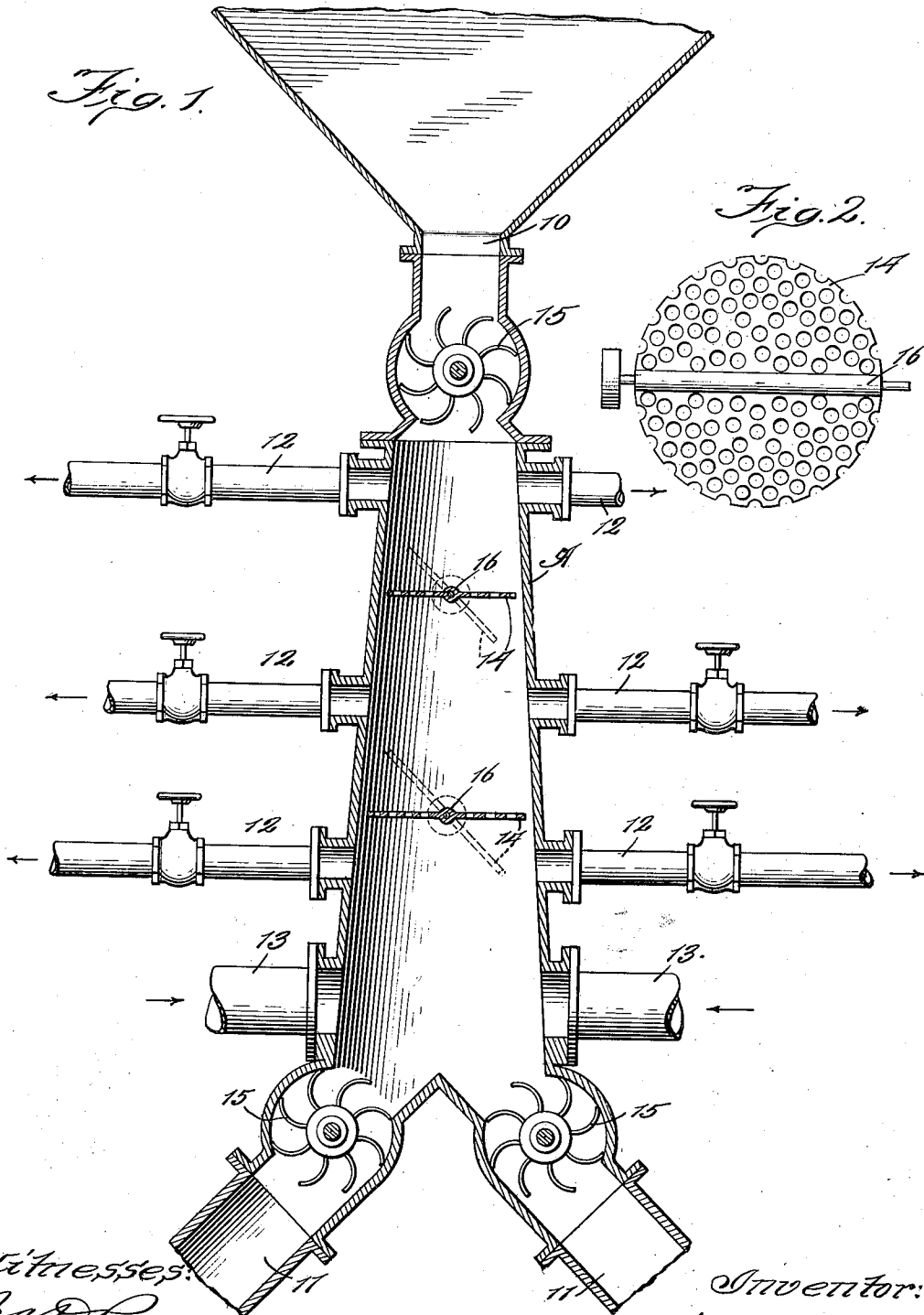


H. G. STONE.
 COKING FURNACE.
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1,243,776.

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COKING-FURNACE.

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To all whom it may concern:

Be it known that I, HORACE G. STONE, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Coking-Furnaces, of which the following is a specification.

The object of my invention is to extract most of the volatile matter from coal and other carbonaceous materials without extracting the carbon, thus leaving a residuum rich enough in carbon and hydro-carbon to burn without heavy draft, which makes a very desirable and improved fuel.

Other objects and advantages of the invention will be apparent as it is better understood from the following description when considered in connection with the accompanying drawing illustrating a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a vertical section through my device, and Fig. 2 is a plan view of one of the perforated grates used therein.

A. is the distillation chamber divided into two or more compartments.

10 is the opening where the coal or other carbonaceous materials are fed into the chamber through air excluding devices.

11 is the opening where the residuum is taken from the chamber through air excluding devices.

12 are the openings where the uncondensable gas and volatile matter or by-products are taken from the chamber through mechanical devices controlling the discharge to which devices exhausters may be attached.

13 is the place where the hot gas enters the chamber.

14 are the grates which divide the distillation chamber into compartments.

15 are air excluding devices through which the material passes in and part of it passes out of the distillation chamber.

16 are the horizontal axles of the grates to which the motive power is attached.

The principal objects in distilling coal and other carbonaceous materials are twofold; first, to obtain the by-products; second, to obtain good fuel.

To produce such fuel, heat is necessary; and if free oxygen (or air) is not excluded, the carbon will burn and hence no fuel be produced.

No "process" for producing the desired result is of any account without the necessary

apparatus to carry it out, since the most correct "process" would avail nothing if the coal be put into a bonfire in an open field; hence, the all-important thing is the apparatus, the use of which will produce the desired result.

In my invention I build a distillation chamber smaller at the top than at the bottom, divided into compartments, producing substantially the equivalent of two or more chambers on top of each other.

I divide said distillation chamber into two or more compartments, one above the other. I make this division with a dumping grate or a grate revolving on a horizontal axle so that from time to time the coal can be dropped from any compartment into the one below it. To prevent clogging, each compartment may be emptied before the one above it is emptied. In lieu of said grate, slides or movable or hinged shelves, or other movable devices, can be used. Said grate has openings or flues in it and at the sides of it, so that heat or gas can pass from one compartment to another. The size of said openings or flues will be according to the character and condition of the coal in that compartment, so that the amount of heat or gas coming up from below can be regulated. In this way each compartment will be a zone with heat at different temperature from that in the other compartments or zones. The coal coming in at the top will first enter the zone of lowest temperature, which will liberate light volatile matter, and then pass down into zones of higher temperature, which will liberate heavier volatile matter. The light volatile matter is extracted from the coal and may pass out before the coal reaches the lower compartments where the heavy volatile matter is liberated, and hence the light volatile matter comes out much cleaner.

In operation the coal is fed into the top compartment through air-excluding devices. All the compartments are filled. Hot gas enters at the bottom of the lowest compartment; as it strikes and penetrates the coal it gets cooler, and when the heat gets into the chamber above, it is still lower in temperature and when it reaches the top chamber it is cooled to say about 200 degrees, F. so that when fresh coal enters the top chamber it encounters a zone of say 200 degrees. Then it goes to the next zone or compartment below, which has a higher temperature,

and so on, until the bottom chamber or zone is reached, where the temperature is, say about 1,000 degrees.

It will thus be seen that the coal passes through zones of different temperature, ranging from about 200 degrees at the top, to about 1,000 degrees at the bottom, and the temperature of these zones is regulated by the size of the openings or flues in or adjoining the grates which separate the compartments.

When distillation is completed, in the lower compartment or zone, what remains there is taken out of that compartment through air-excluding devices, and the material in each of the other compartments passes down by the opening of the grates into the next compartment below, and the top compartment is again filled, and so on.

The distillates and uncondensable gas are drawn out of the different compartments through openings in the sides thereof, with or without the aid of exhausters; said openings being provided with mechanical means for controlling the discharge of the distillates and uncondensable gas, and the carbon and part of the heavy hydro-carbons pass out with the residuum, enriching it and producing the improved fuel, which is the object of my invention.

All the openings into and out of the distillation chamber are protected by mechanical devices to prevent an excess of free oxygen or air from entering that chamber.

It will be manifest that various changes may be made in the form, construction and

arrangement of the parts without departing from the spirit and scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

Apparatus for distilling coal or other carbonaceous material including a distillation chamber having an opening located at the upper portion thereof for the passage into the chamber of material to be distilled; means at said opening for preventing admission of an excess of air or free oxygen into the chamber while material is being passed thereinto through said opening, said chamber also having an opening at its base through which coke is discharged; means at said latter opening for preventing admission of an excess of air or free oxygen into the chamber while coke is being passed from said chamber through the latter opening; means for admitting high temperatured gas into the chamber near the base thereof; a plurality of perforated dampers and means for removing products of combustion from the space above each of said dampers; said chamber also having an opening in the upper part thereof through which products of distillation are discharged.

In testimony whereof, I affix my signature in presence of two witnesses.

HORACE G. STONE.

Witnesses:

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