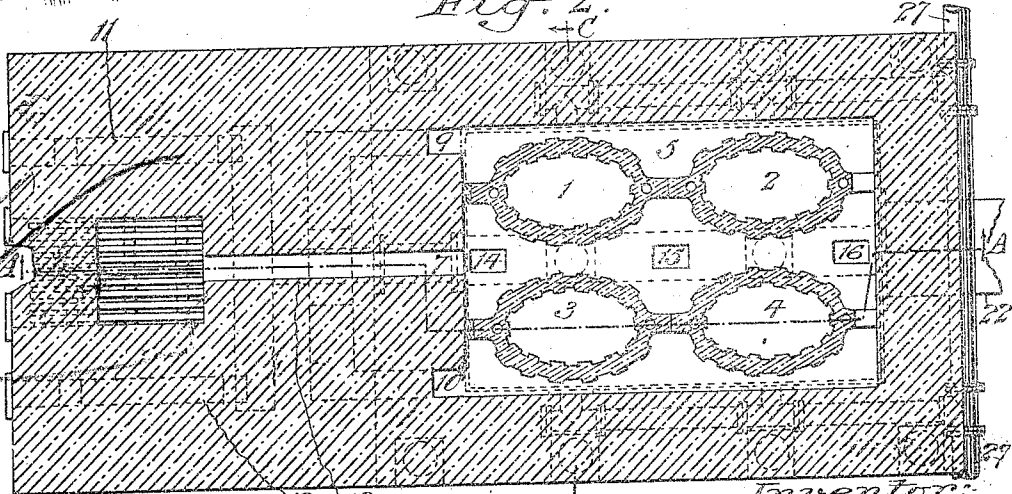
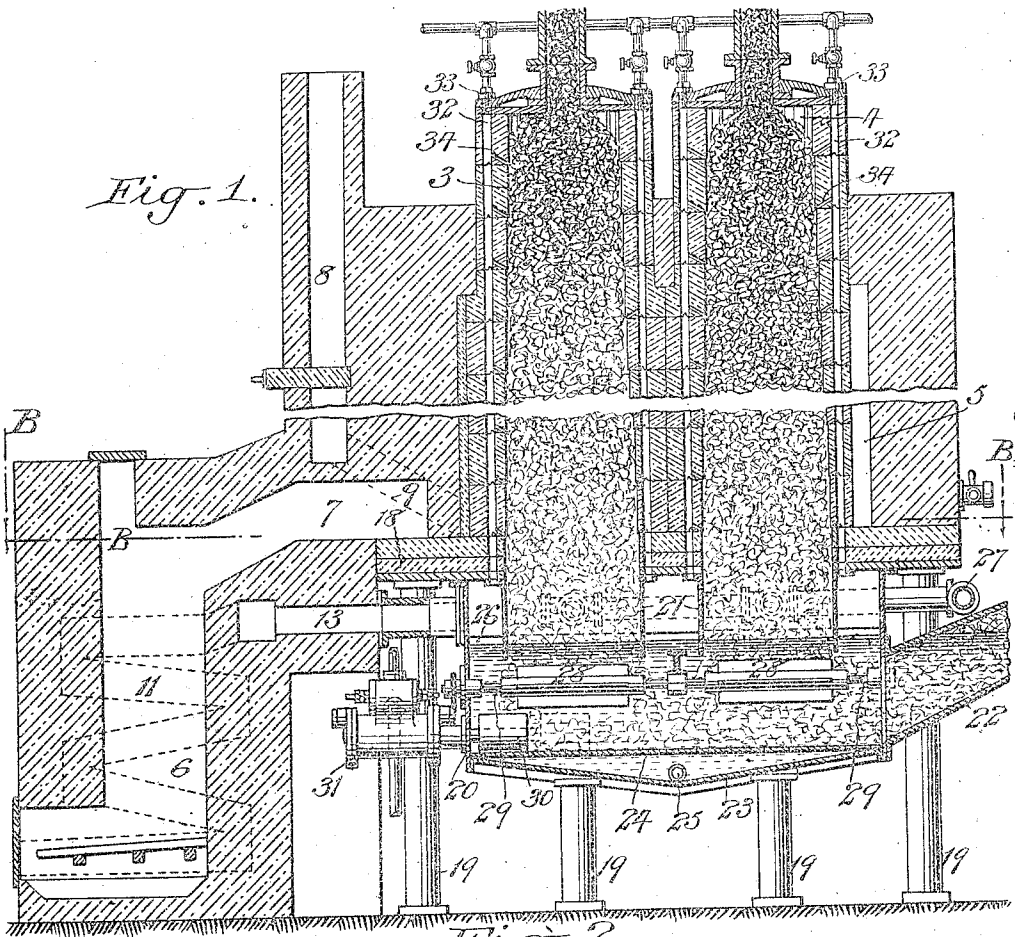


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 RETORT FOR THE MANUFACTURE OF ILLUMINATING GAS.
 APPLICATION FILED FEB. 26, 1909.

942,858.

Patented Dec. 7, 1909.

2 SHEETS—SHEET 1.



Witnesses: 12 13
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 Henry Thoma.

Inventor:
 Charles W. Isbell
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Fig. 3.

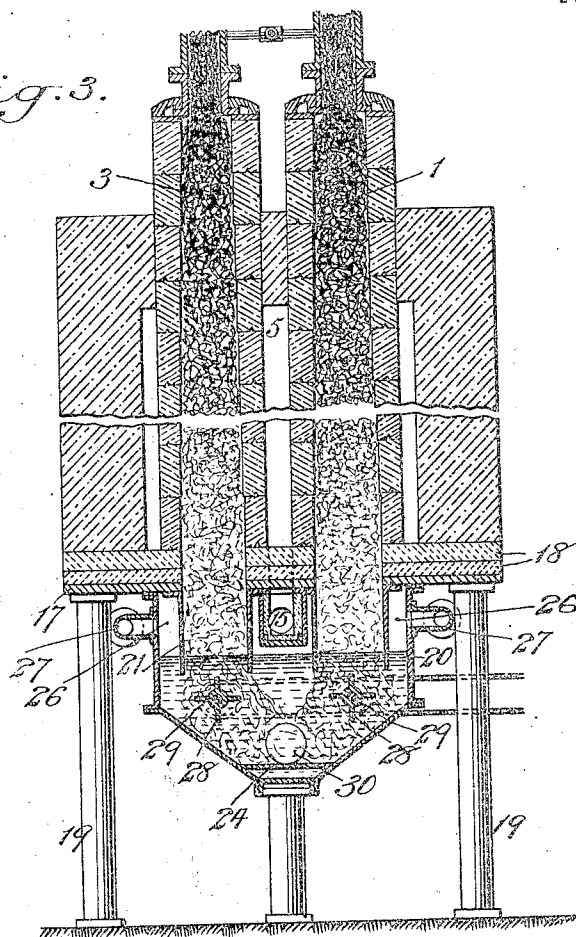


Fig. 4.

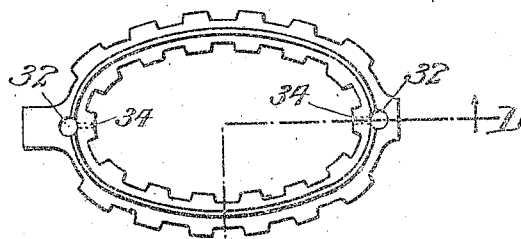
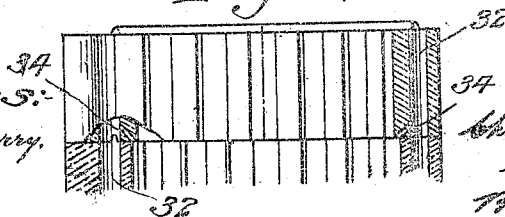


Fig. 5.



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UNITED STATES PATENT OFFICE.

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RETORT FOR THE MANUFACTURE OF ILLUMINATING-GAS.

942,858.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Original application filed December 2, 1908, Serial No. 465,602. Divided and this application filed February 26, 1909. Serial No. 480,132.

To all whom it may concern:

Be it known that I, CHARLES W. ISBELL, a citizen of the United States, and resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Retorts for the Manufacture of Illuminating-Gas, of which the following is a specification.

This invention consists in certain improvements in the construction, form and arrangement of the several parts of an upright gas retort used for the manufacture of illuminating gas from bituminous coal, the retort being of that class in which there is a continuous carbonization in a completely full retort, with a water seal at the bottom of the retort.

This invention particularly consists in certain improvements in the construction of the retort itself whereby a step by step enlargement of the area of the retort from the top to the bottom thereof is provided for accomplishing the purpose of forming an annular free gas space under each step from which space one or more branch flues lead into one or more main gas flues in the retort. This step by step enlargement also allows a sudden expansion of the coal at intervals as it passes down through the retort instead of the gradual expansion of the coal as is usual.

A practical embodiment of my invention is represented in the accompanying drawings, which show a bank of four retorts, it being understood that the number of retorts may be varied to suit different requirements.

Figure 1 is a vertical section taken in the planes of the lines A—A of Fig. 2, looking in the direction of the arrows; Fig. 2 is a horizontal section taken in the plane of the line B—B of Fig. 1, looking in the direction of the arrows; Fig. 3 is a transverse section taken in the plane of the line C—C of Fig. 2, looking in the direction of the arrows; Fig. 4 is a plan view of one of the retort sections, and Fig. 5 is a section taken in the planes of the line D—D of Fig. 4, looking in the direction of the arrows, a portion of the next adjoining retort section being shown in longitudinal vertical central section.

The four vertical retorts 1, 2, 3, 4, are arranged in two parallel rows within the combustion chamber 5, through which chamber, between and around the said retorts, the products of combustion from the furnace 6

and its flue 7, circulate to the chimney flue 8 through the side flues 9 and 10. The secondary air is fed directly into the combustion chamber instead of into the furnace flue as heretofore. In the present instance this secondary air is fed from side flues 11, 12 and their common flue 13 and openings 14, 15, 16, through the floor plate 17 of the combustion chamber 5 and its fire-brick lining 18. This floor plate 17 is supported by suitable columns 19 and the retorts are supported by said floor plate and by the structure of masonry which includes the furnace 6.

Beneath the floor plate 17, I provide a casing 20 into the interior of which project the dip pipes 21 which form downward extensions of the retorts 1, 2, 3, 4. This casing has an upwardly inclined outlet 22 for the coke and is further provided with a double inclined main bottom 23 and a false flat bottom 24. The space between the main bottom 23 and the false bottom 24 is adapted to receive the tar, and a suitable pipe 25 is provided for removing the tar. Water is introduced into this casing 20 to a point slightly above the lower ends of the dip pipes 21, so as to form a water seal for the same, the space 26 between the water level and the floor plate 17, forming a gas chamber. A system of piping 27 leads from the gas chamber 26 for conveying the gas to any desired point.

Revolving supports 28 are fixedly mounted on shafts 29 below the bottoms of the several retorts, which supports also serve to agitate the coke at the bottoms of the retorts and cause the same to be deposited on to the false bottom 24 of the casing. The two shafts 29 may be rotated at the desired speed from any suitable source of power, not shown herein. Suitable means, not shown herein, are provided for feeding the coal continuously into the tops of the several retorts.

The coke is removed little by little upwardly through the inclined outlet 22, by means of a ram 30 reciprocating on the false bottom 24, which ram is driven by a suitable engine 31.

Each of the retorts increases in area step by step from the top to the bottom thereof, so as to serve the double purpose of permitting a sudden expansion of the coal at intervals during its downward movement and also of providing gas spaces under the said

steps. In the present instance, this step by step enlargement of the retort is provided for by forming the retort of hollow sections having parallel bores, the top section having a bore of a certain diameter and the succeeding sections having bores of gradually increasing diameters. Each retort is provided with one or more main vertical gas flues; in the present instance two of these gas flues 32 are provided, the lower ends of which are open through the floor plate 17 and lining 18 into the gas chamber 26 and the upper ends of which flues are provided with suitable plugs 33 through which steam may be admitted for preventing the overheating and consequent decomposition of the gas as it passes down into the gas chamber. Diagonal gas flues 34 lead upwardly from the steps in the interior of the retort, into the main gas flues 32, thus affording an outlet for the gas which collects in the spaces beneath the said steps. This gas passes downwardly through these flues 32 into the gas chamber 26. The rest of the gas passes downwardly through the water seal at the bottom of the retort and bubbles upwardly into the said gas chamber 26.

Where the retorts are arranged in parallel series as shown in the accompanying drawings, the two retorts 1 and 3 nearest to the furnace, are connected to the furnace wall and are also connected to the next two retorts 2 and 4, so that the products of combustion as they pass from the furnace 6 through the flue 7, have to first pass between the adjacent walls of the retorts and from thence to the chimney branch flues 9, 10, along the outer walls of the said retorts, thus insuring the utilization of the products of combustion to the best advantage. Furthermore, the secondary air which is introduced through the openings 14, 15, 16, is introduced at the enlarged spaces in the combustion chamber where the secondary air may be readily mixed with the products of combustion from the furnace to produce the greatest heat at the desired points. Another great advantage of introducing the secondary air directly into the combustion chamber instead of into the furnace flue, is that the greatest heat of the products of combustion is insured within the combustion

chamber and not within the furnace flue where the tendency has been to heat the walls of the furnace flue to a melting point. 55

The parts of the apparatus shown and described but not claimed herein form the subject matter of an application filed by me the second day of December, 1908, its serial number being 465,602, of which application this present application is a division. 60

What I claim is:—

1. In an apparatus of the character described, a retort having its interior enlarged in steps from the top to the bottom thereof to form gas spaces under the steps, said retort having a main gas flue therein and branch flues leading from said gas spaces into said main gas flue. 65

2. In an apparatus of the character described, a retort having its interior enlarged in steps from the top to the bottom thereof to form gas spaces under the steps, said retort having a plurality of main gas flues therein and branch flues leading from the said gas spaces into the said main gas flues. 75

3. In an apparatus of the character described, a retort composed of sections, the bores of which increase in diameter from the top to the bottom of the retort to form a step by step enlargement of the interior of the retort whereby gas spaces are formed under the said steps, said retort having a main gas flue therein and branch flues leading from said gas spaces into said main gas flue. 85

4. In an apparatus of the character described, a retort composed of sections, the bores of which increase in diameter from the top to the bottom of the retort to form a step by step enlargement of the interior of the retort whereby gas spaces are formed under the said steps, said retort having a plurality of main gas flues therein and branch flues leading from the said gas spaces into the said main gas flues. 95

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twentieth day of February 1909.

CHARLES W. ISBELL.

Witnesses:

F. GEORGE BARRY,
C. S. SUNDGREN.