

(No Model.)

W. SWINDELL.
FURNACE.

6 Sheets—Sheet 1.

No. 463,176.

Patented Nov. 17, 1891.

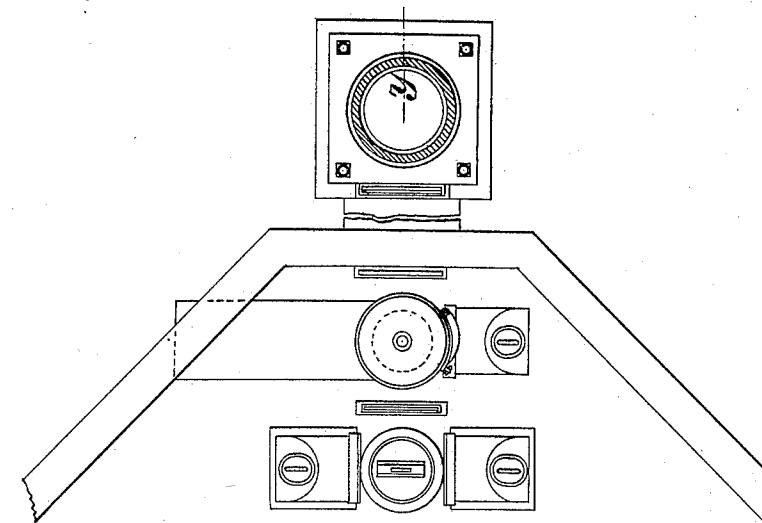
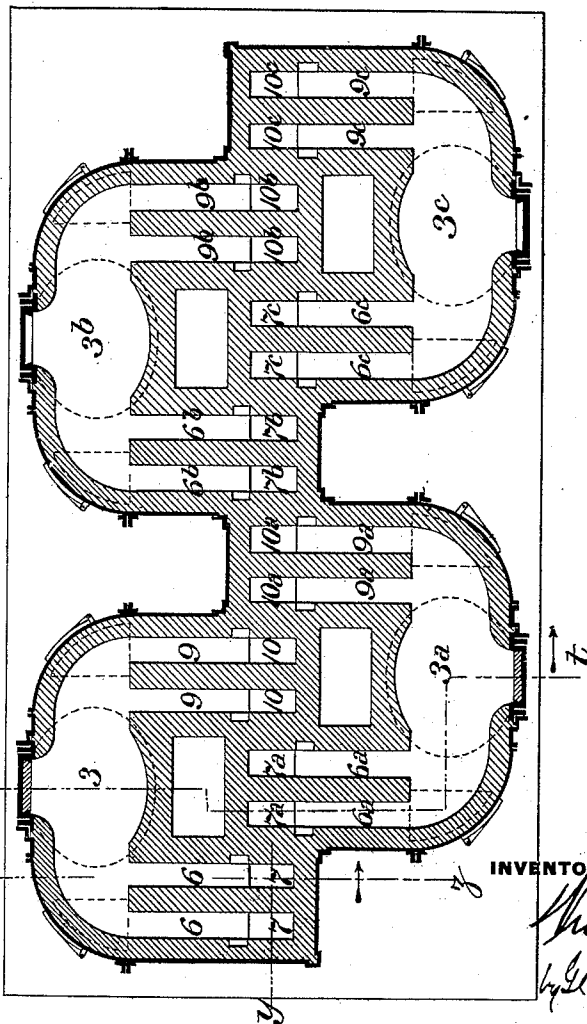


FIG. 1.



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(No Model.)

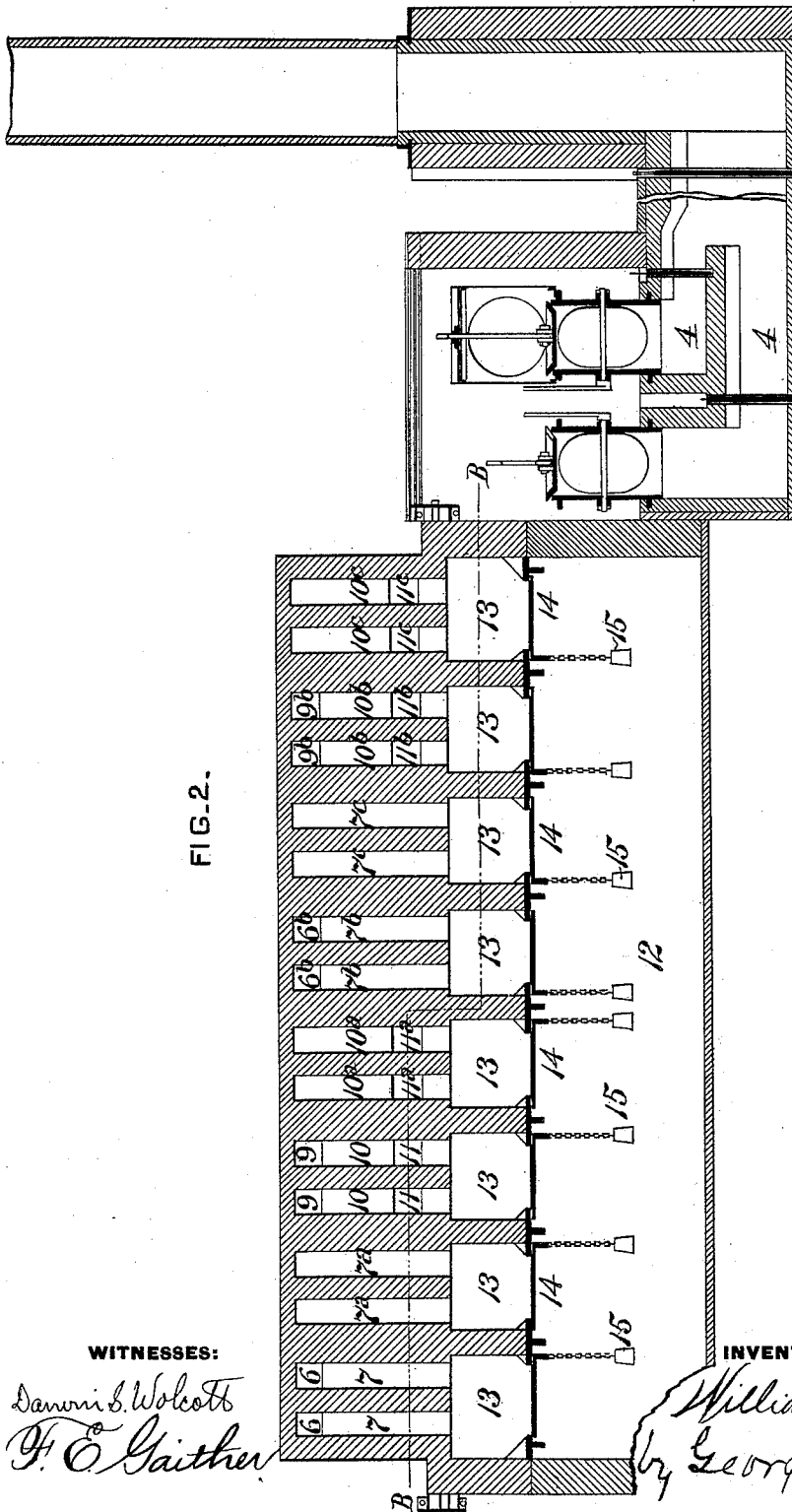
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FIG. 2.



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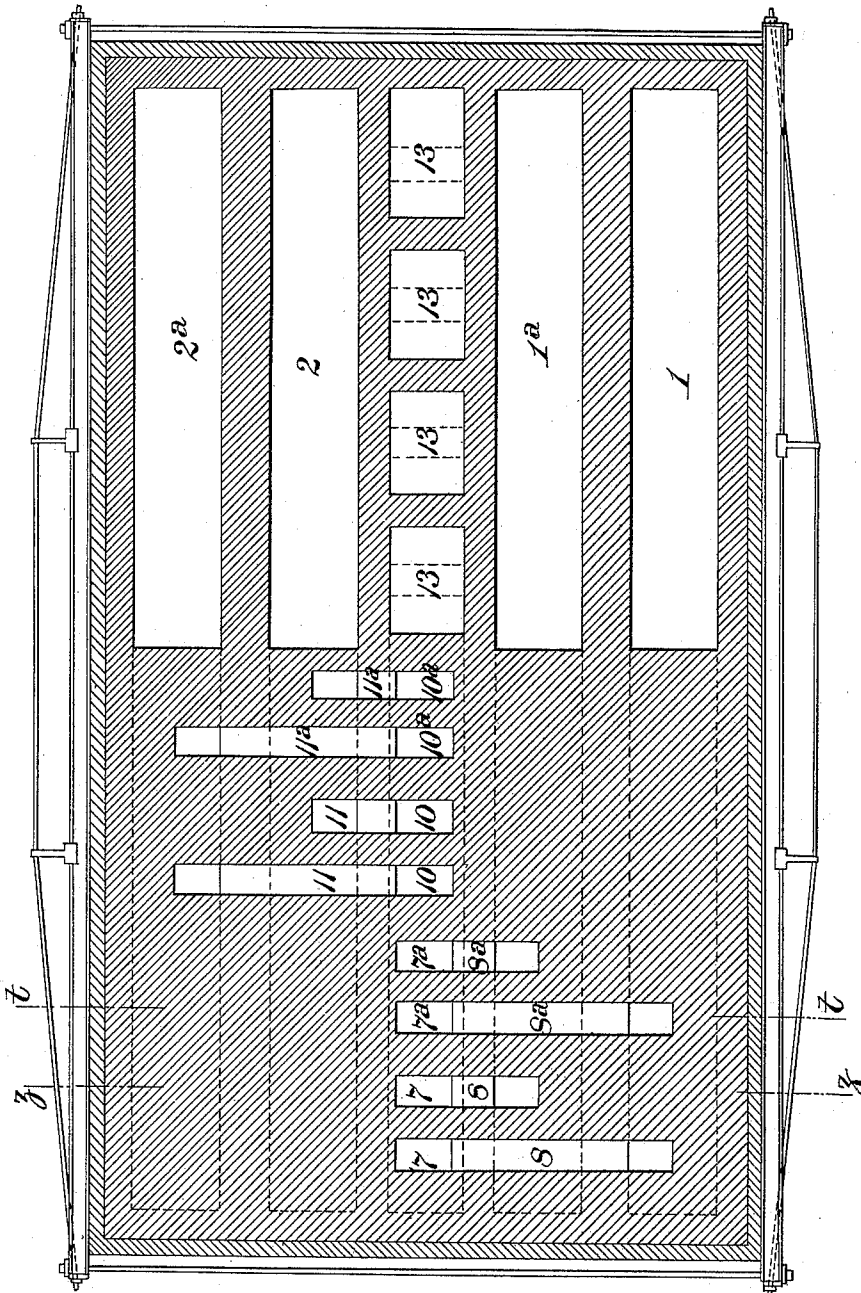
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FIG. 3.



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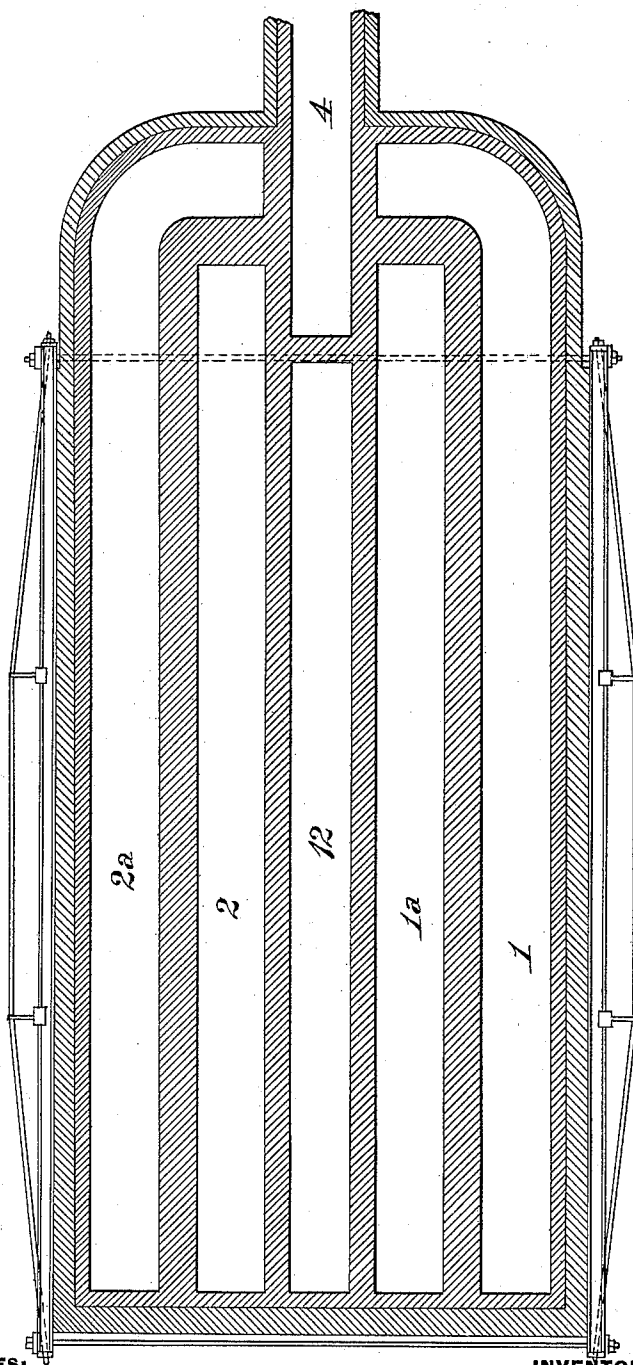
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FIG. 4.



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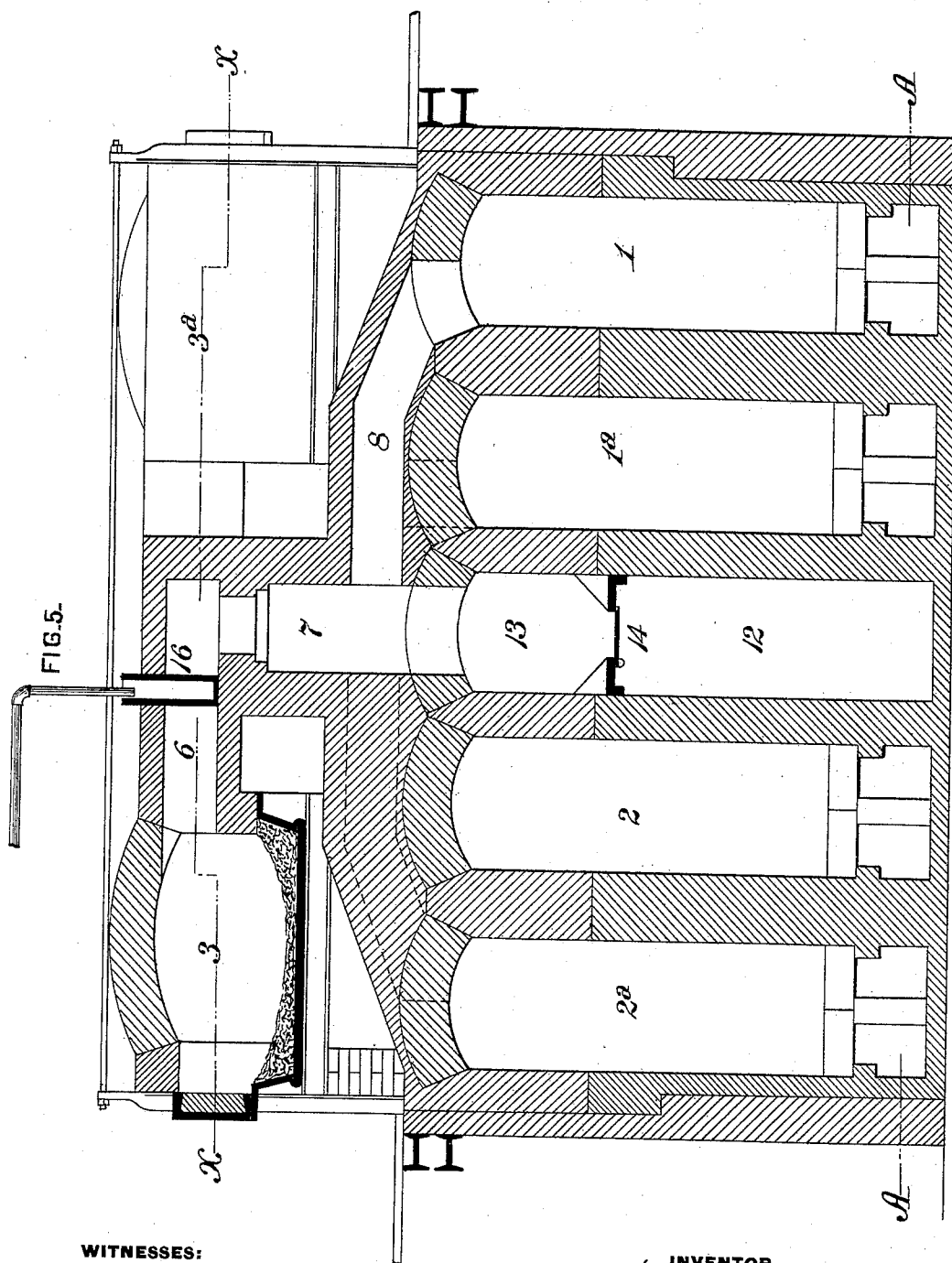
(No Model.)

W. SWINDELL.
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6 Sheets—Sheet 5.

No. 463,176.

Patented Nov. 17, 1891.



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6 Sheets—Sheet 6.

W. SWINDELL.
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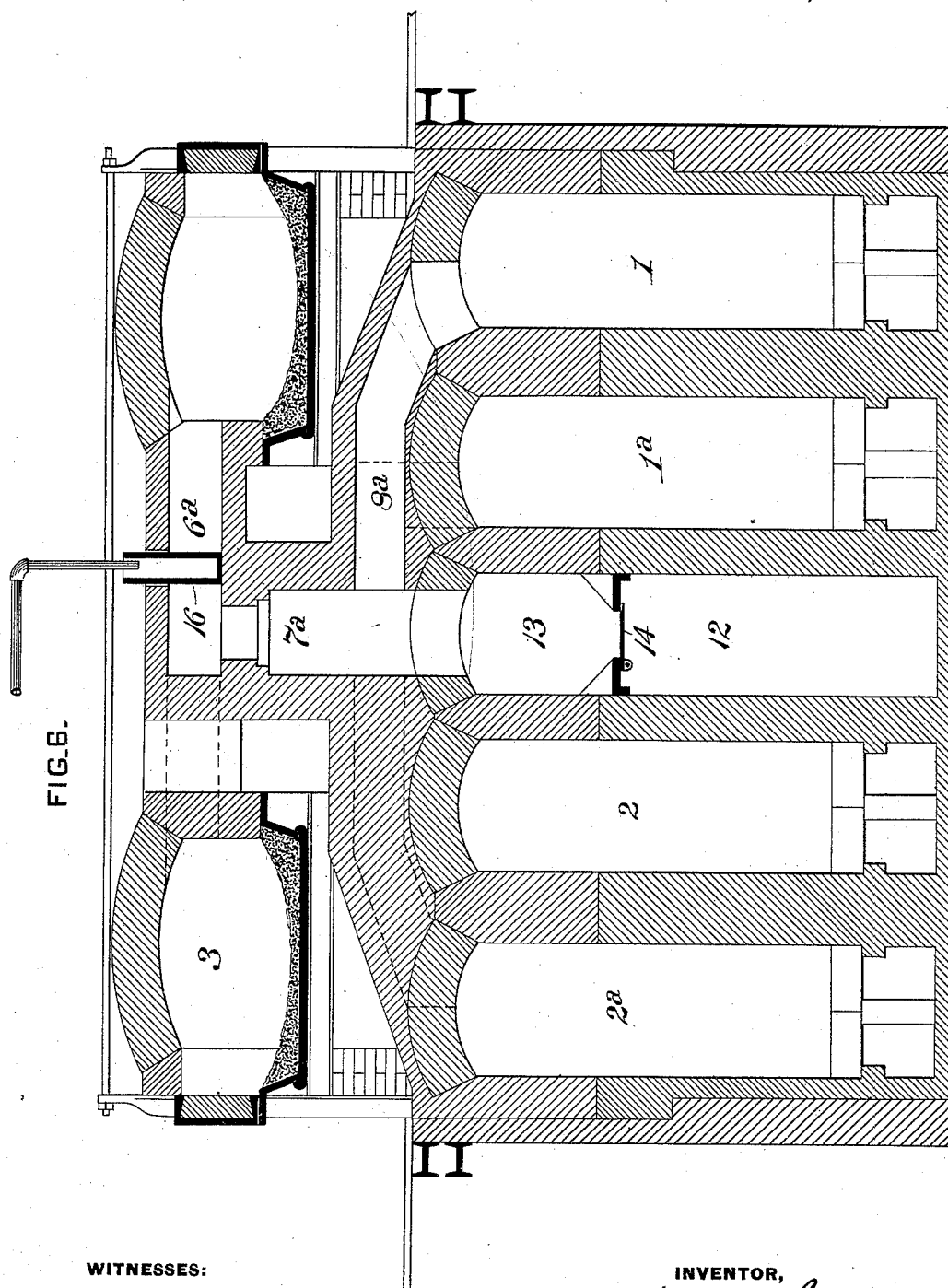


FIG. B.

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UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 463,176, dated November 17, 1891.

Application filed March 7, 1891. Serial No. 384,184. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SWINDELL, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Furnaces, of which improvement the following is a specification.

The invention described herein relates to certain improvements in regenerative furnaces, and has for its object such a construction and arrangement of hearths and passages connecting them to the regenerating-chambers as will permit of the connection of several hearths with the same regenerating-chamber, the hearths being so arranged relative to each other that the operators around one of hearths will not interfere with those around the other hearths.

In general terms the invention consists in the construction and combination, all as more fully hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view partly in section and partly in plan, the plane of section being indicated by the line *xx*, Fig. 5. Fig. 2 is a sectional elevation, the plane section being on the line *yy*, Fig. 1. Fig. 3 is a horizontal section on the line *BB*, Fig. 2. Fig. 4 is a similar view on the line *AA*, Fig. 5. Fig. 5 is a sectional elevation, the section being taken on the line *zz*, Figs. 1 and 3; and Fig. 6 is a similar view on the line *tt*, Figs. 1 and 3.

In the practice of my invention I construct long regenerative chambers 1 1^a and 2 2^a for the gas and air, said chambers being of suitable width and height and of a length proportional to the number of heating or melting hearths 3 3^a, &c., desired. These chambers are connected in the usual manner by conduits 4 with the stack and with a suitable source of gas-supply, said conduits being provided with suitable reversing and regulating valves of the usual or any desired construction. On top of the regenerating-chambers I construct two, four, or more heating or melting hearths 3 3^a 3^b, &c., said hearths being arranged in pairs, as shown in Fig. 1, the two members of a pair being arranged back to back, but out of line by a distance equal to

the width of two flues or passages connecting the regenerating-chambers with the hearths. From the hearths 3 extend the flues 6, which for convenience are termed the "hearth-flues," and connect with the vertical flues 7, constructed on the median line of the furnace, and these vertical flues are connected by the flues 8 (termed "chamber-flues") with the regenerative chambers 1 1^a.

By reference to Fig. 5 it will be seen that the flues 6, 7, and 8 form a continuous Z-shaped passage from the hearth 3 to the regenerating-chambers 1 1^a, the hearth 3 being arranged above the regenerating-chambers 2 2^a and the flues 8 passing between the hearth 3^a and the regenerating-chambers 1 1^a, over which the hearth 3^a is located. From the opposite end of the hearth 3 extend the hearth-flues 9, connecting with the vertical flues 10, which in turn connect with the horizontal chamber-flues 11, leading to the regenerating-chambers 2 2^a, as shown in Figs. 1, 2, and 3. These chamber-flues 11 extend under the hearth 3 and are parallel with and directly below the hearth-flue 9, as will be seen by reference to Figs. 1 and 3, thereby forming a continuous □-shaped passage from the hearth 3 to the regenerating-chambers 2 2^a.

As shown by reference to Figs. 1, 2, 3, and 6, the hearth-flues 6^a, vertical flues 7^a, and chamber-flues 8^a form continuous □-shaped passages from the hearth 3^a to the regenerating-chambers 1 1^a, the chamber-flues 8^a being parallel with and directly below the hearth-flues 6^a, and pass between the hearth 3^a and the regenerating-chambers 1 1^a.

By reference to Figs. 1, 2, and 3 it will be seen that the opposite side of the hearth 3^a is connected with regenerating-chambers 2 2^a by continuous Z-shaped passages formed by the hearth-flues 9^a, vertical flues 10^a, and chamber-flues 11^a.

From the foregoing it will be understood that each of the hearths is connected with the regenerating-chambers by Z and □ shaped passages, the former extending to one pair of chambers and the latter to the other pair of regenerating-chambers.

As shown in Figs. 2, 3, 4, 5, and 6, a chamber 12 is formed between the two sets or pairs of regenerating-chambers, said chamber ex-

tending along under the series of vertical flues and connecting by a series of supplemental chambers 13 with said flues, forming, in fact, a continuation or enlargement of said flues. At the lower ends of the supplemental chambers are placed doors or valves 14, which are normally held in a closed position by suitably-arranged weights 15. Any dust or other foreign matter drawn from the hearth will be deposited in the supplemental chambers until a sufficient quantity has accumulated to overbalance the weights 15, when the doors or valves will turn and, dropping their load into the chamber 12, will return to a closed position under the action of the weights, or the doors may be lowered at any time and the supplemental chambers cleared.

As shown in Figs. 1, 5, and 6, valves 16 are arranged in the several hearth-flues, whereby the combustion in each hearth may be entirely cut out of operation or regulated independent of the other hearths and without interfering with their operation. The hearth 3^b is connected to the regenerating-chambers 11^a and 22^a by flues 6^b, 7^b, 8^b, 9^b, 10^b, and 11^b, arranged in the same manner as the flues of the hearth 3, and the hearth 3^c and its flues are similar to the hearth 3^a.

It will be readily understood that the number of hearths which may be arranged and connected to the same regenerating-chambers is only limited by the distance the gas and air can be caused to travel along the regenerating-chambers.

I am aware that a furnace for melting glass has been constructed with a single hearth with a central offshoot or wing, all parts of such hearth being in free and continuous communication with each other and having uninterrupted flue connections with the usual regenerating-chambers. I am also aware that furnaces have been constructed with two or more hearths, each hearth having suitable flue connections with an independent set of regenerating-chambers. In my improved furnace the hearths do not have any communication or connection with each other, and hence can be operated at will, and different metallurgical operations can be carried on in them; and my improved furnace differs from the last-named furnace in that all the hearths are connected with the same regen-

erating-furnaces, so that it is possible while operating only one or two of the hearths to maintain the checker-work in a heated condition, so that there need not be any delay in starting the other furnaces.

I claim herein as my invention—

1. In a furnace, the combination of two pairs of regenerating-chambers, two non-communicating hearths arranged back to back upon said chambers, flues connecting each hearth with each regenerating-chamber, and valves for reversing the operation of the furnace, substantially as set forth.

2. In a furnace, the combination of two pairs of regenerating-chambers, a series of hearths arranged in pairs back to back upon the regenerating-chambers, flues connecting each hearth with each regenerating-chamber, and valves for reversing the operation of the furnace, substantially as set forth.

3. In a furnace, the combination of two pairs of regenerating-chambers, two or more hearths arranged upon said chambers, flues connecting each hearth with each regenerating-chamber, and valves arranged in said flues, substantially as set forth.

4. In a furnace, the combination of two pairs of regenerating-chambers, a chamber arranged between said pairs, two or more hearths arranged upon said chambers, and flues connecting each hearth with each regenerating-chamber, said flues having valved connections with the intermediate chamber, substantially as set forth.

5. In a furnace, the combination of two pairs of regenerating-chambers, a chamber arranged between said pairs, two or more hearths arranged upon said chambers, □-shaped flues connecting each hearth with two of the regenerating-chambers, and Z-shaped flues connecting each hearth with the other chambers, the vertical portions of the □ and Z shaped flues having valved connections with the intermediate chamber, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM SWINDELL.

Witnesses:

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