

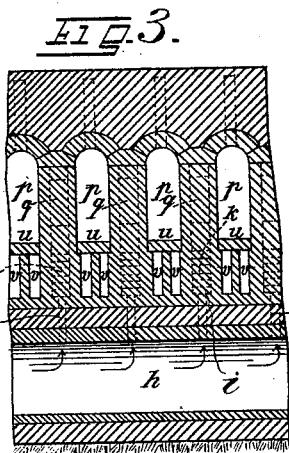
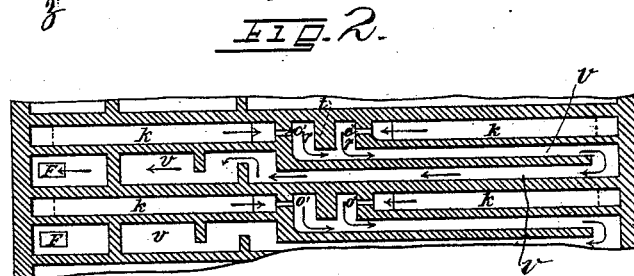
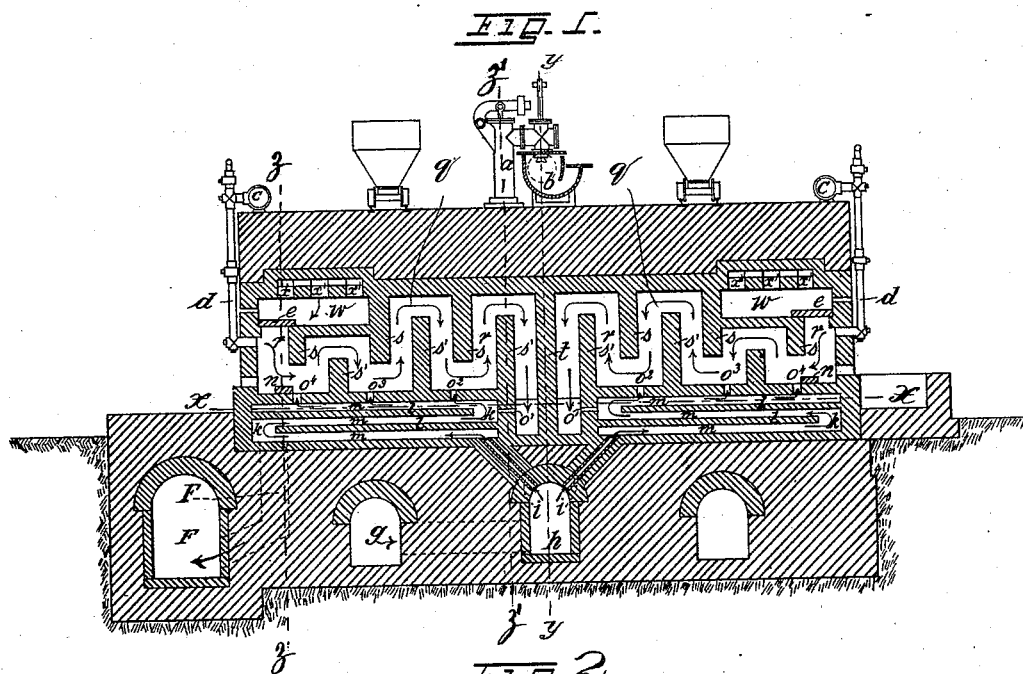
(No Model.)

2 Sheets—Sheet 1.

W. FRITSCH.
COKE OVEN.

No. 455,684.

Patented July 7, 1891.



Witnesses.
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Henry J. Dieterich

Inventor:
Wilhelm Fritsch.
per *Aug Ott*
Attorney.

(No Model.)

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Fig. 5.

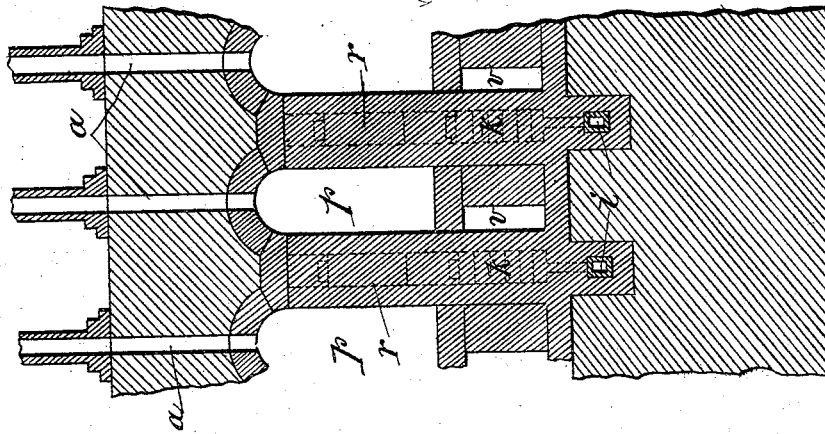
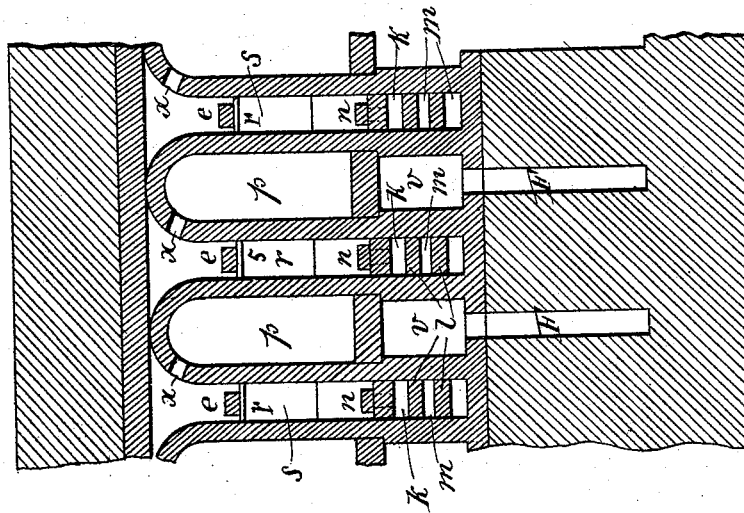


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

WILHELM FRITSCH, OF ZABORZE, GERMANY.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 455,684, dated July 7, 1891.

Application filed February 8, 1890. Serial No. 339,688. (No model.) Patented in England August 24, 1889, No. 13,390; in Belgium August 24, 1889, No. 87,492; in France August 24, 1889, No. 200,395; in Germany August 24, 1889, No. 52,134, and in Austria-Hungary March 27, 1890, No. 36,965 and No. 8,623.

To all whom it may concern:

Be it known that I, WILHELM FRITSCH, inspector of coke-ovens, a subject of the German Emperor, residing at Zaborze, Upper Silesia, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Coke-Ovens, (for which I have received Letters Patent in Great Britain, No. 13,390, dated August 24, 1889; in Belgium August 24, 1889, No. 87,492; in France August 24, 1889, No. 200,395; in Germany August 24, 1889, No. 52,134, and in Austria-Hungary March 27, 1890, No. 36,965 and No. 8,623;) 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 of reference marked thereon, which form a part of this specification.

Referring to the accompanying drawings, Figure 1 is a longitudinal vertical section through one of the combustion-chambers of the oven. Fig. 2 is a horizontal section of a portion of the oven on line xx of Fig. 1; and Fig. 3 is a vertical transverse section of a portion of the oven on line yy of said Fig. 1, the receiver b being omitted therefrom. Figs. 4 and 5 are sections taken, respectively, on lines zz and $z'z'$ of Fig. 1, the escape-pipe being broken away.

The means heretofore employed for heating horizontal coke-ovens by means of the waste gases, and more especially when the said waste-gases have been more or less cooled in the extraction therefrom of by-products and by means of air which is preheated and then conducted to the combustion-chambers, are defective, in that the supply of air necessary to support combustion cannot be regulated so as to uniformly heat all the coking-chambers. In consequence of this some of the coking-chambers become too cold, while others are heated too much. With a view to remedying this defect it has been the practice to admit a portion only of the escaping gases to the combustion-chambers. Under these circumstances the liability to undue cooling, which leads to the production of bad coke, is

increased. On the other hand, in many coke-ovens it is impossible to regulate the supply of air, the heated air being conducted through subdivided channels to the combustion-chambers.

The object of this invention is to remedy the defects referred to; and to this end the invention consists in structural features, as will now be fully described.

The supply of heated air admitted to the combustion-chambers r is regulated in the following manner: An air-heating space k is arranged below each of the coking-chambers p , and partition-walls q on opposite sides of flues r formed under said chambers p , through which flues flow the escaping products of combustion that serve to heat the floors u of the coking-chambers p , Figs. 3, 4, and 5. The air upon leaving the air-heating space is caused to flow in a contrary direction to the gases, and is then admitted to the combustion-chambers r through a number of openings $o^1 o^2 o^3 o^4$ of appropriate areas. The largest opening o^4 is situated at the point where the gases enter the combustion-chambers, and the volume of such air admitted to the latter chambers is regulated by means of a damper n . In the improved oven the combustion is thus under control in all the combustion-chambers.

When the by-products are to be extracted from the material under treatment, the gases are conducted in the ordinary manner from the coking-chambers p through pipes, such as a , into a receiver, such as b , and thence to the condensing-vessel, whence, after being freed from tar and ammonia, they are led through suitable pipes c back to the oven and admitted at the outer end of the combustion-chambers through pipes d . If the coking-chambers in one part of the oven happen to become too cold, or it is not desired to extract the by-products, the gases are admitted directly from the coking-chambers p through openings x into chambers w , and thence into the desired combustion chamber or chambers r through an opening the area of which can also be regulated by means of a suitable damper e . The combustion-chambers r are provided with vertical baffle-walls

s s' for diverting the gases alternately upward and downward, said gases being conducted near the partition *t* into the flues *v*, hereinbefore referred to, said flues *v* leading to a main flue F, common to all the combustion-chambers. The gases after they reach the main flue F may be used for raising steam or heating air. The air required for supporting combustion is supplied by a blower and enters the oven through a side channel or channels *g*. It is conducted thence to a central channel *h*, whence it is distributed through small inclined passages *i* to the several air-heating chambers *k*. The latter contain horizontal baffle-walls *l*, which cause the air while being heated to flow through the spaces *m* in both directions along the side walls and afterward in a direction contrary to that of the gases along the floor of the combustion-chambers *n*.

In the floor of each combustion-chamber are formed the series of air-passages $o^4 o^3 o^2 o'$, hereinbefore referred to, and leading to the air-heating chambers below said floors. The area of the said passages $o^4 o^3 o^2 o'$ is gradually reduced in the order named. The largest passage o^4 is nearest to the outer and the smallest passage o' nearest to the inner end of the combustion-chamber. As previously stated, the largest passage o^4 is controlled by a damper *n*, which when fully open permits the greater portion of the heated air to flow into that part of the combustion-chamber situated between the end wall of the oven and the first baffle-wall *s'* and at the point where the gases enter, intense combustion of the gases under such circumstances taking place at that point. Proportionate quantities of air are admitted through the other openings $o^3 o^2 o'$, the air passing through the smallest opening o' serving to effect the complete combustion of the gases. The more the damper *n* is closed the more air passes through the passages $o^3 o^2 o'$, the combustion being rendered correspondingly more intense toward the inner end of the combustion-chamber. By these means the heat in the oven may be easily controlled, the coking-chambers *p* being in consequence heated uniformly over their whole extent.

In an oven constructed as above described the flow of the gas, the heated air, and the products of combustion cannot become obstructed, so that a portion of the oven will become cold; neither can the heat become too intense at any particular point, while the heat is, moreover, controlled in the simplest possible manner by means of a single damper in respect of each air-heating chamber.

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

1. The improvement in coke-ovens, which consists in a plurality of parallel vertical coking-chambers, a combustion-chamber interposed between each two coking-chambers, an air-heating flue arranged immediately un-

der the sole of each combustion-chamber, and a flue for the escape of the products of combustion interposed between said air-heating flues and arranged immediately under the sole of the coking-chambers, and suitable connections between the combustion-chamber, the air-heating flues, and the flues for the escape of the products of combustion, respectively, substantially as and for the purpose set forth.

2. The improvement in coke-ovens, which consists in a plurality of parallel vertical coking-chambers, a combustion-chamber interposed between each two coking-chambers, an air-heating flue arranged immediately under the sole of each combustion-chamber, and a flue for the escape of the products of combustion interposed between said air-heating flues and arranged immediately under the sole of the coking-chambers, and suitable connections between the combustion-chamber, the air-heating flues, and the flues for the escape of the products of combustion, respectively, in combination with dampers adapted to control the volume of air supplied to the combustion-chambers, substantially as and for the purpose set forth.

3. The improvement in coke-ovens, which consists in a plurality of vertical parallel coking-chambers, a combustion-chamber interposed between each two coking-chambers, an air-heating flue arranged immediately under the sole of the combustion-chambers and provided with a plurality of air-escape ports of different area opening into the combustion-chamber at different points, a damper for the air-port of greatest area, and flues for the escape of the products of combustion interposed between the air-heating flues immediately under the sole of the coking-chambers and in communication with the combustion-chambers, substantially as and for the purpose set forth.

4. The improvement in coke-ovens, which consists in a plurality of vertical parallel coking-chambers, a combustion-chamber interposed between each two coking-chambers, a flue for the escape of the products of combustion immediately under the sole of each coking-chamber and communicating with the combustion-chamber thereof, air-inlet ports formed in the sole of said combustion-chamber at different points, said ports increasing in area, the port of greatest area being located farthest from the outlet for the products of combustion, an air-flue immediately below each combustion-chamber and communicating therewith through said ports, and a damper for the air-inlet port of greatest area, substantially as and for the purpose set forth.

5. The improvement in coke-ovens, which consists in the combination, with the coking-chambers and with flues arranged below said chambers for the escape of the products of combustion, of air-heating chambers arranged between the flues of the coking-chambers, a combustion-chamber in communication with

said flues and arranged above the same, a gas-conduit connecting the coking-chambers with their respective combustion-chambers at the outer end and near the roof thereof, and passages arranged to admit the heated air to the combustion-chambers at different points, said passages decreasing in area from the outer to the inner end of the combustion-chamber, and a damper for the outer larger passage, substantially as and for the purposes specified.

6. The improvement in coke-ovens, which consists in the combination, with the coking-chambers, a combustion-chamber extending between and along the same and having partitions to direct the flame and products of combustion alternately upward and downward, a gas-conduit connecting the coking-chambers with the combustion-chambers at the upper outer end of the latter, and flues in communication with the inner end of the combustion-chamber for the escape of the products of combustion, said flues being located below the coking-chambers, of an air-heating chamber located below the combustion-chamber, said air-heating chamber having partitions to direct the air alternately from the inner to the outer end of the chamber, passages in the floor of the combustion-chamber com-

municating with the air-heating chamber, said passages decreasing in area from the outer to the inner end of the combustion-chamber, and a damper for the larger passage of the series, substantially as and for the purposes specified.

7. The improvement in coke-ovens, which consists in the combination, with the coking-chambers, the flues below said chambers for the escape of the products of combustion, and air-heating chambers arranged on opposite sides of said flues, of a combustion-chamber arranged above the air-heating chambers and in communication therewith by ports in the floor thereof, a gas-admission port in the outer end of the combustion-chamber, a gas-chamber above the combustion-chamber and in communication therewith by a valved port, and connections between the gas-chambers and the coking-chambers, substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILHELM FRITSCH.

Witnesses:

T. VOLLNER,

B. BROEDENDER.