C. D. McHENRY.

GAS GENERATING APPARATUS.

APPLICATION FILED FEB. 9, 1914.

1,154,869.

Patented Sept. 28, 1915.

Fig. 1

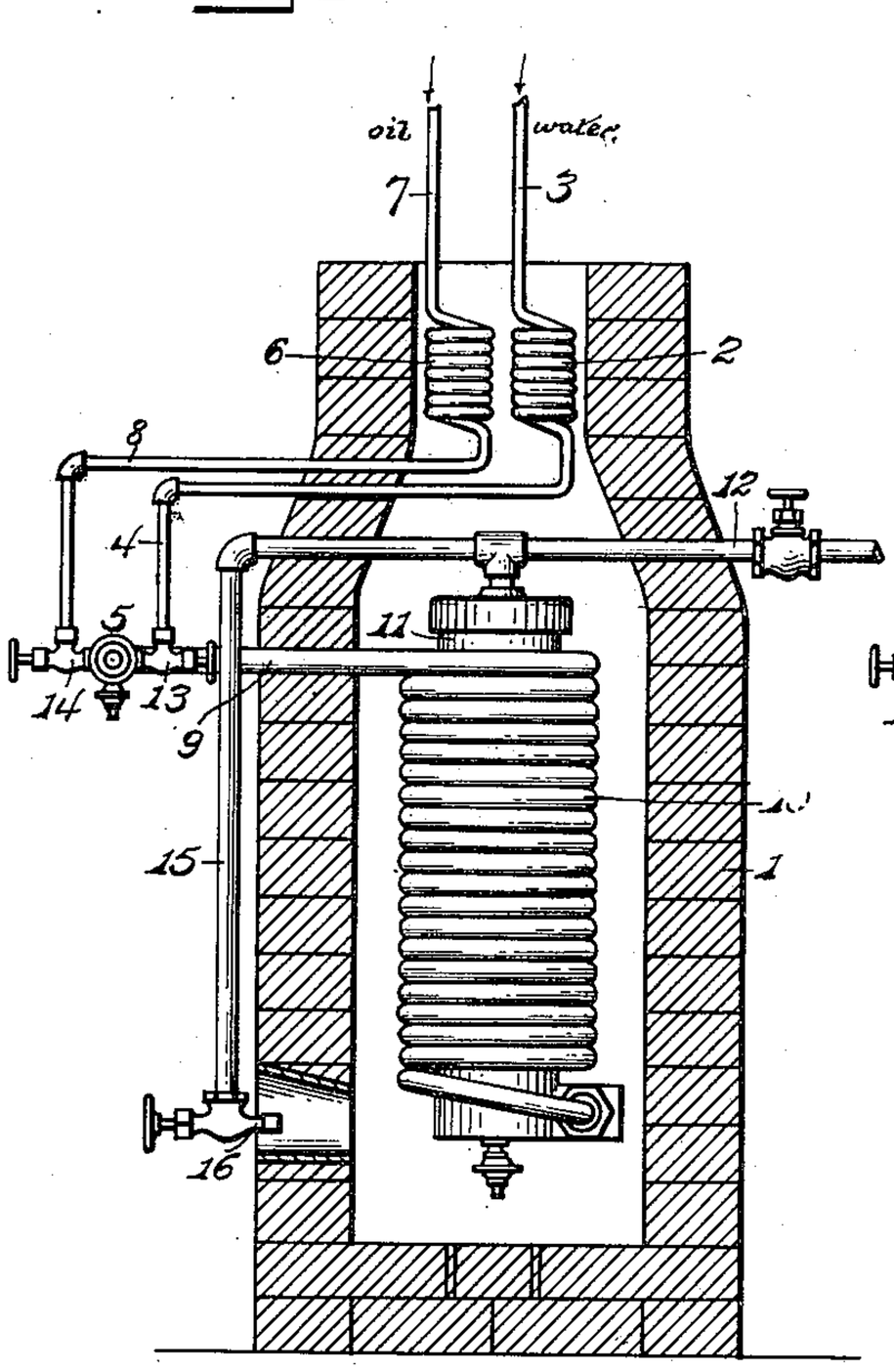



Fig. 2

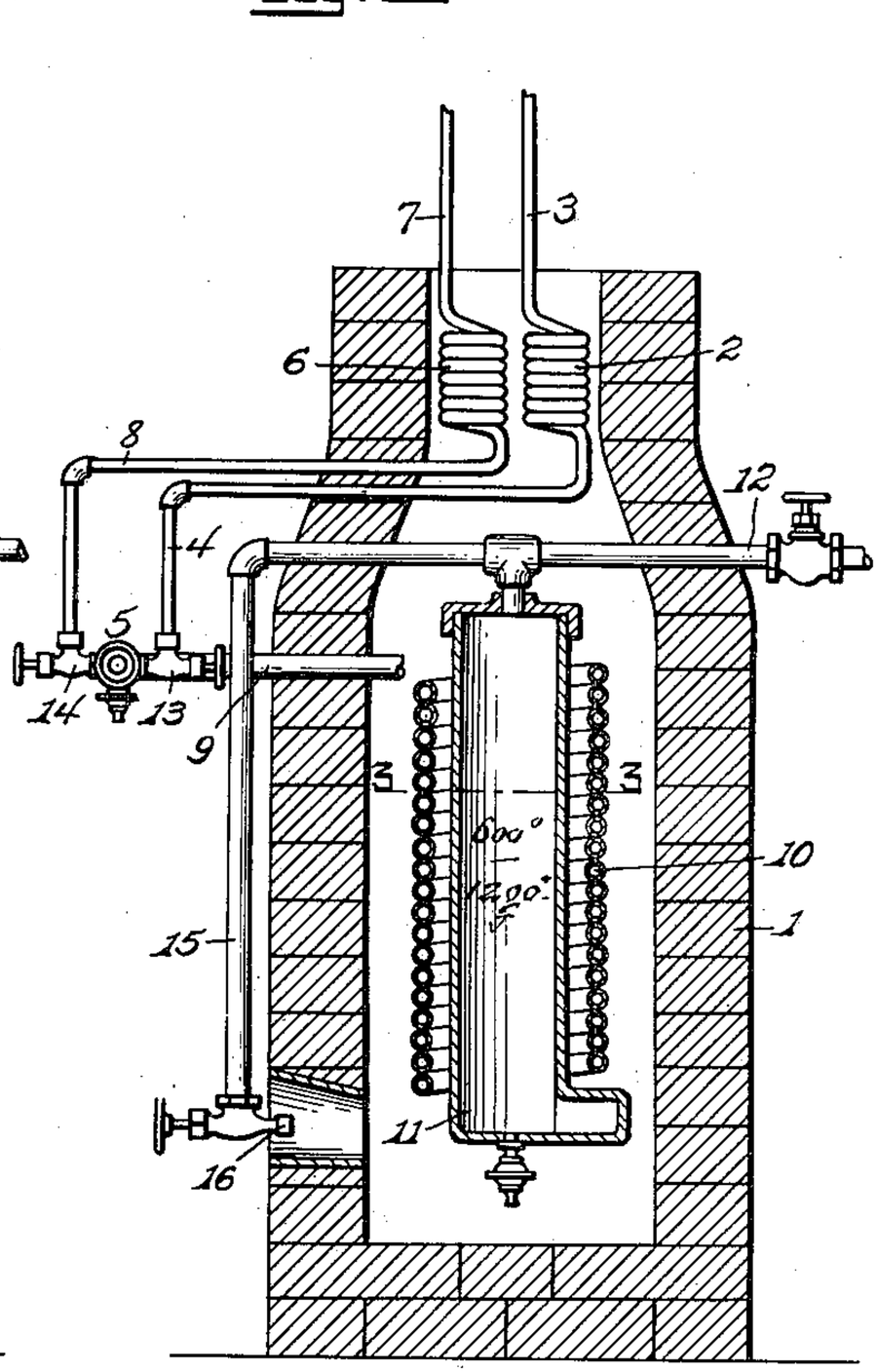
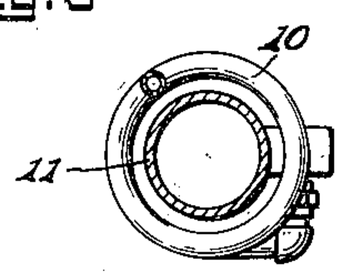



Fig. 3




WITNESSES:

J. E. Arthur

H. F. Keefer.

INVENTOR

Clyde D. McHenry

BY N. E. Dunlap

ATTORNEY.

# UNITED STATES PATENT OFFICE.

CLYDE D. McHENRY, OF MARTINS FERRY, OHIO.

## GAS-GENERATING APPARATUS.

1,154,869. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed February 9, 1914. Serial No. 817,410.

*To all whom it may concern:*

Be it known that I, CLYDE D. McHENRY, a citizen of the United States of America, and resident of Martins Ferry, county of Belmont, and State of Ohio, have invented certain new and useful Improvements in Gas-Generating Apparatus, of which the following is a specification.

This invention relates broadly to gas generators, and specifically to an apparatus for producing fuel gas from oil.

The primary object of the invention is to provide an apparatus for readily converting mineral oils, and particularly oils of low grade, as crude oil, asphaltum oil, and the like, into a fuel gas having a high thermal efficiency.

A further object of the invention is to provide an apparatus whereby a fuel gas of high calorific value is economically produced from an admixture of oil and water.

With these and other objects in view, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be exemplified, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view showing the furnace in vertical section and showing the generator and associated parts in side elevation; Fig. 2 is a view showing both the furnace and generator in vertical section; and Fig. 3 is a horizontal section of the generator, taken on the line 3—3, Fig. 2.

Referring to said drawings, in which like designating characters distinguish like parts throughout the several views, 1 indicates a furnace, preferably circular in form, which may be constructed of a refractory material, as brick, or of any other suitable material having a refractory lining. Located at a suitable point, as within the stack portion of said furnace, so as to be heated by the waste heat arising therethrough, is a pipe coil 2 to which oil is conducted under pressure, as by a pipe 3, and from which oil is conducted, as by a pipe 4, to a suitably located emulsifier, designated generally by the numeral 5. Also located within the stack portion of the furnace is a second coil 6 to which water is conducted under pressure, as by a pipe 7, and from which water is conducted, as by a pipe 8, to said emulsifier 5. Said emulsifier serves to thoroughly commingle, or emulsify, oil and water in any desired proportion, suitable controlling valves 13 and 14 being therein provided whereby the proportions of oil and water, respectively, may be regulated to any desired extent. The preliminary heating to which the oil is subjected in passing through the coil 2 acts to materially lessen the degree of viscosity of said oil prior to its passage to the emulsifier, while the preliminary heating of the water renders the same more readily commingable with the oil, thus faciliating the production of an emulsion of the oil and water.

The emulsion passes from the emulsifier 5, as through a pipe 9, to the upper end of a pipe coil 10 which forms a part of a gas generator located within the furnace 1, said generator comprising said coil 10 and an upright hollow cylinder or expansion tank 11 encircled by said coil. The lower end of said coil 10 communicates with the lower end of the tank 11 which has a cross sectional area greatly exceeding that of said coil, and the upper end of said tank communicates through a pipe 12 with a burner or blast nozzle (not shown) located at the point where the gas produced is to be consumed. The emulsion passes downward through the coil 10 by gravity, and in its passage is subjected to an intense heat, the interior of the furnace 1 and, consequently, of said generator being maintained at a temperature ranging above 600° F., or from 600° F. to 1200° F., experience having demonstrated that such high temperature is conducive to the production of the best results. The said intense heat acts to vaporize, or volatilize, the emulsion, the oil being converted into gas, and the water being converted into a highly superheated or dry steam gas in the presence of the gases generated from the oil. The oxygen of said steam gas is immediately taken up and united with the heated carbon of the gases produced from the oil, and the resultant gas produced possesses a calorific value much in excess of that of gas generated from the oil alone. The gas generated in passing through the coil 10 passes to the interior of the expansion tank 11 which is directly subject to the heat generated within the furnace whereupon the gas is caused to expand and to become highly superheated before it is permitted to escape from the top of said tank to and through the pipe 12 leading to the point of consumption (not shown),

which point is preferably located in close proximity to the furnace 1 so that the gas may be used promptly, or before it becomes appreciably cooled, resulting in a high degree of efficiency being attained for producing heat at the combustion point. The generation of gas may be regulated as required to furnish at the combustion point any desired supply of gas within the capacity of the generator, such regulation being accomplished by adjustment of the valve 17 of the emulsifier 5, which valve controls the supply of the emulsion furnished to the generator. The interior of the furnace 1 may be heated by any suitable means as by coal, wood, or natural gas introduced thereinto. However, when once heated to a point where the generation of gas has commenced, a portion of said gas may be utilized within said furnace, a branch pipe, as 15, being arranged to conduct said gas to a suitable burner or nozzle, as 16, by means of which regulatable blasts of flame are directed into the furnace at a suitable point, as shown.

I claim—

1. A gas generating apparatus comprising a furnace, means located outside said furnace for producing an emulsion of oil and water, means for controlling the proportions of said fluids emulsified, means whereby said fluids are conducted under pressure to the emulsifier, a pipe coil to which the emulsion is delivered from said emulsifier, said coil being located within said furnace, and an expansion chamber in which the gases generated within said coil are expanded and superheated.

2. A gas generating apparatus comprising a furnace, means located outside said furnace for producing an emulsion of oil and water, means for controlling the proportions of said fluids emulsified, means whereby said fluids are conducted under pressure to the emulsifier, the last mentioned means including coils located in said furnace and in which said fluids are preheated, a pipe coil through which the emulsion gravitates from said emulsifier, said coil being located within said furnace, and an expansion tank of relatively large cross sectional area to which the gases generated within said coil are delivered and in which they are expanded and superheated.

3. A gas generating apparatus comprising a furnace, means located outside said furnace for producing an emulsion of oil and water, means for controlling the proportions of said fluids emulsified, means whereby said fluids are conducted under pressure to the emulsifier, the last mentioned means including coils located in said furnace and in which said fluids are preheated, a pipe coil through which the emulsion gravitates from said emulsifier, said coil being located within said furnace, and an expansion tank of relatively large cross sectional area to which the gases generated within said coil are delivered and in which they are expanded and superheated, said tank being encircled by said coil and communicating at its lower end with the lower end of said coil.

In testimony whereof, I affix my signature in presence of two subscribing witnesses.

CLYDE D. McHENRY.

Witnesses:
JAMES M. NOBLE,
H. E. DUNLAP.