

989,810.

H. C. RUGGLES.
FURNACE.
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Fig. 1.

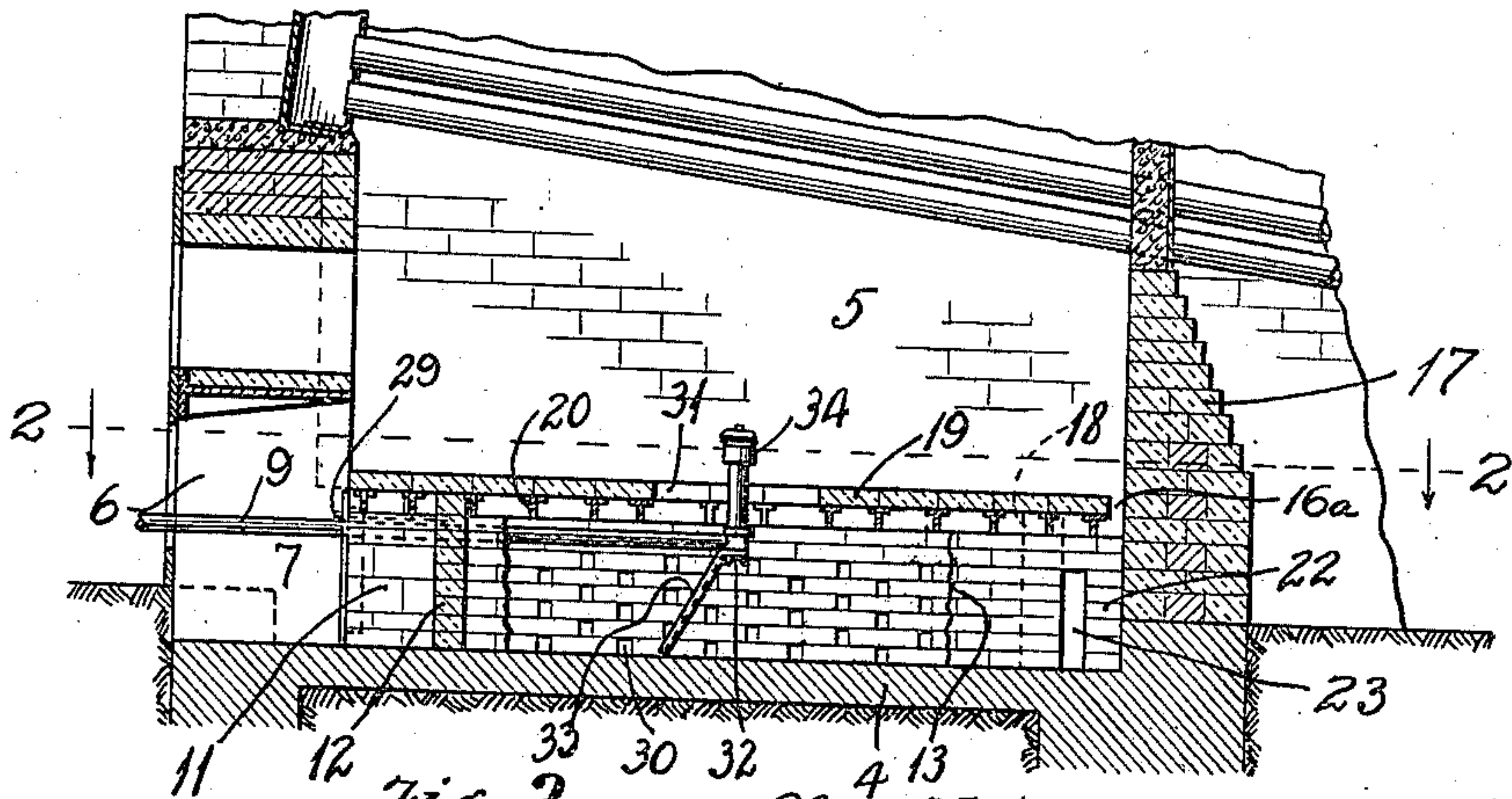


Fig. 2.

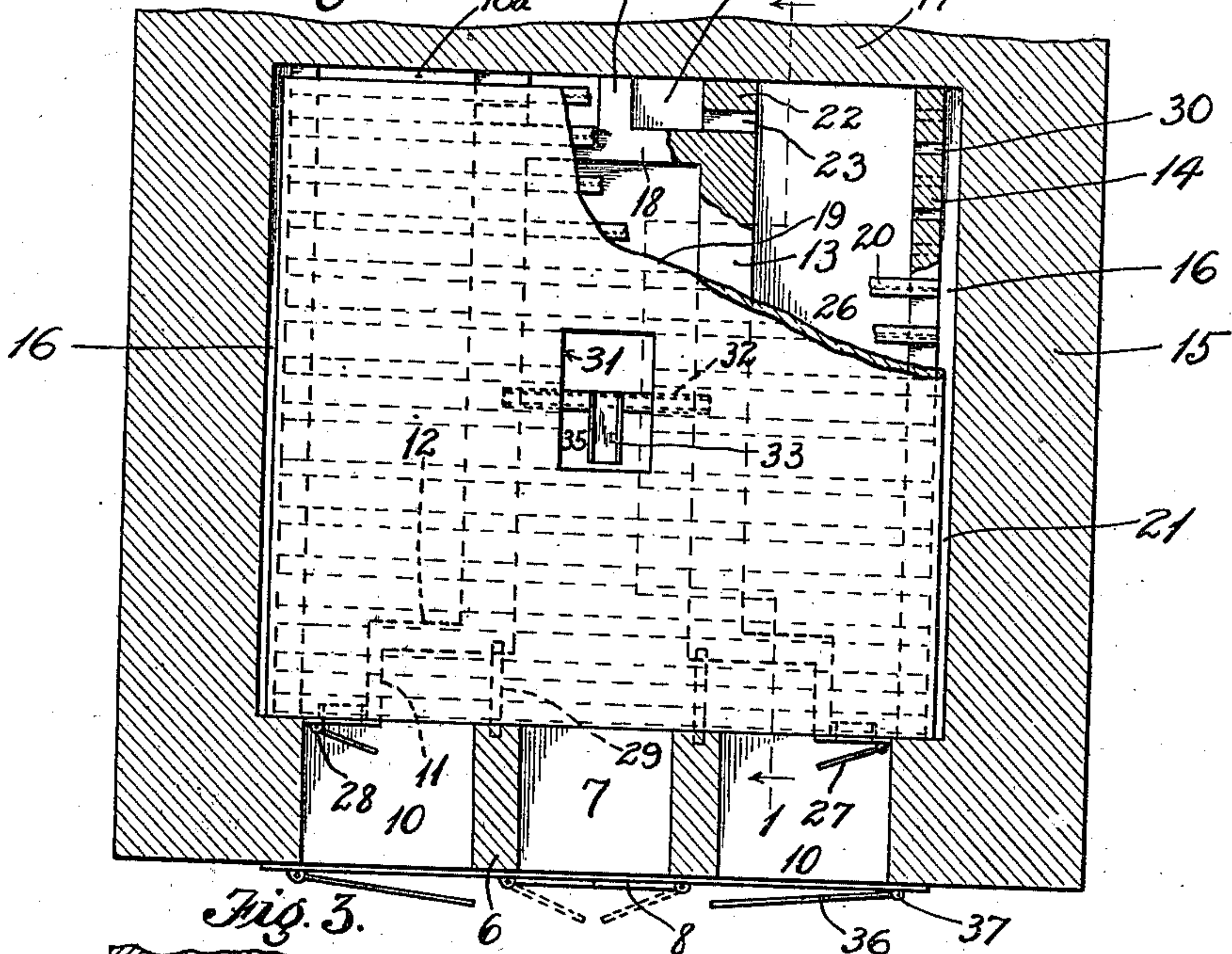
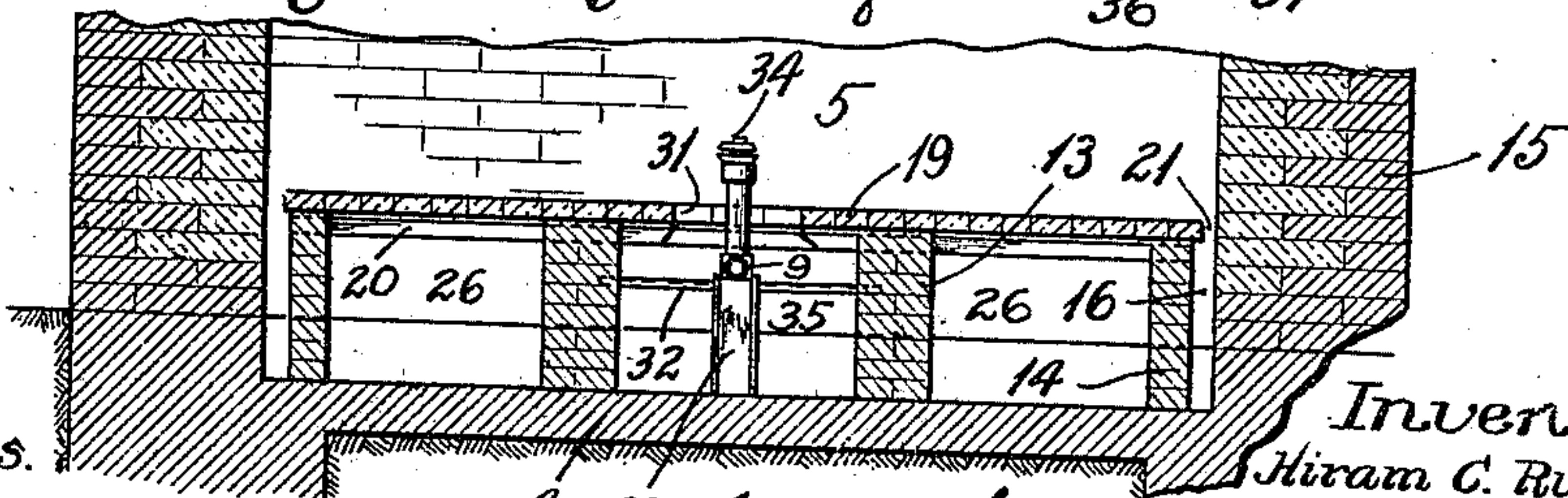


Fig. 3.



Witnesses.

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FURNACE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HIRAM C. RUGGLES, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to furnaces and is especially applicable to furnaces of boilers.

10 The invention contemplates the employment of a burner disposed at an intermediate point in the interior of the fire box, and the object of the invention is to provide improved means for supplying the air which supports the combustion. An arrangement is provided for giving a normal draft, and an auxiliary draft connection is provided to be used under heavy firing.

20 The invention is especially useful in connection with furnaces which burn liquid fuel.

In the annexed drawing, which fully illustrates my invention, Figure 1 is a vertical longitudinal section through a boiler having a furnace constructed according to my invention. This view is taken substantially on the section line 1—1 of Fig. 2 with the middle portion broken away to disclose the remote side draft wall of the fire box. Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1. In this view the burner is omitted. Fig. 3 is a transverse vertical section taken near the middle of the furnace, certain parts being broken away.

35 Referring more particularly to the parts, 4 represents the foundation of the furnace upon which the furnace walls are laid so as to form a substantially rectangular fire box 5. The forward wall 6 of this fire box presents a fuel opening 7, which is normally closed by swinging doors 8, between which the fuel supply pipe 9 passes inwardly. In addition to this the forward wall 6 is provided with two side draft openings 10, and these draft openings are divided at their rear ends by guide walls 11, which extend rearwardly a short distance and then inwardly in a lateral direction so as to form abutments 12 extending toward the middle axial line of the furnace. These abutments 12 form baffles for guiding the air inwardly toward the center of the furnace, and the air is guided rearwardly between two main guide walls 13, which extend toward the rear of the furnace, as shown.

From the outside edges of the draft open-

ings 10, side draft walls 14 extend rearwardly and these draft walls are disposed a short distance from the side walls 15 of the furnace so as to form side draft conduits 16. A similar conduit 16^a is formed at the rear. Near the rear wall 17 of the fire box, the main guide walls 13 are connected by a cross wall 18, as shown. The floor 19 of the fire box is formed of fire brick laid on transverse tee rails 20, and the side edges and rear edges of the floor 19 do not come into contact with the sides of the furnace, from which arrangement an open space or gap 21 is formed surrounding the fire box floor on the rear and two sides. Beyond the cross wall 18, the main guide walls 13 extend to the rear wall 17 of the furnace and the extensions 22, and at this point are provided ports 23. At the middle point of the cross wall 18, a rearwardly extending stop wall 24 is formed, which extends to the rear wall 17, and from this arrangement two draft pockets 25 are formed at the rear wall of the furnace near the central line thereof.

It will be seen that between the side draft walls 14 and the main guide walls 13, two parallel rearwardly extending draft flues 26 are formed, and these flues 26 are adapted to conduct air inwardly from the openings 10, the flow through them being regulated by swinging doors 27 having hinge connections 28 at their outer edges, said doors operating as dampers when partially closed. The forward ends of the main guide walls 13 are provided with short bars 29, which operate as supports for the foremost tee bars 20 in the vicinity of the forward doors of the furnace. The side draft walls 14 are provided with a plurality of draft openings 30, formed in the brick when built in. The fire box floor 19 is formed with a central opening 31, and at this opening a short cross beam 32 is supported, the middle portion of this beam being arranged as a support for the end of an inclined guide channel 33, which extends toward the front of the furnace and downwardly. The inclined portion of this member 33 forms a guide for the burner 34 when it is being placed in position, and the upper portion of this member forms a seat and support for the burner when in position, as indicated in Fig. 1. In this connection it should be understood that in placing the burner in the furnace, the pipe 9 is thrust into the furnace so that the lower end of the burner will rest on the guide 33

and by forcing the pipe inwardly and raising it, the guide 33 will guide the burner onto its seat and hold it centrally in the opening 31.

5 Special attention is called to the fact that the main guide walls 13 are built up to the under side of the floor 19 so that they effectually cut off the side flues 26 from the main central flue 35, which is formed between the walls 13. Likewise the side draft walls 14 are built up to the under side of the floor 19, so as to cut off any draft between the tee bars 20. In this way all the side draft is made to pass through the draft
10 openings 30.

The draft openings 10 may be closed or partially closed by damper doors 36, which have hinge connections 37 at their side edges, as indicated. When these doors are closed,
20 all the draft is cut off. Under normal firing conditions the doors 36 are open or partially open, and the doors 27 are closed so that all the draft passes through the main flue 35 to the opening 31, whence it passes upwardly to the burner 34. When a higher
25 rate of combustion is desired, the doors 27 are open or partially open so that in addition to the main air supply passing in the main flue 35, air will pass rearwardly in the side flues 26; a portion of this air passes
30 laterally at the rear of the openings 23 to the pockets 25, and from the pockets 25 the air passes upwardly through the gap at the rear edge of the floor 19; a portion of the
35 air from these side flues passes laterally through the draft openings 30 into the conduits 16, and passes upwardly from the gap 21 at the side edges of the furnace. In this way when the auxiliary draft is in operation,
40 an auxiliary air supply is delivered all around the fire box at the edge of the floor thereof.

It is obvious, that a furnace constructed as described can be used for any heating
45 purposes, and it can be used under boilers of water tube type or any other type.

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

1. A furnace having a floor with a main draft opening at an intermediate point thereon, a burner disposed adjacent to said opening, a main draft flue passing under said floor adapted to conduct air to said opening, side draft flues, and means for admitting air
50 from said side draft flues into the space above said floor. 55

2. A furnace having a fire box, a floor within said fire box having its side edges removed from the walls of said fire box so as to form a gap at said edges, a burner, a main draft flue under said floor conducting air to said burner, and side draft flues conducting air through said gaps. 60

3. A furnace having a fire box, a floor within said fire box, a burner disposed within said fire box, a main draft flue passing through said floor and conducting air to said burner, auxiliary draft flues at the side of said main flue, said floor having gaps
65 formed at the side edges thereof through which a draft may pass upwardly into said fire box, said gaps being in communication with said side draft flues, and means for controlling the admission of air to said flues. 70 75

4. A furnace having a fire box, said fire box having a forward wall with side draft openings, a main flue extending rearwardly under the middle portion of said fire box and receiving air from a portion of said side draft openings, auxiliary draft openings in connection with said side draft openings and adapted to give an auxiliary air supply, and means for regulating said auxiliary draft openings. 80 85

In witness that I claim the foregoing I have hereunto subscribed by name this 6th day of May, 1910.

HIRAM C. RUGGLES.

Witnesses:

F. D. AMMEN,

EDMUND A. STRAUSE.