

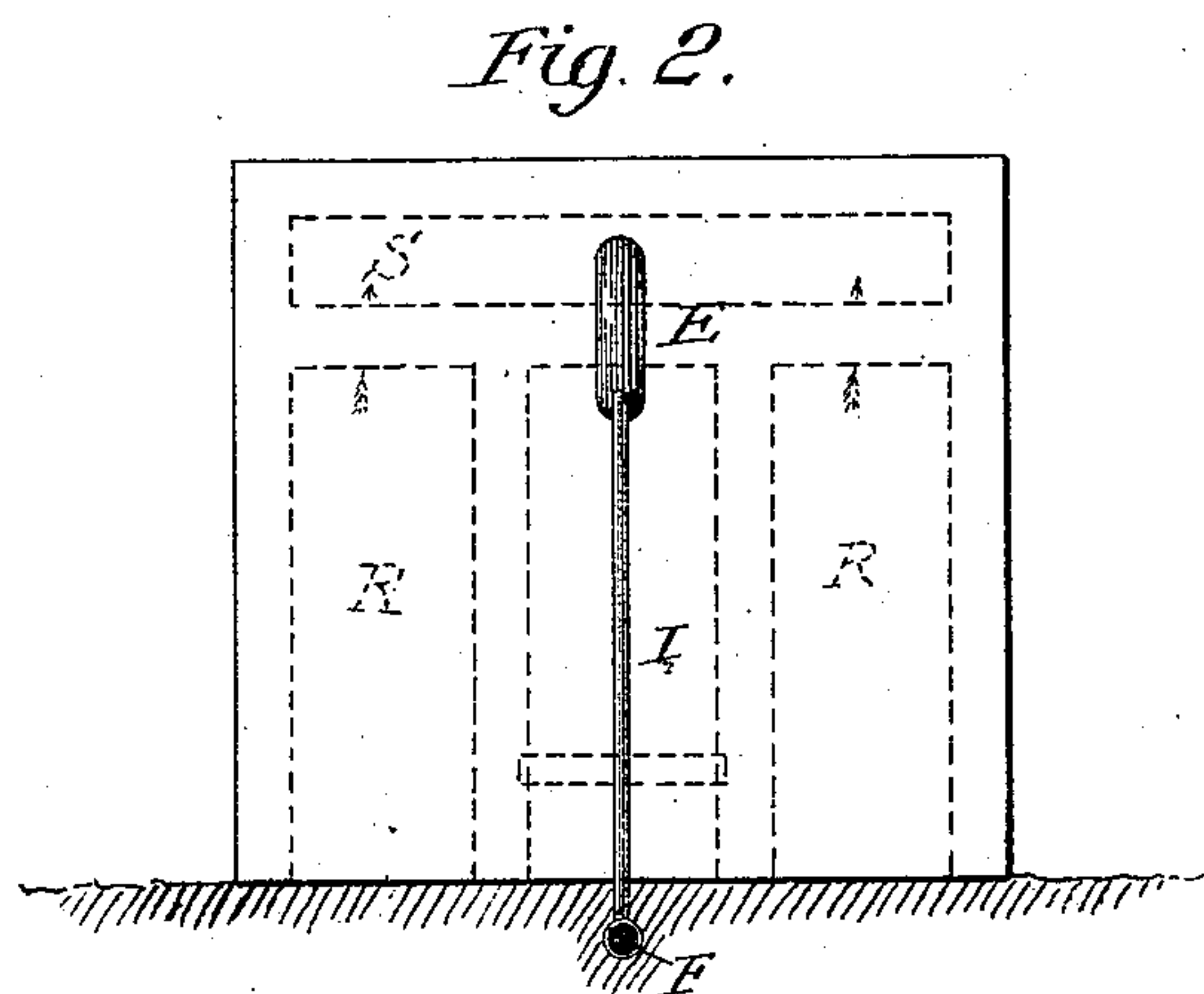
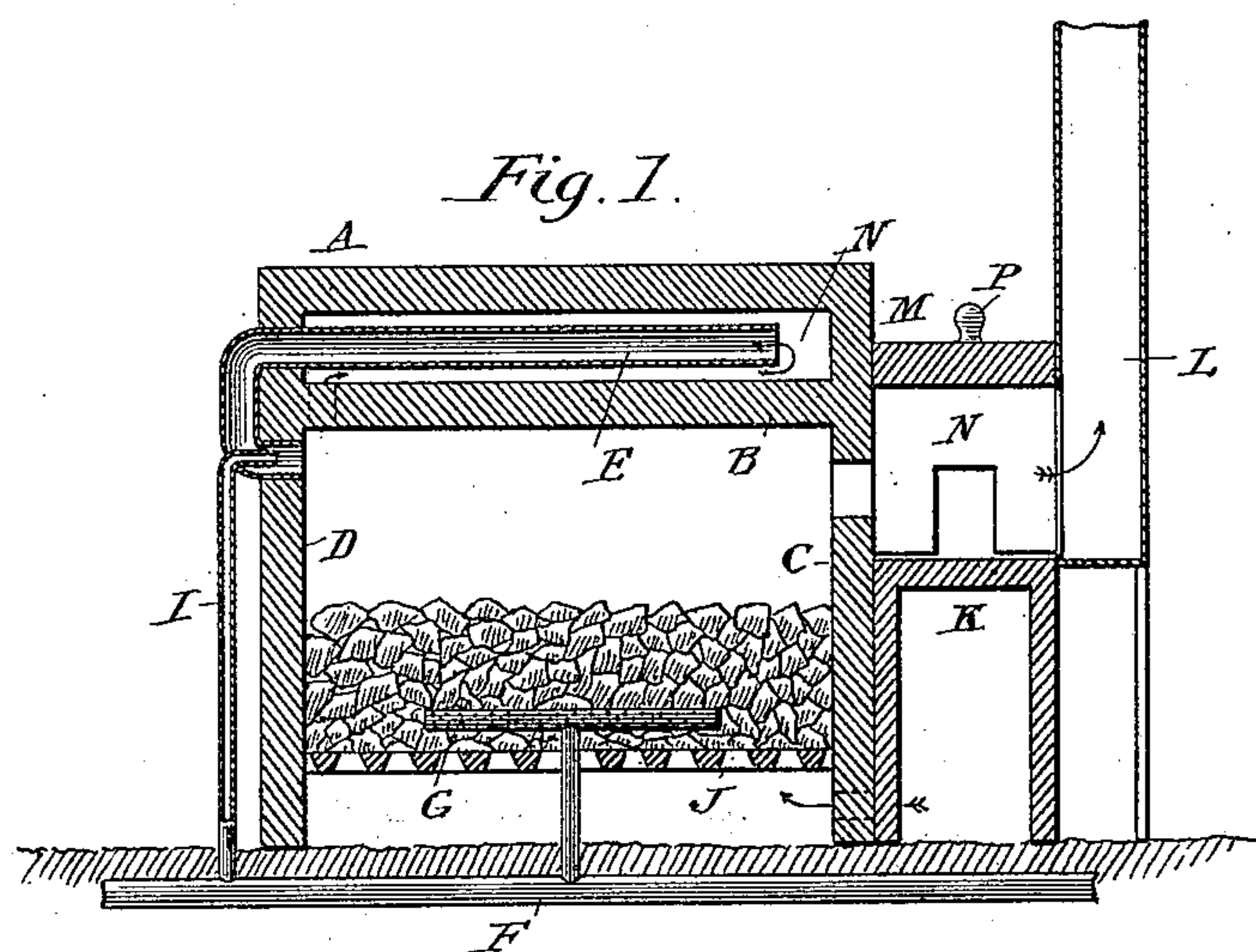
(No Model.)

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FURNACE FORGE FOR WELDING AND FORGING IRON, STEEL, AND
OTHER METALLIC BODIES.

No. 347,875.

Patented Aug. 24, 1886.



Witnesses.
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UNITED STATES PATENT OFFICE.

ARTHUR C. HUIDEKOPER, LÉOPOLD MAMBOURG, ULGIS HOUZE, AND DENNIS S. DOCKSTADER, OF MEADVILLE, PENNSYLVANIA.

FURNACE-FORGE FOR WELDING AND FORGING IRON, STEEL, AND OTHER METALLIC BODIES.

SPECIFICATION forming part of Letters Patent No. 347,875, dated August 24, 1886.

Application filed July 23, 1886. Serial No. 202,895. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR C. HUIDEKOPER, LÉOPOLD MAMBOURG, ULGIS HOUZE, and DENNIS S. DOCKSTADER, all residents of Meadville, in the county of Crawford and State of Pennsylvania, (ARTHUR C. HUIDEKOPER and DENNIS S. DOCKSTADER being citizens of the United States, but LÉOPOLD MAMBOURG and ULGIS HOUZE, former subjects of the King of Belgium, have both made oath of their intentions to become citizens of the United States,) have jointly invented a Furnace-Forge for Welding and Forging Iron, Steel, and other Metallic Bodies by the Use of Natural Gas as Fuel, of which the following is a specification.

Our object is to combine heated air with gas in an apparatus so constructed that a portion of the gas is first burned in contact with a mass of broken fire-clay bricks, while the main supply of gas, under a high pressure, previously mixed with air, is forced over the mass of heated fire-brick in the combustion-chamber, the force of the gas driving the products of combustion through and beyond the bricks to a working-chamber, where they are used to heat or melt metallic bodies. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal central sectional view of our furnace. Fig. 2 is a rear view of the combustion and air-heating chambers.

Similar letters refer to similar parts throughout the several views.

We build our furnace in three compartments, the central chamber or compartment being the combustion-chamber, and those at the sides and top of the combustion-chamber are for the purpose of heating the main air-supply before it enters the upper part of the central combustion-chamber.

All the walls, floors, and covers of the furnace are built of fire-clay brick, and each compartment is preferably three times longer than the width, and so arranged that a row of bricks will span each chamber as a cover.

Over the air-heating and gas-combustion chambers we form a cover some two inches above the top of the lower chamber. The chamber thus formed is not divided by partitions, but as stated, it forms the upper surface of the combustion and lower or side air-heat-

ing chambers. There are openings from the side chambers into this upper chamber, so that the air can be more highly heated after passing through the side chambers.

To compel the air to traverse the heated surface of the upper chamber we project a pipe, E, into this chamber, to take the air from the opposite end from which it enters.

The arrows, Fig. 1, show the direction and path of the air from where it first enters the air-heating chambers at the opening Q below the hearth or forge at the bottom of the wall C till finally it is drawn through pipe E by the gas-blast from pipe F, and is discharged into the combustion-chamber over the mass of highly-heated fire-brick resting on the grate-bars J J.

As heretofore stated, Fig. 1 is a longitudinal central section of our furnace, in which the letter A represents the top or cover of the upper air-heating chamber; B, the cover of the combustion-chamber; C, the front wall of the combustion and air-heating chambers; D, the rear wall of the same. E is an air-pipe for the introduction of air to the upper air-heating chamber. F is a gas-main leading from a gas-well or other source of supply.

The arrows in Fig. 1 show the path of the air through the heating passages or compartments. I is a gas-pipe leading from the main pipe F. G is a perforated pipe or burner. J J are grate-bars, on which is shown the layer of broken brick.

In the path of the products of combustion, as they pass from the combustion-chamber, we locate the furnace-hearth or working-chamber. K represents the floor of the forge; L, the chimney of the same. M is a sectional view of the top or cover of the forge. N shows farther side of forge provided with the opening O, through which the materials to be heated are introduced. P is a loop in the cap or cover, for the purpose of raising it with a lever or pulley, as desired.

When the bars are to be heated their entire length, we make a proportional distance between the combustion-chambers or furnace and the chimney, and, if necessary, feed the bars through the rear wall of the chimney.

Fig. 2 is a rear view of the combustion-chamber, showing in dotted lines the side air-

heating chambers, R R, and the upper air-heating chamber, S, and the central combustion-chamber and grate.

In order to give greater intensity to the heat
 5 in the working-chamber, we place the burner
 G just over the grate bars J J, in the midst of
 the broken fire-clay bricks. The supply of
 gas being turned on through the gas-main F,
 the gas at the burner G is lighted, and the air
 10 is supplied thereto by air-passages which open
 into the combustion-chamber below the grate-
 bars J J. When the broken fire-clay bricks
 surrounding the burner G are highly heated,
 by means of the combustion of the gas in con-
 15 tact therewith, as described, we turn on the
 main supply of gas through the pipe I, and,
 owing to the pressure of the gas, without the
 use of fans, blowers, or other devices ordina-
 rily employed in supplying air to gas-furnaces,
 20 we draw the supply of air required for the
 complete combustion of the gas through the
 side and top air-heating chambers. The highly-
 heated condition of the broken bricks in the
 combustion-chamber causes the air and gas
 25 entering from the pipe E to be immediately
 inflamed, and the two are thoroughly com-
 mingled, and the gas consumed partly in the
 combustion-chamber.

The point of complete combustion and of
 30 the greatest intensity of heat of our furnace is
 formed in the working-chamber, and for this
 reason our apparatus described is admirably
 adapted for heating metals, and like purposes
 of the industrial arts.

The construction shown is simple, and the 35
 results attained prove that the apparatus is
 more effective in attaining higher temperatures
 and a more complete combustion of gas than
 the apparatus heretofore employed for such
 purposes. 40

Having fully described our invention, what
 we claim as our improvement, and desire to
 secure by Letters Patent, is—

1. The combination of the central combus-
 tion-chamber provided with a grate covered 45
 with broken fire-bricks, of the gas-burner lo-
 cated near the grate, of the side air-heating
 chambers and the upper air-heating chambers,
 and the air-pipe and gas-pipe opening into the
 upper part of the combustion-chamber, as de- 50
 scribed.

2. The combination of the combustion-cham-
 ber, the air-heating chambers located on the
 side of the combustion chambers, the upper
 air-heating chamber, the air-pipe located in 55
 said upper chamber, and the gas-jet opening
 into said air-pipe, and the forge or working-
 chamber, as described.

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