

No. 874,452.

E. L. STINE.

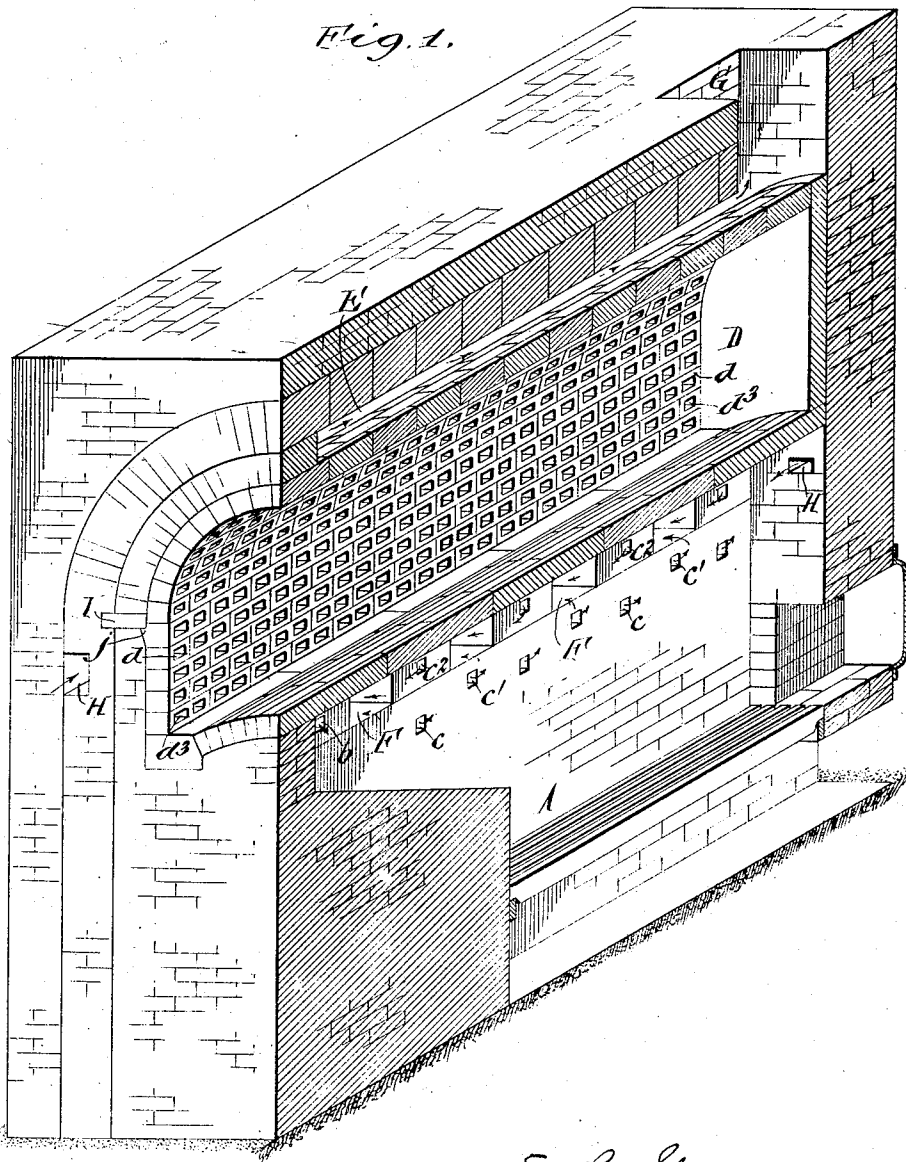
PATENTED DEC. 24, 1907.

MUFFLE FURNACE.

APPLICATION FILED MAY 23, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

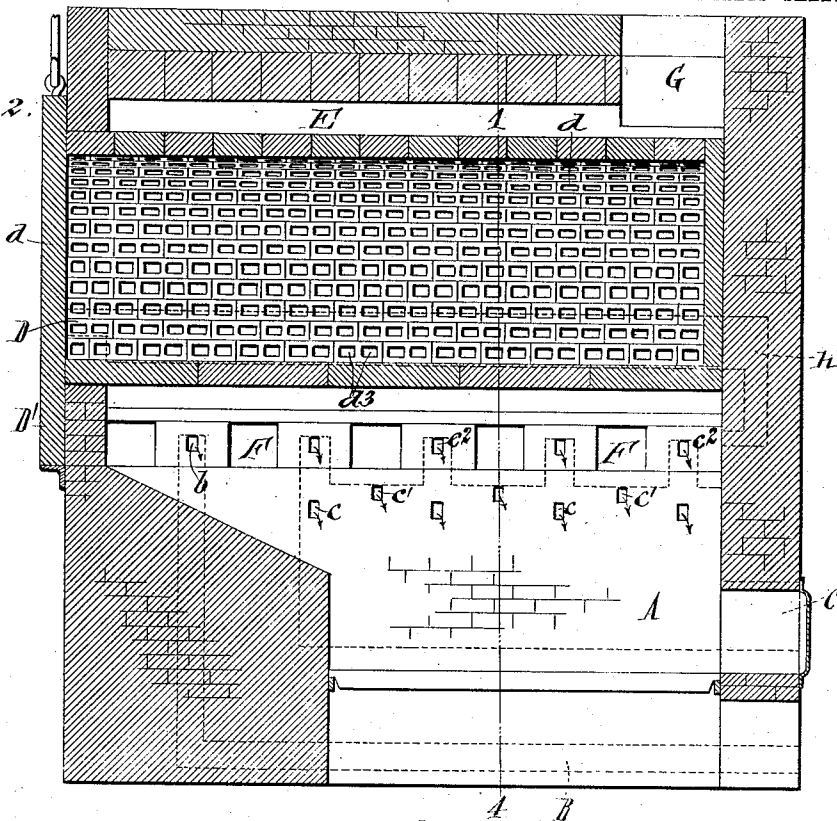
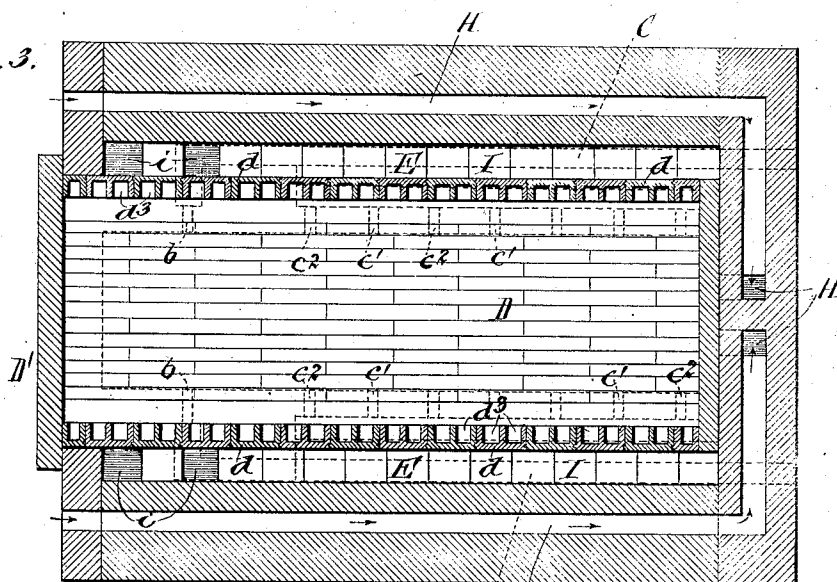


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 1.

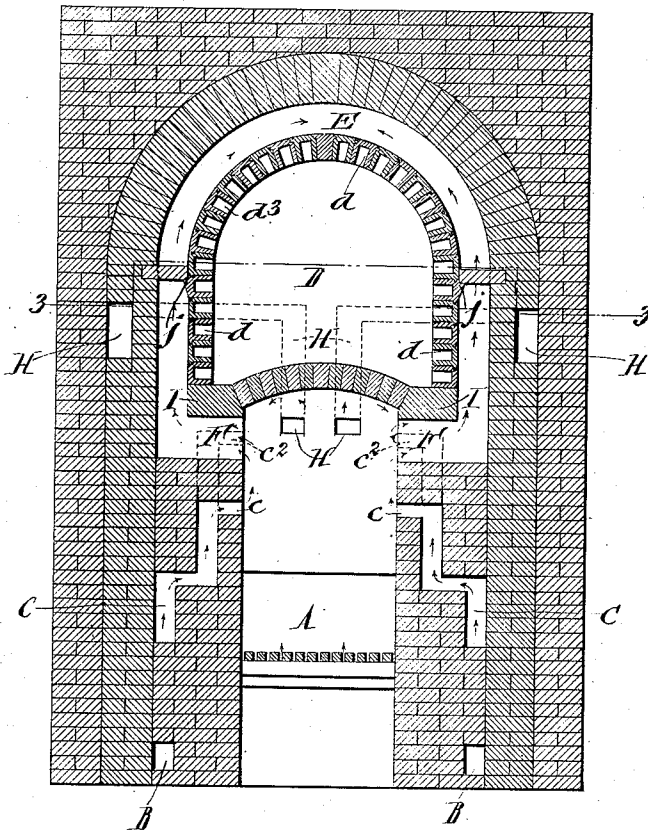


Fig. 5.

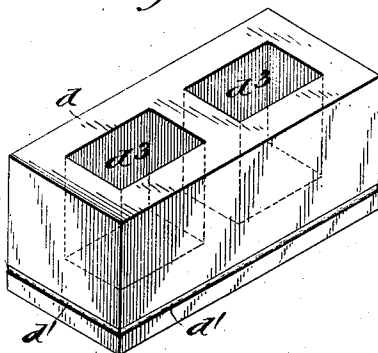
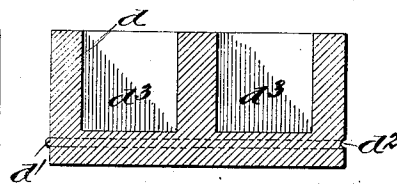


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWARD L. STINE, OF BUFFALO, NEW YORK, ASSIGNOR TO THE REPUBLIC METALWARE COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

MUFFLE-FURNACE.

No. 874,452.

Specification of Letters Patent.

Patented Dec. 24, 1907.

Application filed May 23, 1906. Serial No. 318,412.

To all whom it may concern:

Be it known that I, EDWARD L. STINE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Muffle-Furnaces, of which the following is a specification.

This invention relates more particularly to the muffle furnaces employed for baking enameled or glazed kitchen utensils and other articles having a similar coating.

One of the objects of my invention is to improve the construction of the muffle with a view of rendering its walls highly conductive and at the same time increasing their strength, in order to prevent warping of the same under the intense heat to which they are subjected.

The invention has the further object to provide the furnace with an improved arrangement of air flues for supplying heated air to the fire box to promote combustion.

In the accompanying drawings consisting of 3 sheets: Figure 1 is a sectional perspective view of a furnace embodying the invention. Fig. 2 is a central longitudinal section thereof. Fig. 3 is a horizontal section in line 3—3, Fig. 4. Fig. 4 is a transverse section in line 4—4, Fig. 2. Fig. 5 is an enlarged perspective view of one of the refractory muffle-blocks or bricks. Fig. 6 is a longitudinal section of the same.

Similar letters of reference indicate corresponding parts throughout the several views.

A is the usual fire-box or combustion chamber, and B the customary longitudinal cold air flues arranged in the lower portions of its side walls. As shown by dotted lines in Fig. 2, these flues communicate with the atmosphere at the rear end of the furnace and extend nearly to the front end thereof, where they ascend and communicate with the top of the combustion chamber, as shown at b. C indicates similar cold air flues arranged lengthwise in the upper portions of the walls of the combustion chamber and communicating with the latter by several horizontal rows of openings or transverse passages c, c', c". These flues, like the cold air flues B, open into the atmosphere at the rear end of the furnace, as shown by dotted lines in Fig. 2.

D indicates the muffle arranged above the combustion chamber and extending through-

out the length thereof, the same being closed at the rear end of the furnace and its opposite open end being normally closed by the usual sliding door D', Figs. 2 and 3.

E is the exit flue or passage for the products of combustion arranged between the sides and top of the muffle and the inclosing walls or masonry of the furnace. This flue communicates with opposite sides of the combustion chamber by a series of transverse passages F located below the bed or bottom of the muffle while at its upper rear end it communicates with the customary chimney flue G.

H, H indicate hot air flues or passages for supplying heated air to the fire box to promote combustion. These flues extend lengthwise through the side walls of the furnace from its front end nearly to its rear end, as shown in Fig. 3, thence inwardly adjacent to the closed rear end of the muffle nearly to the center thereof, thence downwardly to a point below the bottom of the muffle, as shown by dotted lines in Figs. 2 and 4, and thence forwardly into the upper rear portion of the combustion chamber. The inlet ends of the flues H open into the atmosphere at the front end of the furnace, as shown in Fig. 3. Their main or longitudinal portions are in proximity to the hot exit flue E, so that the cold air in passing through the same becomes highly heated by the time it reaches the combustion chamber and in this condition commingles with the gases therein, greatly promoting combustion and producing a high temperature. Owing to the complete combustion thus obtained, slack coal may be burned in the furnace with a natural draft.

The side walls and the arch of the muffle are constructed of blocks or bricks d of refractory material, as fire-clay, laid in courses like ordinary bricks. The blocks are preferably provided with tongues d' and grooves d" for interlocking them, those shown in the drawings (Figs. 5 and 6) having tongues at one end and one side and grooves in the remaining end and side. Heretofore, the muffle has been built up of comparatively thin and long blocks or slabs, but this construction is objectionable because of the narrow contact or supporting edges of contiguous slabs and their consequent liability to warp and become displaced in a short time by constant exposure to the intense heat.

To overcome this objection, I employ comparatively thick blocks, as shown, which afford a wide base or bearing surface for the same. In order to permit the necessary
 5 conduction or penetration of the heat from the exit flue into the muffle, each block is provided with one or more recesses, cavities or depressions *d*³ extending inwardly from its face nearly to its back. This construction, while producing a strong and stable
 10 muffle which effectually resists warping of the blocks, renders the backs of the blocks sufficiently thin to allow the heat to pass through them. Satisfactory results have
 15 been obtained by the use of blocks nine inches long, four inches wide and four inches thick.

I indicate the horizontal series of blocks or "kickers" which span the exit flue *E* on
 20 opposite sides of the muffle and serve to retard the escape of the products of combustion into the chimney. These blocks form a tight partition between the upper and lower portions of the flue except at the front end of the furnace, where a number of openings or
 25 passages *i* are formed for the escape of the products of combustion, as shown in Fig. 3. The outer ends of these kickers are preferably embedded in the side walls of the furnace, while their inner ends rest upon ledges or supports *j* formed on or carried by the adjacent courses of blocks, as shown in Figs. 1
 30 & 4. By this construction the kickers are firmly supported at their inner as well as their outer ends and effectually prevented from sagging out of place and allowing the heat to escape too freely and ultimately dropping into the passages *F* and clogging the same.

40 I claim as my invention:

1. In a muffle furnace, the combination of the combustion chamber, a muffle arranged above said chamber lengthwise of the furnace and separated from the furnace-walls
 45 by an intervening longitudinal exit-flue for the products of combustion, and a hot air flue arranged in the side wall of the furnace lengthwise of the muffle and adjacent to said exit-flue, said hot air flue communicating

with the atmosphere and leading to the combustion chamber, substantially as set forth. 50

2. In a muffle furnace, the combination of the combustion chamber, a muffle arranged above said chamber lengthwise of the furnace and separated from the furnace-walls
 55 by an intervening longitudinal exit-flue for the products of combustion; the muffle being closed at its top and sides to isolate its interior from said flue, and hot air flues arranged in the side walls of the furnace lengthwise of the muffle and adjacent to said exit
 60 flue, said hot air flues extending from the front end of the furnace throughout the length of the exit flue and communicating at their rear ends with the combustion chamber, substantially as set forth. 65

3. In a muffle-furnace, the combination of the combustion chamber, a muffle arranged above said chamber lengthwise of the furnace and separated from the furnace-walls
 70 by an intervening exit flue for the products of combustion, and longitudinal hot air flues arranged in the side walls of the furnace adjacent to said exit flue and extending from the front end of the furnace throughout the
 75 length of said exit flue and thence inwardly and downwardly adjacent to the closed rear end of the muffle and into the combustion chamber, substantially as set forth.

4. In a muffle furnace, the combination of 80 the combustion chamber, and a muffle separated from the furnace-walls by an intervening flue for the products of combustion; the walls of the muffle being constructed of comparatively thick refractory blocks laid in
 85 courses and provided in their inner sides which face the interior of the muffle with recesses terminating short of their backs, the closed backs of the blocks forming the inner wall of said flue and preventing communication between the same and the muffle, substantially as set forth. 90

Witness my hand this 8th day of May, 1906.

EDWARD L. STINE.

Witnesses:

C. F. GEYER,
 E. M. GRAHAM.