

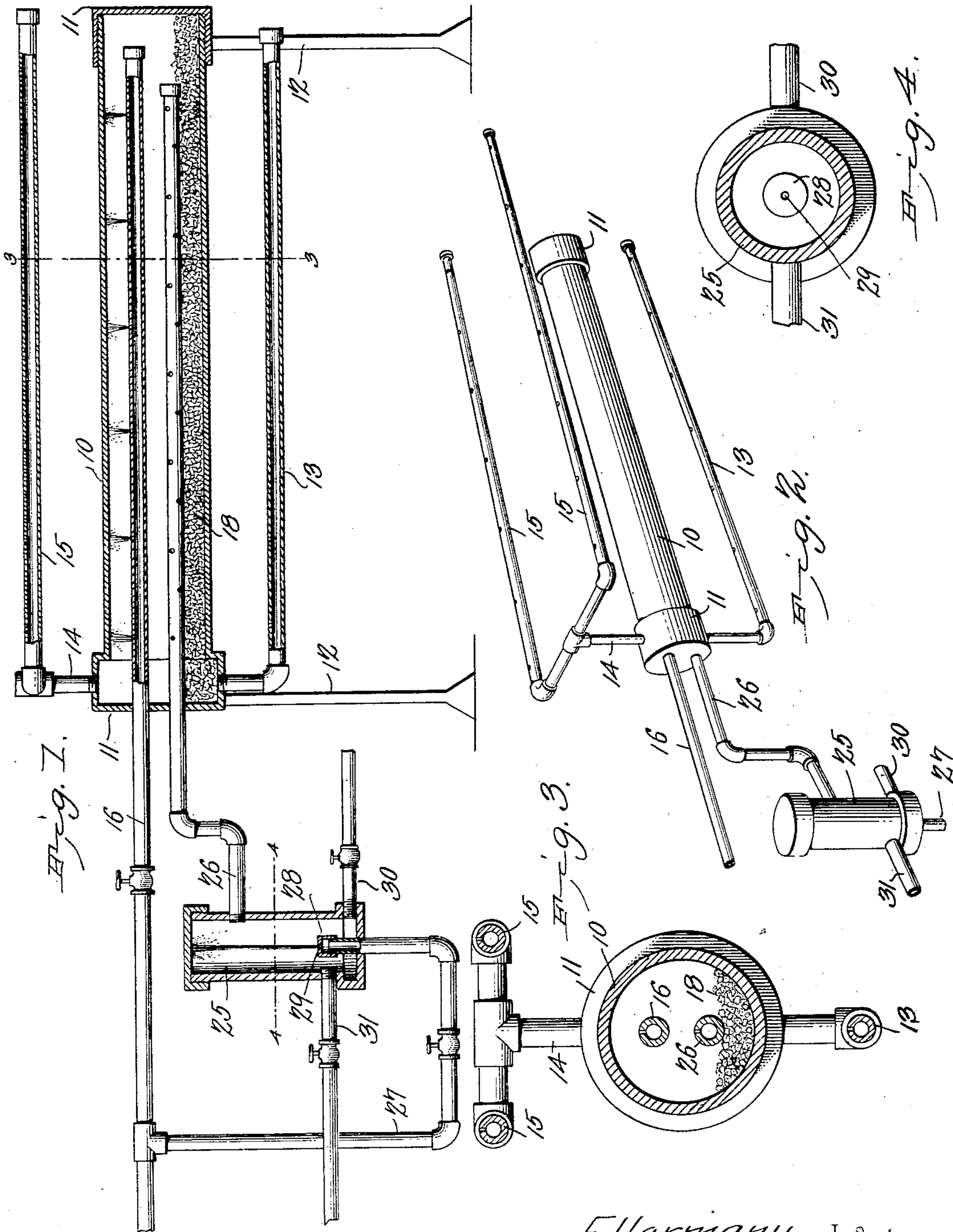
No. 750,764.

PATENTED JAN. 26, 1904.

F. HARMANY.
CARBURETER.

APPLICATION FILED NOV. 24, 1902.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERIC HARMANY, OF MARIETTA, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF PART TO IDA M. BUTTS, JAMES McCORMICK, FORREST CLYMER, AND JAMES B. McCORMICK, OF MARIETTA, OHIO.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 750,764, dated January 26, 1904.

Application filed November 24, 1902. Serial No. 132,612. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC HARMANY, a citizen of the United States, residing at Marietta, in the county of Washington and State of Ohio, have invented a new and useful Device for Vaporizing and Burning Hydrocarbon Oils, of which the following is a specification.

This invention relates to improvements in devices for vaporizing and burning hydrocarbon oils, and has for its object to provide a construction by which a substantially fixed gas may be produced from the oil which will burn with complete consumption of the carbon and will give the highest heat possible and at the same time the device shall be free from liability of clogging from condensation of the gas or deposit of carbon.

With this object in view the invention comprises means for mechanically breaking up or atomizing the oil and mixing the vapor thus formed with air to form a combustible mixture at a comparatively low temperature and before the oil is subjected to high heat and a burner to which the mixture is conveyed.

The invention also comprises the combination, of the means for atomizing the oil and mixing the vapor with air, with a burner comprising a retort-vaporizer in which the mixture coming from the atomizing and mixing device is subjected to high heat to convert it into a substantially fixed gas before it is conveyed to the burner proper.

The invention further comprises the construction and combination of parts hereinafter described, and particularly pointed out in the claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a sectional elevation of a burner and retort-vaporizer constructed in accordance with my invention. Fig. 2 is a detail perspective view of the same. Fig. 3 is a transverse sectional elevation through the retort on the line 3 3 of Fig. 1. Fig. 4 is a sectional plan view of the mixing-chamber on the line 4 4 of Fig. 1.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The burner in the present case is intended for use for heating purposes in general and may be placed within the combustion-chamber of a steam-boiler furnace or at any other required point.

The retort-vaporizer is preferably in the form of an elongated cylinder 10 having removable end caps 11, said retort being supported in place in any suitable manner, as by standards 12. Extending under and parallel with the retort is a gas-pipe 13, connected at one end with the retort and receiving gas therefrom to be conducted through a plurality of burner-orifices in the pipe, the flame impinging directly on the retort and heating the same to an extent sufficient to vaporize the hydrocarbon contained therein. The gas employed for heating the steam-boiler or other purpose is discharged from the retort through a pipe 14, which may be connected to one or more burner-pipes 15, having discharge-openings adjacent to the retort or at any required distance therefrom.

The oil in liquid form may be fed to the retort through a valved pipe 16, provided at a point inside the retort with a plurality of discharge-openings, which are formed at the top of the pipe in order that the oil entering under pressure may be forced in the form of minute jets against the top of the retort and thence fall in the form of a spray toward the highly-heated lower portion of the retort. In the lower portion of the retort is placed a quantity of refractory material 18 in the form of broken fire-brick or the like, which will act to store heat and in the event of the deposit of any heavy impurities will subject the latter to a high temperature for purposes of distillation, the mixture of oil-vapor and the distillate escaping through the several burner-pipes and will be consumed.

Where the oil used is crude and contains a comparatively large percentage of impurities, it is preferred to introduce it into the retort in connection with a quantity of air, the liquid

being first reduced to an atomized condition in order that the heat of the retort may act more effectually thereon to convert the same into gas, and in this connection provision is also made for a partial mechanical separation of such of the heavier impurities as it may be desired to remove from the atomized liquid before entering the retort. To this end I employ a mixing and atomizing chamber 25 in the form of a vertically-disposed cylinder or tube having upper and lower removable caps and provided at a point near its upper end with a discharge-pipe 26, leading into the retort-vaporizer and provided with perforations within the retort for the escape of the atomized liquid. Extending into the lower portion of the mixing-chamber is a valved pipe 27, connected to a source of supply, as the pipe 16, and the upper end of said pipe 27 is provided with a cap or plug 28, having a centrally-disposed discharge-orifice 29 of very small diameter. The liquid hydrocarbon is forced under pressure through the orifice 29 in the form of a minute jet which strikes against the upper cap of the mixing-chamber, which acts as a fixed abutment against which the jet of oil impinges and by which it is broken up into minute particles, which are thence deflected downwardly toward the bottom of the chamber as a spray or vapor, the separation of heavier impurities which may have been held in suspension in the oil being assisted by gravity and these impurities falling to the bottom of the chamber, from which they may be withdrawn from time to time through a discharge 30, while the atomized liquid passes through the pipe 26 into the retort. In one side of the mixing-chamber is an opening through which passes a valved air-pipe 31, leading from a compressed-air reservoir or the like, the inner end of the pipe being directed in a radial line toward the oil-inlet pipe 27, but in a horizontal plane below the cap 28, so that the entering air-jet will not interfere with the upward movement of the small jet of oil issuing through the orifice 29. The air-jet impinges against the cap and the oil-pipe, its force being broken and the tank and cap acting as deflectors to divide the current and form, in effect, a horizontal wall or partition of air through which the atomized oil tends to fall by gravity, while the air in seeking an outlet moves bodily upward within the mixing-chamber and becomes thoroughly saturated with the atomized oil and carries the same in the form of a vapor through the pipe 26 into the retort to be there subjected to the action of heat, by which the mixture is converted into a substantially fixed combustible gas, which is conveyed to the burner and is burned in the combustion-chamber as a gas with complete combustion of the carbon.

In operating the burner and retort-vaporizer it is generally preferred to introduce the air and atomized oil from the mixing-chamber

alone, the valve in the oil-supply pipe 16 being closed; but should a heavier or richer gas be required the valve in the pipe 16 is opened and the oil in its liquid form is forced through said pipe and discharged in minute jets against the top of the retort. In striking the top of the retort the small jets of oil are broken up practically into the form of a vapor, which gradually sinks by gravity toward the bottom of the retort, the breaking up or disintegration of the body of oil rendering the action of the heat much more effective in effecting the vaporizing or gas-forming process.

In starting the device the valves controlling the supply of oil and air to the mixing-chamber are opened and the mixture of atomized oil and air is formed as above described. The mixture passes to the retort and from the retort to the burner-orifice in pipes 13 and 15, where it is lighted and burns as a vapor, probably consisting of the more volatile hydrocarbons and air. The retort being cold at starting, the mixture as it comes from the mixing-chamber passes without change to the burners, except that probably the heavier hydrocarbons condense to a greater or less extent in the retort. As soon as the vapor is lighted the retort begins to be heated, and as it heats up the heavier hydrocarbons, if any, condensed in the retort are vaporized and converted into gas. As the device continues in action the mixture coming to the retort from the mixing-chamber is subjected to high heat and is converted into a substantially fixed gas and is conveyed to the burner as a gas.

After the retort has become sufficiently hot the valve admitting oil to the pipe 16 may be opened to discharge oil more or less vaporized by the heat of the retort into the retort, where it is converted into gas and mixed with the gas formed from the mixture coming from the mixing-chamber, forming a richer gas than would be formed from the atomized oil and air alone.

Having thus described the invention, what is claimed is—

1. The combination in a device for vaporizing and burning hydrocarbon oils, of a mixing-chamber provided with a fixed abutment, a discharge-orifice within the chamber below the abutment, means for forcing a fine stream or jet of oil through the discharge-orifice upwardly against said abutment, by which it is deflected downward in the form of spray or vapor, means for introducing air into the mixing-chamber below the discharge-orifice to mix with the spray or vapor to form a combustible mixture, means for heating the mixture thus formed to convert it into a substantially fixed gas, and means for conveying the gas to a burner; substantially as described.

2. The combination in a device for vaporizing and burning hydrocarbon oil, of a mixing-chamber provided with a fixed abutment, a discharge-orifice within the chamber below

the abutment, means for forcing a fine stream or jet of oil through the discharge-orifice upwardly against said abutment, by which it is deflected downward in the form of spray or vapor, means for introducing air under pressure into the mixing-chamber below the discharge-orifice to mix with the spray or vapor, a retort-vaporizer, a connection from the mixing-chamber to the retort-vaporizer for conveying the mixture thus formed to the retort-vaporizer, and a burner connected with the retort-vaporizer and arranged to heat the same; substantially as described.

3. In a device of the class specified, the combination with a retort, of means for heating the retort, a mixing-chamber, an oil-supply pipe leading into the mixing-chamber and provided with a discharge-orifice for directing a jet of oil against the top of the mixing-chamber, an air-supply pipe leading into the lower portion of the mixing-chamber at a point below the discharge-orifice and adapted to direct a jet of air into contact with the oil-pipe, and a piping connection between the mixing-chamber and the retort for conveying the air and atomized oil from the mixing-chamber.

4. The combination with the retort, of means for heating the retort, a mixing-chamber closed at its upper and lower ends, an oil-supply pipe leading into the lower end of the mixing-chamber and provided with a perforated cap through which a jet of oil may be discharged against the top of the mixing-chamber, a radially-disposed air-supply pipe leading into the mixing-chamber at a point below the perforations of the cap and adapted to direct a jet of air against the cap and upper portion of the oil-supply pipe, and a pipe leading from the upper portion of the mixing-chamber into the retort and there provided with orifices, the upward-moving body of air in the mixing-chamber meeting the deflected jet of oil in said chamber and becoming saturated with the oil before its passage through the pipe leading to the retort.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FREDERIC HARMANY.

Witnesses:

C. E. DOYLE,
J. ROSS COLHOUN.