

(No Model.)

2 Sheets—Sheet 1.

H. STINNES.
COKE FURNACE.

No. 582,491.

Patented May 11, 1897.

Fig: 1.

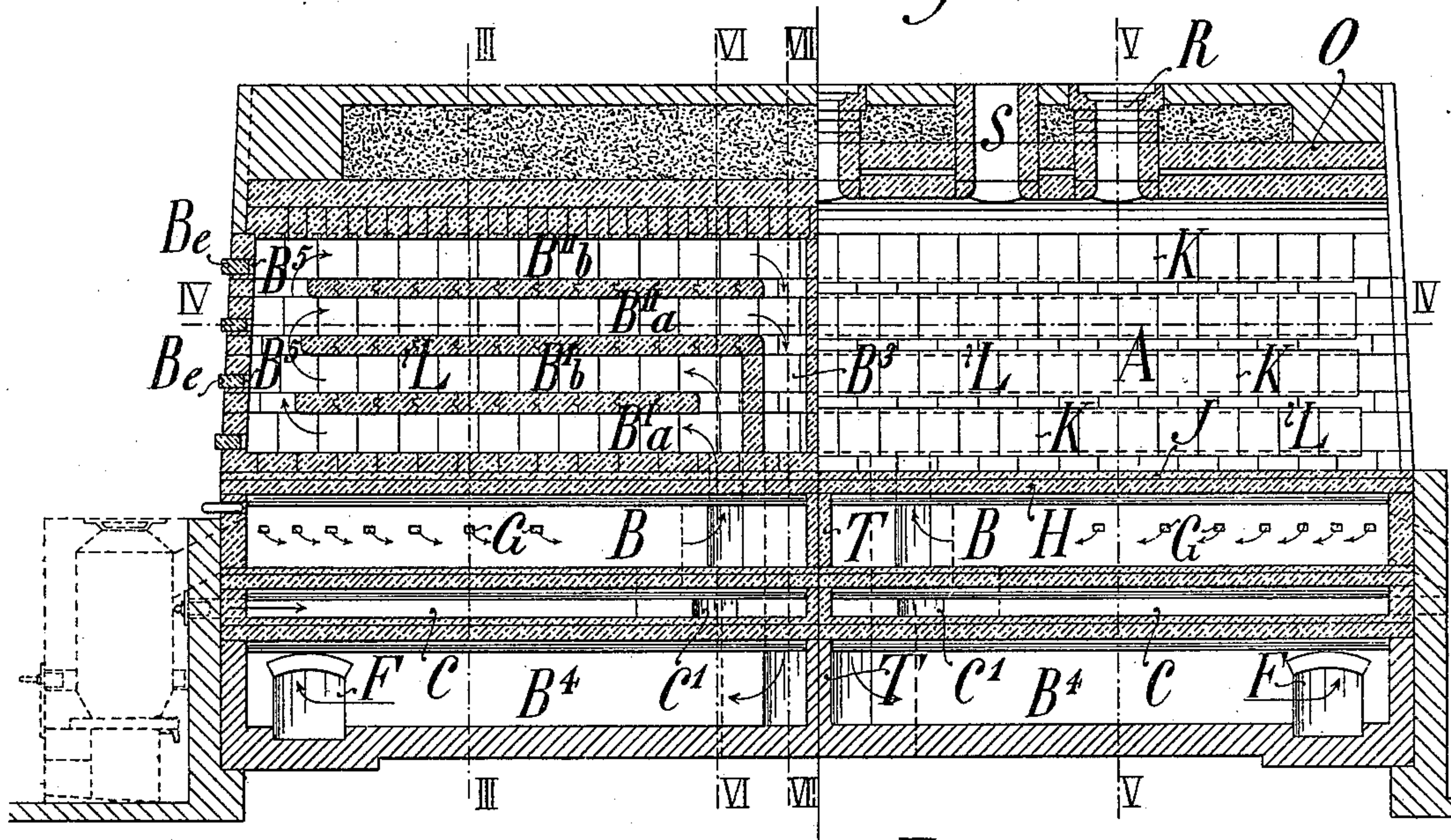
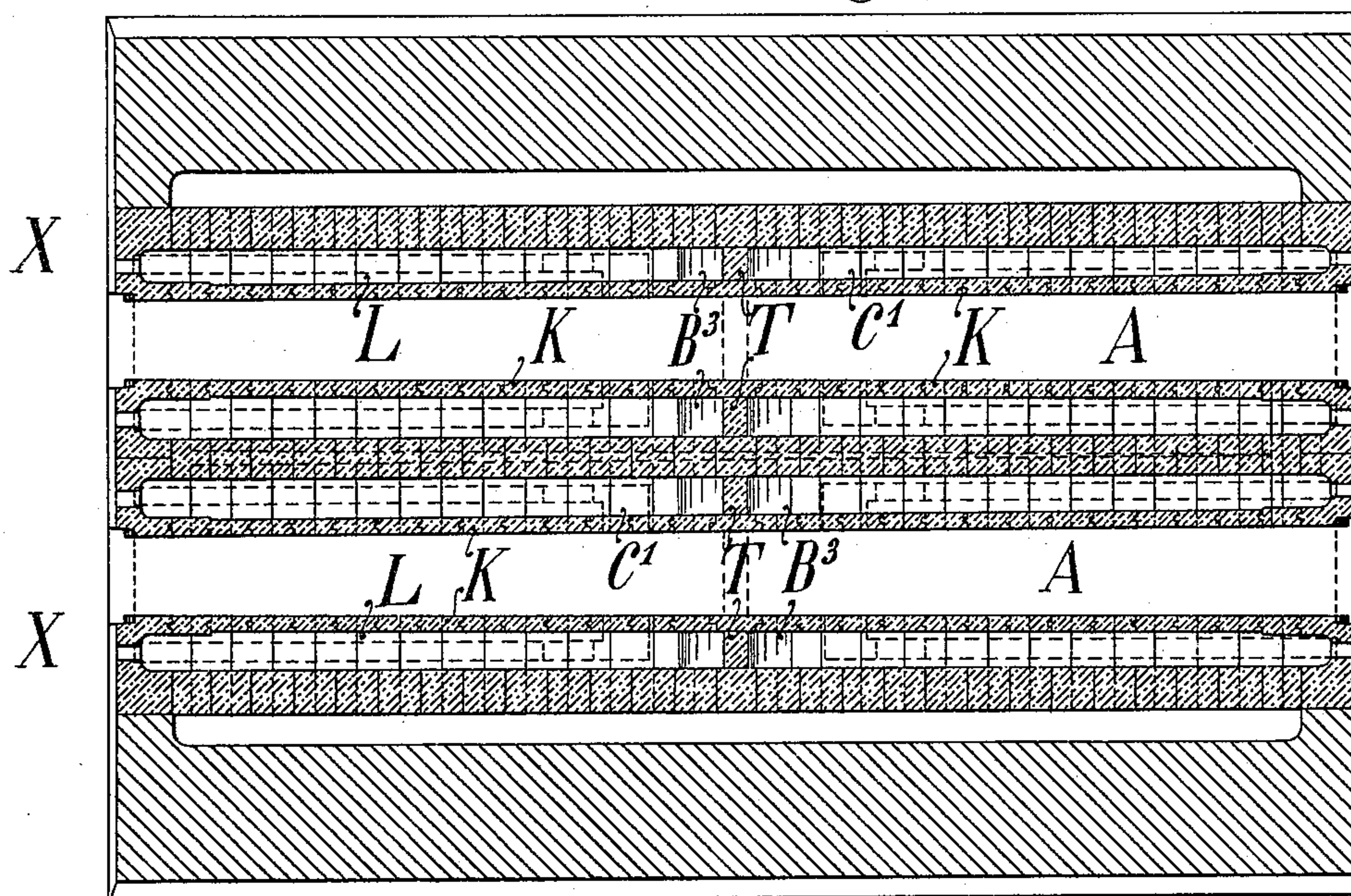


Fig: 3



Witnesses:

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Inventor:

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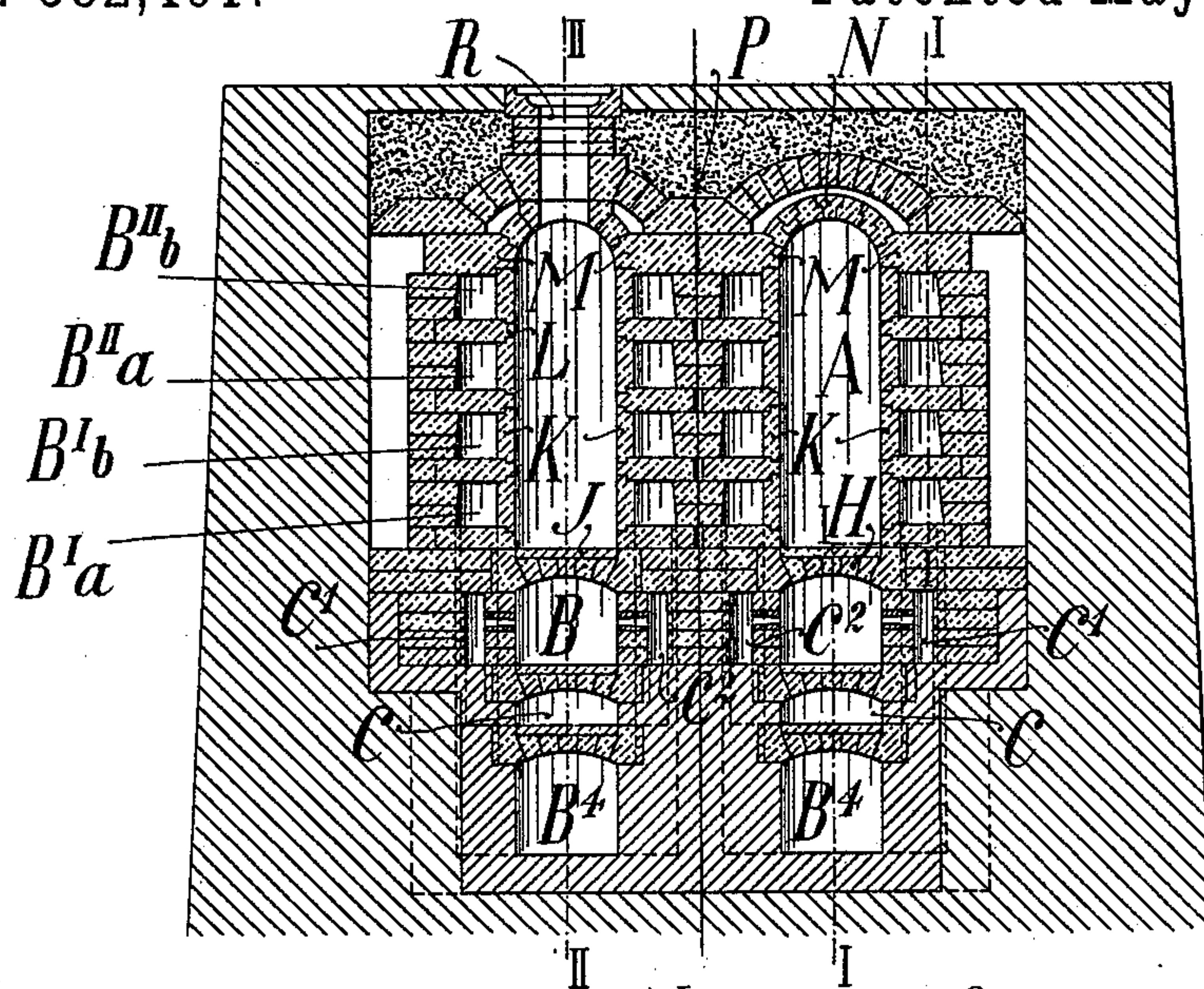


Fig: 2

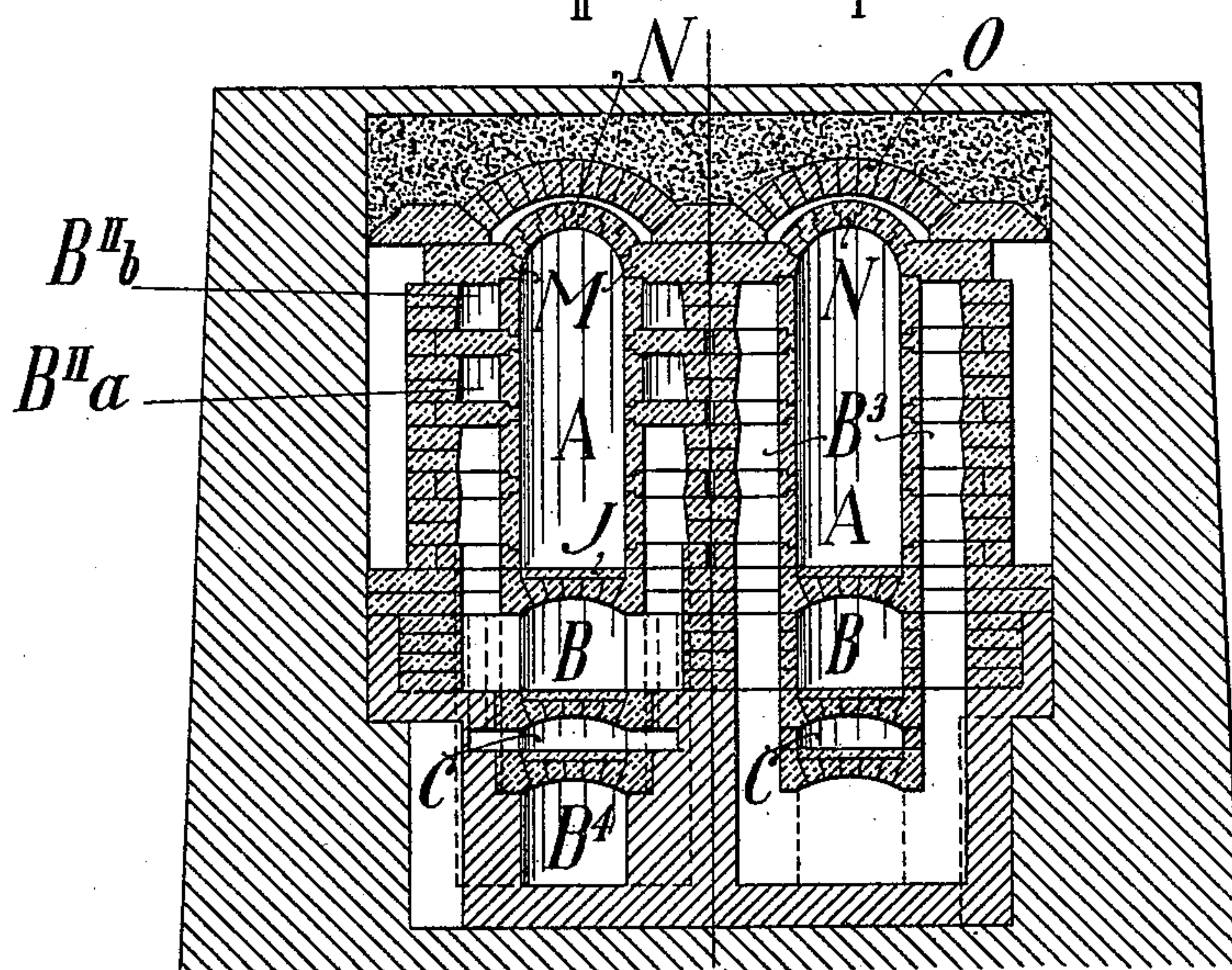
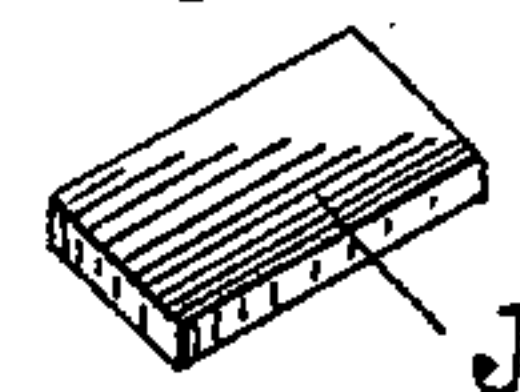


Fig: 4

Fig. 5



Witnesses.

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UNITED STATES PATENT OFFICE.

HUGO STINNES, OF MÜLHEIM-ON-THE-RUHR, GERMANY.

COKE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 582,491, dated May 11, 1897.

Application filed March 17, 1896. Serial No. 583,629. (No model.)

To all whom it may concern:

Be it known that I, HUGO STINNES, a subject of His Majesty the Emperor of Germany, and a resident of Mühlheim-on-the-Ruhr, Rhenish Prussia, Germany, have invented a new and useful Improvement in Coke-Furnaces, of which the following is a specification.

My invention relates to improvements in gas-fired coke-furnaces with outlets for delivering the gas and other by-products of coal-distillation for subsequent use; and it has for its objects to arrange the furnace, its chambers, and the flues heating these chambers in such a way that the products of distillation may serve as well for heating the coke-furnace itself as for subsequent use in other apparatus or for lighting purposes.

It consists in building up the coking-chamber with heating-flues at the bottom and at the sides and in providing such air-admitting and air-heating flues that the best utilization of the heating-gas is obtained and that the flues during the process may be controlled and inspected, and, finally, that repairs in the most exposed parts of the interior of flues and distilling-chamber may be made without disturbing the neighboring parts in the furnace and in the flues and without necessitating the pulling down of other parts of the furnace.

The accompanying drawings represent my invention, showing in Figure 1 a vertical longitudinal section of the furnace, left part along line I I and right part along line II II of Fig. 2. Fig. 2 is a vertical cross-section of the furnace, right part along line III III and left part along line V V of Fig. 1. Fig. 3 is a horizontal section along line IV IV of Fig. 1. Fig. 4 is partly a vertical cross-section along line VI VI, (left part,) partly one along line VII VII (right part) of Fig. 1. Fig. 5 is a perspective view of one of the floor-plates of the chambers A.

The coke-furnace of my invention is constructed with two systems of heating-gas flues, separated at the middle of the length of the furnace in both the heating-gas circulation-flues and in the outlet-flues for the

products of combustion of the heating-gas by the wall T, while the coking-chamber occupies the whole length uninterrupted.

The drawings represent a block of two coke-furnaces constructed according to my invention and situated one alongside the other and having each a coking-chamber A, heated not only from both their sides in their full height, but also from below by a bottom heating-flue B, which is at the same time the mixing and combustion flue for the heating-gas and the air necessary for its combustion. This air is heated previously by its contact with hot parts of the furnace during its passage to the combustion-chamber.

The heating of my coke-furnace is effected either by the gases generated in the coking process of the furnace itself or in case these gases are conducted away for other purposes by gas generated in separate generators—as, for instance, shown in dotted lines to the left of Fig. 1—and this heating-gas is introduced into a flue B, situated under the bottom of the coking-chamber. Air is admitted into a flue C and heated there by suitably-situated hot flues, and this air is led then highly heated through the passage F into the combustion-flue B. From this the heating-gases pass upward into the flues B' a, B' b, B'' a, and B'' b, which are formed in the side walls of the coking-chambers A, so that the temperature of said gases as they pass upward is gradually decreased. This way of conducting the heating-gas is taken for the purpose of expediting the process of distillation by heating the lower part of chamber A and by moderating the heating in the upper part of same in order to avoid the passage of the distillation products of the lower part of the charge in the chamber A through an upper stratum of already-finished hot coke, wherein these products would be partly decomposed.

In order to equalize the loss of heat suffered by the end faces of the furnaces, part of the highly-heated gas is conducted direct from B' a upward to B'' b along the front wall in order to heat the latter better.

The regulation of the streams of heating-gas is effected simply by narrowing the width

of the flues $B'a$ and $B'b$ and $B''a$ and $B''b$. Opposite to each of these flues there is a hand-hole B^5 in the front walls, through which fire-bricks may be introduced and laid in the flue in convenient sizes to obtain the desired reduction of area of the latter. These hand-holes or show-holes B^5 are generally closed by bricks B^6 laid loosely in them, so that at any time the process of gas-combustion may be inspected and controlled in the respective flues, and thereby the coking process regulated.

The heating-gas flows from flues $B''a$ and $B''b$ through flue B^3 downward to the chimney-flue B^4 , situated under the air-admission flue C in order to heat the air in this flue. From flue B^4 the combustion products finally take their way through flue F to the chimney.

The air necessary for combustion of the heating-gas enters the flues C , situated between the flue B above and the flue B^4 below, and having reached the middle of the furnace length it rises by side passages upward into flues C' and C'' , situated at both sides of and parallel to the combustion-chamber B , into which the air is introduced by the openings or twyers G in the side walls of flue B , (see Fig. 1,) and these openings or twyers are arranged in such a manner in these side walls that a greater quantity of air is entering the gas-combustion flue near to the front or ends of the furnace than in the middle part in order to produce a more energetic combustion and development of heat at these ends. In the present case this result is obtained by the twyers being placed nearer to each other at the front ends and farther apart in the interior, as shown in Fig. 1. It is obvious that the same result may be obtained by making the twyers near the front ends of greater area than those farther away from the ends. I prefer, however, the manner represented in the first instance.

The furnace is built in such a manner that the bottom plates, the side walls, the ceiling-vaults, and, in fact, all those parts which are exposed to great wear can be renewed and repaired without disturbing in a serious way the adjoining parts.

The bottom of chamber A is paved with plates J , which are arranged in such order that all the joints of the vault bricks are covered thereby throughout the whole construction. The furnace is disposed so as to exclude any straight-through joints of the bricks in the separating-walls between the flues or the exterior walls. The side walls of the flues and coking-chambers mainly consist of fire-brick plates K , jointed to each other with groove and fillet and set between rows of rabbeted tiles L , which equally are jointed closely with groove and fillet and form the horizontal separating-layers between the flues $B'a$ $B'b$ $B''a$ $B''b$, so that they can be renewed or replaced at any time.

The top of the upper side flues is covered

with bonding-tiles M , which support the upper construction and especially the fire-brick ceiling-vault, made of vault-bricks N , molded so that no straight-through joints go through the vaulting, but all joints are in broken lines.

The top consoles M support the molded bricks P , shaped so as to carry the outer protecting-vault O , arched at a certain distance above the ceiling-arch N , leaving an air-space between the said vaults.

The coking-chambers of the furnace are filled from the top by the feeding-holes R .

The products of distillation or the gases generated leave the coking-chamber by uptakes S in the ceiling-arch, to which are connected in suitable way the pipes or other conducts (not shown in the drawings) for these gases. The finished coke is pushed out of the coking-chamber from the front side X by a suitable machine in known manner.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a coke-furnace arranged for utilizing the gas produced in coking for heating or for lighting purposes, in combination with a coking-chamber A , combustion-channels B below the chamber A and divided midway by a wall T , air-heating channels C below the combustion-channels, chimney-flues B^4 below the air-heating channels, air-conducting channels C' C'' situated sidewise and parallel to the combustion-channels, twyer-like holes G admitting the heated air from the channels C' C'' into the combustion-channel and being placed nearer together at the ends of the furnace than in the middle; channels $B'a$ and $B'b$ conducting the hot gases emanating from the end of the combustion-channel toward the front, return-channels $B''a$ and $B''b$ leading said gases backward and into descending channels B^3 and into the said chimney-flues B^4 , the whole as described and for the purpose specified.

2. In a coke-furnace arranged for utilizing the gas produced in coking for heating and lighting purposes, the combination of a coking-chamber A , combustion-channel B , air-heating channels C , chimney-flues B^4 , air-conducting flues C' C'' , heat-conducting channels $B'a$ $B'b$, $B''a$ $B''b$, with exchangeable sole-plates J in the coking-chamber, side plates K jointed together by groove and fillet, rabbeted bonders L , molded consoles M and zigzag-molded arch-bricks N the whole as described and for the purpose specified.

3. In a coke-furnace arranged for utilizing the gas produced in coking and the by-products for heating and lighting purposes the combination of a coking-chamber A , combustion-channels B , air-heating channels C , chimney-flues B^4 , air-conducting flues C' C'' , heat-conducting channels $B'a$, $B'b$, $B''a$, $B''b$

exchangeable sole-plates J, side plates K having groove and fillet, rabbeted bonders L, molded consoles M, zigzag-molded arch-bricks N with molded supporting-bricks P and an
5 outer protecting-vault O leaving an air-space between itself and the arch of molded bricks N over the coking-chamber, the whole as de-

scribed and illustrated and for the purpose set forth.

HUGO STINNES.

Witnesses:

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FRITZ ATHÖWER, Jr.