

(No Model.)

4 Sheets—Sheet 1.

C. COULTASS.

FURNACE FOR BAKING INCANDESCENTS.

No. 323,500.

Patented Aug. 4, 1885.

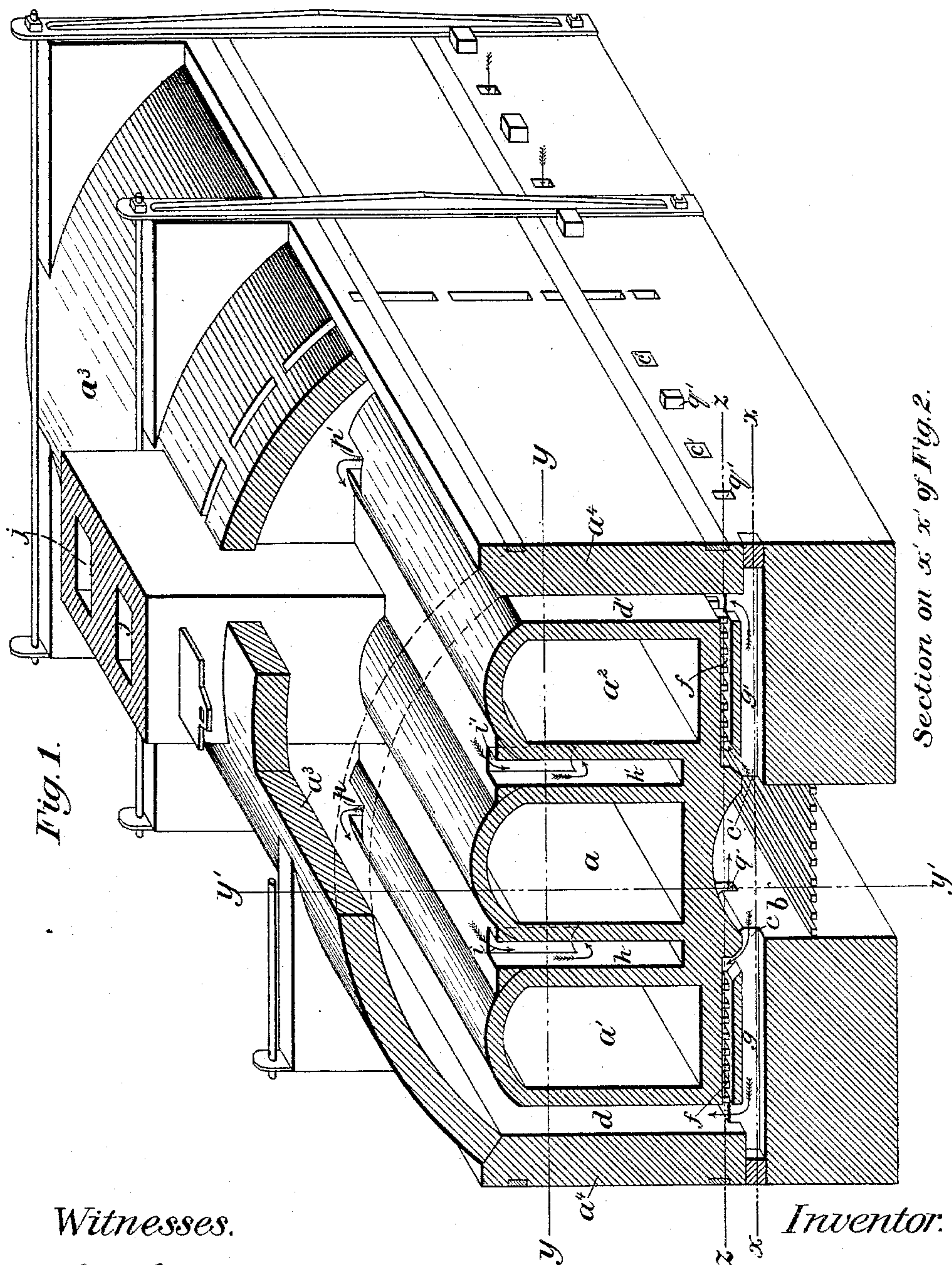


Fig. 1.

Section on  $x' x'$  of Fig. 2.

Witnesses.

H. L. Gill.  
H. M. Wilson

Inventor.

Charles Coultass  
by his Attorneys  
Bakerwell & Hers



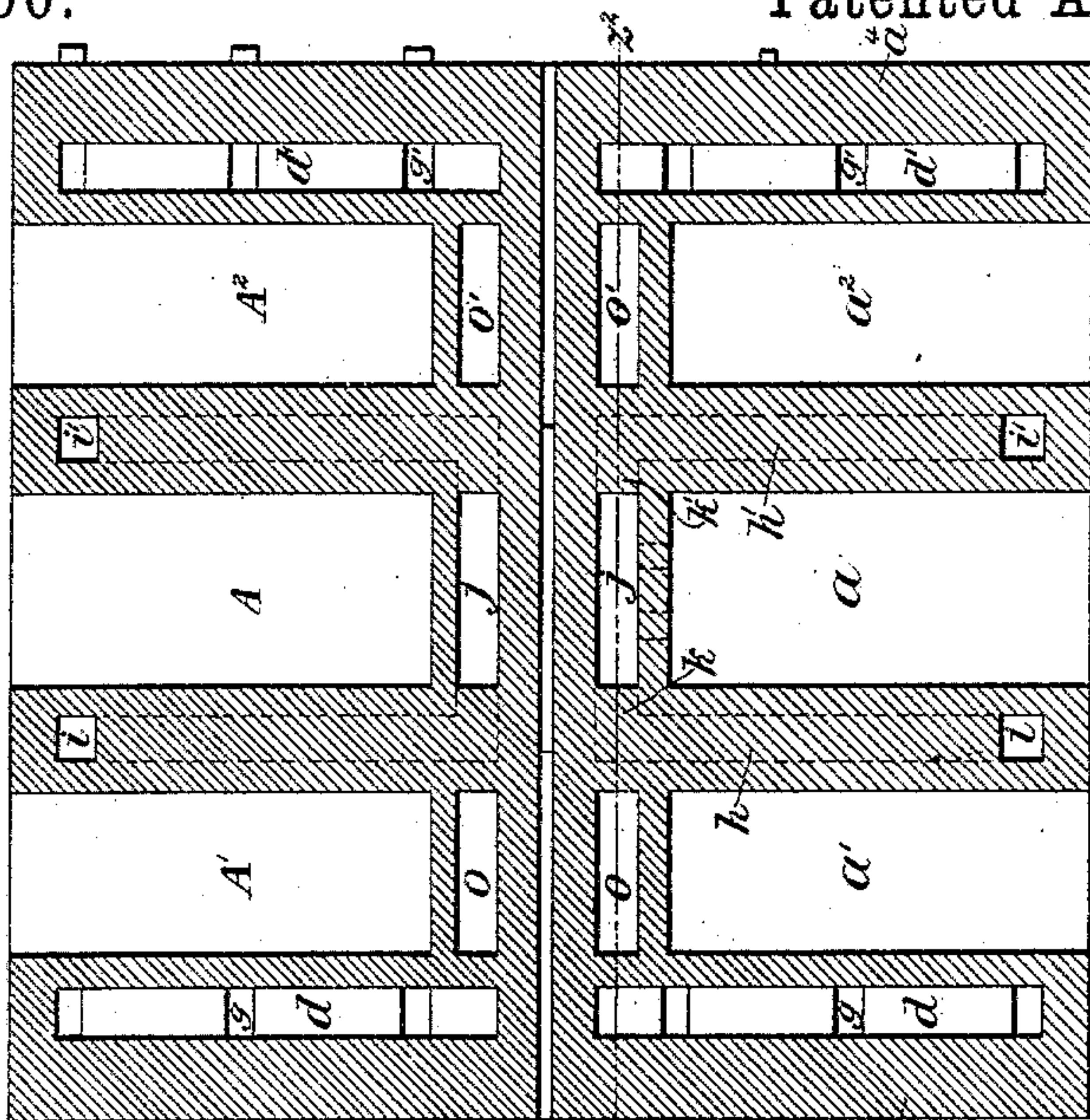
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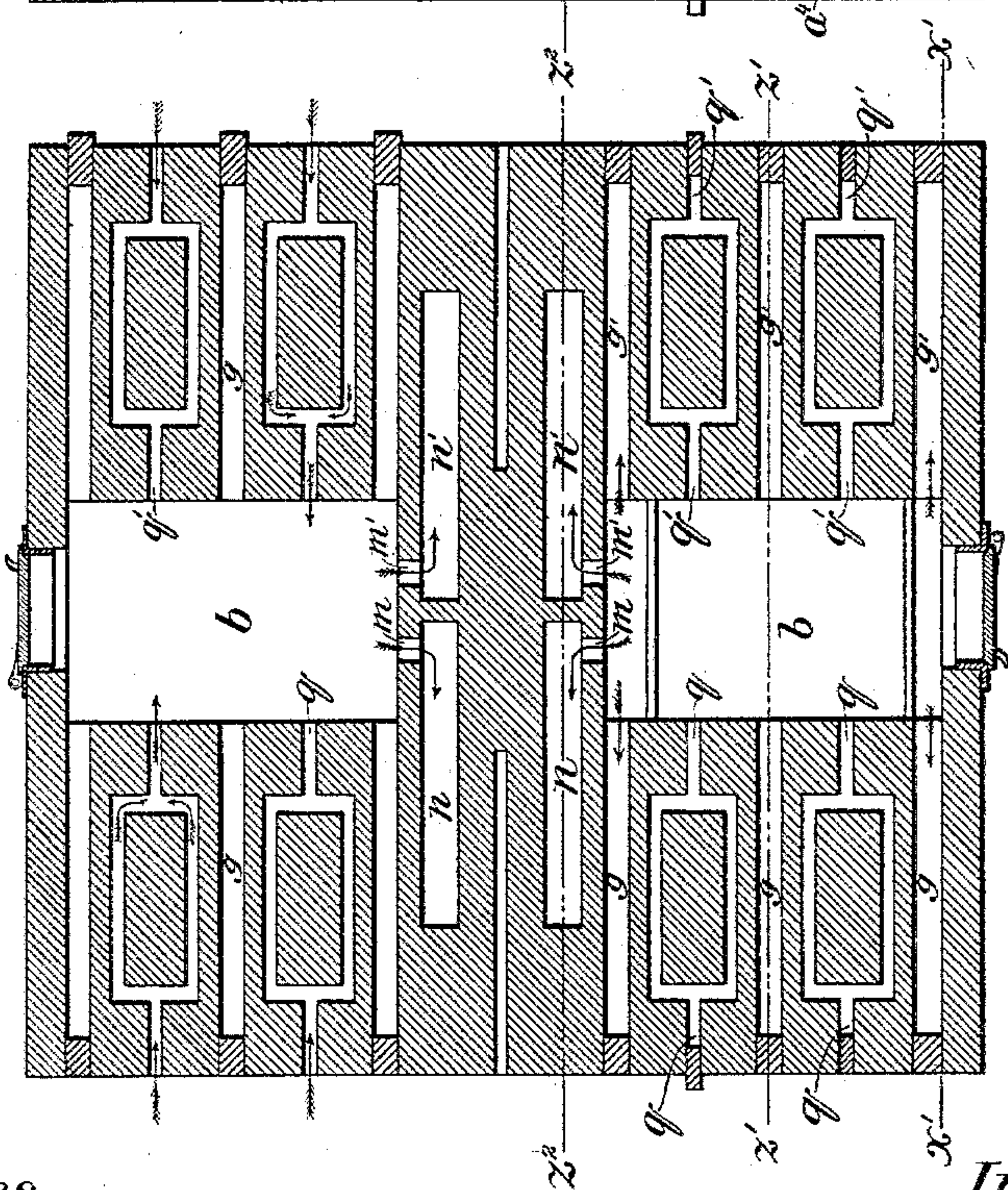
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Fig. 3.



Section on y-y of Figs 1 & 6.

Fig. 2.



Section on x-x of Figs 1 & 6.

Witnesses.

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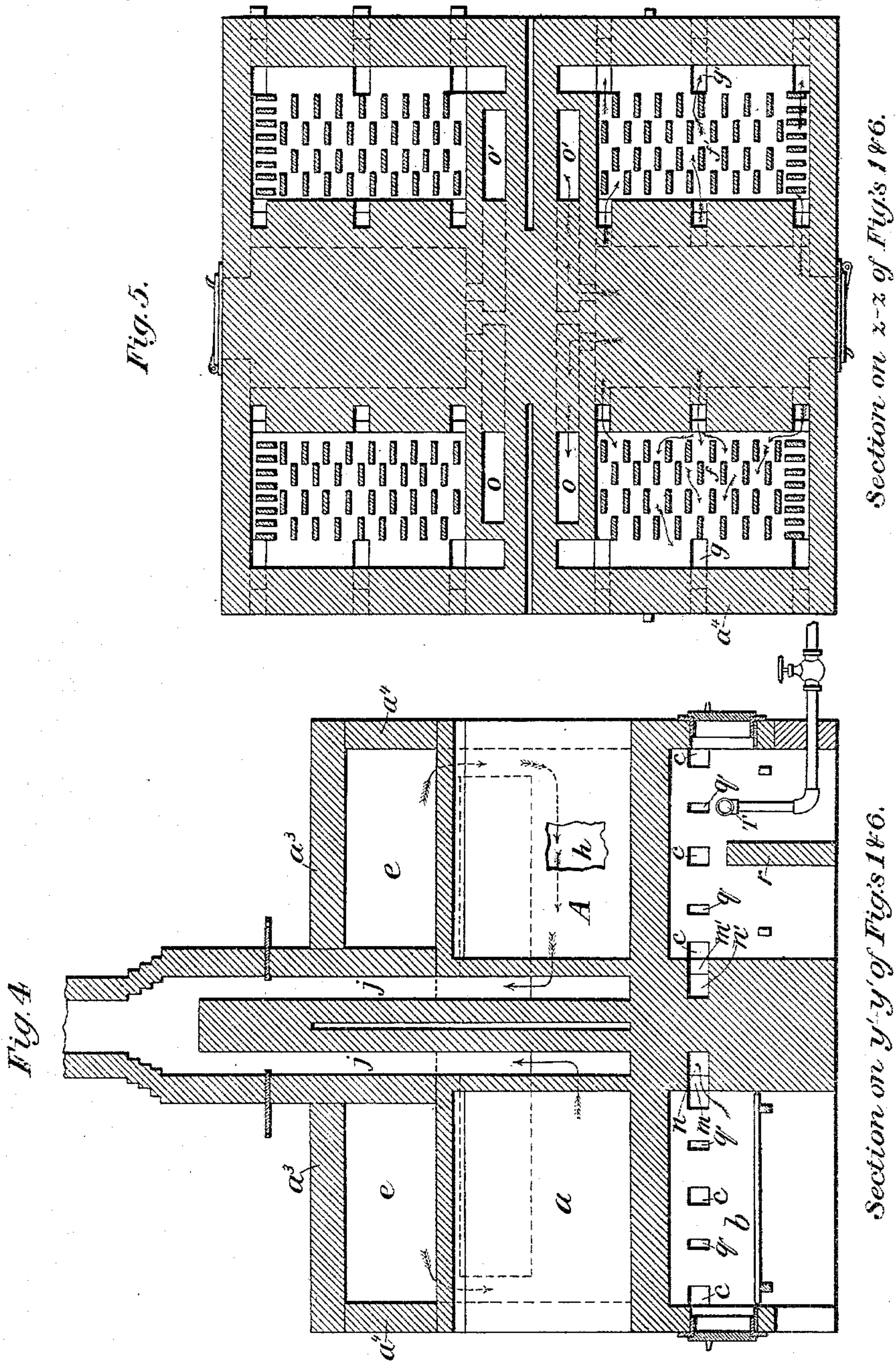
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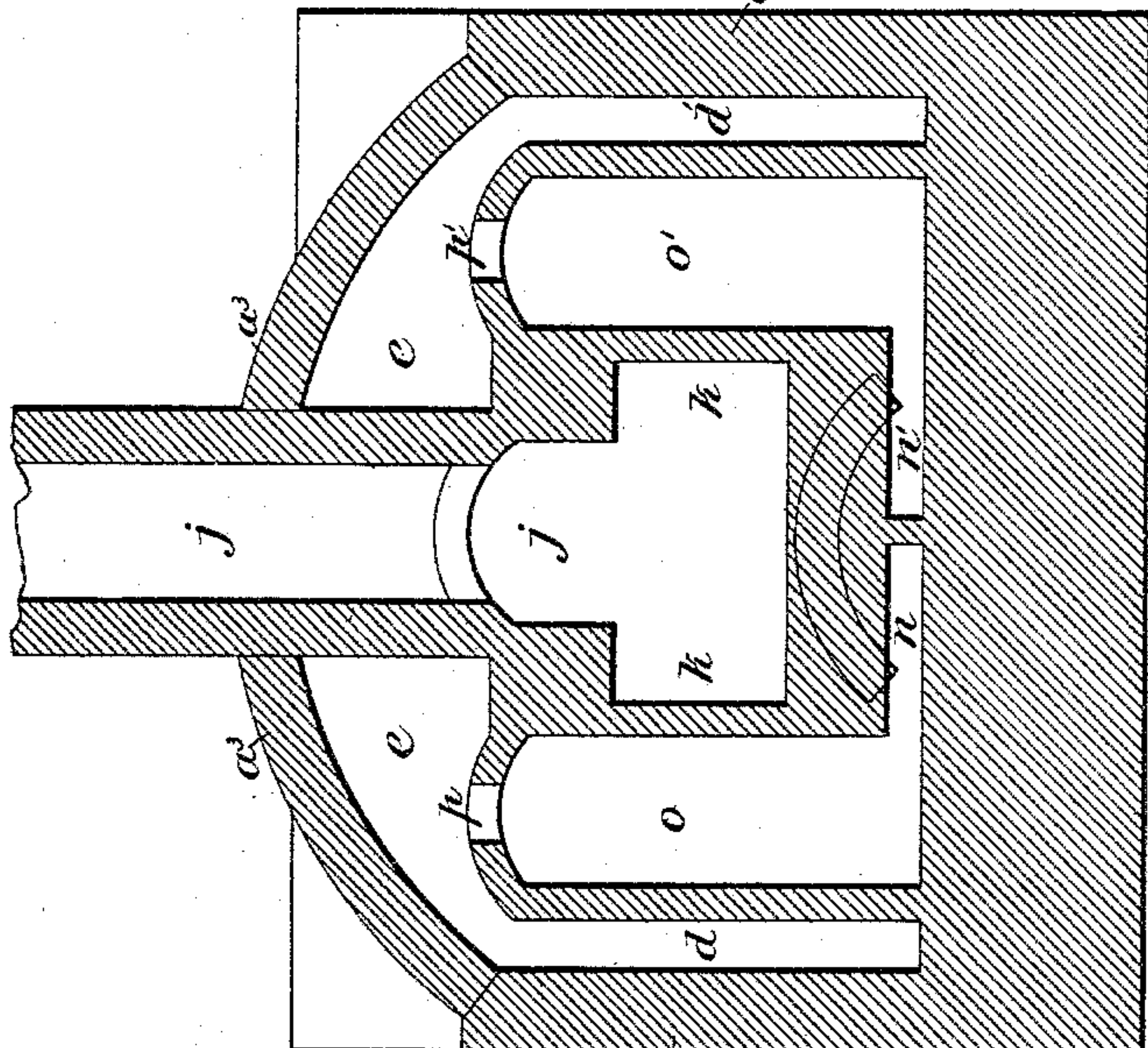
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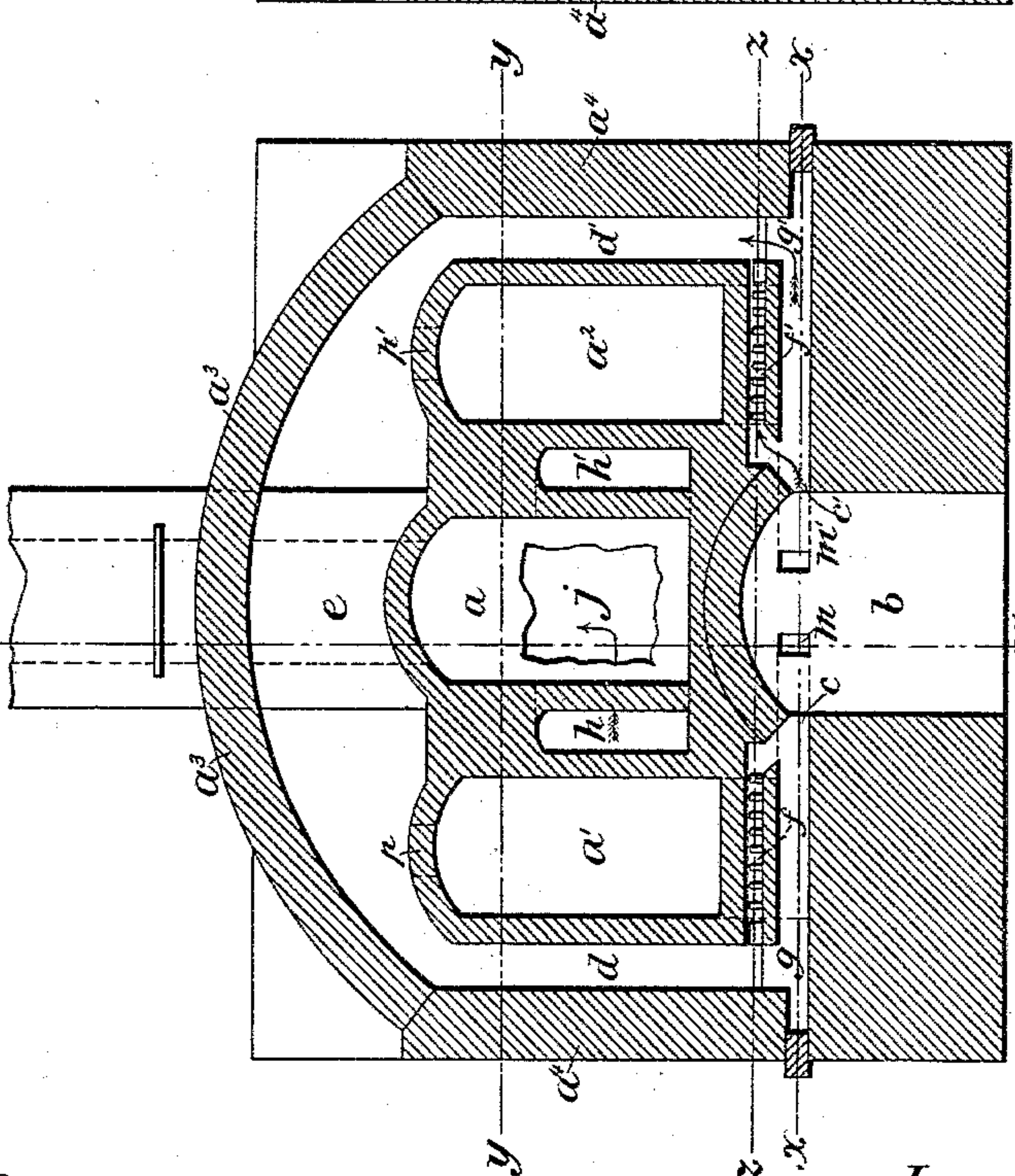
Patented Aug. 4, 1885.

Fig. 7.



Section on x²-x³ of Figs 2 & 3.

Fig. 6.



Section on x¹-x² of Fig. 2.

Witnesses.

A. L. Gill  
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Inventor.

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# UNITED STATES PATENT OFFICE.

CHARLES COULTASS, OF SHARPSBURG, ASSIGNOR TO THE EMPIRE ELECTRIC CARBON COMPANY, OF PITTSBURG, PENNSYLVANIA.

## FURNACE FOR BAKING INCANDESCENTS.

SPECIFICATION forming part of Letters Patent No. 323,500, dated August 4, 1885.

Application filed May 6, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES COULTASS, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Furnaces for Baking Carbons for Electric Lamps; and I do hereby declare the following to be a full, clear, and exact description thereof.

In the manufacture of carbon pencils for electric-arc lamps, one of the steps of the process is the baking or roasting of the carbon after it has been molded into shape by the forming apparatus. Where these articles are made in large quantities, the ovens now in common use have proved defective by reason of the fact that it is practically impossible to heat them uniformly. The contents of one part of an oven are apt to be but partially roasted, while those in another part have been perfectly heated. It is the object of my invention to obviate this difficulty and to provide an oven capable of receiving an equable temperature throughout; and, further, to combine a series of such ovens, each of which is heated from the same source, and is exposed to heat equally with the others.

I will now describe my improvement with reference to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of two series of my improved ovens, placed adjacent for purpose of convenience. It is shown in section on the line  $x'x'$  of Fig. 2. Fig. 2 is a horizontal cross-section on the line  $xx$  of Figs. 1 and 6. Fig. 3 is a similar section on the line  $yy$  of the same figures. Fig. 4 is a vertical longitudinal section on the line  $y'y'$  of Figs. 1 and 6. Fig. 5 is a horizontal section on the line  $zz$  of Figs. 1 and 6. Fig. 6 is a vertical cross-section on the line  $z'z'$  of Fig. 2. Fig. 7 is a similar section on the line  $z^2z^2$  of Figs. 2 and 3.

Like letters of reference indicate like parts.

In the drawings,  $a$ ,  $a'$ , and  $a^2$  (see Fig. 1) represent three adjacent heating chambers or ovens, the sides of which are closed, except the fronts, which are provided with doors, or adapted to be closed by tiles or bricks for the purpose of inserting and removing the carbons. In the drawings there are shown two

series of ovens, the second series,  $A$   $A'$   $A^2$ , being placed back of the first series, and heated by a separate combustion-chamber. Both of these series operate in the same way, and are joined only for purpose of convenience, because the same chimney-stack is used for both. I will therefore limit this specification to a description of the construction and working of the first series.

The series of ovens  $a$   $a'$   $a^2$  are inclosed by an arch  $a^3$  and by walls  $a^4$ . The arch  $a^3$  is placed somewhat above the ovens, and they together make a chamber or flue,  $e$ , Fig. 4, for the passage of the waste products of combustion. Vertical flues  $d$   $d'$ , communicating with the chamber  $e$ , are made by the separation of the side walls,  $a^4$ , from the outer walls of the heating-chambers  $a'$   $a^2$ . The flues  $e$ ,  $d$ , and  $d'$  extend the entire length of the heating-ovens.

The combustion-chamber  $b$  is situated underneath the middle chamber,  $a$ , and in the construction shown in Fig. 1 has grate-bars for consuming coal. When gas is used as fuel, I employ the modification shown in Fig. 4, which will be explained hereinafter.

The floors of the outer chambers,  $a'$   $a^2$ , are preferably on a little lower horizontal plane than that of the central chamber,  $a$ , and are supported by a layer of separately-laid bricks in the manner of checker-work. (Shown in Figs. 1 and 5.) The horizontal flues  $f$   $f'$  thus formed communicate with the combustion-chamber  $b$  by means of short flues or openings  $c$   $c'$ , and also with the vertical flues  $d$   $d'$ , into which they open.

Transverse horizontal flues  $g$   $g'$  are made at intervals through the hearth of the furnace underneath the flues  $f$   $f'$ . (See Figs. 1 and 6.) They lead from the combustion-chamber  $b$  to the base of the vertical flues  $d$   $d'$ , into which they open, thereby establishing communication between these parts. In Fig. 1 I have shown these flues  $g$   $g'$  extended through the outer side walls,  $a$ , of the furnace structure, and closed by brick-stoppers. The purpose of this arrangement is to enable their easy cleaning from soot and ashes.

Between the central heating-chamber,  $a$ , and the outer chambers,  $a'$   $a^2$ , are vertical longitudinal flues  $h$   $h'$ , which are co-extensive



with the chambers, and communicate at their front ends with the flue *e* by diving-flues *i* and *i'*, and at their rear with a common rising flue, *j*, through a transverse flue, *k*, Fig. 3. The flue *j* is situated back of the middle heating-chamber, *a*, and forms part of the chimney-stack of the furnace.

The operation of the parts just described is as follows: The heated products of combustion from the chamber *b* enter the transverse and horizontal flues *f* *f'* and *c* *c*, preferably through a common adit, as shown in Fig. 1. So much as enters the flues *f* *f'* circulates among the bricks arranged therein and imparts heat to the floors of the chambers *a'* *a''*, while that which enters flues *c* *c'* passes directly into the rising flues *d* *d'*, where it meets the gas and smoke emerging from the flues *f* *f'*. Then mingled, they ascend the flues *d* *d'* and enter the flue or chamber *e*, where they heat the crowns of all the ovens, and thence descend through the diving flues *i* *i'* into the longitudinal flues *h* *h'*, in passing through which the inner sides of the ovens *a'* *a''* and both sides of the oven *a* are heated. Finally, the products of combustion go from the flues *h* *h'* through the flues *k* *k'* into the stack at *j*, thus heating the back of the oven *a*.

In order to heat the back walls of the ovens *a'* *a''* and the floor of the middle oven, *a*, the furnace is provided with additional flues, which are most clearly shown in Figs. 2, 7, and 5 of the drawings. At the back of the combustion-chamber *b* are ports *m* *m'*, which open into horizontal transverse flues *n* *n'*, situate on about the same level as that of the flues *c* *c'*, and opening into vertical rising flues *o* *o'*, which are contiguous to the back of the ovens *a'* *a''*. The flues *o* *o'* enter the chamber *e* above the several ovens through ports *p* *p'*. The operation of the flues last described is as follows: The products of combustion from the fire-chamber traverse in succession the ports *m* *m'*, flues *n* *n'* *o* *o'*, ports *p* *p'*, and having crossed the chamber *e*, descend the flues *i* *i'*, and finally enter the stack *j* through the flues *h* *h'* and *k* *k'*, as before described.

It will be apparent that this construction of furnace offers a large space to the heating action of the burning gases, and that those parts of the ovens which are first affected by the gases receive less amounts than those which are more remote. All sides of each of the ovens are exposed to the heat. All the ovens are therefore equally heated, and the contents of each roasted evenly.

The modification of my improvement which adapts it to use with natural gas is illustrated in Figs. 1, 2, and 4. As is well known, this gas is most effective when used with heated air, and in order to do this I make horizontal flues *q* *q'* through the floor of the furnace parallel with the gas-flues *g* *g'*, and extending likewise through the outer walls, *a''*, and into the combustion-chamber. These flues are heated by proximity to the combustion-flues, *a* as the air is drawn through them it be-

comes highly heated. To increase their heating properties they may be made tortuous or provided with checker-work, as shown in Fig. 2, so as to delay the circulation of the air. In the use of natural gas the front of the combustion-chamber is closed up, the grate-bars are of course taken out, and a bridge-wall, *r*, built just forward of the *T*, which introduces the gas. One part of the furnace (shown in Fig. 4) is built for natural gas and the other for coal.

When the air-flues *q* *q'* are not desired, as when coal is used, they may be closed by brick stoppers.

The other series of ovens before mentioned needs no further description. It is built back to back with the first series, and its flues open into the common stack, as shown in Fig. 4. A furnace thus built is compact and convenient.

I am well aware that horizontal and vertical flues situate around and in the walls of ovens and furnaces are not new, and I do not desire to claim the same, broadly, as my invention relates merely to the arrangement of the flues, combustion-chamber, and ovens, as hereinbefore described. I do not desire, however, to limit myself to any particular number of ovens.

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

1. In a roasting-furnace, the combination, with a series of adjacently-situate heating-ovens, *a* *a'* *a''*, of a combustion-chamber, *b*, flues *g* *g'*, underlying said ovens, a flue, *e*, overlying the same, rising flues *d* *d'*, connecting the said upper and lower flues and contiguous with the sides of said ovens, and flues *h* *h'*, communicating with said overlying flue and contiguous with the remaining sides of said ovens, substantially as and for the purposes specified.

2. In a roasting-furnace, the combination, with a series of adjacently-situate heating-ovens, *a* *a'* *a''*, of a combustion-chamber, *b*, flues *g* *g'*, underlying said ovens, a flue, *e*, overlying the same, rising flues *d* *d'*, connecting said upper and lower flues and contiguous with sides of said ovens, a flue or flues, *h*, communicating with said overlying flue contiguous with the remaining sides of said ovens, and a flue, *j*, contiguous with the rear of one of said ovens and communicating with said flue *h*, substantially as and for the purposes set forth.

3. The combination, with a series of adjacently-situate heating-ovens, of a combustion-chamber, *b*, rising flues *d* *d'*, contiguous with the sides of several of said ovens, flues underlying the same, communicating with the combustion-chamber *b* and with the rising flues *d* *d'*, for heating the floors of the ovens, and flues *g* *g'*, leading directly from the combustion-chamber to the rising flues and separated from said floors, substantially as specified.

4. The combination, with a series of adjacently-situate heating-ovens, *a* *a'* *a''*, of a com-



5 bustion-chamber, *b*, flues *f*, underlying said  
ovens, a flue, *e*, overlying the same, rising  
flues *d d'*, connecting said upper and lower flues  
and contiguous with the sides of said ovens,  
flues *h h'*, communicating with said overlying  
flue and contiguous with the remaining sides  
of said ovens, a flue or flues, *m m'*, leading  
from the combustion-chamber to the rear of  
the ovens, and rising flues *o*, leading thence to

said overlying flue, all of said flues being in 10  
intercommunication, substantially as and for  
the purposes described.

In testimony whereof I have hereunto set  
my hand this 27th day of April, 1885.

CHARLES COULTASS.

Witnesses:

W. B. CORWIN,

T. W. BAKEWELL.