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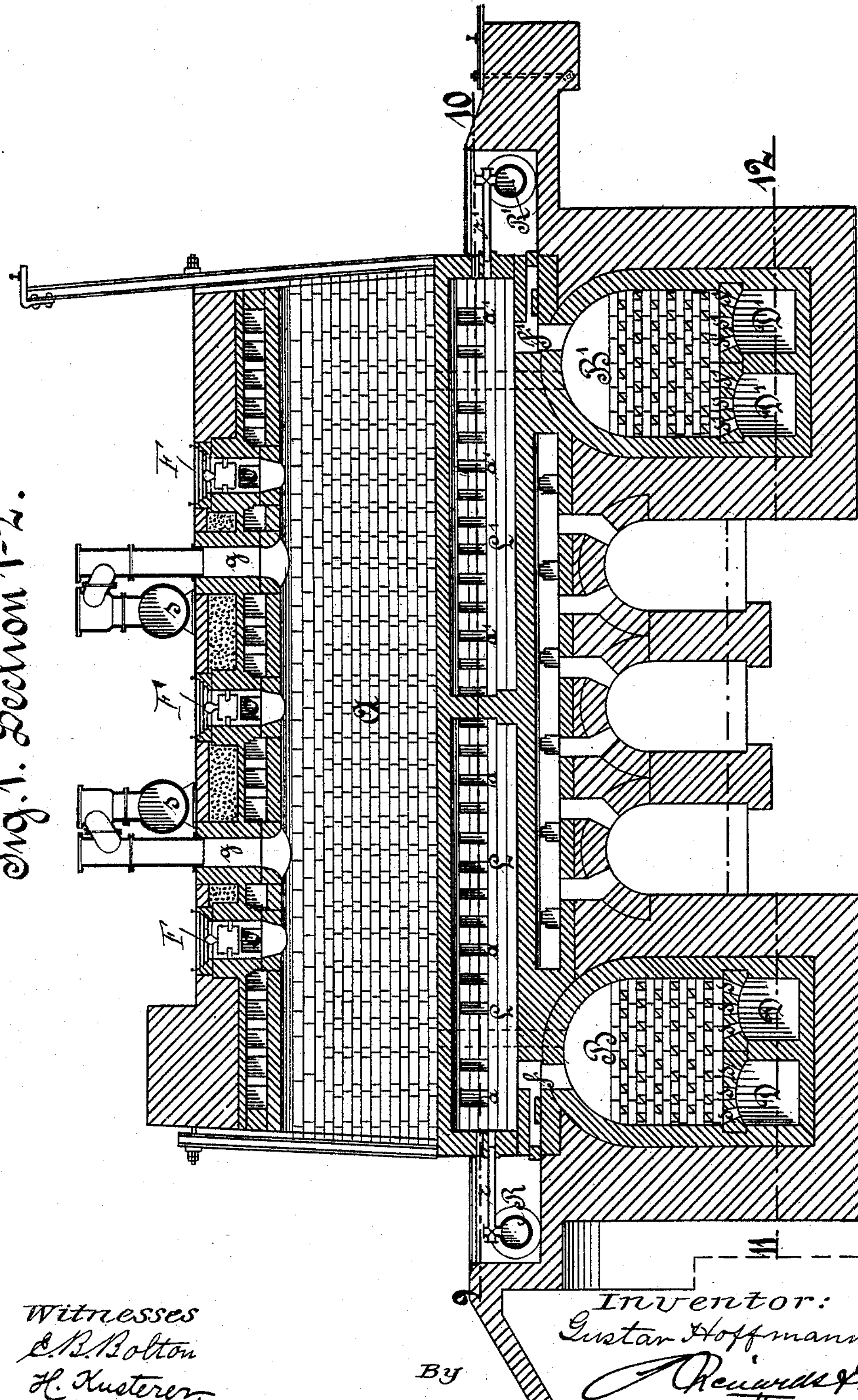
COKE OVEN.

No. 492,400. Patented Feb. 28, 1893.

Fig. 1. Section 1-2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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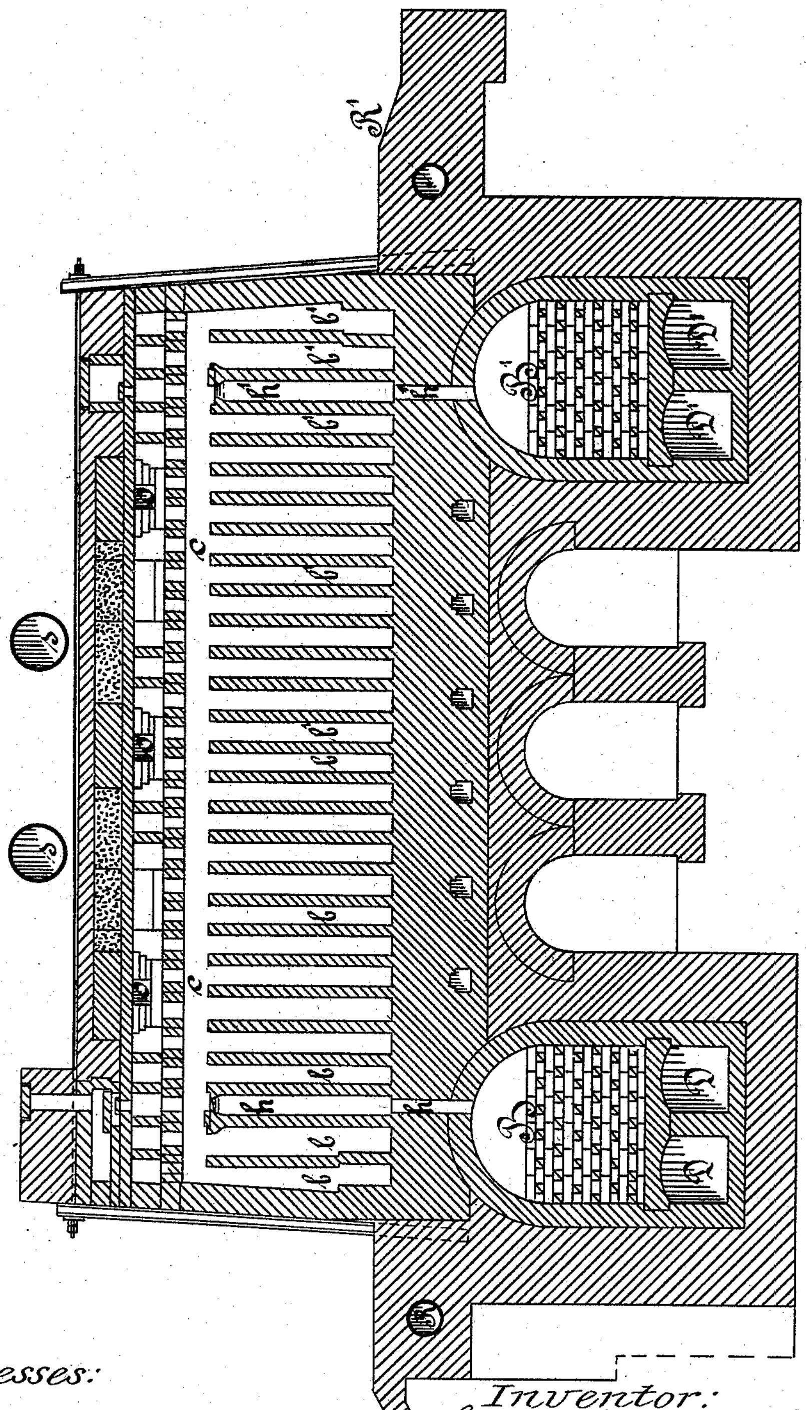

Fig. 2. Section 3-4.

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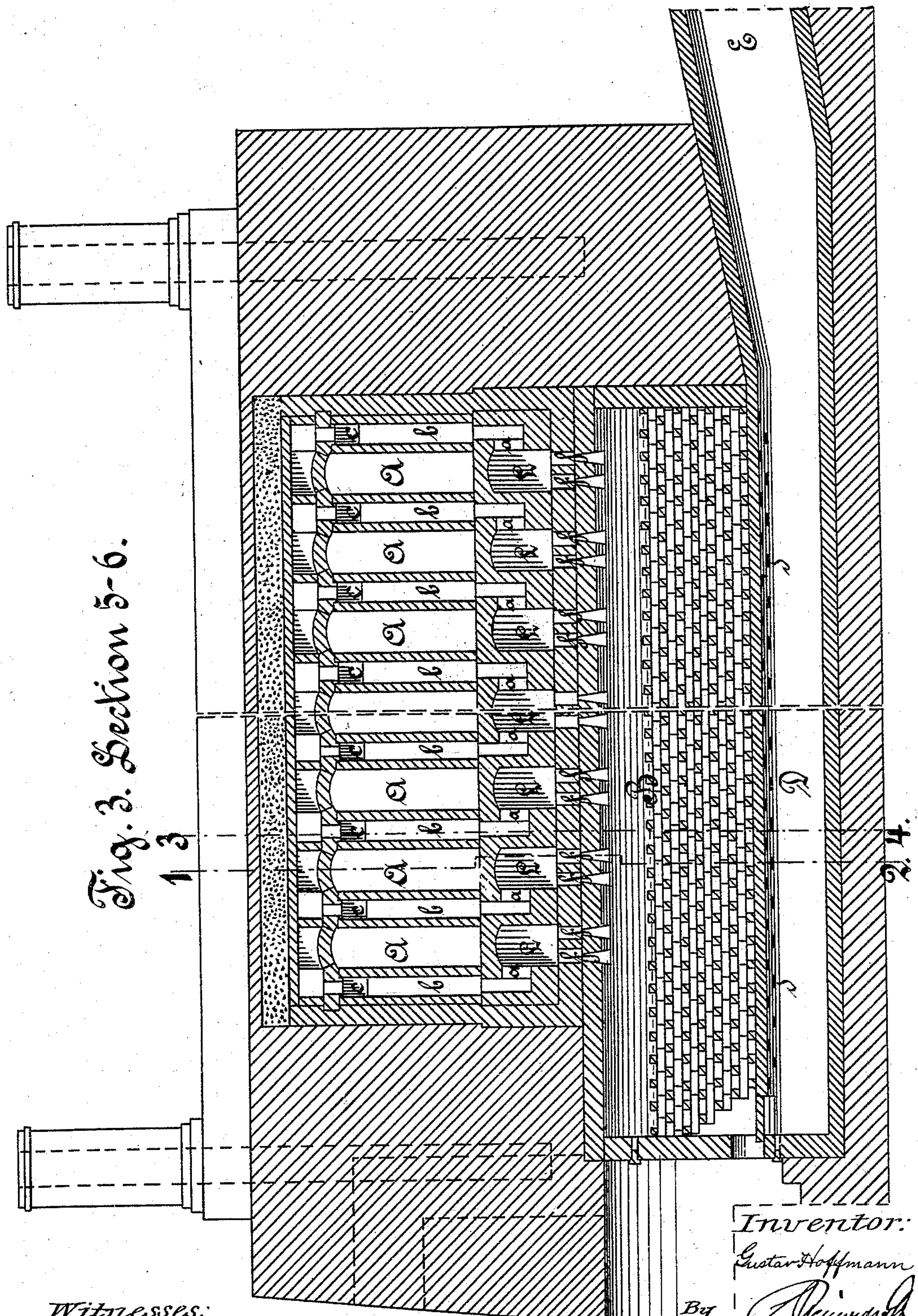

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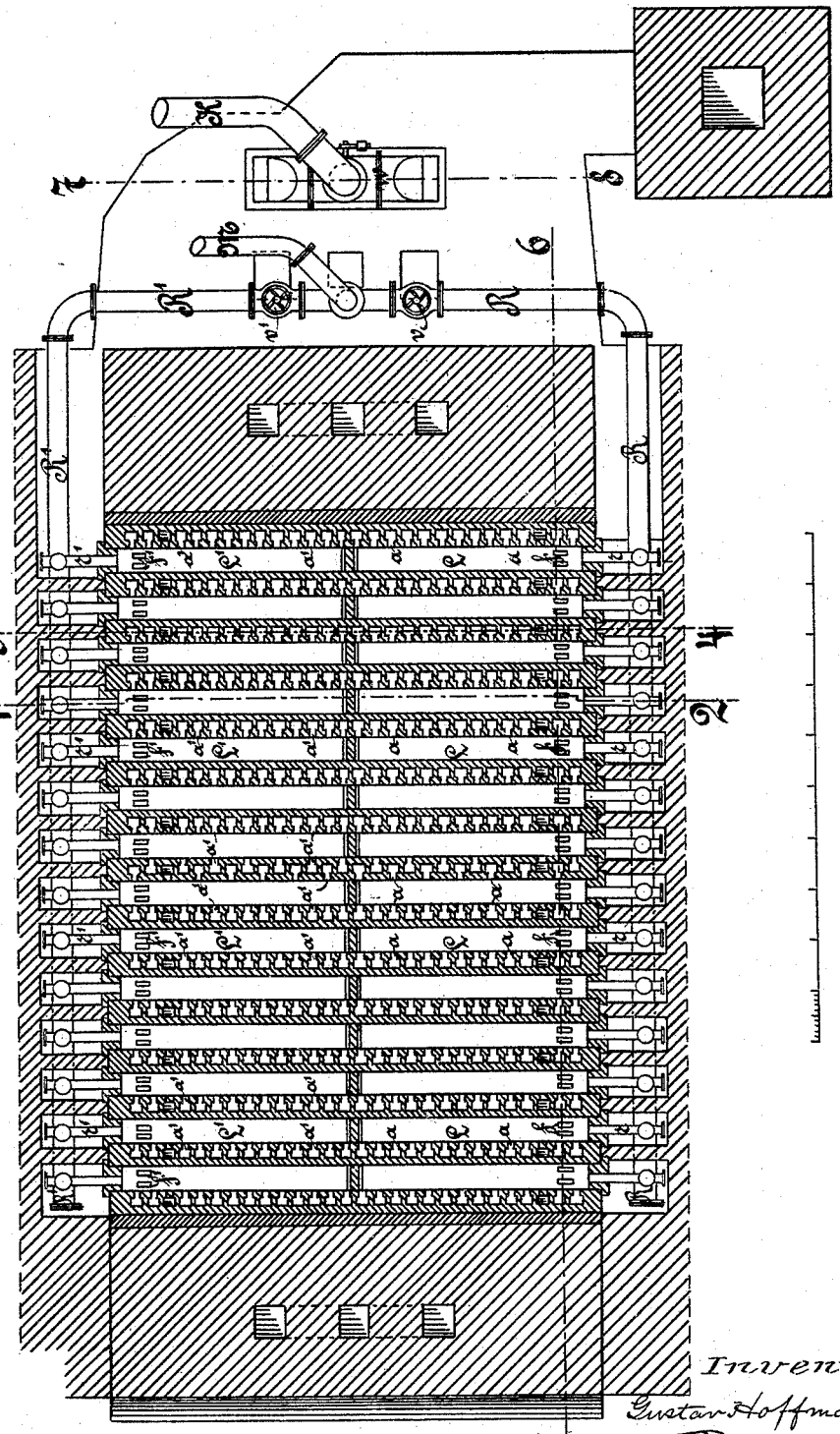

Fig. 4. Section 9-10.

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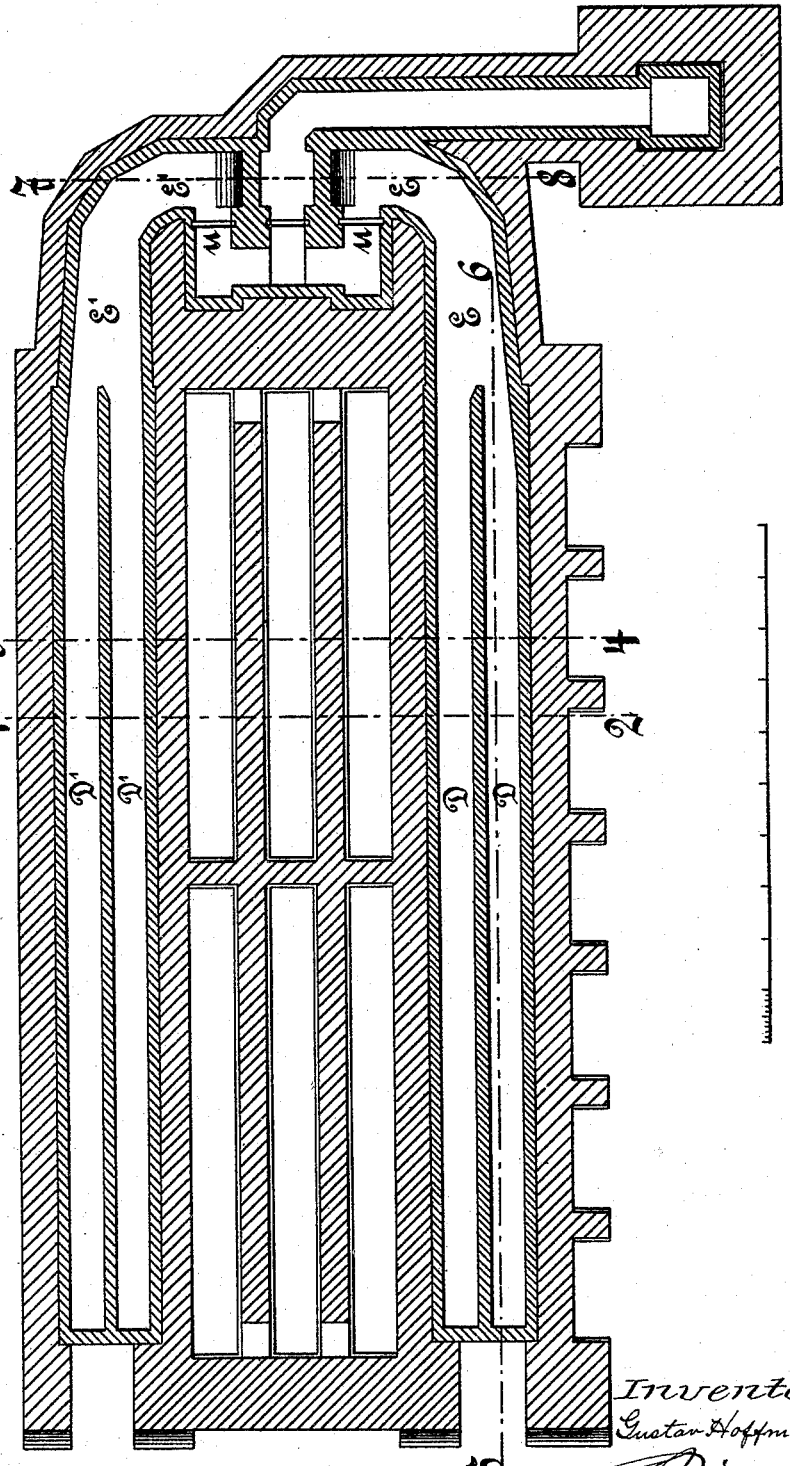

Fig. 5. Section 11-12.

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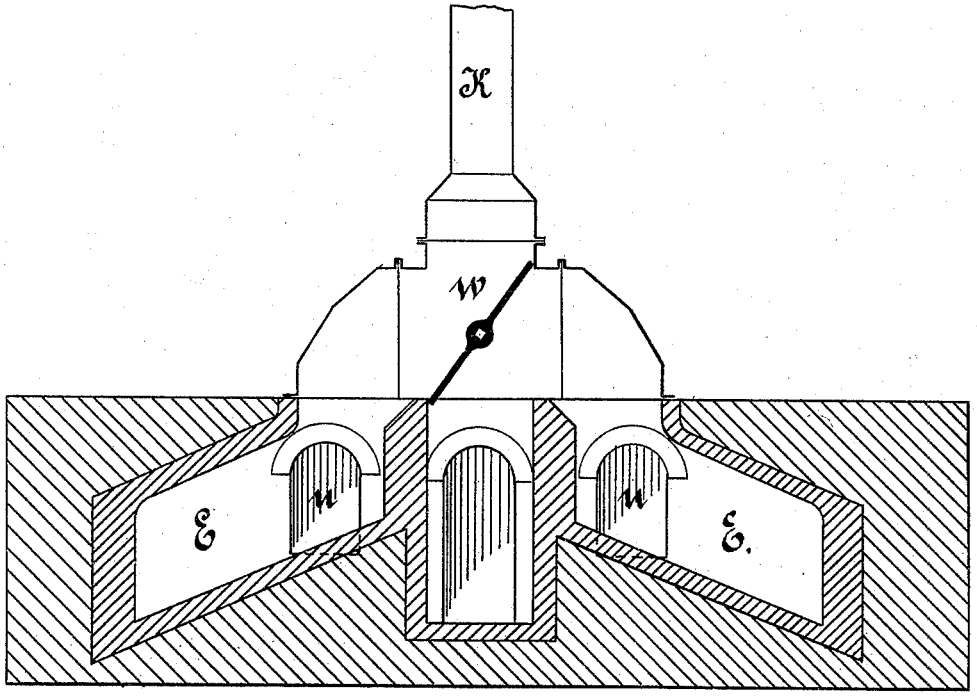
COKE OVEN.

No. 492,400. Patented Feb. 28, 1893.

Fig. 6. Section 7-8.



Witnesses:
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UNITED STATES PATENT OFFICE.

GUSTAV HOFFMANN, OF GOTTESBERG, GERMANY.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 492,400, dated February 28, 1893.

Application filed May 13, 1892. Serial No. 432,909. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV HOFFMANN, a subject of the Emperor of Austria-Hungary, residing at Gottesberg, in the Kingdom of Prussia, German Empire, have invented certain Improvements in Regenerative Coke-Ovens, of which the following is a specification.

The object of the present invention is to highly and uniformly heat the sides and bottoms of coking ovens, with the view of securing the best results in the manufacture of coke and by-products.

My invention attains the desired results by securing the complete combustion of the coal gases returned from the condenser, the air for such combustion being previously heated to the highest possible degree.

For the heating of the air used in the combustion, the regenerators B, B′, connect with the coke ovens A, and as illustrated in the accompanying drawings, said regenerators are located in the cooling off canals leading from the coking ovens to the chimney. The regenerators B and B′ can be arranged at any other suitable place, or be entirely replaced by other air heating apparatus.

In the accompanying drawings forming part of this specification, Figure 1, is a vertical section through a coking oven A, transversely through the regenerators B and B′; on the lines 1—2, Figs. 3, 4, and 5. Fig. 2 is a vertical section through the side walls of the coking oven, the canal C and vertical conduit *b* and *b′* said section being taken on the line 3—4, Figs. 3, 4 and 5. Fig. 3 is a vertical section transversely through a coking oven A, with the length of the regenerator B; on line 5—6, Figs. 4 and 5. Fig. 4 is a horizontal section through the canals L and L′, *a* and *a′*, and opening *f;* on line 9—10, Fig. 1. Fig. 5 is a horizontal section through the canals D and E, D′ and E′; on the line 11—12, Fig. 1. Fig. 6 is a vertical section from the deflecting damper *w′*, through the canals E and E′, on line 7—8, Figs. 4 and 5.

As illustrated, the coke ovens are formed by long narrow chambers A, Figs. 1 and 3, each of which is almost oblong, and has its end closed by means of gas tight doors. These chambers, A, are supplied with the coal through the openings F, Fig. 1, the doors for which are also adapted to be made gas tight. The gas developed from the coal in the coking ovens, is conducted during the coking operation through the pipes *g* F, Fig. 1, and the gas exhaust conduit *s* (same figure); into the condenser not shown. If the gases have been cooled off in this apparatus, and have thereby become separated from the tar and ammonia, the cold gases return through the gas conduit M, Fig. 4, to the oven. The cold gases coming from the condenser, enter alternately into the pipes R and R′, Figs. 1, 2 and 4. The passage these gases take depends upon the position of the gas valve *v* and *v′*, in the conduits R, R′, Fig. 4. The gases go from the gas conduits R, R′, through the pipes *r r′*, and circulate beneath the floor of the separate ovens, and pass into the chambers L and L′, Figs. 1 and 4. If the valve *v′* in the gas conduit is open, and valve *v* is closed, the gases coming from the condenser are led to the conduit R′, from which they pass by way of the pipe *r′* into the chamber L′ beneath the floor of the oven, Fig. 1. The air for the combustion of the gases is forced through the tube K, Figs. 4 and 6, and the deflecting damper *w*, and enters through this near the same as in the position shown in Fig. 6, into the canal E′, passes through the canal D′, Fig. 5, enters the regenerator B′ through the numerous small openings *d′*, is then heated and passes through the opening *f′* into the canal L′, where it is mixed with gas, comes through *r′*, and effects the complete combustion. (See Figs. 1 to 6.) The hot products of combustion fed through the opening *a′*, Fig. 1, ascend in the shaft *b′* between the side walls of the oven, Figs. 2 and 3, collect in canal *c*, and are then discharged downwardly through the shafts *b* and enter into the canal L, Figs. 1 and 4. From the latter they enter the regenerator chamber by way of opening *f*, and heat the masonry work of the same, then pass through the numerous small openings *d′* into the canals D, float along the same and enter the canal E, from where they reach the chimney through the deflecting dampers *w*, Figs. 1 to 6. After this operation has been conducted for a suitable period of time, say anywhere from thirty to sixty minutes, the operation is reversed by changing the position of the valves *v* and *v′*, in the gas conduits

R and R′, Fig. 4. and that of the deflecting damper *w* in the air conduits K, Figs. 4 to 6. Then the gas, returning from the condenser, enters the conduit R, and from this passes to the canal L by way of tube *r;* while the combustion air goes through the deflecting damper *w* and canal E into the canals D, and through the numerous small openings *d* into the generator B, then heated and reaches the canal L through *f*. The products of combustion then go through *a* into the shaft *b*, rise in the same, collect in the canal *c*, descend through the shaft *b′* and enter the canal L′ by passage *a′* and then pass from said canal into the generator D′ by way of the opening *f′*, to heat said regenerator. The air then passes through the numerous small openings *d′* into the canal D′, and from this latter through the canals E′ and the deflecting damper *w* to the chimney. The small openings *o* in F, are connected with the interior of the oven walls, Figs. 1 and 2, and are intended when heating the masonry of the oven, before the operation is well under way, to lead the gases developed into the canals *c* Fig. 2, into which air from the combustion of the same is led through canals *h* from the regenerators B and B′. The gases thus obtained flow through vertical conduits *b* and *b′*, Fig. 2, through *a* and *a′* into the chambers L and L′, Figs. 1 and 3, then from there through *f* and *f′* into the regenerators B and B′, and in the previously described regular manner to the chimney.

When the working is actually commenced, the openings *o* and *h*, Figs. 1 and 2, and the valves *u*, Fig. 5 are closed. These valves *u*, as shown in Figs. 5 and 6 are arranged to supply air to the canals D, D, D′, D′, independently of the pipe K and valve W.

I claim—

In combination the ovens having the combustion chambers under the same, and the shafts *b′* extending about them, the canals *c* at the top of said shafts, the regenerators B, B′ with air passages leading thereto, the gas conduits F leading from the ovens and the ports *o* connecting the same with the canals *c* and the passages *h h′*, leading directly from the regenerators to the canals *c* and past the combustion chambers, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GUSTAV HOFFMANN.

Witnesses:
REINHOLD FRIESE SCHUTZMANN,
THEODOR EHRENBERG.