E. C. WILEY.

DRYING OVEN.

APPLICATION FILED AUG. 13, 1912.

1,067,087.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

Fig. 2.

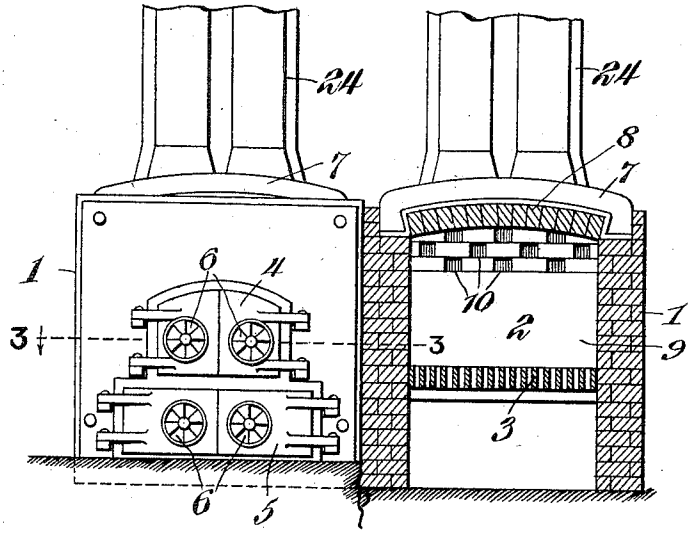
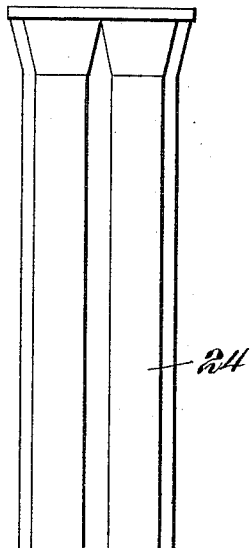
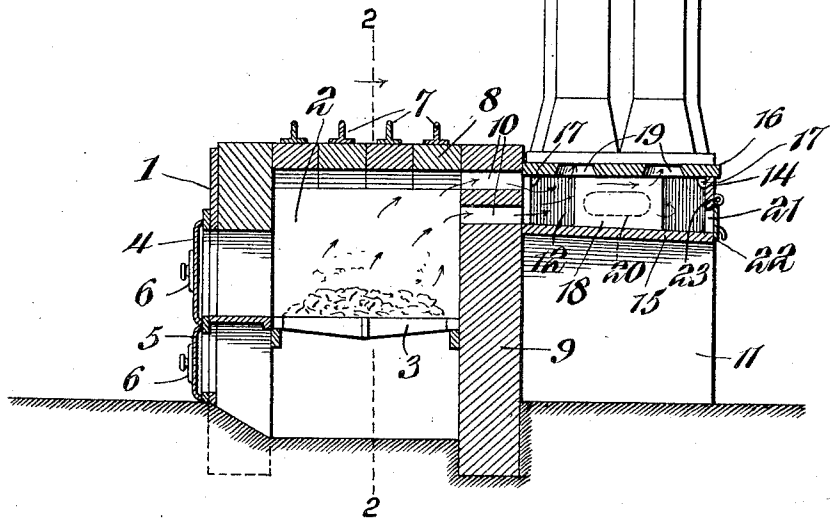


Fig. 1.





WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

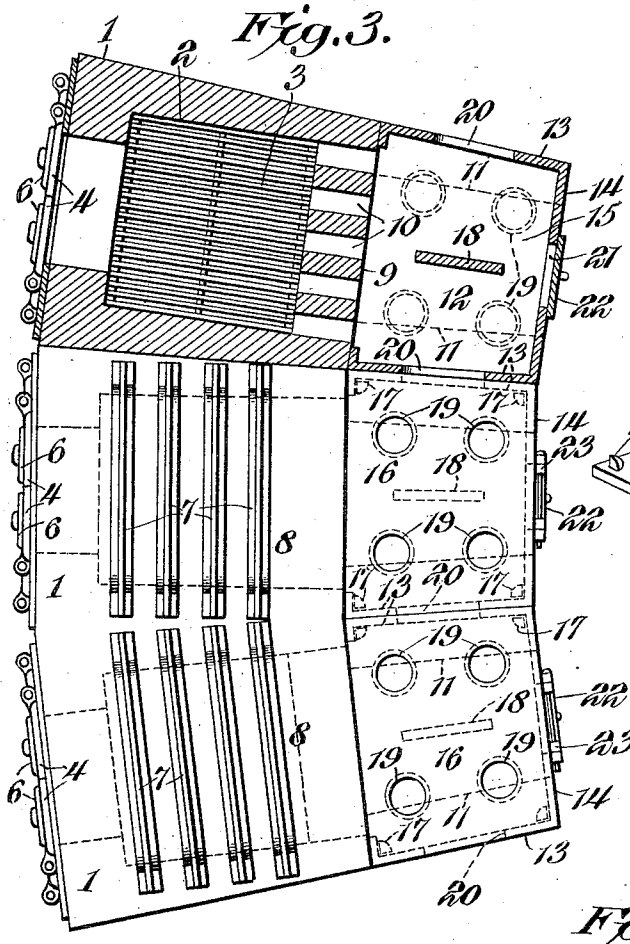


Fig. 5.

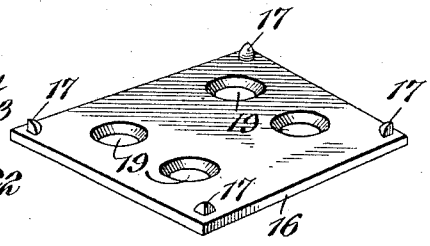
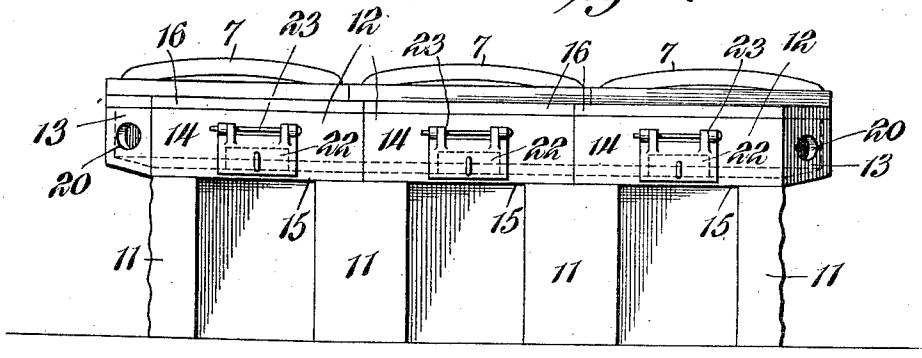


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDGAR C. WILEY, OF LYNCHBURG, VIRGINIA, ASSIGNOR OF ONE-HALF TO LYNCHBURG FOUNDRY CO., OF LYNCHBURG, VIRGINIA, A CORPORATION OF VIRGINIA.

DRYING-OVEN.

1,067,087. Specification of Letters Patent. Patented July 8, 1913.

Application filed August 13, 1912. Serial No. 714,860.

To all whom it may concern:

Be it known that I, EDGAR C. WILEY, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Drying-Oven, of which the following is a specification.

This invention has reference to improvements in drying ovens designed especially for drying pipe molds used for casting iron pipe, and its object is to provide an oven for the purpose, wherein the pipe molds may be expeditiously dried without being subjected to excessive heat.

In ovens for drying pipe molds as heretofore actually produced, it is customary to place the pipe mold directly over the fire-chamber of a furnace, so that the lower ends of the pipe molds, which molds are placed upright, are oftentimes injured by the direct action of the flames of the fire, unless, as is the custom, a plate with a small opening be placed at the upper end of the pipe mold to throttle the passage therethrough to cut down the draft to an extent that the fire will burn so low as to avoid the danger of injury to the mold. The consequence of this is that many hours are consumed in properly drying the pipe mold.

By the present invention the direct action of the flames upon the pipe mold is entirely avoided, while at the same time the full area of the passage or passages through the pipe mold is utilized for the flow of heated air and gases of combustion and the arrangement is such that complete combustion is brought about, and, furthermore, any melted metal which may escape from the mold in the casting, this operation being performed while the mold is in position with respect to the furnace, will find escape without injury to the fire-chamber or parts therein.

In accordance with the present invention there is provided a support for the mold immediately over a chamber which communicates with the fire chamber through checker brick work, wherefore the products of combustion must pass through the checker work before reaching the chamber leading to the mold, and such mold operates as a chimney, thereby improving the draft, and this draft is regulated by suitable dampers in doors located in front of the fire chamber, or, as it may be called, the furnace. Since it sometimes happens that the molten metal and casting reaches the mold supporting chamber, the latter has the bottom portion slanted away from the furnace to a door having a normal tendency to close, but opening to the pressure of molten metal, which may therefore find escape without liability of harming any part of the structure.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the further understanding that while the drawings illustrate a practical embodiment of the invention, the latter is susceptible of various changes and modifications, wherefore the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes mark no material departure from the salient features of the invention.

In the drawings: Figure 1 is a front to rear vertical elevation through a furnace and associated mold supporting chamber with a mold on the latter shown in elevation. Fig. 2 is a front elevation of a drying oven with a fire-box of an adjacent oven shown in section on the line 2—2 of Fig. 1. Fig. 3 is a plan view of associated drying ovens with one shown in section on the line 3—3 of Fig. 2, the pipe molds being omitted. Fig. 4 is a rear elevation of the group of drying ovens illustrated in Fig. 3, the molds being omitted. Fig. 5 is a perspective view of one of the cover plates of the mold carrying chamber inverted.

It is customary to place the drying ovens in a pit and to arrange them in series, usually in a curved series, about a center coincident with the center of the pit, but this arrangement is not at all obligatory, and one or more drying ovens may be employed as may be found desirable. Since the ovens are all alike, a description of one will answer for all. Each oven comprises a furnace 1, inclosing a fire-chamber 2 in which is located a grate 3, more or less conventionally shown in the drawing. The front wall of the furnace is provided with suitable openings having doors 4, 5, respectively, above and below the grate line, and these doors have draft controlling devices 6.

The top of the furnace may be constructed in any convenient manner, but preferably is

provided with arch bars 7 carrying fire-brick 8. The furnace is provided with a rear wall 9, that wall having the doors 4, 5 being considered the front wall, and at the upper portion of the wall 9 below the line of the cover of the fire chamber are passages 10 formed by a checker construction of the brick of which the wall 9 is usually constructed.

At the rear of the furnace are supports 11 upon which is mounted a box 12 preferably of cast iron of suitable weight, and this box has side walls 13 and a rear wall 14 and is open coincident with the passages 10. The box has also a bottom 15 slanting downwardly or declining from the passages 10 toward the wall 14. The box is provided with a cover plate 16 having corner lugs 17 adapted to the interior corners of the box, so that the plate may be readily placed or removed, and when in place will hold its position. Rising from the bottom 15 of the box is a web support 18 designed to engage the plate 16 about midway of its length to aid in supporting the weight. At appropriate points through the plate 16 are passages 19 preferably flaring toward the under side of the plate. Each side wall 13 of the box is provided with a passage 20 designed to match a similar passage in the corresponding side wall of an adjacent box. The rear wall 14 of the box has through it a passage 21 normally closed by a door 22 provided with a hinge support 23 at its upper edge, so that the door hangs pendently in normally closing relation to the passage 21.

The plate 16 is designed to carry a pipe mold 24 in an upright position, so that the pipe mold may be dried, and while still in the same position upon the plate 16, the casting is made, the molten metal being poured in the then upper end of the mold.

Considering the operation of a single oven, let it be assumed that a pipe mold 24 is located on the cover plate 16 of a box 12 and that suitable fuel is placed upon the grate 3 and is burning, it being understood that the grate 3 with fuel thereon may be taken as indicative of any fuel, and means for burning the same, since the kind of fuel used, whether liquid or solid, or whatever be the means for producing appropriate heat is not in itself a part of the present invention so long as some appropriate heat producing means be present. The flame of the burning fuel or the heated gases within the fire-chamber of the oven find escape through the passages 10, and these passages in the checker brick work are productive of more complete combustion than would be the case in the absence of such checker brick work. The hot gases now free, or practically so from flame are distributed through the interior of the box 12 and through the openings 19, which latter match appropriate passages through the mold 24 and in accordance with the present invention they find unrestricted passageway through the mold, since it is neither necessary nor desirable to restrict such passageway by the use of a top plate for the mold with small openings as has been the custom heretofore. The fire within the fire chamber of the oven is readily regulated by means of the doors 4 and 5 and the dampers 6 therein, while the mold 24 acts as a chimney to create a strong draft which may be controlled effectively by the dampers 6 and doors 4 and 5. By this means the mold is protected from direct contact with the flame and the lower end of the mold is not subjected to the destructive action of superheating as is liable to occur with drying ovens as customarily constructed with the mold directly over the fire chamber. Nor is it at all necessary to choke back the flame from the burning fuel by throttle means at the top of the mold, as has been found necessary in the drying ovens as customarily employed. The consequence is that the drying of the mold is performed in far less time than heretofore, and without the least danger of injury to the mold by super-heating.

The molten metal is poured into the mold while the latter is still resting upon the plate 16. Sometimes through some defect in the mold some of the molten metal will escape, and if this occurs the molten metal will flow through the holes 19, or one or more of them into the box 12 and upon the sliding bottom 15 along which the molten metal will gravitate to the door 22, and as such door is held in place solely by gravity, it will yield to the flow of the molten metal, which latter thereupon escapes from the box without injury to any part of the structure.

Where a series of furnaces are placed side by side, as indicated in part in Fig. 3, the openings 20 match and this produces an equalization of the heat, for if one furnace be burning poorly it will receive heat from the next furnace through the openings 20.

By the present invention each furnace will furnish heat for a single mold or a very small group of molds, so that the heat is practically equalized with respect to the molds and they are dried nearly simultaneously, this being due to an extent to the use of the boxes 12 which may be termed distributing boxes.

By the present invention large quantities of comparatively moderately heated air are passed through the molds instead of in the prior methods as practised, directing small quantities of very hot gases through the molds. Again, the brick checker work between the furnace and the distributing boxes splits up the flame and acts as a barrier to prevent the direct action of the fire upon the molds, while the high temperature of the checker work facilitates the complete com-

bustion of the gases before entering the distributing chamber or box. This checker work provides a means for also thoroughly mixing and heating cold air admitted over the top of the fire. The removable cover plate 16 provides for the interchange of cover plates to accommodate different sizes and types of molds to be dried.

The furnace as shown is designed for the use of coke or coal, but it will be understood that oil may be employed with the customary changes familiar to constructing engineers to provide for the use of the last-named fuel.

What is claimed is:—

1. In a drying oven, a furnace provided with a combustion chamber, and a distributing chamber on a level with the upper portion of the combustion chamber and having direct connection therewith for the passage of the products of combustion, said distributing chamber being provided with a top member constituting a support for the mold and having a free and unrestricted passage in position to communicate with the interior of the mold to constitute said mold a chimney, said furnace being provided at the end remote from the distributing chamber with controllable means for the inlet of air.

2. In a drying oven, a furnace provided with a combustion chamber, and a distributing chamber on a level with the upper portion of the combustion chamber and connected therewith by a plurality of direct passages for the products of combustion, said distributing chamber being provided with a supporting plate for a mold constituting the top of the distributing chamber and having a free and unrestricted passage therethrough for communication with a mold placed thereon to constitute said mold a chimney or flue for the furnace.

3. In a drying oven, a furnace having means for accommodating fuel and a combustion chamber thereabove with draft means opening both above and below the fuel accommodating means and with a checkered outlet through one side wall near the top of the combustion chamber at a point remote from the draft means, and a distributing chamber or box at the side of the furnace having the checkered outlet and located on a level with the checkered outlet, and said outlet forming a straight or direct passage from the combustion chamber to the distributing chamber, said distributing chamber being provided with a top member having free and unrestricted passages therethrough and constituting a support for a mold.

4. In a drying oven, a furnace and a mold supporting distributing chamber communicating with the furnace and having a bottom slanting downwardly away from the furnace with an outlet responsive to the flow of molten metal escaping from the mold into the distributing chamber.

5. In a drying oven, a furnace, and a mold supporting distributing chamber communicating with the furnace at one side thereof and provided with a bottom member slanting downwardly away from the furnace and having a door with a normal tendency to close and yieldable to molten metal gravitating along the slanting bottom of the furnace into engagement with said door.

6. In a drying oven, a furnace and a mold sustaining distributing chamber or box in communication with the furnace and provided with a bottom portion slanting downwardly away from the furnace, said box having an opening at a low point provided with a closure yieldable to molten metal gravitating along the slanting bottom, with side openings for communication with adjacent boxes and with a removable cover plate having openings therethrough and adapted to support a mold with its interior in communication with the interior of the box through the openings in the top plate.

7. In a drying oven, a furnace having a fire chamber with draft controlling doors both above and below the bottom of the fire chamber and with checker work openings on the side of the fire chamber remote from the draft controlling means, and a distributing box at the side of the furnace remote from the draft controlling means and communicating with the fire chamber through the checker work, said distributing box having side openings and a rear opening with the latter provided with a normally closed door yieldable to a force applied from the interior of the box, said box having a bottom portion slanting downward away from the furnace and toward the door, openings through the side walls and a removable top constituting a cover for the box and provided with openings adapted to match passages through a mold supported by said cover.

8. In an oven for drying pipe molds, a fire chamber having means for controlling the entrance of air thereto, and a mold supporting member at one side of the fire chamber and in communication therewith, said mold supporting member being provided with means for directing molten metal escaping from a mold thereon in a direction away from the fire chamber.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDGAR C. WILEY.

Witnesses:
W. W. COFFEY,
F. B. DAVIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."