2 Sheets--Sheet 1.

H. FRANK.

Metallurgic Gas-Furnace Valves.

No. 134,372. Patented Dec. 31, 1872.

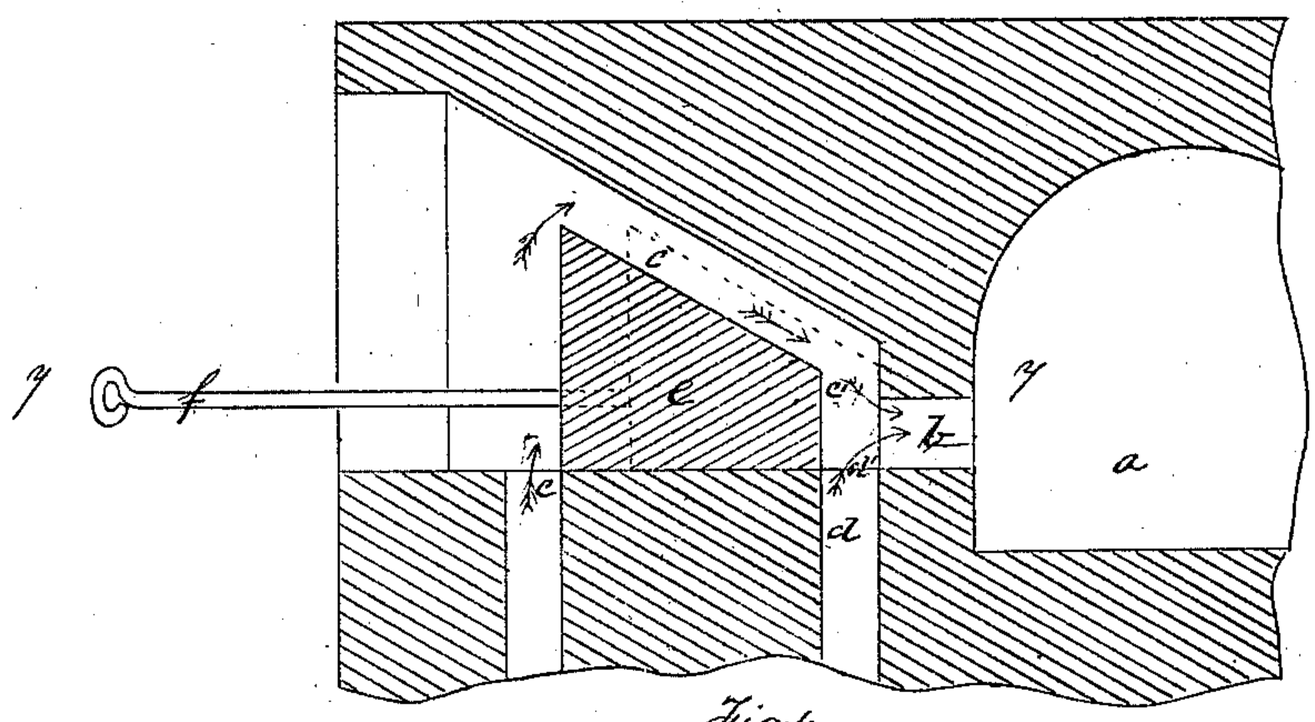

Fig. 1.

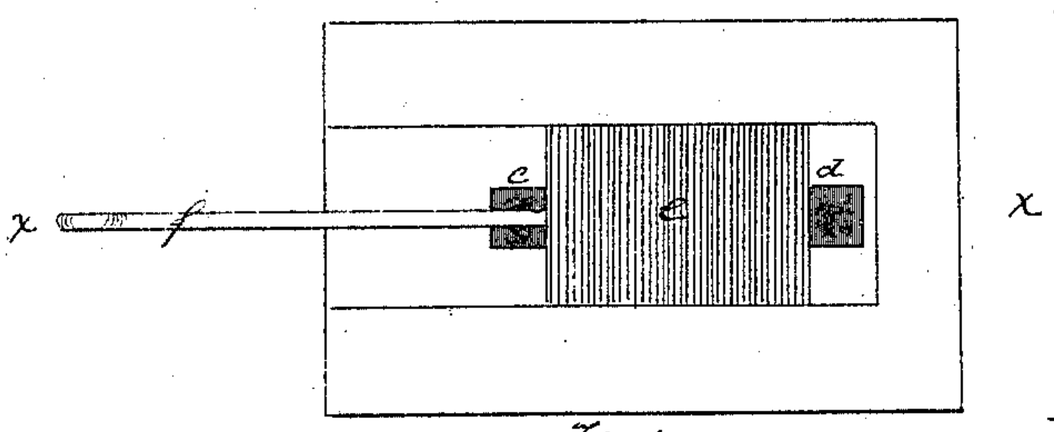

Fig. 2.

WITNESSES

James L. Kay
E. C. Fuller.

INVENTOR

Hiram Frank
by Bakewell Christy & Kerr
his Attorneys.

2 Sheets--Sheet 2.

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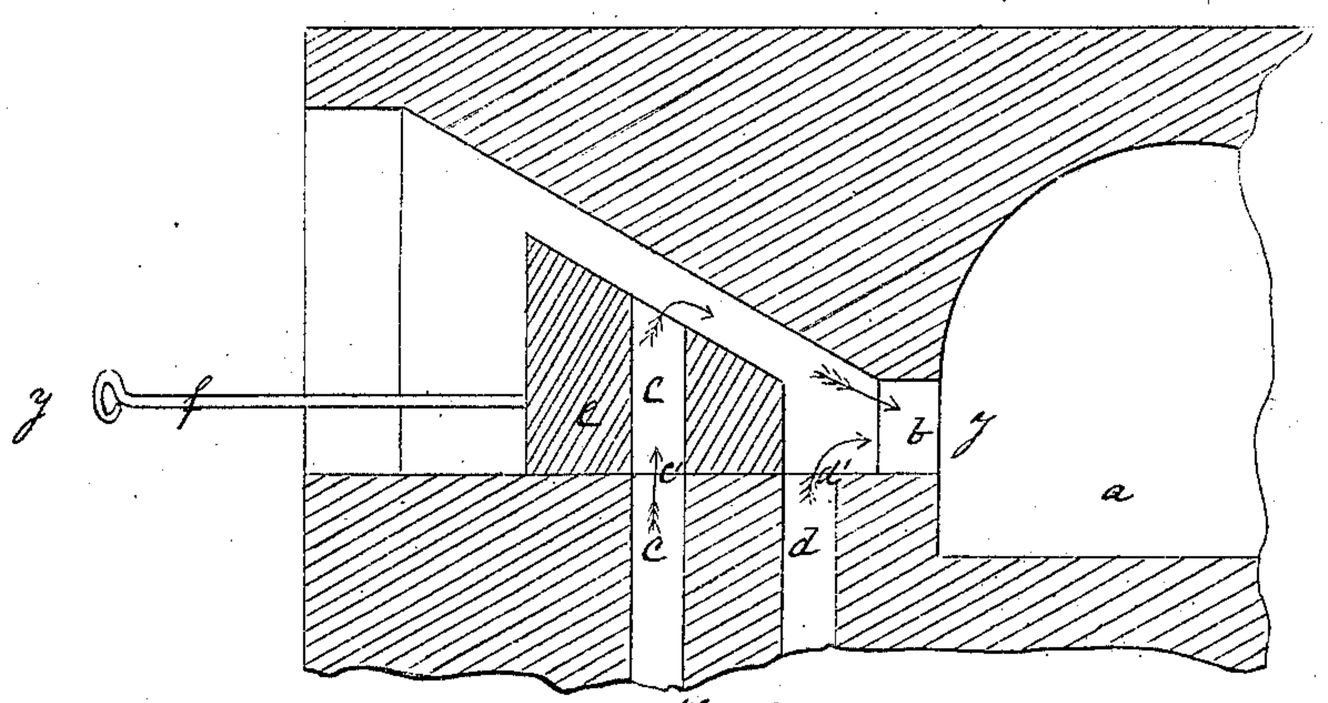

Fig. 3.

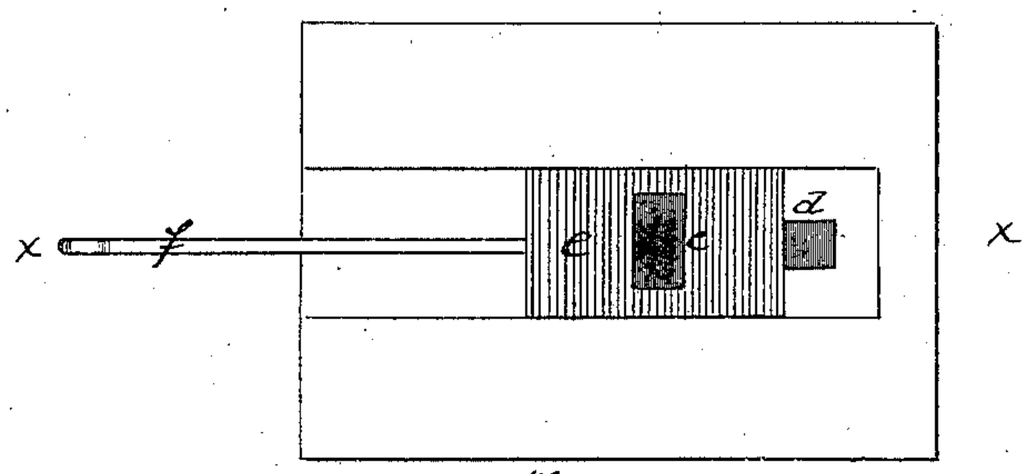

Fig. 4.

WITNESSES

James I. Kay

E. C. Fitler

INVENTOR

Hiram Frank

by Bakewell Christy & Ken

His Attorneys

UNITED STATES PATENT OFFICE.

HIMAN FRANK, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN METALLURGIC GAS-FURNACE VALVES.

Specification forming part of Letters Patent No. **134,372**, dated December 31, 1872.

To all whom it may concern:

Be it known that I, HIMAN FRANK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Valves for Furnaces for Metallurgic and other purposes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing forming a part of this specification, in which—

Figures 1 and 3 are longitudinal vertical sections of a metallurgic furnace with its inlet-flues through *x x*, Figs. 2 and 4. Figs. 2 and 4 are longitudinal horizontal sections through *y y*, Figs. 1 and 3.

Like letters of reference indicate like parts in each.

My invention relates to that class of furnaces for metallurgic and other purposes, in which gas and air are used as the elements of combustion.

In many operations in which such furnaces are used it is desirable, and frequently necessary, to regulate the admission of air and gas at certain periods of the operation; also, in different operations different quantities of air and gas are required. In some cases double the quantity of air in proportion to the amount of gas is required, and in others different proportions. In many operations it is necessary to have a much greater amount of heat at a certain part of the furnace than is required at another part. This is done by regulating the quantity of air and gas admitted at that point, and at the same time great care has to be taken not to change the relative proportions of the volume of the air and gas currents.

My invention has for its object the construction and arrangement of a damper or valve device, in connection with the air and gas flues of a furnace, whereby I am enabled at pleasure either to shut off the inflowing currents of air and gas or to reduce them, in such a manner that their respective volumes shall retain the same relative proportions at every stage of the reduction, whether the currents be relatively equal or not.

To enable others skilled in the art to make and use my invention, I will describe its construction and mode of operation.

The bed of the furnace is shown at *a*. The air and gas enter by the port *b* from their respective flues *c* and *d*. The flow of air and gas from the ports *c'* and *d'* is regulated by means of the sliding damper *e*, operated by the handle *f*. The width of the ports *c'* and *d'* in the direction of the advance of the damper *e* being equal, the same relative proportions will be retained by the inflowing currents of air and gas. In order to admit currents of different relative volumes, I make the flue *c* of twice the size of the flue *d*, as shown in Figs. 3 and 4, and continue it directly up through the damper *e*. The cut-off of the flue *c* is in this case in the same plane as the cut-off of the flue *d*, and is done by that portion of the damper which is in the rear of the port.

It will be perceived that the ports *c'* and *d'* have the same relative width, while their breadth is in the proportion of two to one.

The flues *c* and *d* may be made side by side, and a broad damper be used which would extend over them both. In this case the opening through the damper would not be required.

The same result may be obtained by means of two dampers, one for each flue, operated by a single stem, with a common motion; but in all cases the width of the ports in the line of advance or movement must be the same.

By making a damper or valve device of this kind at each of the several ports of a furnace the amount of heat at the differents parts of the furnace may be regulated thereby, so that I am able to create a very high degree of heat in one part of the furnace while I reduce it in another.

By this means I accomplish the object of my invention, the merits of which are so evident I will not enumerate them.

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

1. The construction and arrangement of the air and gas flues of a furnace, in connection with a suitable damper, so that the inflow of air and gas may be regulated at the pleasure of the operator, substantially as described.

2. A valve device, operated by a single mo-

tion and acting so as simultaneously to open or close in equal proportions the gas and air ports which lead to the combustion-chamber, substantially as described, and for the purposes set forth.

3. A valve device, constructed substantially as described, in combination with each of the several ports of a furnace, whereby I am enabled to regulate the amount of heat at any desired part of the bed, substantially as described.

In testimony whereof I, the said HIMAN FRANK, have hereunto set my hand.

HIMAN FRANK.

Witnesses:
A. S. NICHOLSON,
THOS. B. KERR.