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SOLUBLE OIL

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This invention relates to the so-called "soluble" oils or emulsifiable oils which have various uses such as for textile lubricants, cutting oils for machine purposes, spray oils and the like, and applies particularly to those for making stable-type emulsions.

Heretofore, in the preparation of various emulsifiable and soluble oils it has been a common practice to employ a soap as the emulsifying agent for the various mineral oil fractions, and in turn to introduce a mutual solvent which acts as a bonding agent to hold the soap and the oil together.

I have found that for many purposes the use of a mutual solvent or bonding agent can be eliminated if the soluble oil is prepared from mineral oil and potassium or sodium naphthenate where the mixture is nearly anhydrous, that is, contains preferably not over about 2% of water. However, such a solution of soap and oil is semi-gelatinous at ordinary temperatures and therefore is too viscous for most purposes. I have found further that in order to reduce the viscosity as desired or to control the viscosity readily, a small proportion of triethanolamine naphthenate, oleate or other soap soluble in the oil, may be used to replace an equally small proportion of the sodium or potassium naphthenate. In other words, a very small percentage of the triethanolamine soap reduces the pour point of the substantially anhydrous soap solution to a desirable degree.

The invention, therefore, may be stated as residing in a substantially dehydrated solution of a potassium or sodium naphthenate in mineral oil and also as residing in such a nearly anhydrous solution containing a small quantity of defined triethanolamine soap to increase the fluidity to a workable consistency where a substantial quantity of sodium or potassium naphthenate is present forming an otherwise too viscous mass.

In practice I find that potassium naphthenate or sodium naphthenate of comparatively low water content may be combined with mineral oil in a quantity ranging from 5% or 10% up to 25% or 30% or thereabouts to yield a substantially anhydrous solution which may thereafter be emulsified in water. An average amount of potassium naphthenate for most purposes is about 15%, but when larger amounts are employed the solution of the soap in the oil is ordinarily too viscous for practical uses unless larger amounts of triethanolamine soap are added, but in that event both excess materials are without substantial advantage and merely

serve to increase cost. According to this invention, approximately $\frac{1}{2}\%$ of triethanolamine naphthenate or other described soap is added. As a result, the viscosity of the solution is reduced from a semi-gelatinous mass to a fluid body which pours readily. Thus, such a product would contain about 85% of mineral oil, 14.5% of potassium naphthenate, and 0.5% of the triethanolamine naphthenate or other soap. In general, the triethanolamine naphthenate may be varied from about 0.1% to 1.5% of the total. The minimum limit is that which will satisfactorily increase fluidity of the solution. The maximum limit of the triethanolamine soap is that which does not affect the stability of the emulsion subsequently produced with the soluble oil and water, or that which is economically feasible. In general, the maximum limit is in the order of a few percent of the soluble oil.

As an example of one method of operation according to this invention, naphthenic acids are obtained from a mineral oil having a Saybolt Universal viscosity of 200 seconds at 100° F., and these acids are saponified with potassium hydroxide to produce the potassium naphthenate. The acids employed are usually recovered in a large quantity of mineral oil, for example in about equal amounts. To this material the caustic solution is added and the temperature raised to effect saponification, for example, to 212° F. If necessary to reduce the water content to the minimum necessary to yield the required minimum water content of the final product, a high temperature may be used, e. g. 300° F. This potassium naphthenate then has added thereto the necessary additional quantities of oil, such as a mineral oil having a viscosity of 150 seconds at 100° F., or other kindred mineral oil. Since such a solution pours with difficulty at normal temperatures, an addition of 0.5% of triethanolamine naphthenate is made with agitation to effect thorough distribution and this reduces the viscosity so that the resultant soluble oil then pours readily at normal temperatures.

Instead of dehydrating the mixture before addition of further oil, and the triethanolamine naphthenate, it may be dehydrated as by heating after the addition of either or both of these. The preferred water content is about 1%, but 2% is not objectionable, and in some cases the mixture may be considered as substantially anhydrous for the present purpose if the water does not exceed about 5%.

By addition of a few percent of such soluble oil to water accompanied with agitation, a quite

stable emulsion is produced suitable for various uses to which this type of oil is adapted, such as in the textile and metal working industries.

- Instead of triethanolamine naphthenate, other triethanolamine soaps may be employed with satisfactory results, these including triethanolamine oleate, stearate, and similar soaps from fatty acids of similar molecular weight and generally similar character, which soaps are soluble in the oil. In addition to these materials, alcohols and the like may also be added to impart other desirable properties such as rapid dispersability, these including such alcohols as ethyl alcohol, ethylene glycol and similar alcoholic products.
- It is to be understood that the above disclosures are merely illustrative of the generic

invention defined by the appended claims, and that various modifications within the scope of these will be apparent to those skilled in the art.

I claim:

1. A soluble oil comprising mineral oil, an alkali metal naphthenate in the order of 5% to 30% and a small quantity of an oil-soluble triethanolamine soap in the order of 0.1% to 1.5%.
2. A soluble oil comprising mineral oil, approximately one-half percent of triethanolamine soap and an alkali metal naphthenate approximating 10% to 25%.
3. A soluble oil according to claim 2 wherein the triethanolamine soap is a naphthenate.

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