

UNITED STATES PATENT OFFICE

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PROCESS FOR REFINING MINERAL OIL

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1 Claim. (Cl. 196—147)

This invention relates to the refining of mineral oils and is especially applicable to mineral oil containing low boiling constituents which it is desired to remove and to mineral oils, such as lubricating oils, which have been used in internal combustion engines and which it is desired to refine for re-use. The processes which have hitherto been in most common use for the refining of these oils consist in treating the oil with a coagulating reagent such as a solution of an alkaline salt, or with sulfuric acid, then separating the reagent and reaction products, then separating the low boiling components by any suitable means such as distillation under vacuum or in a stream of air, and then treating with a bleaching agent.

The objection to the above mentioned and like processes is that dark-colored compounds are formed in the oil during the step of removal of the low boiling components. The complete removal of these dark-colored compounds requires a high consumption of bleaching agent during the last step in the refining processes mentioned above. My invention has for its objects to prevent or minimize the formation of these dark-colored compounds during the step of removal of the low boiling components and to materially reduce the consumption of bleaching agent.

I have found that the disadvantage above discussed can be avoided by causing the oil to commingle intimately with a bleaching agent during the process of removal of the low boiling components of the oil. By the term "bleaching agent" I mean to include all those known materials capable of adsorbing coloring materials from the oil. By the use of this improved process, the quantity of bleaching agent required to refine the oils to a good oil will be only from forty to sixty per cent. of that required in the processes hitherto in use, thereby effecting an appreciable saving in the cost of refining.

The following is a detailed description of one preferred way of practicing my process: A mineral oil which has been used in an internal combustion engine and contains low boiling components is mixed with a solution of trisodium phosphate at 200° F. and the mixture is separated by passage through a centrifugal separator. A stream of air is then blown through the oil and five per cent. by weight of fuller's earth is added simultaneously, while heat is applied to bring the

entire mass to 300° F. The air stream is continued through the oil at this temperature until all the low boiling components are removed. The mixture is then conveyed to a tower containing five per cent. by weight of fuller's earth, through which the oil is percolated. The total amount of bleaching agent required, in this way of practicing the process, to produce a refined oil of good color is about ten per cent. by weight of the oil, whereas, in the processes hitherto used, the quantity of bleaching agent required to produce a refined oil of good color is from twenty to twenty-five per cent. by weight of the oil.

The process, as described, is capable of considerable variation. Thus the removal of the low boiling constituent by means of a stream of air is only one of different ways of removing the low boiling constituent, a common alternative method being distillation under vacuum. If it is desired to raise the flash and fire test and the viscosity of the oil, the process of evaporating the low boiling constituents, preferably under a high vacuum and consequently with application of less heat than at atmospheric pressure, is preferable to the air-blowing process. The bleaching agent is added to the oil before or during the evaporation. In the described example, the use of trisodium phosphate is preferred, but other known reagents, including those hereinbefore mentioned, may be substituted. The temperature given may be varied considerably. For fuller's earth may be substituted other filtering and decolorizing materials, such as filtrol, decolorizing carbons, and silica gel.

What I claim and desire to protect by Letters Patent is:

The process of refining mineral oil containing low boiling constituents and oxidation products, which comprises first agitating the oil with the solution of a reagent adapted to coagulate said products and separating out the reagent and reaction products and simultaneously therewith commingling a bleaching agent with the oil, and then percolating the oil through another quantity of the same bleaching agent that has not been used in the first step specified, whereby the desired decolorization of the oil may be effected by the use of a minimum quantity of the bleaching agent.

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