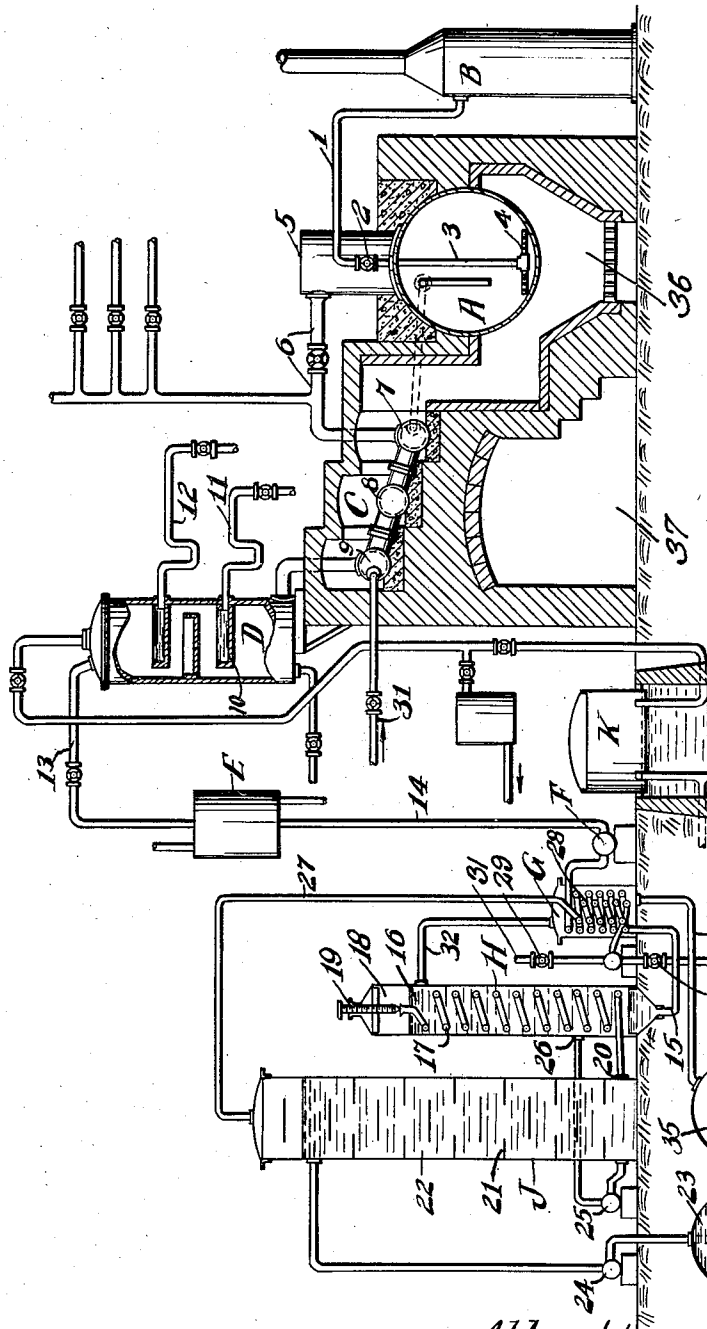
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METHOD AND MEANS OF PRODUCING ANTIKNOCK FLUID

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METHOD AND MEANS OF PRODUCING ANTIKNOCK FLUID

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This invention relates to a method and means of producing anti-knock fluid of the type commonly used in internal combustion engines. At the present time, it is customary to use a peroxide of lead in small quantities in gasoline in order that the gasoline shall not produce what is known as "ping" in high compression engines.

The present invention relates to the production of an anti-knock gasoline without utilizing some extraneous means, such as lead peroxide.

An object of the invention is to produce an anti-knock gasoline which is not detrimental to the working parts of an engine. It is generally known that anti-knock gasolines on the market today have a tendency to eat out valves, gaskets, and also produce so-called "sticky" valves to the end that the engine does not run evenly at low speeds. With this invention, it is possible to produce an anti-knock fluid, such as gasoline, in an inexpensive manner, which will give sustained power to the engine and without the necessity of appreciably increasing the cost of the gasoline.

Prior investigators have attempted to produce a so-called anti-knock gasoline by the introduction of coal oil or kerosene which acts to prevent an immediate explosion of the gasoline and thus do away with a knock. It is generally known in the industry that the so-called knock is caused by the gasoline itself and not by the metal and secondly, anything that would retard the immediate explosion would overcome the so-called knock. However, such fluids tend to carbonize the interior of the engine and require frequent valve grinding which, of course, is undesirable. Furthermore, it is impossible to accurately determine the amount of coal oil or kerosene that should be mixed with the gasoline to produce the anti-knock fluid.

The present invention overcomes the difficulties above mentioned in a simple manner and permits the manufacture of so-called anti-knock gasoline in a rapid, efficient and exact manner and in a manner in which the results to be obtained can be predetermined. As before stated, several crude oils now on the market produce motor fuels of the anti-knock type but these so-called unsaturates in the crude oil suffer a loss in the refining process because of the presence of sulfuric acid which dissolves the unsaturate with resultant loss to the valuable product.

In the present invention, I have evolved a process whereby I add to a refined motor fuel an unsaturate and whereby the results to be obtained by the fuel can be accurately determined. From a commercial standpoint, this method is more accurate and economical due to the fact that in the production of gasoline, if natural gas is treated to produce gasoline, it is easy then to treat the gasoline so produced to make it an anti-knock motor fuel.

Other objects of the invention will appear as the specification proceeds and with the objects above mentioned and others in view, the invention consists in the novel and useful provision, formation, construction, association and interrelation of parts, members and features, as well as the method and process of forming an anti-knock gasoline, details of a plant for carrying out the invention being shown in the accompanying drawing, described generally, and more particularly pointed out in the claims.

The drawing is a fragmentary side elevation, partly in section, of a plant which may be utilized in practicing the invention.

Referring now with particularity to the drawing, I have shown several associated devices which may be utilized in practicing my invention, although it is to be understood that the drawing is illustrative only and shows a simple manner in which the objects of the invention may be effected.

To those interested in the art of producing gasoline, I respectfully refer them to United States Letters Patent Nos. 1,378,066 and 1,456,953.

In the drawing, I have shown a still A of any ordinary construction and which still is adapted to be heated in the usual manner by furnace **36**. This still is adapted to hold the crude oil from which is to be produced the anti-knock fluid. B is a pre- or super-heater having a direct connection by a tube **1** with the interior of the still A, the said tube **1** being connected through the medium of a valve **2**, with a further tube **3** carrying a perforated tube **4**. Thus, if crude oil is placed within the pre- or super-heater B, the gases or vapors therefrom may be conducted to the still A through the tubes **1** and **3**, and out through the perforated tube **4** into the still. The still A is provided with a dome **5** and the heated gases or vapors are received in this dome and in turn may be conducted through a valve tube **6** which leads to one or more carburizer batteries C. In the present instance, these carburizer batteries take the form of tubes which are interconnected and arranged in ascending relation, relative to the flow path of the vapor being conducted from the still through the tube **6**. For instance, I have provided three carburizer batteries at **7**, **8** and **9**. These carburizer batteries are adapted to have contained within the tubes thereof some

substance such as activated charcoal, petroleum coke, soot or, in some instances, coal. The gas or vapor being passed through the carburizer batteries is maintained at a high temperature, additional heat being provided thereto by the furnace 37, that is, between 800° and 1800° F., and these carbureted vapors are passed from the last carburizer battery 9 directly into a vapor dephlegmator D and at the bottom of said dephlegmator. This dephlegmator is of ordinary construction and provided with a series of ascending plates or troughs 10, whereby condensed vapors of different density may be removed in the ordinary manner, as illustrated by the pipes 11 and 12. The uncondensed vapors from the dephlegmator may be conducted through a valved tube 13 to a cooler E. This cooler is or ordinary construction and of a type generally utilized in the art. The vapors thus cooled may be removed from the cooler E through the medium of a compressor F associated with the said cooler by means of a tube 14. The compressor in turn leads to a further cooler G. Quite obviously, the compressor F forces the vapors through the cooler under pressure and the cooled vapors are finally conducted from the cooler G through a pipe 15 into the bottom of an absorber H. This absorber is filled with gasoline to be charged with unsaturated hydrocarbon, the liquid being shown at 16. Within this absorber is a helical cooling coil 17. The unsaturated vapors which are passed into the gasoline 16 and which are not absorbed by the gasoline, bubble up through the gasoline to the space 18 above the top of the gasoline column. The coil 17 terminates above the top of the liquid column and is associated with a pressure reducing device 19. This vapor received in the portion 19 is then conducted through the coil 17 and into a precooler or absorber tank J, as shown at 20. This precooler or absorber tank is formed with a plurality of deflecting plates 21. This particular tank is adapted to receive therein gasoline to be treated, such as, for instance, shown at 22 and to this end the tank communicates with a source of gasoline supply in a tank shown at 23 beneath the surface of the ground, the said gasoline from said tank being elevated through the medium of a pump 24, and discharged into the upper absorber J adjacent the top thereof. This, of course, will fill the absorber with the gasoline 22 and a pump 25 withdraws gasoline from this absorber and directs it into the absorber H and adjacent the bottom thereof. Any vapors that are not entrained in the liquid 22 are directed in a devious path by the plates 21 upwardly through the tank where they may be passed into a pipe 27 and downwardly through a coil 28 in the cooler G. From here the vapor which by this time may or may not be condensed may be directed in two paths, valves being arranged for this purpose at 29 and 30. If the valve 29 is closed and the valve 30 opened, the vapors will be directed into the gas holder K. The valve 29 may communicate with the pipe 31 which leads to the carburizer batteries. The gasoline in the absorber H is, of course, treated with the unsaturated vapor and such gasoline so treated is then removed from said absorber through a pipe 32 passed into the cooler housing G where it surrounds the cooler coils and thence through a pipe 33 into a tank 34 which may be situated below the ground and adapted to hold the treated gasoline shown at 35.

The feature of the invention resides in the fact that the carburizer batteries may be heated, it being noted that the heat used for the still has a pathway to said batteries, the walls surrounding the furnace and said batteries preferably being formed of some refractory material. In brief, it may be said that the distillates in either of the units A or B are adapted to be heated to produce light fractions, which fractions are then conducted into the batteries C for carburization. It is important to note that these batteries are maintained in a heated condition. The inventor is aware that in the so-called charcoal gasoline plant construction that charcoal in any adsorber first absorbs the gasoline after which the gasoline is distilled from the charcoal and the next adsorber cooled and made ready for another charge of gasoline, the said cooling being done by means of "stripped" gas which has already passed through an adsorber. The batteries C can hardly be called adsorbers and no cooling for the batteries is provided, it being intended that they should be maintained in a heated condition and, as previously pointed out, the temperature may be as high as 800° to 1800° F., although I do not wish to be restricted to any given temperature. Furthermore, I do not wish to be restricted as to the character of the crude oil used in the first instance, as the apparatus is equally applicable for the converting of hydrocarbons of the paraffin series distillates such as pentane, butane, ethane and methane, or natural gas or the like and one of the more volatile unsaturates, such as naphthene. Furthermore, these unsaturates may be of the naphthene, olefine or benzene series. Thus, in brief, the operation and the object intended by the invention is accomplished by taking a raw gasoline and then treating it with an unsaturate of the character above mentioned and whereby I produce a so-called anti-knock motor fuel and by anti-knock motor fuel, I mean a fuel which will accomplish results in high compression motors without the usual "ping" and still give a high degree of power to the motor.

I do not wish to limit myself to any particular method of heating either the batteries C or the tank A or the preheater B as this may be done in any of the various known ways such as by oil, electricity or the like.

It is also evident that I have provided for a nicety of balance between the unsaturates and the gasoline to be treated through the medium of the dephlegmator D, coolers E and G as well as through the medium of the pumps, to the end that I can regulate both the temperature of the unsaturate as well as the pressure of the unsaturate.

As I stated in my objects, the presence of sulfuric acid in the usual plant for the production of gasoline more or less completely dissolves the valuable products of the crude oil, which is to say, dissolves or ruins the unsaturates. With my invention, the unsaturates are preserved and remixed, as it were, with already formed gasoline to the end that the gasoline has restored to it the valuable unsaturates. Furthermore, I may regulate to a nicety through the medium of the batteries and the dephlegmators, as well as by regulating the cooling of the vapors, which of the several unsaturates shall be added to the raw or refined and washed gasoline. To this end, I do not wish to be limited to any particular unsaturate although I have discovered that the absence of unsaturates from gasoline is what causes the usual "ping" in an internal combustion motor but with the presence of said unsat-

urates, all the properties of the so-called antiknock gasoline are produced.

It is obvious that I may vary the proportions of the unsaturates to the raw gasoline as well as varying the character of said unsaturates all within the scope of my invention.

I claim:

1. In apparatus of the character described, the combination with a preheater for oils; a still connected to said preheater and adapted to be heated to certain temperatures by a furnace for vaporizing oil; a carburizer connected to said still by elements subjected to heat, and containing carbonaceous materials, and adapted to be heated to a greater temperature than said still; and a dephlegmator operatively connected to said carburizer and provided with several outlets including one for vapor; of an absorbing device comprising a compressor connected to the vapor outlet of said dephlegmator, and adapted to compress said vapors; means to cool said vapors by refined gasoline; means to force said cooled vapors to combine with said gasoline including circulating and storage tanks; and means to return unabsorbed vapors to either said carburizer or said dephlegmator comprising a system of pipes and valves and utilizing the pressure created by said compressor.

2. A process of forming an antiknock motor fuel as described, which comprises preheating hydrocarbons, passing the preheated hydrocarbons to a still heated to a temperature high enough to ensure a vapor phase condition of the heated hydrocarbons, passing the heated hydrocarbons in vapor form to a carburizer containing carbonaceous material and in which the aforementioned vapors are subjected to a temperature in excess of the temperature maintained in the aforementioned still, whence the highly heated vapors pass to a dephlegmator where the heavier products are condensed and removed in a number of streams according to their boiling points and specific gravity, while the uncondensed volatiles are passed to a cooling device where the volatiles are cooled, whence they pass to a compressor where the aforementioned volatiles are compressed and passed under an increased pressure through a cooling zone and thence through a substantial pool of light hydrocarbons deficient in antiknock qualities and derived from a source outside the aforementioned distilling and carburizing system and of different composition than the compressed vapors and gases, while under superatmospheric pressure, condensing and collecting an antiknock motor fuel and returning the uncondensed vapors and gases to the system for retreatment.

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