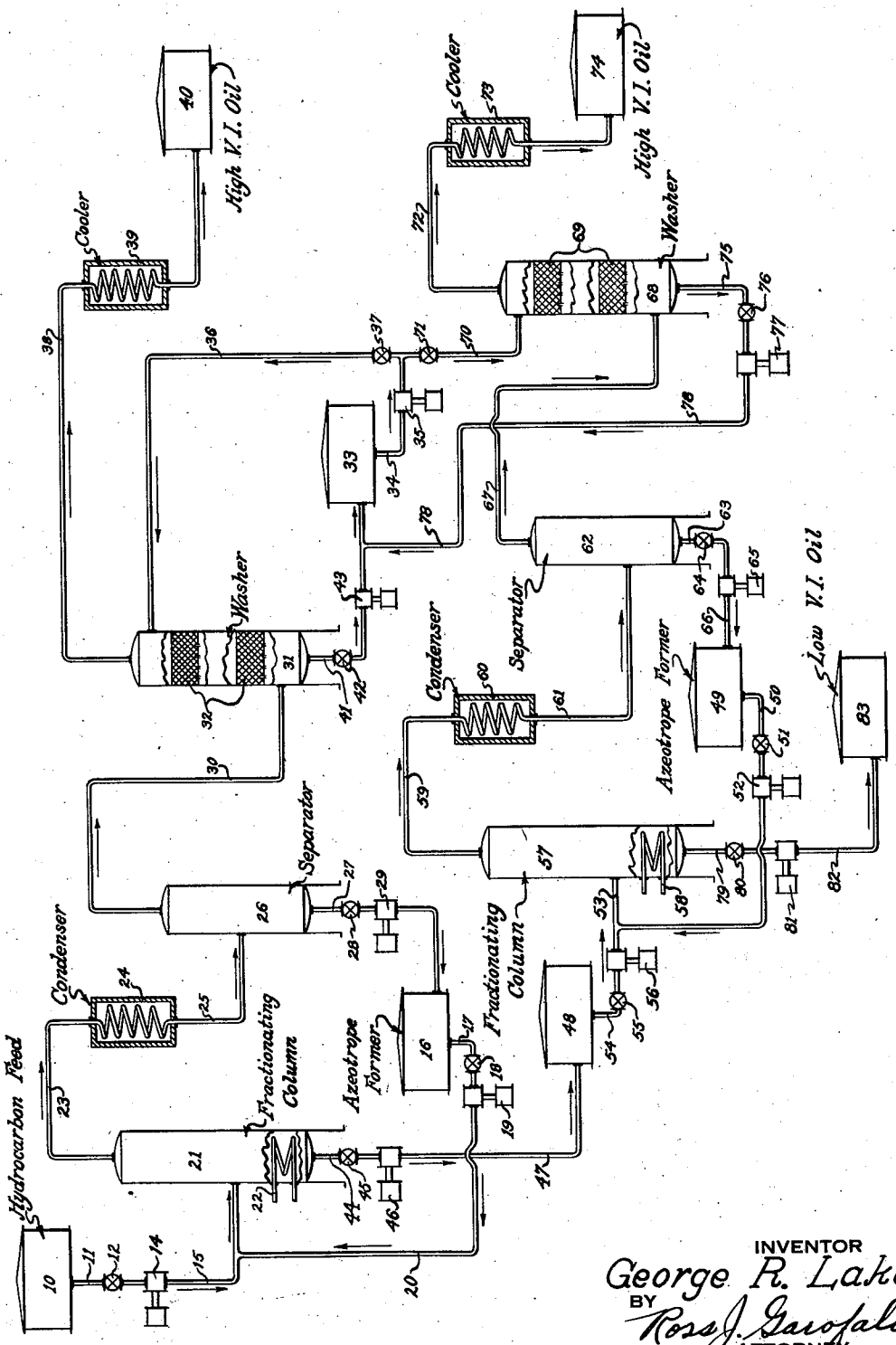
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LUBRICATING OIL PRODUCTION

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LUBRICATING OIL PRODUCTION

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This invention relates to the separation of relatively paraffinic from relatively non-paraffinic oil fractions in the lubricating oil range. The invention relates particularly to the production of lubricating oils having a relatively low viscosity gravity constant from lubricating oils containing oil fractions having a relatively high viscosity gravity constant.

An object of the present invention is to produce lubricating oil having a relatively low viscosity gravity constant by azeotropic distillation. Another object is to remove by azeotropic distillation such oil fractions as exhibit low paraffinicity or high viscosity gravity constant which have poor lubricating oil qualities from a lubricating oil fraction containing the same.

A further object is to separate asphalt, resins and resin-like materials from oils containing the same by azeotropic distillation.

A further object is to produce good quality lubricating oils in a more economical manner without necessarily resorting to extraction with selective solvents.

It is well known to produce lubricating oil of relatively low viscosity gravity constant or paraffinicity, by subjecting the lubricating oil fraction, such as petroleum distillates, to extraction with a selective solvent adapted to separate relatively paraffinic oil fractions from relatively non-paraffinic oil fractions. In this process, the selective solvent, as for example phenol, is mixed with the lubricating oil fraction which preferentially discloses the relatively non-paraffinic oil fractions, thus permitting by stratification or settling, the separation of the relatively paraffinic oil fractions from the solution of selective solvent and relatively non-paraffinic oil fractions. The viscosity gravity constant has been defined by Hill and Coates in the Journal of Industrial and Engineering Chemistry in vol. 20 1928, page 641. This constant represents the paraffinicity or naphthenicity of an oil. A low value represents a high degree of paraffnicity, while a high value indicates a high degree of naphthenicity. The viscosity index (V. I) is also a measure of the paraffinicity of an oil, a high V. I. indivating a good quality paraffinic type oil and a low V. I. indicating a poor quality non-paraffinic type oil.

It is also well known to separate asphalt, resins and other asphaltic and resin-like materials from oils by means of solvents which preferentially dissolve the oil fraction and precipitate the asphalt and the like materials from the solution of solvent and oil. The amount of precipitate will, of course, depend upon the character of the solvent, its gravity and the temperature of treatment or separation. For this purpose many solvents such as the liquefied normally gaseous hydrocarbons, such as propane, etc., and normally liquid hydrocarbons, such as naphtha, hexane, etc., have been used.

I have discovered that the foregoing relatively non-paraffinic components, such as the asphalt, resins and aromatic or naphthenic oil fractions may be removed from oils by a fractional distillation process known as azeotropic distillation wherein a substance is added to the mixture to be distilled which will form an azeotrope boiling at a lower temperature with one or more of the components in the oil so as to permit separation from the other components. I have found that lubricating oil of relatively low viscosity gravity constant may be produced by subjecting the lubricating stock containing the high viscosity gravity constant fractions to fractional distillation in the presence of an added substance, hereinafter referred to as an azeotrope former, which is adapted to form an azeotrope or lower boiling mixture with the lubricating oil fractions of relatively high paraffinicity so that these components may be distilled from the relatively low paraffinicity oil fractions of substantially the same boiling point range as the high paraffinicity lubricating oil fractions. Ordinarily, the separation of lubricating oil stocks into relatively low and relatveiy high viscosity gravity constant oil fractions is difficult if not impossible, by the usual fractional distillation process in the absence of a material which alters the distillation temperature of one of the fractions in the mixture. However, the distillation in the presence of an azeotrope former lowers the boiling point of one class of components so as to permit the desired separation.

While the separation of asphalt from oils offers less difficulty by ordinary fractional distillation in view of the fact that the asphalt is generally of a higher boiling point than the lubricating or other oil components, nevertheless, a considerable quantity of asphalt has been found to be present in even such light lubricating oil distillates as the S. A. E. 20 oil fractions. This is particularly true of the lighter or pseudo asphalt or resin-like materials which boil closer to the oil fractions and distill over therewith. I have found that the distillation in the presence of an azeotrope former lowers the distillation temperature of the oil components so that there is less tendency for the asphalt and like compo-

nents to be distilled together with the oil components. The azeotropic distillation may distill the more paraffinic oil fractions leaving asphalt and the less paraffinic oil fractions as still bottoms.

In general, when choosing azeotrope formers for separating the non-paraffinic components from lubricating oil fractions, it is preferable to employ an azeotrope former having substantially the same boiling point as the stock, and, preferably, boiling not more than about 100° F. below or about 40° F. above the boiling point of the stock. As azeotrope formers which I have found useful for treating lubricating oil fractions of various grades are the poly glycols, such as tri-, tetra-, hexa-, and nona-ethylene glycols, di-, tri-, and tetra-propylene glycols, mono-, di-, and tri-butylene glycols, the alkyl and aryl ethers of the above glycols, such as mono-ethyl ether of tetra-ethylene glycol, phenyl ether of tetra-ethylene glycol, and also the acid esters of the above glycols and the acid esters of alkyl and aryl ethers of the above glycols, such as the acetic acid ester of the ethyl ether of tetra-ethylene glycol; high boiling homologues of phenol, such as alkyl homologues of phenol as, for example, xylenol and the alkyl homologues of polyhydric aromatic compounds, such as resorcinol, orcinol, etc; high boiling amines, such as tri-ethanolamine, iso-propanolamine, tri-ethylene tetramine, tetra-ethylene pentamine, tri-ethylene triamine, etc.

In carrying out the process, the lubricating oil stock, such as crude oil distillate having a boiling range such that when the stock is treated to remove undesirable components, it will finish into a lubricating oil of the desired grade or which may be blended with other lubricating oils to produce the oil of desired grade, is subjected to fractional distillation in the presence of the azeotrope former until all of the paraffin-type oils have been distilled from the mixture. These components which are vaporized are condensed together with the azeotrope former. In order to separate the azeotrope former from the oil components, it is merely necessary to cool and/or mix the condensate mixture with water which dissolves in the azeotrope former and allows the hydrocarbons to separate from the aqueous azeotrope former. By allowing this mixture to settle, two distinct layers are formed, an upper layer consisting of the hydrocarbon and a lower layer of the diluted azeotrope former. These may be separated from each other by simple decantation.

Depending upon the conditions and control during the azeotropic distillation, the overhead from the distillation may contain not only all of the paraffin hydrocarbons but also the olefin type and naphthene type hydrocarbons, leaving as undistilled bottoms only the more aromatic type hydrocarbons. If desired, the overhead material may be redistilled in the presence of the same or different azeotrope former under controlled conditions to separate the paraffin from the other olefin and/or naphthene type hydrocarbons. If the lubricating oil stock had not previously been dewaxed, the wax components will be contained in the overhead paraffinic oil fractions which may then be subjected to conventional methods of dewaxing, such as by diluting with a diluent and chilling and filtering the mixture.

In general, I prefer to carry out the azeotropic distillation on the lubricating oil stock which will finish up into the desired lubricating oil. However, in such cases where the oil fraction has a very wide boiling range such that all of the paraffinic type oils cannot be separated in one step by azeotropic distillation, the lubricating oil stock may be fractionated into a plurality of cuts, each having a boiling range such that the azeotropic distillation will permit all of the high paraffinicity components to be removed from the low paraffinicity components. The separated high paraffinicity components may then be reblended in any desired proportion to produce the proper lubricating oil.

If desired, the wide boiling range lubricating oil fraction may be separated into low and high paraffinicity oils by the following procedure. When the azeotrope former is added to the oil fraction, an azeotrope is formed with the paraffinic hydrocarbons thus lowering their boiling points. The boiling point range of the azeotrope, however, ranges below and within the lower portion of the boiling range of the low paraffinicity fractions. By partially distilling this mixture, the first component which will distill over will be the lighter portion of the relatively high paraffinic hydrocarbons admixed with azeotrope former. Further distillation will remove a mixture of azeotrope former, the higher boiling portion of the relatively high paraffinic hydrocarbons and the lower boiling portion of the relatively low paraffinic oil fractions, leaving the higher boiling portion of the relatively low paraffinic oil fractions as still bottoms. By removing the azeotrope former from the middle fraction and fractionally distilling, the resulting oil may be separated into an overhead fraction consisting of the lighter portion of the less paraffinic oil fractions and a bottoms fraction of the higher boiling portion of the more paraffinic oil fractions. The paraffinic oil fractions may be combined to produce a lubricating oil having the same boiling range as the original stock.

In some cases, it may be desirable to separate a portion of the higher paraffinicity oil fractions using one azeotrope former, then removing the azeotrope former from the remaining undistilled oil and then continuing the distillation in the presence of another azeotrope former to remove the remaining oil fractions of high paraffinicity. This procedure may be carried out in as many stages of azeotropic distillation using different azeotrope formers for each stage as may be necessary to recover the desired oil fractions. In such cases, it is desirable to employ progressively higher boiling azeotrope formers in order to correspond with the boiling point of the fraction to be distilled.

Other objects, features and advantages of my invention will be apparent to those skilled in the art from the following description of the invention which represents a diagrammatic arrangement of apparatus for carrying out my invention.

In the drawing, the hydrocarbon feed to be resolved into relatively low and relatively high viscosity lubricating oils, such as for example a wax-containing lubricating oil distillate which finished up into an S. A. E. 20 lubricating oil derived from a Santa Fe Springs crude oil, is taken from tank 10 via line 11 controlled by valve 12 and pumped by pump 14 into line 15. Azeotrope former, such as tetraethylene glycol, is taken from tank 16 via line 17 controlled by valve 18 and is pumped by pump 19 through line 20 into line 15. This mixture in line 15 consisting of the hydrocarbon feed and azeotrope former in ratio of approximately one volume of

each, is then passed into fractionating column 21 where the mixture is subjected to fractionation, heat being supplied by closed steam coil 22. In some cases, it may be desirable to introduce the azeotrope former into the top of the column so as to provide reflux therein. In the fractionating column, the distillation is controlled so as to distill overhead an azeotrope consisting of the relatively low viscosity gravity constant lubricating oil fractions together with the azeotrope former. This fraction is removed from the fractionating column via line 23, condensed and cooled in condenser 24 and passed via line 25 into a separator 26 where the hydrocarbons separate from the azeotrope former as two distinct layers which may be removed from each other by simple decantation. The lower layer consisting of azeotrope former is withdrawn via line 27 controlled by valve 28 and is pumped by pump 29 to storage tank 16.

The upper layer in separator 26 may be passed to storage. However, if this fraction contains azeotrope former, it is passed via line 30 into the bottom of washer 31 provided with packing material, such as broken tile 32, for effecting intimate countercurrent contact with water which is introduced into the washer from tank 33 via line 34 and passed by pump 35 into line 36 controlled by valve 37 into the washer. The contact of the azeotrope former and hydrocarbons and water in the washer causes the small amount of azeotrope former to separate from the hydrocarbons. The hydrocarbons are removed via line 38, cooled in cooler 39 and passed to storage tank 40 as high V. I. lubricating oil. The washing operation is preferably carried out at an elevated temperature of approximately 300° F. under superatmospheric pressure. The low viscosity gravity constant oil in tank 40 may be dewaxed by mixing the oil with a liquefied normally gaseous hydrocarbon under pressure, such as liquid propane, in the ratio of three volumes of propane to one of the oil or with other diluents now known in this art. The solution of propane and waxy oil is chilled to a temperature sufficiently low to crystallize wax, such as —40° F., and the chilled slurry is filtered to remove the crystallized wax from the solution of oil and propane. The propane may then be distilled from the oil. Ordinarily this oil will not require further treatment; however, if desired it may be given an acid and/or alkali treatment and/or a clay treatment. In some cases, the relatively high paraffinicity lubricating oil may be further treated with selective solvents, such phenol, in order to further purify the oil. If desired, instead of dewaxing the oil subsequent to the azeotropic distillation, the lubricating oil stock may be dewaxed before being subjected to azeotropic distillation.

The lower phase in washer 31 consisting of dilute aqueous solution of azeotrope former is returned to tank 33 via line 41 controlled by valve 42 and pumped by pump 43. If desired, this solution may be distilled to recover azeotrope former which may be returned to tank 16. The undistilled bottoms in the fractionating column 21 consisting of the relatively nonparaffinic oil fractions is removed via line 44 controlled by valve 45 and pumped by pump 46 through line 47 into storage tank 48.

In some cases particularly where the lubricating oil stock has a very wide boiling range, these bottoms may contain the high boiling low viscosity gravity constant lubricating oil fractions admixed with relatively high viscosity gravity constant oil fractions. The product obtained as low viscosity gravity constant lubricating oil which is collected in tank 40 will, therefore, consist of the lower boiling fractions of the low viscosity gravity constant oils. The high boiling low viscosity gravity constant lubricating oils contained in the bottoms of fractionating column 21 may be retreated by azeotropic distillation employing a higher boiling azeotrope former, such as hexaethylene glycol, than employed in the first step. The azeotrope former is withdrawn from tank 49 in line 50 controlled by valve 51 and pumped by pump 52 into line 53 in which it mixes with the oil fraction withdrawn from tank 48 via line 54 controlled by valve 55 and pumped by pump 56 into line 53. The mixture then enters fractionating column 57 where it is subjected to fractionation, heat being supplied by closed steam coil 58. In the column, the distillation is controlled so as to distill overhead an azetrope consisting of the relatively high boiling low viscosity gravity constant lubricating oils together with the azeotrope former which is removed via line 59, condensed and cooled in condenser 60 and passed via line 61 into separator 62 where the mixture separates into two layers, i. e. a lower layer consisting of azeotrope former which is passed via line 63 controlled by valve 64, pump 65 and line 66 into tank 49 and an upper layer of hydrocarbons which is passed via line 67 to washer 68 provided with packing 69 where it contacts water introduced from tank 33 via lines 34 and 70 controlled by valve 71. The oil fraction is removed via line 72, cooled in cooler 73 and passed to storage tank 74. This fraction may be mixed in any desired proportion with the oil collected in tank 40. The lower aqueous layer in washer 68 is removed via line 75 controlled by valve 76 and pumped by pump 77 through line 78 to tank 33.

The bottoms in fractionating column 57 consisting of the relatively low paraffinicity oil fractions is withdrawn via line 79 controlled by valve 80 and pumped by pump 81 through line 82 into tank 83. If desired, depending upon whether this oil contains still higher boiling relatively low viscosity gravity constant oils, it may be subjected to further azeotropic distillation in the presence of a still higher boiling azeotrope former.

As examples of my invention, the following is submitted which is merely illustrative thereof and is not to be considered as limiting:

A lubricating oil distillate obtained from the vacuum distillation of a Santa Fe Springs crude oil having a gravity of 21.8° A. P. I., a viscosity of 57 seconds (Saybolt Universal at 210° F.) and a viscosity gravity constant of 0.866 was fractionally distilled into two cuts of substantially equal quantities. The lighter fraction having a viscosity of 51 seconds, a gravity of 22.4° A. P. I. and a viscosity gravity constant of 0.865 was subjected to fractional distillation in the presence of approximately an equal volume of tetraethylene glycol under relatively high vacuum at an overhead temperature of about 275° F. which gradually increased to about 325° F. towards the end of the run. The overhead oil which was separated from the azeotrope former had a gravity of 28.7° A. P. I., a viscosity of 45.5 seconds and a viscosity gravity constant of 0.823 and was obtained in a yield of 63% by volume. The distillation bottoms representing 37% had a gravity

of 7.9° A. P. I., a viscosity of 142 seconds and a viscosity gravity constant of 0.968.

The heavier fraction having a viscosity of 60 seconds, a gravity of 21.6° A. P. I. and a viscosity gravity constant of 0.866 was subjected to functional distillation in the presence of approximately an equal volume of hexaethylene glycol under relatively high vacuum at an overhead temperature of about 425° F. which gradually increased to about 475° F. towards the end of the run. The overhead which was separated from the azeotrope former had gravity of 27.6° A. P. I., a viscosity of 57.7 seconds and a viscosity gravity constant of 0.821 and was obtained in a yield of 65% by volume. The distillation bottoms representing 35% had a gravity of 6.0° A. P. I., a viscosity of 305 seconds and a viscosity gravity constant of 0.974.

The overhead light and heavy fractions recovered in the foregoing azeotropic distillations were blended. The blended material representing 64% by volume based upon the original 21.8° A. P. I. lubricating oil distillate had a gravity of 28.1° A. P. I., a viscosity of 51.5 seconds and a viscosity gravity constant of 0.821. The bottoms from each of the azeotropic distillations were blended and the blend showed a gravity of 7.0, a viscosity of 224 seconds and a viscosity gravity constant of 0.968.

Another portion of the original 21.8° A. P. I. lubricating oil distillate was fractionally distilled in the presence of approximately two volumes of tetraethylene glycol under relatively high vacuum at an overhead temperature of 275° F. which gradually increased to about 350° F. towards the end of the run. The overhead which was separated from the azeotrope former represented 48% by volume of the feed and had a gravity of 29.0° A. P. I., a viscosity of 45 seconds and a viscosity gravity constant of 0.821. The distillation bottoms had a gravity of 15.4° A. P. I., a viscosity of 78 seconds and a viscosity gravity constant of 0.910.

It will be observed that in the foregoing azeotropic distillations, substantially all of the paraffinic components were removed by the distillation and separately recovered since in each of the azeotropic distillations towards the end of the run, the overhead product consisted substantially only of azeotrope former even though the temperature of distillation was increased appreciably.

The foregoing description of my invention is merely illustrative and is not to be considered as limiting as many variations can be made by those skilled in the art without departing from the scope of the following claims.

This application is a continuation-in-part of the earlier application Serial No. 360,264, filed October 8, 1940.

I claim:

1. A process for producing lubricating oil from an oil containing relatively paraffinic and relatively non-paraffinic oil fractions which comprises distilling said oil in the presence of a compound selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil and capable of forming a lower boiling azeotrope with said relatively paraffinic oil fraction and thereby distilling said azeotrope from the remaining relatively non-paraffinic oil fractions.

2. A process for separating relatively paraffinic lubricating oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions to produce a plurality of fractions, distilling each of said oil fractions in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of the fraction undergoing distillation and capable of forming a lower boiling azeotrope with said relatively paraffinic oil fractions and thereby separating said azeotrope from the remaining relatively non-paraffinic oil fractions, separating azeotrope former from said relatively paraffinic oil fractions and blending said separated relatively paraffinic oil fractions.

3. A process for separating relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols adapted to form an azeotrope with the lighter portion of said relatively paraffinic oil fraction, distilling said azeotrope from the remaining mixture of heavier relatively paraffinic oil fractions and relatively non-paraffinic oil fractions and fractionally distilling the remaining mixture in the presence of an azeotrope former adapted to form an azeotrope with the heavier portion of said relatively paraffinic oil fraction.

4. A process for separating relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols adapted to form an azeotrope with the lighter portion of said relatively paraffinic oil fraction, distilling said azeotrope from the remaining mixture of heavier relatively paraffinic oil fractions and relatively non-paraffinic oil fractions and fractionally distilling the remaining mixture in the presence of an azeotrope former adapted to form an azeotrope with the heavier portion of said relatively paraffinic oil fraction, separating azeotrope former from each of said relatively paraffinic oil fractions and blending said relatively paraffinic oil fractions as desired.

5. A process for separating relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols adapted to form an azeotrope with the lighter portion of said relatively paraffinic oil fraction, distilling said azeotrope from the remaining mixture of heavier relatively paraffinic oil fractions and relatively non-paraffinic oil fractions and fractionally distilling the remaining mixture in the presence of a second azeotrope former which is different from said first azeotrope former adapted to form an azeotrope with the heavier portion of said relatively paraffinic oil fraction.

6. A process for separating relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols adapted to form an azeotrope with the lighter portion of said relatively paraffinic oil fraction, distilling said azeotrope from the remaining mixture of heavier relatively paraffinic oil fractions and relatively non-paraffinic oil fractions and fractionally distilling the remaining mixture in the presence of a second azeotrope former having a higher boiling point than said first azeotrope former adapted to form an azeotrope with the heavier portion of said relatively paraffinic oil fraction.

7. A process for separating relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions in the presence of terta-ethylene glycol adapted to form an azeotrope with the lighter portion of said relatively paraffinic oil fraction, distilling said azeotrope from the remaining mixture of heavier relatively paraffinic oil fractions and relatively non-paraffinic oil fractions and fractionally distilling the remaining mixture in the presence of an azeotrope former adapted to form an azeotrope with the heavier portion of said relatively paraffinic oil fractions.

8. A process for producing lubricating oil from an oil containing relatively paraffinic and relatively non-paraffinic oil fractions which comprises distilling said oil in the presence of a relatively high boiling polyglycol capable of forming an azeotrope with said relatively paraffinic oil fraction and thereby distilling said azeotrope from the remaining relatively non-paraffinic oil fractions.

9. A process according to claim 8 in which said polyglycol comprises tetraethylene glycol.

10. A process for producing lubricating oil from an oil containing relatively paraffinic and relatively non-paraffinic oil fractions which comprises distilling said oil in the presence of a relatively high boiling ether of a polyglycol capable of forming an azeotrope with said relatively paraffinic oil fraction and thereby distilling said azeotrope from the remaining relatively non-paraffinic oil fractions.

11. A process for producing lubricating oil from an oil containing relatively paraffinic and relatively non-paraffinic oil fractions which comprises distilling said oil in the presence of a relatively high boiling acid ester of a polyglycol capable of forming an azeotrope with said relatively paraffinic oil fraction and thereby distilling said azeotrope from the remaining relatively non-paraffinic oil fractions.

12. A process for separating asphalt, resins and the like substances from an oil containing the same which comprises distilling said oil in the presence of a compound selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil and capable of forming a lower boiling azeotrope with oil components other than said asphalt, resins and like substances desired to be separated from said oil and separating said oil components from said asphalt, resins and like substances together with said compound.

13. A process for separating asphalt, resins, aromatic and naphthenic oil fractions from an oil containing the same and paraffinic oil fractions which comprises distilling said oil in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil and capable of forming a lower boiling azeotrope with said paraffinic oil fractions and separating said azeotrope from the remaining undistilled asphalt, resins, aromatic and naphthenic oil fractions.

14. A process for separating asphalt, resins and the like substance from an oil containing the same which comprises distilling said oil in the presence of a compound selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil and capable of forming a lower boiling azeotrope with oil components other than said asphalt, resins and like substances desired to be separated from said oil and separating said oil components from said asphalt, resins and like substances together with said compound.

15. A process for separating asphalt, resins, aromatic and naphthenic oil fractions from an oil containing the same and paraffinic oil fractions which comprises distilling said oil in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil capable of forming a lower boiling azeotrope with said paraffinic oil fractions and separating said azeotrope from the remaining undistilled asphalt, resins, aromatic and naphthenic oil fractions.

16. A process for separating wax, asphalt, resins, aromatic and naphthenic oil fractions from an oil containing the same and paraffinic oil fractions which comprises distilling said oil in the presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil and capable of forming a lower boiling azeotrope with said paraffinic oil fractions and wax and separating said azeotrope from the remaining undistilled asphalt, resins, aromatic and naphthenic oil fractions and separating wax from said paraffinic oil fractions.

17. A process for the separation of relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises distilling said oil in the presence of a compound selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of said oil and capable of forming a lower boiling azeotrope with said relatively paraffinic oil fraction and thereby distilling said azeotrope from the remaining relatively non-paraffinic oil fractions.

18. A process for the separation of relatively paraffinic oil fractions from relatively non-paraffinic oil fractions which comprises fractionally distilling an oil fraction containing a mixture of said relatively paraffinic and relatively non-paraffinic oil fractions to produce a plurality of fractions, distilling each of said oil fractions in the

presence of an azeotrope former selected from the class consisting of polyglycols and derivatives of polyglycols having a boiling point not more than about 100° F. below or about 40° F. above the boiling point of the fraction undergoing distillation and capable of forming a lower boiling azeotrope with said relatively paraffinic oil fractions and thereby separating said azeotrope from the remaining relatively non-paraffinic oil fractions, separating azeotrope former from said relatively paraffinic oil fractions and blending said separated relatively paraffinic oil fractions.

19. A process as in claim 17 in which said compound comprises an acid ester of a polyglycol.

20. A process as in claim 17 in which said compound comprises an ether of a polyglycol selected from the group consisting of alkyl and aryl ethers.

21. A process as in claim 17 in which said compound comprises an acid ester of an ether of a polyglycol selected from the group consisting of alkyl and aryl ethers.

22. A process as in claim 17 in which said compound comprises the acetic acid ester of ethyl ether of tetraethylene glycol.

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