Patented Oct. 6, 1925. 1,556,047

UNITED STATES PATENT OFFICE.

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PROCESS FOR THE PREPARATION OF A CARBURETING FUEL MIXTURE FOR INTERNAL-COMBUSTION ENGINES.

No Drawing. Application filed March 28, 1923. Serial No. 628,357.

To all whom it may concern:

Be it known that I, HENRI TERRISSE, a citizen of Switzerland, residing at Geneva, Canton of Geneva, in the Confederation of Switzerland, have invented certain new and useful Improvements in Processes for the Preparation of a Carbureting Fuel Mixture for Internal-Combustion Engines, of which the following is a specification.

In internal combustion engines in which the ignition is effected by means of sparking plugs, it has not yet been possible to use kerosene as a carbureting material, even when mixed in small proportions with petrol because it has an unfavourable influence upon the output of the engine and causes the latter to knock. Moreover, its lack of volatility prevents the engine from restarting and slowing down in a satisfactory manner.

The same thing happens when heavy petrol is used and when the cooling water of the engine reaches a certain temperature, 80° C. for instance. It would be however very advantageous to use heavy petrol mixed with a certain amount of kerosene or to utilize petrols distilled at higher temperatures than has been done hitherto.

I have found that it is possible to manufacture very good carbureting substances by using heavier products than ordinary petrol, for instance kerosene mixed with heavy petrol provided that a mixture of alcohol and acetaldehyde is added thereto; these two substances give with a heavy petrol, if necessary mixed with kerosene, a sufficiently volatile carbureting substance which has in addition the advantage of not causing the engine to knock.

It may be feared that the use of acetaldehyde would have the drawback of giving an insufficient stability to the carbureting substance, owing to the low boiling point of the acetaldehyde. We have noticed however that it is possible to stabilize the latter in a practically satisfactory way by operating as follows:

If acetaldehyde and alcohol are mixed, a reaction is produced; the temperature is lowered by a few degrees for a few seconds, passing for instance from 15° C. to 11° C., then rises up to about 40° C. Once the reaction ended, the temperature becomes normal again but the density of the mixture of alcohol-aldehyde is higher than that of its component parts; it is about 0.900. This figure varies slightly according to the relative proportions of acetaldehyde and alcohol. The product which is obtained does not distil at 21° C. and at 78° C. like the acetaldehyde and the alcohol but it commences to distil very slightly, for a mixture of two parts of alcohol and one part of acetaldehyde, at 46° C.; only 2% have passed at 51° C. and it is necessary to go up to 60° C. in order that 10% shall have distilled off; 73% distil off up to 77° C. It is therefore seen that the acetaldehyde has been somehow fixed; it has become less volatile which is important and in spite of this it has not lost its qualities. It is advisable to make sure that the aldehyde is quite neutral. It happens sometimes that it oxidizes in the air and has an acid reaction to litmus paper on action, which does not take place after it has been mixed with petrols. If it has an acid reaction it is necessary to neutralize it.

The choice of the neutralizing substance is not immaterial; it is necessary to choose one which does not produce any reaction with the aldehyde that is, either an aldolization or formation of aldehydic resins, because these substances are extremely harmful for the engine in this that they do not become mixed with the oil, are not volatile and render the valves dirty. It is therefore absolutely necessary to avoid their formation and with this object in view it is necessary to utilize a neutralizing substance which has no basic reaction. Carbonate of lime is particularly suitable for this purpose.

It is also possible instead of mixing alcohol and aldehyde to utilize directly the product which is obtained when alcoholic vapours are passed upon a catalyzer, such as copper for instance. Part of the alcohol is converted into acetaldehyde, no water but hydrogen is evolved, whilst the remaining part does not react. A mixture or a combi-

nation of alcohol and acetaldehyde is thus directly obtained, which mixture is added to the hydrocarbons. The partial conversion of the alcohol into aldehyde takes place with alcohol at 90° C. or at 95° C. or with absolute alcohol. But of course, it is necessary when the alcohol is to be mixed with petrol to use only a sufficiently anhydrous alcohol.

If benzol is used as hydrocarbon, alcohol at 95% may be used; if on the contrary petrol or kerosene is used, it is necessary to use more concentrated alcohol or even pure alcohol.

It is sufficient for instance to add 10% of alcoholaldehyde mixture to the heavy petrol in order to prevent knockings of the engine and to obtain a very supple carbureting material which shall be strong and the consumption of which shall be approximately equal to that of the petrol.

A mixture such as for instance: 20% of kerosene, 60% of heavy petrol, 20% of alcohol-aldehyde (two parts of alcohol and one part of acetaldehyde) does not produce knockings even at high temperatures. Moreover this carbureting material has the same properties as a good petrol; the restartings and slowings down are easy and it behaves very well for half-loads. Owing to the fact that the engine does not knock and that the combustion is more complete the power obtained is high in spite of the fact that liquids have been introduced into the mixture the heat of combustion of which is smaller than that of light petrol.

However, the quantity of aldehyde-alcohol which may be mixed to the petrol is not arbitrary. If the proportion of aldehyde-alcohol is increased too much, the efficiency of the carbureting substance is reduced; therefore it is preferable to keep to the proportions which are sufficient for preventing knocking of the engine and for producing a good ignition of the mixture; these proportions vary with the nature of the hydrocarbons to which aldehyde-alcohol is mixed.

The present invention applies not only to hydrocarbons derived from petroleum but to those which are obtained by the distillation of shale, coal tar, peat, etc. It is also possible to add paraldehyde to the hydrocarbon alcohol aldehyde mixture above described. This substance can become easily mixed with hydrocarbons and exerts also a favourable influence from the point of view of knockings of the engine. It is also possible to add a substance facilitating the starting of the engine for instance, ether, gasolene, petrol, acetone, etc., either alone or mixed together to the products, above mentioned more particularly in winter.

Lastly if alcohol and acetaldehyde are added to the petrols usually employed for motor car engines, the quality of these petrols is considerably improved, because their suppleness and their power is increased and carbureting substances of first class quality are obtained which may be advantageously used in aviation engines.

I claim:

1. A process for the preparation of carbureting substances for internal combustion engines, consisting in adding ethylic alcohol and acetaldehyde to hydrocarbons heavier than ordinary petrol.

2. A process for the preparation of carbureting substances for internal combustion engines, consisting in mixing with each other alcohol and acetaldehyde and adding the mixture to hydrocarbons heavier than gasoline.

3. A process for the preparation of carbureting substances for internal combustion engines consisting in passing vapours of alcohol upon a catalyzer and in adding the mixture of alcohol and acetaldehyde thereby obtained to hydrocarbons heavier than gasoline.

4. A process for the preparation of carbureting substances for internal combustion engines consisting in neutralizing acetaldehyde by means of a salt having no alkaline reaction, then mixing it with alcohol and adding the mixture to hydrocarbons heavier than gasoline.

5. A process for the preparation of carbureting fuel mixture for internal combustion engines, consisting in adding alcohol and acetaldehyde and a product facilitating the starting at low temperature to hydrocarbons heavier than gasoline.

6. A process for the preparation of carbureting fuel mixture for aviation engines, consisting in adding acetaldehyde and alcohol to heavy petrol.

7. A carbureting substance for internal combustion engines consisting of a mixture of hydrocarbons heavier than ordinary petrol with alcohol and acetaldehyde.

8. A carbureting substance for internal combustion engines consisting of a mixture of kerosene, heavy petrol alcohol and acetaldehyde.

9. A carbureting substance for internal combustion engines comprising hydrocarbons, ethylalcohol, acetaldehyde and ether.

10. A carbureting substance for internal combustion engines comprising hydrocarbons, ethylalcohol, acetaldehyde and gasolene.

11. A carbureting substance for internal combustion engines comprising hydrocarbons, ethylalcohol, acetaldehyde and petrol.

12. A carbureting substance for internal combustion engines comprising hydrocarbons, ethylalcohol, acetaldehyde and acetone.

13. A carbureting substance for internal combustion engines comprising 20 per cent

kerosene, 60 per cent of heavy petrol, 20 per cent of a mixture of two parts of alcohol and one part of acetaldehyde.

14. A process for the preparation of carbureting substances for internal combustion engines consisting in adding to hydrocarbons which are heavier than ordinary petrol, a mixture of ethylic alcohol and acetaldehyde in such a proportion which is sufficient for giving to the whole product the necessary volatility for producing a good ignition of the same and for preventing knocking of the engine.

In testimony whereof I have affixed my signature.

HENRI TERRISSE.