T. T. GRAY.

PROCESS FOR TREATING PETROLEUM HYDROCARBONS

APPLICATION FILED MAY 18, 1914.

1,340,889.

Patented May 25, 1920.

Fig. 1.

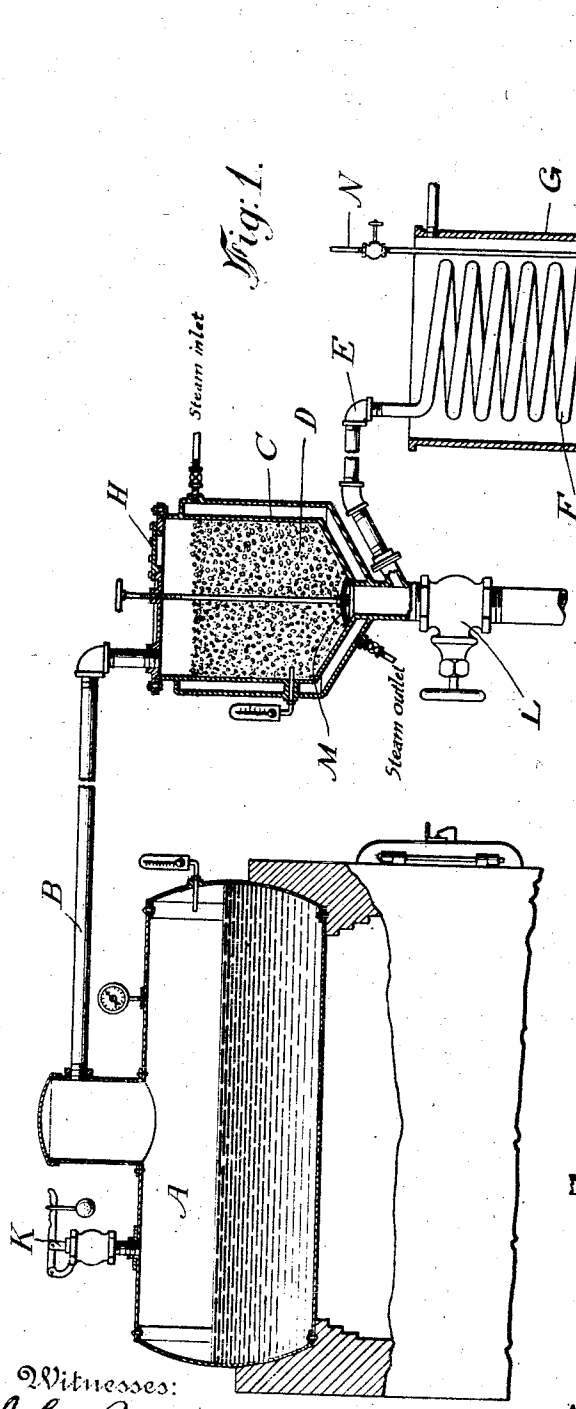
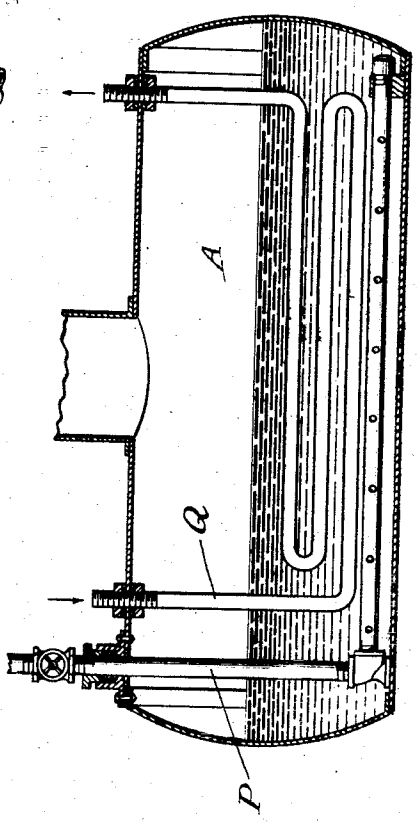


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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PROCESS FOR TREATING PETROLEUM HYDROCARBONS.

1,340,889. Specification of Letters Patent. Patented May 25, 1920.

Application filed May 18, 1914. Serial No. 839,203.

To all whom it may concern:

Be it known that I, THOMAS TARVIN GRAY, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented a new and useful Process for Treating Petroleum Hydrocarbons and the like to Improve their quality, of which the following is a specification.

The invention relates to the treatment of hydrocarbon mixtures, for example cracked gasolene, containing unsaturated bodies, in order to obtain a saturated or less unsaturated product, or a product which is freed from those objectionable characteristics which are ascribed to unsaturation. In the present state of the art, unsaturated hydrocarbons, existing naturally in crude petroleum as well as those formed during distillation, are found in the refined products, as indicated by their property of adding iodin.

For illustration, gasolene, burning and lubricating oils often show high unsaturation, which makes them inferior on account of their odor, etc., to products composed more largely of saturated hydrocarbons.

The object of my invention is to treat or purify these various products in order to secure products of saturated character *i. e.* those having their complement of hydrogen, or at least to remove or transform the particular unsaturated constituents which are responsible for bad color and odor and which tend to polymerize in storage and in the carbureting apparatus of internal combustion engines. This I accomplish by passing them in vapor form through fullers' earth or an equivalent catalytic agent, which is heated above the condensing point of the entering vapors. The catalyst in this process apparently causes polymerization of the unsaturated bodies or at least of some of them. In time the fullers' earth becomes poisoned with an asphaltic or resinous deposit, requiring it to be replaced or revived.

Suitable apparatus for carrying out my improvement is shown in the accompanying drawing, in which,

Figure 1 is a broken view in vertical longitudinal section, and

Fig. 2, a detail sectional view showing modification.

A represents a boiler-like holder fitted with a safety valve K, and connected by pipe B with a tank C charged nearly to the top with the catalytic agent D introduced through manhole H. The tank C may be heated by a steam jacket or otherwise, as, for instance, it may be placed in a brick oven and heated by fire. Still A is placed in a brick furnace and heated directly by fire or it may be heated by steam coils placed in the still in case of working with lower boiling point products. The liquid in A is distilled and passed through tank C containing fullers' earth, bone-black, charcoal, or other catalytic agent, which is maintained at a temperature higher than the boiling point of the distillate. The relatively saturated vapors pass by line E through coil F, placed in a tank G cooled by water where they condense and may be directed to any receiving tank, as I.

The tank C has a tapered bottom from which leads a discharge pipe containing a valve L. The opening to the spout within the tank is closed by a vertically movable perforated plate M which when elevated permits the charge of the tank to pass out through the spout. This perforated plate may be in part woven wire of fine mesh over the upper surface of which is a layer of material, such as mineral wool, that is readily permeable by the gases.

Valved vents such as indicated at N and O may be provided to permit the escape of uncondensed gases.

To induce the more ready flow of the vapors, and to thus reduce pressure in the tank C, a suction device such as a pump may be connected to the receiving tank I.

A modification is shown in Fig. 2 consisting in heating the contents of the vessel A by a steam tight coil Q. At the same time steam may be released in the oil through a perforated coil P. Such admission of steam to the oil may be used however the oil in the vessel A is heated. In such case water vapor would be combined with the vapor that passes through tank C.

I have found that unsaturated oils, gasolene, naphtha, benzin and other hydrocarbon products treated in this manner give rise to saturated hydrocarbons, or become less unsaturated, due probably to polymerization.

I claim:

1. The method of treating mineral oil hydrocarbon mixtures containing unsaturated constituents, which comprises vaporizing the same and effecting a substantial reduction in the objectionable unsaturated

constituents by passing the vapors outside of the vaporizing chamber in contact with catalytic material heated above the condensing point of the entering vapors, without cracking in the presence of the catalyst.

2. The method of treating mineral oil hydrocarbon mixtures, which comprises passing the same in the state of vapor through catalytic material to produce polymerization of unsaturated bodies, said catalytic material being heated sufficiently to maintain the desired constituents in vapor form, without cracking while in the presence of the catalyst, separating heavy polymerized bodies from the vapors and thereby effecting a substantial reduction in the objectionable unsaturated constituents.

3. The method of treating mineral oil hydrocarbon mixtures, which comprises passing the same in the state of vapor through fullers' earth heated above the condensing point of the entering vapors and thereby effecting a substantial reduction in the objectionable unsaturated constituents.

4. The method of treating cracked gasolene mixtures, which comprises passing the same in the vapor state through catalytic material to produce polymerization of unsaturated bodies, said catalytic material being heated sufficiently to maintain the desired constituents in vapor form, without cracking while in the presence of the catalyst, separating heavy polymerized bodies from the vapors and thereby effecting a substantial reduction in the objectionable unsaturated constituents.

5. The method of treating cracked gasolene mixtures, which comprises passing the same in the vapor state through fullers' earth heated above the condensing point of the entering vapors, without cracking in the presence of the catalyst, and thereby effecting a substantial reduction in the objectionable unsaturated constituents.

6. A process of purifying mineral oils to remove undesirable constituents, which consists in vaporizing the oil, passing such oil vapors into contact with a body of fullers' earth, heating said fullers' earth by heat from an external source and condensing the purified vapors.

7. A method of treating mineral oils consisting in vaporizing such oil and passing the vapor through a substance having the absorbent properties of fullers' earth while said substance is maintained at a temperature at or above the highest boiling point of the distillate required.

8. The method of deodorizing and clarifying liquid hydrocarbon mixtures, which comprises vaporizing the liquid and passing the vapor through fullers' earth maintained at a temperature not materially below the boiling point of the least volatile fraction of the distillate required.

9. The method of treating mineral oil hydrocarbon mixtures, which comprises passing the same in the state of vapor through fullers' earth maintained at a temperature not below the condensing temperature of the entering vapors and thereby effecting a substantial reduction in the objectionable unsaturated constituents.

In testimony whereof, I have hereunto subscribed my name.

THOS. T. GRAY.

Witnesses:
L. F. BROWNING,
MARY W. WALLACE.