2 Sheets--Sheet 1.

H. RAGOT de MONTHUREUX.

Improvement in Glass-Furnaces.

No. 133,083. Patented Nov. 19, 1872.

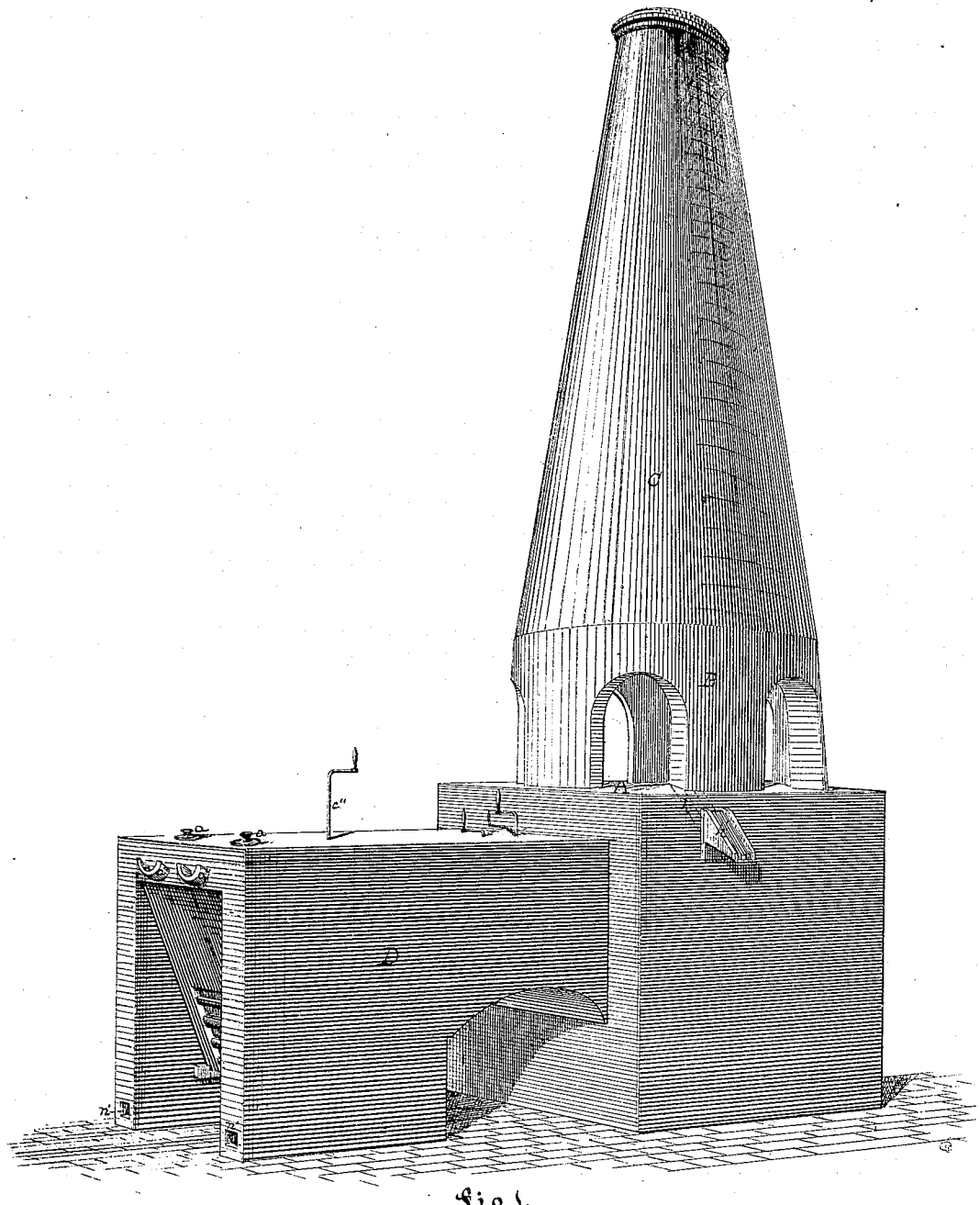

Fig. 1.

Witnesses: R. F. Wrenshall, Jas. I. Kay.

Inventor: Henry Ragot de Monthureux, by Bakewell Church, his Attys.

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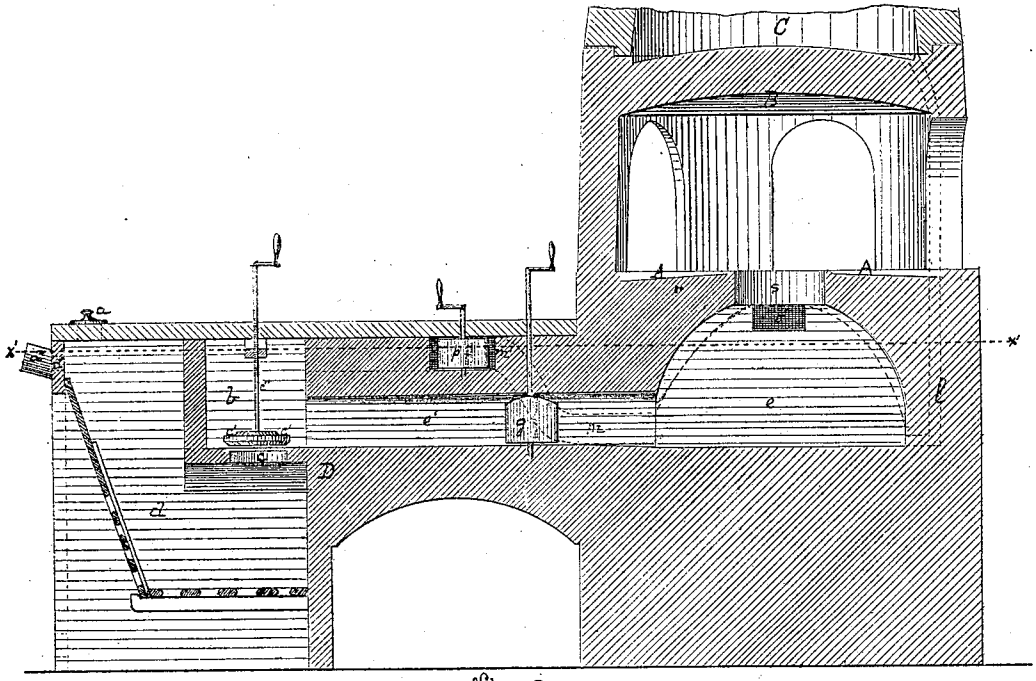

Fig. 2.

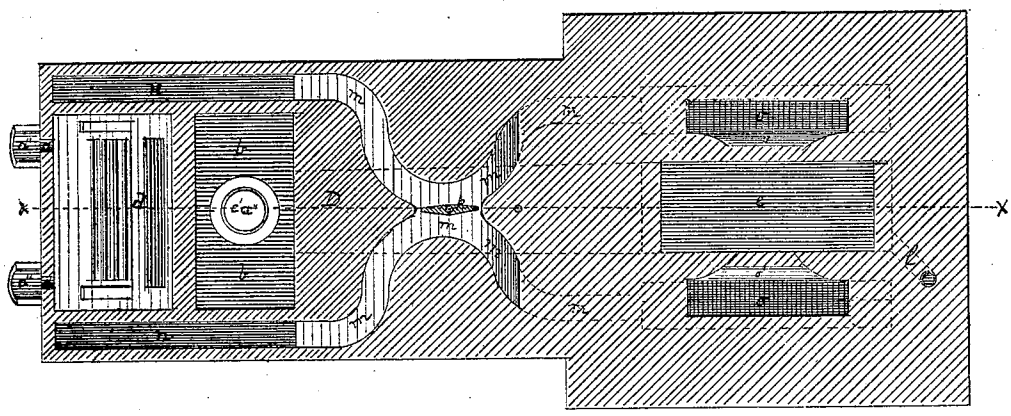

Fig. 3.

Witnesses { R. C. Wrenshall
Jas. I. Kay

Inventor: Henry Ragot de Monthureux,
by Bakewell & Christy, his Attys.

UNITED STATES PATENT OFFICE.

HENRY RAGOT DE MONTHUREUX, OF BIRMINGHAM, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE "RAGOT DE MONTHUREUX GAS COMPANY," OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN GLASS-FURNACES.

Specification forming part of Letters Patent No. **133,083**, dated November 19, 1872; antedated November 16, 1872.

To all whom it may concern:

Be it known that I, HENRY RAGOT DE MONTHUREUX, of the borough of Birmingham, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Furnace; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, in two plates, (A and B,) making a part of this specification, in which—

Figure 1 is a perspective view of my improved furnace; Fig. 2 is a longitudinal vertical section in the line *x x*, Fig. 3; and Fig. 3 is a horizontal section in the line *x' x'*, Fig. 2.

Like letters of reference indicate like parts in each.

My invention consists in an improved construction of furnace for melting glass and other purposes, where an intense heat is required, along with freedom from dust, impure gases, &c. It is particularly designed for the consumption of soft or bituminous coal, coal-dust, and slack, the use of which for such purposes has heretofore been highly objectionable chiefly on account of the difficulty of effecting a complete combustion of the carbon.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation, with particular reference to its use in melting glass.

The furnace is constructed of any suitable material. The pots are arranged on a foundation, A, and under the arch B and stack C, in the usual way. At the front of the furnace part D is a fire-chamber, *d*, having a grating in front and under, as shown, through which air is supplied in any desired quantity to the fuel within, the interstices between the bars being closed to a greater or less extent by mortar, dampers, or in other known way. The top of the fire-chamber *d* is close. Fuel is supplied at the top through holes which are closed by the covers *a*, and in front are smaller holes *a'*, through which the condition of the fire is observed; a poker or stirrer is used, and slack fed in in small quantities, if desired. A box or hopper, *a''*, is arranged under each of these holes, which may be kept full of slack to supply the fire inside or stop up the holes when desired. One object of my furnace is to enable slack to be used for the purposes named. The lower part of the fire-chamber *d* extends back under a box, *b*, into which it opens by a hole, *c*, which is closed, when desired, wholly or in part by a valve, *c'*, the latter being operated by a stem, *c''*. The gases given off by the fuel in the chamber *d* will pass through the hole *c*, whence they are conducted by a flue, *e'*, directly back to the gas-chamber *e*, which is under the throat *s*, which leads into the melting-chamber under the arch B. The flow of the gas may be regulated by a damper, *g*. The side walls of the fire-chamber *d* are made double, so as to give air-heating chambers *n*. The air is supplied to these chambers at openings *n'*, whence it rises along the chambers *n*, and, passing in thin layers along the inner walls of the fire-chamber *d*, is heated as it rises, so that it passes off through the flues *m* at a high temperature. These flues unite, as at *m'*, where the flow of heated air is regulated by a damper, *p*. Thence the flues divide and descend, as shown by dotted lines, Figs. 2 and 3, till they open each into a hot-air chamber, *o*, one on each side of the gas-chamber *e*. The hot-air chambers open, by narrow throats *o'*, into the upper end of the gas-chamber *e*, so that the hot air and gases shall unite at or in the throat *s*. The oxygen of the hot air unites with the carbon and other combustible matter of the gases at such temperature as to secure their ignition, with the consequent evolution of heat, as desired. The chamber *e* is of such size that the draft through it will be small, so that any dust, ashy matter, or other solid non-combustible impurities will be deposited in the bottom. Then, when the heat is out, or after any desired interval of time, such dust, ashy matter, &c., are blown out through a side flue, *l*, (shown in dotted lines,) into the stack, the draft being deflected that way by any desired arrangement of dampers. The floor of the arch B I make slightly sloping toward either side, whence a pipe, *k*, leads out to a waste-gate, *k'*. If a glass-pot happens to

break the molten glass then flows off and may be caught in a water-tub and saved. A rim, *r*, should be made around the throats *s*.

The devices described are also applicable to other kinds of furnaces for generating and applying heat, and in reverberatory furnaces the chambers *e* and *o* may be made horizontal instead of vertical, if so preferred; also a pair of flues may take the place of the hot-air chambers *o*.

With such construction of furnace bituminous coal and coal-slack may be used not only for ordinary uses but for uses which have heretofore required more costly kinds of fuel.

I do not claim broadly the combination of a gas-generator and blast-heating apparatus. My invention is intended especially for a glass-furnace.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a glass-furnace a fire-chamber, *d*, with a flue or passage for carrying therefrom the gas and products of a slow combustion, in combination with side-heating chambers *n* for heating air, such chambers having flues leading thence to the exit or combustion point of the gas-flues, substantially as described.

2. In combination with the substance of the first clause of claim, a gas-chamber, *e*, arranged intermediate between the fire and the point at which the heat is to be applied, substantially as herein described, and for the purpose set forth.

3. In a glass-melting furnace a sloping floor to the arch B, in connection with a waste-pipe, *k*, substantially as described.

In testimony whereof I, the said HENRY RAGOT DE MONTHUREUX, have hereunto set my hand.

HENRY RAGOT DE MONTHUREUX.

Witnesses:
W. N. HOWARD,
THOS. B. KERR.