

No. 673,928.

Patented May 14, 1901.

F. W. C. SCHNIEWIND.  
REGENERATIVE COKE OVEN.

(Application filed Oct. 22, 1900.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 2.

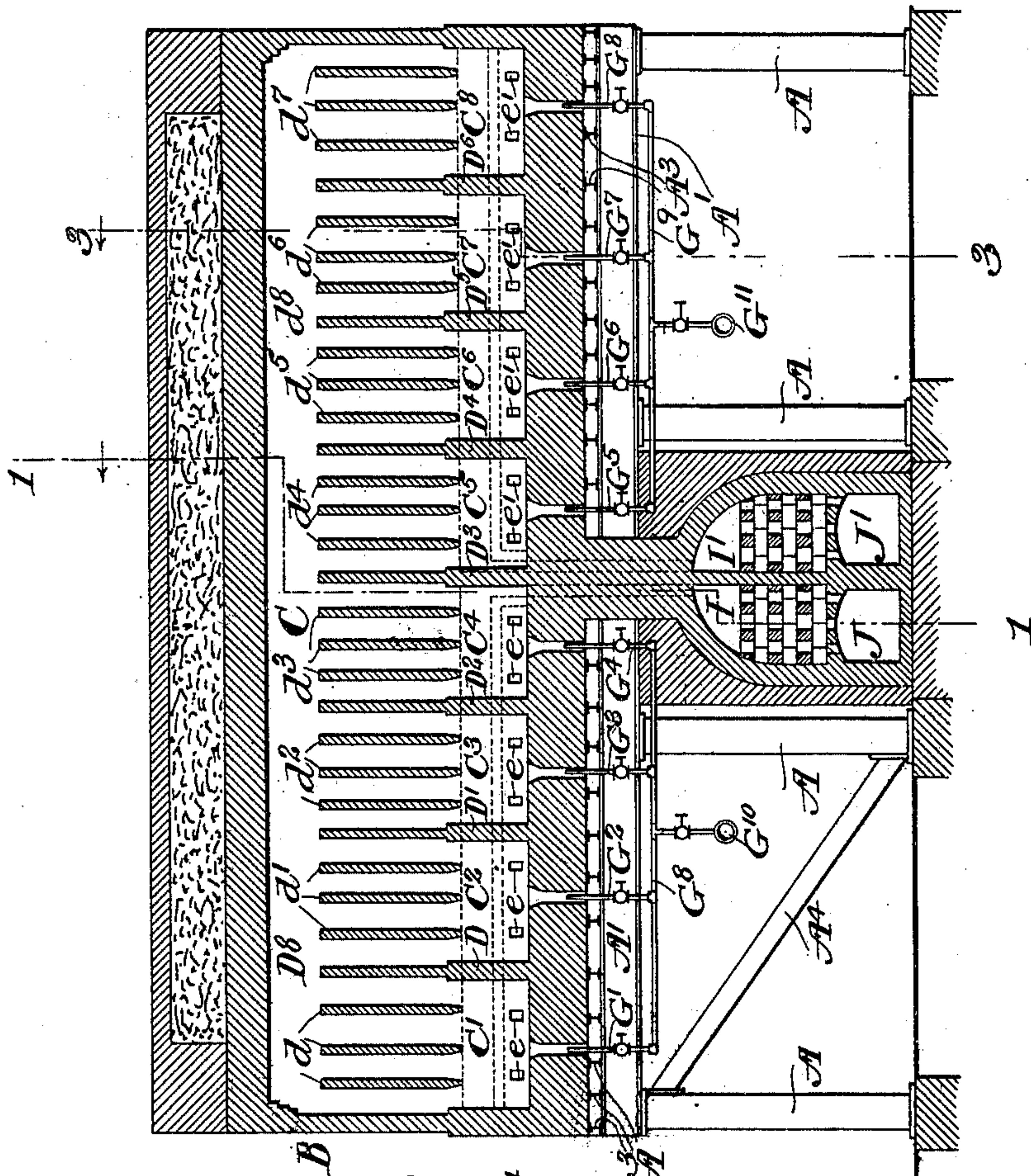
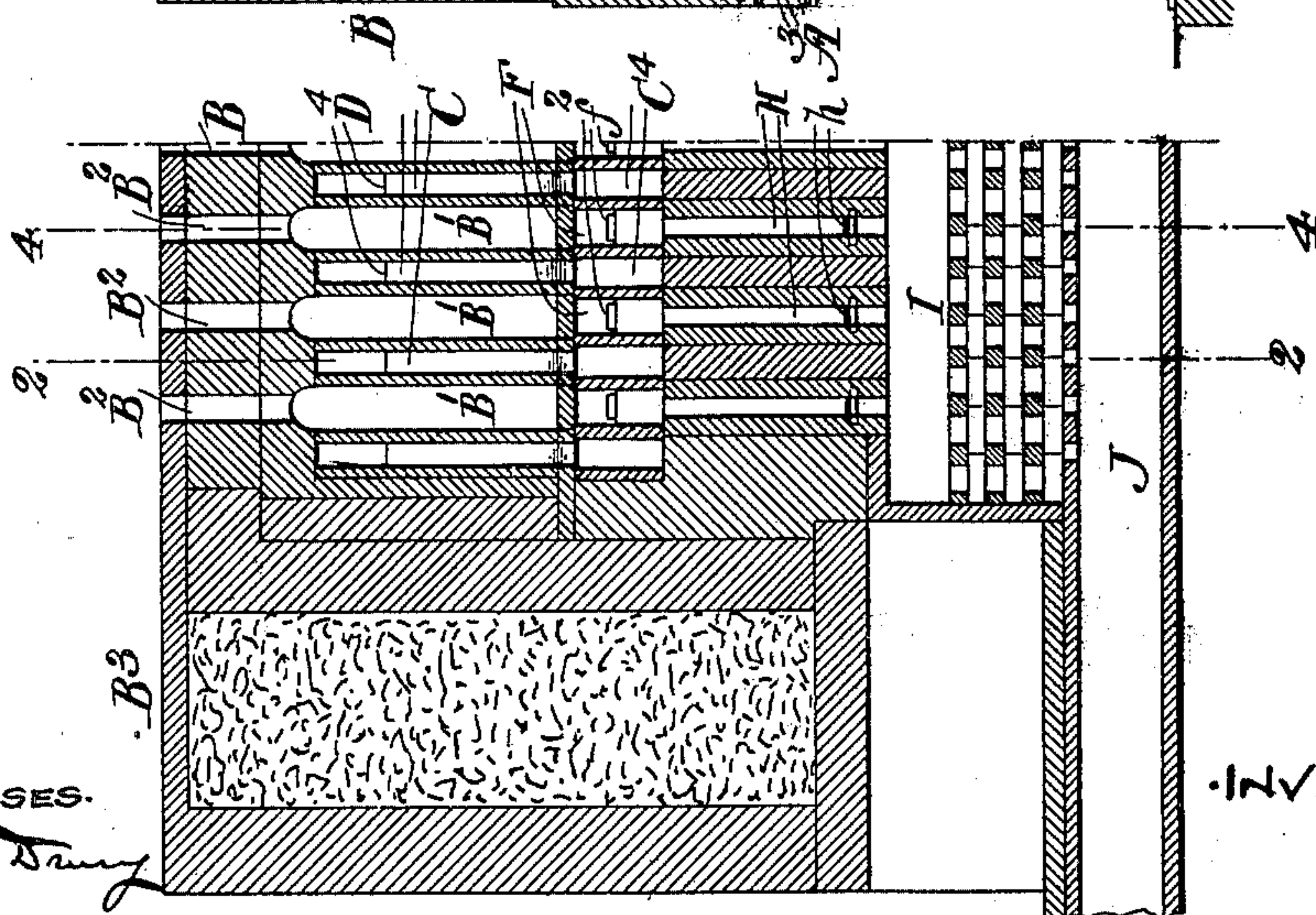


FIG. 1.



WITNESSES.

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*Francis W. C. Schniewind*  
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FIG. 4.

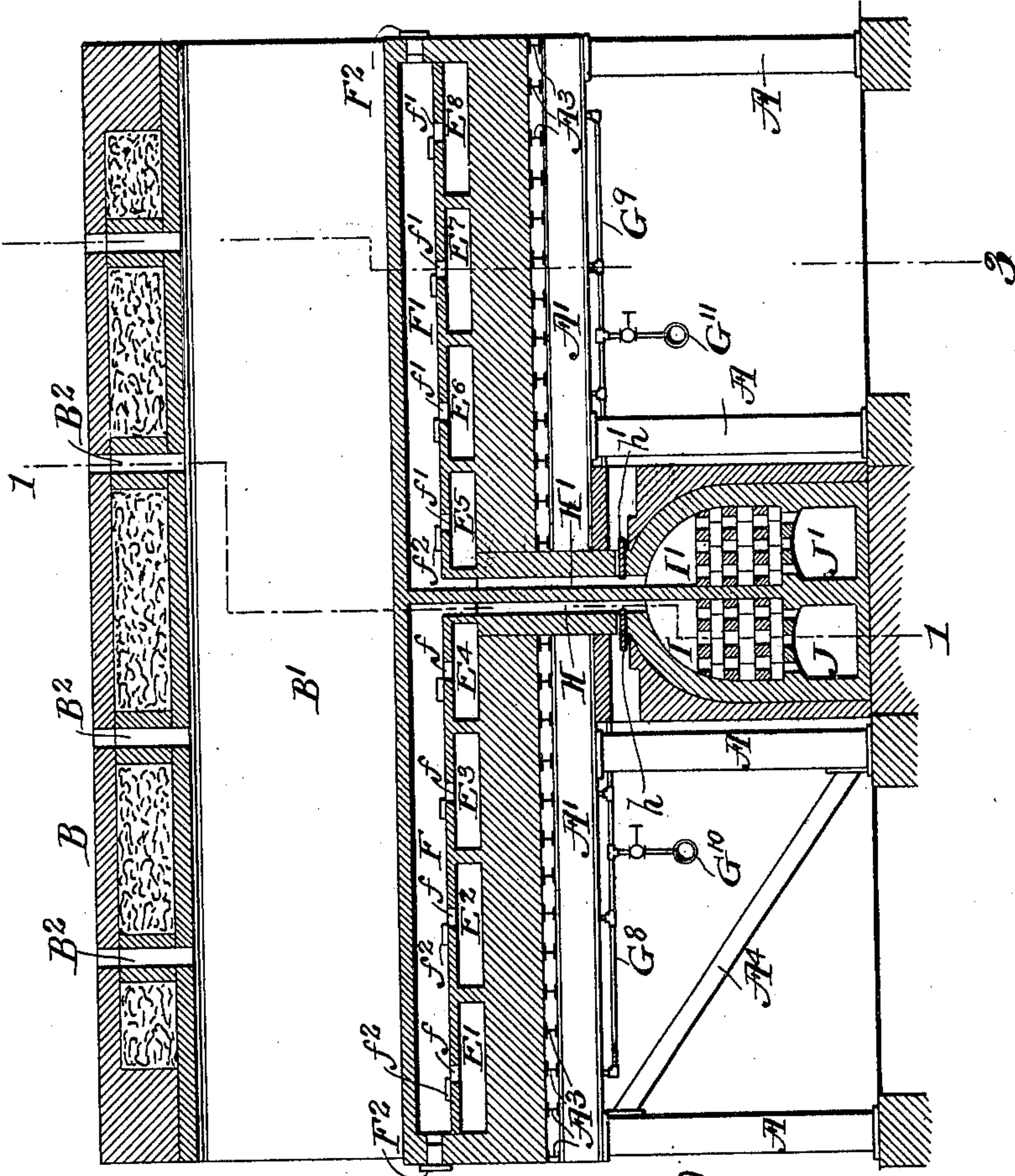
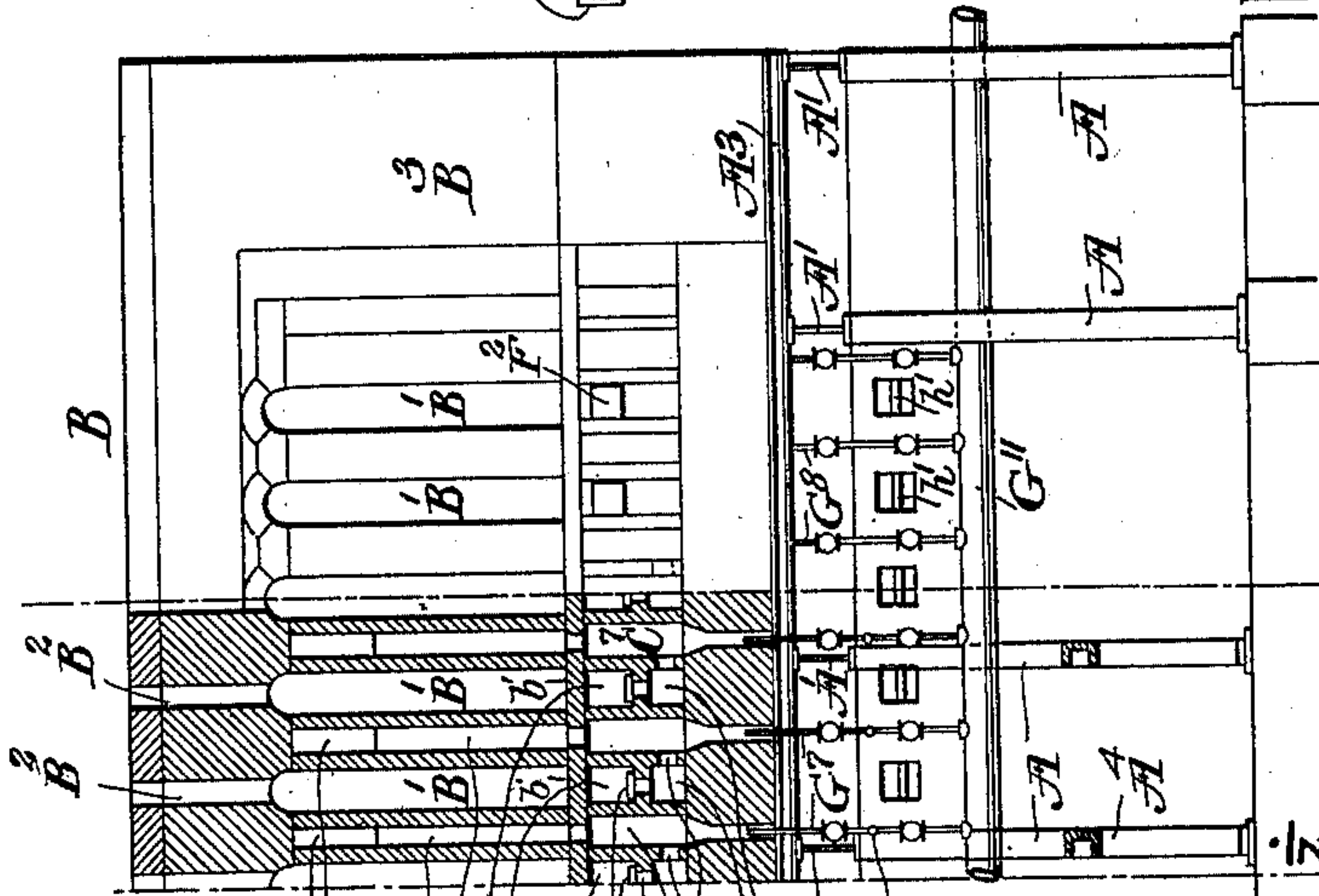


FIG. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## REGENERATIVE COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 673,928, dated May 14, 1901.

Application filed October 22, 1900. Serial No. 33,926. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERIC WILLIAM CHARLES SCHNIEWIND, a citizen of the United States of America, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Regenerative Coke-Ovens, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to horizontal open-ended coke-ovens provided with a regenerative system of heating, and has for one object to provide an oven of this type of great heat economy and one of great rapidity of coking action, further objects of my invention being to improve the general structure, so that operatives can at once see cracks in the masonry causing leaks, and, without exposure to undue heat, get at its parts for repair and necessary manipulation.

The nature of my improvements will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a section through one end of a series of ovens, the section being taken on the line indicated at 1 1 of Figs. 2 and 4. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 is an end view, partly in section, on the line indicated at 3 3 in Figs. 2 and 4; and Fig. 4 is a cross-section on the line 4 4 of Fig. 1.

A A, &c., indicate a series of vertical columns, directly supporting cross-beams, (indicated at A<sup>8</sup> and A<sup>2</sup>), said cross-beams in turn supporting a platform (indicated at A<sup>3</sup>) and made up, preferably, of a series of I-bars set close together, as shown. This platform supports the masonry of the ovens, and in order to brace the structure against the thrust of the pushing apparatus by which the coke is forced out of the ovens I prefer to provide on the side at which the pusher acts angular braces, as indicated at A<sup>4</sup>, connecting adjacent inner and outer columns A, said braces being set in the direction of the thrust to prevent any dangerous racking of the metal structure.

B indicates the masonry of the coke-oven

structure, B' B' indicating the horizontal open-ended ovens formed in the masonry, and B<sup>2</sup> indicating the flues for the escape of gas, which of course are connected with the main, &c., (not shown,) in the usual way. At B<sup>3</sup>, Fig. 1, I have shown the ordinary structure of the end of the bank of ovens.

C (see Figs. 1 and 2) indicates the flue-space, arranged between the walls of each adjacent pair of ovens, the lower part of this flue-space being divided into a series of combustion-chambers (marked C' to C<sup>8</sup>, inclusive) by vertical partitions D' D<sup>2</sup>, &c. The upper part of each of the combustion-chambers is preferably divided into a series of flues by vertical partitions, as indicated at d d', &c., or other flue-partitions may be used, and all of the combustion-chambers communicate at top with the horizontal flue-spaces, (indicated at D<sup>8</sup> and d<sup>8</sup>.)

E' E<sup>2</sup> E<sup>3</sup>, &c., indicate a series of chambers situated to one side of each series of combustion-chambers and corresponding in number and arrangement with said combustion-chambers, with which they communicate through passages, (indicated at e.) These chambers E' E<sup>2</sup>, &c., communicate through passages indicated at f f' with one of the two flues indicated at F and F', the openings f and f' being independently regulable, as by means of adjustable tiles f<sup>2</sup>, so that the passage of air and gas between the connecting chambers and flues can be regulated at will. The flues F and F', which lie directly beneath the bottoms b' of the ovens, communicate through the flue-passages H and H' with the regenerative chambers I and I', which in turn communicate through flues J and J' with the stack (not shown) or source of air-supply, the connection being made by any of the well-known reversing devices for this purpose.

G' G<sup>2</sup>, &c., indicate gas-burners or supply-pipes, one entering each of the chambers C' C<sup>2</sup>, &c., said burners being connected through pipes G<sup>8</sup> and G<sup>9</sup> with supply-mains G<sup>10</sup> and G<sup>11</sup>. Each of the burners should be provided with an independent regulating-valve, as indicated, and each group of the burners, supplied by the pipe G<sup>8</sup> or G<sup>9</sup>, is also provided with a regulating-valve.



The ovens are charged in the usual way and in use are heated as follows: Gas is turned on into the group of chambers indicated at C' to C<sup>4</sup>, inclusive, and air admitted through the regenerator I and flues H and F to the group of chambers indicated at E' to E<sup>4</sup>, inclusive, from which chambers the air passes through the openings *e* into the corresponding combustion-chambers C' to C<sup>4</sup>. The burning gas ignited in these chambers passes upward through the flues, through the combustion-chambers, into the horizontal flue D<sup>8</sup>, and thence into the continuation of this flue (indicated at *d*<sup>8</sup>) and down through the flues *d*<sup>4</sup>, *d*<sup>5</sup>, *d*<sup>6</sup>, and *d*<sup>7</sup> into the combustion-chambers C<sup>5</sup> to C<sup>8</sup>, escaping thence through the openings *e*' into the group of chambers marked E<sup>5</sup> to E<sup>8</sup>, from which the products of combustion pass through the opening *f*' into the flue F', and thence into the flue H' into the regenerator I', finally escaping to the stack through the flue J'. At intervals the action of the heating device is reversed, the gas being shut off from the group of chambers C' to C<sup>4</sup> and admitted to the group of chambers C<sup>5</sup> to C<sup>8</sup>, the air of course being then drawn from the regenerator I' and passing in the reverse direction into the regenerator I.

At *h* and *h*' I have indicated valves for regulating the flow of air and gas through the flues H and H', and I would call attention to the fact that my regenerators are supported independently of the oven structure and of the metal columns and are preferably arranged, as shown, along the center line of the oven structure, so as to give free access for the air and the operatives beneath the ovens on both sides.

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

1. In combination with a series of horizontal externally-heated coke-ovens having heating-flues, as C, situated between their walls and partitions, as D, D', D<sup>2</sup>, &c., dividing said flues into a series of combustion-chambers connected at top by flue-passages, as D<sup>8</sup>, *d*<sup>8</sup>, a series of gas-burners, as G' G<sup>2</sup>, &c., supplying said combustion-chambers with gas, a pair of regenerators, as I, I', and flues, as H F and H' F', connecting each regenerator with a group of the combustion-chambers as specified and so that heated air is supplied by one regenerator to one group of combustion-chambers and the products of combustion drawn through the other group of chambers into and through the other regenerator.

2. In combination with a series of horizon-

tal externally-heated coke-ovens having heating-flues, as C, situated between their walls and partitions, as D, D', D<sup>2</sup>, &c., dividing said flues into a series of combustion-chambers connected at top by flue-passages, as D<sup>8</sup>, *d*<sup>8</sup>, a series of gas-burners, as G', G<sup>2</sup>, &c., supplying said combustion-chambers with gas, a pair of regenerators, as I I', a series of chambers E' E<sup>2</sup>, &c., one connecting with each of the combustion-chambers, and flues, as H F and H' F', connecting each regenerator with a group of the chambers E' E<sup>2</sup>, &c., and through said chambers with a corresponding group of the combustion-chambers and independently-regulable means for regulating the passage of air and gas to and from the chambers E' E<sup>2</sup>, &c., as specified and so that heated air is supplied by one regenerator to one group of combustion-chambers and the products of combustion drawn through the other group of chambers into and through the other regenerator.

3. A series of coke-ovens with heating-flues situated between adjacent ovens built up of masonry supported above the ground on metal columns in combination with a pair of regenerators connected with the heating-flues of the ovens said regenerators being situated beneath the ovens and supported on the ground independently of the columns aforesaid.

4. A series of coke-ovens with heating-flues situated between adjacent ovens built up of masonry supported above the ground on metal columns in combination with a pair of regenerators connected with the heating-flues of the ovens, said regenerators being situated beneath the centers of the ovens and supported on the ground independently of the columns aforesaid.

5. A metal platform, as A<sup>3</sup>, a series of vertical columns supporting the same above the ground, a series of angular braces A<sup>4</sup> connecting said columns on one side and set in the direction of the thrust of the coke-discharging pusher, in combination with a masonry structure supported on the metal platform comprising a series of coke-ovens with interspaced heating-flues and a pair of regenerators supported on the ground independently of the columns, said regenerators being set side by side along the middle of the series of ovens and connected with the heating-flues.

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Witnesses:

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