A. SMALLWOOD.

FURNACE.

APPLICATION FILED JULY 17, 1920.

1,373,152.

Patented Mar. 29, 1921.

2 SHEETS—SHEET 1.

Fig. 3.

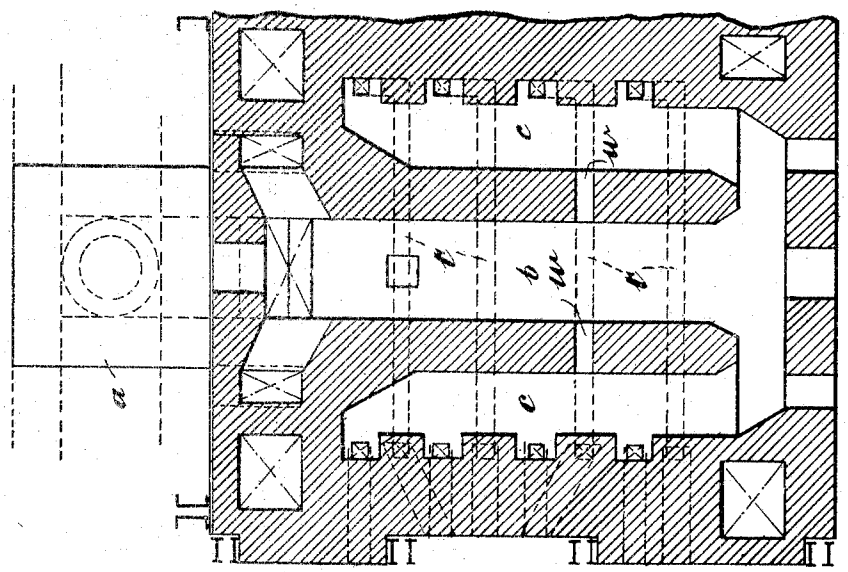
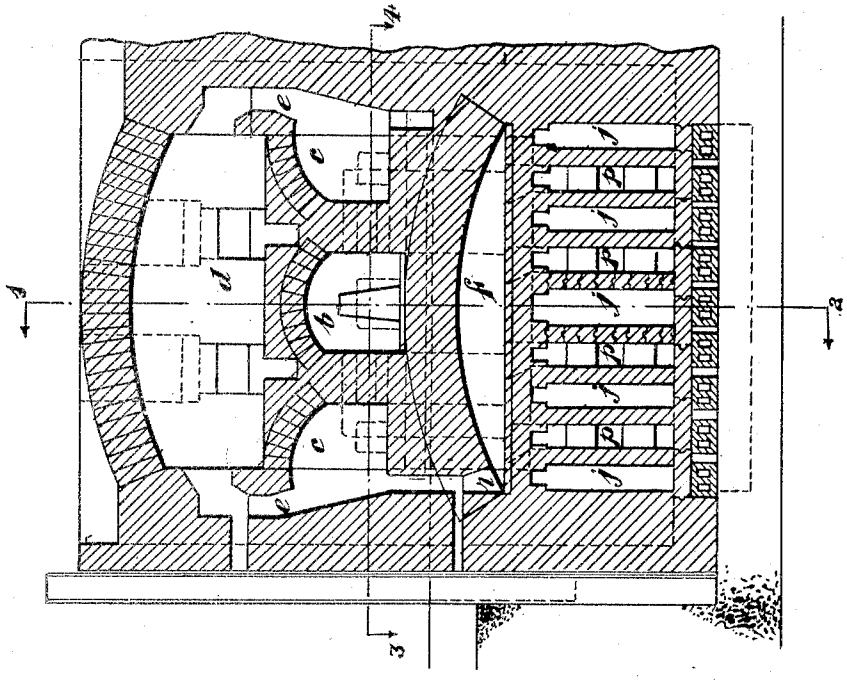


Fig. 1.



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2 SHEETS—SHEET 2.

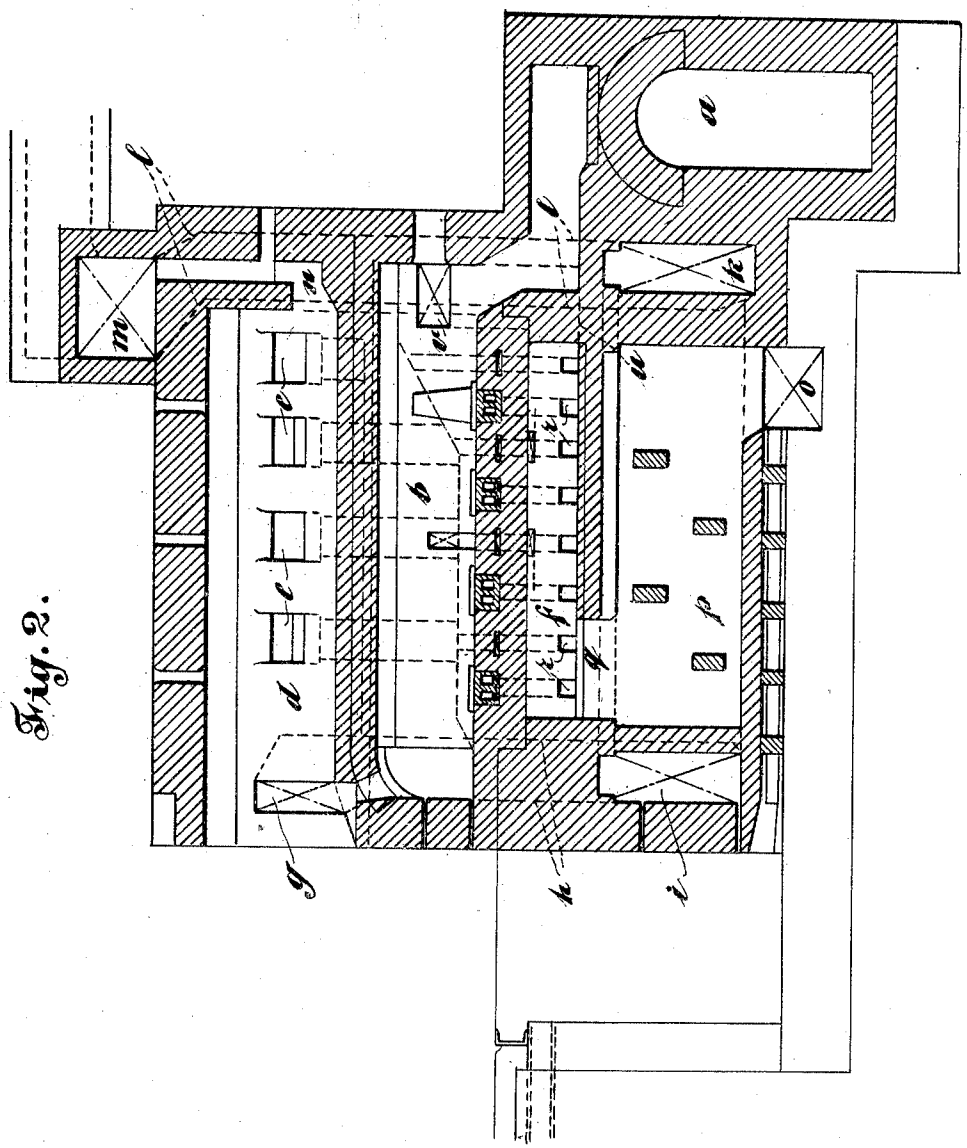


Fig. 2.

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UNITED STATES PATENT OFFICE.

ALFRED SMALLWOOD, OF LONDON, ENGLAND.

FURNACE.

1,373,152. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed July 17, 1920. Serial No. 397,088.

To all whom it may concern:

Be it known that I, ALFRED SMALLWOOD, a subject of the Kingdom of Great Britain, residing at 42 Hargrave Park, Highgate, London, N., in the county of Middlesex, England, metallurgist, have invented Improvements in or Relating to Furnaces, of which the following is a specification.

This invention is an improvement in or modification of the invention forming subject of my prior patent of the United States of America Number 1335202 which comprehends a furnace in which the source of primary combustion communicates with a combustion chamber, which latter in turn communicates with a heat chamber, from which heat chamber a series of individually regulable ports extend to the working chamber, and in which the waste furnace gases after egressing from said working chamber are conveyed to a recuperator system located below the working chamber for heating the air for combustion.

According to the present invention, in a furnace having the above defined characteristics air for combustion is admitted to the furnace gases after they have traversed the combustion chamber. Advantageously the said air is admitted to the furnace gases when they are in or are issuing from the heat chamber, and the said air may conveniently be admitted to the said heat chamber at intervals along its length by individually regulable ports. These ports may be located below the individually regulable ports by which the furnace gases egress from the heat chamber in their passage to the working chamber of the furnace.

In order that this invention may be clearly understood and readily carried into practice, reference may be had to the appended explanatory sheets of drawings, upon which:—

Figure 1 is a sectional end elevation of a furnace constructed according to the present invention.

Fig. 2 is a sectional side elevation of the furnace shown in Fig. 1, the plane of section being on line 1—2 of the figure last mentioned.

Fig. 3 is a sectional plan of the furnace shown in Figs. 1 and 2, the plane of section being on line 3—4 of Fig. 1.

In a convenient embodiment of the present invention, a fire-grate or gas producer *a* communicates with one extremity of a longitudinal primary combustion chamber *b* located below the working chamber, and above the recuperator system; this primary combustion chamber communicates at its other extremity with two heat chambers *c*, *c* also located below the working chamber *d* one on each side of the combustion chamber, within which heat chambers the furnace gases from the combustion chamber flow rearwardly. Ports *e* extend upwardly from these heat chambers on each side of the furnace at intervals along the length of the same and communicate with the working chamber. These ports are individually regulable.

The recuperator system is located below the primary combustion and heat chambers and above the said recuperator system is a shallow air flue *f* covered by an arch. The waste gases from the working chamber pass out through openings *g*, one on each side, and descend by flues *h* also one on each side, to a common transverse waste gas flue *i* from which a series of longitudinal recuperator gas flues *j* extend to another transverse waste gas flue *k* at the other end of the furnace, from which transverse waste gas flue *k*, ascending flues *l* extend, one on each side of the furnace to the outlet *m* leading to the stack. At *n*, Fig. 2, will be seen one of two waste gas outlets at the end of the furnace remote from that at which the outlets *g* are provided, by way of which outlets *n* the portion of the waste gas may if desired be passed directly to the stack, these ports *n* being regulable.

o is a transverse air ingress flue which communicates with a series of longitudinal air recuperator flues *p*, which latter in turn communicate by openings *q* with the shallow air flue *f*. From the one side of this shallow air flue *f* a series of ports or passages extend upwardly. These ports occur at intervals along the length of the furnace and they are individually regulable. Every alternate port *r* communicates with the heat chamber *c* immediately above. The other or intermediate ports are, as indicated at *t*, Fig. 3, carried across the furnace structure below the heat chambers and combustion chamber and communicate with the heat chamber *c* on the other side of the furnace. The air ports advantageously enter the bottoms of the heat chambers at positions immediately below the egress ports extending upwardly from the tops thereof.

The air enters the shallow air flues *f* above the recuperator at the extremity thereof remote from the fire-grate or gas producer, and at the end of such shallow air flue adjacent to such fire-grate or gas producer an outlet or outlets *u* is or are provided by which air is admitted to the ingress extremity of the primary combustion chamber at *v*.

At a point about half way or more along the primary combustion chamber *b*, openings *w* may be provided offering communication between said combustion chamber and the heat chambers *c* on either side thereof.

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

1. A furnace, including a working chamber, a recuperator system adapted to receive the waste gases from said working chamber, a combustion chamber, a heat chamber extending along said combustion chamber and interconnecting therewith, ports connecting said heat and working chambers, and means for conducting air for combustion through said recuperator system and to the furnace gases subsequent to their traversing the combustion chamber.

2. A furnace, including a working chamber, a recuperator system adapted to receive the waste gases from said working chamber, a combustion chamber, a heat chamber extending along said combustion chamber and interconnecting therewith, ports connecting said heat and working chambers and means for conducting air for combustion through said recuperator system and to said heat chamber.

3. A furnace, including a working chamber a recuperator system adapted to receive the waste gases from said working chamber, a combustion chamber, a heat chamber extending along said combustion chamber and interconnecting therewith, ports connecting said heat and working chambers, and means for conducting air for combustion through said recuperator system and to said heat chamber at intervals along its length.

In witness whereof I have hereunto set my hand.

ALFRED SMALLWOOD