Jan. 9, 1934. J. A. DE GREY 1,942,956

APPARATUS FOR MAKING EXPLOSIVE GASEOUS MIXTURES

Filed July 7, 1930

Fig. 1.

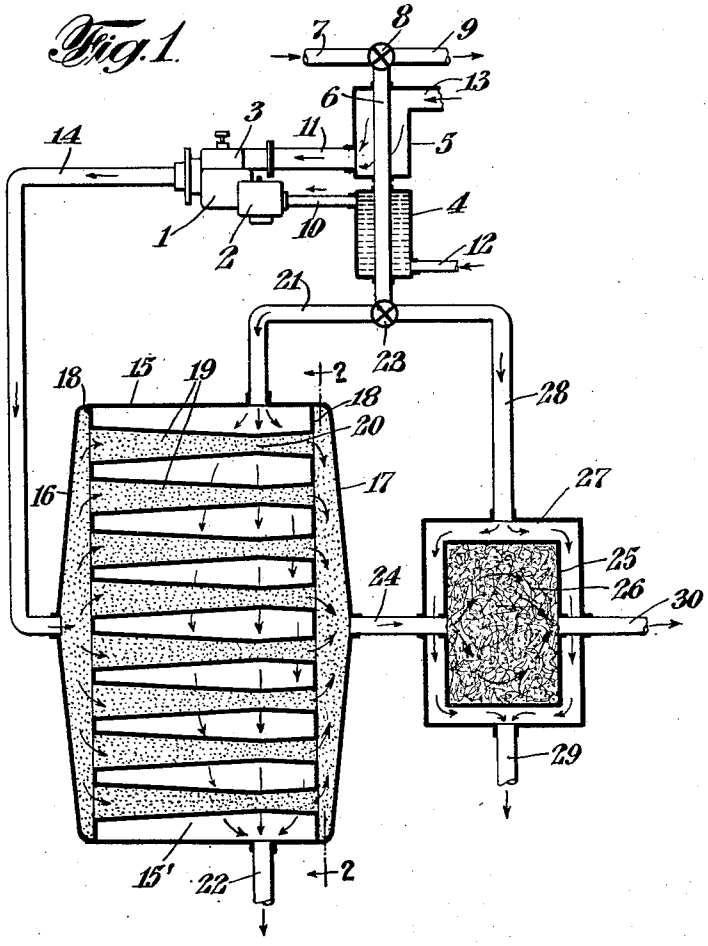
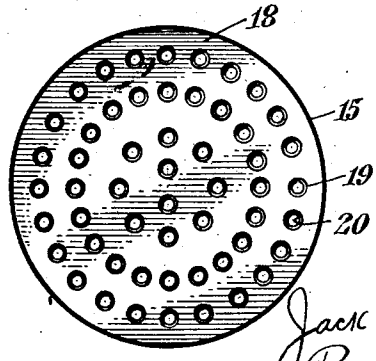


Fig. 2.



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Patented Jan. 9, 1934 1,942,956

UNITED STATES PATENT OFFICE

1,942,956

APPARATUS FOR MAKING EXPLOSIVE GASEOUS MIXTURES

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Application July 7, 1930, Serial No. 466,027, and in France July 10, 1929

2 Claims. (Cl. 48—180)

This invention relates to improvements in methods of and apparatus for making explosive gaseous mixtures from ordinary liquid fuel or low grade hydrocarbons to be utilized in internal combustion engines.

One object of the invention is to provide a method and apparatus for changing heavy liquid hydrocarbons or low grade hydrocarbons into a rich, stable gas adapted to be used in internal combustion engines, the method involving the use of a catalyst or catalytic agent.

Another object of the invention is the provision of a method of and apparatus for atomizing heated hydrocarbons and mixing heated air therewith and then passing the mixture through a catalytic chamber to produce a highly explosive mixture to be used in internal combustion engines.

A further object of the invention is the provision of a highly explosive mixture the use of which produces better and more economical operation of internal combustion engines.

Other objects and advantages of this invention will be in part obvious and in part specifically pointed out in the description hereinafter contained which, taken in conjunction with the accompanying drawing, discloses a device adapted to be operated and a method adapted to be practiced in accordance with the invention.

In the drawing:

Figure 1 represents a diagrammatic showing of the invention.

Figure 2 is a vertical section taken on line 2—2 of Figure 1 looking in the direction of the arrows.

Referring now to the drawing, a carburetor 1 is provided having a liquid chamber 2 and an air inlet 3. Before passing to the carburetor, the air and liquid fuel are heated by means of hot exhaust gases. A liquid heating chamber 4 is provided for heating the liquid fuel and an air heating chamber 5 is provided for heating the air prior to its passage to the carburetor. The heating chambers 4 and 5 are separate, and each encases the pipe 6, which is in communication with a pipe 7 leading from the exhaust pipe, a valve 8 being provided which affords a means for regulating the amount of exhaust gas which passes through pipe 6 and pipe 9 which can be operated as a by-pass. The liquid heating chamber 4 is connected to the liquid chamber 2 by means of a pipe 10, and the air heating chamber 5 communicates with the air inlet 3 by means of a pipe 11. The heating chamber 4 is provided with a liquid fuel inlet 12 and heating chamber 5 is provided with an air inlet 13. The air and liquid fuel in the air and liquid chambers, before passing to the carburetor are heated to a suitable temperature by the heated pipe 6 which conducts hot exhaust gases and heats the air and liquid fuel in chambers 4 and 5 by conduction only, there being no mixing of the exhaust gases with the air or fuel. However, it is to be expressly understood that different temperatures may be necessary for the different fuels, and a heavy fuel oil will require a different temperature than a lighter liquid fuel.

The carburetor 1 atomizes and pulverizes the hot liquid fuel and mixes the heated air therewith. The fuel may be ordinary motor fuel, fuel oil, heavy or low grade hydrocarbons, heavy oils obtained from the distillation of crude oil or coal tar, and oils obtained from the low temperature distillation of coals, shales, or peats.

From the carburetor 1 the carbureted mixture passes through a pipe 14 to a drum 15 provided with converging front and rear walls 16 and 17, respectively, which cause the mixture to be evenly distributed throughout the drum 15. As shown, the pipe 14 is positioned substantially centrally of front wall 16. At each end of the drum a perforated end plate 18 is welded or otherwise secured to the inside wall of drum 15. Mounted within the perforations and connecting the two plates 18 is a plurality of tubes 19, each tube having a Venturi nozzle 20 near one end. These tubes 19 assist in thoroughly mixing the atomized hydrocarbon and the air, by dividing the carbureted mixture into a plurality of streams. The Venturi nozzle 20 functions to assist in further mixing the atomized hydrocarbon and the air and also to vaporize any fuel which may have condensed in the apparatus. It is to be expressly understood, however, that the number of tubes may be varied for different engine sizes and different liquid fuels.

The plates 18 in which the tubes 19 are mounted form, with the preferably cylindrical casing of the drum 15, a chamber 15' through which exhaust gases from the pipe 21 are led from the exteriors of the said tubes to heat them, the said gases escaping through the pipe 22. The pipe 21 is connected to pipes 6 and 7 to conduct hot exhaust gases thereto, the valve 23 being provided in order to regulate the amount of exhaust gases passing to the heating chamber 15'. It is to be noted that the pipe 21 directs the heated exhaust gases against the Venturi nozzle section 20 of each tube 19, so that the Venturi nozzle section is the hottest part of each tube 19. The

heating action being most efficient in the Venturi nozzle or narrow section of each pipe, the restricted opening facilitates vaporization of the carbureted mist.

A pipe 24 connects the drum 15 with a catalyzing chamber 25, the said tube being positioned approximately centrally of the converging rear wall 17 of the drum 15. This catalyzing chamber is filled with a catalytic agent or catalyst 26 for cracking the heavy components of the fuel into lighter components. The catalysts or catalytic agents 26 which may be used include metals, such as iron, manganese, copper, nickel, platinum, or similar metals, the oxides or salts of such metals, carbonaceous materials, such as wood charcoal, peat charcoal, brown coal semicoke, and activated charcoal, or inert materials, such as pumice, asbestos, silica gel, kieselguhr, Florida earth, or other earth having the same properties.

The Florida earth is a bauxite earth of Florida especially used in oil refining.

The catalyzing chamber 25 is surrounded by a heating chamber 27 provided at its top with a tube or pipe 28 which communicates with pipes 6 and 7 to conduct hot exhaust gases around the catalyzing chamber 25, a pipe 29 being provided at the bottom of the heating chamber 27 to conduct the hot exhaust gases away from the heating chamber 27. A tube or pipe 30 is connected to one side of the catalyzing chamber to lead the treated gaseous explosive mixture to an internal combustion engine.

The method of practicing the invention will now be described. The liquid fuel in the carburetor and the air entering the carburetor are heated so that more efficient vaporization and better atomization are secured. The action of the carburetor atomizes the heated liquid, and mixes the heated air therewith, and the carbureted mixture then passes through the plurality of heated pipes or tubes 19 in heated drum 15. The heated mixture is improved by being divided into numerous streams in passing through the tubes 19, and also by passing through their Venturi nozzles 20. The Venturi nozzles are heated to a higher temperature than the remainder of the tubes 19 due to the fact that the hot exhaust gases from pipe 21 are directed toward the Venturi nozzles, and this facilitates vaporization and mixing, and the Venturi action also tends to prevent the settling of any particles of liquid which may have condensed in the apparatus. The heated mixture now passes to the heated catalyzing chamber 25 where the cracking or thermal decomposition of the heavier components of the liquid fuel is obtained to produce explosive gaseous mixtures. A perfect gaseous mixture of air and hydrocarbon vapors is produced, which mixture is highly explosive, and when used in internal combustion engines results in increased mechanical and thermal efficiency. The explosive gaseous mixtures formed in the apparatus and present in the heated catalyzing chamber 25 may now be conducted to the inlet of an internal combustion engine.

While I have described the best embodiment of the apparatus and method of my invention known to me, such embodiment is to be taken only as typical of many possible embodiments, and my invention is not to be confined thereto.

What I claim is:

1. An apparatus of the character described, comprising a plurality of tubes, means for conducting a gaseous mixture through said tubes, a catalytic chamber, and means for conducting the gases from said tubes through said chamber.

2. An apparatus of the character described, comprising a plurality of tubes, means for conducting a combustible gaseous mixture through said tubes, a catalytic chamber, means for conducting the gases from said tubes through said chamber, and means for heating said catalytic chamber.

JACK ARNOUL DE GREY.