(No Model.) 2 Sheets—Sheet 1.

E. O. GOSS.

MUFFLE FURNACE.

No. 463,401. Patented Nov. 17, 1891.

Fig. 1

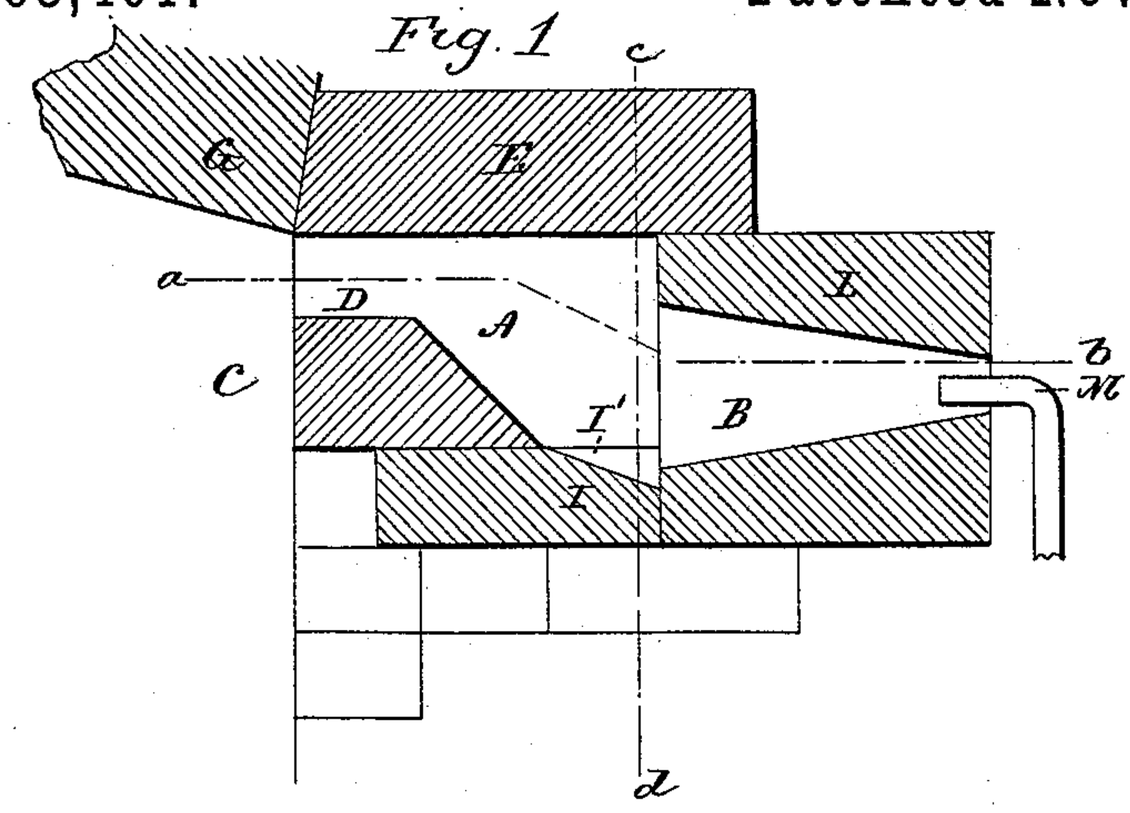


Fig. 2

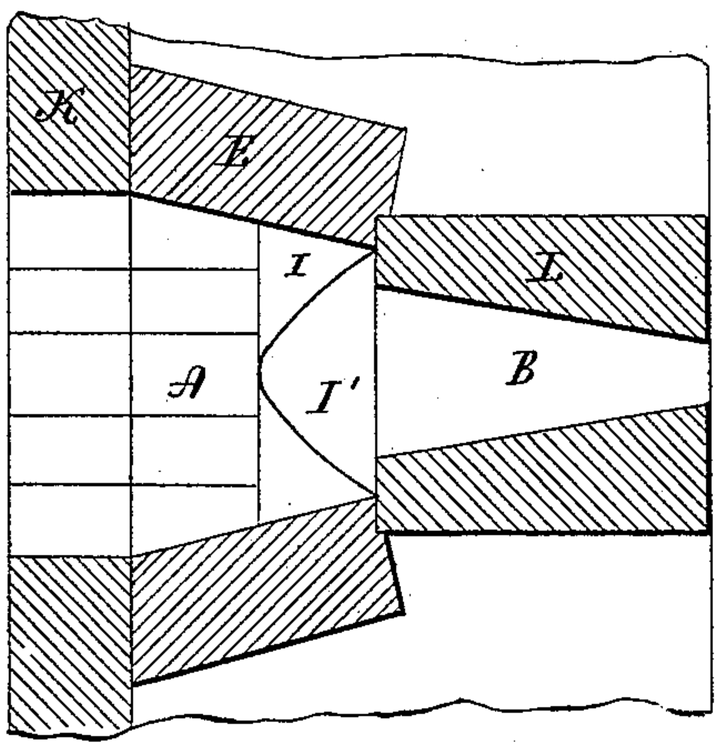


Fig. 3

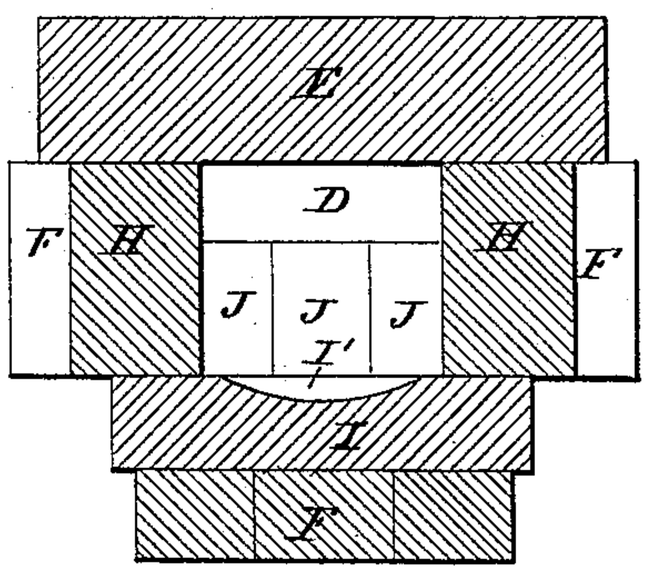
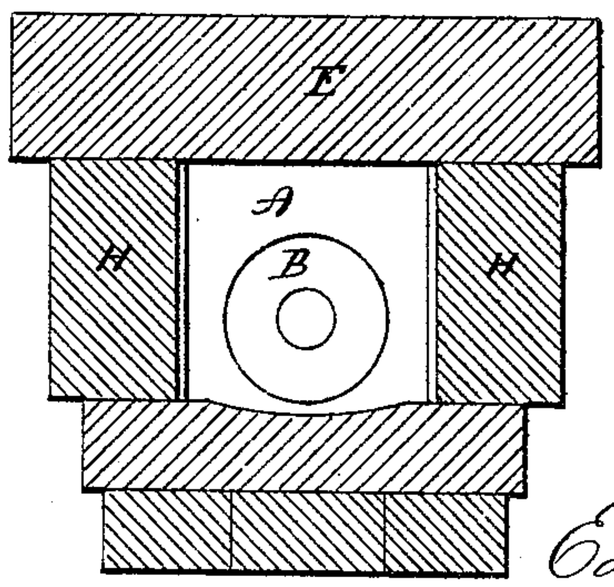


Fig. 4



Witnesses
L. F. Shumway.
L. D. Kelsey.

Edward O. Goss.
Inventor.
By Atty's
Earle & Seymour

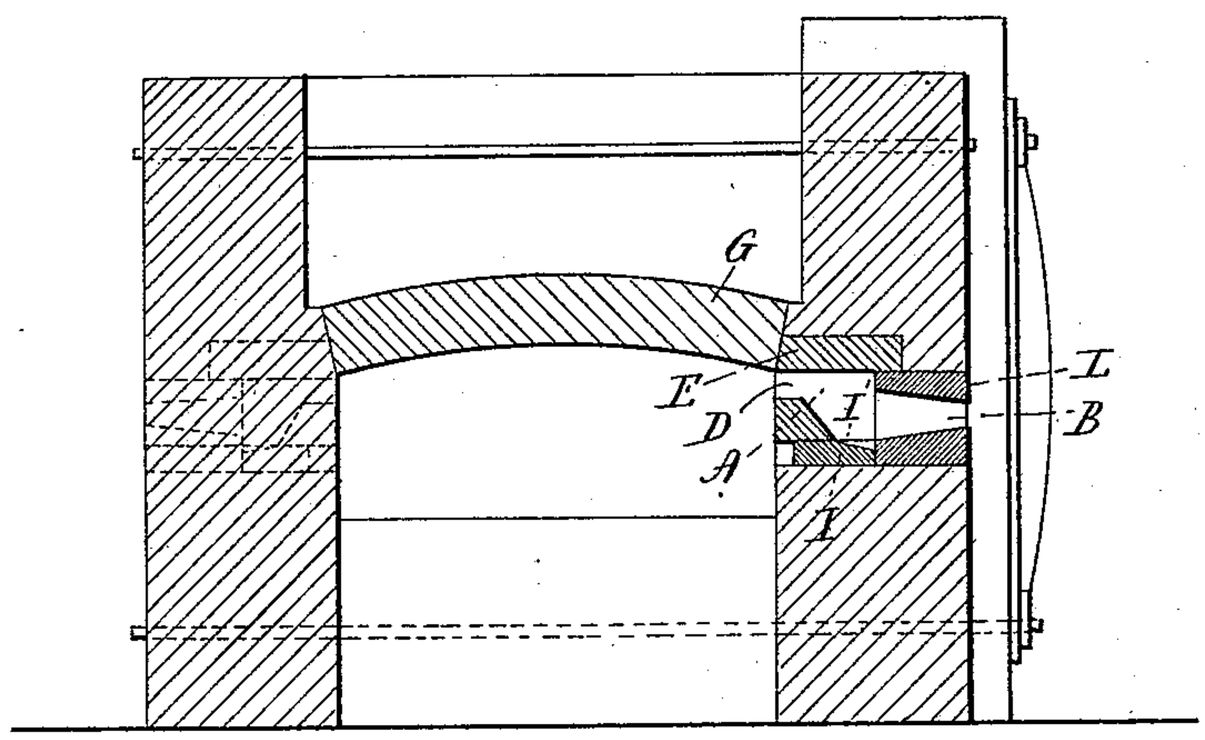
(No Model.) 2 Sheets—Sheet 2.

E. O. GOSS.

MUFFLE FURNACE.

No. 463,401. Patented Nov. 17, 1891.

Fig. 5



Witnesses
J. A. Shumway.
Lillian D. Kelsey.

Edward O. Goss
Inventor.
By atty's.
Earle & Seymour

UNITED STATES PATENT OFFICE.

EDWARD O. GOSS, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE SCOVILL MANUFACTURING COMPANY, OF SAME PLACE.

MUFFLE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 463,401, dated November 17, 1891.

Application filed November 17, 1890. Serial No. 371,668. (No model.)

To all whom it may concern:

Be it known that I, EDWARD O. GOSS, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new Improvement in Muffle-Furnaces; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in transverse section through a portion of the masonry of a muffle-furnace, showing one of my improved combustion-chambers and the adjuncts thereof in longitudinal section; Fig. 2, a sectional view of the same parts in horizontal section on the irregular line *a b* of Fig. 1; Fig. 3, a view in vertical section on the line *c d* of Fig. 1, looking inward; Fig. 4, a similar view on the same line, but looking outward. Fig. 5 is a view in transverse section through a muffle-furnace constructed in accordance with my invention and showing a combustion-chamber with the adjuncts thereof in each of its side walls.

My invention relates to an improvement in that class of muffle-furnaces which employ oil as a fuel, the object being to increase their efficiency and to render them easy of renewal and repair.

With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

As herein shown, the combustion-chamber A is located between the tapering expansion-chamber B and the muffle-chamber C, communicating directly with the former and with the latter through a long narrow horizontal discharge-opening D, leading out of its upper end, the said combustion-chamber being located substantially in line with the said expansion-chamber. The upper wall of the said chamber A is formed by a single heavy tile E, supported at its side edges upon the masonry F of the furnace and abutted at its rear edge against the end of the arch G thereof. The side walls of the combustion-chamber are formed by heavy fire-clay tiles H H, fitting closely under the tile E, above mentioned, and set edgewise, so as to converge toward each other at their outer ends upon the side edges of a heavy floor-tile I, placed flatwise and supported upon the masonry F of the furnace. The said tile I has its forward edge cut away, as at I′, so as to clear it from the destructive action of the burning fuel and air, which issues with considerable force from the flaring inner end of the expansion-chamber B aforesaid. A series of chamfered tiles or bricks J, made of fire-clay, are set edgewise side by side upon the rear portion of the tile I and virtually form a portion of the floor of the combustion-chamber, which they contract at its inner end, so as to retain the burning fuel and air therein and prevent it from shooting at once into the muffle-chamber C. These tiles or bricks J also form the floor of the long narrow horizontal discharge-opening D, which is closed at its ends by bricks or tiles of fire-clay K and has its upper wall formed by the inner edge of the large roof-tile E. The tapering expansion-chamber B is formed in a heavy block L, of fire-clay, abutted against the outer edges of the tiles H H and I, set under the outer edge of the tile E, and otherwise supported and inclosed by the masonry F. It will be apparent from the drawings and the foregoing description that either the roof-tile E or the tile L may be removed and renewed without disturbing any of the other tiles or bricks, and that by removing the tile L the tiles H H I and the chamfered tiles J may be removed or renewed without disturbing the roof-tile E. Under my construction, therefore, the furnace is made very easy of renewal and repair. It will be understood, of course, that a horizontal series of such combustion-chambers is formed in each of the side walls of the furnace; but a description of one suffices for all.

The oil is led to the contracted outer end of the expansion-chamber B by means of a burner M, which enters the same, sufficient space being left around it for the entrance of air, which is drawn inward by the currents created by the draft of the furnace and by the jet of oil, which is sprayed into the expansion-chamber under high pressure. The oil and air expand and commingle as they flow along together and ignite just before

they emerge into the combustion-chamber, where the initial and destructive combustion takes place. The incandescent and gaseous products of this combustion pass into the muffle-chamber through the discharge-opening leading from the combustion-chamber thereinto, and finally pass off, after having done their work, through the draft thereof.

The combustion-chamber is made of sufficient size to permit the required expansion of the fuel and air to permit them to burn freely and shaped at its inner end so as to prevent them from being drawn by the draft into the muffle-chamber before a thorough combustion has taken place, the discharge-opening being located above the main draft of the said chambers. By thus providing for effecting the initial or destructive combustion of the fuel and air without the muffle-chamber the metals therein are exposed only to the incandescent gaseous products of combustion, and, furthermore, a more perfect combustion is secured, inasmuch as the combustion-chamber is small and less liable to be chilled than the muffle-chamber, which must be more or less chilled all the time by the opening of the doors thereof for the introduction and removal of the metal. Under my invention, therefore, the efficiency of the furnace is increased.

I would have it understood that I do not limit myself to the exact construction and arrangement of the tiles herein shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a muffle-furnace, the combination, with the muffle-chamber thereof, of a combustion-chamber formed entirely within one of the side walls of the furnace, the said wall having a discharge-opening formed in it and leading from the upper portion of the inner end of the combustion-chamber into the muffle-chamber, and a tapering expansion-chamber located substantially in line with the combustion-chamber and formed in a single block-tile set into the said furnace-wall, the larger end of the expansion-chamber opening into the outer end of the combustion-chamber and its outer smaller end receiving a burner, substantially as set forth.

2. In a muffle-furnace, a combustion-chamber formed in the masonry of the furnace by a horizontal roof-tile, a similar floor-tile, side tiles supported by the latter, and chamfered tiles, also set up edgewise on the floor-tile, in combination with a tapering expansion-chamber formed in a single block-tile and also supported by the masonry of the furnace, the roof-tile and block-tile being independently removable, and the side, floor, and chambered tiles being removable without disturbing the roof-tile after the removal of the block-tile, substantially as described.

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

EDWARD O. GOSS.

Witnesses:
J. H. PILLING,
C. M. DEMOTT.