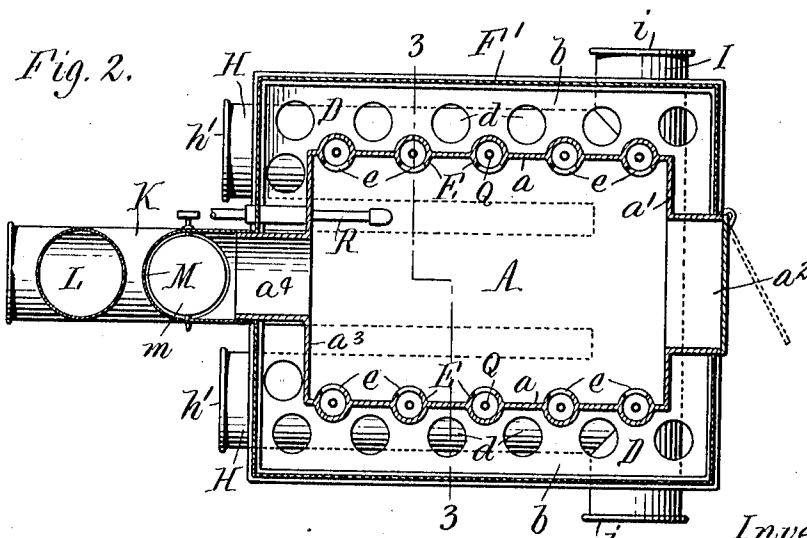
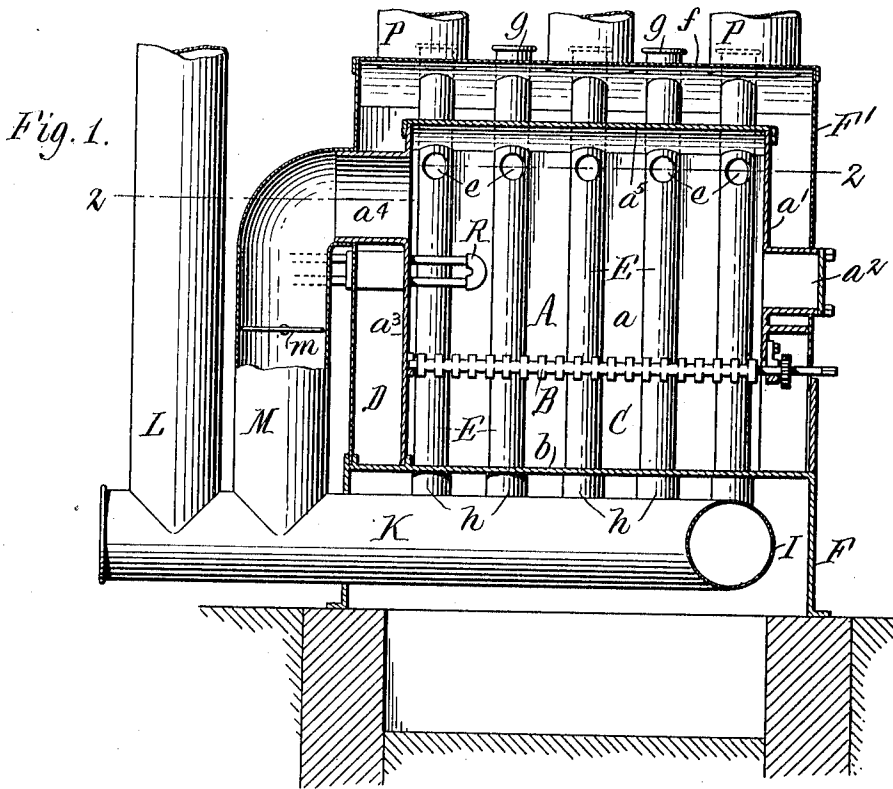


1,035,599.

J. S. KEMP.
HOT AIR FURNACE.
APPLICATION FILED MAY 15, 1906.

Patented Aug. 13, 1912.
2 SHEETS—SHEET 1.



Witnesses:
E. A. Volk.
A. G. Diamond.

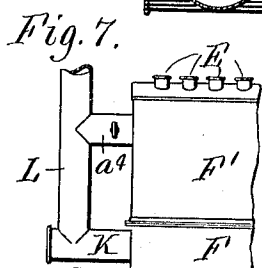
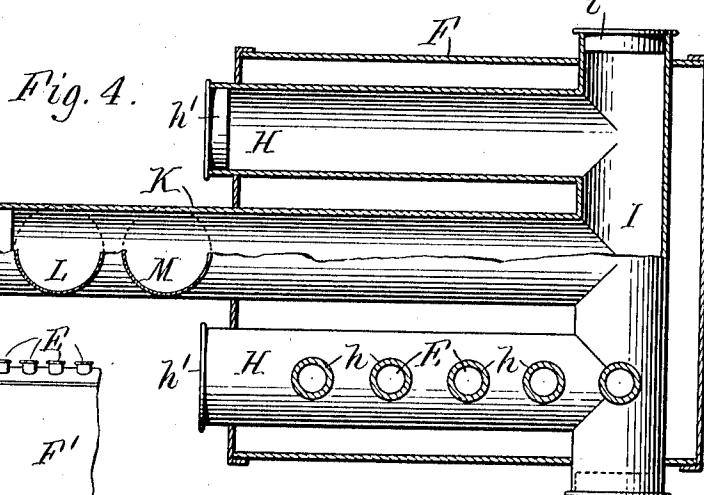
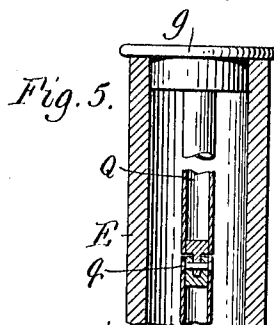
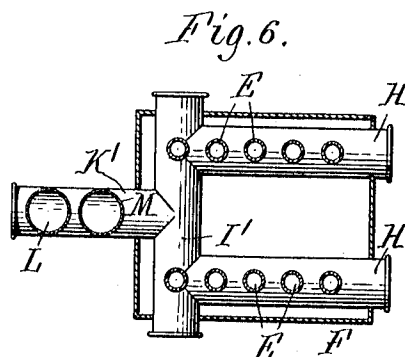
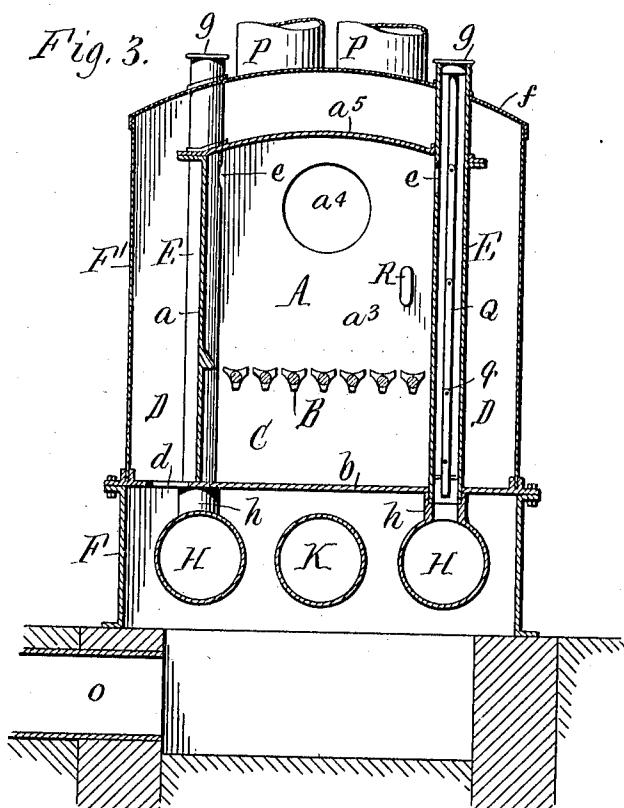
Inventor.
Joseph S. Kemp
By William B. Rutter & Co.,
Attorneys.

1,035,599.

J. S. KEMP.
HOT AIR FURNACE.
APPLICATION FILED MAY 15, 1906.

Patented Aug. 13, 1912.

2 SHEETS-SHEET 2.



Witnesses:
E. A. Volk.
A. F. Demond.

Inventor.
Joseph S. Kemp
By Wilhelm R. Parker & Ward
Attorneys.

UNITED STATES PATENT OFFICE.

JOSEPH S. KEMP, OF NEWARK VALLEY, NEW YORK.

HOT-AIR FURNACE.

1,035,599.

Specification of Letters Patent. Patented Aug. 13, 1912.

Application filed May 15, 1906. Serial No. 316,918.

To all whom it may concern:

Be it known that I, JOSEPH S. KEMP, a citizen of the United States, residing at Newark Valley, in the county of Tioga and State of New York, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a specification.

This invention relates mainly to the arrangement of the flues of the furnace and has the object to provide a construction which affords large and effective heating surfaces and which permits the flues to be cleaned conveniently and without contaminating the air which flows through the heating passages of the furnace.

In the accompanying drawings, consisting of two sheets: Figure 1 is a longitudinal sectional elevation of a furnace provided with my improvements. Fig. 2 is a horizontal section in line 2—2, Fig. 1. Fig. 3 is a vertical transverse section in line 3—3, Fig. 2. Fig. 4 is a sectional plan view of the lower horizontal flues. Fig. 5 is a vertical section of the upper portion of one of the dividing flues, on an enlarged scale. Fig. 6 is a sectional plan view, on a reduced scale, showing a modified construction of the lower horizontal flues. Fig. 7 is a side elevation of the rear portion of the furnace, showing a slightly modified arrangement of the draft passages.

Like letters of reference refer to like parts in the several figures.

A represents the fire chamber of the furnace, a the side walls thereof, a' the front wall provided with the fire door opening a^2 , a^3 the rear wall provided with the direct draft pipe a^4 , and a^5 the top plate or crown sheet.

B represents the grate and b the bottom plate beneath the grate, which plate forms the bottom of the ash pit C and extends sidewise beyond the furnace and across the ascending air passages D where the plate is provided with openings d for the passage of the air.

E represents the descending flues which are preferably formed in the side walls a of the fire chamber so as to expose their inner surfaces to the heat in the fire chamber and their outer surfaces to the air which flows upwardly through the air passages D. These flues are provided on their inner walls below the crown sheet or top plate a^5 with openings e through which

the hot gases enter the flues from the fire chamber.

The casing which incloses the furnace and through which the air passes upwardly which is being heated is preferably composed of a lower portion F and an upper portion F', which latter extends with its top plate f over the top of the furnace. The lower portion F rests on the floor or other foundation and the horizontal bottom plate b rests on this lower portion and supports the upper portion F'. This foundation of the air casing or chamber is desirable when made of metal but it may be constructed of other suitable material and in any other suitable manner.

The openings or air passages d in the bottom plate b are arranged adjacent to the outer side of the fire chamber, so that the air flowing upwardly through these passages is brought into close contact with the hot walls of the fire chamber and the descending flues.

The descending flues E extend with their top portions upwardly through the top plate f of the air casing and are provided with removable covers g , or are otherwise so constructed that the closure of their upper ends can be removed when access is required to the flues for cleaning the same. The descending flues connect at their lower ends, below the bottom plate b , with longitudinal horizontal flues H which are provided on their upper sides with collars h for the reception of the upright flues. These longitudinal side flues connect at their front ends with a transverse flue I which in turn connects at its middle with a longitudinal central exit flue K which extends rearwardly to the smoke pipe or chimney L. As shown in Figs. 1, 2 and 4, this exit flue receives in rear of the air casing the descending direct draft flue M which extends from the direct draft pipe a^4 down to the rear portion of the central exit flue K and which is provided with a damper m . If desired, however, the direct draft pipe a^4 may be directly connected with the chimney L, as represented in Fig. 7. When the damper is closed the draft passes from the fire chamber downwardly through the flues E, forwardly through the longitudinal side flues H, inwardly through the transverse front flue I, and rearwardly through the central exit flue K to the chimney.

The longitudinal side flues extend with

their rear ends through the rear wall of the air casing and are provided with removable end pieces or covers *h'* or otherwise so constructed that the flues can be readily opened 5 for cleaning. The transverse front flue extends with its ends through the side walls of the air casing and has its ends similarly closed by removable end pieces or covers *i*. Upon removing the covers of the upright 10 flues *E* the ashes, soot, &c., deposited in these flues can be dislodged and collected in the horizontal bottom flues *H*. Upon removing the covers from the rear ends of these flues the ashes, &c., can be removed from the same 15 partly at the open rear ends and partly by moving the ashes, &c., into the horizontal front flue *I*, from which latter the ashes can be readily removed upon opening the ends of this flue.

20 As the ends of all these flues are arranged outside of the air casing the flues can be cleaned at any time without causing the air which flows through the casing from the inlet *O* at the bottom to the outlet pipes *P* at 25 the top to become contaminated by ashes, soot, &c.

The descending flues *E* are preferably provided with removable cores *Q* which occupy the central portion of each flue and 30 compel the hot gases to flow near the wall of the flue. These cores are preferably attached to the removable covers *g* of these flues, from which the cores depend, and in order to permit the cores to be easily inserted and removed, especially when the 35 available space above the air casing is limited, the cores are made in short sections which are connected by hinges *q*, or otherwise movably jointed, so that the sections 40 can be folded or placed at an angle to each other. The sections are preferably constructed of tubing to reduce their weight.

In the modified construction of the lower horizontal flues represented in Fig. 6, the 45 side flues *H* are connected at the rear instead of at the front, the rear connection being

made by a transverse flue *I'* which connects with a short longitudinal flue *K'* to which the direct draft flue *M* and the chimney *L* are connected.

A heating pipe *R* through which water circulates for heating the same may be arranged in the rear portion of the fire chamber and extend through the rear portion of 55 the air casing.

I claim as my invention:

1. The combination with an inclosing air casing, of a fire chamber arranged therein and having its top separated from the top of said casing, by an air space, and upright 60 flues which have their inner portions exposed to the heat in said fire chamber and are provided in their upper portions with inlets for the hot gases from the fire chamber and in their lower portions with exits for 65 the gases, said flues being provided above said inlets with top portions which extend through the air space between the top of the fire chamber and the top of the air casing, substantially as set forth. 70

2. The combination with an inclosing air casing, of a fire chamber arranged therein and having its top separated from the top of said casing by an air space, upright flues 75 which have their inner portions exposed to the heat in said fire chamber and are provided in their upper portions with inlets for the hot gases from the fire chamber and in their lower portions with exits for the gases, said flues being provided above said inlets 80 with top portions which extend through the air space between the top of the fire chamber and the top of the air casing, and closing devices which are removable from the upper ends of said top portions for giving access 85 to the flues, substantially as set forth.

Witness my hand this 12th day of May, 1906.

JOSEPH S. KEMP.

Witnesses:

GEO. H. EGGLESTON,
JAMES SHELLEY.