(No Model.)

M. GROSS.

RETORT FOR MAKING GAS.

No. 277,270. Patented May 8, 1883.

Fig: 1.

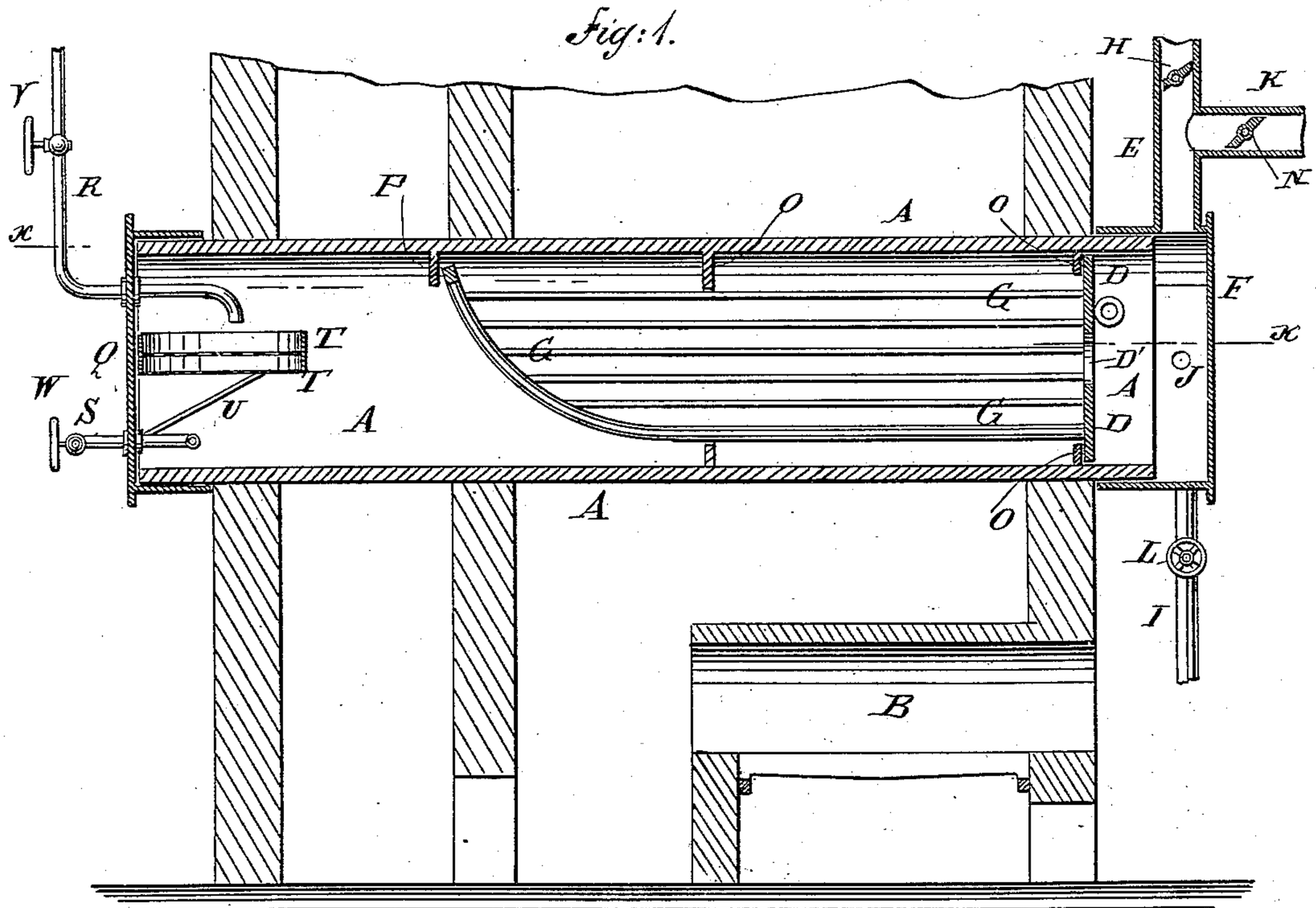


Fig: 2.

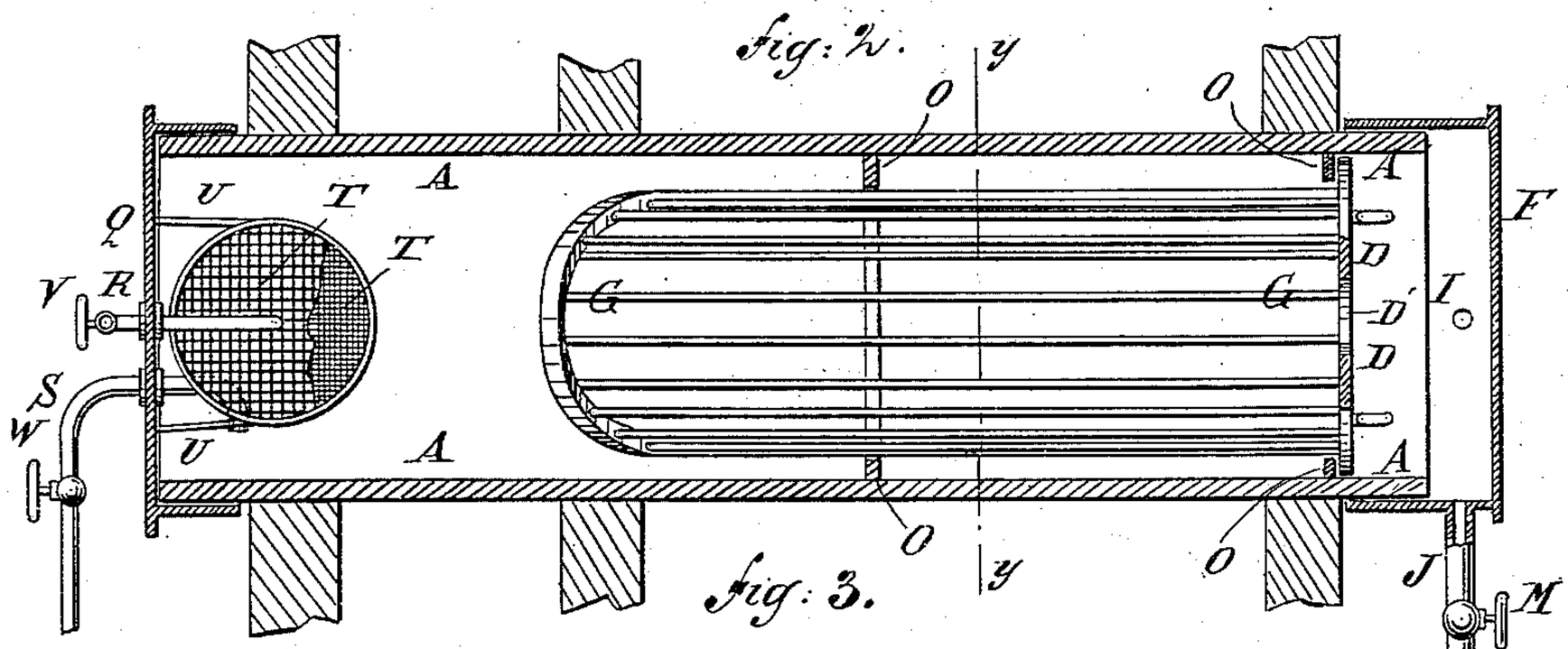
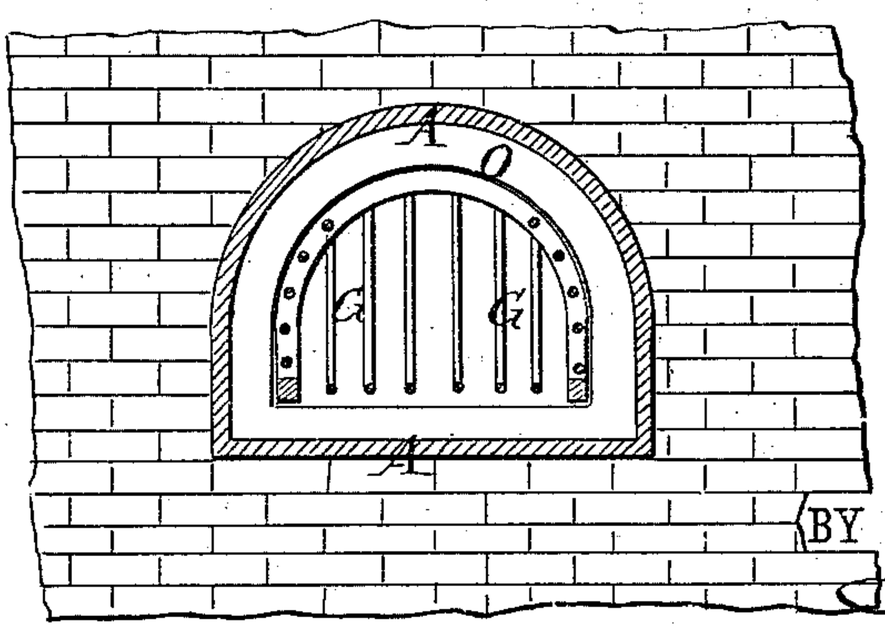


Fig: 3.



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UNITED STATES PATENT OFFICE.

MAGNUS GROSS, OF NEW YORK, N. Y.

RETORT FOR MAKING GAS.

SPECIFICATION forming part of Letters Patent No. 277,270, dated May 8, 1883.

Application filed February 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, MAGNUS GROSS, of the city, county, and State of New York, have invented a new and useful Improvement in Retorts for Making Gas, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of my improved retort and a part of the bench. Fig. 2 is sectional plan view of the same, taken through the broken line *x x*, Fig. 1. Fig. 3 is a sectional end elevation of the same, taken through the line *y y*, Fig. 2.

The object of this invention is to furnish, for the purpose of making illuminating or fuel gas from crude oil, naphtha, or other liquid hydrocarbons and superheated steam, an improved retort, by the aid of which disassociation and readjustment of the constituents of any liquid hydrocarbons and steam can be accomplished simultaneously and in the nascent state, and a gas for lighting and heating will be produced of from eighteen to thirty-six candle-power, and so thoroughly fixed that it will emit neither smell nor smoke while being burned, and which will require no other purification but condensation, and in which the percentage of carbonic oxide is completely under the control of the operator, and the formation of carbonic acid and any explosive-gas mixtures are rendered impossible, for the reason that the access of atmospheric air is wholly prevented.

The retort A is made open at both ends, and is divided practically into three chambers in the manner hereinafter described.

The central part of the retort A, for about three-fifths of its length, is exposed to the full heat of the furnace B, and is kept in a state of high incandescence, and is filled with any convenient highly-porous material. To the center of the upper part of the retort A is secured a piece of chamotte, which projects downward several inches and serves as a flange or bridge to deflect in a downward direction all gases or vapors that strike against it, and which may be replaced by a diaphragm having a central opening, if desired.

Into the retort A, near its forward end and close to the porous material, is hermetically fitted a correspondingly-shaped heavy cast-iron plate, D, in the center of which is formed a circular aperture, D′, about four inches in diameter, through which as an outlet all the gases must pass before they can enter the stand-pipe E, attached to the mouth-piece F in the ordinary manner.

To the plate D may be attached a basket, G, made of strong iron bars, wherein to embed the porous material in case it should be desired to use a combustible substance—as coke, for instance—needing renewal every two or three months. If the porous material used be incombustible the retort need never be opened or the operation of gas-making interrupted except for the purpose of repairing cracks.

The basket G is centered in the retort A by diaphragms O, of chamotte or other suitable material, which have openings formed through them to receive and fit upon the said basket. The forward diaphragm, O, serves as a stop for the plate D to rest against, and also as a cover to the joint between the said plate D and the retort A. The rear diaphragm serves also as a flange to deflect the steam and vapor into the incandescent material whether a basket be used or not. The lower side of the forward end of the basket G is rounded or beveled for convenience in inserting it in the retort, and to the upper part of the retort is attached a downwardly-projecting flange, P, in such a position as to serve as a stop for the basket G, and as a deflector to cause the gases and vapor to enter and pass through the incandescent porous material.

If fuel-gas is to be made in any one of the retorts to serve as a feeder for the bench or boiler furnace or other purpose, the connection with the stand-pipe E is interrupted by closing the valve H placed in the said pipe, and the gas is led to the furnace or other place through the pipes I J, attached to the bottom and side of the mouth-piece F. If the fuel-gas is to go to a holder, it is allowed to pass out through the pipe K, connecting with and projecting horizontally from the stand-pipe E. The pipes I J K are provided with valves L

M N for convenience in controlling the exit of the gas.

To the open rear end of the retort A is attached a cast-iron mouth-piece, Q, of less weight and outward projection than the front mouth-piece, F.

Through an aperture in the center of the upper part of the mouth-piece Q passes the oil-pipe R, and through an aperture in the lower part of the mouth-piece Q passes the pipe S for introducing superheated steam. The pipes R S are provided with valves V W, so that the amount of oil and steam delivered to the retort can be regulated as desired. The inner end of the oil-pipe R is curved downward, so that the oil or naphtha will drop upon hot perforated plates T, made with upwardly-projecting rims, and supported, by rods U or other suitable means, in the middle rear part of the retort A.

The steam-pipe S enters beneath the perforated plates T, and its inner end is bent to one side, so that the entering steam will strike the side of the mouth-piece Q, or of the rear end of the retort A, and will be thrown back and made to commingle with the vapor of the oil or naphtha formed by the contact of the said oil or naphtha with the hot perforated plates T and with the still hotter steam. The mouth-piece Q is thickly coated with a non-conducting cement to prevent loss of heat from radiation and the cooling effect of the outside air. Thoroughly superheated steam and the vapor of oil or naphtha intimately mixed in proper proportions are drawn by the action of a steam jet or exhauster placed between the hydraulic and condenser through the length of the retort, which becomes gradually hotter toward its center. The retort is constantly filled with an atmosphere of incandescent carbon, which causes the ready decomposition of the steam into its elements, and the combination of the said elements in the nascent state with the highly-heated vapors of the liquid hydrocarbon into a compound of fixed combustible gases, consisting mainly of heavy hydrocarbons of the ethylene series, the illuminators proper of light carbureted hydrogen of the methylene series of pure hydrogen, carbonic oxide, and a certain percentage of the vapors of tar, no nitrogen, carbonic acid, ammoniacal or sulphurous compounds, or any other impurities being present or formed to pass out of the retort.

The porous material in the heated part of the retort, the bridge-like projection in the center, and the contracted outlet in the middle of the front plate, D, prevent any of the vapors or gases from leaving the retort before having come in contact with and passing through the incandescent porous material, and thus becoming thoroughly fixed, except such particles of tar as remain suspended in the hot gas till the latter reaches the condenser and the tar drops out of the cooled gas, which, without any further treatment of any kind or manner, is now fit for use.

To insure permanency and uniformity in the operation of gas-making by the use of my improved retort, the said retort should be placed in the bench described in Letters Patent No. 206,724, issued to me August 6, 1878.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A retort for gas-making made, substantially as herein shown and described, with plates to distribute the oil or naphtha, a downwardly-projecting flange for deflecting the gases and vapors downward, a porous material, and a front plate having central aperture, whereby all the gases and vapors will be made to pass through the porous material before reaching the front of the retort, as set forth.

2. In a retort for gas-making, the combination, with the retort A, the oil-pipe R, and the steam-pipe S, of the perforated plates T, substantially as herein shown and described, whereby the oil or naphtha is distributed and made to thoroughly commingle with the superheated steam, as set forth.

MAGNUS GROSS.

Witnesses:
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