

(No Model.)

J. GRAY.  
HOT AIR FURNACE.

No. 397,979.

Patented Feb. 19, 1889.

Fig. 1.

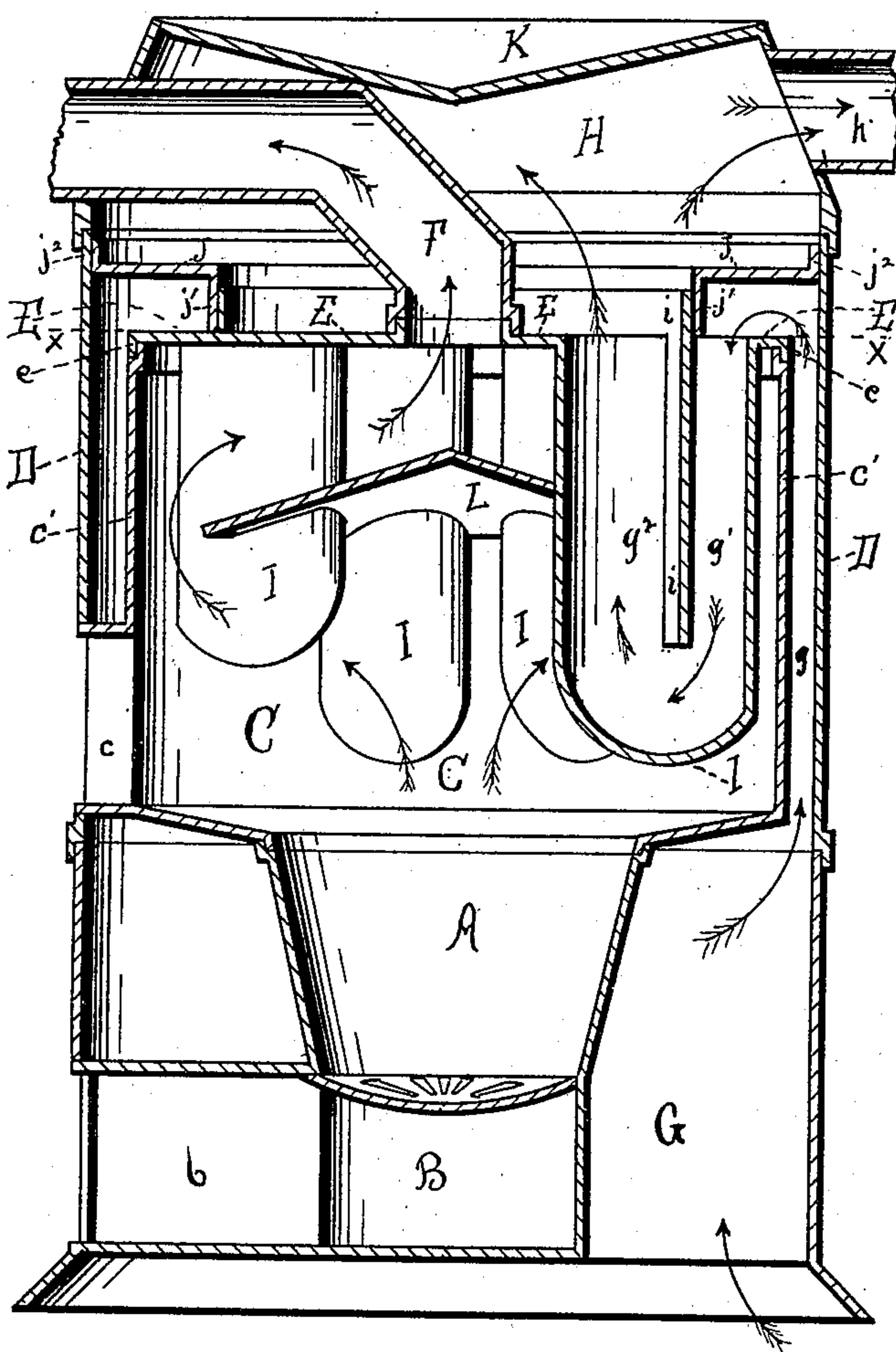
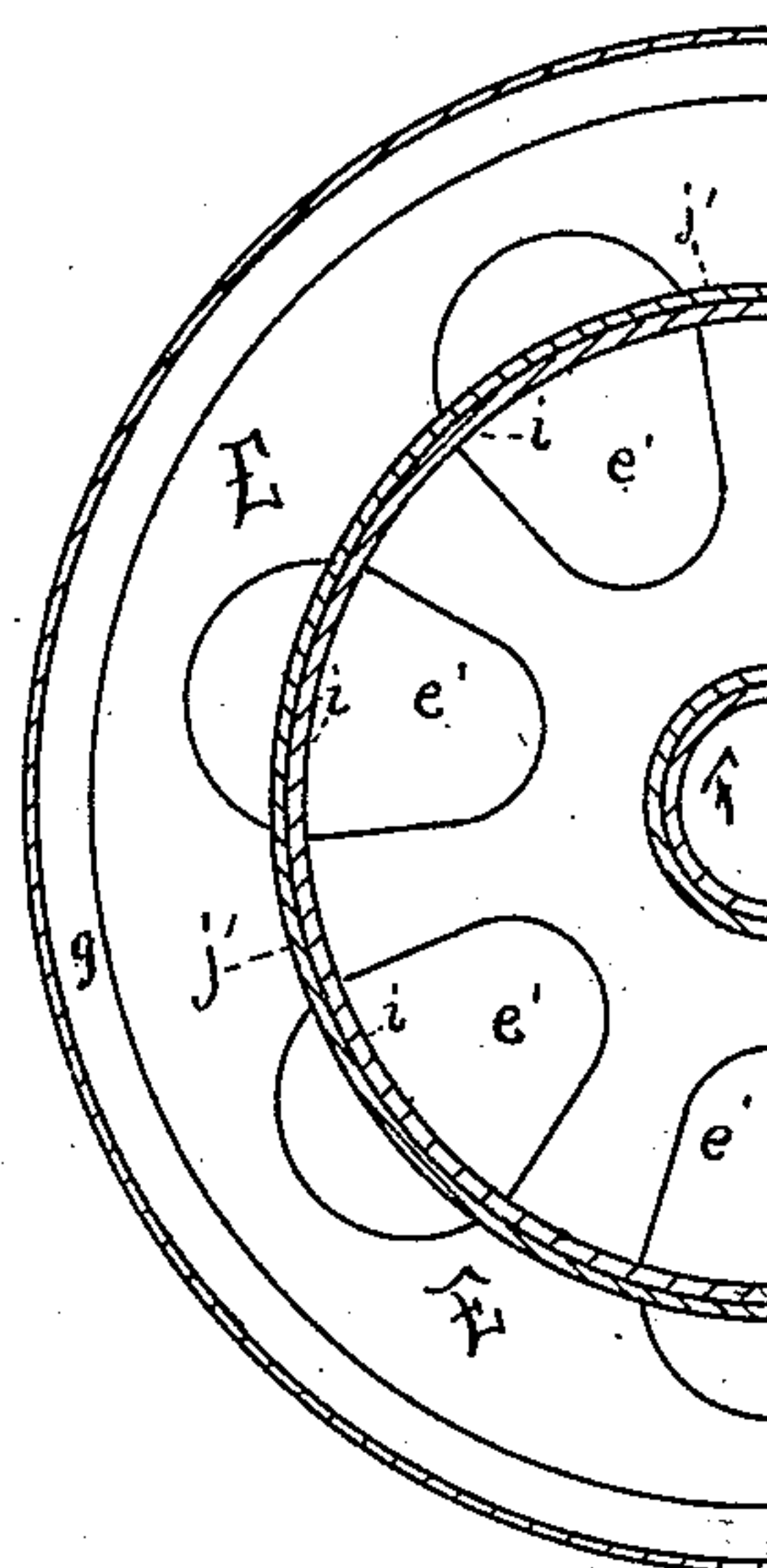


Fig. 2.



WITNESSES:

*Harry Bitner*  
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INVENTOR

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# UNITED STATES PATENT OFFICE.

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## HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 397,979, dated February 19, 1889.

Application filed March 7, 1888. Serial No. 266,458. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH GRAY, a citizen of the United States of America, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

My invention relates to that class of furnaces which are designed to heat a current of air as it passes through them, and my object is to increase the heating-surface in contact with the air as much as possible without materially obstructing either the air-passages or the smoke-flues. Many furnaces have been constructed with this end in view, the greater number of which leave the smoke-flue as direct as practicable and lead the air through passages projecting into the combustion-chamber. These passages have been commonly made in the form of annular rings, usually concentric with the fire-pot and combustion-chamber. The great disadvantage attendant upon this construction is the lack of free communication between the portion of the combustion-chamber within and that without this ring.

My invention consists in dividing up these annular rings into a series of pockets or separate passages, leaving room enough between them to allow the hot gases to circulate freely between and around the same, and combining with said pockets a deflector, preferably located directly over the fire-pot and obstructing the passage leading directly upward from the fire, thereby compelling the hot gases to pass out between and around the pockets before escaping up the chimney.

In the accompanying drawings, Figure 1 is a vertical section of a furnace, showing my improvements, taken in a plane passing through its center; and Fig. 2 is a horizontal section taken in the line *xx* of Fig. 1.

I have chosen as a means of illustrating my invention a portable furnace of the style and shape in common use. It is hardly necessary to state that they can be as well applied to any other form of furnace. In this furnace A is the fire-pot; B, the ash-pit; *b*, the opening into the ash-pit; *c*, the feed-door, and F the smoke-pipe.

The combustion-chamber C is centrally located in the furnace, and is inclosed by a wall, *c'*, which, with the exterior casing of the furnace D, forms an annular air-passage, *g*, opening into the cold-air chamber G, connected in the usual manner with the cold-air supply. Over the combustion-chamber is placed the cap or cover E, fitted tightly upon the wall *c'* by means of the flange *e*. This cap is provided with a series of perforations or holes, *e' e'*, and into these holes are fitted a number of tube-like pockets, I I, extending downward almost to the bottom of the combustion-chamber and containing partitions *i i*, projecting downward into the same, dividing the interior into two passages or flues, *g'* and *g''*, connecting at the bottom.

Between the upper ends of the partitions *i i* and the outer casing, D, of the furnace is fitted an annular plate or partition, J, having at its inner edge a downwardly-projecting flange, *j*, which rests upon the cover E of the combustion-chamber, and is fitted closely to the upper edge of the partitions *i i*, and at its outer edge a projecting flange, *j''*, forming a tight joint with the outer casing, D, of the furnace. It will be noticed that this partition J cuts off all communication between the outer air-space, *g*, and the hot-air chamber A, except by means of the pockets I I through the flues *g'* and *g''*.

In the central portion of the combustion-chamber is placed the deflector L, preferably closing the central flue surrounded by the pockets I I, and extending out a short distance between these pockets. The exact location of this deflector will be governed by the style of furnace used, and any form of deflector may be employed which is adapted to the furnace; but I prefer the cone-shaped deflector shown in the drawings placed with the apex pointing upward, inasmuch as this form is easily cleaned by tapping it with a hammer.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hot-air furnace, the combination of the combustion-chamber with a series of pockets projecting into the same through which the air circulates, and with a deflector located above the fire-pot and between these pockets to



throw the heated products of combustion out between and around the same before passing off up the chimney, as and for the purpose stated.

- 5 2. In a hot-air furnace, a series of pockets through which the air circulates projecting downward into the combustion-chamber, in combination with a deflector located above the fire-pot and between these pockets, and an  
10 escape-flue for the smoke centrally located

above said deflector, whereby the greater portion of the heated gases from the fire will be made to pass outward between said pockets and back again between the same before passing off up the chimney, as and for the purpose stated. 15

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Witnesses:

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