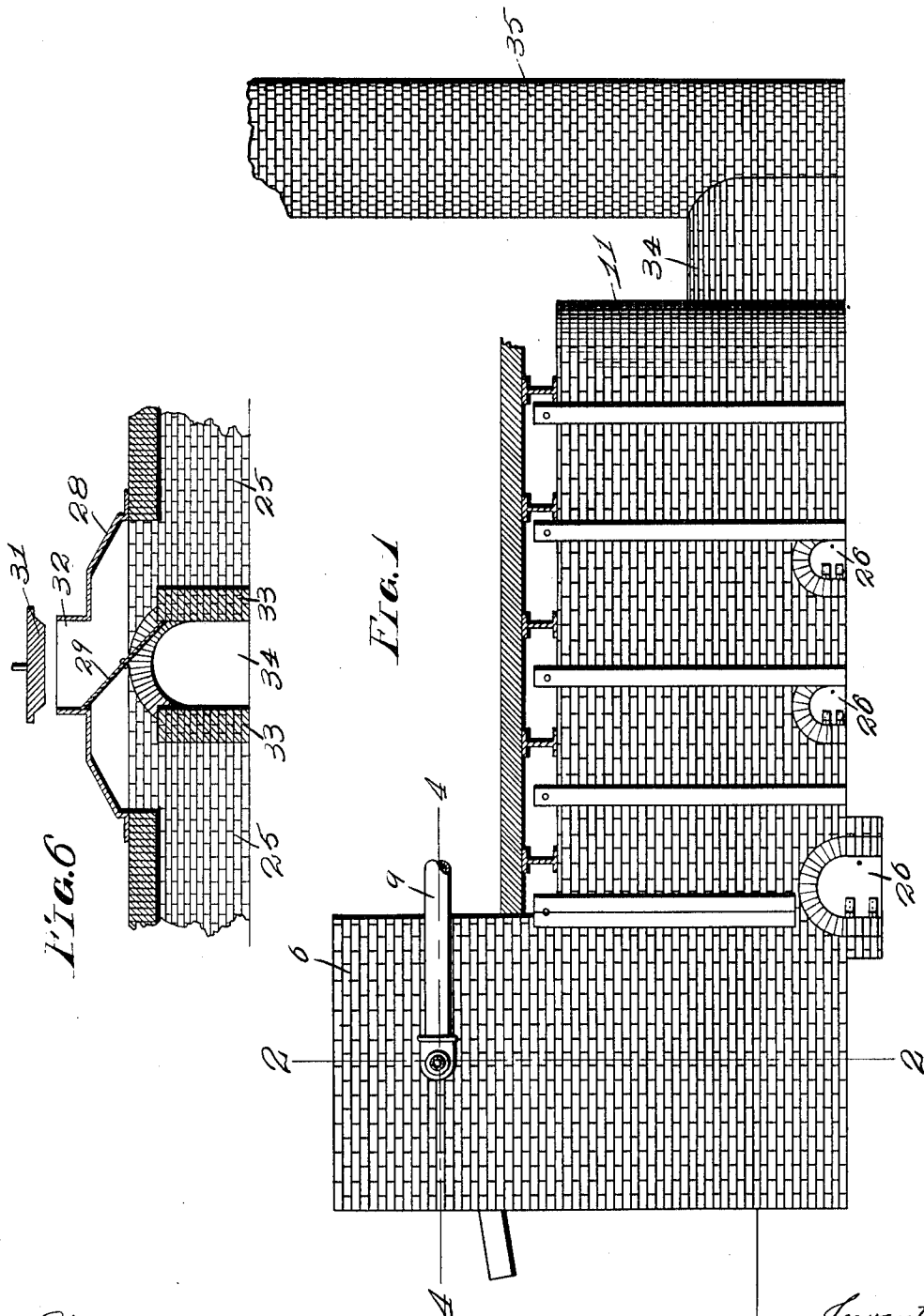


S. E. MEYERS.
 OPEN HEARTH FURNACE.
 APPLICATION FILED FEB. 10, 1909.

949,192.

Patented Feb. 15, 1910.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

FIG. 2

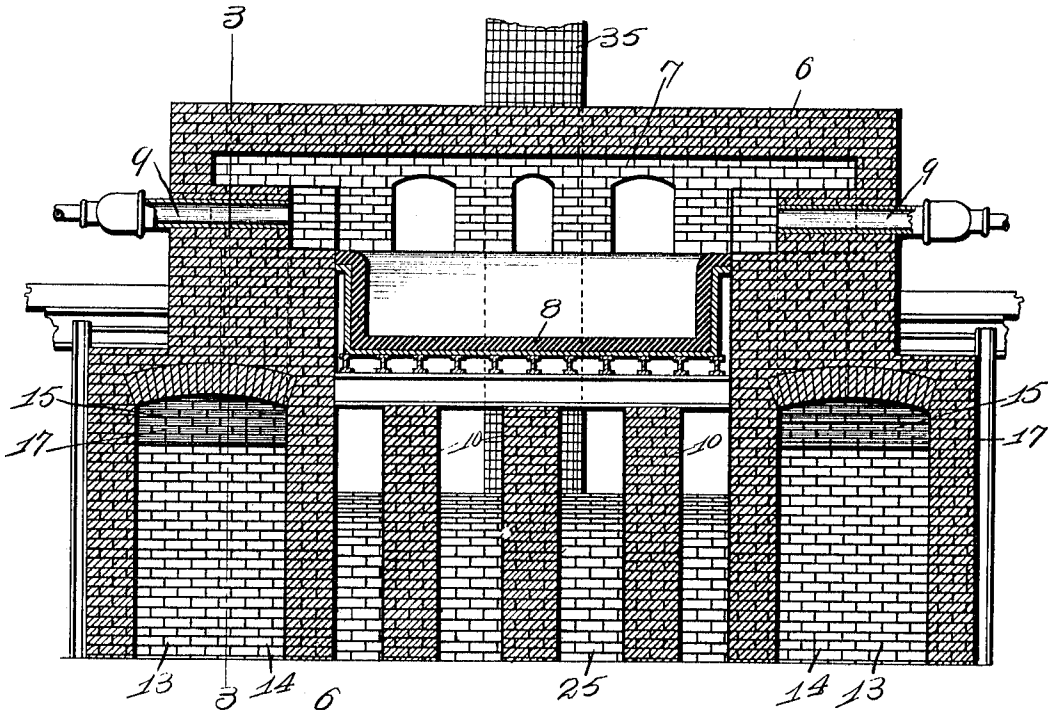
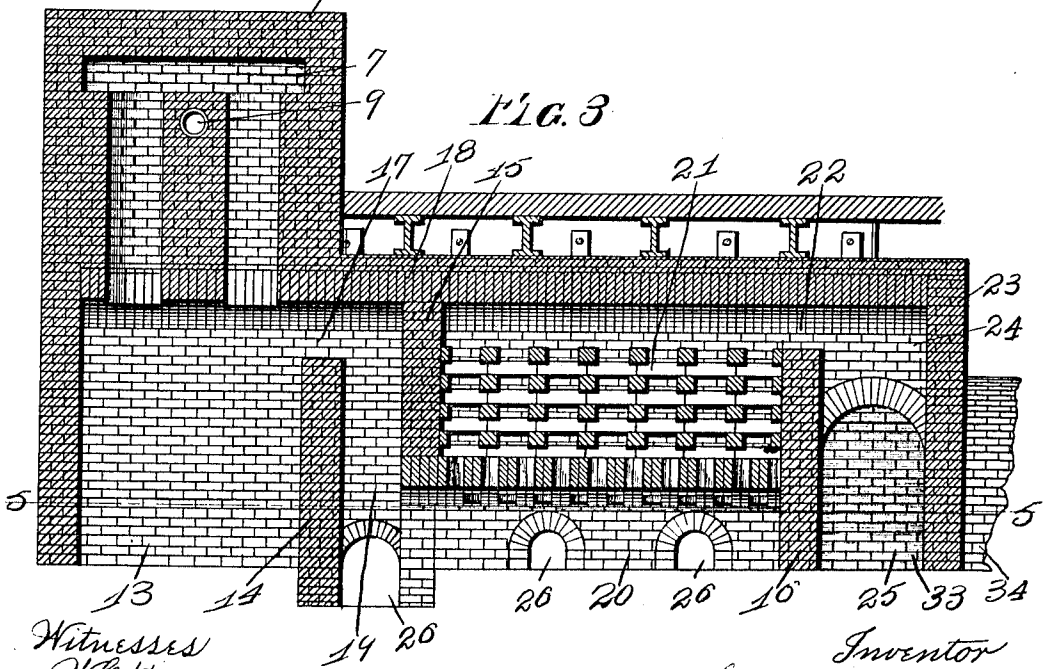


FIG. 3



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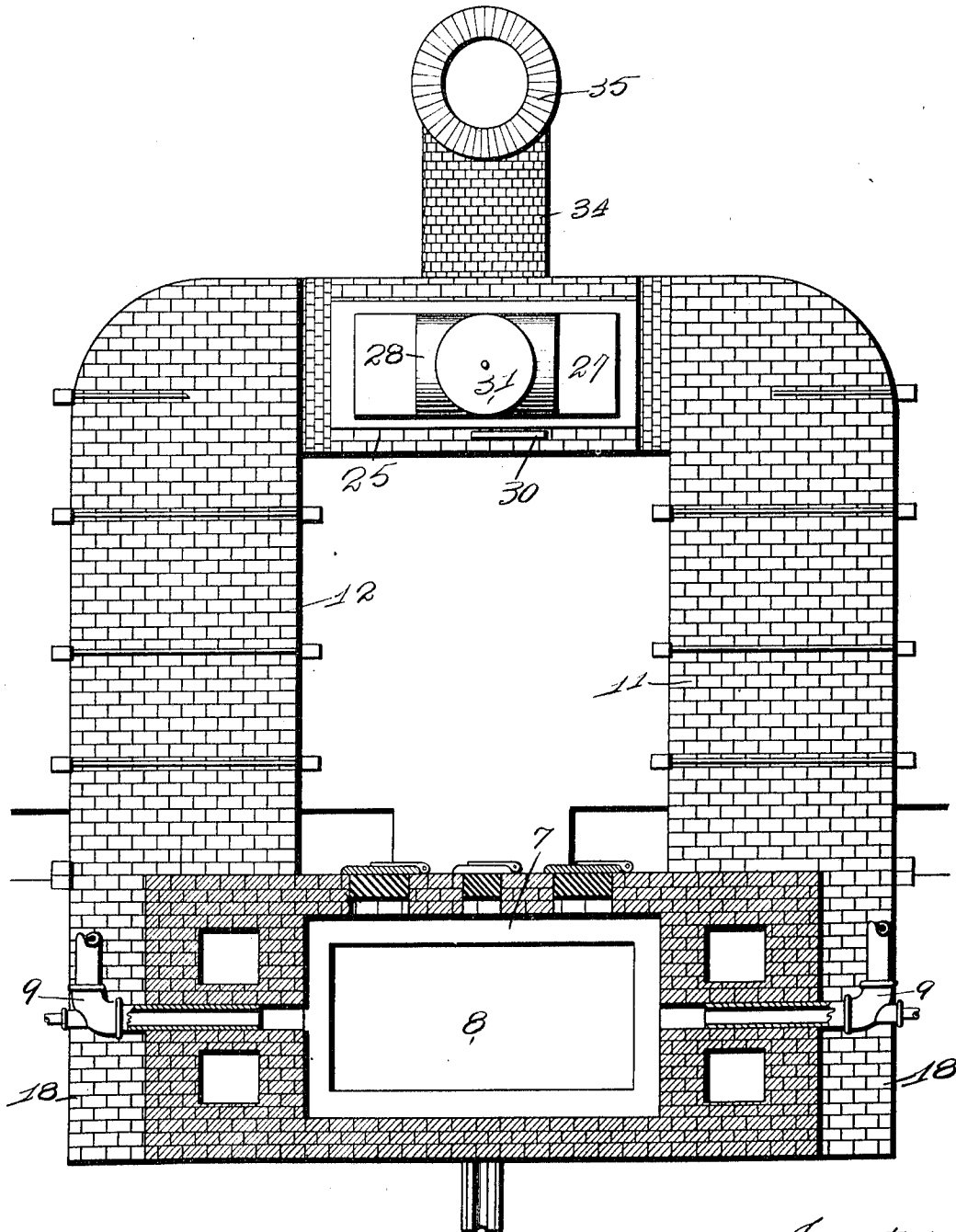
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4 SHEETS—SHEET 3.

FIG. 4



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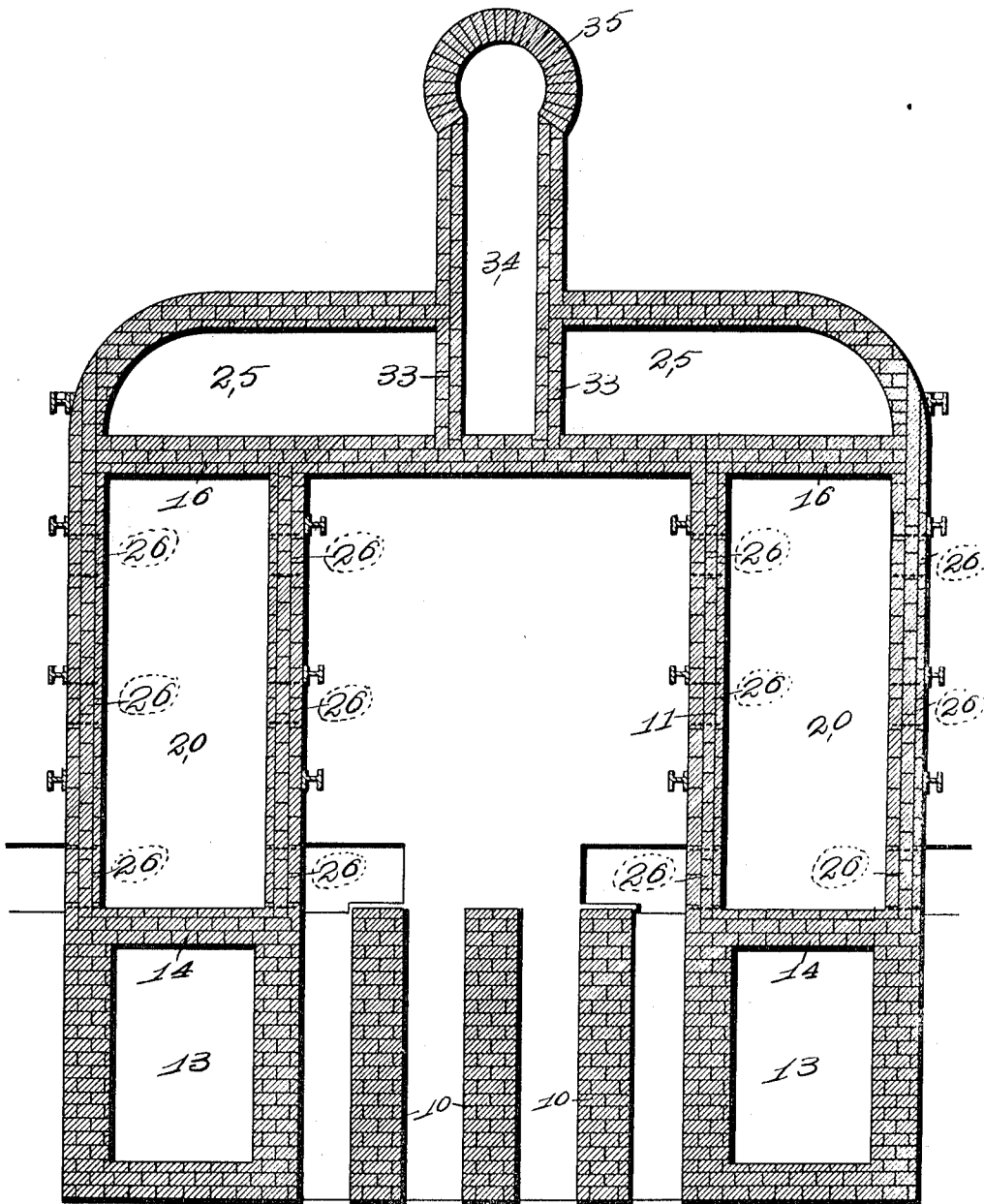
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4 SHEETS—SHEET 4.

FIG. 5



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UNITED STATES PATENT OFFICE.

SAMUEL E. MEYERS, OF ST. LOUIS, MISSOURI.

OPEN-HEARTH FURNACE.

949,192.

Specification of Letters Patent.

Patented Feb. 15, 1910.

Application filed February 10, 1909. Serial No. 477,246.

To all whom it may concern:

Be it known that I, SAMUEL E. MEYERS, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Open-Hearth Furnaces, of which the following is a specification.

This invention relates to improvements in open-hearth furnaces, and has regard to that type of furnace wherein ore or mineral is smelted by an over-draft heat, the heat of the particles of combustion passing downwardly through passages and upwardly through a checker-generator and then out through a flue into the chimney.

A further object of my invention is the construction of a furnace having two combined heat and air passages, one located on each end of the furnace, and in each passage is built a checker-generator and a plurality of bridge walls whereby the heat, while passing through one chamber, is deflected upwardly through the checker-generator while the air passing from the valve takes its circuit through the opposite passage, passing downwardly through the checker-generator and being superheated before entering into the furnace.

In the drawings—Figure 1 is a side elevation of my invention. Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is a longitudinal sectional view taken on the line 3—3 of Fig. 2. Fig. 4 is a horizontal sectional view taken on the line 4—4 of Fig. 1. Fig. 5 is a horizontal sectional view taken on the line 5—5 of Fig. 3. Fig. 6 is an enlarged detail sectional view of the valve made use of in connection with my improved furnace.

In the construction of my invention I provide a suitable housing 6 in which is located the furnace 7, and in the bottom of the furnace is located the smelting basin 8. This basin is supported in the usual manner and lined with fire-brick of the usual form, and in the same, after suitable fire has been placed therein, mineral is distributed and the excessive heat is applied over the top of the basin by means of the burners 9. These burners are located in the walls of the housing and the fuel used by said burners is oil under an air blast.

The smelting basin 8 is supported on the risers 10 and on the two ends of the housing are built the combined heat and air

passage compartments 11 and 12. In each of the compartments 11 and 12 is formed the passage 13 in which are located the bridge walls 14, 15 and 16; the wall 14 being so located as to form the steps 17 between the top of said wall and the roof 18 of the compartment. The bridge wall 15 extends downwardly from the roof parallel to the wall 14 and a short distance therefrom, forming a passage or carbon-chamber 19 through which the heat passes downwardly into a horizontal passage 20 located beneath the checker-generator 21. The bridge wall 16 is constructed similar to the wall 14, forming a passage 22 between the top thereof and the roof of the compartment, and is located a suitable distance from the rear wall 23, forming the passage 24 to which is connected the flue 25, this flue connecting the compartments 11 and 12.

The checker-generator is built between the bridge walls 15 and 16 and is constructed of firebrick, one brick built upon the other in zig-zag fashion, so as to form small passages through which the heat passes on its travel from the furnace to the chimney; and while passing through this generator, the bricks forming the same are excessively heated and the particles of carbon or soot which are carried during the circulation contact with the under surface of the brick and are permitted to fall into the sub-passage or pit 20 and can be removed through the door-openings 26.

The essential feature of my invention is the arrangement and construction of the combined heat and air passages extending from the furnace to the chimney, as heretofore the passages arranged in such a furnace have been so built as to permit the heat passing from the furnace to circulate downwardly through the checker-generator, which, in this instance, permits the carbon and soot to lodge upon the top of the brick forming the checker-generator, and in a very short time the passages between the brick, by means of the lodging of the carbon and soot, are caused to be closed and the draft interrupted. Whenever this occurs, it is necessary to wreck this portion of the furnace in order to cleanse the same and the checker-generator in this instance must be re-built. In the construction as shown in my invention this difficulty is obviated because the particles of carbon and soot fall

from their contact position into the sub-passage 20 and the same can be removed at will without wrecking any portion of the furnace.

5 In the flue 25 which connects the compartments 11 and 12 is located a valve 27, as shown in Fig. 6, which constitutes a hood 28 provided with a damper 29 operated from the exterior by the lever 30. The top of the
10 valve is provided with a cap 31 which is raised and lowered from its seat 32 to regulate the intake of air and in order to provide the proper circulation into the flue so as to admit the air into one compartment and then
15 another alternately, I provide in the flue partition walls 33 between which is formed the chimney flue 34 leading rearwardly and connected to the chimney or smoke-stack 35.

The operation of my invention is as follows: After the furnace has been properly ignited and the mineral placed in the basis, the chamber 29 in the valve 28 is so regulated as to permit the circulation of heat to pass downwardly through the passages located in the housing which connect with the slag pocket 13, permitting the heat to circuit over the bridge wall 14, down through the passage or carbon-chamber 19, under the bridge wall 15 into the sub-passage 20 and
30 up through the checker-generator, depositing its particles of carbon and soot at the bottom of the generator, the heat then passing over the bridge wall 16, downwardly through the passage 24 and into the flue 25, through the valve and into the chimney flue 34 and out. During this operation only one of the passages is used at a time and that for a period of about fifteen minutes so as not to burn out the checker generator on
40 account of the excessive heat. While the heat is passing through one compartment, the air is admitted through the opposite compartment by passing through the valve in a reverse operation to the heat, and as the
45 air passes downwardly through the checker-generator it is superheated before it is admitted into the furnace, supplying the furnace with sufficient air, at the same time cooling the checker-generator. This operation is repeated at intervals of about fifteen minutes apart. The essential feature is to arrange the circulation of heat through the checker-generator so as to prevent its clogging with carbon and soot, and this is accomplished by permitting the heat to pass
50 upwardly through the checker-generator instead of downwardly.

Having thus fully described my invention, what I claim as new and desire to have

secured to me by the grant of Letters Patent, is:

1. An open-hearth furnace comprising a housing; a furnace; a smelting basin located in the furnace; the housing on both sides of the furnace provided with a combined heat
65 and air passage at each end; a slag pocket located beneath each of said passages; a bridge wall located adjacent each of said slag pockets extending upwardly and terminating near its top and forming a passage
70 and carbon-chamber at its rear; a second bridge wall located to the rear of the first mentioned bridge wall extending downwardly terminating near the bottom and forming the rear wall of the carbon-chamber;
75 a third bridge wall located in each of the compartments extending upwardly and terminating near the top of the compartment; a checker-generator located in each compartment between the second and third
80 mentioned bridge walls; a horizontal passage located beneath the checker-generator; clean-out doors communicating with the several passages for removing sediment; a flue located to the rear of the checker-generators,
85 and a valve located in the flue for regulating the circulation in the compartment, substantially as specified.

2. An open-hearth furnace comprising a housing; a furnace; a smelting basin centrally located in said housings; passages located in the housing at each side of the smelting basin; slag pockets located in each of said passages to separate and catch the slag passing downwardly through the passages connecting the slag pocket with the furnace chamber; a carbon-chamber located to the rear of the slag pocket and arranged to catch the carbon which separates itself from the slag as it passes through the course
100 of circulation; a checker-generator located to the rear of the carbon-chamber and so arranged as to permit the draft to circulate upwardly therethrough; a flue passage located at the rear of the checker-generator,
105 connecting the same with the smoke-stack of the furnace; a valve for regulating the circulation of air in either one of the compartments, and clean-out doors arranged in the several passages for removing the carbon
110 and sediment, substantially as described.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

SAMUEL E. MEYERS.

Witnesses:

ALFRED A. EICKS,
WALTER C. STEIN.