

L. BANSART.

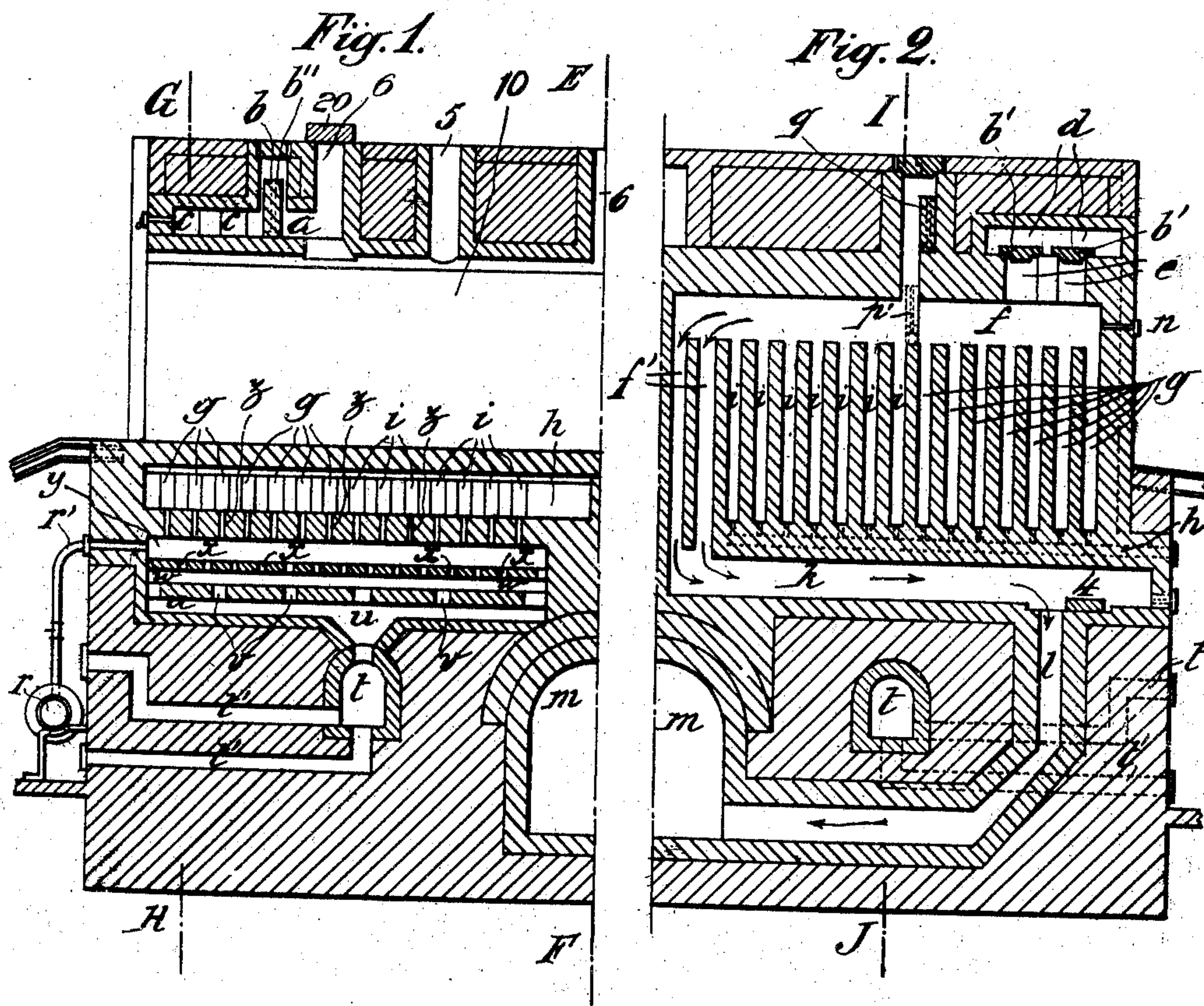
COKE OVEN.

APPLICATION FILED MAY 13, 1908.

928,302.

Patented July 20, 1909.

2 SHEETS—SHEET 1.



Witnesses.
B. Schroter
B. Waller

Inventor,
Louis Bansart,
By *Stewart & Stewart*,
his Attorneys.

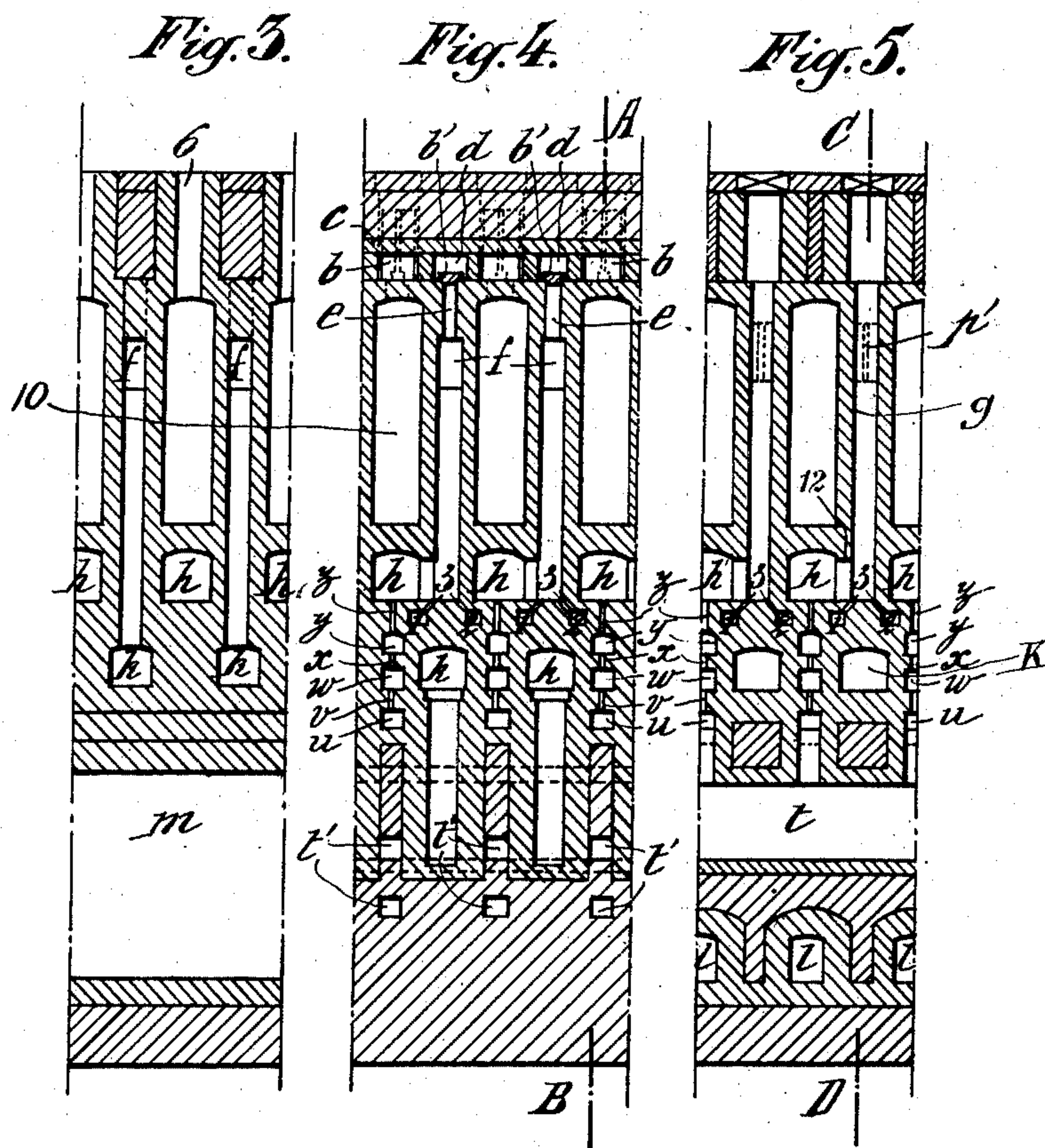
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UNITED STATES PATENT OFFICE.

LOUIS BANSART, OF JOLIMONT HAINE ST. PAUL, BELGIUM.

COKE-OVEN.

No. 928,302.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed May 13, 1908. Serial No. 432,590.

To all whom it may concern:

Be it known that I, LOUIS BANSART, a subject of the Kingdom of Belgium, residing in Jolimont Haine St. Paul, in Belgium, have invented certain new and useful Improvements in Coke-Ovens; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked therein, which form a part of this specification.

The present invention relates to coke furnaces capable of operation with or without regeneration. This furnace is so arranged as to provide for the heating of the air which is introduced to support combustion. It also includes a mixer by means of which the air and gas are thoroughly diffused and intermingled before combustion.

The furnace shown is of the double front type, consisting of two parts which are absolutely symmetrical and have a common collecting gallery.

Referring to the drawings,—Figure 1 is a longitudinal section of one half of the furnace taken along the line A—B in Fig. 4. Fig. 2 shows a longitudinal section of a half of the furnace and is a view taken on the line C—D in Fig. 5. Fig. 3 is a section on the line E—F in Fig. 1. Fig. 4 is a section on the line G—H in Fig. 1. Fig. 5 is a section on the line I—J in Fig. 2.

In the various figures, the dampers, or valves, are shown in continuous lines in the positions they occupy when working with regeneration.

The furnace is built of fire brick or other vitreous material having the capacity to resist a high degree of heat. It is of the double front type, having a central, transversely disposed, collecting gallery (*m*) and longitudinally extending coal ovens, or retorts, (10). These retorts are at right angles to the collecting galleries. Between the retorts, in the walls thereof, are vertical flues (*g*, *i*, and *f'*) connected at their upper extremities by horizontal chambers (*f*). The lower extremities of these flues (*g* and *i*) are connected by lower horizontal chambers (*h*) beneath each oven, to which the lower extremities of the flues (*g* and *i*) are connected by short passages (12). Beneath each pas-

sage (*f*) with its flues is a longitudinally extending passage (*k*). Into this passage, the lower extremities of the flues (*f'*) open. It should be noted that the vertical passages in the walls of the ovens are separated by a vertical, transverse partition in the plane of the axis of the collecting gallery (*m*). Above each oven is a horizontal passage, *a*, (see Fig. 1) having an opening which leads into the upper part of the oven. A vertical passage 6 for the admission of coal also leads to the oven at this point. The passage 6 may be closed at will by means of a valve 20. From passage *a*, transverse passages (*c*) lead to a horizontal passage (*d*), which is over the corresponding gas passage (*f*). From the passage (*d*) vertical openings (*e*) lead to the passage (*f*). The passage (*a*) may be closed at will by means of valves (*b*) in apertures (*b'*), and the openings (*e*) may be closed by plugs, or valves, (*b'*) see Fig. 2. A damper, or valve, (*p'*) is also provided to close the upper horizontal passage (*f*) at a point between the flues (*i*) and the flues (*g*). An air gallery (*t*) is provided on each side of the collecting gallery (*m*) parallel thereto, and substantially centrally placed in regard to the body of each furnace, beneath the flues. A passage (*l*) leads down from the front of the horizontal passage (*k*), bends back around the air gallery and enters the collecting chamber (*m*). The draft through the passage *l* may be regulated by means of the valve 4. The air galleries are connected with the outside air by suitable air passages (*l'*).

A second passage (5) leads from the upper portion of each furnace. This is connected to a suitable regenerator, or separator, and the gas is returned to the pipe, *r*, (see Fig. 1). From this pipe, suitable connections lead to the furnace and enter longitudinal gas retorts (*y*). These retorts are longitudinally placed in regard to the furnace and transversely in regard to the galleries (*t*) which they cross. Directly over the gallery (*t*) and beneath the chamber (*y*) is a chamber (*u*) of similar extent and parallel to the chamber (*y*). This chamber (*u*) is connected to the gallery (*t*). Above the chamber (*u*) and between it and the chamber (*y*) is a chamber (*w*). The chambers (*w* and *u*) are connected by means of widely separated, vertical passages (*v*), and the cham-

bers (*w* and *y*) are connected by means of numerous passages (*x*). The passages (*h*) are directly over the passage (*x*) and are connected thereto by means of vertical openings (*z*). Directly beneath the passages (*h*) are longitudinal air passages (1 and 2). These passages are connected to each flue (*g* and *i*) by means of passages (3).

In the operation of the furnace without regeneration, the plugs, or valves, (*b* and *b'*) are opened and the dampers, or valves (*p'*) are closed. The ovens (10) are supplied with coal and a temperature of distillation is first secured by means of gas supplied to the pipes (*r'*) from an outside source. When gas is given off from the coal, it enters the passage (*a*), from there goes through the opening (*c*) into the passage (*d*), from which it descends through the openings (*e*); going down the flues (*g*), along the passage (*h*), it ascends through the passages (*i*) and descends through the passages (*f'*) to the horizontal passage (*k*). Air is admitted from the outside at *n* and also at 3, from the air passages (1 and 2) at the lower extremities of the flues (*g* and *i*), and combustion occurs in the chamber (*f*) and the flues (*g* and *i*). From the passage (*k*), the product of combustion descends through the passage (*l*) encircling the air gallery (*t*) and passes to the collecting chamber (*m*).

During the regeneration, the valves (*b'* and *b*) are closed and the valve (*p'*) is open. The gas leaves the oven through the passage (5) and enters the regenerator, from whence it is returned to the passage (*r*) entering the chamber (*y*) through the pipes (*r'*). Heated air from the gallery (*t*) enters the chamber (*u*), passing up through the passages (*v*) to the chamber (*w*), is diffused and passes through the openings (*x*) to the chamber (*y*). Here the gas and air become completely mixed and enter the combustion chamber (*h*), through the openings (*z*). The chamber (*h*) is directly beneath the dead wall, or bottom, of the oven. From the passage (*h*) the products of combustion rise through the flues (*i* and *g*) to the horizontal passage (*f*) from which they enter the flues (*f'*) and pass to the lower horizontal passage (*k*), from which they enter the passage (*l*) encircling the air gallery, and from there they pass to the collecting gallery (*m*).

It will be noted that in both methods of operation, the air passages are heated by the products of combustion which are passed in the immediate neighborhood thereof. In this way complete combustion is secured.

By the arrangement of the passages described, and the use in connection therewith of the dampers, (*b*, *b'* and *p'*) the furnace is made easily convertible from one which oper-

ates with regeneration to one which operates without regeneration.

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

1. In a coking furnace, an oven, a collecting gallery, an air gallery in the furnace structure, passages in the walls of the oven, the said passages consisting of substantially vertical flues and horizontal passages, one of the latter connecting the upper portions of the flues and one connecting the lower portions of part of the flues, means for conducting gas from the retort to the upper horizontal passage, means for admitting air to the flues and passages, and a passage leading from the lower horizontal passage, through the walls adjacent the air gallery, to the collecting gallery.

2. In a coking furnace, an oven, a collecting gallery, an air gallery in the furnace structure, passages in the walls of the oven, the said passages consisting of substantially vertical flues and horizontal passages, one of the latter connecting the upper portions of the flues and one connecting the lower portions of part of the flues, means for conducting gas from the retort to the upper horizontal passage, means for admitting air to the flues and passages, a passage leading from part of the flues, through the walls adjacent the air gallery to the collecting gallery, a combustion chamber beneath the oven, a mixing chamber, connections between the combustion chamber and the mixing chamber, means for leading air from the air gallery to the mixing chamber, means for leading gas from the oven to the mixing chamber, means for closing one horizontal passage substantially mid-way, and means for closing the passage between said horizontal passage and the oven.

3. In a coking furnace, an oven, flues and passages in the walls of the oven, the latter connecting the extremities of the former, means for admitting air to the passages, an air chamber in the furnace structure, means for supplying air thereto, a passage leading from the flues through the walls adjacent the air chamber, a mixer connected to the oven and the air chamber, a combustion chamber near the oven, and connections between the combustion chamber and the mixer, and means for opening and closing the passages in the walls of the oven.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

LOUIS BANSART.

Witnesses:

HENRI RACLOT,

GEORGES VANDER HUEGHEN.