

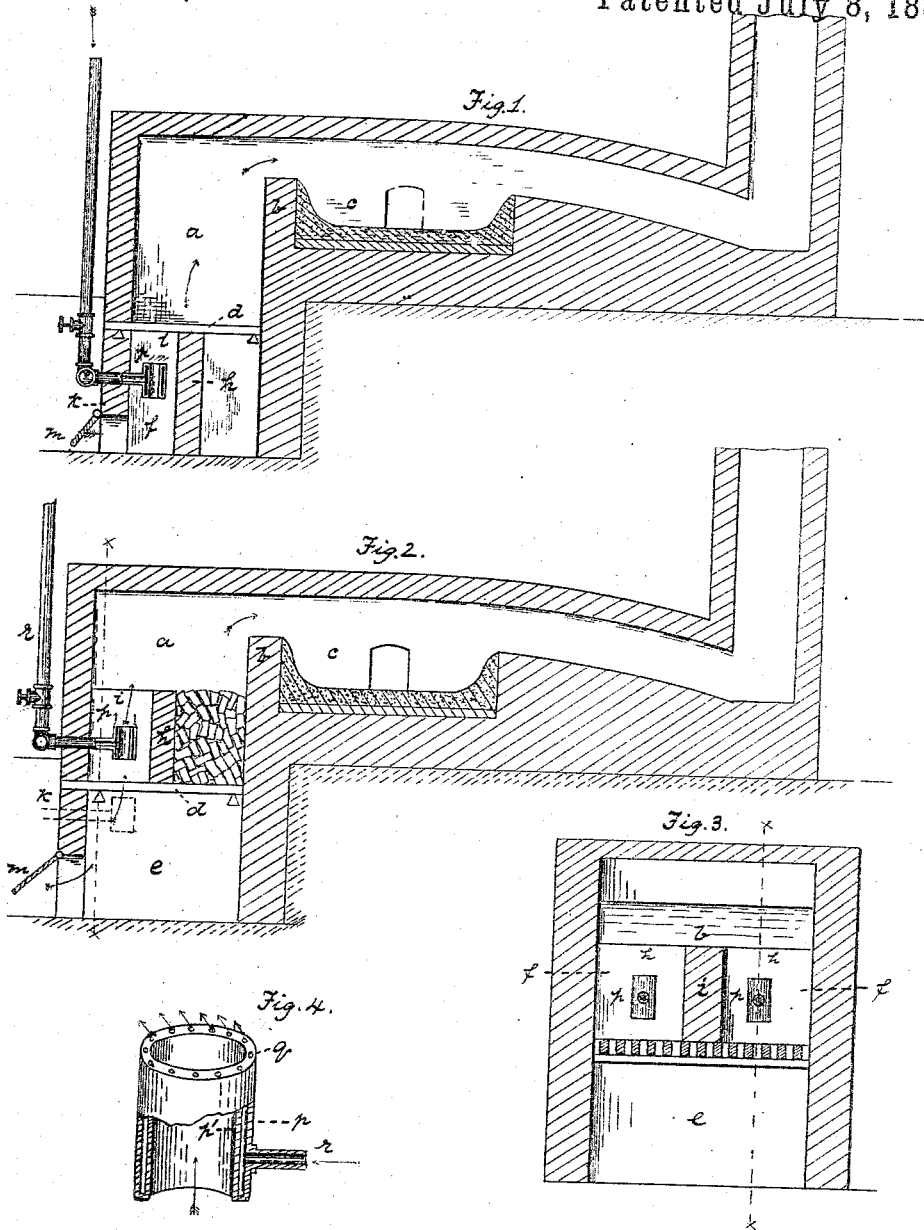
(No Model.)

E. J. DASCHBACH.

PUDDLING FURNACE.

No. 301,688.

Patented July 8, 1884.



Witnesses.  
W. B. Corwin  
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# UNITED STATES PATENT OFFICE.

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## PUDDLING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 301,688, dated July 8, 1884.

Application filed January 25, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD J. DASCHBACH, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Puddling-Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to an improvement in metallurgical furnaces; and it consists in the arrangement and construction of devices for heating the furnace where hydrocarbon gases are employed as fuel.

I am aware that natural gas and other hydrocarbon gases have been employed, either alone or in connection with solid fuel, for the purpose of heating metallurgical and other furnaces, and also that various devices have been employed in feeding the gas to the furnace. In the use of natural gas, however, several more or less objectionable features have been met, among which are the facts that the supply of gas is apt to be intermittent, that it is difficult to concentrate the heat in the body of the furnace, and also that where there is an imperfect mingling of the air and gas the metal in the furnace is cut or burned and rendered hard and brittle.

The object of my invention is therefore, first, to construct the furnace so that either gas or solid fuel may be employed therein, and, second, to arrange and construct the burners so that the gas and air shall be thoroughly mingled before entering the combustion-chamber.

I will now describe my invention, so that others skilled in the art may employ the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical sectional view of my improved furnace. Fig. 2 is a like view of a modified form on the line *xx*, Fig. 3. Fig. 3 is a vertical sectional view on the line *xx*, Fig. 2; and Fig. 4 is a perspective view of the burner, partly in section.

Like letters of reference indicate like parts wherever they occur.

In the drawings, *a* represents the fire-chamber of the puddling-furnace, *b* the bridge-wall, and *c* the working-chamber. Along the bottom of the fire-chamber *a* are the grate-bars *d*, below which is the ash-pit *e*. These

grate-bars *d* are so arranged that any one or all of them may be readily drawn from the fire-chamber. This puddling-furnace is so constructed that it may be heated by means of solid carbonaceous fuel in the usual manner. When, however, it is desired to employ natural or other hydrocarbon gas as fuel, I employ a gas-burner similar to that shown in Fig. 4, which burner acts, in combination with a surrounding flue, in supplying mingled gas and air to the furnace. These flues *f* may be situated either below or upon the grate-bars. I prefer, however, to place them below the grate-bars in the ash-pit, as shown in Fig. 1, and they are formed by the partition-wall *h*, which extends across the ash-pit at right angles to the line of the grate-bars and the partition-wall *i*, which intersects the wall *h* and extends thereto from the front wall, *k*. These walls *h* and *i* may be built of fire-brick in such a manner that they may be at any time easily removed. In the front wall, *k*, opening into the lower portion of the flues *f*, are the air-passages and dampers *m*. If desired, these walls *h* and *i* may be built on the grate-bars, in which case the space between the wall *h* and the bridge-wall should be filled in with pieces of brick and sand, as shown in Fig. 2. In these flues *f* are placed the gas burners *p*, which are formed of two pipes or cylinders, *p* *p'*, placed one inside of the other, so as to form a gas-passage between the two cylinders and an air-passage through the inner cylinder, the gas-passage being closed at the top and bottom, the gas escaping through jets *q* at the top of the burner, which jets are inclined, so as to impart a whirling movement to the gas as it passes from the burner. These burners are placed in the flues *f* in a vertical position, so that a current of air shall pass up through the flue around the burner, and also through the pipe *p'*, while the gas passes from the burner between the two currents of air, and becomes thoroughly mingled therewith before reaching the top of the flues. The burners should be proportioned in size to the size of the flues—that is, too large a space must not exist between the sides of the flue and the burner, as the air and gas must not be allowed to pass over the bridge-wall in separate currents, the operation being on the same principle as that of an Argand burner.

Although I have only shown two flues and their respective burners arranged in the furnace, I do not desire to limit myself to this number. Each burner, however, should have a separate flue.

Should the gas-supply at any time cease, the partition-walls *h* and *i* are removed, together with the burners, and the furnace may then be heated by solid fuel until a supply of gas is again obtained, when the walls are again built, and the burners placed in position and connected with the gas-supply pipe *r*.

The advantages of my invention are, the saving of fuel; owing to the more perfect mingling of the gas and air; the superior quality of metal produced, owing to the absence of air-currents, and the ease and rapidity of placing the burners in position without material change in the furnace.

My improved devices may be applied to heating and other metallurgical as well as puddling furnaces.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a metallurgical furnace, the arrangement of a gas-burner inside of an outer flue, said burner having an interior air-passage and a series of inclined escape-jets for the gas, whereby a current of gas is interspersed between an inner and outer current of air, and the whole thoroughly commingled, substantially as specified.

2. In a metallurgic furnace, a burner arranged in a flue below the grate-bars, the said burner being so constructed and situated in relation to an outer air-flue as to produce a current of gas between an inner and outer current of air, and supply the same thoroughly commingled to the combustion-chamber of the furnace, substantially as and for the purpose specified.

3. In a metallurgical furnace, a gas-burner consisting of a double pipe or cylinder having an interior air-passage, and an outer gas-passage provided with inclined jet-openings, substantially as and for the purpose specified.

4. In a metallurgic furnace, the combination, with the fire-chamber, of transverse and longitudinal detachable partitions arranged therein to form air-flues for the gas-burners, and gas-burners arranged in said air-flues, substantially as and for the purposes specified.

5. In a metallurgic furnace, the combination, with a fire-chamber having suitable grate-bars, of a gas-burner arranged below the grate-bars, and detachable partition-walls arranged in the ash-pit to form air-flues in the ash-pit around the gas-burners, substantially as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 19th day of January, A. D. 1884.

EDWARD J. DASCHBACH.

Witnesses:

W. B. CORWIN,  
JAMES K. BAKEWELL.