

(No Model.)

C. L. WHEELER.
MELTING FURNACE.

No. 475,070.

Patented May 17, 1892.

Fig. 1

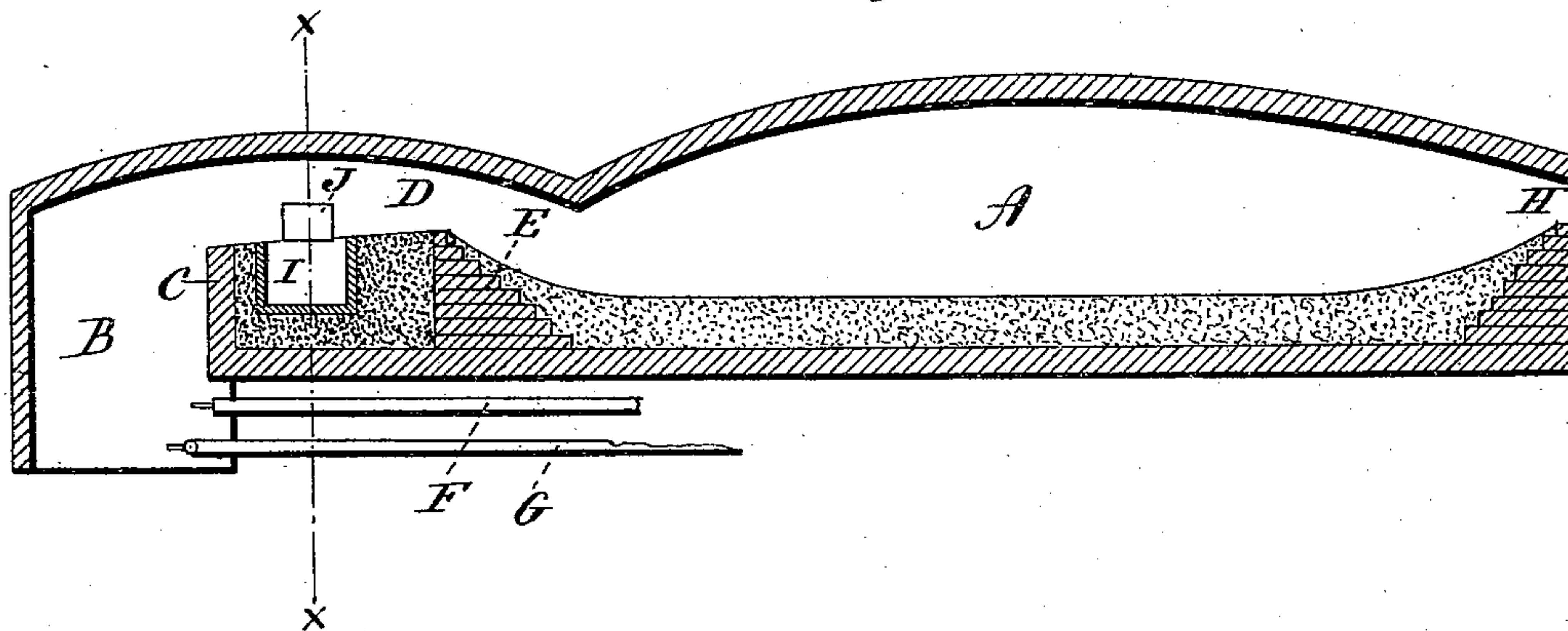
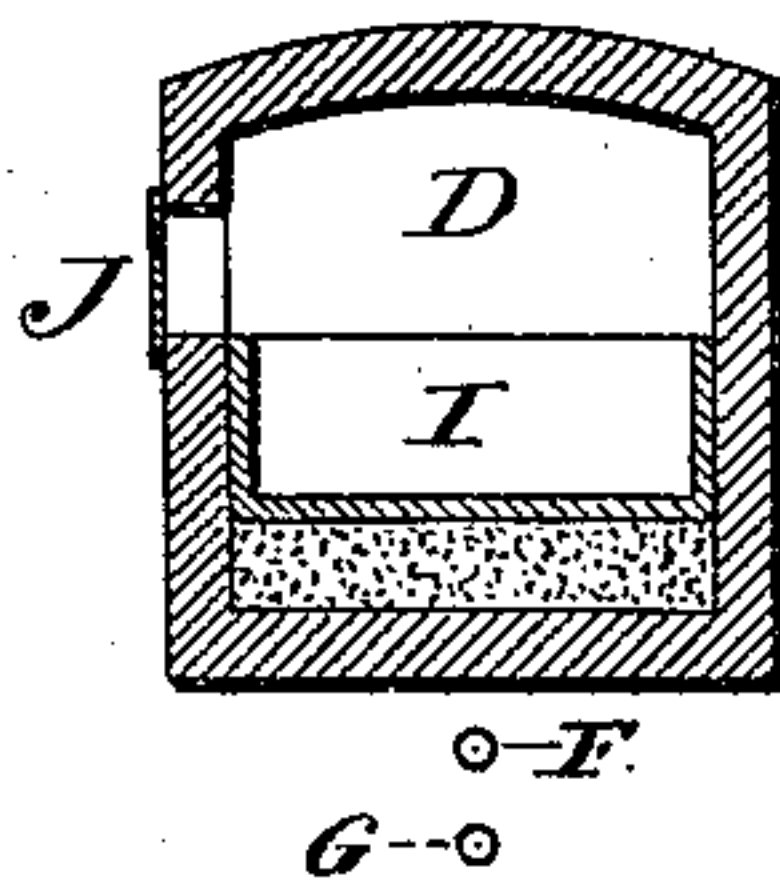


Fig. 2



Witnesses
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UNITED STATES PATENT OFFICE.

CLARENCE L. WHEELER, OF MARION, INDIANA, ASSIGNOR OF ONE-HALF TO
JAY WILLARD CLARK, OF SAME PLACE.

MELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 475,070, dated May 17, 1892.

Application filed February 14, 1891. Serial No. 381,513. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE L. WHEELER, of Marion, in the county of Grant and State of Indiana, have invented a new Improvement in Melting-Furnaces; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a longitudinal central section through the furnace; Fig. 2, a transverse section on line *xx* of Fig. 1.

This invention relates to an improvement in furnaces for melting metal and in which the fuel employed is gas.

I find in practice that it is difficult to produce a proper mingling of the air and gas so as to effect perfect combustion between the fire-box and the hearth of furnaces of the usual construction, and I also find that in the employment of gas as a fuel for melting or reverberatory furnaces the quality of the gas varies to a considerable extent in different localities where natural gas is employed, and that in the manufacture of gas the qualities vary to a considerable extent. In some places there is a lack of sufficient carbon in the gas itself, and in other cases there is an excess of sulphur, both of which detract materially from the effectiveness of the flame.

The object of my invention is the construction of a furnace whereby perfect combustion will be attained and carbon supplied to the flame in its passage from the fire-box to the hearth, or to mingle with the flame in the same passage that which will counteract the excess of sulphur in the flame; and the invention consists in a fire-box to which the gas is admitted with the requisite supply of air, a melting hearth or chamber, a combustion-chamber between the said hearth and fire-box, which will insure the proper mingling of gas and air before the flame reaches the hearth, and also in constructing in the said combustion-chamber a receptacle over which the flame passes, the said receptacle being adapted to contain carbon or material for anti-sulphur

treatment of the flame, as the case may be, and as more fully hereinafter described.

In the accompanying illustration, Fig. 1 represents a longitudinal section, and Fig. 2 a cross-section on line *xx* of Fig. 1, of a single hearth or melting-chamber A, which may be any of the usual constructions of melting or reverberatory furnaces.

B represents the fire-box, and C represents the bridge-wall.

Instead of making an immediate communication between the fire-box and the hearth, as in the usual construction, I form a combustion-chamber D between the fire-box and the hearth. As here represented, this is done by a second bridge-wall E, distant from the bridge-wall C, and which bridge-wall E forms the end of the hearth A. The space between the two bridge-walls may be filled complete, so as to form the long chamber D between the fire-box and the hearth. The combustion-chamber between the fire-box and the hearth affords time between the fire-box and the hearth for a complete mingling of the air and gas, so as to insure perfect combustion. The gas is preferably led into the fire-box below the hearth.

F represents the gas-supply pipe, and the air is led into the fire-box in like manner through a pipe G, which, like the gas-pipe F, is preferably arranged below the hearth, so that the gas and air may both be heated from the hearth.

The supply of gas into the fire-box is arranged in the usual manner, to be so regulated that the requisite quantity of air and gas may be supplied, and if a blast is required the blast is also introduced in the usual manner, these devices being too well known to require description or illustration. At the opposite end of the hearth there is the usual exit-passage H for the flame and products of combustion. The metal is introduced to the melting-chamber or hearth A in the usual manner, and the flames passing through and over the metal so introduced reduce it in the usual manner.

The detrimental effects of imperfect combustion are too well known to require par-

ticular reference, as are the effects of perfect combustion, which perfect combustion is insured by the introduction of the combustion-chamber between the fire-box and the hearth.

5 In the bottom of the combustion-chamber D a cavity or chamber I is formed, with an opening J through the wall of the furnace communicating therewith, so that material may be introduced through the said opening into the
10 said chamber I, as occasion may require.

In case there is a lack of carbon in the flame the chamber I is supplied with a suitable carbon. This may be oil, the vapors of which will be taken up and absorbed by the
15 flame or any suitable carbon which may mingle with the flame in its passage through the combustion-chamber and so as to give to the flame the requisite amount of carbon.

If there be an excess of sulphur in the
20 flame, the detrimental effects of which are too well known to require description, then I introduce into the chamber I an anti-sulphur material, such as fluor-spar, the vapors from which, either from heat or burning of the
25 same, will mingle with the flame in its passage through the combustion-chamber and neutralize the sulphur which the fluor-spar flame contains.

There may be cases in which excess or lack
30 of other qualities in the flame may be cured by the introduction into the chamber I of a

material having the effect to neutralize such objectionable qualities of the flame.

I claim—

1. In a melting-furnace, the combination 35 of a fire-box, means substantially such as described for the supply of gas and air to said fire-box as the fuel, the hearth or melting-chamber distant from said fire-box, and a combustion-chamber between said hearth and fire-
40 box, through which the flames pass from the fire-box to the said hearth, substantially as described.

2. In a melting-furnace, the combination 45 of a fire-box, means substantially such as described for the supply of gas and air to said fire-box as the fuel, the hearth or melting-chamber distant from the said fire-box, a combustion-chamber between said hearth and fire-
50 box, through which the flames pass from the fire-box to the said hearth, with a receptacle or chamber in the bottom of said combustion-chamber, but opening into the said combustion-chamber, substantially as and for the purpose described. 55

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CLARENCE L. WHEELER.

Witnesses:

ARTHUR R. PERRY,
LOUIS A. VON BEHREN.