F. TSCHUDY.

METHOD OF PREVENTING DEPOSITION OF CARBON IN REVERSING FURNACES.

APPLICATION FILED JUNE 17, 1911.

1,093,895. Patented Apr. 21, 1914.

2 SHEETS—SHEET 1.

Fig. 1

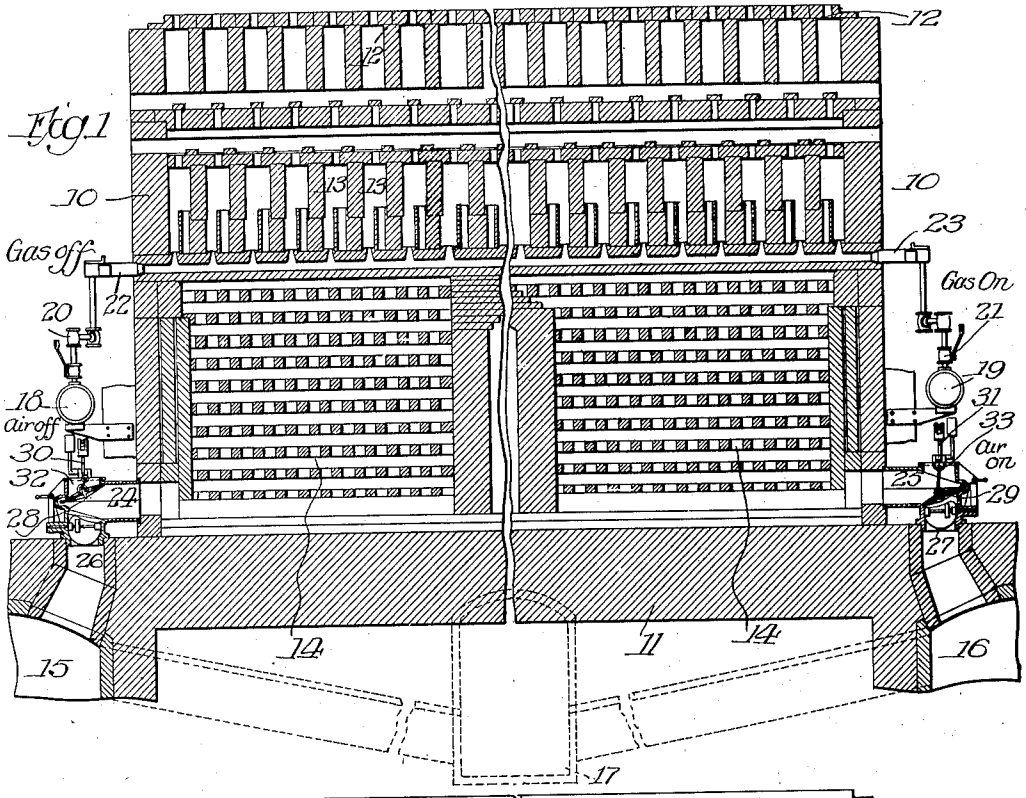

Fig. 2

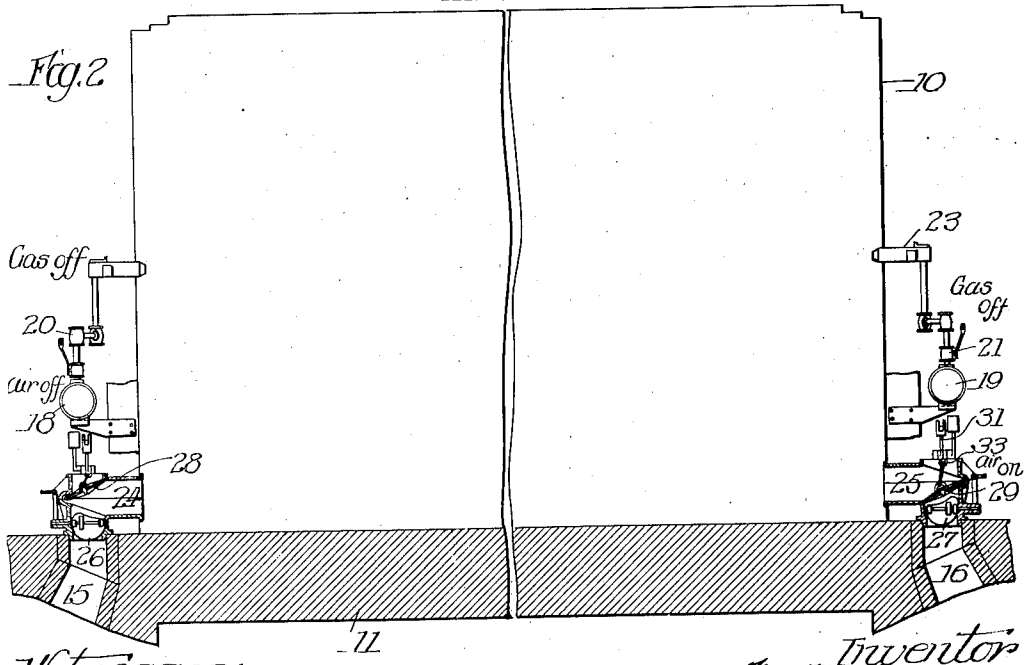

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Fig. 3

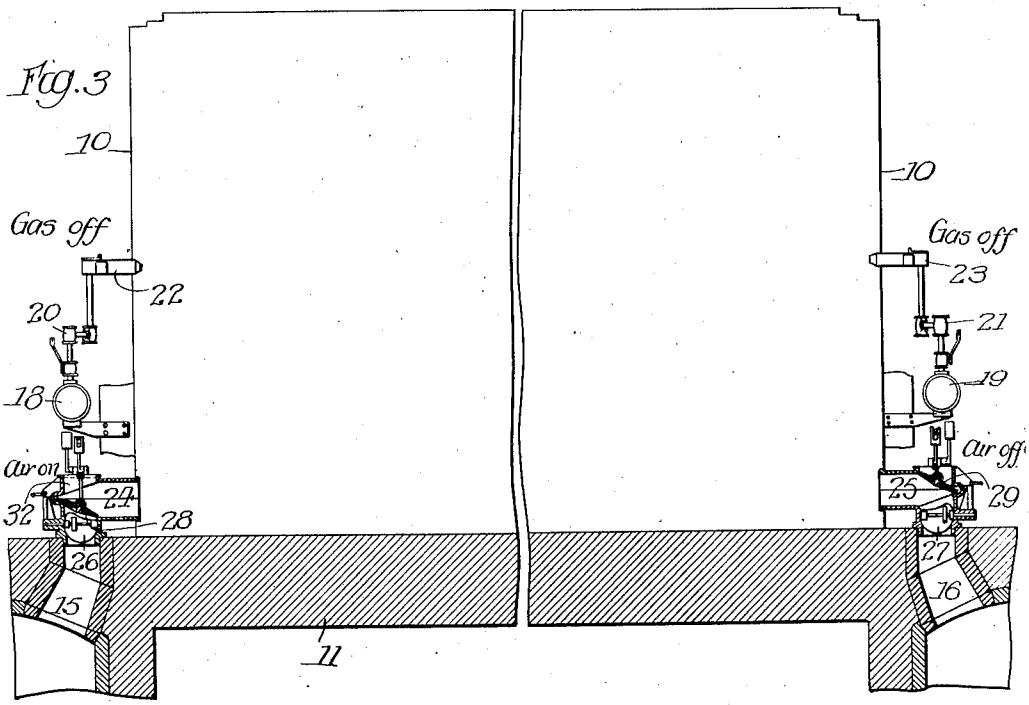
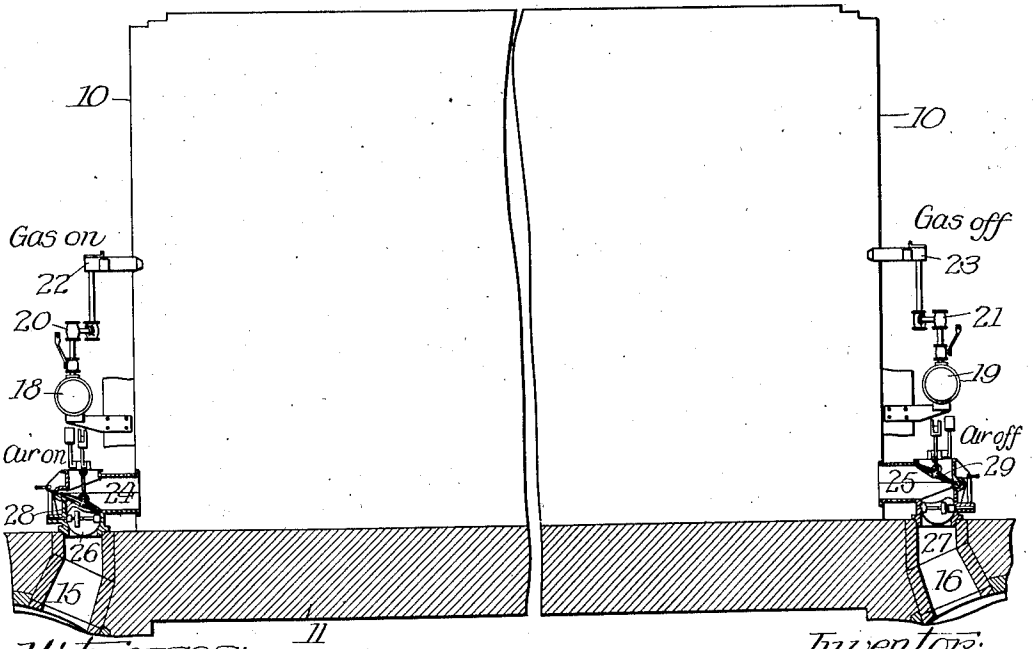


Fig. 4



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UNITED STATES PATENT OFFICE.

FREDERICK TSCHUDY, OF BIRMINGHAM, ALABAMA.

METHOD OF PREVENTING DEPOSITION OF CARBON IN REVERSING-FURNACES.

1,093,895. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed June 17, 1911. Serial No. 633,883.

To all whom it may concern:

Be it known that I, FREDERICK TSCHUDY, a citizen of the United States, and resident of Birmingham, county of Jefferson, and State of Alabama, have invented certain new and useful Improvements in Methods of Preventing Deposition of Carbon in Reversing-Furnaces, of which the following is a specification.

My invention relates to regenerative reversing furnaces and has particular reference to a method of preventing deposition of carbon on the checker work and flues of such furnaces.

In the operation of the regenerative reversing furnaces, it will be understood that the air and sometimes gas are pre-heated, before mixture and ignition, by being passed through checker work previously heated by the outgoing products of combustion. After the entering gas and air have passed through the pre-heated checker work for a specified length of time, the furnace is reversed, the products of combustion passing through the checker work through which the incoming air and gas have previously passed. It is the common practice to reverse the air and gas practically simultaneously with the result that certain of the products of combustion, on their way to the stack, are arrested and come in contact with the incoming gas with the resultant soot or carbon deposits. This is particularly true where coke gas is used as the heating agent, such gas containing a larger percentage of free carbon.

As is well known, the deposition of soot or free carbon on refractory materials intended to conduct or store heat, acts as an insulator and prevents the normal acquisition of heat units by the refractory body. Not only this, but such carbon deposits affect the normal life of the refractory body and when permitted to accumulate make renewals necessary at much shorter intervals than would otherwise be required. I have discovered that this deposition of carbon may be avoided and the consequent ill effects overcome by a novel method of reversing such furnaces. This method consists broadly in the steps of first discontinuing the supply of gas from the incoming side of the furnace, permitting the air to pass freely through the stack, then subsequently shutting off the supply of air from that side and substantially simultaneously admitting air from the reverse side of the furnace, allowing it to pass through to the stack, then subsequently admitting the gas from that side of the furnace. While mechanism may be devised for carrying out these steps automatically, the operations may be performed manually in their proper sequence. I have, therefore, not deemed it necessary to show mechanism for reversing the different valves. I have, however, in order to make my invention clear to those skilled in the art, prepared a series of views, partly diagrammatic in nature, to which reference may be had.

While I have shown, in the accompanying drawings, my invention as applied to a regenerative reversing by-product coke oven, it will be understood that the method may be carried out in any regenerative reversing furnaces.

In the drawings Figure 1 is a longitudinal section through regenerative reversing by-product coke oven, showing the details of the air valve, the checker work and the heating flues, and Figs. 2, 3 and 4 are similar views, the details of the brick work being omitted, showing different positions of the valves during the different steps of my novel method.

Referring more particularly to the drawings, it will be seen that in Fig. 1, I have shown a regenerative by-product coke oven of well known construction. In this oven there are walls 10, base 11, and a roof member 12. Between the walls 10 are provided heating flues 13, the checker work 14, being located thereunder. Stack flues 15 and 16 are provided on each side, having feeders communicating with the main stack flue 17. Gas mains 18, 19 are provided on each side of the furnace there being valves 20, 21 and gas inlet nozzles 22, 23. Mounted below the gas main, I provide two-way inlet valves having connections 24, 25 with the interior of the furnace and connections 26, 27 with the stack flue. These openings are controlled by valve members 28, 29 operable by means of links 30, 31 connected thereto. Air inlet openings 32, 33 communicate with the apertures.

It will be understood that although I have shown preferred mechanism for carrying out my improved method, other mechanism may be employed than that herein shown. I will now proceed to a description of the novel method as herein claimed.

As shown in Fig. 1, air is being admitted to the furnace through the air inlet opening 33 and gas through the gas valve 21. Assuming that it is desired to reverse the operation of the furnace the gas supply is discontinued by means of the valve 21, as shown in Fig. 2, the air being permitted to continue its passage through the furnace. After a short space of time, the air valve 29 is operated shutting off the air inlet port and opening the port 27 of the stack. Simultaneously the valve 28 is shifted closing the port 26 and opening the air inlet port 32. In this way air is allowed to pass both ways through the furnace checker work, thus effectually clearing the checker work of all products of combustion. This reversal of the air inlets is shown in Fig. 3. After a short space of time, as shown in Fig. 4, the gas is admitted through the gas valve 21 and the normal operation of the furnace resumed. Each subsequent reversal of the furnace will be carried out in the same manner.

As heretofore stated, my novel method may be carried out in furnaces having valves operated either manually or otherwise whereby the steps of my novel method may be followed, the method being dependent upon no mechanism or function of mechanism.

I claim:

The method of heating air regenerative coke ovens consisting in supplying air to a regenerator and fuel to a combustion chamber from one side, then discontinuing the supply of fuel to the combustion chamber and permitting the stack draft to withdraw the products of combustion through the previously heated regenerator, then simultaneously reversing the flow of air through the regenerators and cleaning the regenerators of any remaining products of combustion and the carbon residue, then supplying fuel to the combustion chamber on the opposite side of the furnace.

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