No. 849,162. PATENTED APR. 2, 1907.

R. REID.

GAS GENERATOR.

APPLICATION FILED SEPT. 19, 1905.

2 SHEETS—SHEET 1.

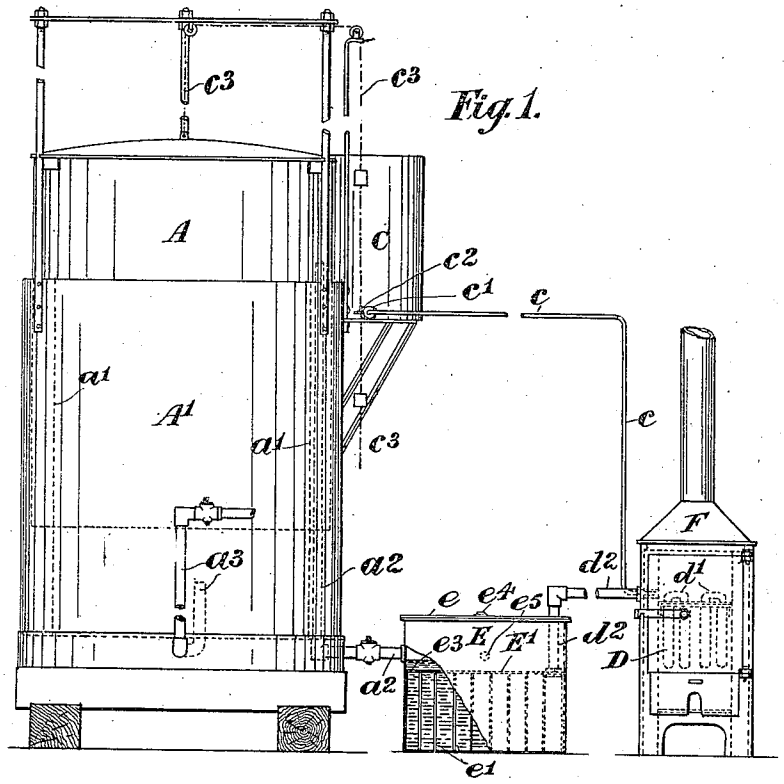

Fig. 1.

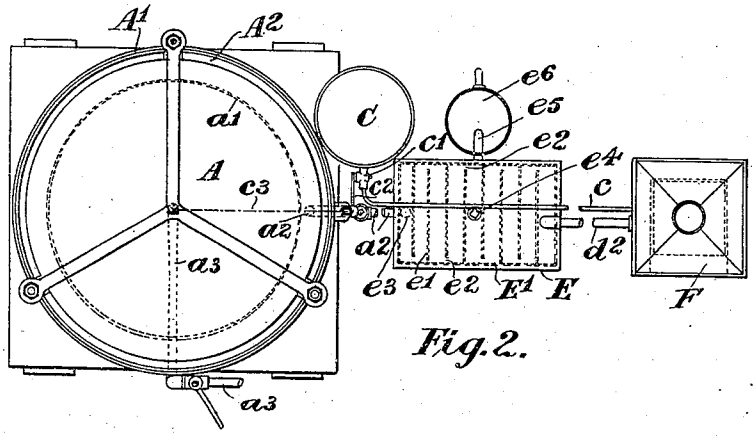

Fig. 2.

Inventor

Robert Reid

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Witnesses.

E. R. Peck

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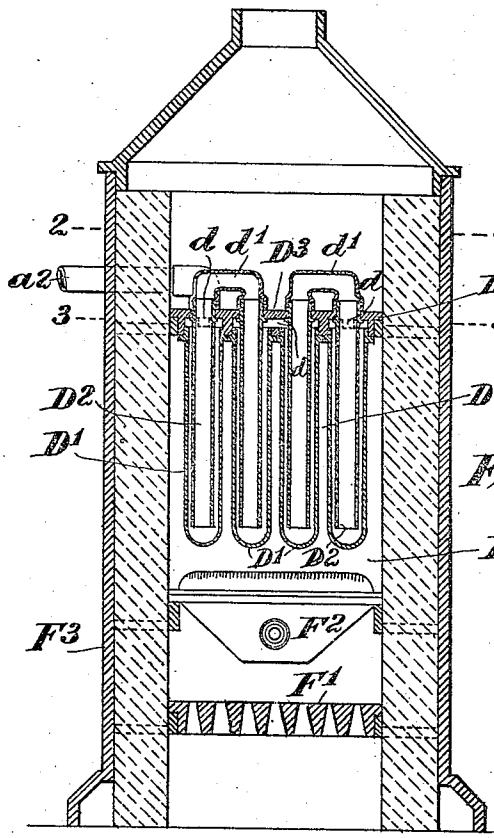

Fig. 3.

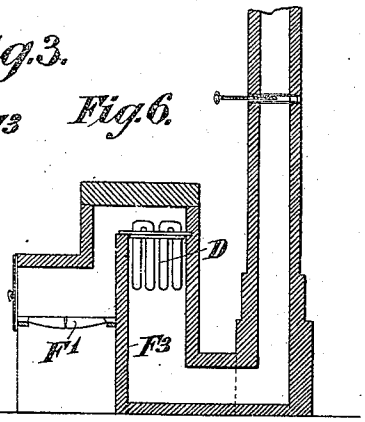

Fig. 6.

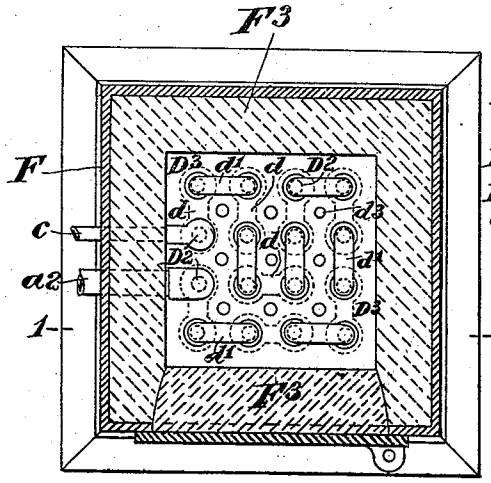

Fig. 4.

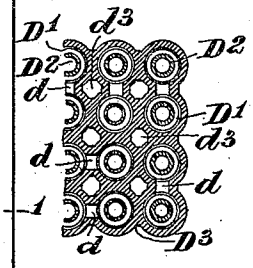

Fig. 5.

Witnesses.

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Inventor

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UNITED STATES PATENT OFFICE.

ROBERT REID, OF SOUTH YARRA, VICTORIA, AUSTRALIA.

GAS-GENERATOR.

No. 849,162. Specification of Letters Patent. Patented April 2, 1907.

Application filed September 19, 1905. Serial No. 279,180.

To all whom it may concern:

Be it known that I, ROBERT REID, a subject of the King of Great Britain and Ireland, residing at Toorak Road, South Yarra, in the British State of Victoria, Commonwealth of Australia, engineer, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification.

This invention relates to improvements in apparatus for generating gas from liquid hydrocarbons.

It consists, mainly, in a novel construction of generator designed to be highly heated by being arranged above or within a stove or within a furnace.

When used for generating gas, the oil, preferably kerosene-oil, is fed by gravitation or pressure to the generator in a thin stream and takes a circuitous course therethrough, the length and area of which when heated is sufficient to first convert the oil into vapor and then superheat the latter, so that when it finally leaves the exit end of generator it is in the form of a highly carbonaceous and non-condensable and permanent gas.

The invention also consists in other details in the construction of the apparatus and in the combination of the several parts, as hereinafter described.

The invention will now be fully described, aided by a reference to the accompanying sheets of drawings, throughout which similar letters of reference will refer to the same parts, Figure 1 showing by a side elevation a gas-generating apparatus with my improvements embodied in it, and Fig. 2 a plan of same; Fig. 3, a vertical section on line 1 1, Fig. 4, of the generator as arranged in an up-draft-furnace; Fig. 4, a horizontal section on line 2 2, Fig. 3; and Fig. 5, a half-sectional plan of the generator on line 3 3 of Fig. 3, while Fig. 6 is a sectional view showing the generator arranged in a downdraft-furnace, Figs. 3 to 6 being shown to a larger scale than Figs. 1 and 2.

An apparatus designed for generating gas from oil, such as kerosene-oil, is shown in the drawings, and it comprises a covered-top cylindrical gas-holder A, assembled in a combined gas-holder and water-tank A′, having gas inlet and outlet stand-pipes. The said tank A′ is seated upon a bed-plate and is provided with an inner cylindrical division a', thus forming two compartments, the outer one forming the annular water lute or tank A^2 and the inner one the lower part of gas-holder. The gas-inlet pipe a^2 is arranged in the annular water-compartment A^2 and extends upward to above the water-line, while the gas-outlet pipe a^3 is arranged in the gas-holder at any desired height.

C is an oil-supply receptacle shown attached to the water-tank A′ at a suitable height, although it may be arranged at any other suitable position, and from said receptacle the oil is led through pipe c to the generator D, which is either arranged in a furnace or above a heating apparatus within a heat-retaining casing.

The generator shown in Figs. 3, 4, and 5 is made of metal, although it may be made of externally-glazed porcelain or other suitable material. It is constructed in the form of a nest or series of telescopic tubes D′ and D^2, suspended from a supporting plate or body D^3, of metal or other suitable material, and through said plate or body D^3 are ports or passages d, connecting in pairs the upper end of the larger or outer tubes D′, the smaller or inner tubes D^2 being connected up in pairs at their top ends by double or U-shaped elbows d'. The lower ends of the outer tubes D′ are closed, the inner tubes D^2 being opened, and terminate just above the closed ends of the outer tubes; also, through said supporting-plate D^3 are flues or vent-holes d^3.

In constructing the generator when of metal each outer tube D′ is threaded at its upper end and secured in the threaded sockets formed in the supporting-plate D^3, said sockets being connected together by the ports d. Again, the inner tubes D^2 are also threaded at their upper ends, and which latter pass neatly through holes in the supporting-plate, while the threaded ends are secured in the threaded sockets of the double or U-shaped elbows d', save and except two of the inner tubes, one of which connects direct with the oil-inlet pipe c and the other with the gas-outlet pipe d^2.

The oil fed by pipe c enters the generator D at the top end of the first inner tube D^2 and leads therefrom to its lower end and from thence up through the annular space between the inner and outer tubes and then through the port or passage d in the supporting-plate D^3 to the upper end of the annular space between the next pair of tubes D′ and D^2, and so on until it passes out from the end of the last tube through pipe d^2 in the form of a non-condensable and permanent gas and is

led therefrom to the cooling apparatus E. Alternatively the oil may be fed to the annular space in the first telescopic tube and then pass through the generator, as before described. Said series of telescopic tubes D′ and D^2 are made with a heating-surface sufficient in area to produce the requisite quantity of gas from a given quantity of oil, and they are incased, when assembled as above described, in an inclosed furnace or chamber F either above a grate F′ or above a gas or other heating apparatus F^2, as shown in Fig. 3, or in a downdraft-furnace, as shown in Fig. 6, the furnace in each case being provided with heat-retaining walls F^3, while said heating apparatus F^2 may be fed automatically with gas from the holder A.

The oil-supply pipe *c* descends from oil-tank C to the inlet branch of generator, and said oil-supply pipe is fitted with a valve or cock *c′*, operated by a lever c^3, worked from a flexible or other connection c^3 from gas-holder.

The cooling apparatus shown in Figs. 1 and 2 consists of a tank E, provided with an air-tight cover *e* and an inner divided removable chamber E′, in which are arranged a series of vertical division-plates or baffles *e′*, said division-plates having a space e^2 alternately at each opposite end of the division-plates to cause the gas to travel snake fashion through the chamber E′. Said cooling apparatus will also act as a condenser at any time that the generator may not be sufficiently heated to convert the oil into a permanent gas, in which case the condensed oil will pass from the condenser E to the overflow-tank e^6, from which it may be withdrawn for further use. By such a provision there is no possibility of liquid hydrocarbons entering the gas-holder. The gas-exit pipe d^2 from genera. or D passes through the cover *e* and is connected to the top of the first compartment in the chamber E′, near its one end, while in the top of the last compartment of the division-chamber is an opening e^3 to allow the gas to pass into the upper chamber E and be led therefrom by the pipe a^2 to the gas-holder A after taking a zigzag or snake-like course through the chamber E′. The tank E is filled with water to just above the height of chamber E′ to cool the gas on its way to the gas-holder, and the cover *e* of tank E is provided with a water-filling plug e^4. At the side of tank E is a water-outlet pipe e^5, which preserves the water-level within chamber E, and said outlet-pipe terminates with a dip leading into a trap or cistern e^6, which catches and retains any condensation. By this invention the gas passes to the holder in a permanent state due to the complete destruction or conversion of the oil while passing up and down through the tubes of the generator, as by so doing the molecules of the oil are destroyed by the sharp turns given it while passing through the said highly-heated tubes of generator.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A generator for the purpose specified composed of a nest or series of telescopic tubes, a supporting-body therefor having ports or passages for connecting the annular passages between the tubes of each adjoining pair together and with the upper ends of each adjoining pair of inner tubes excepting the inlet and outlet ones connected by double or U-shaped bends and with the lower open end of each inner tube terminating just within the solid end of the outer tube substantially as described and shown.

2. A generator for the purpose specified constructed of depending telescopic tubes arranged and supported in the heated chamber of a furnace or the like in such a manner that the oil in its passage therethrough takes a sharp turn at each end of the tubes and exterior elbows connecting certain tubes substantially as and for the purpose specified.

3. A generator for the purpose specified consisting in combination of a nest or series of telescopic tubes D′ D^2, a supporting plate or body D^3 provided with ports or passages *d* and holes to receive the end of tubes D′ D^2, and the vent-holes d^3 the double or U-shaped bends *d′*, the oil-inlet pipe *c* and the gas-outlet pipe d^2 substantially as described and shown.

4. In a gas-generator, the combination of a heating-chamber, a transverse supporting member therein having draft-openings therethrough, series of tubes having closed outer ends and having their inner ends secured in said member, said member having gas-passages from tube to tube, open-end tubes arranged within said first-mentioned tubes and extending through said member and connected together in pairs at the exterior of said member.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT REID.

Witnesses:
BEDLINGTON BODYCOMB,
W. J. S. THOMPSON.