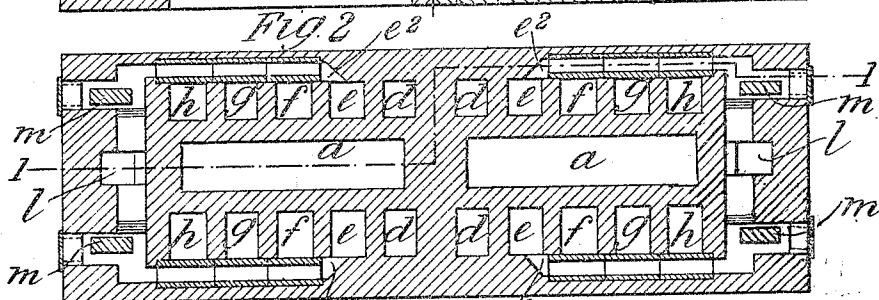
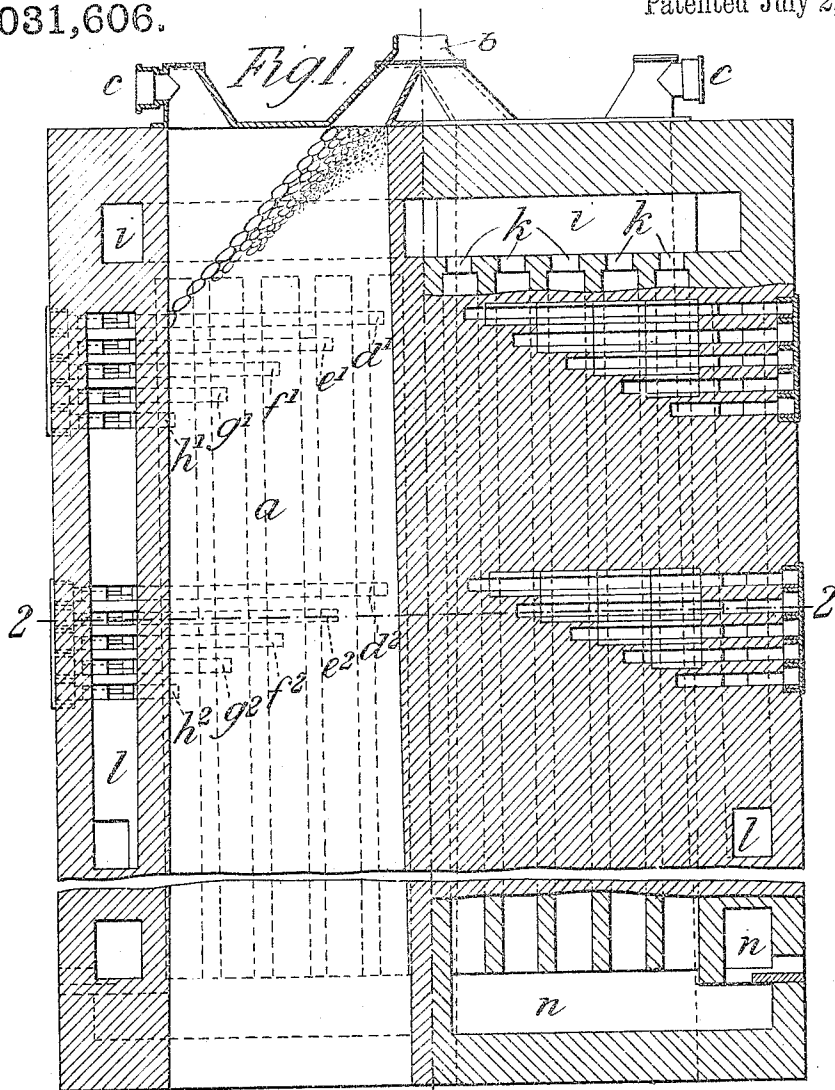


H. W. WOODALL & A. McD. DUCKHAM.
METHOD OF HEATING VERTICAL GAS RETORTS.
APPLICATION FILED APR. 10, 1911.

1,031,606.

Patented July 2, 1912.



Witnesses:

[Signature]
[Signature]

Inventors

Harold W. Woodall
Frederic McD. Duckham
[Signature]

UNITED STATES PATENT OFFICE.

HAROLD WHITEMAN WOODALL, OF THE COUNTY OF DORSET, AND ARTHUR
McDOUGALL DUCKHAM, OF THE COUNTY OF SURREY, ENGLAND.

METHOD OF HEATING VERTICAL GAS-RETORTS.

1,031,606.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed April 10, 1911. Serial No. 620,142.

To all whom it may concern:

Be it known that we, HAROLD WHITEMAN WOODALL, a subject of the King of Great Britain, residing in the county of Dorset, England, and whose post-office address is The Manor House, Lytchett Matravers, in the county of Dorset, England, and ARTHUR McDOUGALL DUCKHAM, a subject of the King of Great Britain, residing in the county of Surrey, England, engineer, and whose post-office address is Walden, Little Bookham, in the county of Surrey, England, have jointly invented certain new and useful Improvements in Methods of Heating Vertical Gas-Retorts, of which the following is a specification.

This invention relates to improvements in heating vertical retorts in which the major axis considerably exceeds the minor. The coal, being charged to such retorts from a device or chute, at one point along the major axis, is separated by gravity into various sizes, the larger pieces falling to the side farther from the charging chute, or device, and the smaller pieces filling the retort directly under the charging device, or chute in the manner common to materials falling to form a heap. In consequence of this, it has been found that the gas travels up that portion of the charge which is composed of the larger pieces, and also that it is detrimental to heat these gases highly as they pass through the charge from the retort.

According to this invention the retort is heated by vertical flues in which the heat is distributed in such a manner that the temperature to which that part of the charge through which the gas passes easily, is heated, is lower than the temperature to which the other part of the charge is heated. In this way the gas is not decomposed, and furthermore, the denser part of the charge receives the greater amount of heat it requires.

In continuously working retorts, arrangements are made so that the temperature in the flue which has been at a lower temperature above, can be increased in the lower portions. This arrangement of heats gives an absolute control over the carbonization of the charge, and results in increased yields of gas, and economy in heating.

A mode of applying the invention in the case of a continuously operated retort is shown in the accompanying drawings.

Figure 1 is a vertical section on line 1—1

of Fig. 2 through a setting of two vertical retorts adapted for continuous working; Fig. 2 is a horizontal section on line 2—2 of Fig. 1.

The retorts *a* are fed from a hopper *b* common to them both, the feed being at one end of the longer axis of each retort so that the coal sorts itself in the manner hereinbefore referred to. The gas is taken off from each retort at *c*. As the retorts and their flues are in every respect alike, only one need be described.

The retort is heated by five vertical flues *d, e, f, g* and *h* on each side. The gas flue *i* runs along each side of the top of the retort and gas is admitted to the upper ends of the vertical flues through ports *k*.

As it is desirable that the lower part of the charge shall be more highly heated than the upper part, the air for combustion is admitted into each flue in two portions. Thus there are two sets of air ports. In the flue *d* adjacent to that portion of the retort wherein the more finely divided coal is situated the air port *d'* is immediately below the gas port *k* and the air ports *e', f', g', h'*, in the flues *e, f, g, h*, respectively are successively at lower levels so that combustion begins in each flue at a lower level from flue *d* to flue *h*. Below the level of these ports is the second set of ports *d², e², f², g², h²* which have a like relationship to each other. The several flues leading to these air ports are branches from a common air flue *l* and each is controllable by its own damper *m*.

The dampers are so adjusted that the desired graduations of temperature are obtained, the proportion of the air admitted through the upper set of ports being generally insufficient for complete combustion so that the temperature of the upper part of the charge may not be so high as that of the lower part. At the bottom the vertical flues open into a common flue *n* leading to the chimney flue.

Having thus described the nature of our said invention and the best means we know of carrying the same into practical effect we claim:—

1. A method of heating a vertical gas retort of the kind which is heated by the heat generated by combustion taking place in vertical flues and is charged in such a manner that there is an easier passage for the

gas through one part of the charge than through the other part, which method consists in causing combustion, adapted to heat the part of the charge through which the
5 gas has the easier passage, to commence at a lower level relative to the charge, than that at which combustion, adapted to heat the other part of the charge, commences, as and for the purposes described.

10 2. A method of heating a vertical gas retort of the kind which is heated by the heat generated by combustion taking place in vertical flues and is charged in such a manner that there is an easier passage for the
15 gas through one part of the charge than through the other part, which method consists in causing combustion adapted to heat the part of the charge through which the

gas has the easier passage, to commence at a lower level relative to the charge, than
20 that at which combustion, adapted to heat the other part of the charge, commences, and in admitting air for the combustion in two portions, one portion for the commencement of the combustion being admitted at
25 a relatively higher level than the other portion for the completion of the combustion as and for the purposes described.

In testimony whereof we have signed our names of this specification in the presence
30 of two subscribing witnesses.

HAROLD WHITEMAN WOODALL.

ARTHUR McDOUGALL DUCKHAM.

Witnesses:

JOSEPH MILLARD,

W. J. SKERTEN.