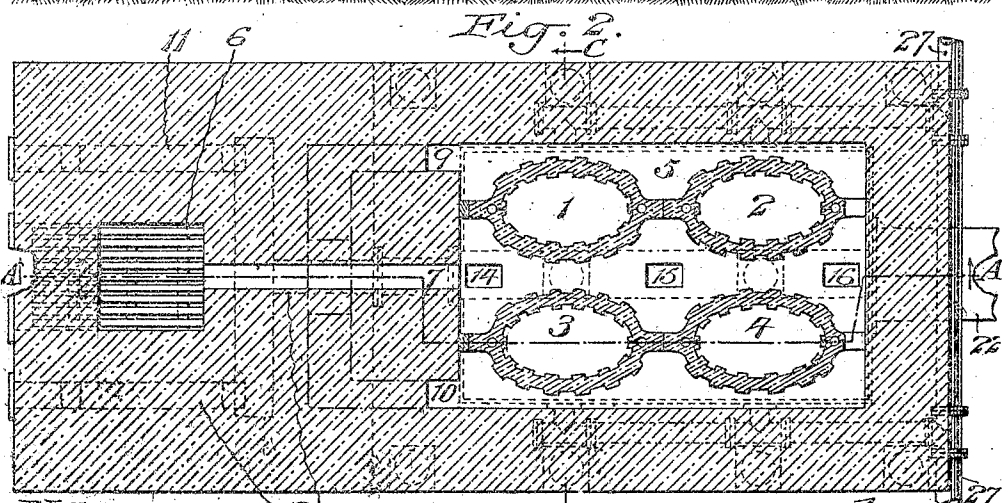
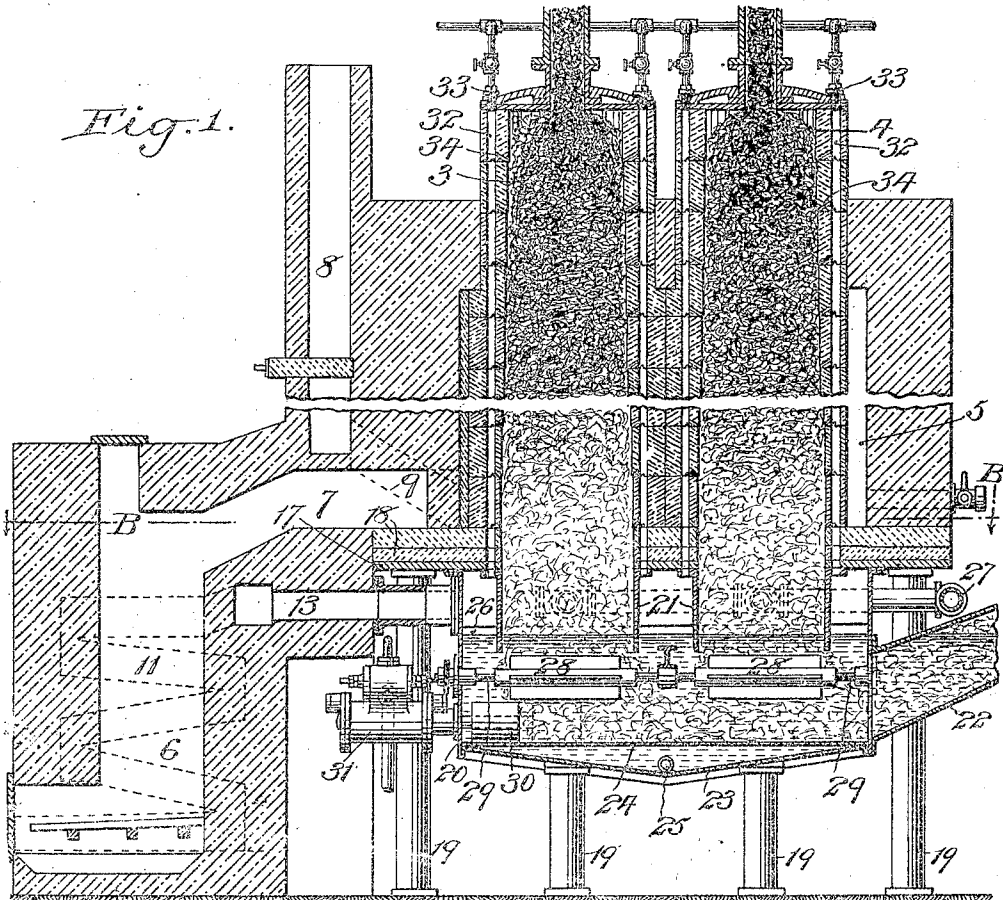


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 APPLICATION FILED DEC. 2, 1908.

942,501.

Patented Dec. 7, 1909.

2 SHEETS—SHEET 1.



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 Henry Chene.

TC

Inventor:
 Charles W. Isbell
 By his attorney
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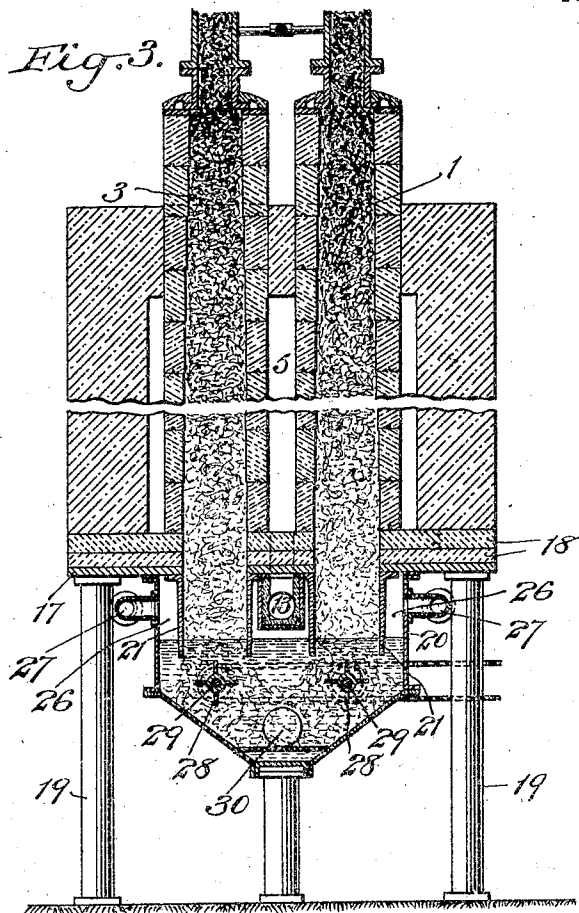


Fig. 4.

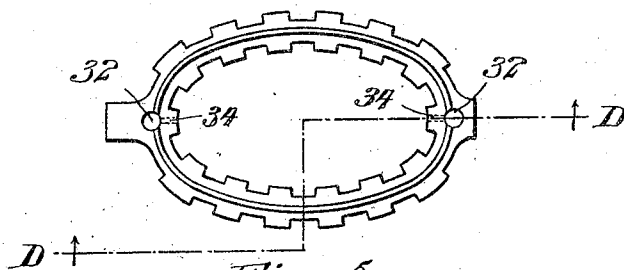
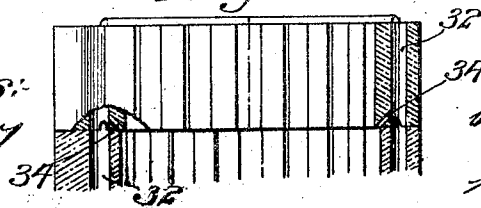


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES W. ISBELL, OF NEW YORK, N. Y.

RETORT FOR THE MANUFACTURE OF ILLUMINATING-GAS.

942,501.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed December 2, 1908. Serial No. 465,602.

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.

The objects of this invention are:—first, to provide means for removing the gas at the bottom of the retort instead of at the top as heretofore: second, to provide means for introducing the secondary air directly into the combustion chamber instead of into the furnace flue as heretofore: third, to provide a gas flue in a retort, communicating at intervals with the interior of the retort: fourth, to provide a step by step enlargement of the area of the retort from the top to the bottom thereof so as to accomplish the double purpose of forming a free gas space under each step from which a flue leads to the gas flue in the retort, and of allowing a sudden expansion of the coal at intervals as it passes down through the retort instead of the gradual expansion as is usual: fifth, to provide a revolving brake at the bottom of the retort which forms a support for the column of coke and coal, and sixth, to provide a ram for removing the coke at the desired speed.

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
 5 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
 10 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
 15 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
 20 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
 25 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
 30 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
 35 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
 40 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. Further-
 45 more, 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
 50 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
 55 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.

60 What I claim is:

1. In an apparatus of the character described, a common closed gas chamber and a plurality of upright retorts arranged to
 65 discharge their gas from the bottoms thereof into said common closed gas chamber.

2. In an apparatus of the character described, a plurality of upright retorts arranged to discharge their gas from the bottoms thereof, a water seal for the bottoms of the retorts and a common closed gas chamber
 70 above the said water seal arranged to receive the gas as it is discharged from the bottoms of the said retorts.

3. In an apparatus of the character described, a closed gas chamber and an upright
 75 retort having an open bottom and arranged to discharge its gas through the bottom into the said closed gas chamber, said retort having a main gas flue located within the walls of the retort and opening at its bottom directly
 80 into said gas chamber and branch flues leading from the interior of the retort at different points along the same into the said main gas flue.

4. In an apparatus of the character described, a closed gas chamber and an upright
 85 retort having an open bottom and arranged to discharge its gas through the bottom into said closed gas chamber, said retort having a plurality of main gas flues
 90 located within the walls of the retort and opening at their bottoms directly into said closed gas chamber and branch flues leading from the interior of the retort at different points along the same into the said main gas
 95 flues.

5. In an apparatus of the character described, a common closed gas chamber and a plurality of upright retorts arranged to
 100 discharge their gas from the bottoms thereof into said common gas chamber, each of said retorts having a main gas flue therein opening at its bottom directly into said common gas chamber and branch flues leading from the interior of the retort at different points
 105 along the same into said main gas flue.

6. In an apparatus of the character described, a common closed gas chamber and a plurality of upright retorts arranged to
 110 discharge their gas from the bottoms thereof into said common gas chamber, each of said retorts having a plurality of main gas flues therein opening at their bottoms directly into said common gas chamber and branch
 115 flues leading from the interior of the retort at different points along the same into said main gas flues.

7. In an apparatus of the character described, an upright retort, a water seal for
 120 its bottom and a gas chamber above said water seal, said retort having a main gas flue therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flue
 125 whereby the gas is discharged from the bottom of the retort.

8. In an apparatus of the character described, an upright retort, a water seal for
 130 its bottom and a gas chamber above the

water seal, said retort having a plurality of main gas flues therein opening at the bottom into said chamber and branch flues leading from the interior of the retort at different points along the same into the said main gas flues whereby the gas is discharged from the bottom of the retort.

9. In an apparatus of the character described, a plurality of upright retorts, a water seal for their bottoms and a gas chamber above the water seal, each of said retorts having a main gas flue therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flue whereby the gas is discharged from the bottom of the retort.

10. In an apparatus of the character described, a plurality of upright retorts and a water seal for their bottoms, each of said retorts having a plurality of main gas flues therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flues whereby the gas is discharged from the bottom of the retort.

11. In an apparatus of the character described, a gas chamber, an upright retort having a main gas flue therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flue whereby the gas is discharged from the bottom of the retort and means for introducing steam at the top of the said main gas flue for preventing the over-heating and consequent decomposition of the gas as it passes down into the gas chamber.

12. In an apparatus of the character described, a gas chamber, an upright retort having a plurality of main gas flues therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flues whereby the gas is discharged from the bottom of the retort and means for introducing steam at the tops of the main gas flues for preventing the over-heating and consequent decomposition of the gas as it passes down into the gas chamber.

13. In an apparatus of the character described, a gas chamber, a plurality of upright retorts each having a main gas flue therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flue whereby the gas is discharged from the bottom of the retort and means for introducing steam at the top of the said main gas flue for preventing the over-heating and consequent decomposition of the gas as it passes down into the gas chamber.

14. In an apparatus of the character described, a gas chamber, a plurality of upright retorts each having a plurality of main gas flues therein opening at the bottom into said gas chamber and branch flues leading from the interior of the retort at different points along the same into said main gas flues whereby the gas is discharged from the bottom of the retort and means for introducing steam at the tops of the main gas flues for preventing the over-heating and consequent decomposition of the gas as it passes down into the gas chamber.

15. In an apparatus of the character described, a plurality of upright retorts, a combustion chamber surrounding the same, a furnace having its flue leading into the bottom thereof and means for leading a supply of secondary air directly into said combustion chamber upwardly through the bottom at different points from the front to the back thereof.

16. In an apparatus of the character described, a plurality of upright retorts arranged in two series, a combustion chamber surrounding the retorts, a furnace having its flue leading into the front of the combustion chamber at a point between said series of retorts and above the bottom of the combustion chamber, chimney flues leading from the front of the combustion chamber at points outside the series of retorts and means for leading a supply of secondary air directly into said combustion chamber upwardly through the bottom at different points between said two series of retorts from the front to the back of the combustion chamber.

17. In an apparatus of the character described, an upright retort arranged to discharge its gas from the bottom thereof, a casing surrounding the bottom of the retort, an outlet for the casing, a water seal within the casing for the bottom of the retort, a gas chamber formed above said water seal into which the gas is discharged from the bottom of the retort and means for removing the coke from the casing through its outlet continuously.

18. In an apparatus of the character described, a plurality of upright retorts arranged to discharge their gas from the bottoms thereof, a casing surrounding the bottoms of the retorts, an outlet for the casing, a water seal within the casing for the bottoms of the retorts, a gas chamber formed above the said water seal into which the gas is discharged from the bottoms of said retorts and means for removing the coke through said outlet continuously.

19. In an apparatus of the character described, an upright retort arranged to discharge its gas from the bottom thereof, a casing surrounding the bottom of the retort,

an outlet for the casing, a water seal within the casing for the bottom of the retort, a gas chamber formed above said water seal into which the gas is discharged from the bottom of the retort, means for removing the coke from the casing through its outlet continuously, a support for the contents of the retort located below the bottom of the retort and means for rotating said support to agitate the coke at the bottom of the retort.

20. In an apparatus of the character described, a plurality of upright retorts arranged to discharge their gas from the bottoms thereof, a casing surrounding the bottoms of the retorts, an outlet for the casing, a water seal within the casing for the bottoms of the retorts, a gas chamber formed above the said water seal into which the gas is discharged from the bottoms of the retorts, means for removing the coke through said outlet continuously, supports for the contents of the retort located below the bottoms of the retorts and means for rotating said supports to agitate the coke at the bottoms of the said retorts.

21. In an apparatus of the character described, an upright retort, a casing surrounding the bottom of the retort, said casing having a main bottom and a false bottom including between them a tar removing space and a water seal within the casing for the bottom of the said retort, a gas chamber being formed above the water seal into which the gas is discharged from the retort.

22. In an apparatus of the character described, a plurality of upright retorts, a casing surrounding the bottoms of the retorts, said casing having a main bottom and a false bottom including between them a tar removing space and a water seal within the casing for the bottoms of the said retorts, a gas chamber being formed above the water seal into which the gas is discharged from the said retorts.

23. In an apparatus of the character described, an upright retort, a casing surrounding the bottom of the retort, said casing having a main bottom and a false bottom including between them a tar removing space, and a water seal within the casing for the bottom of the said retort, a gas chamber being formed above the water seal into which the gas is discharged from the retort, an outlet for the said casing and a reciprocating ram on said false bottom arranged to

remove the coke continuously from the casing through said outlet.

24. In an apparatus of the character described, an upright retort, a casing surrounding the bottom of the retort, said casing having a main bottom and a false bottom including between them a tar removing space and a water seal within the casing for the bottom of the said retort, a gas chamber being formed above the water seal into which the gas is discharged from the retort, an outlet for the said casing, a reciprocating ram on said false bottom arranged to remove the coke continuously from the casing through said outlet and a revolving grate at the bottom of the retort forming a support for the contents of the retort.

25. In an apparatus of the character described, a plurality of upright retorts, a casing surrounding the bottoms of the retorts, said casing having a main bottom and a false bottom including between them a tar removing space and a water seal within the casing for the bottoms of the said retorts, a gas chamber being formed above the water seal into which the gas is discharged from said retorts, an outlet for the said casing and a reciprocating ram on said false bottom arranged to remove the coke continuously from the casing through said outlet.

26. In an apparatus of the character described, a plurality of upright retorts, a casing surrounding the bottoms of the retorts, said casing having a main bottom and a false bottom including between them a tar removing space and a water seal within the casing for the bottoms of the said retorts, a gas chamber being formed above the water seal into which the gas is discharged from the said retorts, an outlet for the said casing, a reciprocating ram on said false bottom arranged to remove the coke continuously from the casing through said outlet and revolving grates at the bottoms of the retorts forming supports for the contents of the said retorts.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this thirtieth day of November 1908.

CHARLES W. ISBELL.

Witnesses:

F. GEORGE BARRY,
HENRY THIEME.