(No Model.) 2 Sheets—Sheet 1.

T. A. McKIBBIN.

FURNACE.

No. 558,737. Patented Apr. 21, 1896.

Fig. 1.

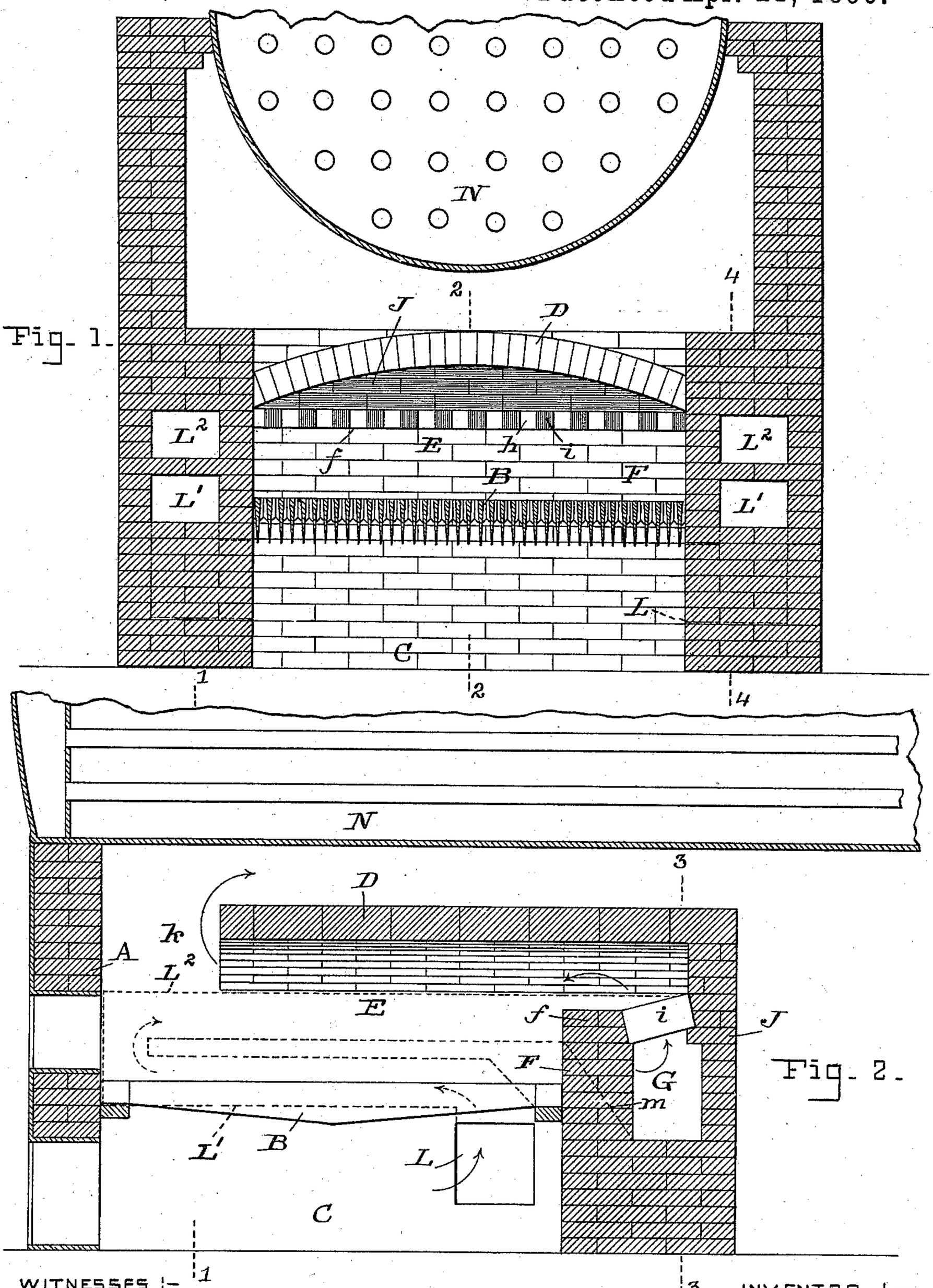


Fig. 2.

WITNESSES :—

Lee I. VanDorn.

Charles B. Mann Jr.

INVENTOR :—

Thos. A. McKibbin

By Chas B. Mann

ATTORNEY :

(No Model.) 2 Sheets—Sheet 2.

T. A. McKIBBIN.

FURNACE.

No. 558,737. Patented Apr. 21, 1896.

Fig. 3.

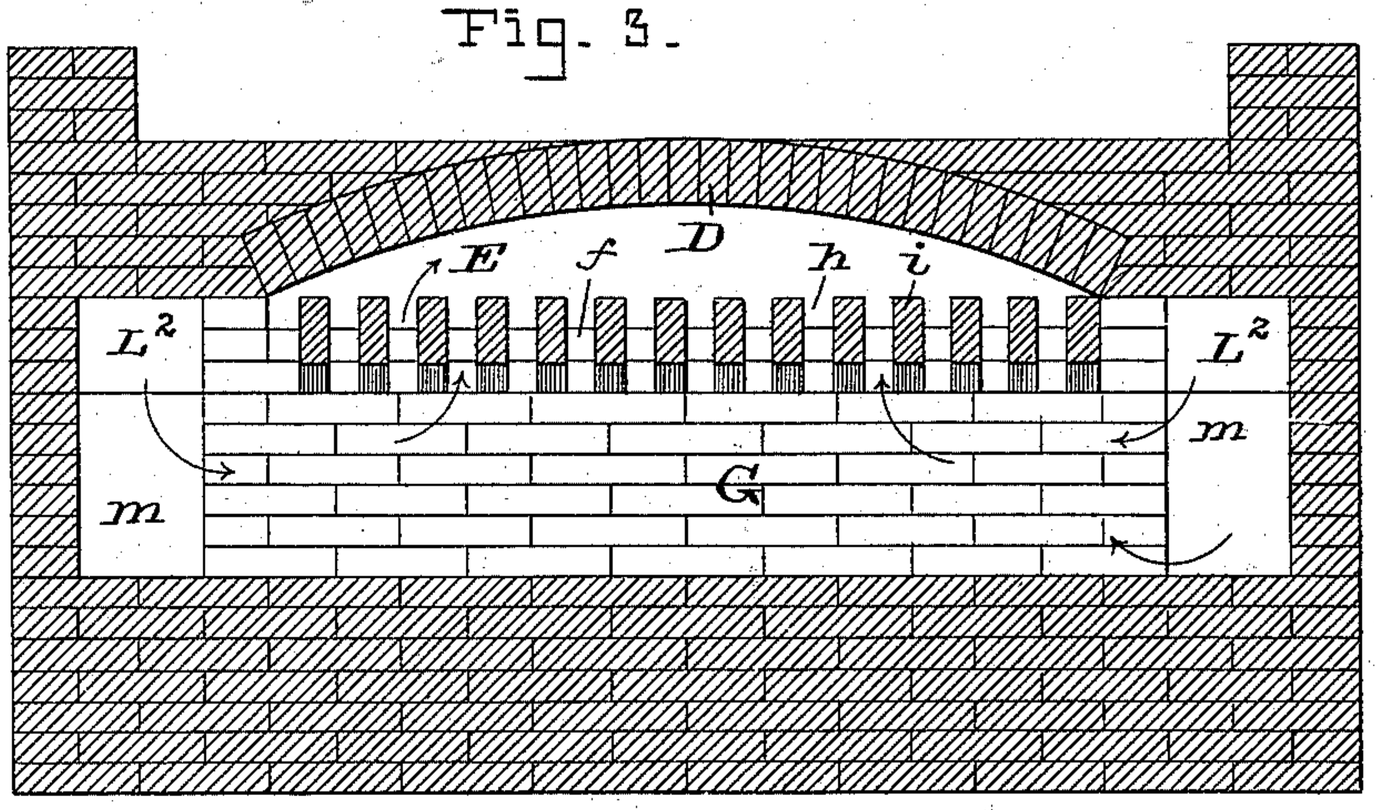
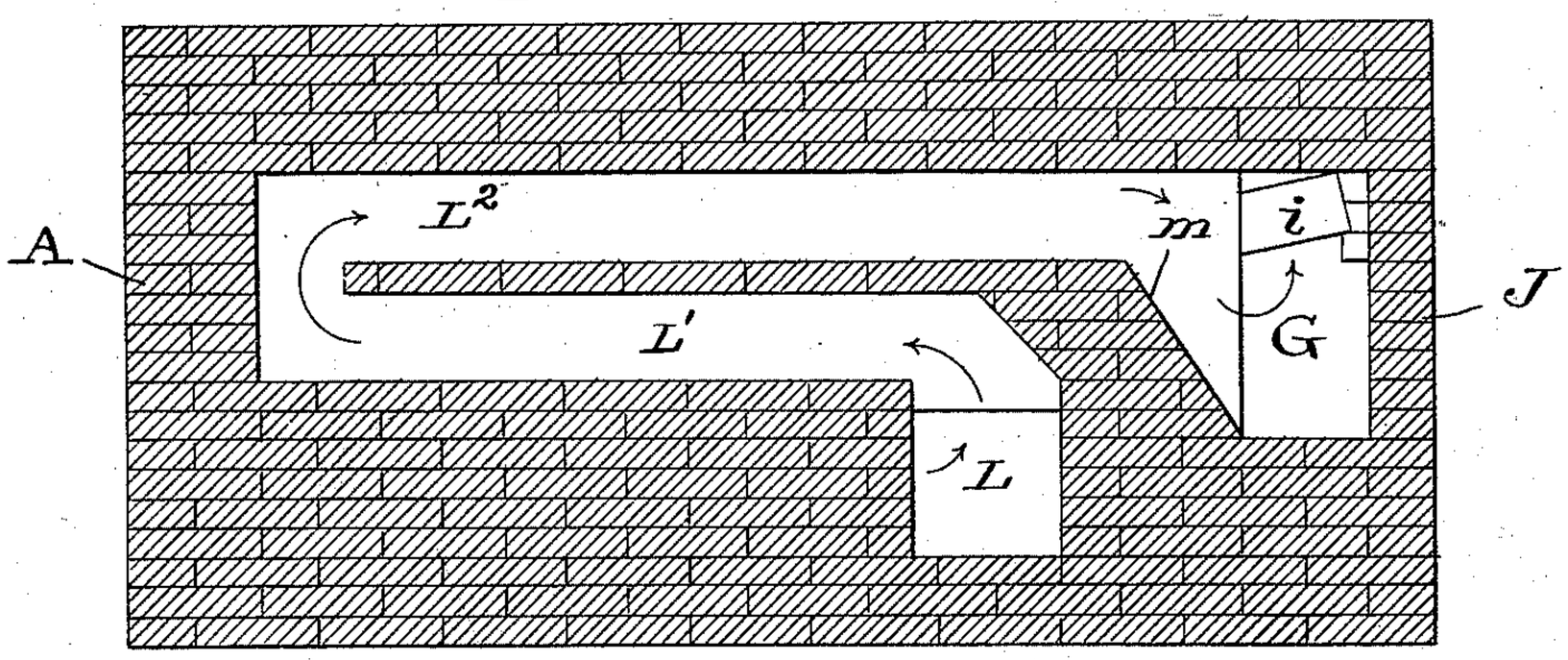


Fig. 4.



WITNESSES:-

Lee D. Vandtorn.

Charles B. Mann Jr.

INVENTOR:-

Thos A. McKibbin

By Chas B. Mann

ATTORNEY.

UNITED STATES PATENT OFFICE.

THOMAS A. McKIBBIN, OF BALTIMORE, MARYLAND.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 558,737, dated April 21, 1896.

Application filed February 11, 1896. Serial No. 578,942. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. McKIBBIN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to an improved furnace of that class in which the products of combustion are mingled in the combustion-chamber with highly-heated atmosphere admitted by passages to that chamber to form a gas which is ignited and consumed. The furnace and the air-passages are all made of brick; and the invention consists in the improved construction described and claimed.

In the accompanying drawings, Figure 1 is a front end elevation in vertical section, taken on the line 1 1 of Fig. 2. Fig. 2 is a central longitudinal vertical section on the line 2 2 of Fig. 1. Fig. 3 is a vertical cross-section of the furnace at its rear end, taken on the line 3 3 of Fig. 2. Fig. 4 is a longitudinal vertical section of one of the side walls. This section is taken on the line 4 4 shown in Fig. 1 and illustrates the parts seen when looking toward the left-hand side.

The invention is shown in the drawings as applied to a furnace for a steam-boiler. The letter A designates the front wall; B, the grate-bars; C, the ash-pit. An arch D extends across from the side walls and over the combustion-chamber E. At the rear of the grate-bars is a wall F, which forms a horizontal ledge *f* at the rear end of the combustion-chamber. A horizontal crosswise air-passage G is formed in this wall. Numerous small vertical passages *h* are formed by inclined bricks *i*, placed at the top of the rear cross-passage and resting on the said ledge *f* and the back wall J. There is an open space *k* between the front wall A and front end of the arch D. The latter extends rearward beyond the wall F and also over the numerous small passages *h* and rests against the back wall J. The open space at the front end of the arch affords a passage to the boiler for the hot products of combustion.

In each side wall at the rear end of the ash-pit and below the grate is an opening L for fresh air. A horizontal passage L′ is formed in the brickwork of each side wall and its rear end connects with said opening L. These passages L′ are on a horizontal plane even with the grate and extend from the said opening forward to the front wall, but do not open through said wall. At the front wall each passage turns upward and then doubles backward at L^2 and extends horizontally as far as the wall F, and finally both passages open into or connect with the crosswise air-passage G. The double-back or rearward-extending portion L^2 is on a plane above the lower forward-extending portion L′. At the extreme rear end the upper passage has a down incline *m*, where it connects with the cross-passage G.

The construction here shown in the side wall of opening L at the rear forward-projecting passage L′, which then extends rearward at L^2 above the said forward part and at the rear connects with the cross-passage G, insures that the cold atmospheric air entering at opening L and traversing said passages will be well heated by the time it enters the said cross-passage at the rear. The arrows or darts indicate the direction the air travels. When the hot air from the passages in the two side walls enters the rear cross-passage G, the hot air then passes upward through the numerous vertical passages *h* under the rear part of the arch to the combustion-chamber and then forward over the fire-bed or coals where it commingles with the smoke, gases, and products of combustion, the currents of which also move forward. The commingling of the hot air and products of combustion takes place under the arch D as the currents move forward, and the most perfect combustion results. The heat, therefore, is intensified and the hot products pass up the open space *k* at the front to the boiler N.

Having thus described my invention, what I claim is—

A furnace whose walls are brick and provided with a grate and an arch across the combustion-chamber and grate, and having at the rear of the grate a cross-wall, a cross-passage, G, in the said wall and a plural number of air-passages from said cross-passage to the rear of the combustion-chamber under said

arch, in combination with an opening, L, in each side wall below the grate and an air-passage in each side wall from said opening extending forward and then doubling back or extending rearward above said forward part and finally connecting with said rear cross-passage.

In testimony whereof I affix my signature in the presence of two witnesses.

THOMAS A. McKIBBIN.

Witnesses:
CHARLES B. MANN, Jr.,
C. CALVERT HINES.