

No. 695,975.

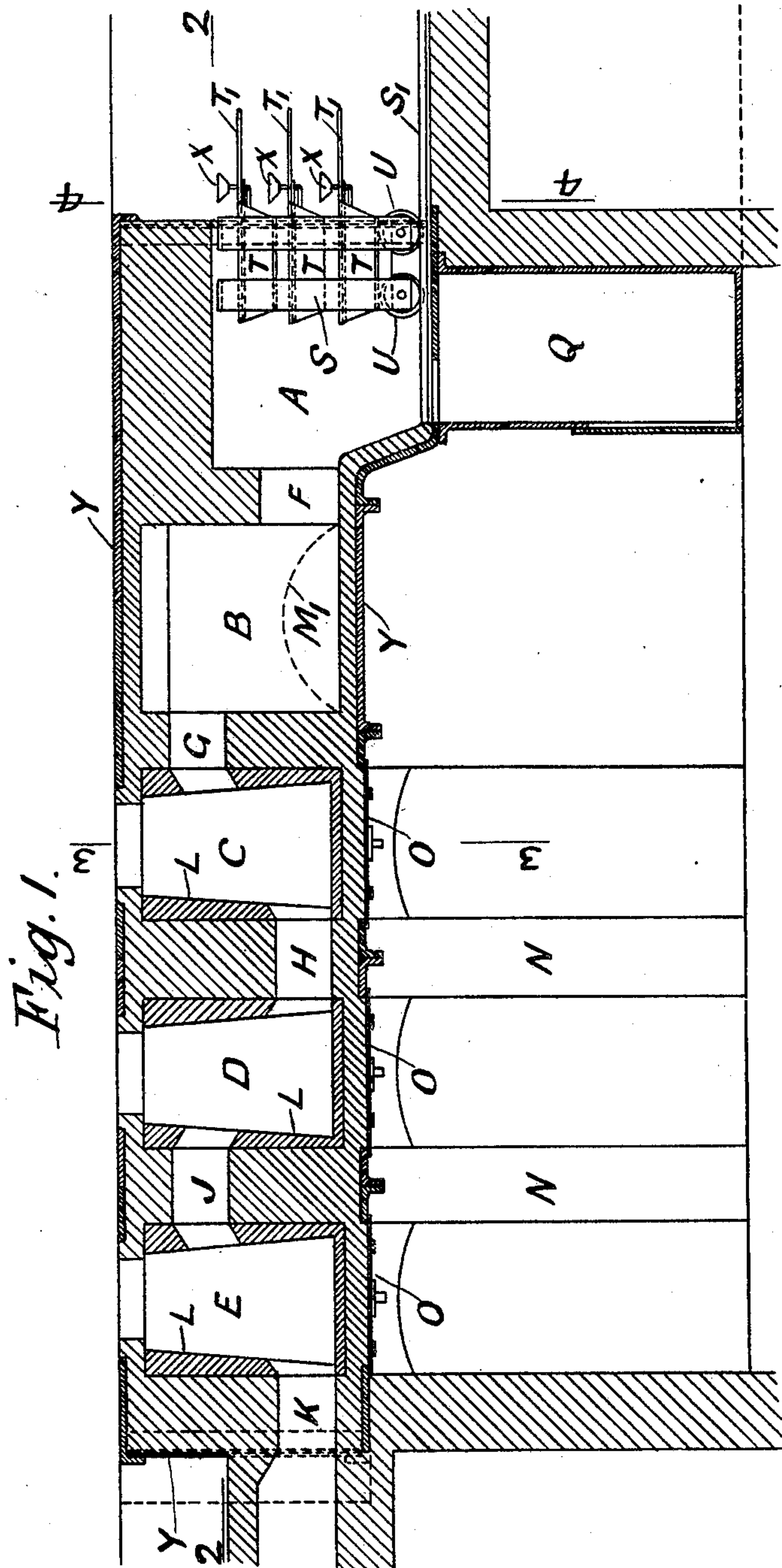
Patented Mar. 25, 1902.

J. WARD.  
FURNACE.

(Application filed Dec. 21, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses  
*A. J. Shadew*  
*E. M. Moore*

Inventor  
*James Ward*  
by his Attorney *R. H. Alden*

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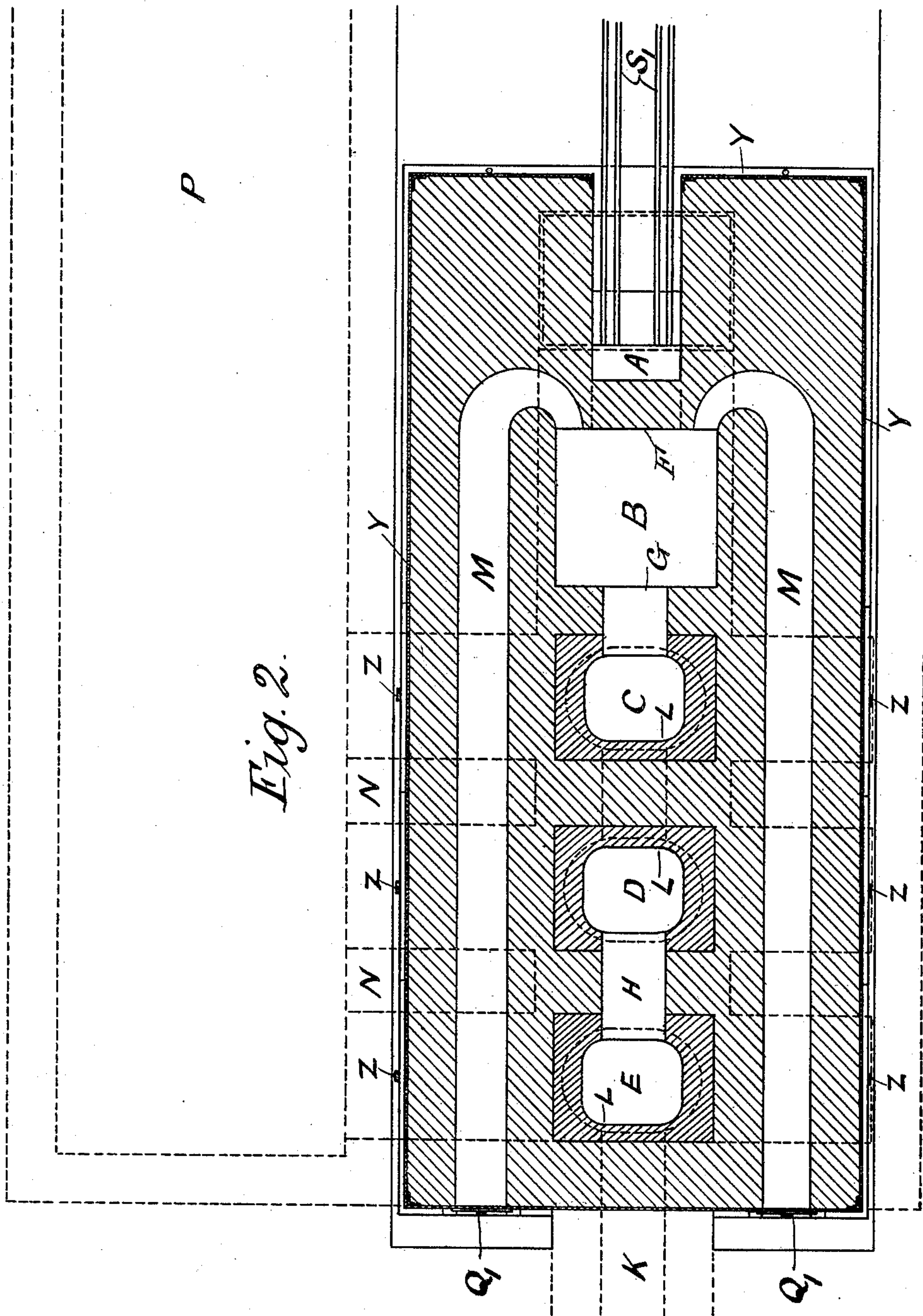
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(Application filed Dec. 21, 1901.)

(No Model.)

3 Sheets—Sheet 2.



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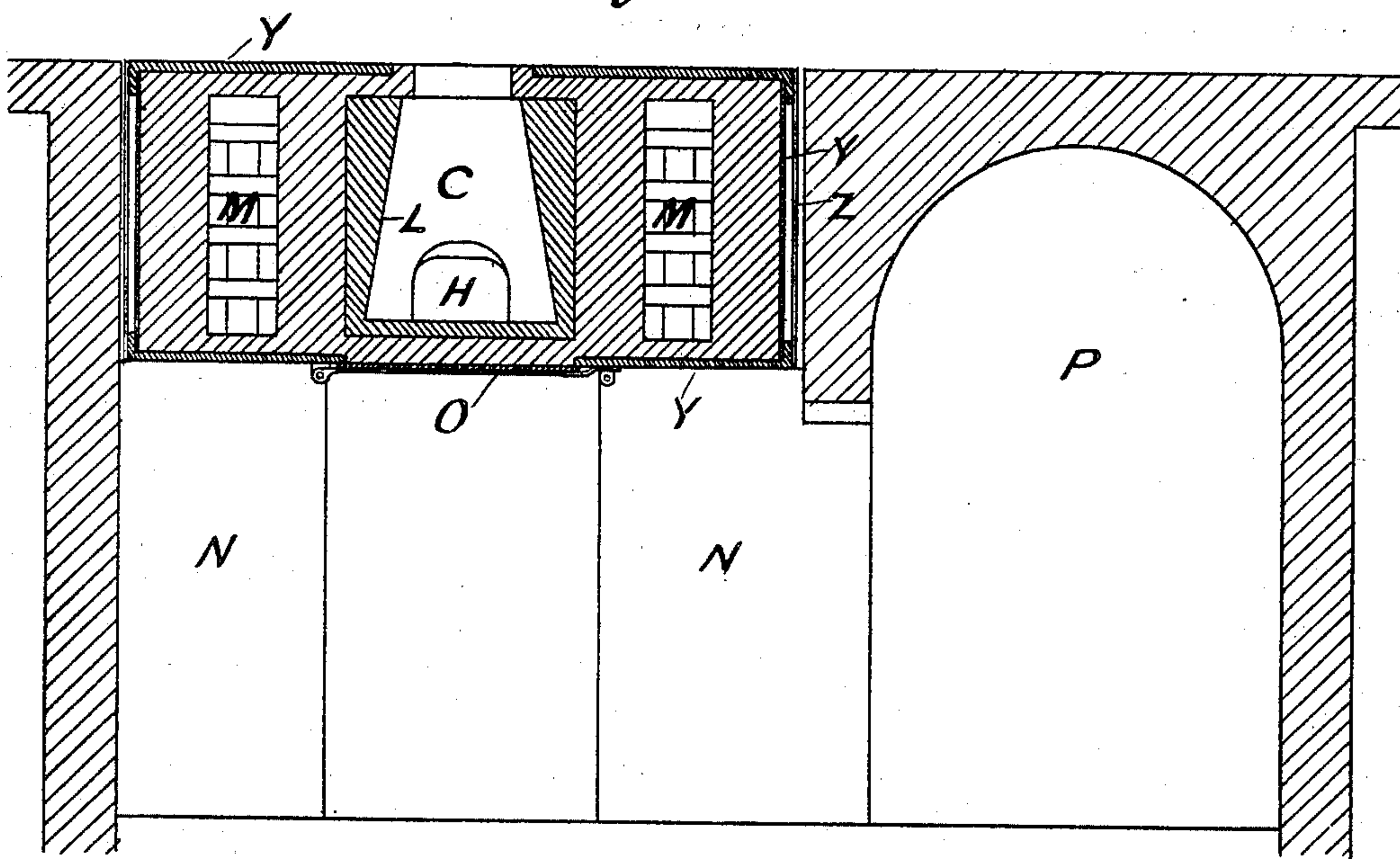
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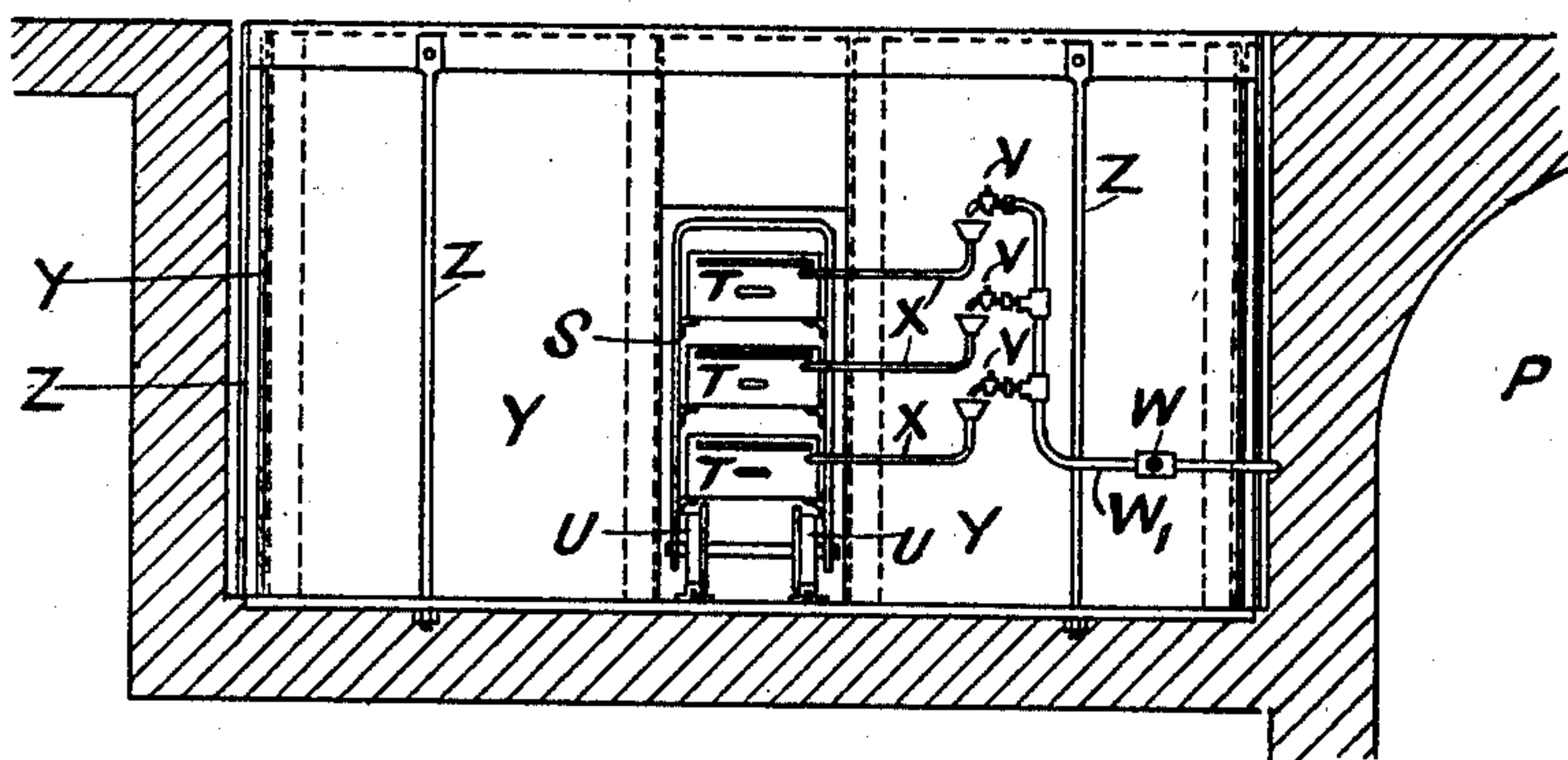
(No Model.)

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*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

JAMES WARD, OF NEWCASTLE-UPON-TYNE, ENGLAND, ASSIGNOR TO  
INTERNATIONAL OIL FURNACE COMPANY, LIMITED, OF NEW-  
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## FURNACE.

SPECIFICATION forming part of Letters Patent No. 695,975, dated March 25, 1902.

Application filed December 21, 1901. Serial No. 86,841. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES WARD, a subject of the King of England, residing and having my post-office address at 86 Pilgrim street, Newcastle-upon-Tyne, in the county of North-  
5umberland, England, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to that type of furnace in which the furnace-gases pass through a series of chambers and the combustible fuel used is crude or refined petroleum, paraffin, or other suitable mineral oil. According to the present improvements I combine, with the  
15other elements of this furnace a mixing-chamber in which the gas or vapor from the fuel is mixed with heated air, said mixing-chamber being interposed between the fuel-vaporizing chamber and the first of the series of furnace-chambers proper, by which  
20means a flame of great heat is obtained capable of melting steel, brass, and others of the hardest metals or alloys and other materials.

The improvements also relate to other details of construction, as will be hereinafter described, and pointed out in the claim.

In the annexed drawings, Figure 1 is a longitudinal vertical section of the furnace. Fig. 2 is a horizontal section on line 2 2 of Fig. 1; Fig. 3, a cross-section thereof on the line 3 3  
30of Fig. 1. Fig. 4 is a sectional end elevation taken upon the line 4 4 of Fig. 1.

The furnace consists of a suitable number of chambers A B C D E, arranged, preferably,  
35adjacent to each other, and the fuel used is preferably crude petroleum, paraffin, or other suitable mineral oil; but refined oil may also be used. The fuel is vaporized in the first chamber A. In the second chamber B the  
40vapor or gas is heated and mixed with heated air, and combustion takes place. The third chamber C and following chambers (if any) D E, to the number of which I do not confine myself, are the melting-chambers. The melt-  
45ing-chamber C or melting-chambers C D E is or are lined with refractory material L of suitable shape and size and have hollow side walls.

The furnace is carried on a series of pillars

or walls N, of brickwork or the like, the height of the pillars being such that convenient access can be obtained to the under side of the furnace. A door O, which opens downward, is provided in the bottom of each melting-chamber and is kept closed by any convenient means. When closed, the brickwork, &c., forming the bottom of the melting-chamber is built upon it. In case of accident or necessity the door can be opened and the brickwork knocked out. Below the foundry  
50or other floor a covered passage or arched way P, of suitable height and preferably parallel longitudinally to the furnace, provides means of access to the under side of the furnace. Openings in the back or other suitable place of the furnace admit air into the passages M M, formed by the hollow walls on each side of the melting-chambers. The  
55openings may be closed by doors or slides Q' Q'. The passages M M in the walls are preferably checkered and are in communication with the second or mixing chamber B, either by means of flues or ports opening into the sides of the chamber at the bottom, as shown by the dotted line M', Fig. 1, or by flues or  
60ports bent around and passing through the wall between the first and second chambers, as shown in Fig. 2, and entering parallel to the gas-flue F, connecting these two chambers A and B.

The fuel is vaporized in the first chamber A by the heat imparted to said chamber in the action of the furnace. The vapor or gas passes into the second chamber B, preferably by a flue, such as F, through the wall between  
65the first and second chambers or by suitably-shaped flues in the sides of the first chamber communicating with the second chamber, where the vapor is further heated, owing to the nearer proximity of the first melting-chamber C, the wall dividing the two chambers B and C being comparatively thin. In this second chamber B the heated gas and air are mixed, the latter having been heated by passing from the back of the furnace through  
70the flues M in the hollow walls at the sides of the melting-chambers. The mixed air and gas then pass from the second chamber B by



flue or port G or several ports or passages preferably at or near the top into the melting-chamber C, thence by a flue or port H at the bottom to the main flue or stack, if there  
5 is only one melting-chamber, or otherwise to the second melting-chamber D and out by or near the top of this into the third melting-chamber E, if there are three chambers, and so on, according to the number of chambers,  
10 preferably leaving the last melting-chamber by the bottom to a flue K, leading to the main flue or stack. A box or other receptacle Q is provided under the vaporizing-chamber A for the reception of soot that may accumulate  
15 in the chamber A and have to be removed. The fuel is contained in one or more trays T, one above the other, suitably supported on a framing S, preferably a vehicular framing, in order that it may be drawn out of the furnace.  
20 As illustrated in the drawings, S' represents rails for the wheels U of frame S.  
W is a stop-valve on the fuel-supply pipe W'.  
V represents fuel-supply cocks, one for each tray.

X represents the pipes conveying the fuel 25 to the trays.

The furnace is provided with a suitable metallic casing Y for holding the whole together. Z Z represent tie-bars therefor.

I claim—

In a furnace, the combination, with a series 30 of communicating chambers arranged in a horizontal plane, of vaporizers for liquid fuel arranged in the first chamber, and air-inlet passages formed in the walls of the furnace 35 and extending longitudinally of all the melting-chambers and connected to the said second chamber which forms a combined mixing and heating chamber between the first or vaporizing chamber and the melting-chambers, 40 substantially as set forth.

In witness whereof I have signed this specification in the presence of two witnesses.

JAMES WARD.

Witnesses:

WILLIAM MEYER,  
A. H. PEBERDY.