

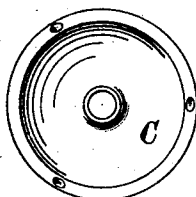
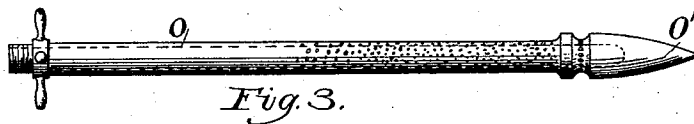
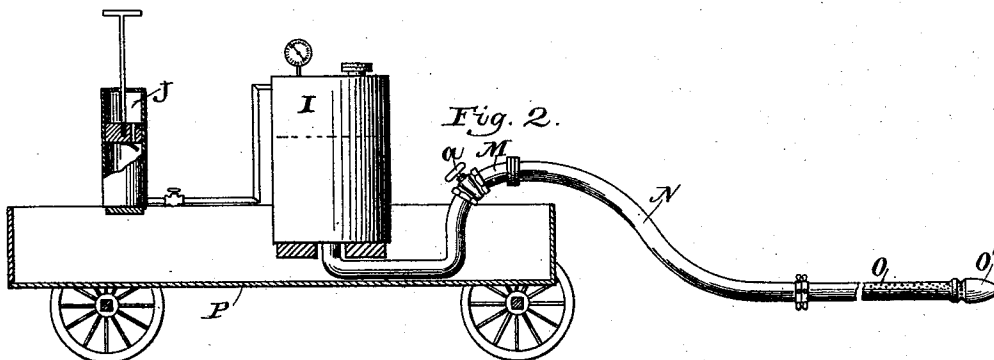
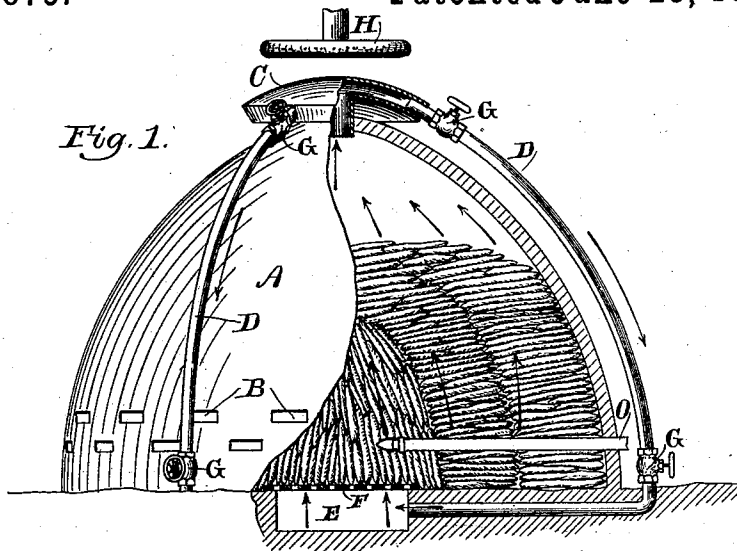
(No Model.)

A. VICKERS.

METHOD OF ARRESTING AND EXTINGUISHING COMBUSTION IN
CHARCOAL KILNS.

No. 477,875.

Patented June 28, 1892.



WITNESSES:

E. Rawson.
N. J. Hayes

Fig. 4.

INVENTOR:

Albert Vickers
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ATTYS.

UNITED STATES PATENT OFFICE.

ALBERT VICKERS, OF BALTIMORE, MARYLAND.

METHOD OF ARRESTING AND EXTINGUISHING COMBUSTION IN CHARCOAL-KILNS.

SPECIFICATION forming part of Letters Patent No. 477,875, dated June 28, 1892.

Application filed February 16, 1891. Serial No. 381,580. (No model.)

To all whom it may concern:

Be it known that I, ALBERT VICKERS, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented a certain new and useful Improvement in the Method of Arresting and Extinguishing Combustion in Charcoal-Kilns, of which the following is a specification.

In the manufacture of charcoal as now practiced after the firing has continued up to the proper point the kiln is hermetically sealed and allowed to stand for a number of days—say eight or ten—in order that the fire may be extinguished and the kiln cooled to a degree permitting its being opened with safety for removal of the charcoal. This period allowed for extinguishing combustion is nearly equal to the time consumed in filling and burning the kiln, so that if the extinguishing process be quickened and cut down, say, to only one or two days' duration a great saving results by reason of the increased output of the kiln in a given time. Another source of waste in the present process is the inevitable consumption and reduction to ash of a portion of the charcoal, arising from the present inability to arrest combustion quickly after carbonization to the proper extent has been attained. Appreciating these objections incident to the process of manufacture now in vogue, I have invented an improved method for arresting and extinguishing the combustion in a comparatively short time, and I do this by introducing into the kiln, when the carbonization has reached the desired point, a substance decomposable into non-combustible gases under the action of the heat and carbon in the kiln, which gases circulate throughout the mass of charcoal and extinguish combustion with remarkable rapidity. Heretofore attempts have been made to accomplish this end by injecting carbonic-acid gas generated and collected in suitable retorts exterior to the kiln. This process, however, is inefficient and necessitates an expensive plant for generating the carbonic-acid gas, all of which I do away with, simply introducing, as I do, the gas-producing substance into the kiln and relying upon the heat and carbon therein to decompose the same and generate the desired gases.

My method may be carried into effect in a

number of ways, one of which is illustrated in the accompanying drawings, wherein—

Figure 1 shows a charcoal-kiln partly broken away; Fig. 2, an apparatus for the introduction of the fire-extinguishing chemical into the kiln. Fig. 3 is a detail view of the pipe or other conveyer used, and Fig. 4 a plan view of the cooling-dome at the top of the kiln.

In the views, A represents a charcoal-kiln provided with vents B, in the construction of which there is nothing peculiar or original. In the top of the kiln there is fitted a pipe communicating with a dome C, from which lead out a desired number of pipes D, terminating in a pit E at the bottom of the kiln and separated therefrom by a grating F. Valves G in these different pipes may be opened or closed at will. These pipes are designed to furnish a circulating system for the gases generated by my process hereinafter described, and, if desired, a sprinkler H may be employed to throw water upon the dome, keeping it cool, and thereby cooling the gases circulating therethrough.

Referring now to Fig. 2, I represents a tank or reservoir containing sulphuric acid or like liquid, which will be decomposed to form gases having the desired properties. This liquid may be put under pressure by an air-pump J, and it is delivered from the tank through a pipe M, fitted with a valve *a*, the pipe preferably including a flexible section N. To the end of the flexible section N there is attached a metal perforated pipe or other conveyer O, which has a solid shoe or leader O', of somewhat greater diameter, which forces a passage for the pipe through the charcoal and leaves a loose space around it, permitting the spraying of the liquid through the perforations without clogging. For convenience of transportation the reservoir and air-pump are shown, and usually will be, mounted on a truck P; but this, of course, is not an essential part of my invention.

The mode of procedure will now be described, laying particular stress upon the use of sulphuric acid as the extinguishing substance, for in my experiments I have found this much superior to anything else tried, and therefore recommend it, though the same results may be accomplished to a degree with

other substances. When the firing has reached a proper point, the pipe O is inserted through one of the vent-holes, reaching a considerable distance into the mass of glowing charcoal, as shown. The valve *a* is opened and the air-pressure forces the sulphuric acid previously stored in tank I through the conveyor, causing it to be sprayed through the perforations in pipe O upon the charcoal. By the action of the heat and carbon present in the kiln the acid is almost instantaneously decomposed, forming carbon dioxide, sulphur dioxide, and steam ($H_2O + CO_2 + SO_2$). These gases ascend through the charcoal, and as all three are non-combustible (meaning thereby that they tend to extinguish and prevent continued combustion) the kiln can be extinguished, cooled, and consequently opened in a very short time as compared with that consumed in the ordinary process of to-day. The gases rising to the top of the kiln pass into the dome C and thence are returned to the bottom of the kiln through pit E and grating F, thereby keeping up a continuous circulation, which insures the gases reaching quickly every portion of the mass of charcoal. The cooling effect of the dome, if simply exposed to the air, is found sufficient to keep up the circulation; but preferably it is sprayed with water to cool the gases to a considerably lower temperature than would otherwise be the case, so that, in addition to the function performed in extinguishing combustion, they also cool off the kiln itself. The pit E is so made that ashes or broken coal falling into it through the grating will not obstruct or clog the pipes.

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

40 1. The method of arresting combustion in

charcoal-kilns after firing has reached the desired point, which consists in introducing from outside the kiln into the interior of the mass of burning coal sulphuric acid or like substance decomposable into non-combustible gases under the action of the heat and carbon present, as set forth. 45

2. The method of arresting and extinguishing combustion in charcoal-kilns, which consists in introducing sulphuric acid into the kiln in contact with the glowing coal when the firing has reached the desired point, whereby said acid is decomposed into non-combustible gases acting to extinguish combustion. 50

3. The method of arresting and extinguishing combustion in charcoal-kilns, which consists in introducing into the kiln after firing has reached the desired point sulphuric acid or like liquid decomposable into non-combustible gases under the action of the heat and carbon present and causing the said generated gases to circulate continuously through the charcoal from top to bottom of the kiln. 60

4. The method of arresting and extinguishing the combustion in charcoal-kilns, which consists in introducing into the kiln after firing has reached the desired point sulphuric acid or like liquid decomposable into gases under the action of the heat and carbon present, causing said generated gases to circulate continuously through and around the kiln and cooling them by exposure to a cooling medium while being returned from top to bottom of the kiln. 70

In testimony whereof I have hereto set my hand. 75

ALBERT VICKERS.

Witnesses:

GEO. R. BLODGETT,

N. F. HAYES.