June 29, 1937. H. E. RIDER 2,085,510

APPARATUS FOR GENERATING FUEL GAS

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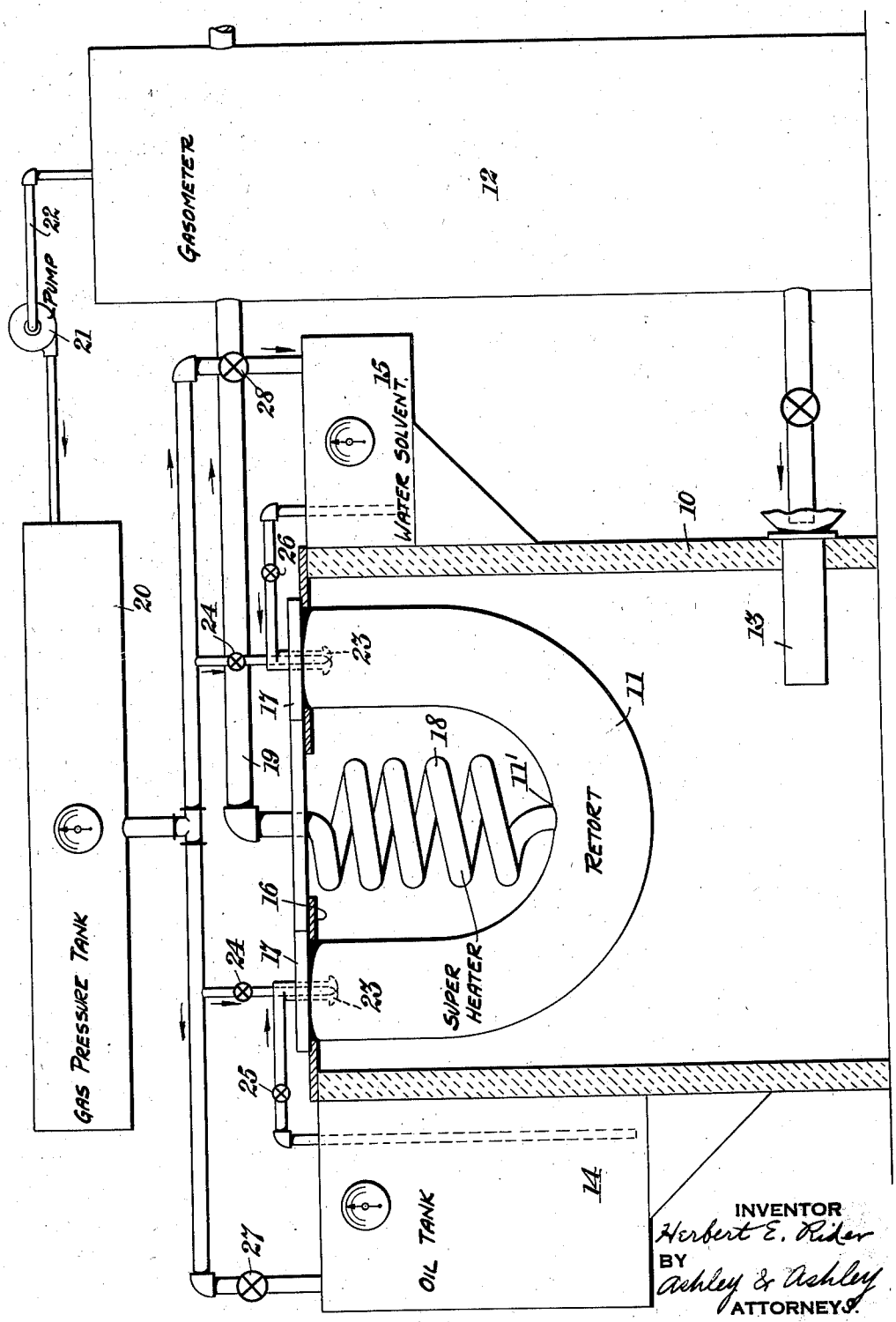

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# UNITED STATES PATENT OFFICE

2,085,510

## APPARATUS FOR GENERATING FUEL GAS

Herbert E. Rider, New York, N. Y., assignor, by mesne assignments, to Henry L. Rosenfeld, Jr.

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3 Claims. (Cl. 48—94)

My invention relates to gas generating apparatus and processes of making hydro-carbon gas. The principal object of my invention is to provide an improved gas generating apparatus of simple construction for generating gas from oil which shall have a high thermal content suitable for brazing and cutting refractory metals.

Referring to the drawing which illustrates my invention and forms a part of this specification, the figure discloses a furnace **10** which may be heated by gas generated in the apparatus or by any desired heating means. I prefer to use the gas generated by the apparatus, thus making a complete independent unit. The gas for heating the retort **11** may be led from the gasometer **12** by a pipe leading to the burner **13**.

**14** indicates a tank for fuel oil and **15** is a tank for holding water in which is intimately incorporated a mixture of molasses, saltpeter and nitric acid in the following proportions: One gallon of molasses, twenty grains of saltpeter, and one quarter fluid ounce of nitric acid to ninety-nine gallons of water. This mixture is led to the retort in the proportion of one part of the water mixture to three parts of oil from tank **14**.

The retort **11** is suspended from a cap plate **16** which rests on the upper end of the furnace wall, as illustrated.

The retort comprises a U-shaped tube which is provided with flanges **17—17** respectively, at each end, and a helical tube or coil **18** which extends from the upper side of the U at **11'** and discharges into pipe **19** leading to the gasometer **12**. A tank **20** is provided for holding the gas generated in the retort under a pressure of about 25 pounds compressed by a pump **21** which draws gas from the gasometer thru pipe **22**. **23—23** respectively, indicate atomizers located in the opposite ends of the U-shaped tube of the retort to which gas is led from the tank **20** thru valves **24—24**, respectively. Valve **25** controls the oil supply from tank **14** to its atomizer, and valve **26** controls the flow of mixture from tank **15** to its atomizer. Valve **27** controls the flow of gas from tank **20** to the oil tank **14**, and valve **28** controls the gas flow to the mixture tank **15**.

The use of the gas to atomize the mixture and the oil dispenses with the use of steam or air, thus providing air-free means for atomizing purposes.

The operation is as follows: The tank **20** may be charged with ordinary illuminating gas in first starting the operation, under a pressure of twenty-five pounds gage. The retort is first heated to a temperature sufficient to gasify the oil, and water mixture, the valves being first closed. The valves **24** are then opened and thereafter the valves **27** and **28** are opened to admit gas to the tanks **12** and **14**, whereupon the valves **25** and **26** are opened and, by properly adjusting them, the oil and water mixture are introduced into the retort in the proper proportions, about three parts oil to one part of the water mixture, in finely atomized condition, and converted into gases. The respective gases then mix in the lower end of the retort and flow into the superheater coil and thence into the gasometer.

If desired, cooling means may be used to cool the gas after it leaves the coil and prior to its passage into the gasometer. It will be understood that the gas pressure in the retort and gasometer is very low relative to that in the tanks. Also, it will be noted that the use of the fuel gas product as a medium for exerting feed pressure on the contents of the tanks **14** and **15** obtains a safety from fire or explosion not possible where air might be permitted to enter the system.

The foregoing description taken in connection with the accompanying drawing discloses the principles of an apparatus which will be readily understood by those skilled in the art to which the invention appertains and comprises what I now consider to be the best embodiment thereof. I desire to have it understood, however, that the apparatus shown is merely illustrative and that such changes may be made, when desired, as fall within the scope of the following claims.

I claim:

1. A gas generator comprising a heating chamber, a retort of U-shape suspended in said chamber from the cover thereof, an atomizer for liquid located at each upper end of said retort, and a super-heating unit having its lower end in communication with said retort near the middle thereof, and an outlet for gas at the other end of said unit.

2. A gas generator comprising a heating chamber, a vertically extending U-shaped cylindrical retort suspended from the cover of said heating chamber, the upper ends of the retort being provided with means for delivering fluids therein, and an outlet conduit from said retort connected therewith at a point adjacent its lower end.

3. A construction as defined in claim 2, having a super-heater located between the arms of the U-shaped retort and connected therewith at its lower end.

HERBERT E. RIDER.