(No Model.) 4 Sheets—Sheet 1.

F. WESTERMANN.

REGENERATIVE COKE OVEN.

No. 500,684. Patented July 4, 1893.

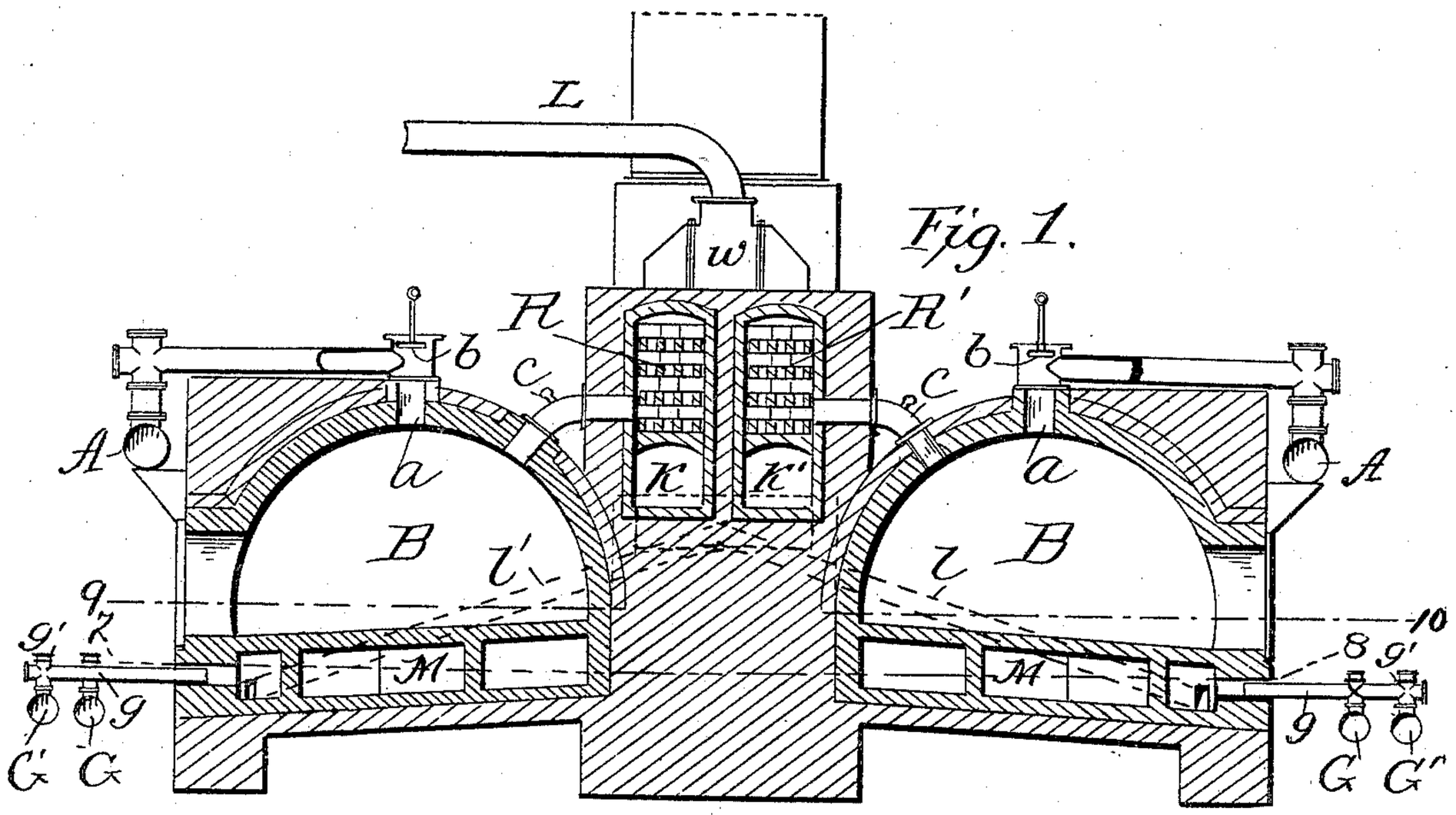

Fig. 1.

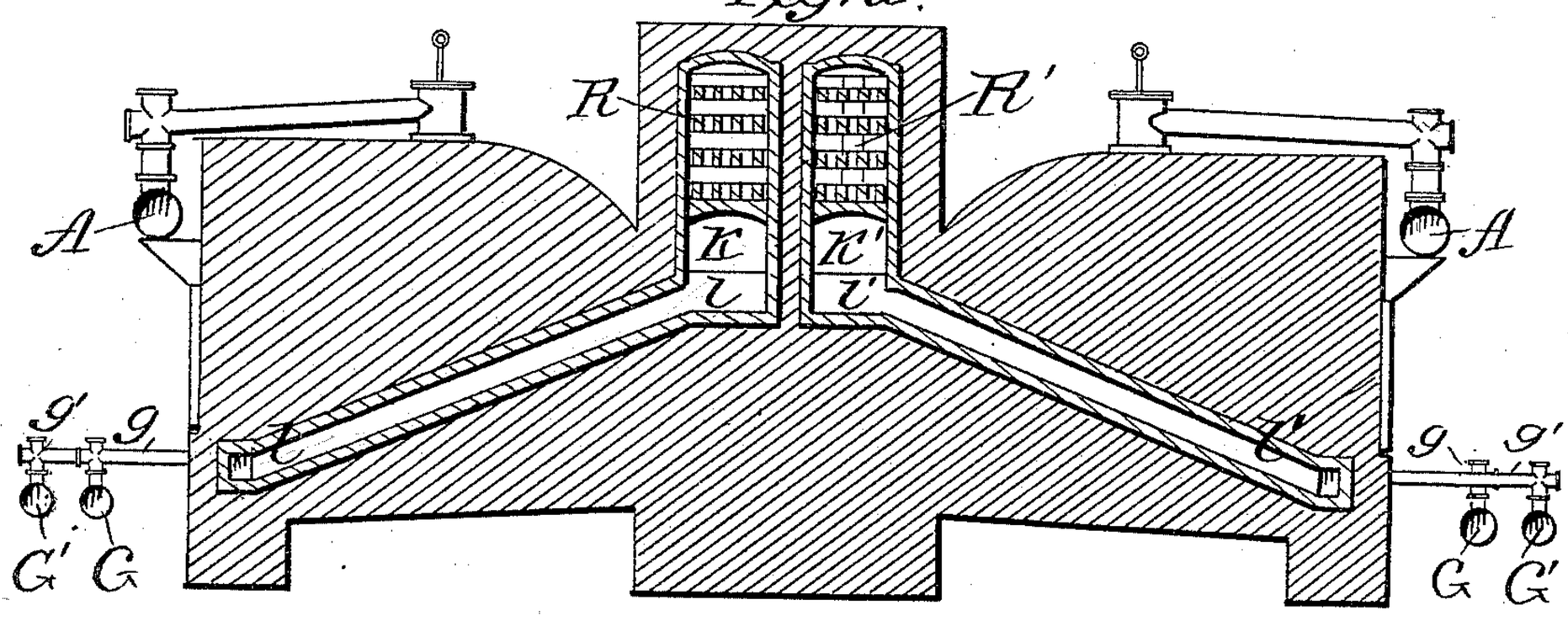

Fig. 2.

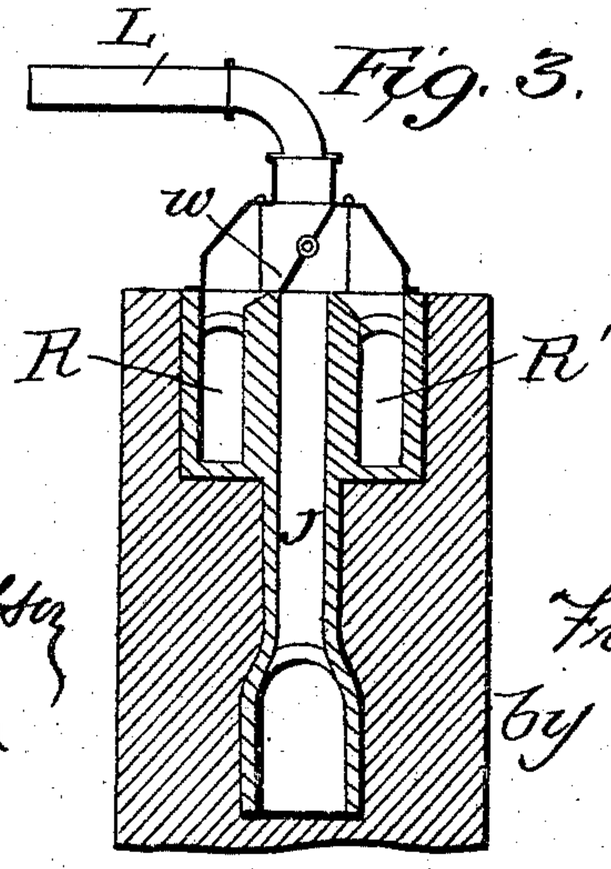

Fig. 3.

Attest
Walter Dwaldson
F. L. Middleton

Inventor
Franz Westermann
by Richards & Co
Attys

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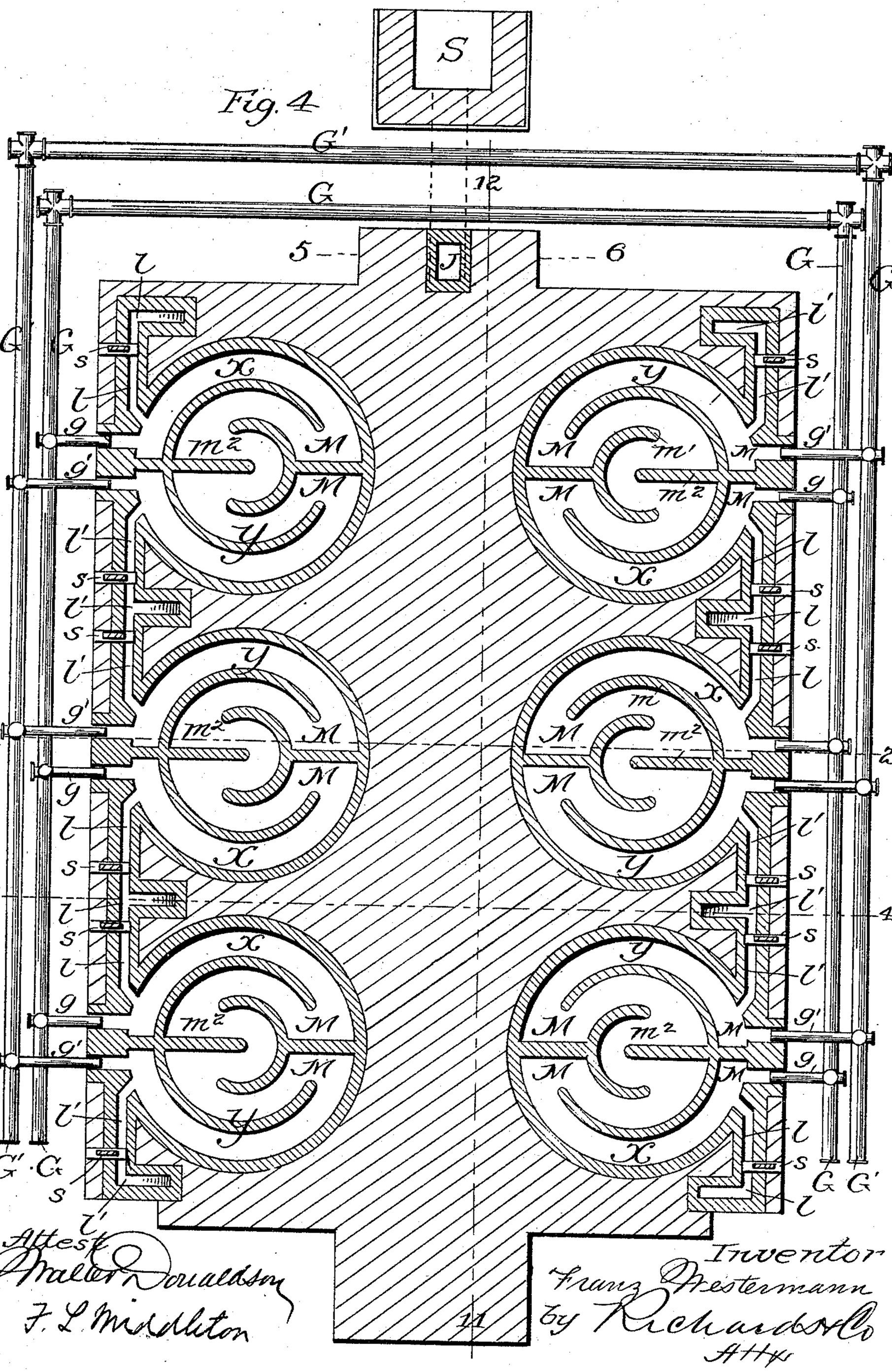
4 Sheets—Sheet 2.

F. WESTERMANN.

REGENERATIVE COKE OVEN.

No. 500,684. Patented July 4, 1893.

Fig. 4



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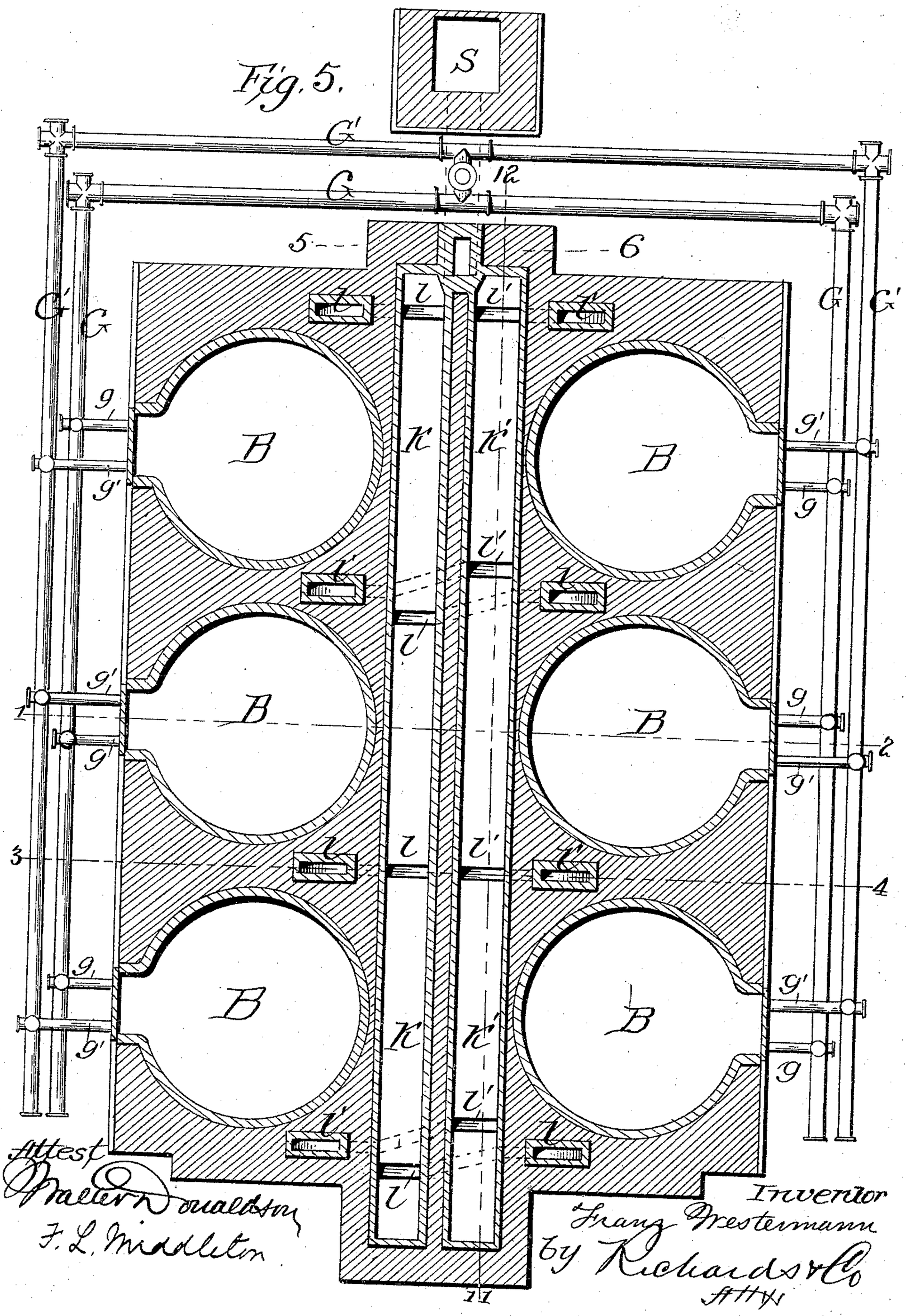
REGENERATIVE COKE OVEN.

No. 500,684. Patented July 4, 1893.

Fig. 5.



(No Model.) 4 Sheets—Sheet 4.

F. WESTERMANN.

REGENERATIVE COKE OVEN.

No. 500,684. Patented July 4, 1893.

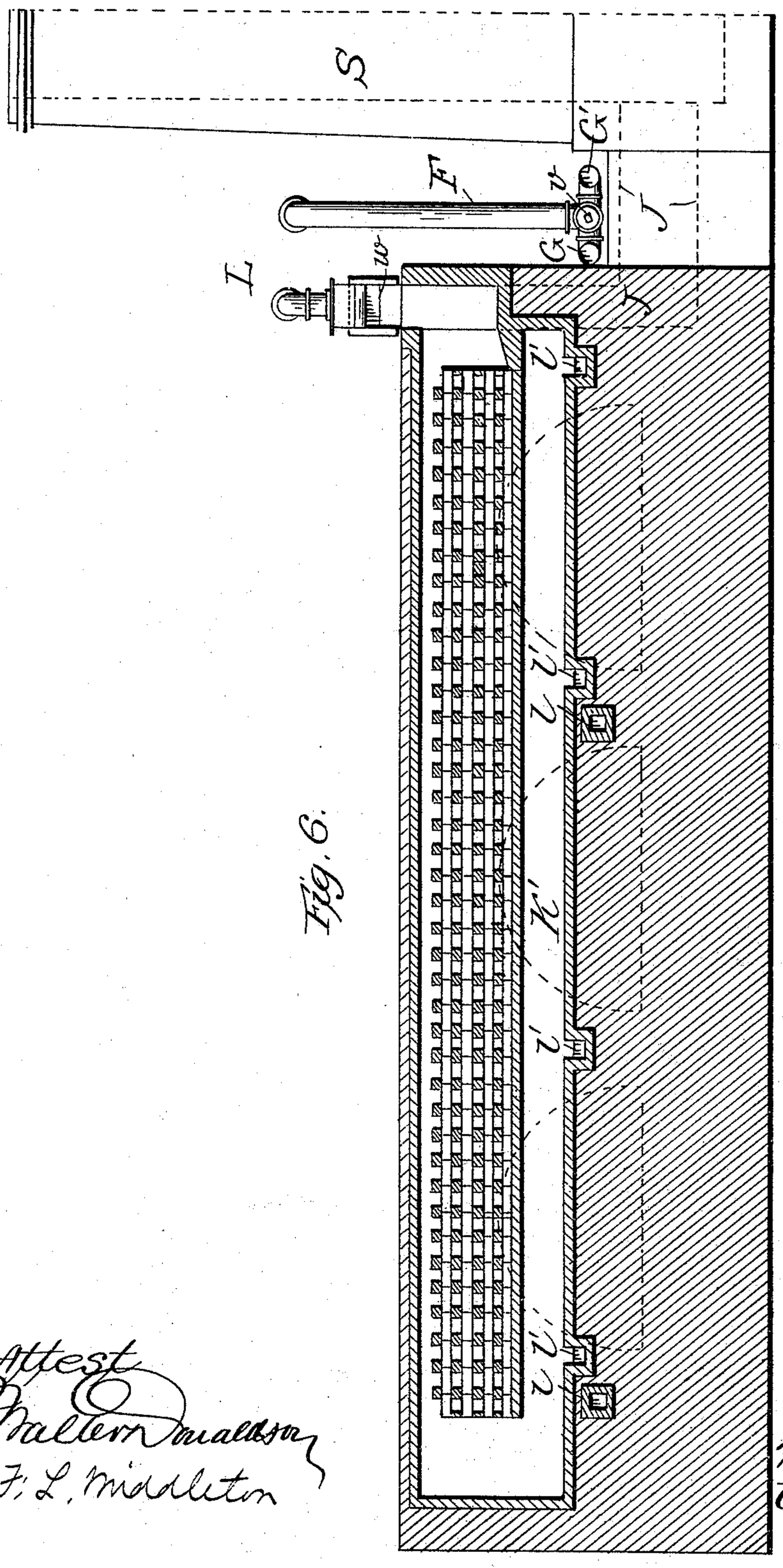


Fig. 6.

Attest
Walter Malleson
F. L. Middleton

Inventor
F. Westermann
by Richards & Co
Attys

UNITED STATES PATENT OFFICE.

FRANZ WESTERMANN, OF HERNE, GERMANY.

REGENERATIVE COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 500,684, dated July 4, 1893.

Application filed April 19, 1892. Serial No. 429,766. (No model.) Patented in Germany March 21, 1886, No. 37,280, and in England April 21, 1886, No. 5,522.

To all whom it may concern:

Be it known that I, FRANZ WESTERMANN, a subject of the King of Prussia, German Emperor, residing at the city of Herne, in the Kingdom of Prussia, Germany, have invented certain Improvements in Regenerative Coke-Ovens, of which the following is a specification.

This invention has been patented in Great Britain under date of April 21, 1886, No. 5,522, and in Germany, dated March 21, 1886, No. 37,280.

This invention relates to regenerative coke ovens, and has for its object, to secure the highest possible degree of combustion with a view of securing the best possible coking results.

In the accompanying drawings forming a part of this specification, Figure 1 is a transverse sectional view of the coking apparatus embodying my improvements; said section being taken on the plane indicated by the line 1—2, Figs. 4 and 5. Fig. 2 is a like view taken on the plane of the line 3—4, Figs. 4 and 5. Fig. 3 is a transverse detailed section showing the arrangement for damper for controlling the air conduits and escape flue, the said section being taken on the line 5—6, Figs. 4 and 5. Fig. 4 is a horizontal sectional plan view, taken on the plane of the line 7—8, Fig. 1, and showing the arrangement of combustion passages beneath the floor of the coking chamber. Fig. 5 is a horizontal sectional plan view, taken on the line 9—10, Fig. 1, and showing the arrangement of coking chambers and longitudinal cooling passages of the regenerators, and Fig. 6 is a vertical, longitudinal, sectional view of the said improved apparatus, taken on the line 11—12, Figs. 4, 5, and showing the longitudinal arrangement of one of the regenerators and its passage.

The coking chambers B have a circular bottom, preferably inclined toward the front, and as illustrated, are of a bee-hive shape. These chambers are fed with coal through any suitable door so arranged that when closed they become gas tight. The gases developed in each oven B, pass to the principal gas conduits A, Figs. 1, 2, by way of the pipe *a*, communicating with the top of the chamber. This latter pipe has a valve *b* to control communication through the same. The gases in the conduits A, are led to a suitable condensing apparatus, not shown where they are properly cooled and their volatile and other elements separated therefrom. The cold gas now flows back to the coking apparatus, by way of the pipe F, Fig. 6. A valve *v* is so disposed that the cold gas referred to, can pass into either of two pipes G and G′, extending along the respective sides of the ovens. The gas then flows through small pipes *g* and *g′* into the passages M beneath the floors of the coking chambers, at one side of the apparatus. Assuming that the gas enters the passages M at one side, by way of the pipes G and *g*, the air necessary for combustion is fed through the air conduit *l*, Figs. 1, 3, 6, either by way of the chimney or by pressure.

The position of the deflecting damper *w*, determines whether the air enters the regenerator R′, Fig. 6, or regenerator R to be heated. Suppose the deflecting damper *w* to be in the position shown in Fig. 3. The air must then enter the regenerator R, flow from the same in a highly heated condition, into the longitudinal passage K, beneath Fig. 6, and therefrom through the passages *l′* which extend alternately on each side of the passage K, Fig. 5 to connect the same with all the passages M beneath the bottom of both the coking chambers B. As the passages *l* extend away from the regenerator R alternately first on one side and then on the other as just stated and as shown in Figs. 4 and 5, it will be clear that both series of passages M, will be fed with air, which enters the said passages on the side of the partition m^2, marked X. The air in connection with the gas, which has already entered the same, also on the side X, will cause with the gas a high degree of combustion, and the mixed gas and air will follow the tortuous passages M to the other side of the partition m^2, marked Y. The products of combustion then escape from the passages M by way of passages *l′* and K′, enter the regenerator R′, heat the latter and finally pass to the chimney S by way of the main collecting pipe J.

When the apparatus has been operated as described, for a sufficient period, say thirty or sixty minutes, the operation is reversed by

turning the valve v in the pipe F, Fig. 6, and changing the position of the deflecting damper w in the air conduit L, Fig. 3, in opposite directions. The air then enters through the regenerator R′ and the passages l' to the two series of passages M, on the side Y. The gas enters the apparatus by way of pipes G′ g', reaches the passages M on the side of the partition marked Y, and the products of combustion pass out by way of the passages l to the regenerator R, and through the same to the chimney. At the beginning of the operation and before the gas is led to the condensing pipe, the pipe C is opened and the coal gas is enabled to escape through the regenerator into the chimney. These pipes are closed during the subsequent operation of the furnace.

As will be seen from Figs. 1, 4 and 5, the regenerators extend longitudinally between the two series of ovens and entirely from end to end thereof. They are arranged in the upper part of the furnace and they are thus in position to receive the heat of the furnace walls and are in position to connect conveniently with the two series of combustion chambers. Referring particularly to said Figs. 4 and 5, it will be noticed that the conduits l all lead from the regenerator R, while those marked l' lead only from the regenerator R′. These conduits extend down between the series of combustion chambers as shown in Fig. 4 and have lateral branches extending on each side and parallel with the furnace wall to connect with the passages M, these lateral branches being controlled by the valves s extending through the wall. The chambers or passages M, are formed by concentrical partitions m' and the transverse partitions m^2. By this simple arrangement of the regenerators intermediate and longitudinally of the furnace and the series of passages l reaching on both sides of the regenerator R, and the second series l' reaching on both sides of the regenerator R′, an effective and easily operated furnace is presented, the parts being compactly and advantageously arranged.

I claim—

1. In combination, the two series of coking chambers arranged side by side, the combustion passages M M, the two pipes G G′ having a valve at v for supplying the said passages with gas, the two regenerators R, R′, arranged intermediate of the two series of coking chambers and extending longitudinally from end to end of the series, in the upper portion of the furnace, the series of the conduits l extending from the regenerator R on each side of the same, to the coking chambers and the second series of conduits l' extending from the regenerator R′ on both sides of the same to the coking chambers, substantially as described.

2. In combination, the two series of coking chambers with their independent combustion passages, the pipes G G′ for supplying gas thereto, the two regenerators R R′, arranged side by side and intermediate of the coking chambers and extending longitudinally from end to end of the series, the series of conduits $l\,l'$ extending from the regenerators R R′ respectively down between the separated passages M, and having lateral branches connecting the conduits with the passages and the valves in the said lateral branches, substantially as described.

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

FRANZ WESTERMANN.

Witnesses:
CHR. SONNENSCHEIN,
A. KLINGHAMMER,
Consulate of the United States.