PATENT SPECIFICATION

581447

Application Date: May 24, 1944. No. 10087/44.

Complete Specification Left: June 5, 1945.

Complete Specification Accepted: Oct. 14, 1946.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Water Gas Plant

We, HENRY BALFOUR & Co., LIMITED, a British Company, WILLIAM LINDSAY BURNS and JAMES WAITE GIBSON, both of British Nationality, and all of the Company's address at Durie Foundry, Leven, Fife, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in water gas plant and has for an object to provide for continuous production of gas in manner to ensure substantially constant conditions as regards quantity and composition of the gas.

A further object is to minimise the ground space occupied in relation to the volume of gas produced.

In general a plant according to the invention comprises two units arranged side by side and constructed approximately as described in the Specification of our co-pending Application No. 10086/44 (Serial No. 580,138), but with no water jackets for the generators, said units being isolated from one another and arranged to operate out of phase, so that, as one is being heated up to be ready for action, the other is producing gas, and *vice versa*.

Steam inlets to the generator units are arranged at different levels so as to increase or decrease the effective area of the fuel bed utilised for the production of gas therefrom.

The air and steam supply connections are arranged in the interspace between the two units. A common wash-box and a common carburettor and steam superheater serve both units.

Associated with the said units is a waste heat boiler, which can be advantageously utilised, as a constant flow of gases will pass through or around the tubes no matter which unit is in operation.

Dated this 23rd day of May, 1944.

DOUGLAS & DOUBBLE,
29, Saint Vincent Place, Glasgow, C.1,
and
19, Ward Road, Dundee, Angus,
Scotland,
Agents for the Applicants.

COMPLETE SPECIFICATION

Improvements in or relating to Water Gas Plant

We, HENRY BALFOUR & Co., LIMITED, a British Company, WILLIAM LINDSAY BURNS and JAMES WAITE GIBSON, both of British Nationality, and all of the Company's address at Durie Foundry, Leven, Fife, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in water gas plant and has for an object to provide for continuous production of gas in manner to ensure substantially constant conditions as regards quantity and composition of the gas.

A further object is to minimise the ground area occupied in relation to the volume of gas produced.

In general, a plant according to the invention comprises two generator units arranged side by side in closely spaced relation, for operation out of phase, steam inlets to each generator unit arranged at different levels, dual air blast devices for said generator units, a common blower for said air blast devices, an air connection bridging the space between said air blast devices, gas-take-offs from said generator units, valves for said gas take-offs, stack valves, one associated with each generator unit, a carburettor and a steam superheater common to both generator units, connections from said superheater having steam inlets to each generator unit, said inlets arranged at different levels, a timing shaft associated with each generator unit, and actuators carried by each timing shaft including a gas-take-off valve actuator, a stack valve actuator, an air valve actuator, and a steam valve actuator.

In the accompanying drawings Fig. 1 is a sectional elevation and Fig. 2 a plan

[*Price* 1/-]

of a water gas plant according to the invention. Fig. 3 is a part elevation part vertical section at right angles to Fig. 1. Fig. 3*a* is a diagram forming part of Fig. 3 and showing instrument boards.

Referring to the drawings, 1, 1¹, denote the generators proper, each in the form of an upright rectangular prism, brick-lined, and provided with an outer casing 2 of mild steel between which and the brick structure may be a packing of slag wool or other insulator.

Each generator has a charging door 3 for coal or coke, an inclined fire-grate 4, and a cleaning door 5.

Extending from the exterior of each generator to a shallow trough 6 above the fire-grate 4 is a pipe 7 for leading cooling water from a drip cup 8 to the fire bars.

Associated with each generator is a dual air blast device 9, both devices 9 being connected to a common blower 10, a valved air connection 9¹ bridging the space between the two air blast devices.

In Fig. 1, 11 denotes one of the air inlets located beneath the fire-grate of one of the generators and close to the ash pan which is shaped and rendered in fire-clay and cement.

12 denotes a steam inlet to the generator below the grate used for the production of producer gas, and 13 a steam inlet to the generator above the grate 4 used for the production of blue water gas.

14, 14¹ denote the gas-take-offs from the generators; 15, 15¹ denote stack valves above each of which is a waste gas flue 16 which may, if desired, be led to a waste heat boiler.

A branch from each gas-take-off leads to a wash box 17 which is in effect a small section hydraulic main and which is provided with a water feed connection 18.

Between the wash box 17 and a Tee-branch 19 connected to the bottom of a carburettor-superheater chamber 20 is a valve 20¹.

Depending from the branch 19 is a pipe 21 dipping into a safety seal pot 22 provided with an outlet for semi-hydrated tar residue.

The chamber or casing 20 may be of mild steel, suitably lagged, and filled with fire-clay rings (not shown) constituting in effect a chequerwork.

A steam superheater coil 23 extends zig-zag from the top to the bottom of the casing 20, steam entering at the top and emerging at the bottom, the steam flowing counter to the gas flow. On emerging from the superheater the steam flows to the inlets 12, 13.

24 denotes the outlet from the casing 20 to the foul gas main. At 25 are gas test cocks. At 26 are fitted pyrometers leading to indicators 27 on an instrument board that carries also indicators 28, 29 and 30 indicating blast, steam, and gas, respectively.

Associated with each generator unit is a timing shaft 31 or 31¹ driven by an automatic operator as 32 in association with a steam engine as 32¹. Each shaft is provided with a stack valve actuating arm 33 or 33¹, an air valve actuating arm 34 or 34¹, a steam valve actuating arm 35 or 35¹. 36, 36¹ denote gas take-off valve-actuating arms actuated by linkages from the stack valve actuating arms 33, 33¹ and actuating take-off valves indicated at 36².

37 denotes steam purge arrangements; 38 denotes a steam trap.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

A water gas plant for the continuous production of gas comprising two generator units arranged side by side in closely spaced relation for operation out of phase, steam inlets to each generator unit arranged at different levels, dual air blast devices for said generator units, a common blower for said air blast devices, an air connection bridging the space between said air blast devices, gas-take-offs from said generator units, valves for said gas-take-offs, stack valves, one associated with each generator unit, a carburettor and a steam superheater common to both generator units, connections from said superheater having steam inlets to each generator unit, said inlets arranged at different levels, a timing shaft associated with each generator unit, and actuators carried by each timing shaft including a gas-take-off valve actuator, a stack valve actuator, an air valve actuator, and a steam valve actuator.

Dated the 4th day of June, 1945.

DOUGLAS & DOUBBLE,
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Agents for the Applicants.

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[This Drawing is a reproduction of the Original, on a reduced scale.]

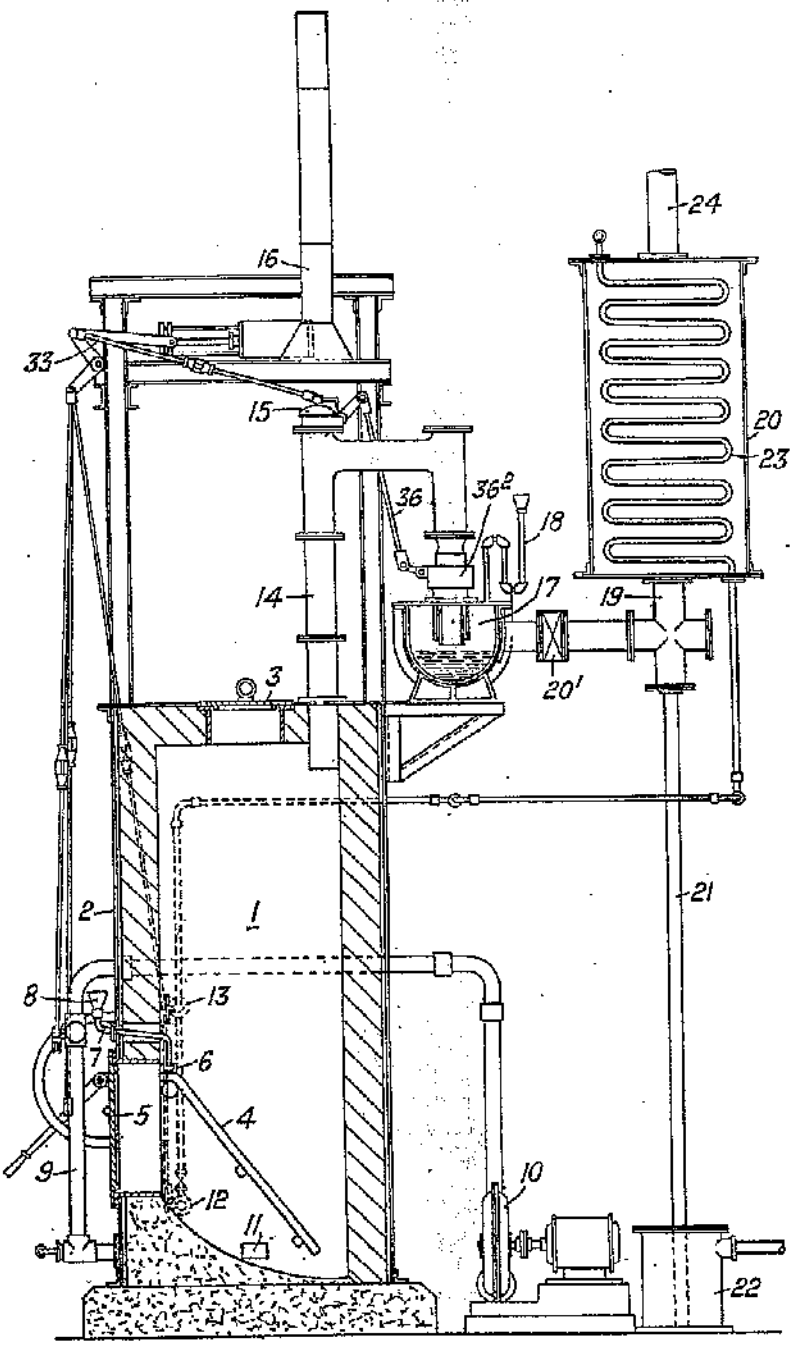

FIG. 1.

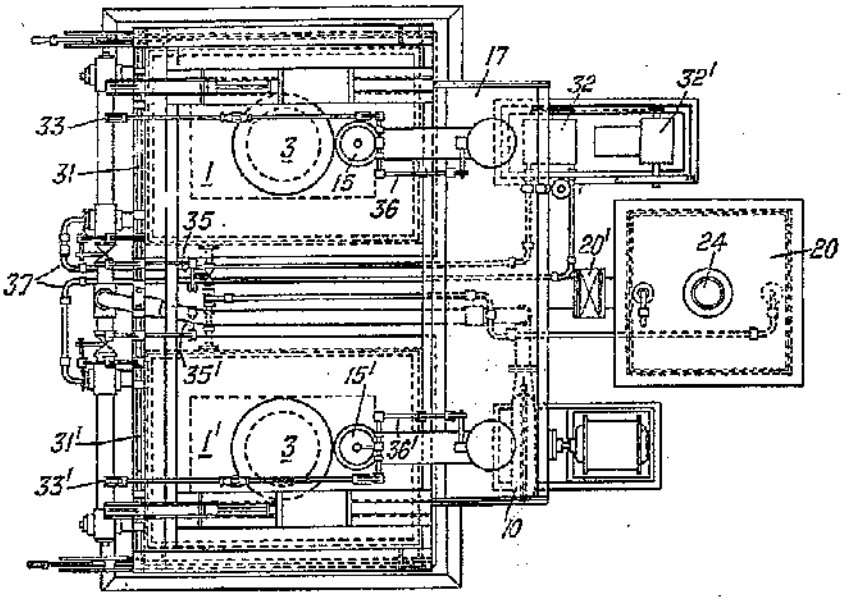
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FIG. 2.

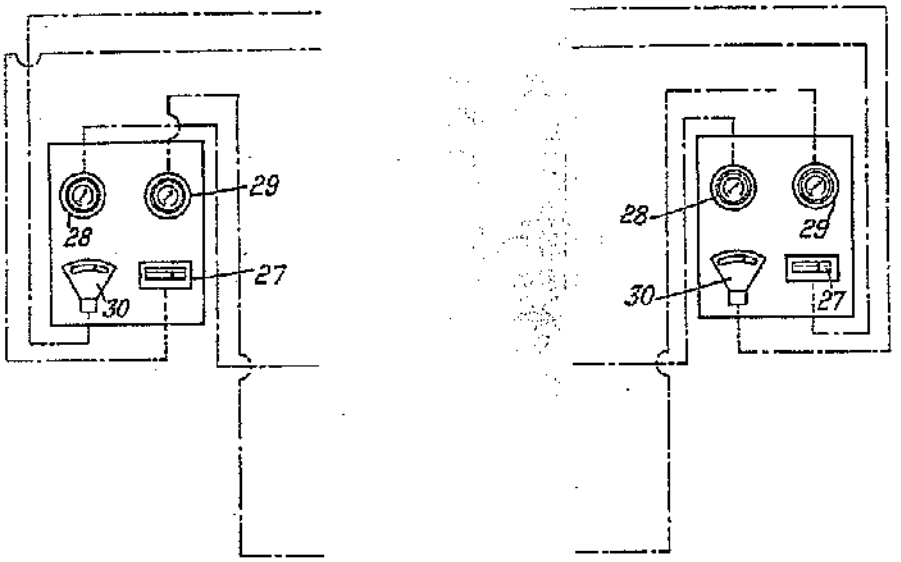
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FIG. 3a.

581,447 COMPLETE SPECIFICATION

SHEET 1

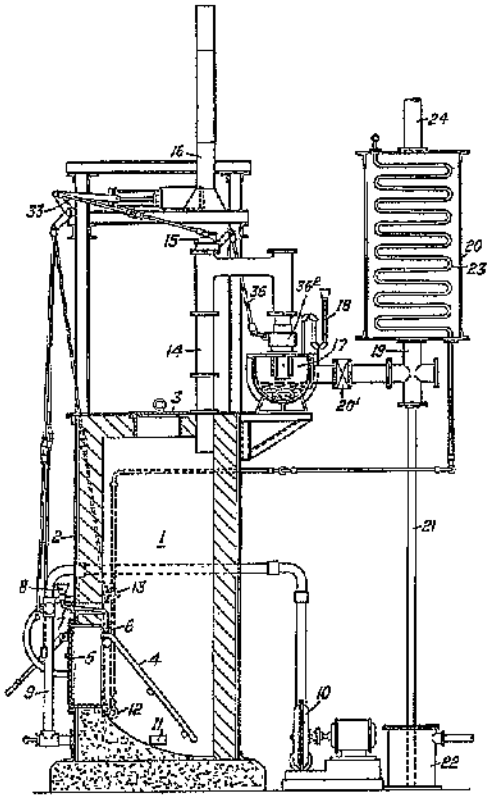

FIG. 1.

SHEET 2

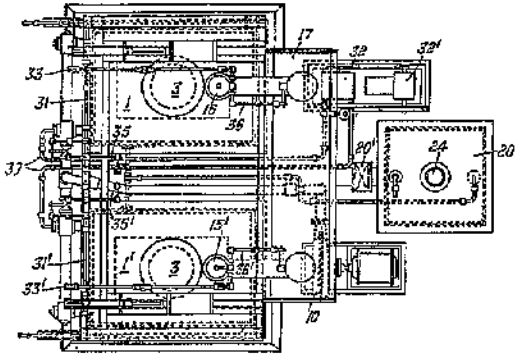

FIG. 2.

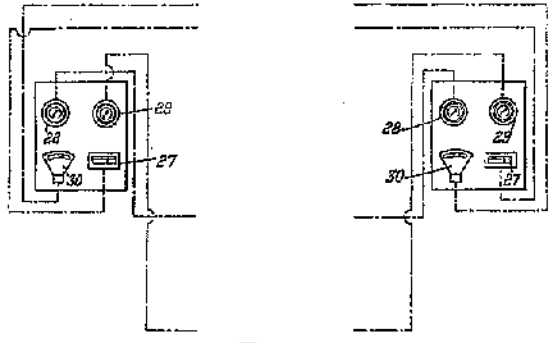

FIG. 3a.

[This Drawing is a reproduction of the Original on a reduced scale.]

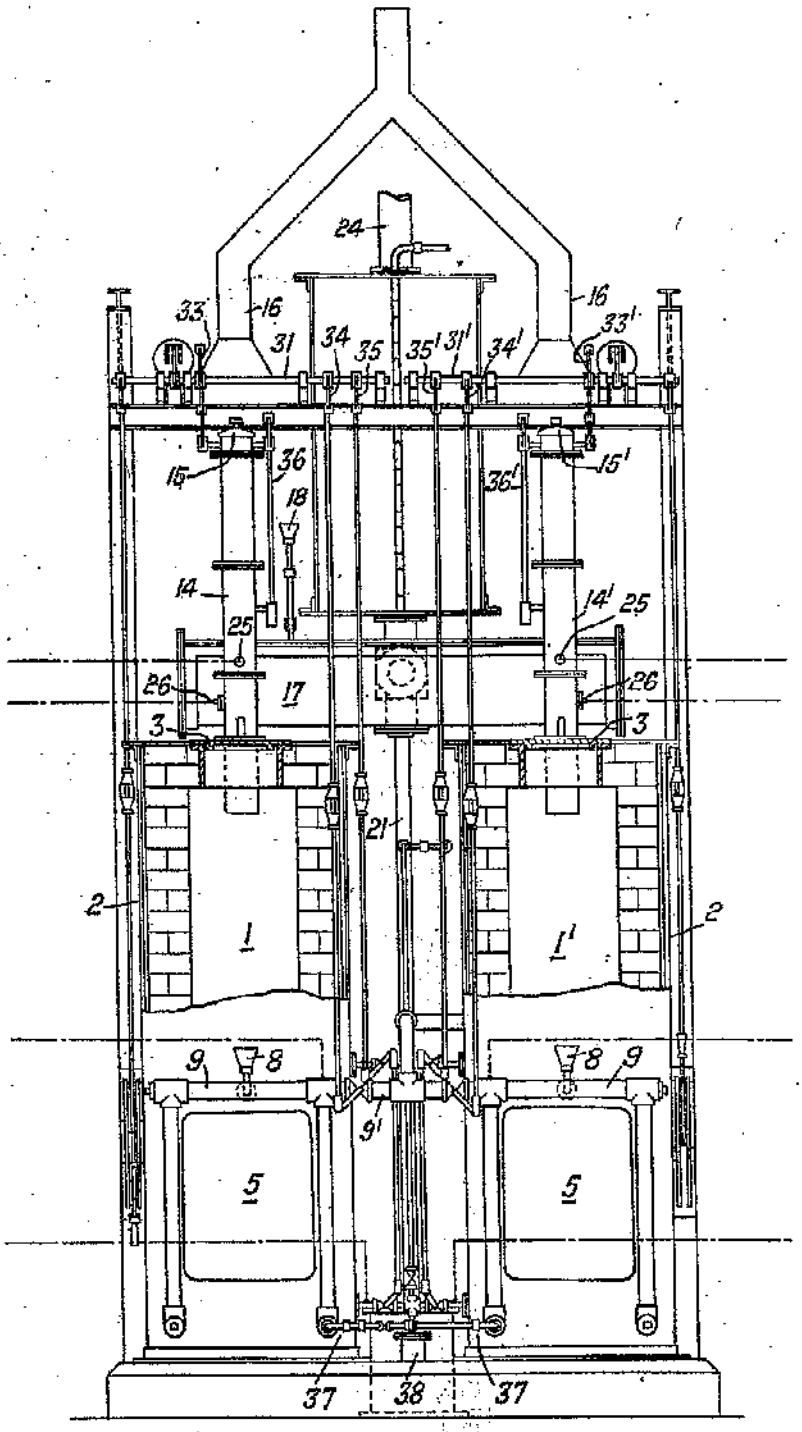

FIG. 3.