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DEASPHALTING MIXTURES OF HYDROCARBONS

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The present invention relates to the treatment of mixtures of hydrocarbons with liquid normally gaseous hydrocarbons and, more particularly, to the treatment of mixtures of hydrocarbons containing asphalt with liquid normally gaseous hydrocarbons and organic carbonates to separate an asphaltic component.

In the years subsequent to 1934 a number of patents have issued relating, generally, to the deasphalting of mixtures of hydrocarbons and, specifically, to the deasphalting of mineral oil. For example, U. S. Patent No. 1,948,296 contains a description of a method of treating crude oils, i. e. asphalt-containing oils which have not been subjected to excessive temperatures, with solvents which have the function of dissolving the oil but which do not dissolve the bitumens. Such solvents are stated in this patent to be light petroleum hydrocarbons, such as naphtha, casinghead gasoline, light petroleum fractions composed of propane, butane and isobutane, certain alcohols, ether and mixtures thereof, acetone, etc. Later, in U. S. Patent No. 2,002,004 the hydrocarbons of the foregoing list of asphalt precipitants were termed normally gaseous liquefied hydrocarbons. Thus, there is a broad designation of deasphalting agents which includes within its scope the normally gaseous liquefied hydrocarbons as a specific type of deasphalting agent.

The term asphalt, as used in generically designating the material insoluble in the conventional deasphalting agents, has likewise been given several definitions which in essence have the same meaning. Thus, in U. S. Patent No. 2,121,517 asphalt and bitumens would appear to be synonymous terms. On the other hand, Abraham, "Asphalts and Allied Substances" (5th ed.) (1945), vol. I, page 61, defines asphalt as, "A term applied to a species of bitumen," while in "Chemical Refining of Petroleum," Kalichevsky-Stagner, asphalt is defined in the "Glossary of Terms" as "Solid or semi-solid bitumen found in nature (natural asphalt) or manufactured by the oxidation, distillation or other treatment of mineral oils (artificial asphalt)." While these definitions differ in some respects, those skilled in the art of petroleum refining when discussing the deasphalting of crudes or lubricating fractions or other mixtures of hydrocarbons by treatment with deasphalting agents consider the substance insoluble in the deasphalting agents to be asphalt. The terms asphalt and deasphalting agents are used hereinafter in the meaning set forth in the last sentence.

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The present invention does not include new or novel manipulations of the mixture of hydrocarbons to be deasphalted but provides for the use of a novel solvent mixture in operations disclosed by the prior art. In other words, the novel solvent mixture is used as a solvent in the prior art processes of deasphalting.

The novel solvent mixture comprises a mixture of one or more of the well known or conventional deasphalting agents and a modifier. The particular mechanism by which the modifier produces the novel results is not entirely understood. That is to say, it is not clear whether the modifier reduces the solubility of the asphalt in the deasphalting agent thereby reducing the Conradson number of the raffinate or decreases the solubility of the raffinate in the liquid asphalt thereby increasing the yield or whether the unexpected overall improvement is the result of some other phenomenon or phenomena. However, it has been establishing, as shown hereinafter that improved results as compared to those of the prior art can be achieved in either of two ways by the use of a deasphalting mixture comprising a modifier in conjunction with a conventional deasphalting agent. That is to say, a deasphalted oil of higher quality than that produced when treating the same charge stock with a conventional deasphalting agent can be obtained by using one of the novel modifiers in conjunction with the same deasphalting agent and at no sacrifice in yield. On the other hand, by using a novel modifier in conjunction with a known deasphalting agent, the deasphalting operation can be carried out in such a manner as to produce a higher yield of deasphalted oil than can be obtained with the same charge stock using the some deasphalting agent alone and at no sacrifice in quality.

The novel modifiers are a special class of the group, organic esters; to wit: the carbonate of aliphatic, cycloaliphatic, and aromatic hydrocarbons and heterocyclic compounds. The most readily available and, for practical reasons, the prefered esters are methyl and ethyl carbonate, $(CH_3O)_2CO$ and $(C_2H_5O)_2CO$ respectively. Typical of the other modifiers are the carbonate of cyclohexane, $(C_6H_{11}O)_2CO$, and the carbonates of furan, pyrrole and thiophene conforming to the general formula, $(RO)_2CO$ where R is the monovalent residue of an aliphatic, or cycloaliphatic, or aromatic hydrocarbons or a heterocyclic compound.

The present invention has as an object to

provide an improved deasphalting agent for use in deasphalting mixtures of hydrocarbons and particularly for use in deasphalting residual mineral oils. The present invention has as another object to provide a deasphalting agent which, in known processes, will produce the same quantity of lighter colored deasphalted oil having a lower carbon residue than deasphalted oil prepared by conventional deasphalting. The present invention has as a further object to provide a deasphalting agent which, in known processes, will produce a larger quantity of higher viscosity, lighter colored deasphalted oil of comparable carbon residue to that prepared by conventional deasphalting. An additional object of the present invention is to provide a deasphalting agent which will retain high viscosity oil constituents in the raffinate phase which are normally discarded with the asphalt in conventional deasphalting.

In general, the deasphalting procedure is that used in conventional deasphalting of oils. For example, as applied to residual oils, the oil is heated to a temperature at which the oil is freely fluid, the heated oil is contacted in a closed system with the mixture of deasphalting agent and modifier. The asphalt is then washed with fresh quantities of deasphalting agent and/or modifier to remove entrained oily material and the asphalt and solution of raffinate in the mixture of deasphalting agent and modifier separated and removed from the system. Two suitable sequences of operations are illustrated in the Process Handbook of Petroleum Refiner (April, 1947) at pages 226 to 229. The mixture of deasphalting agent and modifier is used in the ratio 1 to 15 parts by volume of mixture to 1 part by volume of oil. Preferably, the modifier is used in amounts up to about 20 volume per cent of the mixture. Greater amounts of modifier can be used but at the cost of diminishing returns. Preferably, ethyl carbonate $(C_2H_5O)_2CO$ is used in the range of 1 to 12.0 volume per cent of the mixture. It is also preferred to use deasphalting mixture-oil ratios of about 3:1 to 10:1 by volume.

In order to provide a comparison of the effect of the novel deasphalting mixture and a prior art deasphalting agent, the following data are tabulated:

Table I

Test No.	1	2	3	4	5	6	7	8
Hydrocarbon mixture	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Temperature:								
Top of tower, °F.	180	165	180	180	125	180	125	125–180
Bottom of tower, °F.	120	120	120	120	120	120	120	120
Volume ratio:								
Deasphalting mixture to oil	10.15:1	10:1	10:1	10.25:1	10:1	8.5:1	8:1	8:1
Vol. per cent deasphalting agt	98.5	100	100	97.5	100	94.1	100	
Vol. per cent modifier	1.5			2.5		5.9		100
Raffinate yield, vol. per cent	57.8	55.6	47.5	64.3	63.6	70.9	64.3	(2)
S. U. V. at 210° F., seconds	135.1	125.2	99.9	142.4	162.1	192.2	170	(2)
Color (Lovibond ¼" cell)	62	115	45	115	430	350	625	(2)
Per cent carbon residue	0.8	0.8	0.3	1.0	2.0	2.7	2.5	(2)

[1] A residual oil having an S. U. V. at 210° F. of 1,058 seconds.
[2] No separation of raffinate and asphalt even at low throughout. The carbonaceous material remained suspended in the oil-deasphalting mixture.

The foregoing data provide a basis for three comparisons: one, the effect of the presence of a modifier; two, the effect of increasing concentrations of modifier; and three, the effect of the modifier as the sole deasphalting agent.

The effect of minimum amounts of modifier is, first, to increase the yield when operating at the same tower temperatures (tests 1 and 3), and second, the raffinate is much heavier, i. e. the raffinate had a viscosity of 135.1 seconds at 210 degrees Fahrenheit as compared with 99.9 seconds for the raffinate when propane without a modifier was the deasphalting agent. On the other hand, when propane without a modifier was used as the deasphalting agent (tests 1 and 2) and the tower temperatures controlled to produce substantially the same yield of raffinate the color of the raffinate was much darker, 115 as compared with 62, and the viscosity significantly lower.

By comparing tests 1, 4 and 6, the effect of an increase in the concentration of modifier in the deasphalting mixture can be recognized. An increase in modifier concentration from 1.5 to 2.5 per cent results in an 11 per cent increase in yield. While the viscosity increases slightly, on the other hand, the carbon residue is the same (i. e. within the limit of error). In contrast, when an attempt is made to obtain a process yield equal to that obtained with 2.5 per cent modifier in the deasphalting mixture by controlling tower temperatures, the yield can be equalled but at a sacrifice of quality which cannot be tolerated. Tests 4 and 5 establish the foregoing. When using a deasphalting mixture containing 2.5 per cent of a modifier, a process yield of 64.3 per cent was obtained. When using propane without any modifier, a substantially equal process yield of 63.6 per cent was obtained. However, the raffinate obtained when using propane without a modifier as the deasphalting mixture had a color of 430 as compared with 115 and a carbon residue of 2.0 per cent as compared to 1.0 per cent. Test 7 confirms the foregoing. At exactly the same process yield the color of the raffinate obtained using propane as the sole deasphalting agent is 625 as compared to 115 and the carbon residue is 2.5 as compared to 1.0 when using a deasphalting agent containing 2.5 per cent of a modifier (tests 4 and 7). Test No. 8 establishes these modifiers cannot be used as the sole deasphalting agent in gravity settling equipment. Therefore, it is manifest, in view of the data presented in the foregoing tabulation, that a modifier of the class described hereinbefore cooperates with well known, conventional deasphalting agents to form a deasphalting mixture which produces results unattainable by the use of conventional deasphalting agents. That is to say, the use of the novel deasphalting mixtures comprising a conventional deasphalting agent and a modifier selected from the group consisting of carbonates of aliphatic, cycloaliphatic, and aromatic hydrocarbons and heterocyclic compounds substantially completely miscible in all proportions with

conventional deasphalting agents makes it possible to produce the same process yield of raffinate of better color, higher viscosity and lower carbon residue or a better process yield of raffinate of equivalent quality than can be obtained employing conventional deasphalting agents as the sole component of a deasphalting mixture.

A series of tests have further established that the use of a modifier such as diethyl carbonate as the sole component of a deasphalting mixture in amounts of 500 to 800 volume per cent of residual oil, i. e. $(C_2H_5O)_2CO$: oil ratio of 5:1 to 8:1 does not materially affect the results reported

in the tabulation. In all instances fine, granular, tarry materials in the amount of 9–14 weight per cent could be separated by filtration but the mixture of oil and diethyl carbonate did not stratify into a raffinate layer and a liquid asphaltic layer in gravity separating operations.

Typical of the treatment of other residua are the data submitted hereinafter in Table II obtained by treating a mixed base crude, in Table III obtained by treating a West Texas sweet mixed base crude, and in Table IV obtained by furfural refining after deasphalting of a mixed base crude:

Table II

Processing Conditions—Deasphalting:											
Propane, Per Cent Volume on Oil Charge		800	800	800	800	1,000	1,000	800	800	600	600
Diethyl Carbonate, Per Cent Volume on Oil Charge			15		25		50		35		35
Temperature, °F. Tower Top		180	180	165	180	125	180	125	180	125	165
Temperature, °F. Tower Bottom		120	120	120	120	120	120	120	120	120	120
Run Number		154	279	251	300	246	303	245	301	262	311
Yields, Per Cent Vol. On Process:											
Deasphalting		46.9	59.4	56.5	63.1	63.6	69.2	64.3	67.9	66.0	71.3
Dewaxing, Ultimate		86.1	89.2	89.0	90.3	88.8	90.8	89.4	90.8	90.0	90.8
Overall:											
On Residuum	100										
On Crude	29.5										
Processing Step	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Inspections:											
Gravity, °A. P. I.	13.4	23.7	22.8	22.7	21.7	21.1	20.7	21.1	20.7	21.1	20.3
Gravity, Specific @ 60°F. (Pyc. @ 77°F.)	0.9768										
Pour Point, °F.		5	5	5	5	0	10	5	5	5	10
Flash Point, °F. (COC)	560	545	550	550	565	555	545	545	560	565	575
Fire Point, °F. (COC)	640	605	605	615	620	630	630	625	635	620	640
K. V. @ 100°F. Centistokes		477.6	630	683	848	1,044	1,123	1,136	1,169	1,226	1,560
K. V. @ 210°F Centistokes	227.5	25.39	29.68	31.38	35.10	39.94	41.45	42.25	42.41	44.50	48.45
S. U. V. @ 100°F. Seconds		2,205	2,910	3,160	3,920	4,830	5,190	5,250	5,400	5,660	7,210
S. U. V. @ 210° F. Seconds	1,058	121.5	140.5	148.0	164.8	186.8	193.6	197.2	197.9	207.6	225.9
Viscosity Index		76	74	75	73	73	73	74	73	75	68
Viscosity Gravity Constant @ 210°F	0.907	0.833	0.837	0.837	0.843	0.846	0.849	0.845	0.848	0.844	0.850
Color, Lovibond, ¼" Cell	>750	145	85	245	165	550	415	>750	335	>750	715
Carbon Residue, Per Cent Weight		0.7	0.8	1.3	1.1	2.2	2.2	2.7	2.5	3.3	3.4
Tar:											
Specific Gravity @ 60°F. (Pyc. @ 77°F.)		1.0381	1.0650	1.0552	1.0718	1.0691	1.0854	1.0690	1.0794	1.0711	1.0865
Penetration @ 77°F		24	0	9	0	4	0		0	4	0
R and B Melting Point, °F.		141	203	167.5	215	178	246		226	>180	259

[1] Raw residuum.
[2] Dewaxed deasphalted oil.

Table III

Processing Conditions—Deasphalting:									
Propane, Percent Volume on Oil Charge		600	1,000	800	1,000	600	1,000	1,000	800
Diethyl Carbonate, Percent volume on Oil Charge			25		50		75		50
Temperature, °F, Tower Top		180	180	150	180	150	200	125	200
Temperature, °F, Tower Bottom		120	120	120	120	120	120	120	120
Run Number		447	425	442	426	441	435	440	431
Yield, Per cent Vol. On Process:									
Deasphalting		78.4	82.3	82.8	84.8	83.8	88.8	85.4	89.0
Overall:									
On Residuum	100								
Processing Step	(1)	( )	( )	( )	( )	(2)	(2)	(2)	(2)
Inspections:									
Gravity, °A. P. I.		22.3	21.8	21.9	21.7	21.5	21.1	210.3	21.0
Gravity, Specific @ 60°F. (Pyc @ 77°F.)	0.9440								
Pour Point, °F.			5	0	5	0	5	5	5
Flash Point, °F. (COC)	550	535	545	550	550	525	540	555	545
Fire Point, °F. (COC)	630	615	620	625	625	610	620	620	630
K. V. @ 100°F. Centistokes		741.4	857	890	1,015	955	1,064	1,063	1,187
K. V. @ 210°F. Centistokes	61.69	31.45	35.14	36.07	38.56	37.60	39.39	39.96	41.97
S. U. V. @ 100°F. Seconds		3,425	3,960	4,120	4,690	4,420	4,920	4,900	5,480
S. U. V. @ 210°F. Seconds	286.8	152.8	165	169.2	180.5	176.1	184.2	186.8	196.0
Viscosity Index		73	72	73	71	72	70	72	70
Viscosity Gravity Constant @ 210°F	0.861	0.840	0.842	0.842	0.842	0.844	0.846	0.853	0.846
Color, Lovibond, ¼" Cell	Black	250		450	400	700	370	625	525
Carbon Residue, Per cent Weight	7.1	1.3	1.3	2.0	2.0	2.5	2.2	2.6	2.3
Tar:									
Specific Gravity @ 60°F. (Pyc @77°F.)		1.0386	1.0538	1.0503	1.0615	1.0417	1.0849	1.0594	1.0701
Penetration @ 77°F.		19.5	3.5	7.5	1.5	15	0.5	4.0	1.5
Ring and Ball Melting Point, °F.		133	172	140	181	156	226	165	202

[1] Raw residuum.
[2] Dewaxed deasphalted oil.

Table IV

Processing Conditions—Deasphalting:										
Propane, Per Cent Volume			600					800		
Diethyl Carbonate, Per Cent Volume			0					25		
Temperature, °F., Tower Top			125					165		
Temperature, °F., Tower Bottom			120					120		
Run Number			161					166		
Furfural Extraction:										
Solvent, Per Cent Volume			300					300		
Temperature, °F			250					250		
Run Number			294					287		
Yields, Per Cent Vol. On Process:										
Deasphalting			72.6					81.0		
Extraction			60.6					61.0		
Dewaxing, Ultimate			83.9					83.4		
Overall:										
On Process	100.0		35.4			100.0		39.4		
On Crude	36.3		12.9			38.6		15.2		
Processing Step	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Gravity, °A. P. I.	16.5	22.6	27.3	26.3	27.1	16.8	21.9	27.1	26.1	27.0
Gravity, Specific @ 60° F	0.9561	0.9182	0.8911			0.9541	0.9224	0.8922		
Pour Point, °F	70			10	10	85	110		15	15
Flash Point, °F. (COC)	520	510	520	520		505	515	520	540	525
Fire Point, °F. (COC)	595	585	585	590		585	575	590	585	580
K. V. @ 100° F. Centistokes				498	402				491.6	405
K. V. @ 210° F. Centistokes	98.4	27.19	25.76	29.52	26.25	87.6	29.88	26.14	29.88	26.48
S. U. V. @ 100° F. Seconds				2,300	1,860				2,275	1,875
S. U. V. @ 210° F. Seconds	458	129.5	123.1	139.8	125.3	408	141.3	124.8	141.3	126.3
Viscosity Index				93	95				95	96
Viscosity Gravity Constant										
Viscosity Gravity @ 210° F	0.872	0.838	0.806	0.811	0.807	0.870	0.844	0.807	0.812	0.808
Color, Lovibond, ¼" Cell	>750	700	750	750	85	>750	650	425	450	85
Carbon Residue, Per Cent Weight	12.0	2.0	1.1	1.1	0.7	11.8	2.3	1.0	1.2	0.7
Sulfur, Per Cent Weight	1.70				0.63	1.70				0.59
Asphalt:										
Specific Gravity @ 60° F		1.0569					1.0889			
Penetration @ 77° F		13					4.5			
Ring and Ball Melting Point, °F		155					182			
Furfural Extract:										
Specific Gravity @ 60° F			0.9600					0.9698		

Processing Conditions—Deasphalting:										
Propane, Per Cent Volume			800					1,000		
Diethyl Carbonate, Per Cent Volume			0					50		
Temperature, °F., Tower Top			150					150		
Temperature, °F., Tower Bottom			120					120		
Run Number			381					303		
Furfural Extraction:										
Solvent, Per Cent Volume			300					300		
Temperature, °F			265					275		
Run Number			576					524		
Yields, Per Cent Vol. On Process:										
Deasphalting			53.3					67.6		
Extraction			62.3					52.7		
Dewaxing, Ultimate			83.8					84.7		
Overall:										
On Process	100.0		26.6			100.0		29.0		
On Crude	25.8		6.9			29.5		8.54		
Processing Step	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Gravity, °A. P. I.	12.6	22.6	26.7	26.7	26.7	13.4	21.2	26.9	26.7	26.9
Gravity, Specific @ 60° F	0.9819	0.9181	0.8946	0.8944		0.9768	0.9266	0.8934		
Pour Point, °F				15	15		80		5	10
Flash Point, °F. (COC)	585	560	585	570	585	560	545	575	570	570
Fire Point, °F. (COC)	675	640	640	650	650	640	630	645	640	645
K. V. @ 100° F. Centistokes				571	564				575.5	554
K. V. @ 210° F. Centistokes	364	34.38	29.75	33.08	33.0	227.5	35.24	29.82	33.61	32.87
S. U. V. @ 100° F. Seconds				2,640	2,610				2,660	2,560
S. U. V. @ 210° F. Seconds	169.5	161.5	140.8	155.6	155.3	105.8	165.4	141.1	158	154.7
Viscosity Index				96	96				97	97
Viscosity Gravity Constant										
Viscosity Gravity @ 210° F		0.836	0.808	0.806	0.806	0.907	0.848	0.806	0.806	0.804
Color, Lovibond, ¼" Cell	Black	145	62	86	50	>750	375	175	182	75
Carbon Residue, Per Cent Weight	16.1	1.1	0.3	0.4	0.3	15.2	1.8	0.6	0.5	0.4
Sulfur, Per Cent Weight	2.06				0.62					0.58
Asphalt:										
Specific Gravity @ 60° F		1.0546					1.0817			
Penetration @ 77° F		7					0			
Ring and Ball Melting Point, °F		181					232			
Furfural Extract:										
Specific Gravity @ 60° F			0.9571					0.9636		

[1] Raw residuum.
[2] Waxy deasphalted oil.
[3] Waxy Furfural Raffinate.
[4] Dewaxed raffinate.
[5] Finished oil.

Typical of the results produced by the use of the novel deasphalting mixture (deasphalting agent plus carbonates of aliphatic or cycliali-phatic, or aromatic, or heterocyclic hydrocarbons

or mixtures of the foregoing) in the deasphalting of a mixed base crude high in asphaltic materials, are the data presented in Table V:

Table V

Charge stock—Residuum from mixed base crude high in asphaltic materials
Per cent volume of crude—16.4
Specific gravity 77/60° F.—0.9960
Flash point, °F. (C.O.C.)—600
S.U.V. @ 210° F., seconds—917
Carbon residue, weight per cent—16.1

[DEASPHALTING]

	A	B	C
Deasphalting Agent, percent vol	600	800	800
Modifier, percent vol	0	50	75
Temperature, ° F. top	125	180	180
Temperature, ° F, bottom	120	120	120
Deasphalted Oil:			
Yield, percent vol	55.1	60.5	66.8
S. U. V. @ 210° F. seconds	156.0	165.3	205
Color Lovibond	300	135	300
Conradson Carbon residue percent wt.	2.2	2.0	3.0
Asphalt:			
Specific gravity	1.0739	1.0864	1.0968

FURFURAL REFINING

Percent vol. furfural	200	200	200
Temperature, ° F	250	250	250
Waxy Raffinate:			
Yield, percent vol	71.4	68.0	61.3
S. U. V. @ 210° F. seconds	132.6	136.5	155.3
Conradson Carbon residue percent wt.	0.8	0.7	1.0
Dewaxed Raffinate:			
Yield, percent vol	85.4	86.4	84.3
S. U. V. @ 100° F. seconds	2,530	2,670	3,500
S. U. V. @ 210° F. seconds	151.2	156.1	182.5
Viscosity index	95	95	94
Conradson Carbon residue percent wt.	1.0	0.7	1.1
Overall yield on charge percent vol	33.5	35.6	34.6
Overall yield on crude percent vol	5.50	5.85	5.68
Barrels of S. A. E. 30 (65 seconds @ 210° F. per 10,000 barrels of crude)			
Barrels bright stock	550	585	568
Barrels 150″ 100° F. (neutral) (43″ @ 210° F.)	572	633	694
Total Barrels S. A. E. 30	1,122	1,218	1,262

In other words, due to the high viscosity of the raffinate produced by deasphalting with the novel deasphalting mixture, between about 96 and about 140 barrels more of S. A. E. 30 motor oil can be produced from 10,000 barrels of this crude than can be obtained when deasphalting with conventional deasphalting agents. This represents an increased yield of S. A. E. 30 motor oil from this crude of from about 8.5 to about 12.5 per cent. When it is recalled that, at this time of short supply, low viscosity neutral oils are available in quantities far greater than the demand, the importance of the opportunity presented by the novel deasphalting mixture to balance the supplies of neutral oil and heavy lubricating fractions is recognized. In other words, the novel deasphalting mixture, due to the high viscosity of the finished oil, makes it possible for the refiner to use a greater portion (11 to 21 per cent more) of the low viscosity neutral oils of which there is a large excess in blending the lubricating oil fraction to an oil of predetermined viscosity such as S. A. E. 30.

As used hereinbefore and hereinafter in the claims, the term deasphalting agent includes within its scope those hydrocarbons, mixtures of hydrocarbons, organic compounds and the like which are known to those skilled in the art to function as diluents or solvents for the non-asphaltic components of petroleum and the term deasphalting mixture includes within its scope the mixture of one or more of said deasphalting agents and one or more of the novel modifiers enumerated hereinbefore.

I claim:

1. A method of producing a greater yield of deasphalted oil of given quality as measured by a required Conradson carbon residue of about 0.4 to about 6 weight per cent than can be obtained by conventional solvent deasphalting which comprises contacting a fluid charge stock containing asphaltic material with a mixed deasphalting agent consisting essentially of about 1 to about 20 volume per cent of an organic carbonate and the balance major deasphalting agent, deasphalting said charge stock at a deasphalting temperature above that temperature at which paraffin wax is substantially insoluble in said mixture of charge stock and mixed deasphalting agent to about 206° F. and the nearer the required Conradson carbon residue is to 0.4 weight per cent the higher the deasphalting temperature in the presence of a given concentration of said organic carbonate, and separating a deasphalted oil having said required Conradson carbon residue in greater yield than can be obtained when deasphalting said charge stock to said required Conradson carbon residue using said major deasphalting agent as the sole deasphalting agent.

2. The method as set forth and described in claim 1 wherein the organic carbonate is diethyl carbonate.

3. The method as set forth and described in claim 1 wherein the major deasphalting agent is liquid normally gaseous hydrocarbon.

4. The invention as set forth and described in claim 1 wherein the major deasphalting agent is propane.

5. A method of producing a greater yield of deasphalted oil of given quality as measured by a Conradson carbon residue of about 0.3 to about 4 weight per cent than can be obtained by deasphalting a given charge stock with propane as the sole deasphalting agent at deasphalting temperatures of 125° F. to 160° F. which comprises contacting a fluid charge stock containing asphaltic material with a mixed deasphalting agent consisting essentially of about 1 to about 6 volume per cent of diethyl carbonate and the balance propane, deasphalting said charge stock at a deasphalting temperature of about 165° to about 206° F. and the nearer the required Conradson carbon residue of the deasphalted oil is to 0.3 weight per cent the higher the deasphalting temperature and the lower the concentration of diethyl carbonate, and separating a deasphalted oil having said required Conradson carbon residue in greater yield than can be obtained when deasphalting said charge stock to said required Conradson carbon residue using said propane as the sole deasphalting agent.

6. A method of producing a greater yield of deasphalted oil of given quality as measured by a required Conradson carbon residue of about 0.4 to about 6 weight per cent than can be obtained by conventional solvent deasphalting which comprises contacting a fluid charge stock containing asphaltic material with a mixed deasphalting agent consisting essentially of about 1 to about 20 volume per cent of an organic carbonate and the balance major deasphalting agent in the ratio of about 1 to about 15 parts by volume of said mixed deasphalting agent to about 1 part by volume of charge stock, deasphalting said charge stock at a deasphalting temperature above that temperature at which paraffin wax is substantially insoluble in said mixture of charge stock and mixed deasphalting

agent to about 206° F. and the nearer the required Conradson carbon residue is to 0.4 weight per cent the higher the deasphalting temperature in the presence of a given concentration of said organic carbonate, and separating a deasphalted oil having said required Conradson carbon residue in greater yield than can be obtained when deasphalting said charge stock to said required Conradson carbon residue using said major deasphalting agent as the sole deasphalting agent.

7. The method as set forth and described in claim 6 wherein the organic carbonate is diethyl carbonate.

8. The method as set forth and described in claim 6 wherein the major deasphalting agent is liquid normally gaseous hydrocarbon.

9. The invention as set forth and described in claim 6 wherein the major deasphalting agent is propane.

10. A method of producing a greater yield of deasphalted oil of given quality as measured by a Conradson carbon residue of about 0.3 to about 4 weight per cent than can be obtained by deasphalting a given charge stock with propane as the sole deasphalting agent at deasphalting temperatures of 125° F. to 160° F. which comprises contacting a fluid charge stock containing asphaltic material with a mixed deasphalting agent consisting essentially of about 1 to about 6 volume per cent of diethyl carbonate and the balance propane in the ratio of about 1 to about 15 parts by volume of said mixed deasphalting agent to about 1 part by volume of said charge stock, deasphalting said charge stock at a deasphalting temperature of about 165° to about 206° F. and and nearer the required Conradson carbon residue of the deasphalted oil is to 0.3 weight per cent the higher the deasphalting temperature and the lower the concentration of diethyl carbonate, and separating a deasphalted oil naving said required Conradson carbon residue in greater yield than can be obtained when deasphalting said charge stock to said required Conradson carbon residue using said propane as the sole deasphalting agent.

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