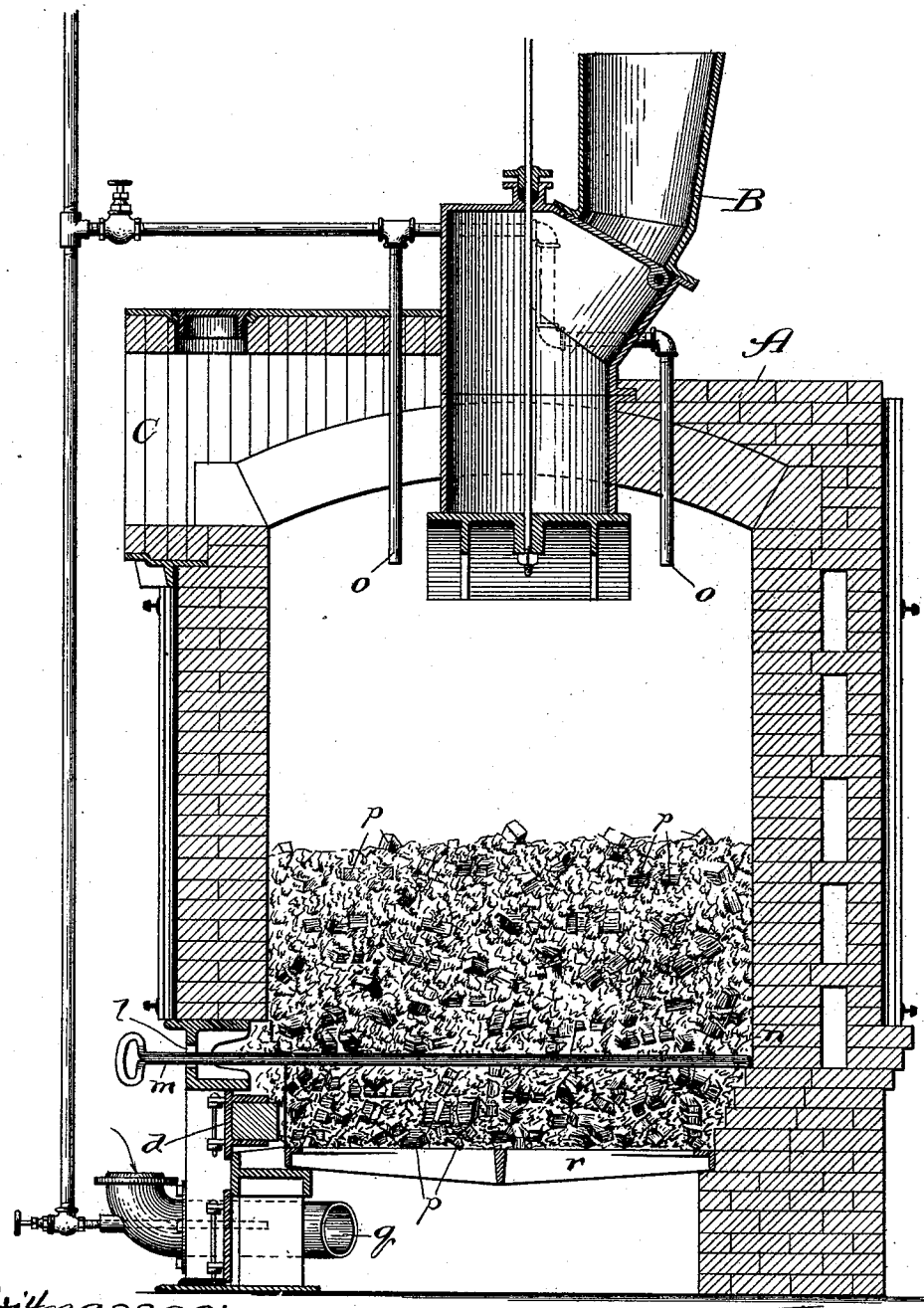
(No Model.)

W. A. KONEMAN.

METHOD OF BURNING COAL SLACK.

No. 469,859. Patented Mar. 1, 1892.



Witnesses:
Chas. E. Gaylord.
Clifford N. White.

Inventor:
William A. Koneman,
By Dyrenforth & Dyrenforth,
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM A. KONEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CHICAGO HEAT STORAGE COMPANY, OF SAME PLACE.

METHOD OF BURNING COAL-SLACK.

SPECIFICATION forming part of Letters Patent No. 469,859, dated March 1, 1892.

Application filed March 3, 1891. Serial No. 383,595. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM A. KONEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Methods of Burning Coal-Slack, of which the following is a specification.

A difficulty hitherto encountered in the use of coal-slack or mine refuse for manufacturing purposes, as for heating and gas production, and which has tended to prevent the use of this cheap form of fuel, has been that it packs or cakes in the fuel-chamber, and thus obstructs the passage through the fuel-bed of the necessary combustion-inducing oxygen, and necessitates frequent manipulation to break up the mass, which is impracticable and otherwise objectionable.

My object is to prevent such caking of finely-divided solid fuel by maintaining the bed thereof sufficiently porous to permit ready passage through it of the air-supply, thereby rendering this cheap form of fuel as convenient for use as the more expensive forms of coal. To this end I burn the fuel mixed with a suitable proportion of refractory material in a fragmentary state.

My further object is to provide for the saving, for repeated similar or other use, of the fragmentary refractory material employed for maintaining the desired porous condition of the bed of fuel.

To illustrate my improvement, I show in the accompanying drawing by a view in sectional elevation a fuel-gas producer.

A is the shell of the producer, containing the grate *r*, below which enters the air or air and steam supply pipe *q*.

B is the hopper device at the upper end of the shell, flanked by the steam-pipes *o*, for injecting steam upon the bed of fuel to entail the coating of its surface with an ash for reducing the temperature thereof and preventing loss by distillation of hydrocarbon vapors from the fresh deposits of coal from the hopper; and C is the outlet.

The fuel employed is coal-slack or mine refuse, which, prior to its introduction into the combustion-chamber, as by dumping it into the hopper, I mix with broken pieces of fire-brick *p* or other refractory material, including lime-rock, suitable proportions being about twenty pounds of the fragmentary brick to one hundred and fifty pounds of the coal. By thus mixing with the fine coal the fragmentary refractory material the latter is distributed through the bed of fuel and maintains the desired porosity thereof by preventing the fine coal from caking, and, as will be noticed by inspecting the drawing, the accumulation of the material *p* becomes more and more dense toward the bottom of the bed where it is thickest, sinking thereto by gravity, and practically forms an interstitial pile of refractory material, affording a storage for the generated heat of combustion, tending the more to promote combustion of the generated gases.

If the material *p* be, as it may, lime-rock, it should be used in a sufficiently-large proportion to avoid the formation of a slag with the ash from the coal, and then air only should be introduced from under the fuel-bed into the fire-chamber.

The advantage of using lime-rock for my purpose is that its residuum is a commercially-valuable product—namely, quicklime; besides, it yields about twelve pounds of carbon to each hundred pounds of lime-rock, which assists in generating a first-class producer-gas.

To remove the fire-brick for repeated use or the quicklime for commercial use from the base of the bed of fuel without interrupting or interfering with the operation of the apparatus, (whether it be the producer shown or any form of heater,) I provide in the back of the fire-chamber a ledge *n*, located the desired distance above the grate and forming a rest for the inner ends of bars *m*, which are inserted and removable through an opening or openings *l* in the front of the apparatus above the fuel-chamber door *d*, and which is only wide enough vertically to admit ready insertion and removal of the false-grate bars, and is to be closed by suitably plugging it after the bars have been withdrawn.

The false grate is to be adjusted in place with the opposite ends of the bars *m* resting, respectively, on the ledge *n* and opening *l* when the mixture of accumulated ashes and fragmentary material *p* require to be raked out, after which the bars are withdrawn and

the fuel above them and material *p*, mixed with it, sink down upon the grate *r*. From the matter thus raked out the fragmentary material is separated and again used if it be such as fire-brick, or is saved for commercial disposition if it be quicklime.

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

1. The method of facilitating the burning of coal-slack or mine refuse, which consists in mixing and burning it with a suitable proportion of fragmentary refractory material *p* and passing air through the mixture to promote the combustion, substantially as described.

2. The method of burning coal-slack and mine refuse to facilitate and economize in the burning thereof, which consists in mixing and burning it with a suitable proportion of fragmentary lime-rock, passing air through the mixture to promote combustion, and separating from the resultant ashes, for commercial use, the quicklime residuum of the lime-rock, substantially as described.

WILLIAM A. KONEMAN.

In presence of—
J. W. DYRENFORTH,
M. J. FROST.