No. 735,064. PATENTED AUG. 4, 1903.

R. A. CARTER.

FURNACE.

APPLICATION FILED DEC. 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

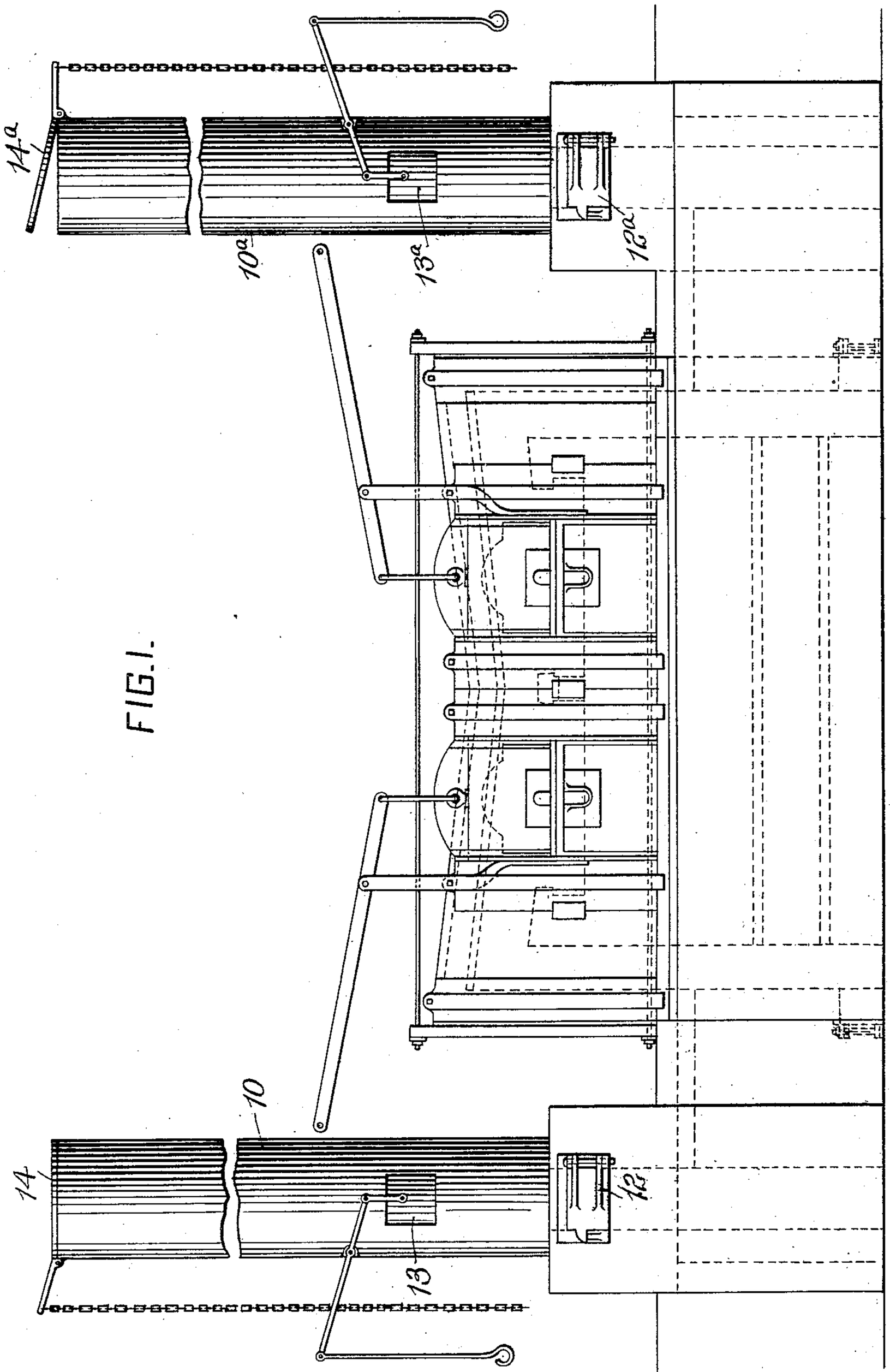

FIG. 1.

WITNESSES:
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F. E. Gaither.

INVENTOR
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by Dennis B. Wolcott Att'y.

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NO. MODEL. 3 SHEETS—SHEET 2.

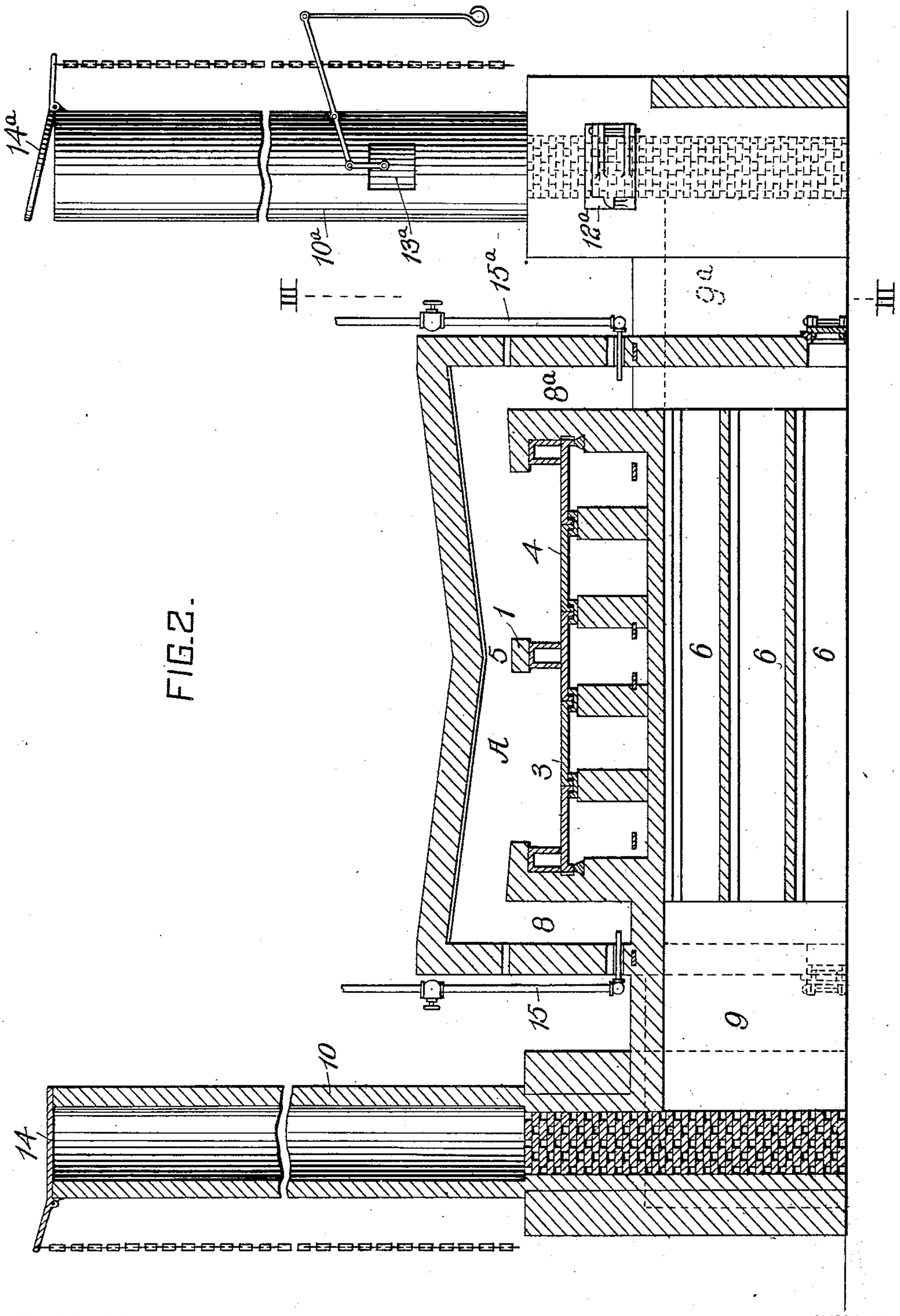

FIG. 2.

WITNESSES:
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NO MODEL. 3 SHEETS—SHEET 3.

FIG. 4.

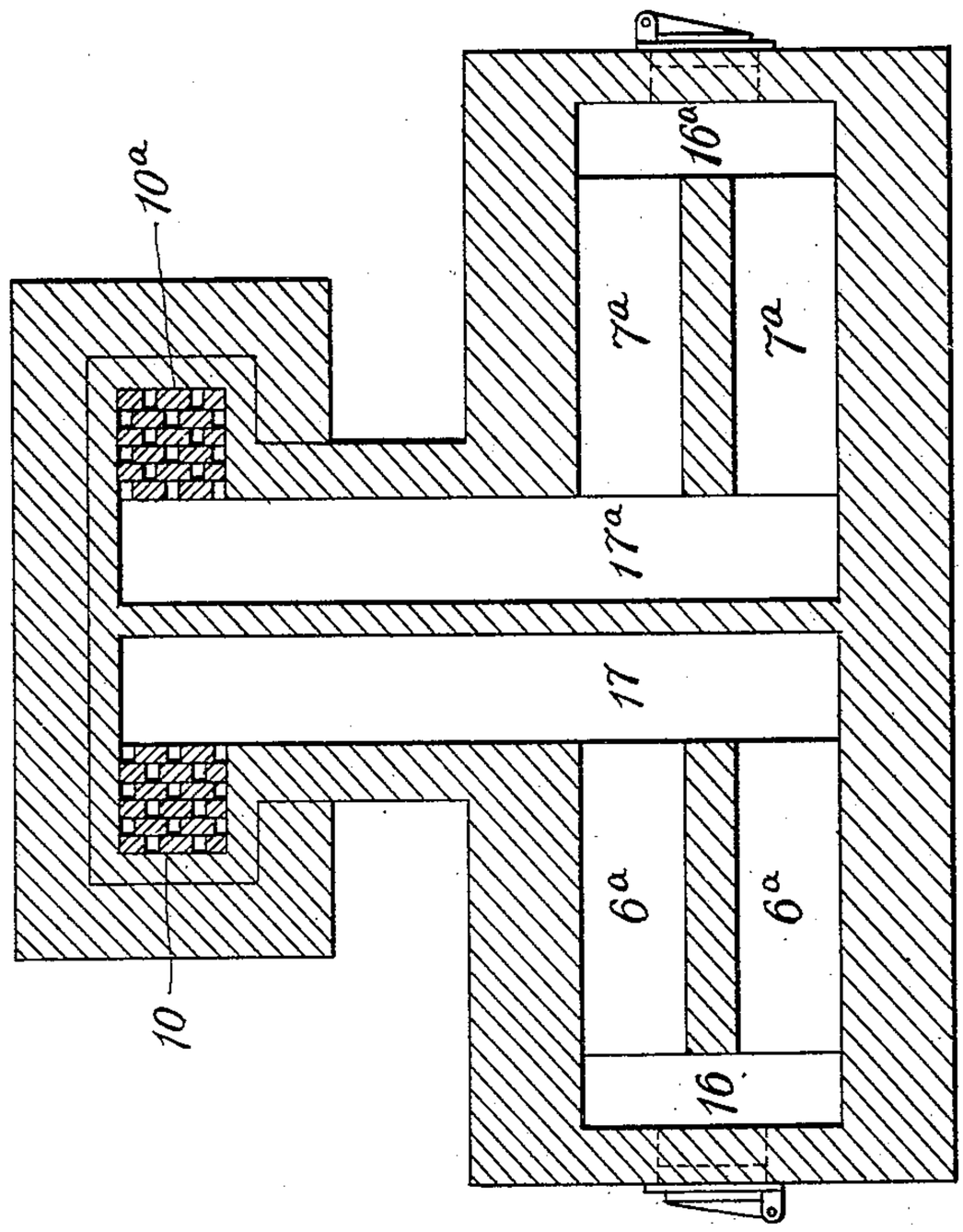
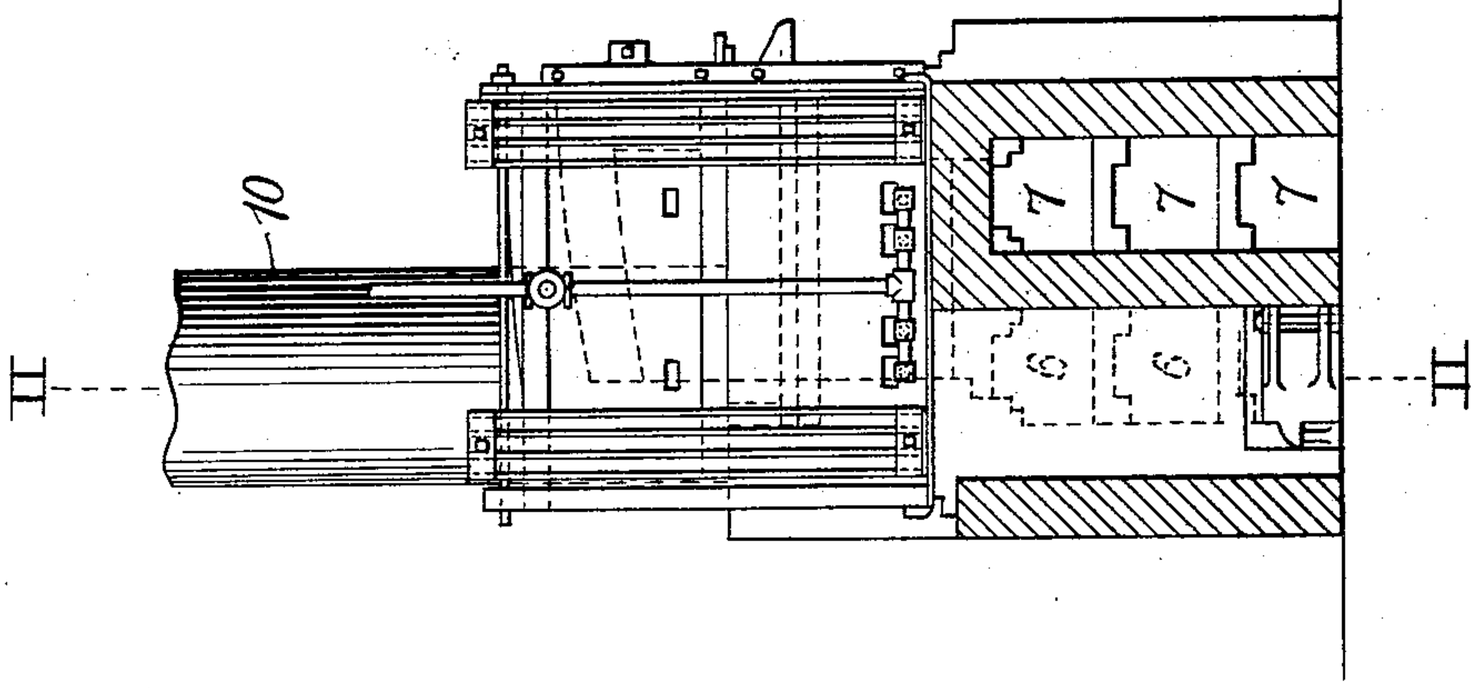


FIG. 3.



WITNESSES:
Herbert Bradley
F. E. Gaither.

INVENTOR
Robert A. Carter
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No. 735,064. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

ROBERT A. CARTER, OF PITTSBURG, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 735,064, dated August 4, 1903.

Application filed December 3, 1902. Serial No. 133,704. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. CARTER, a citizen of the United States, residing at Pittsburg, 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 puddling-furnaces, and has for its object a construction of furnace employing two hearths and having provision made therein for an equal heating of both hearths alternately and a reduced heating of one hearth while the other hearth is at its maximum temperature.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a front elevation of my improved furnace. Fig. 2 is a view partly in elevation and partly in section, the plane of section being indicated by the line II II, Fig. 3. Fig. 3 is a transverse section on a plane indicated by the line III III, Fig. 1; and Fig. 4 is a sectional plan view illustrating an alternative arrangement of the stacks, flues, and the heating-chambers.

In the practice of my invention a transverse bridge 1 is so arranged in the heating-chamber A as to form two hearths 3 and 4 on opposite sides, respectively, of the bridge, which should be so constructed as regards its height as to provide a passage 5 above it for the heat and products of combustion. Below the hearth I arrange two series of passages 6 and 7 longitudinal of the furnace and connecting at one end with flues 8 and 9, respectively, and at the opposite end with flues 8^a and 9^a, respectively. The flues 8 and 8^a at each end of the furnace extend upwardly and connect with the heating-chamber at the ends thereof. The flues 9 and 9^a connect, respectively, with the stacks 10 and 10^a. It is preferred to arrange within the lower end of the stacks a series of checker-work designed to absorb heat and transmit the same to the inflowing air. The stacks are provided at points above the checker-work with inlet-openings provided with doors 12 and 12^a and, if desired, with auxiliary openings and doors 13 and 13^a at higher points on the chimneys. These chimneys are also provided with top doors or dampers 14 and 14^a.

Gas is introduced into the flues 8 and 8^a, preferably at points below their junction with the heating-chamber, by means of pipes 15 and 15^a.

In describing the operation of the furnace it will be presumed that the hearth 4 is to have the highest heat, or, in other words, the metal is to be boiled in said hearth while the metal is being heated in the hearth 3. The top door or damper 14 is closed and one or both of the doors 12 and 13 are opened, so that air will enter the stack 10 above the checker-work, flow thence into the flue 9 along the flues 6 to the flue 8^a, up into and through the furnace over the hearths 4 and 3, down the flue 8 to the passages 7, along the passages 7 to the flue 9^a, through the checker-work in the stack 10^a, and out of the stack, the upper door or damper 14^a of which is open. As soon as the metal in the hearth 4 has been properly boiled and brought to nature a reversal of the furnace is effected by closing the top door or damper of stack 10^a, opening the auxiliary doors 12^a and 13^a, closing the doors 12 and 13 of stack 10 and opening the top door or damper. When so reversed, the air will pass down the stack 10^a through the flues 9^a and 7, up flue 8 and through the furnace, down flue 8^a into flue 6, along the latter to and through the stack 10. With the parts so adjusted and operating the metal in the hearth 3 will be subjected to the highest heat, while in the hearth 4 a lower heat will be had, sufficient, however, to effect a melting and, perhaps, a partial boiling of the metal.

In lieu of the construction shown in Figs. 1 to 3, inclusive, I may employ that shown in Fig. 4. In this construction the flues 6^a and 7^a, arranged, respectively, under opposite ends of the furnace, connect at their outer ends with flues 16 and 16^a, which pass up and connect with one end of the heating-chamber, and at their inner ends with flues 17 17^a, which connect with the stacks 10 and 10^a. In this construction the air will pass down one of the stacks, as through the flues 17, into and through the flues 6^a under one end of the furnace, up the flue 16, over the hearths, down the flue 16^a at the opposite end, through the flues 7^a at that end of the furnace, through

the flue 17ª to the stack 10ª. When the valves are reversed as above stated, a reverse movement of the heated air and products of combustion will take place.

It is characteristic of my improvement that the air entering the furnace to support combustion with the gas is thoroughly heated before being mingled therewith and that a very large proportion of the heat or products of combustion remaining in the gases after passing through the heating-chamber will be absorbed by the walls of the passages through which it flows. It is also characteristic of the improvement that while the metal is being boiled and worked on one hearth another body of metal can be heated to a working and boiling temperature. If desired, the furnace can be so operated—*i. e.*, by frequent reversals—that the same operations—heating, boiling, and working—can proceed simultaneously on both hearths.

It will be readily understood by those skilled in the art that by omitting the intermediate bridge the furnace can be used for heating articles.

I claim herein as my invention—

1. A furnace having in combination a hearth, flues at the ends of the hearth, two series of passages under the hearth, each having one end connected to said flues, stacks arranged at the ends of the furnace and connected respectively to the other ends of said passages and doors or dampers controlling the flow of air and gas to and from the stack.

2. A furnace having in combination two hearths in a common chamber, flues at the ends of the hearth-chamber, passages under the hearth connecting at one end with said flues, stacks connected to the opposite end of said passages, and doors or dampers controlling the flow of air and gases to and from the stacks, substantially as set forth.

3. In a furnace the combination of two hearths in a common chamber, flues at the ends of the hearth-chamber, two series of passages under the hearths each having one end connected to said flues, stacks arranged at the ends of the furnace and connected respectively to the other ends of said passages and doors or dampers controlling the flow of air and gases to and from the stack.

In testimony whereof I have hereunto set my hand.

ROBERT A. CARTER.

Witnesses:
DARWIN S. WOLCOTT,
F. E. GAITHER.