

No. 717,582.

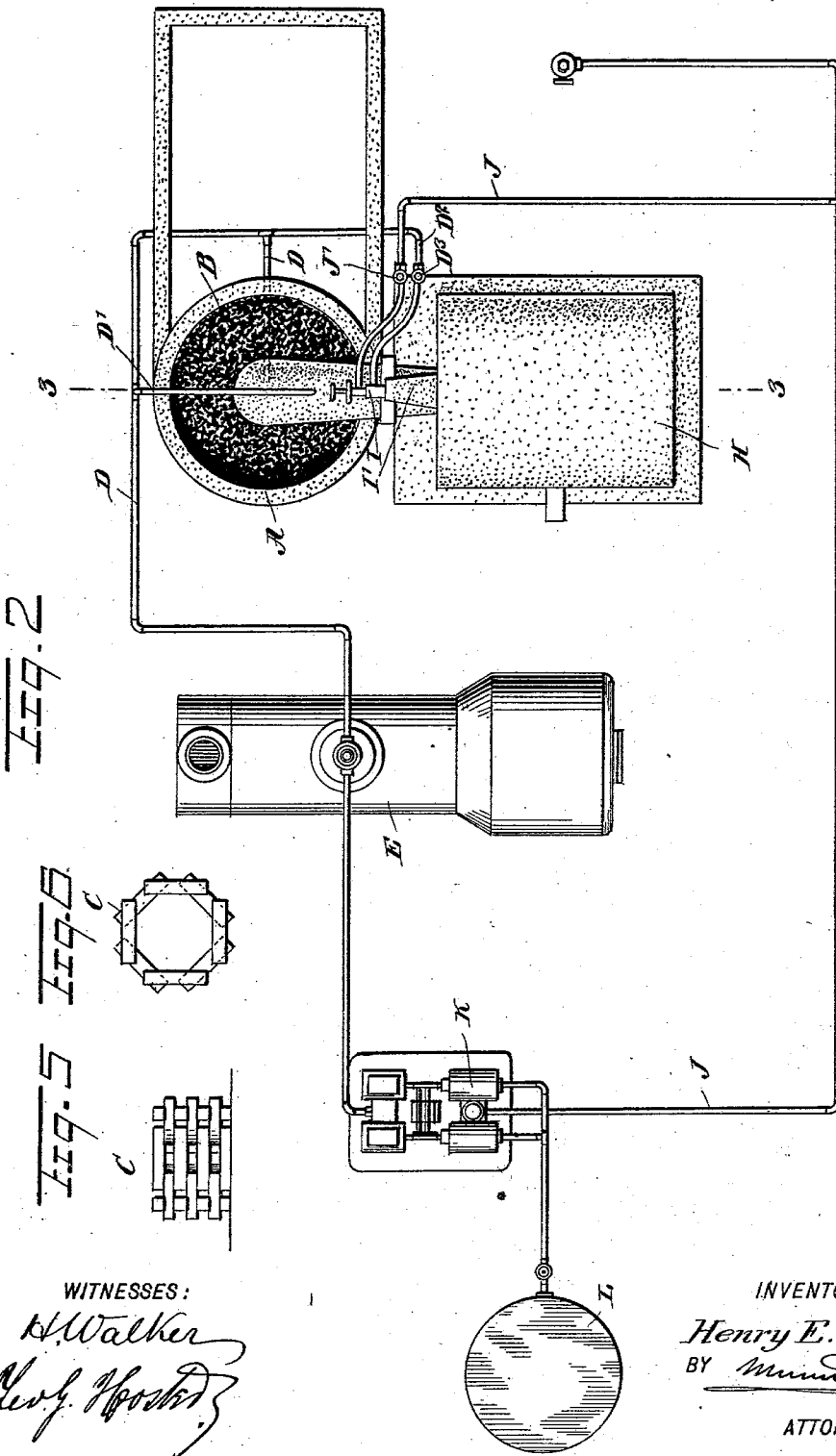
PATENTED JAN. 6, 1903.

H. E. KENT.
FURNACE.

APPLICATION FILED MAR. 4, 1902.

NO MODEL.

3 SHEETS—SHEET 2.



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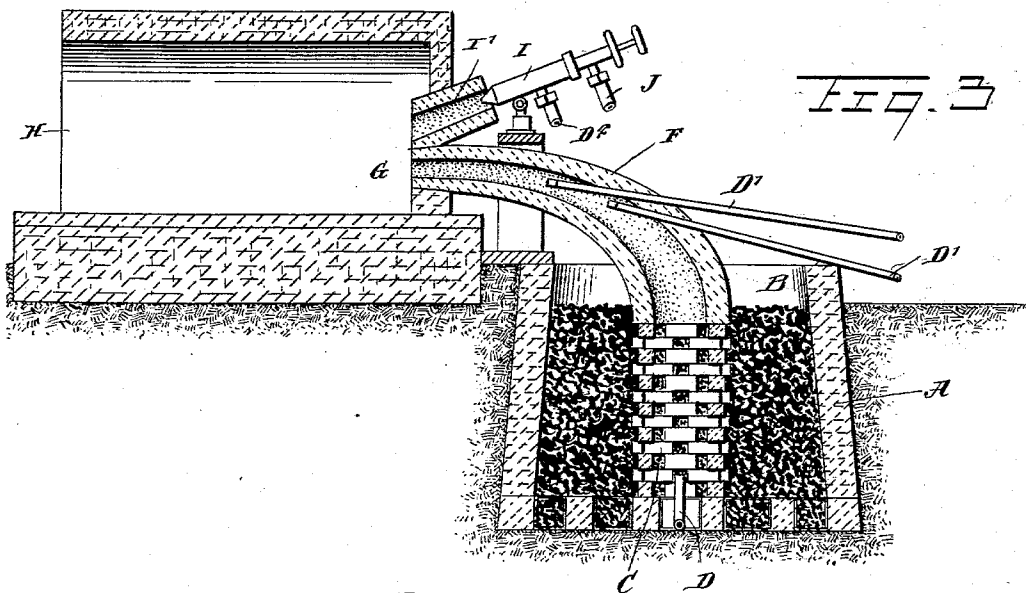


Fig. 3

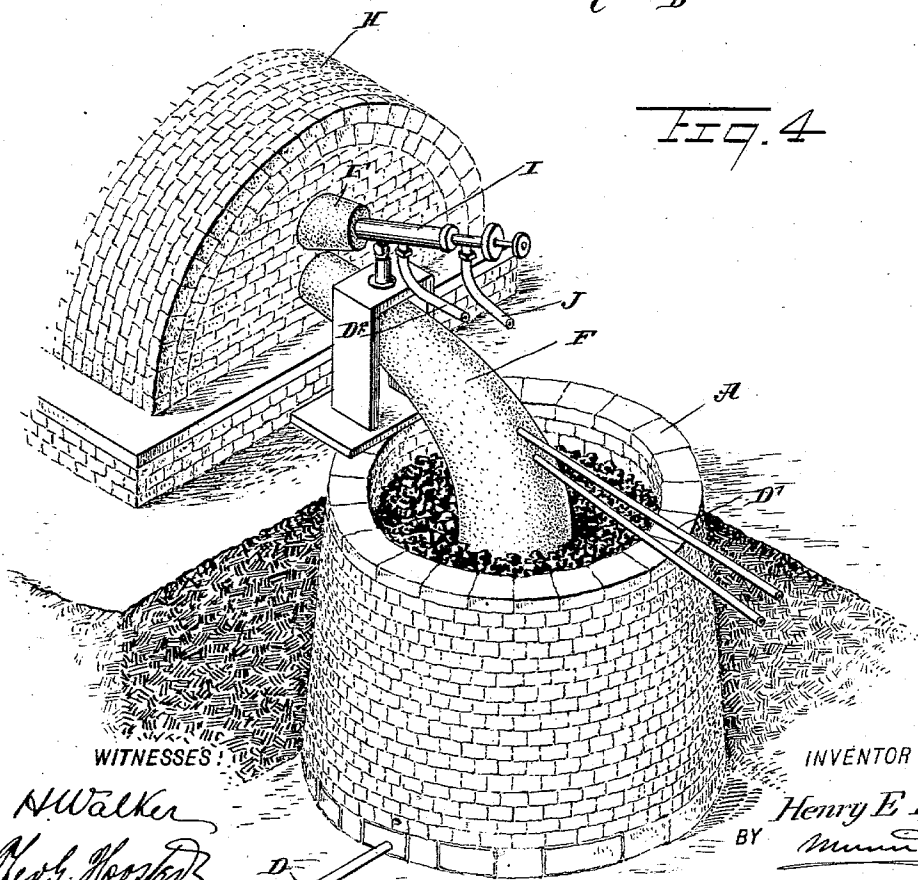


Fig. 4

WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY EDMUND KENT, OF BUFFALO, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO SAID KENT, KATE WILKINSON CAMPBELL AND DONALD CAMPBELL, OF NEW YORK, N. Y., AND ABEL H. GILBERT, OF BROOKLYN, NEW YORK.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 717,582, dated January 6, 1903.

Application filed March 4, 1902. Serial No. 96,587. (No model.)

To all whom it may concern:

Be it known that I, HENRY EDMUND KENT, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented a new and Improved Furnace, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved furnace arranged to insure complete combustion of the fuel and the extraction of all the heat units contained in the fuel, producing thereby an extremely high heat for use in steam-generation, smelting operations, and for various other purposes.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement as applied to a steam-boiler. Fig. 2 is a plan view of the improvement as applied to a smelting-oven. Fig. 3 is an enlarged sectional side elevation of the same on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of the same. Fig. 5 is a side elevation of the perforate tube for the solid fuel-chamber. Fig. 6 is a plan view of the same. Fig. 7 is a side elevation of the conductor. Fig. 8 is a view of one end of the same, and Fig. 9 is a view of the other end thereof.

The fuel-chamber A is preferably in the form of a hollow frustum of a cone, open at the top, and containing solid or hard fuel B—such as coal, coke, peat, shale, lignite, asphaltum, wood, or the like—the fuel completely surrounding a perforate tube C, rising in the center of the chamber A, preferably built of a suitable refractory material or other material capable of withstanding a high heat. The tube C may be built of bricks or the like, set in checker or cob-house form, and into the lower end of this tube opens a steam-jet from a steam-supply pipe D, connected with a steam-supply E, such as a steam-boiler, and from the upper end of the tube C leads a tu-

bular conductor F, gradually contracting and curved, to lead out of the chamber A to one side thereof and into the fire-box G of the steam-boiler E, as shown in Fig. 1, or to a smelter-oven H, as illustrated in Figs. 2, 3, and 4, or to any other place where the heat of the oven is to be applied.

Now when the furnace is in operation the steam passing into the lower end of the perforate tube C causes a suction action therein, so that the fuel B in the chamber A readily burns when ignited and the products of combustion pass through the perforations in the tube C to the interior thereof to be forced upward by the action of the steam-jet and to mix with the steam to produce a highly-inflammable mixture. This mixture passes into the conductor F, which conducts the mixture into the fire-box G of the boiler E or into the smelter-oven H or other place in which the heat is to be used. Into the fire-box G opens a nozzle I', connected with an injector I, for conducting a flame of burning gaseous fuel, such as gas or a mixture of gas and steam, into the fire-box, adjacent to the delivery end of the conductor F, so that the highly-inflammable mixture from the conductor F is ignited and burns with the gaseous fuel in the fire-box G to cause not only a complete combustion of all the fuel and extraction of all the heat units, but at the same time an extremely high heat is produced for quickly generating the steam in the boiler E or rapidly smelting the ores or other materials contained in the smelter-oven H.

In order to increase the suction action in the tube C, I may employ one or more branch steam-pipes D', leading from the steam-supply pipe D and opening into the conductor F to cause steam to pass into the said conductor in the direction in which the mixture is traveling, so that the mixture passes under a high pressure and at great velocity out of the conductor F, and at the same time the mixture is enriched with steam from the branch pipes D'.

The injector I in forcing a mixture of gaseous fuel and steam into the nozzle I' causes air to pass into the said nozzle, (see Fig. 3,) and this mixture readily burns in the nozzle

I' and passes under considerable pressure into the fire-box G to burn with the mixture coming through the conductor F. The injector I is connected by a branch pipe D² with the steam-supply pipe D and by a pipe J with a pump K, having its suction-pipe connected with a reservoir L, containing fuel—such as oil, gas, and the like—the pipe serving to pump the fuel through the pipe J into the injector I, in which the fuel mixes with the steam from the branch pipe D² to form a highly-inflammable gas.

As shown in Fig. 2, the steam-boiler E supplies the pipe D with steam and also the pump K to actuate the latter.

The pipes D² and J are provided with suitable valves D³ J' to permit of properly regulating the amount of steam and gaseous fuel passing to the injector I.

It is evident that when the furnace is in operation all the smoke and gases arising from the burning of the solid or hard fuel in the chamber A are completely burned, and consequently chimneys and other similar draft-tubes are completely dispensed with, and at the same time an extremely high heat is developed, so as to insure a quick generation of steam or smelting of ores and other materials.

I do not limit myself to the particular construction of the furnace shown and described, as the same may be varied without deviating from the spirit of my invention.

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

1. A furnace having a fuel-chamber open at the top, a perforate tube in the said chamber, a steam-jet opening into the tube, to create a suction action therein, to draw the products of combustion from the burning fuel through the perforations into the tube, and a tubular conductor secured to one end of said tube for leading the products of combustion and the steam mixed therewith to a fire-box or the like, as set forth.

2. A furnace having a fuel-chamber open at the top and closed at the bottom, a perforate tube rising centrally in the said chamber and surrounded by the burning fuel, a steam-jet connected with a steam-supply and opening into the lower end of the said perforate tube, to create a suction action therein, to draw the products of combustion from the burning fuel through the perforations into the tube, and a conductor connected with the upper end of the perforated tube, as set forth.

3. A furnace having a fuel-chamber in the form of a hollow frustum of a cone, said cham-

ber being open at the top and closed at the bottom, a vertical perforate tube in said chamber and surrounded by the burning fuel therein, a steam-jet opening into the lower end of the tube, to create a suction action therein, to draw the products of combustion from the surrounding burning fuel into the said tube, and a tapering tubular conductor connected with the upper end of the perforated tube, as set forth.

4. A furnace having a perforate tube, surrounded by the burning fuel, a steam-jet opening into one end of the tube, to create a suction action therein, to draw the products of combustion from the surrounding burning fuel into the said tube, a conductor connected with the discharge end of the said perforate tube, a fire-box into which the conductor discharges, and an injector for delivering to the mixture issuing from the conductor a gaseous fuel, as set forth.

5. A furnace having a chamber for containing solid fuel open at the top and closed at the bottom, a perforate tube rising centrally in the said chamber and surrounded by the burning fuel, a steam-jet connected with a steam-supply and opening into the lower end of the said perforate tube, to create a suction action therein, to draw the products of combustion from the burning fuel through the perforations into the tube, a tubular non-perforate conductor connected with the said perforate tube at the end opposite the one at which the steam enters, and a fire-box into which the conductor discharges, as set forth.

6. A furnace having a fuel-chamber open at the top, a perforate tube rising centrally in the said chamber and surrounded by the burning fuel, a steam-jet connected with a steam-supply, opening into the lower end of the said perforate tube, to create a suction action therein, to draw the products of combustion from the burning fuel through the perforations into the tube, a tubular non-perforate conductor connected with the said perforate tube at the end opposite the one at which the steam enters, a fire-box into which the conductor discharges, a nozzle discharging into the fire-box close to the discharge end of the said conductor, and an injector for the said nozzle, to force air, gas and steam into the nozzle, as set forth.

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

HENRY EDMUND KENT.

Witnesses:

THEO. G. HOSTER,
EVERARD BOLTON MARSHALL.