

# ALIEN PROPERTY CUSTODIAN

## PROCESS FOR THE MANUFACTURE OF IMPROVED OILS, PARTICULARLY SUCH AS ARE STABLE DURING STORAGE AND AT INCREASED TEMPERATURE

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vested in the Alien Property Custodian

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In the utilisation of mineral oils it is often necessary to mix different hydrocarbon oils. For instance, it is customary to adjust the properties of commercial oils to the specific requirements of the respective use by mixing oils of different origin. Furthermore, in order to improve the quality of oils which are not per se high-grade oils, it has been proposed to blend such oils with paraffinic or more saturated hydrocarbon oils.

Some oils have been found not to be readily miscible with each other. Gradually, as time goes on during storing or use or under the action of heat, separations are formed in such mixtures to a larger or smaller extent. Blended motor oils show for instance formation of sediments, of carbon and coke, causing clogging of injector nozzles; blended lubricating oils show an unexpectedly high ageing tendency and sludge formation. Not always the sediments may be seen macroscopically; often they are recognized only by giving bad results in tests, or they appear as inhomogeneous components when testing the oils by optical means.

On the one hand it was suggested to blend only oils with similar physical properties, e. g. with a definite range of densities, and on the other hand it has been endeavoured to improve the miscibility or the quality of the mixture by refining the components most intensively. But the first mentioned measure limits considerably the number of utilisable oils and the second one causes a considerable loss of oil, apart from the necessary high consumption of refining agents. It is well known that by intensive treatment of individual oils with sulphuric acid, valuable components of the oil, such as unsaturated components of motor fuel oils and naphthenic hydrocarbons and other constituents of importance for the oiliness of lubricating oils, are eliminated or chemically changed. It has also been proposed to employ diluents when treating mineral oils with acids, in order to reduce the viscosity of the mixture, or to diminish the intensity of the reaction.

It now has been found that a surprising improvement of the properties of the mixed oils and the like may be attained in a simple manner, by first blending the initial oils produced as usually by distilling or refining and subsequently separating the impurities as a flocculent precipitate by the action on the oil mixture of an electric field. This may be applied in any suitable form, e. g. by applying electrical discharges, or by electrolysis or kataphorising with direct or alternating current.

The precipitates caused by such treatment are

obtained in such a form as is readily separated from the oil.

The improved treatment according to the present invention generally causes a considerable enhancement of the resistance of the oils to ageing. Moreover often an improvement of the color and of the other properties of the oils results as compared with the refining of the individual oils followed by blending.

With the present procedure it is possible to blend oils of good lubricating quality and cold test, such as naphthenic oils, but which do not suffice with regard to some other test, e. g. the viscosity index, with oils unobjectionable in the latter respect, e. g. a highly paraffinic oil, in order to obtain, with a proper after-treatment according to the present invention, a blended or mixed oil satisfactory in every respect.

The present invention which affords the possibility to treat and improve mixtures of oils of a relatively high degree of saturation and oils of a relatively low degree of saturation, has been found to be particularly satisfactory for mixtures of distillates and residual lubricating oils manufactured from German raw oils and from oils of similar character, with Pennsylvanian oils, the so-called Bayonne oils or synthetic lubricating oils produced by Fischer's method, and furthermore for mixtures of distillate oils or such oils as are refined with sulphuric acid, or with raffinates obtained by means of selective solvents, e. g. such as obtained by the process of the U. S. patent application Ser. No. 94,290.

For the refining after mixing according to the present invention the following mixtures may be considered: mixtures of fresh oils with aged ones, of fresh oils with cracked products obtained from said fresh oils, of more refined oils with less refined oils, and in general of oils having relatively high ageing indices with oils having relatively low ageing indices.

A surprisingly high improvement as regards residue formation and ageing tendency is to be observed also when oils already refined but of different boiling ranges are mixed and an electric field is applied to this mixture. This is of importance for instance for the manufacture of the so called two-stroke blends or mixtures. Apparently the effect of this treatment is depending on differences in the quantity of the saturated hydrocarbons contained in the individual fractions. If desired, said mixtures may be decomposed again by distillation after being treated in the indicated manner. Oils are obtained thereby by the properties of which advantageously differ

from those of the oils originally used for the preparation of the mixtures.

The process may be also applied to crude or unrefined oils. Such mixtures may be made exclusively from unrefined oils, or even refined oils may be blended with unrefined ones, the novel feature consisting in the possibility of improving oils by first mixing oils of different character and then refining this mixture.

It has already been proposed to precipitate pitch-like particles from tars by adding crude oil and hydrochloric acid for obtaining products that are more ready workable. In such treatment, however, a considerable part of valuable oils is carried down into the precipitate and thus lost. Furthermore, oil containing slight quantities of mineral acids has been admixed with heavy carbonaceous oils to separate the carbon. Finally, the regeneration of old oils has been tried by treating same in the proportion of 1:100 with a refining mixture consisting of fresh oil and sulphuric acid. Otherwise, hitherto Engler-Höfer's view maintained in their book "Das Erdöl" was shared that heterogeneous oils, e. g. Russian and Galician lubricating distillates should not be refined together but individually and that only the finished products should be mixed. However, it now has been found that in a very great number of cases the manufacture of mixed oils can be simplified and improved by treating according to the present invention the mixture of the crude or unrefined oils with refining means. Thus the individual refining of the components may be dispensed with completely or partly. Of course, it is necessary that such oils are combined which differ in their properties in the aforesaid manner, if the indicated improvements both for the refining process itself and for the refining effect in comparison to the treatment of the individual components shall be obtained.

Thus, unrefined distillates of crudes of various origin may be blended with one another, e. g. unrefined distillates of paraffin base oils, such as Pennsylvanian oils with unrefined distillates of mixed-base or asphaltic crudes, such as German oils. One of the two oils to be mixed, suitably the paraffin base oil, which is rich in saturated hydrocarbons and requiring only small quantities of refining agent, may be prerefined, whereafter the produced mixture is subjected to the action of an electric field. It has also turned out well to pre-treat with bleaching earth one of said oils to be mixed. For this purpose, too, the paraffin base oils are particularly suitable. Similarly, mixtures of lubricating distillates with residual oils may be produced in a condition satisfying all requirements of a first class oil for motor cars. In this latter case it is often to advantage to free the residual oil of at least part of its asphalt content by treating it with a precipitating agent such as propane, alcohols and the like, before mixing or blending said residual oil with the other component.

The present process is principally intended for the treatment of oils of predominately aliphatic character.

The process has proved of special value for manufacturing mixed lubricating oils which are unobjectionable in use, from crude distillates or

residual oils, e. g. such of German origin, with synthetic oils such as for instance obtained by the process of Fischer and Tropisch.

The present process is principally intended for the manufacture of lubricating oils.

The present process, however, is of considerable importance also for the manufacture of mixed motor fuel oils preferably of Diesel fuels. It is already known to free tar oils from asphalt and other sediment forming components by mixing same with gas oil from petroleum or with the product known under the trade-mark "Kogasin" (a synthetic motor fuel from the Fischer process), and distilling the obtained mixture, if necessary under pressure. But in a distillation process it is unavoidable, especially as the conditions of solubility in the heat differ from those in the cold, that part of the components to be separated is carried over into the distillate mechanically or in the form of azeotropic mixtures and afterwards causes inconveniences during use. On the other hand oils mostly undergo a chemical change during their distillation, causing the formation of much polymerisate or even coke. Since, however, it is rarely, if ever, possible to obtain all the suitable oil as a distillate, with the known process a larger or smaller production of poor residual oil must be accounted for. All these disadvantages are avoided by the treatment according to the present invention. For instance highly saturated petroleum-gas-oils, hydrogenated products or synthetic gas-oils may be treated in mixture with light lignite-tar-oils, cracking products and the like. If the oils show a strong tendency for the formation of sediments, it is advisable to distill the motor fuel mixture after refining.

The possibility to operate without artificial heat supply when using the new process affords simultaneously the advantage that any detrimental actions of such heating on the oils are prevented.

The present process has nothing to do with the known methods of de-asphalting crudes or fractions thereof with precipitating agents such as low boiling hydrocarbons, alcohol mixtures and so on. The latter act chiefly on the asphalts and asphaltic resins readily separable, whereas considerable quantities of tar- and sludge-forming substances remain in the oil in a state of a more or less stable distribution. The new process, on the contrary, is specially intended for the removal of these components particularly detrimental to the use of the oil. These may be diminished, it is true, by the usual refining methods but they cannot be eliminated completely by them without injury to the oil or at least without losses of valuable oil components.

Oil mixtures showing a strong tendency to separation may to advantage be subjected to a preliminary purification by settling or centrifuging before the refining agent is added.

In a corresponding manner one may stabilise mixtures of lignite-tar light oils, if desired after having previously decreosotised them, with synthetic gas-oil or of marine fuel oil from lignite tar with petroleum gas-oil, and so on.

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