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PATENT APPLICATION

PROCESS FOR THE MANUFACTURE OF PARAFFINIC OILS

Processing of wax-containing oils can be carried out by diluting the oils with solvents or mixtures of solvents, precipitating the paraffin wax by cooling, separating the wax and obtain stratification in the solvent by the addition of a sufficient quantity of a material which causes the dewaxed oil to separate.

It has been found that it is advantageous in this procedure to use as solvent for the dewaxing step water-soluble organic solvents or mixtures containing these solvents and cause separation into layers in the presence of water by the addition of ammonia. The most suitable mixtures of solvents, according to this process, are mixtures of benzene and acetone or tetrahydrofurane and a water-soluble alcohol.

To obtain stratification it is sufficient to add small amounts of ammonia, e. g., 3 - 5% calculated on the quantity of solvent present. The amount of water required also is small; it amounts to 0.5 - 2% of the solvent. The water can be added to the solution of dewaxed oil independent of the ammonia or together with it.

The upper layer obtained in this way consists mainly of oil, a small amount of solvent and small quantities of ammonia and water. The oil can be separated from solvent, ammonia and water by distillation without excessive cost. The lower layer consists of comparatively much oil, a large amount of solvent and the remainder of the ammonia, as well as the bulk of the water. It is freed from ammonia and water by distillation which, again, is not excessively expensive. The oil present in both layers is not identical. The oil in the layer of low solvent concentration has a lower specific gravity, a higher viscosity index and a lower Conradson carbon residue than the oil in the layer containing most of the solvent. This indicates that by the separation into two layers an effect similar to solvent extraction is obtained.

By distillation of the upper layer a high-quality oil with low pour point is obtained. The lower layer can be processed in various ways. For instance, it can be freed from the solvent by distillation; the distillation of the relatively large amount of solvent is rather expensive but it offers the advantage that a wax-free extract is obtained which can be used for the fluxing of asphalt. If the oil has been refined prior to dewaxing, the lower layer which is rich in solvent can be blended with the charge to the dewaxing unit after removal of the ammonia.

In the latter case it is not necessary to remove the water from the recycled solvent layer since the water remains in solution even when the mixture is subjected to very low temperatures because the water-soluble components of the solvent keep the water in solution and it therefore does not interfere with the dewaxing process. The solution of the dewaxed oil contains in this case already a certain quantity of water so that it is not necessary to add further quantities of water together with the ammonia.

Example.

22 pounds of a lubricating oil containing 12.5% of paraffin wax is dissolved in a mixture of 69.4 pounds solvent, 8.4 pounds dewaxed oil and 5 pounds of

extract prepared from the above lubricating oil. Mixing is carried out at 140°F. The mixture is cooled uniformly to - 4°F. The solvent consists of 65% by weight of dichloroethane, 25% by weight of tetrahydrofurane, 9% by weight of methanol and 1% by weight of water. The paraffin wax which crystallises out is filtered off on a filter with a filtering area of 183 square feet. Subsequently, the filter cake is washed with a blend of 22 pounds of the solvent and 2.6 pounds of the extract. The combined filtrate contains 26.2 pounds of oil, including extract, and 77.5 pounds of solvent. The filtrate is now treated with 3.9 pounds ammonia at -4°F. 2 layers form, the upper layer containing 18.6 pounds oil, 13 pounds solvent and 0.26 pounds of ammonia. The ammonia is distilled off at elevated pressure and the solvent is removed by distillation at atmospheric pressure. In this way, 18.6 pounds of oil with a pour point of -2°F. are obtained. The lower layer contains 64.5 pounds of solvent, 7.6 pounds of extract and 3.6 pounds of ammonia. It is recycled after separation of the ammonia and used as described previously for the solution of fresh lubricating oil and for washing the filter cake. The slack wax remaining on the filter contains 2.8 pounds paraffin, 4.1 pounds of oil and 13.7 pounds of solvent. It is suspended in 26.8 pounds of fresh solvent, washed and filtered again. In this way a slack wax is obtained which contains 2.85 pounds of wax, 0.7 pounds of oil and 13.6 pounds of solvent. The solvent is removed and a paraffin of 80% purity with a melting point of 144°F. is obtained. The filtrate contains 2.4 pounds of oil and 26.7 pounds of solvent. It is recycled and used for the solution of fresh lubricating oil. 2.15 pounds of oil can be processed per square foot of filtering surface per hour. Only 13 pounds of solvent and 3.99 pounds of ammonia have to be distilled for the preparation of 18.6 pounds of oil whereas 13.6 pounds of solvent must be distilled off in order to make 2.8 pounds of paraffin wax.