

(No Model.)

2 Sheets—Sheet 1.

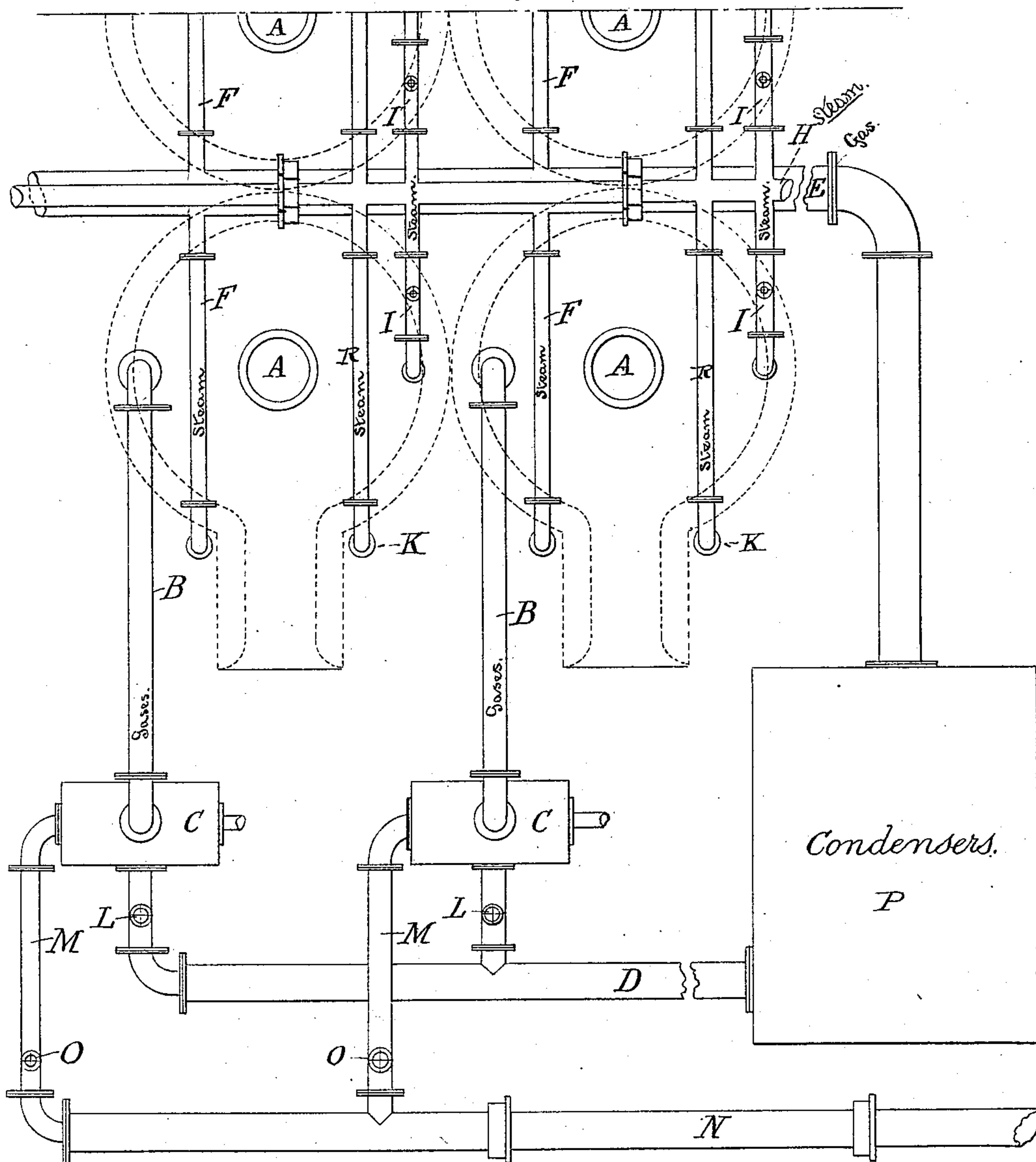
T. NICHOLSON.

APPARATUS FOR COKING AND COLLECTING THE RESULTING GASES AND  
THEIR PRODUCTS.

No. 308,514.

Patented Nov. 25, 1884.

Fig. 1.



Witnesses:

Geo. B. Horch  
J. C. Turner

Inventor  
per. Thos. Nicholson  
R. D. Smith  
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(No Model.)

2 Sheets—Sheet 2.

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THEIR PRODUCTS.

No. 308,514.

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Fig. 2.

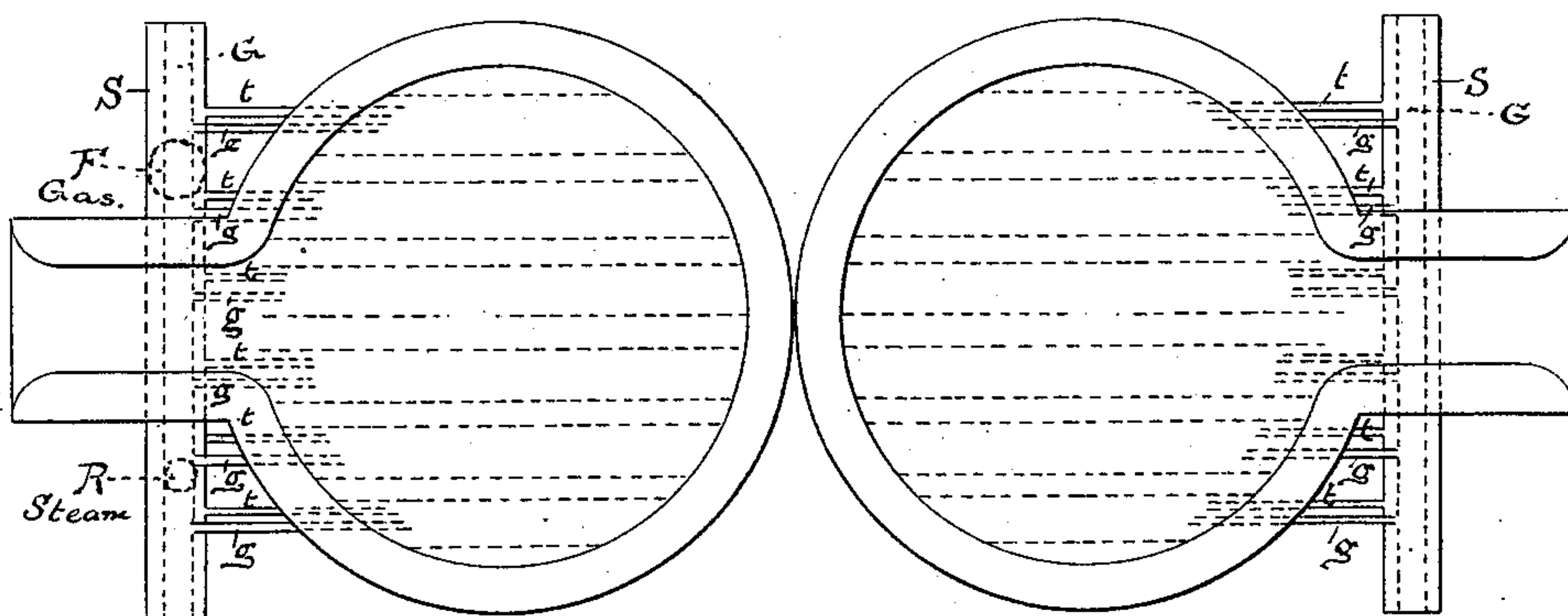
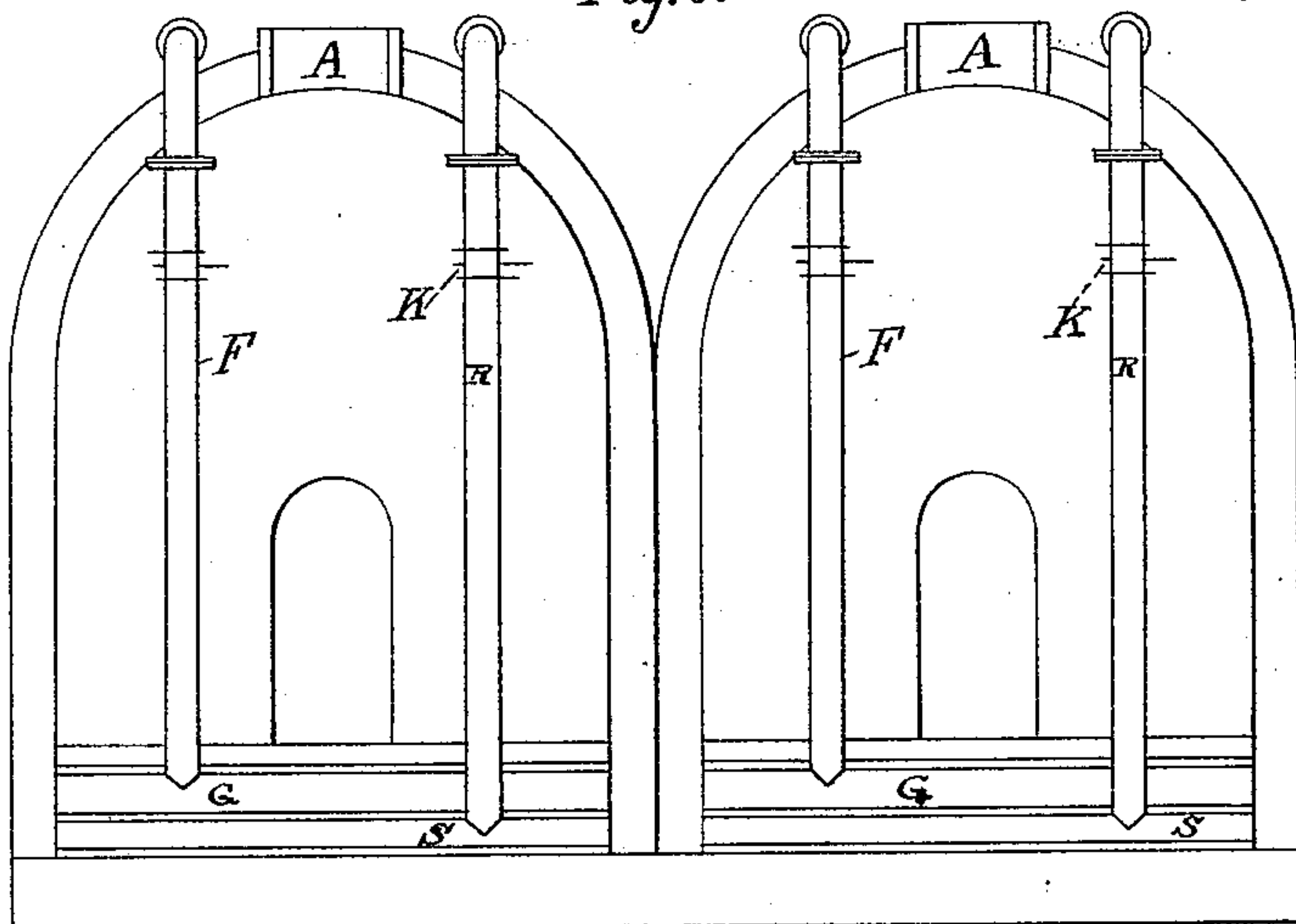


Fig. 3.



Witnesses:

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# UNITED STATES PATENT OFFICE.

THOMAS NICHOLSON, OF HOOLE, COUNTY OF CHESTER, ENGLAND.

APPARATUS FOR COKING AND COLLECTING THE RESULTING GASES AND THEIR PRODUCTS.

SPECIFICATION forming part of Letters Patent No. 308,514, dated November 25, 1884.

Application filed April 23, 1884. (No model.) Patented in England January 2, 1884, No. 358; in France February 11, 1884, No. 160,242; in Belgium February 11, 1884, No. 64,118, and in Spain June 9, 1884, No. 3,971.

*To all whom it may concern:*

Be it known that I, THOMAS NICHOLSON, a subject of the Queen of Great Britain, residing at Hoole, in the county of Chester, Great Britain, have invented an Improvement in Apparatus for Coking and Collecting the Resulting Gases and their Products, of which the following is a specification.

To carry out my invention I construct or adapt ovens, kilns, or furnaces of suitable size and shape with interstices in and flues underneath the bottom. To the top of these I add pipes to receive the gases and convey them through boxes partly filled with coke and liquor into a main pipe connected with a condensing plant similar to that employed at gas-works to collect the tar and ammoniacal liquor. After the tar and ammoniacal liquor have been extracted I return the gases through another set of pipes and use them to give light and heat. A portion of these condensed gases I use to ignite the charge and to sustain the greatest heat at the bottom of the ovens, kilns, or furnaces. The remainder I pass on to be used under steam-boilers or elsewhere, as may be required. To obtain illuminating as well as heating gas, I add an additional range of pipes and collect the gases separately. The position of the pipes is immaterial so long as they receive the gases unburned. I prefer a long narrow oven, but both the ordinary beehive and square ovens can be altered at little cost to suit my purpose. To avoid a vacuum, which would create outside pressure and be liable to introduce air, I keep the top of the oven filled with steam. In cases where it is not convenient to introduce steam directly into the oven the introduction of a small quantity of water will answer the same purpose.

In the manufacture of coke it is desirable to produce as much ammonia as possible, and at the same time to extract the sulphur from the coke, and to this end I cool off the coke by causing steam to pass upward through the charge when the process of carbonization is completed. The usual method of coking is to make the ovens work downward; but in carrying out my invention I reverse this and make the ovens, as well as all kilns and furnaces, work from the bottom upward, and I draw off the

gases above the material in process of carbonization. In this way I avoid the double draft, which has been found objectionable in other ovens with bottom flues.

This invention can be adapted also to kilns or furnaces for burning lime or bricks or smelting ores, and other such like purposes. By these several arrangements I obtain, first, more work from the ovens, kilns, or furnaces in a given period of time; second, an extra profit from the gases and their products; third, illuminating-gas as well as heating-gas, and in the case of coke-ovens, fourth, more coke and less breeze.

The annexed drawings will enable the complete operation to be fully understood. Fig. 1 is a plan view. Fig. 2 is a plan view. Fig. 3 is a front elevation.

After charging the ovens in the usual way the opening A is closed, and the gases as evolved pass through the pipes B (drawn by the action of any ordinary exhaustor) into and through the boxes C, which are partly filled with coke or other rough material and gas-liquor to cleanse them and to prevent their clogging the exit-main D. They then pass through the main D to an ordinary condensing plant P, consisting of an exhaustor, condensers, and scrubbers, and afterward return by the main pipes E to the ovens, and onward wherever they may be required. To the pipes E, I add smaller pipes, F, which convey the gas to the bottom flues, G, from which distributor-pipes g conduct the gases into the bottom of the oven, where they are ignited to fire the charge and give more heat to the oven generally. Pipe H carries steam from boilers to the ovens, and by the pipe I steam from the pipes H is kept playing upon the top of the charge to fill the space in the top of the oven and to prevent the gases burning. To complete the process of coking the steam must be withdrawn from the top of the oven during the last few hours; but when that is done I open the valve K in the steam-pipes R and admit steam to the bottom flues, S, and distribution-pipes t, through which it enters the coke and is drawn upward by the force of the exhaust, carrying with it any sulphur and ammonia that remain in, and at the same time cooling



off the charge. When this has been done, valve L is closed and the oven is discharged in the usual way. Where illuminating-gas is required I add the pipes M and N to the box C. I then pass the illuminating-gas into the main flue D, as already described, and then close the valve L and open the valve O to cause the non-illuminating gases to pass into the gas-main N and on through a condensing plant and return-main, which are merely a counterpart of those already shown.

The annexed drawings show an oven of the bee-hive form; but ovens of other shapes, lime-kilns, and calcining-furnaces can be arranged to work in the same way.

What I claim, and desire to secure by Letters Patent, is—

1. The coking-oven and pipe B, leading therefrom, combined with main D, and the branch pipe M, and main N, provided, respectively, with valves L and O, and separate condensers, whereby early products or illuminating-gas may be separated from the later product or heating-gas and separately treated, as set forth.

2. The coking-oven, the pipes B D, and the

condenser P, combined with the box C, interposed in the pipe B, and filled with coke and other rough material to extract the tar and gas-liquor before the gas reaches the condenser, as set forth and described.

3. A coking-oven combined with two condensers, and an outlet-pipe provided with a branch and separate valves, whereby the gaseous product may be separated or graded as to quality and separately purified, as set forth.

4. The coking-oven combined with a steam-pipe, H, having branches R and I leading into the bottom and top of said oven, respectively, for the purpose of injecting steam therein, as set forth.

5. A coking-oven combined with pipe B, to convey away the gaseous product, pipes E and H, with their branches F R, flues G and S, and the distribution-pipes *g* and *t*, whereby gas and steam are respectively supplied to the bottom of said oven, for the purpose set forth.

THOMAS NICHOLSON.

Witnesses:

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