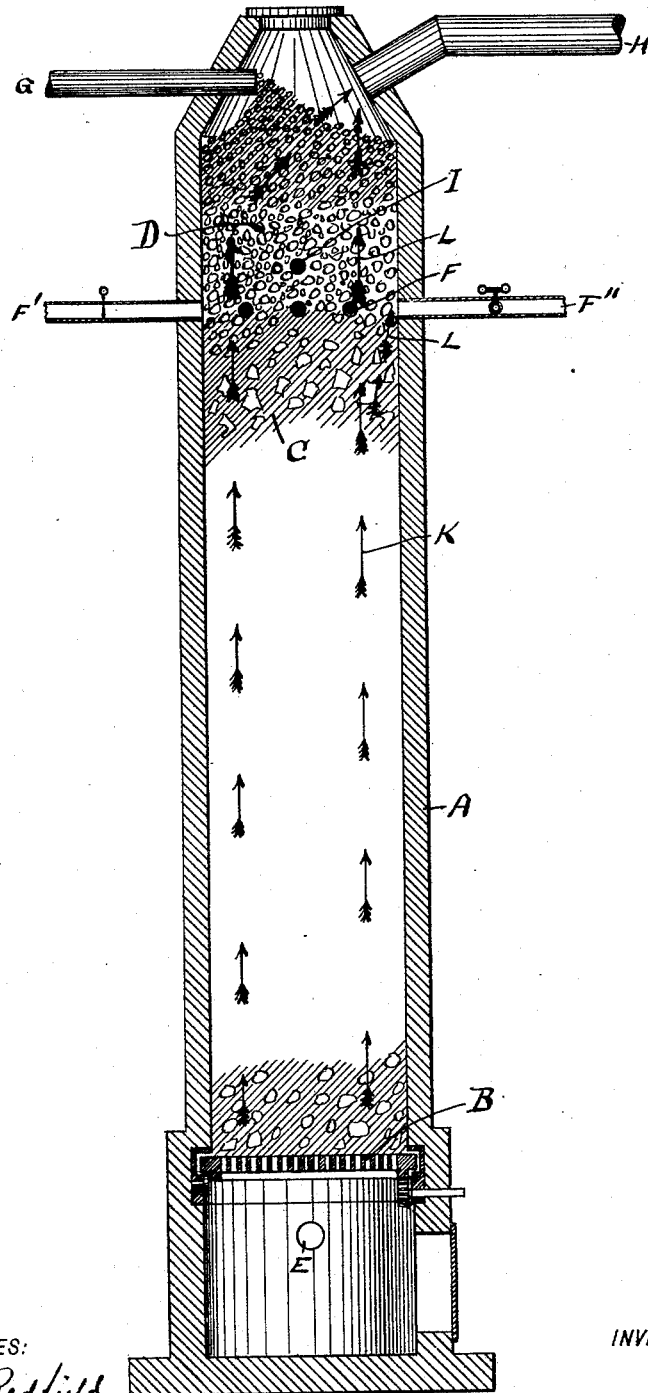


(No Model.)

E. L. RANSOME.
BURNING CITY REFUSE.

No. 524,687.

Patented Aug. 14, 1894.



WITNESSES:

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ERNEST LESLIE RANSOME, OF OAKLAND, CALIFORNIA.

BURNING CITY REFUSE.

SPECIFICATION forming part of Letters Patent No. 524,687, dated August 14, 1894.

Application filed November 6, 1893. Serial No. 490,183. (No model.)

To all whom it may concern:

Be it known that I, ERNEST LESLIE RANSOME, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Burning City Refuse; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to cool the burned residue of the refuse within the furnace in which it is burned.

I carry out this invention in the furnace illustrated in the accompanying drawing, which is a vertical section of the furnace.

A is the wall of the furnace, B the hearth or revolving grate, C the burned contents of the furnace, D the active fire, E the inlet for the air, F, F, F, the outlets, F' a closed outlet, F'' an open outlet, G the fuel feed, H outlet for fuel gas, or chimney, I inlet for steam or spray, K arrow heads indicating direction of a full current of air. L arrow heads indicating direction of a reduced current of air.

By the term "city refuse" I include all semi-combustible materials that in burning leave a large residue of ashes or clinker, such as "ash-bin refuse," "garbage," "stable waste," "sweeping," and the like: also coal shale, &c. All such material under a forced draft will burn of itself without the addition of other fuel.

Under the term "clinker" I include all the solid products of combustion embracing both clinker and ashes.

The object of burning this refuse is threefold; namely, first to destroy it; second to produce heat; third to produce a "clinker" that can be utilized in the manufacture of artificial stone, or for other purposes. To accomplish this economically I have found it necessary to handle the material automatically, because compared with its weight its value is so little.

In order to make the operation automatic I make it continuous, and in making it continuous it is essential that the "clinker" should be cooled in the furnace in which it is burned.

To form a proper "clinker" and to utilize

the heat given off by the burning to the fullest extent, it is necessary that a proper quantity of air be fed to the burning mass. Too much would be detrimental. This proper quantity is not sufficient to cool the clinker to the extent desired in its passage through the furnace. I have therefore devised the method of blowing into the furnace, and through the mass of clinker, far more air than is needed for the fire, and letting out that which is not so needed through one or more outlets placed in the furnace wall below the level of the fire. This I accomplish by aid of the tall furnace previously described.

In practice, in order to give the "clinker" opportunity to cool, I build the furnace eighty feet or more in height with outlets "F" placed a little below the level of the fire.

The operation is as follows: The grate B revolves at such a rate as to pass the clinker through its meshes at about the same rate of speed as it is formed above by the fire. A large bed of this clinker, some sixty feet or more in height, is maintained on this grate, and upon the top of this clinker the fire burns. The fire is fed with the waste from above through the passage G and with air by a forced draft through passage G. The gases of the combustion escape through chimney H. The whole mass of burned and burning matter in the furnace is therefore constantly and slowly moving downward and out through the grate. Its height being, however, always maintained by the refuse that is fed in at the top, and the fire ever burning upward maintains a constant level as it is constantly leaving the burned material below it, and burning up into the unburned material above. By regulating the speed of the grate, the quantity of "clinker" leaving the furnace can be regulated, and by this means the fire can be maintained at the desired level in the furnace. This desired level is above the level of the outlets "F" which are placed some twenty-five or fifty feet from the top of the furnace. The feeding of the fire and the withdrawal of the "clinker" are continuous. A strong regular draft is forced through the passage "E" sufficient, not only for the purpose of perfect combustion at the fire "D," but to cool the column of "clinker" C. All the draft that is not required by the fire "D"

is passed out at outlets "F." There may be one or more of these outlets, and the quantity of air passing through them can be controlled at will by valves, or any other of the well known means, so that, while a steady, and in relation to the needs of the fire, an excessively large current of air is passing through the burned mass, by regulating the outgoing current below the main body of fire, the air passing through the fire can be kept at the required quantity, and can be increased or diminished at will.

By using several outlets, instead of one, the air passing through the fire can be better regulated, and to accomplish this is a part of this invention. For when several outlets are used, by closing up any one of them the zone of fire above the neighborhood of that outlet will receive an increased supply of air, and vice versa by opening out any one of the outlets; the zone of fire above the neighborhood of that outlet will be deprived of a portion of its air supply, so that, in places where the fire is too hot, it can be reduced by opening wider the adjoining or nearest outlet, and in places where the fire is too slow, it can be quickened by closing, more or less completely as the case demands, the adjoining outlet. Thus the fire can be kept under much better control than is possible with a steady and single current of air, and the necessary and proper amount of air passing through the fire can be more easily regulated to suit its varying conditions. The intake of these outlets may be situated in

any convenient position in the furnace, provided they are below the bulk of the burning active fire, and sufficiently far above the bulk of the "clinker."

For the purpose of improving the fire a spray of moisture may be forced into the furnace by means of one or more inlets "I," situated above the outlets "F," and these inlets so situated are also a part of my invention.

Having thus fully described my invention, I claim—

1. The furnace "A" having solid walls, the upper part of the chamber of said furnace constituting a combustion chamber, and the lower part constituting a clinker cooling chamber in combination with a blast pipe communicating with the furnace near the bottom thereof, and air exit pipes communicating therewith at or near the bottom of the combustion chamber.

2. The furnace "A" having solid walls, the upper part of the chamber of said furnace constituting a combustion chamber, and the lower part constituting a clinker cooling chamber, in combination with a blast pipe communicating with the furnace near the bottom thereof and air exit, and steam inlet, pipes communicating therewith at or near the bottom of the combustion chamber.

ERNEST LESLIE RANSOME.

Witnesses:

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