroughly heated thereby. Through the provision of the vertical diaphragm or smoke-deflecting plate *d*, which extends from the lower outer portion of the cone *c*³ upwardly to a point near the upper extremity thereof, that cone is made highly effective as a heater, while at the same time a too rapid escape of smoke and gases, which would otherwise be unavoidable, is effectually prevented.

As already stated, the body, dome, or combustion-chamber B, with the mouth or fuel-supply passage and all the superposed cones, is constructed in a single casting, thus avoiding all joints between the several parts and rendering the escape of deleterious gases impossible.

The diaphragm *d*, represented as of iron, may be composed of fire brick, or other refractory material instead.

The feathered arrows in the drawings indicate the course of the volatile products of combustion, while the unfeathered arrows indicate the direction of the air-currents.

I am well aware that it has long been common to construct the dome or combustion-chamber of a hot-air furnace in a single piece, and I desire that it shall be distinctly understood that I make no claim, broadly, to such construction.

It will be understood, also, that I make no claim to a cone which is open at both ends, so that the products of combustion enter at one end, and, passing through the cone, escape at the opposite end, or to a hot-air furnace in which a series of closed cones are loosely placed upon the flat horizontal top of a fuel or combustion chamber.

Having described my invention, I claim—

1. A hot-air furnace which embraces a rounded or arching body, dome, or combustion-chamber, which is provided with a series of hollow cones or smoke-pockets, which are formed with such dome, and which are closed at the top and open at the bottom.

2. A hot-air furnace which embraces a rounded or arching body, dome, or combustion-chamber, which is provided with a series of hollow cones or smoke-pockets, which are closed at the top and open at the bottom, such body or combustion-chamber being formed in a single part, whereby joints are avoided and the escape of injurious gases into the air-chamber of the furnace is prevented.

3. A hot-air furnace the body, dome, or combustion-chamber of which consists, essentially, of a supporting ring portion or base, a rounded or arching portion extending upwardly and inwardly from the ring portion or base, and a series of cones or smoke-pockets which rise from such rounded or arching portion, such ring portion or base, the rounded or arching portion, and the cones or pockets being formed together in a single part.

4. The combination, with the dome or combustion-chamber of a hot air furnace, of a cone which rises from the rear portion of such dome or combustion-chamber, and which is provided with an exit opening in its rear lower portion and with a diaphragm which rises from the base of the cone and from the bottom of the exit-opening, and extends upwardly to a point near the top of the cone, such diaphragm serving to prevent direct exit of the products of combustion, and serving also to divide the cone into an inner rising flue and an outer diving flue.

5. In a hot-air furnace, a rounded dome or combustion-chamber which is provided with a series of unobstructed cones or smoke-pockets, and with a cone which embraces an inner rising-flue and an outer diving-flue.

6. The combination, in a hot-air furnace, of a body or combustion-chamber which is provided with cones or pockets, an exterior air-casing, and an encircling air-deflecting plate which rests by its inner portion or edge upon the outer cones or pockets, and which extends outwardly to a point near the air-casing.

7. A hot-air furnace which is provided with a body portion or combustion chamber, which embraces a series of imperforate cones or smoke-pockets, and an exit cone or pocket which has a perforation or exit-opening, and a vertical diaphragm or deflecting-plate by which such pocket is divided into an inner rising flue and an outer diving flue.

DWIGHT S. RICHARDSON.

Witnesses:

HENRY RICHARDSON,
JAMES B. TAYLOR.